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INDEX

Illustrated articles indicated by*

A

Abbott, N. H.:
Brief on Sheets, Sept 1 p 536
Academy of Political Science:
Industrial Co-operation, Nov 10 p 1207
Accidents:
Campaign at Farrell Works American Steel & Wire Co., July 21 p 133
Care of Eyes in Industry, Oct 13 p 933
In Steel Industry, Nov 3 p 1148
Mine, 1920, Sept 22 p 732
Workmen's Compensation, July 21 p 145
Acme Machine Tool Co.:
Horizontal High Speed Drilling Machine*, Dec 8 p 1468
Addy, Matthew, Co.:
Status of Southern Blast Furnaces, July 21 p 196
Air Compressors, Ingersoll-Rand New Line*, Oct 6 p 878
Alabama Power Co.:
To Build Dam, July 7 p 48
Alining Level, Universal Precision Machine*, Sept 29 p 802
Allard, R. W.:
Testing Machine Helps*, July 14 p 87
Allegheny County Industries Record, 1920, Aug 4 p 306
Alloys:
Compression Strength of Metal and, Aug 18 p 419
Copper-Aluminum, Aug 18 p 406
Duralumin, for Gears, Oct 20 p 1020
Duralumin, Rôle in Industry (Editorial), Oct 27 p 1088
French Aluminum, Dec 1 p 1413
Iron Castings (Editorial), Sept 1 p 549
K. S. Magnet Steel, July 14 p 82
Nickel-Aluminum-Copper, Properties of, Oct 13 p 961
Research on Special, Dec 22 p 1608
Steel, for Bridges (Editorial), Nov 3 p 1157; Nov 17 p 1287
Sheet Steel, Specifications, Manufacture and Analyses*, Sept 8 p 594; Sept 15 p 655; Sept 22 p 725
Steel Castings, Larger use of (Editorial), Aug 11 p 354
Aluminum:
Bronzes, Aug 18 p 406
French Alloy, Dec 1 p 1413
German Industry, Oct 27 p 1067
Amalgamated Association:
Fourth Classification Added to Jobbing Mill Scale, Oct 6 p 916
Iron Workers' Wages, Sept 1 p 550
Wage Agreement with Bar Iron Association, Aug 4 p 287
American Broach & Machine Co.:
Bench Power Broaching Press*, Nov 3 p 1134
American Car & Foundry Co.:
Annual Report, July 7 p 44
American Cast Iron Pipe Co.:
Jarring for Molding Pipe*, Dec 1 p 1412
American Drop Forging Institute:
Campaign for Publicity, Nov 3 p 1151
American Electrochemical Society:
Convention Announcement, Aug 25 p 470
Convention Program, Sept 15 p 702
Proceedings of Convention, Oct 6 p 879
Meeting in Memory of Dr. J. W. Richards, Nov 17 p 1273
American Engineering Council:
Care of Eyes in Industry, Oct 13 p 933
Cooley, Mortimer E., President, Oct 6 p 877
Guide Questionnaire for Elimination of Waste, Dec 8 p 1464
Program of Coming Meeting, Dec 22 p 1637
Waste in Building Industry, Aug 11 p 347
Waste in Metal Trades, July 28 p 216
American Engineering Societies:
International Dinner, Oct 20 p 1019
American Foreign Steel Corporation:
Liquidating Affairs, Oct 27 p. 1099
American Foundry Equipment Co.:
Sand Cutting Machine*, Oct 27 p 1076
American Foundrymen's Association:
(See Foundrymen's Associations)
American Gear Manufacturers' Association:
Convention Announcement, Sept 29 p 845
Convention Proceedings*, Oct 20 p 1001
American Hardwood Manufacturers' Association:
Government Studying Open-Price Decision, Dec 29 p 1669
Open-Price Decision (Editorial), Dec 29 p 1681
Open-Price Plan Declared Illegal, Dec 22 p 1621
Statement of L. C. Boyle on Decision, Dec 29 p 1697
American Institute of Mining and Metallurgical Engineers:
Convention Announcement, Aug 25 p 470
Meeting of New York Section, Oct 13 p 939
Sharpless, Frederick F., Secretary*, July 14 p 93
American Iron and Steel Institute:
Convention Papers, Oct 27 p 1109
Convention Proceedings*, Nov 24 p 1319
Ingot, Steel, Production, 1900-1920, Dec 15 p 1538
Pig Iron Production First Half 1921, Aug 18 p 439; 1900-1920, Dec 15 p 1538
Production Finished Rolled Iron and Steel, 1905-1920, Oct 20 p 1009
Steel Companies Not Dependent Upon Lake Ores, Dec 15 p 1536
American Iron, Steel and Heavy Hardware Association:
1922 Convention Announcement, Nov 17 p 1299
American Locomotive Co.:
Semi-Annual Report, Aug 18 p 442
American Malleable Castings Association:
Accountants to Meet, Sept 8 p 601
Malleable Castings Research Results*, Oct 6 p 881
American Manufacturers' Association:
Convention Proceedings, Oct 13 p 977
American Pig Iron Association:
Meeting, July 28 p 213; Sept 1 p 541
American Railway Association:
Scrap Classification, Aug 25 p 478
American Rolling Mill Co.:
"Are Iron and Steel Prices Out of Line?" Oct 6 p 865
Buys Ashland Iron & Mining Co., Dec 15 p 1674
American Sheet & Tin Plate Co.:
Weight Cards, Sept 22 p 751
American Society for Steel Treating:
1922 Convention Announcement, Nov 24 p 1339
Boston Chapter Laboratory Meeting, Dec 15 p 1548
Convention Exhibitors*, Sept 15 p 651
Convention Proceedings*, Sept 29 p 807
Educational Lectures (Editorial), Dec 1 p 1424
New York Chapter Meeting, Oct 20 p 1019; Nov 17 p 1273; Dec 15 p 1556
American Society for Testing Materials:
Activities, Nov 10 p 1224
Specifications for Steel Forgings, Sept 29 p 806
American Society of Mechanical Engineers:
Boiler Code, Broadening Use of, Dec 8 p 1489
Convention Program, Nov 17 p 1282
Proceedings of Convention, Dec 8 p 1494; Dec 15 p 1554
Metropolitan Meeting on Pulverized Coal, Dec 1 p 1413
To Confer Honorary Membership on Henry R. Towne, Nov 24 p 1342
American Steel & Wire Co.:
"No-Accident" Campaign, July 21 p 133
American Wholesale Coal Association:
Asks Lower Freight Rates on Coal and Coke, Oct 27 p 1113
Analysis:
Alloy Sheet Steel*, Sept 8 p 594
Steel Corporation Methods, Sept 8 p 588
Anderson-Garner-Shaner Oil Burner*, Aug 25 p 474
Arcade Malleable Iron Co.:
Consolidates with Baldwin Chain & Mfg. Co., July 14 p 109
Armament Limitation:
A Fact (Editorial), Nov 17 p 1284
Effect on Steel Industry, Nov 17 p 1279
Naval, and Steel Output (Editorial), Nov 17 p 1284
Plans for Scrapping Battleships, Dec 22 p 1605
Steel Industry's Message, Nov 10 p 1209
Steel Tonnage To Be Scrapped, Nov 17 p 1279
United for (Editorial), Nov 24 p 1344
Armor Plate, British versus German, Nov 3 p 1154
Armstrong, H. C.:
Fuel Economy in Iron and Steel Works, Nov 10 p 1216

Armstrong, P. A. E.:
Manufacture of Drill Steel from Hollow Ingots*, Sept 8 p 596
Arrow Pump Co.:
Pump with Ring-Oiled Packing Gland*, Aug 4 p 254
Ashland Iron & Mining Co.:
Acquired by American Rolling Mill Dec 15 p 1674
Assembling and Dismantling Machine, Covington*, Sept 22 p 732
Associated Industries of Massachusetts:
Annual Meeting, Nov 3 p 1150
Associated Machinery Corporation:
Export Organization, Aug 11 p 350
To Promote Foreign Trade, Nov 17 p 1287
Association of Iron and Steel Electrical Engineers:
Convention Announcement and Program, Sept 1 p 513; Sept 8 p 601
Convention Proceedings, Sept 22 p 757; Sept 29 p 826
Athol Machine & Foundry Co.:
Drilling and Milling Machine Device*, Dec 1 p 1398
Readjusts Line, Nov 17 p 1265
U-Beam Vise*, Dec 8 p 1480
Atlas Car & Mfg. Co.:
Ore Transfer Car*, Dec 1 p 1408
Aubel, V. W.:
Cupolas in Open-Hearth Practice, Aug 18 p 403
Austen Coal & Coke Co.:
Increased Buying Power of the Dollar, Nov 17 p 1278
Automobiles:
American in Norway, July 21 p 138
Decreased Demand for Steel, Oct 20 p 1048
Dies for Forming Parts of*, Nov 3 p 1127
Rotary Furnace for Heat Treating Parts*, Sept 15 p 666
Southwark Hydraulic Body Press for*, Dec 29 p 1670
Universal Steel Classification Code Proposed, Sept 1 p 515; Sept 22 p 750
Automotive Engineers:
(See Society of Automotive Engineers)
Australia:
Pig Iron Production in New South Wales, 1920, July 21 p 146
Steel Plant in New South Wales, July 14 p 72
Austria:
Iron and Steel Market, Aug 11 p 357; Sept 29 p 849; Nov 17 p 1289
Tariff, and German Activity, July 21 p 157
Avery, W. & I., Ltd.:
Employment Scheme, July 14 p 82
Avis, James L., Jr.:
Pig Iron from Black Sand, July 14 p 83

B

Badger Tool Co.:
Vertical Spindle Disk Grinder*, Dec 22 p 1616
Baily Electric Furnace:
Installations, July 14 p 93
Melting Steel in Non-Ferrous*, Aug 25 p 472
Baker, Charles W.:
Inventor's Opportunity Is Also the Manufacturer's Opportunity, Sept 29 p 823
Baldridge, E. R., & Co.:
Ganister Crushing Plant*, July 14 p 84
Baldwin Chain & Mfg. Co.:
Consolidates with Arcade Malleable Iron Co., July 14 p 109
Balls, Steel, Scleroscope Hardness of*, Dec 1 p 1391
Baltimore Shipbuilding & Drydock Co.:
Acquired by Bethlehem Shipbuilding Corporation, Oct 6 p 905
Bars, Cold Rolled Steel, Freight Rate Decision, July 21 p 132
Barton, Larry J.:
Electric Furnace Operating Experiences*, Sept 8 p 581
Universal Steel Classification Code, Sept 22 p 750
Basing Point, Pittsburgh:
Complaint Amended, Dec 8 p 1489
Federal Trade Commission Studying Case, July 14 p 88; Oct 6 p 903; Dec 1 p 1398
Good Roads and*, July 28 p 200
Government Responsible During War, Dec 1 p 1400
Intervention by Independents May Be Permitted, Aug 11 p 375
Steel Corporation Only to Respond, Aug 4 p 279
Bassett Direct Steel Process Not Yet Commercial, Sept 22 p 754
Bauer and Piwowarsky:
Nickel and Cobalt in Iron, Sept 1 p 513
Bausch & Lomb Optical Co.:
Stereoscopic Eyepiece for Microscopes*, Aug 18 p 390
Bauxite Supplies, German, Dec 15 p 1525
Bearings, Efficient Journal, July 7 p 26; July 14 p 92
Belgian-American Coke Ovens Corporation:
Organized, Aug 4 p 298
Belgium:
As a Machine Tool Market, Sept 1 p 542
Blast Furnaces in Operation, Aug 11 p 371
Iron and Steel Market, July 14 p 109; Aug 4 p 307; Sept 22 p 756; Nov 10 p 1244; Dec 29 p 1695
Iron and Steel Production, 1913-1919-1920—May, 1921, July 21 p 140
Labor Costs, Iron and Steel, July 21 p 138
Ougreé Marihaye Awarded Rail Contract, Oct 6 p 912
Pig Iron and Steel Production Seven Months 1921, Oct 6 p 866
Rail Sales to Argentine, July 14 p 109
Belt, Robert E.:
Foundry Cost System Advantages, Nov 24 p 1351
Belts:
Conveyor, as Inspection Tables*, Dec 1 p 1414
Grain Side More Efficient, Dec 29 p 1667
Oliver Sanding Machine*, Sept 8 p 599
On a Mileage Basis, Olmstead-Flint Co. to Guarantee, Aug 4 p 282
Bench Machine, Triplex Combination*, Dec 1 p 1394
Bending, Forming and Shearing Machine, Bussel*, Nov 24 p 1336
Bessemer Plant of Steel & Tube Company*, Nov 10 p 1199
Bethlehem Shipbuilding Corporation:
Acquires Baltimore Shipbuilding & Drydock Co., Oct 6 p 905
Cores for Turbine Castings*, July 28 p 202
Machining Cruiser Shafts, Dec 1 p 1428
Bethlehem Steel Co.:
Electrification of Plant Railroads, Dec 29 p 1663
Labor Claims Disapproved, Sept 8 p 619
Wage and Price Reductions, July 7 p 48
Bethlehem Steel Corporation:
Quarterly Statement, Aug 4 p 312; Nov 3 p 1159
Bevington Metal Stamping Co.:
Wire Straightening and Cutting Machine*, Aug 11 p 340
Bickford-Switzer Co.:
Tap Grinding Machine*, Oct 6 p 878
Bill of Lading, New Export, Dec 8 p 1468
Biggert, F. C., Jr.:
Causes and Cures of Depression, Sept 8 p 584
Why Investment in Industry Is Hazardous, Dec 1 p 1422
Birdsboro Steel Foundry & Machine Co.:
Buys Camden Iron Works, Dec 15 p 1559
Birmingham Steel Corporation:
Files Voluntary Petition in Bankruptcy, Oct 27 p 1115
Black & Decker Mfg. Co.:
Electric Grinder*, July 7 p 14
Portable Electric Drill*, Dec 29 p 1666
Safety Cleaning Machine*, Nov 10 p 1217
Electric Bench Grinder*, Nov 24 p 1332
To Extend Credit Through Jobbers, Oct 6 p 901
Blank, J. F.:
Application of Time Study in the Foundry, Oct 13 p 958
Blast Furnace and Coke Oven Association:
(See Eastern States Blast Furnace and Coke Oven Association)
Bliss, E. W., Co.:
Attachment for Combination Dies*, Sept 15 p 659
Blount, J. G., Co.:
Ball Bearing Buffing Machines*, Nov 3 p 1154
Grinding Machine, Motor-Driven*, Sept 29 p 806
Blower, Coppus Screw Blade Propeller*, Dec 15 p 1544
Blue, A. A.:
Nitrogen in Steel*, July 7 p 1
Blueprints, Controlling*, Aug 18 p 402
Boilers:
Code, Broadening Use of A. S. M. E., Dec 8 p 1489
Steel for Tubes vs. Copper (Editorial), Aug 11 p 354
Bonner, James B.:
General Pershing's Tribute to, Nov 3 p 1166
Book Reviews:
A B C of Iron and Steel, July 21 p 176
America and the New Era, Sept 22 p 785
Armco in Picture and Fact, July 28 p 238
Automobile Industry and Its Future, Sept 1 p 579
Employee Training, Sept 1 p 579
Employment Methods, Dec 15 p 1587
Facts and Figures of the Automobile Industry, July 28 p 238
Handbook of Standard Details for Engineers, Draftsmen and Students, July 21 p 176
Hendricks' Commercial Register of the United States, Dec 29 p 1702
Human Motor, Sept 1 p 579
Labor Maintenance, Nov 3 p 1197
Labor's Crisis, Sept 1 p 579
Personal Relations in Industry, Nov 3 p 1197
Protection Our Proper Permanent Policy, July 28 p 238
Quin's Metal Trades Directory of the United Kingdom, Sept 22 p 785
Slide Rule, July 21 p 176
South African Engineers' Directory, Sept 1 p 579

Time Study and Job Analysis, Dec 15 p 1587
Training Industrial Workers, Sept 22 p 785
United States Steel, Dec 22 p 1651
Walzen, and Walzenkalibrieren, Dec 1 p 1444
Waste in Industry, Dec 29 p 1702
Year Book of American Bureau of Metal Statistics, July 21 p 176
Books Received, July 21 p 176; Sept 8 p 641; Sept 22 p 785; Oct 27 p 1114; Dec 1 p 1444; Dec 15 p 1587; Dec 29 p 1702
Boring Machines:
Colborn Railroad*, July 15 p 70
Jones, Drilling, Milling and*, July 7 p 6
Jones Vertical Turning and*, Aug 11 p 350
Pawling & Harnischfeger Horizontal Drilling, Milling and*, Sept 22 p 729
Pedrick Taper Bar*, Nov 24 p 1339
Universal Horizontal*, Dec 29 p 1662
Webster & Bennett Duplex Turning and*, July 14 p 84
Bowser, S. F., & Co.:
Consolidate with Richardson-Phenix Co., Dec 15 p 1575
Boyle, L. C.:
Statement on Hardwood Lumber Case, Dec 29 p 1697
Braddock Carnegie Free Library:
Instruction in Safety Methods, Oct 13 p 947
Brass, Casting Ingots, Oct 13 p 962
Brazil:
Conditions in, Dec 29 p 1667
Iron and Steel Production, Aug 4 p 282
Brazilian Centennial Memorial, Members of United States Committee Nov 24 p 1334
Breedlove, L. B.:
Ford Foundry Plant at River Rouge*, Sept 29 p 787
Bregenzer, C. E.:
Production and Uses of Cold Drawn Steel*, July 21 p 135
Bridge Builders and Structural Society:
Business, June, July 28 p 200; July, Aug 25 p 476; August, Sept 22 p 753; September, Oct 20 p 1045; October, Nov 17 p 1288; November, Dec 22 p 1610
Bridgeport Screw Co.:
Screw Stock Heat Treated with Oil*, Sept 15 p 660
Bridges:
Alloy Steel for (Editorial), Nov 3 p 1157; Nov 17 p 1287
British Bid for Uruguay, Sept 15 p 672
Proposed, to Join San Francisco and Alameda Counties, July 21 p 141
To Weatherproof New Hudson River, Dec 8 p 1484
Brier Hill Steel Co.:
Proposed Merger with Midvale, Lackawanna, Youngstown, Republic, Inland and Steel & Tube Companies, Dec 8 p 1492
Pulverized Coal Burning*, Dec 29 p 1673
British Furnaces, Ltd.:
To Make Surface Combustion Apparatus, Sept 8 p 598
Brittleness in Pickling Steel, Prevention of, Oct 6 p 886
Bromley, A. H.:
Steel Lumber for Building Construction, Discussion, Nov 24 p 1374
Bronn, J.:
Drier Air for Blast Furnaces, Sept 22 p 732
Brooks, J. J.:
Refractories in the Steel Plant, Discussion, Nov 24 p 1378
Brown Car Wheel Works, Inc.:
Mechanical Molding of Car Wheels*, Sept 15 p 662
Brown Instrument Co.:
Pyrometer, Cold Junction Compensated*, Sept 15 p 680
Bryant Chucking Grinder Co.:
Double Head Grinder for Wrist Pin Holes*, Dec 29 p 1668
Buck, C. A.:
Brief on Metal Tariff, Sept 1 p 539
Buffalo Forge Co.:
Punch, Shear and Bar Cutter*, Dec 29 p 1657
Buffing Machines, Blount Ball Bearing*, Nov 3 p 1154
Builders Iron Foundry:
Safety Code Grinding Wheel Guards*, Dec 22 p 1610
Building:
Effect of Seasonal Production on, Sept 15 p 684
Prospects (Editorial), Aug 4 p 282
Schools Under Way, Dec 22 p 1594
Steel Lumber for*, Nov 24 pp 1331, 1373
Bunnell, Sterling, H.:
Gas-Engine Piston Without Rings*, July 14 p 81
To License Business Men, Aug 11 p 355
Reinvestment a Present Need in Industry, Dec 22 p 1601
Burdick, Edwin R.:
Swords for Generals of the American Revolution*, Aug 4 p 283
Bureau of Foreign and Domestic Commerce:
To Survey Commercial Laws of Foreign Countries, Sept 15 p 671
Bureau of Mines:
Coal Washing, Studies, Dec 29 p 1672
Educational Films, Dec 1 p 1408
Experiment Station at Minneapolis, Dec 29 p 1672
Experimental Work, Dec 29 p 1696
Foundry Waste Prevention, Dec 8 p 1479
Investigations, Nov 24 p 1335
Bureau of Standards:
Experiments with Ball and Roller Bearings, Dec 1 p 1419
Standard Samples of Lead-Base Bearing Metal, Aug 11 p 324
Tests Canadian Meter Bar, Aug 25 p 499
Tests of Rotary Drill Pipes*, Sept 29 p 804
Burners:
Oil, Anderson-Garner-Shaner*, Aug 25 p 474
Oil Burning Equipment Co.'s*, Sept 22 p 738
Business:
Causes and Cures of Depression, Sept 8 p 584
How Much Work Is Being Done? (Editorial), Sept 22 p 746
Reinvestment a Present Need in, Dec 22 p 1601
Business Paper Editors:
(See National Conference of Business Paper Editors)
Bussel Machine Co.:
Bending, Forming and Shearing Machine*, Nov 24 p 1336
Buying:
Art of, Sept 22 p 757
Responsibility of, Nov 3 p 1139; Nov 10 p 1230
Versus Being Sold, Nov 10 p 1206
Byers Machine Co.:
Revolving Crane, July 21 p 175
By-Products Coke Corporation:
Changes, July 7 p 43

C

Cambria Steel Co.:
Sintering Flue Dust*, Nov 3 p 1141
Camden Iron Works:
Sold to Birdsboro Steel Foundry & Machine Co., Dec 15 p 1559
Camp, James M.:
Iron and Steel and Chemical Industries, Nov 24 p 1329
Campbell, James A.:
Brief on Metal Tariff, Sept 1 p 830
Wage Revisions, Reasons for, July 21 p 133
Wages and Business Conditions, Sept 22 p 739
Campbell, William:
Problems in Metallography*, Oct 13 p 941
Campbell, Wyant & Cannon Foundry Co.:
To Open New Unit, Dec 15 p 1534
Canada:
Customs Ruling on Steel Imports, Nov 3 p 1159; Nov 10 p 1218
Electric Furnace Production (Editorial), Aug 25 p 480
International Nickel Co. Plant to Close, Sept 1 p 568
Meter Bar Tests by Bureau of Standards, Aug 25 p 499
Pig Iron Production, First Half 1921, Sept 22 p 753
Steel Imports from United States, New Regulation, July 21 p 134
Steel Industry Outlook, July 14 p 68
Trade with United States, 1920-21, July 7 pp 13, 29
Canadian Car & Foundry Co.:
Annual Report, Dec 22 p 1600
Canadian Crocker-Wheeler Co.:
Absorbed by English Electric Co. of Canada, Ltd., Oct 6 p 873
"Cancelitis" Then and Now (Editorial), July 14 p 91
Cancellations and Surplus Steel, July 21 p 151
Candee, A. M.:
Fusion Welding and Processes, Discussion, Nov 24 p 1376
Capital City Iron & Steel Co.:
Leases Mill of Harrisburg Bar Mill Co., July 14 p 71
Carwheels:
Molding in Brown Works*, Sept 15 p 662
Riehle Machine for Testing Hardness of*, Sept 15 p 672
Specifications and Southern Charcoal Pig Iron, Aug 25 p 482; Dec 1 p 1427
Specifications for Cast Iron, Dec 22 p 1603
Carbon Steel Co.:
Annual Report, Nov 10 p 1245
Carlyle Johnson Machine Co.:
Friction Clutch, Positive Locking*, Sept 8 p 600
Carnahan Tin Plate & Sheet Co.:
Changes Ownership, Dec 22 p 1637
Carnegie Steel Co.:
Blast Furnace Operations, Nov 10 p 1205
Blast Furnace Slag, Preparing*, Aug 25 p 461
Buys Land on Neville Island, Dec 22 p 1592
To Dismantle Part of Sharon Plant, Nov 10 p 1239; Nov 17 p 1288
Veteran Association, Sept 15 p 680
Carroll Chain Co.:
Organized to Manufacture Welded Chain, Dec 1 p 1393
Cars, Atlas Ore Transfer*, Dec 1 p 1408
Case, J. I., Threshing Machine Co.:
Employees, Benefit Association, July 14 p 85
Case-Hardened Objects, Causes of Cracks*, Aug 18 p 399
Cast Iron:
Composition of Pig Iron and, Nov 17 p 1267
Cutting by Oxy-acetylene Torch*, Oct 13 p 951
Graphitic Corrosion of, Oct 13 pp 938, 942
Graphitization, Aug 18 p 437
Castings:
Alloy Iron (Editorial), Sept 1 p 549

Alloy Steel, Larger Use of (Editorial), Aug 11 p 354
Cores for Turbine, July 28 p 202
Defective, Percentage too High, July 21 p 131
Die, and Their Use, Dec 1 p 1409
Electric Manganese Steel Co. to Make, Dec 1 p 1400
Gray Iron, from Electric Furnaces, Nov 10 p 1214
Iron, for Particular Uses, Sept 8 p 585
Iron, Nickel in*, Aug 25 p 460; Sept 1 p 513
Malleable, Research Results*, Oct 6 p 881
Method to Increase Output, Aug 18 p 390
Castle, A. M., & Co.:
Warehouse, Aug 4 p 272
Cavalier, Prof. J.:
Iron and Steel Metallurgy in France, Oct 13 p 940
Cement, Portland, Production 11 Months 1921, Dec 29 p 1666
Census Bureau:
Cast Iron Pipe Production 1914 and 1919, Aug 4 p 258
Electrical Machinery Manufactured, 1914-1919, July 21 p 130
Machinery Manufacture, 1919, July 7 p 51
Manufactures, New Schedule, Oct 20 p 1029; Dec 8 p 1480
Mineral Industries, 1909 and 1919, Sept 8 p 593
Power and Fuel Consumption in Superpower Zone, July 14 p 68
Steel Works and Rolling Mills Manufacture, 1914-1919, July 14 p 74
Tin Plate and Terne Plate Manufacture, 1914 and 1919, July 28 p 213
To Confer with National Association of Manufacturers, July 21 p 144; July 28 p 196; Aug 4 p 278
To Issue Monthly Price Bulletin, Aug 4 p 284
Wire Manufactures, 1919, Aug 11 p 356
Central Bureau Proposed for Government Surplus, July 28 p 189, 235
Central Steel Co.:
Merger with Massillon Rolling Mill Co. and National Pressed Steel Co., Aug 25 p 501; Oct 6 p 866
Chain:
Malleable Makers Meet, Oct 27 p 1075
Noweld Machine*, July 7 p 14
Steel Roller Rating, Nov 3 p 1164
Chain Products Co.:
Noweld Machine Chain*, July 7 p 14
Chamberlin-Roome Steel Co.:
Organized, Dec 8 p 1476
Chamfering and Reaming Machine. Murchey Nipple*, Dec 15 p 1544
Chamfering Machine, Haskell*, Oct 27 p 1068
Champion Machine & Forging Co.:
Cutting Operating Costs*, Aug 18 p 385
Chapman, W. B.:
Fuel Saving in Gas Producers, Dec 29 p 1671
New Way to Success—A New Year's Address, Dec 28 p 1661
Chateaugay Ore & Iron Co.:
To Replace Furnace at Standish, Aug 18 p 389
Checking System Not Sustained, Dec 22 p 1606
Chemical Industry, Relations of Iron, Steel and*, Nov 24 p 1329
Chevenard and Portevin:
Heat Treatment Curves, Sept 29 p 801
Chicago Pneumatic Tool Co.:
Air Operated Forging Hammers in Italy*, July 21 p 144
Chile:
Maganese Ore from, Nov 10 p 1219
State Railroad Electrification Award, Oct 6 p 869
China:
Blast Furnace Building, Dec 8 p 1483
Locomotive Purchases, Sept 8 p 588
Primitive Iron Smelting*, Aug 25 p 451
Chuck, Saveall Safety Quick Change Drill*, Dec 8 p 1480
Chucking Machine, Vertomatic*, Oct 27 p 1069
Cincinnati Milling Machine Co.:
Milling Machine Dynamometer*, July 21 p 142
Civil Service Positions Open, Nov 24 p 1340
Classification:
American Railway Scrap, Aug 25 p 478
Universal Steel Code Proposed, Sept 1 p 515; Sept 22 p 750
Cleaning Machine, Black & Decker Safety*, Nov 10 p 1217
Cleveland Crane & Engineering Co.:
Crane for Ordnance Plant*, Dec 29 p 1674
Cleveland Trust Co.:
Industrial Savings Scheme*, Oct 27 p 1064
Cleveland Twist Drill Co.:
Mezzo Drills of Special Steel*, Nov 24 p 1336
Clutch, Carlyle Johnson Friction*, Sept 8 p 600
Coal:
Atritor Coal Drying and Pulverizing Machine*, Sept 22 p 742
British Strike and Domestic Labor Problems, July 28 p 210
Dust Explosion Hazard and Prevention*, July 21 p 127; July 28 p 205
Freight Rate Hearings, Nov 10 p 1225
Government Inquiry of Stocks, Nov 10 p 1220; Dec 8 p 1467
Poor Year (Editorial), Dec 29 p 1682
Powdered, at Brier Hill Steel Plant*, Dec 29 p 1673
Powdered, Boiler Fuel, Oct 27 p 1076
Powdered, Dangers, July 28 p 241
Powdered, Drying, July 28 p 242
Powdered, K-B Preparing Machine*, Nov 17 p 1266
Powdered, Quigley Gage for Bins*. Nov 10 p 1220
Powdered, Trent Process for Cleaning, Aug 11 p 323
Powdered, Under Boilers*, Nov 3 p 1146
Prices out of Line (Editorial), Oct 13 p 956
Southern Corporation Leases Pennsylvania Anthracite Fields, Nov 3 p 1131
Wages and Profits in England, July 14 p 82
Washing, Results of Studies, Dec 29 p 1672
Wellman-Seaver-Morgan Trimmer*, Aug 4 p 276
Coal Association:
(See American Wholesale Coal Association)
Codes:
Boiler, Broadening Use of A. S. M. E., Dec 8 p 1489
Steel, Universal Classification, Sept 1 p 515; Sept 22 p 750
Coke:
Beehive and By-Product Production, June-July (Editorial), Aug 18 p 417
By-Product Plants in Operation, May 1, 1921, Aug 4 p 264
By-Product Production, June, July 21 p 137; August, Oct 6 p 882; September, Oct 27 p 1068; October, Nov 24 p 1371; November, Dec 22 p 1615
Foundry, Characteristics of Slag and, Aug 18 p 407
Freight Rates, July 14 p 113
Freight Rate Hearings, Nov 10 p 1225
Oven Shut Downs*, July 7 p 73
Piette By-Product Ovens at La-Clede Plant*, Dec 15 p 1526
Steel Makers as Sellers of (Editorial), Aug 25 p 481
Wages, July 7 p 54; Aug 25 p 467; Sept 15 p 689; Sept 22 p 740
Colburn Machine Tool Co.:
Heavy Duty Drill Press*, Dec 1 p 1404
New Plant*, Oct 27 p 1070
Railroad Boring Mill*, July 14 p 70
Collins, Arthur L.:
Scleroscope Hardness of Steel Balls*, Dec 1 p 1391
Collins and Knerr:
Steel Classification Code, Sept 1 p 515
Collins, E. F.:
Electric Furnace Heat Treatment, Aug 4 p 266
Colorado Fuel & Iron Co.:
Labor Troubles, Dec 22 p 1609
Quarterly Report, Dec 1 p 1449
Starts Steel Works, Nov 24 p 1334
Collord, George L.:
Crane Operating Costs at Blast Furnaces*, Oct 13 p 935
Columbia Steel Co.:
Reinforcing Steel*, Nov 10 p 1222
Commerce Reports, Weekly Instead of Daily, Sept 8 p 607
Commercial Laws, Division of:
Archibald J. Wolf, Chief, July 21 p 196
Commons, John R.:
Views on Labor Problems, Sept 22 p 739
Compensation, Workmen's, July 21 p 145
Competition:
Danish as Well as German, July 7 p 27
Fear of Foreign (Editorial), Nov 17 p 1286
Comrie, Alexander:
Safety Hooks for Handling Plates*, Aug 18 p 400
Comstock, George F.:
Embrittling Effect of Pickling upon Carbon Steel*, Sept 15 p 685
Titanium Treated Rails and Split-Head Failures, Sept 8 p 613
Concrete, "Peds," Sept 8 p 584
Cone, Edwin F.:
Electric Furnaces and Heat Treatment*, Sept 15 p 643
Fuels Used in Open-Hearth Practice, Dec 22 p 1589
Conservatism in Industry (Editorial), Oct 27 p 1087
Construction Work, Conditions for (Editorial), Sept 29 p 821
Contracts:
Buying of Steel (Editorial), Sept 22 p 748
Standardized Pig Iron Form Proposed, Oct 20 p 1029; Nov 3 p 1140
Control Devices, Oilgear Machine Speed*, Sept 22 p 741
Conventions:
American Electrochemical Society, Oct 6 p 879
American Gear Manufacturers' Association*, Oct 20 p 1001
American Iron and Steel Institute*, Nov 24 p 1319
American Manufacturers' Association, Oct 13 p 977
American Society for Steel Treating*, Sept 29 p 807
American Society of Mechanical Engineers, Dec 8 p 1494; Dec 15 p 1554

Association of Iron and Steel Electrical Engineers, Sept 22 p 757; Sept 29 p 826
Industrial Cost Association, Nov 10 p 1213
Institute of Metals (British), Oct 13 p 961; Oct 20 p 996
Iron and Steel Institute (British), Sept 22 p 733; Sept 29 p 796; Oct 6 p 909
National Conference of Business Paper Editors, Oct 27 p 1094; Nov 3 p 1165
National Founders' Association, Nov 17 p 1282; Nov 24 p 1348
National Implement and Vehicle Association, Oct 20 p 1011
National Machine Tool Builders' Association, Oct 20 p 1026; Oct 27 p 1081
National Safety Council*, Oct 6 p 871
Sheet Metal Products Association, Dec 15 p 1546
Society of Industrial Engineers, Oct 13 p 952
Taylor Society, Dec 8 p 1463
Conveyors Corporation of America:
Cast Iron Storage Tanks, Dec 15 p 1539
Cooley, Mortimer E.:
President American Engineering Council, Oct 6 p 877
Cooling Bed in Rolling Mill of Interstate Iron & Steel Co.*, Oct 6 p 859
Cooper, John G.:
Present Labor Troubles, Oct 6 p 916
Co-operation:
Government Activities in Industrial Divisions, Nov 24 p 1372
Industrial, Nov 10 p 1207
Engineering Societies, for International, Sept 22 p 775
Copper:
German Purchases (Editorial), Dec 15 p 1551
Precipitates on Iron, Aug 11 p 346
Production, United States, 1915-1920, July 21 p 136
Steel for Boiler Tubes vs. (Editorial), Aug 11 p 354
Copper and Brass Research Association:
Organized, Aug 25 p 454
To Weatherproof New Hudson River Bridge, Dec 8 p 1484
Coppus Engineering & Equipment Co.:
Screw Blade Propeller Blower*, Dec 15 p 1544
Cores for Turbine Castings*, July 28 p 202
Corrosion of Cast Iron, Graphitic, Oct 13 pp 938, 942
Cost Accountants:
(See National Association of Cost Accountants)
Cost Association:
(See Industrial Cost Association)
Costs:
Analysis of Drop-Forging, Aug 11 p 325
Belgian Labor, Iron and Steel, July 21 p 138
Champion Machine & Forging Co. Cutting*, Aug 18 p 385
Crane Operating at Shenango Blast Furnaces*, Oct 13 p 935
Cutting Overhead Instead of Wages, July 14 p 79
Federal Trade Commission Opposed to Associations Furnishing Statements to Members, July 21 p 143
Foundry, Advantages of System, Nov 24 p 1351
French Iron and Steel Production, Sept 15 p 664
Labor, British Iron and Steel Works, Nov 10 p 1217
Labor, Effect of Hourly Rate Reductions, Oct 13 p 958; Nov 17 p 1287
Labor, Responsible for Lack of Building, Nov 17 p 1273
Living, July 7 p 11; July 21 p 140; July 28 p 190; Aug 25 p 474; Sept 8 p 599; Sept 22 p 737; Oct 20 p 1006; Oct 27 p 1068; Nov 24 p 1340; Dec 22 p 1603
Pig Iron, 1913 and 1920, July 7 p 11
Pig Iron, One Ton, 1914, 1921, Oct 27 p 1084
Pig Iron Production in Three Centers, Dec 8 p 1476
Production, Arguments, Dec 22 p 1617
Production, Federal Trade Commission to Hear Arguments, Nov 24 p 1366
Production, Injunction Case Over Seeking, Oct 27 p 1111; Dec 1 p 1411; Dec 15 p 1578
Proper Accounting, Necessity of, Aug 18 p 391
Rolling Steel in Blooming Mills*, Oct 20 p 998
Steel Prices and (Editorial), Aug 11 p 352
Tramrail in Globe Plant Reduces*, Dec 15 p 1523
Cotel, E.:
Modern Rolling Practice*, Aug 18 p 396
Couplings:
Lubricating Roll Spindle*, Oct 27 p 1064
Smith & Serrell, Oct 13 p 981
Covington Machine Co.:
Machine for Assembling and Dismantling Hose*, Sept 22 p 732
Cracks in Case-Hardened Objects, Causes of*, Aug 18 p 399
Crane Iron Works:
Blast Furnace*, Sept 29 p 814
Cranes:
Byers Revolving, July 21 p 175
Cleveland, for Ordnance Plant*, Dec 29 p 1674
Industrial Crawling Tractor*, Aug 25 p 476
Pawling & Harnischfeger with Goose Neck Boom*, Nov 3 p 1154
Shaw Traveling for Ford Railroad Shop, Sept 15 p 671
Westinghouse Electric Safety Switch for*, Sept 22 p 722
Crawford, E. R.:
Brief on Tin Plate Tariff, Sept 1 p 533
Crompton & Knowles Loom Works:
Acquires Standard Foundry Co., Nov 24 p 1380
Scrap Disposal*, July 21 p 125
Crucible Steel Co. of America:
Annual Report, Nov 17 p 1317
Cruiser, Shafts, Machining, Dec 1 p 1428
Crusher, Kennedy-Van Saun Gearless Rock*, Aug 11 p 336
Crushing Plant, Baldridge Ganister, July 14 p 84
Crutcher, L. T.:
Commodity Consumption from Warehouses, July 7 p 15
Cupolas:
Chemical Reactions in Foundry, Aug 4 p 259
Concerning "Semi-Steel," July 14 p 92
In Open-Hearth Practice, Aug 18 p 403; (Editorial), p 418
Curtis & Curtis Co.:
Threading and Cutting Machine*, Dec 8 p 1480
Cutler-Hammer Mfg. Co.:
Automatic Starter for Motors*, Aug 11 p 349
Cutters:
Buffalo Punch, Shear and Bar*, Dec 29 p 1657
Milling, National Twist*, Dec 29 p 1677
Cutting and Threading Machine, Curtis*, Dec 8 p 1480
Czecho-Slovakian Iron and Steel Market, July 21 p 173; Aug 18 p 434; Sept 29 p 849; Nov 17 p 1289

D

Dale, Richard:
Making Dies for Forming Automobile Parts*, Nov 3 p 1127
Daniels, Robert W.:
Duralumin for Gears, Oct 20 p 1020
Dauch, A. D.:
Rotary Furnace for Automobile Parts*, Sept 15 p 666
Davies, J. Vipond:
Graphitic Corrosion of Cast Iron, Oct 13 p 942
Davis-Bournonville Co.:
Welded Tube Manufacture*, Nov 17 p 1274
Dean, H. L.:
Danish Competition as Well as German, July 7 p 27
DeHart, S.:
Recognition of Employee in Shop Suggestion System, Dec 29 p 1656
DeLamater and Ericsson Tablets to Be Unveiled, Sept 22 p 728
Delaware, Lackawanna & Western Railroad:
Cast Iron Car Wheel Specifications, Dec 22 p 1603
Demurrage Charges on Plates for Export Declared Unreasonable, Dec 22 p 1641
Department of Commerce:
Progress and Plans to Aid Business, Dec 15 p 1529
Publications Indicating Business Drift, Dec 1 p 1421; Dec 8 p 1477
Rastall, Walter H., Head of Heavy Machinery Division*, Aug 4 p 309
Derby, S. E.:
Recooling Quenching Oil*, Sept 16 p 668
Desmond-Stephen Mfg. Co.:
Grinding Wheel Dresser*, Oct 20 p 1021
Despaux, Albert:
French Iron and Steel Production Costs, Sept 15 p 664
Detroit Copper & Brass Rolling Mills:
New Plant*, July 14 p 63
Devanney, M. J.:
Open-Hearth Port Construction, Discussion, Nov 24 p 1328
Devlin, Thomas:
Pioneer in Malleable Foundry Business*, Aug 4 p 273
Diamant Tool & Mfg. Co.:
Standard Punch and Die Sets*, Nov 24 p 1333
Diamond Machine Co.:
Safety Code Grinding Wheel Guards*, Dec 22 p 1610
Die Castings and Their Use, Dec 1 p 1409
Diehead:
For Fine Threads, Alfred Herbert*, Aug 25 p 464
Geometric DS*, July 7 p 15
Die Sinking Machine, Pratt & Whitney*, Oct 6 p 869
Diegel, D.:
Weldability of Low Carbon Steel, Oct 13 p 948
Dies:
Bliss Attachment for Combination*, Sept 15 p 659
For Forming Automobile Parts*, Nov 3 p 1127
Dinkey, A. C.:
Brief on Manganese Tariff, Sept 1 p 532
Testimony in Ore Freight Rate Hearing, Dec 15 p 1539
Dismantling and Assembling Machine, Covington*, Sept 22 p 732

Dollar:
Control, Sept 1 p 514
Economic Status of, Oct 13 p 959
Increased Buying Power, Nov 17 p 1278
Value of (Editorial), July 21 p 149
Dorman, Long & Co.:
Electromagnets in Plate Cooling Bed*, Aug 11 p 321
Dowel, Screw, for Patterns, Kindt-Collins*, Nov 3 p 1152
Drafting Aids to Manufacturers, Nov 10 p 1218
Drew, Walter:
Maladjustments in the Industrial World, Oct 6 p 867
Drilling Machines:
Acme High Speed Horizontal*, Dec 8 p 1468
Athol Device for*, Dec 1 p 1398
Black & Decker Portable Electric*, Dec 29 p 1666
Cleveland, of Special Steel*, Nov 24 p 1336
Electro-Magnetic Portable*, Oct 6 p 864
Jones Boring, Milling and*, July 7 p 6
Langelier Tapping and*, Aug 11 p 338
Lovejoy Electric*, Dec 1 p 1398
Pawling & Harnischfeger Horizontal Boring, Milling and*, Sept 22 p 729
Prentice Conradson with Direct Motor Drive*, Dec 29 p 1678
Driver-Harris Co.:
Rolling Mill, New, Sept 8 p 602
Drop-Forging, Analysis Costs, Aug 11 p 325
Drop Forging Institute:
(See American Drop Forging Institute)
Drying and Pulverizing Machine, Alfred Herbert*, Sept 22 p 742
DuBrul, E. F.:
Proposal to License Business Men, Aug 25 p 483
Dudley, Dr. P. H.:
Evolution of the Heavy Rail*, Dec 15 p 1540
Magnetic Surveys of Railroad Rails*, Nov 17 p 1271
Duggan, M. E.:
Lubricating Roll Spindle Coupling*, Oct 27 p 1064
Duplex Printing Press Co.:
Foundry Charging Floor with Undercover Storage*, Dec 8 p 1459
Dupuy, E. L.:
Mechanical Properties of Steel at High Temperature, Sept 29 p 801
Duralumin:
For Gears, Oct 20 p 1020
Role in Industry (Editorial), Oct 27 p 1088
Dust:
Explosion Hazard and Its Prevention*, July 21 p 127; July 28 p 205
Rubber, Causes and Occurrence of Explosion, July 28 p 240
Sintering Flue, at Cambria Plant*, Nov 3 p 1141
Dyer, Y. A.:
Calculating Foundry Iron Value, Dec 14 p 1547
Chemical Reactions in Foundry Cupolas, Aug 4 p 259
Foundry Irons by Specification, Purchasing, Dec 1 p 1420
Foundry Irons for Particular Uses, Sept 8 p 585
Foundry Cokes and Slags, Aug 18 p 407
Figuring Charges for Foundry Irons, Oct 13 p 931
Pig Iron and Cast Iron Composition, Nov 17 p 1267
Dynamometer, Cincinnati Milling Machine*, July 21 p 142

E

Earnings, Steel Company (Editorial), Nov 3 p 1157
Eastern States Blast Furnace and Coke Oven Association:
Meeting, Dec 8 p 1468
Economics, Training, as Preparation for Business Career, Aug 25 p 482
Edwards, E. J.:
Attaching Wire Rope to a Socket, Dec 15 p 1525
Editorials:
Alloy Iron Castings, Sept 1 p 549
Alloy Steel Castings, Larger Use of, Aug 11 p 354
Alloy Steel for Bridges, Nov 3 p 1157
American Society for Steel Treating, Educational Lectures, Dec 1 p 1424
Armaments, Naval, and Steel Output, Nov 17 p 1284
Armaments Reduced, a Fact, Nov 17 p 1284
Armament Limitation, United for, Nov 24 p 1344
British Steel, Outlook in, Aug 11 p 353
Building, Conditions for Work, Sept 29 p 821
Building Prospects, Aug 4 p 282
"Cancelitis" Then and Now, July 14 p 91
"Check-Off" in Coal Mines, Nov 10 p 1228
Coal, a Poor Year, Dec 29 p 1682
Coal Prices Out of Line, Oct 13 p 956
Coke, Beehive and By-Product, June-July, Aug 18 p 417
Coke-Oven Gas Use, Dec 22 p 1613
Competition and the Open Shop, Aug 18 p 416
Conservatism in Industry, Oct 27 p 1087
"Contract" Buying of Steel, Sept 22 p 748
Copper vs. Steel for Boiler Tubes, Aug 11 p 354
Cupola, Refining with the, Aug 18 p 418
Cupola "Semi-Steel," July 14 p 92
Dollar, Value of, July 21 p 149
Duralumin in Industry, Oct 27 p 1088
Electric Furnace Production in Canada, Aug 25 p 480
Electric Furnaces for Heat Treatment, Sept 15 p 683
Electric Non-Ferrous Metallurgy, Oct 6 p 886
Electric Steel Developments, 1920, July 21 p 150
Etching Mediums for Steel, Dec 8 p 1488
Export Trade, Benefits of, Sept 8 p 610
Exports and Domestic Consumption, July 7 p 25
Exports in Pipes and Fittings, Oct 27 p 1088
Exports, Our Share in, Dec 15 p 1552
Foreign Competition, Fear of, Nov 17 p 1286
Foreign Trade, Financing, Dec 1 p 1426
Freight Rate Reductions, Oct 13 p 956
Freight Rates and Steel, Lower, July 28 p 208
Freight Rates, Call for Lower, Dec 8 p 1487
German Metal Industries, Aug 4 p 281
German Steel Exports, Aug 11 p 354; 1920, Sept 8 p 610; Dec 15 p 1552
Germany's Copper Purchases, Dec 15 p 1551
Government and Rail Strikes, Nov 24 p 1346
Hardwood Lumber Decision, Dec 29 p 1681
Heat Treatment, Progress in, Sept 29 p 821
How Much Work Is Being Done? Sept 22 p 746
Immigrants, Deporting of, Sept 29 p 822
Industrial Growth, Normal in, Oct 6 p 884
Induction Electric Furnaces, Aug 18 p 418
Inflation, No Secondary, Nov 24 p 1345
Ingot Production, Increased, Sept 15 p 684
Intelligence Tests, Nov 10 p 1230
Inventor's Opportunity, Sept 8 p 611
Iron, Stainless, Sept 22 p 747
Japanese Purchases of Black Sheets, Dec 22 p 1613
Kicking Against the Goads, Aug 25 p 480
Machine Tool Improvements, July 21 p 149
Magnetic Testing, Progress, Dec 1 p 1425
Manganese, Why High Duties? Aug 4 p 280
Market Facts, Distortions, Oct 20 p 1017
Menace of the Mark, Oct 6 p 885
Metals, Future Demand, Aug 18 p 417
Naval Tonnage and Rolled Steel, Nov 24 p 1344
Number of Workers, Dec 15 p 1551
On the Will to Work, Sept 8 p 612
"Open Competition" Unlawful, Dec 22 p 1612
Patent Office Distress, Dec 15 p 1551
Pig Iron, Normal in, Dec 28 p 1680
Price Readjustments, Dec 22 p 1613
Price Relations, Dec 8 p 1488
Prices and Buying Power, Sept 8 p 611
Prices and Pig Iron Output, Sept 1 p 548
Prices, Federal Trade Commission's Charges, Dec 8 p 1486
Prices, Liquidation in Steel, Oct 20 p 1017
Prices, Scrap, and Supplies, Sept 1 p 549
Prices, Steel, Past and Present, July 14 p 90
Prosperity and Prices, July 28 p 209
Rail History, Iron and Steel, Nov 3 p 1158
Railroad Earnings, Course of, Nov 10 p 1229
Railroad Problem Remains, Nov 3 p 1156
Railroad Returns in Future, Sept 29 p 820
Railroad Strike Against the People, Oct 20 p 1016
Rails, Life of Heavier, Dec 15 p 1552
Readjustment, Stages in, Sept 15 p 682
Revising War-Time Shop Rules, Dec 8 p 1486
Scrap, High Sulphur Cast-Iron, July 14 p 91
Sentiment and Business, Aug 11 p 352
Shipbuilding and Steel, July 14 p 92
"Skilled Workers" and Strikes, Nov 10 p 1228
Soft Times and Other Times, July 7 p 24
Standardization, Greasing Ways, Oct 20 p 1018
Steel, Adding Silicon to Basic, Aug 25 p 482
Steel and Other Outputs, July 21 p 149
Steel As an Index, July 14 p 90

Steel Company Earnings, Nov 3 p 1157
Steel Consumption, Lines of, Oct 27 p 1086
Steel Demand, Subnormal, Aug 4 p 281
Steel for the Farm, Dec 22 p 1614
Steel Makers as Coke Sellers, Aug 25 p 481
Steel Making Progress, Sept 1 p 548
Steel Mills in the Running, July 28 p 209
Steel, Need of Survey in, Oct 6 p 884
Steel Plate Exports Before and Since the War, Aug 11 p 353
Steel Prices and Costs, Aug 11 p 352
Steel Prices and Rail Freights, Dec 1 p 1424
Steel, Reworking, Dec 15 p 1550
Steel, Sulphur in Ordnance, Dec 29 p 1683
Steel Wage Liquidation, Oct 27 p 1086
Steel, Where it is Going, Nov 17 p 1285
Tariff, Proposed Metal Schedule, July 7 p 24
Thrift and Progress, Dec 29 p 1680
Tin Plate, American Preferred, Sept 22 p 747
Tin Plate Revival, Dec 1 p 1425
Titanium Problem, Solving, Oct 27 p 1087
Traffic Problem, Aug 25 p 481
Unemployment Conference, Sept 22 p 746; Oct 13 p 957
Unemployment, Key Points in, Sept 29 p 820
Union Workers, Proportion, July 7 p 26
Wage Rates and Commodity Prices, July 21 p 148
Wage Reductions a Buying Factor, Sept 1 p 550
Wage Settlement on Industrial Prospects, Dec 29 p 1682
War and Reaction in Steel, Nov 24 p 1346
Wire Price Advance, Sept 15 p 682
Zinc, World's Supply, July 28 p 208
Edmonds, William L.:
Canada's Trade with United States, July 7 p 13
Edwards, E. J.:
Gage to Signal Danger*, Dec 29 p 1683
Elbows, Niagara Corrugated*, Dec 8 p 1475
Eldridge, Frank R. Jr.:
To Survey Asiatic Markets, Aug 18 p 414
Electric Drives in Steel Mills, Nov 3 p 1135
Electric Furnace Co.:
Baily Furnace Sales, July 14 p 93
Melting Steel in Non-Ferrous Furnace*, Aug 25 p 472
Electric Manganese Steel Co.:
Organized to Make Electric Castings, Dec 1 p 1400
Electricity in Great Britain and America, Nov 17 p 1276
Electrification of Steel Plant Railroad, Dec 29 p 1663
Electrochemical Society:
(See American Electrochemical Society)
Electro-Magnetic Tool Co.:
Portable Electric Drill*, Oct 6 p 864
Ely, Sumner B.:
Rolling Sheet Steel, Dec 1 p 1405
Emergency Fleet Corporation:
Inventory of Surplus Material, Oct 27 p 1093
Emigration Supervision by International Commission, Aug 25 p 463
Emlen, George W., Jr.:
Brittleness in Pickling Steel, Prevention of, Oct 6 p 886
Employee Representation:
Adopted by Chicago Packers, Sept 22 p 740
Employees Benefit Association of J. I. Case Threshing Machine Co., July 14 p 85
Employment:
Peak of Industry in July, 1920, Sept 29 p 825
Engineering Advertisers' Association of Chicago:
Monthly Bulletin, Dec 8 p 1468
Engineering Council:
(See American Engineering Council)
Engineering Foundation:
Graphitic Corrosion of Cast Iron, Suggested Research, Oct 13 p 938
Walker, Arthur L., Elected to Board, Nov 10 p 1224
Engineering Societies Planning for International Co-operation, Sept 22 p 775
Engineers, American, Honored by British, July 7 p 31
Ericsson and DeLamater Tablets to be Unveiled, Sept 22 p 728
Erie Forge & Steel Co.:
Stores Keeping System*, Aug 4 p 253
Erie Railroad:
Leases Repair Shop to Railway Service Corporation, Aug 18 p 410
Etching Method Revealing Strain in Steel*, Dec 1 p 1401; (Editorial), Dec 8 p 1488
European Iron Ore Resources, Sept 22 p 738
Exchange:
Effect on Machinery Exports, Oct 6 p 875
Menace of the Mark (Editorial) Oct 6 p 885
Exhibits:
Metal Trades in Indianapolis, Aug 11 p 324
World Foundry in 1922, Sept 22 p 751
Explosions:
Causes and Occurrence of Dust, July 28 p 240
Dust, Hazard and Its Prevention*, July 21 p 127; July 28 p 205
Export Notes, July 7 p 53; July 14 p 109; July 21 p 157; July 28 p 211; Aug 4 p 310; Aug 11 p 374; Aug 18 p 433; Aug 25 p 496; Sept 1 p 569; Sept 8 p 631; Sept 15 p 708; Sept 22 p 775; Sept 29 p 843; Oct 6 p 903; Oct 13 p 959; Oct 20 p 1049; Nov 3 p 1164; Nov 10 p 1247; Nov 17 p 1304; Nov 24 p 1367; Dec 1 p 1449; Dec 8 p 1509; Dec 15 p 1553; Dec 22 p 1637; Dec 29 p 1696
Exports:
American Farm and Mine, 1920, Oct 27 p 1078
American to Russia, Sept 8 p 613
Benefits of Trade (Editorial), Sept 8 p 610
Bill of Lading, New, Dec 8 p 1468
Demurrage Charges on Plates, Dec 22 p 1641
Domestic Consumption and (Editorial), July 7 p 25
Electrical, Sept 8 p 598
Freight Rates Compared, Dec 22 p 1600
Freight Rates Lower for, Sept 1 p 524
Iron and Steel Products, Foreign Buyers, Nov 3 p 1149
Latin American Criticism of U. S. Practices, Sept 8 p 613
Machine Tools, 1920 and 8 Months 1921, Oct 20 p 1012
Machine Tools, Prospects for, Oct 13 p 949
Machinery, August, Oct 13 p 930; 1920 and 8 Months 1921, Oct 20 p 1013; September, Oct 27 p 1093
Machinery, Effect of Exchange on, Oct 6 p 875
Machinery, Government Aid, Dec 22 p 1619
Our Share in (Editorial), Dec 15 p 1552
Pipes and Fittings (Editorial), Oct 27 p 1088
Shipments from Birmingham, Dec 15 p 1552
Steel Plate Before and Since the War (Editorial), Aug 11 p 353
Steel to Canada, New Regulations, July 21 p 134
Tin Plate, American Preferred (Editorial), Sept 22 p 747
To Be Reclassified, Nov 10 p 1221
To South Africa, 1920, Sept 15 p 665
Exports and Imports of Iron and Steel:
June and Fiscal Year 1921, July 28 p 212; July, Aug 25 p 477; August, Sept 22 p 776, Sept 29 p 824; September, Oct 27 p 1092; October, Nov 24 p 1341; November, Dec 29 p 1676
Eyes, Care of in Industry, Oct 13 p 933

F

Fabricated Steel Business:
(See Bridge Builders and Structural Society)
Fabricating in Transit, Sept 1 p 563; Sept 8 p 608; Granted, Sept 15 p 688; Nov 24 p 1378
Falcon Tin Plate Co.:
Officials, Dec 29 p 1675
Farm Implements Manufactured in 1920, Aug 4 p 284
Farrel Foundry & Machine Co.:
Cores for Turbine Castings*, July 28 p 202
Farrell, James A.:
Testimony in Rehearing of United States Steel Products Co., Sept 29 p 795
Federal Trade Commission:
Amends Complaint in Pittsburgh Basing Case, Dec 8 p 1489
Annual Report, Dec 15 p 1530
Assails Steel Prices, Dec 8 p 1477, (Editorial) p 1486
Denied Motion to Compel Manufacturers to Show Costs, Dec 1 p 1411; Dec 15 p 1578; Dec 22 p 1617
Ferromanganese Dumping Case Before, Oct 27 p 1091
Ferromanganese Dumping Case Dismissed, Nov 17 p 1277
New Member, Oct 20 p 1048
Opposed to Business Associations Giving Information on Costs, July 21 p 143
Studying Pittsburgh-Plus Case, July 14 p 88; Oct 6 p 903; Dec 1 p 1398
Federated American Engineering Societies:
Employment Bureau, July 28 p 237
Fellows Gear Shaper Co.:
Gear Shaper*, Dec 22 p 1607
Ferracute Machine Co.:
Press, Adjustable-Bed Punching*, Sept 22 p 738
Ferromanganese:
Dumping Case July 21 p 173; Sept 15 p 687; Oct 13 p 981; Oct 20 p 1013; Oct 27 p 1091; Dismissed, Nov 17 p 1277
Future Price, Nov 24 p 1353
Status of Supplies, Nov 17 p 1270
Tariff Brief of Lavino Furnace Co., Sept 8 p 603; Sept 22 p 749; Sept 29 p 794
Tariff, Exceptions Filed, Sept 29 p 846
Firth-Sterling Steel Co.:
"The Man at the Fire," Aug 4 p 284
Firth, Thomas, & Sons:
Sales Plans, Sept 1 p 513

Fitz, H. M.:
Controlling Blueprints*, Aug 18 p 402
Effect of Hourly Rate Reductions*, Oct 13 p 958
Flora, A. N.:
Presentation to, Dec 29 p 1662
Fluorspar:
Statistics, 1920, July 14 p 72
Foch, Marshal Ferdinand:
Engineering Honors Conferred on, Dec 15 p 1575
Guest of American Iron and Steel Institute*, Nov 24 p 1319
Foley, P. R. and J. H. Pritchard:
Take Over Slatington Rolling Mills*, Dec 29 p 1700
Forbes, Dr. Henry S.:
Blast Furnace CO. Not Permanently Harmful, July 21 p 130
Ford Motor Co.:
Assets, July 21 p 178
Electric Steel Melting Furnace Award, Dec 22 p 1603
Foundry at River Rouge*, Sept 29 p 787
Furnace Record, Aug 11 p 350
Proposed Electric Steel Plant, Dec 1 p 1449
Traveling Crane for Railroad Shop, Sept 15 p 671
Foreign Trade:
Fear of (Editorial), Nov 17 p 1286
Financing (Editorial), Dec 1 p 1426
Methods for Developing, Oct 27 p 1090
United States, Fiscal Year, July 21 p 138
Foremen's Safety School Graduation, Dec 1 p 1449
Forge Manufacturers in Ohio Organize, Nov 24 p 1334
Forgings, Testing Society's Specifications for Steel, Sept 29 p 806
Forming, Bending and Shearing Machine, Bussel*, Nov 24 p 1336
Foster, Thomas J.:
Steel Lumber for Building Construction*, Nov 24 pp 1331, 1373
Founders' Association:
(See National Founders' Association)
Foundry:
Application of Time Study, Oct 13 p 958
Calculating Iron Value, Dec 15 p 1547
Casting Small Parts in Gilbert & Barker Plant*, Dec 29 p 1653
Charging Floor with Undercover Storage, Duplex*, Dec 8 p 1459
Chemical Reactions in Cupolas, Aug 4 p 259
Cokes and Slags, Characteristics of, Aug 18 p 407
Cost System Advantages, Nov 24 p 1351
Electric Jarring Machine for Molding*, Dec 1 p 1412
Ford River Rouge Plant*, Sept 29 p 787
Irons, Figuring Charges for, Oct 13 p 931
Irons for Particular Uses, Sept 8 p 585
Irons, Purchasing by Specification, Dec 1 p 1420
Malleable, to Be Established at Cadillac, Mich., Nov 24 p 1339
Mechanical Control in Problems*, Aug 25 p 456
Molding Sand Conservation, Nov 17 p 1288
Molding Sand Research, July 21 p 139
Murphy Iron Works*, July 14 p 76
National Bronze & Aluminum Plant*, Sept 1 p 511
National Steel, Special Operating Feature*, Oct 20 p 991
Open-Shop, Transition to, Dec 1 p 1395
Simpson Sand Mixer*, July 14 p 71
Waste, Recommendations by Bureau of Mines, Dec 8 p 1479
World Exhibit in 1922, Sept 22 p 751
Foundrymen's Associations:
American, Convention Announcement, Nov 10 p 1208; Nov 17 p 1304; Monthly Bulletin, Aug 18 p 402; Sept 8 p 620; Prepares Index of Transactions, Aug 18 p 412
Michigan, Dec 29 p 1670
New England, December Meeting, Dec 22 p 1594
Newark, Oct 13 p 960
Pittsburgh, Sept 22 p 751; Oct 20 p 1019; Nov 24 p 1378
France:
Aluminum Alloy, Dec 1 p 1413
American Steel Tank Installation, Oct 27 p 1079
Basset Direct Steel Process Not Yet Commercial, Sept 22 p 754
Iron and Steel Industry and Prices, Sept 8 p 592; Sept 22 p 756; Oct 6 p 912
Iron and Steel Metallurgy Problems, Oct 13 p 940
Iron and Steel Production, 1913-19-20-May, 1921, July 21 p 140
Iron and Steel Production Costs, Sept 15 p 664
Iron Ore Deposits of Eastern and Western, Sept 22 p 733
Lorraine Steel Exports, Oct 6 p 909
Reconstruction of Steel Plants, Sept 29 p 796
Société Anonyme des Acieries de Micheville Installing American Rolling Mills*, Dec 15 p 1542
Tin Plate Duty, Sept 22 p 776
Francke Couplings, Smith & Serrell, Oct 13 p 981
Frazar, Gerard:
Casting Small Parts in Production Foundry*, Dec 29 p 1653
Crompton & Knowles Scrap Disposal*, July 21 p 125
Freight Rates:
Amendment on Proposed Reductions, Nov 10 p 1231
Bar Iron Not Unjust, Dec 29 p 1677
Bars, Cold Rolled Steel, Decision, July 21 p 132
Benwood & Wheeling Connecting Railroad Common Carrier, July 21 p 141
Brass Products, Aug 18 p 412
Buffalo Companies Ask for Lower, Nov 3 p 1133
Call for Lower (Editorial), Dec 8 p 1487
Coke, By-Product, Declared Unreasonable, July 14 p 113
Coal, Coke and Ore Hearings, Nov 10 p 1225
Coke Reduced, Oct 20 p 1045
Export, Sept 1 p 524; Oct 6 p 913
Export, Compared, Dec 22 p 1600
Fabricating in Transit, Sept 1 p 563; Sept 8 p 608; Sept 15 p 688
Iron and Steel Products, Reductions, Aug 18 p 411
Ore, Coke and Plate Declared Unjust, Sept 1 p 525
Ore, Iron, Conference for Restoration of Old Rates, Nov 17 p 1277
Ore, Iron, Extended, Nov 24 p 1347
Ore, Iron, Reduction, Oct 13 p 944; Oct 20 p 1048
Ore, Iron, Reduction Canceled, Dec 15 p 1557
Ore, Iron, Reduction Hearing, July 28 p 229; Dec 15 p 1535
Ore, Iron, Restored, Dec 29 p 1677
Ore, Manganese and Chrome, Imported, Nov 10 p 1218
Ore, Manganese, Value Affected, Aug 11 p 335
Ore, Mississippi Valley Iron Co.'s Complaint, Nov 24 p 1332
Ore, to Granite City Unreasonable, July 7 p 11
Pig Iron, Cost of One Ton, 1914, 1921, Oct 27 p 1084
Pig Iron, Eastern Manufacturers Ask for Lower, Sept 8 p 631
Reductions, Attitude of Railroads, Dec 22 p 1618
Raw Material, Southern, Sept 8 p 608
Scrap, Conference on Reclassification, Dec 1 p 1411
Steel and Lower (Editorial), July 28 p 208
Steel, Hearings at St. Louis, Dec 22 p 1615
Steel Ingots, San Francisco to Seattle, July 21 p 137
Steel Makers to Urge Reductions, Aug 4 p 300
Steel Prices and (Editorial), Dec 1 p 1424
Steel, Still in Abeyance, Nov 24 p 1347
Tin Plate, Nov 24 p 1347; Dec 15 p 1553
To Pacific Coast, Sept 8 p 606; Sept 29 p 813; Nov 24 p 1372
Water Route to Lower, Nov 3 pp 1131, 1152; Nov 17 p 1287; Dec 8 p 1477
Youngstown District Demands Equalization of, Nov 24 p 1372
Frick, H. C., Coke Co.:
Wage Reduction, Aug 4 p 290
Friction Tapping Device, Geometric*, Oct 13 p 930
Fry, A.:
Etching Method for Revealing Strain in Steel*, Dec 1 p 1401
Fuel:
Costs, Superpower Report, Nov 10 p 1217
Economy in Iron and Steel Works, Nov 10 p 1216
In Open-Hearth Practice, Dec 22 p 1589
Steel Mill Requirements Analyzed, Sept 29 p 811
Furnaces, Blast:
Belgian, In Operation, Aug 11 p 371
Building in China, Dec 8 p 1483
Carnegie Operations, Nov 10 p 1205
Chateaugay Ore & Iron Co. to Replace Standish, Aug 18 p 389
CO Not Permanently Harmful, July 21 p 130
Crane Iron Works*, Sept 29 p 814
Crane Operating Costs at Shenango Works*, Oct 13 p 935
Drier Air for, Sept 22 p 732
Electrical Cleaning of Gases*, Aug 11 p 329
Ford Record, Aug 11 p 350
Monthly Production*, July 7 p 28; Aug 4 p 286; Sept 8 p 614; Oct 6 p 888; Nov 3 p 1160; Dec 8 p 1490
Notes, Sept 8 p 615; Dec 8 p 1491
Oregon Charcoal Co. to Build, Nov 10 p 1223
Preparing Slag for*, Aug 25 p 461
Proposed in Utah, Nov 24 p 1338
Secure Place of Iron*, Aug 25 p 465
South Africa's First Modern, Sept 8 p 608
Status of Southern, July 28 p 196
Trumbull-Cliffs 600-Ton*, Sept 15 p 673; Sept 22 p 730
Furnaces, Electric:
Alloy Sheet Steel, Specifications, Manufacture and Analyses*, Sept 8 p 594
Baily for Heating Sheets*, Aug 4 p 255
Baily Installations*, July 14 p 93; Aug 4 p 255
Canadian Production (Editorial), Aug 25 p 480
Developments, 1921 (Editorial), July 21 p 150
Ford Motor Co. Award, Dec 22 p 1603
Fuel Saving Device for*, Aug 11 p 328
General Electric Induction*, Aug 11 p 344

General Electric Semi-Cylindrical Heat Treating*, Sept 15 p 665
Gray Iron Castings from, Nov 10 p 1214
Heat Treating, Installed or Contracted for to Sept 1, 1921*, Sept 15 p 643
Heat Treatment and, Aug 4 p 266; Sept 15 p 643*, (Editorial), p 683
Induction (Editorial), Aug 18 p 418
In Non-Ferrous Metallurgy (Editorial), Oct 6 p 886
Melting Cast Iron Scrap, Aug 4 p 283
Melting Steel in Baily Non-Ferrous*, Aug 25 p 472
Operating Experiences in Plant of Southern Pacific Co*, Sept 8 p 581
Progress in 1921, Sept 22 p 723
Tool Steel Practice*, Oct 27 p 1061
Tool Steel Qualities, Sept 15 p 669
Furnaces, Open-Hearth:
Design*, Sept 22 p 719
Fuels Used, Dec 22 p 1589
Improvements*, Aug 4 p 269
Port Construction*, Nov 24 pp 1324, 1326
Talbot, New*, Nov 24 p 1335
Tilting, in Plant of National Steel Foundries*, Oct 20 p 991
Use of Cupolas in, Aug 18 p 403, (Editorial) p 418

G

Gages:
For Powdered Coal Bins, Quigley*, Nov 10 p 1220
Niagara Splitting for Rotary Shear*, Aug 18 p 410
Pratt & Whitney Thread Templet*, Sept 8 p 600
To Signal Danger*, Dec 29 p 1683
Gary, E. H.:
Business and World Conditions, Nov 24 p 1320
Gas:
Coke-Oven, Use of (Editorial), Dec 22 p 1613
Electrical Cleaning of Blast Furnace*, Aug 11 p 329
In Metals, Dec 15 p 1540
Masks, Mine Safety Appliance Co., July 7 p 10
Mono Duplex Recorder*, July 21 p 137
Gas Producers:
Fuel Saving in, Dec 29 p 1671
Miller*, Oct 13 p 948
Gear Manufacturers' Association:
(See American Gear Manufacturers' Association)
Gears:
Double Helical or Herringbone*, Dec 8 p 1469; Dec 15 p 1531
Duralumin for, Oct 20 p 1020
Oliver, Cutting Attachment*, July 7 p 15
Standardization, Progress*, Oct 20 p 1001
Geier, Dr. Otto P.:
Industrial Health, Dec 29 p 1699
Geiger, Charles W.:
Reinforcing Steel for Road Use*, Nov 10 p 1222
Gellert, N. H.:
Electrical Cleaning of Blast Furnace Gas*, Aug 11 p 329
Genders, R.:
Casting Brass Ingots, Oct 13 p 962
Extruded Metals, Oct 20 p 996
General Electric Co.:
Arc Welding Sets*, July 21 p 141
Hobbing Large Worm Wheel*, Sept 8 p 593
Improved Output from Smaller Space*, Oct 13 p 927
Induction Electric Furnace*, Aug 11 p 344
Plan to Reduce Unemployment, Dec 15 p 1539
Planer Motor Drive*, Dec 15 p 1544
Semi-Automatic Arc Welding Lead*, Nov 24 p 1332
Semi-Cylindrical Heat Treating Furnace*, Sept 15 p 665
General Fireproofing Co.:
"Peds" to Attach Trim to Concrete, Sept 8 p 584
General Fire Extinguisher Co.:
Foundry for Pipe Fittings*, Sept 1 p 519
Generator, Gleason Spiral Bevel Gear*, Dec 22 p 1610
Geometric Tool Co.:
Bench Threading Machine*, Sept 1 p 542
DS Die Head*, July 7 p 15
Friction Tapping Device*, Oct 13 p 930
Tap, Solid Adjustment*, Sept 1 p 542
Gerhardt, R. B.:
Electrical Development in Steel Mills, Nov 3 p 1135
Electrification of Steel Plant Railroad, Dec 29 p 1663
Germany:
Aluminum Industry, Oct 27 p 1967
Armor Plate, British vs., Nov 3 p 1154
As a Competitor, July 28 p 211; Sept 8 p 592; Sept 22 p 743
Bauxite Supplies, Dec 15 p 1525
Bids on Cars and Pumps, Sept 15 p 704
Copper Purchases (Editorial), Dec 15 p 1551
Economy Movement, Aug 11 p 343
Etching Method Revealing Strain*, Dec 1 p 1401
Exports, Machinery, July 21 p 138
Exports, Steel, (Editorial), Aug 11 p 354; Aug 25 p 471; 1920, (Editorial), Sept 8 p 610; Dec 15 p 1533, (Editorial), p 1552
Fritz Werner Co., Machine Tool Plant*, Aug 4 p 256
Iron and Steel Industry and Prices, July 7 p 31; July 21 p 152; July 28 p 232; Aug 11 p 374; Aug 18 p 438; Aug 25 p 497; Sept 22 p 755; Oct 6 p 911; Oct 13 p 975; Oct 20 p 1048; Oct 27 p 1109; Nov 3 p 1149; Nov 10 p 1226; Nov 24 p 1369; Dec 1 p 1442; Dec 8 p 1513
Labor Conditions, Sept 29 p 829
Leipzig Fair, Oct 27 p 1080
Menace of the Mark (Editorial), Oct 6 p 885
Metal Industries Active (Editorial), Aug 4 p 281
Pig Iron Production 1919-1920, Aug 4 p 265
Structural Steel Bids for South America, Aug 25 p 463
Synthetic Foundry Pig Irons, Nov 3 p 1137
Tool Prices, Aug 11 p 341
Wages, July 21 p 137
Workmen's Adaptability, Aug 4 p 304
Gifford, George E.:
Demand for Railroad Readjustment, Dec 8 p 1489
Gilbert & Barker Mfg. Co.:
Casting Small Parts*, Dec 29 p 1653
Gilbreth, Frank B.:
Stop-Watch Studies, Address Before Taylor Society, Sept 22 p 754
Gleason Works:
Spiral Bevel Gear Generator*, Dec 22 p 1610
Globe Machine & Stamping Co.:
Tramrail Reduces Costs*, Dec 15 p 1523
Government:
Co-ordination in Buying, July 14 p 94; Aug 4 p 277
Expenditures, July 28 p 235
Surplus, Central Bureau Proposed for, July 28 p 189; 235
Graff, John H.:
Industrial and Technical Photography, Oct 20 p 1018
Graham Mfg. Co.:
Knee Ring Wheel Grinding Machine*, Sept 29 p 802
Graham, Walter:
Scrap, Increasing Ferrous Fund, July 28 p 187
Graphitic Corrosion of Cast Iron, Oct 13 p 938, 942
Graphitization in Cast Iron, Aug 18 p 437
Grand Rapids Grinding Machine Co.:
Tap and Drill Grinder, Combination*, July 14 p 75
Gray, G. A., Co.:
Planer* ,Dec 1 p 1417
Great Britain:
8-Hr. System, Oct 6 p 908
American Engineers Honored, July 7 p 31
American Steel Making, View of, Sept 8 p 589
Armor Plate, British vs. German, Nov 3 p 1154
Avery Works, Employment Scheme, July 14 p 82
British Furnaces, Ltd., to Make Surface Combustion Apparatus, Sept 8 p 598
Coal Strike Settlement and Labor Problem, July 28 p 210
Coal Wages and Profits in England, July 14 p 82
Electricity Supply, Nov 17 p 1276
Electromagnets in Plate Cooling Bed*, Aug 11 p 321
Exports and Imports of Iron and Steel, May, July 14 p 78; June, Aug 4 p 255; July, Sept 1 p 543; August, Oct 20 p 1012; September, Nov 3 p 1149; Nine Months, Nov 17 p 1303; October, Dec 1 p 1400
Foundry Exhibit 1922, World, Sept 22 p 751
Industrial Conditions, Oct 20 p 1012
Institute of Metals Convention Proceedings, Oct 13 p 961; Oct 20 p 996
Iron and Steel Institute Meeting and Program, Aug 25 p 500
Iron and Steel Institute, Proceedings of Fall Meeting, Sept 22 p 733; Sept 29 p 796; Oct 6 p 909
Iron and Steel Prices, Continental and, July 21 p 152; Sept 8 p 592
Iron and Steel Production, 1913, '19, '20, May '21, July 21 p 140; June, Aug 25 p 476; July and August, Sept 15 p 704; September, Oct 20 p 1013; October, Nov 17 p 1286; November, Dec 15 p 1530
Labor Costs in Iron and Steel Works, Nov 10 p 1217
Machine Tool Exports, Trend of*, Dec 15 p 1545
Machinery Trade, 1913, 1920, 1921, Sept 8 p 598
Manganese Ore Supplies, Nov 17 p 1270
Oil Fuel, Use, July 28 p 242
Protective Bill, Aug 25 p 474
Stainless Iron, Developments, Oct 13 p 934
Stavely Coal & Iron Co. Producing Oil from Waste Shale, Nov 10 p 1224
Steel Industry Outlook (Editorial), Aug 11 p 352
Steel Industry Wages, July 28 p 191
Talbot Open-Hearth Furnace*, Nov 24 p 1335
Tariff, View on Vanadium, Sept 22 p 751
Great Southern Steel Co.:
To Develop Ore Lands, Dec 15 p 1553
Greaves and Read:
Nickel-Aluminum-Copper Alloys, Oct 13 p 961

Green, G. Gordon:
Blast Furnace Building in China, Dec 8 p 1483
Green, W. J. and S.:
Electric Furnace Tool Steel Qualities, Sept 15 p 669
Electric Tool Steel Practice*, Oct 27 p 1061
Griffin Wheel Co.:
Pig Iron Production Costs in Three Centers, Dec 8 p 1476
Grinding Machines:
Badger Vertical Spindle Disk*, Dec 22 p 1616
Bickford-Switzer Tap*, Oct 6 p 878
Black & Decker Electric*, July 7 p 14; Nov 24 p 1332
Blount Motor-Driven*, Sept 29 p 806
Bryant Double-Head for Wrist-Pin Holes*, Dec 29 p 1668
Graham Knee Ring Wheel*, Sept 29 p 802
Grand Rapids Combination Tap and Drill*, July 14 p 75
Le Blond, for Cutters and Hobs*, Dec 22 p 1604
Lees-Bradner Gear Tooth*, Oct 13 p 945
Norman Piston*, Nov 10 p 1216
Norton Universal Piston Attachment*, Oct 6 p 876
Osterhom Automatic Surface*, July 28 p 201
Pratt & Whitney Rotary*, July 28 p 190
Pratt & Whitney Vertical Surface*, Oct 6 p 874
Production Utility Polishing and*, Sept 1 p 546
R. V. Electric Precision*, Nov 3 p 1148
Wilmarth & Morman Surface with Sub-Table*, Nov 24 p 1336
Grinding Wheels:
Desmond-Stephen Dresser*, Oct 20 p 1021
Guards, Safety Code*, Dec 22 p 1610
Griscom-Russell Co.:
Wall Set for Distilling Water*, Oct 6 p 864
Guerin, R.:
Aluminum Bronzes, Aug 18 p 406
Guillet, Galibourg and Beuret:
Cracks in Case-Hardened Objects, Causes of*, Aug 18 p 399
Gun Metal, Lead in, Oct 13 p 961

H

Hagan, George J., Co.:
Rotary Furnace for Heat Treating Automobile Parts*, Sept 15 p 666
Haight, Clarence M.:
Drill Steel Sharpening*, July 7 p 8
Halcomb Steel Co.:
Electric Fuel Saving Device*, Aug 11 p 328
Hamilton-Beach Mfg. Co.:
Strike Settles on Open-Shop Basis, Aug 18 p 401
Hammers:
Chicago Pneumatic Air-Operated in Italy*, July 21 p 144
Hardinge Brothers:
Oil Burning Machine*, Dec 22 p 1602
Hardware Associations:
(See American Iron, Steel and Heavy Hardware Association and National Hardware Association)
Harrisburg Bar Mill Co.:
Leases Mill of Capital City Iron & Steel Co*, July 14 p 71
Haskell & Barker Car Co.:
Proposed Merger with Pullman Co., Nov 3 p 1131; Nov 24 p 1381; Dec 29 p 1709
Haskell, William, Mfg. Co.:
Chamfering Machine for Cold Punched Nuts*, Oct 27 p 1068
Hastings, J. M., Jr.:
Coke Oven Shut Downs*, July 14 p 73
Hay, Thomas R.:
Gray Iron Castings from Electric Furnaces, Nov 10 p 1214
Heald Machine Co.:
Cylinder Block Regrinding Jig*, Aug 11 p 340
Heat Treating:
Alloy Sheet Steel*, Sept 15 p 655
Curves of, Sept 29 p 801
Drill Steel Sharpening*, July 7 p 8
Electric Furnace, Aug 4 p 266; Sept 15 p 643*
Electric Furnaces for (Editorial), Sept 15 p 683
General Electric Semi-Cylindrical for*, Sept 15 p 665
Hagan Rotary Furnace for Automobile Parts*, Sept 15 p 666
Mircs Oil System on Screw Stock*, Sept 15 p 660
Progress in (Editorial), Sept 29 p 821
Rock Drill Steel, July 7 p 7
Heat Utilization, Oct 6 p 886
Hebberd, Loren L.:
Drying of Pulverized Coal, July 28 p 242
Hendrick, J. G.:
Car Wheel Specifications and Southern Charcoal Pig Iron, Aug 25 p 482
Herbert, Alfred, Ltd.:
Coal Drying and Pulverizing Machine*, Sept 22 p 742
Diehead for Fine Threads*, Aug 25 p 464
Herdegen, R. T.:
Analysis Costs of Drop-Forging, Aug 11 p 325
Herr, E. M.:
Developing Foreign Trade, Oct 27 p 1090
Hibbard, Henry D.:
Leaves from a Steel Melter's Notebook, Oct 27 p 1065; Nov 24 p 1337, 1339
Hog Island Scrap, Plans to Dispose of, Dec 29 p 1666
Hodson, Frank:
Electric Melting of Cast Iron Scrap, Aug 4 p 284
Hoist, Wright Triple Hook*, Nov 24 p 1332
Hood, O. P.:
Trent Process for Cleaning Powdered Coal, Aug 11 p 323
Hooks, Comrie Safety for Handling Plates*, Aug 18 p 400
Hoover, Secretary Herbert:
Germany as a Competitor, Sept 8 p 592
Hopp, J. H.:
Mechanical Control in Foundry Problems*, Aug 25 p 456
Hot Drawing on the Mandril, Sept 29 p 800; Oct 13 p 930
Howard, Dr. James E.:
Split-Head Rail Failure*, Aug 18 p 393
Hudson City Steel Corporation:
To Build Strip Mill at Beacon, Dec 22 p 1622
Hull, W. A.:
Refractories in the Steel Plant, Nov 24 p 1377
Hunger, Edwin A.:
Foundry of Duplex Printing Press Co.*, Dec 8 p 1459
Hungerford, U. T.:
80th Birthday Celebration*, Dec 22 p 1642
Hunt, Capt. Robert W.:
Rail Specification, Aug 4 p 262
Hydraulic Press Mfg. Co.:
Lead Molding Press*, Aug 25 p 475
Hy-Speed Machine Co.:
Automatic Tapping Machines*, Nov 3 p 1134

I

Illinois Steel Co.:
Land to be Acquired by City of Milwaukee, Sept 15 p 658
Immigrants, Deporting of (Editorial), Sept 29 p 822
Imports:
Army Supplies, 90 Per Cent Duty on, Aug 18 p 410
Manganese Ore Nine Months 1921, Nov 17 p 1270
Sources of Iron and Steel, Seven Months 1921, Sept 22 p 737
Imports and Exports of Iron and Steel:
June and Fiscal Year 1921, July 28 p 212; July, Aug 25 p 477; August, Sept 29 p 824; September, Oct 27 p 1092; October, Nov 24 p 1341; November, Dec 29 p 1676
Index Bases, Industrial Engineering*, Nov 3 p 1148
India:
Industrial Promise, Oct 27 p 1095
Industrial Conditions, Maladjustments, Oct 6 p 867
Normal Growth (Editorial), Oct 6 p 885
Views of Walter Sanborn, Oct 13 p 950
Industrial Co-operation, Nov 10 p 1207
Industrial Cost Association:
Convention Announcement, Sept 22 p 722
Convention Program, Oct 20 p 1049
Proceedings of Convention, Nov 10 p 1212
Meetings, Sept 29 p 845; Oct 27 p 1088; Nov 24 p 1366
Industrial Engineering Co.:
Index Bases*, Nov 3 p 1148
Industrial Engineers:
(See Society of Industrial Engineers)
Industrial Mobilization, Studying, Dec 15 p 1533
Industrial Publishing, Course in, Oct 6 p 887
Industrial Relations Conference:
Convention Program, Oct 20 p 1019
Industrial Savings Scheme*, Oct 27 p 1064
Industrial Works:
Crane, Crawling Tractor*, Aug 25 p 476
Inflation, No Secondary (Editorial), Nov 24 p 1345
Ingersoll-Rand Co.:
Air Compressors*, Oct 6 p 878
Ingots:
Brass, Casting of, Oct 13 p 962
Freight Rates, San Francisco to Seattle, July 21 p 137
Hollow, for Seamless Pipe, Oct 27 p 1065
Hollow, Manufacture of Drill Steel from*, Sept 8 p 596
Steel, Increased Production (Editorial), Sept 15 p 684
Steel, Production United States, 1900-1920, Dec 15 p 1538
Steel, Production, June, July 21 p 140; July, Aug 11 p 349; August, Sept 15 p 707; September, Oct 13 p 943; October, Nov 10 p 1231; November, Dec 15 p 1541
Inland Steel Co.:
Proposed Merger with Midvale, Lackawanna, Youngstown, Republic, Steel & Tube and Brier Hill Companies, Dec 8 p 1492
Resumes Work on Rail Mill, Oct 13 p 963; Oct 20 p 1000
Intelligence Tests (Editorial), Nov 10 p 1230
Interchangeable Manufacture, Aug 4 p 274
International Association of Machinists:
Developing Business in Foreign Countries, Nov 3 p 1147

International Emigration Commission:
Resolutions, Aug 25 p 463
International Engineering Dinner, Sept 8 p 600
International Nickel Co. of Canada to Close Plant, Sept 1 p 568
International Purchasing & Engineering Co.:
Van Dresser Cylinder Reboring Tool*, Aug 4 p 265
Interstate Commerce Commission:
Bars, Cold-Rolled Steel, Freight Rate Decision, July 21 p 132
Orders By-Product Coke Freight Rates Reduced, July 14 p 113
Prices, To Investigate Steel, Dec 1 p 1429
Rating on Steel Roller Chain, Nov 3 p 1164
To Restore Iron Ore Freight Rates, Dec 15 p 1557
Interstate Iron & Steel Co.:
Rolling Mill with Pack Cooling Bed*, Oct 6 p 859, Oct 13 p 946
Inventor's Opportunity (Editorial), Sept 8 p 611; Sept 29 p 823
Investment in Industry, Why It is Hazardous, Dec 1 p 1422
Iron:
Foundry, for Particular Uses, Sept 8 p 585
Foundry, Purchasing by Specification, Dec 1 p 1420
Ore Deposits of Eastern and Western France, Sept 22 p 733
Ore, European Resources, Sept 22 p 738
Ore Mining Industry, 1919, Oct 6 p 887
Ore, World's Developed Resources, Oct 20 p 1011
Primitive Smelting in China*, Aug 25 p 451
Stainless, British Developments, Oct 13 p 934
Stainless (Editorial), Sept 22 p 747
Iron and Steel Electrical Engineers:
(See Association of Iron and Steel Electrical Engineers)
Iron and Steel Institute (British):
Fall Meeting Announcement and Program, Aug 25 p 500
Proceedings of Fall Meeting, Sept 22 p 733; Sept 29 p 796; Oct 6 p 909
Tour of French Iron and Steel Plants, Oct 6 p 909
Iron Cast:
(See Cast Iron)
Italy:
Duties on Steel, Oct 6 p 912
Metal Market, July 21 p 172; Aug 18 p 390; Sept 8 p 598

J

Jackson Machine Tool Co.:
Vertical Milling Machines*, Sept 29 p 803
Jamison Coal & Coke Co.:
Taken Over by Keystone Coal & Coke Co., Dec 15 p 1575
Japan:
German Competition in, July 28 p 210
Purchases of Black Sheets (Editorial), Dec 22 p 1613
Jarvis Friction Tapping Device*, Oct 13 p 930
Jay, John C., Jr.:
Licensing Business, Aug 18 p 419
Jennings Turbine-Driven Heating Pumps*, July 14 p 72
Jig, Heald Cylinder Block Regrinding*, Aug 11 p 340
Jones & Laughlin Steel Co.:
Acquires Coal Lands, Dec 1 p 1411
Shipping Steel by Water, Nov 3 p 1131; Nov 17 p 1287; Dec 8 p 1477
Will Not Build Warehouse, Dec 29 p 1673
Jones Machine Tool Works:
Boring, Drilling and Milling Machine*, July 7 p 6
Vertical Turning and Boring Mill*, Aug 11 p 350

K

Kagarise, John W.:
Open-Hearth Port Construction*, Nov 24 pp 1324, 1326
K-B Pulverizer Co.:
Powdered Coal Preparing Machine*, Nov 17 p 1266
Kelly-Springfield Tire Co.:
Mechanical Features of Plant*, Nov 17 p 1259
Kempsmith Mfg. Co.:
Motion Pictures of Milling Machine Operations, Nov 3 p 1131
Kennedy, Don F.:
Cutting Overhead Cost Instead of Wages, July 14 p 79
Kennedy-Van Saun Mfg. & Engineering Corporation:
Gearless Rock Crusher*, Aug 11 p 336
Ker, Severn P.:
Brief on Strips and Cotton Ties Tariff, Sept 1 p 535
Key Points in Unemployment (Editorial), Sept 29 p 820
Keystone Coal & Coke Co.:
Takes Over Jamison Properties, Dec 15 p 1575
Kindt-Collins Co.:
Screw Dowel for Patterns*, Nov 3 p 1152
King, Clarence S.:
Increased Efficiency of Labor, Oct 20 p 1014
King, Willis L.:
Brief on Bar Tariff, Sept 1 p 532
Kinloch, Capt R. I. H.:
Industrial Promise of India, Oct 27 p 1095
Kinney, C. L., Jr.:
Refractories in the Steel Plant, Discussion, Nov 24 p 1378
Tapping Hole Shield*, July 21 p 126
Kinsey, A. S.:
Cutting Cast Iron by Oxy-acetylene Torch*, Oct 13 p 951
Fusion Welding, Possibilities of, Aug 11 p 327
Kling, Fred:
Germany as a Competitor, July 28 p 211
Knerr and Collins:
Steel Classification Code, Universal, Sept 1 p 515
Knerr, Horace C.:
Alloy Sheet Steel, Specifications, Manufacture and Analyses*, Sept 8 p 594; Sept 15 p 655; Sept 22 p 725
Koon, Sidney G.:
Estimated Steel Scrap Available in Limitation of Armament Project, Nov 17 p 1280
How Steel Prices Have Been Liquidated*, Sept 22 p 752
Krag, E. L., & Co.:
Spotting and Routing Attachment*, Oct 6 p 870
Krom, S. A.:
Sintering System*, Sept 29 p 794
K. S. Magnet Steel, July 14 p 82
Krupp Repeating Impact Testing Machine, Aug 18 p 409

L

La Belle Iron Works:
Extensions, Dec 29 p 1678
Labor:
Accidents in Steel Industry, Nov 3 p 1148
Application of Time Study in Foundry, Oct 13 p 958
Amalgamated Members Enjoined from Interfering with Employees, Dec 22 p 1641
Arizona Injunctions Against Boycotts Invalid, Dec 22 p 1615
Belgian Costs in Iron and Steel, July 21 p 138
Bricklayer's Wage Scale, July 28 p 237
"Check-Off" System (Editorial), Nov 10 p 1228
Checking System Not Sustained, Dec 22 p 1606
Chicago Building Trades, Sept 15 p 689; Oct 6 p 916
Coal Wage Modification, Union Refusal of, Sept 15 p 680
Coal Wages and Profits in England, July 14 p 82
Coke Wages, July 7 p 54; Aug 25 p 467; Sept 15 p 689; Sept 22 p 740
Colorado Fuel & Iron Co.'s Troubles, Dec 22 p 1609
Conditions in Germany, Sept 29 p 829
Congressman Cooper's Views on Problems, Oct 6 p 916
Costs in British Iron and Steel Works, Nov 10 p 1217
Costs, Responsible for Lack of Building, Nov 17 p 1273
Effect of Hourly Rate Reductions, Oct 13 p 958; Nov 17, p 1287
Employee Recognition in Shop Suggestion System, Dec 29 p 1656
Employee Representation Adopted by Chicago Packers, Sept 22 p 740
Employees Benefit Association of J. I. Case Threshing Machine Co., July 14 p 85
Employment in Metal Industries, June, July 21 p 140; July, Aug 11 p 335; August, Sept 8 p 607, Sept 22 p 753; September, Oct 27 p 1068; October, Nov 24 p 1340; November, Dec 8 p 1473, Dec 22 p 1593
Employment Scheme in Avery Works, July 14 p 82
German Wages, July 21 p 137
Government and Rail Strikes (Editorial) Nov 24 p 1346
Hamilton-Beach Strike Settled on Open-Shop Basis, Aug 18 p 401
Increased Efficiency, Oct 20 p 1014
Industrial Co-operation, Nov 10 p 1207
Industrial Health in Cincinnati, Dec 29 p 1699
Market Fact Distortions (Editorial), Oct 20 p 1017
Mine Accidents, 1920, Sept 22 p 732
Number of Workers (Editorial), Dec 15 p 1551
Open-Shop Foundry, Transition to, Dec 1 p 1395
Open-Shop Policy in Dallas, Dec 22 p 1609
Open Shops in St. Louis, July 7 p 15
On the Will to Work (Editorial), Sept 8 p 612
Peak of Industry in July, 1920, Sept 29 p 825
Picketing Restricted, Dec 8 p 1474
Problems, John R. Common's Views, Sept 22 p 739
Puddlers' Wages, Nov 3 p 1162
Railroad Board's Rules for Shop Crafts, Dec 8 p 1478
Railroad Board's Wage Decision, Dec 22 p 1606
Railroad Problem Remains (Editorial), Nov 3 p 1156, 1163
Railroad Strike Against the People (Editorial), Oct 20 p 1016
Railroad Strike, Employees Threatened, Oct 20 p 1022
Revising War-Time Shop Rules (Editorial), Dec 8 p 1486
Sheet and Tin Mill Wages, July 21 p 136; Nov 17 p 1287
Steel Corporation Abrogates Basic 8-Hr. Day, July 14, p 110
Steel Corporation Wage Reduction, Aug 25 p 501

"Skilled Workers" and Strikes, (Editorial), Nov 10 p 1228
Steel Wage Liquidation (Editorial), Oct 27 p 1086
Stop-Watch Studies, F. B. Gilbreth's Address Against, Sept 22 p 754
Strike at Newport Rolling Mill, Dec 29 p 1675
Time for Conciliation and Reasoning, Nov 10 p 1230
Unemployment Conference (Editorial), Sept 22 p 746
Unemployment Conference Committee Recommendations, Oct 6 p 915
Unemployment Conference, Industrial Leaders Among Members, Sept 22 p 754
Unemployment Conference Sessions, Sept 29 p 818, 843
Unemployment in Iron and Steel Industries, January, 1915-July, 1921*, Aug 25 p 459
Unemployment, Plans for Relief, Oct 20 p 1007; Dec 29 p 1666
Unemployment, Key Points in (Editorial), Sept 29 p 820
Union Workers, Proportion (Editorial), July 7 p 26
Wage Agreements of Bar Iron and Amalgamated Associations, Aug 4 p 287
Wage Rates Abroad, Aug 11 p 343
Wage Rates and Commodity Prices (Editorial), July 21 p 148
Wage Reductions, July 7 pp 48, 54; July 14 p 110; July 21 p 136
Wage Revisions, Reasons for, July 21 p 133
Wage Settlement on Industrial Prospects (Editorial), Dec 29 p 1682
Wages, Coal and Coke, Aug 25 p 467; Sept 15 p 689
Wages for Mechanics in New York State, Nov 10 p 1208
Wages in British Steel Industry, July 28 p 191
Welfare Work, July 21 p 170
Wheeling Steel Corporation Controversy, Aug 18 p 418
Whitaker-Glessner Resumes on Open-Shop Basis, Sept 22 p 775
Workmen's Adaptability, Aug 4 p 304
Workmen's Compensation, July 21 p 145
Works Council Successful, July 7 p 5

Lacher, Gilbert L.:
Bessemer Plant of Steel & Tube Company*, Nov 10 p 1199
Railroad Labor Board Decision, Dec 8 p 1478

Lackawanna Steel Co.:
Proposed Merger with Midvale, Youngstown, Republic, Inland, Steel & Tube and Brier Hill Companies, Dec 8 p 1492
Purchases Lackawanna Bridge and Ferguson Iron & Steel Companies, Nov 24 p 1339
Quarterly Report, July 21 p 178; Oct 27 p 1116

LaClede Gas Light Co.:
Piette By-Product Coke Ovens*, Dec 15 p 1526

Ladd Metric System Bill Proposed, July 28 p 189

Lake Erie-Ohio River Canal, Report on, Oct 6 p 901

Lake Superior Iron Ore Association:
Map Showing Distribution of Domestic and Foreign Ores, Dec 22 p 1594
Ore Shipments, 1900-1920, Dec 15 p 1536

Lake Superior Ore:
Shipments, July, Aug 11 p 337; August, Sept 8 p 606; September, Oct 13 p 967; October, Nov 10 p 1220; Season, Dec 1 p 1441

Lake Superior Iron Ore Association:
Ore Analyses for 1921, Aug 11 p 337
To Continue Efforts for Lower Freight Rates, Dec 1 p 1415

Lane, Henry M.:
Continuous Foundry for Pipe Fittings*, Sept 1 p 519

Langelier Mfg. Co.:
Machine for Drilling and Tapping Spoke Nipples*, Aug 11 p 338
Swaging Machine*, Dec 1 p 1416

Lathes:
Lehmann Double Back-Geared Engine*, Aug 11 p 324
Monarch 9 and 11-in.*, Aug 25 p 471
Pratt & Whitney Automatic*, Dec 1 p 1399
South Bend Quick Change Gear*, Sept 15 p 659

Latin American Criticism of U. S. Export Practices, Sept 8 p 613

Lavino Furnace Co.:
Brief on Ferromanganese Before Senate Tariff Committee, Sept 8 p 603

Lead:
In Gun Metal, Oct 13 p 961
Too Pure for Roofing Purposes, Dec 22 p 1594

Leather Belting Exchange:
Grain Side of Belts More Efficient, Dec 29 p 1667

Leaves from a Steel Melter's Notebook, Oct 27 p 1065; Nov 24 pp 1337, 1379

Leavitt, C. W., & Co.:
Ferromanganese Price, Nov 24 p 1353
Proposed Metal Schedule, July 7 p 27

Leahy, F. E.:
Fuel Requirements of Steel Mills Analyzed, Sept 29 p 811

Le Blond, R. K., Machine Tool Co.:
Cutter and Hob Grinding Attachment*, Dec 22 p 1604

Lees-Bradner Co.:
Gear-Tooth Grinding Machine*, Oct 13 p 945

Lehmann Machine Co.:
Engine Lathe, Double Back Geared*, Aug 11 p 324

Leipzig Fair, Oct 27 p 1080

Lewis, Kenneth B.:
Embrittling Effect of Pickling Upon Carbon Steel, Sept 22 p 750

Levy, A. Hoyt:
Efficient Journal Bearings, July 7 p 26

Libraries Association:
(See Special Libraries Association)

Licensing Business, July 14 p 86; Aug 11 p 355; Aug 18 p 419; Aug 25 p 483

Loading and Unloading Record, Ore, Nov 3 p 1134

Lockseaming Machine, Stolph Automatic*, Aug 25 p 475

Locomotives, Chinese Purchases, Sept 8 p 588

Lord, Chester B.:
Interchangeable Manufacture, Aug 4 p 274

Lovejoy Tool Works:
Electric Drill*, Dec 1 p 1398

Lorraine Steel, French Exports, Oct 6 p 909

Lubrication:
In Rolling Mills, Dec 29 p 1661
Roll Spindle Couplings*, Oct 27 p 1064

Lucas Machine Tool Co.:
Vertical Broaching Press*, Dec 15 p 1534

Ludlum Steel Co.:
Manufacture of Drill Steel from Hollow Ingots*, Sept 8 p 596

M

MacCannell, C. E.:
Cold Worked Steel, Aug 11 p 355

McCabe, James J.:
Time for Conciliation and Reasoning, Nov 10 p 1230

McClintic-Marshall Products Co.:
Steel Tank Installation in France, Oct 27 p 1079

McDermott, G. R.:
Device for Use with Oxy-Acetylene Torches, Sept 15 p 686
Handy Aid for Oxy-Acetylene Cutters*, Aug 11 p 348

McKean, Robert A.:
European Conditions, Oct 27 p 1079

McKinney Steel Co.:
To Help Employees at Lake Superior Mines, Aug 4 p 310

McMyler-Interstate Co.:
Crane Award, Sept 22 p 737

Machine Tool Builders' Association:
Convention Announcement, Sept 1 p 569

Machine Tools:
British Exports*, Dec 15 p 1545
Exports 1920 and 8 Months 1921, Oct 20 p 1012
Improvements (Editorial), July 21 p 149
Prospects of Foreign Trade in, Oct 13 p 949

Machinery:
British Trade, 1913, 1920, 1921, Sept 8 p 598
Census of Manufacture, 1919, July 7 p 51
Demand in Spain, Sept 8 p 608
Electrical, Census of Manufactured, 1914-1919, July 21 p 130
Exports, August, Oct 13 p 930; 1920 and 8 Months 1921, Oct 20 p 1012; September, Oct 27 p 1093
Exports, Effect of Exchange, Oct 6 p 875
Exports, Government Aid, Dec 22 p 1619
German Exports, July 21 p 138

Machinery Corporation:
(See Associated Machinery Corporation)

Machining Cruiser Shafts, Dec 1 p 1428

Machinists' Association:
(See International Association of Machinists)

Magnesite:
Testimony on Tariff for, Sept 1 pp 537, 565

Maladjustments in the Industrial World, Oct 6 p 867

Malleable Castings Association:
(See American Malleable Castings Association)

"Man at the Fire," Aug 4 p 284

Management:
Cutting Overhead Cost Instead of Wages, July 14 p 79
Employees Benefit Association of J. I. Case Threshing Machine Co., July 14 p 85
Employee Recognition in Shop Suggestion System, Dec 29 p 1656
Employment Representation Adopted by Chicago Packers, Sept 22 p 740
Employment Scheme in Avery Works, July 14 p 82
Erie Forge & Steel Co.'s Stores Keeping System*, Aug 4 p 253
Improved Core Output with Smaller Space in General Electric Plant*, Oct 13 p 927
Industrial Co-operation, Nov 10 p 1207
Locker System in Youngstown Wire & Iron Plant*, July 14 p 69
Open-Shop Foundry, Transition to, Dec 1 p 1395
Time for Conciliation and Reasoning, Nov 10 p 1230

Management Engineering, New Journal, July 21 p 151

Mandril, Hot Drawing on, Sept 29 p 800, Oct 13 p 930

Manganese:
Ore from Chile, Nov 10 p 1219
Ore Imports, Nine Months 1921, Nov 17 p 1270
Ore, Steel Makers Oppose Duties on, July 21 p 155
Ore, Temo Co. to Sell Caucasian, Dec 1 p 1419
Ore, Why High Duties (Editorial), Aug 4 p 280
Testimony on Tariff, Sept 1 pp 537, 565
Value of Ore Affected Freight Rates, Aug 11 p 335
Why Imports Should Not Be Restricted, Aug 4 p 288
Manufacturers' Association of Northern Ohio:
Organized to Co-operate in Open Shop Movement, July 14 p 86
Mark, Menace of the German (Editorial), Oct 6 p 885
Marking Machine, Noble & Westbrook*, Dec 22 p 1616
Masks, Gas, Mine Safety Appliance Co., July 7 p 10
Massillon Rolling Mill Co.:
Merged with National Pressed Steel Co. and Central Steel Co., Aug 25 p 501; Oct 6 p 866
Matthews, J. A.:
Brief on Alloy Steel Tariff, Sept 1 p 534
Mattingly Automatic Valve Co.:
Safety Gage Glass Valve*, Oct 20 p 1021
Mattson, Ivar:
Future Increase in Railroad Ton Miles, Sept 15 p 686
Merchant Marine, Administration to Establish American, Nov 10 p 1218
Merchant Shipbuilding Corporation:
Fiftieth Anniversary of Roach Shipyard, July 7 p 14
Metal & Thermit Corporation:
Plant for Detinned Billets, July 7 p 14
Metal Trades, Causes of Wastes in, July 28 p 216
Metallography, Problems in*, Oct 13 p 941
Metallurgy:
Iron and Steel, Problems in France, Oct 13 p 940
Non-Ferrous, Electric (Editorial), Oct 6 p 886
Non-Ferrous, Symposium on, Oct 6 p 879
Progress in Iron and Steel, Oct 13 p 939
Metals:
Compression Strength of Alloys and, Aug 18 p 419
Extruded, Investigation of, Oct 20 p 996
For Aeronautics, Dec 29 p 1666
Future Demand (Editorial), Aug 18 p 417
Gases in, Dec 15 p 1540
Recovery of Secondary, 1920, July 28 p 234
Standard Samples of Lead Base Bearing, Aug 11 p 324
Meter Bar, Bureau of Standards Tests Canadian, Aug 25 p 499
Metric System:
Hearings on Ladd Bill, Oct 13 p 951; Oct 20 p 1010
High Cost of Compulsory, Sept 15 p 671
Ladd Bill Proposed, July 28 p 189
Use of, Nov 3 p 1181
Michigan Foundrymen's Association: (See Foundrymen's Associations)
Microscopes, Bausch & Lomb Stereoscopic Eyepiece for*, Aug 18 p 390
Midvale Steel & Ordnance Co.:
Against Restrictions on Manganese Imports, Aug 4 p 288
Proposed Merger With Lackawanna, Youngstown, Republic, Inland, Steel & Tube and Brier Hill Companies, Dec 8 p 1492
Miller, S. W.:
Fusion Welding and Processes*, Nov 24 p 1374
Miller, W. R., Co.:
Gas Producer*, Oct 13 p 948
Milling Machines:
Athol Device for*, Dec 1 p 1398
Cincinnati Dynamometer*, July 21 p 142
Jackson Vertical*, Sept 29 p 803
Jones Boring, Drilling and*, July 7 p 6
Motion Pictures of Kempsmith Operations, Nov 3 p 1131
Oesterlein Constant Speed*, Oct 20 p 1014
Pawling & Harnischfeger Horizontal Drilling, Boring and*, Sept 22 p 729
Pratt & Whitney Bench Hand*, Oct 6 p 874
Waltham Automatic Thread*, Sept 1 p 546
Mine Safety Appliances Co.:
Gas Masks, July 7 p 10
Minerals:
Industry, 1909 and 1919, Sept 8 p 593
Liberalized War Act Passed, Dec 1 p 1403
Plans to Better Conditions, In Industry, Nov 10 p 1224; Nov 17 p 1305; Dec 8 p 1479
Mining and Metallurgical Engineers: (See American Institute of Mining and Metallurgical Engineers)
Mining Experiment Station at Minneapolis, Dec 29 p 1672
Mircs Fuel Oil Equipment Co.:
Heat Treating Screw Stock*, Sept 15 p 660
Mississippi Valley Iron Co.:
Complaint Against Ore Rate, Nov 24 p 1332
Mixer, Simpson Sand*, July 14 p 71
Mixtures for Foundry Irons, Figuring, Oct 13 p 931
Mobilization Plans of War Department, Dec 22 p 1618
Moffett, L. W.:
American Valuation Plan Favored, Dec 8 p 1481
Buffalo Companies Ask Lower Freight Rates, Nov 3 p 1133
Coal, Coke and Ore Rate Hearings, Nov 10 p 1225
Freight Rates, Efforts to Be Continued for Lower, Dec 1 p 1415
Freight Rates on Iron Ore to Be Restored, Dec 15 p 1557
German Competition and American Expansion Prospects, Sept 22 p 743
How Disarmament Affects Steel Makers, Nov 17 p 1279
Iron Ore Freight Rate Reduction, Oct 13 pp 944, 976
Minor Changes in Metal Schedule, July 21 p 153
Plans for Scrapping Battleships, Dec 22 p 1605
Progress of Unemployment Conference, Oct 6 p 915; Oct 20 p 1007
Tariff Bill, July 7 p 16
Tariff Bill Plans, Aug 4 p 285
Tariff Hearings, July 28 p 214; Sept 1 p 527
Washington Views on Business Outlook, Sept 29 p 805
Monarch Machine Tool Co.:
Engine Lathes*, Aug 25 p 471
Mono Corporation of America:
Combustible Gas Recorder*, July 21 p 137
Montgomery, M. T.:
Storage Principles*, July 28 p 194
Moore, Edward T.:
Electric Furnace Progress in 1921, Sept 22 p 723
Fuel Saving Device for Electric Furnaces*, Aug 11 p 328
Moore, J. A.:
Refractories in the Steel Plant, Discussion, Nov 24 p 1378
Morris, L. R.:
German Exports Exaggerated, Aug 25 p 471
Morrison, C. J.:
Embrittling Effect of Pickling Upon Carbon Steel*, Aug 11 p 334
Motion Pictures, Bureau of Mines Educational, July 28, p 242; Dec 1 p 1408
Motor Accessories Manufacturers' Association:
Back to Normal Convention, Sept 8 p 631
Motor Drive:
Adjustable Speed for Rolling Mills*, Dec 22 p 1595
General Electric Planer*, Dec 15 p 1544
In Mill of Interstate Iron & Steel Co.*, Oct 13 p 946
Motors, Cutler-Hammer Automatic Starter for*, Aug 11 p 349
Mullins Body Corporation:
Baily Electric Furnace for Heating Sheets*, Aug 4 p 255
Murchey Machine & Tool Co.:
Nipple Reaming and Chamfering Machine*, Dec 15 p 1544
Murphy, H. D.:
British Coal Strike Settlement and Domestic Labor Problems, July 28 p 210
Economic Status of the Dollar, Oct 13 p 959
Effect of Seasonal Production on Building, Sept 15 p 684
Increasing Production, Nov 17 p 1287
Murphy Iron Works:
Handling Materials*, July 14 p 76
Myers, F. E., & Brother:
Incorporated*, July 14 p 115

N

Nail Prices, Present Retail and Pre-War, Sept 29 p 847
Nash Engineering Co.:
Jennings Turbine Driven Return Line Heating Pump*, July 14 p 72
National Acme Co.:
Belts as Inspection Tables*, Dec 1 p 1414
National Association of Cost Accountants:
Convention Papers, Sept 1 p 526
Rates for Special Purpose Machines, Aug 4 p 311
National Association of Manufacturers:
To Confer with Census Bureau, July 21 p 144; July 28 p 196
To Co-operate with Department of Commerce, Dec 22 p 1642
National Association of Purchasing Agents:
Officers Nominated, Sept 1 p 542
Standardized Pig Iron Contract Form Proposed, Oct 20 p 1029; Nov 3 p 1140
National Bronze & Aluminum Foundry Co.:
Plant Description*, Sept 1 p 511
National Cash Register Co.:
Prizes for Employee Suggestions, Sept 29 p 793
National Conference of Business Paper Editors:
Convention Proceedings, Oct 27 p 1094; Nov 3 p 1165
National Engineering Co.:
Simpson Sand Mixer*, July 14 p 71
National Foreign Trade Council:
Convention Announcement, Dec 29 p 1673
National Founders' Association:
Convention Program, Oct 27 p 1078
Proceedings of Convention, Nov 17 p 1282; Nov 24 p 1348
National Hame & Chain Co.:
Stockholders Sue Officers and Directors, Aug 11 p 348

National Hardware Association:
Convention Program, Oct 13 p 960
National Implement and Vehicle Association:
Convention Proceedings, Oct 20 p 1011
National Industrial Conference Board:
Living Costs, July 28 p 190
Peak of Industry in July, 1920, Sept 29 p 825
Use of Metric System, Nov 3 p 1181
National Machine Tool Builders' Association:
Convention Proceedings, Oct 20 p 1026; Oct 27 p 1081
National Pressed Steel Co.:
Merged with Massillon Rolling Mill Co. and Central Steel Co., Aug 25 p 501; Oct 6 p 866
National Research Council:
Molding Sand Research, Dec 8 p 1477
National Rolling Mill Co.:
Bar Iron Freight Rates Not Unjust, Dec 29 p 1677
National Safety Council:
Appointments, Oct 27 p 1075
Convention Program, Sept 15 p 688
Proceedings of Convention, Oct 6 p 871
National Steel Foundries:
Plant with Special Operating Features*, Oct 20 p 991
National Supply and Machinery Dealers' Association:
Machine Tool Section Meeting, Sept 29 p 845; Oct 27 p 1083
Price Revision on Factory Supplies, Nov 3 p 1146
National Tube Co.:
Benwood & Wheeling Connecting Railroad Common Carrier, July 21 p 141
Hammer Welded Steel Pipe*, Nov 3 p 1130
National Twist Drill & Tool Co.:
Milling Cutter*, Dec 29 p 1677
Naugle, H. M.:
Steel Lumber for Building Construction, Discussion, Nov 24 p 1374
Naval Aircraft Factory:
Alloy Sheet Steel, Specifications, Manufacture and Analyses*, Sept 8 p 594
Navy Department:
Armaments and Steel Outputs (Editorial), Nov 17 p 1284
Awards Bars and Shapes, Dec 15 p 1543
Crane Contract Awarded to McMyler-Interstate Co., Sept 22 p 737
Plans for Scrapping Battleships, Dec 22 p 1605
Naval Ordnance Plant to Make Larger Guns, Dec 15 p 1543
Plate Bids, July 14 p 110
Seeking Advice on Disposal of Tonnage, Dec 15 p 1559
Sells Five Dismantled Vessels, Aug 11 p 339
Steel Tonnage to Be Scrapped in Limitation of Armament, Nov 17 p 1279
Tonnage and Rolled Steel, Nov 24 p 1344
New England Foundrymen's Association:
(See Foundrymen's Associations)
New England Iron and Hardware Association:
Outing, Sept 29 p 845
New England Tool & Machine Co.:
Tool Bits*, Aug 11 p 349
New Era Iron & Steel Corporation:
Pig Iron from Black Sands, July 14 p 83
New York Business Publishers' Association:
Course in Industrial Training, Oct 6 p 887
New York Shipbuilding Corporation:
Record of Ships Built, Sept 22 p 785
Newark Foundrymen's Association:
(See Foundrymen's Associations)
Newcastle Iron & Steel, Ltd.:
Blast Furnace, South African, Sept 8 p 608
Newport Rolling Mill Co.:
Strike Troubles, Dec 29 p 1675
Niagara Machine & Tool Works:
Corrugated Elbows*, Dec 8 p 1475
Power Squaring Shears*, July 7 p 9
Ring and Circle Shear*, July 14 p 71
Splitting Gage for Rotary Shear*, Aug 18 p 410
Nickel:
And Cobalt in Iron, Sept 1 p 513
In Iron Castings*, Aug 25 p 460
Nickel-Chromium Sheets, Specifications, Manufacture and Analysis*, Sept 8 p 594
Nicou, Prof. Paul-René:
Iron Ore Deposits of Eastern and Western France, Sept 22 p 733
Nitrogen in Steel*, July 7 p 1
Noble & Westbrook Mfg. Co.:
Marking Machine for Tubing*, Dec 22 p 1616
Nolan Patent Bill, July 7 p 6
Norman Machine Tool Co.:
Piston Grinding Machine*, Nov 10 p 1216
Norton Co.:
Universal Piston Grinding Attachment*, Oct 6 p 876
Norway:
American Automobiles, July 21 p 138
Tin-Plate Manufacture, Aug 25 p 463
Novelty Steam Boiler Works:
Expansion, Dec 29 p 1670

O

Obituary:
Ahles, Robert L.,* Oct 20 p 1047
Atwood, Henry D., Dec 8 p 1513
Baker, Daniel, Sept 8 p 630
Baldwin, Raymond S., Sept 15 p 707
Barnhart, Henry B., Oct 13 p 981
Bartlett, Nelson S., Dec 29 p 1701
Bastian, Henry A., Nov 3 p 1185
Bauer, Alfred D., Aug 25 p 501
Beaman, Charles F., July 21 p 175
Begole, Charles M., Dec 29 p 1701
Berry, Charles P., July 21 p 175
Bindley, John*, Dec 22 p 1641
Blair, Joseph L., Nov 24 p 1371
Blankenship, Joseph, Nov 24 p 1371
Blauvelt, Frank B., Sept 8 p 630
Bowen, Clinton, Oct 27 p 1112
Bradford, Oscar, Oct 6 p 907
Bragg, Charles F., Sept 15 p 707
Brent, Joseph, Sept 29 p 847
Bullard, Frank F., Oct 27 p 1112
Burdick, Julian, Aug 18 p 441
Bush, Sumner O., Nov 3 p 1185
Carr, John H., Nov 10 p 1249
Carran, Richard B., Sept 15 p 707
Chapman, Albert H., Dec 15 p 1575
Childs, Albert H., Sept 1 p 571
Chollar, Frank B., Dec 5 p 1575
Clapp, DeWitt C., Oct 13 p 981
Coates, George H., Nov 3 p 1185
Collins, Lewis D., Sept 29 p 847
Craig, Edward A., Sept 1 p 571
Crocker, Prof. Francis B., July 14 p 115
Davis, Charles W., Sept 15 p 707
Denham, Matthew T., Oct 27 p 1112
Dexter, Fred A., Sept 1 p 571
Dickerman, Alton L., Sept 29 p 847
Drowne, Frederick H., Oct 27 p 1112
Dugger, Jarrott P., Nov 10 p 1249
Duntley, John W., Dec 22 p 1641
Durston, J. Frank, Nov 24 p 1371
Eccles, George W., Nov 24 p 1371
Edson, John J., Jr., Nov 24 p 1371
Eldridge, Charles W., Sept 15 p 707
Eliot, Henry, Jr., Sept 15 p 707
Erdle, Frederick, Aug 18 p 441
Evans, Henry C., Dec 15 p 1575
Fauntleroy, Thomas S., Nov 17 p 1308
Fenn, Wilson L., Aug 4 p 309
Finley, Thomas, Dec 29 p 1701
Fitzsimmons, Thomas G., Dec 15 p 1575
Foote, Charles H., Sept 8 p 630
Fowl, Percy M., Sept 1 p 571
Frauenheim, August A., Aug 18 p 441
Frohwein, Richard W., Dec 22 p 1641
Glidden, Wallace D., Aug 25 p 501
Goldman, Louis J., Sept 1 p 571
Gouvy, Alexandre, Oct 13 p 981
Griffiths, William H., Aug 18 p 441
Hamilton, Harry G., Oct 13 p 981
Hammond, Harry D., Dec 1 p 1449
Hanlon, John A., Aug 18 p 441
Hanna, Dan R., Nov 10 p 1249
Hewitt, Peter C., Sept 1 p 571
Hibben, Heron K., Nov 3 p 1185
Hinkins, Arnold, Dec 8 p 1513
Hofsess, William T., Aug 4 p 309
Holmes, Thomas W., Aug 18 p 441
Hyde, Frank A., Dec 8 p 1513
Ireland, James D., Dec 8 p 1513
Irwin, Oscar, July 7 p 52
Jernberg, John, July 21 p 175
Jones, Arthur, Dec 22 p 1641
Jones, Benjamin H., Sept 1 p 571
Jones, David J., Nov 3 p 1185
Jones, Salmon P., Oct 6 p 907
Jurack, William R., Oct 6 p 907
Kennedy, Michael, Sept 1 p 571
Keyes, Frederick, Dec 1 p 1449
Kieckhefer, August C., July 28 p 237
Kimman, Henry J., Sept 29 p 847
Kolb, Charles E., Nov 3 p 1185
Kryl, John, Aug 2 p 501
Lane, William B., Dec 1 p 1449
Larson, J. L., July 21 p 175
Lighthipe, William W., Aug 11 p 373
Lindstrom, Reuben L., Dec 22 p 1641
Loucks, George W. S., Nov 24 p 1371
Lowell, Walter N., Aug 25 p 501
Lozier, Robert Ten Eyck, Aug 25 p 501
MacDonald, H. P., Oct 6 p 907
Magee, John, Nov 17 p 1308
Manning, Henry S.*, July 14 p 115
McClary, John, Dec 15 p 1575
McElroy, John F., Oct 6 p 907
McKey, Douglas F., Dec 29 p 1701
McNamar, Julius J. D., Oct 27 p 1112
Meyers, Fred J., Nov 3 p 1185
Mill, Anton, Sr., Dec 29 p 1701
Mills, John W., July 21 p 175
Moffat, Frank D., Sept 1 p 571
Murray, Thomas*, Dec 29 p 1701
Myers, William B., Sept 15 p 707
Nicoll, Benjamin, July 7 p 52
Nickerson, Ernest, July 7 p 52
Nodine, Joel, Oct 27 p 1112
Nolan, John J., Dec 8 p 1513
Park, William R., Aug 4 p 309
Parker, Herbert G., July 21 p 175
Phillips, Bayard, Sept 1 p 571
Pope, George P., July 14 p 115
Porch, James W., July 28 p 237
Porter, Jonathan E., July 28 p 237
Price, J. H., Dec 8 p 1513
Purnell, L. E., Oct 13 p 981
Rabe, Thomas H., July 21 p 175
Ransom, Allan, Sept 29 p 847
Reed, Francis, July 21 p 175
Regester, Henry S., Sr., Nov 10 p 1249
Richards, Edward W.*, Nov 24 p 1371
Richards, Dr. Joseph W.*, Oct 20 p 1047
Rider, James B., Nov 10 p 1249
Robbins, Chandler, Aug 25 p 501
Roberts, T. W., Nov 3 p 1185
Robertson, John F., Oct 27 p 1112
Roelker, John W., Dec 22 p 1641

Rood, Clarence E., Dec 15 p 1575
Saunders, James, Dec 15 p 1575
Sherman, George D., Nov 24 p 1371
Siebert, William P., Jr., Aug 4 p 309
Skiff, John A., Dec 15 p 1575
Smith, Frank J., Sept 1 p 571
Smith, Frederick E., Nov 24 p 1371
Smythe, William G., Sept 29 p 847
Sollinger, Daniel, Sept 1 p 571
Stafford, Benjamin E. D., Dec 8 p 1513
Stanley, Frank P., July 28 p 237
Stanton, John, Sept 29 p 847
Steedman, James H., July 14 p 115
Stewart, James C., Sept 29 p 847
Summers, Edgar W., Dec 15 p 1575
Sweeney, James, Sept 1 p 571
Sweeney, Matthew M., Sept 15 p 707
Tower, James H., Aug 25 p 501
Townley, John B., Sept 29 p 847
Turk, Frank J., Dec 29 p 1701
Vogt, Axel S., Dec 1 p 1449
Vogt, H. C., Nov 24 p 1371
Voorhees, Samuel S., Sept 29 p 847
Wainwright, Joseph C. J., July 21 p 175
Waite, Harry W., Nov 10 p 1249
Wallace, John F., July 7 p 52
Ward, Edgar T., Oct 6 p 907
Warner, Randolph S., Oct 13 p 981
Warrington, William H., Aug 25 p 501
Wenzel, Bernard H., July 28 p 237
Wesson, Walter H., Dec 8 p 1513
Whitley, Charles W., Oct 27 p 1112
Williams, Charles H., Aug 18 p 441
Williams, M. C., Dec 8 p 1513
Wilson, David H., Sept 29 p 847
Winslow, Albert H., Sept 1 p 571
Wiselogel, Christian D., Sept 29 p 847
Wittman, John, Nov 3 p 1185
Woodward, Frank E., Aug 11 p 373
Wright, Morris S., Sept 15 p 707
Young, Andrew G.*, Oct 6 p 907

O'Brien Machine Co.:
Improvements, Dec 8 p 1521

Oesterlein Machine Co.:
Constant Speed Milling Machines*, Oct 20 p 1014

Ohio River-Lake Erie Canal, Report on, Oct 6 p 901

Oil:
From Waste Shale, Nov 10 p 1224
Fuel, British Use of, July 28 p 242
Recooling Quenching*, Sept 15 p 668

Oil Burner, Anderson-Garner-Shaner*, Aug 25 p 474

Oil Burning Equipment Co.:
Burner*, Sept 22 p 738

Oil Burning Equipment, Hardinge*, Dec 22 p 1602

Oilgear Co.:
Machine Speed Control*, Sept 22 p 741

Oliver Machinery Co.:
Belt Sanding Machine*, Sept 8 p 599
Gear Cutting Attachment for Pattern Milling Machine*, July 7 p 15
To Make Factory Truck Hardware, July 28 p 242
Universal Vise*, Nov 3 p 1152

Olmstead-Flint Co.:
To Guarantee Belting on a Mileage Basis, Aug 4 p 282

Open-Shop:
Competition and (Editorial), Aug 18 p 416
Manufacturers' Association of Northern Ohio Organized for, July 14 p 86

Ore:
Investigating Passage of Air Through, Nov 24 p 1335
Iron, Deposits of Eastern and Western France, Sept 22 p 733
Iron, European Resources, Sept 22 p 738
Iron, Freight Rates Extended, Nov 24 p 1347
Iron, Freight Rate Hearings, Nov 10 p 1225
Iron, Freight Rate Reduction, Oct 13 pp 944, 967, (Editorial), p 956; Oct 20 p 1048
Iron, Freight Rates Restored, Dec 29 p 1677
Iron, Freight Rates to Be Restored, Dec 15 p 1557
Iron Mining Industry, 1919, Oct 6 p 887
Iron, World's Developed Resources, Oct 20 p 1011
Lake Superior Shipments, July, Aug 11 p 337; August, Sept 8 p 606; September, Oct 13 p 967; October, Nov 10 p 1220; Season, Dec 1 p 1441; 1900-1920, Dec 15 p 1536
Manganese and Chrome Freight Rates, Imported, Nov 10 p 1218
Manganese, from Chile, Nov 10 p 1219
Manganese Imports, Nine Months 1921, Nov 17 p 1270
Manganese, Steel Makers Oppose Duties on, July 21 p 155
Manganese, Temo Co. to Sell Caucasian, Dec 1 p 1419
Manganese, Why High Duties on? (Editorial), Aug 4 p 280
Manganese, Why Imports Should Not Be Restricted, Aug 4 p 288
Prices, Foreign and Lake Superior Delivered, 1921, Dec 15 p 1538
Steel Companies Not Dependent Upon Lake, Dec 15 p 1536

Oregon Charcoal Co.:
Organized, Nov 10 p 1223

Osgood Co.:
Rubber Tired Steam Shovel, Sept 15 p 680

Osterhom, William:
Automatic Surface Grinding Machine*, July 28 p 201

Oxides and Sulphur in Ordnance Steel*. Dec 29 p 1658, (Editorial) p 1683

Oxy-Acetylene:
Cutters, McDermott Handy Aid for*, Aug 11 p 348
Cutting Cast Iron by *, Oct 13 p 951
Torches, Devise for Use with, Sept 15 p 686

P

Pangborn Corporation:
Sand Blast Barrel*, Oct 27 p 1078

Parish, William F.:
Friction in Rolling Mills, Dec 29 p 1661

Park & Williams, Inc.:
To Import Swedish Iron Ores, Sept 8 p 606

Parker Supply Co.:
Screw for Assembling Die Cast Parts*, Oct 13 p 951
Screw for Attaching Nameplates to Machinery*, Nov 3 p 1152

Patent Office:
Annual Report (Editorial), Dec 15 p 1551
Delays, Protest Against, Dec 8 p 1473
Needs Men, Oct 6 p 886
Salaries, Increase Urged, Sept 22 p 740
To Hold Hearings on Bill, Aug 18 p 410

Patents:
Nolan Bill, July 7 p 6

Paul, George F.:
Electromagnets in Plate Cooling Bed*, Aug 11 p 321

Pauly, K. A.:
Adjustable Speed with Motor Driven Mills*, Dec 22 p 1595

Pawling & Harnischfeger Co.:
Crane with Goose Neck Boom*, Nov 3 p 1154
Horizontal Boring, Drilling and Milling Machines*, Sept 22 p 729

Pearce, H. C.:
Buying Responsibility, Nov 10 p 1230

Pearson-Scott Co.:
Hand Screw Machine Attachment*, Aug 18 p 406

Pedrick Tool & Machine Co.:
Taper Boring Bar*, Nov 24 p 1339

"Peds" to Attach Trim to Concrete, Sept 8 p 584

Pennsylvania Tank Line:
The Tank Car, Aug 18 p 402

Perkins, A. E.:
Heat Treatment of Rock Drill Steel, July 7 p 7

Pershing, Gen. John J.:
Tribute to James B. Bonner, Nov 3 p 1166

Peru:
Vanadium Production, Aug 18 p 389

Peters, Richard, Jr.:
Blast Furnace of Crane Iron Works*, Sept 29 p 814

Phillips, W. Vernon:
Brazilian Conditions, Dec 29 p 1667

Photography, Industrial and Technical, Oct 20 p 1018

Pickling:
Embrittling Effect Upon Carbon Steel*, Aug 11 p 334; Sept 15 p 685; Sept 22 p 750
Prevention of Brittleness in Steel, Oct 6 p 886

Piette By-Product Coke Ovens at La-Clede Plant*, Dec 15 p 1526

Pig Iron:
Belgian Production Seven Months 1921, Oct 6 p 866
Canadian Production First Half 1921, Sept 22 p 753
Composition of Cast Iron and, Nov 17 p 1267
Costs, 1913-1920, July 7 p 11
Figuring Charges for Foundry, Oct 13 p 931
Foundries to Report Stocks, Aug 18 p 402
Freight Cost of One Ton, 1914, 1921, Oct 27 p 1084
From Black Sands, July 14 p 83
German Production 1919-1920, Aug 4 p 265
Imports, Seven Months, Sources of, Sept 22 p 737
Monthly Production*, July 7 p 29; Aug 4 p 286; Sept 8 p 614; Oct 6 p 888; Nov 3 p 1160; Dec 8 p 1490
Normal Production (Editorial), Dec 29 p 1680
Prices and Output (Editorial), Sept 1 p 548
Production Costs in Three Centers, Dec 8 p 1476
Production in New South Wales, 1921, July 21 p 146
Production, United States, First Half 1921, Aug 18 p 439; 1900-1920; Dec 15 p 1538
Readjustment of Prices, First Half 1921*, July 7 p 12
Specifications, Southern Charcoal and Car Wheel, Aug 25 p 482; Dec 1 p 1427
Standardized Contract Form Proposed, Oct 20 p 1029; Nov 3 p 1140
Synthetic Foundry in Germany, Nov 3 p 1137
Trend of Prices Nine Months 1921*, Oct 13 p 834

Pig Iron Associations:
(See American Pig Iron Association and Southern Ohio Pig Iron and Coke Association)

Pilling, W. S.:
British Industrial Conditions, Oct 20 p 1012

Pipe:
Bessemer Plant of Steel & Tube Company*, Nov 10 p 1199
Cast-Iron Production, 1914 and 1919, Aug 4 p 258

Electric Jarring Machine for Molding*, Dec 1 p 1412
Exports in Fittings and (Editorial), Oct 27 p 1088
General Fire Extinguisher Plant for Fittings*, Sept 1 p 519
Hammer-Welded Steel*, Nov 3 p 1130
Hollow Ingots for Seamless, Oct 27 p 1065
Tests of Rotary Drill*, Sept 29 p 804
Piston Without Rings, Gas-Engine*, July 14 p 81
Pittsburgh Basing Point:
(See Basing Point, Pittsburgh)
Pittsburgh Steel Co.:
Annual Report, Oct 27 p 1116
Pittsburgh Foundrymen's Association:
(See Foundrymen's Associations)
Pittsburgh Railways Co.:
Storing Stock*, July 28 p 194
Pittsburgh Saw & Mfg. Co.:
Anderson-Garner-Shaner Oil Burner*, Aug 25 p 474
Pittsburgh Steel Co.:
Quarterly Statement, Nov 3 p 1166
Piwowarsky and Bauer:
Nickel and Cobalt in Iron, Sept 1 p 513
Piwowarsky, P.:
Silicon Additions to Steel, Aug 25 p 459
Planing Machines, Gray New*, Dec 1 p 1417
Plates, Bids for the Navy, July 14 p 110
Poliakoff, R.:
Universal Machine Shop Rule, Aug 18 p 400
Polishing and Grinding Machine, Production Utility*, Sept 1 p 546
Political Science:
(See Academy of Political Science)
Porter, C. A.:
Depreciation, Oct 27 p 1088
Portevin and Chevenard:
Heat Treatment Curves, Sept 29 p 801
Portsmouth By-Product Coke Co.:
Organized, Nov 24 p 1342
Portsmouth Solvay Coke Co.:
Acquired by American Rolling Mill and Whitaker-Glessner Companies, Nov 24 p 1342
Power and Fuel Consumption in Superpower Zone, July 14 p 68
Pratt & Whitney Co.:
Automatic Lathe*, Dec 1 p 1399
Bench Hand Milling Machines*, Oct 6 p 874
Cylindrical Plug and Thread Gages*, Sept 1 p 545
Die Sinking Machine*, Oct 6 p 869
Gages, Thread Templet*, Sept 8 p 600
Rotary Grinder*, July 28 p 190
Vertical Surface Grinder*, Oct 6 p 874
Precision Machine Alining Level, Universal*, Sept 29 p 802
Prentice-Conradson:
Vertical Drill with Direct Motor Drive*, Dec 29 p 1678
Prentiss, F. L.:
Belts as Inspection Tables*, Dec 1 p 1414
Colburn Machine Tool Co.'s New Plant*, Oct 27 p 1070
Cutting Costs in Champion Machine & Forging Plant*, Aug 11 p 385
Detroit Copper & Brass Rolling Mills, New Plant*, July 14 p 63
Features of National Bronze & Aluminum Foundry*, Sept 1 p 511
Presses:
American Bench Power Broaching*, Nov 3 p 1134
Colburn Heavy Duty Drill*, Dec 1 p 1404
Ferracute Adjustable Bed Punching*, Sept 22 p 738
Hydraulic Lead Molding*, Aug 25 p 475
Lucas Vertical Broaching*, Dec 15 p 1534
Southwark Hydraulic Automobile Body*, Dec 29 p 1670
Waterbury Farrel Plunger*, Nov 3 p 1132
Prices:
Austrian Iron and Steel, Aug 11 p 357; Sept 29 p 849
Belgian Iron and Steel, July 14 p 109; Aug 4 p 307; Sept 22 p 756; Nov 10 p 1244
Bethlehem Steel Co. Reductions, July 7 p 48
British and Continental Iron and Steel, July 21 p 152; Sept 8 p 592
Buying Power and (Editorial), Sept 8 p 611
Coal, Out of Line (Editorial), Oct 13 p 956
Czecho-Slovakian Iron and Steel, July 21 p 173; Aug 18 p 434
Factory Supplies, Revision, Nov 3 p 1146
Ferromanganese Future, Nov 24 p 1353
French Iron and Steel, Sept 8 p 592; Oct 6 p 912
German Iron and Steel, July 7 p 31; July 21 p 152; July 28 p 232; Aug 11 p 374; Aug 18 p 438; Aug 25 p 497; Sept 22 p 755; Oct 6 p 911; Oct 13 p 975; Oct 20 p 1048; Oct 27 p 1109; Nov 3 p 1149; Nov 10 p 1226; Nov 24 p 1369; Dec 1 1442; Dec 8 p 1513
German Tool, Aug 11 p 341
Iron and Steel, Are They Out of Line? Oct 6 p 865
Iron and Steel, Trend 9 Months*, 1921, Oct 13 p 934
Italian Iron, Steel and Metal, July 21 p 172; Aug 18 p 390
Liquidation in Steel (Editorial) Oct 20 p 1017
Nails, Present Retail and Pre-War, Sept 29 p 847
Open Competition Unlawful (Editorial), Dec 22 p 1612
Open, Court in Favor of Associations, Nov 10 p 1243
Open, Decision in Hardwood Association Case (Editorial), Dec 29 p 1681
Open, Government Policy and Trade Organizations, Aug 18 p 395
Open, Government Studying Decision, Dec 29 p 1669
Open, Statement of L. C. Boyle on Decision, Dec 29 p 1697
Open, Trade Associations, Government Studying Decision, Dec 29 p 1669
Open, Trade Associations' Practice Illegal, Dec 22 p 1621
Ore, Foreign and Lake Superior Delivered, 1921, Dec 15 p 1538
Pig Iron and Finished Materials, First Half 1921*, July 7 p 12
Pig Iron Output and (Editorial), Sept 1 p 548
Prosperity and (Editorial), July 28 p 209
Rail Reduction, Oct 27 p 1089
Readjustments (Editorial), Dec 22 p 1618
Relation to Pre-War (Editorial), Dec 8 p 1488
Scrap and Supplies (Editorial), Sept 1 p 549
Steel and Costs (Editorial), Aug 11 p 352
Steel and Rail Freights (Editorial), Dec 1 p 1424
Steel, Federal Trade Commission Assails, Dec 8 p 1476, (Editorial) p 1486
Steel, Interstate Commerce Commission to Investigate, Dec 1 p 1429
Steel, Liquidation,*, Sept 22 p 752; Sept 29 p 823; Oct 27 p 1113
Steel, Past and Present (Editorial), July 14 p 90
Swedish Iron and Steel, Sept 1 p 551; Nov 3 p 1180
Wage Rates and Commodity (Editorial), July 21 p 148
Wire Advance (Editorial), Sept 15 p 682
Pridmore, Henry E., Inc.:
Powdered Coal Under Boilers*, Nov 3 p 1146
Priestley, William J.:
Sulphur and Oxides in Ordnance Steel*, Dec 29 p 1658
Pritchard, J. H., and P. R. Foley:
Take Over Slatington Rolling Mills*, Dec 29 p 1700
Prizes Offered to Employees for Suggestions, Sept 29 p 793
Production Machine Co.:
Utility Polishing and Grinding Machine*, Sept 1 p 546
Production Statistics:
Allegheny County Industries, 1920, Aug 4 p 306
Belgian Pig Iron and Steel Seven Months 1921, Oct 6 p 866
British Steel and Iron, June, Aug 25 p 476; July and August, Sept 15 p 704; September, Oct 20 p 1013; October, Nov 17 p 1286; November, Dec 15 p 1530
By-Product Coke, June, July 21 p 137; July, Aug 18 p 417; August, Oct 6 p 882; September, Oct 27 p 1068; October, Nov 24 p 1371; November, Dec 22 p 1615
Canadian Pig Iron, First Half 1921, Sept 22 p 753
Cast-Iron Pipe, 1914 and 1919, Aug 4 p 258
Coke, June, July 21 p 137; July, Aug 18 p 417; August, Oct 6 p 882; September, Oct 27 p 1068
Copper, United States, 1915-1919, July 21 p 136
Ferromanganese, 10 Months 1921, Nov 17 p 1270
Ingots, Steel, June, July 21 p 140; July, Aug 11 p 349; August, Sept 15 p 707; September, Oct 13 p 943; October, Nov 10 p 1231; November, Dec 15 p 1541; 1900-1920 p 1538
Iron and Steel, Finished Rolled; 1905-1920, Oct 20 p 1009
Iron and Steel in Four Countries, 1913-19-20, May, 1921, July 21 p 140
Iron and Steel, United States, 1913-19-20, May, 1921, July 21 p 140
Pig Iron, New South Wales, 1921, July 21 p 146
Pig Iron, United States, First Half 1921, Aug 18 p 439; 1900-1920, Dec 15 p 1538
Portland Cement, 11 Months 1921, Dec 29 p 1666
Refractories*, July 7 p 10; Aug 18 p 388; Aug 25 p 499; Dec 22 p 1593
Spiegeleisen 10 Months, 1921, Nov 17 p 1270
Steel and Other Outputs (Editorial), July 21 p 149
Steel, Cold Drawn, July 21 p 135
Tin Plate and Terne Plate Manufacture, 1914 and 1919, July 28 p 213
Wire, 1919, Aug 11 p 356
Pullman Co.:
Merger with Haskell & Barker Car Co., Nov 3 p 1131; Nov 24 p 1381; Dec 29 p 1709
Pulverizing and Drying Machine, Alfred Herbert Coal*, Sept 22 p 742
Pump Associations Merged, Aug 4 p 275
Pumps:
Arrow, with Ring-Oiled Packing Gland*, Aug 4 p 254

Jennings Turbine Driven Return Line Heating*, July 14 p 72
Punch and Die Sets, Diamant Standard*, Nov 24 p 1333
Pyrometer, Brown Cold Junction Compensated*, Sept 15 p 680

Q

Quenching Oil Recooling*, Sept 15 p 668
Quigley Furnace Specialties Co.:
Gage for Powdered Coal Bins*, Nov 10 p 1220

R

Railroad Labor Board:
Denies Hearings to Manufacturers in Labor Case, Aug 11 p 339
Effort to Abolish, Sept 22 p 732
Revising War-Time Shop Rules, Dec 8 p 1478, (Editorial) p 1486; Dec 22 p 1606
Railroads:
Earnings, Course of (Editorial), Nov 10 p 1229
Electrification of Plant, Dec 29 p 1663
Employees' Strike Against the People (Editorial), Oct 20 p 1016
Employees' Threatened Strike, Oct 20 p 1022
Freight Carried by, July 28 p 235
Freight Rates, Demand for Readjustment, Dec 8 p 1489
Funding Bill Delayed, Aug 18 p 401
Future Increase in Ton Miles, Sept 15 p 686
Government and Strikes (Editorial), Nov 24 p 1346
Iron Ore Freight Rate Reduction, Oct 13 pp 944, 976, (Editorial), p 956
Labor Board's Wage Decision, Dec 22 p 1606
Plans for Financing, July 14 p 88
Returns in Future (Editorial), Sept 29 p 820
Traffic Problem (Editorial), Aug 25 p 481; Sept 15 p 686
Transportation Costs and Wage Problem Remains (Editorial), Nov 3 p 1156, 1163
Rails:
Belgian Firm Awarded Contract for Tangier-Fez Railroad, Oct 6 p 912
Belgian Sales to Argentine, July 14 p 109
Evolution of the Heavy*, Dec 15 p 1540, (Editorial), p 1552
Failures, Split-Head*, Aug 18 p 393; Sept 8 p 613
Failures, Status of Problems, Dec 22 p 1616
History, Iron and Steel (Editorial), Nov 3 p 1158
Magnetic Surveys of*, Nov 17 p 1271
Price Reduction, Oct 27 p 1089
Specifications, Proposed, Aug 4 p 262
Railway Association:
(See American Railway Association)
Railway Service Corporation:
Leases Erie Railroad Repair Shop, Aug 18 p 410
Ralph, John J.:
Art of Buying, Sept 22 p 757
Buying Responsibility, Nov 3 p 1139
Buying Versus Being Sold, Nov 10 p 1206
Dollar Control, Sept 1 p 514
Ramage, J. H.:
Open-Hearth Port Construction (Discussion), Nov 24 p 1328
Ramp, Herbert W.:
Defective Castings Percentage, July 21 p 131
Ramp, Paul R.:
Open-Shop Foundry, Transition to, Dec 1 p 1395
Rastall, W. H.:
British Machine Tool Exports, Trend of*, Dec 15 p 1545
Head of Heavy Machinery Division Department of Commerce*, Aug 4 p 309
Machinery Exporting, Government Aid, Dec 22 p 1619
Prospects for Foreign Trade in Machine Tools, Oct 13 p 949
Read and Greaves:
Properties of Some Nickel-Aluminum-Copper Alloys, Oct 13 p 961
Read, Thomas T.:
Primitive Iron Smelting in China*, Aug 25 p 451
Readjustments:
Danger in Legislation, Oct 27 p 1077
Demand for Railroad, Dec 8 p 1489
Price (Editorial), Dec 22 p 1613
Stages in (Editorial), Sept 15 p 682
Reaming and Chamfering Machine, Murchey Nipple*, Dec 15 p 1544
Reboring Machine, Van Dresser Cylinder*, Aug 4 p 265
Recooling Quenching Oil*, Sept 15 p 668
Recorder, Mono Duplex Gas*, July 21 p 137
Refractories Manufacturers' Association:
Meeting, Dec 22 p 1604
Refractories:
In the Steel Plant, Nov 24 p 1376
Market, July 14 p 75; July 28 p 217; Aug 4 p 289; Aug 18 p 433; Sept 1 p 526; Sept 15 p 705; Sept 29 p 818; Oct 13 p 979; Oct 27 p 1091; Nov 10 p 1221; Nov 24 p 1371; Dec 8 p 1484; Dec 29 p 1675
Production, 1920, Aug 18 p 388
Production Statistics, Stocks and Shipments*, July 7 p 10; Aug 25 p 499; Dec 22 p 1593
Reinvestment a Present Need in Industry, Dec 22 p 1601
Republic Iron & Steel Co.:
Changes in Sales Organization, Aug 11 p 373
Proposed Merger with Midvale, Lackawanna, Youngstown, Inland, Steel & Tube and Brier Hill Companies, Dec 8 p 1492
Quarterly Report, July 28 p 250; Oct 27 p 1116
Renaud Co.:
Tie-Splicing Machine*, Sept 8 p 607
Research:
Alloy Steels, Special, Dec 22 p 1608
Defects in Extruded Metals, Oct 20 p 996
Graphitic Corrosion of Cast Iron, Oct 13 p 938
Malleable Castings*, Oct 6 p 881
Molding Sand, July 21 p 139; Dec 8 p 1477
Research Association:
(See Copper and Brass Research Association)
Richards, Dr. J. W.:
Electro Chemists Hold Meeting in Memory of, Nov 17 p 1273
Richardson-Phenix Co.:
Consolidates with S. F. Bowser & Co., Dec 15 p 1575
Ricketts, Edwin B.:
Powdered Coal for Boilers, Oct 27 p 1076
Riehle Brothers Testing Machine Co.:
Machine for Testing Hardness of Chilled Wheels*, Sept 15 p 672
Rodan, H. S.:
Fusion Welding and Processes, Discussion, Nov 24 p 1376
Roder, C. T.:
Die Castings and Their Use Dec 1 p 1409
Rogers, Brown & Co.:
Foundry Situation, Sept 1 p 541
Rolfe, R. T.:
Lead in Gun Metal, Oct 13 p 961
Rolling Mills:
Adjustable Speed with Motor Drive*, Dec 22 p 1595
American, for France*, Dec 15 p 1543
Census of Manufacture, 1914-1919, July 14 p 74
Cost of Rolling Steel in Blooming Mills*, Oct 20 p 998
Driver-Harris New, Sept 8 p 602
Electrical Development in, Nov 3 p 1135
Electromagnets in Plate Cooling Bed*, Aug 11 p 321
Interstate Iron & Steel with Pack Cooling Bed*, Oct 6 p 859; Oct 13 p 946
Lubrication in, Dec 29 p 1661
Principles of Modern Practice*, Aug 18 p 396
Sheet Steel, Improved Method of, Dec 1 p 1405
Rope, Strength of Manila, Oct 27 p 1078
Routing and Spotting Attachment, Krag*, Oct 6 p 870
Rubber Dust, Causes and Occurrence of Explosions, July 28 p 240
Ruder, W. E.:
Fusion Welding and Processes, Discussion, Nov 24 p 1376
Rule, Poliakoff Universal Machine Shop, Aug 18 p 400
Russell, H. A.:
Concellations and Large Stocks of Surplus Steel, July 21 p 151
Russia:
American Exports to, Sept 8 p 613

S

Safety, Instruction in Methods, Oct 13 p 947
Safety Code Grinding Wheel Guards*, Dec 22 p 1610
Safety Council:
(See National Safety Council)
Safety Hooks for Handling Plates, Comrie*, Aug 18 p 400
Safety School Graduation, Foremen's, Dec 1 p 1449
Salvaging Companies Suggested to Take Care of Naval Scrap, Nov 24 p 1357
Samuel, Frank:
Ferromanganese, Against a Duty on, Sept 22 p 749; Sept 29 p 794
Sanborn, Walter:
Industrial Conditions, Oct 13 p 950
Sand:
American Foundry Cutting Machine*, Oct 27 p 1076
Conservation of Molding, Nov 17 p 1288
Pig Iron from, Black, July 14 p 83
Research of Molding, July 21 p 139; Dec 8 p 1477
Sand Blast Barrel, Pangborn*, Oct 27 p 1078
Sanding Machine, Oliver Belt*, Sept 8 p 599
Savage Mountain Fire Brick Co.:
Clay Deposits to Last 100 Years, Oct 6 p 870
SaveAll Tool Co.:
Safety Quick Change Drill Chuck*, Dec 8 p 1480
Savings Scheme, Industrial*, Oct 27 p 1064
Schiefer, H. V.:
Sintering Flue Dust with Minimum Labor*, Nov 3 p 1141
Scharschu and Unger:
Induction Electric Furnace, Aug 18 p 344
Schneider, Eugene:
Hot Drawing on the Mandril, Sept 29 p 800; Oct 13 p 930

Schumann, A. G. and A. F.:
Open-Hearth Improvements*, Aug 4 p 269
Schwab, Charles M.:
Danger in Readjustment Legislation, Oct 27 p 1077
Scleroscope:
Hardness of Steel Balls*, Dec 1 p 1391
Improved Shore*, Nov 17 p 1266
Scrap:
American Railway Classification, Aug 25 p 478
Disposal in Crompton & Knowles Works, July 21 p 125
Electric Melting of Cast Iron, Aug 4 p 283
Ferrous, Increasing Fund, July 28 p 187
Freight Rates, Conference on Reclassification, Dec 1 p 1411
High Sulphur Cast-Iron (Editorial), July 14 p 91
Hog Island, Plans to Dispose of, Dec 29 p 1666
Naval, Salvaging Companies Suggested, Nov 24 p 1357
Prices and Supplies (Editorial), Sept 1 p 549
Steel Tonnage in Limitation of Armament, Nov 17 p 1279
Screws:
Kindt-Collins Dowel for Patterns*, Nov 3 p 1152
Parker, for Assembling Die Cast Parts*, Oct 13 p 951
Parker, for Attaching Nameplates to Machinery*, Nov 3 p 1152
Screw Machines, Pearson-Scott Attachment for Hand*, Aug 18 p 406
Sehl, J. B.:
Proper Cost Accounting, Aug 18 p 391
"Semi-Steel," Cupola (Editorial), July 14 p 92
Shadgen, Joseph H.:
Explosion Hazard and Its Prevention*, July 21 p 127; July 28 p 205
Iron Blast Furnace*, Aug 25 p 465
Shale, Producing Oil from Waste, Nov 10 p 1224
Shapers:
Fellows Gear*, Dec 22 p 1607
Stevenson Multiple*, July 21 p 197
Sharon Pressed Steel Co.:
Hand Truck, for Heavy Service, Dec 1 p 1398
Heavy Duty Tractor Trailer*, Sept 8 p 599
Sharon Steel Hoop Co.:
Reduces Wages, July 14 p 110
Sharpless, Frederick F.:
Secretary American Institute of Mining and Metallurgical Engineers*, July 14 p 93
Shaw Crane Co.:
Crane for Ford Railroad Shop, Sept 15 p 671
Shears:
Niagara Power Squaring*, July 7 p 9
Niagara Ring and Circle*, July 14 p 71
Southwark-Gray Turret Rotary*, Oct 6 p 876
Sheet Metal Products Association:
Convention, Dec 15 p 1546
Shenango Furnace Co.:
Crane Operating Costs at Blast Furnaces*, Oct 13 p 935
Sherlock, Chelsa C.:
Workmen's Compensation, July 21 p 145
Shield, Kinney Tapping Hole*, July 21 p 126
Shipbuilding, Steel and (Editorial), July 14 p 92
Shipments, Iron and Steel, Second Quarter 1921, Oct 6 p 868
Shore Instrument & Mfg. Co.:
Scleroscope, Improved*, Nov 17 p 1266
Shovel, Osgood Rubber Tired Steam, Sept 15 p 680
Silberberg, Mortimer J., Co.:
Time Study Watch*, Aug 18 p 390
Silicon Additions to Steel, Aug 25 p 458, (Editorial), p 482
Simonds, Alvan T.:
Licensing Business, July 14 p 86
Sintering:
Flue Dust at Cambria Plant*, Nov 3 p 1141
Krom System*, Sept 29 p 794
Sintering Engineering Co.:
Krom Sintering System*, Sept 29 p 794
Slag:
Foundry, Characteristics of Cokes and, Aug 18 p 407
Preparing Blast Furnace*, Aug 25 p 461
Slatington Rolling Mills:
Taken Over by P. R. Foley and J. H. Pritchard*, Dec 29 p 1700
Sligo Furnace Co.:
Furnace To Be Abandoned, Sept 15 p 707
Smith & Serrell:
Light Duty Francke Couplings, Oct 13 p 981
Smith, R. Percival:
British View of American Steel Making, Sept 8 p 589
Société Anonyme des Acieries de Micheville:
Installing American Rolling Mills*, Dec 15 p 1542
Society of Automotive Engineers:
Universal Steel Classification Code, Sept 1 p 515; Sept 22 p 750
Society of Industrial Engineers:
Convention Announcement and Program, Sept 8 p 599
Convention Proceedings, Oct 13 p 952
South Africa:
Blast Furnace, First Modern, Sept 8 p 608
Imports, 1920, Sept 15 p 665
South Bend Lathe Works:
Change Gear Lathes*, Sept 15 p 659
Southern Coal & Iron Corporation:
Leases Pennsylvania Anthracite Mines, Nov 3 p 1131
Southern Ohio Pig Iron and Coke Association:
Annual Meeting, Oct 6 p 864
Southern Pacific Co.:
Electric Furnace Operations*, Sept 8 p 581
Southwark Foundry & Machine Co.:
Hydraulic Automobile Body Press*, Dec 29 p 1670
Turret Rotary Shears*, Oct 6 p 876
Spain:
Machinery Demand, Sept 8 p 608
Special Libraries Association:
Libraries in Industry, Oct 27 p 1114
Specifications:
Alloy Sheet Steel*, Sept 8 p 594; Sept 15 p 655
Carwheel, and Southern Charcoal Pig Iron, Aug 25 p 482; Dec 1 p 1427
Cast Iron Railroad Carwheels, Dec 22 p 1603
Rail, New Proposed, Aug 4 p 262
Steel Forgings, Testing Society's, Sept 29 p 806
Tool Steel, Sept 15 p 669
Speed Control Devices, Oilgear Machine*, Sept 22 p 741
Spiegeleisen Production, 10 Months 1921, Nov 17 p 1270
Spotting and Routing Attachment, Krag*, Oct 6 p 870
Springfield Foundry Co.:
Strike Declared Illegal, Sept 29 p 801
Stainless Iron (Editorial), Sept 22 p 747
Standard Foundry Co.:
Acquired by Crompton & Knowles Loom Works, Nov 24 p 1380
Standard Parts Co.:
Forge Plant Sold, Dec 22 p 1622
Standard Tin Plate Co.:
Resumes Operations, Sept 29 p 845
Standard Parts Co.:
Finances, Aug 4 p 312; Aug 25 p 464
Standardization:
Gear Association Programs for Committees*, Oct 20 p 1001
Gears, Progress*, Oct 20 p 1001
Greasing Ways (Editorial), Oct 20 p 1018
Interchangeable Manufacture, Aug 4 p 274
Significance to Industry and the Government, Dec 15 p 1530
Stang, A. H.:
Tests of Rotary Drill Pipes*, Sept 29 p 804
Stavely Coal & Iron Co.:
Oil from Waste Shale, Nov 10 p 1224
Steel:
Alloy, for Bridges, Nov 17 p 1287; (Editorial), p 1157
Alloy Sheet, Specifications, Analyses and Manufacture*, Sept 8 p 595; Sept 15 p 655; Sept 22 p 725
Alloys, Research on Special, Dec 22 p 1608
And Iron Prices, Are They Out of Line? Oct 6 p 865
As An Index (Editorial), July 14 p 90
Automotive Industry, Decreased Demand for, Oct 20 p 1048
Basset Direct Process Not Yet Commercial, Sept 22 p 754
Belgian Production, Seven Months 1921, Oct 6 p 866
Carbon, Embrittling Effect of Pickling Upon*, Aug 11 p 334; Sept 15 p 685; Sept 22 p 750
Code, Universal Classification, for Automotive, Sept 1 p 515; Sept 22 p 750
Cold Drawn, Production and Uses, July 21 p 135; Aug 11 p 355
Consumption, Lines of (Editorial), Oct 27 p 1086
"Contract" Buying (Editorial), Sept 22 p 748
Cracks in Case-Hardened Objects, Causes of*, Aug 18 p 399
Demand Subnormal (Editorial), Aug 4 p 281
Drill, Manufacture from Hollow Ingots*, Sept 8 p 596
Drill, Plans to Study Breakages, Sept 22 p 722
Drill Sharpening*, July 7 p 8
Etching Methods Revealing Strain*, Dec 1 p 1401; (Editorial), Dec 8 p 1488
Exports to Canada, New Regulation, July 21 p 134
Fabricating in Transit Sept 1 p 563, Sept 8 p 708; Granted, Sept 15 p 688
For Boiler Tubes vs. Copper (Editorial), Aug 11 p 354
For the Farm (Editorial), Dec 22 p 1614
Freight Rate Hearings at St. Louis, Dec 22 p 1615
Fuel Requirements of Mills, Sept 29 p 811
Heat Treatment Curves, Sept 29 p 801
Heat Treatment of Rock Drill, July 7 p 7
Hot Drawing on the Mandril, Sept 29 p 800; Oct 13 p 930
Imports, Seven Months, Sources of, Sept 22 p 737
In American Ships, July 21 p 138
Ingot Production, June, July 21 p 140; July, Aug 11 p 349; August, Sept 15 p 707, (Editorial) p 684; September, Oct 13 p 943
Ingot Production, Where it is Going (Editorial), Nov 17 p 1285
K. S. Magnet, July 14 p 82
Leaves from a Melter's Note Book (Car Coupler Design to Resist Shock), Nov 24 pp 1337, 1379

Low Carbon, Weldability of, Oct 13 p 948
Lumber, for Building Construction*, Nov 24 pp 1331, 1373
Magnetic Testing, Progress (Editorial), Dec 1 p 1425
Making, British View of, Sept 8 p 589
Mechanical Properties at High Temperature, Sept 29 p 801
Need of a Survey in (Editorial), Oct 6 p 884
Nitrogen in*, July 7 p 1
Ordnance, Sulphur and Oxides in*, Dec 29 p 1658 (Editorial), p 1683
Pickling, Prevention of Brittleness in, Oct 6 p 886
Price Liquidation, July 14 p 93; Sept 22 p 752*; Sept 29 p 823
Price Readjustment First Half 1921*, July 7 p 12
Price Trend, Nine Months 1921*, Oct 13 p 934
Prices and Costs (Editorial), Aug 11 p 352
Production, Finished Rolled, 1905-1920, Oct 20 p 1009
Progress in Making (Editorial), Sept 1 p 548
Reinforcing for Road Use*, Nov 10 p 1222
Reworking (Editorial), Dec 15 p 1550
Sheet, Improved Methods of Rolling, Dec 1 p 1405
Shipbuilding and (Editorial), July 14 p 92
Silicon Additions to Basic, Aug 25 p 458 (Editorial), p 482
Structural, Failures, Aug 18 p 409
Surplus, Cancellations and, July 21 p 151
War and Reaction in (Editorial), Nov 24 p 1346
Steel & Tube Co. of America:
Bessemer Plant*, Nov 10 p 1199
Proposed Merger with Midvale, Lackawanna, Republic, Youngstown, Inland and Brier Hill Companies, Dec 8 p 1492
Steel Industry:
Census of Manufacture, 1914-1919, July 14 p 74
Companies Not Dependent Upon Lake Ores, Dec 15 p 1536
Earnings (Editorial), Nov 3 p 1157
Electrical Development in, Nov 3 p 1135
Expansion Prospects and German Competition, Sept 22 p 743
Fuel Economy, Nov 10 p 1216
How Disarmament Affects, Nov 17 p 1279
Mills in the Running (Editorial), July 28 p 209
Relations of Chemical, Iron and*, Nov 24 p 1329
Steel Treaters' Association:
(See American Society for Steel Treating)
Sterner-Rainer, Dr. R.:
German Aluminum Industry, Oct 27 p 1067
Stevens Institute:
50th Anniversary, Dec 22 p 1623
Stevenson, A. A.:
Standardization in Industry and Government, Dec 15 p 1530
Stevenson Gear Co.:
Multiple Shaper*, July 21 p 197
Stolp Co., Inc.:
Automatic Lockseaming Machine*, Aug 25 p 475
Stoltz, G. E.:
Adjustable Speed for Motor Driven Mills, Discussion*, Dec 22 p 1598
Cost of Rolling Steel in Blooming Mills*, Oct 20 p 998
Stores Keeping in Erie Forge & Steel Plant*, Aug 4 p 253
Stoughton, Bradley:
Progress in Metallurgy of Iron and Steel, Oct 13 p 939
Stroud, Arva:
R. V. Electric Precision Grinder*, Nov 3 p 1148
Succop, C. F.:
Efficient Journal Bearings, July 14 p 92
Sulphur and Oxides in Ordnance Steel*, Dec 29 p 1658 (Editorial), p 1683
Superpower Report on Fuel Saving, Nov 10 p 1217
Supply and Machinery Dealers' Association:
(See National Supply and Machinery Dealers' Association)
Surplus Material, Inventory of Emergency Fleet Corporation, Oct 27 p 1093
Swaging Machine, Langelier*, Dec 1 p 1416
Sweden:
Iron and Steel Prices, Sept 1 p 551; Nov 3 p 1180
Iron Ores, Park & Williams to Import, Sept 8 p 606
Swords for Generals of the American Revolution*, Aug 4 p 283
Symposium on Non-Ferrous Metallurgy, Oct 6 p 879

T

Talbot, Benjamin:
Open-Hearth Furnace, New*, Nov 24 p 1335
Talbot, Howard H.:
Double Helical or Herringbone Gears*, Dec 8 p 1469; Dec 15 p 1531
Taps:
And Die Holder, Warner and Swasey*, July 28 p 204
Geometric Solid Adjustment*, Sept 1 p 542
Tapping Hole Shield, Kinney*, July 21 p 126
Tapping Machines:
Hy-Speed Automatic*, Nov 3 p 1134
Langelier Drilling and*, Aug 11 p 338
Tariff:
Alloy Steel, Brief of J. A. Matthews, Sept 1 p 534
American Valuation Plan, Advantages, Aug 18 p 413, 437; Dec 8 p 1481
American Valuation, Plans for Determining, Aug 4 p 285; Aug 11 p 375
Bars, Brief of Willis L. King, Sept 1 p 532
British Protective, Aug 25 p 474
British View on Vanadium, Sept 22 p 751
Cotton Ties, Brief of Severn P. Ker, Sept 1 p 535
Discussion in House, July 14 p 94
Ferromanganese, Brief of Lavino Furnace Co., Sept 8 p 603, Sept 22 p 749; Sept 29 p 794
Ferromanganese, Exceptions Filed, Sept 29 p 846
Ferromanganese, Duty Favored on Foreign, Sept 8 p 603
Hearings, July 28 p 214; Aug 25 p 468; Sept 1 pp 527, 564; Sept 8 p 603
Hearings of British High-Speed Steel Makers, Sept 1 pp 527, 568; Sept 8 p 605
Legislation, Delay, Nov 24 p 1334; Dec 22 p 1620
Manganese and Magnesite Hearings, Sept 1 pp 532, 537, 565; Sept 8 p 603
Manganese, Steel Makers Oppose Duties on, July 21 p 155
Manganese, Why High Duties on? (Editorial), Aug 4 p 280
Metal Schedule, July 7 pp 19, 27, (Editorial), p 24
Metal Schedule, Comparisons, July 7 p 27
Metal Schedule, Features of, July 7 p 17; July 21 p 153
Pipe, Brief of J. A. Campbell, Sept 1 p 530
Plea from Pacific Coast for Protection, Oct 6 p 913
Sheets, Brief of N. H. Abbott, Sept 1 p 536
Strips, Brief of Severn P. Ker, Sept 1 p 535
Tin Plate, Brief of E. R. Crawford, Sept 1 p 533
To Extend Emergency, Oct 20 p 1013
Wire, Brief of J. A. Campbell, Sept 1 p 530
Payments on Appreciated Capital, Sept 15 p 671
Taxes:
Revised Bill, Aug 18 p 412; Aug 25 p 487; Oct 6 p 868; Dec 1 p 1413
Revision, Legislation on, July 28 p 228; Aug 4 p 277; Aug 11 p 375
Senate to Increase Revenues in Its Bill, Sept 8 p 600
Steel Corporation, July 28 p 250
Taylor Society:
Convention Program, Nov 3 p 1151
Proceedings of Convention, Dec 8 p 1463
Taylor Welder Co.:
Bench Type Spot Welder*, Aug 25 p 464
Temple Furnace Co.:
Owners to Apply for Charter, Aug 11 p 323
Terne Plate:
Production, 1914 and 1919, July 28 p 213
Testing Machine Helps, July 14 p 87
Riehle for Determining Hardness of Chilled Wheels*, Sept 15 p 672
Testing Machines:
Krupp Repeating Impact, Aug 18 p 409
Testing Materials Society:
(See American Society for Testing Materials)
Tests:
Ball and Roller Bearings, Dec 1 p 1419
Magnetic Progress in (Editorial), Dec 1 p 1425
Rotary Drill Pipes*, Sept 29 p 804
Tetard, Louis C.:
Price Reductions in Steel, Sept 29 p 823
Thompson, John G.:
Training in Economics, Preparation for Business Career, Aug 25 p 482
Threading Machines:
Curtis Cutting and*, Dec 8 p 1480
Geometric Bench*, Sept 1 p 542
Thrift and Progress (Editorial), Dec 29 p 1681
Tie-Splicing Machine, Renaud*, Sept 8 p 607
Time Study:
Application in Foundry, Oct 13 p 958
Silberberg Watch for*, Aug 18 p 390
Tin Plate:
American Preferred (Editorial), Sept 22 p 747
Campaign for Greater Use, Nov 17 p 1307
Freight Rates, Nov 24 p 1347; Dec 15 p 1553
French Duty on, Sept 22 p 776
Manufacture in Norway, Aug 25 p 463
Production, 1914 and 1919, July 28 p 213
Revival (Editorial), Dec 1 p 1425
Tire Plant of Kelly Springfield Tire Company*, Nov 17 p 1259
Tismer, Paul G.:
Gas Engine Piston Without Rings*, July 14 p 81
Titanium Problem, Solving the (Editorial), Oct 27 p 1087
T. M. C. Mfg. Co.:
Axle Shaft Turning Machine*, Sept 1 p 525

Tool Steel Practice, Electric*, Oct 27 p 1061
Topping, John A.:
Testimony in Ore Freight Rate Hearings, Dec 15 p 1535
Testimony Before Senate Tariff Committee, Sept 1 pp 527, 564
Tower, Walter S.:
To Be Connected with the Department of Commerce, July 14 p 114; July 21 p 174*
Towne, Henry R.:
American Society of Mechanical Engineers to Confer Honorary Membership on, Nov 24 p 1342
Townsend Co.:
Improvements, Nov 24 p 1380
Tractor Companies Consolidate, Aug 18 p 410
Trade Associations:
Allowable Practices in Collecting and Disseminating Statistics, Aug 11 p 337
Government Open Price Policy and, Aug 18 p 395
Government Studying Open-Price Decision, Dec 29 p 1669
Useful in Solving Business Problems, Nov 3 p 1150
Traffic Problem (Editorial), Aug 25 p 481
Trailer, Sharon Heavy Duty Tractor*, Sept 8 p 599
Tramrail in Globe Machine & Stamping Plant Reduces Costs*, Dec 15 p 1523
Trent, Walter E.:
Process for Cleaning Powdered Coal, Aug 11 p 323
Triplex Machine Tool Corporation:
Combination Bench Machine*, Dec 1 p 1394
Trolley System, Whiting Overhead*, July 2 p 139
Trucks:
Motor, Van Dorn Co. Plant for Making Bodies*, Oct 13 p 937
Sharon Heavy Service Hand, Dec 1 p 1398
Trumbull-Cliffs Furnace Co.:
600-Ton Blast Furnace*, Sept 15 p 673; Sept 22 p 730
Truscon Steel Co.:
Pressed Steel Tunnel Linings*, Aug 11 p 336
Tube Manufacture, Welded*, Nov 17 p 1274
Tunnel Linings, Truscon Pressed Steel*, Aug 11 p 336
Turning Machines:
Jones Vertical Boring and*, Aug 11 p 350
T. M. C. Axle Shaft*, Sept 1 p 525
Webster & Bennett Duplex Boring and*, July 14 p 84
Tyler, Paul M.:
German Tool Prices, Aug 11 p 341
Wages in British Steel Industry, July 28 p 191
Tyrrell, William:
Pig Iron from Black Sands, July 14 p 83

U

Unemployment:
Key Points in (Editorial), Sept 29 p 820
Long Range Planning of Public Works to Relieve, Dec 29 p 1666
Conference (Editorial), Sept 22 p 746; (Editorial), Oct 13 p 957
Conference, Committee Recommendations, Oct 6 p 915
Conference Sessions, Sept 29 p 818, 843
Industrial Leaders Among Conference Members, Sept 22 p 754
Unger and Scharschu:
Induction Electric Furnace*, Aug 18 p 344
United Engineering & Foundry Co.:
Installing Rolling Mills in France*, Dec 15 p 1542
United States Steel Corporation:
Abrogates Basic 8-Hr. Day, July 14 p 110
Analysis Methods, Sept 8 p 588
Chart Showing Employment, Pig Iron Production and Unfilled Orders for Seven Years*, Aug 25 p 459
Dismantling Mobile Shipyard, Dec 8 p 1491
Prices, Aug 4 p 310
Prices and Overtime Pay, July 14 p 110
Quarterly Statement, July 28 p 231; Oct 27 p 1109
Rail Price Reduction, Oct 27 p 1089
Steamship Lines Through Panama Canal, Rehearing, Sept 29 p 795
Stock Subscription to Employees, Dec 29 p 1675
Stockholders, July 7 p 44
Taxes, July 28 p 250
Unfilled Orders, July 21 p 139; Aug 18 p 388; Sept 15 p 705; Oct 13 p 976; Nov 17 p 1278; Dec 15 p 1541
Wage Reduction, Aug 25 p 501
Universal Boring Machine Co.:
Horizontal Boring Machine*, Dec 29 p 1662
Precision Machine Alining Level*, Sept 29 p 802
University of Michigan:
Course for Factory Foremen, July 14 p 84
Utah Steel Corporation:
Plans, Dec 1 p 1449

V

Valves, Mattingly Safety Gage Glass for*, Oct 20 p 1021
Van Deventer, F. M.:
Adjustable Speed with Motor Driven Mills, Discussion*, Dec 22 p 1600
Vanadium:
British View of Tariff on, Sept 22 p 751
Production in Peru, Aug 18 p 389
Van Dorn Iron Works Co.:
Making Dump Bodies for Motor Trucks*, Oct 13 p 937
Van Dresser Cylinder Reboring Tool*, Aug 4 p 265
Vauclain, Samuel M.:
American Industry and Outlook Abroad, Nov 3 p 1150
Velco Mfg. Co.:
Broaching Machine, Heavy-Duty*, Sept 1 p 526
Verity, George M.:
Liquidation in Steel Prices, Oct 27 p 1113
Vertomatic Mfg. Co.:
Jackson Chucking Machine*, Oct 27 p 1069
Vise:
Athol U-Beam*, Dec 8 p 1480
Oliver Universal*, Nov 3 p 1152

W

Wages:
Agreement of Bar Iron and Amalgamated Associations, Aug 4 p 287
British Steel Industry, July 28 p 191
Coal and Coke, July 7 p 54; Aug 25 p 467; Sept 15 p 689; Sept 22 p 740
Coal, Union Refusal of Modification, Sept 15 p 680
Effect of Hourly Rate Reductions, Oct 13 p 958
German, July 21 p 137
Iron Workers, Sept 1 p 550
Mechanics in New York State, Nov 22 p 1208
Puddlers', Nov 3 p 1162
Rates Abroad, Aug 11 p 343
Rates and Commodity Prices (Editorial), July 21 p 148
Reasons for Revisions, July 21 p 133
Reductions, July 7 p 48, 54; July 14 p 110; July 21 p 130; Aug 4 p 290
Reductions a Buying Factor (Editorial), Sept 1 p 550
Reductions in Cincinnati, Oct 13 p 963
Settlement on Industrial Prospects, Dec 29 p 1682
Sheet and Tin Mill, July 21 p 136; Nov 17 p 1287
Steel Corporation Reduction, Aug 25 p 501
Steel Liquidation (Editorial), Oct 27 p 1086
Walden-Worcester, Inc.:
To Be Reorganized, Sept 8 p 633
Wins Trademark Decision, Aug 11 p 349
Walker, Arthur L.:
Member of Board of Engineering Foundation, Nov 10 p 1224
Wall Set for Distilling Water, Griscom-Russell*, Oct 6 p 864
Waltham Machine Works:
Automatic Thread Milling Machine*, Sept 1 p 546
War:
Legal Tangles of Peace, Dec 1 p 1402
Materials, Proposal to Abolish Private Manufacture of, Dec 8 p 1484
Reaction in Steel and (Editorial), Nov 24 p 1346
War Department:
Bids on Hangar, Sept 15, Sept 1 p 545
Labor Claims on Bethlehem Steel Co. Disapproved, Sept 8 p 619
Mobilization Plan, Dec 22 p 1618
Warehouses, Statistics of Commodity Consumption, July 7 p 15
Warner & Swasey Co.:
Clutch Tap and Die Holder*, July 28 p 204
Washington Steel & Ordnance Co.:
Dissolved, Dec 8 p 1512
Waste:
Causes in Metal Trades, July 28 p 216
Industrial, Discussion at A. S. M. E. Meeting, Dec 8 p 1494; Dec 15 p 1554
Questionnaire for Elimination of, Dec 8 p 1464
Sources in Building Industry, Aug 11 p 347
Watch, Silberberg Time Study*, Aug 18 p 390
Water Transport Co.:
River Traffic, Between St. Louis and Pittsburgh, Nov 3 p 1152; Nov 17 p 1287; Dec 8 p 1477
Waterbury Farrel Foundry & Machine Co.:
Plunger Press for Multiple Operation*, Nov 3 p 1132
Webster & Bennett, Ltd.:
Duplex Boring and Turning Mill*, July 14 p 84
Weight Cards, American Sheet & Tin Plate Co., Sept 22 p 751
Weirton Steel Co.:
Operations, Sept 1 p 551
Welding:
Alloy Sheet Steel, Electric and Acetylene*, Sept 22 p 725
Fusion, and Processes*, Nov 24 p 1374
Fusion, Possibilities of, Aug 11 p 327
General Electric Arc Lead*, Nov 24 p 1332
General Electric Arc Sets*, July 21 p 141
Low Carbon Steel, Oct 13 p 948
Tube Manufacture*, Nov 17 p 1274
Welding Machine:
Taylor Bench Type Spot*, Aug 24 p 464

Welfare Work for Employees, July 21 p 170
Wellman-Seaver-Morgan Co.:
Coal Trimmer*, Aug 4 p 276
Werner, Fritz, Co.:
Machine Tool Plant*, Aug 4 p 256
Westinghouse Electric & Mfg. Co.:
Electric Crane Safety Switch*, Sept 22 p 722
Electrifying Chilean State Railroad, Oct 6 p 869
Wheeling Steel Corporation:
Extensions, Oct 27 p 1076
Labor Controversy, Aug 18 p 418; Aug 25 p 473; Sept 1 p 551
Wheels:
Car, Chilled, Riehle Machine for Testing Hardness of*, Sept 15 p 672
Car, Molding in Brown Works*, Sept 15 p 662
Hobbing Large Worm*, Sept 8 p 593
Whitaker-Glessner Co.:
Railroad Not Obliged to Interchange Switching, Aug 18 p 412
Resumes Operations on Open Shop Basis, Sept 22 p 775
Whiting Corporation:
Over-Head Trolley System*, July 21 p 139
Williams, A. D.:
Heat Utilization, Oct 6 p 886
Open-Hearth Furnace Design*, Sept 22 p 719
Williams, John:
Tariff Protection on Pacific Coast, Oct 6 p 913
Wilmarth & Morman Co.:
Surface Grinder with Swivel Sub-Table*, Nov 24 p 1336
Wilson, B. F., Jr.:
Carwheel Specifications and Southern Charcoal Pig Iron, Dec 1 p 1427
Wire:
Output, 1919, Aug 11 p 356
Price Advance (Editorial), Sept 15 p 682
Rope, Attaching to a Socket, Dec 15 p 1525
Straightening and Cutting Machine, Bevington*, Aug 11 p 340
Wolf, Archibald J.:
Chief of Division of Commercial Laws, July 28 p 196
Wolfe, A. J.:
Legal Tangles of Peace, Dec 1 p 1402
Wolvin, Roy M.:
Canadian Steel Industry Outlook, July 14 p 68
Wood, Harold F.:
Electric Furnace Heat Treatment, Discussion, Aug 4 p 267
Wood, R. D. & Co.:
Plans, Dec 22 p 1615
Wright, G. F., Steel & Wire Co.:
Organized, Sept 15 p 679
Wright Mfg. Co.:
Triple Hook Hoist*, Nov 24 p 1332

Y

Yale & Towne Mfg. Co.:
To Establish Plant in Germany, Dec 15, p 1543
Youngstown Sheet & Tube Co.:
Proposed Merger with Midvale, Lackawanna, Republic, Inland, Steel & Tube and Brier Hill Companies, Dec 8 p 1492
Youngstown Wire & Iron Co.:
Locker System*, July 14 p 69

Z

Zinc:
World Stocks, Aug 25 p 464
World's Supply, July 28 p 208

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An Occurrence of Nitrogen in Steel

Effect of Gases on a Light Forging Left Accidentally in a Furnace Flue — Critical Analysis of the Resulting Structures

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THE presence and effects of nitrogen in steel have recently received considerable study, especially as applied to arc welding, case hardening and the erosion of guns. The present instance is described, therefore, not as being of any practical value in itself but as a possible addition and confirmation to results already obtained in other cases.

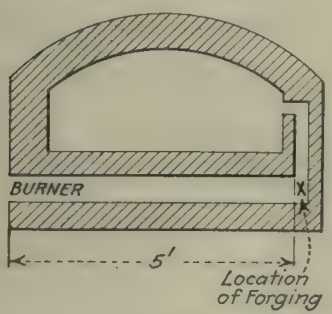


Fig. 1 (Left)—The Type of Furnace and the Location of the Forging

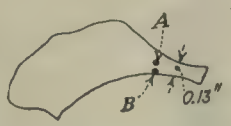


Fig. 2 (Above) Actual Size and Dimensions of the Piece Examined

A drop forged connecting rod of light weight design and made of steel conforming to the composition No. 1035, of the specifications of the Society of Automotive Engineers, was lodged in the flue of an underfired heat treating furnace, due to carelessness on the part of one of the helpers in charging the furnace. The type of furnace and relative location of forgings and burner are shown in Fig. 1. Some two months later, the highly oxidized remains of the forging were found and removed while repairing the furnace. During this time, the temperature in the furnace proper had at no time exceeded 1600 deg. Fahr. and generally was used for tempering heats, at from 1100 to 1200 deg. Fahr. The temperature in the flue probably did not exceed 1700 to 1800 deg. Fahr. The fuel used in the burners was natural gas and air was furnished by a low pressure blower system.

The portion of the forging that still remained solid steel was cut in half, longitudinally, the actual size and dimensions being shown in Fig. 2. The dimensions of the forging in the plane at right angles to that of the section shown, were approximately double those of the section.

Microscopic examination of the piece revealed the needle structure shown in Fig. 3, generally accepted to be typical of iron nitride. Similar structures have been stdied by Miller[1], Comstock[2], Rawdon[3], Knight, Northrup[4] and others, additional discussions and further references in connection with these articles furnishing additional information on the subject.

As might be expected, the needles were in greatest abundance in the narrowest part of the section, the number diminishing rather rapidly towards the heavy end. Thus, Fig. 3 is of the center of the thinnest section and Fig. 4 is from the center of the tapered por-

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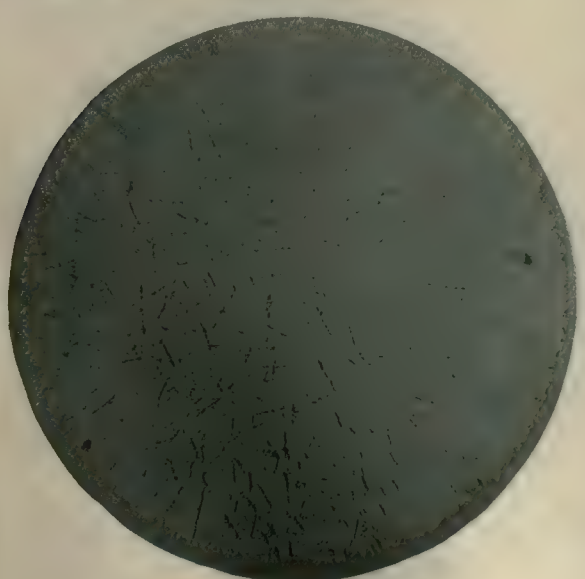


Fig. 3. 200 diameters



Fig. 4. 200 diameters



Fig. 5. 200 diameters



Fig. 6. 500 diameters



Fig. 7. 200 diameters



Fig. 8. 500 diameters

tion of the specimen, at A in Fig. 2. The reduction in the number of needles is very marked. In the heavy section, no needles at all were found. On the other hand, there appeared to be a tendency toward a greater concentration in the central portions of the section rather than at the edges; thus, Fig. 5 is taken at the edge of the tapered section, designated by B in Fig. 2, and shows much less nitride than Fig. 4, from the center of the same locality.

At first glance, it would appear that the needles are indiscriminate as to direction, but closer examination shows them to follow fairly consistent directions at well defined angles to each other in the same grain. This has been noted by Rawdon[3] also. Often twinning occurs, resulting in star shaped formations, as seen in Figs. 3 and 6. Occasionally, very marked parallel formations were found, as shown in Fig. 7. In a few rare instances, needles were found to pass from one grain into another, seen in Fig. 8, and as found by Rawdon[3] and others. Generally, however, what appeared to be cases of this nature were found upon closer examination to be two individual needles starting at the same point on the grain boundary.

Quite often needles originated at the same point on a grain boundary, extending into their respective grains at different angles. This is seen in Fig. 9 at a number of places. The needles do not always occur as continuous straight lines, being occasionally found in a zig-

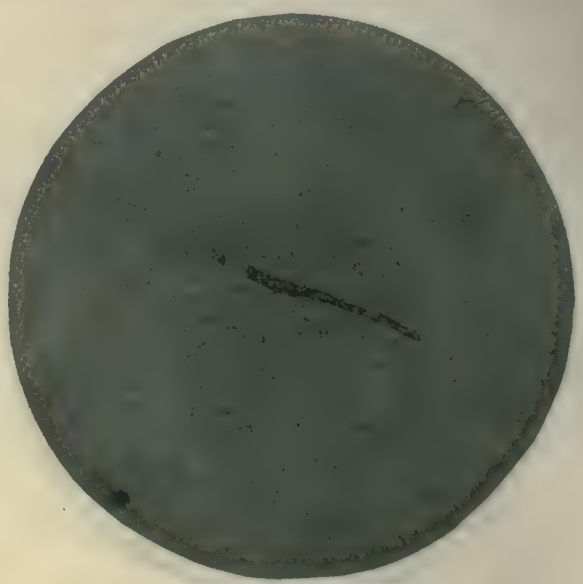


Fig. 9. 200 diameters

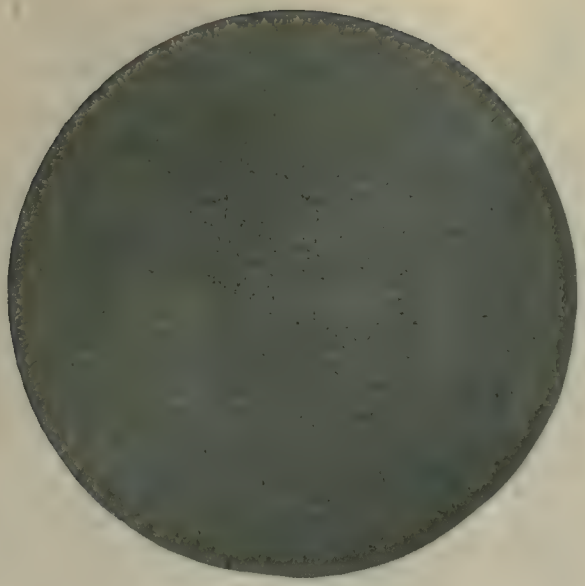


Fig. 10. 200 diameters

zag formation. Instances of this kind are shown in Figs. 3 and 6. This phenomenon is noticeable also in a number of photographs previously published. The appearance may be described as "side-stepping," that is, the needle appears to follow one cleavage plane for a distance, then turning into a crossing plane for a short distance, and turning again following the first direction but in a plane parallel to the original one.

Rawdon[a] and Miller[1b] report groups of fine small needles, which were found frequently in the present instance, in greater abundance where the larger needles were not so prevalent, as shown in Figs. 7, 8, 9, 10 and 13. It was found to be characteristic that large and small needles did not exist in close contact. Thus, reference to these photographs shows that where a large needle occurs in a field of small ones, the large one is always surrounded by a small area of clear metal. This appears to indicate a considerable tendency on the part of the nitride to form in larger masses. Thus, where conditions permit—probably a question of temperature—this tendency is great enough to cause so rapid a formation of a large plate as to leave the surrounding areas impoverished of this material.

Very frequently, the needles are found originating at the grain boundaries and it seems possible that those appearing in the central portions of the grains are, in reality, simply cross sections of needles, or really plates, which have grown up or down from grain



Fig. 11. 900 diameters

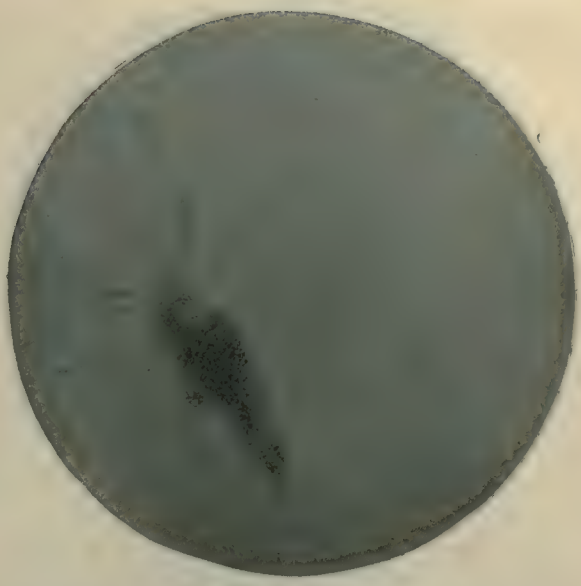


Fig. 12. 500 diameters



Fig. 13. 500 diameters



Fig. 14. 200 diameters

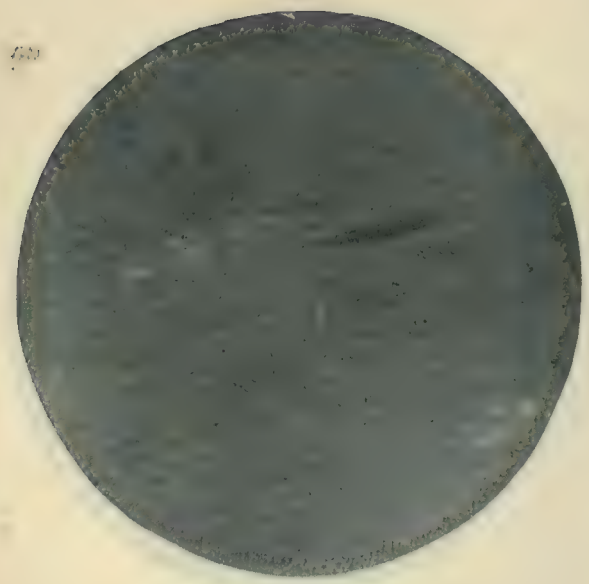


Fig. 15. 200 diameters

boundaries below the polished surface or from boundaries above the surface, and which have been removed in preparation of the sample, that is, that all needles originate at grain boundaries.

In many instances what appear to be distinct openings between the grains were found. Figs. 4 and 5 show such openings clearly. It will be noted these double lined openings extend a short distance and then close up to the normal single line grain boundary, indicating that their occurrence is not due to a polishing or etching condition. Fig. 11 shows one of these openings at higher magnification, and here, too, it is seen that the opening closes to a single line in the lower end of the photograph. These conditions seem to indicate a separation of the grains due to their long period at high temperatures, forming an avenue of entrance for nitrogen and oxygen.

The mechanism of the decarbonization is illustrated in Fig. 12 showing an area of pearlite only partially decarbonized, the outer portion, i.e., along the grain boundaries, being attacked first. Fig. 13 shows another instance of the same character.

This expansion between the grains no doubt is extended as well to the cleavage planes in the grains themselves, allowing the entrance and combination of the nitrogen.

The effects of heat treatment were studied in the following manner. The second half of the original specimen was heated in an electric muffle furnace to



Fig. 17. 200 diameters

1780 deg. Fahr. held for half an hour and quenched in water. The resulting structure is shown in Fig. 14, taken of the thinnest section where the needles or plates were most prevalent previously. It is seen that they have entirely disappeared. This agrees with results obtained by Ruder, Rawdon and others. The sample was then reheated to 1200 deg. and allowed to cool slowly over night in the furnace. The resulting structure showed a reappearance of traces of nitride. Reheating again to 1780 deg. for half an hour, and cooling in the furnace resulted in the reappearance of additional nitride as in Fig. 15.

The sample was finally reheated to 1780 deg., held at this temperature for 24 hr. and cooled in the furnace. These various reheatings considerably reduced the size of the narrow section, the final dimensions being shown in Fig. 16. Examination of the sample after this final prolonged treatment showed results that were quite surprising. The narrow portion, where in all previous cases the concentration of the needles had been greatest, was found to contain practically no needles at all. Moving toward the heavier sections, at the location A, Fig. 16, a fairly great number of needles was found, as in Fig. 17. The thickness of the sample at this point is seen to be approximately the same as the thinnest portion in the original sample, indicating what might be termed a "critical thickness." Closer examination of the thinner sections revealed a number of areas at first taken for pearlite as shown in Figs. 18, 19 and 20. This section, previous to the last reheating, however, contained completely decarbonized ferrite, no pearlite being then present until well up in the thickened portions. These areas, therefore, were examined more closely and found to contain inter-



Fig. 16. Final Dimensions of the Narrow Section of the Original Forging After Various Retreatments

mixed in them a number of needles and presented other features not characteristic of pearlite; thus, several occurred at the edges of grain areas whereas it has been shown in an earlier paragraph pearlite decarbonizes inward from the grain boundary. The only explanation for them that appeared plausible was to assume them an eutectoid of nitride similar to pearlite, the nitride having coalesced due to the increased temperature.

The reasons for this eutectoid not being found in the original sample may be due to the "critical thickness" mentioned above. That is, with a thinner section, the partial pressure of the nitrogen becomes great enough to cause this formation. Temperature could hardly be the cause, as, judging from the grain size of the original and treated samples, the former was exposed to the higher temperature, as in Figs. 3 and 15, although the larger grain size in the original may have been due mainly to the longer time of heating at possibly lower average temperatures. Comstock[1] expresses the belief in such a eutectoid, stating the difficulty of distinguishing it from pearlite. In the present case, where no pearlite was found previously and a number of such areas prominent after heating, this contention would seem to be substantiated.

Various theories as to the nature of these needles or plates have been suggested, as cementite, martensite, etc., although the nitride explanation has been practically accepted. The present instance offers much in support of the latter, as in a completely decarbonized piece of steel, such as the thinnest section is found to be, the presence of cementite and martensite is, of

course, out of the question. In the combustion products to be found in the flue from the natural gas fuel, the only constituents of any quantity would be nitrogen, oxygen and carbon dioxide, making it evident the first named is responsible for the characteristic structure found.

As stated in an early paragraph, the present example of nitride in steel is in itself of no practical value, but it is felt the condition of the direct combination of ordinary inert atmospheric nitrogen with iron at moderate heating temperatures is quite unusual. Further, the specimen examined displayed excellent examples and confirmation of phenomena already found and described under entirely different conditions, as well as some not previously emphasized, so that it is hoped the present description may be of value in problems involving this interesting condition in more practical lines.

[1] S. W. Miller: (*a*) "Some Structures in Steel Fusion Welds," *Transactions* A. I. M. M. E., vol. 58, page 700, 1918. (*b*) "Path of Rupture in Steel Fusion Welds," *Transactions* A. I. M. M. E., vol. 62, page 524, 1920.

[2] G. F. Comstock: "Microstructure of Iron Deposited by Electric Arc Welding," *Transactions* A. I. M. M. E., vol. 62, page 555, 1920.

[3] H. S. Rawdon, "Metallography of Arc-fused Steel," *Chem. and Met. Eng.*, vol. 23, page 777, Oct. 20, 1920.

[4] O. A. Knight, "Some Notes on the Effect of Nitrogen in Steel," *Chem. and Met. Eng.*, vol. 23, page 1107, Dec. 8, 1920.

[5] G. F. Comstock, in a reply to discussion on paper on "Microstructure of Iron Deposited by Electric Arc," *Transactions* A. I. M. M. E., vol. 62, page 568, 1920.

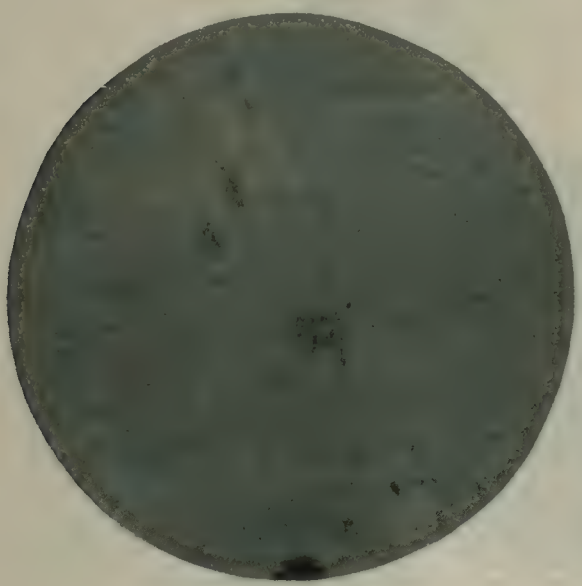


Fig. 18. 500 diameters

Works Council Stands Severe Tests

Ninety-five per cent of the American workmen are on the square, and if they are furnished the facts on which to base their conclusions, their group judgment will be eminently fair, asserted Arthur H. Young, International Harvester Co., in discussing before the American Drop Forge Association the company's experience with the works council plan. The scheme is now 27 months old in 19 out of 20 plants in which it was submitted to the men. The McCormick Works, Chicago, which first rejected the plan, recently accepted it by a vote of 10 to 1. The representatives of the employees and management in the councils have come to agreement on all questions except two during the life of the plan, and these were settled through the offices of the president of the company.

In providing that controversial points such as wages, hours, and working conditions are decided by the employee and management representatives, the council plan is unique. In case of disagreement, questions go to the president, and if he cannot propose a settlement that is satisfactory to both sides, they may mutually agree to arbitration. At the same time they can refuse to arbitrate, if they choose. If the issue affects other plants, the president has the privilege of calling a general council of representatives of all plant councils, which consider the question de novo.

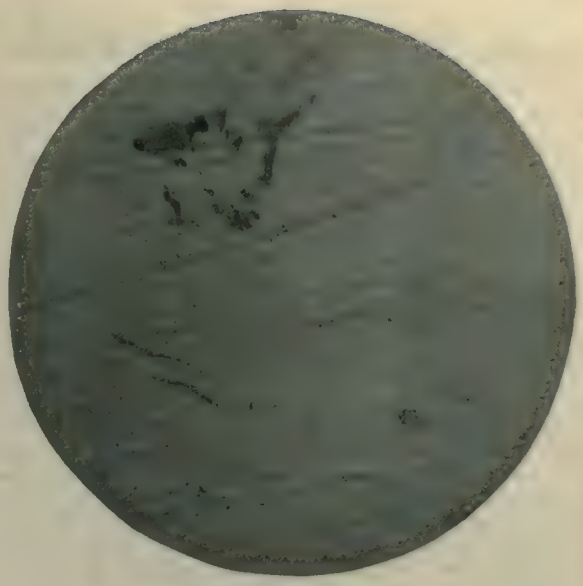


Fig. 19. 500 diameters

The council plan has had several severe tests, said Mr. Young. In the summer of 1919, when a strike was called at the McCormick works, the plant which rejected the council scheme, the neighboring tractor works and the Deering plant were closed at the request of the men themselves, because of the lack of police protection against the intimidation of the McCormick strikers. Within a few weeks, both of these plants were reopened, at the direction of their councils, and practically all of the employees returned to work.

During the steel strike of the fall of 1919 the Wisconsin Steel Works was similarly closed, for like reasons. Within three weeks all but 180 men returned, when the council decided to reopen the plant, and since that time all but 12 of the original employees have come back to the plant. During the coal strike late in 1919, the Benham, Ky., coal mine of the company was at first closed, practically all of the miners being union men, but inasmuch as they had no reason for controversy with the management, they soon held a council meeting and voted 463 to 17 to return to work—this despite the fact that all employee members of the council were union men.

Recent 20 per cent wage decreases in most of the Harvester plants have been negotiated in the works councils.

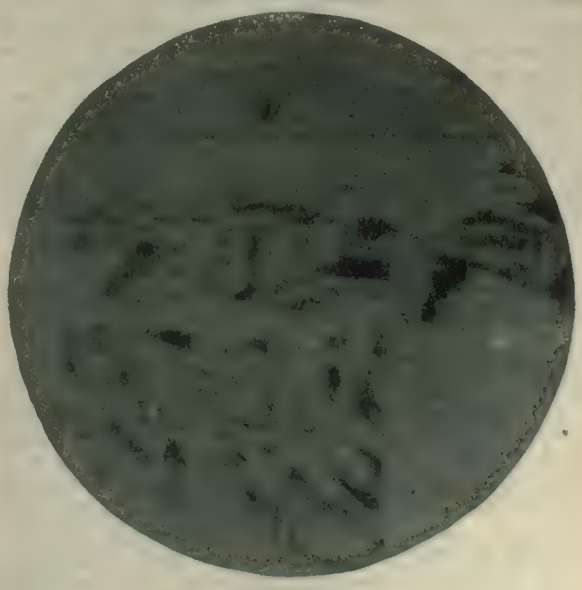


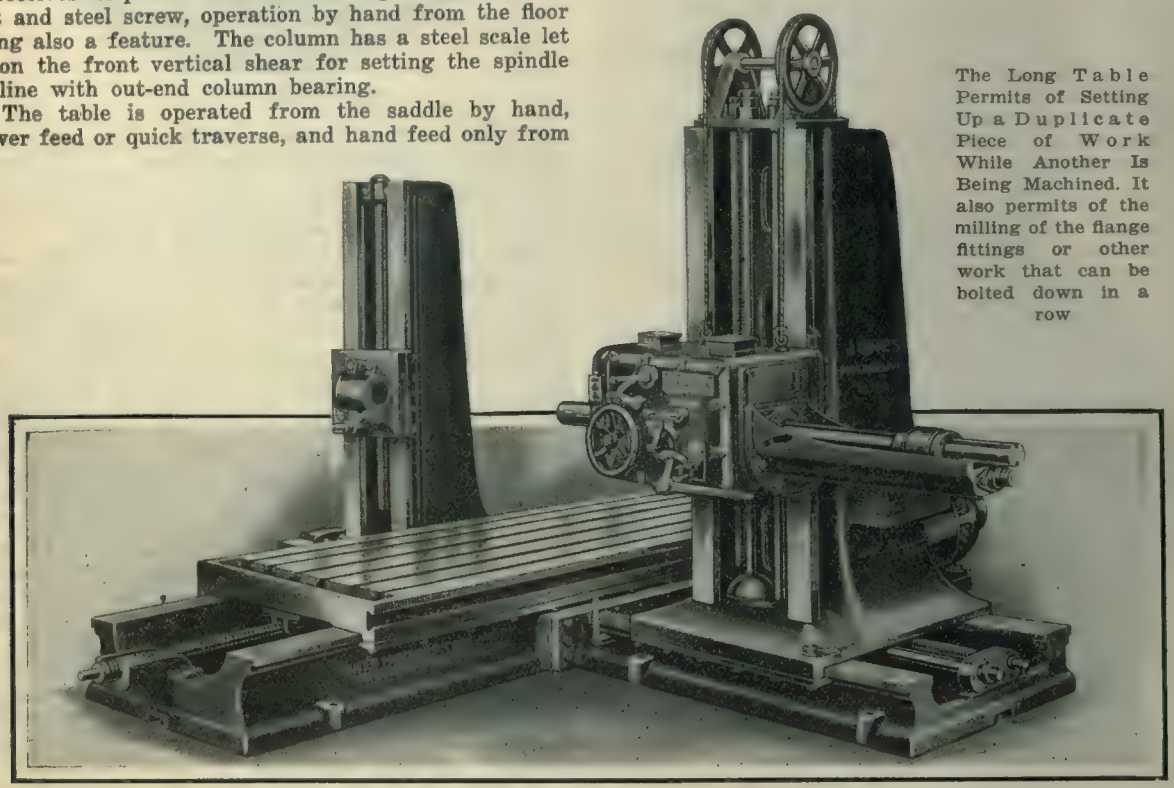
Fig. 20. 500 diameters

Boring, Drilling and Milling Machine

A horizontal boring, drilling and milling machine of the planer table type, shown in the illustration, is being offered by the Jones Machine Tool Works, Philadelphia. The machine is known as the Nos. 4½ and 5 and is designed for the boring of cylinders, motor housings and other horizontal boring mill work. The drive is by a constant or variable speed motor located at the base, transmitting power to a vertical shaft through spur and miter gearing. From the vertical shaft the drive is through a set of heat-treated miter gears and sliding change speed gears to a bull gear and quill to the spindle.

The saddle is raised and lowered on the column by a revolving bronze nut on a steel screw, either by hand wheel, power feed or quick traverse. The main column can be traversed in either direction on its base from the saddle by hand or power feed or quick traverse. It receives its power from the saddle gearing to bronze nut and steel screw, operation by hand from the floor being also a feature. The column has a steel scale let in on the front vertical shear for setting the spindle in line with out-end column bearing.

The table is operated from the saddle by hand, power feed or quick traverse, and hand feed only from the floor. It derives its power from the saddle gearing to a revolving bronze nut and steel screw. The table top is provided with tie slots, and its face side provided with a dovetail slot for holding special index plates and fixtures. The out-end column support is hand-operated and the column has let in on the face of the shear a steel scale for aligning the bearing with the spindle. A saddle platform (not shown in the illustration) is furnished, which is slipped into position on the saddle when doing work which takes the operator from the floor, the central controls on the saddle giving the operator easy control of the machine from the platform. This is pointed out as a special feature in reducing production time.



The Long Table Permits of Setting Up a Duplicate Piece of Work While Another Is Being Machined. It also permits of the milling of the flange fittings or other work that can be bolted down in a row

Among other details of construction it may be mentioned that all sliding speed and feed gears, except the electric steel bull gear, are from 0.60 to 0.70 per cent carbon steel, heat treated, the gear shafts running in bronze bearings with sight feed lubrication. The bull gear, in addition to being carried by a steel quill, sets in a large conical bearing to take the thrust when using the face plate, milling cutters and facing attachments. The quill runs in large bronze bearings at each end of the saddle, and drives the spindle by two splined keys diametrically opposite, the front end being provided with cone bearing adjustment and the rear end arranged for ball bearing thrust and adjustment. Power feed gears are provided with friction safety device, quick traverse being also of the friction type, providing against breakages should the spindle, saddle column or table become jammed when at the end of their respective traverses.

Nolan Patent Bill's Prospects Improve

WASHINGTON, July 5.—The Nolan patent bill has been given a privileged position on the House calendar, in order that it can be taken up for vote at an early date. The measure allows increases in a number of employees and in salaries at the Patent Office and has the support of prominent associations of producers throughout the country who have pointed out that industry will suffer severely unless relief as provided for in the bill is afforded.

Details of this bill, which failed to pass at the regular session of Congress, have been explained by THE IRON AGE. In brief, it carries an increase in salary amounting to $447,740 over the appropriation for the current fiscal year and makes many changes in grades of employees and increases the salary of the Commissioner of Patents from $5,000 to $6,000. Manufacturing interests are especially interested in that provision of the bill which allows the Patent Office to employ a larger number of more efficient examiners at material increases in salary.

Coal Bill Fails to Pass

WASHINGTON, July 5.—Proposed legislation urged by Senator Frelinghuysen to establish seasonal rates on coal and to stabilize the coal industry is considered to have been defeated so far as this session is concerned, when the Senate last Wednesday voted 38 to 26 to recommit the former measure. Motion to recommit was made by Senator Borah, of Idaho, who said he could not vote for the bill as presented. Following this action of the Senate, Senator Frelinghuysen made no attempt to bring up his bill authorizing Government agencies to gather coal statistics.

The Interstate Commerce Commission has dismissed a complaint of Suzuki & Co. vs. the Wharton & Northern, et al, by holding that the combination rate of 63.88c. per 100 lb. on pig iron in carloads from Wharton, N. J., to Seattle, Washington, for export shipped in the period from August 1917, to February 1918, was not unreasonable, unjustly discriminatory or unduly prejudicial.

Heat Treatment of Rock Drill Steel

Effect on Breakage—Steel Giving Longest Service—Maximum and Minimum Life Expected — Comparison with Eye-Bars

AT the symposium on the breakage of drill steel which was held at the February meeting in New York of the American Institute of Mining and Metallurgical engineers, several papers were presented which were not printed by the institute. One of them was entitled "The Breakage and Heat Treatment of Rock Drill Steel," by A. E. Perkins, Western sales manager Colonial Steel Co., Pittsburgh. It was read by the vice-president of the company, Charles M. Brown. The paper was as follows:

First: Study of steels which give greatest service before failure by breakage.

Nature of Section.—Actual figures showing the superiority of one section or another are difficult to obtain, as I know of no company that has kept figures on this phase of the subject. However, I think I may state positively that in a given size of steel the cruciform section in that particular size shows far more breakage, the country over, than any other section.

Of course this section of steel is used almost exclusively in stopping machines drilling "up" holes which are more trying on steel than horizontal holes, but the cruciform section is, nevertheless, inherently a weak section. In the first place it contains less steel per foot than any other standard section of the same size and secondly conditions are encountered in its rolling which do not obtain in the other sections and which, in my opinion, make it weak. The other sections, namely, round, hexagon, octagon and quarter octagon, are compact, but when a cruciform bar is rolled the wings or ribs tend to cool off relative to the main body of the bar and we encounter the unavoidable condition, always undesirable, of rolling a bar made up of steel of unequal temperatures. This sets up cooling strains, which often give rise to minute cracks in the finished bar, which are the genesis of points of failure later when the steel is put into service.

Many companies have discarded the cruciform section entirely, substituting in its place quarter octagon steel, either hollow or solid, depending of course upon the machine and use and practically always with improved results. The chuck wear is always much less with quarter octagon than with cruciform and I look for the mining fraternity to practically abandon the cruciform section within the next few years.

Composition.—Too much importance cannot be attached to the quality of the drill steel. In general it may be said that the best steel to employ for a fixed set of conditions is the steel that will withstand the duty imposed upon it without undue breakage and that will withstand the abrasive action of the rock with the least amount of wear.

The chemical composition of drill steel is a matter that has been subjected to a great deal of experiment by the mining industry, the manufacturers of rock drills and the steel companies. It is an accepted fact that steel of a low carbon content will stand more abuse by the blacksmith and will lend itself more readily to welding than steel embodying a greater percentage of carbon.

In that connection I might recall a statement which I just made to Mr. Tillson, said Mr. Brown, taken from a paper read before the British Mining Engineers Institute in which the conclusion was reached that carbon content was about 0.60 per cent, but that was dependent upon the character of labor that they had to depend upon to make those drills; but that is so radically different from the results in this country and the results shown with the higher carbon steel as to be quite noticeable.

On the other hand, continues the paper, the consensus of opinion seems to be that the higher carbon steel will withstand the vibration shocks to which it is subjected in the hammer-drill service, and that the cutting bit, although requiring more care in the tempering and working, may be made to last much longer than is possible with lower carbon steel.

We believe that the following specifications are right for straight carbon drill steel under the average present day conditions:

	Per Cent		Per Cent
Carbon	0.85 to 0.90	Phosphorus	0.03
Manganese	0.30 to 0.40	Sulphur	0.03

In buying drill steel, however, one must not rely too strongly on chemical analysis as an indication of quality, for the quality of a steel which has to be hardened and tempered depends far more upon the process of manufacture and the character of the workman than on the chemist. Tool steel of good quality was made long before chemists were heard of and it is safe to say that steel of equally good quality can be produced today in small quantities without the assistance of chemists in any step of the process. Steel makers' chemists in their laboratories are valuable in enabling the works to maintain a uniformly high quality in producing tool and drill steel in the large quantities which are demanded at the present time. It takes pure iron and experienced satisfied workmen to make good steel.

Second: Maximum and minimum service which might be expected.

Life of Steel.—I find that I have no intelligent figures to present to answer the question: How long will a piece of drill steel last? There are so many variables that any such figures are bound to be individual rather than general and of doubtful value at best. Any figures along the above lines, to be at all comparable, should be expressed in terms of drilling hours rather than in drilling footage or in pounds of steel per ton of rock broken. I have a number of figures of this last class from different sources, showing the pounds of steel used per ton of rock broken, which vary from 0.05 lb. per ton to 0.51 lb. per ton, but they have no place here as they admit of no uniform basis of comparison.

Summary.—We may summarize the points which make for maximum service from drill steel as follows:

Keep your heat down. Ninety-five per cent of the trouble which results underground is the result of overheating in forging or in tempering or both. Never heat either the bit end or the shank end, preparatory to forging, higher than 1600 deg. Fahr. This may mean a little more work on the part of the blacksmith, but the gain in quality of the finished drills will greatly offset the slightly additional expense in forging. Overheating a piece of steel preparatory to forging produces coarseness of structure which cannot be restored or refined by merely allowing it to cool and then subjecting it to a tempering operation.

To harden successfully, plenty of time must be given to the heating and always leave the steel in the furnace long enough to insure its being heated uniformly and thoroughly. This may be best accomplished in a slow fire and only by slow uniform heating is it possible to secure the required uniformity in hardness.

Steels lying too long in the fire, especially when not turned about, are liable to show soft spots in hardening, due to a slow decarbonization which takes place.

After hardening and tempering either bit or shank always quench at the critical temperature on the rising heat.

When tempering shanks, do not overlook the fact that density and toughness provide wear-resisting qualities, and that hardness, except on the extreme outer surface, is not essential or desirable. Subject the part for a distance of 2 in. below the lugs or collar to the heat treatment.

Either keep the heated tool moving about in the quenching bath or keep bath agitated, otherwise soft places may result, due to the steam which is formed around a heated steel upon being plunged into the water.

To get uniform results in hardening, a good supply of liquid should be provided so that the temperature of the bath will be kept as nearly as possible a constant.

Discourage the practice of operating with a dull bit and

remember that the only reason drill steel will drill rock is because of the cushioning effect of penetration at every blow delivered. The effect of continued hammering on a dull steel is exactly the same as it would be in driving up against an impenetrable substance, such as a hardened anvil. Minute fatigue checks are established throughout the length of the drill steel. At the beginning they may be so small as to be hardly detected with the naked eye but with continued operation one of these fatigue checks, which will develop at the weakest point, will gradually grow larger by assuming a semi-circular or arc-shape appearance extending into the body of the steel. As this check enlarges it is caused to open and shut at each vibration or blow of the hammer in the drill.

A breathing action is thus established which, when the gap opens, causes an inrush of the surrounding air, carrying in with it impurities part of which are retained by the surface when the mouth closes. It is these foreign particles sucked in with the air which give to the surface of the check a discolored appearance. The smooth surfaces of the check are due to the hammering action to which they are subjected by the closing of the jaws for every blow or vibration. Eventually the steel is broken apart with the balance of the section, disclosing a good, clear fracture of the metal in its original condition.

Watch your drill-sharpening machine for worn dies and dollies. Worn parts of a sharpener often cause poor bits to get out. These bits are often feathered badly, which means that a feather or tip of steel is left on one or more of the corners. These feathers, of course, break off as soon as they are put in the drill and cause a rapid loss of gauge.

Watch your air pressure at your sharpening machine. Most sharpeners should have at least eighty pounds at the machine and if the machine is running on less pressure and the smith tries to forge the bit at the proper temperature, it gets cold before he can get the corners on, so to get out his work he usually yields to the temptation of putting the steel through hotter than he should. If the pressure were high enough he could complete the forging of his bit at the proper temperature before it got too cold.

Keep the chuck bushing up to size and remember that the worn end of a check bushing will prevent the transmission of a square, direct blow. This same statement will apply to the size of the drill shank.

That is the conclusion of Mr. Perkins' paper. I have a note here that I would like to read, added Mr. Brown, bearing on Mr. Foley's statement in which he showed that by far the largest number of breaks happened at or near the point to which extended the heat treatment in forging either the shank or the bit.

Heat treatment of drills after the shanks and bits are forged would undoubtedly increase greatly the time and service before breaking occurs in the bar. The heat should not be carried so high as to put the drill in an annealed condition, but be just a low faint red hardly visible in a dark place, or about 900 deg. Fahr., and then allowed to cool off naturally in air. After this is done the bit should be hardened and tempered and the shank tempered.

The same treatment applied to the drill bar after it has been used for some time would relieve the strains which have been set up in the bar and prolong its actual life before breakage.

Similar experience was found years ago in the manufacture of eye-bars for bridge work. The eyes at the ends of these bars are formed by an upsetting process which involved heating one of the ends of the bars and great trouble was experienced in breaking at or close to the point which was reached by the heat. It was found that by placing the entire bar in the furnace and giving it a mild heat treatment similar to the one referred to that this breakage was eliminated and this is now common practice.

DRILL STEEL SHARPENING*

Structure of the Carbon Steel in the Various Stages of Heat Treatment

BY CLARENCE M. HAIGHT

The general practice in drill sharpening shops, of which descriptions have been written, is about as follows:

The bit is heated to a forging heat of 1600 to 1900 deg. Fahr. for a distance back from the cutting edge necessarily greater than the length of the finished bit.

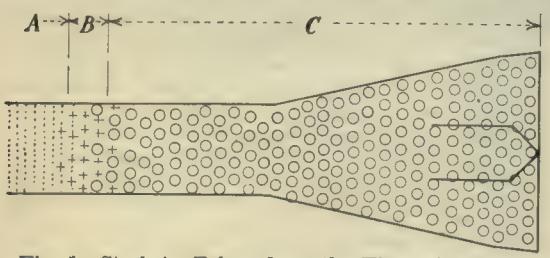


Fig. 1—Steel As Taken from the Fire. *A*, normal size; *B*, section of change from normal size to 1800 deg. Fahr. size; *C*, size at 1800 deg. Fahr., 4 in. long

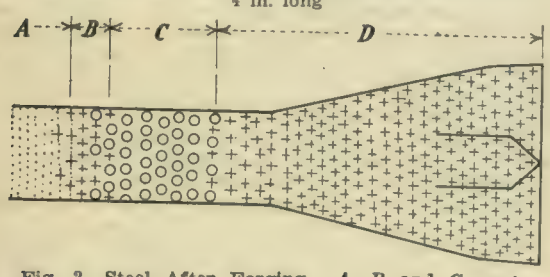


Fig. 2—Steel After Forging. *A*, *B* and *C* as in Fig. 1. *D*, size of grain at 1600 deg. Fahr., 3 in. long from hammering; this leaves *C* only 1 in. long with a section of change between *C* and *D*

After forging to the proper shape and size in the sharpening machine, the steel is allowed to cool and is then passed to a hardening furnace where the end only of the bit is heated to the critical temperature or a little higher, or to about 1450 deg. Fahr., and then quenched either in cold water or brine or, as in one case, in brine with a layer of oil on the top.

If the assumption is true that, as a steel cools whether slowly or rapidly from the highest heat to which it has been subjected, it retains the grain size that corresponds to that highest temperature; then there is a condition in the bit, and also in shanks if the same process is followed, that perhaps is detrimental for the best service from the steel.

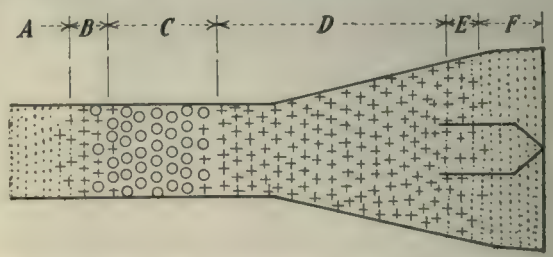


Fig. 3—Steel After Hardening. *A*, *B*, *C* and *D* as in Fig. 2. *E*, section of change from 1600 deg. Fahr. grain size to normal grain size; *F*, normal grain size in hardened portion; *D* has been reduced in length by *E* and *F*

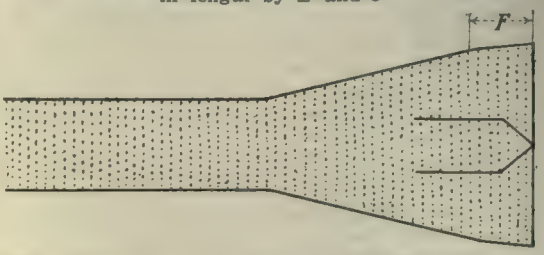


Fig. 4—Steel As It Is Desired to Be When Ready for Use

For the sake of clearness let the following assumptions be made:

That the forging temperature is 1800 deg. Fahr.
That the forging operation reduces the 1800 deg. grain

*From a paper read at the symposium on drill steel failures at the February meeting of the American Institute of Mining and Metallurgical Engineers in New York. The author is assistant mine captain, New Jersey Zinc Co., Franklin, N. J.

size to a size corresponding to that produced at 1600 deg.

That the proper grain size desired is that produced at 1450 deg.

That the bit is originally heated for 4 in. back from the cutting edge, that the hammering effect acts only to a point 3 in. back from the cutting edge, and that the hardening heat extends back only 1 in. from the cutting edge.

Then, as a steel is taken from the fire the grain condition is as shown in Fig. 1. After the forging operation has been performed a different condition exists as is shown by Fig. 2. The heating operation to harden the cutting edge produces still another effect as is shown in Fig. 3.

The questions that naturally arise from this are:

Will the cost of the extra heat treatment necessary to change this condition (annealing) be more than the saving that may be effected in the drill steel or will the extra heating be an economical as well as a wise thing to do?

Is this condition necessarily detrimental to the maximum service of the drill steel?

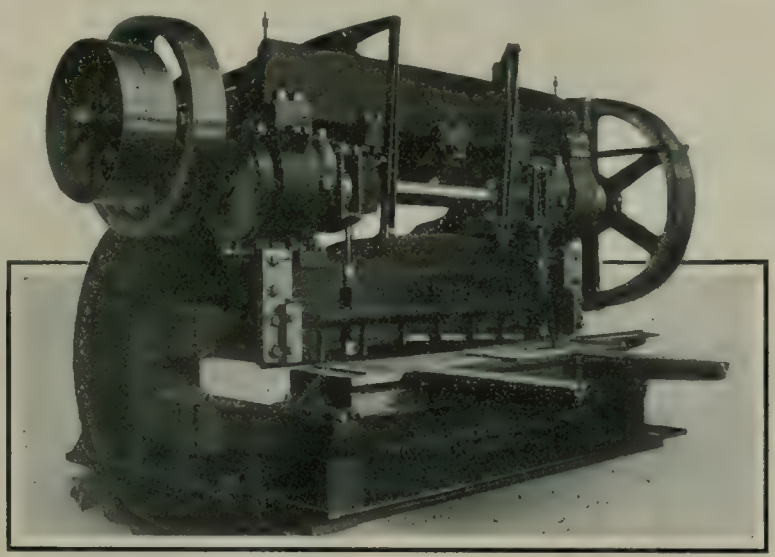
Can this annealing action be obtained in the hardening heat by heating more of the bit, say at least 5 in., to the hardening temperature but quenching only the end of the bit by a shallow immersion?

When taking up the question of heat treatment with the general run of mine blacksmiths it is difficult to get them to realize the part grain sizes play in the structure of the steel and the necessity for overcoming a wrong grain if obtained. Perhaps the presentation of the matter in this way may be of assistance.

New Series of Power Squaring Shears

The Niagara Machine & Tool Works, Buffalo, N. Y., is placing on the market a No. 8-H power squaring shear, which is said to introduce a new series recently added to the line of power squaring shears manufactured by that company. In offering the new machines the makers state that they have been able to build a shear with a capacity of ⅝ to ¾ in., that will make a much cleaner cut than any of the ordinary mill type.

Introducing the new series, the No. 8-H power squaring shear is shown in the accompanying illustration. Among its features may be mentioned the heavy crosshead of box section, guided in liberally proportioned guides and counterbalanced. The main shaft and eccentrics are forged in one piece and the clutch block, made of hammered steel forging, is equipped with hardened and ground removable striking jaws, as well as with hardened back lash jaws. The clutch wheel, bronze bushed, is provided with hardened and ground removable striking faces and with a back lash pin. Cam and throwout rollers for clutch disengagement are both of hardened steel.



Mainshaft and Eccentrics Are Forged in One Piece. The clutch block is from a hammered steel forging and equipped with hardened and ground removable striking jaws

The two center bearings for the main shaft are placed close to the eccentrics and hold-down cams. The latter are of hammered steel and are arranged to give positive action, both in lifting and in holding down. The cams are liberally proportioned and bear against hardened steel rollers lubricated through hollow pins. The hold-down rods are equipped with springs to compensate for various thicknesses of plates.

The brakes are made in two halves, hinged and lined with asbestos, and have automatic spring take-ups for wear. The knife chuck is provided with pockets to enable bolts to be easily removed from the top, and has T-slots on the top for gages and on the front for gage brackets. The knife chuck is also provided with a screw and set screw on each end to facilitate easy adjustment. Housings are massive and do not require stay rods for cutting the maximum capacity rating, stay rods and stay bolts being furnished to special order only. Counterbalance rods are regularly placed so as to pass outside of housings.

A complete set of gages is provided, including a front, side, bevel and slitting gage and a patented automatic screw adjusting back gage. The driving mechanism is overhead. The pressure of the cutter bar toward the back is taken up by solid metal rather than by loose gibs. Gears are machine cut and pinions of hammered steel with wide face.

The specifications give the following dimensions: Capacity, mild steel, ⅝ in.; nominal cutting length, 96 in.; weight, 54,000 lb. and 61,000 lb., 24 in. and 36 in. gap respectively; horsepower required, 30; and double geared ratio, 15 to 1. The flywheel is 62 x 9 in., and weighs 2300 lb, the pulleys being 36 x 9 in., and running at 240 r.p.m. The floor space occupied is given as 132 in., front to back; 197 in., right to left; the overall height being 123 in.

Wage Agreement Expected

Representatives of the Western Sheet and Tin Plate Manufacturers' Association and the Amalgamated Association of Iron, Steel and Tin Workers met Tuesday at an adjourned conference in Columbus, Ohio, to attempt to negotiate a new wage agreement covering these branches of the industry.

James H. Nutt of Youngstown, secretary of the employers' association, stated: "The conference will probably last all week, but we look for an agreement. Nothing was said in the previous conference at Atlantic City which indicated that we might not get together.

Conferees are meeting at the New Southern hotel.

Upon expiration June 30 of the 1920-21 contract, sheet and tinplate mills operated by about 20 mid-Western makers under the Amalgamated Association's sliding scale, suspended and will not resume until a new contract is agreed upon.

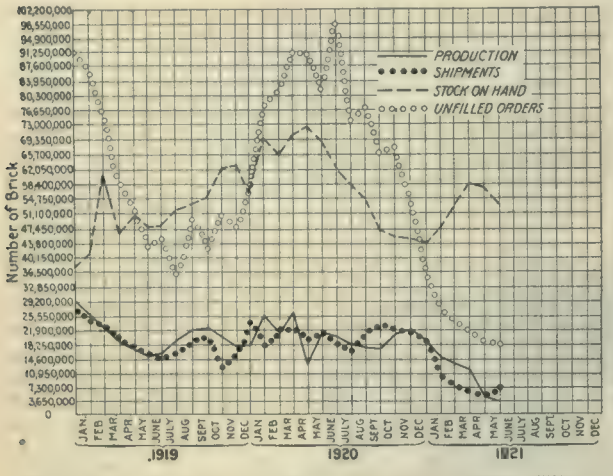
It is expected there will be little difficulty in arriving at an agreement on the sheet scale, as both sides have agreed to retention of the old base rates, but disagree upon the question of retaining an extra man on the crews, added during the war. In the tin mill scale, manufacturers are pressing a reduction in the rate of advance above the base of $3.50 per 100-lb. box of prime plates, from 1 1-8 per cent. for each 5c increase, to one per cent.

The business of the Isaac A. Sheppard Co., established in 1860 and long known as a maker of stoves, ranges and heating apparatus, is to be sold by the receivers, George W. Barr and William E. Wagner. The plant is located at Eastern Avenue and Chester Street, Baltimore, and the receivers, who will take bids by Aug 1, point out the location of the site for eastern and southern business.

REFRACTORY INDUSTRY

Valuable Information Made Public in Harmony With Secretary Hoover's Policy

The Refractories Manufacturers' Association, which embraces almost all of the manufacturers of fire clay brick and other refractories in the country, is among the first to adopt the suggestion recently made by Secretary of Commerce Hoover that trade associations should make public such production statistics as have hitherto been compiled exclusively for circulation among the memberships of such associations. The accompanying charts, giving the production, shipments, stock on hand and the unfilled orders of fire clay and silica brick from Jan. 1, 1919, to May 31, 1921, in-



Production, Shipments, Stocks and Unfilled Orders, Silica Brick

clusive, are the result. Although the charts were made up under the direction of the Refractories Manufacturers' Association, the figures are those for the entire industry and are not confined to the reports alone of the members of the association.

The charts provide a perfect picture of the industry over a period of almost two and one-half years and also reflect conditions within the iron and steel industry, since in excess of 90 per cent of the production of fire clay and silica brick goes to the latter industry. Like the iron and steel industry, the peak of unfilled orders in fire clay and silica brick was reached in the summer of 1920. At the end of May, 1920, the unfilled orders for fire clay brick were around 360,000,000, this representing a rise in this item from the previous low point in November, 1919, of about 240,000,000 brick. The curve of unfilled orders, starting with June, 1920, has been uninterruptedly downward, being almost perpendicular during the latter part of last year, when cancellations were heavy in keeping with the recession in business in iron and steel and the consequent curtailment in furnace repairs and relinings.

Stocks of fire clay brick reached low ebb last November and since have been on a gradually increasing scale, due to the continued downward trend of shipments and the fact that in spite of drastic curtailment of production, some surplus of production over shipments could not be avoided if the manufacturers were to maintain some semblance of working organizations. As of May 31, 1921, stocks on hand of fire clay brick were about 201,000,000, as compared with 212,000,000 on the same date in 1920 and about 230,000,000, the high point reached in September, 1919, when the industry still was feeling the impulse of the wartime demand. Unfilled orders at the end of May were about 45,000,000, as compared with 360,000,000 a year ago, a decline in a year of 315,000,000, or 700 per cent. The chart discloses that production since last December has run somewhat in excess of shipments, in contrast with the conditions of the previous six months, when the reverse was true.

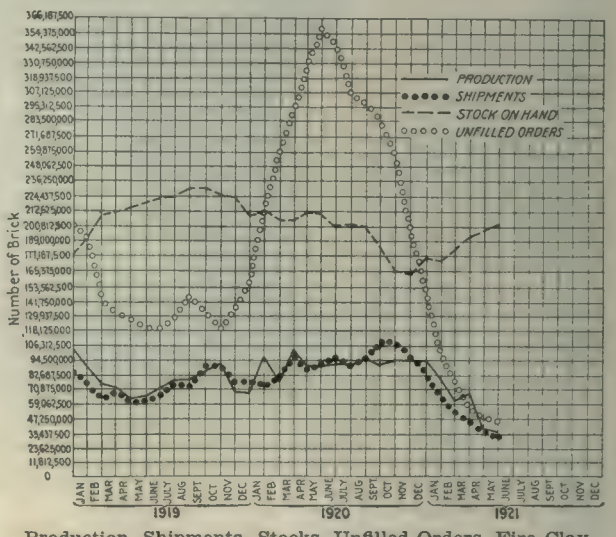
Conditions with regard to silica brick were similar to those in fire clay brick in a general way. It is noted however, that the peak of unfilled orders did not come until July of last year, as compared with May, when the industry had its largest order book in fire clay brick. Also, it will be observed the line of stocks on hand in silica brick was pointed downward at the end of May, while it was in the other direction in fire clay brick. And the last month of the period showed shipments of silica brick to be running ahead of production, or the opposite of the situation in fire clay brick.

Gas Mask for Carbon Monoxide

A public demonstration of a gas mask for protection against carbon monoxide, manufactured by the Mine Safety Appliances Co., Pittsburgh, and in which is utilized the special chemical mixture called Hopcalite, developed by the U. S. Bureau of Mines and Chemical Warfare Service, U. S. Army, was given recently in the special smoke room of the U. S. Bureau of Mines, Pittsburgh.

In the test two men entered the smoke room which contained one per cent of carbon monoxide gas in the air. The wearers of the mask remained in the atmosphere for 30 min., doing vigorous work part of the time, and experienced no ill effects whatever from the poisonous carbon monoxide gas. The gas masks are claimed to have given protection throughout the entire period of the test.

The carbon monoxide gas mask is of special interest to iron and steel industries, fire departments, in-



Production, Shipments, Stocks, Unfilled Orders, Fire Clay Brick

dustries using gas producers, illuminating gas plants, coal and metal mines and to all other persons who are apt to encounter carbon monoxide gas in their work.

Welding a steam line approximately one mile in length was successfully accomplished at the plant of the Dayton Lighting Co., Dayton, Ohio. The line is constructed of 10, 12 and 14-in. pipe and carried a pressure of about 200 lbs. During construction the line was frequently tested with cold water at a hydraulic pressure of from 400 to 500 lb., and when steam was turned into the line it was found light in every joint. The electric welding process was used, the work being done by the Ohio Wilson Welding & Repair Co., Dayton.

The open-hearth plant and rolling mills projected by the Automobiles M. Berliet at Venissieux, near Lyons, France, are to be abandoned by that company. Efforts are now being made to interest a Lorraine group of iron masters to take over the semi-completed plant. An account of the equipment, most, if not all, of which was bought in the United States, was given in THE IRON AGE of March 27, 1919.

PIG IRON COSTS

Producer Gives Figures as to Production and Freight Rates

Asked by an official of the Pennsylvania Railroad to give his ideas as to the extent the present freight rates were stifling the business of producing pig iron and consequently the other products manufactured from iron ore, a prominent western Pennsylvania pig iron producer made the following observations:

"The year 1913 was the last year in which the distribution of iron and steel products might be considered normal; that is, the distribution of them was unaffected in 1913 by any extraordinary causes and it seems proper to take the year 1913 as a point of comparison against present conditions. In the matter of freight rates charged in assembling of raw material necessary to make a ton of pig iron at Valley furnace, the following is illustrative:

Freight Rates

	1913	1920
Coke	$1.32	$2.77
Stone	.17	.42
Ore, upper rail	1.20	2.00
Ore, lake	1.10	2.48
Ore, lower rails	1.12	1.99
Supplies (estimated)	.25	.50
	$5.16	$10.16
Taxes		.31
		$10.47

"The above figures show that the freight rates in these assembling processes have increase $5.31 and while by a reduction of 30c. a ton in the carrying rate on the Great Lakes, the replacement cost of the ore from a freight standpoint has been reduced about 60c. a ton, Valley blast furnace managers will make pig iron this year, if any, from inventory material, which is loaded with the 1920 freight rates. Taking this view of it and following the iron ore through the blast furnace strictly along the lines of cost of production of other materials and disregarding their market prices, we have the following situation:

Cost of Producing Pig Iron Per Ton at Valley Furnace Now

Freights	$10.47
Ore at Minnesota mines	6.40
Coke at Connellsville ovens	3.30
Stone at quarry	.70
Costs above material	4.00
	$24.87

"In passing, let me say that the average market price of basic iron, Valley furnace, in 1913 was $14.63. The market price to-day is something less than $20, at the same point: (say $19.50).

"Since Jan. 1, this year, substantial reductions have been made in the cost of mining ore, coal and stone, none of which operations so far as the blast furnace industry is concerned is unionized in any substantial degree. It is within all the probabilities that the costs of producing these materials may be still further reduced, which probability extends to the 'costs above materials' excepting the item of taxes and as they are affected by your charges for switching.

"I hope I have made clear one of the fundamental things which is causing the present stagnation in the iron and steel business, thereby almost eliminating the commodities upon which many of your expectations of revenue are based and upon the free movement of which the prosperity of the iron and steel business generally depends.

"Allow me to say that it cannot be expected that labor in all other industries should be called upon to stand all of the burden of the reductions which are necessary and allow railroad labor to escape.

"It might be said too, that some of our friends in the pig iron manufacturing business will add an item to the figures we have given you, growing out of the very substantial increases made in the matter of wasting, to which we are not subject because we merchandise most of our former waste products, and also attention will be paid to the very substantial rates charged for docked ore; our figures dealing only with direct ore. Most of them too, will necessarily add something to the ore figures because ours are based on actual cost."

Ore Rates Declared Unreasonable

WASHINGTON, July 5.—Passing on the complaint of the St. Louis Coke & Chemical Co. vs. Alton & Southern, et al., the Interstate Commerce Commission has condemned as unreasonable rates on iron ore from Hurley, Florence and Baraboo, Wis., and Iron River, Iron Mountain and Ironwood, Mich., to Granite City, Ill., established on Aug. 26, 1920. New rates of $2.35 per ton from Baraboo and $3.25 from the other points of origin are to be established to Granite City not later than Sept. 1. These will be 15c. higher from Baraboo and 25c. higher than they were prior to the general advance on Aug. 26, last year. The rates held to be unreasonable are $2.836 from Baraboo and $4.05 from the other points mentioned.

The complaint contended that the rates on ore do not bear a proper relationship to the rates on coal northbound; that if properly related rates were made on the ore the southbound empty movement of cars would be greatly lessened. The commission said the testimony did not show any recognized relationship of rates on coal northbound and ore southbound. The complainant showed many rates on ore to other destinations made from 60 to 70 per cent of the rate on coal in the reverse direction.

Traffic officials from the Alton and the Wabash railroads admitted that the rates are relatively unreasonable because out of proportion with the rates to blast furnace and by-product coke plants served by rail-lake-and-rail hauls. They suggested that $3.25 would be a reasonable rate from the points of origin other than Baraboo and what they suggested, the commission prescribed.

The complaining plant, producing pig iron, coke and by-products, has been in operation since May, 1920, and up to the time of the hearing 110,000 tons of ore had been moved. The complainant said that if proper ore rates were made the movement of ore to Granite City would be approximately 2,400,000 tons as a counter-balance for 4,000,000 tons of coal moving in the other direction.

Cost of Living Slowly Falling

Figures prepared by the Bureau of Labor Statistics of the Department of Labor, Washington, show that about one-third of the maximum advance since 1913 in the budget of the average family has been annulled by the descending scale of prices. Wholesale prices have fallen much faster; it is the retail prices of clothing and furniture, and the recent advance in rents, which have retarded the fall in the family expenditures. In terms of a $1,500 living cost in 1913, and the same standards since then, the figures follow:

	1913	a1919	a1920	b1921
Food	$573	$1,054	$1,255	$829
Clothing	249	534	716	554
Housing	201	230	271	320
Fuel and light	80	116	138	145
Furniture and furnishings	77	174	225	191
Miscellaneous	320	554	644	668
Total	$1,500	$2,662	$3,249	$2,707

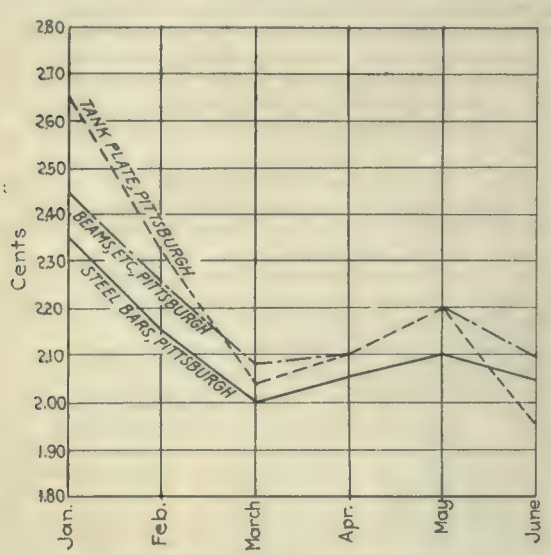
a—Based on figures for June. b—Based on figures for May.

For the past several years it has been the custom of the Youngstown Sheet & Tube Co., Youngstown, Ohio, to award to any of its employees by whose act a life is saved by reason of accident, or bodily injury averted, a solid gold safety fob. Such a fob was recently presented Joseph Kukura, a helper on No. 8 blast furnace, in the presence of officials of the company. In presenting the fob, Safety Director James M. Woltz complimented the blast furnace department for its success in holding accidents to a minimum. E. T. McCleary, assistant general superintendent, said that with the Sheet & Tube company it will continue in the future as in the past, Safety First, then quality and tonnage. Kukura, recipient of the fob, rescued a fellow employee who had fallen in a hot cinder bed.

TREND OF HALF YEAR

Readjustment of Prices of Pig Iron and Finished Materials in Past Six Months

Looking back over the course of prices on pig iron and steel products during the first six months of 1921, it may be noted that the downward trend has proceeded in orderly fashion. Aggregate price reductions during this period have varied according to products, the greatest drop being on galvanized steel sheets, the price of which at the end of June was $19 a ton below its Jan. 1 quotation. Plates have declined $15 a ton, structural shapes, $9 to $10, steel bars, $7 to $8 and wire products $5 to $7. In pig iron the reductions have been proportionate. Basic, Valley furnace, declined $9.50 during the six-month period, while foundry iron at Philadelphia has shown a decline of about $8, at Chicago $12, and at Birmingham $13.



Prices of Tank Plates, Beams and Bars—Jan. 1 to June 30, 1920

This rate of decline is the best answer to those self-appointed critics of the steel industry, who profess to see the whole economic readjustment being delayed by the alleged failure of the steel trade to assume its share of liquidation in commodity prices. Many market observers, including a considerable number of steel consumers, in comparing present steel prices with pre-war prices, take the low levels which existed in 1914 as a basis for a "normal" market. Steel prices in the latter part of 1914 were the lowest in a ten-year period, and hence are not truly representative of the general average of steel prices before the war. A ten-year pre-war average is undoubtedly a fairer measure of comparison, and if this is followed it will be noted that 1921 steel prices have already reached a point that is roughly, only $10 to $12 a ton above the pre-war average.

For example, the ten-year average for plates, 1905 to 1914, inclusive, was 1.47c., Pittsburgh, whereas plates in the last week of June were easily obtainable at 1.90c., Pittsburgh, a difference of only $8.60 per net ton. Structural shapes were obtainable at the end of June at 2c., Pittsburgh, the ten-year pre-war average being 1.48c., Pittsburgh, an advantage in the present price of only $10.40 per net ton. Steel bars are to be had at 1.95c. to 2c., Pittsburgh, which is $11 80 or $12.80 higher than the pre-war average.

In pig iron the price reductions of the first half of the year have, in a few instances, been drastic. Basic iron at Valley furnace has declined from $30 on Jan. 1 to $20.50, a drop of $9.50, or more than 30 per cent. No. 2 foundry iron at Chicago has declined during the six-month period from $31.50 to $20.50, a total of $11. Other grades have declined proportionately. The greatest drop is in Alabama iron, which declined from $35 to $22. The ten-year pre-war average for basic iron, Valley furnace, was $15.57, as compared with $20.50 the last of June, the difference representing approximately the increased cost of assembling the raw materials, ore, coke and limestone in freight rates and labor costs alone, not counting higher costs of these raw materials. The ten-year pre-war average for No. 2X iron, Philadelphia, was $17.46, as compared with $25.50, quoted the last week in June.

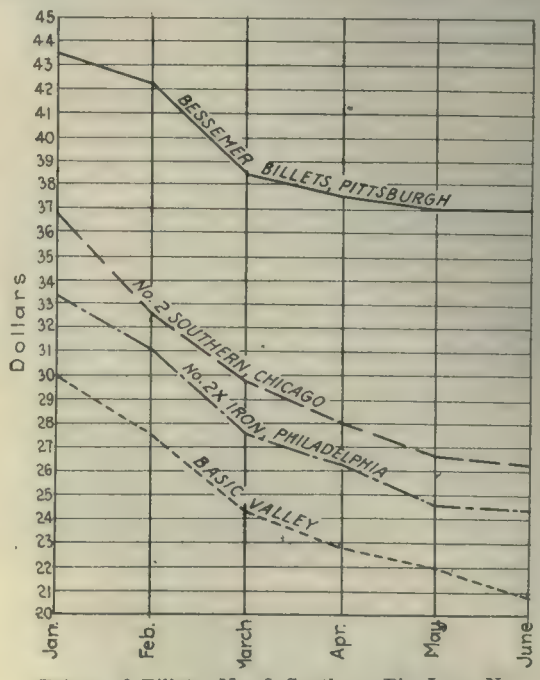
In semi-finished steel the decline has not been so great during the first half as in finished steel. Billets have dropped only $6.50 per gross ton.

The accompanying table shows the monthly averages for several grades of pig iron, semi-finished steel and finished steel for the first half of the year, as compiled from THE IRON AGE price tables.

During the first five months of the present year 806 men have been killed by accidents at coal mines, according to reports received by the United States Bureau of Mines, against 874 killed during the corresponding months of 1920, a decrease of 68 fatalities, or 7.8 per cent. The output of coal for the same months was 201,000,000 short tons in 1921 and 245,000,000 tons in 1920, a decrease during the present year of 44,000,000 tons, or 17.9 per cent. These figures represent a fatality rate of 4.01 per million tons mined in 1921, and 3.57 per million tons mined in 1920.

Prices of Leading Products for First Half of 1921

	Jan.	Feb.	March	April	May	June
No. 2X pig iron, Philadelphia	$33.34	$31.09	$27.59	$26.26	$25.71	$25.50
No. 2 Southern, Cincinnati	36.75	32.65	29.80	28.00	26.70	26.37
No. 2, Chicago	31.50	29.00	25.60	24.00	22.80	20.75
Basic, Valley furnace	30.00	27.50	24.25	22.88	22.00	20.75
Bessemer iron, Pittsburgh	33.96	31.46	28.16	26.96	25.96	24.71
Bessemer billets, Pittsburgh	43.50	42.25	38.40	37.50	37.00	37.00
Wire rods, Pittsburgh	57.00	54.50	52.00	49.00	48.00	48.00
Steel bars, Pittsburgh	2.35c.	2.15c.	2.00c.	2.05c.	2.10c.	2.05c.
Tank plates, Pittsburgh	2.65c.	2.33c.	2.04c.	2.10c.	2.20c.	1.95c.
Beams, etc., Pittsburgh	2.45c.	2.26c.	2.08c.	2.10c.	2.20c.	2.10c.
Wire nails, Pittsburgh (per 100 lb. keg)	$3.25	$3.21	$3.02	$3.13	$3.05	$3.00



Prices of Billets, No. 2 Southern Pig Iron, No. 2X and Basic—Jan. 1 to June 30, 1921

Canada's Trade with the United States

Value Was Largest on Record—Increase in Shipments of Rolling Mill Products an Outstanding Feature—Heavy Movement of Machinery

BY WILLIAM LEWIS EDMONDS

TORONTO, June 27.—Canada's import trade with the United States in iron and steel and products thereof during the fiscal year 1920-21 was marked by several outstanding features.

In value the trade was the largest on record, the total being $226,862,465, an increase over the previous high point of 1917-18 of $37,092,544, or more than 19 per cent. Compared with 1919-20, it is a gain of $48,200,859, or about 27 per cent, while it is in excess of five years ago by $140,196,705, or nearly 162 per cent.

The proportion the imports of iron and steel from the United States bore to the total from all countries was slightly less than in the previous year, being 92.36 per cent, as against 95.88 per cent. This is nearly altogether due to the fact that there was an increase of over 151 per cent during the year in the imports from the United Kingdom, the total from the latter country having a value of $16,698,085, compared with $6,637,065 for the fiscal year 1919-20.

Rolling Mill Products

The most outstanding increase in the imports from the United States was in rolling mill products, the total value of which was $70,750,358, against $41,717,551 in 1919-20 and $62,151,289 two years ago. The following table gives the principal imports from the United States under this classification during the past two years and the total from all countries for the fiscal year 1920-21:

	United States		All Countries
	1920-21	1919-20	1920-21
Rolled iron or steel and cast steel in bars, bands, etc.	$11,587,594	$4,563,307	$13,876,312
Rolled iron or steel hoop, band, etc., 14 g. and thinner	1,158,614	501,636	1,158,614
Rolled iron or steel, hoop, band, etc., gal. or coated	1,124,797	608,042	1,206,659
Rolled steel, not further mnfd. than cut to shape.	483,477	323,559	507,952
Hammered, drawn or cold rolled bars or shapes..	390,332	194,166	391,842
Steel rails	980,191	370,824	980,191
Shafting	445,845	157,171	448,361
Boiler plate	1,040,554	526,133	1,040,554
Canada plates, Russian iron, terne plates, etc...	1,153,659	901,722	1,243,108
Tin plate	8,605,139	6,556,216	8,902,463
Plates not less than 30 in. wide and not less than ¼ in. thick	2,603,421	1,168,601	2,603,921
Plates or sheets, sheared or unsheared	1,178,474	858,598	1,179,926
Sheets, 14 gage and thinner.	5,866,282	2,979,161	6,497,410
Galvanized sheets, flat	2,584,206	912,819	3,566,291
Skelp, sheared or rolled in grooves	5,963,149	4,294,019	5,963,149
Wire rods	1,630,836	1,135,348	1,630,836
Angles, beams, channels, etc.	8,833,877	3,959,625	8,850,134
Steel plate over 12 in. wide for structural work.	1,532,521	729,927	1,532,521
Boiler tubes	2,505,642	1,252,973	2,640,125
Wrought or seamless tubing	1,307,940	624,917	1,313,853

Smelted Products

In smelted products the imports from the United States more than doubled, having a value of $3,750,261 against $1,442,401 the previous year. The principal items were:

	United States		All Countries
	1920-21	1919-20	1920-21
Ferromanganese	$577,505	$7,257	$1,247,827
Pig iron	2,387,027	778,187	2,311,184
Billets, less 60 lb. lineal yd.	476,508	466,698	549,425
Ingots, blooms, puddled bars, etc.	253,245	6,187	253,245

New Record in Machinery Imports

Imports of machinery were the largest on record, and more than double in value those of 1916. The total for all kinds except agricultural machinery was $40,766,905, an increase over the previous year of $6,479,952. The most outstanding increases were in textile, pulp and paper mill and printing machinery. Principal items for the two years were:

	United States		All Countries
	1920-21	1919-20	1920-21
Steam and electric shovels.	$569,722	$398,195	$569,722
Ore and rock crushers ..	729,420	408,118	788,820
Adding machines	953,253	923,512	955,373
Cash registers and parts.	322,007	225,944	322,007
Typewriting machines	998,481	1,042,345	1,001,587
Bookbinding and ruling machinery	777,007	519,975	791,029
Printing and lithographic presses	1,631,314	947,230	1,639,505
Typecasting and typesetting machines	1,244,256	899,904	1,244,504
Air compressing machines.	263,219	249,639	305,179
Cement making machines..	133,065	32,510	135,042
Coal handling machines..	166,818	102,777	168,577
Concrete mixing machines.	86,205	59,546	86,405
Cranes and derricks	848,157	1,005,199	876,717
Power lathes	542,246	741,330	565,337
Paper mill machines	1,296,543	939,302	1,988,945
Pulp mill machines	415,252	102,033	499,048
Rolling mill machines....	646,087	533,308	646,635
Saw mill machines	320,543	200,125	321,969
Textile machinery	4,932,506	2,056,400	6,199,562
Machinery, wholly or in part of steel	19,704,650	17,386,182	20,977,346

Striking Gains in Engines

There were some striking increases under the classification of "Boilers, engines, windmills and pumps." The aggregate value under this classification was $25,220,438, against $22,705,319 the previous year. There was a decline in the imports of automobile engines of nearly $3,000,000 and in gasoline and gas engines of nearly $800,000, but on the other hand there was an increase of $5,398,552 in traction engines for farms. The principal imports were:

	United States		All Countries
	1920-21	1919-20	1920-21
Steam boilers and parts..	$493,434	$374,183	$861,508
Automobile engines	5,387,416	8,402,351	5,388,444
Gas and gasoline engines.	2,175,077	2,960,728	2,257,870
Steam engines	443,968	454,403	505,182
Railway locomotives	542,643	523,732	542,643
Parts of traction engines.	1,871,647	1,404,969	1,871,647
Traction engines for farms	12,597,316	7,198,764	12,603,592
Power pumps	1,201,506	910,713	1,255,244
Hand pumps	293,451	247,478	298,901

Increase in Agricultural Implements

Imports of agricultural implements from the United States had a value of $11,431,444, an increase over the previous year of $4,639,199, and the largest by $1,787,000 ever experienced. Principal imports were:

	United States		All Countries
	1920-21	1919-20	1920-21
Cream separators and parts	$1,828,078	$1,373,928	$2,110,537
Harvesters, self-binding ..	1,106,426	641,210	1,118,133
Potato diggers	101,267	53,015	101,267
Cultivators	177,170	78,432	177,170
Harrows and parts	382,554	255,357	382,770
Plows and parts	2,526,472	1,795,438	2,526,503
Threshing machine separators	1,534,572	808,059	1,534,572
Parts threshing machine separators	1,056,794	442,505	1,056,929
Plow parts, mold boards, etc.	778,667	409,059	778,667

Cutlery and Hardware

Except in knives and forks of steel and scissors, cutlery imports from the United States experienced a decrease as a result of the increase in the imports from the United Kingdom. Taking cutlery and hardware as a whole, however, there was an increase of $420,389, the figures for the two years being $3,815,885 and $3,395,496 respectively. The figures covering imports from the United Kingdom were $1,938,585 and $819,430, an increase for the year of $1,119,155. The principal im-

ports from the United States under the classification of "cutlery and hardware" were:

	United States		All Countries
	1920-21	1919-20	1920-21
Knives and forks of steel.	$301,742	$266,424	$723,916
Pen - knives and pocket knives	104,297	192,882	704,225
Razors of all kinds	41,109	104,128	173,483
Scissors and shears	233,907	138,205	297,414
Cutlery n. o. p.	253,442	267,838	570,260
Builders' hardware	703,950	657,472	784,815
Locks of all kinds	676,418	560,380	702,142
Butts and hinges	164,078	116,300	165,642
Nails, wire	197,786	83,726	197,807
Nuts, rivets and bolts	389,355	316,518	395,632
Screws	180,369	141,062	182,538

Under the classification of tools and hand implements there was a substantial increase in the imports from the United States, the trade having a value of $2,315,480, against $1,942,036 the previous year. As the total imports from all countries had a value of $2,562,029, it will be seen that the lion's share of the trade fell to American manufacturers. Although there was a decline of about $10,000 in the imports of American stamped and enameled products, it was due to a smaller trade in the less important lines, agateware, ironware and tinware all showing increases. Total trade under this general classification had a value of $937,027, against $947,306 for the previous year.

Decline in Automobile Imports

Owing to the two-fold influence of special tax and trade depression, a decline in imports of automobiles was to be expected. In passenger cars, imports had a value of $8,339,704, against $11,196,327 the previous year; freight trucks, $3,476,163, against $3,811,139; automobile parts, $11,729,731, against $12,660,789 the previous year. Total imports of automobiles and parts from the United States had a value of $23,545,598, against $27,668,255 the year before, a decline of $4,122,657.

Electric and Gas Apparatus

Total imports of electric and gas apparatus from the United States had a value of $16,343,425, compared with $15,371,461 the previous year. The principal items were as follows:

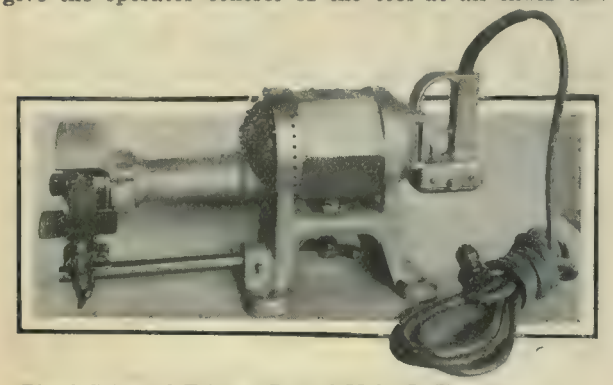
	United States		All Countries
	1920-21	1919-20	1920-21
Batteries, storage	1,363,986	$1,470,479	$1,364,456
Cooking and heating apparatus	127,627	111,148	129,575
Dynamos and generators (electric)	1,227,398	1,039,067	1,323,664
Meters	352,348	243,252	376,968
Electric motors	2,578,807	1,956,639	2,628,734
Sockets	300,935	138,312	304,160
Telephone instruments	889,553	649,994	922,357
Transformers	167,427	123,118	167,427
Electric apparatus n. o. p.	7,296,540	7,311,499	7,633,425
Electric light fixtures	650,548	698,879	668,475
Electric lamps	998,832	1,163,126	1,213,246
Gas and oil fixtures	132,821	140,066	136,758

With the enormous hydro-electric power developments and electric railway expansions which are under way in various parts of the Dominion, and particularly in the provinces of Ontario and Quebec, imports of electric apparatus will probably be extensive for some time to come.

Portable Electric Grinder

The Black & Decker Mfg. Co., Baltimore, is adding to its line of electric drills the portable electric grinder shown in the accompanying illustration.

The pistol grip and trigger switch are designed to give the operator control of the tool at all times and



Pistol Grip and Trigger Control Make It Unnecessary to Shift Either Hand to Start or Stop Machine

to make it unnecessary to shift either hand to start and stop it. Although essentially portable, the machine is supplied with a detachable base and adjustable tool rest, as shown, so that it can be used with equal facility as a bench grinder. The equipment also includes two 5 x 1 in., grinding wheels, one fine and one coarse; a wire brush wheel and a rag buffing wheel. The machine is designed for a wide range of usefulness in machine shop, foundry and garage work.

The mechanism is protected from dust and foreign matter, has grease lubrication throughout and forced air cooling. Gears and shafts are of chrome nickel steel and the housing of aluminum alloy. The grinder can be operated on either direct or alternating current. The motor is ½ hp., with a no load speed of 3200 r.p.m. The diameter of the wheel arbor is ⅝ in., and the net weight, without base, 21 lb.

The Building Trades Council of Cincinnati has adopted resolutions calling for a grand jury investigation of the building industry in Cincinnati, following charges of collusion between employers and employees to keep costs of building up, made at a meeting to consider the building situation.

New Plant for Making Detinned Billets

The Metal & Thermit Corporation has constructed and will shortly place in operation in South San Francisco, Cal., a large new plant for the production of hydraulically compressed detinned billets, in addition to the detinning plants already operated by this company for several years at Chrome, N. J., and East Chicago, Ind.

The new South San Francisco plant has also been equipped with a welding shop for repairing by the Thermit process. The new plant will be in charge of Em. Kardos, superintendent. The former offices of the company at 329-333 Folsom Street, San Francisco, have been moved to the South San Francisco plant.

Fiftieth Anniversary of Shipyard

Commemorating the fiftieth anniversary of the establishment of the Roach shipyard at Chester, Pa., now the property of the Merchant Shipbuilding Corporation, the latter organization has published an attractive issue of its employees' magazine, The Chester *Compass*, devoted almost exclusively to a history of the business from the time it was started by John Roach, sometimes called "the father of American iron and steel shipbuilding." J. H. Loughran is editor and business manager.

New Design of Weldless Machine Chain

A new design of weldless machine chain known as Noweld chain has been brought out by the Chain

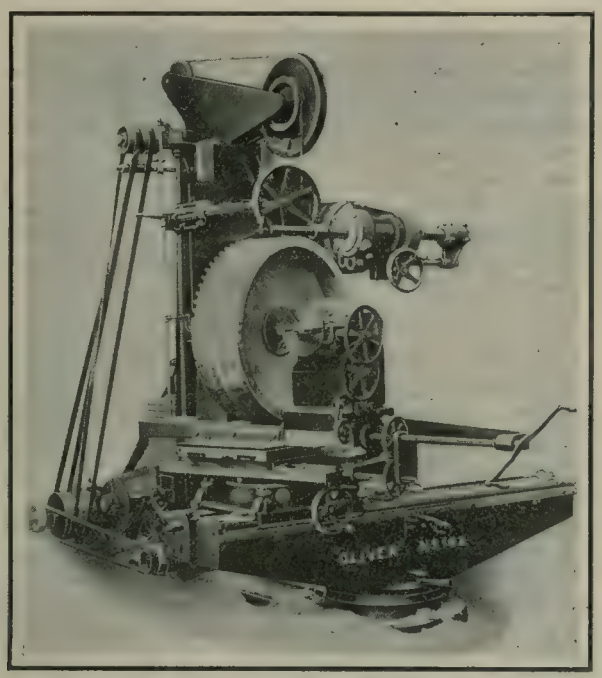


Products Co., Cleveland. It is a woven steel wire chain intended for manufacturing purposes where machine chain is required, and to take the place of electrically welded machine chain. The maker points out that in making the weldless type of chain, high carbon or even an alloy steel can be used, increasing the tensile strength or giving the exact physical characteristics wanted.

Gear Cutting Attachment for Pattern Milling Machine

A complete set of appliances for cutting spiral, spur, bevel and worm gears has been marketed by the Oliver Machinery Co., Grand Rapids, Mich., for use with its No. 102 wood pattern milling machine.

The outfit includes a 14 in. universal dividing head with tail stock, index plate, index chart, two face plates, a set of raising blocks, recessing change gears, quadrants, and a connecting mechanism installed between the table and the dividing head. The machine is so arranged that in turning spirals the gear pattern rotates according to the spiral as the cutting progresses from the back edge to the front edge. In cutting a bevel gear pattern 30 in. in diameter, 12 in. face, the makers state that very close proximations of the theoretically



Wood Pattern Milling Machine Equipped with Gear Cutting Attachment

perfect bevel gear patterns may be made in a few hours as against several days required in the ordinary methods. The attachment shown in the accompanying illustration is known as the No. 733.

Establish Open Shop

Ten of the 22 boiler and sheet iron manufacturers of St. Louis have established the open shop. They are: Ruemmeli-Dawley Mfg. Co.; Hummel Mfg. Co.; Missouri Boiler & Sheet Iron Works; Philip A. Rohan Boat, Boiler & Tank Co.; Alois Aufrichtig Cooper & Sheet Iron Mfg. Co.; John Nooter Boiler Works Co.; Heine Boiler Co.; John O'Brien Boiler Works Co.; William Koch Boiler & Sheet Iron Repair Works and Campbell & Dwyer Boiler & Sheet Iron Works. When the contract with the Boilermaker and Helpers' Union expired, the men demanded its continuation at the old rate of $1 an hour for layers out, 90 cents an hour for boilermakers and 70 cents an hour for helpers. The manufacturers' counter offer of 90c., 80c. and 50c. respectively was rejected. Eleven signed with the union, the others became open shops.

At a dinner last week at the Norton Boat Club, Lake Quinsigamond, 49 employees of the Norton Co., Worcester, Mass., grinding machinery and abrasives, were presented gold medals and framed engraved certificates signed by the directors, in recognition of 25 or more years service. A. C. Higgins, treasurer, made the presentations. The medal on one side shows a grinding wheel flanked by two mechanics, and on the reverse side bears the name of the recipient and the words "Presented by the Norton Co. in Recognition of 25 Years of Faithful Service."

Statistics of Commodity Consumption from Warehouses

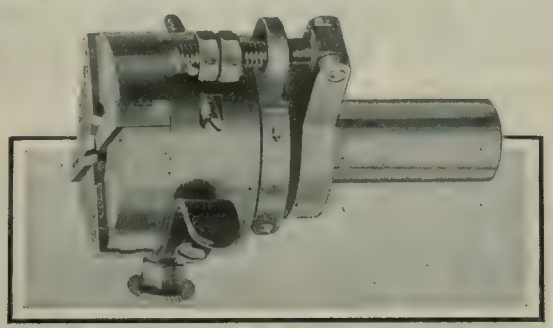
The necessity for statistics as to consumption of commodities from warehouses was stressed in the paper read by L. T. Crutcher, representing the domestic distribution department of the Chamber of Commerce of the United States, before the Central Warehousemen's Club, Chicago, July 1. He said: "Statistics are important in periods of depression to indicate when operations in any particular line may be enlarged safely; and in times of prosperity they furnish a light by which the prudent may be guided. Briefly, accurate statistics such as you warehousemen could prepare would act as a trade stabilizer." He stated further: "Since the value of money is based wholly upon its power in purchasing commodities; and since the warehousemen hold the commodities, it seems reasonable to believe that in due time they will be able to design negotiable paper which will be as carefully safeguarded, equally elastic and as widely accepted as is that of bankers." Mr. Crutcher also advocated pool-car shipments.

New Style DS Geometric Die Head

A new style DS Geometric self-opening and adjustable die head, primarily designed for Brown & Sharpe automatic screw machines but also adapted to other makes of automatics, has been placed on the market by the Geometric Tool Co., New Haven, Conn. The die head is simple and compact and does not depend on the turret feed but floats to suit the thread being cut, thereby eliminating stripping and shaving of threads, and making the usual close camming of the machine unnecessary. Where it is used there is no reversing of the spindle to back the die head off the threaded work.

A lever trip is provided which reduces the force of tripping the die head and accordingly lightens the reaction on the threads cut. Buffer springs allow the die head to yield slightly when chasers come in contact with the work, insuring a smooth thread throughout. Two check nuts at the side provide easy adjustment of the point of tripping, and push buttons are provided to eliminate trouble in inserting the chaser. No face plate is necessary, making it possible to use projecting chasers where required for cutting close to the shoulder.

Chasers are of sturdy construction, have long bear-



Buffer Springs Allow the Die Head to Yield When Chasers Come in Contact with the Work

ings in the die head skeleton and are supported by hardened keys, preventing tilting and consequent cutting of taper threads. There are four chasers in each die head.

A spring closing attachment is located in a convenient position to strike a stop on the machine, automatically closing the die head when the turret revolves. It is of especial value when closing the die head rapidly and eliminating shock and wear. The die heads have shanks to fit the particular size machine on which they are to be used, and micrometer adjustment is provided.

They are made in three sizes, 5/16, 9/16 and ¾ in., the shanks being ⅝ x 1 5/16, ¾ x 2 1/16 and 1 x 2⅜ in., respectively. They have a capacity of 1/16 to ¾ in. in diameter, 1¼ in. or shorter to 1¾ in. in length, and 18 or finer to 10 or finer pitch.

Many New Features of Tariff Bill

Administrative Provisions Mark Important Departure

Differences of Opinion as to Effect of American Valuation Plan—The President Given Large Powers to Negotiate for Reciprocity—Numerous Changes of Rates Already Made and Many More Will Probably Be Adopted—Sharp Opposition to Ferroalloys Tariff Expected

BY L. W. MOFFETT

Washington, July 5.
THE IRON AGE BUREAU,
816 Fifteenth Street.

THE metal schedule of the permanent tariff bill as finally drafted and accepted by Republican members of the House Committee on Ways and Means carries important changes in rates of duty on pig iron, scrap, spiegeleisen, ferrosilicon, ferromanganese and manganese ore from recommendations made by the subcommittee in charge of the schedule which had been tentatively adopted and in part published in THE IRON AGE of June 30. The revisions, determined upon shortly before the bill was given out for publication, lowered rates on pig iron, scrap, and spiegeleisen from $2.50 per ton and placed a duty of $1.25 on these products, as compared with the Payne-Aldrich duty of $2.50 on the former two and $1 on scrap. The reduction in pig iron and spiegeleisen under the act of 1909 therefore was 50 per cent, while on scrap there is an increase of 25 per cent. All three of these products are in the free list in the Underwood-Simmons act. Changes made in the final draft as to the ferroalloys mentioned and manganese ore cleared up conflicts that appeared in recommendations of the subcommittee. There is reason to believe, however, that these items had undergone previous changes at the hands of the subcommittee itself and that, as an instance, manganese ore had been placed on the free list and ferromanganese given the Payne-Aldrich duty of $2.50. Insistence upon protection on these products brought about the duties that have been printed in the bill, and apparently based on the claim that they come under the classification of infant industries. This is one of the outstanding features of the schedule.

Crucible Steel Industry

Another feature is the recognition given to the crucible steel industry, as had been urged at hearings, though recommendations made were not specifically followed. The attention given this part of the steel industry may be observed by the classification and rates of duties made with respect to such products as chrome metal, tungsten, vanadium, molybdenum, etc. The placing of ferromanganese in a ferroalloy paragraph instead of in the pig iron class is another interesting change, marking the first time this has been done in tariff history in this country. Request that this be done was made by domestic producers of that alloy. Chrome ore appears in the free list.

Follows Payne-Aldrich Law

The metal schedule as a whole on the heavier products follows rather closely the Payne-Aldrich schedule as to duties, but, with some exceptions, carries slightly lower duties and approximately seems to follow the principle that applies to the entire bill as explained by Chairman Fordney of the Ways and Means Committee. He estimated that the duties in the new bill will range between 18 and 20 per cent as compared with 18.55 per cent in the Payne-Aldrich act. The Underwood-Simmons average rate, he said, was 6 per cent and the Dingley average 26½ per cent. Like the Payne-Aldrich act, rates in the metal schedule of the new bill are stated in specific rather than ad valorem terms wherever practicable. There have been many transfers of products from the Underwood-Simmons free list to the dutiable list, but among those continued on the free list is iron ore, which carried a duty of 15c. a ton in the Payne-Aldrich act.

Duty on Magnesite

Sharing in interest with regard to disposition of products carried in the metal schedule were several which are consumed by the iron and steel trade, including magnesite, fluorspar, and pig tin. There was considerable discussion over magnesite, with prominent makers of refractories who import material from Austria where they have money invested in mines asking that it be made free, while domestic producers, especially in Washington and California, asked for a duty. The latter have been victorious so far as the present bill is concerned, calcined magnesite, including dead burned and grain, being given a duty of ¾c. per pound, while crude or ground magnesite was made dutiable at ½c. a pound. Fluorspar, for which some interests had asked a duty of $6 a ton, was given a duty of $5, with the provision that after the expiration of one year beginning on the day following the passage of the tariff act, the duty shall be $4 a ton. Tin in bars, blocks or pigs, and grain or granulated tin, were made dutiable at 2c. a pound. There is a provision in the free list, however, which deals with tin ore and pig tin, blocks, and bars, which requires clearing up. It calls for a duty of 4c. a pound on tin ore and 6c. a pound on pig tin, etc., "when it is made to appear to the satisfaction of the President of the United States that the 'mines' of the United States are producing 1500 tons of cassiterite and bar, block, and pig tin per year," the President to make the fact known by proclamation, after which the duties would become operative. This paragraph, except for placing a duty of 6c. on pig tin, etc., is similar to the one in the present act, which would apply a rate of 4c. to the pig tin as well as to the ore. So far as it applies to ore it perhaps is not important because no tin ore is mined in the United States, but as the paragraph reads, it relates to the "mining" of pig tin, bars, etc., and if these commodities were manufactured to the extent of 1500 tons it might be questionable whether the 6c. rate could technically be applied. Zinc and lead-bearing ores are given the same duties as those carried in the Payne-Aldrich act, the former ranging from ¼c. to 1c. per pound on the zinc content for 10 to more than 25 per cent material, and free when under 10 per cent. The Underwood-Simmons act carries a flat ad valorem duty of 10 per cent. Restoration of the Payne-Aldrich duty of 1½c. per pound on the lead content doubles the present duty of

¾c. Crude aluminum and aluminum scrap are given a duty of 5c., as compared with 7c. in the Payne-Aldrich act and 2c. in the Underwood-Simmons act, while aluminum plates, sheets, etc., are given a duty of 9c. as compared with 9c. and 3½c., respectively.

Important Departures

Administrative features in the bill mark some wide departures in tariff making. Undoubtedly one of them, a provision that has been the source of sharp differences of opinion, not only as between Democrats and Republicans, but also between the Senate Committee on Finance and the House Committee on Ways and Means, regardless of party, is that fixing duties on an American valuation basis. The Senate committee refused to approve this provision in the emergency bill as the latter passed the House and it now is under attack by House Democrats, one of whom, Representative Garner of Texas, ranking member of the Committee on Ways and Means, states that the rates in the new tariff bill, when considered in the light of American valuations, are much higher than in any tariff passed by Congress since the Civil War. This claim is vigorously denied by Representative Fordney and is one of many evidences that the bill is going to be subjected to much controversy. The American valuation provision is apparently not clearly understood, and has caused many members of Congress to hesitate about comparing rates of duty in the new bill and the Payne-Aldrich act. Under the present and past laws, the assessment of customs has been based upon foreign value. It is stated that the operation of the section may be made difficult because it calls for assessment of customs upon the value in the American market of a comparable and competitive product, while it is estimated that 50 to 60 per cent of all imports have no standard value. In the case of steel, however, comparison would be simple, and it is assumed the American value would be placed on the Pittsburgh basis. But most steel duties are specific and would not involve valuations. In denying that the American valuation would mean a great increase in rates, the Republican members of the Ways and Means Committee said that because of the higher values in the American market the rates of duty may be decreased 30 per cent without lowering the protection which the rates will afford or the amount of revenue they will produce. Or, according to Mr. Fordney, a duty of 70 per cent, if based on the American valuation, will produce the same revenue and afford the same protection as a duty of 100 per cent if assessed on the present foreign valuation system.

Bargaining Made Possible

Request made by the Consolidated Steel Corporation, and other interests for a bargaining tariff has been complied with in the new bill, which goes into this interesting feature at considerable length. This provision, in brief, authorizes the President to enter into reciprocal arrangements with foreign countries by treaty, to be ratified by the Senate. One clause also gives the President the right to impose higher duties on articles from countries which discriminate against the United States, while still another provides that within three years the President may conclude reciprocal arrangements with foreign countries by which for five years their articles may be imported into the United States at not more than 20 per cent reduction of the regular rates in the tariff. Provision also is carried repealing the Canadian reciprocity agreement, effective since 1910. The measure authorizes customs officers to obtain verified statements of production costs where it is considered they are necessary and changes to some degree approximately one-half of the customs laws with regard to passage of commodities through customs houses, methods of assessing duties and other definitions to guide customs officials.

The bill is so bulky, contains so much new material, and is the object of such a great variance of opinion, over and above the expected political differences, that there can be no question that it will be the object of sharp debate in both branches of Congress and predictions are made that it will be considerably changed before it passes the Senate, though it is traditionally true that this happens to all tariffs. The bill, however, was the source of many differences among Republican members of the Ways and Means Committee. This is shown by the changes made from recommendations of subcommittees of the various schedules, as to a number of schedules even after the first print of the bill was given out, calling for a revised print, and the issuance of a supplementary change in mimeographed form. Changes in the metal schedules referred to were among those made at a late hour. It is proposed that other changes by way of amendments from Republican members of the Ways and Means Committee will be made on the floor of the House. While this is commonly done, it is claimed that in this instance they may be very important in some instances and not be confined to the more ordinary changes as to phraseology. Whether the metal schedule will be affected by these revisions remains to be seen. It is stated that the House Republican caucus held last Thursday evening developed considerable difference of opinion, and that it then was found amendments would have to be made in order to insure strong Republican support of the bill, which will be fought by Democrats who urged preparation of another bill and a minority report. Under the parliamentary procedure in the House, debate can be limited by special rule, and because of this, Republicans propose to hold amendments down to the minimum and admit only those acceptable to them. It has been proposed to put the bill through the House in two weeks, the intention being to take it up for consideration to-morrow by the full Committee on Ways and Means.

Hearings in the Senate

Hearings on the tariff before the Senate Committee on Finance, according to Chairman Penrose, will occupy "one or two months" and probably will begin as soon as the bill passes the House. Those who do not look for the House to make changes they desire are waiting to present protests before the Committee on Finance.

This is said to be true with regard to some independent steel interests, and their position denotes that duties on manganese ore and ferroalloys, particularly on ferromanganese, will be the storm center of the metal schedule, which, by reason of additional classifications, is unusually large, consisting of 94 paragraphs as compared with 66 in the Underwood-Simmons act.

They have protested that manganese ore should be placed on the free list and ferromanganese either free listed or given a duty of not more than $10 a ton. Contention is made by them that a duty of 1c. per lb. on manganese ore would mean an added cost of only 7c. per ton to the steel maker who manufactures his own ferromanganese, calculating that the average imports will run about 48 per cent in manganese and that it requires 15 lb. of ferromanganese (taking 2.2 tons of ore per ton of ferromanganese) to make a ton of soft steel. As against this, it is asserted that a duty of 2 1/5c., based on the quantity of ore in a ton of the alloy, on ferromanganese in excess of 1 per cent of carbon—the average tonnage is said to run between 4 and 7.50 per cent in carbon—would be equivalent to $38.43 a ton based on 78 per cent ferromanganese, or approximately 26c. a ton additional in the cost of making steel. On this basis, it is claimed, the annual cost to independent steel makers as the result of the 2 1/5c. ferromanganese duty

would be approximately $5,200,000, estimating their normal finished steel output at 20,000,000 tons. Protests also have been made against any duty on either fluorspar or magnesite, while those urging duties are said to be prepared to support strongly the proposed levies or to ask for higher ones. In the case of fluorspar, consumers have stated that the pre-war price ranged from $4.75 to $7.25 per net ton, f.o.b. mines, and that the duty now is higher than the former market price, while the pre-war price on grain magnesite was $16 per ton, Atlantic seaboard, as compared with a proposed duty of $15 per net ton.

Chairman Tilson Explains the Metal Schedule

Chairman Tilson of the sub-committee on the metal schedule made the following report in part:

"Whatever may be the facts in regard to other schedules, the rates of duty as carried in the metal schedule of the act of 1897 were revised downward in the act of 1909. A careful comparison of the two acts will show a general and substantial reduction. The revision was well and carefully done, so that comparatively few mistakes were discovered in the administration of this portion of the act in the four years during which the law was in effect. In fact, during all the bitterness of partisan conflict which raged about this law during its four years of life very little adverse criticism, except the most general kind, was ever made against the metal schedule.

"The highest tribute, however, was paid to the 1909 revisers of Schedule C by those who revised the same schedule in 1913. The revision of this schedule in 1913 could not by any stretch of the imagination be called a scientific revision. A few paragraphs were transferred to the free list. In a much larger number of cases, the carefully prepared specific rates were stricken out and either a blanket ad valorem rate or a series of more or less haphazard ad valorem rates substituted, while in the cases where ad valorem rates were applied in the act of 1909, the rates were quite generally reduced, many of them disastrously so, as subsequent events fully proved. Although ruthlessly hacked and distorted in many of its features shorn of its symmetry and rendered impotent in most respects to perform the useful functions for which it was originally designed and fitted, nevertheless the frame work and in general the classifications of the old schedule were carried over to the new in the 1913 revision.

Same General Structure

"Although conditions have materially changed in many of the metal industries since 1909 and 1913, nevertheless the same general structure of the schedule as carried in the two preceding acts is here used. Many of the classifications remain substantially the same, while in many other cases classifications have been prepared to meet the new conditions.

"In the four normal years from 1909 to 1913 the rates of duty carried in the act of 1909 proved on the whole to be reasonably protective without being excessive or prohibitive and the metal industries thrived. As soon as general business conditions return to approximately the pre-war normal many of these rates will doubtless again measure with reasonable accuracy the proper rate level. Acting upon the belief that this will be true, a number of rates which had proved satisfactory in pre-war normal times have been restored to this bill. In other cases, time and war have so changed conditions that different and sometimes higher rates have been rendered necessary.

"Difficulties have been encountered at every step in the committee's efforts to secure satisfactory information as to industrial conditions throughout the world and even at home. Government statistics mean less and have been less valuable than ever before. Statistics for the period of the war and immediately following are practically of no value whatever. Statistics showing the exports and imports during the operation of the act of 1913 are most unsatisfactory because the groupings are made either by fiscal or calendar years and that act was not in effect through either a fiscal or a calendar year before the war produced abnormal conditions. There remain the statistics of the normal years before 1914 and those now accumulating of the last year, which cannot be reckoned as normal, but which serve to indicate tendencies and the direction in which industrial affairs are moving. Some of the most valuable information received as to conditions in foreign countries came from persons who have been abroad recently on business trips. Letters containing offers from foreign manufacturers have been submitted with price lists and advertising matter. Also original invoices of foreign made goods. From all the information received, it appears clearly and beyond question that as far as manufactures of metals are concerned the spread or differential between the labor cost of articles made here and abroad is much greater than before the war. This is so to a very marked degree in Germany and only less so in the other countries which compete with us in the metal industries. It is well known that before the war Germany had already become our most effective competitor in the manufacture of metals. With uninjured, and in many cases greatly improved, facilities for manufacturing, with abundant skilled labor at wages less than one-fourth, in many cases less than one-eighth, measured in gold, that of the corresponding American labor, the German faces his American competitor, now paying the highest wages ever paid in any country at any time, except in this country for a portion of last year. The answer to the problem outlined by such a condition furnishes abundant reasons for such increases in rates of duty as are proposed in this Title.

Divided Into Three Classes

"For the purposes of determining proper rates of duty the articles contained in this Title may be roughly divided into three classes.

"The first class includes articles produced in large part by machinery, where the element of labor, though important, is relatively small as compared with the quantity and value of the product. This class includes iron and steel in the earlier stages of manufacture embracing the many forms of what are sometimes called the heavy or rolled product. Even for this class of products the increase of labor cost alone might justify an increase in rates of duty beyond what was ever before required, but rates have not been increased upon these articles. In many cases they have been substantially reduced below the rates in the Act of 1909 and in some cases below the Act of 1913.

"Formerly many articles of a higher stage of manufacture fell within this class because of the fact that in this country labor saving machines and appliances were used to a degree unknown in any other country. America was the land of 'jig made' goods. With proper machinery and an adequate equipment of tools, jigs, dies, gages and fixtures, one American workman could turn out several times the output of his brother workman abroad. Such advantages on our side in a large measure have ceased to exist and in many of the older industries have entirely ceased. With this change, such industries pass into the next class.

"The second class comprises articles produced in industries long established and thoroughly developed, wherein advantages by way of labor saving devices have ceased to exist, where the element of labor is relatively most important and where the difference in labor cost is the controlling factor in competition. The list of this class of industries is growing as the machines, the equipment and the methods of this country become the common property of all industrial countries.

"The third class consists of those articles the production of which was begun or largely developed during the war period and which have not yet reached the stage of competition upon even terms with those longer engaged in the industries in foreign countries. A number of these may be truly called 'infant industries.'

"*Surgical and Scientific Instruments.*—Among the new industries may be mentioned surgical, dental, philosophical and scientific instruments. Prior to the war we had been accustomed to import these articles largely from abroad. The making of them had not been satisfactorily developed in this country, which, when the war came to us, became a matter of genuine and serious regret, not to mention inconvenience and danger. Before the war ended we had made considerable progress in making these articles and it is proposed in this bill that so far as protective duties can properly assist, to insure the continuance of these industries here.

"*Scissors.*—Long before the war the making of steel laid shears had become an important industry in the United States, but the making of solid steel scissors had been almost entirely neglected, so that the war found us without a scissors industry. This was developed and built up during the war and it is believed that a fair rate of duty will enable it to continue.

"*Ferroalloys.*—The making of new kinds of steel by means of various metal alloys was greatly developed during the war as new and different uses were discovered. Some of these alloys had been used for a long time, but the use of all of them was greatly stimulated. The most important alloy metals used in making different kinds of steel are chrome, tungsten, vanadium, molybdenum and titanium. Other ferroalloys for the most part still in the experimental stage are ferrouranium, ferroboron, ferroaluminum, ferrozirconium and ferrocerium.

"Chrome and tungsten are used extensively in making high speed tool steel. Vanadium toughens the steel and renders it more resistant to shock and stress. Molybdenum gives it greater toughness and tensile strength. In fact, by the use of these alloys the making of steel has become a business much like that of the pharmacist who stands ready to compound his drugs according to the prescription. There are unlimited possibilities ahead of the ferroalloy industry.

"The addition of alloys in general makes the steel harder, tougher, or in some respect more difficult to work, requiring an increasing number of operations and additional labor, so that somewhat increased rates of duty are required for these products and articles made thereform.

Mining Industries

"During the war not only such old mining industries as lead, zinc and quicksilver underwent unusual development, but a considerable number of new industries were undertaken and to a considerable extent developed. Under Government stimulus, mining was encouraged to a very marked degree. Rare metals used as alloys for steel, such as chrome, tungsten, molybdenum and others were eagerly sought for. The mining of manganese ore was especially encouraged and reached a production of more than 40 per cent of the total domestic consumption in 1918. Many of these newer enterprises have suffered seriously since the close of the war. In some cases, such as tungsten, molybdenum and manganese, it is here attempted by protective duties to preserve the industries. Others, like chrome, also encouraged by the Government and now destined to lose what has been invested, unless recovered by the Government, the committee has deemed it unwise to attempt to save because the results of the war developments do not seem to warrant the belief that an economical industry can be built up in this country and if not, then the duty imposed would prove a useless burden upon the entire steel industry.

"In the metal title, as throughout the bill, specific rather than ad valorem duties have been imposed wherever practicable, first, because they are readily determined and also because they furnish greatest protection on a falling market when protection is most needed. In comparing the rate in the bill with that contained in any previous act, it should be borne in mind that by reason of the war, production costs have been generally increased, but nowhere so much as in the United States, which means that a specific rate now furnishes a less degree of protection than was furnished by the same specific rate when the value of the article was less. In view of the well grounded belief that it will be a long time before production costs in this country again approach normal, it has been found necessary in fixing rates to take the changed conditions into account."

Metal Schedule of the New Tariff Bill

Items Now on the Free List Restored to the Dutiable List—Manganese Ore and Ferromanganese Duties Are Noteworthy

IN THE IRON AGE of June 30 were printed some paragraphs of the Metal Schedule of the new tariff bill as originally printed for presentation to the full Ways and Means Committee. Changes were made in some of these sections before the bill in its final form was given to the press. These changes were notably in pig iron and in the ferroalloy section.

Below is given the Metal Schedule in full, and inserted are the corresponding provisions of the present Underwood tariff and of the previous tariff, commonly known as the Payne-Aldrich tariff. The Underwood duties are given in parentheses ( ), while the Payne-Aldrich duties are given in brackets [ ]. It is to be expected that amendments will be made to the bill, both in the House and in the subsequent consideration of the measure by the Senate.

Schedule 3.—Metals and Manufactures of

301. Iron in pigs, iron kentledge, spiegeleisen (all on free list) [all $2.50 per ton], wrought and cast scrap iron, and scrap steel, including scrap tin plate (all scrap on free list) [scrap, $1 per ton], *$1.25 per ton:* Provided, That nothing shall be deemed scrap iron or scrap steel except second-hand or waste or refuse iron or steel fit only to be remanufactured.

302. Manganese ore or concentrates containing in excess of 30 per cent of metallic manganese (free list), *1c. per lb.* on the metallic manganese contained therein; molybdenum ore or concentrates, *75c. per lb.* on the metallic molybdenum contained therein; tungsten ore or concentrates, *45c. per lb.* on the metallic tungsten contained therein; ferromanganese containing in excess of 1 per cent of carbon (free list) [$2.50 per ton], *2½c. per lb.* on the metallic manganese contained therein; manganese metal, manganese-silicon, manganese-boron, and ferromanganese containing less than 1 per cent of carbon (free list) [$2.50 per ton], *2½c. per lb.* on the manganese contained therein and *28 per cent* ad valorem; ferromolybdenum, metallic molybdenum, molybdenum pow-

der, calcium molybdate, and all other compounds and alloys of molybdenum, *$1.25 per lb.* on the molybdenum contained therein and *17 per cent* ad valorem; ferrotungsten, metallic tungsten, tungsten powder, tungstic acid, and all other compounds of tungsten, *72c. per lb.* on the tungsten contained therein and *15 per cent* ad valorem; ferrochromium tungsten, chromium tungsten, chromium cobalt tungsten, tungsten nickel, and all other alloys of tungsten not specially provided for, *72c. per lb.* on the tungsten contained therein and *17 per cent* ad valorem; ferrosilicon, containing 8 per cent or more of silicon and less than 30 per cent, *2½c. per lb.* on the silicon contained therein; containing 30 per cent or more of silicon and less than 60 per cent, *2¾c. per lb.* on the silicon contained therein; containing 60 per cent or more of silicon and less than 80 per cent, *3½c. per lb.* on the silicon contained therein; containing 80 per cent or more of silicon and less than 90 per cent, *4c. per lb.* on the silicon contained therein; containing 90 per cent or more of silicon, and silicon metal, *8c. per lb.* on the silicon contained therein; ferrochrome or ferrochromium containing 3 per cent or more of carbon, *3½c. per lb.* on the chromium contained therein; ferrochrome or ferrochromium containing less than 3 per cent of carbon, and chrome or chromium metal, *30 per cent* ad valorem; ferrophosphorus, ferrotitanium, ferrovanadium, ferrouranium, ferrocerium, zirconium ferrosilicon, ferroboron, titanium, zirconium, tantalum, chromium nickel, vanadium nickel, zirconium nickel, chromium vanadium, chromium silicon, zirconium silicon, calcium silicide, and all alloys used in the manufacture of steel not specially provided for, *30 per cent* ad valorem (ferroalloy paragraph carried 15 per cent) [ferroalloys, 20 to 25 per cent].

303. Muck bars and bar iron, square iron, rolled or hammered, comprising flats not less than one inch wide nor less than ⅜ in. thick, round iron not less than 7/16 in. in diameter, *¼c. per lb.*; round iron, in coils or rods, less than 7/16 in. in diameter, and bars and shapes of rolled or hammered iron, not specially provided for (5 per cent) [6/10c. per lb.], *5/10c. per lb.;* iron in slabs, blooms, loops, or other forms less finished than iron in bars, and more advanced than pig iron, except castings (5 per cent) [4/10c. per lb.], *2/10c. per lb.:* Provided, That all iron bars, blooms, billets, slabs or loops in the manufacture of which charcoal is used as fuel shall be subject to a duty of *3/10c. per lb.* (5 per cent) [3/10c. per lb.].

304. Steel ingots, cogged ingots, blooms and slabs, by whatever process made; die blocks or blanks; billets and bars and tapered or beveled bars; mill shafting; pressed, sheared, or stamped shapes, not advanced in value or condition by any process or operation subsequent to the process of stamping; hammer molds or swaged steel; gun-barrel molds not in bars; alloys used as substitutes for steel in the manufacture of tools; all descriptions and shapes of dry sand, loam, or iron molded steel castings; sheets and plates and steel not specially provided for; all of the foregoing valued at not over 1c. per lb., *2/10c. per lb.* [7/40c. per lb. on value of ¾c. per lb. or less and ranging up to 4.6c. per lb. on value of 16c. to 24c.]; valued above 1c. and not above 1½c. per lb., *3/10c. per lb.;* valued above 1½c. and not above 2½c. per lb., *5/10c. per lb.;* valued above 2½c. and not above 3½c. per lb., *8/10c. per lb.;* valued above 3½c. and not above 5c. per lb., *1c. per lb.;* valued above 5c. and not above 8c. per lb., *1½c. per lb.;* valued above 8c. and not above 12c. per lb., *2c. per lb.;* valued above 12c. and not above 16c. per lb., *2½c. per lb.;* valued above 16c. and not above 20c. per lb., *3½c. per lb.;* valued above 20c. and not above 24c. per lb., *4c. per lb.;* valued above 24c. and not above 32c. per lb., *5c. per lb.* [6c. per lb.]; valued above 32c. and not above 40c. per lb., *6c. per lb.* [7c. per lb.]; valued above 40c. per lb., *20 per cent* [20 per cent] ad valorem: Provided, That on steel circular saw plates there shall be levied an additional duty of *¼c. per lb.* (Ingots, billets, etc., by Bessemer or open-hearth process, free list; electric, crucible and alloy ingots, &c., 15 per cent.)

305. In addition to the rates of duty provided for in this title on steel in all forms and shapes, by whatever process made, and by whatever name designated, whether cast, hot or cold rolled, forged, stamped, or drawn, containing more than 6/10 of 1 per cent of nickel, cobalt, vanadium, chromium, tungsten, molybdenum, or any other metallic element used in alloying steel, there shall be levied and collected *15 per cent* ad valorem: Provided, That manganese and silicon shall not be considered as alloying material unless present in the steel in excess of 1 per cent: Provided further, That an additional cumulative duty of *$1.25 per lb.* on the molybdenum content in excess of 1 per cent, and *72c. per lb.* on the tungsten content in excess of 1 per cent shall be levied and paid on any of the above-named articles.

306. All metal produced from iron or its ores, which is cast and malleable, of whatever description or form, without regard to the percentage of carbon contained therein, whether produced by cementation, or converted, cast, or made from iron or its ores, by the crucible, electric, Bessemer, Clapp-Griffith, pneumatic, Thomas-Gilchrist, basic, Siemens-Martin, or open-hearth process, or by the equivalent of either, or by a combination of two or more of the processes, or their equivalents, or by any fusion or other process which produces from iron or its ores a metal either granular or fibrous in structure, which is cast and malleable, excepting what is known as malleable-iron castings, shall be classed and denominated as steel.

307. Boiler or other plate iron or steel, except crucible plate steel and saw plate steel, not thinner than 140/1000 in., cut or sheared to shape or otherwise, or unsheared, and skelp iron or steel sheared or rolled in grooves, valued at 1c. per lb. or less, *7/20c. per lb.* [from 3/10c. on 8/10c. value to 6/10c. on 3c. value]; valued above 1c. per lb. and not above 3c. per lb., *5/10c. per lb.;* valued at over 3c. per lb., *20 per cent* ad valorem [20 per cent]: Provided, That all sheets or plates of iron or steel thinner than 140/1000 in. [No. 10 wire gage] shall pay duty as iron or steel sheets (all plates 12 per cent).

308. Sheets of iron or steel, common or black, of whatever dimensions, and skelp iron or steel, valued at 3c. per lb. or less, thinner than 140/1000 and not thinner than 38/1000 in., *45/100c. per lb.;* thinner than 38/1000 and not thinner than 22/1000 in., *55/100c. per lb.;* thinner than 22/1000 and not thinner than 10/1000 in., *75/100c. per lb.;* thinner than 10/1000 in., *85/100c. per lb.;* corrugated or crimped, *75/100c. per lb.;* all the foregoing when valued at more than 3c. per lb., *20 per cent* ad valorem: Provided, That all sheets or plates of common or black iron or steel not thinner than 140/1000 in. shall pay duty as plate iron or plate steel (all black sheets, 12 per cent) [5/10c. on 3c. value, and less, and thinner than No. 10 wire gage, ranging up to 9/10c. on thinner than No. 32 gage; over 3c. value, 30 per cent].

309. All iron or steel sheets, plates, bars, and rods, and all hoop, band, or scroll iron or steel, excepting what are known commercially as tin plates, terne plates, and taggers tin, when galvanized or coated with zinc, spelter, or other metals, or any alloy of those metals, shall pay *2/10c. per lb.* more duty [same] than if the same was not so galvanized or coated; sheets or plates composed of iron, steel, copper, nickel, or other metal with layers of other metal or metals imposed thereon by forging, hammering, rolling, or welding, *28 per cent* ad valorem [40 per cent]; sheets and plates of iron or steel, polished, planished, or glanced, by whatever name designated, *1¼c. per lb.* [1½c]: Provided, That plates or sheets of iron or steel, by whatever name designated, other than polished, planished, or glanced, herein provided for, which have been pickled or cleaned by acid, or by any other material or process, or which are cold-rolled, smoothed only, not polished, shall pay *2/10c. per lb.* [same] more duty than the rates provided on corresponding thicknesses of common or black sheet iron or steel. (For all the above, 15 per cent ad valorem.)

310. Sheets or plates of iron or steel, or taggers iron or steel, coated with tin or lead, or with a mixture of which these metals, or either of them, is a component part, by the dipping or any other process, and commercially known as tin plates, terne plates, and taggers tin, *1.1c. per lb.* [1.2c. per lb.].

311. No article not specially provided for which is wholly or partly manufactured from tin plate, terne plate, or the sheet, plate, hoop, band, or scroll iron or steel, or of which such tin plate, terne plate, sheet, plate, hoop, band, or scroll iron or steel shall be the material of chief value, shall pay a lower rate of duty than that imposed on the tin plate, terne plate, or sheet, plate, hoop, band, or scroll iron or steel from which it is made, or of which it shall be the component thereof of chief value.

312. Beams, girders, joists, angles, channels, car-truck channels, tees, columns and posts, or parts or sections of columns and posts, deck and bulb beams, and building forms, together with all other structural shapes of iron or steel, not assembled, manufactured, or advanced beyond hammering, rolling, or casting, *7/20c. per lb.* (10 per cent) [3/10c. to 4/10c. per lb.]; any of the foregoing if machined, drilled, punched, assembled, fitted, fabricated for use, or otherwise advanced beyond hammering, rolling, or casting, 25 *per cent* ad valorem (10 per cent) [45 per cent].

313. Hoop, band, and scroll iron or steel, not specially provided for, valued at 3c. per lb. or less, 8 in. or less in width, and thinner than ⅜ in. and not thinner than 140/1000 in., *25/100c. per lb.* (10 per cent) [3/10c. per lb.]; thinner than 140/1000, and not thinner than 38/1000 in., *35/100c. per* lb. (10 per cent) [4/10c. per lb.]; thinner than 38/1000 in., *55/100c. per lb.* (10 per cent) [6/10c. per lb.]: Provided, That barrel hoops of iron or steel, and hoop or band iron, or hoop or band steel, flared, splayed, or punched, with or without buckles or fastenings, shall pay no more duty than that imposed on the hoop or band iron or steel from which they are made, bands and strips of iron or steel, whether in long or short lengths, not specially provided for, *20 per cent* ad valorem (10 per cent) [35 per cent].

314. Hoop or band iron, and hoop or band steel, cut to

lengths, or wholly or partly manufactured into hoops or ties, coated or not coated with paint or any other preparation, with or without buckles or fastenings, for baling cotton or any other commodity, *¼c. per lb.* (free list) [3-10c. per lb.].

315. Wire rods: Rivet, screw, fence, and other iron or steel wire rods, whether round, oval, or square, or in any other shape, nail rods and flat rods up to 6 in. in width ready to be drawn or rolled into wire or strips, all the foregoing in coils or otherwise, valued at not over 4c. per lb., *3/10c. per lb.* (10 per cent) [3/10c. per lb.]; valued over 4c. per lb., *6/10c. per lb.* (10 per cent) [3/10c. per lb.]: Provided, That all round iron or steel rods smaller than 20/100 in. in diameter shall be classed and dutiable as wire: Provided further, That all iron or steel wire rods which have been tempered or treated in any manner or partly manufactured shall pay an additional duty of *¼c. per lb.* (10 per cent) [½c. per lb.]: Provided further, That on all iron or steel bars and rods of whatever shape or section which are cold rolled, cold drawn, cold hammered, or polished in any way in addition to the ordinary process of hot rolling or hammering, there shall be paid *⅛c. per lb.* [same] in addition to the rates provided on bars or rods of whatever section or shape which are hot rolled; and on all strips, plates, or sheets of iron or steel of whatever shape, other than polished, planished, or glanced sheet iron or sheet steel, which are cold hammered, blued, brightened, tempered, or polished by any process to such perfected surface finish or polish better than the grade of cold rolled, smoothed only, there shall be paid *2/10c. per lb.* (10 per cent) [4/10c. per lb.] in addition to the rates provided on plates, strips, or sheets of iron or steel of common or black finish of corresponding thickness or value.

316. Round iron or steel wire, not smaller than 95/1000 in. in diameter, *¾c. per lb;* smaller than 95/1000 and not smaller than 65/1000 of one inch in diameter, *1¼c. per lb.* (15 per cent) [1¼c. per lb.]; smaller than 65/1000 in. in diameter, *1½c. per lb.* (15 per cent) [1¾c. per lb.]: Provided, That all of the foregoing valued above 6c. per lb. shall pay a duty of *20 per cent* ad valorem; all wire composed of iron, steel, or other metal, not specially provided for, except gold, silver, or platinum; all flat wires and all steel in strips not thicker than ¼ in. and not exceeding 16 in. in width, whether in long or short lengths, in coils or otherwise, and whether rolled or drawn through dies or rolls, or otherwise produced, and all other wire not specially provided for, 20 *per cent* ad valorem (15 per cent) [35 per cent]: *Provided,* That all iron or steel wire coated by dipping, galvanizing, sherardizing, electrolytic or any other process with zinc, tin, or other metal, shall pay a duty of *2-10c. per lb.* in addition to the rate imposed on the wire of which it is made [same]; telegraph, telephone, and other wires and cables composed of iron, steel, or other metal except gold, silver, or platinum, covered with or composed in part of cotton, jute, silk, enamel, lacquer, rubber, paper, compound, or other material, with or without metal covering, 30 *per cent* ad valorem (15 per cent) [40 per cent]; wire rope and wire strand, 30 *per cent* ad valorem (30 per cent) [maximum wire duty and 1c. per lb.]; spinning and twisting ring travelers, 30 *per cent* ad valorem; wire heddles and healds, *25c. per thousand* and 30 *per cent* ad valorem. (30 per cent) [25c. and 40 per cent].

317. All galvanized wire not specially provided for, except gold, silver, or platinum, not larger than 20-100 and not smaller than 8-100 in. in diameter, of the kind commonly used for fencing purposes (free) [wire duty plus 2-10c. per lb.], galvanized wire fencing composed of wires not larger than 20-100 and not smaller than 8-100 in. in diameter; and all wire commonly used for baling hay or other commodities, *½c. per lb.* (free) [not less than 40 per cent].

318. Woven-wire cloth: Gauze, fabric, or screen, made of wire composed of steel, brass, copper, bronze, or any other metal or alloy, not specially provided for, with meshes not finer than thirty wires to the lineal inch in warp or filling, 20 *per cent* ad valorem; with meshes finer than 30 and not finer than 90 wires to the lineal inch in warp or filling, 30 *per cent* ad valorem; with meshes finer than ninety wires to the lineal inch in warp or filling, 40 *per cent* ad valorem. (15 per cent) [maximum wire duty plus 1 c. per lb.].

319. Iron or steel anchors and parts thereof [1c. per lb]; forgings of iron or steel, or of combined iron and steel, not machined, tooled, or otherwise advanced in condition by any process or operation subsequent to the forging process, not specially provided for, 25 *per cent* ad valorem (12 per cent) [30 per cent].

320. Electric storage batteries and parts thereof, storage battery plates and storage battery plate material, wholly or partly manufactured, all the foregoing not specially provided for, 30 *per cent* ad valorem. (20 per cent) [45 per cent].

321. Antifriction balls and rollers, metal balls and rollers commonly used in ball or roller bearings, metal ball or roller bearings, and parts thereof, whether finished or unfinished, for whatever use intended, 10c. *per lb.* and 35 *per cent* ad valorem. (35 per cent) [45 per cent].

322. Railway fishplates or splice bars, made of iron or steel, *¼c. per lb.* (10 per cent) [3-10c. per lb.]; all other railway bars made of iron or steel, and railway bars made in part of steel, T rails, and punched iron or steel flat rails, 7-40c. *per lb.* (free) [7-40c. per lb.].

323. Axles and parts thereof, axle bars, axle blanks, and forgings for axles, of iron or steel, without reference to the stage or state of manufacture, not specially provided for (10 per cent), valued at not more than 6c. per lb., 6-10c. *per lb.* [3-4c. per lb]: *Provided,* That when iron or steel axles are imported fitted in wheels, or parts of wheels, of iron or steel, they shall be dutiable at the same rate as the wheels in which they are fitted. (same) [same].

324. Wheels for railway purposes, and parts thereof, of iron or steel, and steel-tired wheels for railway purposes, wholly or partly finished, and iron or steel locomotive, car, or other railway tires and parts thereof, wholly or partly manufactured, 1c. *per lb.* (20 per cent) [1¼c. per lb.]: *Provided,* That when wheels for railway purposes, or parts thereof, of iron or steel, are imported with iron or steel axles fitted in them, the wheels and axles together shall be dutiable at the same rate as is provided for the wheels when imported separately.

325. Anvils of iron or steel, or of iron and steel combined, by whatever process made, or in whatever stage of manufacture, 1 5-8c. *per lb.* (15 per cent) [1 5-8c. per lb.].

326. Blacksmiths' hammers, tongs, and sledges, track tools, wedges, and crowbars, of iron or steel, 1⅜c. *per lb.* (10 per cent) [1⅜c. per lb.].

327. Cast-iron pipe of every description [¼c. per lb.], cast-iron andirons, plates, stove plates, sadirons, tailors' irons, hatters' irons, but not including electric irons, and castings and vessels wholly of cast iron [8-10c. per lb.], including all castings of iron or cast-iron plates which have been chiseled, drilled, machined, or otherwise advanced in condition by processes or operations subsequent to the casting process but not made up into articles, or parts thereof, or finished machine parts [2-10c. per lb. extra]; castings of malleable iron not specially provided for [7-10c. per lb.]; cast hollow ware, coated, glazed, or tinned [1½c. per lb.], but not including enameled ware or hollow ware containing electrical elements, 10 *per cent* ad valorem. (All the above, 10 per cent).

328. Lap-welded, butt-welded, seamed, or jointed iron or steel tubes, pipes, flues, and stays, not thinner than 65-1000 in., if not less than ⅝ in. in diameter, *¾c. per lb.;* if less than ⅝ and not less than ¼ in. in diameter, *1¼c. per lb;* if less than ¼ of an inch in diameter, *1¾c. per lb.* (all 20 per cent) [1c. to 2c.]; *Provided,* That no tubes, pipes, flues, or stays made of charcoal iron shall pay a less rate of duty than *1¼c. per lb.* [1½c.]; cylindrical and tubular tanks or vessels, for holding gas, liquids, or other material, whether full or empty; welded cylindrical furnaces, tubes and flues made from plate metal, whether corrugated, ribbed, or otherwise reinforced against collapsing pressure, and all other finished or unfinished iron or steel tubes not specially provided for, 20 *per cent* ad valorem [30 per cent]; flexible metal tubing or hose, whether covered with wire or other material, including any appliances or attachments affixed thereto, not specially provided for [30 per cent], and rigid iron or steel tubes or pipes prepared and lined or coated in any manner suitable for use as conduits for electrical conductors, 25 *per cent* ad valorem. (All 20 per cent).

329. Chain and chains of all kinds, made of iron or steel, not less than ¾ in. in diameter, 1c. *per lb.;* less than ¾ and not less than ⅝ in. in diameter, *1¼c. per lb.;* less than ⅝ and not less than 5-16 in. in diameter, *2⅛c. per lb;* less than 5-16. in. in diameter, *4c. per lb;* chain and chains of all kinds, of iron or steel, not specially provided for, 25 *per cent* ad valorem; sprocket and machine chains, of iron or steel, and parts thereof, 30 *per cent* ad valorem (25 per cent); anchor or stud link chain, two inches or more in diameter, *1½c. per lb.;* less than two inches in diameter, *2c. per lb.* (all except sprocket and machine, 20 per cent) [chains, ⅞ to 3c. per lb., but not less than 45 per cent]: *Provided,* That all articles manufactured wholly or in chief value of chain shall not pay a lower rate of duty than that imposed upon the chain of which it is made, or of which chain is the component material of chief value.

330. Nuts, nut blanks, and washers, of wrought iron or steel, 6-10*c. per lb.* (5 per cent); bolts, with or without threads or nuts, and bolt blanks, of iron or steel, 1c. *per lb.* (10 per cent); spiral nut locks, and lock washers, of iron or steel, 30 *per cent* ad valorem. (30 per cent) [All 1⅜c. per lb.].

331. Cut nails and cut spikes, of iron or steel [4-10*c. per lb.*], exceeding 2 in. in length, 4-10*c. per lb.;* cut tacks and brads, hobnails and cut nails, of iron or steel, not exceeding 2 in. in length, 20 *per cent* ad valorem; horseshoe nails, and other iron or steel nails, not specially provided for, 2*c. per lb.*

[1½c. per lb.]; nails, spikes, tacks, brads, and staples, made of iron or steel wire, not less than 1 in. in length nor smaller than 65-1000 in. in diameter, 4-10*c. per lb.*; less than 1 in. in length and smaller than 65-1000 in. in diameter, ¾*c. per lb.* [⅝c. per 1000 to ¾c. per lb.]; spikes, tacks, brads, and staples, not specially provided for, 6-10*c. per lb.* (All on free list).

332. Rivets, studs, and steel points, lathed, machined, or brightened, and rivets or studs for nonskidding automobile tires, 25 *per cent* ad valorem (20 per cent) [45 per cent]; rivets of iron or steel, not specially provided for, 1*c. per lb.* (20 per cent) [1¼c. per lb.].

333. Horse, mule, or ox shoes of wrought iron or steel, 6-10*c. per lb.* (free) [¾c. per lb.].

334. Steel wool, 10*c. per lb.* (20 per cent) [40 per cent]; steel shavings, 5*c. per lb.* (20 per cent) [40 per cent]; and in addition thereto, on all of the foregoing, 30 *per cent* ad valorem: *Provided,* That in computing the duty the weight and value of the package shall be included and the net weight of the contents shall be plainly marked upon each package.

335. Grit, shot, and sand of iron or steel, in any form, 1*c. per lb.* (30 per cent) [1c. per lb.].

336. Corset clasps, corset steels, and dress steels, whether plain or covered with cotton, silk, or other material, 35 *per cent* ad valorem. (15 per cent) [35 per cent].

337. Card clothing not actually and permanently fitted to and attached to carding machines or to parts thereof at the time of importation, when manufactured with tempered or untempered round iron or steel wire, or with plated wire or other than round iron or steel wire, or with felt face, wool face, or rubber-face cloth containing wool, 35 *per cent* ad valorem. (10 to 35 per cent) [20 to 55c. per sq. ft.].

338. Screws, commonly called wood screws, of iron or steel, more than 2 in. in length, 10*c. per gross;* over 1 in. and not over 2 in. in length, 8*c. per gross;* over ½ in. and not over 1 in. in length, 5*c. per gross;* ½ in. and less in length, 3*c. per gross* (25 per cent) [3 to 10c. per lb.]; *Provided,* That each package or carton shall have conspicuously marked thereon the number of screws contained therein and the duty shall not be assessed upon a less number than so marked.

339. Table, household, kitchen, and hospital utensils, and similar hollow or flat ware, not specially provided for; composed of iron or steel and enameled or glazed with vitreous glasses, 5*c. per lb.* and 30 *per cent* ad valorem [40 per cent]; composed wholly or in chief value of aluminum, 28 *per cent* ad valorem (all above, 25 per cent); and in addition thereto, upon any of the foregoing articles containing electrical heating elements as constituent parts thereof, 10 *per cent* ad valorem.

340. Crosscut saws, mill saws, pit and drag saws, circular saws, steel band saws, finished or further advanced than tempered and polished, hand, back, and all other saws, not specially provided for, 15 *per cent* ad valorem (12 per cent) [5c. per ft. to 5c. per lb. and 20 per cent extra]; jewelers' or piercing saws, 40*c. per gross.* [25 per cent].

341. Steel plates, stereotype plates, electrotype plates, halftone plates, photogravure plates, photoengraved plates, and plates of other materials, engraved for printing, [20 per cent], and plates of iron or steel engraved or fashioned for use in the production of designs, patterns, or impressions on glass in the process of manufacturing plate or other glass, 15 *per cent* ad valorem (15 per cent) [25 per cent]; lithographic plates of stone or other material engraved, drawn, or prepared, 20 *per cent* ad valorem. (25 per cent) [50 per cent].

342. Umbrella and parasol ribs and stretchers, composed wholly or in chief value of iron, steel, or other metal, in frames or otherwise, and tubes for umbrellas, wholly or partly finished, 35 *per cent* ad valorem. (Same) [50 per cent].

343. Spring-beard needles, and other needles for knitting, sewing, shoe, or embroidery machines of every description, not specially provided for, and crochet needles, $1.15 *per* 1000 and 25 *per cent* ad valorem; latch needles, $2 *per* 1000 *and* 35 *per cent* ad valorem [above, $1 to $1.15 per 1000 and 25 to 35 per cent extra]; tape knitting, and all other needles, not specially provided for, bodkins of metal, and needle cases or needle books furnished with assortments of needles or combinations of needles and other articles [25 per cent], 30 *per cent* ad valorem. (All 20 per cent).

344. Fishhooks, fishing rods and reels, artificial flies, artificial baits, snelled hooks, leaders or casts, and all other fishing tackle and parts thereof, fly hooks, fly boxes, baskets or creels, finished or unfinished, not specially provided for, except fishing lines, fishing nets, and seines, 35 *per cent* ad valorem (30 per cent): *Provided,* That any prohibition of the importation of feathers in this act shall not be construed as applying to artificial flies used for fishing, or to feathers used for the manufacture of such flies.

345. Saddlery and harness hardware: Buckles, rings, snaps, bits, swivels, and all other articles of iron, steel, brass, composition, or other metal, commonly or commercially known as saddlery or harness hardware, 35 *per cent* ad valorem. (15 per cent).

346. Belt buckles, trouser buckles, and waistcoat buckles, shoe or slipper buckles, and parts thereof, made wholly or partly of iron or steel, valued at not more than 20c. per 100, 5*c. per* 100; valued at more than 20 and not more than 50c. per 100, 10*c. per* 100; valued at more than 50c. per 100, 15*c. per* 100; and in addition thereto, on all of the foregoing, 20 *per cent* ad valorem. (15 per cent).

347. Hooks and eyes, wholly or in chief value of metal, whether loose, carded, or otherwise, including weight of cards, cartons, and immediate wrappings and labels, 4½*c. per lb. and* 15 *per cent* ad valorem. (15 per cent).

348. Snap fasteners and clasps, and parts thereof, by whatever name known, or of whatever material composed, not plated with gold, silver, or platinum, and not mounted on tape, 40 *per cent* ad valorem; mounted on tape, 45 *per cent* ad valorem. (15 per cent).

349. Metal trouser buttons, except steel and nickel bar buttons, 1-12*c. per line per gross;* steel trouser buttons, ¼*c. per line per gross;* buttons of metal, not specially provided for, ¾*c. per line per gross;* and in addition thereto, on all of the foregoing, 10 *per cent* ad valorem; metal buttons embossed with a design, device, pattern, or lettering, 35 *per cent* ad valorem: *Provided,* That the term "line" as used in this paragraph shall mean the line button measure of 1-40 in.

350. Pins with solid heads, without ornamentation, including hair, safety, hat, bonnet, and shawl pins, and pins with heads of glass, paste, or fusible enamel, composed of brass, copper, iron, steel, or other base metal, not plated with gold or silver, and not commonly known as jewelry, 28 *per cent* ad valorem. (20 per cent) [35 per cent].

351. Pens, metallic, not specially provided for, 12*c. per gross* (8c.) [12c.]; with nib and barrel in one piece, 15*c. per gross.* (12c.) [15c.].

352. Penholder tips, penholders and parts thereof [5c. per gross and 25 per cent], gold pens [25 per cent], combination penholders comprising penholders, pencil, rubber eraser, automatic stamp, or other attachments, 25*c. per gross and* 20 *per cent* ad valorem [45 per cent]; mechanical pencils made of base metal and plated with gold, silver, or platinum, 45*c. per gross and* 20 *per cent* ad valorem (all 25 per cent): *Provided,* That pens and penholders shall be assessed for duty separately.

353. Fountain pens, fountain-pen holders, stylographic pens, and parts thereof (25 per cent) [30 per cent], valued at not more than $2 per dozen, 72*c. per dozen;* valued at more than $2 and not more than $6 per dozen, $1.50 *per dozen;* and in addition thereto, on all of the foregoing, 25 *per cent* ad valorem: *Provided,* That the value of cartons and fillers shall be included in the dutiable value.

354. Penknives, pocketknives, clasp knives, pruning knives, budding knives, erasers, manicure knives, and all knives by whatever name known, including such as are denominatively mentioned in this act, which have folding or other than fixed blades or attachments, valued at not more than 40c. per dozen, 40 *per cent* ad valorem; valued at more than 40c. and not more than 50c. per dozen, 1*c. each and* 30 *per cent* ad valorem; valued at more than 50c. and not more than $1.25 per dozen, 5*c. each and* 30 *per cent* ad valorem; valued at more than $1.25 and not more than $3 per dozen, 10*c. each and* 30 *per cent* ad valorem; valued at more than $3 and not more than $8 per dozen, 20*c. each and* 30 *per cent* ad valorem; valued at more than $8 per dozen, 30*c.* each and 30 *per cent* ad valorem; cuticle knives, corn knives, nail files, tweezers, hand forceps, and parts thereof, finished or unfinished, by whatever name known, 40 *per cent* ad valorem (35 to 55 per cent) [40 per cent and up to 20c. each, with 40 per cent extra]: *Provided,* That any of the foregoing, if imported in the condition of assembled, but not fully finished, shall be dutiable at not less than the rate of duty herein imposed upon fully finished articles of the same material and quality, but not less in any case than 15*c. each and* 35 *per cent* ad valorem: *Provided further,* That all the articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the name of the country of origin die-sunk conspicuously and indelibly on the shank or tang of at least one or, if practicable, each and every blade thereof.

355. Table, butchers', carving, cooks', hunting, kitchen, bread, cake, pie, slicing, cigar, butter, vegetable, fruit, cheese, canning, fish, carpenters' bench, curriers', drawing, farriers', fleshing, hay, sugar-beet, beet-topping, tanners', plumbers', painters', palette, artists', shoe and similar knives, forks, and steels, and cleavers, all the foregoing, finished or unfinished, not specially provided for, with or without handles of mother-of-pearl, shell, ivory, deer, or other animal horn, silver, nickel silver, or other metal than iron or steel, 16*c. each;* with handles of hard rubber, solid bone, celluloid, or any pyroxylin, casein, or similar material, 8*c. each;* with handles

(*Continued on page* 45)

CONTENTS

An Occurrence of Nitrogen in Steel 1

Effect of Gases on Light Forging Left Accidentally in Furnace Flue—Analysis of Resulting Structures

Heat Treatment of Rock Drill Steel 7

Effect on Breakage—Maximum and Minimum Life Expected—Comparison with Eye-bars

Canada's Trade with the United States 13

Value Largest on Record—Increase in Shipments of Rolling Mill Products—Heavy Movement of Machinery

Many New Features of Tariff Bill 16

Numerous Changes of Rates Already Made—Opposition to Ferroalloys Tariff Expected—The Metal Schedule

Pig Iron Production in June 28

New Low of 35,494 Tons per Day or 3900 Tons Less Than in May—Net Loss of 14 Furnaces

Labor Notes 5, 15, 30, 51
Boring, Drilling and Milling Machine..... 6
Nolan Patent Bill Prospects..... 6
Drill Steel Sharpening..... 8
Power Squaring Shears..... 9
Wage Reductions 9, 48, 54
Refractory Industry 10
Gas Mask for Carbon Monoxide.....10
Pig Iron Costs.....11
Ore Rates 11
Cost of Living Statistics.....11
Price Trend of Half Year.....12
Portable Electric Grinder.....14
To Make Detinned Billets.....14
Weldless Machine Chain.....14
Gear Cutting Attachment for Milling Machine 15
Statistics of Warehouse Consumption.....15
New Style of Geometric Die Head.....15
Editorials 24
Soft Times and Other Times—Proposed Metal Schedule—Exports and Domestic Consumption — Proportion of Union Workers.
Correspondence 26
Efficient Journal Bearings—Proposed Metal Schedule—Danish Competition as Well as German.
Comparisons of Metal Schedule of Tariff...27
Canadian Imports 29
Army and Navy Award Contracts.....30
Foreign Market Conditions.....31, 53
American Engineers Honored.....31
Industrial Finance 44
Bethlehem Prices 48
Lake Ore Shipments.....50
Manufacture of Machinery.....51
Lower Freight Rates to Seattle Expected..51
Trade and Office Changes.....55

Iron and Steel Markets.....32
Comparison of Prices.....33
Prices Finished Iron and Steel, f.o.b. Pittsburgh.....49
Non-Ferrous Metal Markets.....50
Personal Notes.....52
Obituary Notes.....52
Machinery Markets and News of the Works.....56
New York Jobbers' Prices.....62

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THE IRON AGE

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Soft Times and Other Times

It is desirable at intervals to review at long range our position and prospects, and in particular to note the verification or failure of predictions previously made. We may well ask at this time what has become of the prophecy made during the war that there would follow a period of from three to five years of activity and prosperity. Certainly there was a substantial foundation for such predictions. Six months or so ago the thought was in many minds that there was merely a short interruption, while certain readjustments would be made, whereupon the activity of 1920 would be resumed. That view is no longer held.

The war-time viewpoint, from which the predictions were made, was that men would be able and willing to work hard. That was taken practically as a matter of course. Hard work ought to be welcome as a change from making war. The prediction rested chiefly on the belief that the opportunity for hard work and advancement would be presented, and that part of the argument was sound.

What occurred after the war, however, was that nearly everyone, manufacturers, dealers and workmen, concluded that soft times had come, and they proceeded to take advantage of the soft times. There was indulgence rather than progress, a superficial activity rather than real prosperity.

It was a psychological phenomenon rather than a business or financial development. By reason of the mental attitude taken, that soft times had come, the period of activity was shortened. The cycle that with a normal mental attitude might have required from three to five years was run through its course in a shorter period. There is not an interruption to the period. It has simply come to its natural close.

Those who predicted a period of three, four or five years of activity also predicted that afterward there would be a period of recovery from the effects of the war. That is the period upon which we have entered and we shall delay the recovery if we do not recognize the fact. Such a period is sometimes called one of "hard times," but that viewpoint should be avoided, since the term suggests times that are abnormal, and no one can do his best work if he feels he is laboring under abnormal or unnatural conditions. It is a time for hard work and man is destined by nature for hard work. There is no acceptable system of religion or philosophy that teaches otherwise, none that shows that man is entitled to live in "soft times."

The Proposed Metal Schedule

The new tariff bill as it has just left the hands of the Ways and Means Committee represents, in general, as was expected, a return to the protective character of the Payne-Aldrich act, the predecessor of the existing Underwood-Simmons act. In the comment made in these columns last week it was pointed out that in general iron and steel manufacturers had given little advice to the framers of the bill. The metal schedule as published in full on other pages indicates that the committee wrote most of its paragraphs with the definite idea of re-establishing the general lines of the Payne-Aldrich metal tariff of 1909. In some cases the actual rates in that act are restored and for the most part the departures from it are not marked. As was expected, the unscientific and loosely made ad valorem duties of the present metal schedule are supplanted by specific duties, and every iron and steel product the Underwood tariff put on the free list, save only barbed wire, is restored to the dutiable list. The committee, having decided to make an end of the farmer's free cotton ties, wire nails and wire for baling, left that one remnant of the Underwood committee's largess to the agricultural community.

The pig iron duty of $1.25 is neither protective nor a revenue maker. Apparently the low tariff members of the committee suggested halving the $2.50 duty of the Payne-Aldrich act which had a place in the bill as originally drafted. Similarly scrap might as well have been retained on the free list.

The ferroalloy section promises to be the storm center of the new bill. The duties on manganese ore and ferromanganese in particular will be points of attack. It might be assumed, in view of the fact that normally nearly all the ores used in the making of ferromanganese in this country

are imported, that the imposition of a duty of 1c. per pound of metallic manganese in such ores was designed as a revenue tariff. But the subcommittee on the metal schedule, in its explanatory statement, says that the manganese ore duty, like that on tungsten and molybdenum ores, represents an attempt, by means of protective duties, to preserve domestic industries.

It need not be said that a radical departure is involved in imposing on a product long on the free list a duty equal to 100 per cent of the price at which that product sold—under exceptional conditions it is true—for a considerable time in 1914. At 2 1/5 cents per pound of manganese content, as proposed, the duty on a ton of 80 per cent ferromanganese would amount to $39.42, and it will be recalled that both the British producers and the United States Steel Corporation sold large lots in 1914 at $37 and $38, seaboard. So far as most independent steel manufacturers are concerned, the effect of the proposed duty will be to impose a tax of close to 27 cents per ton on their output, figuring 16 pounds of ferromanganese to the ton of steel. The Steel Corporation, in common with other producers of ferromanganese, would pay $11.20 duty per ton of 50 per cent manganese ore, but it has the advantage of the operation of its own Brazilian mines.

The issues involved in the proposed manganese duties promise to take precedence, so far as the steel industry is concerned, over all other features of the new metal schedule. The ability of British producers of ferromanganese, who have long supplied a considerable part of the ferromanganese consumed in the United States, to continue to do business here is one factor. The advisability of keeping in reserve for future emergency the limited supply of manganese ore in this country, instead of attempting its present development by the maintenance of a permanently high level price for ferromanganese, is another. The consumers of ferromanganese, it is already apparent, will exert themselves to secure radical reductions in the duties now carried in the bill.

Exports and Domestic Consumption

The subject of refunding approximately ten billion dollars owed by foreign governments to the United States Government has just been placed squarely before Congress, which is asked to give the Secretary of the Treasury practically unrestricted power to act. Another important matter before Congress is the tariff.

We have heard a great deal of talk lately about "economics," though there may not have been much illumination, and the superficially bright observation has been made that while this subject originally was "political economy" and referred principally to the policies of nations as such, it has now become more "practical" and has become "a matter of vital interest to the individual."

Right here we are in danger of making a grievous blunder. Never before did the United States Government have greater need for a definite and intelligent system of political economy. This ten billion dollars admitted to be owing to us, and the question of the tariff, as well as some other pending matters, make the economic issue of the most vital importance.

Why do we export goods? Before the war we exported, as an annual average, merchandise worth about half a billion dollars more than the merchandise we imported. That was our "trade balance" and it was needed and used to cover freights paid to foreign vessel owners on our imports, interest and dividends on our securities held abroad, the expenses of American tourists, gifts of residents of this country to residents of foreign countries, and some other and smaller items.

Now, as everyone knows, most of these conditions are reversed. About 40 per cent of our water-borne commerce is now in American vessels, and as our exports, valued at the home port, exceed our imports, valued at the foreign port, it would look as though we were in line to receive as much in ocean freights as we pay out. We are in line to receive more interest and dividends than we pay. We practically "broke even," in the broad sense, before the war with half a billion more merchandise exports than imports, while in future we might break even with some excess of imports over exports.

If we have a balance to be settled in gold, securities or other evidence of value, not merchandise or service that we can use, will it be profitable to us as a nation? There is a law of trade that if such a matter is left to itself prices of commodities will so change that a country with an excess of merchandise exports not otherwise taken care of will have rising prices, tending to discourage exports and encourage imports. It would be foolish to leave the matter to adjustment according to that law, since if we want to export we want to continue to export indefinitely.

The argument that we cannot consume all we produce needs more analysis. It is a good thing to be able to produce a great deal, but it is not a good thing to be too poor to consume. Of course it might not be well for us to consume more wheat than we do or more canned milk or hops or musical instruments, in all of which we have had a considerable export trade; but it might possibly be well for us to use the labor involved in producing these surpluses in building houses or good roads or other things that involve actual advancement and increase our comfort.

What is here suggested would involve a redistribution of man power. There is a difficulty with respect to factory power. We may have typewriter factories in which much capital is tied up and which can supply us with all the typewriters we need and still have a large surplus. It would not be good practice to destroy that capital. But if a man can do as good work building roads as in raising wheat and we can use the good roads to advantage, but do not need the money that would be paid for the wheat, it is better for us to have the good roads than the money.

We should have, then, a national policy, a system of political economy, aimed directly at giving us what we really need and will be good for us. A policy of endeavoring to keep merchandise from coming into the country, to force merchandise out of the country, and to accumulate gold and securi-

ties, could be advantageous only by the slimmest kind of a chance.

The Proportion of Union Workers

Statements have been made lately that between 80 and 90 per cent, or between 85 and 90 per cent, of the workers in the United States do not belong to labor unions. Friends of the labor union movement have sometimes claimed proportions of unionism up to 50 or 75 per cent. Here are wide discrepancies. Sometimes a discrepancy is produced by the friends of labor unions juggling the figures. For instance, some time ago a presentation was made, claiming to use "the latest figures," but these figures were on the one hand the 1910 census for the total number of persons "engaged in gainful occupations" and on the other hand the latest claim of the labor unions as to the number in their ranks. The population had increased since 1910 and the proportion of the population at work had increased.

A large part of the discrepancy arises from differences in classification as to who are "workers." The labor union advocates have a way of counting out those who work but who do not seem susceptible to unionization, though if any such workers should later be found susceptible they would be added to the union total. Those classed as "public servants" are excluded from the total with which the strength of unionism is compared, but this did not prevent the Boston policemen from being organized and going on strike.

The 1920 census has not yet reported on the number of persons engaged in gainful occupations. The figure as to total population is 105,708,771. The 1910 census was as follows:

Total	91,972,266
Ten years and older	71,580,270
Ditto, engaged in gainful occupations	38,167,336

Punctiliously counting up all classes that it might be considered proper to exclude, when considering the proportion of unionism, one cannot find more, at the outside, than about 12,600,000. The deductions include farmers, 5,865,003, farm laborers working at home, 3,310,534, persons in public service, 459,291, clergymen, 118,018, other professional men, newsboys and a great many others.

Allowing for the 15 per cent increase in population from 1910 to 1920, but not allowing for the proportion of workers having increased, the figures for 1920 would be 44,000,000 for all persons ten years and older engaged in gainful occupations and 29,300,000 for the number of workers left after the very free deductions referred to above.

As to the strength of unionism, the outside claim ever made was under 7,000,000, while even at that the strength of unionism has since declined. At the Denver convention the American Federation of Labor reported 3,906,528, against 4,078,740 in 1920. The figures are said to exclude men locked out, on strike or out of employment, since these do not pay dues. Even with these allowances there is reason to believe the figure is too high. Outside the American Federation of Labor are the four railroad brotherhoods, quite a number of miners in the West, and some small unions. The total number of union workers can hardly be taken at over 5,000,000 at the present time, and that is probably a liberal statement.

At 5,000,000 for unionism there is a proportion of 11 per cent for unionism of all those who work instead of depending upon investments or upon some one else for their keep. It is a proportion of 17 per cent of workers, excluding all who by any species of argument can be claimed as properly deductible. Thus a statement that between 80 and 90 per cent of the workers are nonunion provides a leeway that covers all points that could be brought into controversy.

CORRESPONDENCE

Efficient Journal Bearings

To the Editor: In your issue of June 16, you quote "from a monograph" on the above subject. The early part of the article improperly makes comparisons between babbitt bearings and ball and roller bearings. I use the word "improperly" advisedly, as the statements are made without qualification, from which it may be inferred that, in all cases, babbitt bearings are the inferior of ball or roller bearings.

Every engineer knows that there are many places where ball or roller bearings cannot be used; that in most of the world's machinery, babbitt is indispensable, and in fact, that some of the bearings in the machinery used to manufacture the very ball or roller bearings are babbitt-lined—we know this because we furnish babbitt for such machinery.

I do not wish to enter here upon a discussion as to the respective merits of babbitt bearings and ball or roller bearings. Each has its place where it is better adapted than the others. But so general a statement as "the annoyance of shut-downs to reline, adjust or replace plain bearings . . . more than compensates for any increase in first cost of application of the antifriction bearings," should not go unchallenged, for the plain reason that it is only fractionally true. It would be just as fractionally true for one to say that the use of a genuine babbitt "more than compensates for any increase in the cost of the application of bearings made from No. 4 Babbitt." Anybody familiar with bearings knows that there are many places where the ultimate cost of babbitted bearings is considerably less than that of ball or roller bearings.

More frequently than otherwise, the bearings in the connecting rod of an automobile outwears the car itself. Take the big bearings in a marine engine, brass as well as babbitt; the right babbitt will operate under heavy duty for years before relining of the bearings is found necessary.

Another assertion open to question is that "workmen will not give proper attention to the correct lubrication of plain bearings." Long experience has convinced us that bearing troubles caused by inattention to their lubrication are so rare, compared to the great number of babbitt bearings in use, as to be negligible. Few machines are in charge of an ordinary "workman." The lubrication of most machines is looked after by engineers and master-mechanics, who as a rule are men of intelligence, mechanically skilled and fully cognizant of the importance of keeping their bearings properly lubricated. But if, by chance, a bearing does burn out "at just the time when the mill is busy," how much time will it take to reline it, as compared to the replacing and installation of a roller-bearing that has broken, an accident by no means rare? And bear in mind, that while the mill always has babbitt on hand, it does not often have extra rollers on hand, but

Features of the Metal Schedule of the Proposed Tariff Bill, with Comparisons

	NEW BILL	PRESENT TARIFF	PAYNE-ALDRICH TARIFF
Iron ore	Free	Free	15c. per ton
Pig iron	$1.25	Free	$2.50
Spiegeleisen	$1.25	Free	$2.50
Scrap	$1.25	Free	$1.00
*Manganese ore	1c. per lb. Mn. content	Free	Free
†Ferromanganese	2 1/5c. per lb. Mn. content.	Free	$2.50 per ton
Steel billets	2-10c. to 6c. per lb.	Bess. and O.H. free.	7-40c. to 7c. per lb.
Bar iron	¼c. to ½c. per lb.	5 per cent.	3-10c. per lb.
Beams, etc., plain	7-20c. per lb.	10 per cent.	3-10 to 4-10c. per lb.
Plates	7-20c. to 5-10c. per lb.	12 per cent.	7-20 to 5-10c. per lb.
Wire rods	3-10c. per lb.	10 per cent.	3-10c. per lb.
Galv. wire for fencing	½c. per lb.	Free	Wire duty plus 2-10c. per lb.
Axles	6-10c. per lb.	10 per cent.	3-4c. per lb.
Rails	7-40c. per lb.	Free	7-40c. per lb.
Cast-iron pipe	10 per cent.	10 per cent.	1-4c. per lb.
Cut nails and spikes	4-10c. per lb.	Free	4-10c. per lb.
Barbed wire	Free	Free	3-4c. per lb.
Machine tools	35 per cent.	15 per cent.	30 per cent.
Chain	1c. to 4c. per lb.	20 per cent.	7-8c. to 3c. per lb.
Aluminum ingots	5c. per lb.	2c. per lb.	7c. per lb.
Tin, pig	2c. per lb.	Free	Free
Nickel, ingots	5c. per lb.	10 per cent.	6c. per lb.
Fluorspar	$5 per ton	$1.50 per ton	Free
Magnesite	½c. to ¾c. per lb.		

*Above 30 per cent Mn.
†Above 1 per cent carbon.

must lose days before their arrival from the makers.

The most absurd assertion of the article is that "a properly designed ball or roller bearing . . . will operate 50 times longer than a plain bronze or babbitt bearing under the same conditions." It would be just as logical to recommend a genuine babbitt that costs 40c. per lb. for a car axle bearing, instead of a lead-based babbitt that costs 15c. per lb., because the genuine babbitt will operate "at least fifty times longer." We have records of babbitted bearings in engines, lumber gangs, centrifugals and many other machines where the bearings operated under severe conditions and did not require relining for 3 years. Who in the world would want to pay so much more for the initial cost in order that the bearings in his engine-lumber-gangs, centrifugals or other machines, may still be in service for his great-great-grandchildren 150 years hence?

There is no question that ball and roller bearings have done wonderful work in advancing the progress of machinery. But they have not as yet reached that point where they can displace babbitt bearings except in comparatively few places. We have the highest regard for ball bearings and roller bearings and use them in certain of our machinery, just as some of our friends in the ball and roller bearing industries use babbitt in certain of their machinery.

A. HOYT LEVY,
Secretary United American Metals Corporation,
Brooklyn, N. Y., June 20.

The Proposed Metal Schedule

To the Editor: The tariff bill just proposed by the Ways and Means Committee is the most unreasonable accumulation of greed ever submitted to any American Congress. Surely it does not represent an attempt to reduce the cost of living or to stabilize industry, and therefore deserves and will receive a storm of condemnation that will not need an amplifier to be heard in Washington.

The metal rates with few exceptions are absolutely prohibitive, and this Chinese wall would be a joke as a revenue producer, but it will not be a joke to the American consumer who is waiting for a reduction in his expense account.

Wake up, consumer, before it is too late, and send your protest to Washington.

C. W. LEAVITT & CO.
New York, June 30, 1921.

Danish Competition as Well as German

To the Editor.—I was interested in reading the reprint of J. R. Bates' letter in the June 23 issue of your journal with regard to competition encountered in the crane business from German manufacturers, but as you are undoubtedly aware it is not from Germany alone that very excellent machinery can be obtained cheaper than at prevailing prices here.

For instance we can land Diesel engines, made in Denmark by probably the best known builder in the world, on cars at New York after paying for ocean boxing, freight, insurance and 20 per cent duty at figures below those quoted for American-built engines of equivalent powers and speeds.

The margin for duty alone is a handsome profit on heavy machinery of this class, hence it is easy to understand the difficulties United States manufacturers face in attempting to compete abroad under present conditions of labor and other costs here and the exchange situation.

H. L. DEAN,
President Dean Machinery Corporation.
New York, June 28.

The Iron Age and Its Readers

Perhaps no department of THE IRON AGE is read with more interest than the personal section. It is a department, not only for its readers, but by its readers. In the last four weeks 78 personal paragraphs were published; 23 of these —or nearly one-third—were contributed by readers themselves. These tangible evidences of reader interest seldom bear any marks of desire for self advertisement but instead are expressions of an impulse to serve fellow readers as the individuals have been served by others.

NEW LOW IN IRON OUTPUT

June Production 3900 Tons Per Day Less Than in May

Net Loss of 14 Furnaces—Ferromanganese Output Lowest on Record

After standing practically stationary during April and May the blast furnace output of the country again registered a rapid decline in June and made a new low record for the year and for several years. It is necessary to go back to January, 1908, to find a month's output which parallels that of June, this year. In January, 1908, the country's total output was 1,045,250 gross tons or 33,918 tons per day as compared with 1,064,833 tons or 35,494 tons per day last month. This is a decline from May of 156,388 tons or 3900 tons per day. The net loss in furnaces blown out or banked in June is 14 as compared with six in both April and May respectively. The net loss in the last nine months is 243 furnaces.

The production of coke and anthracite furnaces in June, a 30-day month, amounted to 1,064,833 gross tons, or 35,494 tons per day as compared with 1,221,221 tons, or 39,394 tons per day in May, a 31-day month, and with 1,193,041 tons or an av rage of 39,768 tons per day in April, a 30-day month. In June, 1920, the total output was 3,043,540 tons or 101,451 tons per day. The total furnaces in blast on July 1 was 76 compared with 90 on June 1, with 96 on May 1, with 102 on April 1 and with 201 on January 1. The 76 furnaces in blast July 1 had a capacity of 32,195 tons per day as compared with 38,080 tons per day for the 90 in blast on June 1 last. There were 16 furnaces blown out or banked and only two blown in during June.

A feature of the June output was the further sharp decline in the production of manganese-iron alloys. In June no spiegeleisen was produced and the output of ferromanganese was only 4536 tons. This compares with 6853 tons of ferromanganese in May besides an output of 2379 tons of spiegeleisen in that month. The decline is emphasized when it is remembered that in April 9566 tons of ferromanganese and 14,744 tons of spiegeleisen were produced. The lowest month previous to this was in January, 1904, when the combined output of manganese-iron alloys was 6673 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from June, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
June	73,659	27,792	101,451
July	71,954	26,983	98,937
August	72,740	28,789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94,473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	39,768
May	73,015	108,422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107,820	110,354	78,340	98,931	.....
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	.....
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	.....
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	.....
Nov.	101,244	110,394	106,859	111,802	79,745	97,830	.....
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	.....

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302,260	3,015,181	2,416,292
Feb.	2,645,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
Apr.	3,334,960	3,288,211	2,478,218	2,739,797	1,193,041
May	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
June	3,270,055	3,323,791	2,114,863	3,043,540	1,064,833
Half yr.	19,069,892	18,002,572	16,033,808	18,138,986	9,428,166
July	3,342,438	3,420,988	2,428,541	3,067,043	.....
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	.....
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	.....
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	.....
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Total yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,430,022	2,232,455	1,932,159	32,787	23,957	22,228
Feb.	2,209,470	2,181,679	1,625,695	28,105	28,038	29,013
Mar.	2,277,507	2,480,668	1,323,443	26,644	35,275	41,294
Apr.	1,838,677	1,968,542	1,015,621	17,308	27,628	24,310
May	1,586,805	1,128,720	1,024,678	14,604	33,407	9,232
June	1,655,944	2,209,770	883,312	14,254	34,751	4,536
July	1,906,604	2,230,567	.....	14,805	36,789	.....
Aug.	2,108,566	2,254,943	.....	17,419	36,985	.....
Sept.	1,828,613	2,247,250	.....	20,631	39,546	.....
Oct.	1,295,690	2,393,644	.....	20,238	34,786	.....
Nov.	1,727,656	2,150,075	.....	19,964	26,944	.....
Dec.	1,916,249	2,047,167	.....	15,718	28,023	.....

Capacities in Blast July 1

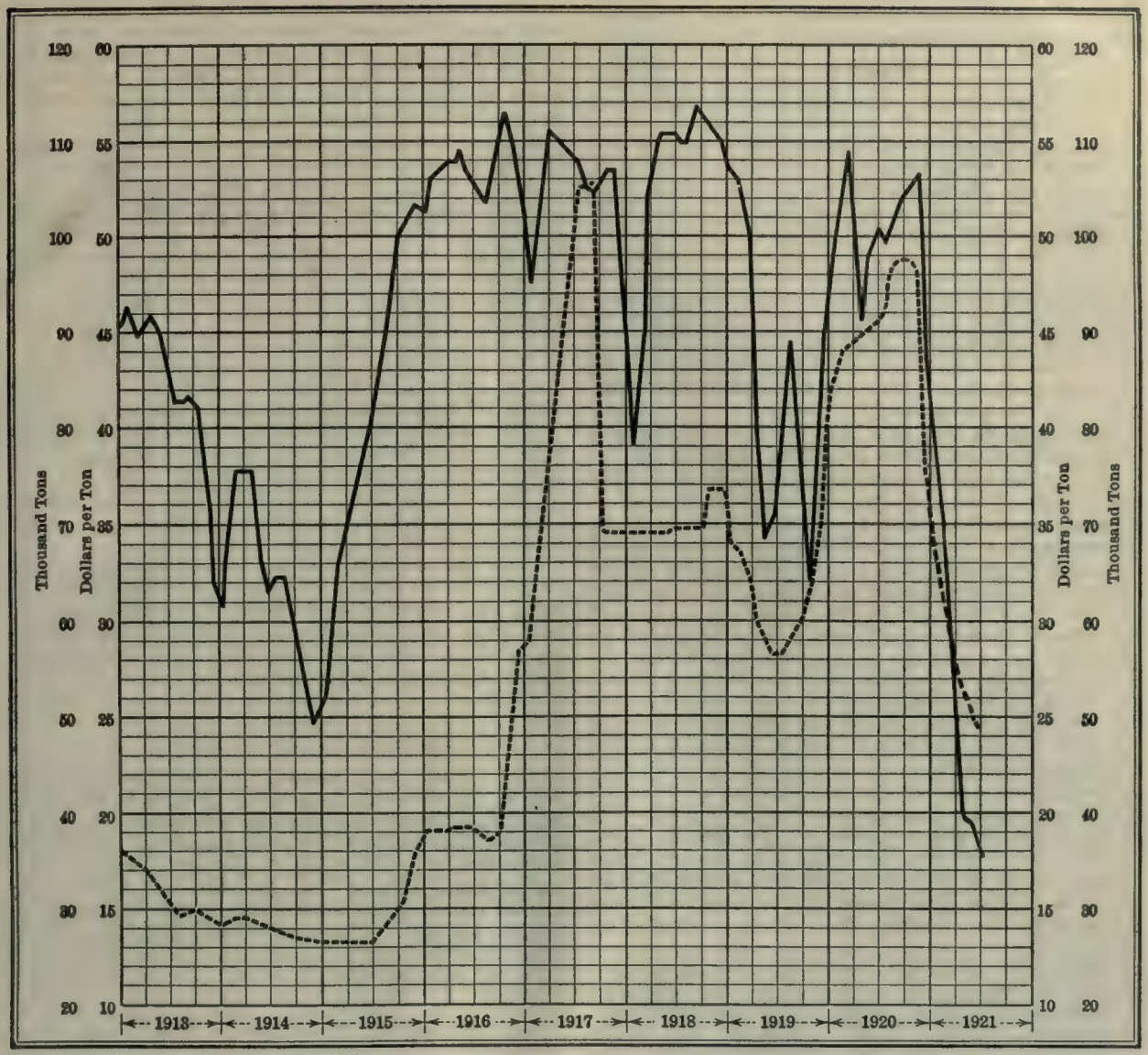
The following table shows the number of furnaces in blast July 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast June 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	July 1—In Blast	July 1—Capacity per Day	June 1—In Blast	June 1—Capacity per Day
New York:					
Buffalo	22	3	1,140	3	1,200
Other New York	4	0	...	0	...
New Jersey	4	1	175	2	330
Pennsylvania:					
Lehigh Valley	18	2	900	3	1,125
Spiegel	2	0	...	0	...
Schuylkill Valley	15	2	705	2	785
Lower Susquehanna	10	1	380	1	790
Ferro	0	0	...	0	...
Lebanon Valley	8	1	135	0	...
Ferro	2	0	...	1	65
Pittsburgh District	55	16	7,550	18	8,700
Ferro and spiegel	4	1	110	1	110
Shenango Valley	19	0	...	2	900
Western Penn.	26	6	2,100	5	2,000
Ferro and spiegel	0	0	...	0	...
Maryland	6	1	335	1	450
Wheeling District	15	1	600	1	580
Ohio:					
Mahoning Valley	27	5	3,000	5	2,400
Central and Northern	26	6	3,220	8	4,140
Southern	16	2	200	1	1,010
Illinois and Indiana	42	13	7,000	15	8,100
Mich., Wis. and Minn.	11	2	850	2	1,335
Colorado and Missouri	6	2	740	1	760
The South:					
Virginia	16	2	175	2	175
Kentucky	7	0	...	0	...
Alabama	41	8	2,880	9	3,125
Tenn., Ga. and Texas	16	0	...	1	...
Total	418	76	32,195	90	38,080

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for June, and the three months preceding:



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Pig Iron Production by Districts, Gross Tons

	June (30 days)	May (31 days)	April (30 days)	March (31 days)
New York	34,241	37,202	41,223	82,559
New Jersey	6,051	10,291	9,875	9,307
Lehigh Valley	29,929	42,289	45,329	48,256
Schuylkill Valley	21,172	24,471	21,279	28,631
Lower Susquehanna and Lebanon Valleys	25,809	26,491	24,799	24,521
Pittsburgh district	243,025	281,391	304,308	387,966
Shenango Valley	12,077	27,981	30,763	52,516
Western Penna.	63,802	73,661	70,930	83,350
Maryland, Virginia and Kentucky	15,289	20,781	17,575	22,069
Wheeling district	18,207	17,981	1,991	54,573
Mahoning Valley	88,515	87,090	102,826	132,482
Central and Northern Ohio	116,003	133,801	107,747	137,925
Southern Ohio	25,798	29,103	11,843	4,547
Illinois and Indiana	214,834	249,671	239,585	344,675
Mich., Minn., Mo., Wis., Colo. and Wash.	56,857	65,004	68,058	80,539
Alabama	93,224	94,013	94,910	101,484
Tennessee	none	none	none	122
Total	1,064,833	1,221,221	1,193,041	1,595,522

Only two furnaces were blown in during June, and they were as follows:

A furnace of the Bethlehem Steel Co. in the Lebanon Valley and Grace furnace of the Brier Hill Steel Co. in the Mahoning Valley.

Among the furnaces blown out or banked during June were the following:

The Musconetcong furnace in New Jersey; B furnace of the Bethlehem Steel Co. in the Lehigh Valley; B furnace of the Bethlehem Steel Co. in the Lower Susquehanna Valley and B furnace of the same company in the Lebanon Valley, making ferromanganese; G furnace of the Carnegie Steel Co. and the second Monongahela furnace of the National Tube Co. in the Pittsburgh district; Nos. 2 and 4 New Castle furnaces of the Carnegie Steel Co. in the Shenango Valley; Dover furnace and the second River furnace in the Central and Northern Ohio district; the Belfont and Portsmount furnaces in southern Ohio; the second Federal furnace and one Joliet furnace of the Illinois Steel Co. in the Chicago district; the second furnace of the Minnesota Steel Co. in Minnesota and the second North Birmingham furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama.

Canadian Imports for Twelve Months

During the twelve months ended May 31, Canada reports imports from the United States goods amounting to $812,531,821 and exports to the United States goods amounting to $525,164,405. Materials of iron and steel and of nonferrous metals moved as follows:

	Iron and Steel	Non-ferrous
From Canada to United States	$16,577,593	$27,359,422
From United States to Canada	16,297,882	6,055,775

Former employees of the Mullins Body Corporation at Salem, Ohio, have voted to return to work at reduced wages following a strike which lasted 16 weeks.

MANY IDLE PLANTS

Greatly Reduced Production in Manufacturing Centers

PITTSBURGH, July 4.—The mid-summer shutdown of iron and steel plants for repairs and other necessary work on equipment this year is much more general and promises to be for a much longer period than before in several years. Demands are so few and small that nearly all steel manufacturers will be able to meet them from stocks which have been built up over the past few weeks. The plant suspensions, therefore, instead of being for a definite period, are likely to continue until either there are sufficient orders on the books to warrant a resumption or mill stocks are reduced to a point where it is considered wise to replenish them. The outlook is that iron and steel producing capacity will be more poorly engaged during the first half of July than it has been for many years.

July starts off with only 19 of the 139 blast furnaces in the territory bounded by Johnstown, Wheeling, Pittsburgh and the Mahoning and Shenango Valleys, making iron. Seven of the furnaces of the Carnegie Steel Co. were banked on June 30, for over the holiday, while the Pittsburgh Steel Co. also banked the one furnace it had making iron on the same date. The standing of the leading steel companies in the matter of active furnaces is 7 of 57 for the Carnegie Steel Co.; 2 of 12 for the Jones & Laughlin Steel Co.; 2 of 11 for the Cambria Steel Co.; 1 of 8 for the Republic Iron & Steel Co. in the Youngstown district; 2 of 6 for the Youngstown Sheet & Tube Co., and 2 of 6 furnaces located within the territory referred to for the National Tube Co. All four of the Pittsburgh district furnaces of the American Steel & Wire Co. are down, and have been for some time. All six of the furnaces embraced in the Wheeling Steel Corporation now are idle, the stack of the Whitaker-Glessner Co., at Portsmouth, Ohio, having gone down on June 25. Only one merchant furnace is making iron in the territory mentioned, this being one of the two stacks of the American Manganese Mfg. Co., Dunbar, Pa., which is running on foundry iron.

Among the various classes of finishing mills those turning out tubular goods are making the best showing, and even these mills are not as well engaged this week as they were recently, due to the fact that jobbers are doing a good deal of trading between themselves and thus keeping back orders from the mills. Besides, the demand for oil country pipe is extremely light because so many of the big producers are reclaiming and repairing old pipe. Although the Steel Corporation has been getting some bar business from some of the automobile companies, and a few demands for plates and small shapes are developing as a result of the railroad repair orders recently placed, it cannot be said that operations of bar, plate and shape mills reflect these developments. Operations of the sheet and tin plate mills have rarely been so low as at present. Union mills generally have suspended because of the failure of an agreement on a wage scale, also because demands are so low that the manufacturers are satisfied that they can meet such demands as develop in the immediate future from stocks. Leading independent makers here of wire have shut down their plants.

Plant Operations

The steel works of the National Enameling & Stamping Co. at Granite City, Ill., closed down on July 1, with the exception of the finishing department which will run until July 15. Hayward Niedringhaus, plant manager, said that the company had a fairly large stock on hand. The plant likely will remain closed for several months. The stamping works at Granite City also is virtually closed down.

The entire plant of the Minnesota Steel Co., Duluth, Minn., is idle with the exception of 38 coke ovens, the remaining active blast furnaces and open hearths having been put out last week.

Reports from 476 members of the National Metal Trades Association for the months of March, April and May, indicated that 227, or almost 50 per cent of those reporting, were operating 50 hours or more a week. The majority of these, however, are working with greatly reduced forces as compared with six months ago. Operations of less than 50 hours were reported by 249; 116 reported 40 hours, or less; 36, 30 hours or less; five were completely shut down, while five, on the other hand, are operating two shifts.

For 45 Milwaukee metal working shops reporting, 12,404 men were employed in May, as compared with 13,061 in April. The average number of hours worked per man per week was 41.1 in April and 40.6 in May. Comparison with conditions a year ago is much less favorable. In May, 1920, the total employees in 36 shops amounted to 19,169, while in May, 1921, the same 36 shops had only 11,954 men on their pay rolls. The average number of hours worked per man per week was 52.5 in May, 1920, and 40.6 in May, 1921.

The plant at St. Johns, Mich., of the Hayes Wheel Co. of Jackson, Mich., reopened Tuesday, July 5. The plant had been closed for inventory and repairs.

The machine shop of the Union Iron Works, Springfield, Mo., is operating on two-thirds time and the foundry two or three days a week.

The Erie Railroad shops at Meadville, Pa., resumed July 1, after being closed down since May 3. About 600 men are affected by the order.

The Pennsylvania Railroad Co., Philadelphia, is arranging for the closing of its repair shops at Chambersburg, Pa., transferring the work now being handled at this point on its Cumberland Valley Division to the shops at Altoona and other outlying repair plants. The local shops have been giving employment to about 350 men.

Massachusetts Plants Close

Indications are a number of New England plants will be closed two or three weeks or longer this month. The Goodell-Pratt and various Greenfield Tap & Die Corporation, Greenfield, Mass., plants, as well as the Millers Falls Co., Millers Falls, Mass., plant closed July 1 until Aug. 1. The first and last named companies manufacture small tools. Other producers of small tools are feeling the business depression, especially those located in Rhode Island, and will operate on a reduced schedule this month.

Army and Navy Award Contracts

WASHINGTON, July 5.—Awards were made last week by the War Department for supplying material for and fabricating 76 airplant hangars, of which 60 are small ones. The contract for the latter went to the Fort Bridge Works, Pittsburgh, at $204,000, f.o.b. Pittsburgh, while that for 16 hangars of the larger size went to the Belmont Iron Works, Philadelphia, at $271,000, f.o.b. New York. The latter company also was awarded a contract for hangar spare parts at $103,343, f.o.b. manufacturer's plant. In all, the steel involves approximately 3500 tons.

The Bureau of Supplies and Accounts, Navy Department, has awarded a contract to the Duquesne Steel Foundry Co., Pittsburgh, for 276 net tons of steel castings for the Philadelphia Navy Yard, at $28,704, delivered.

The following bids have been received by the Bureau: 60 net tons of nickel steel, for the Naval Ordnance plant, South Charleston, W. Va.; Carnegie Steel Co., Pittsburgh, 0.0426c. per lb.; Crucible Steel Co. of America, Pittsburgh, 0.044c. per lb., and Cambria Steel Co., Johnstown, Pa., 0.045c. per lb., all on a delivered basis; 70 net tons of rivet stock for the Mare Island, Cal., Navy Yard, $3.082 f.o.b. producers' plants, submitted by all bidders, including the Jones & Laughlin Steel Co., the Carnegie Steel Co., the Crucible Steel Co. of America, Pittsburgh; Cambria Steel Co., Johnstown, and the Bethlehem Steel Co., Bethlehem, Pa.

The Rogers Haggerty Co. was the low bidder for the hill to hill bridge to be constructed in Bethlehem, Pa., by the Pennsylvania State Highway Commission. Its bid was $2,568,000. In addition to the structural steel a large tonnage of reinforcing bars will be required for this project.

GERMAN MARKET STIFFENS

Finished Material Stiff But Semi-Finished Material and Sheets Slightly Weak

(Special Correspondence)

BERLIN, GERMANY, June 20.—Buying activity has been stimulated to a certain extent during the past week by the favorable view taken in industrial circles of the recent conference between the French and German ministers of reconstruction. The conditions still obtaining in Upper Silesia are increasingly influencing the Western market. Added to this is the foreign exchange situation that has once more demonstrated its importance as a determining factor in the German iron and steel market. Though the general tendency is still downward, signs are nevertheless multiplying that the bottom of the price curve has been reached and that a hardening of prices may be looked for soon, as an advance in coal prices is predicted and a further depreciation of the mark considered a certainty. The market in general was rather erratic during the past week, especially in sheets, but recent quotations in finished materials are from 5 to 10 per cent higher than the low prices quoted some weeks ago and mills are showing less inclination to make concessions.

Price Reductions in Pig Iron

Foundry business is largely of a "pick-up" character, being affected by the pig iron market. Blast furnaces are piling up stock and several stacks have lately been blown out. There being a glut of ore offers, the Siegerland Ironstone Syndicate has had to reduce prices by 30 m. per ton. Present quotations for German pig iron are unchanged, but the Pig Iron Syndicate is contemplating a price reduction. Some isolated deals in Lorraine and Luxemburg iron were closed at 1020 to 1030 m. per ton ($13.77 to $13.90), base Brebach. For economic reasons blast furnaces are increasing the use of scrap wherever practicable, owing to the high cost of certain foreign ores. The market is flooded with ferroalloy offers, English ferromanganese being quoted at £16 and less per ton f.o.b., Antwerp or Hamburg. Keen competition in the ferrosilicon market has prompted German mills to reduce prices for blast furnace ferrosilicon, 10 to 12 per cent Si., by 120 m. as from June 1, so that the official quotation is now 1980 m. ($26.73) per ton, base Oberhausen. Ferrosilicon, 45 per cent Si., which is subject to import permit, is offered by the Stinnes company at Knapsack at 3200 m. ($43.20) per ton, f.o.b. cosumers' point. For 75 per cent Si. stock, 5000 to 5100 m. ($67.50 to $68.85) are charged.

Semi-Finished Prices Decline

The tone of the semi-finished material market has been decidedly weak, with prices suffering a further decline. We quote billets, basic, at 1330 m. ($17.95), sheet bars at 1400 m. ($18.90), and cogged blooms, open hearth, at 1300 m. ($17.55) per ton.

For rolled material the following prices generally prevail:

	Marks per Metric Ton	
Angles	1800	$24.30
Bar iron	1800	24.30
Rounds, flats, squares, basic	1820	24.57
Structural shapes	1780	24.03
Beams	1750	23.63
Rivet stock	1750	23.63
Bolt and nut stock	2200	29.70
Rails, heavy	2250	30.38
Fish plates	2350	31.72
Double-angle splice bars	2750	37.12
Rails for mines, inc. fish plates	1850	24.98

Contrary to general assumption, the wire convention has been continued for another four weeks for tactical reasons. Official prices in force since April 26 are 2300 m. ($31.05) for drawn commercial wire, 2700 m. ($36.45) for bolt and rivet wire, 2950 m. ($39.82) for galvanized wire, 2700 m. ($36.45) for nails, and 3400 m. ($45.90) for barbed wire. Wire rods in the open market are quoted at 1650 ($22.27).

Sheet and Plate Market Dull

Inquiries for sheets and plates have been light and prices, especially for thin plates, soft. We quote as follows: Heavy sheets, 1800 m. ($24.30); medium sheets, 1850 m. ($24.98); light plates, 1850 to 1900 m. ($24.98 to $25.65). The Association of German Iron Merchants, at their last meeting held at Düsseldorf in the middle of June, revised prices as follows:

	Marks per 100 Kg.	
Bar iron	230	$3.10
Hoop iron	280	3.78
Heavy sheets, according to gage	240–251	3.24 to $3.39
Medium sheets	250	3.37
Light plates, according to gage	262–289	3.54 to 3.90
Chequered plates	268	3.62

These prices are intended to serve as a guidance for closing deals and though there is a penalty for firms underselling, it remains to be seen whether the Association is strong enough to prevent members from going their own way.

American Engineers Honored by British

Information by cable brings the announcement that a number of American engineers who are now in Europe as members of the delegation to present the John Fritz medals, awarded to Sir Robert A. Hadfield and to Dr. Eugene Schneider, have had conferred on them honorary membership in a number of British engineering societies.

Charles F. Rand, who has been notably active in mining engineering circles, a trustee for years of the United Engineering Society, which is the institution in charge of the Engineering Societies Building in New York, and who is, among other things, head of the Engineering Foundation, has been made an honorary member of the Iron and Steel Institute. According to the latest list of members of that British society, there are only four other honorary members, the Prince of Wales, the King of the Belgians and two elected from Sweden.

Ambrose Swasey, chiefly prominent in the American Society of Mechanical Engineers, of which he was at one time president, and the man whose generous donation was the means of establishing the Engineering Foundation, was made an honorary member of the Institution of Mechanical Engineers. Both Messrs. Swasey and Rand were elected honorary members of the Institute of Mining and Metallurgy, and they together with Arthur S. Dwight and William Kelly, of the Institute of Mining and Metallurgical Engineers, were made honorary members of the Institution of Mining Engineers.

How High Freight Rates Operate

YOUNGSTOWN, OHIO, July 5.—Leading independent steel executives in the Mahoning Valley point to the prevailing high railroad freight charges and high rail wages as the chief contributing cause in the present period of economic depression.

"The farmer to-day has not the purchasing power to buy the things he needs and in turn the steel plants and factories of the country are adversely affected," states the president of a large interest. "The increase in freight in a certain type of gang plow, for instance, which costs $125, is $28.50, which the farmer is obliged to pay. This increase is made up by the excess freight on the wheat which the farmer is obliged to sell to purchase the implement; by the higher freight charges paid in assembling at the factory the materials to manufacture the plow, and the higher freight on the plow from the factory to the farmer. In 1915, this gang plow sold at $75. The condition illustrated by the gang plow is, I believe, at the root of the present trouble in this country."

The American Steel & Wire Co., Waukegan, Ill., has established a grocery store to reduce the cost of living for its employees in that city. For the present the store will sell only staple articles, such as smoked meats, flour, soap, etc. In addition to selling groceries to employees, the company plans to sell hard coal at cost.

Iron and Steel Markets

PRICES SETTLE FURTHER

Readjustments Still in Progress, Wages Keeping Pace

Pig Iron Production Lowest Since January, 1908 —Railroad and Automobile Buying

The reductions in prices of various steel products formally made on July 5 by the Bethlehem Steel Co., amounting to $4 per ton for bars, plates, shapes, billets, skelp, sheet bars and blue annealed sheets, $5 for black and galvanized sheets and $10 for tin plate, have been met by such of the other producers as were not already selling at the new Bethlehem levels. The fact is that as to some products the announcement merely recorded what the market already had done.

That the Steel Corporation will meet the market is inferred from recent evidence that the schedule of April 13 was not rigidly observed by some of its subsidiaries. Formalities of publication, as followed by the Bethlehem company, tend to make the adjustment of the industry to lower prices gradual and somewhat orderly.

A reduction of 15 per cent in mill wages and of 10 per cent in salaries is a part of the Bethlehem readjustment, and fresh wage reductions at various western Pennsylvania and Youngstown, Ohio, plants are expected about July 15. What action the Steel Corporation will take as to a new wage basis is not indicated as yet.

Only 18 blast furnaces out of 139 in Johnstown, Pittsburgh, Wheeling and Mahoning and Shenango Valley districts were operating over July 4, various stacks being banked. Thus in operations and in sales the first week in July has been making a low record.

Pig iron production in June was smaller than in any month since January, 1908, when the low point was touched due to the 1907 panic. But capacity then was only about half of to-day's.

At 1,064,833 tons, output last month averaged 35,494 tons per day, against 1,221,221 tons in May, or 39,394 tons per day. The month brought a net loss of 14 furnaces, the 76 which were active July 1 having a daily capacity of 32,195 tons, whereas the 90 furnaces in blast June 1 had a daily capacity of 38,080 tons.

For the six months ending June 30 the country's pig iron output, exclusive of charcoal iron, was 9,428,000 tons, against 18,139,000 tons in the first half of 1920.

While railroad buying is restricted to the last degree, there are signs that more business will be released by Aug. 1. The condition of rolling stock and in some case of track is such as to compel action. The Illinois Central's locomotive inquiry is for 100 to 130, representing over 3000 tons of steel. The Southern Pacific is inquiring for 4800 kegs of spikes and 3300 kegs of track bolts.

In the Chicago district a large share of current orders is for Federal, State, municipal and county work. Automobile plants are more of a factor in the Central West. The Ford company has bought 1000 tons of light plates and is about to place a month's requirements in other forms.

Whereas 2c., Pittsburgh, is the new Bethlehem price for plates, some western car repair work recently let brought out plates at 2c., Chicago.

Negotiations are practically completed by which the American Locomotive Co. will supply 45 locomotives to Mexico.

Fabricated steel business has shown some improvement. In the East 10,000 tons of work was contracted for, with 3000 tons practically settled and 2500 tons involved in new projects.

Opposition in the steel trade to the metal schedule of the new tariff bill centers on the manganese ore and ferromanganese duties, which steel manufacturers consider far too high. There is also the anomaly that 20 units of manganese in spiegeleisen pay $1.25 duty, whereas 80 units in ferromanganese pay $39.42, or at nearly an eight-fold rate. The general provision for American valuations would be of little help in keeping out European steel, since nearly all steel duties are specific and hence do not involve valuations.

Over and above the duty on the foreign ores they use, domestic merchant producers of ferromanganese have close to $15 per ton protection against the British product. This margin would encourage more steel companies to make their own alloy.

The monotonous record of recessions in pig iron prices continues. In the South the prevailing price is down 50c. and production is to be further curtailed. Other centers report reductions of from 50c. to $1 and there is no evidence that bottom has yet been struck. Sales are mostly in carload lots, the largest of the week being 2000 tons of basic at Pittsburgh.

Pittsburgh

PITTSBURGH, July 5.

The new schedule of prices announced by the Bethlehem Steel Corp. is received here with mixed emotions. The reductions have been generally adopted by other independent companies and while official announcement is yet to be made, it is believed that the new prices will be adopted by the Steel Corporation. As a stimulus to business, nobody expects that the new schedule will be any more beneficial than the old one, for the reason that the prices named had been fairly generally quoted against attractive inquiries previously. The claim is made in some quarters that some business which was near the closing stage has been deferred as a result of the announced reduction. Publication of a new price schedule on the minor products still is to be made, but it is expected that the revision will be completed by the end of the week and that then the Steel Corporation will adopt all of the new schedule.

Business over the past week has been smaller than at any time since the contraction started last fall. This condition finds reflection in plant operations, which are unusually small, even for the first week of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 5, 1921	June 28, 1921	June 7, 1921	July 6, 1920
No. 2X, Philadelphia‡	$25.50	$25.50	$25.50	$47.15
No. 2, Valley furnace†	21.00	21.00	22.50	45.00
No. 2, Southern, Cin'ti†	*25.50*	26.00	26.50	45.60
No. 2, Birmingham, Ala.†	*21.00*	21.50	22.00	42.00
No. 2, foundry, Chicago*	20.00	20.00	21.50	45.00
Basic, del'd, eastern Pa.	23.50	23.50	25.00	43.00
Basic, Valley furnace	*20.00*	20.50	21.00	45.00
Bessemer, Pittsburgh	*23.46*	24.46	24.96	46.40
Malleable, Chicago*	20.00	20.00	21.50	43.50
Malleable, Valley	*21.50*	22.50	23.00	45.00
Gray forge, Pittsburgh	21.96	21.96	23.46	44.40
L. S. charcoal, Chicago	37.50	37.50	37.50	57.50
Ferromanganese, del'd.	70.00	70.00	75.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	*33.00*	37.00	37.00	60.00
O.-h. billets, Pittsburgh	*33.00*	37.00	37.00	65.00
O.-h. sheet bars, P'gh.	*35.00*	39.00	39.00	75.00
Forging billets, base, P'gh.	*38.00*	42.00	42.00	85.00
O.-h. billets, Phila.	*38.74*	42.74	42.74	69.10
Wire rods, Pittsburgh	*45.00*	48.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	2.00	2.00	2.20	2.75
Skelp, sh. steel, P'gh., lb.	2.00	2.00	2.20	3.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.25	2.25	2.25	4.75
Iron bars, Chicago	*2.10*	2.15	2.25	3.75
Steel bars, Pittsburgh	*1.90*	2.00	2.10	3.50
Steel bars, New York	*2.28*	2.38	2.48	4.02
Tank plates, Pittsburgh	1.90	1.90	2.00	3.50
Tank plates, New York	2.28	2.28	2.38	3.77
Beams, etc., Pittsburgh	2.00	2.00	2.20	3.10
Beams, etc., New York	2.38	2.38	2.58	3.27
Steel hoops, Pittsburgh	2.50	2.50	2.75	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	July 5, 1921	June 28, 1921	June 7, 1921	July 6, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	*3.50*	3.75	3.85	5.50
Sheets, galv., No. 28, P'gh.	*4.50*	4.75	5.00	7.00
Sheets, blue an'l'd, 9 & 10.	*2.65*	2.85	2.90	4.50
Wire nails, Pittsburgh	3.00	3.00	3.00	4.00
Plain wire, P'gh	2.75	2.75	2.75	3.50
Barbed wire, galv., P'gh.	3.65	3.65	3.85	4.45
Tin plate, 100-lb. box, P'gh.	*$5.75*	$6.25	$6.25	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$13.25	$13.25	$13.50	$35.50
Carwheels, Philadelphia	18.00	18.00	18.00	38.00
Heavy steel scrap, P'gh.	12.00	12.00	13.00	25.50
Heavy steel scrap, Phila.	11.00	11.00	11.50	22.50
Heavy steel scrap, Ch'go	*10.00*	10.25	11.50	23.50
No. 1 cast, Pittsburgh	16.00	16.00	17.00	40.00
No. 1 cast, Philadelphia	*16.00*	17.00	17.50	37.00
No. 1 cast, Ch'go (net ton)	12.50	12.50	13.00	36.00
No. 1 RR. wrot, Phila.	13.50	13.50	15.00	33.00
No. 1 RR. wrot, Ch'go (net)	9.50	9.50	10.00	25.00
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$3.00	$3.00	$3.00	$17.00
Furnace coke, future	3.25	3.25	3.25	11.50
Foundry coke, prompt	4.25	4.25	4.50	17.00
Foundry coke, future	4.75	4.75	5.00	14.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.75	12.75	13.00	19.00
Electrolytic copper, N. Y.	12.62½	12.62½	13.00	19.00
Spelter, St. Louis	**4.35**	4.25	4.55	7.85
Spelter, New York	**4.85**	4.75	5.05	8.20
Lead, St. Louis	**4.25**	4.15	4.50	8.00
Lead, New York	4.40	4.40	4.75	8.25
Tin, New York	**29.87½**	29.00	29.00	48.00
Antimony (Asiatic), N. Y.	*4.75*	4.87½	5.20	7.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Finished Steel, 2.557c. per Lb.

Based on steel bars, beams, tank plates, open-hearth rails, plain wire, black pipe and No. 28 gage black sheets

June 28, 1921,	2.607c.
June 7, 1921,	2.679c.
July 6, 1920,	3.724c.
10-year pre-war average,	1.684c.

July, which is usually chosen for plant repairs. All producers are carefully watching overhead and where less loss would be sustained by keeping in operation than in shutting down the former course is pursued. The fact that only 18 furnaces out of the 139 in Johnstown, Wheeling, Pittsburgh and The Valley districts were making iron over July 4 is evidence of the small order books of the steel companies and also of the desire to avoid the piling up of cold iron at current costs. Seven furnaces of the 14 Carnegie Steel Co. which were in blast in the last week of June were banked over the holiday and resumed production to-day, while the blast also was turned on this morning at the stack of the Weirton Steel Co., which was banked over Saturday, Sunday and Monday. This brings the number of active furnaces to 26 out of 139, or slightly less than 19 per cent.

Although the railroads tributary to Pittsburgh are not ordering forward rails placed early in the year, they are expected to do so by August 1, and expectations of increased railroad buying are stronger than they have been recently. The railroads in this part of the country are showing a balance on the right side of the ledger, and in order that this development may not be used against them as an argument in favor of lower freight rates, the common tendency lately has been to increase the maintenance of way payrolls and to start up idle shops as a means of getting rid of some of the enlarged earnings. Because of this disposition on the part of the railroad management, orders for steel are expected to be more numerous than they have been. Few, however, expect the railroads to be heavy buyers.

There is considerable opposition among the steel companies to the proposed tariff on ferromanganese and manganese ore and suggestion is heard that some companies will go into the manufacture of ferromanganese because of the proposed duty.

Pig Iron.—The only important transaction recently noted is one involving 2000 tons of basic iron recently sold by a Valley steel maker to another steel producer at $20, furnace. This is a drop of 50c. per ton from the former quotation, but the market does not yet give evidence of having touched bottom, as other offerings have been made at $20, furnace, and there are reports from Cleveland that as low as $19 has been done. If business has been done that low, it is probably from the stock of a Cleveland middle interest which has been carrying a big tonnage for some time, bought at well above to-day's market. Little or nothing has been done recently in Bessemer iron, which nominally is quoted at $2 a ton above basic, or offered at $21.50, without takers, and this quotation must be given consideration. Producers of foundry iron claim to have lost prospective orders because of the price reduction just announced by independent companies. W. P. Snyder & Co. report the average price of Bessemer iron from Valley furnaces in June at $23, and the average price on basic the same month at $20.70. These prices show declines of $1.25 in Bessemer from the May average and of $1.175 in basic from the average of May.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$20.00
Bessemer	$21.50 to 22.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	21.50 to 22.00

Structural Material.—Since there has been no appreciable increase either in the number or the size of structural awards to fabricating shops in this district, the demand for plain material is extremely limited. The announcement of the cut by the Bethlehem Steel Co. to 2c. base, Pittsburgh, for structural beams has been followed by other independent companies and probably also will be followed by the Steel Corporation. Since this price could have been done previously, it is doubtful whether much new business will develop, and the opinion is expressed in some quarters that an inquiry involving a really sizable tonnage could be placed with a little shopping, at well below 2c. Prices are given on page 49.

Ferroalloys.—Business probably never before was so completely at a standstill as at present. With independent steel works operations not much over 20 per cent of capacity, and these companies, unlike the Steel Corporation, dependent on outside sources for supplies of ferromanganese and spiegeleisen, the lack of demand is readily explained. There are occasional inquiries, but when quoted against they usually prove to be nothing more than "feelers." Prices are purely nominal and the undertone of the market is weak, based on bid and asked quotations. It is reported that a price as low as $65 furnace, freight allowed, recently was made on 50 per cent ferrosilicon. Bessemer ferrosilicon and silvery iron at current quotations are much out of line with pig iron and the appearance of a sizable inquiry undoubtedly would develop sharply lower prices.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 to $28 furnace quoted by makers on direct business and $25 to $26 furnace on resale tonnages; 50 per cent ferrosilicon, $69 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The lower prices announced by Bethlehem Steel Corporation of $33 for 4-in. billets, $35 for sheet bars and $34 for slabs have been generally adopted by other independents and while there has been no official announcement, it is assumed that the Steel Corporation will name these prices at an early date. Almost no business has been done lately and the new prices are not expected to stimulate the demand because it has been possible to obtain tonnages at these prices for at least the past two weeks. Steel works operations are at the lowest notch since the depression set in, and, including the corporation subsidiaries, it is doubtful whether operations reach 20 per cent of capacity.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $33; 2 x 2-in. billets, $35; Bessemer and open-hearth sheet bars, $35; slabs, $34; forging billets, ordinary carbons, $38, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Thus far there has been no announcement relative to change from the old base of $48 for No. 5 common soft rods. There is almost no demand, however, and it is currently stated that a bid of $45 would get consideration. Maintenance of the present differential between 4-in. billets and wire rods, of $11, would suggest a new base of the latter of $44. Prices are given on page 49.

Steel Skelp.—Reduction by independent companies in the base price to 2c. is looked upon merely as a public announcement of a price which it is known could have been done for at least the past fortnight. The corporation is expected to meet this cut, but it is doubtful whether it will produce much new business in view of the tapering demand in both pipe and boiler tubes.

Wire Products.—Evidence of the light demand is found in the fact that at least two large independent producers have shut down their plants, and while this action is explained in part by the fact that there usually is a suspension in the first week in July for necessary plant repairs, neither of these companies has a definite date for resumption. Manufacturers have fair-sized stocks and the fact that jobbers are doing much trading between themselves is keeping down demands upon the former to a minimum. Prices have not yet been revised in keeping with the reduction announcd in other finished lines, but a new schedule is probable, notwithstanding the recent reduction of $5 per ton in nails and plain wire and the cutting of the differential in galvanized products.

We quote wire nails at $3 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.75 base per 100 lb. Pittsburgh.

Nuts, Bolts and Rivets.—The recent downward revision in prices has been without effect either upon the demand or specifications against unfilled orders. Plant operations here are almost nil, but one company that had been down resumed on part time this week. Prices and discounts are given on page 49. Some makers of track bolts recently have gone as low as $4 per 100 lb. in an effort to stir up orders.

Spikes.—The market now is quotable at $3.25 base, Pittsburgh, on all sizes and does not show much real strength even at that figure, as makers are more anxious to sell than buyers are to buy. There are rumors of quotations as low as $3 by some makers on both standard and small spikes. Prices are given on page 49.

Iron and Steel Bars.—It is generally expected that the corporation will meet the new independent price of 1.90c., base, Pittsburgh, on soft steel bars, although no official announcement of this sort has been put out. The new base is not expected to appreciably stimulate business for the reason that it is common knowledge that such a price could have been done right along against orders of sufficiently attractive proportions. Reinforcing bars from steel also have been cut to 1.90c., base, but even this price seems high with such bars rolled from old rails or shell steel available at 1.75c. There has been a cut of $5 per ton in iron bars, which now are quoted by makers here at 2.50c., base, for refined iron.

We quote steel bars rolled from billets at 1.95c. to 2.10c.; reinforcing bars, rolled from billets, 1.95c. to 2.10c. base; reinforcing bars rolled from old rails, 1.75c. to 1.85c.; refined iron bars, 2.65c. to 2.75c., in carloads, f.o.b. mill, Pittsburgh.

Cold-Finished Steel Bars.—Business is so nearly at a standstill that quotations have little or no value. The general quotation is 3c., base, Pittsburgh. How much lower an order might be placed is purely conjectural in the absence of real inquiries. As low as 2.75c., base, has been quoted and now that soft steel bars definitely are quotable at 1.90c., there are suggestions of 2.65c., and even of 2.50c., as a base for the cold-finished bars.

Iron and Steel Pipe.—In comparison with other finished steel products, the demand for pipe is fairly good. One of the Valley producers last week was able to maintain 50 per cent operation and to ship its entire production, and this week's schedule calls for the operation alone of its tube works. Generally, most of the current production is for stock. Shipments are on a tapering scale, due to the fact that oil production continues to be curtailed and the fact that most of the producers have ample supplies and some have a surplus of which they are disposing at low prices. Business in standard pipe is purely of a piecing out character and such business does not bulk large because so many jobbers are matching up stocks among themselves. No announcement yet has been made as to the reduction which seems likely in view of the cut in skelp and other semi-finished and finished products. Discounts are given on page 49.

Hoops and Bands.—With merchant steel bars definitely at 1.90c. base, the market for hoops and bands has settled to 2.50c. base and even that quotation, which has been fairly common in the past fortnight, does not mean much because makers have so few chances to quote.

Hot-Rolled and Cold-Rolled Strips.—A revision in prices is yet to be made in keeping with the reduction just made in billet prices. A cut seems probable, although it is likely to be a moderate one, in view of the fact that prices of strips have been discounting lower steel prices for several weeks. The market is

quotable from 2.50c. to 2.60c. on hot-rolled strips and from 4.75c. to 5c. on cold-rolled strips. Business still is slack although some demands are coming from the Ford Motor Co. and Dodge Brothers Co. The latter has decided upon an increased production schedule, which will carry its daily output to 525 pleasure cars, which compares with full production of 600 cars daily.

Plates.—The reduction by the Bethlehem Steel Co. to 2c., Pittsburgh, has been followed by other independent companies, which hitherto have been nominally quoting 2.20c. Outside of the fact that the reduction brings buyers' and sellers' price ideas a little closer together, it has no importance because some makers for several weeks past have been willing to go as low as 1.90c. to secure business, and an even lower price recently was made by a Chicago district manufacturer. The corporation has not yet made an official announcement as to prices, but undoubtedly will meet the revised independent quotations. We therefore quote sheared plates, ¼ in. and heavier, of tank quality, at 1.90c. to 2c.

Steel Rails.—Railroads, despite the lower wage rates which became effective July 1, are not specifying against rail orders placed earlier in the year, but some increase is expected by Aug. 1, when it is believed, the railroads will have used up such supplies as already have been delivered them. The market on light rails, rolled from new steel, still is nominally quoted at 2.20c., Pittsburgh, for 25 to 45-lb. sections, but in view of the reductions recently announced in the finished lines, and also that for some time past there has been considerable shading of that price, it is expected that a new price soon will be named and a base of 2c. is forecast. Demand for light rails still is slack.

We quote 25 to 45-lb. sections, rolled from new steel 2.10c. to 2.20c.; rolled from old rails, 1.80c. to 2c.; standard rails, $45 mill for Bessemer, and $47 for open-hearth sections.

Sheets.—Increased production schedules of Dodge Brothers are finding some reflection in the demand for automobile sheets, but outside of this class of material, the market still is exceedingly quiet. The new schedules of the Bethlehem Steel Co. of 2.65c. base for blue annealed, 3.50c. base for black and 4.50c. base for galvanized, have been adopted by most of the other independent makers, and it is assumed that they will be followed by American Sheet & Tin Plate Co. The latter has put into operation its sheet plant at Scottdale, Pa., and is running heavier at some of its other plants running on automobile sheets. So many of the independent mills are down, however that the operations of the industry as a whole do not exceed 20 per cent capacity. No word yet has been received relative to the wage scale conference which convened to-day in Columbus, Ohio, between representatives of the Amalgamated Association of Iron, Steel and Tin workers and manufacturers who have been working under an agreement with this organization. Prices are given on page 49.

Tin Plate.—The new base of $5.75, Pittsburgh, for tin plate, announced by the Bethlehem Steel Co., has been adopted by other independents generally, and probably will be adopted by the American Sheet & Tin Plate Co. A good many of the independent plants working under an agreement with the Amalgamated Association are idle this week, but the loss has been somewhat offset by increased operations by the American Sheet & Tin Plate Co. and some of the independents working under an open shop policy. One independent company which has been running eight of its 32 mills for several weeks past has 14 under power this week.

Coke and Coal.—The coke market is extremely inactive but fairly steady at $3 per net ton oven, for spot furnace grade and at $4.25 for selected 72-hr. coke, for spot delivery. Oven operators have been willing to keep production where losses have not exceeded those that would have been sustained by complete suspension. Demand, however, has become so limited that there no longer is any opportunity to save money by keeping in operation, and the result has been a suspension of several plants. The contract market is purely nominal in the absence of any important business. The coal market still is weak because there is so little demand. Lake requirements have been disappointing and there is no compensating demand from other quarters. Mine run steam coal is quotable from $1.50 to $2.25 per net ton, mine, by-product from $1.60 to $2, and gas coal from $2.25 to $2.50.

Boiler Tubes.—Business is dull to the point of stagnation. Jobbers are getting very little business because it is possible for consumers to buy less than a carload at about the carload prices from manufacturers. Discounts are given on page 49.

Steel Skelp.—A tapering demand in pipe and boiler tubes is fully reflected in the call for the raw material. The April 13 base was 2.20c. Pittsburgh for sheared, universal and grooved skelp, but this price has been shaded $2 to $4 a ton against recent inquiries. With plates at 2c. or less and the demand far below normal, users of skelp would not have much trouble in obtaining supplies at 2c.

Old Material.—Trading is practically at a standstill. The foundries in this district are running at a very low rate, and are practically out of the market for old material, while interest on the part of steel companies is passive on account of the suspensions for lack of orders and to make the annual plant repairs, for which the first week in July usually is chosen. Offerings of scrap are not heavy, but they cannot be cut off entirely and dealers in their efforts to find an outlet for material which cannot be applied against old contracts, are obliged to put the knife to prices. Machine shop turnings have been rather freely offered lately at $7.50 a gross ton, delivered, which would mean in some instances, where the freight rate from shipping point to Pittsburgh is high, that the railroads would obtain about twice as much as the producer. Figuring a freight rate of $5 a ton from Detroit to Pittsburgh, would mean that the producer or shipper would receive only $2.50 a ton on the shipment. Prices generally are merely an appraisal of what might be obtained and mean little in the absence of business. The Baltimore and Ohio Railroad will receive bids until noon, July 11, for 15 cars and 15,875 gross tons of scrap; also for 3000 lbs. of high speed steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.50 to 10.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	16.00 to 16.50
Railroad malleable	12.00 to 13.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	14.50 to 15.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	12.00 to 12.50
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	14.00 to 14.50
Stove plate	12.00 to 12.50
Cast iron borings	8.00 to 8.50
No. 1 railroad wrought	12.00 to 12.50

Directors of the Truscon Steel Co., Youngstown, Ohio, have declared a quarterly dividend on common stock of 1¾ per cent, payable July 15 to holders of record July 5. Previous to the recent payment of a common stock dividend of 50 per cent, the company maintained a quarterly dividend rate of 4 per cent on the junior issue. Directors met at the home office in Youngstown, instead of in Detroit as usual, and inspected the main properties.

The Reedy Foundry Co., one of the oldest Chicago jobbing foundries, has been sold to the Oil & Chemical Co., Chicago, which will transfer the plant into a refinery. W. H. Reedy, head of the Reedy Foundry Co., is interested in the oil concern. All of the foundry equipment will be sold.

Cleveland

CLEVELAND, July 5.

Iron Ore.—The market is inactive. A few sales have been made in lots of around 5000 tons of certain ores for mixtures, but only one inquiry is reported involving any large tonnage requirements. Ore shipments during June were 3,600,000 gross tons, or only about 40 per cent of the movement during the corresponding month last year, when the lake shipments amounted to 9,233,566 tons. Shipments during May were 2,594,027 tons. Lake shipments up to July 1 were 6,371,227 tons as compared with 16,440,515 for the same month last year. The total amount of iron ore in furnace yards and on Lake Erie docks June 1 was 27,840,000 tons, or an increase of 240,000 tons over May 1. This compares with 18,975,000 on June 1, 1920. The consumption of Lake Superior ore during May was approximately 1,725,000 tons, or an increase of 48,000 tons over April.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The buying of pig iron continues in light volume and orders are almost wholly for car lots. The market still shows a downward tendency. While open quotations range from $21 to $21.50, Valley furnace, for No. 2 foundry iron, the $21 price has been shaded in some cases, although some car lot sales have been made at $21.50. The only inquiry of any size is from a Johnstown, Pa., radiator interest for 250 tons. June shipments as a whole fell off as compared with May, and with very few shipping orders at present, producers do not look for an improvement in consumption for this month.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$21.96
Northern No. 2 fdy., sil. 1.75 to 2.25	22.50
Southern fdy., sil. 2.25 to 2.75	29.42
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	$37.00 to 38.00

Finished Iron and Steel.—The price reduction by the Bethlehem Steel Co. had little effect on the market, as buyers had expected reductions July 1, and quotations as low as, and in some cases lower, than the newly named prices, have become common in steel bars, plates and structural material. Some of the independent mills promptly accepted the new prices and others will probably do so, although the attitude of the Steel Corporation has not yet been made known. Consumers see no indication that prices will be stabilized at the new levels, but look for further price irregularities. While the market continues very quiet, some of the mills report a little improvement in inquiries both in number and tonnage involved. The Ford Motor Co. is understood to have placed 1000 tons of light plates for frames, dividing this steel among four mills. The Illinois Central Railroad is inquiring for 100 Mikado type locomotives requiring 3000 tons of steel. The Brown Hoisting Machinery Co. has taken the coal handling plant for the Superior Coal & Dock Co., requiring 800 tons of structural material. The Akron, Canton & Youngstown Railroad is inquiring for 600 tons of rails. The Ohio State University stadium and other steel building work previously noted have not yet been placed. With the reduction in mill prices, Cleveland warehouse prices will be reduced within a day or two.

Cleveland warehouses quote steel bars at 2.99c.; plates, 3.09c.; structural shapes, 3.09c.; No. 9 galvanized wire, 3.75c.; No. 9 annealed wire, 3.50c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 10 blue annealed sheets, 3.60c. to 3.75c.; hoops and bands, 3.69c.; shafting, 4.25c.

Bolts and Nuts.—Bolts and nuts still show a tendency toward lower levels. Further reductions amounting to 5 per cent have been made on large machine and carriage bolts by some makers. Prices on semi-finished nuts are also weaker. Local makers are meeting on desirable orders a 10 per cent cut in prices that had appeared in the East. The demand for bolts and nuts has improved somewhat owing to buying by the railroads. Some orders up to carloads have come from this source.

Sheets.—Some of the independent mills have adopted the price reductions made by the Bethlehem Steel Co., but others have as yet taken no action on price changes, and still others without formally reducing prices will meet the new prices, which seem to be generally recognized as the going market quotations.

Hot-Rolled and Cold-Rolled Strip Steel.—There is some demand for strip steel from the Detroit territory. Hot-rolled strips are quoted at 2.55c. to 2.60c. and cold-rolled strip steel at 4.75c. to 5c.

Rivets.—The demand for rivets is only for small lots and prices are weak. Quotations of 2.75c. for structural and 2.85c. for boiler rivets have appeared. Small lot sales are being made at $3 a ton higher prices.

Coke.—A few car lot sales of the better grades of Connellsville foundry coke are quoted at $5 per ton. Some makes are quoted as low as $4.

Old Material.—Only one mill in this territory is taking shipments of scrap and that in very small quantities. There is virtually no activity in the market, sales being limited to a few car lot transactions between dealers. Dealers are offering $10 per ton for heavy melting steel scrap. Prices are unchanged.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.00 to 7.50
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	6.50 to 7.00
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 casting	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

Birmingham

BIRMINGHAM, ALA., July 5.

Pig Iron.—With the coming in of July the Birmingham iron market had reached a level of $21, some carloads still going at $21.50, but the former was admitted to be the new base. Among other recent purchasers was the American Radiator Co., which is credited with having taken 1000 tons and is known to have placed one order for 500 tons at $21. Numbers of consumers made offers during the week of $20, but none of these offers is believed to have been taken. It is known that one maker turned down an offer of 2000 tons at $20 base and that a like amount of iron brought $21.50 shortly before close of the month. A fairly good tonnage was sold during the week, one concern admitting the booking of 6500 tons recently. However, furnace interests feel that the limit has been reached and will not continue production on the present price tendency. The Sloss-Sheffield Steel & Iron Co. closed down its one active stack the first of the month and the Alabama Co. will bank or blow out at Gadsden about July 15. The action of the latter company appears significant in the light of its reputation for ability to dispose of a one-stack production. With the Alabama Co. out of the merchant iron production, the Woodward Iron Co. will have the only producing stack. The Sloss-Sheffield company has large stocks of yard iron. Its operations will be confined for the time being to as much of by-product works as will furnish the city of Birmingham with gas. Southern iron interests want some freight rate relief and that is believed to be part cause of the general furnace suspension. It is not a producers' strike in name, but is beginning to resemble one.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$21.00
Basic	20.00
Charcoal	35.00

Cast Iron Pipe.—The National Cast Iron Pipe Co. continues to book orders for the Middle Western cities,

but no large order has been taken in Birmingham since that of 5000 tons for Phoenix, Ariz. Recent bidding has shown that sizes from 24 in. and up go under $40, although $45 remains base for smaller sizes. Sanitary shops have booked Eastern business. The $40 base seems fairly firm.

Old Material.—With the slowing down of operations at the Gulf States Steel Co. mills, heavy melting steel is not in much demand. Cast scrap is going fairly well to pipe works and stove and radiator works. Freight rates prevent scrap getting beyond the district at this time.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	16.00 to 17.00
Car wheels	16.00 to 17.00
Tramcar wheels	15.00 to 16.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Buffalo

BUFFALO, July 5, 1921.

Pig Iron.—Iron offered by a steel mill is the best-moving furnace product in this district. Sales of 2,500 tons last week are reported as going to various points east of Buffalo. The producer insists that the lowest price on this iron has been $21.50 base, f.o.b. Buffalo despite reports from other points that this iron was offered through brokers for $20 and $20.75. Two furnaces have been offered considerable tonnage if they would consider $18.50 base and both producers rejected the offer. Inquiry of 3000 tons is in hand and sales for a week total about 600 tons. Carload lots of malleable are sold at $23, and the same price is quoted on carload lots of 2.75 to 3.25 silicon. Rumors that the largest buyer in this market has lately made a purchase of a large tonnage at $18 lack verification. An agency having a number of branch sales offices reports total orders for the week amount to 500 tons sold at $22 base. In one instance, a small carload of No. 2 plain was sold at $24.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$22.75 to $23.50
No. 2X foundry, 2.25 to 2.75 sil.	21.75 to 22.50
No. 2 plain, 1.75 to 2.25 sil.	20.75 to 21.50
Basic (nominal)	21.00 to 22.00
Malleable (nominal)	23.00 to 24.00
Lake Superior charcoal	37.00

Finished Iron and Steel.—Mills and sales offices unite in saying business could not be worse. Opinion is general that actual wants have been disregarded for several weeks, while buyers watched for the new price schedules. The fact that this revision did not come, made no change in the policy of the buyers, which it is hoped will now be changed as price reductions are being announced. A situation with reference to Canadian business—always interesting in this vicinity—has arisen and threatens to bring a complete withdrawal of shipments of American-made steel products into the Dominion. The Canadian customs has promulgated a ruling which requires every invoice of steel going into Canada to bear a footnote showing that the shipment is billed at cost plus a reasonable profit. Coming at a time when sales are either at cost or even less, shippers here say the ruling is offensive and that it will result in an advance in prices on Canadian shipments or withdrawal from that market. Sales of two or three tons of bars daily, comprise the sole activity of one of the largest interests. The rail department of the largest mill will operate at 25 per cent capacity for July, but has no schedule beyond that date. A fair amount of plate and reinforcing bar inquiry has reached this mill. The Buffalo Structural Steel Co. will fabricate 400 tons of shapes for the new Cataract theatre at Niagara Falls, N. Y.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.25c.; plates, 3.25c.; plates, No. 8 gage, 4.10c.; soft steel bars and shapes, 3.15c.; hoops, 3.85c.; blue annealed sheets, No. 10 gage, 3.90c.; galvanized steel sheets, No. 28 gage, 6.05c.; black sheets, No. 28 gage, 5.05c.; No. 9 gage annealed wire, 4.35c.; cold rolled strip steel, 8.15c.

Old Material.—One dealer has sold 500 tons of heavy melting steel to a wire manufacturer and it is understood the same buyer has made other purchases of the same material. A dealer has not bought or sold a ton of material in a week. All yards are well stocked, many of them holding material bought when prices were almost double present quotations. A few tonnages of bundled sheet stampings have been moved.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$12.00 to $12.50
Hydraulic compressed	9.00 to 9.50
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	13.00 to 14.00
Car wheels	14.50 to 15.00
Railroad malleable	10.50 to 11.50
Machine shop turnings	6.00 to 7.00
Heavy axle turnings	9.00 to 10.00
Clean cast borings	6.00 to 7.00
Locomotive grate bars	10.50 to 11.50
Wrought pipe	8.00 to 9.00
No. 1 busheling	9.50 to 10.50
Stove plate	14.00 to 15.00
Bundled sheet stampings	7.00 to 8.00
No. 1 machinery cast	17.50 to 18.00

Boston

BOSTON, July 5.

Pig Iron.—The outstanding features the past week are the shrinkage in sales and a stiffening of prices, especially on Buffalo iron. Buffalo irons, silicon 1.75 to 2.50, offered a week ago at $20.75 furnace, and silicon 2.50 to 3 at $20.90, are now quoted at $21.25 and $21.40, respectively. Less than half a dozen cars were sold to foundries at the lower quotations, and comparatively little other Buffalo furnace iron is available at the moment at less than $23 furnace base. The market on eastern Pennsylvania also has a firmer undertone, nothing having sold since last reports for less than $21 furnace base. Certain brokers are credited with going short of the market and the firming up of Buffalo and eastern Pennsylvania prices possibly has something to do with such selling. Sales for the week include 200 tons, silicon 1.75 to 2.25, Buffalo to a Massachusetts melter at $21, furnace, 100 tons eastern Pennsylvania, silicon 2.25 to 2.75, to a Massachusetts foundry at $22 furnace, 100 tons, silicon 2.75 to 3.25, to an eastern Connecticut plant at $22.50 furnace, 100 tons, silicon 1.75 to 2.25, and 100 tons, silicon 2.75 to 3.25, to another Connecticut foundry at $22. These, with car-lot sales, largely No. 1X iron, bring the aggregate sales for the week up to something better than 1000 tons. Inquiries, including one of 600 tons No. 2X iron from a Massachusetts consumer, approximate 2200 tons. Delivered prices follow:

East. Penn. silicon 2.25 to 2.75	$27.21 to $29.96
East. Penn. silicon 1.75 to 2.25	26.71 to 29.46
Buffalo, silicon 2.25 to 2.75	25.96 to 29.46
Buffalo, silicon 1.75 to 2.25	25.46 to 28.46
Virginia, silicon 2.25 to 2.75	33.58 to 34.58
Virginia, silicon 1.75 to 2.25	32.58 to 33.58
Alabama, silicon 2.25 to 2.75	33.16 to 33.66
Alabama, silicon 1.75 to 2.25	32.66 to 33.16

Warehouse Business.—Although individual orders continue small, the consumption of iron and steel appears on the mend. Warehouse business, however, is in no instance more than 50 per cent of that for the corresponding time last year and in a majority of cases less. In at least one case, employees are working on half time. Stocks are complete although not excessive. Those of nails, especially wire, are small and jobbers will be obliged to buy within the near future. The recent downward revision in prices on bolts has failed to stimulate business. The demand for machine screws is improving and covers a wide range of sizes.

Jobbers now quote: Soft steel bars, $3.18 per 100 lb. base; flats, $4.18 to $4.28; concrete bars, $3.18 to $3.45¼; tire steel, $4.25 to $4.75; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.33 to $4.48; steel hoops, $4.38; toe calk steel, $5.25; cold rolled steel, $4.65 to $5.15; structural, $3.18 to $3.28; plates, $3.28 to $3.50; No. 10 blue annealed sheets, $4.03; No. 28 black sheets, $5.50; No. 28 galvanized sheets, $6.50; refined iron, $3.18 to $5; best refined, $5; Wayne iron, $7.50; Norway iron, round, ¼-in. to 2½-in., 7.25c. per lb. net; other sizes, 8c. base.

Tool Steel.—High speed steel generally is quoted at $1, as compared with $1.10 to $1.25 a month or so ago, but quotations on other tool steels remain practically unchanged. Going business is of a hand-to-mouth character, notwithstanding the fact stocks in consumers hands in many cases are badly broken. Offers

of German and English steel at concessions apparently fail to interest the trade.

Finished Material.—Structural prospects continue in light supply and some lots already bid on by fabricators remain unlet, including 400 tons for a Boston municipal building. Bids are in on 650 tons for bridge connecting Lynn and Point of Pines, Mass. Plans for a street railway underground loop at East Boston are in the preliminary stages. The estimated structural needed is 1000 tons. Plates are quoted at 2c. to 2.20c., Pittsburgh, with going business not exceeding car lots. The Bath Iron Works, Bath, Me., will soon ask bids on a round tonnage of sheared and boiler plates for five Government lightships. Buying of bars has been held up pending an expected new mill price schedule July 1. Mill representatives look for a flurry of business within the next fortnight. As low as 1.85c., Pittsburgh, has been done on soft bars by Rhode Island bolt and nut makers.

Coke.—New England coke producers are unanimous in the opinion, based on shipping instructions, that July will mark an improvement in the movement of foundry grade. Buyers in many instances are considering the wisdom of accumulating coke during the third quarter, and a considerable number already have covered possible requirements, as is attested by contracts signed up since last reports. No change in prices is noted.

Old Material.—The market was inactive the past week, and aside from a slight hardening in quotations on cast iron borings, without special features. Foundries show practically no interest in the usual run of machinery cast, but scattered small tonnages of textile machinery cast and one 100 ton lot have been taken by Massachusetts consumers at $17.50 delivered. Comparatively little heavy melting steel is going to Pennsylvania mills and usually for stocking purposes. A dealer paid $2 for a car of machine shop turnings this week, but others are willing to pay $2.50 to $3. The firmer undertone to cast iron borings quotations is due to inquiries from chemical interests, amounting to several cars. A local dealer sold a small tonnage of boiler clippings to a Dorchester foundry at $15 delivered.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $17.50
No. 2 machinery cast	15.50 to 16.00
Stove plate	15.00 to 16.00
Railroad malleable	14.00 to 15.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

St. Louis

ST. LOUIS, July 2.

Pig Iron.—Sales are few and are confined largely to carload lots, the principal exceptions being 800 tons of Northern foundry bought by a Western consumer and 100 tons of low phosphorous purchased in the local industrial district. Few open-hearth furnaces are in operation in this section and the melt of malleable and gray iron foundries is less than 30 per cent of normal. Many melters still have liberal stocks, and even those who have cleaned up their yards are buying from hand to mouth. The lowest quotation on Southern foundry reported in this district is $21.50 base Birmingham, but the addition of $5.74 freight makes the delivered price too high to permit competition with Northern iron. The local market on Northern material is largely determined by Chicago furnace prices, which are now $20, Chicago, or $22.80 delivered St. Louis, for foundry, basic and malleable. The Granite City furnace is still in blast, and is meeting Chicago competition, while the Mississippi Valley stack still has stocks which it is offering on the market. There is very little activity in the ferroalloys, the only inquiry reported being for 50 tons of 50 per cent ferrosilicon.

We quote delivered consumers' yards St. Louis:

Northern No. 2 foundry, sil. 1.75 to 2.25	$22.80 to $23.30
Northern malleable	22.80 to 23.30
Basic	22.80 to 23.30
Southern Foundry, sil. 1.75 to 2.25	27.24 to 27.74

Coke.—Because of their light operations melters are buying sparingly, with the result that sales are small and scattered. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis. The Granite City by-product ovens are actively competing for business, and are meeting beehive prices. Local by-product foundry is quoted at $11.50 ovens, or $11.70 delivered anywhere in the industrial district.

Old Material.—The only bright spot in the old material market is the relaying rail situation. Inquiries have been received here for 26 miles from one Texas industrial concern, another inquiry for 20 miles from a Missouri industrial and there is an inquiry for 400 tons from Michigan. Some actual sales are being reported, and the relaying market is looking up. Coal mines also are inquiring for light weight rails. Users of scrap either are closed down or running on rather short time, and there is no immediate outlet for this material. Despite the low level of the market, railroads are offering material, the lists closing this and next week covering 3000 tons for the southwestern region of the Pennsylvania System, 1500 tons for the Santa Fe, and the Big Four has an open list.

We quote dealers' prices, f.o.b. consumer's works, St. Louis industrial district and dealers' yards as follows:

Per Gross Ton	
Iron rails	$12.50 to $13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Relaying rails, standard section, subject to inspection	27.00 to 29.00
Cast-iron car wheels	12.00 to 12.50
No. 1 railroad heavy melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Ordinary bundled sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	5.00 to 5.50
Iron angle bars	10.50 to 11.00
Steel angle bars	10.00 to 10.50
Iron car axles	18.00 to 18.50
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 9.00
No. 1 dealers' forge	6.50 to 7.00
Cast iron borings	6.00 to 6.50
No. 1 busheling	9.00 to 9.50
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.50 to 4.00
Railroad grate bars	7.00 to 7.50
Machine shop turnings	4.00 to 4.50
Country mixed iron	6.50 to 7.00
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.00 to 10.50
Railroad brake shoes	7.50 to 8.00

Finished Iron and Steel.—Buying is so limited that the market is largely untested in this district. Some few sales at the full April 15 prices are reported, and on the other hand some concessions have been made, notably on bars, sheets and track fastenings. Soft steel bars have been sold at from 1.90c. to 2c., Pittsburgh, blue annealed sheets at as low as 2.65c., base Pittsburgh, while there are unverified rumors of sales of galvanized and black at 4.50 and 3.50c., base Pittsburgh, respectively. Quotations of 3.25 and 4.20c., Pittsburgh, on track spikes and bolts are not uncommon and as low as 3.10 and 4.10c. have been named. The Mobile & Ohio is in the market for 550 kegs of spikes and 165 kegs of bolts. The principal item of interest in the structural field is a machine shop for the Motor Transport division of the Army at Fort Leavenworth, Kan., the general contract for which has been let to the Murch Brothers Construction Co., St. Louis. The fabrication of the steel, amounting to 1100 tons, has not yet been let. The Unit Construction Co.,

St. Louis, has the general contract for a depot at Memphis for the Illinois Central, which will involve 300 tons of reinforcing material, which has not yet been let. Warehouse prices on bolts, nuts, and sheets have been reduced.

For stock out of warehouse, we quote: Soft steel bars, 3.22½c. per lb.; iron bars, 3.22½c.; structural shapes, 3.32½c.; tank plates, 3.32½c.; No. 10 blue annealed sheets, 3.97½c.; No. 28 black sheets, cold rolled, one pass, 5.25c.; No. 28 galvanized sheets, 6.25c.; cold drawn rounds, shafting and screw stock, 4.72½c.; structural rivets, $4.62½ per 100 lb.; boiler rivets, $4.72½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and, tapped, $3.00 off list.

New York

NEW YORK, July 5.

Pig Iron.—Reports from other centers of less weakness in Buffalo iron are not confirmed in New York and this iron is still to be had on a basis of $21, furnace, for No. 2 plain. Eastern Pennsylvania iron is weak and sales are reported as low as $21, furnace. Sales are limited to carload lots and no inquiries of importance are pending, although some interest is being shown in last quarter business. Furnaces are not disposed to quote for delivery later than August or possibly September.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$27.52 to $28.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	26.52 to 27.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	25.52 to 26.52
Buffalo, sil. 1.75 to 2.25	25.46 to 26.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—The bids on 100 net tons of ferromanganese for the Government, referred to a week ago, are not yet reported as having been accepted and the market is featureless with quotations nominal. It is reported, however, that a carload lot was sold at an equivalent of $72.50, delivered. The spiegeleisen market is quiet with inquiries of two 100-ton lots, but no sales. There is no demand for manganese ore on which the quotations continue nominal. The prevailing topic is the question of the proposed duties on manganese ore and ferromanganese, concerning which opinions decidedly differ, depending upon the interests concerned. It is recognized, however, that it will be some time before the matter is settled and it is evident a stiff fight will be put up by the various interests before this part of the bill is approved. Sales of ferrosilicon, 50 per cent, are confined to a carload or two here and there, which can be obtained at a range of $67.50 to $70 per ton, delivered, depending on conditions. Quotations are as follows:

Ferromanganese, domestic, delivered, per ton	$80.00
Ferromanganese, British, seaboard, per ton	$75.00
Spiegeleisen, 20 per cent, furnace, per ton	$30.00
Ferrosilicon, 50 per cent, delivered, per ton,	$67.50 to $70.00
Ferrotungsten, per lb. of contained metal	.48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	16c. to 16.50c.
Ferrovanadium, per lb. of contained vanadium	$5.00
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00
Manganese ore, foreign, per unit, seaboard.	22.50c.

Finished Iron and Steel.—No particular interest is shown in the announcement of a downward revision in finished steel prices by the Bethlehem Steel Co., as they are regarded largely as the official recognition of prices already the basis of transactions. As to sheets the decided cut is taken as an illustration, so far as the Eastern market is concerned, of the basis on which the automobile trade has lately been purchasing. The announced price of 2c. for plates is not taken seriously for the reason that in the last few days, for example, the Steel Corporation is reported to have sold to a leading railroad line on a basis of less than 2c., Chicago basis. Fabricated steel business is the one division of the market which is looking upward. Quite a number of relatively small projects are under active negotiations with every indication that they are definitely to be put through, and the situation appears to be an outcome in part of a decided betterment in the efficiency of the building trades. Among the awards of the week may be mentioned the following: 2100 tons for a department store, 230 West 125th Street, 800 tons for a 16-story office building at 66 West Fortieth Street, and 500 tons for a 12-story office building at Madison Avenue and Forty-fourth Street, all to the Hay Foundry & Iron Works; 700 tons for a mercantile building, East Twenty-fifth Street, to the Hinkle Iron Co.; 500 tons for transfer tables, New York terminal, Lehigh Valley Railroad, to the Bethlehem Steel Bridge Corporation; 2700 tons for 14 oil storage tanks for the Government to the Pittsburgh & Des Moines Bridge Co.; 1500 tons for the Chesapeake & Ohio over the Licking River to the Mt. Vernon Bridge Co.; 225 tons for dormitories for the Sisters of Mercy, East 199th Street, to the Bethlehem Steel Fabricators. New work includes 700 tons for a marine terminal at Wilmington, 250 tons for two bridges for the Boston & Maine and 200 tons for the Grand Trunk at New Stratford, N. H. It is expected that the Fort Pitt Bridge Co. will be awarded 1400 tons for the airship hangars for the War Department and the Belmont Iron Co. 500 tons for similar work. Terry & Tench Co., Inc., is low in the bidding for a 650-ton bascule span for the Hudson River bridge between Troy and Cohoes; Rodgers & Hagerty are the low bidders on the hill-to-hill bridge at Bethlehem, Pa., and bids have been received on the barge canal freight terminal at Rochester, N. Y., taking 400 tons. The power house project of the Edison Electric Illuminating Co., Boston, has been postponed. In car repair work an inquiry has been received from the New York Central lines and possibly may mean considerable more work than now indicated.

Prices unchanged. We quote for mill shipments, New York, as follows: Soft steel bars, 2.28c. to 2.48c.; plates, 2.28c. to 2.58c.; structural shapes, 2.38c. to 2.58c.; bar iron, 2.28c.

Warehouse Business.—The market continues quiet since last week's change in prices by most warehouses, the reduction thus far not having stirred up any new business. Some dealers are looking forward to the curtailment of mill production this month as the possibility of greater buying from warehouses. The few contracts in the pipe market are still pending. There is no change in the brass and copper situation. We quote prices on page 62.

High Speed Steel.—There are no signs of improvement, sales still being confined to a few small orders to complete stocks. Producers continue to quote 90c. to $1 per lb. with resales and special concessions sometimes made at 85c. per lb.

Old Material.—The chief activity is in heavy melting steel and stove plate, though there are but few transactions in either. One broker is paying $11, delivered to Conshohocken, for heavy melting steel, though $1 less than this is being paid for other plants in the same district. The volume of business is very small, the holidays having added to the dullness.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$6.50 to $7.50
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10 50 to 11.00
Iron car axles	17.00 to 18.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	3 50 to 4.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 7.50
Stove plate	9.00 to 9.50
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	8.00 to 8.50
Old car wheels	12.50 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Cast-Iron Pipe.—No new municipal business has developed, but orders from private companies are keeping the pipe foundries busy, most of them operating at over 50 per cent. Prices for carload lots have been lowered about $1 a ton and should a tonnage of desirable size, totaling 300 tons or more, be asked for, concessions would be made undoubtedly. Quotations for carload lots, f.o.b. New York, follow: 6-in. and larger, $52.30; 4-in. and 5-in., $57.30; 3-in., $67.30, with $4 additional for Class A and gas pipe.

Cincinnati

CINCINNATI, July 5.

Pig Iron.—The past week was perhaps the quietest experienced in the market this year. Two sales of malleable, each of 200 tons, were reported, but the carload business was even scarcer than usual. A local agency reports the sale of 600 tons of Virginia iron to an Eastern melter. There are no inquiries of consequence before the trade, though the American Car & Foundry Co. has not yet closed on 700 tons for its Huntington, W. Va., plant. Prices of southern Ohio irons are off $1, sales having been made during the latter part of the week at $22 Ironton furnace. Chicago iron is now quoted in this territory at $20.50 to $21 for carloads, while Lake furnaces are reported to be making the same price. Southern irons are unchanged, $22 being the general quotation on carload business, but lower prices have been made on tonnages in the Southern territory. An inquiry for 500 tons of foundry coke from a melter in this territory has been received. This is the only evidence of any activity.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.00
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	26.50
Ohio silvery, 8 per cent sil.	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.52
Basic, Northern	23.52
Malleable	24.52

Finished Material.—The market is unusually quiet. Most steel buyers are of the opinion that lower prices will prevail in the immediate future and for that reason are holding off buying for other than their immediate and pressing needs. The opinion is becoming more general among steel men that a price reduction with some guarantees of permanency would go a long way towards stimulating business. Only small orders are being received, though occasionally 100-ton lots are inquired for. Some orders for light rails have been placed during the week and several car loads of bars have also been taken. Prices altogether depend on the ability of the buyers to drive a bargain, as there does not appear to be any recognized level. Two cents appears to be the general quotation on bars, shapes and plates, though occasionally one hears of 1.90c. being done. The business going, however, is so small, that it is doubtful whether this price has any basis in sales. Tonnage business, however, undoubtedly could be placed at better than 2c. The sheet market is unusually quiet, the recent reductions having failed to stimulate any business. Mill quotations are 2.65c. to 2.85c. on blue annealed, 3.50c. to 3.75c. on black and 4.50c. to 4.75c. on galvanized. There is very little activity in structural steel. No award has been made for the Ohio State University stadium project. It is expected that the building committee will consider the bids some time this week. There is a well defined rumor that this project will be postponed for a short time and that eventually new bids will be called for. The Kanawha & Michigan Railroad has asked bids on four plate girder spans, involving approximately 600 tons. The Middletown Hotel Co., Middletown, Ohio, will shortly ask bids on a 180-room hotel which will take about 450 tons of steel. A number of projects in which small tonnages of reinforcing bars will be required are also up for bids. Plant operations will not materially change next week. Most of the sheet mills operating in this territory will close down pending the outcome of negotiations with the Amalgamated Association at Columbus, commencing July 5.

Warehouse Business.—Local jobbers report the market as spotty. Some days will see a spurt in orders but the next two or three will bring practically no inquiries. Local jobbers have reduced the prices on cold rolled products to 4.25c. for rounds and 4.75c. for flats, squares and hexagons. No other price changes have been made.

Iron and steel bars, 3.35c. base; hoops and bands, 4.05c. base; shapes, 3.45c. base; plates, 3.45c. base; reinforcing bars, 3.42½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 6.25c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.60 per 100 lb.

Tool Steel.—Pick up business is about the only activity. Tool steel prices are about the same as previously noted, 18 per cent tungsten high speed steel being quoted at $1.00 per lb., base.

Coke.—Connellsville furnace coke is being quoted at $3, foundry at $4 to $5; Wise County furnace is quoted at $5, and foundry at $6. New River foundry is bringing $8.50.

Old Material.—There is very little activity. According to the local dealers, prices do not mean anything to-day, as there is practically no market. Some of them are taking advantage of the low prices to lay down yard stocks, but are not buying heavily. Consumers in this territory have practically abandoned the market, although occasionally a carload sale is made. Prices are quotably unchanged.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$5.00 to	$7.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	4.50 to	5.00
Steel turnings	2.00 to	2.50
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	17.00 to	17.50
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	6.00 to	6.50

San Francisco

SAN FRANCISCO, June 29.

Pig Iron.—Activity continues very much limited in the Coast market; in fact, the situation is prevailingly quiet, except for an occasional sale. Recently a comparatively small quantity of Belgian iron changed hands at $33, ex ship. The Southern Pacific Co. is in the market again for 800 tons of Nos. 2 and 3 grades. These are the only specific instances of business reported in two weeks. Belgian pig iron is being freely offered here from about $30 to $34, but little interest is taken. The Chinese iron situation is very dull. Foundry operations are constantly being restricted, which is reflected in the buying market. The proposed reduction of about 10 per cent in railroad freight rates from Eastern points is a topic of discussion on the Coast, but not much is expected of it.

Coke.—A few spot orders are being placed, which suggest some activity, at least. A little foreign tonnage, principally Australian, comes in occasionally for local smelters, but this is not material. The railroads are working on a reduction in freight rates, possibly around 33⅓ per cent.

Cast Iron Pipe.—This market presents an unsettled appearance, with opinion divided on the future trend of prices. At present business is light from all quarters. The city of Santa Monica received bids last week for 1000 tons of 4-6-8-10 and 12 in. pipe. Ft. Mason, San Francisco, opened bids for 142 tons of 8-in. pipe, and the Luke Field Distribution System, Honolulu, for 150 tons of 6-in. pipe. A small tonnage recently arrived on the steamer West Caddoa.

Old Material.—This market continues in a stagnant condition. Practically all the foundries of this district are closed or will be shortly. The Pacific Coast Steel Co. is planning to shut down its open hearth department July 1, having already a large supply of manufactured ingots on hand. Prices are nominal at about $24 for heavy melting steel and $10 for cast iron scrap.

Finished Iron and Steel.—With the building trades' lockout still persisting in San Francisco and environs, the situation is very quiet, as building construction work is about the only possibility in these times. Reports from the South indicate a falling off in new large structural jobs, which is the condition in northern California. At this time, there is a good deal of talk about bridging San Francisco Bay, thus connecting with the trans-bay cities. Ralph Modjeski and John Vipond Davies, distinguished bridge engineers, have arrived, and state that the project is plausible, but have not yet decided what kind of bridge will be most suitable. The steel interests are much interested, as a heavy tonnage is involved. The Columbia Steel Co. has decided to continue quoting $2.35, mill, California, on structural steel during the second quarter. The Southern Pacific Co. will be in the market for a quantity of miscellaneous material, including track spikes.

Philadelphia

PHILADELPHIA, July 5.

The announcement to-day by the Bethlehem Steel Co. of a reduction in prices on finished and semi-finished steel was promptly followed by other independent steel companies, which notified their district sales agents to quote the same figures. The attitude of the Steel Corporation was not made known to consumers in this district to-day, but it was presumed that the leading interest would immediately name the same prices without any formal announcement. The new price schedule is a reduction of $4 a ton from the April schedule on plates, shapes and bars and semi-finished steel, 50c. per box on tin plate, $4 on blue annealed sheets and $5 per ton on black and galvanized sheets. The new prices on sheets are $9 and $10 per ton below the April schedule, a $5 reduction having been put into effect a little more than two weeks ago. Plates and shapes are now quoted by the leading independents at 2c., bars at 1.90c., tin plate at $5.75 per base box, rerolling billets, 4 x 4 in., $33, slabs, $34, sheet bars, $35, blue annealed sheets, 2.65c., black sheets, 3.50c. and galvanized sheets, 4.50c.

As the new prices became known only to-day, there has not been time to determine whether they will have any effect in releasing some of the tonnage which has been held back during the past few weeks when rumors of further price reductions have been widely circulated.

Holiday week has intensified the dullness of the local market, there being few inquiries or sales. Most of the Eastern steel mills are shut down because of lack of orders.

Ferroalloys.—There is no demand for ferromanganese or spiegeleisen and prices are nominal, $70 to $80, delivered, for ferromanganese, and $28 to $30, furnace, for spiegeleisen.

Semi-Finished Steel.—The new price for open hearth rerolling billets, as announced by the Bethlehem Steel Co. and also quoted now by other steel producers, is $33, Pittsburgh, with a freight rate to Philadelphia of $5.74. The differential of $5 for forging billets will probably be maintained, making forging quality $38, Pittsburgh. Slabs are now $34, sheet bars, $35 and skelp 2c. per lb., Pittsburgh.

Pig Iron.—It now develops that an eastern Pennsylvania furnace took 2500 tons of the foundry iron business recently placed by a New England melter. The price was about $20.50, furnace. A sale of 250 tons to a consumer in this district is reported to have been made at $23, base, furnace, but the bulk of the current business, which consists mainly of carload lots, is being done at $24 for No. 2 plain and $25 for No. 2 X, furnace. The furnaces in this district are trying to maintain these prices in the immediate Philadelphia territory, where competition from furnaces in other districts is not a factor, but in competitive territory lower furnace prices are being quoted to equalize the higher freight rates. There is an inquiry for 1000 tons of foundry iron from a radiator company. An inquiry for basic comes from the American Steel & Wire Co., Worcester, Mass., but no tonnage is named. The Harrisburg company, which a week or so ago bought 600 tons of basic, is negotiating for an additional lot of about 1000 tons. The Robesonia furnace was put in blast to-day (Tuesday) and will make low phosphorus iron to fill old contracts.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.75 to $25.25
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.50 to 26.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.74
Virginia No. 2X, 2.25 to 2.75 sil.	32.99
Basic deliv. Eastern Pa.	23.50 to 24.00
Gray forge	23.00 to 23.50
Standard low phos. (f.o.b. furnace)	38.00
Malleable	26.00 to 27.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Plates.—With plates obtainable from some mills at 1.90c., Pittsburgh, the reduction from 2.20c. to 2c., Pittsburgh, by those steel companies which have been holding to the former price since April, probably will not be influential in stimulating buying. We now quote universal and sheared plates at 1.90c. to 2c., Pittsburgh.

Structural Shapes.—The reduction from 2.20c. to 2c. on shapes may release some building work which has been held up for the past few weeks pending an expected adjustment of prices. A few structural jobs have been let within the past month or so on which fabricators have not covered for the steel. We quote plain material at 2c., Pittsburgh.

Bars.—A few sales of soft steel bars had been made at 1.90c., Pittsburgh, during the past two weeks; hence the formal reduction to that figure by the leading producers, following the lead of Bethlehem, meets this competition. Bar iron makers continue to quote 1.90c., Pittsburgh, but are doing practically no business.

Sheets and Tin Plate.—Scarcely had the reduction of $5 a ton on sheets been put into effect two weeks ago before some of the smaller mills began cutting the new prices. The further reductions put into effect to-day meet these low prices and for the moment, at least, put practically all mills on the same basis. Stock tin plate has been selling at $5.75, but now production tin plate is reduced to that price. Blue annealed sheets are now quoted at 2.65c., black at 3.50c. and galvanized at 4.50c., Pittsburgh.

Warehouse Business.—Local warehouses will probably put some price reductions into effect this week. Business continues slow.

Coke.—Furnace coke on contract is available at $3 per ton, Connellsville. Foundry coke contracts have been made at $4.50, Connellsville.

Old Material.—With most of the Eastern mills idle, the demand for scrap is even smaller than it has been for some weeks. Prices remain almost stationary, however, there being a little buying by brokers to apply against old orders. Some of the railroads are said to be holding their scrap for higher prices. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.00
Scrap rail	$10.00 to 10.50
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under.	17.00 to 18.00
Car wheels	18.00 to 19.00
No. 1 railroad wrought	13.50 to 14.50
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	8.50 to 9.00
Cast borings (for chemical plants)	No market
No. 1 cast	16.00 to 17.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	11.50 to 12.00
Iron car axles	No market
Steel car axles	No market

Chicago

CHICAGO, July 5.

The announcement of price reductions by the Bethlehem Steel Co. has failed to cause any stir in the market, as it merely gives the stamp of official recognition to quotations which have been common in this section for several weeks. Whether other independents will decide to adhere to these new prices in view of the losses incurred in taking business at lower quotations, is as yet uncertain. Although mill bookings are not improving, neither are they getting much worse. It is to be noted, however, that a large proportion of the current orders are for Government, State, municipal and county work. Railroad buying has not yet developed in the volume expected in some quarters. Perhaps the most striking inquiry is one for 100 to 130 locomotives from the Illinois Central. The Southern Pacific is in the market for 4800 kegs of spikes and 3300 kegs of track bolts, which are expected to go to the Colorado mills.

There has been no material change in average furnace and mill operations. The Illinois Steel Co. still has eight active blast furnaces and is producing steel at the rate of about 30 per cent of normal. The Inland Steel Co. is operating at close to 30 per cent of ingot capacity and has two out of three furnaces in blast. The Interstate Iron & Steel Co. was idle over the holidays but will resume at its East Chicago and South Chicago mills some time this week and at its steel works July 11. The Wisconsin Steel Works is idle except for one blast furnace. The Republic Iron & Steel Co. continues to operate its bar iron plant at East Chicago.

Pig Iron.—There has been little buying during the past week outside of carload lots, but it is apparent that $20, Chicago furnace, is the top of the market on No. 2 foundry, malleable and basic and it is not unlikely that $19.50 furnace, could be done on tonnage. There are few inquiries in the market, the principal ones being 200 tons of malleable wanted by the Link-Belt Co., 100 tons of malleable for a Wisconsin melter, 100 tons of low phosphorus for another Wisconsin foundry, and two 100-ton lots of foundry for Michigan delivery. The resale silvery which has been sold of late at several dollars under the furnace prices has been entirely disposed of. The disappearance of this material has failed to strengthen the market, however, because the demand for silvery has fallen off. Foundry operations in this territory probably do not average 25 per cent, as most plants are running, if at all, only two or three days a week. The blast furnace situation is unchanged. Local by-product foundry coke continues to be quoted at $11.25 delivered, Chicago foundry, while standard beehive foundry coke is bringing $4.50 to $4.75 oven, or $9.12 to $9.37 Chicago.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$37.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos.	20.00
Southern foundry, sil. 1.75 to 2.25	27.67
Malleable, not over 2.25 sil.	20.00
Basic	20.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	35.00
Low phos., f.o.b. Birmingham, sil. 1 to 2 per cent copper free	31.00
Silvery, sil. 8 per cent	37.53

Ferroalloys.—The Crane Co. is inquiring for 200 tons of spiegeleisen. This alloy is slightly weaker, now being available at from $36 to $37 delivered.

We quote 78 to 82 per cent ferromanganese, $78 delivered; 50 per cent ferrosilicon, $80 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Plates.—The placing of oil storage tank and railroad car repair work has brought some respectable tonnages to the mills. Eighteen hundred eighty tons of plates for tanks to be built for the Midwest Refining Co. at Casper, Wyo., has been placed with a local mill. The steel for 600 gondola cars to be repaired for the Illinois Central by the General American Car Co. as noted last week, will amount to about 4000 tons of plates, shapes and bars which will also be furnished by a Chicago mill. A Chinese railway has let 300 box cars to the General American Car Co., requiring 2000 tons of steel which will be supplied by a local steel company. The Wabash has let repairs on 300 hopper cars to the Western Steel Car & Foundry Co. and the Missouri Pacific has awarded repairs on 500 box cars to the Sheffield Car & Equipment Co., Kansas City. The Wabash cars call for about 1500 tons of steel while the Missouri Pacific cars are wooden and will require little steel. In the East, the Western Maryland is in the market for repairs on 1000 gondola cars and is also asking for figures on 500 new hopper bodies. The price of 2c. Pittsburgh on tank plates announced by the Bethlehem company has made little impression on the market as 2c. and less have been done here for several weeks.

The mill quotation is 2c. Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.23c. for plates out of stock.

Cast-Iron Pipe.—The market is quiet for the time being, possibly on account of the holidays, and no new inquiries have been reported. Detroit has not yet awarded the 16,000 tons on which it took bids recently, and Akron has not yet taken action on 6500 tons. There has been no disposition of the 200 tons wanted by Minneapolis, and Ft. Wayne, Ind., has rejected bids on 470 tons and will readvertise. Spring Wells, Mich., has awarded 667 tons to the United States Cast Iron Pipe & Foundry Co. The Detroit Board of Fire Commissioners has let 100 tons to the Flower Valve Co. of that city and Kansas City, Kan., has awarded 200 tons to the National Cast Iron Pipe Co. Fifty tons for Moweaqua, Ill., was also let to the National company.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $52.10 to $57.10; 6-in. and above, $49.10 to $54.10; class A and gas pipe, $3 extra.

Bolts and Nuts.—The bolt and nut quotations published in this paragraph a week ago are adhered to by many companies, although there is a tendency on the part of few makers to quote f.o.b. works instead of f.o.b. Pittsburgh. Rivets are exceptionally weak, as low as $2.47½ having been quoted on large structurals. The largest recent purchase of bolts and nuts was by the Ford Motor Co. which was inquiring for 12,000,000 nuts, as well as bolts, and is understood to have bought all it asked for. The Ford company expects to maintain its present high rate of production throughout July, while the Dodge company has increased its output to 500 cars a day and some other Michigan plants are also on a fairly good operating basis. Most automotive plants still have large stocks and for a time will continue to buy in small quantities to fill in. A Western railroad is in the market for from 75 to 100 tons of large structural rivets.

Jobbers quote structural rivets, 4.53c.; boiler rivets, 4.63c.; machine bolts up to ⅝ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅝ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Rails and Track Supplies.—Inquiries and orders for track fastenings are scattering and small. Track spikes and bolts are weak and have been quoted recently at as low as 3c. and 4.10c., Pittsburgh, respectively. The Mobile & Ohio is in the market for 550 kegs of spikes.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 2.20c. f.o.b. makers' mills. Standard railroad spikes, 3.25c., Pittsburgh; track bolts with square nuts, 4.20c., Pittsburgh; steel tie plates, 2.50c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.50c., f.o.b. makers' mills.

Wire Products.—The market remains quiet with no changes in the price situation. A few railroads have put out inquiries for nails and fair purchases of not only nails, but fencing and barbed wire, are expected to be made by the carriers in the near future. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 47.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.63 per 100 lb.; No. 9 and heavier bright basic wire, $3.78 per 100 lb.; common wire nails, $3.73 per 100 lb.; cement coated nails, $3.05 per keg.

Structural Material.—The market is unusually quiet. No new fabricating awards have been announced and no new prospects have developed. The new Bethlehem

price of 2c., Pittsburgh, on plain material seems to represent the ruling market.

The mill quotation is 2c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.23c. for materials out of warehouse.

Sheets.—The Bethlehem Steel Co.'s prices of 2.65c., Pittsburgh, on No. 10 blue annealed, 3.50c., Pittsburgh, on No. 28 black and 4.50c., Pittsburgh, on No. 28 galvanized represent the ruling market on those products in this section. Business is principally from domestic sources and is sufficient to keep about half of the capacity of one of the local mills in operation. Warehouse prices on sheets have been reduced again and Armco iron sheet have likewise been cut by the jobbers, No. 28 galvanized having been marked down to 7.35c. and No. 10 blue annealed to 4.63c. The new warehouse prices on steel sheets are given below.

Mill quotations are 3.50c. for No. 28 black; 2.65c. for No. 10 blue annealed and 4.50c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.68c.; No. 28 black, 4.90c.; No. 28 galvanized, 5.90c.

Old Material.—With the exception of the purchase of about 1000 tons of wrought by an iron mill, buying by consumers has been almost nil. Prices are still weak, but owing to the extreme dullness of the market there are few actual declines to record. Two important local mills have temporarily stopped all shipments of scrap on contract. The Pennsylvania, Southwestern Region, is offering 3500 tons, while the Lake Erie & Western and the Michigan Central have issued blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.50 to $16.00
Relaying rails	27.50 to 30.00
Car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft.	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	18.00 to 18.50
Steel car axles	12.50 to 13.00
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.00 to 6.50
Cut forge	9.00 to 9.50
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.50 to 9.75
No. 2 railroad wrought	9.00 to 9.50
Steel knuckles and couplers	10.50 to 11.00
Coil springs	11.75 to 12.25
No. 1 machinery cast	12.50 to 13.00
Low phos. punchings	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.25
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	10.00 to 10.50
Railroad malleable	11.25 to 11.75
Agricultural malleable	11.25 to 11.75
Country mixed	7.00 to 7.50

Bars.—Aside from car repairs and a fair amount of reinforcing work, there is little demand for bars. Recent car repair awards are mentioned in the plate paragraph. The largest recent letting of reinforced work was 600 tons for a continuation school at Milwaukee, which went to the Worden-Allen Co. The Inland Steel Co. will furnish the steel. Other recent lettings include:

McElmore viaduct, Illinois Central, Memphis, 400 tons, to Corrugated Bar Co.

Carpenter Building, Des Moines, Iowa, 250 tons to the Paul J. Kalman Co.

Bridge, Racine, Wis., 120 tons, to Paul J. Kalman Co.

Among pending reinforcing jobs is 150 tons for State highway work at Wisconsin Rapids, Wis. It is not yet apparent whether the announcement of a price of 1.90c., Pittsburgh, on soft steel bars by the Bethlehem company will tend to stabilize the market. Lower prices have been named in this territory of late, in some cases as low as 1.825c., Pittsburgh. The railroads are commencing to buy bar iron a little more freely for repair purposes, but this far no individual order has exceeded 400 tons. Prices have weakened, the present ruling market being from 2.10c. to 2.20c., Chicago. The demand for rail carbon steel bars remains light and the price situation is unchanged.

Mill prices are: Mild steel bars, 1.85c. to 1.90c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 2.10c. to 2.20c., Chicago; rail carbon, 1.90c. to 2c., mill or Chicago.

Jobbers quote 3.13c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.63c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.48c. base.

Changes in By-Products Coke Corporation

At a recent meeting of the directors of the By-Products Coke Corporation held in Syracuse, N. Y., William L. Brown, chairman of the board, tendered his resignation. Mr. Brown resigned because of his desire to withdraw from some of his many business activities. H. H. S. Handy resigned as president and was elected chairman of the board to succeed Mr. Brown. Mr. Handy is also vice-president of the Allied Chemical & Dye Corporation, the requirements of that position demanding most of his time. It was the unanimous decision of the board to further concentrate the management of affairs in Chicago, where the coke oven plant and the blast furnace plant of the company are located. Clifford D. Caldwell of Chicago was the choice for president to succeed Mr. Handy. Mr. Caldwell has been associated with the By-Products Corporation for seven years, and for two years has been vice-president in direct charge of the company's activities in Chicago. E. L. Pierce and A. W. Hudson resigned as vice-presidents; M. D. Whitford as treasurer; H. H. Fisher and Seymour Wheeler as assistant treasurers; E. D. Winkworth as secretary; B. H. Handy and Donald S. Boynton as assistant secretaries; A. D. Allibone as auditor; V. N. Morey and H. W. Ostrander as assistant auditors. The successors to the above are all Chicagoans. James A. Galligan, formerly sales manager, has been appointed assistant to the president. The new treasurer is Donald S. Boynton and Seymour Wheeler has been elected secretary. Both of these men are also vice-presidents of Pickands, Brown & Co. Charles P. Fitzgerald, formerly cashier, is assistant secretary and assistant treasurer; and Benjamin L. Lynch, formerly assistant cashier, becomes auditor. The company's offices will continue in the McCormick Building, Chicago.

Steel Corporation Case Reopened

WASHINGTON, July 5.—The Interstate Commerce Commission has entered an order reopening the case relating to the application of the United States Steel Corporation, its exporting subsidiary, the United States Steel Products Co., and subsidiary rail lines, in which request was made of the commission to determine whether the operation of two steamship lines, the New York & South America Line, and the Isthmian Steamship Lines, through the Panama Canal, was in contravention of the law prohibiting railroad owned boat lines from using the canal or other waterways where such operation substantially reduces competition.

Industrial Relations Conference

An industrial relations conference, authorized by Gov. William C. Sproul, Pennsylvania, is being arranged by Dr. Clifford B. Connelley, Commissioner of Department of Labor and Industry, Commonwealth of Pennsylvan to be held at Harrisburg, Pa., Oct. 24 to 27.

This conference will include the features of the welfare and efficiency conferences and safety congresses of other years. The main topics to be discussed will include Industrial Waste, Industrial Co-operation, Industrial Publicity, Industrial Education, Women and Children in Industry and the Medical Supervision of Industry.

IRON AND INDUSTRIAL STOCKS

Better Feeling in Banking Circles Evinced in Market for Securities

That a better feeling exists in leading banking circles of the country is evinced by the further average recovery in iron and industrial stocks the past week. The showing is all the more significant in view of the fact that little improvement is noted in the steel industry, and the fact that car loadings are once more on the decrease. Stocks presumably are inclined upward, because banks are beginning to discount commercial paper slightly more freely, the Administration is planning smaller operating expenses, and because of the clearing of the labor atmosphere in England. The proposed new Fordney tariff bill evidently is displeasing to certain oil and other interests, as is attested by the course of security values involved, but investors in a majority of steel and industrial stocks are satisfied with most of the protective features as they line up today. With the recovery in stock values has come less desire to liquidadte holdings by those who had become disturbed over the general business situation.

With this resumption of confidence, railroads show indications of becoming interested in new equipment and car repair work, realizing as they must there will be a severe strain on carrying capacities when the movements of crops begin. Shares of equipment companies have responded to the prospect of business. In certain quarters, at least, buyers are beginning to believe iron and steel quotations are at or near the bottom, which possibly acounts for the recent better character of buying of steel shares. Late developments in the copper metal market have not been sufficiently reassuring to result in very much higher prices for stocks. The fabric markets seem established on a stable basis, although it is reported the margin of manufacturing profit is small. Merchants are placing orders for fall merchandise, another sign, according to bankers, that we can reasonably expect a slow but steady recovery in general business from now on.

The range of prices on active iron and industrial stocks from Monday of last week to Tuesday of this week was as follows:

Allis-Chalm. com.	30¾ - 31⅝	Midvale Steel....	23 - 24
Am. Can com...	25½ - 26⅞	Nat.-Acme	15 - 15¾
Am. Can pf.....	76¾ - 78	Nat. E. & S. com.	42½ - 44½
Am. C. & F. com.	119½ -124½	N. Y. Air. Brake	56 - 57¼
Am. C. & F. pf..	108¼ -109¾	Nova Scotia Steel	22 - 22¼
Am. Loco. com..	78½ - 81½	Pitts. Steel pf...	.. - 80
Am. Rad. com..	.. - 68½	Pressed Stl. com.	65⅜ - 69
Am. Stl. F. com.	25 - 26⅜	Ry. Stl. S. com.	74 - 81
Bald. Loco. com.	66¼ - 72	Replogle Steel ..	.. - 20¼
Bald. Loco. pf...	95 - 97	Republic, com. ..	43½ - 47
Beth. Steel com..	45 - 45¾	Republic, pf. ...	.. - 80
Beth. Stl. Cl. B..	44½ - 47⅞	Sloss com.	32⅛ - 32½
Beth. Stl. 8% pf.	96¼ - 97	Sloss pf.	.. - 68¼
Chic. Pneu. Tool	49 - 50	Superior Steel...	.. - 29
Cruc. Steel com..	55 - 59¾	Sup. Steel 1st pf.	.. - 92¼
Cruc. Steel pf...	.. - 77	Un. Alloy Steel..	22 - 23½
Gen. Electric	126 -128¾	U. S. Pipe com..	13⅛ - 14½
Gt. No. Ore Cert.	26½ - 27	U. S. Pipe pf....	.. - 43¼
Gulf States Steel	30 - 33	U. S. Steel com..	72½ - 75
Int. Har. com...	79 - 84	U. S. Steel pf...	105¾ -109½
Int. Har. pf....	.. -100⅛	Vanadium Steel.	27 - 29¾
Lack. Steel	35⅝ - 39⅞	West'ghouse Elec.	43½ - 45

United States Steel Stockholders

The largest number of holders of common stock of the United States Steel Corporation on record in the company's history appeared when the books were closed for the June dividend. The number, 105,310, compared with 104,376 in March. Preferred stockholders at the closing of the books for the May dividend totalled 81,614, compared with 81,462 in February.

Exclusive of duplication the holders of common and preferred combined now number approximately 165,000. The gain in the last year has been 18,081, and since 1916, 67,590, or nearly 180 per cent. The number on Dec. 31, 1916, was 37,720.

Fiscal Year of the American Car & Foundry Co.

The American Car & Foundry Co. earned $8,551,000 net in the fiscal year ended April 30, 1921, compared with $10,401,000 for the previous year. This was equivalent to $21.50 a share on the common stock, compared with $27.67 in 1920. The orders on hand at the end of the year amounted to $30,000,000. The company had to carry its customers to an extent much greater than normal, due partly to the fact that the Railroad Administration held back payments to the railroads; accordingly, accounts and notes receivable in the 1921 fiscal year amounted to $28,302,000, compared with $8,574,000 the year before.

Materials on hand, inventoried at cost or less and not in excess of present market prices, amounted to $14,010,000 this fiscal year, compared with $15,007,000 the year previous. During the year the company sold $29,000,000 of United States certificates of indebtedness, Liberty bonds and Victory notes, reducing the amount held at the end of the year to $5,009,000.

Contemplated car repair work did not develop as the railroads placed damaged cars into storage rather than into repair shops. Accordingly only one-fifth of the profits of the company was realized from car repair work. A greater part of the profit came from the manufacture and sale of miscellaneous products.

President W. H. Woodin has expressed doubt as to the success of developing broader foreign markets without Government aid. He also realizes the keen competition with Europe.

Industrial Finances, Etc.

The voting trust agreement of the Penn Seaboard Steel Corporation has been extended five years from June 26, 1921.

A creditors' petition has been filed against the Phoenix Mfg. Corporation, Lowell, Mass., automatic firearms, by creditors with claims of $2,534.

The National Scale Co., Chicopee Falls, Mass., has filed a voluntary petition in bankruptcy in the United States District Court, Boston, giving liabilities of $172,743 and assets of $152,561.

Stockholders of the Hydraulic Steel Co. have rejected plans proposing a merger of the company with the Detroit Pressed Steel Co. The stockholders also have decided to drop a contemplated issue of preferred stock and to relinquish an option on the Detroit concern.

The Graton & Knight Mfg. Co., Worcester, Mass., leather belting, etc., has filed a statement of its financial condition as of March 23, 1921, with the secretary of Massachusetts which shows total assets and liabilities of $21,029,867, as against $23,114,783 on Dec. 31, 1919. The two most important changes in the balance sheet are an increase of $1,802,400 in the capital stock and a drop from $1,249,947 to $62,739 in the reserves account.

Stockholders of the Standard Parts Co., Cleveland, now in the hands of a receiver, have petitioned the court to continue the receivership instead of accepting the proposed reorganization suggested by creditors. The company in March had $600,000 business, in April and May $1,000,000 each, in June $600,000. All receivers' debts have been paid except current, and the company has $1,000,000 in the bank. Frank A. Scott, Warner & Swasey Co., machine tools, is receiver.

A voluntary petition in bankruptcy has been filed by the Springfield Automatic Screw Machinery Corporation, Springfield, Mass., citing liabilities of $374,111 and assets of $290,337.

Directors of the Wheeling Steel Corporation voted to pass the quarterly dividend on the common stock at a meeting in Wheeling, June 29. In explanation of this action the following statement was given out: "The question of a dividend on the common stock was given careful consideration, and in view of the present very unsatisfactory condition of the steel industry and the rather gloomy prospects for the immediate future, together with the fact that the Corporation has not shown a profit in any month this year, the directors decided it unwise to make a cash dividend on the common stock at this time."

The Wickwire Spencer Steel Corporation has filed with the Massachusetts commissioner of corporations a statement of its financial condition as of Dec. 31, last, which shows total assets and liabilities of $39,009,037, contrasted with $18,415,641 at the close of 1919.

A. Judson Brown & Co., Inc., New York, has been incorporated with a capital of $50,000 by E. R., A. J., and A. Judson Brown, to manufacture marine machinery and parts. I. Katz, 52 Broadway, represents the company.

The Terry Kitchen Device Co., New York, has been incorporated with a capital of $600,000 by E. B. and N. E. Terry and A. DeMatteteis, to manufacture metal specialties for domestic service. It is represented by E. P. Yaselli, 160 Broadway.

The Wollaston Foundry Co., Wollaston, Quincy, Mass., has issued an additional $20,000 of stock. George D. Woodbury is president, and Leonard W. Newell, treasurer.

The Hanna Furnace Co. is issuing $4,000,000 in first mortgage 8 per cent sinking fund gold bonds, due June 1, 1926, five years from date of issue.

Metal Schedule of the New Tariff Bill

(*Continued from page 22*)

of any other material, if less than 4 in. in length, exclusive of handle, 3c. *each;* if 4 in. in length or over, exclusive of handle, 8 cents each; and in addition thereto, on all of the foregoing, 35 *per cent* ad valorem (25 to 30 per cent) [not under 40 per cent]: *Provided,* That all articles specified in this paragraph when imported, shall have the name of the maker and beneath the same the name of the country of origin die-sunk legibly and indelibly upon the blade in a place that shall not be covered.

356. Planing-machine knives, tannery and leather knives, tobacco knives, paper and pulp mill knives, roll bars, bed plates, and all other stock-treating parts for pulp and paper machinery, shear blades, circular cloth cutters, circular cork cutters, circular cigarette cutters, meat slicing cutters, and all other cutting knives and blades used in power or hand machines, 35 *per cent* ad valorem.

357. Steel laid scissors and shears, and blades for the same, finished or unfinished (30 per cent), 10c. *each and* 30 *per cent* ad valorem; all other scissors and shears, and blades for the same, finished or unfinished, valued at not more than 50c. per dozen, 3c. *each and* 35 *per cent* ad valorem; valued at more than 50c. and not more than $1.75 per dozen, 15c. *each and* 35 *per cent* ad valorem; valued at more than $1.75 per dozen, 20c. *each and* 35 *per cent* ad valorem (30 per cent) [15c. per dozen and 15 per cent to 75c. per dozen and 25 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the name of the country of origin die-sunk conspicuously and indelibly on the outside of the blade between the screw or rivet and the handle.

358. Razors, finished or unfinished, valued at less than $2 per dozen, 10c. *each;* valued at $2 and less than $3 per dozen, 12c. *each;* valued at $3 and less than $4 per dozen, 16c. *each;* valued at $4 or more per dozen, 20c. *each;* and in addition thereto, on all of the foregoing, 30 *per cent* ad valorem (35 to 55 per cent) [35 per cent up to 15c. each and 35 per cent]: Provided, That handles, unfinished razors and blades (except for safety razors), safety razors, and safety-razor handles and frames, shall pay no less duty than that imposed on finished razors valued at $2 per dozen: Provided further, That finished or unfinished blades for safety razors shall pay a duty of 1c. *each and* 30 *per cent* ad valorem: Provided further, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the name of the country of origin die-sunk conspicuously and indelibly on the blade or shank or tang of each and every blade and on safety razors and parts thereof.

359. Surgical and dental instruments, or parts thereof, composed wholly or in part of iron, steel, copper, brass, nickel, aluminum, or other metal, finished or unfinished, valued at not more than $5 per dozen, 60c. *per dozen;* valued at more than $5 per dozen, 12c. *per dozen* for each $1 per dozen of such value; and in addition thereto, on all of the foregoing, 35 *per cent* ad valorem (20 per cent) [45 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the country of origin die-sunk conspicuously and indelibly on the outside, or if a jointed instrument on the outside when closed.

360. Philosophical, scientific, and laboratory instruments, apparatus, utensils, appliances (including drawing, surveying, and mathematical instruments), and parts thereof, composed wholly or in chief value of metal, and not plated with gold, silver, or platinum, finished or unfinished, not specially provided for, 40 *per cent* ad valorem (20 per cent) [45 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the country of origin die-sunk conspicuously and indelibly on the outside, or if a jointed instrument on the outside when closed.

361. Pliers, pincers, and nippers of all kinds, finished or unfinished, 4 in. in length and under, 8c. *each;* over 4 in. and not over 6 in. in length, 10c. *each;* over 6 in. in length, 12c. *each;* and in addition thereto, on all of the foregoing, 25 *per cent* ad valorem (30 per cent) [8c. per lb. and 40 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the name of the country of origin die-sunk conspicuously and indelibly on the outside of the joint.

362. Files, file blanks, rasps, and floats of all cuts and kinds, 2½ in. in length and under, 25c. *per dozen;* over 2½ and not over 4½ in. in length, 47½c. *per dozen;* over 4½ and under 7 in. in length, 62½c. *per dozen;* 7 in. in length and over, 77½c. *per dozen.*

363. Sword blades, and swords and side arms, irrespective of quality or use, wholly or in part of metal, 40 *per cent* ad valorem (30 per cent) [50 per cent].

364. Muzzle-loading muskets, shotguns, rifles, and parts thereof, 20 *per cent* ad valorem (15 per cent) [25 per cent].

365. Double and single-barreled sporting breech-loading and repeating shotguns, rifles, and combination shotguns and rifles, valued at not more than $5 each, $1.50 *each;* valued at more than $5 and not more than $10 each, $4 *each;* valued at more than $10 and not more than $25 each, $6 *each;* valued at more than $25 each, $10 *each;* and in addition thereto, on all of the foregoing, 35 *per cent* ad valorem; barrels for sporting breech-loading shotguns and rifles, further advanced in manufacture than rough bored only, $4 *each;* stocks for sporting breech-loading shotguns and rifles, wholly or partly manufactured, $5 *each;* and in addition thereto, on all of the foregoing, 40 *per cent* ad valorem (35 per cent) [75c. each and 25 per cent extra to $6 each and 35 per cent extra]; on all parts of such guns or rifles, and fittings for such stocks or barrels, finished or unfinished, 45 *per cent* ad valorem (35 per cent): Provided, That all sporting breech-loading shotguns and rifles imported without a lock or locks or other fittings shall be subject to a duty of $10 *each and* 40 *per cent* ad valorem.

366. Pistols: Automatic, magazine, or revolving, and parts thereof and fittings therefor, valued at not more than $4 each, $1.25 *each;* valued at more than $4 and not more than $8 each, $2.50 *each;* valued at more than $8 each, $3.50 *each;* and in addition thereto, on all of the foregoing, 25 *per cent* ad valorem (35 per cent) [75c. each and 25 per cent].

367. Watch movements, whether imported in cases or otherwise, assembled or knocked down for reassembling, if having less than seven jewels, 75c. *each* [70c.]; having seven and not more than eleven jewels, $1.25 *each* [$1.35]; having more than eleven and not more than fifteen jewels, $2 *each* [$1.85]; having more than fifteen and not more than seventeen jewels, unadjusted, $2.75 *each* [$1.25 and 25 per cent]; having seventeen jewels and adjusted to temperature, $3.50 *each;* having seventeen jewels and adjusted to three positions, $4.75 *each;* having seventeen jewels and adjusted to five positions, $6.50 *each;* having more than seventeen jewels, adjusted or unadjusted, $10.75 *each* (all the above, 30 per cent); watchcases and parts of watches, chronometers, box or ship, and parts thereof, 35 *per cent* ad valorem (30 per cent) [40 per cent]; all jewels for use in the manufacture of watches, clocks, meters, or compasses, 10 *per cent* ad valorem (10 per cent); enameled dials for watches or other instruments, 3c. *per dial and* 35 *per cent* ad valorem: Provided, That all watch and clock dials, whether attached to movements or not, when imported shall have indelibly painted or printed thereon the name of the country of origin, and that all watch movements and plates, lever clock movements with jewels in the escapement, assembled or knocked down for reassembling, and cases shall have the name of the manufacturer and the country of manufacture cut, engraved, or die-sunk conspicuously and indelibly on the plate of the movement and the inside of the case respectively, and the movement and plates shall also have marked thereon by one of the methods indicated the number of jewels and adjustments, said numbers to be expressed both in words and in Arabic numerals, and if the movement is not adjusted, the word "unadjusted" shall be marked thereon by one of the methods indicated, and none of the aforesaid articles shall be delivered to the importer unless marked in exact conformity to this direction: Provided further, That only the number of the jewels which serve a mechanical purpose as frictional bearings shall be marked as herein provided.

368. Clocks and clock movements, and clockwork mechanisms, cased or uncased, whether imported complete or in parts, and any device or mechanism having an essential operating feature intended for measuring time, or the flowage of water, gas, electricity, or similar uses, or for regulating or controlling the speed of arbors, drums, disks, or similar uses, or for recording, indicating, or performing any operation or function at a predetermined time or times, any of the foregoing whether wholly or partly complete or knocked down for reassembling (in which condition they shall be appraised at the valuation of the complete article); cases and casings for clockwork mechanisms imported separately; all the foregoing, 35 *per cent* ad valorem (30 per cent) [40 per cent]; and in addition thereto, upon any of the foregoing articles or parts thereof, having jewels, but not more than two jewels, in the escapement, $1 *each;* having more than two but not more than four jewels, $2 *each;* having more than four jewels, $4 *each;* if without jewels in the escapement and valued at not over $1.10 each, 35c. *each;* valued at more than $1.10 and not more than $2.25 each, 70c. *each;* valued at more than $2.25 but not more than $5 each, $1 *each;* valued at more than $5 but not more than $10 each, $2 *each;* valued at more than $10 each, $3 *each;* all parts and materials for use in any of the foregoing if imported separately, and not

specially provided for, 40 *per cent* ad valorem: Provided, That all dials and the front or back plate of the movement frame of any of the foregoing when imported shall have the name of the maker, the country where manufactured, and the number of jewels, if any, indelibly stamped on the most visible part of same; but if such markings are in whole or in part sufficiently similar to the trade name of an established American manufacturer as to be liable to deceive the user in the United States, entry thereof shall be denied if such trade name or trade-mark has been placed on file with the collector of customs.

369. Automobiles, automobile bodies, automobile chassis, and parts of automobiles, not including tires, 25 *per cent* ad valorem (30 per cent under $2,000; above $2,000, 45 per cent; parts, 30 per cent): Provided, That if there be imported into the United States any of the foregoing articles manufactured in or exported from any country which imposes a duty greater than 25 per cent ad valorem upon similar articles exported from the United States, there shall be levied, paid, and collected upon such articles a duty equal to the duty imposed by such country upon such articles imported from the United States, but not to exceed in any case 50 per cent ad valorem.

370. Airplanes, hydroplanes, motor boats, and parts thereof, 30 *per cent* ad valorem.

371. Bicycles, motor cycles, and finished parts of bicycles and motor cycles, 30 *per cent* ad valorem (25 per cent) [45 per cent]: Provided, That if there be imported into the United States any of the foregoing articles manufactured in or exported from any country which imposes a duty greater than 30 per cent ad valorem upon similar articles exported from the United States, there shall be levied, paid, and collected upon such articles a duty equal to the duty imposed by such country upon such articles imported from the United States, but not to exceed in any case 50 *per cent* ad valorem.

372. Steam engines (15 per cent) [30 per cent] and steam locomotives (15 per cent) [45 per cent], 15 *per cent* ad valorem; machine tools and parts of machine tools (15 per cent) [30 per cent], embroidery machines, including shuttles for sewing and embroidery machines, lace-making machines, machines for making lace curtains, nets and nettings (25 per cent) [45 per cent], and all other machines or parts thereof, finished or unfinished, not especially provided for, 35 *per cent* ad valorem: Provided, That machine tools as used in this paragraph shall be held to mean any machine operating other than by hand power which employs a tool for work on metal.

373. Shovels, spades, scoops, and drainage tools, and parts thereof, composed wholly or in chief value of iron, steel, lead, copper, brass, nickel, aluminum, or other metal, whether partly or wholly manufactured, 25 *per cent* ad valorem (20 per cent) [45 per cent].

374. Aluminum, aluminum scrap, and alloys of any kind in which aluminum is the component material of chief value, in crude form, 5*c. per lb.* (2c.) [7c.]; in plates, sheets, bars, rods, circles, disks, blanks, strips, rectangles, and squares, 9*c. per lb.* (3½c.) [11c,].

375. Metallic magnesium and metallic magnesium scrap, $1 *per lb.*; magnesium alloys, powder, sheets, ribbons, tubing, wire, and all other articles, wares, or manufactures of magnesium, not specially provided for, $1 *per lb.* on the metallic magnesium content and 20 *per cent* ad valorem (10 per cent) [20 per cent].

376. Antimony, as regulus or metal, 1½*c. per lb.* (10 per cent) [1½c. per lb.].

377. German silver, unmanufactured, 20 *per cent* ad valorem (15 per cent) [25 per cent].

378. Copper wire not coated or covered, and copper wire and copper-clad wire, coated with tin, 1½*c. per lb.*; copper in rolls, rods, or sheets, 2½*c. per lb.* (5 per cent) [2½c. per lb.]; copper engravers' plates, not ground, and seamless copper tubes and tubing, 7*c. per lb.;* copper engravers' plates, ground, and brazed copper tubes, 11*c. per lb.;* brass wire, brass rods, sheet brass, brass plates, bars, and strips, Muntz or yellow metal sheets, sheathing, bolts, piston rods and shafting, 4*c. per lb;* seamless brass tubes and tubing, 8*c. per lb.;* brazed brass tubes, brass angles and channels, 12*c. per lb.;* bronze wire, bronze rods and sheets, 4*c. per lb.;* bronze tubes, 8*c. per lb.* (20 per cent) [45 per cent].

379. Bronze powder, powdered tin, brocades flitters, and metallics, 16*c. per lb.* (25 per cent) [12c. per lb.]; bronze, or Dutch metal or aluminum, in leaf, 8*c. per* 100 *leaves* (25 per cent) [6c. per 100 leaves]. The foregoing rate applies to leaf not exceeding in size the equivalent of 5½ by 5½ in.; additional duties in the same proportion shall be assessed on leaf exceeding in size said equivalent.

380. Gold leaf, 50*c. per* 100 *leaves.* The foregoing rate applies to leaf not exceeding in size the equivalent of 3⅜ by 3⅜ in.; additional duties in the same proportion shall be assessed on leaf exceeding in size said equivalent (35 per cent) [35c. per 100 leaves upward].

381. Silver leaf, 5*c. per* 100 *leaves.* (30 per cent) [10c. per 100 leaves].

382. Tinsel wire, lame or lahn, made wholly or in chief value of gold, silver or other metal, 10*c. per lb.* and 30 *per cent* ad valorem (6 per cent) [5c. per lb.] bullions and metal threads made wholly or in chief value of tinsel wire, lame or lahn, 10*c. per lb.* and 35 *per cent* ad valorem (25 per cent) [5c. per lb. and 30 per cent.]; ribbons, beltings, toys, and other articles made wholly or in chief value of tinsel wire, lame or lahn, and India rubber, bullions, or metal threads, not specially provided for, 45 *per cent* ad valorem (40 per cent) [15c. per lb. and 60 per cent]; woven fabrics, fringes, and tassels, made of any of the foregoing, 55 *per cent* ad valorem (40 per cent) [15c. per lb. and 60 per cent].

383. Quicksilver, 7*c. per lb.* (10 per cent) [7c. per lb.]; Provided, That the flasks, bottles, or other vessels in which quicksilver is imported shall be subject to the same rate of duty as they would be subjected to if imported empty.

384. New types, 15 *per cent* (15 per cent) [1½c. per lb. on the lead contained therein].

385. Nickel, nickel oxide, alloy of any kind in which nickel is the component material of chief value, in pigs or ingots, or similar forms, 5*c. per lb.* [6c. per lb.]; in bars, rods, plates, sheets, strips, strands, anodes, or electrodes, 30 per cent ad valorem (sheets or strips 20 per cent; all other 10 per cent) [sheets or strips 35 per cent; bars, rods, plates, 35 per cent.]

386. Tin in bars, blocks or pigs, and grain or granulated and scrap tin, 2*c. per lb.* (free list).

387. Bottle caps of metal, collapsible tubes and sprinkler tops, if not decorated, colored, waxed, lacquered, enameled, lithographed, electroplated, or embossed in color, 25 *per cent* ad valorem (30 per cent) [½c. per lb.]; if decorated, colored, waxed, lacquered, enameled, lithographed, electroplated, or embossed in color, 40 *per cent* ad valorem (40 per cent).

388. Lead-bearing ores and mattes of all kinds, 1½*c. per lb.* on the lead contained therein (¾c. per lb.) [1½c. per lb.]: Provided, That such duty shall not be applied to the lead contained in copper mattes until after two thousand tons of such lead shall have been imported in any one year, to be allocated under rules and regulations to be prescribed by the Secretary of the Treasury. [Here follows the usual administration provision.—EDITOR.]

389. Lead bullion or base bullion, lead in pigs and bars [2½c. per lb.], lead dross [1½c. per lb.], reclaimed lead, scrap lead, antimonial lead, antimonial scrap lead, type metal, Babbitt metal, solder, all alloys or combinations of lead not specially provided for, 2½*c. per lb.* on the lead contained therein [2½c. per lb.]; lead in sheets, pipe, shot, glaziers' lead, and lead wire, lead in any article or material not specially provided for, 2⅝*c. per lb.* (25 per cent) [2⅝c. per lb.].

390. Zinc-bearing ore of all kinds, including calamine containing less than 10 per cent of zinc, shall be admitted free of duty; containing 10 per cent or more of zinc and less than 20 per cent, one-fourth of 1*c. per lb.*, on the zinc contained therein; containing 20 per cent or more of zinc and less than 25 per cent, one-half of 1*c. per lb.*, on the zinc contained therein; containing 25 per cent of zinc, or more, 1*c. per lb.* on the zinc contained therein: [Here follows the administrative provision.—EDITOR.] Provided, That for a period of two years beginning on the day following the enactment of this act the rate of duty on zinc-bearing ores of all kinds, including calamine, containing 10 per cent or more of zinc, shall be as follows: If containing 10 per cent or more of zinc and less than 20 per cent, ½*c. per lb.* on the zinc contained therein; containing 20 per cent or more of zinc and less than 25 per cent, 1*c. per lb.* on the zinc contained therein; containing 25 per cent of zinc or more, 1½*c. per lb.* on the zinc contained therein.

391. Zinc in blocks or pigs and zinc dust, 1⅝*c. per lb.* [1⅝c. per lb.)]; in sheets, 1⅝*c. per lb.*. [1⅝c. per lb.]; in sheets coated or plated with nickel or other metal, or solutions, 1¾*c. per lb.* [1¾c. per lb.]; old and worn-out, fit only to be remanufactured, 1*c. per lb.* (15 per cent) [1c. per lb.]: Provided, That for a period of two years beginning on the day following the enactment of this Act the rates of duty shall be as follows: On zinc in blocks, pigs, or slabs, and old and worn-out zinc fit only to be remanufactured, 2*c. per lb.;* zinc in sheets, plates, strips, or coils, plated with nickel or other base metals, or in fabricated form, and zinc dust, 2⅞*c. per lb.*

392. Print rollers and print blocks used in printing, stamping, or cutting designs for wall or crêpe paper, linoleum, oilcloth, or other material, not specially provided for, composed wholly or in chief value of iron, steel, copper, brass, or any other metal, 30 *per cent* ad valorem (20 per cent) [45 per cent].

393. Articles or wares not specially provided for, if composed wholly or in chief value of platinum, gold, or silver, and articles or wares plated with platinum, gold, or silver, or colored with gold lacquer, whether partly or wholly

manufactured, 45 *per cent* ad valorem (50 per cent) [45 per cent]; if composed wholly or in chief value of iron, steel, lead, copper, brass, nickel, pewter, zinc, aluminum, or other metal, but not plated with platinum, gold, or silver, or colored with gold lacquer, whether partly or wholly manufactured, 35 *per cent* ad valorem (20 per cent) [45 per cent].

394. No allowance or reduction of duties for partial loss or damage in consequence of rust or of discoloration shall be made upon any description of iron or steel, or upon any article wholly or partly manufactured of iron or steel, or upon any manufacture of iron or steel.

Free List

1504. Agricultural implements: Plows, tooth and disk harrows, headers, harvesters, reapers, agricultural drills and planters, mowers, horserakes, cultivators, thrashing machines, cotton gins, machinery for use in the manufacture of sugar, wagons and carts, and all other agricultural implements of any kind and description, whether specifically mentioned herein or not, whether in whole or in parts, including repair parts.

1509. Antimony ore and needle or liquated antimony, but only as to the antimony content.

1514. Articles the growth, produce, or manufacture of the United States, when returned after having been exported, without having been advanced in value or improved in condition by any process of manufacture or other means if imported by or for the account of the person who exported them from the United States; steel boxes, casks, barrels, carboys, bags, and other containers or coverings of American manufacture exported filled with American products, or exported empty and returned filled with foreign products, including shooks and staves when returned as barrels or boxes; also quicksilver flasks or bottles, iron or steel drums of either domestic or foreign manufacture, used for the shipment of acids, or other chemicals, which shall have been actually exported from the United States; but proof of the identity of such articles shall be made, under general regulations to be prescribed by the Secretary of the Treasury, but the exemption of bags from duty shall apply only to such domestic bags as may be imported by the exporter thereof, and if any such articles are subject to internal-revenue tax at the time of exportation, such tax shall be proved to have been paid before exportation and not refunded; photographic dry plates and films of American manufacture (except moving-picture films), exposed abroad, whether developed or not, and photographic films light struck or otherwise damaged, or worn out, so as to be unsuitable for any other purpose than the recovery of the constituent materials, provided the basic films are of American manufacture, but proof of the identity of such articles shall be made under general regulations to be prescribed by the Secretary of the Treasury; articles exported from the United States for repairs may be returned upon payment of a duty upon the value of the repairs at the rate at which the article itself would be subject if imported, under conditions and regulations to be prescribed by the Secretary of the Treasury: Provided, That this paragraph shall not apply to any article upon which an allowance of drawback has been made, the reimportation of which is hereby prohibited except upon payment of duties equal to the drawbacks allowed; or to any article manufactured in bonded warehouse and exported under any provision of law.

1519. Bells, broken, and bell metal, broken and fit only to be remanufactured. (Free list).

1534. Brass, old brass, clippings from brass or Dutch metal, all the foregoing, fit only for remanufacture. (Free list).

1541. Cash registers, linotype and all typesetting machines, sewing machines, typewriters [all 30 per cent], shoe machinery [45 per cent], sand-blast machines, sludge machines, and tar and oil spreading machines [all 45 per cent], used in the construction and maintenance of roads and in improving them by the use of road preservatives; all the foregoing whether in whole or in parts, including repair parts. (All on free list).

1544. Chromite or chrome ore. (Free list).

1545. Coal, anthracite, bituminous [45c. per ton], culm, slack, and shale; coke [20 per cent]; compositions used for fuel in which coal or coal dust is the component material of chief value, whether in briquets or other form [20 per cent]. (All above on free list). Provided, That when any country, dependency, or other subdivision of government imposes a duty on such articles imported from the United States, an equal duty shall be imposed upon such articles coming into the United States from such country.

1547. Cobalt and cobalt ore.

1552. Composition metal of which copper is the component material of chief value, not specially provided for.

1553. Copper ore; regulus of, and black or coarse copper, and copper cement; old copper, fit only for remanufacture, copper scale, clippings from new copper, and copper in plates, bars, ingots, or pigs, not manufactured or specially provided for.

1559. Metallic mineral substances in a crude state, and metals unwrought, whether capable of being wrought or not, not specially provided for.

1565. Emery ore and corundum ore.

1589. Iridium, osmium, paladium, rhodium, and ruthenium and native combinations thereof with one another or with platinum.

1590. Iron ore, including manganiferous iron ore, and the dross or residuum from burnt pyrites. (Free list). [15c. per ton].

1613. Minerals, crude, or not advanced in value or condition by refining or grinding, or by other process of manufacture, not specially provided for.

1617. Needles, hand sewing and darning.

1627. Ores of gold, silver, or nickel, and nickel matte; ores of the platinum metals; sweepings of gold and silver.

1633. Platinum, unmanufactured or in ingots, bars, plates, sheets, wire, sponge, or scrap.

1647. Shotgun barrels, in single tubes, forged, rough bored.

1669. Tin ore or cassiterite, and black oxide of tin: Provided, That there shall be imposed and paid upon cassiterite, or black oxide of tin, a duty of 4c. per lb., and upon bar, block, pig tin and grain or granulated, a duty of 6c. per lb. when it is made to appear to the satisfaction of the President of the United States that the mines of the United States are producing one thousand five hundred tons of cassiterite and bar, block, and pig tin per year. The President shall make known this fact by proclamation, and thereafter said duties shall go into effect.

1679. All barbed wire, whether plain or galvanized.

Provisions from Other Schedules

A number of products and materials in which the iron and steel trades are interested appear elsewhere than in the Metal Schedule of the new tariff bill. Some of these are given below:

Bauxite or beauxite, crude, not refined or otherwise advanced in condition in any manner, $1 *per ton.* (Free.)

Fire brick, weighing not more than 10 lb. each, not glazed, enameled, ornamented, or decorated in any manner, and brick other than fire brick, 10 per cent ad valorem; glazed, enameled, ornamented, or decorated, 20 per cent ad valorem; weighing more than 10 lb. each and not specially provided for, not glazed, enameled, ornamented, or decorated in any manner, 17 per cent ad valorem; glazed, enameled, ornamented, or decorated, 20 per cent ad valorem; magnesite brick, ¾c. per lb. and 10 per cent ad valorem; chrome brick, not glazed, enameled, painted, vitrified, ornamented, or decorated in any manner, 20 per cent ad valorem; if glazed, enameled, painted, vitrified, ornamented, or decorated in any manner, 23 per cent ad valorem; bath brick, 23 per cent ad valorem.

Graphite or plumbago, crude or refined, not specially provided for, 10 per cent ad valorem. (Free.)

Carbons and electrodes, of whatever material composed, and wholly or partly manufactured, for producing electric arc light; electrodes, composed wholly or in part of carbon or graphite, and wholly or partly manufactured, for electric furnace or electrolytic purposes; brushes, of whatever material composed, and wholly or partly manufactured, for electric motors, generators, or other electrical machines or appliances; plates, rods, and other forms, of whatever material composed, and wholly or partly manufactured, for manufacturing into the aforesaid brushes; and articles or wares (composed wholly or in part of carbon or graphite), wholly or partly manufactured, not specially provided for, 35 per cent ad valorem.

Grindstones, finished or unfinished, $2 per ton.

Fluorspar, $5 per ton; after one year, $4 per ton. ($1.50 per ton). [Free].

Calcined magnesia not suitable for medicinal use and calcined magnesite, including dead burned and grain, ¾c. *per lb.*; and magnesite, crude or ground, ½c. *per lb.*

Domestic Values as Basis of Duties

An important feature of the new tariff bill is a section evidently designed to counteract the competitive effect of the low exchange values in European countries. It provides that the market values of competitive products in the United States shall be taken as the basis for calculating duties. The section in full is as follows:

Sec. 402. Value.—Except as otherwise provided by law, the word "value" wherever used in this act or in any other law relating to the appraisement or the classification of imported merchandise shall mean the price on the date of exportation of the imported merchandise at which comparable and competitive products of the United States were ordinarily sold or freely offered for sale in the usual wholesale quantities and in the customary wrappings, coverings, and containers, whether holding liquids or solids, to

all purchasers in the ordinary course of trade, including all costs, charges, and expenses, in the principal market or markets of the United States; or, when such value can not be ascertained to the satisfaction of the appraising officer, shall mean the value of the imported merchandise on said date for sale (whether or not there shall be an actual sale), for consumption or use in the United States in its condition, including wrappings, coverings, and containers, whether holding liquids or solids, as imported. In determining the value for sale, appraising officers may take into consideration, among other matters, the selling price or cost of production of comparable products of the United States and of articles made therefrom or from like imported materials, not sold in usual wholesale quantities or not sold or freely offered for sale to all purchasers in the ordinary course of trade, or not sold at all, and the selling price in the United States of comparable imports, or the selling price or market value or cost of production of the imported merchandise in the foreign country, and may exclude or include all or any costs, charges, and expenses, including duties, and also profits and commission, if any, keeping always in mind the legislative intention that duties ad valorem shall be assessed upon the fair market value of the imported merchandise in the United States. No pretended sale or offer for sale, and no sale or offer for sale tending to establish a fictitious market, shall be held to establish value as herein defined; nor shall a value substantially raised or lowered at the time of exportation otherwise than in the ordinary course of trade be deemed to be such value.

More Wage Reductions Expected

YOUNGSTOWN, OHIO, July 5.—While steel companies in the Mahoning and Shenango Valleys have as yet announced no wage reduction, following announcement of the cut effective July 16 by the Bethlehem Steel Co., such action is declared to be eventually inevitable. The new common labor rate of 27c. per hr., paid by the Bethlehem company at its Steelton plant, compares with 37c. paid in the Youngstown district.

"Liquidation of both wages and values is still going on," states a leading independent steel maker, "and this must and will continue until the equalizing process reaches the farmers, who are the largest single group of consumers and require the largest amount of transportation."

Another Valley manufacturer states: "It is impossible for us to pay 10c. an hour more for our labor than does an important competitor; we will have to make some further reduction shortly, but it is unfair that we are forced to do so, with neither the railroads nor the building trades down to even our first cut."

As earlier in the year, the independents are expected to take the lead in the further adjustment of wages. Valley steel producers state that a revision of wage rates to make them conform more nearly to what competing interests are paying will be discusssd immediately. Valley employers have generally paid a few cents more per hour than Eastern steel independents. A 30-cent rate in the Valleys for common labor would mean a reduction of 20 per cent., and would compare with 19 1-2c. paid before the war. It would represent a reduction of about 35 per cent. from the war peak, but would still be 60 per cent above the rate which was paid at the opening of the war.

Much common labor outside the industry in the Youngstown district is being paid 25c. per hr.

Will Build Great Dam

BIRMINGHAM, ALA., July 5.—The Alabama Power Co. will at once begin construction of the Mitchell dam on the Coosa River, the Federal Power Commission having granted the permit. The dam will take two years to build and will cost $7,000,000 to $8,000,000. It will be 74 ft. high and 1800 ft. long. Initial installation will be 60,000 hp.; eventual, 120,000.

The International Nickel Co. has purchased a 3-ton electric furnace from the Pittsburgh Electric Furnace Corporation, Pittsburgh, for its new plant at Huntington, W. Va. The furnace will be used for the melting of Monel metal. A few weeks ago the Chapman Valve Co., Indian Orchard, Mass., purchased a 5-ton furnace from the same company.

BETHLEHEM PRICES

Announcement of New Schedule Follows Closely Reduction of Wages

Following closely the reduction of 15 per cent in wages and 10 per cent in salaries by the Bethlehem Steel Co., E. G. Grace, president, announced on July 4 a new schedule of prices of steel products effective the following day as follows:

	Old Prices	New Prices
Bars	$2.10	$1.90
Structural shapes	2.20	2.00
Plates	2.20	2.00
Sheet bars	39.00	35.00
Billets, 4 x 4	37.00	33.00
Slabs	38.00	34.00
Blue annealed sheets	2.85	2.65
Black sheets	3.75	3.50
Galvanized sheets	4.75	4.50
Tin plate	6.25	5.75
Skelp	2.20	2.00

The new prices represent a reduction of $4 a ton on bars, structural shapes, plates, skelp, billets, sheet bar, slabs and blue annealed sheets; $5 a ton on black and galvanized sheets; $10 a ton on tin plate," said Mr. Grace.

"Present manufacturing costs do not in any sense warrant these reductions," he added, "but this company desires to contribute even more than its full share to re-establish conditions in the steel trade on what might be regarded as a normal basis. There has been so much said about steel prices not having been reduced to pre-war levels that an analysis of the new prices is desirable and will be illuminating to both the trade and the general public.

Freight Largest Factor

"The increase in freight rates has been the largest factor in increasing the cost of manufacturing steel products because the making of a ton of finished steel involves the transportation of more than five tons of raw materials. The cost factors next in importance are materials and labor.

"Taking as an example the price for structural shapes, under the new schedule of prices, 2c. a pound, or $44.80 a gross ton, the comparison with pre-war prices, reflecting concretely the three more important cost factors, is as follows: The increase over pre-war cost in transportation on ore, coal, limestone, scrap and miscellaneous supplies amounts to $7.85 per ton of finished steel; the increase in the cost of coal, ore, limestone, alloys, refractories, lubricants and miscellaneous supplies at point of shipment amounts to $7.10 per ton of finished steel; the increase in the cost of labor under the present wage scale, as compared with pre-war wages in the steel plant proper, is $5.64 per ton of finished steel.

"These items account for an increase in present day costs over pre-war costs of $20.59 per ton of finished product. The new price of $44.80 for structural steel is equivalent to a pre-war price of $24.21 per ton, or 1.08c. per pound.

"Statistics covering the last 20 years show in only one month (December, 1914) has structural material been sold as low as this figure (1.08c.). The ten year pre-war average (1904-1913) was 1.51c. per pound.

"The figures I have used are the results of actual compilation made by the company's comptroller in the every day conduct of the business."

The number of surplus or idle freight cars on the railroads of the country continue to decline, according to reports just received from the carriers by the car service division of the American Railway Association. These show that on June 23 there were 377,850 cars in excess of current freight requirements or a reduction of 3896 cars compared with the total on June 15.

For the first time this year the Girard, Ohio, plant of the A. M. Byers Co., Pittsburgh, was wholly suspended last week. Other companies in the Mahoning Valley whose plants are idle are the Falcon Steel Co. and the Mahoning Valley Steel Co.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb, while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of cal' on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2c.

Wire Products

Wire nails, $3 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.75 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.75; galvanized wire, $3.25; galvanized barbed wire, $3.65; galvanized fence staples, $3.65; painted barbed wire, $3.15; polished fence staples, $3.15; cement-coated nails, per count keg, $2.60; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 65½ to 68 per cent off list for carload lots, 64½ to 67 per cent for 1000-rod lots, and 63½ to 66 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.90
Large boiler rivets.....$2.85 to $3.00
Small rivets .....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 60 and 10 to 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads .....60 and 10 per cent off list
Longer and larger sizes, 60 and 5 to 60 and 10 per cent off list
Lag bolts .....70 per cent off list
Plow bolts Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅝-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S., 80 and 10 to 80, 10 and 10 per cent off list
Same sizes S. A. E., 80, 10 and 10 to 80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10 and 10, 70, 10, 10 and 10 per cent off list
Stove bolts in packages .....80 and 10 per cent off list
Stove bolts in bulk .....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....4c. to 4.20c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $45 to $48; chain rods, $45 to $48; screw stock rods, $50 to $53; rivet and bolt rods and other rods of that character, $45 to $48; high carbon rods, $55 to $70, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in., and 7/16-in., $3.25 base; 5/16-in., $3.25 base. Boat and barge spikes, $3.25 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 to $4.20 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $12.30 per package; 8-lb. coating, I. C., $12.60; 12-lb. coating, I. C., $14.30; 15-lb. coating, I. C., $15.30; 20-lb. coating, I. C., $16.55; 25-lb. coating, I. C., $17.80; 30-lb. coating, I. C., $18.80; 35-lb. coating, I. C., $19.80; 40-lb. coating, I. C., $20.80 per package, all f.o.b., Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.90c. from mill. Refined bar iron, 2.75c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 2½	+28½
¼ to ⅜	52½	26	½	27½	9½
½	56½	42	¾	33½	18½
¾	60½	48	1 to 1½	35½	20½
1 to 3	62½	50			

Lap Weld

2	54½	42	2	30½	16½
2½ to 6	58½	46	2½ to 6	33½	20½
7 to 12	54½	41	7 to 12	29½	16½
13 to 14	45	..			
15	42½	..			

Butt Weld, extra strong, plain ends.

⅛	46½	29	¼ to ⅜	+10½	+43½
¼ to ⅜	48½	31	½	26½	14½
½	53½	42	¾	33½	19½
¾	58½	47	1 to 1½	35½	21½
1 to 1½	60½	49			
2 to 3	61½	50			

Lap Weld, extra strong, plain ends

2	52½	41	2	31½	18½
2½ to 4	56½	45	2½ to 4	34½	22½
4½ to 6	55½	44	4½ to 6	33½	21½
7 to 8	50½	37	7 to 8	24½	12½
9 to 12	45½	32	9 to 12	19½	7½

To the large jobbing trade an additional 1, 5 and 2½ per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	19½	1½ in.	+10
2 to 2¼ in.	30	1¾ in.	List
2½ to 3 in.	41	2 to 2¼ in.	—10
3¼ to 13 in.	47	2½ to 2¾ in.	—15
		3 to 3¼ in.	—16
		3½ to 4½ in.	—20

Carload Discounts on Standard Commercial Seamless—

Cold Drawn			
1 in.	56	2 to 2½ in.	17½
1¼ in.	49	2¾ and 4 in.	20
1½ in.	48	4½ to 5 in.	7½
1¾ in.	25		

Hot Rolled

3 to 4 in. 30

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.55	Nos. 11 and 12	2.75
Nos. 9 and 10 (base)	2.65	Nos. 13 and 14	2.85
		Nos. 15 and 16	2.95

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.30	No. 28 (base)	3.50
Nos. 22 to 24	3.35	No. 29	3.60
Nos. 25 and 26	3.40	No. 30	3.70
No. 27	3.45		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.50	Nos. 25 and 26	4.25
Nos. 12 to 14	3.60	No. 27	4.35
Nos. 15 and 16	3.75	No. 28 (base)	4.50
Nos. 17 to 21	3.90	No. 29	4.75
Nos. 22 to 24	4.05	No. 30	5.00

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.30	No. 28 (base)	3.50
Nos. 17 to 21	3.35	No. 29	3.55
Nos. 22 to 24	3.40	No. 30	3.55
Nos. 25 to 27	3.45	Nos. 30½ and 31	3.60

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
June	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
29	12.75	12.62½	28.87½	4.40	4.25	4.75	4.25
30	12.75	12.62½	29.00	4.40	4.25	4.80	4.30
July							
1	12.75	12.62½	29.37½	4.40	4.25	4.85	4.35
2	12.75	12.62½	....	4.40	4.25	4.85	4.35
5	12.75	12.62½	29.87½	4.40	4.35	4.85	4.35

NEW YORK, July 5.

The markets have been exceedingly quiet, the inactivity being intensified by the July holiday. Buying of copper has not improved but prices are steady. There has been very little change in the tin market. Conditions in the lead market have been quiet with the price tendency firm. There has been a better feeling in the zinc market and prices are higher. In the tin, lead and zinc markets the predominating topic has been the proposed duty in the tariff bill just introduced into Congress.

New York

Copper.—There has been very little change in the fundamental conditions as reported a week ago. Most of the large producers refuse to quote at anything less than 13c. to 13.25c. for electrolytic copper for July delivery, but there are two or three other sellers who are willing to meet any reasonable offer and such business as is going, which is decidedly small, is being taken by these sellers at an average of 12.87½c., delivered, or 12.62½c., New York, which we quote as the market. Some sellers report a slight increase in foreign purchases, but in general interest on the part of the domestic consumer continues light. Quotations for Lake copper are largely nominal and at nearly the same levels as in the electrolytic market.

Copper Averages.—The average price of Lake copper for the month of June, based on daily quotations in THE IRON AGE, was 12.91c. The average price of electrolytic copper was 12.88c.

Tin.—With the exception of last Friday, July 1, the market has been nearly stagnant with very few buyers or sellers and a decided lack of interest, which is characterized by some as greater than ever before in the history of the market. Late on Friday dealers turned buyers and about 300 to 400 tons of prompt shipment from England and of future shipment from the East was sold around 29.25c. to 29.37½c. The feature of the week has been the proposed duty of 2c. per lb. on pig tin with tin ores free, as presented in the new tariff bill recently introduced into Congress. General satisfaction over this seems to prevail among importers, due largely to the fact that there was a strong movement to obtain a duty of 10c. per lb. on pig tin and 6c. on tin contained in the ore. Spot Straits tin, New York, has been steady during the week around 29c. to 30c., with the quotation to-day at 29.87½c., New York. The London market is again higher than a week ago by £5 to £6 per ton, the quotations to-day standing at £172 5s. for spot standard, £174 5s. for future standard and £172 15s. for spot Straits. Deliveries into consumption during the month were 1590 tons, with 2546 tons in stocks and landing on June 30. Imports for the half year have been only 8918 tons, as compared with 27,743 tons to July 1, 1920.

Lead.—The feature of the market is the fact that it is practically impossible to buy the metal from any of the independent producers, thus leaving the market practically in the hands of the leading interest. At the best, however, there is very little business, at least not enough to establish a market among independent sellers. The market may be characterized as quiet at from 4.40c., New York, or 4.25c., St. Louis. The new tariff bill proposes a duty of 2½c. per lb. on pig lead as compared with the present rate of 25 per cent ad valorem.

Zinc.—There has been a stiffening in quotations and prime Western cannot be bought from producers at less than 4.35c., St. Louis, or 4.85c., New York, for early delivery. The stronger feeling is due partly to the proposed tariff of 2c. per lb. on imports for the first year as compared with the present rate of 10 per cent ad valorem, but there is also a feeling that July will see the bottom of the zinc market, if it has not already appeared, and that from then on a better demand at higher prices will rule. It develops that some galvanizers are bare of stocks, while others are well supplied.

Antimony.—Wholesale lots for early delivery are quoted largely nominal at 4.75c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by the leading interest at 28c., f.o.b. plant, with foreign metal of the same grade obtainable at a range of 22c. to 23.50c., New York, depending on the seller and the source of the metal.

Chicago

July 5.—Tin has advanced in sympathy with London, where the improved English industrial outlook has strengthened the market. Lead is slightly stronger, principally because sellers refuse to sell at the prices which buyers offer. In both lead and spelter there is something of a deadlock between buyers and sellers because of inability to agree on price. Most of the old metals have declined. We quote: Tin, 32c.; lead, 4.45c.; crucible shapes, 7.50c.; copper clips, 7.50c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.

St. Louis

July 1.—The non-ferrous markets continue dull, with lead quoted at 4.25c. and spelter 4.25c. in car lots. We quote Lake copper at 13.61c. in car lots; tin, 29.86c.; antimony, 5.49½c. On old metals we quote: Light brass, 4c.; heavy yellow brass, 6c.; heavy red brass, heavy copper and copper wire, 9c.; light copper, 7.50c.; pewter, 17c.; tinfoil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c.; aluminum, 9c.

Lake Iron Ore Shipments in June

The movement of Lake Superior iron ore by water in June and for the season up to July 1 was less than that of the corresponding period in 1920. June shipments from upper lake docks amounted to 3,600,989 gross tons, against 9,233,566 tons in June, 1920, a decrease of 5,632,577 tons. The total to July 1 was 6,371,227 tons, or 10,069,278 tons less than to July 1 last year. The shipments by ports for June, 1920 and 1921, and for the season were as follows in gross tons:

	June, 1920	June, 1921	To July 1, 1920	To July 1, 1921
Escanaba	1,147,136	138,756	1,942,809	210,804
Marquette	553,367	38,959	928,403	52,944
Ashland	1,299,820	309,398	2,312,869	526,937
Superior	2,256,250	873,674	4,445,496	1,716,230
Duluth	2,528,446	1,681,411	4,216,685	2,908,299
Two Harbors	1,448,547	558,791	2,594,243	956,013
Total	9,233,566	3,600,989	16,440,505	6,371,227
Decrease		5,632,577		10,069,278

Duluth shipments this year have been considerably less than to July 1, 1920, which is true also of Escanaba, Marquette, Ashland and Superior.

Union molders in foundries in the Youngstown, Ohio, district have agreed to accept a new wage scale 20 per cent lower than the old scale. The new rate, which became effective July 1, provides for a minimum wage of 80c. per hr., as compared with a minimum of $1 under the old scale.

The Metropolitan Paving Brick Co., Canton, Ohio, has reduced the price of paving block from $30 to $27 per 1000. The new price is a decline of 20 per cent from the peak. Kilns of the company at Bessemer, Pa., are operating at 75 per cent of normal.

MANUFACTURE OF MACHINERY

Census Bureau's Summary Concerning the Industry, 1919

WASHINGTON, D. C., June 25.—A preliminary statement of the general results of the 1919 census of manufactures has been issued by the Bureau of the Census, Department of Commerce, furnishing statistics concerning the value of various kinds of machinery manufactured during the year 1919, with comparisons for 1914.

	1919		1914	
	Number Establishments	Value of Products	Number Establishments	Value of Products
Adding and calculating machines	54	*$57,454,000	44	*$14,734,000
Air compressors	57	13,960,000	84	5,158,000
Bakers' machinery	62	10,186,000	32	2,555,000
Blowers and fans	43	9,498,000	..	†
Blotting machinery	38	6,439,000	29	1,359,000
Brick, pottery and other clay working machinery	43	5,371,000	89	2,439,000
Cash registers and parts	20	*31,038,000	19	*15,935,000
Concrete mixers	62	9,579,000	44	2,956,000
Condensers	16	9,387,000	..	†
Cotton gins	21	8,632,000	25	4,902,000
Confectioners' machinery	49	8,469,000	..	†
Cranes:				
Electric	33	25,865,000	..	†
Steam and hydraulic	13	13,515,000	26	4,194,000
Other	38	9,568,900	..	†
Dairy mach'y and apparatus	139	34,456,000	78	*12,998,000
Dredging machinery	11	1,939,000	..	†
Elevators and elevator machinery	195	54,052,000	213	17,228,000
Excavating machinery	34	6,641,000	21	2,969,000
Firearms, ordnance and ammunition machinery	18	2,814,000	..	†
Flour and grist mill machinery	86	16,366,000	101	5,018,000
Gas machines and apparatus	70	7,898,000	90	4,426,000
Glass making machinery	23	3,015,000	30	1,091,000
Hydraulic rams	13	1,369,000	..	†
Laundry machinery:				
Power machines	30	10,341,000	73	6,135,000
All other	18	2,192,000	35	1,430,000
Lawn mowers	14	2,176,000	22	2,848,000
Leather working machinery, other than shoes	47	5,108,000	27	1,067,000
Metal working machinery, other than machine tools	155	36,348,000	277	17,420,000
Meters, gas and water	39	*20,572,000	40	*11,638,000
Mining machinery, exclusive of oil-well machinery	107	41,866,000	153	13,254,000
Motion picture machinery	24	*3,510,000	16	*1,820,000
Oil-well machinery	61	22,219,000	127	10,569,000
Oil-mill machinery, cotton-seed and other	20	6,598,000	20	1,878,000
Ore crushers	17	1,162,000	..	†
Paper and pulp mill mach'y	121	16,198,000	139	8,588,000
Photo engraving machinery	7	660,000	..	†
Printing machinery:				
Presses	45	15,520,000	88	8,397,000
Typesetting machines, linotype and other	11	15,197,000	10	7,635,000
Other	81	9,334,000	56	3,197,000
Pumps and pumping mach'y	204	*65,360,000	298	*27,457,000
Refrigerating machinery:				
Ice making	44	14,624,000	73	10,522,000
Other refrigerating	40	15,277,000		
Road making machines	43	13,915,000	31	3,545,000
Rubber working machinery	51	13,302,000	14	2,726,000
Sandblast machines	12	686,000	..	†
Sewing machines	29	*48,946,000	46	*21,711,000
Shoe machinery	58	7,459,000	72	5,949,000
Slot vending machines	17	1,206,000	..	†
Steam shovels	8	9,654,000	..	†
Stokers, mechanical	9	2,811,000	..	†
Sugar-mill machinery	49	13,249,000	42	1,972,000
Typewriters	39	*43,313,000	53	*20,517,000
Vacuum cleaners	9	1,641,000	39	2,059,000
Washing machines	115	*50,955,000	111	*7,600,000
Well drilling machinery, other than oil well	30	1,663,000	..	†
Windmills	33	*9,923,000	50	*5,843,000
Wire-drawing machinery	12	619,000	..	†
Woodworking machinery:				
Sawmill	69	10,046,000	182	6,304,000
Planing mill	36	6,338,000	196	7,089,000
Other	136	13,198,000		
Other machinery		121 930,000		
Machine parts and castings		53,504,000		
Amount received for contract work, repairs, etc.		35,922,000		72,545,000

*Includes value of all products of establishments engaged primarily in the manufacture of machines specified.
†Comparative figures not available.

The Edwin Forrest Forge Co., San Francisco, has secured the contract for approximately 400 tons of forgings to go to the Southern California oil fields.

LOWER FREIGHT RATES

Revision of Schedule to Seattle Expected—Shipping Steel to Alaska

SEATTLE, June 27.—It is the opinion of jobbers that sheets must come down before there will be any late summer movement, and advices this week indicate that some further reductions, which will meet the view of investors and the trade, are in prospect.

Pipe in sizes of three-quarters and halves, the two sizes most popular in the north Pacific territory, has been moving well. Present stocks have begun to show breakage and jobbers report that it is difficult to fill in. Some sheets have begun again to move by water, the difference in rail and water rates being attractive to buyers, but the same reconditioning process has been necessary and the saving is of doubtful proportions. Freights from Pittsburgh to Seattle by rail are to be cut, it is understood, from $1.66 to $1.05, applicable to sheets, plates and pipe. This is believed to be a hopeful sign. Reports here indicate that Eastern rail lines that have steadily opposed the trans-continentals in the desire for workable rate reductions have assented to the decline.

Advices here this week are in effect that the Isthmian Steamship lines will dispatch the steamer Charlton Hall from Baltimore and Mobile for Seward and other Alaska ports with a full cargo of rails for the Alaska Engineering Commission. This will be the first intercoastal vessel traveling through without transshipment at Seattle to deliver steel into Alaska.

The National Steel Construction Co., John Wilson, president, has established in the company's Duwamish Waterway plant the first range boiler factory west of the Rocky Mountains. Heretofore this section has had to draw from the Middle West for its range boilers. The factory will have an initial capacity of 80 range boilers per day. Establishment of the factory followed eight months of experimental work in getting a competitive high standard product. In establishing the plant a pickling division and special equipment and machinery were added to the company's steel construction and shipbuilding plant. The steel used in the boilers is pickled in a series of chemical solutions to prevent rust or scaling. Range boilers built in the East, it is stated, are not constructed for the high water pressure used in the North Coast territory. While developing the boiler feature the company will continue in the steel construction and shipbuilding industry. Its plant is the only one left in Seattle with facilities for building steel ships.

Jobbers complain of the heavy amount of second-hand tools, heavy duty and otherwise, that has been offering from shipyard stocks. The result has been heavy reductions in the spring and summer orders for new material. Frequent revised price lists, with declining prices for these mixed stocks, are adding further to the embarassment.

Employees of the Pennsylvania Railroad shops at Altoona, Pa., on July 1 began working under new conditions agreed upon with the management after a series of conferences. The new order constitutes a piece-work system, which the management claims will enable the workmen to earn more than under the day rate system. A 48-hr. basic week, with not more than nine hours or less than eight hours, with half-holidays on Saturdays, has been established. Overtime is to be paid pro-rata for the ninth and tenth hours, with time and a half after the tenth hour.

The Interstate Commerce Commission has entered an order changing from July 1 to Sept. 1, 1921, the effective date for the payment by the Louisville & Nashville and other railroads of reparation to the Sloss-Sheffield Steel & Iron Co., and other Southern iron and steel producers on account of unreasonable rates charged on pig iron shipments from points in Alabama and Tennessee to Ohio river crossings and points in Central Freight Association territory.

PERSONAL

Additional business representatives have been appointed by THE IRON AGE as follows: H. E. Barr, Eastern New England advertising manager; F. W. Schultz, New York City advertising manager; E. Sinnock, Brooklyn and Long Island advertising manager; C. L. Rice, eastern New York State advertising manager; B. L. Herman, western New York State advertising manager; W. C. Sweetzer, New Jersey advertising manager; A. L. Marsh, central Pennsylvania advertising manager, and D. G. Heinly, Michigan advertising manager. The branch offices in Philadelphia, Cincinnati, Chicago, Pittsburgh, Cleveland, Washington and San Francisco will continue under their present managers.

William D. Kelly, works manager Oakland Motor Car Co., Pontiac, Mich., has resigned.

Frank H. Crockard, president Woodward Iron Co., has been elected president of the Alabama Coal Operators' Association.

Clarence V. Brown, head of the United States Pressed Steel Co., Ypsilanti, Mich., has been appointed receiver of the Universal Utilities Corporation, Alpena, Mich. He has announced that the plant will be in operation in a short time.

C. E. Kitchen, formerly in charge of coal and coke sales for the Iron Trade Products Co., Pittsburgh, and R. B. Loos, until recently associated with the Pittsburgh office of the Walter Wallingford Coal Co., Cincinnati, have organized the Penn-Empire Coal, Inc., with a capitalization of $200,000 and have opened offices in the Empire Building, Pittsburgh. The new company controls some production and also will do an agency business in coal and coke.

Floyd Rose, secretary Heppenstall Forge & Knife Co., Pittsburgh, was made general manager of sales of both that company and its subsidiary, the Heppenstall Forge Co., at a recent meeting of the board of directors.

Walter J. Kohler, president Kohler Co., Kohler, Sheboygan County, Wis., manufacturer of sanitary plumbing fixtures, farm lighting plants, etc., was elected president of the board of regents of the University of Wisconsin at the annual meeting on June 27.

Harry R. Jones, president United Alloy Steel Corporation, Canton, Ohio, sailed for Europe a few days ago and will spend two months in Iceland, Norway and England.

Joseph E. Jacobson, formerly in charge of the Chicago office of the Continental Iron & Steel Co., is now associated with Luria Brothers & Co., Inc., iron and steel scrap, will be district manager in its Pittsburgh office, Oliver Building.

John Booth, coke sales department, New England Coal & Coke Co., Boston, has resigned to becomes sales representative for a Pennsylvania anthracite coal producing company, with headquarters in Boston.

Capt. Harry K. Cage has been appointed manager Charlestown Navy Yard, Boston, in charge of ship repairs.

Sven Binquist, Swedish inventor and founder of the S. K. F. industries, and B. G. Prytz, president of the affiliated organizations, were given a banquet at the Farmington Country Club, Farmington, Conn., last week by B. M. W. Hanson, Whitney-Hanson Mfg. Co., Hartford, Conn. About 35 representatives of leading Connecticut, Rhode Island and Massachusetts manufacturing industries attended.

Everett Morss, president Simplex Wire & Cable Co., Boston, recently returned from a nine weeks' tour in Europe, last week was tendered a complimentary dinner at the Boston City Club by 37 members of the company's organization.

James R. Mills, Cleveland sales manager of the Carnegie Steel Co., sailed from New York on July 5 on a European trip.

Joshua A. Hatfield, president American Bridge Co. of New York, sailed on the Aquitania on Tuesday on a trip to England and the Continent.

A. A. Fowler, New York resident partner of Rogers, Brown & Co., has returned from a four months' stay in Europe.

Charles M. Muchnic of the American Locomotive Sales Corporation, New York, has returned from a business trip to Mexico.

OBITUARY

Benjamin Nicoll

BENJAMIN NICOLL, long a prominent figure in iron and steel circles in New York, died unexpectedly from apoplexy Saturday evening, July 2, while talking with friends at the Somerset Country Club, Bernardsville, N. J. Mr. Nicoll was born on Shelter Island, Long Island, and was 66 years of age. He graduated from Princeton University in 1877 at the age of 22 and soon after became connected with the Mt. Pleasant Mining Co., which was operating iron ore properties in New Jersey. After being engaged in the selling of ore of this company for several years, Mr. Nicoll started in the mining of ore in New Jersey in his own interest, and in the late 80's organized the firm of B. Nicoll & Co. Although associated with partners in the early days of the business, Mr. Nicoll was the dominating factor in the firm, which continued until January, 1921, when it became incorporated as B. Nicoll & Co., Inc., the officers being Benjamin Nicoll, president; G. F. Eldridge and H. K. Stauffer, vice-presidents; Edward Mullen, treasurer, and Courtlandt Nicoll, secretary.

B. Nicoll & Co. carried on a large business in ore and pig iron, both domestic and for export, also did a considerable business in importing, and at times were heavy exporters of steel products. In 1902 coal was added to the products, and in 1917 non-ferrous metals were included. For many years the firm was the sales agent for the Wharton Steel Co., as it was also for the Wickwire Steel Co. until that company became a part of the Wickwire-Spencer Steel Corporation in 1919. Mr. Nicoll had been a director of the Colorado Fuel & Iron Co., Rossie Iron Ore Co. and the Vulcan Detinning Co., but had withdrawn from all of these. Mr. Nicoll had homes at 46 West Fifty-fourth Street, New York; Morristown, N. J.; Water Mill, Long Island, and Peapack, N. J. He is survived by his wife; his son Courtlandt Nicoll, who is an attorney; a daughter and a brother, Delancey Nicoll. Mr. Nicoll was a man of strong personality, great energy, and in a quiet way was happy in being of service to his fellow men.

JOHN FINDLEY WALLACE, best known as one time chief engineer of Panama Canal, died suddenly at a hotel in Washington on the evening of July 3. He had gone to Washington to testify before a Senate committee investigating the railroad situation. He was born in Fall River, Mass., Sept. 10, 1852, and was graduated from the University of Wooster as a civil engineer. He was identified for years with railroads, notably with the Illinois Central from 1891 to 1904, or until he became connected with the Panama Canal. From 1906 to 1917 he was first president, and then chairman of the board of Westinghouse, Church, Kerr & Co. Among his conspicuous achievements was the building of a joint entrance into Chicago for the Santa Fe and Illinois Central roads and the building of the World's Fair terminals at Chicago in 1892.

OSCAR IRWIN, aged 47 years, superintendent of the spike plant at the Soho Works, Jones & Laughlin Steel Co., Pittsburgh, died at the Southside Hospital, Pittsburgh, June 29, as a result of injuries sustained at the plant, Friday, June 24.

ERNEST NICKERSON, Wellesley, Mass., engineer and erector of many bridges throughout the United States, died in that town June 30, at the age of 52 years.

British Iron and Steel Market

Signs of a Resumption of Activity—British Prices Still Too High to Compete with Continent

(*By Cable*)

LONDON, ENGLAND, July 5.

Official prices of pig iron are unchanged, but up to 15s. ($2.80) premium is being paid for No. 3 Cleveland. Some furnaces are preparing to start up again, but much depends on fuel prices. Coke is expected to fall to 30s. to 35s. ($5.59 to $6.53) at ovens, against 42½s. ($7.93) before the strike; but everything is very uncertain at present. Wage agreements are being arranged in various directions, with provision for arbitration to settle disputes. Belgian foundry pig iron is arriving, delivered in the Midlands at £7 5s. ($27.04).

There is more inquiry for steel, but British prices are still too high. The tendency is downward, and a more substantial revision is expected very soon. Common iron bars are £3 ($11.19) down at £16 ($59.68).

German merchant bars are being sold here at £8 ($29.84) and Belgian bars at £8 10s. ($31.70). German billets are offered at £5 17s. ($21.82) f.o.b.; French billets at £6 5s. ($23.31) f.o.b.; French sheet bars at £6 10s. ($24.24) f.o.b.; Belgian billets at £6 17½s. ($25.64) c.i.f.

Efforts for price convention on galvanized sheets have failed. Makers quote £22 10s. ($83.92) upward, but there is more inquiry and there are some signs from India of a revival of buying.

Tin plates show little fresh features. For prompt delivery, quotations are 27¼s. to 27½s. ($5.07 to $5.12) f.o.b.; for forward delivery, 25½s. to 26s. ($4.75 to $4.85) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.73 per £1 as follows:

Durham coke	£2 2	$7.83
Cleveland basic	6 0	22.38
Cleveland No. 1 foundry	6 5	23.31
Cleveland No. 3 foundry	6 0	22.38
Cleveland No. 4 foundry	5 19	22.19
Cleveland No. 4 forge	5 17½	21.91
Hematite	7 0*	
East Coast mixed	8 0 & £7 5*	29.84 & $27.04
Ferromanganese	18 0 & 15 0*	67.14 & 55.95
Ship plates	15 0 to 15 10	55.95 to 57.81
Boiler plates	19 0 to 21 0	70.87 to 78.33
Tees	15 0 to 15 10	55.95 to 57.81
Channels	14 5 to 14 15	53.15 to 55.01
Beams	14 0 to 14 10	52.22 to 54.08
Round bars, ¾ to 3 in.	14 0 to 14 10	52.22 to 54.08
Rails, 60 lb. and up	13 0 to 15 0	48.49 to 55.95
Billets	11 0 to 11 10	41.03 to 42.89
Sheet and tin plate bars, Welsh	10 10	39.16
Galvanized sheets, 24 g.	22 10 to 23 0	83.92 to 85.79
Black sheets	19 0 to 20 0	70.87 to 74.60
Tin plate base box	1 5½ to 1 8	4.75 to 5.22
Steel hoops	17 0	63.41

*Export price.

SOUTH MANCHURIA BUYS

Inquires for Railroad Material and Tie Plates—Public Works in Shanghai—Mexican Locomotives

NEW YORK, July 5.—Although there is a slight inclination on the part of European buying centers to place some orders in the United States, Japan still maintains the greatest activity. In addition to about 300 tons of structural material recently inquired for from Japan, evidently for shipbuilding, an additional 300 tons has been asked for from the same source. The greater part of these two orders will probably be placed in Europe. The South Manchurian Railroad, which has been actively buying of late, has purchased a number of electric car heaters and parts and a quantity of car couplers totaling about $15,000. This railroad is also in the market for about 1500 tons of tie plates.

American Locomotive Co. is understood to have closed on 45 locomotives for Mexico.

Japanese Inquiries Continue

New inquiries continue to appear from Japanese sources. In all about 10,000 boxes of tin plate are reported in the market, 5000 boxes previously mentioned being for the Imperial army. One of the largest Japanese shipyards, which is represented in the United States, has inquired for about 1700 tons of ship plates and there is a small inquiry in the market for a tonnage of 75-lb. rails. A contract for transmission towers, similar to those in the market some time ago, is reported to have been issued. A fair-sized tonnage of reinforcing bars is being handled by a Japanese export house, part of the order being for shipment to Kobe and part for Yokohama, for building projects in both cities.

Light Buying of Foreign Material

Not only are warehouses and exporters in New York showing an interest in foreign material, but in a few cases sales have been made of small tonnages, purchased largely as an experiment as to quality, price and delivery. While low bids are being received from the United Kingdom, they are generally from commission merchants and exporters, who are importing Belgian and German material for re-export. British manufacturing costs are reported as altogether too high to permit of more than normal competition with American material. A representative of a large German interest is said to have been offering cotton ties in the Southern States at a low figure.

In a general way it may be said that European prices on steel delivered in the Orient correspond to about 1c., Pittsburgh; in other words, there is a difference at present in favor of European business of about $20 a ton, taking into consideration all factors of prices at European mills, exchange and freight rates. No great concern is felt, as with any expansion in the volume of business the disparity would, it is believed, tend to vanish. It follows that on business which is done here on export account prices are low; in one case of plates the Steel Corporation is believed to have closed at a price figuring back to 1.60c., Pittsburgh, probably shipping the material from the Gulf.

Improvements in China

A new sewerage system is to be installed in the International settlement in Shanghai, China. Besides the pipe, about 20 pumps will be installed for 4-in. and 6-in. pipe. The Stereophagus type of pump has been specified. The existing wharves at Pukow, at the terminus of the Tsientsin-Pukow Railroad, which are about 10 years old, will be reconstructed and two additional wharves built to accommodate the increased mining traffic. Contract has been awarded to the Kiangnan Dockyard, Shanghai.

Research facilities and the development activities of American industries are to be described in the forthcoming revision of "Bulletin of the National Research Council." Only 300 such laboratories were listed in the first edition but it is hoped that several hundred new names will appear in the revision and that a more nearly complete reference list will thus become available.

The General Electric Co., Schenectady, N. Y., has acquired the electrical manufacturing company of Societa Elettrotecnica Galileo Ferraris, Milan, Italy, and in the future will operate the property. This concern formerly was known as the Thomson-Houston Co. The electrical business will be separated from the steam equipment manufacturing operations, and placed under another management.

SEE FAVORABLE SIGNS

Youngstown Manufacturers Hope for Improved Conditions at Not Far Distant Date

YOUNGSTOWN, OHIO, July 5—While actual production of iron and steel probably reached a new low level this week in the Mahoning Valley, due to the combined influence of the holiday suspension and the closing down of union sheet and tinplate mills, manufacturers, nevertheless, see hopeful signs for a betterment in the industry. Joseph G. Butler, Jr., vice-president of the Brier Hill Steel Co. and a director of the Youngstown Sheet & Tube Co., believes there will be a definite upturn in buying of some finished steel lines by fall, which will gather force before the end of the year. Mr. Butler attributes the slump in sheets and plates to an over-expansion in productive capacity, superinduced by war demands. Withdrawal of such requirements left the country with greater capacity, and any diminution in demand would therefore appear for the time being more pronounced than it really is, he points out. Gradual growth in demand, he believes, will absorb any excess capacity which may exist, which in the case of sheets will be accelerated by the new uses to which such material is being constantly put.

Only those departments requiring continuous operation, such as blast furnaces and coke ovens, were operated over the week-end and the holiday. On Tuesday but five of the 51 independent open-earth furnaces in the Valley resumed, while the Carnegie Steel Co. operated nine furnaces. But 19 of the 105 sheet mills are under power, 10 of the Newton Steel Co. at Newton Falls and nine of the Youngstown Sheet & Tube Co., all union mills being suspended through failure of the manufacturers and employees to reach a new wage agreement. Tin mills of the Trumbull Steel Co. are idle for the same reason. The Youngstown Sheet & Tube Co. has five pipe furnaces fired and the Republic Iron & Steel Co. two. The Trumbull company is operating a number of strip mills. The 84-in. plate mill of the Brier Hill Steel Co. is running on a part-time schedule.

Expansion in Production

Fabricating interests whose products go into building construction generally, report an expansion in production. President Julius Kahn of the Truscon Steel Co. states productive capacity is to be enlarged to 75 per cent., from 60, to take care of increased inflow in new business. The William B. Pollock Co., on the other hand, a fabricating interest whose work in the past has been devoted to a large extent to blast furnace construction and repairs, is virtually suspended and may continue so for an indefinite period.

Price readjustments in some important finished lines are believed impending, through the general disregard of nominal quotations by all the leading district interests. An impetus to fall buying is expected in view of the drastc readjustments which have already taken place in the industry, especially in prices, and because of the very satisfactory crop conditions throughout the country. Exceptionally limited buying by the farmers for the past year will bring them into the market for many miscellaneous needs, steel makers here believe, which will directly and indirectly benefit the steel industry through the improved demand for farm implements, tractors, automobiles and railroad equipment to haul them. Lower freight rates, for which important independent steel makers are contending, will help the farmer realize a larger net return on his products and thus bring into the market a large group of consumers who are at present buying little or nothing because they cannot supply their needs at the same relative prices they receive for their grain, cattle, hogs and other products.

Price Determined by the Size of Order

The tonnage produced by one large interest in June was somewhat better than that in May, the smallest for any month in many years. It is generally acknowledged that the price situation is weak and determined to a large degree by the size of the order and nature of the specifications.

There is generally more activity in wire, nails, conduit, smaller sizes of merchant pipe and fabricated materials entering into construction. Renewed inquiry for steel plates is coming from car repair and tank interests and a strengthened buying movement is anticipated by Valley makers in view of the awarding of substantial repair contracts by some of the railroads. One consuming interest reports that plates have been offered at 1.85c, Pittsburgh base, which is 35c per 100-lb.. below the market. The plate market maximum appears to be 2c on business placed.

Lower prices which are being quoted on buttweld pipe and line pipe and casing are in line with the trend of finished commodities generally. Lapweld business is lifeless through overstocking by the oil fields, and is consequently moving on a highly competitive basis.

In strip steel, demand for hot-rolled supersedes that for cold rolled, auto builders and makers of automobile parts taking most of the tonnage. The cold material has settled to 5c, declining from 5.50c, and hot rolled is quotable at 2.50c to 2.60c, a decline from 2.75c.

Offerings of lapweld pipe in the resale market are interfering to an appreciable extent with the primary market, say producers, who estimate that 100,000 tons are in the hands of oil groups in mid-continent and adjacent fields. This product is now being freely offered at prices well below those quoted by the makers, which is turning business from them.

Tinplate business has been accepted at $6, with stock plate moving at $5.50 to $5.75.

In raw materials, prime Western spelter has sold at 4.25c and consumers look for a record low price of 4c before the upward swing gets under way.

COKE WORKERS' WAGES

Reduction Announced by Two Large Companies —Rainey Operations Curtailed

UNIONTOWN, PA., July 2.—A further reduction of 10 per cent in wages affecting all employees was announced this week, immediately effective, by W. J. Rainey, Inc., and the Washington Coal & Coke Co., two of the largest independent operators in the Connellsville bituminous district. No notices have been posted by the other independents in the region but it is considered likely that the majority will put the reduced scales in effect. No further reduction is expected at this time by the H. C. Frick Coke Co., subsidiary of the United States Steel Corporation.

Rainey operations have been reduced to between 30 and 40 per cent on coke. All ovens at Allison and Vanderbilt were blown out this week and 299 ovens were blown out at Revere. Washington Coal & Coke Co., with operations at Dawson, has 140 ovens in blast making foundry coke almost exclusively. The Washington company has landed a northwest coal order requiring delivery of 40 cars daily for shipment by lakes. This is in addition to a railroad order and other contracts held by the company which boosts its operations to between 60 and 70 per cent.

With the reduction in wages announcement was made by both companies of reduced prices, practically to cost, of commodities in their stores and reduced rents for houses.

All ovens of the H. C. Frick Coke Co. remain out of operation. Coal production of the Frick company is between 30 and 40 per cent.

There are insufficient sales in the region, either on coal or coke, to base accurate prices. Some furnace coke has been sold at below $3 to clear unconsigned lots. Coal has dropped to $1.65.

C. Davis & Co. with offices at 909-912 B. F. Jones Building, Pittsburgh, and a warehouse at West Homestead, Pa., has taken over the business of Davis, McCloy & Co. The latter did a business in pipe for structural and agricultural purposes, including railing, fence, columns and other structural purposes where internal pressure is not required. U. L. Tierney is manager of this division of C. Davis & Co.

Trade and Office Changes

The National Machinery Sales Co., 28 North Des Plaines Street, Chicago, was recently incorporated to engage in the machine tool business. The officers include, James L. Gough, president and treasurer; James Jay Sheridan, secretary; and George D. Benson assistant secretary. Mr. Gough until a year ago was president of the Federal Machinery Sales Co., Chicago, a machine tool house which he was largely instrumental in founding in 1915, and which became one of the prominent companies of its kind in the Central West. Mr. Gough has been in the machine tool business for more than 25 years, having become identified with it in his early youth. Prior to his connection with the Federal Machinery Sales Co., he had been sales manager the E. L. Essley Machinery Co., and assistant manager the Marshall & Huschart Machinery Co., both Chicago houses. Mr. Sheridan, secretary, is resident attorney for the National Bank of the Republic, Chicago, and is an ex-president of the Hamilton Club, the Republican Club of the city. Although not a machinery man, strictly speaking, he has a wide acquaintance in the trade, having been for five years vice-president of the Federal Machinery Sales Co. Mr. Benson was formerly connected with the Federal Machinery Sales Co. and has been in the machine tool business about five years.



JAMES L. GOUGH

Harry W. Torney, Torney & Co., recently made president of the reorganized Sharon Pressed Steel Co., 66 Broadway, New York, has taken in hand the refinancing of the concern and states that its former financial difficulties have been satisfactorily adjusted. The company is now in a position to handle production and delivery of car and truck frames up to 1500 per day. Manufacture is now in charge of Arthur W. Swan, general manager, who was formerly chief engineer and works manager of the Crucible Steel Co. A recent addition to the plant is the 4000-ton Mesta press. Lack of work in the surrounding district has enabled it to add to its force a corps of picked, all-American labor.

The Brown Instrument Co., Philadelphia, manufacturer of instruments for indicating and recording temperatures, pressure, speeds, operations, and drafts, has opened a branch office in Cleveland, 201 Reliance Bank Building, 1634 Euclid Avenue. This now makes at total of 11 district offices, located in New York, Pittsburgh, Detroit, Cleveland, Chicago, St. Louis, Denver, Los Angeles, San Francisco, and Montreal.

The Hydraulic Hoist Mfg. Co., Detroit, has moved from 954 East Milwaukee Avenue into larger quarters at 5730 Michigan Avenue, Detroit.

The offices of the Schuylkill Iron Works and the John Wood Mfg. Co., of the Alan Wood Iron & Steel Co., Conshohocken, Pa., will be consolidated on July 1, covering the rolling mill department of the organization. The offices will be maintained at the Schuylkill works, with William A. Cooper continuing in the capacity of manager of rolling mills.

The office of W. A. Jackson, purchasing agent, Walworth Mfg. Co., Boston, wrenches, etc., is now located at 88 Pearl Street, fourth floor.

The Standard Pressed Steel Co., Philadelphia, has moved to Jenkintown, Pa.

On June 1 the Chicago sales offices of the New Departure Mfg. Co. were removed from 2721 South Michigan Avenue to the People's Gas Building, 122 South Michigan Avenue.

Roper, Hurrey & Parks, business and government consultants, Munsey Building, Washington, have retained as their general counsel William L. Frierson, former solicitor general of the United States, and have opened a New York office in the Canadian-Pacific Building, Forty-fourth Street and Madison Avenue. The firm comprises Daniel C. Roper, C. B. Hurrey and Franklin C. Parks.

The Clark-Turner Piston Co., Los Angeles, Cal., manufacturer of Deluxe light weight cast-iron pistons, has appointed the Laystall Motor Engineering Works, Ltd., London, England, distributors of Deluxe pistons in Great Britain and Ireland.

The Progressive Mfg. Co., Torrington, Conn., maker of wire products, will close its factory about July 1 for about one week or ten days for annual inventory and repairs.

The Joseph L. Skelton Engineering Co., 242 Water Street, Toledo, has opened a Detroit office at 1156 Penobscot Building, in charge of H. E. Heilman. This company specializes in municipal and general power plant construction. It also acts as representative for the Ames Iron Works, Otsego, N. Y., Houston, Stanwood & Gamble, Cincinnati, the American Steam Pump Co., Battle Creek, Mich., and several other lines.

The Falk Co., Milwaukee, Wis., has changed its name to the Falk Corporation.

The C. H. Wheeler Co., of Philadelphia, manufacturer of condensers, pumps, etc., has opened a new branch office in Boston; at 53 State Street, room 613.

The Ohio Pipe Bending & Machine Co., Cleveland, is now located at 2010-20 Elm Street, corner of Washington.

The Rock Point Sand Co., 635-639 Wabash Building, Pittsburgh, has established a branch office at Youngstown, Ohio, in charge of C. C. Whiteside, general manager. The company produces silica sands of various kinds for the foundry trade.

The Atlantic Welding Works, welding engineers, will change its name to Atlantic Welded Products Co. and will move into its own building at 1725-27 North Howard Street, Philadelphia, both changes to take effect on or about June 15.

The Sturgis Steel Go-Cart Co., Sturgis, Mich., has changed its name to Sturgis Go-Cart Co. and has increased its capitalization from $650,000 to $3,150,000.

The Master Machine Co., Philadelphia, has filed notice of change of name to the Victor Slicing Machine Co., to manufacture special cutting machines and parts.

The Erickson Pattern & Mfg. Co., Beaver Dam, Wis., has changed its corporate style to Beaver Pattern & Mfg. Co. It manufactures wood and metal patterns, templates and other similar supplies for foundries of all kinds.

The Sheldon Co., 41 Park Row, New York, has been made the exclusive agent in New York territory for the sale of the Houston, Stanwood & Gamble Co.'s new plate press for boiler, tank and stack shop use, or for use in plants doing plate or structural work.

The New York offices of the Jeffrey Mfg. Co., Columbus, Ohio, are now located at 30 Church Street, with Harold B. Wood as district manager.

The Acme Motor Truck Co., Cadillac, Mich., has organized in New York the Acme Motor Truck Corporation, a subsidiary, which will act as direct factory branch. Headquarters are at 647 West Fifty-fifth Street, with assistant sales manager C. A. Ward, Jr., in charge.

The Mueller Metals Co., Port Huron, Mich., is appointing sales representatives in all the larger cities of the country. Hunter & Wilkie, 603 Kerr Building, Detroit, will handle the Mueller products, exclusive of rods and tubing, in Detroit and vicinity, and the Steel Sales Corporation, with offices at 129 South Jefferson Street, Chicago, and 404 Book Building, Detroit, will handle rods and tubing in Detroit, and the complete Mueller line in Illinois, northern Indiana and Michigan territory outside Detroit, and also in Iowa, Missouri and Wisconsin. The Mueller company manufactures red-tip brass rods, blue-tip bronze rods, red-tip brass and copper seamless tubing, sand castings and forgings in brass, bronze and aluminum, die castings and screw machined parts.

The Dayton-Dowd Co., manufacturer of centrifugal pumps, Quincy, Ill., has opened a new district office for the sale of pumping machinery in the Pioneer Building, St. Paul, Minn., in charge of the George M. Kenyon Co. The firm consists of George M. Kenyon, president and general manager; Robert D. Lewis, vice-president, and James C. Willson, vice-president, all of whom are engineers of long standing in St. Paul, well acquainted with the power plant, railroad and municipal field.

The Johnson-Peter Co. has opened an Eastern branch office at Warehouse 34, Bush Terminal, Brooklyn, N. Y., in charge of Edward H. Gill, vice-president. A complete stock of boiler tubes will be carried here, as well as at Pittsburgh. The company has specialized in the sale of this commodity entirely until the Eastern branch was opened. However, it will now handle diversified products, including mechanical tubing, pipe, bars, sheets, tin plate, wire and wire products.

The factory of the Root Co., Bristol, Conn, automatic counters, will be closed from July 2 to July 18.

Machinery Markets and News of the Works

JUNE POOREST MONTH

Some Offices Make No Sale During Entire Period

One Sale of Ten Machines; Another Inquiry for Five Is Pending

June was decidedly the poorest month of the year. In New York there were local sales offices which did not make one sale during the month. In some centers, notably Pittsburgh, new plant construction proceeds at a lively pace, but little interest is manifest in buying the equipment for these new plants.

In the New York district, prospective crane buyers seem in a mood more receptive to give heed to sellers. In the Milwaukee district, there is a certain degree of confidence in future business from railroads and the automotive industries, including the motor truck industry.

Two 10 per cent price reductions are announced in the Middle West: That of the Richards Machine Co., Milwaukee, on drill presses, and that of the United States Electrical Tool Co., Cincinnati, on electric drills.

An eastern Pennsylvania steel company is asking for the following machines for doing work on the New York-New Jersey vehicular tunnel: A 42-in. lathe; two shapers, 16-in. and 32-in.; a 5-ft. radial drill and a 31-in upright drill. The Champion Wrench Co., Chicago, recently purchased about 10 machines.

Neither the Illinois Central nor the Rock Island has taken action on its inquiries.

New York

NEW YORK, July 5.

The pre-holiday week was as dull in the local machine-tool trade as those which preceded. There is very little inquiry and few orders. Several local sales offices of machine-tool companies did not sell a single machine during June, which was the poorest month of the year for the whole trade.

It is generally conceded that purchasers of cranes are to-day in a slightly more receptive mood than for some time past. A fair volume of inquiries is in the market, but the number of sales reported is small. Among current inquiries, upon which bids are being submitted, is one from the Amoskeag Mfg. Co., Manchester, N. H., calling for a 60-ton overhead traveling crane.

Among recent sales are: Industrial Works, a 20-ton, 50-ft. boom locomotive crane with grab bucket to H. F. Curtis, 1270 Broadway, New York; Pawling & Harnischfeger Co., a 10-ton, 71-ft. span overhead traveling crane to the Chapman Derrick & Wrecking Co., 17 Battery Place, New York; Alfred Box & Co., a 2-ton, electric overhead traveling crane to the Williams Harvey Corporation, Brooklyn, N. Y.

The Telescope Cot Bed Co., 535 East Seventy-ninth Street, New York, manufacturer of metal beds, has awarded contract to F. M. Webster, 229 Baker Avenue, Syracuse, N. Y., for a new one-story plant, 70 x 420 ft., at Granville, N. Y., to cost about $100,000. A power house will also be built.

The Remington-Burnelli Aircraft Co., New York, has been incorporated with a capital of $100,000 by G. C. T. Remington, V. J. Burnelli and J. A. Nugent, care of Nugent & Nugent, 280 Madison Avenue, to manufacture airplanes and parts.

The Verne Mfg. Corporation, New York, has been incorporated with a capital of $100,000 by S. T. Paley, S. S. Rand and E. J. Whitlock, to manufacture electrical specialties. It is represented by H. S. Mansfield, 55 Liberty Street.

The Columbia Valley Paper Co., 44 Howard Street, Albany, N. Y., F. B. Oldham, president, is making inquiries for materials and equipment for the construction of a new paper mill at Mellenville, N. Y. Plans for the factory have been completed.

The Koffee Saver Mfg. Co., New York, has been incorporated with a capital of $100,000 by J. T. Pedersen, M. M. and A. M. Sloss, 18 West Eighteenth Street, to manufacture metal coffee urns and kindred products.

The P. & R. Auto Specialty Mfg. Co., Brooklyn, has been incorporated with a capital of $50,000 by B. and L. Robbins, and G. Portmoy, to manufacture automobile equipment. The company is represented by H. O. Falk, 145 West Forty-fifth Street, New York.

The Dodge Building Corporation, an interest of the Dodge Mfg. Co., 21 Murray Street, New York, manufacturer of transmission machinery, has secured a loan of $800,000 for the erection of a new twelve-story building on West Broadway, extending from Park Place to Murray Street. The company will occupy three floors. Plans are being prepared by Shape, Bready & Peterkin, 220 West Forty-second Street, architects.

The Winner Wire Goods Mfg. Co., New York, 349 East 133rd Street, New York, has been organized under state laws by J. and M. Spiegel, to manufacture wire products.

Russell G. Cory, 50 Church Street, New York, consulting engineer, is placing on the market a four-story plant building at New Haven, Conn., approximating 80,000 sq. ft. of manufacturing area.

The New York & Harlem Railroad Co., 1874 Second Avenue, New York, has filed plans for a one and two-story repair and mechanical shop at 2155 Madison Avenue, 38 x 154 ft., to cost about $45,000. Contract for erection has been let to James Stewart & Co., Inc., 30 Church Ctreet.

A one-story power house will be erected in connection with the new plant of the Hires-Turner Glass Co., Thirtieth and Walnut Streets, Philadelphia, on Tivoli Street, Albany, N. Y., miscellaneous construction contracts for which are being awarded. The entire plant will cost about $100,000.

Durant Motors, Inc., 1764 Broadway, New York, will commence the production of its new popular priced automobiles at its new plant at Long Island City about Aug. 1, and it is planned to develop a capacity of about 25,000 cars per year at these works. W. C. Durant is president.

The National Autoparts Corporation, New York, has been incorporated with a capital of $4,000,000 to manufacture automobile parts. It is represented by Arthur W. Britton, 65 Cedar Street.

The International Cement Corporation, Boston, has arranged for the acquisition of the Knickerbocker Portland Cement Co., 30 East Forty-second Street, New York, with plant at Hudson, N. Y., rated at 1,250,000 bbl. of material per annum. About $3,169,000 will be given for the property.

The New York Central Railroad, Grand Central Terminal, New York, will receive bids up to noon, July 12, for bridge parts, steel and material for track scales and bridge repairs, in accordance with plans and specifications on file at the office of W. C. Bower, general purchasing agent.

The New York Electric Installation Co., 147 West Thirty-fifth Street, New York, has leased the four-story factory, 26 x 100 ft., at 71 Eighth Avenue for 21 years, with aggregate rental of $94,500, for the establishment of a new plant.

The Ashland Contracting Co., Brooklyn, referred to in a recent issue of THE IRON AGE, has arranged for offices at 186 Remsen Street, and from which matters pertaining to its new industrial project at Fulton Street and New York Avenue, Jamaica, L. I., will be handled. The cold storage and refrigerating plant to be erected, in connection with market building, warehouses and light manufacturing plants, will cost about $300,000 with machinery. A power plant will be constructed for central station service. The entire project will cost in excess of $1,250,000. Michael H. Wolpert,

head of Carucci & Wolpert, general contractors, is president of the company; Herman Froeb, treasurer, and A. A. Carucci, secretary.

The Laurant-Kelly Co., East Rutherford, N. J., has been incorporated with a capital of $25,000 by Henry J. Laurant and John J. Kelly, East Rutherford, to manufacture surgical instruments and other precision equipment.

In connection with a new high pressure water system to be installed at Boonton, N. J., bonds for $100,000 for which have been approved, a large pumping plant with high-pressure pumping machinery will be constructed near Sheep Hill. Frederick V. Pitney, 21 South Street, Morristown, N. J., consulting engineer, has been retained to prepare plans and specifications.

The Ajax Battery Co., Buffalo, has been incorporated with a capital of $1,000,000 by O. M. Gallagher, G. N. Culbertson and E. H. Hill, to manufacture electric storage batteries and kindred products. The company is represented by Layton H. Vogel, Ellicott Square.

The Martin Automatic Fishing Reel Co., Mohawk, N. Y., has been incorporated with a capital of $75,000 by C. Maurice, D. Moynihan and A. B. Maury, to manufacture nickeled metal fishing reels and kindred products. J. E. Rafter, Mohawk, represents the company.

The Mayer Coating Machines Co., 205 St. Paul Street, Rochester, N. Y., is about to begin the erection of a factory building and is in the market for material used in construction.

New England

BOSTON, July 5.

The machine tool market for July has started off fairly well, and, while business continues spotty, it has every indication of exceeding that for June. One local house has under negotiation a sale involving approximately $20,000 worth of new and used equipment for one company, and other prospects, bringing the gross value considerably above that figure, which are expected to close this week. Another dealer is figuring on a fairly large list of new production tools issued by a local concern, while other interests report a number of sales pending on one, two and three machines which are expected to close within the next 15 days. In view of the condition of the machine tool market the first six months of 1921, it is of interest to note that one New York corporation recently mailed bonus checks to outlying sales organizations covering equipment delivered in the quarter ended March 31.

The city of Springfield, Mass., has purchased through the E. S. Stacey Supply Co., one 16-in. x 6 ft. and six 13-in. x 5 ft. South Bend lathes. It is intimated the city of Manchester, N. H., will close on its list of school equipment this month, as will also the city of Worcester, Mass. The Worcester list probably will be placed with local manufacturers, athough there is some doubt as to the 10 lathes involved. Bids have been submitted to Washington for two arbor presses, a motor-driven wet tool grinder and a 2 x 24 flat turret lathe for the Boston Navy Yard. The Lowell Electric Light Co. will need machine shop equipment for its proposed new plant, but no list has been compiled.

A majority of other machines sold the past week were used tools. Sales include a large list of production equipment to the Badger Fire Extinguisher Co., Roxbury, which is reported in the market for die castings. A Cambridge, Mass., manufacturer of fasteners has covered on milling and tapping equipment, and another company in that city on four-spindle high speed drilling machines, while a Providence, R. I., firm bought six-spindle high speed drilling machines.

Local machine tool houses were closed from Friday evening, July 1, until Tuesday morning, July 5.

The Montague Machine Co., Millers Falls, Mass., the past week purchased $600 worth of small tools.

Cleveland interests have issued a second price list on drills and reamers showing a further reduction amounting to approximately 5 per cent on some lines.

Inquiries, largely from leather manufacturers and fabric mills, have appeared in this market for twenty gross and larger lots of files, the demand being more active than for many months.

Most of the machine tools sold June 30 at the public auction of the Iverson Piano Player Co., Worcester, equipment brought remarkably good prices. For instance, a Consolidated Press Co. practically new No. 4 open back power press went at $662.50, compared with a factory price of about $675. Bench precision lathes sold at $90 to $130, mostly the top price. A J. E. Snyder & Son 23-in. upright drill, in good condition, sold for $200; a Blair automatic plain surface grinder, $362.50; a No. 6 Perkins open back geared power press, $250; an almost new Flather 14-in. x 6 ft. screw cutting engine lathe, $312.50; a Waltham bench automatic spur gear cotton machine, $262.50; No. 1 Consolidated open back power press, $162.50; No. 2½ open back power press made by the same concern, $200, and a No. 3 open back Consolidated power press, $300.

The Worcester Electric Light Co., Worcester, Mass., will erect a machine shop and storehouse, 60 x 70 ft., at an estimated cost of $20,000.

The New Britain Machine Co., New Britain, Conn., has secured several Government orders, the most recent of which is for 6-in. sights for naval guns representing more than $100,000. It has been working on reduced schedule.

The Maine Central Railroad Co. is taking bids for a one-story roundhouse and one-story, 50 x 220 ft. repair shop to replace those recently destroyed by fire at Calais, Me. The roundhouse will contain eight pits, each 77 ft.

The Dennison Mfg. Co., Framingham, Mass., paper goods, has purchased 233,000 sq. ft. on Maple Street, Marlboro, Mass., on which it plans to erect a factory. The first unit probably will be two stories which will be enlarged as the business requires.

The Waltham Motor Manufacturers, Inc., capitalized for $3,500,000, has been granted a Massachusetts charter to manufacture motor vehicles and parts. The incorporators are Charles H. Metz and Charles H. Wolf, Waltham, and Matthew C. Dittman, Weston. It will take over the Metz plant, Waltham.

The Fowler Co., Worcester, hardware and hardware specialties, recently incorporated under Massachusetts laws, has taken over the business of Henry A. Fowler, 65 Beacon Street, manufacturer of curtain fixtures which it will enlarge and plans to erect new works. Tempest C. Garbutt, Brookline, is president and treasurer. Charles B. Rugg, son of Chief Justice Arthur P. Rugg of the Massachusetts Supreme Court, and Henry L. Green are interested financially in the company.

The Worcester Automatic Sprinkler Co., Worcester, Mass., recently incorporated, has secured manufacturing quarters at 60 Ellsworth Street. It proposes to have its sprinklers made in Baltimore and assembled in Worcester. George F. Nixon, formerly with Stone & Webster, Boston; Frank P. Bergin, at one time superintendent Globe Automatic Sprinkler Co., Philadelphia; Joseph R. Zink, Baltimore; Frank O'Reilly, who has been connected with the General Fire Extinguisher Co., Providence, and Thomas J. McDermott, formerly with the Rockwood Sprinkler Co., Worcester, are interested in the new project. A permanent organization has not been completed as yet.

H. D. Meadows, 100 School Street, Springfield, Mass., president New England Steel Castings Co., Longmeadow, Mass., is said to be planning for the immediate rebuilding of the plant, recently destroyed by fire with loss of about $100,000, including equipment.

The Positive Mfg. Co., Springfield, has been chartered under State laws to manufacture automobile and street signals and other metal products. John A. Hamberg is president, and A. E. Snow, 36 Irvington Street, treasurer.

The Boston & Albany Railroad Co., F. A. Ryer, purchasing agent, Room 237, South Station, Boston, will receive bids up to noon, July 12, for the following material: Complete turntable center, in accordance with specifications for material of roller bearing center for heavy 85 ft. turntable, together with cross and longitudinal girders, rivets, bolts, etc.; cast steel wheel bearings and caps for turntable wheels, one right and one left; 16 bearings, with bolts, nuts, etc.

The David Brown Co., Lawrence, Mass., manufacturer of shuttles, bobbins and other textile machine equipment, has completed plans for a new two-story and basement building, 40 x 100 ft., estimated to cost about $40,000.

E. T. Davis, 398 Bridge Street, Springfield, will commence the immediate erection of a new two-story automobile service and repair works, 73 x 180 ft., at Chestnut and Taylor streets, estimated to cost about $120,000.

The North Shore Machine Co., Lynn, Mass., has been organized under State laws to manufacture machinery and tools. L. A. Porter is president, and Eugene R. Dennett, Cedar Heights, Mass., is treasurer.

The Peerless Mfg. Co., Providence, R. I., has been incorporated with a capital of $300,000, by Theodore Beauregard, Providence; Leon S. Courcy and John B. Pinault, Attleboro, Mass., to manufacture tools and other metal products.

The Boston Ornamental Iron Works, Boston, has filed notice of organization to manufacture iron and steel specialties. Nathan Cohen, 108 Washington Street, North, heads the company.

Chicago

CHICAGO, July 5.

The Illinois Central and the Rock Island have not yet taken action on their inquiries and business from industries continues very light. Buying is confined principally to single tools, although occasionally a group of machines is purchased. The Champion Wrench Co., Chicago, recently closed for three automatic milling machines, two drill presses, a riveting hammer, a cutter tool grinder, and three case hardening and tempering furnaces with complete equipment. The Duplex Printing Press Co. is contemplating the purchase of considerable equipment for its plant at Battle Creek, Mich. The price situation remains substantially unchanged, only two reductions having been reported of late. The Richards Machine Co., Milwaukee, has reduced drill presses ten per cent, and the U. S. Electrical Tool Co., Cincinnati, has marked down electric drills a like percentage.

Albert N. Ruttenberg, 105 North Clark Street, Chicago, has begun the preparation of plans for a one-story garage, 94 x 214 ft., for erection on the West Side at a cost of $30,000.

H. Brands, 11343 Edbrooke Avenue, Chicago, has let contract for a one-story machine shop, 25 x 100 ft., 4532 West Madison Street, to cost $5,000.

The Ruel Lumber Co., 7046 Stoney Island Avenue, Chicago, has been granted a permit to build a one-story garage, 50 x 113 ft., to cost $15,000.

R. W. Olmsted, 171 West Jackson Boulevard, Chicago, has let a contract for a one-story garage, 112 x 165 ft., 704-12 South Wabash Avenue, to cost $48,000.

Holton Steelye & Co., real estate, 140 South Dearborn Street, Chicago, have let contract for a one-story factory, 3419-25 Wentworth Avenue, to cost $12,000.

The Atlantic Brass Works, 1335 West Lake Street, Chicago, has been organized to manufacture brass, bronze and other metal products. Herman W. Grossman heads the company.

The Motor Transport Division of the Army has let a contract for a repair shop, 250 x 1000 ft., Ft. Leavenworth, Kan., to cost $500,000.

A hearing on an application for the sale of the Wahle Foundry & Machine Works, Davenport, Iowa, filed by the guardian of LeRoy L. Wahle, part owner, will be heard in the Scott County District Court on July 5. The Western Pump Co., Davenport, is understood to have offered $39,000 for the property, which it is now renting.

A. J. St. Onge, Saskatoon, Can., plans to locate a factory in River Falls, Minn., for the manufacture of metal products, such as ventilators, cistern and house tanks, and cornices. It will be operated under the name of the Metal Roofing & Cornice Mfg. Co.

The Gem City Foundry, Quincy, Ill., has resumed operations after being idle for six months.

The Agrimotor Mfg. Co., Wichita, Kan., plans to erect a two-story factory to cost $100,000.

The Peelle Co., Brooklyn, N. Y., manufacturer of elevator doors, safety appliances, etc., has let contract for a factory, with 27,000 sq. ft. of floor space to be erected at Richmond, Ind. Some time ago the company acquired a controlling interest in the Richmond Safety Gate Co., which will be operated as the Richmond unit and will manufacture safety gates, exit and entrance doors, and fire door hardware. The old plant of the Richmond Safety Gate Co. has been acquired by the Quaker City Machine Co., manufacturer of ventilating machinery.

The Petroleum Motors Corporation, 220 South State Street, Chicago has completed foundations for the initial buildings of its new plant at Rockford, Ill., and will begin work on the superstructure at once. It will be one and two stories, and in three complete units, estimated to cost about $2,000,000 with machinery. The Holm-Page Co., Rockford, has the erection contract. The Arnold Co., 105 North Monroe Street, Chicago, is engineer. R. C. Cole is general manager.

The Marquette Electric Co., 222 West Austin Avenue, Chicago, has been incorporated with a capital of $200,000 by Harold B. Harvey, Harry I. Kirk and Samuel A. Hohman, to manufacture electrical devices and equipment.

The Domestic Electric Appliance Co., 315 South Jefferson Avenue, Peoria, Ill., has been incorporated with a capital of $50,000 by Milton V. Stagg, R. B. Cherry and E. G. Kuecks, to manufacture electrical appliances and equipment.

Fire, June 18, destroyed a portion of the works of the Curtiss Northwest Aeroplane Co., Minneapolis, Minn., with loss reported at about $70,000.

The St. Clair Foundry Co., Belleville, Ill., has been incorporated with a capital of $100,000 by Richard D. and Frank C. Wiechart, Belleville, to manufacture iron and steel and other metal castings.

The American Process Co., 815 Marquette Building, Chicago, has been incorporated with a capital of $50,000 by Clifford J. Thompson, Taylor E. Brown and David E. Peterson, to manufacture filters and filtering equipment.

Philadelphia

PHILADELPHIA, July 5.

The Bethlehem Steel Co., Bethlehem, Pa., has issued an inquiry for the following machines to be used on work for the New York-New Jersey vehicular tunnel at Jersey City, N. J.: 42-in. lathe, 16-in. shaper, 32-in. shaper, 5-ft. radial drill, 31-in. upright drill.

The J. W. Paxson Co., 1021 North Delaware Avenue, Philadelphia, manufacturer of foundry equipment and supplies, has filed plans for two shop buildings at Algon Avenue and Luzerne Street, to cost about $60,000, totaling 118 x 118 ft.

The Smith & Furbush Machine Co., Hancock and Somerset streets, Philadelphia, manufacturer of textile machinery, has awarded contract to Stewart Brothers, 2526 North Orkney Street, for extensions and improvements in its plant.

The Van Dusen & Stokes Co., 1123 Chestnut Street, Philadelphia, manufacturing jeweler, has leased space in the building at 2224 Chestnut Street, to be equipped with precision and other machinery for general manufacture.

The William Cramp & Sons Ship & Engine Building Co., Richmond and Norris streets, Philadelphia, is planning for the early erection of a new one-story automobile service and machine repair works for company trucks and automobiles at Wildey and Fletcher streets, estimated to cost about $32,000.

Fire, June 25, destroyed the automobile service and repair works of Richard J. Hill, 340 East Somerset Street, Philadelphia, with loss reported at about $100,000.

The New York Shipbuilding Corporation, Camden, N. J., has secured a contract for the construction of a 10,000-ton fuel ship for the Japanese Navy, and will commence work on the vessel at an early date.

C. E. Abel, Philadelphia Housing Corporation, Commonwealth Building, Philadelphia, has completed plans for the erection of a new one and two-story automobile service and repair works, 150 x 250 ft., at Fifty-sixth and Walnut streets, to cost about $100,000.

A new power plant will be built by the board of directors, St. James Mercy Hospital, Chester, Pa., in connection with the erection of a new main building.

Machine and mechanical equipment will be installed in the new vocational school to be erected by the Lower Paxton Township School Board at Linglestown, Pa., estimated to cost about $55,000. Frank G. Fahnestock, Jr., Patriot Building, Harrisburg, Pa., architect, is in charge.

Robert M. Hallowell, Inc., Ambler, Pa., has been incorporated with a capital of $100,000 by Robert M. Hallowell and Jefferson H. Thompson, Ambler, and George R. Oglesby, North Wales, Pa., to manufacture agricultural implements.

The Schmick Gear & Screw Co., Williamsport, Pa., care of F. Arthur Rianhard, Masonic Temple Building, architect, has awarded a contract to J. V. Bennett & Co., Williamsport, for a new one-story plant, 40 x 100 ft., at Edwin and Campbell streets.

The Phil-King Sanitary Cooler Co., Pottstown, Pa., has been incorporated with a capital of $100,000 by Jacob E. and J. Roy Kinckiner and Frank A. Phillippi, Pottstown, to manufacture water coolers, filters and other sanitary equipment.

The Lane Signal Accessories Co., Sayre, Pa., has been incorporated with a capital of $500,000 by William H. Lane, Harry S. Fish and Raymond L. Gebhardt, Sayre, to manufacture signal devices and other electrical equipment.

Detroit

DETROIT, July 5.

The Hinkley Motor Corporation, West Fort and Third streets, Detroit, is taking bids for the erection of its new one and two-story plant on Cicotte Avenue, Ecorse, Mich., 250 x 340 ft., to cost in excess of $200,000. Albert Kahn, 1000 Marquette Building is architect; H. M. Butzel is secretary.

The Fredericksen Co., Saginaw, Mich., has been incorporated with a capital of $100,000 by Niels J. Fredericksen,

5740 Lorain Avenue, Detroit; Alexander M. Lemke and Otto Schupp, Saginaw, to manufacture brass, bronze, aluminum and other metal castings.

The Street Railway Department, Detroit, Murphy Building, is completing plans for its new one-story car construction and repair shop, 260 x 370 ft., at St. Jean and Shoemaker streets, and will call for bids at an early date. William O. Markham, 312 Marquette Building, is consulting engineer. Ross Schram is secretary.

The Acme Boiler Works, Inc., Detroit, has been incorporated with a capital of $25,000 by N. G. and Charles L. Simmons, 1405 Nineteenth Street; and Samuel A. Reigel, Highland Park, Mich., to manufacture boilers, tanks, and other sheet and plate products.

The Auto Safety Signal Co., Detroit, has been organized by Joseph Miller and Henry A. Schoenberg, 5043 Allendale Avenue, to manufacture safety signals, lamps, and kindred products.

David Buick, Flint, Mich., founder of the original Buick Motor Co., and associates, have acquired control of the Lorraine Motors Corporation, Grand Rapids, Mich., and will use the plant for the manufacture of a popular-priced automobile. A large portion of operations will be devoted to assembling, and certain parts of the plant will be remodeled. It is understood that the capacity of the local works will be increased. Mr. Buick will be head of the new organization.

The Wyandotte More-Power Truck Co., Wyandotte, Mich., has been incorporated with a capital of $125,000 by Frank Armstrong, 119 State Street, Detroit; William Anderson and W. Allard, Grosse Pointe Village, Mich., to manufacture motor-driven trucks and parts.

Pittsburgh

PITTSBURGH, July 5.

The machine tool situation is disappointing. Plant construction and extensions have not ceased, but when it comes to buying equipment there is a marked tendency to wait. The Crane Co., Chicago, which is putting up a warehouse in this city, for which at least three cranes will be wanted, is going ahead with the building but is not interested yet in placing the cranes. The machine tool business has not been so small in years as it is at present and crane builders are finding it difficult to put orders on their books. The International Nickel Co. has placed an order for two more 15-ton Shaw cranes, making 10 in all for its new plant at Huntington, W. Va. The cranes for the Kelley Island Lime & Transport Co. for its new crusher plant at Marblehead, Ohio, and the crane inquired for sometime ago by the Greenville Steel Car Co., Greenville, Pa., are yet to be placed. Crane prices steadily are working downward and while current quotations are about 10c. per lb. below the average of the war period they still are about 5c. per lb. above pre-war prices. Union City, Pa., opens bids July 6 for an oil-burning pumping engine and air-compressor for deep well pumping, and the West Penn Power Co. is expected to be in the market soon for some power equipment in connection with the addition to its Springdale, Pa., plant. The city of Youngstown, Ohio, recently bought a DeLaval steam turbine-driven waterworks type centrifugal pumping unit, with condenser and auxiliaries. The gear drives for the new plant of the International Nickel Co., Huntington, W. Va., have not yet been placed.

In connection with the extensions to be erected at the plant of the Oliver Iron & Steel Co., Tenth Street, Pittsburgh, estimated to cost about $185,000, and addition to the bolt shop will be constructed, 40 x 80 ft.

The Phelps Can Co., Lawrence Street, Baltimore, is arranging for the early operation of its new plant at Clarksburg, W. Va. It will produce about 450,000 cans per day, and will give employment to over 200 operatives. G. S. Tibbits is manager.

The Standard Sanitary Mfg. Co., Pittsburgh, manufacturer of sanitary ware, has arranged for a stock issue of $1,500,000, the proceeds to be used for general expansion, including plant additions and improvements.

The Parsons Pulp & Lumber Co., Finance Building, Philadelphia, is reported to be planning for the erection of an addition to its pulp mill in the vicinity of Horton, W. Va., to double the present capacity.

The Romisch Mfg. Co., Morgantown, W. Va., has completed plans for a new two-story machine shop, 35 x 150 ft., on Beechurst Avenue, estimated to cost about $25,000. A. Romisch is head.

The Wheeling Bronze Casting Co., Wheeling, W. Va., has been reorganized with a capital of $100,000 to manufacture brass, bronze and other metal castings. It is headed by William J. Braddock, Wheeling, and J. W. Millard, Sr. and Jr., Martins Ferry, Ohio.

The West Virginia & Maryland Power Co., Kingwood, W. Va., has been organized by Col. Carleton C. Pierce, Kingwood, and associates, to carry out a large power project in this section, including the erection of a new electric generating plant and transmission system.

The Ellwood Foundry & Machine Shop recently reorganized with a capitalization of $75,000 now is known as the Ellwood Foundry & Machine Co., Ellwood City, Pa. C. W. Carbeau, formerly with the American Steel Co., Ellwood City, is treasurer. The company contemplates extensions to the pattern and machine shops, necessitating the purchase of additional equipment.

Baltimore

BALTIMORE, July 5.

The Seaboard Steel & Iron Corporation, 905 Lake Drive, Baltimore, has plans under way for the erection of a new one-story building at Paca and West streets, to cost about $25,000. William F. Holl is head.

The Holdtite Rubber Co., 919 Baltimore Street, Baltimore, recently organized to manufacture rubber specialties, has awarded a contract to R. B. Mason, 308 West Madison Street, for the superstructure of its new plant at Warner and Ostend streets, one-story, 50 x 125 ft., estimated to cost close to $30,000. Charles W. Lenden is in charge.

The quartermaster general, United States Army, Washington, is taking bids up to 3 p. m., July 25, for the purchase of two Government plants at Montreal, Que., comprising the works of the Peter Lyall Construction Co., with 24 buildings, totaling 260,350 sq. ft., and the plant of Munition & Machinery, Ltd., at Notre Dame, Seventeenth and Eighteenth streets, with one main three-story building, aggregating 45,000 sq. ft.

The Athens Railway & Electric Co., Athens, Ga., has arranged for a bond issue of $179,000, the proceeds to be used for general operations, improvements, etc.

The E. R. Parker Motor Co., Macon, Ga., is considering the rebuilding of its works, recently destroyed by fire with loss estimated at about $125,000.

Shapers, molders, sanders, jointers, band saws, rip saws and other machine equipment will be installed in the new plant to be erected by the Elkins Furniture Co., Elkins, N. C., to replace its works recently destroyed by fire with loss of about $100,000. Most of the machinery will be operated with individual motor drive. A list of equipment has been prepared. R. L. Hubbard is secretary and treasurer.

The War Department, Washington, will commence the immediate construction of a new automobile service and repair building at Columbia, S. C., for Federal motor trucks and cars. It will approximate about 3400 sq. ft. in floor area.

Plans for the construction of a new electric power plant for mill service are being prepared by the Thomaston Cotton Mills, Thomaston, Ga. R. E. Hightower is president.

The Albemarle Oil & Gas Co., Charlottesville, Va., is planning for the installation of new electrically operated pumping machinery, including self-measuring oil and gas pumps. A local building has been acquired for a new plant. J. B. Belk is manager.

Cleveland

CLEVELAND, July 5.

Sales during the week were in small volume and largely in single machines. The demand is coming mostly from small companies that need one or two tools to manufacture a new product. Some new inquiries for fair sized lots have come out, but as a rule these do not lead to the placing of orders, purchases being delayed until conditions improve. One new inquiry is for 32 machines. A Cleveland machine tool manufacturer has two inquiries for 10 or 12 gear hobbing machines for the automotive industries, one coming from Detroit and the other from Pennsylvania. Several inquiries are pending from Ohio schools for equipment for manual training departments, but in some cases the placing of the orders has been postponed. Sales by local dealers during June were generally lighter than in May, although one dealer reports more business in June than during the previous month. The State of Ohio has purchased several machines for the reformatory at Mansfield.

Price reductions of around 10 per cent have been announced by the U. S. Electric Tool Co., Cincinnati, on its line of tools. The Diamond Machine Co., Providence, R. I.,

has also made reductions on some of its types of grinding machines.

The Gaskill Industrial Furnace & Foundry Co., Cleveland, has been organized to manufacture the Gaskill oil-fired melting furnaces, the company having taken over the business of the Gaskill Furnace Co., Chicago, and moved it to Cleveland. It has been incorporated with a capital stock of $50,000 in preferred stock and 1000 shares of no par common stock and will make stationary, tilting and oscillating types of furnaces. Offices have been established at 402 Engineers Building. The officers have not yet been elected. James A. Gaskill will be the general manager. This design of furnace was described in THE IRON AGE, March 18, 1920.

The Riverside Bridge Works has placed a contract for an extension to its fabricating plant at Martins Ferry, Ohio, that will about double its capacity. The main building and machine shop will be extended and new blacksmith and pattern shops will be erected.

The Master Tool Co., 203 St. Clair Avenue, Cleveland, has been organized to succeed the Federal Engineering & Mfg. Co., and will devote its efforts largely to reclaiming old pneumatic tools. James Nightingale is president; C. F. Overly, vice-president and general manager, and William Eckert, secretary and treasurer.

The E. G. Atkins Co., Mansfield, Ohio, manufacturer of carburetors has increased its capital stock from 1300 to 2000 shares of no par value stock and is planning to increase its output.

The City Ice & Fuel Co., Cleveland, is planning the erection of a new ice manufacturing plant in Lakewood, a suburb. It is expected that the plant will involve an expenditure of $50,000.

A new one-story power house will be constructed by the Orr Felt & Blanket Co., Piqua, Ohio, for general mill service. Pretzinger & Susselman, 1155 Reibold Building, Dayton, Ohio, is architect.

The Lima Sheet Metal Products Co., Lima, Ohio, has awarded a contract to the Lima Construction Co., 215 South Central Avenue, for the erection of a one-story addition to its plant on Charles Street, 120 x 234 ft., estimated to cost about $50,000.

A power plant will be built by the Farmers Sugar Co., Defiance, Ohio, in connection with the erection of its one, two and three-story mill, estimated to cost about $1,000,000 with machinery. The power house will be of steam-operated type. A. H. Smith, 215 Nasby Building, Toledo, Ohio, is architect and engineer. Charles H. Allen is president.

Cincinnati

CINCINNATI, July 5.

Several of the larger manufacturers are contemplating closing down for a short period, as they have sufficient stock to take care of the present demand. While the market generally is dull, a few bright spots appear occasionally. One of these was the booking by a local concern recently of eight milling machines for a Japanese naval arsenal and another manufacturer secured several radial drills from the same source. Local manufacturers report the receipt of reinstatements on a number of machines destined for the automotive industry and the reinstatement of an order for a $10,000 machine with the prospects good for another order for a machine of the same type. Some of the above orders were canceled last fall. Dealers report the market for used machinery as very quiet although occasionally inquiries are received for several tools.

The Norton Iron Works, Ashland, Ky., recently purchased two-10-ton traveling cranes from the Bedford Foundry & Machine Co.

The Boss Service Co., Cincinnati, with a capitalization of $100,000 has been organized for the purpose of conducting a garage and service station at Twelfth and Sycamore streets. William Boss is president of the company.

The National Recording Pump Co., Dayton, Ohio, has been incorporated with a capitalization of $50,000 to manufacture a gasoline pump and oil filler. It has taken over the patents formerly held by the Protecto Pump Co. and is now in operation at Second and Dale streets. William T. Hatmaker is president.

An addition to the plant of the Herring-Hall & Marvin Safe Co., Hamilton, Ohio, has recently been completed at a cost of $75,000. It will be used for assembling purposes and practically all of the equipment has been purchased.

The Quick Change Chuck Mfg. Co., Arcanum, Ohio, manufacturer of the Quickchange chuck, is about to enter the aeroplane field and has signed a contract with the American Aeroplane Co. to manufacture and assemble its planes. Three of the machines are now in process. The company will devote its facilities to the manufacture of plane parts, tools, dies and special machinery. It is their intention in the near future to establish a landing field and erect hangars to house the machines. Fred Cline is president.

Milwaukee

MILWAUKEE, July 5.

A loosening tendency in the demand for machine tools is expected to develop with the passing of mid-year. While the local trade does not expect to see any large volume, nevertheless confidence is expressed in the possibilities of business from railroads, as well as from the automotive industries, which are getting back into a fair production schedule on passenger cars. The motor truck industry also is improving. Agricultural implements, including tractors, remain in a dull condition, with little hope of a revival before fall. Current transactions are light, and in general it may be said that June sales of tools were the smallest of any month this year.

The Bell Mfg. Co., Beaver Dam, Wis., manufacturer of barn equipment and other metal specialties for dairy and farm, has acquired the real estate, machinery and tools of the Helbing-Knaup Mfg. Co. in the same city, which recently went into the hands of a receiver. The Bell company intends to make alterations and rearrange the equipment, as well as to add some new machinery, and will then occupy the former Helbing-Knaup plant.

The Wisconsin Top Co., Inc., Racine, Wis., has been organized with an authorized capital stock of $300,000 to succeed to the business of the McAvoy Mfg. Co., Racine, manufacturer of closed bodies for passenger cars, winter tops, curtains, truck cabs, etc. The ownership and management remain unchanged. The incorporators are C. V. McAvoy, L. M. Johnston and O. M. Kalmeliano.

The Truckmixer Co., Milwaukee, has been incorporated to manufacture concrete mixers and allied machinery, as a development of the Stamp Machine Co., Milwaukee, The capital stock consists of $40,000 of preferred and 250 shares of common stock having no par value. For the present manufacturing operations will be carried on under contract with existing machine shops, but later it is intended to erect new works in Milwaukee. The incorporators are Edward Jacobi, Lorraine Stamp and H. O. Stamp, 3732 Walnut Street, Milwaukee.

The Hartenberger Double Wall Silo Co., Sheboygan, Wis., is completing plans for enlargement of its factory. The capital stock has been increased from $50,000 to $125,000 to finance the work and future increase in production.

The Moloch Co., Kaukauna, Wis., a consolidation of the Kaukauna Machine Works Co. and the Moloch Automatic Stoker Co., Chicago, on July 1 commenced operations in its new foundry and machine shop, erected and equipped at a cost of approximately $200,000. The foundry is 100 x 150 ft., and the machine shop of like dimensions. The principal product is mechanical stokers for boiler plants and the manufacture of Mayer power hammers also will be continued, on an increased scale. The Moloch Co. has unfilled orders which will keep it operating at capacity more than three months.

The village of Webster, Wis., has let contracts for the erection of a new high school, with manual arts department, costing about $90,000 complete. Shop equipment will be purchased within a short time. Paul C. Meyers is clerk of the board of education.

The Lighting Products Corporation, Wauwatosa, Wis., incorporated recently to manufacture electric lighting fixtures, devices, appliances, etc., has made a change of title to Light Products Co., and changed the capitalization to $25,000. Clarence Ullman, J. J. Meyer and W. F. Zack, all of Wauwatosa, are the principals in the enterprise.

Henry Fiege, Bayfield, Wis., who has succeeded Fiege Brothers as owner and manager of the Fiege Garage & Machine Co., will add a full story to the present building and erect a one-story brick addition, 30 x 100 ft., to be equipped as a machine and repair shop. Construction will begin about July 15.

The Fox Ice Co., Racine, Wis., has purchased a site, 125 x 200 ft., at Sixth and Racine streets and will erect an artificial ice producing plant and warehouse, 80 x 198 ft. The contract for furnishing and installing an ice machine with a capacity of 120 tons a day, and with electric motor drive, has been let to the Vilter Mfg. Co., Milwaukee.

The Wisconsin Textile Mfg. Co., Two Rivers, Wis., manufacturer of wood and metal supplies and specialties for the textile mill industry, will spend about $30,000 in the erection of an addition, 60 x 180 ft., which will include a steam generating plant. Gus. C. Kirst is president.

The Six-Wheel Truck Co. of Wisconsin, organized at

Fox Lake, Wis., with a capital stock of $50,000, to manufacture a new design of motor truck having six wheels, is negotiating for a permanent location of works and offices in Portage, Wis. H. E. Plumner, Portage, Wis., is handling negotiations.

The Great Northern Pail Co., Gillett, Wis., will erect a two-story addition, 36 x 93 ft., of brick and concrete, to accommodate a new department being established for the manufacture of veneer shipping cases in addition to the present line of candy pails and similar stade containers. Veneer cutting, electric motor and other equipment is now being purchased.

The A. H. Peterson Mfg. Co., 1614 Fratney Street, Milwaukee, established four years ago for the production of special tools and dies, is discontinuing this line to concentrate upon the manufacture of portable electric drills and other automotive appliances and devices. The entire plant is being re-arranged and considerable new machinery and equipment is being purchased. Some of the present equipment will be exchanged or rebuilt. The company is continuing production on a partial basis for 60 days while the works are changed over for the new line. A force of 200 will them be employed. Arno H. Peterson is president-treasurer and general manager.

The Central South

ST. LOUIS, July 2.

The Duplex Tire & Rubber Co., 322 Frisco Building, Joplin, Mo., will take bids at an early date for its proposed new three-story plant, 100 x 300 ft., and estimated to cost about $175,000 with machinery. R. W. Crissey is manager.

The Tennessee Charcoal Iron Co., Collinwood, Tenn., is planning for the installation of a new ice-manufacturing and refrigerating plant at its local properties.

Crushing, grinding and other mechanical equipment will be installed at the proposed new line manufacturing plant to be constructed by the Robinson Lime Co., Anderson, Tenn., recently organized with a capital of $250,000. The plant will have an initial capacity of about 50 tons per day. A. J. Robinson is president; and M. H. Bates, treasurer.

The Common Council, Independence, Mo., has approved a bond issue of $35,000 for the installation of a municipal electric power plant. Plans will be prepared at once.

Fire, June 26, destroyed the plant of the Curtis-Bentley Woodworking Co., Oklahoma City, Okla., comprising a three-story brick structure, with power house. The loss is estimated at about $500,000, including machinery. It is planned to rebuild.

The Porter-Holtkamp Motor Corporation, Richmond Heights, Mo., has plans under way for a new two-story machine and service works, 40 x 60 ft., on Sunset Avenue. George C. Porter is president.

The Brown-Harrison Welding Co., 1500 East Sixth Street, Little Rock, Ark., will install new welding equipment.

The Willis-Smiley Production & Refining Co., Springfield, Mo., recently organized with a capital of $250,000, will operate a local oil refinery. William E. Willis is president and general manager.

The Brookhaven Lumber & Mfg. Co., Hattiesburg, Miss., is planning to rebuild its plant, recently destroyed by fire. It will include planing mill, 80 x 120 ft., roughing department, 100 x 200 ft., dressing department, 100 x 200 ft., and other structures. Equipment will be aranged for individual motor drive. The new plant is estimated to cost in excess of $175,000. W. J. Dreyfus is manager.

The Gulf States

BIRMINGHAM, July 2.

The Alabama Power Co., Birmingham, has been granted permission to build its proposed hydroelectric generating plant at Duncan's Riffle on the Coosa River, near Verbena, estimated to cost about $7,000,000. It will have an ultimate generating capacity of 120,000-hp., with initial installation to total 60,000-hp. Work will begin at once and it is said that 24 months will be required to complete the project. About 6 miles of railroad line will be constructed to reach the site. Thomas W. Martin is president.

Freight handling and conveying machinery will be installed on the new wharf and dock to be constructed by the City Council, Orange, Tex. Bonds for $250,000 for the construction have been voted.

F. W. Crane, Austin, Tex., manufacturer of automobile tops, has plans under way for the erection of an addition to its plant.

The F. Streigler Mfg. Co., Fort McKavett, Tex., has been incorporated with a capital of $100,000 by Fritz Streigler, Fort McKavett; M. Whitely and A. O. Streigler, Eden, Tex., to manufacture automatic valves and kindred mechanical equipment.

The Department of Public Utilities, St. Petersburg, Fla., has plans under way for the installation of a new electric generating unit and other equipment at the municipal lighting plant, to increase the capacity of 7000 kw. R. E. Ludwig is director of the department.

Fire, June 22, destroyed the plant of the Henderson Cotton Oil Co., Shreveport, La., with loss estimated at about $300,000, including machinery. It will be rebuilt.

The Cobb Motor Co., Gadsden, Ala., will install a complete mechanical and machine department on the second floor of its building, for construction and repair work. J. J. Cobb is head.

A. A. Miller, Chattanooga, Tenn., is planning for the erection of an addition to the former municipal light and power plant at Fort Payne, Ala., recently acquired. New machinery will be installed and the capacity increased.

The United States Gypsum Co., 205 West Monroe Street, Chicago, is perfecting plans for the construction of its proposed new manufacturing plant in the vicinity of Sweetwater, Tex., estimated to cost close to $1,000,000, including machinery.

Oil-loading and bunkering machinery, and kindred mechanical equipment will be installed on the new local dock to be erected at Morgan's Point, near Houston, Tex., by the Humble Oil & Refining Co., Houston. It will be 20 x 100 ft.

California

LOS ANGELES, June 28.

The Leach-Biltwell Motor Co., 4800 Santa Fe Avenue, Los Angeles, manufacturer of automobiles and parts, has plans under way for extensions and improvements to cost about $25,000. New machinery will be installed, including foundry apparatus.

The American Auto Signal Co., Inc., Los Angeles, has been incorporated with a capital of $200,000 by E. W. McKinley, Arthur Dietz and W. E. Coffman, 5909 South San Pedro Street, to manufacture automobile signals and devices, and other kindred products.

The Republic Steel Package Co., 7930 Jones Road, Cleveland, has acquired property at Los Angeles for a new plant to handle Pacific Coast trade. The initial unit will be one-story, 60 x 300 ft., and will give employment to about 100. It is expected to break ground at an early date. S. B. Merry is treasurer.

The Clark-Turner Piston Co., Los Angeles, has been incorporated with a capital of $100,000 by Edward W. Clark, S. S. Turner and Fred C. Calloway, to manufacture pistons, piston rings and other motor equipment. It is now operating a plant on South Los Angeles Street, and has general expansion plans under way, including the erection of new buildings on South Utah Street.

The Southern California Edison Co., Los Angeles, is perfecting plans for the initial work in connection with the erection of a number of hydroelectric power plants on the Colorado River. The entire project will require a number of years to complete, and will include at least five large generating stations, with total cost in excess of $100,000,000.

Plans of New Companies

The Cook & Willoughby Co., 4465 Second Boulevard at Prentis, Detroit, is a manufacturers' agent and controls for the State of Michigan the French Houdaille shock absorbers. It is open for one or two more high grade accounts.

The Multiple Storage Battery Corporation, 350 Madison Avenue, New York, recently incorporated with an authorized capital of $1,000,000, has acquired the business of the Multiple Storage Battery Co., and is building a large addition to its plant at Jamaica, Long Island. The work is in the hands of Consulting Engineer Harvey E. Mole, 55 Liberty Street, and the building contract is being carried out by John Lowry, Jr., 171 Madison Avenue, New York. Herbert G. Clopper, formerly of the New Jersey Zinc Co., and more recently vice-president of the Eagle-Picher Lead Co., has been elected president and treasurer. Norman D. Sturges remains as vice-president and general manager and Jasper Bayne as secretary. The board of directors has been increased to include Howard Bayne and L. N. DeVausney.

Manufacturers' Japanning & Enameling Co., 548-50-52 Rising Sun Avenue, Philadelphia, recently incorporated, does not expect to build at the present time and is not in the market for equipment. It plans to conduct the business along the lines of its predecessor, G. W. Parvis, Jr., who assumes the presidency of the new corporation.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	3.13c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	3.13c.
Hoops, base price	4.15c. to 4.18c.
Bands, base price	3.78c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.23c.
Channels, angles and tees under 3 in. x ¼ in., base	3.23c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.13c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.33c.
Toe calk, ½ x ⅜ in. and larger	3.75c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.50c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.63c.
Squares, flats and hex	4.98c. to 5.13c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.23c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.88c.
No. 12	3.93c.
No. 14	3.98c.
No. 16	4.09c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.95c.	.....
Nos. 22 and 24	4.60c. to 5.00c.	5.60c.
No. 26	4.65c. to 5.05c.	5.65c.
No. 28	4.75c. to 5.15c.	5.75c.
No. 30	5.00c. to 5.40c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.50c. to 4.75c.
No. 16	4.75c. to 5.00c.
Nos. 18 and 20	4.90c. to 5.15c.
Nos. 22 and 24	5.05c. to 5.30c.
No. 26	5.20c. to 5.45c.
No. 27	5.35c. to 5.60c.
No. 28	5.50c. to 5.75c.
No. 30	6.00c. to 6.25c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt...	—46	—30	¾ in Butt....	—18	List
¾ in. Butt...	—52	—37	1-1½ in. Butt.	—20	— 2
1-3 in. Butt..	—54	—40	2 in. Lap	—14	+ 3
3½-6 in. Lap.	—49	—35	2½-6 in Lap..	—18	— 2
7-12 in. Lap..	—40	—24	7-12 in. Lap..	— 7	+10

Steel Wire

BASED PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c.
Annealed soft	4.50c.
Galvanized annealed	5.25c.
Coppered basic	5.00c.
Tinned soft Bessemer	6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16 c. to 19¼c.
High brass wire	17¼c. to 21¾c.
Brass rod	15 c. to 20¾c.
Brass tube brazed	29½c. to 31½c.
Brass tube seamless	19½c. to 20½c.
Copper tube, seamless	22½c. to 23¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. to 24c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20	
		Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$7.30 $7.05
		90 lb....	7.40 7.15
		100 lb....	7.50 7.25
IC..	$11.10 $10.00	IC...	7.70 7.45
IX..	12.30 11.25	IX...	8.60 8.35
IXX..	14.10 12.75	IXX...	9.60 9.35
IXXX..	16.10 14.75	IXXX...	11.00 10.75
IXXXX..	17.70 16.50	IXXXX...	12.00 11.75

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$8.00
IC	8.25
IX	8.50
Fire door stock	11.50

Tin

Straits pig	32c.
Bar	38c. to 40c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	24¼c.
No. 1 solder	21½c.
Refined solder	18½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	30c. to 33c.

Old Metals

The market continues quiet and transactions are scarce. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.25
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.75
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

THE IRON AGE

New York, July 14, 1921

ESTABLISHED 1855

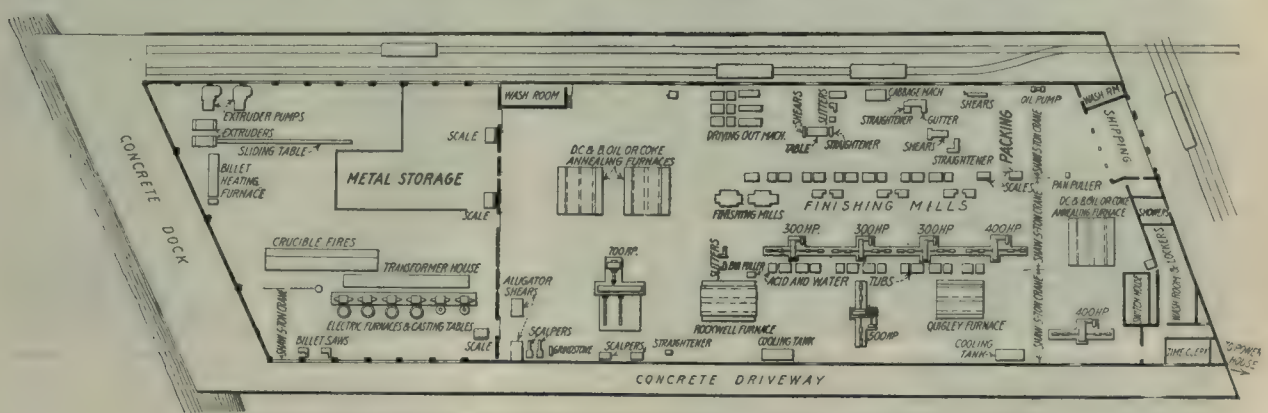
VOL. 108: No. 2.

Direct Routing in a Modern Brass Plant

Electricity Used Almost Exclusively for Melting in Detroit Copper and Brass Rolling Mills—Hand Labor Reduced to a Minimum

BY F. L. PRENTISS*

TWO new plant units recently have been placed in operation by the Detroit Copper & Brass Rolling Mills, Detroit, equipped according to the latest developments in processes and practices in the brass melting and manufacturing industry and arranged for economical production by the conservation of manual labor, use of handling equipment, and the direct routing of material in the process of manufacturing. A predominating feature is that electricity is used almost exclusively for the melting of brass. Pouring pits are virtually eliminated, thus economizing in labor. All mills shop through an alcove to the brass manufacturing department. After passing through break-down rolls, annealing furnaces, scalping machines, run-down rolls, other annealing furnaces and a second set of run-down rolls, the material goes through another annealing furnace at the end of the building, at right angles with the length of the building. Therefore the brass or copper charged into the furnace in the first bay is delivered from the opposite end of the annealing furnace into the second or middle bay, where all the finishing operations are performed. Two of the other annealing furnaces are similarly transversely arranged for convenience in routing the material from the finishing rolls to the adjoining bay for the operations that follow rolling.



Brass Melting and Brass Manufacturing Plants Occupy Adjoining Connected Buildings

The plant extensions include a melting shop and brass manufacturing plant occupying adjoining connected buildings with a brick wall between. The casting shop supplies metal for the entire works in the form of flat slabs, known as bars, for the brass department, and billets for rods, seamless tube and wire. Its daily capacity is 180,000 to 200,000 lb. The operations in the plant have shown that a much more uniform mixture is secured by the use of the electric furnaces and that the production costs have been reduced considerably as compared with the use of pit furnaces.

The brass manufacturing department is designed for large production of light, thin gage sheets, about one-half of the product being in 30 gage and lighter down to 0.001 in., and the remainder in heavier than 30 gage. In widths, the sheets are made up to 12 in.

Material has a direct routing from the casting and other manufacturing equipment are motor-driven.

The sheets pass back down the center bay in the opposite direction from which the material was routed in the first bay, the various rolling operations being performed en route. Then they pass directly over to the third bay for the operations following rolling, provided they are in the heavier gages. The lighter gages are given the necessary passes for further reductions through additional rolls on the opposite side of the center bay before going to the final finishing department.

Each bay is equipped with a 5-ton Shaw electric traveling crane, used for supplying the mills with metal. Trucks carry the metal from the rolls to the annealing furnaces. Similar cranes are provided in the casting shop for charging the furnaces, handling the bars and billets and for other service.

The casting shop is 199 ft. long and the brass manufacturing department, 474 ft. long. Both are

*Cleveland editor THE IRON AGE.

183 ft. wide, of steel and reinforced concrete, with practically continuous glass sides set in Fenestra steel sash. The casting house has two monitors, the side walls being 32 ft. high and the top being 45 ft. from the floor. The monitor sash are stationary, ventilation being provided through sixty-four 48-in. Swartwout ventilators in two rows, staggered. Continuous rolling steel doors are on each side of the building. Both buildings have wood block floors except in front of the furnaces. The roofs are of gypsum tile.

The casting shop extends over the Detroit River, the building site having been filled in for 150 ft. out to the harbor line, and a concrete dock extends along the water. It is the intention eventually to bring refined copper by boat from the head of the lakes direct to the plant. Two railroad tracks extend along the west side of the two buildings.

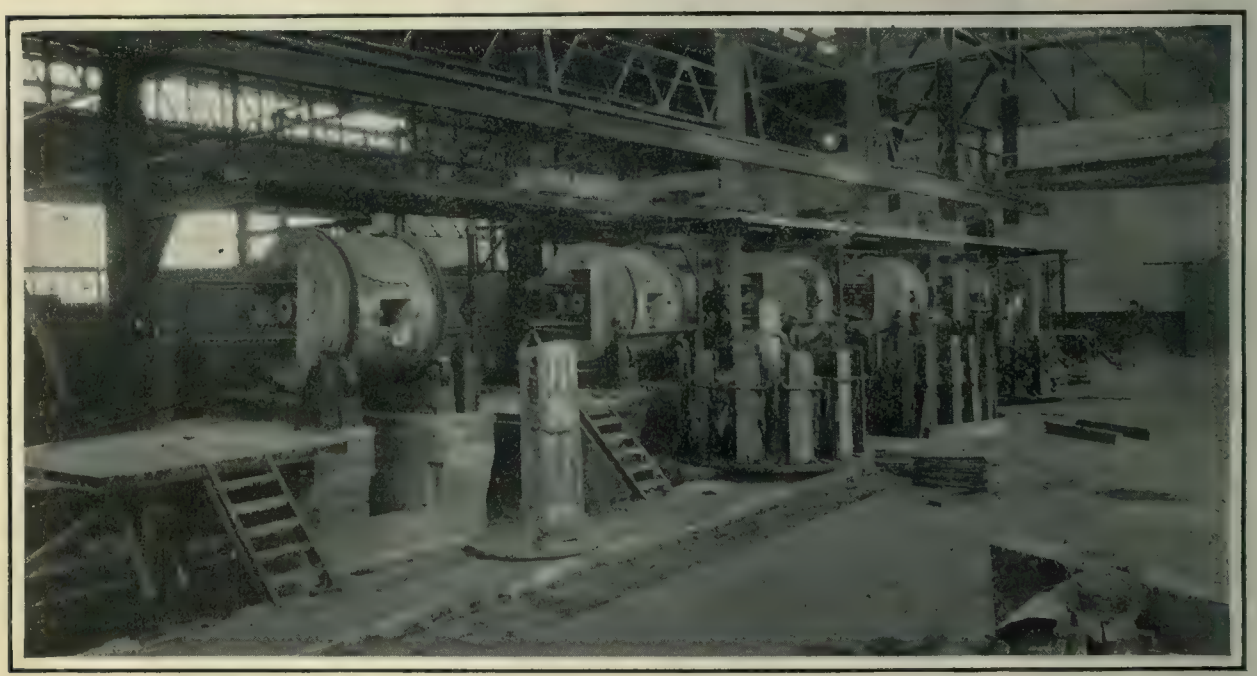
The brass manufacturing plant is of sawtooth construction, but differs in design from the usual building of this type. Instead of having equal column spacing in each direction, the distance between columns across the building is 60 ft. and the column spacing lengthwise is 20 ft. In place of the usual steel roof trusses, supported on the girders and columns, this building has sloping I-beam purlins, supported on lateral trusses and cantilevering over the trusses at the top, a distance of 2 ft. 4 in., to bring the sash out far enough from the truss to allow the ventilating sash in the sawtooth roof to swing in the center instead of at the top, as in the usual arrangement. The sash swings 120 deg., affording much better ventilation than a top-hung sash.

The casting shop is equipped with six 300 kw. melting furnaces of 2000 lb. capacity and two additional furnaces will be installed. One spare furnace drum is provided. The furnaces are of the rocking type, built by the Detroit Electric Furnace Co. They are in a row in the east bay and stand on 3½-ft. pedestals. The furnaces are fed from a charging floor that extends over the furnaces 2 ft. above the furnace tops and about 12 ft. above the floor of the casting shop. Above each furnace is a 14 x 22-in. hole in the charging floor, through which a funnel reaching down into the furnace is placed when charging.

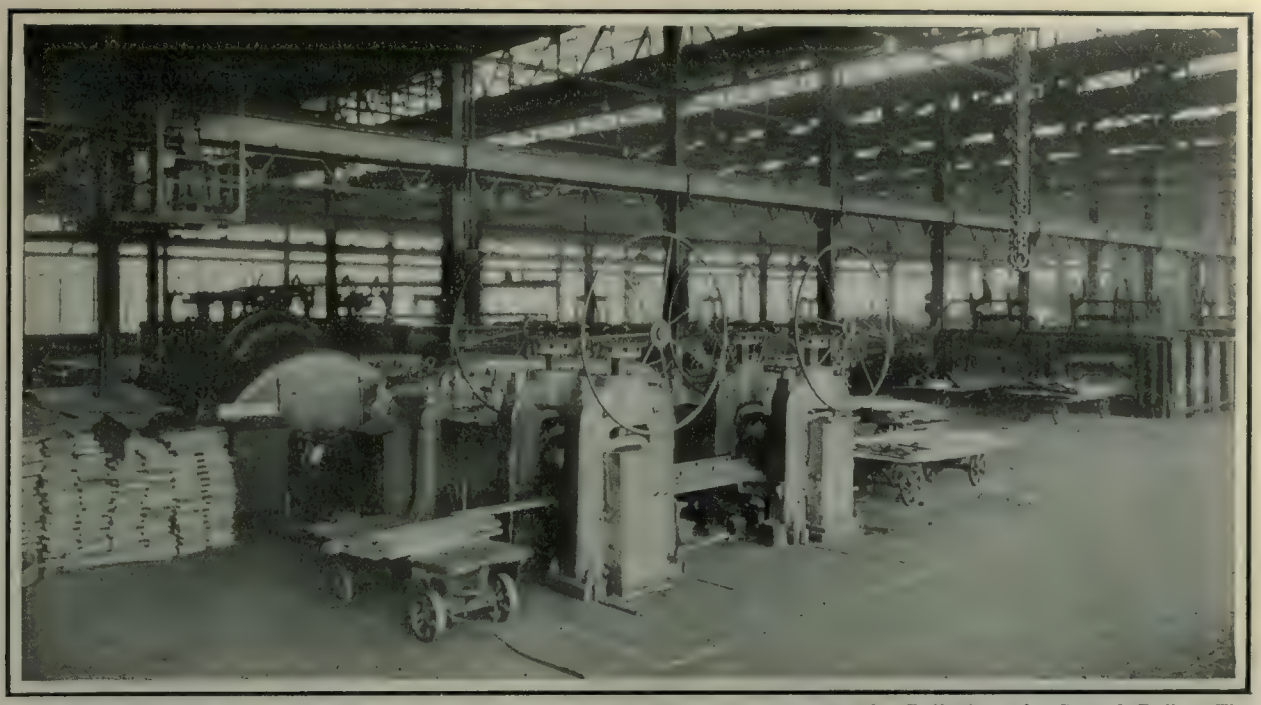
The charge of refined copper, spelter and scrap, and sometimes a little lead, is made up in the stock room in a portion of the two adjoining bays back of the melting furnace. A standard size of charging box is used, holding 2100 lb., the usual charge. This is placed on an electric truck which carries it to the furnace bay after being weighed. An electric traveling crane picks up the charging box and delivers it to the charging floor.

One of the interesting features of the casting shop is a specially designed turntable in front of each furnace on which the flat metal molds for casting brass sheet bars are carried. This turntable is approximately 10 ft. in diameter, and consists of a cast iron base, a section of pipe in the center forming the axis for revolving, and angle iron structural members which support the molds. The molds are of cast iron and consist of two parts hinged together, a stationary part being clamped to the frame of the turntable and the front part swinging on hinges. Before pouring, the two sections of the molds are clamped together at the top, bottom and center by three bands and wedges, the wedges being driven between the bands and the front of the molds, holding the two parts together firmly. Then a pouring box is placed over the top of the mold. The turntable revolves on ball bearings that support a sub-base 40 in. in diameter in which the turntable rests. The turntable is held in position by a cone cast to the sub-base into which the pipe axis of the turntable fits. At the top of this pipe is a hook for handling the turntable with the crane.

Turntables are provided in different heights to hold molds of different sizes, and little time is required in changing the table, should it be desired to pour molds of a different size. There is a mold capacity on the turntable for 2500 lb., but usually 20 molds are used for flat metal, these being sufficient for pouring one heat. The metal is poured directly from the furnace spout into a mold and then the turntable is moved until the next mold comes in line with the pouring spout. The turntable revolves so easily on the ball bearings that



Brass Is Melted in Electric Furnaces of the Oscillating Type and Poured Directly into Molds Set on Turntables. A standard sub-base is provided so that another table can be substituted if a change in the size of molds is required. A charging platform extends over the furnaces, the charging boxes being deposited on this platform by means of a traveling crane



The Break-down Rolls Are Arranged Tandem, the Bar Passing from One Side of the Rolls into the Second Rolls. The tandem rolls save considerable labor in handling the bars

one man can turn it. Turntables of similar design are used for handling billet molds, but as these are much larger, one turntable carries only three billet molds. The billets used for making rods and wire are cast 6 in. in diameter in 72 in. lengths, weighing approximately 750 lb. However, brass billets weighing as much as 5000 lb. have been cast in the plant. The billets are sawed into three 24-in. sections. A Newton cold saw cuts the billets and removes the gates.

In the center bay are 32 coke-fired, pit type, crucible furnaces, consisting of four floors with 8 furnaces to a floor. Adjoining these is a concrete pit for pouring the molds. The pit furnaces are used only as spare equipment for melting small quantities or special heats. Jib cranes handle the crucibles while pouring.

At the lower end of the center bay is a Marcy mill and three Wilfley tables for recovering brass and copper from the ashes of the pit furnaces and from the sweepings around the mills. These sweepings are dumped into a pit from which an elevator raises them to the mill. In this, the material is rotated in a barrel containing steel balls and crushed, separating the metal and ash. A stream of water washes the small pieces out through openings in the barrel to an oscillating separating, or washing table, over which water flows. The metal moves lengthwise over the table and is deposited in a trough, and the lighter matter, known as tailings, passes over one side of the table.

The scrap, or washings, from the table is passed through a magnetic separator and then sent back to the electric furnaces for re-melting. The fine material, or tailings, separated in the washing process, is sold to smelters. The reclaiming equipment was



For Removing Scale and the Rough Surface of Bars Up to 10½ In. Wide, Specially Designed Milling Machines Are Used. Two of these machines are shown at the right, and a straightening machine at the left

put in particularly for use with the pit furnaces, but with the departure from the original plan which has resulted in the almost exclusive use of the electric instead of pit furnaces, it is expected that there will not be much need for the mill and washing equipment. Experiments are now being conducted on the recovery of copper from the scale by the electrolytic process, which will be continued if it is found profitable.

The extrusion process will be used in the manufacture of rods from billets and two extrusion presses are now being installed in the cast shop. These are 2000-ton presses, built by the Southwark Foundry & Machine Co.

The brass manufacturing plant is equipped with 24 stands of rolls, located along the inner side of the east bay and on each side of the center bay, those in the center bay being finishing rolls. The first set is a tandem pair of 22-in. break-down rolls. The bar passes from the first set of rolls on to a guide and the roller pushes it along on the guide into the second set. Tandem rolls eliminate one trucking operation and the labor of two men is saved, as compared with the use of two separate single stands. Only four men are required to handle the bars through the tandem stands.

The bars, on entering the brass rolling department from the casting shop through an alcove, go to two motor-driven alligator shears where the gates are cut off and additional metal is removed, should the ends of the bars not be solid metal, and then go to the break-down rolls, each set reducing the thickness of the bars approximately 25 per cent.

After the two passes in the break-down rolls the bars are annealed in double-end annealing furnaces. There are 10 of these furnaces set in pairs, of the same size and generally similar in construction. They are of the under-fired type with chambers, 7 x 28 ft. The furnaces are oil-fired but they are so arranged that coal or coke can be substituted. The metal is charged into the annealing furnaces on long steel plates, or pans, placed on trucks that bring the pans to a level with the furnace floor. The pans are coupled and are pulled through the furnace with a winch, one charge being drawn in while the other is drawn out. The furnaces are Quigley and Rockwell makes and some designed in the plant.

After the first annealing the bars go to the opposite side of the bay where they are straightened on a five-roll straightening machine. Then the scale and rough surface are removed. Scalping machines, built by the Waterbury-Farrel Foundry & Machine Co., are used for the widest bars, but for widths up to 10½ in. a milling machine, built by the Torrington Co., is employed for scalping. This machine has a cutter 12 in. wide, similar to a milling cutter, and a capacity of milling both sides of 600 to 800 bars per day. After scalping, the bar is given another pass through each of the tandem break-down rolls, and on leaving the second set of rolls is coiled on a coiler attached to the mill stand.

All of the larger rolling units, after the break-down rolls, consist of two sets of rolls with a single drive. After the second pass through the break-down rolls, the next rolling operation is through 20-in. run-out rolls, and from there to another pair of annealing furnaces. Much of the metal is pickled after annealing by placing the brass on a truck and putting the truck and its load in a large pickling tank with an overhead crane.

After the 20-in. run-out rolls, the bar passes through a set of 18-in. run-out rolls. There are two sets of 18-in. rolls, one a finishing set having rolls 30 in. in width. The finishing rolls include six 16-in. rolls, arranged in pairs, and 10 smaller sets, six with 9-in. rolls and four with 10-in. rolls, both 16 in. in width. A separate drive is provided for each of the smaller finishing rolls.



The Finishing Mill Department in the Center Bay Has 18 Stands of Rolls, All Parallel. One of the annealing furnaces appears at the left

All of the rolls except the break-down rolls and the first run-out set are located in a line parallel to the length of the building. Unless sheets are to be rolled in very light gages the material, after passing through the larger finishing mills on the east side of the center bay, goes directly across to the west bay for the finishing operations that follow rolling. Some of the finishing rolls are so arranged that, if it is desired, the metal is given a pass through one set of rolls and back through the rolls of the adjoining mill that are running in the opposite direction. The mills were built by the Mesta Machine Co., Waterbury-Farrel Foundry & Machine Co., and the A. Garrison Foundry Co.

An interesting feature of the mill equipment is that the coilers are so designed that the motor that drives the coiler is attached to the bottom of the coiler table, and swings with the coiler to which it is directly geared, thus eliminating all belting. The motors for the coilers have push-button controls.

In the west bay are drying-out, shearing, slitting and straightening machines, and the packing and shipping department.

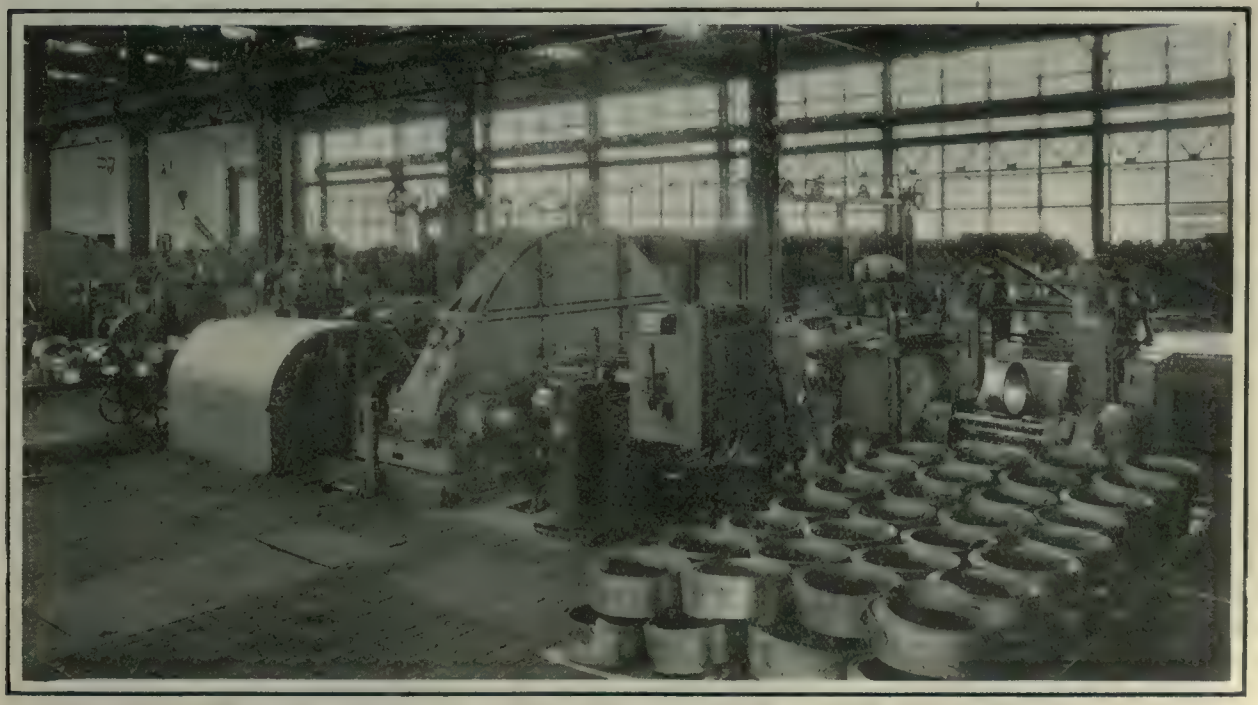


The Motor That Drives the Coiler Is Attached to the Bottom of the Coiler Table, with Which It Swings. Electric hoists run on the lower flange of the crane runway and serve pickling tables between the bays

Both rolls of the tandem break-down mill have an 800 hp. herringbone type of drive, furnished by the Mesta Machine Co. The speed of the first break-down roll is 19 r.p.m. and that of the second break-down roll 24 r.p.m. The drive is from a 750 hp. Allis-Chalmers motor. The other mills have the Falk drive and General Electric phase-wound induction motors. The 20-in. run-out mill is driven by a 500 hp. motor with a speed reduction from 435 to 29 r.p.m. The 18-in. run-out rolls are driven by a 400 hp. motor with a speed reduction from 450 to 39 r.p.m. The 18-in. finishing mill, with rolls 30 in. wide, is driven by a 400 hp. motor with a speed reduction from 450 to 39 r.p.m. For driving the six sets of 16-in. finishing rolls there are three 300 hp. motors with a speed reduction from 600 to 48 r.p.m. The smaller 9-in. and 10-in. finishing rolls have double reduction drives and are driven by 50 and 75 hp. motors at a speed reduction of from 1200 to approximately 75 r.p.m.

Electric current is received from a commercial station at 4600 volts and is stepped down to 440 volts for the rolling mill equipment, and to 110 volts for the electric furnaces. For emergency purposes current is also supplied at 440 volts from the power station. For the melting furnaces the current is stepped down at each furnace. A brick transformer house extends along the back of the melting furnaces. The mill motors up to 500 hp. are handled with relatively small drum control with only one lever. The controller rooms will be totally inclosed with a drum controller located in alcoves, connected to these rooms.

Uniform artificial illumination is provided in the brass manufacturing department with 500 watt Mazda lamps furnishing an intensity of 5 or 6 ft.



The Finishing Mill Has an Efficient Arrangement of Rolls, Drive, Control, Etc.

candles at the working plane. Most of the pickling tanks are between the columns and convenient to the adjoining finishing roll, a tank serving each set of rolls. Each of these tanks is served by an electric hoist that has as its runway the lower flange of the traveling crane runway, making a convenient and economical arrangement. Oil is stored in a 100,000-gallon concrete oil-proof tank located in the basement, from which it is pumped underground to the furnaces.

Well equipped physical and chemical laboratories and physical testing rooms are on the second floor at the front of the building. The physical testing room has equipment for testing temper, hardness and tensile strength. A sample of every heat when poured is taken for the laboratory.

A labor-saving method has been adopted for the delivery of sheet brass to Detroit consumers. The coils of brass are placed in a shipping box 3 ft. wide, 5 ft. long and 12 in. deep, having a capacity of 3600 lb. This is constructed of wood, with corners bound with angles and with steel straps and lugs at each end for handling with a crane. The material is delivered in the box and the empty boxes are brought back when the next delivery is made to the same plant.

The Detroit Copper & Brass Rolling Mills established a small plant in 1881 which has been extended from time to time and is one of the largest plants in this industry. Its products include brass and copper sheets and rods, seamless and brazed tubes and copper wire and various bronze products. It is stated that the plant is equipped to roll larger brass plates than are made in any other American plant and that during the war 80 per cent of the condensor plates for the Navy and Emergency Fleet Corporation were produced in these works. The plant has made brass plates up to 11 ft. 6 in. in diameter and 1 in. in thickness.

The new casting shop and brass manufacturing plant were designed by Smith, Hinchman & Grylls, engineers, Detroit.

POWER IN SUPERPOWER ZONE

Census Bureau Summary of Industrial Power and Fuel Consumption

WASHINGTON, July 9.—Power equipment and fuel consumption of plants in the superpower zone are shown by a statement prepared by the Census Bureau, in collaboration with the Superpower Survey of the United States Geological Survey. The superpower project contemplates the development of available water powers to supplement and equalize the power requirements of public service, manufacturing and other enterprises, and effect economies in fuel consumption.

The superpower zone embraces the North Atlantic area from Maryland to New Hampshire and includes all of Connecticut, Massachusetts, Rhode Island, New Jersey, and the District of Columbia; the southern portions of New Hampshire and Vermont, Kent and New Castle counties in Delaware; the central counties in Maryland; the eastern portion of Pennsylvania and the southeastern portion of New York.

Power and fuel statistics for the manufacturing establishments and mines and quarries in this area are given in the statement. The figures are based upon returns from 95,984 establishments. Of these 76,227, or 79.4 per cent, used power, the same including 73,694 manufacturers, 1563 laundries, 939 mines and quarries and 31 governmental institutions. The net total is 9,069,471 hp. of rated power equipment, primary and purchased, of which 5,336,627 hp., or 58.8 per cent, is represented as utilized, by electric motor equipment.

	Establishments Using Power	Horsepower Used, 1919			Fuel Used, 1919	
		Total	Prime Movers	Purchased Energy	Anthracite*	Coke and Bituminous†
Total	76,227	9,069,471	6,247,002	2,822,469	20,909,865	§40,330,352
Iron and steel	6,362	1,745,755	1,175,504	570,251	1,311,943	10,224,543
Metals, non-ferrous	3,423	405,249	245,774	159,475	883,861	1,545,733
Railroad repair shops	316	119,906	68,549	51,357	435,866	835,468
Vehicles	3,862	95,380	28,222	67,158	107,669	238,864
Mines and quarries	939	1,010,757	857,273	153,484	8,598,467	266,118
Above five classes	14,902	3,377,047	2,375,322	1,001,725	11,337,806	13,110,726
Per cent of total	19.5	37.2	38.0	35.5	54.2	32.5

*Tons of 2240 lb. †Tons of 2000 lb. §34,669,324 tons of bituminous coal and 5,661,028 tons of coke.

Power equipment	Units	Horsepower	Average Power
Aggregate	....	9,069,471	...
Prime movers	....	6,247,002	...
Steam engines	33,379	4,255,868	127.5
Steam turbines	2,115	1,171,061	553.7
Internal combustion engines	6,246	279,040	44.7
Water wheels	4,708	541,033	114.9
Operated by purchased energy	....	2,822,469	...
Electric motors	361,961	2,770,715	7.66
Other (mainly shaft power and compressed air)	....	51,754	...
Electric motors, total	560,907	5,336,627	9.53
Run by current generated in establishment	198,946	2,565,912	12.90
Run by purchased current	361,961	2,770,715	7.66

Canadian Steel Industry

TORONTO, ONT., July 9.—Stopping in Toronto for a day or two on his way to New York, Roy M. Wolvin, president British Empire Steel Corporation, Montreal, in an interview outlined the various promising features in the outlook of the Canadian steel industry. "The strongest hope for betterment," he said, "rests on the prospect of a revival in the domestic trade of Canada. A bumper grain crop, which now appears a probability, will add greatly to the purchasing power of the whole Dominion. If, in addition to this, the national railway situation improves so that the railways, our biggest consumers of steel, are in a financial position to undertake the work of replacements and extensions which are so sorely needed, the demand for steel products will increase substantially . . . " As to the British Empire Steel Corporation, Mr. Wolvin said that it had now seen its worst quarter, that of the first three months of this year, and that there had been a steady improvement since.

"Coal production costs are being reduced to some extent, owing to the greater efficiency of labor, and the benefit which is being derived from expenditures made last year on power plants and other improvements. The same applies generally to the steel plants. The Dominion Steel plants are to-day running about 70 per cent of last year's operations at this time."

While in England lately Mr. Wolvin was impressed by the seriousness of the financial situation there. The last week or two, however, had witnessed a number of favorable developments, including the termination of the strike. Still, England did not promise to become a buyer of Canadian steel products for some time.

LOCKERS IN STEEL PLANT

Clothes Airing and Locking Device of Youngstown Wire & Iron Co.

A sanitary and space saving locker system has been installed by the Youngstown Wire & Iron Co., Youngstown, Ohio, which consists of individual garment hangers, provided with locks, forming in effect an open locker for each workman.

The system provides a lock-controlled clothes hanger for each individual on which the clothes are suspended under the ceiling, where they are aired and dried. The garments and toilet articles are held in security and are still easily accessible to the holder of the key. The system is arranged in a large room so that a maximum number of men are accommodated with individual safe storage of their clothing, together with toilet and bathing facilities, leaving the larger part of the space, however, available for gymnasium drills or other purposes.

The unit hanger consists of a pan for storing soap, comb and brush, to which are attached four hooks on which the garments are suspended. The detail of the arrangement may be seen from the illustrations. Each of the hangers is suspended from a small chain, which passes over a pulley depending from the ceiling, then passing over a guide pulley, also attached to the ceiling in a position approximately over the rack to which the chain is fastened and locked.

The pulleys are provided with chain guides to prevent the chains from slipping out of the grooves. They are suitably spaced to permit circulation of air and are fastened partly to ceiling beams and partly to tubes running longitudinally under the ceiling.

One of the illustrations shows the location of racks at the plant of the Youngstown Wire & Iron Co., allowing use of almost the entire floor space, with ample provision for bathing, washing and dressing. The locking racks are formed of vertical tubes, fastened by means of a strap bar, resting upon horizontal angle bars and supported by tubular end posts and columns of the building. The upper part of the tube is open and provides for locking of the chain by means of padlock and ring. The chain is long enough to allow the hanger to be lowered to within easy reaching distance and when pulled up to the ceiling, the excess chain is neatly and compactly stowed in the tube.

When a workman arrives at the plant in the morning, he unlocks the particular chain assigned to him, lowers it, takes off his street clothes and puts on shop clothing. He then pulls the hanger up to ceiling, and locks the chain in the rack. In the evening he reverses the process. The janitor carries a master key, in case of loss of an employee's key.



Installation of the Locker System in Plant Shows Racks in Foreground and Background, Also Showers and Wash Basins, and Illustrates Space Saving

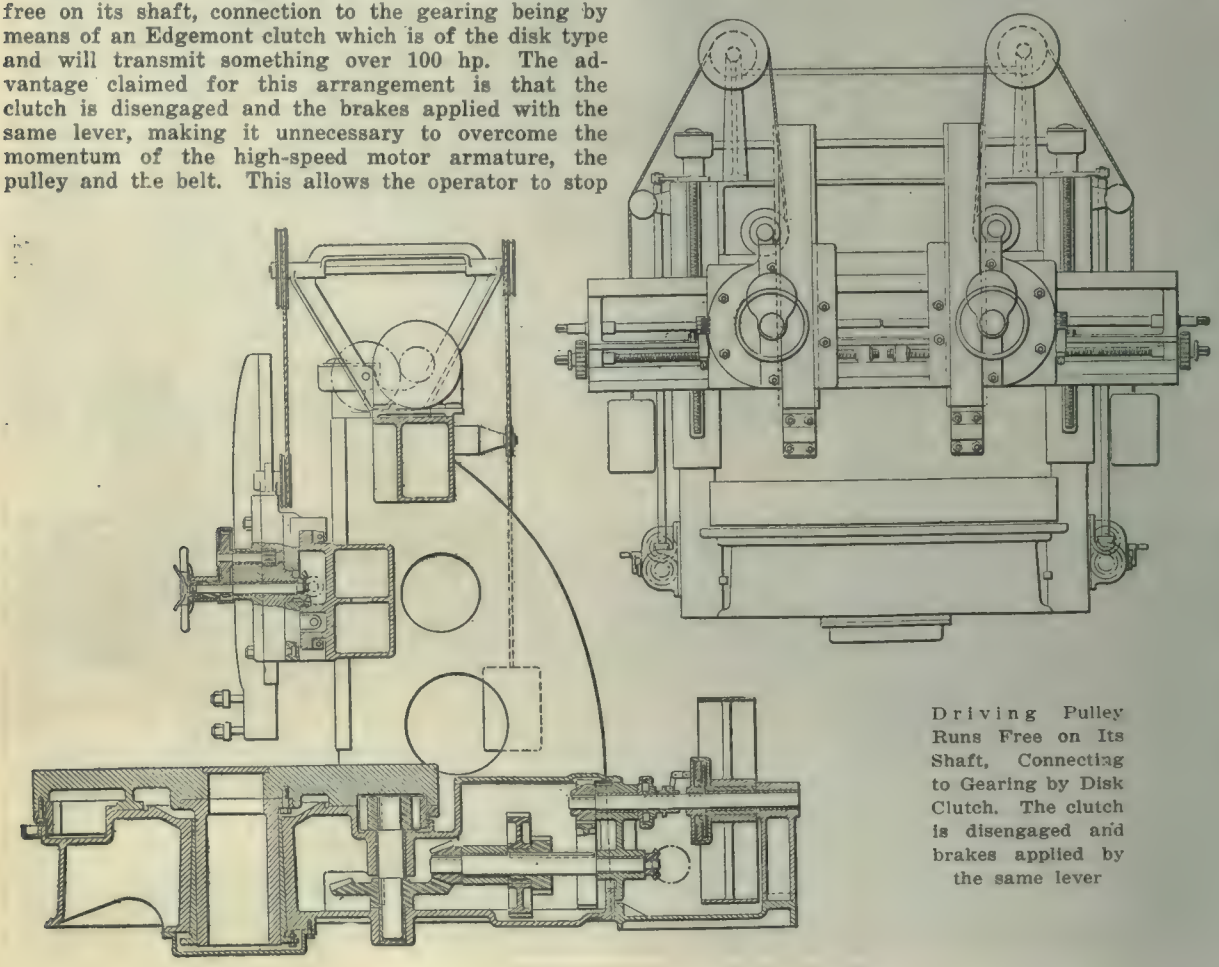
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The Pennsylvania Coal & Coke Corporation, operating 34 bituminous mines in the Central Pennsylvania field, announced July 5 that it has made a complete revision and reduction in all salaries, averaging about 20 per cent. The reduction, the officials state, applies to all officers, superintendents, foremen, monthly men, clerks, and stenographers, all operating departments and the general office in New York are affected. A statement by officials says that only nine of the 34 mines are operating owing to the impossibility of meeting competition in other fields operating on the 1917 scale of wages. The nine mines operating are working only from one to four days a week.

Railroad Boring Mill

To meet the requirements of locomotive building and railroad shops in performing turning and boring operations on engine wheels, the Colburn Machine Tool Co., Cleveland, and the Dale Machinery Co., New York and Chicago, co-operated in the development of a 90-in. machine, front and side views of which are shown in the accompanying line drawings. The first six machines were built on order for the American Locomotive Co., whose standard specifications for a heavy duty wheel boring and turning mill of the movable cross-rail type were adopted as a general guide for the designers.

In design the established practice in the construction of boring mills of the movable cross-rail type is followed. The following details, however, may be emphasized: Power is delivered to a single pulley from a 42½-hp. 3 to 1 variable speed motor which runs on 220-volt, direct current. The driving pulley on the machine is 44 x 12 in., carries a 10-in. belt, and runs free on its shaft, connection to the gearing being by means of an Edgemont clutch which is of the disk type and will transmit something over 100 hp. The advantage claimed for this arrangement is that the clutch is disengaged and the brakes applied with the same lever, making it unnecessary to overcome the momentum of the high-speed motor armature, the pulley and the belt. This allows the operator to stop the table instantly or to move it around slightly when setting tools or work.



Driving Pulley Runs Free on Its Shaft, Connecting to Gearing by Disk Clutch. The clutch is disengaged and brakes applied by the same lever

From the driving pulley power is transmitted through gears which are inclosed in the bed of the machine and run in oil. Feed lubricators are used to deliver oil to the spindle drive gears and feed change-gears. All gears are of steel with cut teeth and heat treated, so that they possess ample strength and durability, and in this connection it is of interest to know that the full back gear ratio is 104 to 1 with a maximum gear speed of only 1064 ft. per min. The table is driven by a pinion meshing with an internal gear.

The machine is said to have demonstrated its capacity for taking a maximum feed of ½ by ⅛ in. in steel, with a cutting speed of 60 ft. per min. The bed is of box form, reinforced with ribs and flanges. A cast-steel trough surrounds the bed to provide for catching cutting compound as it drips from the table. Large fitted bolts connect the bed and housings, which are also of box form and reinforced with ribs and flanges. The spindle is mounted on the table and has a suitable tapered bushing in the bed, which is provided with means of adjustment to compensate for wear. A powerful built-in independent 4-jaw chuck is provided on the table, and in common with other gears in the drive, the table gear and pinion run in oil.

A 5-hp. independent motor is provided for elevating and lowering the cross-rail, which is equipped with two independent saddles that are made right and left hand to adapt them for working close together. Either saddle may be moved to the center of the table for use in the performance of boring operations. All wear between the cross-rail and saddles, except on the face of the cross-rail, may be taken up with gibs made of cast-iron. The cross-rail is of the narrow guide type. It is made of cast-iron and the saddles of steel. The rams are of steel with cut rack teeth, and both swivels have adjustment up to 30 deg. on each side of the vertical position. Swiveling is accomplished by a worm and ratchet adjustment. Rapid hand movement is provided for the rams, and they are equipped with counterbalances that are arranged to exert a direct pull on the rams in any angular position. Feeds are reversible, changes of feed being accomplished by sliding gears and clutches.

Among the important dimensions may be mentioned: Maximum swing, 91⅛ in.; maximum distance between table and cross-rail, 46 in.; spindle travel, 42 in.; diameter of table, 87 in.; diameter of track, 52 in.; width of track, 6 in.; diameter of spindle, 18 in.; length of spindle in bearing, 28 in.; table-speed with back gears in 1⅛ to 4½ r.p.m.; table-speed with back gears out, 6 to 18 r.p.m.; number of available table speeds, 32; minimum vertical feed, 1⅛ in.; minimum horizontal feed, 0.022 in.; maximum horizontal feed, 0.672 in.; number of available vertical and horizontal reversible feeds, 8. The approximate weight of the machine, including the motor, is 67,000 lb.

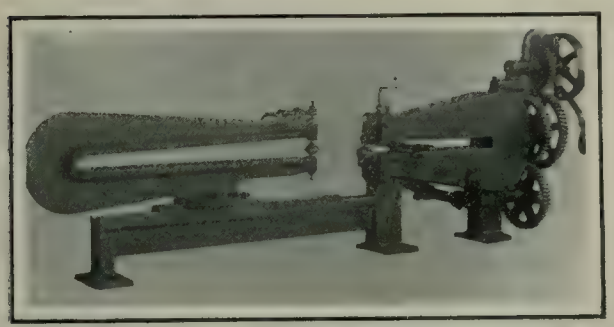
After a two-months' layoff, about 1200 machinists and helpers returned to work this week in the shops at Meadville, Pa., Kent, Cleveland and Galion, operated under jurisdiction of the Ohio region of the Erie railroad.

Ring and Circle Shear

A deep-throat ring and circle shear, designated as the No. 13-B, for light material, has been placed upon the market by the Niagara Machine & Tool Works, Buffalo, N. Y.

The machine is shown in the accompanying illustration and is regularly furnished for bench use, although high legs can be furnished if desired. Owing to the inclined position of the lower shaft and cutter internal circles or holes as well as outside circles can be cut. It is also suitable for cutting reverse curves within certain limits.

Cutters are 1⅝ in. in diameter, of tool steel, ground and hardened, and adjustment is provided for taking



Upper Cutter Can Be Raised and Lowered to Penetrate the Stock. This enables the cut to be started in the sheet, not only on the edge

up wear and for thickness of material to be cut. The upper cutter can be raised and lowered to penetrate the stock so that the cut can be started in the sheet, and not only on the edge. The slitting gage applied to the cutting head is accurate and readily adjustable for strips of various widths. The circle arm can be conveniently moved and fastened to proper distance from the cutters, according to the diameter to be cut. A scale graduated in 1/16 in. is marked on the circle arm support, and the proper position of the blank between the clamping disks is determined by a swinging gage and the cutters. An eccentric device is used for clamping. The clutch is actuated by a hand lever, permitting stopping the motion quickly at any point.

The machine will cut No. 20 gage soft steel and will circle from a square blank 3½ to 42 in. The distance from throat of cutting head to frame is 18 in. and to the gage, 9 in. The throat of circle arm is 30 in. The weight is 430 lb.

More Readjustment Necessary

WASHINGTON, July 12.—Mid-year statistical study of financial conditions has convinced the Federal Reserve Board "there are many factors which seem to make it sure that still further work in the direction of readjustment must be accomplished before even approximate stability can be arrived at. "Encouragement is found in the statement that the board believes that the facts now available indicate that the main elements in business and the industrial recession have made their effects manifest, and that there have been in the majority of lines fairly extensive realinements of relationships. It believes the spring months of 1921 were a period of approach to equilibrium in certain lines of business and of preparation for recovery from the depressed conditions that have developed.

"The board stated that the year 1920-21 has been a period of reorganization." This reorganization, with its effects, has, like all other great business changes, been directly reflected in our banking position and the corresponding position of banking systems the world over."

As to financial and economic tendencies of the readjustment period, the board stated that on the banking side, the characteristics have been "reduction of loans and bills held, retirement of note circulation, gain in gold, and liquidation of investments; while on the business side they have been lowering of production, growth of unemployment, falling off of foreign trade and reaction of prices."

Rolling Mill Leased

The newly erected rolling mill of the Capital City Iron & Steel Co., Harrisburg, Pa., has been leased to Joseph K. White and A. Leigh Ensinger, who will operate it as the Harrisburg Bar Mill Co.

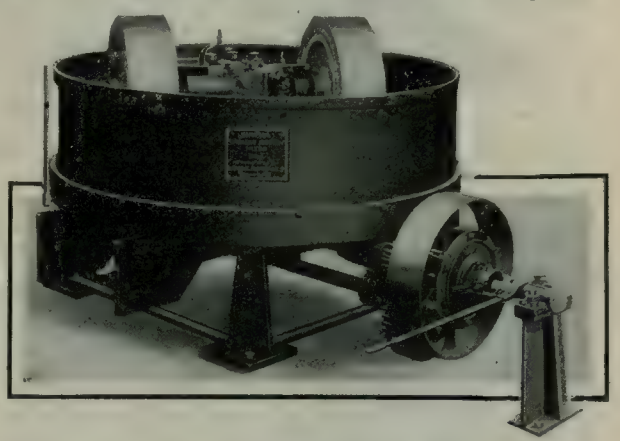
There are at present 9 and 12-in. Belgian mills in operation and a 16-in. mill is under way. The heating furnaces will be operated with oil for fuel and the power equipment is all electrical. The product will be rerolled iron and steel bars in all commercial shapes and sizes.

The purchases and sales will be in charge of Mr. White, who was formerly general sales agent of the Harrisburg Pipe & Pipe Bending Co. and retired at the time that the former owners withdrew. The operation of the plant will be in charge of Mr. Ensinger, also formerly connected with Harrisburg Pipe & Pipe Bending Co., lastly as chief engineer.

New Size Simpson Sand Mixer

The National Engineering Co., Chicago, is adding to its line of Simpson sand mixers a No. 3 size, with an 8 ft. diameter pan. The new machine is said to have been developed particularly for steel foundry purposes, although conveniently used where large capacities are required in gray-iron, malleable, brass and aluminum foundries.

The mixer will hold an average charge of 20 cu. ft., which, figuring 100 lb. of sand to the cubic foot, gives a capacity of 2000 lb. or 1 ton of sand. Smaller or larger batches may be mixed, depending on the particular mixture and the conditions of operation. The drive is from line shaft, or from counter shaft by an individual motor or by direct-connected gearing to a motor. The power in all cases is 25 hp. excepting where a bucket loader is attached, in which case 30 hp. is necessary.



The Cross Head Runs on a Ball Thrust Bearing. All bushings are removable

The parts subject to wear are of cast steel and the crosshead runs on a ball thrust bearing. The vertical shaft bushings are of bronze. All bushings are removable.

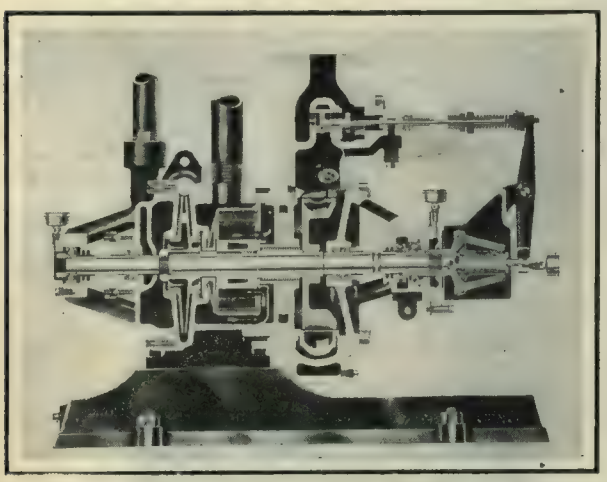
The microchanges which occur during the tempering of hardened steels is now under investigation by the Bureau of Standards, Washington, through its metallurgical division. It is necessary to take hardness measurements and make microscopic examination of all the specimens of each type of steel for each tempering treatment. Over 800 specimens are involved in the investigation and the time necessary for the mere polishing for examination is of course considerable.

Complaint has been filed with the Interstate Commerce Commission by the Brier Hill Steel Co., Youngstown Sheet & Tube Co. and Republic Iron & Steel Co. against the freight rates on limestone from quarries at Hillsville, Pa., to the companies' plants at Youngstown, Ohio. The complaint cites that the rate is discriminatory and unfair, not only to Youngstown, but to all iron and steel producers in the Mahoning and Shenango Valleys.

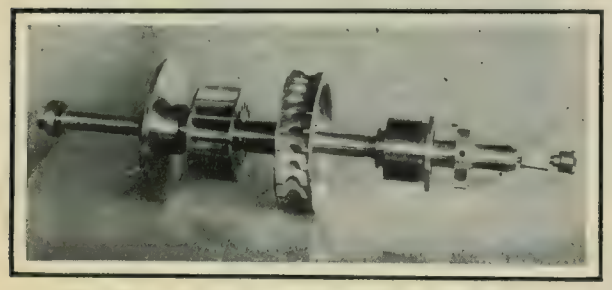
Turbine Driven Return Line Heating Pump

The Nash Engineering Co., South Norwalk, Conn., is placing on the market the Jennings steam turbine driven return line heating pump, a cross section view of which is shown in the accompanying illustration. This unit is designed for use with heating or drying systems where the pump is called upon to maintain both a vacuum on the heating system and to return the hot water and condensation against pressure.

The unit consists of two independent turbine pumps built in one casing; one pump handling the air, the other the condensation, the air and condensation being separated in a receiver under vacuum before entering the unit. This arrangement makes possible a saving in power, because the condensation, which is only one-eighth of the volume handled, is alone delivered against discharge pressure, the air being delivered to the atmosphere.



Two Independent Turbine Pumps Are Built in One Casing. One pump handles air, the other condensation, the air and condensation being separated in a receiver under vacuum



The Three Rotors Are Mounted on One Shaft

The air end is a development of the Hytor vacuum pump in which the rotor, the only moving part, revolves in an elliptical casing filled with water. The water turns with the rotor, but follows the casing, due to centrifugal force. The water end of the machine is a centrifugal pump with an enclosed type impeller designed to give high efficiency when handling hot water. It unloads when not handling condensation, and is said to require little increased power when delivering against low heads. Provision has been made to vent the centrifugal inlet back to the receiving tank, which is under vacuum, to eliminate air binding.

All interior parts of the pump are of bronze excepting the steam turbine rotor. No lubricant is required in the interior of the pump and no oil or grease can be introduced by the pump into the condensate. The shaft upon which the impeller, rotor and steam turbine wheel are mounted is supported by annular ball bearings mounted outside of the casing, in an adjustable housing. The steam turbine rotating element consists of a solid steel forging with blades milled out of the rim. A centrifugal throttling governor is furnished to maintain a constant steam turbine speed, automatically shutting off steam if the steam pressure rises or if the pump unloads when not handling condensation, preventing increase in speed.

The turbines are designed to operate at 75 lb. steam pressure, although the turbine casing is suitable for pressures up to 200 lb. If it is desirable to operate at pressures lower than 75 lb., a satisfactory operation can be secured on pressures as low as 40 lb. The pumps are furnished in sizes up to 300,000 sq. ft., of equivalent direct radiation.

Fluorspar in 1920

The total quantity of fluorspar reported as shipped from domestic mines in 1920, according to figures compiled by Hubert W. Davis of the United States Geological Survey was 186,778 net tons, valued at $4,718,547, which shows an increase of 35 per cent in quantity and 34 per cent in value as compared with the figures for 1919. The general average price per ton f.o.b. mines or shipping points for all grades of spar in 1920 was $25.26; in 1919 it was $25.49.

The imports of flurospar into the United States in 1920 were 24,612 short tons, valued at $265,630, an increase over 1919 of 254 per cent in quantity and of 147 per cent in value. The exports of fluorspar from the United States in 1920 amounted to 2764 short tons, valued at $65,475. All the fluorspar exported was sent to Canada.

The imports of fluorspar during the first four months of 1921, the greater part of which was brought from Canada, amounted to 4049 short tons, valued at $39,990.

Figures furnished by steel manufacturers who produce about 75 per cent of the output of basic open-hearth steel show that the steel industry consumed about 117,000 short tons of fluorspar in 1920 and that the stocks on hand Jan. 1, 1921, at all steel plants were about 66,600 short tons. From Jan. 1 to April 30, 1921, about 22,600 tons was consumed by basic open-hearth steel plants. Figures showing the shipments of domestic fluorspar to steel plants during this four-month period are not available, but the total was evidently small, and of the 4000 tons imported practically all has been taken by steel manufacturers.

Statistics of shipments of fluorspar by States, by grades, and by uses are now available and may be had on application to the Director, United States Geological Survey, Washington.

New Steel Plant in New South Wales

WASHINGTON, July 12.—A new steel works is to be established at Port Kembla, New South Wales, a new port 60 miles south of Sydney, according to a report received by the Bureau of Foreign and Domestic Commerce. A large breakwater is nearing completion, which will considerably enhance the natural facilities of the port and provide the required accommodation for the largest vessels trading to Australia. The port is in the center of a large coal mining district, and it is believed that when the works are in operation, many subsidiary industries, depending upon the free supply of iron and steel, will be established. It is stated that the outlay on the works will be in the neighborhood of £2,000,000. The same company is now operating iron and steel works at Lithgow, which is 100 miles inland from Sydney.

Suits for the recovery of $75,000 and a reasonable attorney fee recently were instituted against James C. Davis, Federal director-general of railroads, by the Central Iron & Steel Co., Harrisburg, Pa., in Federal court at Scranton, Pa. It is alleged that while the Government was in control of the Philadelphia & Reading and the Pennsylvania railroads, the plaintiff was compelled to do considerable shifting of cars into and out of its plant at its own expense in connection with shipments made over the roads mentioned, and that the shifting complained of should have been done by the railroads without cost to the plaintiff. Because of this, the plaintiff seeks to recover $40,000 for the shifting done on the Pennsylvania and $35,000 for the shifting done on the Philadelphia & Reading.

Repeated Shut Downs of Coke Ovens

Twenty Years' Experience With By-Product Plant Near Wheeling, W. Va., With Floods and Stoppage for Other Reasons

BY J. M. HASTINGS, JR.

THE impression seems to have gained considerable credence that a by-product coke oven plant cannot be allowed to become cold without serious consequences and more or less complete rebuilding before it can be started again. Some owners are even going to heavy expense to keep their oven plants hot, or are selling coke at a serious loss to avoid a shut-down. A report recently received from a plant of by-product ovens near Wheeling, W. Va., shows that a correctly designed plant may be shut down completely without serious injury.

In 1898 a plant of 60 Semet-Solvay ovens was built for the Riverside Iron Works, now owned by the National Tube Co. at Benwood, W. Va., just outside of Wheeling. Two years later 60 more ovens were added. The plant was built on the flat land along the Ohio



Oven in Operation 17 Years and Out of Running 20 Times for a Total of 5 Years and Yet Requiring No Replacements of Lining

River, and although the records of high water were carefully studied for a long period, the progressive denudation of the forests made these records of little value, and three years after the first ovens were started the plant was put out of operation by high water. During the twenty years from April 24, 1901, when this first shut-down occurred, to March 16, 1921, the date of the most recent shut-down, the Benwood coke oven plant has been closed down and started up again twenty distinct times.

Seven times in that period the Ohio has flooded the district and effectively put the ovens out of commission. Most of these interruptions were for relatively short periods, although in each case the plant was kept in operation until water entered the waste heat flues. In March, 1907, however, flood water was high enough to enter the sole flues and reach the oven floors proper, causing an 18-day shut-down, and in April, 1913, the worst flood in the history of the river brought the water into the lower heating flues 15 in. above the floor of the ovens. On this latter occasion a shut-down of 25 days resulted, largely because natural gas for starting up again was not available for some time after the flood subsided.

In addition to interruptions caused by floods, the plant has been down four times on account of coal shortage, twice for repairs to the hydraulic mains and seven times on account of business conditions. Duration of shut-downs from this last cause has ranged from one month in 1914 to a year and seven months in 1907 to 1909.

During its entire twenty-two and a half years' existence, the Benwood plant has been shut down 1958 days, or a total of 5-1/3 years up to March 16 of this year, since which date it has again been cold. Several other Semet-Solvay plants have been shut down for varying periods, but none has approached this record and probably none ever will, due to the peculiar circumstances at Benwood.

Notwithstanding this rather remarkable record of shut-downs, the present condition of the plant shows that it has suffered no serious damage. Of course these extraordinary and repeated stresses on such a large amount of brickwork cannot be encountered without some injury and expense for repairs. But the constrution of this type of oven, with the well-known strong division wall between the ovens, was so substantial that any injury occasioned by these vicissitudes has been of a minor nature, as is shown by the following records.

Of all the ovens built in the United States, No. 30 oven in block No. 1 at Benwood, illustrated in the accompanying cut, holds the record for low repair costs. This oven has been in operation 17 years and out of running 20 times for a total of over five years, and to date has required no replacements whatever in its lining or brickwork. No. 60 oven in block No. 2 is a close second, having required less than $20 expense for brickwork repairs. It should be further noted that the two ovens mentioned at Benwood are both end ovens, which is the point where injury to the structure of the blocks often first appears. The repair records of these two ovens are of course exceptional, but the record of the entire plant has been remarkable, despite the numerous interruptions.

In addition to these repair records on the ovens, the yields obtained at the Benwood plant have been very satisfactory and compare favorably with those from the best modern plants. For the five-year period from Jan. 1, 1915, to Jan. 1, 1920, during which time the plant enjoyed fairly continuous operation, the average results were as follows:

Analysis of Coal Charged		*Yields Obtained*	
Volatile	29.9 per cent	Total coke	78.2 per cent
Fixed carbon	62.2 per cent	Sulphate of ammonia,	24.5 lb. per ton
Ash	7.9 per cent	Light oil	3.11 gal. per ton
		Tar	10.0 gal. per ton

These records show conclusively that that plant has not suffered by reason of its many shut-downs and the same should be true for any correctly designed oven plant. Of course it is necessary to exercise care and to take certain precautions when closing down a coke oven plant for an indefinite period. The process is, in general, just the reverse of that employed in starting up a block. The heats should be lowered gradually by a gradual reduction in the supply of fuel gas, so that the contraction of the block will take place slowly and regularly. As this contraction progresses, the tie rods should be readjusted and a close watch maintained to guard against cracks developing.

If the coke is left in the ovens, as is sometimes done when a long shut-down is not anticipated, the greatest care must be used in sealing the ovens as nearly airtight as possible. The door frames must be kept tight

against the brickwork, uptake pipes maintained in proper position and charging hole covers sealed tight. With an experienced operator in charge there is no reason why a block of ovens of correct design cannot be shut down for a longer or shorter period, without extraordinary labor or heavy repair expense on starting up.

Steel Works and Rolling Mills

Census Bureau's Summary Concerning the Industry, 1919 and 1914

WASHINGTON, July 7.—Figures of the 1919 census of manufactures, with respect to steel works and rolling mills prepared by the Bureau of the Census, are based upon the returns from 487 establishments with products for the year valued at $2,814,179,000. At the census of 1914 there were 427 establishments with products valued at $918,664,600, an increase of $1,895,514,400, or 206 per cent, due very largely to increased unit prices.

The output of finished rolled products and forgings aggregated 25,368,000 gross tons, valued at $1,852,128,100, as compared with 18,482,000 tons and $623,486,000 in 1914; an increase of 37.3 per cent in tonnage and 197 per cent in values, and an increase in average unit values from $33.20 per gross ton in 1914 to $73 in 1919, or 120 per cent. Tonnage figures reported differ from those of the American Iron and Steel Institute, as given at pages 925 and 985, THE IRON AGE, Oct. 7 and 14, 1920.

The increase in leading groups of products was reported as follows:

Plates and sheets. Output, 1919, 7,682,000 tons,

Summary	1919		1914	
Number of establishments	487		427	
Steel works and rolling mills	149		113	
Steel works, no hot rolling	99		96	
Rolling mills, no steel furnaces	239		218	
Principal Materials Used	Quantity, Gross Tons	Cost	Quantity, Gross Tons	Cost
Pig iron	23,868,000	$579,948,000	17,128,000	$232,132,000
Spiegeleisen and ferromanganese	343,800	41,083,000	301,600	16,499,000
Other alloys (ferro and nonferro)	94,700	31,894,000		
Scrap purchased	6,944,300	143,072,000	5,070,900	59,382,000
Scrap made and consumed	9,197,800	.....	5,585,300	.....
Steel, crude and unfinished	9,353,600	388,412,000	6,458,400	132,178,000
Steel Production				
Total	33,908,800		23,383,500	
Open-hearth:				
Basic	25,642,000		16,233,100	
Acid	968,200		830,200	
Bessemer	6,946,600		6,218,800	
Crucible	64,300		79,800	
Electric and all other	287,700		21,600	
Ingots	33,287,300		22,814,300	
Direct castings	619,500		569,200	
*Products**	Quantity Gross Tons	Value	Quantity Gross Tons	Value
Total		$2,814,179,000		$918,664,600
Steel works and rolling mills		1,884,159,500		593,874,700
Steel works, no hot rolling		126,152,300		39,783,000
Rolling mills, no steel furnaces		803,867,200		285,006,900
Finished rolled products and forgings	25,368,000	1,852,128,100	18,482,000	623,486,000
Plates and sheets:				
Plates (No. 12 and thicker)	4,307,200	290,293,900	2,183,800	62,768,600
Sheets (No. 13 and thinner):				
Black for tinning	1,084,200	94,456,200	1,011,900	43,147,000
Other	2,290,600	227,284,200	1,515,500	67,017,400
Skelp	2,589,000	150,157,900	1,960,800	52,443,300
Cotton ties	42,700	3,509,500	603,900	19,945,100
Hoops, bands and strips	791,000	66,361,700		
Nail and tack plate	34,600	2,573,000	50,300	2,008,300
Rails	2,088,800	92,849,500	1,842,000	54,009,900
Rails, rerolled	95,600	4,738,900	63,700	1,438,200
Rail joints and fastenings, tie, plates, etc	462,700	27,596,700	349,300	11,527,000
Structural shapes	2,526,400	151,970,100	2,083,400	57,475,400
Steel bars, merchant, mill shafting, etc	4,026,400	326,729,300	2,062,800	71,352,400
Iron bars, merchant, etc	450,200	33,306,500	411,900	13,057,100
Reinforced concrete bars, iron and steel	301,400	18,426,800	269,700	7,751,500
Iron and steel rods:				
Wire rods to be drawn or rolled	2,484,400	126,738,100		
Cold-rolled, cold-drawn, etc	145,700	17,676,700	2,377,700	61,578,100
Rolled wire rods in coils or bars, crucible, electric or cementation steel	15,300	4,463,300		
Bolt and nut, spike and chain, horseshoe nail rods and horseshoe bars	223,400	14,616,500	535,900	18,319,900
Axles, rolled or forged	97,800	9,753,000	89,400	3,407,300
Armor plate and ordnance	101,100	55,699,600	38,700	19,947,900
Car and locomotive wheels, rolled or forged	117,700	17,044,700	1,031,100	56,291,600
Rolled, forged or other iron and steel products not otherwise enumerated	1,091,800	115,881,800		
Partly finished rolled products (sold or transferred to other works of same company)	9,266,000	389,596,300	6,408,000	130,674,900
Blooms, billets and slabs:				
Rolled for forging purposes	186,500	10,669,800	65,900	1,695,600
Hammered charcoal	17,800	920,700	.....	.....
All other (steel)	6,024,100	249,394,100	3,991,900	80,638,700
Sheet and tin-plate bars	2,864,600	117,855,800	2,241,700	45,372,800
Muck and scrap bar	173,000	10,755,900	108,500	2,967,800
Unrolled steel (sold or transferred to other works of same company):				
Ingots	713,000	33,315,200	63,400	1,383,500
Direct steel castings	585,000	112,153,600	569,200	44,733,700
Scrap iron or steel (for sale or transfer to other works of same company)	2,112,000	37,381,400	1,446,200	16,334,800
All other iron and steel products, including value added to rolling-mill products by further manufacture	.....	361,084,300	.....	85,239,000
All products other than steel or iron, including custom work and repairing	.....	28,520,100	.....	16,812,700

*In addition, steel castings and rolled steel valued at $5,419,600 was produced by 7 establishments in 1919; and to the value of $2,831,964 by 13 establishments in 1914, not classed as "Steel works and rolling mills."

valued at $612,034,300, an increase with respect to 1914 of 63 per cent in tonnage, 254 per cent in value, and in average unit value from $36.77 to $79.67 per ton.

Skelp. 2,589,000 tons, valued at $150,157,900, an increase of 58 per cent in tonnage and 186 per cent in value, and in average ton value from $26.75 to $58.

Rails. 2,088,800 tons, valued at $92,849,500, an increase of 13.4 per cent in tonnage and 71.9 per cent in value, and in average ton value from $29.32 to $44.45.

Structural shapes. 2,526,400 tons, valued at $151,970,100, an increase of 21.2 per cent in tonnage and 165 per cent in value, and in average ton value from $27.60 to $60.

Merchant bars, etc., iron and steel, 4,476,600 tons, valued at $360,035,800, an increase of 81 per cent in tonnage and 327 per cent in value, and in average ton value from $34.51 to $80.43, and

Wire rods, 2,645,400 tons, valued at $148,878,300, an increase of 11.2 per cent in tonnage and 142 per cent in value. and in average ton value from $25.90 to $56.28.

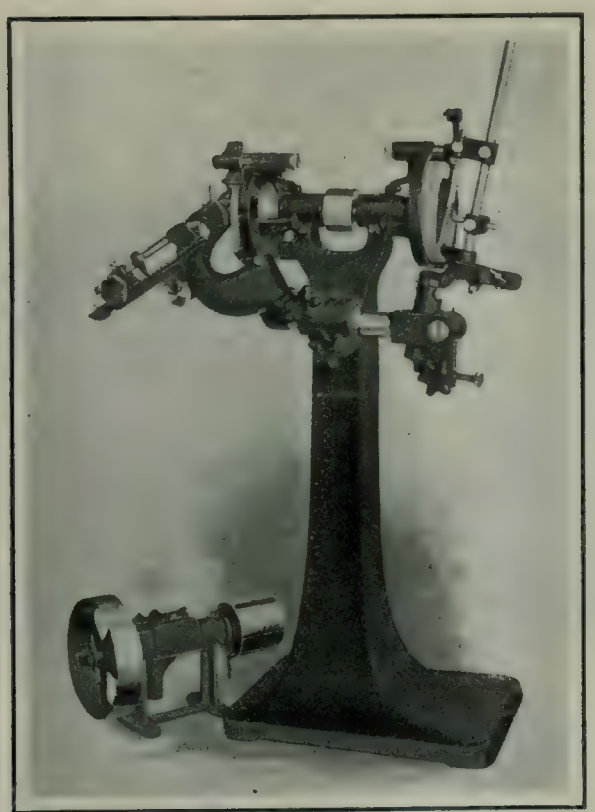
There was manufactured 33,908,800 tons of steel in 1919, compared with 23,383,500 tons in 1914, an increase of 45 per cent, chiefly in open-hearth steel. The plants consumed 23,868,000 tons of pig iron in 1919, or 78.14 per cent of the pig iron production for the year.

The per cent ratios of increase in average unit values, 1914 to 1919, for the different classes of products are quite uniform for all other than railroad steel, viz: 113 per cent for reinforced concrete bars; 117 for plates and sheets, skelp, or structural shapes and wire rods; 133 for merchant bars; 154 for cotton ties, hoops or bands, and 162 for axles; for steel rails the increase in average unit value was but 51.6 per cent.

Combination Tap and Drill Grinder

A combination tap and drill grinder intended for shops not having enough work to justify the installation of separate single purpose machines has been placed on the market by the Grand Rapids Grinding Machine Co., Grand Rapids, Mich. It is said to incorporate the features of the single purpose machines previously introduced and automatically grinds the same taper and clearance on every flute.

The machine is made in two styles of two sizes



Both Wheels Carry a Wheel-Truing Mechanism with Diamond

each. In the first style, taps No. 6 to 1½ in., and drills ⅛ to 1½ in., and No. 52 to ¾ in. can be ground, taper on taps being limited to width of the wheel which is regularly 1½ in. In the other style, taps ⅜ to 3 in., and drills ¼ to 2½ in. and ⅛ to 1½ in. can be handled. The latter combination can be furnished for wet grinding.

The drill grinding side is equipped with a holder stop, which, working in connection with the base of the diamond truing device, automatically places the drill holder in proper relationship with the face of the grinding wheel. This is said to be an exclusive feature. Both wheels carry a wheel-truing mechanism with diamond. machines of the first style having two types one of which is for truing the periphery of the tap grinding wheel and the other for truing the face of the drill grinding wheel. In machines of the second style both wheels are cup shaped and the diamond truing device is arranged for keeping the face of the wheel in proper shape. Diamonds of approximately ½ carat are furnished for each wheel.

The floor space occupied is 2 x 3½ ft., height to center of spindle, 44 in., and net weight 385 and 400 lbs. The specifications give the grinding wheels as 8½ x 10 in. in diameter; the spindle speed 1600 r.p.m.; the main frame studs 2¼ in. in diameter, and the swivel bearings 1½ x 4½ in.

Lower Prices in Refractories Expected

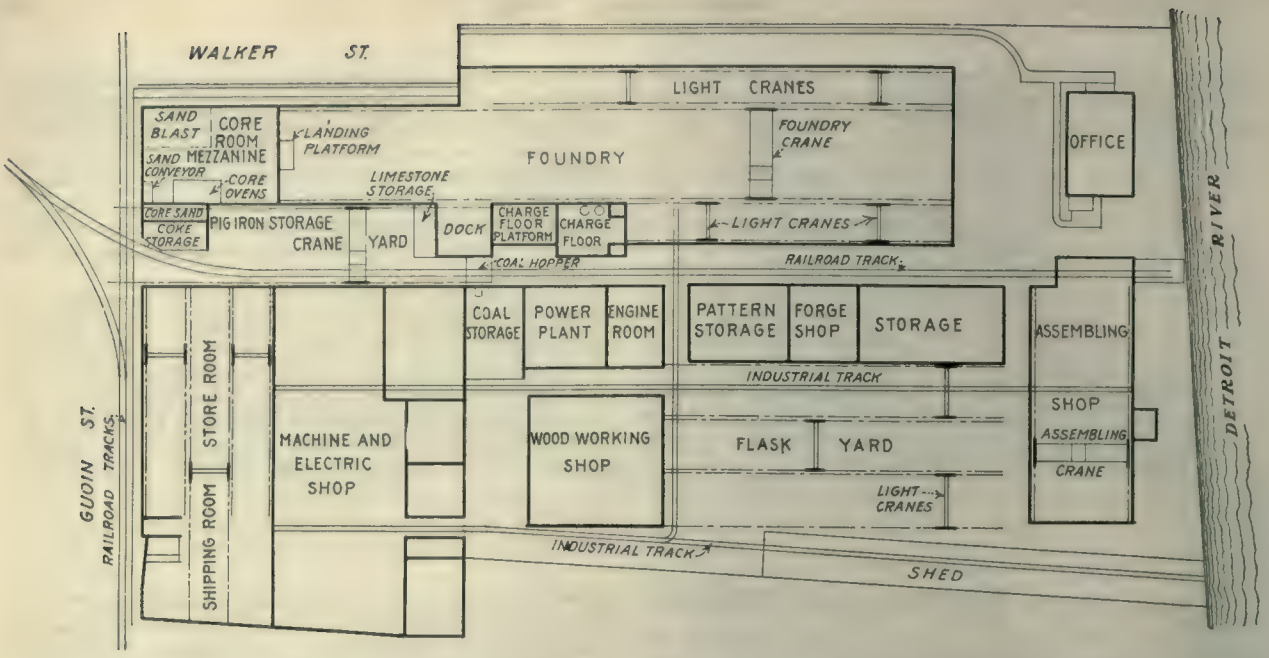
PITTSBURGH, July 11.—Prices of fire clay brick and other refractories are holding at the quotation established more than a month ago, but there is almost no business on account of the exceedingly limited activities of the iron and steel industry. It is more than probable that the appearance of attractive orders would lead to price concessions; in fact, it is currently reported that quietly there has been more or less shading of the public quotations on the small orders which have come out recently. In view of the recent public announcement of lower prices on steel, it is possible that the refractories industry, at an early date, may contribute to this step in the readjustment movement by making a voluntary reduction in prices as it did following the announcement by the Steel Corporation in April. Current operations of the refractories plants are running between 15 and 20 per cent of capacity. A good many plants in various parts of the country are shut down, and most of those which are running are producing special sizes and shapes. On standard sizes and shapes, most of the manufacturers are easily meeting current demands from their stocks.

We quote per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$36.00 to $43.00	$30.00 to $36.00
Ohio	36.00 to 40.00	30.00 to 35.00
Kentucky	36.00 to 40.00	34.00 to 38.00
Illinois	40.00 to 45.00	30.00 to 40.00
Missouri	45.00 to 50.00	35.00 to 40.00
Silica Brick:		
Pennsylvania		35.00 to 40.00
Chicago		42.00 to 45.00
Birmingham		46.00 to 50.00
Magnesite Brick:		
Standard size, per net ton		70.00 to 75.00
Chrome Brick:		
Standard size, per net ton		60.00 to 65.00

Ferromanganese Hearing Postponed

WASHINGTON, July 12.—Proceedings in the so-called ferromanganese anti-dumping case have again been postponed by the Federal Trade Commission, this time for one week, or until July 19, on account of the illness of Attorney Joseph E. Davies, representing respondents in the case. Mr. Davies is in a hospital in New York. The case is to be heard in that city at the offices of the commission when the hearings are resumed and at which time the respondents will submit their defense.



Handling Materials in a Remodeled Foundry

But Few Carrying Units Used at Murphy Iron Works, Detroit—New Crane Installations Saved in a Year Over Double Their Cost

MAKING over a foundry to an efficient and harmonious whole out of a series of disconnected units where the area was limited because of city streets was the problem faced by the engineers who remodeled the Murphy Iron Works, Detroit, maker of Murphy automatic furnaces and Riley underfeed stokers. The various buildings of the Murphy plant were constructed at widely separated intervals with no idea of co-ordination. The extension of the foundry, the installation of the yard crane and the present systems of handling were completed about a year ago.

In the remodeled plant comparatively few handling units are used, the great bulk of the material being moved by two electric traveling cranes only, one in the yard and one in the foundry. According to Frank B. Bigelow, general manager, and George I. Bouton, chief engineer, both of whom were responsible for the changes, in one year from the installation of the yard crane alone the company had saved more than twice the cost of the crane, the runways and the entire expense of installation.

Coke, coal, pig iron, sand, etc., are switched in on cars on the spur track between the foundry and machine shop buildings. This open space is covered by a 10-ton 3-motor Northern type E crane, 51 ft. span, designed with high speed to handle a clam shell bucket, a lifting magnet, and to be used for general handling purposes. The bucket is electric-driven with a motor

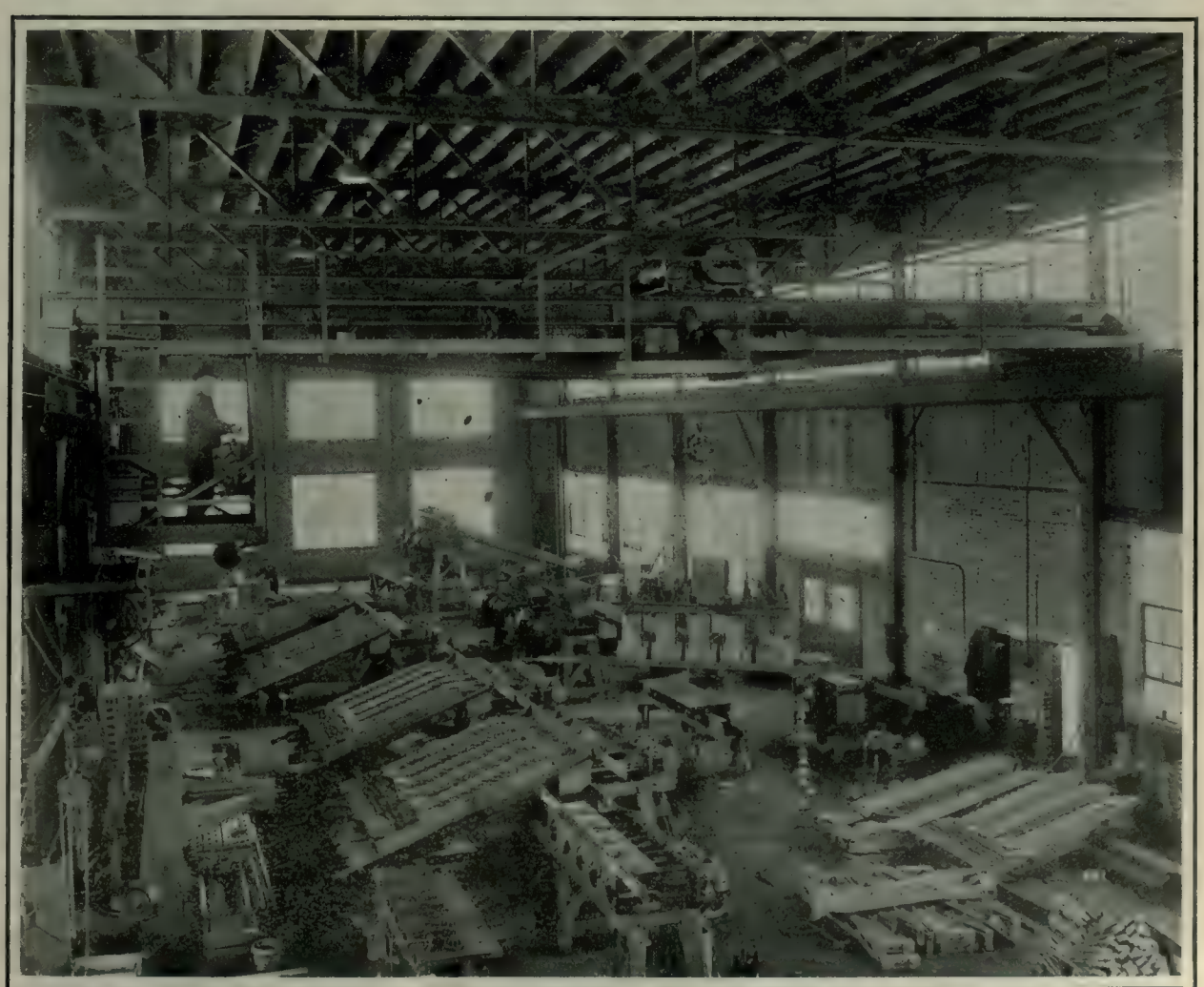


This Material Storage Openway Separates the Foundry from the Machine Shop and Other Units. The platform in the background holds raw material for near-future use in the cupolas beyond



The Crane Ladles Are Deposited on Floor Ladle Trucks, by Which the Molten Iron Is Distributed

in the bucket, 1 cu. yd. capacity, made by the Hayward Co., New York. The lifting magnet, 45 in. diameter, was manufactured by the Electric Controller & Mfg. Co., Cleveland. The crane runway extends in one direction as far as the angle of the foundry containing the cupolas, and in the other direction it cantilevers over the street, permitting the crane to handle material from the street railroad track at right angles to the yard track. An open landing platform, or dock, is at one end at the same level as the charging platform. This dock has a several days' storage capacity of raw material for the cupolas. A car of coke is



Underfeed Stokers and Automatic Furnaces Are Assembled in This Well-Lighted Bay, Served by a 7½-Ton Crane

switched in and unloaded by the crane and bucket in 60 to 90 min. The coke for immediate consumption is placed on the dock and the remainder deposited in the coke storage bin whence it may be transferred to the dock as required. The core sand and limestone are handled in like manner, the former being placed in the core sand storage bin, and the latter carried either directly to the dock or to the storage bin in the yard. For handling pig iron, the lifting magnet is substituted for the bucket, the change requiring only two minutes. The iron is unloaded from the car 1200 lb. at a lift. An average car can be unloaded in 30 min. The pig iron is placed in various piles in the yard until the analysis can be checked, whence it is transferred as required to the dock. Scrap for melting is handled in a like manner. The coal for the power plant is moved by the crane and bucket, being discharged into a steel hopper located over the railroad track from which it descends by gravity to the coal storage pile contiguous to the boiler house. A car of coal can be unloaded in 45 to 60 min.

From the dock the material is fed to the cupolas by industrial cars and charging boxes, and as each load passes through the door opening from the dock to the charging floor it is weighed by the scales at that point. An Otis electric elevator is located in one corner of the charging room, to be used as an auxiliary for carrying material in case of any interruption to the service of the yard crane, or in case that crane is being used on other service.

The foundry, with a capacity of 50 to 60 tons per day, is 500 ft. long, with the main bay 56 ft. in width and the side bays 25 ft. wide. The main bay is served by a Northern 10-ton 4-motor type E electric crane with a 5-ton auxiliary hoist, and in the side bays over the molding floors are several single girder cranes with electric hoists of 1 and 2-ton capacity. Two 84-in. Newten cupolas, made by the Northern Engineering Works, Detroit, melt the iron, and can be used together or alternately. The foundry is exceptionally light and airy and is provided with an efficient heating and ventilating system for which the Green Economizer Co. furnished the blower and the heating unit. A locker room for employees is under the docks and is provided with shower baths and other lavatory equipment.

At the north end of the foundry, is a mezzanine floor upon which are located the core room and the core ovens. The core sand is carried from the outside storage bin to mezzanine level by an electric-driven conveyor built to a special design by the Murphy Iron Works. The mezzanine floor is furnished with a landing platform so that the foundry crane can place on or remove any material from the mezzanine floor to the foundry floor.

Below the mezzanine on the main floor level is located a battery of electric-driven steel tumbling mills built by the Sly Mfg. Co., and also Mott sand blast equipment with its ventilating system, overhead tracks, etc.

The cores are baked on racks moved about on the core room floor by Barrett lifting trucks. When removed from the ovens, the racks are wheeled to the landing platform where they are picked up by the foundry crane and distributed to various parts of the foundry.

The iron is poured from the cupolas into a reservoir ladle on wheels suitable for being moved back and forth between the two cupola spouts. From the reservoir ladle it is received by the crane in a crane ladle and carried to a certain station in the foundry where the crane ladle is deposited in a special floor ladle truck with flat wheels which makes it possible to move the floor ladle from place to place. There are several of these floor ladle trucks at different points in the foundry, and the function of the crane, while pouring, is to deposit full ladles on the trucks at various points and take back the empty ladles for refilling. From the floor ladles the iron is distributed to the molds by hand ladles although in the case of large molds it is sometimes poured direct from the crane. With this system the one crane can take care of the entire foundry while pouring, as its function is principally to keep the floor ladles supplied with hot metal. The use of a standard overhead traveling crane for primary distribution to small ladles is interesting as compared with the usual monorail distributions.

In shaking out, the castings are collected in boxes and carried by the crane directly to the tumbling mills at the north end of the foundry. Sprues and risers are also carefully tumbled to free from sand before being returned to the cupola.

After the castings are tumbled or treated by the sand blast, they are carried in trucks on an industrial track to the machine shop, where they are handled by small cranes or overhead tracks. The small units are assembled in a shop adjacent to the machine shop but the large units are carried through various stages to the main assembling shop where they are handled by a 7½-ton Northern 3-motor crane, 44 ft. span. The railroad track also runs into this shop and the large units are loaded by the crane and shipped from this shop.

British Steel Exports at Low Point in May—Imports Declining

British steel exports in May this year, excluding iron ore and including scrap, were 101,202 gross tons as compared with 161,508 tons in April, 149,847 tons in March, 167,158 tons in February and with 233,114 tons in January. The May exports last year were 332,869 tons. The average per month in 1920 was 274,881 tons per month, while in 1913 it was 420,757 tons per month. The 1919 rate was 188,519 tons per month. The May outgo is therefore less than even the 1919 monthly average and close to the smallest in the war years. Imports in May were 89,348 tons, which contrast with 196,945 tons in January, 181,565 tons in February, 179,610 tons in March, 111,536 tons in April, and with 128,685 tons per month in 1920. The 1913 imports were 195,264 tons per month.

Expressed as a table the exports and imports this year and in previous years were as follows in gross tons:

	Exports	Imports
January, 1921	233,114	196,945
February, 1921	167,158	181,565
March, 1921	149,847	179,610
Average per month, first quarter, 1921	183,373	186,040
April, 1921	161,508	111,536
May, 1921	101,202	89,348
Average per month, 1919	188,519	50,801
Average per month, 1920	274,881	128,685
Average per month, 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data in gross tons:

	Average per Month		May	May
	1913	1920	1920	1921
Pig iron	78,771	38,505	51,633	7,673
Steel rails	41,676	11,213	11,088	10,522
Steel plates	11,162	16,571	19,621	5,607
Galvanized sheets	63,506	34,244	41,761	10,679
Steel bars	20,921	30,322	36,898	4,851
Tin plates	41,208	29,418	36,480	12,350
Black plates	5,679	3,026	3,846	979
Steel sheets	....	....	19,266	3,078

The May exports of all products showed a marked decline from May, 1920, and in most cases are not up to the average per month in 1913.

Pig iron imports in May were 19,344 tons as compared with 15,744 tons in May, 1920. The monthly average imports in 1920 and 1913 were 12,705 tons and 18,059 tons respectively.

Iron ore imports in May were only 15,696 tons as compared with 541,742 tons per month in 1920. In May, 1920, they were 710,592 tons. The total for the first five months was 1,249,957 tons as compared with 2,784,329 tons in the first five months in 1920.

Manganese ore imports were 21,518 tons in May against 37,717 tons per month in 1920 and 50,098 tons per month in 1913. The total to June 1 this year was 133,704 tons against 140,387 tons for the same five months last year.

Automobile production in the Detroit district during April, 1921, is reported at 140,955 cars, as compared with 105,245 in March, 1921, and 119,213 in April, 1920. The Ford production alone was 90,125 automobiles and trucks. Ford recently reached an output of 4000 a day.

Orders have been issued recalling 250 men to the shops of the Pennsylvania railroad at Logansport, Ind. They were laid off last December.

Cutting Overhead Cost Instead of Wages

A Large Detroit Automobile Company Paid War Time Wages, Ran Half Time and in the Same Period Made Profits

BY DON F. KENNEDY*

LAST December the automotive industry was at its lowest ebb. Cancellations had wiped out unfilled orders and shipments had eaten up the balance. Few, if any, new orders came in from day to day.

Employment in Detroit, the center of the industry, was at a crisis. The city poor commission was swamped with demands it could not fill. Clerks and stenographers from other city departments volunteered to work after hours to help the poor commission get caught up with the appeals of frantic fathers and mothers. All the chain grocery stores carried signs announcing that poor commission vouchers would be honored.

Factory after factory laid off men by the thousands. Some were running three days a week, some two days a week and many were closed tight, including some of the very largest.

At this time the writer interviewed the heads of representative manufacturing concerns to get their ideas toward labor in general, with particular reference to their intentions toward reducing wages, to obtain information for an article which appeared in the Dec. 9 issue of THE IRON AGE, entitled, "What will Employers Do About Labor?" Some were more or less open in their remarks, some were afraid to talk on the subject, and a few refused to be interviewed.

LAST December an automobile company cut the price of its car, but announced that it would not reduce the wages till the cost of living came down and justified it in doing so.

This article is written by the man who interviewed the factory manager. He now gives the results that have come from carrying out this policy.

The company has done as it said it would six months ago. The interesting part of the story is the ways in which it was actually able to make money through the bad times it experienced along with all the rest of the motor industry.

This was six months ago, before the attitude of labor had had time to adjust itself to the thought of lower wages which it has since accepted—and quite gracefully, too, for the most part. All these employers had reductions in mind, but only a few felt themselves quite justified, or had the moral courage to say so. They were not sure that they were morally warranted in reducing wage rates; that their attitude would be in line with public opinion; that their workmen were ready to accept wage cuts without protest, although they realized that with the unemployment situation such as it was, they could put into effect any kind of a cut, and get plenty of men, no matter what the wage.

I said that all the employers had reductions in mind. There was one exception. His ideas were different. His plant was running three days a week. Those readers who saw the article in question may recall that I quoted one man as saying that wages should not be reduced, and that his company for one would not reduce them until retail prices dropped sufficiently to warrant such a cut. His idea was that profits, overhead expense, manufacturing methods and material prices should be looked at closely, and reductions in expense made by cuts from these items rather than from the wages of the workmen.

Six months have elapsed and it should be interesting to find out how this theory has worked out in practice. I know that this attitude sounded more or less altruistic to me at the time. It was an admirable idea, but how practical? How would it work out in dollars and cents?

This company is one of the large automobile makers and a representative one. During the past winter it worked on an average of less than half time, which has about averaged up with the rest of the industry. It made a cut of more than $200 in the price of its car last fall. This represents more than the average automobile manufacturer's profit per car. The overhead expense of these enormous factories, filled as they are with expensive machinery, runs on day and night, whether the factory is running or closed. This company faced this situation; it was running less than half time, it had cut the price of its product as much or more than its normal profit, and it proposed to keep wages up to war-time standards.

How Has It Worked Out?

I called there again the other day and saw how it had worked out. I found that the first wage cut was being put into effect the day I called in the middle of May. It was almost six months from the time of the original interview. Comparison between the wages paid in that plant and those paid in other similar plants in the city showed that this company was paying higher rates than the average in every department. These figures are at the disposal of all members of the Employers' Association of that city.

Running less than half time and keeping up war-time wages, the company has actually made money every month! The seemingly altruistic general manager has actually put his plan into effect and made money while doing it.

"We are turning out a better car to-day," he said, "than we have ever turned out. Our standards of accuracy are higher. We, in common with all manufacturers, were inclined to let things slip a little during the great pressure that was brought to bear on the automotive industry during the past two years. We find, however, that everyone handling our cars is becoming more particular. The buyer now complains of little matters which formerly would have been overlooked. The dealer in the past would fix them up himself and say nothing. Now he complains to the distributor. The distributor collects all these instances together and brings them to the factory.

"Several months ago we brought to the factory in convention the service managers of our ten largest distributors, located in the principal cities all over the country. Together we went over the

*Sales engineer, Detroit.

praiseworthy idea that a system or a report will make things go better.

'So he starts one, without the supervision of the executive who has a better outlook on the relation of that idea to the whole situation. Sometimes reports grow out of the necessities of the time. They continue long after their usefulness has ceased. Some are started in error; they never had an adequate excuse for existence.

"Each individual has his own ideas. All want to improve on the work of their predecessors, which is quite natural. It is the fault of the executives that so many systems are allowed to develop.

"And the cost of all these systems and reports may be just the difference between profit and loss on the balance sheet. You start the memorandum system and it goes on indefinitely. A man writes a memorandum to a department with copies perhaps for several other departments. The memorandum gets attention, and the copies get attention, and they probably all get answered, which answers call for still further replies. These get interchanged, taking up the time of a lot of people, and the copies and answers clutter up the files so that you can't find what you do need. A virtual chain-letter system develops that keeps stenographers busy on unimportant work.

"There are not more than 100 memoranda in any one department in the course of a year that are useful three months after they are written."

"How did you happen to get started on this subject of eliminating reports?" I asked him. "Where did you commence?"

"The first thing I did," he replied, "was to lay out on my desk all the reports that came into this office. They more than covered it. I analyzed them all to see how much of this information was actually necessary for the running of this business. I came to the conclusion that it could all be condensed in very much smaller space. Every report represents considerable time of various people in compiling it.

Started on His Assistant First

"My first job was to show my assistant that our system had run away from us so that our men were working for the benefit of the system, rather than using the system for the benefit of the balance sheet. He was the hardest man to convince. He finally saw things my way and together we went through this report business.

"We looked into our welfare department. Like everyone else who has had the subject of labor to contend with the last few years, we found that we had to take more interest in the problem. We developed a welfare department, and had been recently considering some additions to it.

"Looking into the various records and reports we had gradually developed, I came to the conclusion that we, as well as other employers, were acting as though the workman was a child to be held in our lap. We decided that we were interesting ourselves in a lot of things that were none of our business. What records are actually needed in hiring and firing? We came to the conclusion that our one original employment card has all the necessary information. This tells us when a man applies for work whether he has worked for us before; if so, when; how much he was making, and why he left.

"Several years ago we decided to manufacture some of our units that we had formerly purchased. I made an extensive trip around the country investigating systems developed by other manufacturers. I found one in an Eastern shoe factory that had given desirable satisfaction and I decided that this or a modification of it was better adapted to the new work we were undertaking at our plant than any I had seen. I handed it over to our people to develop. They installed the system, and as is perfectly natural, 'improved' on it. The result was that we had to have a $5,000 man to run the system.

"Now I looked into the workings of our elaborate cost system. The first thing I found was that it didn't tell us our costs. None of these elaborate systems do. We made it both simpler and more accurate.

"Another system that had developed unnoticed to a point where it was costing us $12,500 a year was a cross index of the parts numbers of all the parts of each individual car. By means of it, knowing the number of the frame, the magneto and the clutch, we could tell the number of the car. You can see what a cumbersome thing this becomes when keeping track of cars by the 100,000.

"We have so simplified and condensed our records that our time study, stores and production systems are all under one head."

Many Inspectors Eliminated

"We went after our inspection system. The customary system is wrong end foremost. You pay a mechanic $1 an hour to produce accurate parts, and then pay a non-mechanic 50 cents an hour to watch the mechanic. The mechanic who knows an inspector will catch his errors won't try very hard to get the work right in the first place.

"We now hold the department foremen responsible for the work. The foreman of each operation is held responsible for his part of the work until it gets to the assembly line, where the first inspectors are stationed. We have almost entirely eliminated the use of inspectors on minor operations but use them to catch any work not up to standard at the various assembly points. In return for this responsibility we are paying most of our foremen a little more money than we did.

"We find that when the workmen know that it is up to them to turn the work out right with no inspector except their foremen to catch it if it isn't, they will do it properly in the first place. This change has given us better results at a lower cost.

"During the war times we hired a number of outside factories in which to make parts of our car. The cost of trucking materials to and from the branch factories and the main plant was a large item of the expense. This has been eliminated."

I asked him what they had done about contracts for raw materials, that is, about canceling them. "We have never tried to evade our obligations under a signed contract. I instructed our purchasing department to act under the theory that we made the contracts in good faith, and to act accordingly. We have made requests for reductions from most of our sources of supply with whom we had contracts, and have had very satisfactory co-operation from most of them.

Decided Stock Chasers Are Unnecessary

"Another thing we have done is to eliminate all stock chasers. I came to the conclusion that we did not give our suppliers sufficient credit for being good business men, for wanting our business, and being just as anxious to ship their stuff to steady customers who always pay their bills on the 10th, as we were to get them. We have eliminated all of this expense."

"But what about your whole production line being held up for lack of some one part? Do you

not consider a stock chaser needed for such emergencies?" I asked him.

"Why chase one temporary item?" he replied. "As soon as that is found some other item is missing, and so on. No, we have stopped them all. We have also eliminated this local stock chasing around town which is peculiar to Detroit. In other cities supply dealers deliver their material. Here in Detroit we send out pick-up cars and collect our various purchases here and there. We have stopped them all, and their salaries and traveling expenses.

"We have consolidated departments. The simplification of our system has rendered unnecessary certain high-salaried department heads. It has cut out useless effort on the part of a lot of clerks, stenographers and department heads. We combined the functions of several departments under one head, instead of three or four. We have cut out straw bosses and inspectors. Our workmen are contented. They are producing more per man. They have a most kindly feeling toward our company which I know will last for a long time, and we have the satisfaction of knowing that we followed a policy we felt to be right, and made money for our stockholders while doing it."

I admit that this is a feat, one worthy of study and thought. This man's experience goes a long way toward answering the question so often asked when such questions as upholding wages arise: "We know it sounds ideal, but is it practical?"

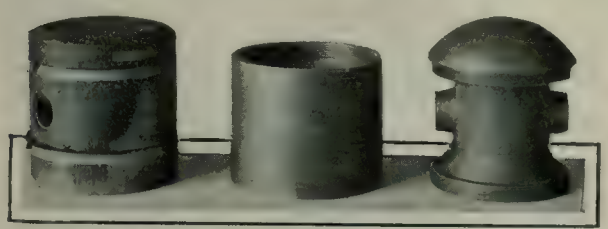
A Gas-Engine Piston Without Rings

Importance of the Continuous Oil Film in Lubrication Stressed—Avoidance of Uneven Expansion

BY STERLING H. BUNNELL*

BY theory and many tests it has been shown that two surfaces, such as a shaft and its bearing, are kept apart by the surface-tension of a film of oil or grease. By loading the bearing, the oil film is forced to become thinner in the direction of the greatest strain. As the shaft revolves, oil entering the bearing at an opening, generally at the top, travels around the shaft in a film of gradually decreasing thickness until at the bottom of the bearing the minimum is reached. Passing on around the bearing in the direction of motion the oil film becomes thicker toward the unloaded portion of the bearing surface, at which point the pressure is sufficiently low to permit the introduction of the lubricating supply.

If the load in the bearing is gradually increased, under test conditions, it is observed that the oil film becomes thinner at the line of greatest strain; until finally under excessive pressure the film is broken and the shaft comes in contact with the bearing surface and seizes. Evidently anything which tends to disturb



At Left Is a Ringed Piston Just as Removed from the Cylinder, with a Heavy Carbon Deposit. At right is the new Tismer piston center, upon which the thin barrel (center) is screwed

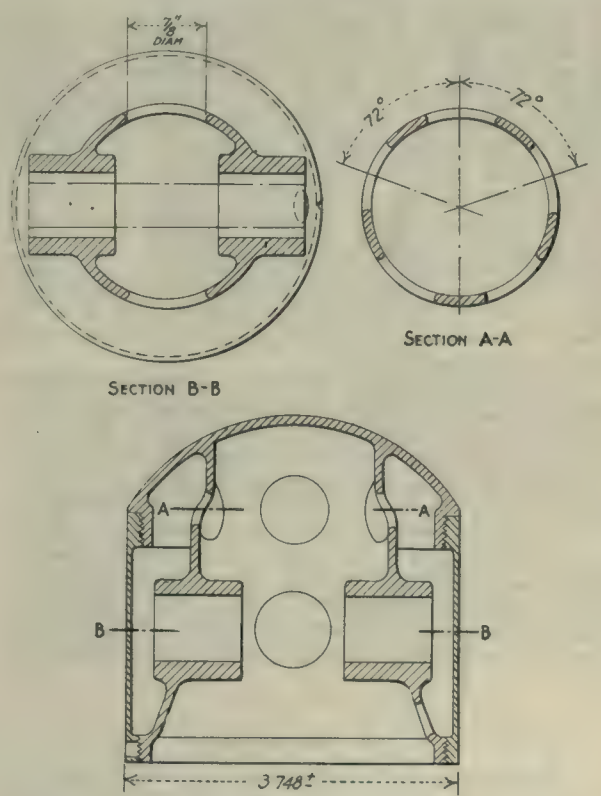
the film of oil, or to decrease its thickness, reduces the load which can be successfully carried by the bearing.

This reasoning applies equally well to reciprocating motion. A cross-head, sliding back and forth in a guide, tends to work out the oil film between the slide and guide surfaces, and the tendency is opposed by the surface tension of the oil film. The best form of slide is a perfectly smooth surface, with the ends slightly rounded to prevent cutting into the film of oil. The bearing qualities of the surface would be very much reduced by cross grooves or other openings which would release the pressure on the oil film and allow it to be reduced in thickness by the escape of oil at the edges of the openings.

More than one builder of machinery has learned that an unbroken oil film is necessary for the best results in lubrication, and has accordingly made shaft bearings with solid boxes meeting accurately at the necessary joint between the box and cap, instead of being separated by the usual shims. Such a bearing will withstand a heavier load and take less oil than a bearing with gaps between the cap and box. Probably the worst form of bearing devised is the four-part box bearing common on steam engines, as it provides not less than four openings through which the oil film may be forced out by the revolution of the shaft.

Development of the Ringless Piston

Study of the action of the film of lubricating oil was the factor which led to the invention of the ring-



Longitudinal Section and Two Transverse Sections Showing How the New Piston Is Made

less piston, recently brought out by Paul G. Tismer. In the ordinary vertical gasoline motor a copious supply of oil is thrown up by the splash system into the cylinder bore, which ought to insure thorough lubrication. However, the piston is invariably provided with two or more sharp edged piston rings, bearing tightly

*Consulting Engineer, New York.

against the cylinder wall and operating effectively to scrape off the oil as fast as put on.

As a result, some of the oil is thrown up into the cylinder, and depositing on the walls and piston head, causes carbon trouble; while some of the oil is forced down into the crankcase, and with it more or less of the fuel, causing gradual thinning of the crank case oil by wasted gasoline which has passed by the piston rings. It is evident that the piston rings interfere greatly with the maintenance of a satisfactory oil film on the cylinder walls. If they are left off, and the grooves omitted, the piston trunk would slide indefinitely over the lubricating film without disturbing it, and there would not be a tendency to flip the oil upward and thus to cause carbon above the piston.

The only difficulty was to make a piston round and smooth with a reasonable uniform clearance between the piston diameter and the cylinder diameter. Engine pistons, however, have always been made with the sides thickened at the piston pin bosses, and a flat head cast integrally with the shell. As the piston frequently heats up suddenly in advance of the heating of the cylinder, it has been necessary to reduce the diameter of the upper end of the piston. The same sort of relieving had to be done around the piston barrel, where the piston pin bosses are located. Accordingly, no gas engine piston is round or of uniform diameter, either when it is new and cold, or when it is old or hot. It is necessary to separate the outer shell of the piston from the interior portion which holds the piston pin, and to have neither flanges nor flat head connected to the shell, if it is to remain round under the varying conditions of heat.

The Tismer ringless piston was accordingly worked out by carefully observing these principles. It consists of a piston center in which the piston pin is secured, provided with either a domed or a concave head, as required for different classes of engines. A thin shell of cast iron or other metal, threaded at the end only, is slipped over the piston center and screwed to it. The shell is truly cylindrical, and made with the customary difference of 0.002 or 0.003 in. between its diameter and the diameter of the cylinder. This working clearance space is, of course, occupied by the oil film.

So universal has been the use of piston rings that it is difficult for an experienced designer to imagine an engine operating without them. The first impulse is always to declare that the oil film will be blown out by the pressure of the exploding fuel. But the time element is so short that it is impossible for the oil film to move in the least under the momentary excessive pressure. Next is the thought that the piston will wear rapidly or cut. This is not the case in practice. There is, in fact, no reason to expect trouble, as is proved by the fact that marine engine slides run for thousands of miles without wear, and usually have no adjustment at all, and that the ringless piston in a gas engine is a similar slide running in a similar guide. Ringed pistons do wear and cut excessively, due to the scraping action of the rings in destroying the oil film, and to the relieving of the middle portion of the shell around the piston pins, so that the oil can escape, and the rapid collection of carbon in the ring spaces and between the piston and the cylinder wall as the engine operates. The ringless piston does not permit the formation of carbon, and does not cut.

The Tismer piston has been carefully tried and found satisfactory, to the extent of about one-third more mileage, less oil and no observable wear whatever. The inventor and associates, as the Ringless Piston Co., Inc., 103 Park Avenue, New York, are now adapting the design to the most popular types of automobiles, and will shortly enter the stationary engine field.

Novel Employment Scheme

To take care of men who otherwise would be out of work, a measure was inaugurated last fall by W. & I. Avery, Ltd., Soho Foundry, Birmingham, England, which gave partial employment to both skilled and semi-skilled men. This scheme involved continuing the work of the shop in certain departments after the usual hours, this late work being performed by the extra men.

Schedules of four or five hours per turn were prepared, the work being carried on from 6 to 10 p. m. the first four days of the week, from 5.30 to 10 p. m. on Friday and from 7 a. m. to noon on Saturday, making a total of 25½ hours. Payment for this work was based on the rates for night shift work and ex-service men received priority.

The owners report that the partial employment scheme was found very satisfactory, due largely to the fact that men of high skill, unable otherwise to find work, were willing to take on semi-skilled jobs at corresponding wages. It happened, however, in this particular case, where the work included the manufacture of automatic weighing and testing machines, that it was impossible to find enough skilled men for the final finishing operations to keep the enlarged force supplied with the preliminary work. This condition, of course, would not militate against the scheme as such, but did put a stop to it eventually in the Soho Foundry.

K. S. Magnet Steel

Remarkable for its high coercive force and strong residual magnetism, an alloy steel discovered in Japan in 1917 was named "K. S." after Baron K. Sumitomo, who liberally endowed the university where the discovery was made. The composition of this steel, which has undergone certain improvements since first discovered, includes from 0.4 to 0.8 per cent carbon, from 5 to 9 per cent tungsten, from 1.5 to 3 per cent chromium and from 30 to 40 per cent of cobalt.

As the alloy is brittle, it can be forged only with difficulty and after considerable practice. It is best quenched in oil at about 1750 deg. Fahr., and requires no heat treatment when used for permanent magnets. Its coercive force is reported at about three times that of the best tungsten steel, whose residual magnetism it also surpasses. This residual magnetism was not diminished after prolonged heating in boiling water. Its hysteresis loop has a very large area.

Quenching increases the hardness of the annealed steel—the Brinnell figure being thus raised from 444 to 652, and the Shore figure from 38 to 55. It is reported that the microstructure of the quenched and very hard steel is exceptionally fine. Specimens dropped on a concrete floor from a height of a yard or more lost magnetization only about 6 per cent. The steel is said to be suited for short magnets.

Coal Wages and Profits in England

In a written Parliamentary reply, the British Secretary of Mines has stated that the total amounts of wages and profits in the coal industry for the years 1913 and 1920 were estimated to be the following:

	1913	1920	Increase
Wages	£91,000,000	£264,721,000	190.9%
Profits	21,000,000	27,000,000	28.6%
Per cent of total:			
Wages	81.25	90.75	.....
Profits	18.75	9.25	.....
£ wages to each £ profits.	4.33	9.80	126.3%

During June, the Bessemer Limestone & Cement Co. shipped 95,100 bbl. of cement from its plant at Bessemer, Pa., establishing a new monthly record for shipments. The June production was at the annual rate of 1,140,000 bbl. Officials state that the company is well booked ahead and expects to sell capacity production this year.

The American Bridge Co., Ambridge, Pa., has been awarded the contract for the steel frame and other structural steel work on a six-story building at Youngstown, Ohio, to be erected by the Youngstown Terminal Building Co., the ground floor of which will be devoted to a passenger station for the Erie Railroad. The structure will require 420 tons of steel.

PIG IRON FROM BLACK SANDS

Results of Recent Experimental Work on the Pacific Coast

Some details are available of experimental work done on the Pacific Coast in the reduction of the iron sands which are found along the coast and on the banks and bottoms of most of the rivers flowing into the Pacific Ocean from Alaska to Southern California. The work was carried on by William Tyrrell, for the New Era Iron & Steel Corporation, at Sedro Woolley, Wash., and the description given below is furnished by James L. Avis, Jr., consulting engineer, Seattle, Wash.:

"In 1920 Mr. Tyrrell built a small blast furnace at Sedro Woolley of about 10 tons capacity. The furnace is 35 ft. high and 30 in. at the hearth inside. A 16-pipe hot blast stove and Root blower, operated by 20 hp. motor, furnish the blast. The top is closed by usual cone and bell. The shell is ½-in. plate; the bosh jacket above the tuyeres is 4 ft. 4 in. high of 1-in. cast steel and is spray cooled. There are four bronze tuyeres and water coolers with 3-in. blowpipe. The hot-stove is 30 ft. high, 5 ft. 6 in. in diameter, lined with firebrick, and has four rows of 4 6-in. pipes. A 15-in. bleeder leads off the downcomer. Two burners lead the gas to the hot stove. The plant is operated by electric power. There has been no trouble whatever with briquettes made from black sand. The binder is not only a powerful binding agent but is also a purifier, or scavenger, and since the materials of which the binder is composed are abundant in nature and consequently can be produced at small cost, there is no apparent reason why this iron should not be produced in unlimited quantities at greatly reduced cost of production, as there is no expensive and troublesome sintering or nodulizing. Chromium and titanium are eliminated by the use of this binder, which not only gives entirely satisfactory results in producing briquettes at a very small cost, with a yield of 1300 to 1400 lb. of iron to the ton of briquettes, but gives equally satisfactory results with any kind of fine ore, metals, concentrates or flue dust.

"It is highly probable this magnetic black sand was originally limonite, subsequently dehydrated. Of course, briquetting has been attempted before, covering various materials, but never with satisfactory results until the process as developed by Mr. Tyrrell of the New Era Iron & Steel Corporation had been given a thorough tryout. Typical charges in the experimental blast furnace at Sedro Woolley comprised approximately 47 per cent briquettes, 47 per cent fuel and 5 per cent flux.

"Average analyses of the briquettes show 54 per cent Fe., 11 per cent TiO_2, 7 per cent SiO_2 and 0.018 per cent phosphorus. The metal produced was run into pigs of approximately 4 x 2½ in. section. Chemically these contain 2.75 per cent graphitic carbon, 0.98 per cent combined carbon, 0.60 per cent phosphorus, 0.08 per cent sulphur and 1.25 per cent silicon, these results being the average of numerous casts. When specimens have been polished and etched and examined at 150 diameters a very dense and uniform structure is seen. The distribution of graphite is very regular and is nodular rather than in the form of plates. The continuity of the metal is therefore not broken up and it is much stronger than the general run of commercial irons. In fact, physically this pig iron is denser, stronger and more readily machinable than the usual run of gray iron machine castings. It is not only tough but possesses great ductility, sharp corners standing hammering down without signs of chipping or cracking. Specimens machine readily, having been subjected successfully to boring, milling, thread-cutting and planing operations.

"The New Era Iron & Steel Corporation is not content with producing pig iron from black sands, but is continuing further experiments. During January and February of this year steel and gray iron castings were produced using varying percentages of this pig iron. For example electric furnace steel castings have been produced containing roughly 39 per cent open-hearth scrap, 44 per cent foundry scrap and 16 per cent black sand pig iron. Castings produced from this mix were clean, homogeneous, and when annealed machined satisfactorily. The carbon content ran 0.28 per cent and specimens gave an average of 69,000 lb. tensile strength. Another melt of steel containing 50 per cent of this pig and showing a carbon content of 0.69 per cent was formed into a small ingot of approximately 4 in. diameter and 30 in. long. This was forged to 1¼ in. square. At high forging temperature metal was quite resilient. A shaper tool was made from this metal, hardened and tempered, and gave a very satisfactory service. The tensile strength of this material averaged approximately 120,000 lb. per sq. in.

"A mixture in the cupola approximated 30 per cent commercial No. 1 Northern pig and 70 per cent black sand pig. This metal entered a locomotive driving wheel and its machining qualities and dense structure received high praise at the hands of the purchaser. Test bars gave a modulus of rupture of 61,000 lb. per sq. in.

"Referring again to the briquettes made from this black sand, the average compressive strength of these is 255 lb. per sq. in. higher than the compressive strength of coke. Compressive strength of briquettes increases as temperature rises and does not start to decrease until closely approaching fusing point. The binder used in these briquettes is of such a nature that certain objectionable elements contained in some fine ores and sands are satisfactorily reduced by contact with the furnace gases."

AT LOW EBB

Operations of Iron and Steel Plants Show Much Idle Capacity

Wheeling, W. Va., July 11.—The schedule of operations of the Wheeling Steel Corporation for this week reflects the very low ebb of current steel business. Plants of the Whitaker-Glessner Co. here, in Martins Ferry, Ohio, and Beech Bottom, W. Va., are idle and at the Portsmouth, Ohio, plant of this subsidiary of the Wheeling Steel Corporation, only three open hearth furnaces are in operation. At the latter plant there are ten open hearth furnaces. One lap weld pipe furnace and one butt-weld pipe furnace constitute the only activities of the Wheeling Steel & Iron Co., another subsidiary. LaBelle Iron Works, the other subsidiary, has four open hearth furnaces out of 11 at its Steubenville, Ohio, plant in operation while at this plant the blooming mill and No. 3 plate mill are operating one turn. All eight sheet mills at this plant are on, as well as two jobbing mills. At its Wheeling works LaBelle Iron Works has 22 of 120 cut nail machines in operation.

Plant Operations

The American Locomotive Co., Dunkirk, N. Y., has resumed operations at its local plant for the construction of 30 locomotives, five of which will be for Western railroads, and the rest for eastern lines. The men have been asked to accept another 15 per cent wage reduction, making a total cut of 30 per cent in wage scale.

The last of the furnaces of the Sloss-Sheffield Steel & Iron Co. to go on the idle list was blown out on June 29. This is the first time in the history of the company and its predecessors—covering more than 35 years—that the entire pig iron producing capacity has been idle.

The property of the Penn Iron & Steel Corporation, Plum Street, Lancaster, Pa., bankrupt, will be sold by the receivers, including plant and adjoining land, and machinery, equipment and supplies. John M. Groff is trustee in bankruptcy.

The Bostick Stove Co., of Lapeer, Mich., which has been operating only four days a week, is again working full time and with a small night force. The company has received a large order for carburetor castings.

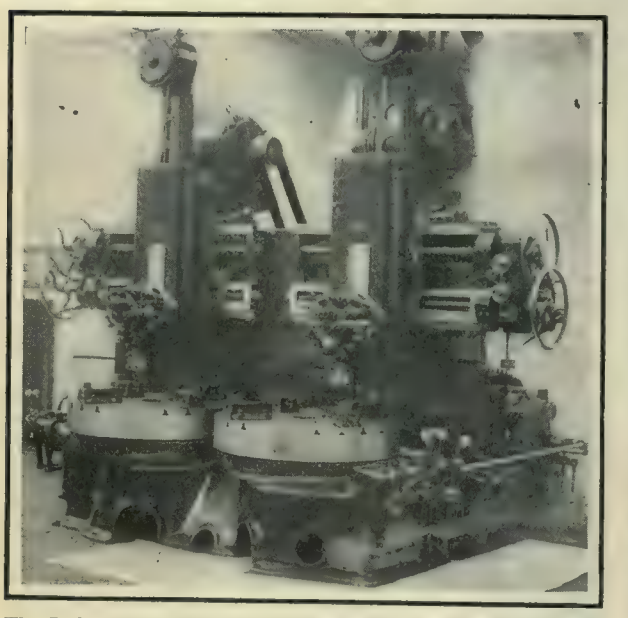
The Lansing Forge Co., Lansing, Mich., is now operating on a 60 per cent basis, and it is expected that this will be largely increased very shortly.

Duplex Boring and Turning Mill

A two-table, two-head boring and turning mill fitted with revolving turrets has been recently introduced by Webster & Bennett, Ltd., Coventry, England, and is said to supersede the single-table, two-head machine previously manufactured by that company.

The machines are furnished in two sizes with 20 in. and 42 in. tables. The drive is by means of single pulleys fitted with friction clutches and the speed change gears cannot be shifted until the clutch has been released. A patented reversing motion to the left hand table enables the operator when turning and surfacing, to work with the tool adjacent to the tool control levers. In the case of drilling, boring or reaming standard tools can be used and the table run in the reverse direction, a feature which is said to obviate the expense of left hand tools. Horizontal, vertical and angular feeds are provided and are positive reversible and interlocked. Rapid power traverse is immediately available.

A feed safety clutch is provided which is held in position by a spring and set to take the pressure exerted by the heaviest cut a tool will take. Pressure beyond this causes the clutch to slip preventing damage to the feed mechanism through accident or carelessness. Adjustable micrometer collars are provided, the position of which are controlled by spiral springs enabling the operator to readily make adjustment for setting tools and sizing the work by revolving the collars. Graduated trip dials are geared to the feed motion by means of friction clutches and are engaged or disengaged by knurled knobs at the front of the dial. When dial zero is opposite the pointer, the feed motion is automatically cut out.



The Left Hand Table Is Provided with a Patented Reversing Motion. Table runs clockwise for turning and anti-clockwise for boring

Ball thrusts are provided to all feed screws and worms. Turrets are balanced by compensating springs instead of weights and chains, tension being adjusted by revolving worm shaft on the top of the balance box. Other features include an improved tool binder for holding boring bars, etc., rigidly and without bruising; narrow guides to all slides; centralized control and reduction to two levers controlling the automatic feed and rapid traverse motion. Large bearing areas are provided to spindle and thrust ring, the down thrust being taken on a large diameter double-coned bearing. Filtered oil is supplied to gears and bearings by means of sight feed and other lubricators. For motor drive two motors are required each fitted with belt pulleys of size suitable to drive the 14 by 5½ in., machine pulleys at 400 r.p.m.

Alfred Herbert, Ltd., 50 Church Street, New York, is acting as sole distributer in the United States for the machines manufactured by Webster & Bennett, Ltd.

Course for Foremen

DETROIT, July 9.—The University of Michigan has opened a special conference course for factory foremen and superintendents, industrial executives and teachers, covering a four-weeks period between July 5 and 29. Only 20 students have been admitted. K. G. Smith, mechanical engineer, and Thomas Diamond, associate professor of industrial education, both practical shop men, are conducting the course. The main factors being considered are organization, capital, management and labor, to be studied from the viewpoints of relationships between foremen, management and workers; qualifications necessary for foremanship, basis upon which foremen should be selected, the factors of efficiency and contentment, the kind of training required, wages, problems of hiring and discharging men, and the advisability of shop committees. Under the head of materials and equipment, the class will study routing of materials, care of materials and equipment, working equipment to capacity, and recording machine efficiency.

New Ganister Crushing Plant in Pennsylvania

A ganister crushing plant has recently been completed by E. R. Baldridge & Co. at their Barree, Pa., quarries. This firm, with offices at Hollidaysburg, Pa., has been engaged in the ganister business since 1889. In addition to its use in the Bessemer, open-hearth electric ferrosilicon and silica brick practices, the ganister will be used for railroad ballast and road construction. The analysis shows 99 per cent silica, while tests made show crushing strength of 33,000 lb., or twice that of limestone and 50 per cent more than trap rock, both of which have been extensively used as railroad ballast.

The crusher installed is a special type, known as 5x, made by the Good Roads Machinery Co., Kennett Square, Pa. It has a return track elevator and a screen with four size screening surfaces, permitting the separation of the crushed ganister into commercial sizes for the various uses. The motive power is a fuel oil engine, of the Y type, made by the Fairbanks & Morse Co. Water is furnished by an automatic air pump, both for cooling and washing purposes.

The crude ganister is taken from near the top of an adjoining mountain and brought to the plant on a 2600 ft. inclined plane, with figure 8 sheaves for balancing or braking power. The quarry is about half a mile long and somewhat over 100 ft. high, showing a white ledge of silica which can be seen from a long distance. The cars used are of three tons capacity with end lift for use on an all-steel dumping table.



One of the Deposits of Crude Ganister near Barree, Pa.

The ganister is blasted from the ledge with dynamite and owing to the open seams, no drilling has been done as yet as the ledge opens up after each shot and permits dynamite to be inserted for further blasts. The capacity of the crushing plant is 300 tons daily, while 200 tons in addition can be shipped daily as crude rock, separate dumping tables being provided for each kind of material.

Racine Company Helps Unemployed Men

Plan to Prevent Suffering Among Those Formerly on Payroll Based on Definite Information as to Needs—Advance to Be Repaid

THE industrial depression has forced many manufacturers to curtail operations or to close their doors entirely, with the result that many employees have been thrown out of work. Reduced or suspended output is an expensive burden for any company. No fair-minded person could expect an industrial concern thus affected to add to its expenses by giving assistance to its idle employees, particularly in view of the fact that during the war and immediately after it, the wages of workmen in this country were the highest in history. Although it is generally true that the unemployed would not suffer if they had been provident during prosperity, the J. I. Case Threshing Machine Co., Racine, Wis., received reports early this year which seemed to indicate that many of its employees who had been laid off through no fault of theirs, and had family responsibilities, were in great need; in many instances, even of the necessities of life.

The company tried several methods of checking up the condition of these ex-employees, but without much success in ascertaining the actual facts. It was finally decided to send out a letter to every employee whose address the company possessed, who was on the payroll at August 1, 1920, cutting out the apparent transients. This letter requested each person to assist the company in locating the address and condition of any family man who was reported to be in need. Something over 2000 of these letters were mailed, and the result was very satisfactory, in that they produced fairly complete information on all men who had been laid off and were really in trouble. When the name of such a workman was reported, a competent, sympathetic investigation was made, and help was furnished by means of issuing to the family a local order for such things as were required from his regular grocer or source of supply. This local order authorizes the merchant to bill the company, attaching the local order, and to deliver the merchandise to the bearer. The local order is tied up with a signed memorandum whereby the man who gets this assistance agrees that the cost of the help given to him is an advance on future earnings and promises to pay back the amount of money involved in installments on each pay day, without interest.

The plan has been working out satisfactorily and the results of the company's investigations indicate that relatively few of its former employees were in particular need, although there were sufficient cases of want to justify having gone into the matter thoroughly. Up until June 20, approximately 75 families had received help under this plan. Below is the original letter which was sent out to employees, asking for assistance in locating family men who had been laid off, who were in need of help:

EMPLOYEES BENEFIT ASSOCIATION
OF THE
J. I. CASE THRESHING MACHINE CO.
INCORPORATED

Office of Superintendent

RACINE, WIS., Feb. 16, 1921.

Dear Sir:

Will you please help us locate any family man who has been laid off by the J. I. Case Threshing Machine Co. who is in need of help at this time? If you will send in any names and addresses and tell us what you know about the case, we will investigate promptly and see what can be done to relieve the situation. All information will be kept confidential.

This request is sent to you because your name appears on the August list of members of Employees Benefit Association.

Please used inclosed envelope.

J. I. CASE THRESHING MACHINE CO.

The following is the form which was filled out on the basis of an investigation of the reported case.

Date.....
Name ..... Address .....
Reported by .....
Nationality .....
Employed: From..... To..... Dept.....
Reason for leaving .....
Earnings when employed .....
Gross earnings at present.....
Other incomes .....
Other help: Source..... Amt. weekly.....
Family: Wife..... No. of children..... Sex.....
Ages.....
Disposition of case:
.....
.....
.....
.....
.....
Remarks:
.....
.....
.....

The ensuing form is the contract between the company and the employee, wherein the employee agrees to pay back the principal of advances made without interest:

RACINE, WIS., Feb. 16, 1921.

The J. I. Case Threshing Machine Co., on account of the previous creditable service of.....
.....
has this day issued to him Local Order No..... on ..... and agrees to pay the said merchant for the goods to be delivered on such order; and in consideration thereof the said ..... agrees to repay to the company said advance as soon as he can obtain work at ..... dollars per pay day without interest, and until such advance is finally repaid he does authorize any future employer to make such payments for him and deduct the same from his wages.
.....
.....
.....
.....
.....

J. I. CASE THRESHING MACHINE CO.,
By .....
And .....

Made in duplicate.

The following is the local order, in triplicate, which authorizes the employee to secure goods on the company's account from the local merchant:

Original
LOCAL ORDER

Date ....., 192..

To ..... No.....
.....

Please deliver to bearer .....
and charge to our account:
.....
.....
.....
.....

Itemized bill to cover must be sent to us at once with this order attached.

We shall issue no further orders on any merchant who shall charge for any item a price in excess of his regular price for such item on the day this order is filled.

EMPLOYEES BENEFIT ASSOCIATION OF
J. I. CASE THRESHING MACHINE CO.,
By .....

The Harvey Spring Co. and the Webster Electric Co., both of Racine, have adopted substantially the same plan which was introduced by the J. I. Case Threshing Machine Co. The J. I. Case Plow Works Co. has in operation a plan which is somewhat similar

LICENSING BUSINESS

To Embark on an Enterprise Involving Many People Should Require Knowledge of Economics

Urging that no man should be allowed to engage in business—at least, in business involving a capital larger than a certain fixed amount—without passing an examination and securing a license, as the doctor and the lawyer are now required to do, and that no one should be allowed to participate in making laws unless he has proved in some way his fitness to grasp conditions to meet which the laws are being made, Alvan T. Simonds, president Simonds Mfg. Co., Fitchburg, Mass., maker of saws, knives, files and steel, recently contributed a notable article to the *Boot and Shoe Recorder*.

Parallel in Medicine and Law

"The state," he wrote, "does not allow men to practice law or medicine without a license, but it allows any man who can secure the proper amount of capital or credit to enter upon a business venture involving not only himself and his future, but also the future welfare of thousands of others. When a company employing thirty thousand men and women fails because of poor management due to an ignorance of fundamental economic laws, something has happened that society should not allow."

He likened a great business enterprise to a great ship at sea. "The welfare of those on the ship is, to a large extent, determined by the skill and education of the captain and his assistants. If the ship meets stormy weather or unforeseen conditions, if accidents occur, the education and experience of those in charge must make it reasonably certain that the ship with its cargo and its passengers will come safely through.

"A great business carries the responsibility of the welfare and happiness of thousands of men, women and children in many homes. It seems almost criminal to allow such an organization to exist under the direction of those who know little or nothing of the laws which make for its safety. The number of failures occurring annually proves that this is a real and constantly recurring danger. One hundred and twenty thousand corporations in the United States in 1917 produced no profit. There were 1641 commercial failures in the United States in February, 1921, representing an indebtedness of over sixty million dollars."

What Is Required of Law Makers

As to lawmakers, he asks: "Is it not a rather curious attitude on the part of the public that requires all those who are to practise law to go through a long term of study and to pass difficult examinations before they are admitted to the bar and at the same time will send to our legislatures and to Congress to make laws men who have little or no knowledge of the great fundamental principles that underlie the prosperity of the country?"

It must be required that our business men and our law-makers shall have studied and have a fairly good knowledge of the laws of economics which deal with the material things which satisfy human desires. They must prove by examination or certification by some accepted school that they are prepared to undertake business without more than ordinary risk of misfortune to others, and therefore to society in general.

FOR THE OPEN SHOP

Manufacturers' Association of Northern Ohio Is Organized

Manufacturers of 12 central Ohio counties, at a meeting held recently at Bucyrus, formed an association to be known as the Manufacturers' Association of Northern Ohio. One of the main objects of the association is to co-operate in the open shop movement under the American plan of operating their plants. C. F. Michael, president Ohio Crane Co., Bucyrus, and of the Bucyrus Employers' Association, presided at the meeting and 60 companies in the district were represented and joined the association.

The objects of the new organization as outlined in the constitution are to promote the principles of fidelity among members, to promote and improve the opportunity of personal contact, to foster among the members the spirit of friendliness and good-will, to discuss the plans, ways and means of giving larger and better service to the customers of the members, to promote the use and sale of worthy merchandise manufactured by fellow members, to discuss questions of interest pertaining to the operation of manufacturing plants, to assist fellow members to dispose of surplus stocks, to provide the best possible working and living conditions for all employees, to promote principles of honesty, competent and efficient services for wages paid and to pay honest wages for such services rendered, to discountenance conditions which are not just or which will not allow a workman to earn a wage proportionate to his productive ability or capacity, to prevent interference with those who desire to work and give faithful service, to promote fair dealings between its members in the improvement of each other's employees, to assist fellow members in securing competent, loyal and desirable employees, to assist whenever possible to adjust industrial disturbances in the plants of fellow members, to obtain the open shop principle, to uphold the majesty of the morale and to increase the love for America's institutions and to promote the love and prosperity of humanity, and loyalty to God, home and country.

Officers were elected as follows: President, C. B. King, Marion Steam Shovel Co., Marion, Ohio; first vice-president, C. F. Michael; second vice-president, F. B. McMillen, Hydraulic Pressed Mfg. Co., Mt. Gilead, Ohio; third vice-president, T. R. Barnes, Barnes Mfg. Co., Mansfield; fourth vice-president, J. L. Clark, Hess-Clark Co., Ashland; secretary-treasurer, Fred B. Scherff, Marion. These officers and the following constitute the board of directors: J. L. Morrow, Burch Plow Works, Crestline; Z. E. Taylor, C. & G. Cooper Co., Mt. Vernon; H. C. France, Tiffin Wagon Works, Tiffin; A. B. Whitney, Whitney Tractor Co., Plymouth; E. B. Phillips, Champion Engineering Co., Kenton; J. S. Boyd, Galion Iron Works, Galion.

The next meeting will be held at the Westbrook Country Club, Mansfield, July 27.

Business Prospects at Seattle

SEATTLE, July 5.—During April, the brightest outlook of the year appeared from Manila. The jobbing and exporting trade looked for a brisk summer inquiry. That inquiry is still here, but the weakness in Philippine exchange and the extreme difficulty of financing exports caused exporters to withdraw in part from the contemporaneous selling market. Manila, it is known, needs heavy duty tools and machinery, but financial conditions have arisen which compel caution in closing on contracts. Japan is getting into better position to buy, and is to-day regarded as the strongest of the Oriental buyers. A rather brisk fall inquiry is expected from Japan.

The weakness in sheets, plates and pipe is due largely to the expected decline in transcontinental rail rates. Through devious sources jobbers have been advised that the Eastern or initial carriers on this haul have consented to reductions from $1.66 to $1.05, Pittsburgh, to Puget Sound common points. Buyers have learned of this attitude of mind of Eastern carriers who have stood out against any reductions in freight although transcontinental lines have taken the opposite view of conditions.

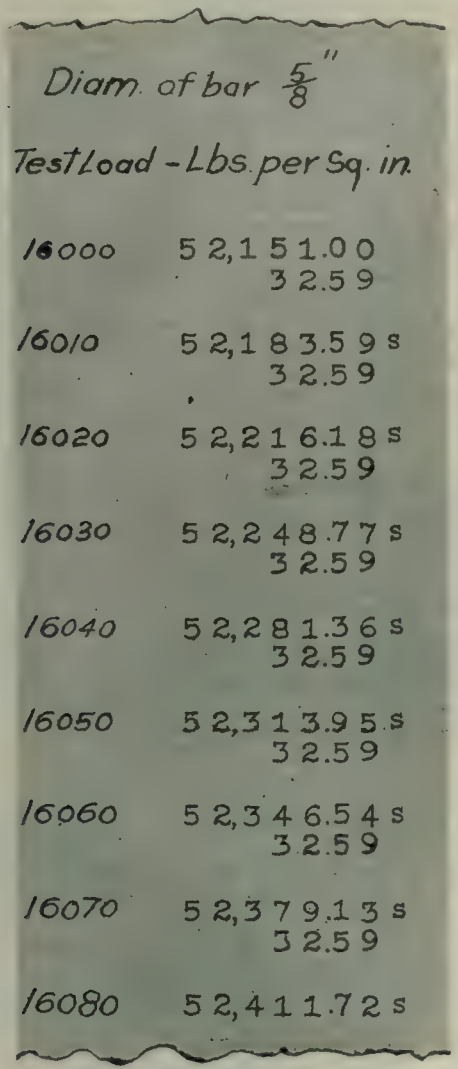
The Dravo-Doyle Co., Pittsburgh, has been awarded a contract for a new turbine engine for the municipal waterworks plant at Youngstown, Ohio, on its bid of $52,000.

TESTING MACHINE HELPS

Compiling Table to Translate Pounds on Test Bar into Pounds per Square Inch

BY R. W. ALLARD*

When a great number of bars of the same diameter are to be tested, as a part of routine work, a table relating machine-bar readings to unit stress is of particular value. The first step is the solving for pounds per square inch by computation for the even 1000 lb. both above and below the average range at which the particular bars break. Then determine the smallest increment that the testing machine will read. (This is commonly 10 lb.) Determine the value of this increment in lb. per sq. in. for the diameter of bar under test.



Mechanical Calculation of Pounds per Square Inch for Given Test Loads

Then with a recording adding machine put down the lb. per sq. in. for the whole thousands of pounds actual bar test load with which the table is to be started. Add in the value of the testing machine increment in lb. per sq. in. by means of the *sub total* key. The sub total sum is the value in lb. per sq. in. of the testing load for the thousands of pounds testing load with which the table was started, plus the smallest reading of the testing machine.

Repeat the adding of the increment value in lb. per sq. in. with the *sub total* key until tables have been made covering the range the bars commonly fall under. Print with drawing ink before the sub total figures the proper values of pounds of actual testing load. Cut the strips of paper from the adding machine and paste on a heavy piece of cardboard. Paint with white shellac.

If the smallest reading of the testing machine is 10 lb., the value of this reading in lb. per sq. in. must be added 100 times by means of the *sub total* key to make a table covering 1000 lb. test load. Insure the accuracy of the table by noting if the values of the even 1000 lb. of test load obtained by the use of the adding machine agree with the computed values for the even 1000 lb. test load.

Following is an example for test bars ⅝ in. in diameter. The value of a 1000-lb. test load in terms of lb. per sq. in. is 3259. The increment or smallest reading of the machine is 10 lb. There are then 100 increments for every 1000 lb. test load. The value of each increment is 32.59 lb. per sq. in.

To start the table with 16,000 lb. test load, the fiber stress is calculated at 52,151 lb. per sq. in. On the recording adding machine put down 52 151, and by means of the *sub total* key add 32.59 and get 52,183, which is the value in lb. per sq. in. for 16,010 lb. of test load. Continue adding 32.59 by means of the *sub total* key and note that after one hundred additions the answer is 55,410, which checks with the computed value for 17,000 lb. test load.

Example of computation:

Area of ⅝-in. round bar = 0.3068 square inch.

0.3068 : 1 (sq. in.) : : 16 000 (test load) : x (lb. per sq. in.)

$$x = \frac{16{,}000}{0.3068} = 52{,}151.$$

The slip of paper illustrates the use of the adding machine.

*Metallurgical engineer Northern Malleable Iron Co., St. Paul, Minn.

Lower Wages Expected

Mid-western bar iron makers who are members of the Western Bar Iron Association look for further declines in the price of bar iron from the average price of 2.30c. per lb. disclosed at the last settlement with the Amalgamated Association of Iron, Steel and Tin Workers to determine the tonnage rates to be paid boilers and finishers in the July-August period. Bar iron is reported offered in the East at 1.85c., Pittsburgh. Additional decline will mean, of course, further reductions in the rates paid workers in affected mills. At 2.30c, puddlers' wages dropped to $12.52 per ton from $13.76, paid in the May-June bi-monthly period. The current rate compares with a post-war peak of $18.76. At 1.85c, the puddling rate would be $10.26, on the old scale. In view of the possible downward revision of the base rates and the price of iron falling below 2c, a puddling rate of $9 per ton is predicted.

Active bar iron mills are still operating under the 1920-1921 agreement, under a clause which provides for its automatic continuance for 30 days following expiration of the old scale, upon failure to negotiate a new agreement.

Unemployment Increasing

Unemployment in Pennsylvania still is increasing according to the latest report of the State Department of Labor and Industry, despite the fact that a good many men are finding employment on the farms and in the construction of highways. Reports from the district offices of the departments give the number of unemployed in the different centers as follows: Altoona, 22,050; Erie, 14,635; Harrisburg, 14,245; Johnstown, 17,090; McKeesport, 5,850; New Kensington, 9,820; Philadelphia, 105,000; Philadelphia (women's office), 11,150; Pittsburgh, 48,100; Scranton, 20,250; Williamsport, 5,950.

The unorganized employees of the Mullins Body Corporation, Salem, Ohio, have called off the strike at the Mullins plant which was declared nearly four months ago, when the men refused to accept a 9-hr. working day. Although the union machinists at the plant have not called off the strike, the action of the unorganized employees has virtually ended the strike, as only about 25 machinists are still out.

RAILROAD FINANCES

Time Will Be Required to Work Out Plans for Relief of the Carriers

WASHINGTON, July 12.—The iron and steel trade, as well as financial circles, is greatly interested in tentative plans of the Secretary of the Treasury to advance funds to the railroads at an early date as a partial settlement of money owed by the Government to the carriers. This proposal has been miscalled a "loan," and has been estimated at $500,000,000. In point of fact, it is merely a furtherance of plans taken up recently by the Administration, looking to the expediting of payments in order that the railroads may settle obligations they owe and be in a position to make purchases of steel and other requirements which they need. Probably several weeks will be required before a conclusion of the plans can be brought about, although the misleading belief has been prevalent that it would be reached within a few days.

The financial relations between the carriers and the Government were set forth in THE IRON AGE of June 30, but in view of subsequent developments looking to the making of settlements with the railroads, they will be restated in a brief form.

The railroads owe the Government approximately $800,000,000 for expenditures made by the Railroad Administration in improving railroad property during Federal control. At the outset, there was a total of about $1,200,000,000 due the Government from the railroads because of the improvements and by reason of the purchase of car equipment. Something like $400,000,000 of that sum was funded by the Railroad Administration, which took notes of the railroads at 6 per cent for a period of 10 years, leaving about $800,000,000 due and unfunded.

Under the transportation act, it lies within the discretion of the President to fund part or all of this indebtedness. The suggestion that the $800,000,000 be funded for 10 or 15 years was made before the Senate Committee on Interstate Commerce at the railroad inquiry by President Samuel Rea of the Pennsylvania Railroad. Objection was made by him to the Railroad Administration deducting sums owed by the railroads to the Government in making final settlements. The point was made that this method of procedure deprived the carriers of cash which would aid them greatly in paying their bills for materials and supplies and in doing required maintenance work.

The matter was taken up with President Harding, who in turn referred it to Director-General Davis of the Railroad Administration, Secretary of the Treasury Mellon and Secretary of Commerce Hoover and in consequence negotiations were started with the railroad executives to work out a plan for funding part or all of the $800,000,000. If this is funded, it would mean that whatever amount the Government owes the railroads will be paid in cash as soon as settlement can be effected between each individual railroad and the Railroad Administration. It is roughly estimated that there is approximately $400,000,000 due the railroads from the Railroad Administration without taking into consideration the dispute involving the demand of the railroads for allowance for alleged inefficiency of labor during Federal control. There is also due the railroads approximately $200,000,000 under the guaranty during the six months following Federal control, making a total of practically $600,000,000 which may be paid to the railroads as soon as settlements are effected between the carriers and the Government.

It is explained that even though the $800,000,000 of railroad indebtedness to the Government is funded, it will still remain for each railroad and the Railroad Administration to agree on the amount due the given carriers. A number of railroads have not yet filed their claims for use of their property during Federal control, but in view of the desire of President Harding to expedite the settlement of claims as much as possible, it is hoped those which have not as yet been filed will be presented soon. The feeling is prevalent in the Administration, however, that some claims which have been filed are unduly high and should be scaled down.

Whatever may be done with regard to making sizable funds available to the railroads, it will, as indicated, require several weeks in all probability. The problem is no easy one, for the Railroad Administration in funding railroad indebtedness will have to obtain more cash than it has available, and it is not believed it will seek further appropriations than the estimate of $200,000,000 presented before the House Committee on Appropriations. It might, however, borrow the additional sum necessary from the War Finance Corporation, giving in return car trust certificates.

STILL STUDYING

Federal Trade Commission Examining Pittsburgh-Plus Case—An Interesting Possibility

WASHINGTON, July 12.—While no definite date has been set by the Federal Trade Commission to begin hearings in the so-called Pittsburgh-plus case, it is expected that they will start early in September. The commission continues study of the case and has had a conference with an attorney representing the United States Steel Corporation, with regard to the procedure to be followed and the more important points to be taken up. Chairman Houston Thompson, and Harle Steinhauer, who has been assigned as trial attorney for the commission, have gone to Duluth, Minn., in connection with gathering data, although the trip of the chairman is not entirely of an official character, inasmuch as he has gone on a vacation of two months which will end the first of September.

It is interesting to observe that hearings in the case hardly will be before the term of one of the members of the commission, John Garland Pollard, expires. He goes out of office on Sept. 20. With Commissioners Thompson and Nugent he voted for the issuance of a complaint as against the opposing votes of Commissioners Gaskill and Murdock. Naturally, there now is speculation as to who will be appointed as a successor to Mr. Pollard and what his attitude on the case may be. It is assumed that, like others who preceded him but who were not members when previous hearings were held, he will go over the voluminous records before passing upon the case. If another vote should be taken and the new appointee oppose the complaint apparently the commission would reverse itself for the second time and in this instance the case would be dropped, granting that the remaining members of the commission are unchanged as to their views. There is, of course, no assurance that another vote will be taken, but the possibilities of the situation have created interest.

Reports are heard that Judge Vernon Van Fleet of Elkhart, Ind., now associated with the Department of Justice in connection with work looking to its more economical operation, will be appointed as the successor to Commissioner Pollard. Judge Van Fleet was in charge of the Harding campaign in Indiana, before the Republican convention.

Railroads Add to Their Forces

CHICAGO, July 9.—The Chicago, Burlington & Quincy has added 600 men to its rip track forces during the past week. The Minneapolis, St. Paul & Sault Ste. Marie has put 3600 men back to work in the bridge, carpenter and other shops. The first deviation from the policy of reducing forces to a minimum, under which the Atchison, Topeka & Santa Fe has been operating for months, was the return of 100 employees in the road's car repair shops at Topeka, Kan., last Monday.

The United Engineering & Foundry Co., Pittsburgh, is about to begin publication of a plant paper for its employees, the first issue to appear in July.

CONTENTS

Direct Routing in a Modern Brass Plant 63

Electricity Used Almost Exclusively for Melting in Detroit Copper & Brass Rolling Mills

Repeated Shut Downs of Coke Ovens 73

Twenty Years' Experience With By-Product Plant Near Wheeling, W. Va., With Floods and Stoppage for Other Reasons

Census of Steel Works and Rolling Mills 74

Summary Concerning the Industry in 1919 and 1914, Covering Numbers, Quantities and Values

Handling Materials in a Remodeled Foundry 76

Few Carrying Units Used at Murphy Iron Works, Detroit—Saving of New Crane Installations

Cutting Overhead Cost Instead of Wages 79

Large Detroit Automobile Company Paid War Time Wages, Ran Half Time and Made Profits

A Gas-Engine Piston Without Rings 81

Importance of Continuous Oil Film in Lubrication Stressed—Avoidance of Uneven Expansion

Racine Company Helps Unemployed Men 85

Plan to Prevent Suffering Among Those Formerly on Payroll Based on Definite Information as to Needs

Power in Superpower Zone 68
Canadian Steel Industry 68
Lockers in Youngstown Steel Plant 69
Railroad Boring Mill 70
Ring and Circle Shear 71
More Readjustment Necessary 71
New Size Simpson Sand Mixer 71
Turbine Driven Pump 72
Fluorspar in 1920 72
Steel Plant in New South Wales 72
Tap and Drill Grinder 75
Refractories Market 75
Ferromanganese Hearing 75
British Exports and Imports 78
Novel Employment Scheme 82
K. S. Magnet Steel 82
Coal Wages and Profits in England 82
Pig Iron From Black Sands 83
Duplex Boring and Turning Mill 84
Course for Foremen 84
Ganister Crushing in Pennsylvania 84
Licensing Business 86
Northern Ohio Manufacturers Organize 86
Testing Machine Helps 87
Labor Notes 87, 88, 95
Railroad Finances 88
Pittsburgh-Plus Case 88
Editorials 90
Steel as an Index—Past and Present Steel Prices—"Cancelitis" Then and Now—Shipbuilding and Steel—Concerning Cupola Semi-Steel
Correspondence—Efficient Journal Bearings 92
Liquidation of Steel Products 93
New Secretary of Mining Engineers 93
Government Buying 94
Tariff Discussion 94
Foreign Trade Conditions 109
Basic Day Abrogated 110
Bids on Plates for Navy 110
Industrial Finances 111
Trade and Office Changes 111

Iron and Steel Markets 96
Comparison of Prices 97
Finished Iron and Steel, f.o.b. Pittsburgh 112
Non-Ferrous Metal Markets 113
Personal Notes 114
Obituary Notes 115
Machinery Markets and News of the Works 116
New York Jobbers' Prices 124

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Steel As An Index

It is just as true now as it was one year ago that the steel industry cannot long maintain a rate of operation either far above or far below the general percentage of business activity in the country. One year ago, when signs of reaction in other lines were increasing, steel producers were straining every nerve to meet the demands upon them and were quite willing to believe that for many months they would be called on to deliver all the steel they could turn out. Three months later, when the inflow of iron and steel orders was suddenly checked, almost overnight, the interdependence of all members of the industrial body was recognized again.

That demand upon the country's steel mills should have fallen to the starveling rate of 20 to 25 per cent is the feature of the industrial situation upon which the attention of both producers and consumers has been riveted of late. It is well known that the country's consumption has not fallen to such a low rate. All other measurements ordinarily applied to business—bank clearings, car loadings and the like—indicate general activity in manufacture and trade far above that which is the rule at blast furnaces, steel plants and rolling mills. The interchange of rolled steel by jobbers, in the liquidation of their stocks, the resale of rolling-mill products by manufacturing consumers of such steel, and the shipment of material from one plant to another, in the case of large corporations, to avoid sending fresh orders to the mill, are examples of the policy followed out in every quarter. The outcome of it all will be, one day, a country bare of steel to a degree that has not been paralleled.

Underlying all this effort to use up every pound of steel in sight, or to turn it into money, is the palpable intention to replace it at an indefinite later day, when the process of deflation has run its course. And such replacement, together with new buying that will not be for stock replacement, may actually start at a time when in the opinion of many any real improvement is far in the future. Over against the time needed for further readjustments that must precede the return of health to business, there must be a reckoning sooner or later with the fact that steel mill operations, as was the case for nearly half of 1920, are quite at variance with other indices of trade.

Past and Present Steel Prices

Recent reductions having placed steel prices within easily measurable distance of their pre-war levels, there is more disposition to make comparisons. Using as a basis the prices formally announced within the past ten days, the advances over the ten-year pre-war average are as follows in representative products:

	Per Cent
Billets	33
Merchant bars	34
Plates	34
Shapes	33
Black sheets	57
Galvanized sheets	35
Wire nails	52

The advances over pre-war averages in billets and the three heavy rolled products, bars, shapes and plates, are remarkably close, the increase being almost precisely one-third. Black sheets stand out with a heavier advance, and for this divergence several influences may be assigned. The sheet market before the war was an especially competitive one, and wage advances have fallen with particular heaviness upon sheets. That galvanized sheets show a smaller percentage advance is partly a matter of arithmetic. The average spread between black and galvanized sheets before the war was about 1.05 cents, while the present spread, with black quoted at 3.50 cents and galvanized at 4.50 cents, is 1 cent. Wage rates in galvanizing shops are much higher than before the war, but zinc is much cheaper, its present price of 4.35 cents comparing with an average of 5.64 cents in the ten pre-war years, showing a decline of 23 per cent.

Of all the familiar steel mill products wire nails have been most often mentioned of late as the victim of high labor costs. The new $2.75 price is regarded by producers as a very low one, yet it is 52 per cent above the average price quoted

in THE IRON AGE from 1904 to 1913. This comparison, moreover, being simply of the base price, does not take into account the change in the card of extras. Making allowance for that, the advance on a typical specification would be between 55 and 60 per cent.

There are those who regard pre-war averages as useful only for comparisons in a very general sense. It is pointed out that mills did not necessarily receive the average prices commonly cited, since as a matter of fact these are simply averages of open market quotations from week to week for comparatively early deliveries. The mills did not sell much at the lowest prices, but on the other hand they did not sell much at the top prices. It may be cited in favor of pre-war averages that if any steel commodity be taken it will be found that the ten-year average, 1904 to 1913 inclusive, the five-year average, 1909 to 1913 inclusive, and the average for the single year 1913 all hang pretty well together, and that is suggestive that "there must be something in it."

On the other hand it may be argued that we are in a period of depression, when rules do not always work. In the spring of 1909, in the depression following the panic of 1907, the mills might have demanded the average prices of the preceding ten years, but they did not get them within 20 per cent, for a time, and as to the ten-year pre-war average now often cited for comparison, at the end of 1914 the mills were not getting that average within 25 per cent.

If comparison be sought with pre-war low points in steel prices, allowances must certainly be made for ineradicable increases in cost, and in that list wages and freight rates will necessarily be prominent for a long time.

"Cancelitis" Then and Now

With the customers of the steel mills calling for deliveries of steel at a rate equal to no more than about 20 per cent of the mill capacity, the generally accepted view is that the customers are afflicted with stocks, either of steel or of commodities they have made from steel. It is insisted that the actual requirements of the country cannot be at as low an ebb as are mill operations. In such conditions the question is asked, how or when did these stocks accumulate? Steel was so scarce until the fall of 1920 that no one was in position to accumulate stocks, whether or not he had the desire. The stocks must have been accumulated after steel ceased being scarce.

One readily recalls that at just about the time that steel ceased being scarce there was in industry and business generally much canceling of contracts or holding up of deliveries. It was much talked about and financial and other writers discoursed upon it. They cried out about the epidemic of a new disease, which they called "cancelitis." Everything was being ruined by this blight, and the inference was that if only people would not cancel, business would go right along. Serious losses in prospective profits, in other words, might be averted.

Now we have a new aspect of affairs, that of the steel industry suffering from a lack of orders, because the customers have stocks. In other words, they did not cancel enough tonnage or did not cancel soon enough.

What would have been the condition to-day if in industry generally there had been none of this canceling? On general principles, it is a bad thing to cancel a contract. A contract should be lived up to. But it is certainly an accepted adage that two wrongs do not make a right. Why was not the outcry against the making of these contracts instead of against their being canceled? Undoubtedly if everything were placed under contract for a stated period all would be well, the people to contract with their bakers for bread a year ahead (having at the same time contracts for steady employment), the bakers to contract with the millers, the millers with the farmers, the farmers with the agricultural implement dealers, the dealers with the implement factories, the factories with the steel mills, the steel mills with their employees, and so clear around the circle.

That, however, was not done. There were missing links in the chain. There are different practices in different lines of business. Sometimes there are different practices among the members of the same line of trade, and sometimes a whole trade makes a mistake in judgment. Some business men contract for their raw materials farther ahead than the period for which they sell their products, some for the same period, some for less. There is no uniform practice. Nearly always there is a time when somebody is getting caught, either with obligations to take more material than he needs or with greater needs than he has covered.

It was notable that the steel makers did not complain as loudly about "cancelitis" as did many others. It has been more or less of a custom with steel manufacturers to adjust matters with their customers. The practice has not been universal, but it has been common. Some of the steel trade practices have been described as extremely unbusinesslike, yet an outstanding fact has been that in the long run both the steel manufacturers and their customers succeed. It is not clear that if, say in the past quarter century, there had been no accommodation of this sort either party would have been more successful. Contract cancellation, in the abstract, is absolutely wrong, but the spirit of the contract, the history of the relations of the parties to the contract, and the surrounding circumstances are entitled to some consideration.

Not a little has been said since the war about high sulphur cast-iron scrap and its menace to the iron foundry. Advocacy of the use of the basic electric furnace in conjunction with the cupola as a refiner of such iron has been frequent. This method has demonstrated its success in more than one case. The principal objection is its cost and the fact that not many foundries can avail themselves of the use of such a furnace. The employment of lime, however, in the regular cupola charge as a successful eliminator of a certain amount of sulphur is recommended by A. C. Porter in an article in the *Foundry*. By basing the lime charge somewhat on the practice followed in burdening a blast furnace, the author claims that

he has demonstrated by experimental runs that a sulphur content of 0.139 per cent in the original metal charged was reduced to 0.093 per cent, the manganese at the same time increasing from 0.54 per cent to 0.71 per cent. The suggestion is valuable and may prove by further experimentation to be worthy of general adoption. The author holds that the high sulphur menace can be overcome by this practice or at least be held under sufficient control to prevent the troubles that would be apt to come.

Shipbuilding and Steel

In the first half of 1919 there were under construction in American shipyards 4,185,523 gross tons of vessels, mostly cargo. This year the figure is 1,102,672 gross tons. While it is not possible to assign accurately any definite ratio between the tonnage measurement of a ship and the quantity of steel and iron going into its make-up, yet a figure of one ton of such materials to each two tons of measurement will provide an approximate index of the shipbuilding demand upon the iron and steel industry. And perhaps three-fourths of this demand, expressed in tons, will be represented in plates and shapes.

Hence a loss of 3,000,000 tons measurement of shipping being built may be translated into 1,500,000 tons of iron and steel, including more than 1,100,000 tons of plates and shapes. This represents, to a certain degree of approximation, the loss which the steel industry is sustaining through the drastic decline in shipbuilding following the completion of the Shipping Board's abridged program. More than half of the tonnage now building consists of tankers for the conveyance of oil, and considerably less than 500,000 tons will carry the miscellaneous cargo of the liner or tramp. With the approaching completion of the tanker program, still further curtailment may be anticipated.

Concerning Cupola "Semi-Steel"

An effort is being made by the American Society for Testing Materials, through its committee on cast iron, to do away with the use of the term "semi-steel." The definite recommendation was made by this committee at the society's convention two weeks ago that the name "high test" iron be substituted. Gray-iron castings in which steel scrap has been used in the charge do not approach steel in character or properties, and the name "semi-steel" is held to be misleading. The committee states that the steel scrap additions result in an iron higher in strength, but points out that the improvement is one of degree only, and cites other objections. The society's committee is now formulating specifications to fit the term "high test" iron or whatever is finally decided upon.

Those in the foundry industry who have been disposed to regard "semi-steel" as already established in commercial nomenclature have contended that steel scrap is the best medium through which to give to cast iron increased transverse and tensile strength, as well as toughness, along with machinability. They hold that the manufacture of semi-steel castings has been carried on for so long that producers and users are alike thoroughly familiar with the real character of the metal and that there is no misunderstanding concerning it. The proposal has been made, indeed, that the American Foundrymen's Association make the status of such castings more definite by laying down requirements for castings produced by using steel in the cupola mixture. For light castings, 15 to 20 per cent of steel has been proposed, giving tensile strength of 32,000 pounds as a minimum, and for heavy castings a range of 30 to 40 per cent steel and 37,000 pounds tensile strength. A certain sanction, it is contended, was given the term which the Testing Society's committee seeks to abolish, by the issuance of a Government specification for "semi-steel" shells during the war, and it will be recalled that one important company manufactured thousands of tons of such shells for the American Army.

In whatever action is taken toward clearing up the status of semi-steel castings the committee of the American Society for Testing Materials might well proceed in coöperation with a committee from the American Foundrymen's Association, since it would rest largely with the latter organization to give practical effect to any decision that might be reached.

CORRESPONDENCE

Efficient Journal Bearings

To the Editor: Careful reading of the article under the above title, in your issue of June 16, page 1605, thoroughly convinces me that a great injustice is done to all manufacturers of ball and roller bearings, excepting possibly the one responsible for the "monograph."

For a number of years ball and roller bearing manufacturers have been conducting an educational campaign in the use of anti-friction bearings in general. One phase of this campaign has caused thousands of dollars to be expended in the trade papers to acquaint engineers, designers, equipment users and others with facts—not theory—with engineering standards established upon practical applications and experience. An article of the nature appearing in your June 16 issue does little except to contradict many established facts and practices. Furthermore, manufacturers of recognized anti-friction bearing designs are discredited.

Many of the statements appearing in this article are absolutely unfounded and are directly critical of features employed in the design of roller bearings manufactured by the writer's company. Other statements are in direct contradiction of established characteristics of the Hyatt bearing, manufactured by the Hyatt Roller Bearing Co., and proved successful by reason of its wide application.

Furthermore, this so-called "monograph" does a great injustice to manufacturers of ball bearings, as many statements seriously reflect upon standards established and proved correct by years of experience and millions of applications. C. F. SUCCOP,

General manager American Roller Bearing Co.
Pittsburgh, June 20.

Will Sell Black Sheets

WASHINGTON, July 12.—The Bureau of Supplies and Accounts, Navy Department, has issued specifications calling for bids on approximately 1200 tons of black sheets of various dimensions for its different navy yards. The bids are to be received up to August 5.

Extent of Liquidation in Finished Steel Products

In bars, plates, shapes and sheets, from 80 to 95 per cent of the excess of 1917 peak prices over the 10-year pre-war average has been wiped out. In beams, for instance, where the excess was 3.00c., it is now only 0.50c., a reduction of 83 1/3 per cent. The "Composite" is the simple average of the seven products quoted. These products represent approximately 85 per cent of the annual output of finished steel in the United States.

	Cents Per Pound				1917 Peak Exceeded 10-Year Pre-War by	July 12, 1921, Exceeds 10-Year Pre-War by	Extent of Liquidation from 1917 Peak
	10-Year Pre-War	Peak July, 1917	Industrial Board Mar.. 1919	July 12, 1921			
Bars	1.42	4.50	2.35	1.90	217%	34%	84½%
Plates	1.488	9.00	2.65	1.90	505%	28%	94½%
Beams	1.50	4.50	2.45	2.00	200%	33%	83%
Rails	1.34	1.79*	2.10	2.10	34%	57%	....
Sheets	2.226	8.50	4.35	3.50	282%	57%	80%
Wire	1.62	3.95	3.00	2.50	144%	54%	62%
Pipe	2.194	5.10	4.25	3.55	132%	71%	46½%
Composite	1.684	5.334	3.021	2.493	217%	48%	82%

*Reached 2.545c., which was maintained all through 1918; again in 1920.

New Secretary of Mining and Metallurgical Engineers

Frederick Fraley Sharpless, who has been selected by the directors of the American Institute of Mining and Metallurgical Engineers, to succeed Bradley Stoughton as secretary of the institute, was for several years secretary of the Mining and Metallurgical Society of America. He graduated in chemistry from the University of Michigan and from 1888 to 1892 was instructor in metallurgy in the Michigan School of Mines at Houghton. Later he opened a chemical laboratory in Minneapolis in association with Horace V. Winchell, and then followed some years of valuable experience at Western mines, one engagement being as manager of the California Copper Co. From 1900 to 1912 Mr. Sharpless's work was varied, including much exploring, reporting and operating in British Columbia, Alaska, Mexico and South America, chiefly for English investors. The past eight years have been occupied with consulting work, with offices in New York. Mr. Sharpless is a native of West Chester, Pa., coming of Quaker stock, and is 55 years of age. His membership in the mining institute dates from 1889.



F. F. SHARPLESS

Electric Furnace Sales

The Electric Furnace Co., Alliance, Ohio, reports more orders for its Baily electric furnaces in June than in any single month in the last two years. These orders include standard brass melting units, car furnaces for steel plant purposes and a special electric enameling equipment. Most of the sales were made to concerns not particularly busy at the present time, but who purchased this equipment with a belief that by the time the furnaces were installed and ready for operation business would be such as to justify the present expenditure. The Empire Brass Mfg. Co., Ltd., London, Ont., bought the fifth Baily furnace sold in Canada during the past year. The Mueller Metals Co., Decatur, Ill., ordered three 105-kw. furnaces each with 1500-2000-lb. hearth capacity. The Ingram Richardson Mfg. Co., Beaver Falls, Pa., bought a 600-kw. electric enameling furnace, a rotating car type furnace arranged to travel on a circular platform 60 ft. in diameter. The equipment will have a heating capacity of 44 tons of material per day.

Not a Common Carrier

WASHINGTON, July 12.—In a decision handed down last Friday the Interstate Commerce Commission held that the Allegheny & South Side Railway Co., the stock of which is owned by the Oliver Iron & Steel Co., is not a common carrier and directed it to cancel its tariffs on file with the commission.

The Blair Engineering Co. announces that Arthur G. McKee & Co., 2422 Euclid Avenue, Cleveland, will hereafter have the exclusive right to manufacture and sell all special open-hearth equipment previously handled by the Blair company. This includes Blair valves, ports and slag-pockets, all of which are well known to operators of open-hearth furnaces. Arthur G. McKee & Co. will also have the exclusive right to manufacture and sell the new Eglar type furnace which has recently been put into operation. Results already obtained in this furnace are said to prove that this development will greatly increase the output of open-hearth furnaces, with a considerable increase in fuel economy.

The Iron Age and Its Readers

Figures from the United States Census Office afford the means of determining how largely THE IRON AGE covers the manufacturing interests of the United States. The 34,536 plants in those machinery and allied fields which are served by THE IRON AGE turned out, during 1919, products to a total value of $19,516,888,000, or an average per plant of $565,000. The remaining plants of all descriptions and sizes, more than 250,000 in number, showed an average product of only $170,000 per plant. Thus the average plant in our field is 3 1/3 times as large in its operations as the average plant outside our field.

Leaving out the plants employing fewer than 50 men, the remaining manufacturing establishments in all branches of industry in the country number about 25,200. These include the whole range—textile mills and candy factories as well as factories using iron and steel in producing their product. More than half of the entire 25,200 large plants in American industry, however, are reached by THE IRON AGE.

GOVERNMENT BUYING

General Dawes Planning for Co-ordination in Buying—Selling Surplus Steel

WASHINGTON, July 12.—Steps looking to the co-ordination of all Government purchases, wherever practical, are believed to be in the mind of Director of the Budget Charles G. Dawes, as the result of an order he issued last Friday. The order itself primarily deals with sales and purchases of material held by the different Government departments, but it is thought ultimately the plan will be expanded to as to include all purchases. In his order to heads of Government departments and independent establishments, General Dawes said:

> In order to conserve to the utmost the expenditure of Government funds and to save loss by deterioration in storage of surplus property now available for disposal by the several executive departments of the Government, it is directed that whenever advertisements for bids are contemplated, before such advertisements are made public, copies of the same in the exact form in which it is intended they shall be published be sent to the surplus property division, or corresponding agency, of each of the executive departments.
>
> Each department advertising material for sale shall in like manner inform every other department prior to the advertisement of the exact nature of the advertisement which it is proposed to publish.
>
> In both cases, copies will be sent to the chairman of the Interdepartmental Board, which is hereby charged with co-ordinating these activities.

In substance, this order itself requires that the different Government departments make known to each other the surplus property they have on hand with a view to disposing of it to Government sources which may need such requirements as are already on hand without going outside to purchase the material. It will remain for the chairman of the Interdepartmental Board to co-ordinate the necessary activities after getting the information requested by the Director of the Budget. The proposal also is looked upon as a means of preventing Government departments from bidding against each other in the purchase of supplies and to give more uniformity to prices of materials bought by the Government. It is doubted that steel and machinery supplies on hand as surplus will figure much in the order, although the setting up of a co-ordinated buying agency for the Government would do so.

Should a centralized system for purchases be organized it is pointed out that it could be helpful to the steel trade, as well as to the Government, by standardization of specifications, perhaps adopting those of the American Society for Testing Materials, on the more ordinary steel products; of forms as to liquidated damages, and requirements for giving bonds, certified checks, etc. It is recognized by Government authorities that there are limits of a definite character to the idea of standardization and some steel supplies, such as many required by the War and Navy Departments, would not yield to such a system, but on the more common products such a plan could be devised and bidders annoyed by less red tape. Moreover, they would know readily where to go for information. Under present conditions the latter is often impossible, for small producers who do not maintain close connection with Government sources in the way of getting information as to activities for purchases.

All Sales Stopped

All sales of surplus material, including steel, have been stopped by the United States Shipping Board and it has begun a physical inventory of its surplus property under the direction of Col. R. H. Montgomery, of the New York accounting firm of Lybrand, Ross & Montgomery. In the meantime, the board has rejected all bids that were received recently on 26,270 tons of steel, and while it is understood bids will be received on the 110,000 tons at Hog Island, Pa., up to July 26, it is apparent that none of these tenders will be accepted, at least not in the near future.

The board is undecided as to what policy will be followed in disposing of its surplus property and will not know until the inventory under way has been completed and the results studied. Altogether, it is estimated that the board has practically 300,000 tons of surplus steel on hand. There is a sentiment in favor of selling it at once in view of the fact that it is exposed to the weather and deteriorating and represents considerable cost on the investment. There also is another opinion to the effect that if material is held until the iron and steel market resumes activity and strength, the surplus could be sold at a better figure than could be obtained under existing conditions.

TARIFF DISCUSSION

Congressman Tilson Refers to Steel Industry—Valuation Plan Explained

WASHINGTON, July 12.—Defense of the metal schedule carried in the permanent tariff bill was made in the course of general debate in the House yesterday afternoon by Representative John Q. Tilson, chairman of the subcommittee who has charge of that schedule. While his speech largely consisted of the points made in his report, Mr. Tilson took occasion to answer criticisms made in the minority report on the bill with regard to sinister influence exerted by business or business men toward preparation of the measure.

"Of course no member signing the minority views believes for a moment that any sinister or undue influences were exerted by either big or little business or business men or had any effect whatever upon the preparation of this bill, but they had to say something," declared Mr. Tilson. "No one who signed these views would say, and attempt to keep a straight face, that he believed any member of the majority of the committee was any less honest or patriotic than himself, but something had to be said. It speaks volumes for the merits of this bill that it was found necessary to indulge in such insincere accusations of dishonesty against honorable colleagues in order to be able to say something derogatory to the bill."

It was stated by Mr. Tilson that what the Ways and Means Committee had in mind in preparation of the bill was not the rates carried in the Payne-Aldrich or the Underwood-Simmons or any other bill, but what rates are needed to preserve and cause the continuance of the industries of this country.

Non-ferrous Products

It is understood that one of the principal amendments will relate to paragraph 378, which covers copper and brass wire and other non-ferrous products. It is proposed to eliminate all reference to wire and in removing these classes of wire from this special classification to allow them automatically to be covered in the basket clause, paragraph 393, which assesses ad valorem duties of 45 and 35 per cent as compared with specific duties ranging from 1½c. to 12c. per lb. contained in paragraph 378.

The latter paragraph, if the proposed amendment is made, will read as follows:

> Copper in rolls, rods, or sheets, 2½c. per lb.; copper engravers' plates, not ground, and seamless copper tubes and tubes, 7c. per lb.; copper engravers' plates, ground, and brazed copper tubes, 11c. per lb.; brass rods, sheet brass, brass plates, bars and strips, Muntz or yellow metal sheets, sheathing, bolts, piston rods, and shafting, 4c. per lb.; seamless brass tubes and tubing, 8c. per lb.; brazed brass tubes, brass angles and channels, 12c. per lb.; bronze rods and sheets, 4c. per lb.; bronze tubes, 8c. per lb.

Chairman Fordney's Address

Reports formally made on the House bill contained nothing of a particularly illuminating character over and above what had been said previously by different members. They indicate, however, as do speeches in the House, that the American valuation plan is one of the chief features of the measure causing discussion. Chairman Fordney in an address last Thursday in supporting this plan gave several examples of how it would work, first pointing out its necessity because of the wide difference in international exchange.

Unions Make Important Concessions

Agreement Reached at Columbus Conference of Sheet and Tin Plate Manufacturers and Representatives of Amalgamated Association

YOUNGSTOWN, OHIO, July 12.—The Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers will meet the last week in July at an adjourned conference to negotiate the 1921-1922 wage agreement. The place of meeting is still undetermined. At the annual conference held early in June at Atlantic City, representatives of both associations failed to agree. The 1920-21 agreement expired June 30, but mills are operating under a clause which provides for their automatic continuance for 30 days.

An agreement was reached July 9 at Columbus, Ohio, between sheet and tinplate manufacturers subscribing to the Amalgamated scale and representatives of the employees, following sessions which began on July 6. At times it appeared as if the conference would result in disagreement. Union sheet and tinplate mills suspended June 30 upon expiration of the old contract.

Manufacturers insisted upon reductions and changes in working conditions which would effect economies in production so as to enable them to compete with other makers operating independently of the Amalgamated Association. It was pointed out to representatives of the employees that unless such economies could be effected in the agreement, manufacturers would be forced, of necessity, to take other steps to reduce production costs.

Reduction of 10 Per Cent

An average saving of approximately 10 per cent in production costs is effected under the terms of the new contract, though the economy in particular divisions varies.

Employees attempted to retain the gains which they had made during the war and conceded reductions and changes only after bitter contest.

The most important concession gained by manufacturers was in the tin mill scale. At the conference last year, employers granted an increase in the rate of advance in the tonnage rate from 1 per cent to 1⅛ per cent for each member of the crew on each five cents advance in the selling price of tinplate above the base of $3.50 per box of 100-lb. of coke prime sheets. The rate of increase was again restored to 1 per cent in the new contract.

Similarly, in the tin house scale, the rate of advance for tinners, redippers and risers was last year advanced to three-fourths of 1 per cent for each 5c. increase in the selling price above the $3.50 base, from one-half of 1 per cent. This year the old rate was restored.

During the May-June period, the tonnage rate for tin mill employees was based on a selling price of $6.50 per base box of plates, or $3 above base. In consequence of the reduction in the rate of advance from 1⅛ per cent to 1 per cent, tin mill workers would sustain an actual reduction in the current tonnage rate of 7½ per cent. The actual loss to workers will, of course, vary with the selling price of tin plate.

Charges Pared Down

A number of extra charges in the tin plate scale were also pared down. For instance, the old agreement provided that "all sheets or black plate 14½ ft. square or over, when finished in six or more sheets to the pack, should be paid for at the following rates above the tinplate scale—10 per cent extra on No. 26 gage and heavier and 20 per cent for all lighter gages, up to and including No. 32 gage; and for all sheets or black plate 15½ sq. ft. and over, finished in fours, the same percentage shall apply." In the new scale, this is reduced to 10 per cent instead of 20.

Manufacturers conceded an extra hand on tin mill crews, with a revision of work and distribution of it among the various members of the crew, subject to local agreement.

The sheet mill base scale is not materially different in the new agreement than in the old, though changes have been brought about in working conditions which manufacturers say will produce savings in costs. Employers contended for the elimination of an extra man added to sheet mill crews during the war, and a lively contest developed over this issue. It was finally compromised, by eliminating the extra helper six months in the year and providing for his employment during the six war months from April to October.

In both the sheet and tinplate agreements, the catcher is reduced to the status of the rougher, the change having previously been made under the stress of war conditions. Both are on a par in the new wage scale.

New Classification

Manufacturers secured the consent of the Amalgamated Association for another classification on jobbing mills, the purpose being to rearrange positions to bring about reductions in costs. This reclassification will be made sometime between the middle of July and Sept. 1.

When due to shortage of men, the limit of time for sheet, jobbing mill or tin mill crews to remain in the mill without working was extended from one hour to 1½ hours. Employers contended that the extra man on sheet mill crews increased the cost of production from $1.50 to $2 per ton above that of non-union competitors.

President M. F. Tighe of the Amalgamated Association presided over the adjourned conference. Many representatives of the manufacturers left Friday evening with the understanding that the employers would offer compromises on Saturday that would break the deadlock.

The original conference at Atlantic City started June 6 and terminated June 13, without agreement.

The bimonthly examination of sales sheets in the sheet and tinplate divisions, ordinarily held on the tenth of every second month, was delayed this month on account of the Columbus conference. However, sales sheets have been sent in by a majority of the mills and the settlement will probably be effected this week. Average sales prices are sent by the subscribing mills to James H. Nutt, secretary of the Western Sheet and Tin Plate Manufacturers' Association, who tabulates them and represents employers at the settlements.

A number of companies affected by the agreement started sheet or tinplate units this week, after a shutdown since June 30. In the Mahoning Valley, however, the accumulation of orders during the suspension, was small.

Seventeen makers were represented at the Columbus conference.

The Steubenville, Ohio, plant of LaBelle Iron Works, idle much of the time since the first of the year, started up last week. All of the eight sheet mills of this works went on July 5, while 4 of the 11 open hearth furnaces were started up July 7.

Due to lack of business, the Masury plant of the Pennsylvania Tank Car Co. has closed for an indefinite period, affecting several hundred workers.

The Mercer works of the American Sheet & Tin Plate Co. at Farrell, Pa., resumed in full this week.

Iron and Steel Markets

WAGE REDUCTIONS

Little Market Response to New Steel Prices

Better Railroad Buying and More Activity in Pig Iron—Export Competition Sharper

Less rather than more buying has followed the formal posting of new steel price lists last week, and steel works operations have not improved. Buyers do not question that prices are generally below cost, but they need little steel and await the effect of labor and freight adjustments.

Further wage reductions by independent steel companies will go into effect July 16. The rate for common labor is reduced from 37 to 30 cents per hour, making the total reduction from the peak about 35 per cent. The Steel Corporation, by abolishing the eight-hour basic day, comes to 37 cents per hour for common labor. There are predictions of a 25-cent rate before the downward movement is stopped, as against 19 cents before the war. In one Eastern mill town as low as 20 cents is now being paid.

The independent sheet and tinplate mills made a settlement at Columbus, Ohio, on July 9, with the union workers which means a 10 per cent lower labor cost. The Western bar iron scale is yet to be fixed. Two independent sheet makers who signed the scale last year are expected to operate on the open shop plan in future.

The Steel Corporation followed the Bethlehem Steel Co. in announcing 1.90c. as its price for bars, with other prices the same as in the Bethlehem schedule. In addition, the Steel Corporation issued new cards reducing prices on standard pipe $2 to $4 per ton on butt weld and $4 to $6 per ton on lap weld, while oil country goods were reduced by $4 to $7 per ton. A $5 reduction in wire was also made, bringing nails down to $2.75 per keg and plain wire to $2.50 per 100 lb. On wire rods the price has gravitated to $42.

Market prices of some products, including hot and cold rolled strip steel, are not well defined. Irregularity appears also in seamless tubes. While 2.60c. is regarded as the Steel Corporation price on hot rolled strip, sales by other makers are reported at 2.50c. and lower.

The season's business on cotton ties has opened at a price of $1.35, Pittsburgh, per bundle of 45 lb. and a carrying charge of 1c. per bundle per month, as compared with $2 in 1920 and $1.70 in 1919. It is reported that German cotton ties have been offered as low as $1.36 at Gulf port, but no sales have been made in view of the uncertainty of deliveries.

New structural projects total 11,000 tons, nearly half of which is for a building in the Grand Central area in New York. Contracts awarded involve about 7000 tons in sizable jobs, while the capacity of the country's fabricating shops exceeds 40,000 tons per week.

Marked increase in interest on the part of pig iron buyers in several important centers, with sales of fair tonnages, has caused a more cheerful sentiment, but business is being taken at further price concessions. Southern iron has declined 50c. and at Chicago charcoal has been marked down $1.50, while other grades have declined $1 in that market and lower prices are also noted at Pittsburgh, where an offer to buy 1500 tons of basic at $18, or $1.50 below the prevailing quotation, is considered to represent the views of buyers.

Rails are the chief item in the export trade. The Pekin & Mukden Railway inquiry has been increased from 11,000 to 17,000 tons, and the award is expected this month. On 9500 tons for Argentina the Belgian mill which took the order bid 469 francs or close to $36 per ton, c.i.f. Santa Fe, while the lowest bid from the United States was $62.15. A 5000-ton girder rail order for a Toronto car line, taken this week, will be rolled at Bethlehem.

A bridge over the Yellow River, China, requiring 40,000 tons of steel, which has been bid on by several American builders, would probably go to Europe on the score of price, but financial problems threaten long postponement.

While offers of Belgian and German steel in the United States at low prices are still reported, sales do not result, all buying being at so low an ebb. In Canada likewise offers of Continental steel have been ignored, though at $10 per ton below American prices.

Continental pressure has forced another downward revision of 10s. and £1 in British steel prices, with rails now quoted at £10 against £13 a week ago. Urgent need of pig iron has put in some blast furnaces, but others are waiting on stabilization of fuel prices.

Pittsburgh

PITTSBURGH, July 12.

The general report of steel manufacturers here is that the reaction following the new prices has been extremely poor. It usually happens that on price revisions such as that of last week, it takes some little time to complete the readjustments and during such periods very little business is done. The latest revision, however, with the possible exception of wire products, merely gave public affirmation to prices which previously had been current, and since there was no actual reduction, buyers seem to be expecting still further concessions and are holding off. In this attitude they are encouraged by the wage reduction from 37c. to 30c. per hour in the common labor wage rate by Valley steel makers and the expectation that this action will be followed by independents in the Pittsburgh district.

Abrogation by the Steel Corporation of the basic eight-hour day will mean a reduction in producing costs but not nearly enough to offset the high overhead which current operations mean, nor as much as would be saved if the corporation subsidiaries were operating in normal fashion. The position of leading steel manufacturers is that the new prices are as low as they should be on to-day's producing cost, and some go so far as to say that even if common labor was obtainable at 25c. an hour no excuse would exist for further concession until the industry obtained the benefit of lower

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 12, 1921	July 5, 1921	June 14, 1921	July 13, 1920
No. 2X, Philadelphia†....	$25.50	$25.50	$25.50	$48.15
No. 2, Valley furnace†....	*20.50*	21.00	22.50	45.00
No. 2 Southern, Cin'ti†...	*24.50*	25.50	26.50	45.60
No. 2, Birmingham, Ala.†.	*20.00*	21.00	22.00	42.00
No. 2 foundry, Chicago*..	*19.00*	20.00	21.00	45.00
Basic, del'd, eastern Pa...	23.50	23.50	25.00	43.00
Basic, Valley furnace.....	*19.50*	20.00	21.00	46.00
Bessemer, Pittsburgh	*22.96*	23.46	24.96	47.40
Malleable, Chicago*	*19.00*	20.00	21.00	43.50
Malleable, Valley	*21.00*	21.50	23.00	45.00
Gray forge, Pittsburgh....	*21.46*	21.96	23.46	44.40
L. S. charcoal, Chicago...	*36.00*	37.50	37.50	57.50
Ferromanganese, del'd....	70.00	70.00	75.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill.	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill.	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh...	33.00	33.00	37.00	60.00
O.-h. billets, Pittsburgh...	33.00	33.00	37.00	65.00
O.-h. sheet bars, P'gh.....	35.00	35.00	39.00	70.00
Forging billets, base, P'gh.	38.00	38.00	42.00	85.00
O.-h. billets, Phila.	38.74	38.74	42.74	69.10
Wire rods, Pittsburgh....	*43.00*	45.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb..	2.00	2.00	2.20	2.75
Skelp, sh. steel, P'gh., lb..	2.00	2.00	2.20	3.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	*2.15*	2.25	2.25	4.75
Iron bars, Chicago.....	*2.00*	2.10	2.25	3.75
Steel bars, Pittsburgh....	1.90	1.90	2.10	3.50
Steel bars, New York.....	2.28	2.28	2.48	4.02
Tank plates, Pittsburgh...	1.90	1.90	2.00	3.50
Tank plates, New York...	2.28	2.28	2.38	3.77
Beams, etc., Pittsburgh...	2.00	2.00	2.20	3.10
Beams, etc., New York...	2.38	2.38	2.58	3.27
Steel hoops, Pittsburgh...	2.50	2.50	2.75	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 12, 1921 Cents	July 5, 1921 Cents	June 14, 1921 Cents	July 13, 1920 Cents
Sheets, black, No. 28, P'gh.	3.50	3.50	3.85	6.50
Sheets, galv., No. 28, P'gh	4.50	4.50	5.00	8.00
Sheets, blue an'l'd, 9 & 10.	2.65	2.65	2.90	5.00
Wire nails, Pittsburgh....	*2.75*	3.00	3.00	4.00
Plain wire, P'gh.....	*2.50*	2.75	2.75	3.50
Barbed wire, galv., P'gh...	*3.40*	3.65	3.85	4.45
Tin plate, 100-lb. box, P'gh.	$5.75	$5.75	$6.25	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$13.25	$13.25	$13.25	$35.50
Carwheels, Philadelphia...	*16.00*	18.00	18.00	38.00
Heavy steel scrap, P'gh...	12.00	12.00	13.00	26.00
Heavy steel scrap, Phila..	11.00	11.00	11.50	22.50
Heavy steel scrap, Ch'go..	10.00	10.00	11.00	23.50
No. 1 cast, Pittsburgh....	16.00	16.00	17.00	40.00
No. 1 cast, Philadelphia...	16.00	16.00	17.50	37.00
No. 1 cast, Ch'go (net ton)	12.50	12.50	13.00	36.00
No. 1 RR. wrot, Phila.....	13.50	13.50	15.00	33.00
No. 1 RR. wrot, Ch'go (net)	*9.25*	9.50	9.50	25.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt.....	*$2.75*	$3.00	$3.00	$17.00
Furnace coke, future	3.25	3.25	3.25	11.50
Foundry coke, prompt....	*4.00*	4.25	4.50	18.00
Foundry coke, future.....	4.75	4.75	5.00	14.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	12.75	12.75	13.00	19.00
Electrolytic copper, N. Y..	12.62½	12.62½	13.00	19.00
Zinc, St. Louis	*4.30*	4.35	4.45	7.85
Zinc, New York	*4.30*	4.35	4.95	8.20
Lead, St. Louis	**4.35**	4.25	4.25	8.15
Lead, New York	4.40	4.40	4.50	8.40
Tin, New York	*28.50*	29.87½	29.25	50.25
Antimony (Asiatic), N. Y.	4.75	4.75	5.20	7.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 12, 1921, Finished Steel, 2.493c. per Lb.

Based on steel bars, beams, tank plates, open-hearth rails, plain wire, black pipe and No. 28 gage black sheets	July 5, 1921,	2.557c.
	June 14, 1921,	2.679c.
	July 13, 1920,	3.867c.
	10-year pre-war average.	1.684c.

freight rates. It is asserted that every ton of steel produced by the Pittsburgh district to-day carries freight charges of more than $7.50. It remains to be seen, however, whether the deadlock will be broken by the latest price changes. The industry continues to look forward hopefully to the railroads as a Moses. Thus far, outside of the car repair orders which have been placed, in which Pittsburgh district shops have not shared, there has been no tangible evidence of increased railroad buying, but a good many expect results in the next 30 or 60 days from the economies the railroads will be able to effect through lower wage rates and the abrogation of war-time labor agreements, while the attitude of the Administration toward the carriers also is looked upon as a hopeful sign.

The most promising development of the recent past indicating that a turn is not far distant is to be found in the pig iron market where there has been one inquiry for 1500 tons of basic iron carrying a firm offer of $18 furnace, while there also has been some activity on the part of sellers to get melters to make bids.

Some confusion has attended the reaching of official prices on some of the minor steel products, the market not being very clearly defined in this respect on hoops and bands or hot-rolled strip steel. The Steel Corporation price on these products is 2.60c., base, Pittsburgh, but some of the independents are quoting 2.50c. and it is known that some business was done even as low as 2.40c. It is probable, though, that the official quotation will be 2.60c. The new quotation on cold-finished steel bars has been set at 2.80c., base, Pittsburgh, but this is above what previously had been possible and shading is likely on the appearance of attractive orders. As a matter of fact, the new prices of the latter product and a number of others are regarded as maximum rather than minimum.

We note no increase in steel plant activities in the past week, indeed the tendency still is in the other direction, and the fact that an agreement has been reached between the Amalgamated Association of Iron, Steel and Tin Workers and the sheet and tin plate manufacturers, on the question of a wage scale, has not yet found reflection in the activities of the plants involved. Indications are that at least two and probably more sheet and tin plate makers will not sign up with the Amalgamated Association this year.

The coke market has been enlivened by an inquiry from the Wickwire-Spencer Steel Corporation, Buffalo, for 30,000 tons for August and September delivery, this company figuring on starting up some of its idle furnaces Aug. 1.

Ferroalloys.—There is an utter dearth of inquiries and in the absence of important sales prices are purely conjectural. The proposed import duties on ferromanganese and manganese ore have been without effect upon the demand for the former because consumers uniformly regard them as improbable of enactment and some of the larger independent steel makers are figuring on making their own ferromanganese in the event of the passage of the bill as introduced. These companies figure that they could save almost $20 per ton by making their own ferromanganese, even with a duty of 1c. per lb. on the metallic content of the ore. Generally domestic makers of ferromanganese are holding to $80 delivered for 76 to 80 per cent material, but there has been no recent basis in sales for a price of more than $70. There are reports here that English makers would consider contract business around $60 f.o.b. New York. Makers of spiegeleisen are quoting $30 to $31, furnace, for average 20 per cent alloy, but this is about $3 per ton above what could be done to-day even on small tonnages. We note the sale of a carload of 50 per cent ferrosilicon of domestic origin at $62.50

delivered. This sale, however, was surrounded by some unusual conditions and the real minimum is $65.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 to $28 furnace quoted by makers on direct business and $25 to $26 furnace on resale tonnages; 50 per cent ferrosilicon, $65 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Pig Iron.—We note another sale of 2000 tons of standard basic iron but at a further recession of 50c. per ton, the iron moving from a Valley steel works at $19.50, furnace. This is as low as any sales of this grade are reported, although there are rumors that small lots have changed hands at $19, Valley furnace, or its equivalent. It is also reported that a price of less than $18.50, figuring on a Valley furnace basis, has been quoted against an inquiry for a round tonnage recently put out by a Pittsburgh district melter. A steel foundry interest which recently bought 100 tons of basic at $20.80 delivered, equal to $20.10 at the furnace from which it was shipped, is reported to have duplicated that purchase. An inquiry for 1500 tons of basic carrying a firm offer of $18, Valley furnace, has been before a number of producers, but has not been placed. Bessemer iron has been offered at $21, Valley furnace, without takers, and a higher price is no longer justified. It is probable that this grade could be bought at $20.50, Valley furnace. Only small sales of foundry iron are being made and on these the common base is $20.50, Valley furnace, for No. 2 grade. A radiator company with plants in Johnstown and New Castle, Pa., and Trenton, N. J., is reported to be in the market for 1200 tons of foundry iron. Since only the latter plant of the company is busy, it is probable that the business will be placed in the East.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.50
Bessemer	21.00
Gray forge	19.50
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	21.00

Billets, Sheet Bars and Slabs.—So little is going on that actual prices are quite as indefinite as they were prior to the Bethlehem Steel Co. announcement as of July 5. So much finishing capacity is idle that both demands and specifications are exceedingly light. In the absence of inquiries which would provide a test, quotations must be regarded as entirely nominal.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $33; 2 x 2-in. billets, $35; Bessemer and open-hearth sheet bars, $35; slabs, $34; forging billets, ordinary carbons, $38, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The recent reduction of $5 per ton in wire products has been accompanied by a like reduction in prices of wire rods. Information as to price of the American Steel & Wire Co. on rods is lacking, but independent companies have assumed that the reduction in finished products by this company carried with it the same cut in rods. Little is going and not much publicity is being given prices, but there is no question that all independent makers would take business at $43 for the base size of soft rods. Prices are given on page 112.

Plates.—Inquiry still is very light and buyers look upon the new base of 2c., Pittsburgh, as merely a nominal figure, and likely to be shaded on sizable orders. The Pittsburgh-Des Moines Steel Co., which was awarded 14 55,000-bbl. storage tanks by the Shipping Board, has not yet bought the 2800 tons of plates which will be required.

Structural Material.—Structural inquiries have been much fewer since the holiday than they were previously and awards, except of tonnages of less than 100 tons, have been few. The building trade situation seems to be clearing up slowly and the decline in business seems to be ascribable chiefly to the unsettlement of the latest price revision in plain material. The new base of 2c. for structural beams is rather nominal, at least in the minds of fabricating interests, some of which report bids on fabricated steel that would indicate a plain material base of around 1.65c. The Bureau of Yards and Docks, Navy Department, has awarded the McClintic-Marshall Co. 175 tons for a machine shop at San Diego, Cal., and 230 tons for a machine shop and a carpenter shop at Hampton Roads, Va. The McClintic-Marshall Co. also has taken 500 tons for a 350-ft. arch span bridge over the Willamette River, Oregon City, Ore. The Pittsburgh Bureau of Building Inspection, after a considerable controversy, has issued a permit for the reconstruction of the Empire Building, Liberty Avenue and Stanwix Street, Pittsburgh, whereby this building will be raised from a 12-story to a 30-story structure. The permit also allows the construction of a 30-story building on an adjoining site by the owners of the Empire Building. Plain material prices are given on page 112.

Wire Products.—Last week's cut of $5 per ton, which includes everything in this classification and is the second of like size made since the April effort at stabilization, has not been productive of any appreciable increase in business. Since there was no important cutting of $3 for nails and $2.75 for plain wire, the price changes made last week constitute practically the only actual price reduction that has been made in steel. Cement coated nails go to $2.35 per count keg, Pittsburgh, in the latest revision and there has been a 2½ per cent increase in the discount on woven wire fencing. The latter now is quoted at 68 per cent off list for carload lots, to retailers, while an additional 2½ per cent is made by manufacturers who distribute solely to jobbers.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Steel Rails.—As indicated in THE IRON AGE of last week, the new "official" quotation on light rails rolled from new steel, is 2c. Very little demand is developing except for small lots from the coal companies and these are being supplied to a large extent from mills rerolling old sections. A price as low as $40 per gross ton is reported to have been made by the latter.

We quote 25 to 45-lb. sections, rolled from new steel, 2.10c. to 2.20c.; rolled from old rails, 1.80c. to 2c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—No improvement yet is observed in the demand for bolts and nuts by makers in this district who, to a large extent, are dependent on the railroads for the bulk of their orders. The railroads are recalling a good many of their furloughed shop workmen, however, and it is believed that the next 30 to 60 days will bring some increase in the demand.

Spikes.—The new quotation on railroad spikes is $3 base, a cut of $5 per ton. Bolt and barge spikes, however, were lowered only $1 per ton in the latest revision, the new price being $3.20 per 100 lb.

Iron and Steel Bars.—The new base of 1.90c. for soft steel bars has brought out no increase in the demand, presumably because it is above the price which some makers prior to July 5 were willing to accept. It is now said that a quotation as low as 1.80c., Pittsburgh, was made before the holiday by some of the independent makers. Very little demand is noted for reinforcing bars and those rolling them from new steel still are encountering stiff competition from those making from old rails. Refined iron bars nominally are held at 2.50c. base, but it is believed attractive orders would develop lower figures.

We quote steel bars rolled from billets at 1.90c.; reinforcing bars, rolled from billets, 1.90c. base; reinforcing bars rolled from old rails 1.75c. to 1.85c.; refined iron bars, 2.50c., in carloads f.o.b. mill, Pittsburgh.

Cold-Finished Steel Bars.—The "official" base growing out of the recent price revision is 2.80c. Pittsburgh, for carloads and 3.05c. for less than carloads. These prices, however, are at least $1 per ton above the going price prior to July 5, and are generally regarded as maximum, which would be shaded substantially on the appearance of anything like an attractive order. Small sales are known to have been done at 2.75c. base and consequently we quote the carload base at 2.75c. to 2.80c. Business shows no material increase.

Hoops and Bands.—There is some uncertainty as to the new base. The Steel Corporation is quoting 2.60c.,

a drop of $3 per ton from its last previous official price, while independents are quoting 2.55c. and 2.50c. Since the latter price had been named prior to the Bethlehem Steel Co. announcement, and it is even said to have been shaded, it probably measures the present possibilities better than the higher figures. Business still is slack.

Iron and Steel Pipe.—Effective July 7, the National Tube Co. issued new cards cutting prices on standard pipe, ¼-in. and over, $2 to $4 per ton on butt weld and $4 to $6 per ton on lap weld pipe. Effective the same day, prices of oil country pipe were reduced from $4 to $7 per ton. Independent makers have followed these reductions. Price cuts also have been made in wrought iron pipe, the cut being $2 per ton in ¼-in. and ⅜-in., the same as that in the same size of steel pipe, while in the sizes from ½-in. and up the reduction in iron pipe is $8 to $12 per ton, or double that in steel pipe of like sizes. Lower materials and labor costs have permitted this narrowing of the gap between steel and iron pipe, which, up to the latest change, was a matter of $48 to $50 per ton on lap weld, and $54 to $58 in butt weld pipe. The new prices for iron pipe are $44 to $46 per ton above those for steel pipe, in lap weld, while butt weld iron pipe is $50 to $54 per ton higher than steel pipe, size for size. Business has not benefited much from the reduction, possibly because the change has not yet been digested by the consuming trade. New discounts are given on page 112.

Sheets.—A fair number of orders is being received for small lots for quick shipment, but these are coming chiefly from the automobile industry and general business still is light. The new prices are fairly well observed, but it is too early to say the market is firm, since there is so little going on. It is reported that galvanized sheets have been offered as low as 4c., but these sheets have been in stock for some little time. Sheet mill operations are at the lowest point of the year, due to the fact that practically all of the so-called union mills are down. Prices are given on page 112.

Tin Plate.—Orders for small lots are fairly numerous with those companies operating their plants on an open shop basis. Evidently container manufacturers still are inclined to take on supplies only as and when needed and manufacturers are not able to make up schedules very far ahead. A good deal of stock has been made up and the danger of a pinch in the supply over the remainder of the year is considered to be slight. All makers are quoting production plate at $5.75 per base box, Pittsburgh, and stock items no longer are available much below that price. Roofing ternes have been reduced $1 per package on all weights, in keeping with the recent price revisions.

Cotton Ties.—The season was opened last week by the Carnegie Steel Co. which announced a price of $1.35 per bundle of 45-lb. and a carrying charge of 1c. per bundle per month. The Carnegie Steel Co. opening price last year was $2, in 1919 $1.70 and $2.10 in 1918 and 1917. The carrying charge last year was 1½c. per bundle per month. The Pittsburgh Steel Co. also is quoting $1.35 per bundle as compared with its opening price last year of $2.45. Rollings against this season's requirements, although sharply curtailed in keeping with estimates of the cotton crop, are understood to be in excess of probable needs. German competition is being encountered. and a price as low as $1.36 per bundle, delivered, is reported to have been made. German makers do not seem to have succeeded in getting any business, however, because of the uncertainty as to deliveries.

Steel Skelp.—The reaction in the demand to the reduction in steel skelp from 2.20c. to 2c. has been extremely poor. Demands upon the mills for finished tubular goods still are light and the nonintegrated makers have not been tempted by the official reduction recently announced.

Boiler Tubes.—The National Tube Co. has issued a card dated July 7 cutting prices of steel lap-weld boiler tubes from $4 to $12 per ton and the new schedule has been adopted by independent makers. The National Tube Co. has not yet made public the new discounts on seamless tubes, and makers of charcoal iron boiler tubes here are waiting on Eastern producers to take the first step in a revision of prices. Business in all kinds of boiler tubes has been extremely slack for some time and there has been no noticeable increase in the demand since the revision. Discounts are given on page 112.

Hot-Rolled and Cold-Rolled Strips.—The American Steel & Wire Co. has announced a price of 4.25c., base, for cold-rolled strips which compares with 5.50c., its last previous official price, and 5c., at which it was accepting orders prior to the holiday. The new price, therefore, constitutes a cut of $25 a ton from the April 13 price and of $15 per ton from its recent actual selling base. Independent makers are expected to adopt the new price. Hot-rolled strips are variously quoted from 2.50c. to 2.60c., the latter being the price of the Steel Corporation. Business is reflected in mill operations, which are about 25 per cent of capacity.

Steel Chain.—Recent price cuts in steel bars and wire rods have not yet been reflected in steel chain, which still is quoted at 6.25c. per 100 lb. for 1-in. proof coil. There are rumors that this price is being shaded.

Coal and Coke.—The market is an extremely limited affair as regards both the demand and supply, but if there is a definite tendency to prices, it is down. Important operators are not inclined to consider less than $3 per net ton, oven, for spot freshly drawn furnace coke, but it happens from time to time that they have surplus supplies which they are not able to dispose of at more than $2.75. Uniform wage scales are lacking in the Connellsville district and some of the smaller operators are able to obtain workmen at such low rates that they are willing to sell furnace coke right from the oven at $2.75 per net ton. The Wickwire-Spencer Steel Corporation, Buffalo, is figuring on starting up a furnace on Aug. 1, and has sent broadcast an inquiry for 30,000 tons of furnace coke running less than 1 per cent in sulphur, for delivery at the rate of 500 tons a day over August and September. Competition for this business is likely to be sharp, and a price of below $3 is thought possible. Choice brands of foundry coke are held as high as $4.50, but the more common range is from $4 to $4.25 and there are reports that some loaded cars of this grade have gone as low as $3.75. The difference between the wage scales in union and non-union coal fields is beginning to be a factor in the demand.

Old Material.—The market remains extremely dull and prices merely are an appraisal arrived at on bids and offers. Quotations show no marked changes except that on the basis of bids and offers cast iron borings are not quotable above $8 per ton delivered or about 50c. per ton below last week's quotation. Sheet bar crops and heavy breakable cast scrap also are quoted 50c. down from last week's prices. There is an inquiry out from a dealer against a sale of a few hundred tons of mixed borings and turnings carrying a price of about $8.50 delivered Dunbar, Pa. Dealers report much difficulty in getting a bid of more than $7 per ton delivered for machine shop turnings.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.50 to 10.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	16.00 to 16.50
Railroad malleable	12.00 to 13.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	14.50 to 15.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	12.00 to 12.50
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

Chicago

CHICAGO, July 12.

The new prices on steel products announced by the Bethlehem Steel Co. last week have been generally adopted, but it is too early to ascertain whether they will hold, as most current business is covered by protections granted under former quotations. The railroads continue to show interest in car repairs, although they are not yet letting work on the scale expected in some quarters. The automobile industry is more active than was anticipated a month ago. The Ford Motor Co. continues to maintain a normal output and some other makers are doing well. The Dodge company is turning out 400 to 500 cars a day, the Buick company is manufacturing cars at the rate of 9000 a month, and the Studebaker plants at Detroit and South Bend are reported to be on a 75 per cent basis. Generally speaking, however, the demand for steel continues light.

Pig iron has taken another slump of $1 a ton, and bolts and nuts are weak.

Mill and furnace operation in this district is substantially unchanged except for further curtailment by the Inland Steel Co. This producer has blown out a furnace which has been operating on merchant iron, leaving only one of the company's three furnaces in blast. Its steel output has dropped to between 20 and 25 per cent of normal.

Pig Iron.—Output in this district was further curtailed when on Monday the Inland Steel Co. blew out one of its blast furnaces which had been producing merchant iron. This action leaves only one furnace, a Mayville stack, operating on merchant iron exclusively, while a second furnace, an Iroquois stack, is employed chiefly on Bessemer for an allied company, only occasionally making a few casts of malleable or foundry. Buying is still limited, purchases of carload lots being notably fewer. A local purchaser has bought 100 tons of malleable for Indianapolis delivery at $19, local furnace, while a Chicago plant has closed for 300 tons of foundry averaging 3 per cent silicon at $20, furnace, or figuring silicon differentials at 50c., $19 base, furnace. A carload of charcoal for Eastern delivery has been sold at $32.50 base, furnace, or $1.50 under the previously prevailing market. New inquiries include one for 350 tons of foundry for the United States Radiator Co. at Edwardsville, Ill., and another from a Wisconsin smelter for 150 tons of 3 per cent foundry and 75 tons of charcoal. Coke buying is light, but we note a sale of seven carloads of high-grade beehive foundry to an Indiana buyer at the price ruling at time of delivery.

Quotations on Northern foundry, high phosphorous, malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumer's yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.00 to $36.50
Northern coke, No. 1, sil. 2.25 to 2.75	19.00 to 20.00
Northern coke foundry, No. 2, sil. 1.75 to 2.25	19.00 to 19.50
Northern high phos.	19.00 to 19.50
Southern foundry, sil. 1.75 to 2.25	27.67
Malleable, not over 2.25 sil.	19.00 to 19.50
Basic	19.00 to 19.50
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	35.00
Silvery, sil. 8 per cent	37.53

Ferroalloys.—A local buyer has purchased 100 tons of resale spiegeleisen at $34 delivered.

We quote 78 to 82 per cent ferromanganese, $78 delivered; 50 per cent ferrosilicon, $80 delivered; spiegeleisen, 18 to 22 per cent, $36 delivered.

Structural Material.—Most mills are quoting the new price of 2c., Pittsburgh, on plain material, announced by the Bethlehem Steel Co. July 4. No new business, however, has developed to test the stability of the quotation. A number of fabricating jobs on which protections had been previously secured have been awarded within the past week, two of them involving over 1000 tons each. The successful bid on one of these was the low figure of approximately $72 delivered. Among pending projects the largest is for repairs to the Armour Grain Co. elevator, Chicago, requiring 1500 tons. Bids were taken last week on the fabrication of the substructure of the Federal Reserve Bank Building, Minneapolis, amounting to 800 tons. Recent lettings include:

U. S. Window Glass Co., plant at Shreveport, La., 2500 tons, Decatur Bridge Co.

Mechanical repair shop, Motor Transport Division, Army, Fort Leavenworth, Kan., 1100 tons, to Missouri Valley Bridge & Iron Co.

Atlas Life Building, Tulsa, Okla., 400 tons, to Kansas City Structural Steel Co.

Selwyn & Harris Theater, Chicago, 348 tons, to Vatnerkloot Iron Works.

Miller Theater and Office Building, Wichita, Kan., 285 tons, to Fort Pitt Bridge Works.

Main building for West Hills School, Salt Lake City, Utah, 217 tons, to Minneapolis Steel & Machinery Co.

Masonic Temple, Kokomo, Ind., 220 tons, reinforced concrete substituted for structural steel.

Rosary College, River Forest, Ill., steel for the roofs of three buildings and a swimming pool, 160 tons, to Lackawanna Bridge Co.

Five highway spans, Taylorville, Ill., 157 tons, to Decatur Bridge Co.

Beams for Twelfth Street bridge, Boulder, Colo., 123 tons, to American Bridge Co.

Government river terminal, St. Louis, 150 tons, to St. Louis Structural Steel Co.

Pending business includes:

Lake Shore Trust & Savings Bank, Chicago, 325 tons, bids in, award expected this week.

The mill quotation is 2c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.03c. for materials out of warehouse.

Plates.—The leading mills, the subsidiaries of the Steel Corporation included, have adopted the quotations announced by the Bethlehem Steel Co. last week. As the new price of 2c., Pittsburgh, on tank plates is higher than has been done in this section recently, it is a question whether it will bring out business or will merely cause buyers to withhold their orders in the hope that lower quotations will be named. The Standard Oil Co., which was in the market for 25 oil storage tanks for Baton Rouge, La., calling for 3500 tons of plates, has withdrawn its inquiry and will erect old tanks taken from another of the company's properties.

The mill quotation is 2c. Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.03c. for plates out of stock.

Bolts and Nuts.—Prices lack stability, some makers quoting larger discounts than those recently published in this column and others billing material f.o.b. Chicago instead of Pittsburgh. The Rock Island Railroad is in the market for 200,000 bolts and has bought 31 tons of rivets. The Great Northern is inquiring for 136,000 bolts. Jobbers continue to buy sparingly.

Jobbers quote structural rivets, 4.03c.; boiler rivets, 4.13c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Although most mills are quoting 1.90c., Pittsburgh, on mild steel bars, lower prices are still being named by some makers. Business remains relatively light, although a number of good-sized reinforcing jobs are being figured on, principally at locations outside of this city. A high school at Janesville, Wis., will require 350 tons. Buying of bar iron is still confined to small lots, purchases by railroads thus far having been exceedingly conservative. Prices on this product have again declined, the present ruling market being 2c. to 2.10c., Chicago. The hard steel bar situation remains unchanged both as to price and demand.

Mill prices are: Mild steel bars, 1.85c. to 1.90c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 2c. to 2.10c., Chicago; rail carbon, 1.90c. to 2c., mill or Chicago.

Jobbers quote 2.93c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.35c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—There seems to be little likelihood that the new prices announced by the Bethlehem Steel Co. and the leading interests will be generally adhered to. In fact, lower prices have already been named by some makers. There has been no change in the volume of demand.

Mill quotations are 3.50c. for No. 28 black; 2.65c. for No. 10 blue annealed and 4.50c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.68c.; No. 28 black, 4.90c.; No. 28 galvanized, 5.90c.

Railroad Rolling Stock.—The Chicago Great Western is in the market for repairs on 175 to 200 box cars. The Northern Pacific is asking for alternate figures on 1000 steel center constructions and 1000 underframes. The American Refrigerator Transit Co. has ordered 100 steel underframes from the General American Car Co. The Illinois Central, which recently placed an order for the repair of 600 gondola cars, has let repairs on 400 more to the Haskell & Barker Car Co. The same road was generally reported to be in the market for 100 to 130 engines, but instead is asking for figures on the conversion of 100 to 130 consolidation-type locomotives into Mikado-type engines. The Mississippi Central has bought three locomotives and the Pittsburgh & West Virginia has bought two from the American Locomotive Co. The Western Steel Car & Foundry Co., which was awarded repairs on 300 hopper cars by the Wabash, as noted last week, has placed the steel, amounting to about 1500 tons, with a local mill under a protection granted before the new prices became effective.

Warehouse Prices.—Following the recent announcement of reductions in prices by the mills, local jobbers have cut their quotations on plates, shapes and bars, 20c. per 100 lb. Structural rivets and boiler rivets also have been reduced 50c. a 100 lb., while cold-rolled bars have been marked down 28c. A reduction in warehouse prices on sheets was announced last week and reductions in bolts and nuts have been published in recent issues. Local jobbers have also reduced their quotations on wire products, wire and wire nails having been marked down 25c. per 100 lb. and cement coated nails 15c. per keg. Lap-weld boiler tubes have been reduced from 3c. to 3¼c. per foot, depending on the size. Four-inch is now quoted at 40c. per foot.

Rails and Track Supplies.—Prices on track spikes and bolts have been reduced to 3c. and 4c., Pittsburgh, respectively, while light rails rolled from billets have been marked down to 1.90c., mill. No action has yet been taken on the prices of tie plates and angle bars, but reductions are expected to be made. The Mobile & Ohio has bought 550 kegs of spikes from a local mill.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.90c. f.o.b. makers' mills. Standard railroad spikes, 3c., Pittsburgh; track bolts with square nuts, 4c., Pittsburgh; steel tie plates, 2.50c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.50c., f.o.b. makers' mills.

Cast Iron Pipe.—The Detroit Board of Water Commissioners has awarded 8000 tons, or about one-half the tonnage it took figures on, to the Lynchburg Foundry Co. Akron, Ohio, will take bids for a third time July 18 on 6500 tons of 48-in. On July 15 it will receive figures on 1000 tons of 4 to 16-in. Fort Wayne, Ind., which recently rejected bids on 470 tons, will take figures a second time on July 15. Minneapolis has let 140 tons to the National Cast Iron Pipe Co. and 60 tons to the United States Cast Iron Pipe & Foundry Co. Although there have been fewer municipal lettings of late, private business has been of fair proportions. The ruling price on 6-in. and larger appears to be $40, Birmingham, although some business is reported as having been taken at a few dollars higher.

We quote per net ton, f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $52.10 to $55.10; 6-in. and above, $49.10 to $52.10; class A and gas pipe, $3 extra.

Wire Products.—The leading maker has announced substantial reductions which have been adopted by its competitors. The new prices are as follows:

Wire nails, $2.75 base per keg; plain wire, $2.50 per 100 lb.; galvanized wire, $3 per 100 lb.; barbed wire, $2.90 per 100 lb.; galvanized barbed wire, $3.40; staples, $2.90; galvanized staples, $3.40.

There has not yet been any noticeable change in the demand. Although the railroads are looked to as a source of business, their purchases thus far have been small. Jobbers continue to order from hand to mouth but with the approach of fall they are expected to lay in stocks.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Old Material.—Consumers are almost totally absent from the market and prices have undergone few changes. Present quotations are regarded as exceedingly low and it is felt that even a slight revival in demand would cause an advance. Railroad lists are heavy. The Baltimore & Ohio and the Southern are advertising 15,000 tons each, the Northern Pacific 2500 tons, the Pere Marquette and the Great Northern 1500 tons each, the Soo Line 900 tons and the Pullman Co 500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.50 to $16.00
Relaying rails	27.50 to 30.00
Car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	13.50 to 14.00
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
No. 1 busheling	8.25 to 8.75
No. 2 busheling	5.75 to 6.25
Cut forge	9.00 to 9.50
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.25 to 9.75
No. 2 railroad wrought	8.75 to 9.25
Steel knuckles and couplers	10.50 to 11.00
Coil springs	11.75 to 12.25
No. 1 machinery cast	12.50 to 13.00
Low phos. punchings	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.25
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	10.00 to 10.50
Railroad malleable	11.25 to 11.75
Agricultural malleable	11.25 to 11.75
Country mixed	7.00 to 7.50

Philadelphia

PHILADELPHIA, July 12.

Notwithstanding the announcements only last week of new prices on steel products further weakness has appeared. In reality there are today no "regular" prices for steel. Some of the mills are determined to get what business they can and price seems not to be a factor, the only consideration being to get the order, if possible, at the best price obtainable. In structural shapes, for example, concessions of $2 a ton have been freely made, while it is reported that some fabricators have been quoted as low as 1.80c., Pittsburgh. There has been at no time recently any difficulty in obtaining plates at 1.90c., but on attractive tonnage a better figure would be quoted. Bar iron has been sold at 1.80c., Pittsburgh, a reduction of $2 a ton, while one or two orders have been placed at 1.70c. Large bolts and nuts have been reduced about 12½ per cent.

New prices have been named on steel pipe, boiler tubes and wire products. Discounts now effective on pipe and tubes are given under the heading Pittsburgh f.o.b. prices in this issue. The reduction on wire products amounts to $5 a ton and is made by all of the mills, following the lead of the American Steel & Wire Co. Warehouse prices have also been reduced to conform to lower mill prices.

Little new business is in sight, two railroad car inquiries and a few sizable structural jobs being about the only signs of real life in the market. Mill operations continue at a very low rate. The only renewed activity is that the Midvale Steel & Ordnance Co. has started up one plate mill at Coatesville, this plant having been idle since early December, except for one week's rolling in the spring.

Pig Iron.—The local pig iron market continues dull and featureless. A spotty improvement in inquiry is noted, one local office having received several inquiries totaling 2800 tons of foundry iron in one day's mail last week. All of the inquiries, however, were from New England and New York districts, the immediate Philadelphia district offering scarcely any business larger than carload lots. Prices quoted for this dis-

trict on foundry iron range from $23 to $24, furnace, for No. 2 plain, $24 to $25, furnace, on No. 2X and $25 to $26, furnace, on No. 1X, the furnace quoting the lower prices having a freight rate of $1.54 to Philadelphia. In meeting Buffalo competition in New England and in the vicinity of New York, the eastern Pennsylvania furnaces have been obliged, however, to quote lower furnace prices than those above named. In grades of iron other than foundry, there is pronounced dullness, with prices easy but unchanged. Some sales agents of Eastern furnaces point to the fact that shipments of iron are now exceeding the quantity that is being made in this district.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.50 to $25.25
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.50 to 26.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.74
Virginia No. 2X, 2.25 to 2.75 sil.	32.99
Basic deliv. eastern Pa.	23.50 to 24.00
Gray forge	23.00 to 23.50
Malleable	26.00 to 27.00
Standard low phos. (f.o.b. furnace)	38.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—The possibility of the imposition of a high tariff on imported ferromanganese and manganese ore has not stimulated any buying interest among consumers, the market continuing as dull as it has been for some time. Ferromanganese is available at $70 to $80, delivered, and spiegeleisen at $28 to $30, furnace. Some low-grade ferromanganese is offered at $1 per unit.

Semi-Finished Steel.—No inquiry of importance has come out for semi-finished steel since the announcement of new prices $4 a ton lower. Open-hearth rerolling billets are to be had at $33 and forging billets at $38, Pittsburgh.

Plates.—The Midvale Steel & Ordnance Co. has started one plate mill at Coatesville to roll an order for 1200 tons of locomotive plates. Otherwise there is no change in plate mill operations in the East, most of the mills being idle or operating only intermittently on small orders. Several shipyards, which are bidding on one or two boats for the Red D Line, have inquired for 2600 or 5200 tons of plates and shapes. Plate mills are somewhat encouraged by the belief that considerable car repair work will come out within the next few months. The Bangor & Aroostook Railroad is inquiring for 200 flat cars and 300 composite gondolas and the Western Maryland asks bids on 500 steel car bodies. We quote sheared plates at 1.90c. to 2c., Pittsburgh.

Structural Shapes.—Eastern fabricating shops are quoting on a fair quantity of work, but difficulty is experienced in getting builders to go ahead. Several projects on which the general contracts have been let are still held up so far as the steel is concerned. Some of the mills are making every effort to assist the fabricators with whom they work to close business by naming low prices. In one instance 1.80c., Pittsburgh, is reported to have been named by an Eastern mill, while 1.90c. is freely quoted. We quote plain material at 1.90c. to 2c., Pittsburgh.

Bars.—Some makers of bar iron have made price concessions of $2 a ton from the recent quotation of 1.90c., Pittsburgh, but this has been done only on desirable specifications. In at least one instance, 1.70c., Pittsburgh, has been named. There is no improvement in the demand for steel bars. While 1.90c., Pittsburgh, is the nominal quotation, a good specification would undoubtedly command a lower figure. A few large inquiries for concrete bars, which have been in the market for some weeks, are still pending. We quote bar iron at 1.80c. and soft steel bars at 1.90c., Pittsburgh.

Wire Products.—Independent mills have met the prices adopted by the American Steel & Wire Co. Wire nails are now quoted at $2.75 per keg, plain wire at $2.50 per 100 lb., cement coated nails, $2.35, and galvanized barbed wire at $3.40.

Bolts and Nuts.—Lag screws, nuts and large-size bolts have been reduced in price about 12½ per cent. Large machine bolts are now 65 and 10 per cent off list, lag screws, 70 and 5 per cent off and hot pressed nuts, square and hexagon, c.p.c. and t., blank, 5c. off list, tapped, 4.50c. off list.

Warehouse Business.—Reductions of several dollars a ton have been made by local warehouses in line with the lower mill prices on steel products. We quote the new warehouse prices for local delivery as follows:

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ in. x ½ in., 3.20c.; round edge steel, planished, 3.95c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage, 4.50c.; galvanized sheets, No. 28 gage, 5.50c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.75c.; 3/16-in., 4.95c.; ⅛-in., 5.05c.; spring steel, 4.40c.; round cold-rolled steel, 4.50c.; squares and hexagons, cold-rolled steel, 5c.; steel hoops, No. 13 gage and lighter, 3.85c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.60c.; iron bands, 4.20c.; rails, 3.20c.; tool steel, 12c.; Norway iron, 6.50c.; toe steel, 4.50c.

Old Material.—The scrap market is stagnant and prices are almost stationary. We quote carwheels $2 a ton lower. The following are prices for delivery at consuming points in this district:

No. 1 heavy melting steel	$11.00
Scrap rail	$10.00 to 10.50
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	13.50 to 14.50
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	8.50 to 9.00
Cast borings (for chemical plants)	No market
No. 1 cast	16.00 to 17.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	11.50 to 12.00
Iron car axles	No market
Steel car axles	No market

Boston

BOSTON, July 12.

Pig Iron.—Estimated sales for the week are not more than 1500 tons, mostly eastern Pennsylvania, and at private terms. The largest sale was one of 600 tons No. 2X Northern to the Saco-Lowell Shops, Boston, at an indicated price of $21 furnace, which would bring the furnace base price down to at least $20.50. A Framingham, Mass., melter took 200 tons No. 1X eastern Pennsylvania at a price of around $20 furnace for No. 2 plain. In both instances it is believed iron was purchased on a delivered basis of about $25. The other extreme is a sale of 200 tons eastern Pennsylvania No. 2X to a Massachusetts consumer at $29.81 delivered, which figures out $24.75 furnace for No. 2 plain. Another Massachusetts foundry bought 200 tons eastern Pennsylvania resale at private terms and some half dozen car lots, largely eastern Pennsylvania, silicons 2.25 to 2.75 and 2.75 to 3.25, were purchased by various Massachusetts melters at $25 to $30 delivered. New Hampshire and Massachusetts melters took car lots of Buffalo No. 1X at $28.50 delivered. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$25.56 to $29.31
East. Penn., silicon 1.75 to 2.25	25.06 to 28.81
Buffalo, silicon 2.25 to 2.75	25.96 to 29.46
Buffalo, silicon 1.75 to 2.25	25.46 to 28.46
Virginia, silicon 2.25 to 2.75	33.08 to 34.58
Virginia, silicon 1.75 to 2.25	32.08 to 33.58
Alabama, silicon 2.25 to 2.75	33.16 to 33.66
Alabama, silicon 1.75 to 2.25	32.66 to 33.16

Warehouse Business.—Local prices on Wayne iron have been reduced 50c. per 100 lb.; on cold rolled steel, 30c.; best refined and Norway iron, 25c.; soft steel bars, steel flats, concrete bars, structural, plates, steel bands and refined iron, 20c.; on tire steel and steel hoops, 5c. Quotations on open-hearth and crucible spring steels, steel half rounds, ovals and bevels and toe calk steel remain unchanged. The demand for iron and steel, if anything, is quieter, and that for bolts and

nuts is decidedly so, buyers holding off for lower prices. The flurry of buying of horseshoes has dried up.

Jobbers now quote: Soft steel bars, $2.98 per 100 lb. base; flats, $3.98 to $4.08; concrete bars, $2.50 to $3.25¼; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.63 to $4.08; steel hoops, $4.33; toe calk steel, $5.25; cold rolled steel, $4.35 to $4.85; structural, $2.98 to $3.13; plates, $3.08 to $3.28; No. 10 blue annealed sheets, $3.83; No. 28 black sheets, $5.50; No. 28 galvanized sheets, $6.50; refined iron, $2.98 to $5; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Finished Material.—The Boston Structural Steel Co., Inc., Cambridge, Mass., was awarded 330 tons structural for a Boston municipal building. Original plans for the Lynn-Point of Pines, Mass., bridge, involving 650 tons, are abandoned, a wooden structure being substituted. Bids are being taken on 300 tons structural steel for an Allston, Boston, theater, and 300 tons for a Mystic, Conn., highway bridge. Bids are in on 600 tons for a Pawtucket, R. I., theater. Stone & Webster, within a month, will ask bids on about 300 tons for the Ford Motor Co.'s Green Island, N. Y., proposed plant. The Government has asked for re-bids on 200 tons boiler plates recently awarded by a shipyard. Mill representatives are getting more small orders than usual, but few large orders for plates. Contrary to earlier reports, 500 tons of girder rails wanted by the Eastern Massachusetts Street Railway Co. have not been placed. New prices on steel, publicly announced recently, are shaded more often than adhered to, 1.90c. Pittsburgh having been named on plates, shapes and bars. Inquiries on one 100-ton lot of reinforcing bars brought out 1.90c., Pittsburgh base from mills, and 2c., Pittsburgh, from local jobbers. The Amoskeag Mfg. Co., Boston, is in the market for 200 tons of deformed bars.

Coke.—New England foundry coke producers have eliminated the spread in spot and contract prices, now quoting both at $10.91 delivered, where the local freight rate does not exceed $3.40. This change is the first one reported since early in June and represents a drop of 50c. per ton on spot and 25c. on contract, and is equivalent to $4.57 f.o.b. Connellsville ovens. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to give consumers the right to contract for last half fuel at prices ruling at date of shipment. Contracted coke as of July 1 approximated 50 per cent of that for the corresponding period last year, which is considerably better than the showing in normal years. The New England Coal & Coke Co. has reduced wages of plant employees about 10 per cent.

Old Material.—The market is practically at a standstill and quotations are largely nominal. The only sale of importance reported this week is one of 500 tons of heavy melting steel at $12 delivered to a Massachusetts melter. Steel mills, last month interested in heavy melting steel, etc., are operating on such a small scale they have ceased to be old material market factors. Purchases of machinery cast by New England foundries are confined to an occasional car lot on a basis of $17 to $17.50 delivered for No. 1. Stove plate generally is quoted at around $15 delivered, but no sales are reported this week. Stocks of old material in New England yards are much larger than they were Jan. 1, inasmuch as three-fourths of stock taken in since then could not be sold except at a loss. Many yard owners have reached a point where they are unwilling to commit themselves further.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $17.50
No. 2 machinery cast	15.50 to 16.00
Stove plate	15.00 to 16.00
Railroad malleable	14.00 to 15.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Buffalo

BUFFALO, July 12.

Pig Iron.—There is a decided picking up in inquiry with majority of producers, but it has not been reflected in orders. This increase brings no better or more optimistic feeling to the producers, as they are not hopeful of seeing much of it reduced to actual sales. With one furnace the total tonnage on which prices were asked last week was 7000 tons as compared with 3000 the preceding week, while their sales for the week were slightly less than 1000 tons. This company is quoting $21 on 2.25 to 2.75 silicon, but has sold a grade of iron containing extra high sulphur at less than $20. In the 7000 tons on which prices were asked were 25 individual inquiries. Sales of 500 tons at $22 and $23 base represent the week's business with a producer who is operating one furnace out of a group of three—but only from week to week. Operating in August depends on a pick up in orders the remainder of this month. An inquiry for 500 tons was abandoned by the prospective buyer before prices were quoted. The furnace interest was not inclined to regret the decision not to buy, as the delivery was for the last half of the year—a factor no more attractive than heretofore. A decided falling off in orders for the iron made by a steel company is noticed; sales of less than 500 tons have been recorded. The campaign conducted by brokers to sell this product has resulted in inquiry of 6000 tons reaching the maker. The price situation is the same—$21.50 the usual base, but $21 would be accepted on an order of 1000 tons or more. There is no verification to the report that the national user who has been the largest sole buyer, bought 3000 tons of Buffalo iron at $19.50 base.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$22.75 to $23.50
No. 2X foundry, 2.25 to 2.75 sil.	21.75 to 22.50
No. 2 plain, 1.75 to 2.25 sil.	21.00 to 21.50
Basic (nominal)	21.00 to 22.00
Malleable (nominal)	23.00 to 24.00
Lake Superior charcoal	37.00

Warehouse Business.—Coincident with new price schedule announcements by mills, local warehouses have adjusted their prices all along the line. Business has not improved since the announcement but executives attribute the general lull to the wait which preceded new schedules and say that sufficient time has not elapsed for anything to develop. Plate business seems to overshadow activity in other lines. In point of size, best orders come from customers who admit failure to get the same material at mills for immediate delivery.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.05c.; plates, 3.05c.; plates, No. 8 gage, 3.65c.; soft steel bars and shapes, 2.95c.; hoops, 3.65c.; blue annealed sheets, No. 10 gage, 3.70c.; galvanized steel sheets, No. 28 gage, 5.80c.; black sheets, No. 28 gage, 4.80c.; cold rolled strip steel, 7:15c.

Finished Iron and Steel.—Reopening of several railroad shops is a matter for vicinity encouragement. Altogether the mills are more hopeful and with the price situation cleared, for the present at least, better business seems nearer. One of the largest factors here—a branch of a Pittsburgh interest—has been advised to conform to the price scale announced by the mill first in the field last week to make public its cuts. Canadian business is quiet and is likely due to the customs ruling explained last week in THE IRON AGE. No price schedule will be published by the largest of independent mills here. The same policy which has been in existence for some time—of meeting competition as it develops—will continue. Several fair structural jobs have been awarded. The Van Dorn Iron Co., Cleveland, has booked the order for the cell work at the new penitentiary. The Buffalo Structural Steel Co. will fabricate 60 tons for the same job. The Lackawanna Bridge Co. will fabricate 375 tons for the new warehouse of the barge canal at Rochester. Better inquiry with one mill office is not attributed to new prices; its business in structural shapes and in plates is entirely a carload proposition. There is a goodly proportion of small orders in bars and sheets and pipe business consisting of one and two carload lots is regarded as satisfactory in view of general conditions.

Better business in piling has come to a mill—orders for 1000 tons having been booked in one week.

Old Material.—Increased shop operation with the railroads may throw considerable material on the market. Dealers cannot report any worth-while business and stocks in the yards have not been reduced to any appreciable extent. Prices, of course, are nominal, but dealers are quoting less now than a week ago.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$11.50 to $12.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	15.00 to 16.00

St. Louis

ST. LOUIS, July 8.

Pig Iron.—One sale of consequence was reported here this week, and that was of 1000 tons of Northern No. 2 by a St. Louis manufacturer to an outside concern, the price for which was not given. Outside of that, there has been practically nothing done. The steel plant of the National Enameling & Stamping Co. closed on July 1 for two months. The only companies having open hearths running now are Scullin Steel Co., where one of 10 furnaces is operating, and American Steel Foundries, where four of the 10 are in operation. These and other consumers are fairly well stocked. The furnace of the St. Louis Coke & Chemical Co. is still in blast.

We quote delivered consumers' yards, St. Louis:

Northern malleable	$22.80 to $23.30
Basic	22.80 to 23.30
Southern foundry, sil. 1.75 to 2.25	26.24 to 26.74

Finished Iron and Steel.—The reduction in steel prices, effective last Tuesday, fell flat here, and did not result in the sale of one ton of material. While it is generally regarded that steel prices have been sufficiently reduced, the labor market is still up, and the building trades here have refused to reduce their wages. However, plans for some construction are going right ahead. The principal items in the structural field are 237 tons of rerolled bars for a hotel at Grand and Lindell boulevards, F. J. Cornwell, builder, and 1100 tons of structural steel for the Motor Transport division for the army at Fort Leavenworth, Murch Brothers, St. Louis, contractors. Steel requirements will soon be known for the new Federal Reserve Bank Building, Mauran, Russell & Crowell, architects. Approximately 1500 tons of structural steel will be used in the new Scottish Rite Cathedral, which also has not yet reached the contract stage. A close survey of the railroad situation revealed that the prospects for their buying are no better than they have been for the last few months. Warehouse business is slow, and further reductions have been made.

For stock out of warehouse, we quote; Soft steel bars, 3.02½c. per lb.; iron bars, 3.02½c.; structural shapes, 3.12½c.; tank plates, 3.12½c.; No. 10 blue annealed sheets, 3.77½c.; No. 28 black sheets, cold rolled, one pass, 5c.; No. 28 galvanized sheets, 6c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, $4.12½ per 100 lb.; boiler rivets, $4.22½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and, tapped, $3.00 off list.

Coke.—With most of the foundries not melting, and it is problematical when there will be a general resumption, there is very little demand. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis, which price is being met by Granite City by-product coke. Laclede by-product foundry is quoted at $11.50 ovens, or $11.70 delivered anywhere in the industrial district.

Old Material.—Outside of relaying rails there is no demand for old material. St. Louis dealers are interested in an inquiry for 1000 tons of 60 lb. from New Orleans, presumably for export. Railroads continue to submit lists, offering old material, those closing next week being the Mobile & Ohio, 1000 tons; Northern Pacific, 750 tons, and Great Northern, 500 tons, while the Big Four has an open list. Dealers here are well stocked, and are not interested in these offerings, nor are consumers, and it is believed that no reasonable offers will be made here on railroad lists.

We quote dealers' prices, f.o.b. consumer's works, St. Louis industrial district and dealers' yards as follows:

Per Gross Ton	
Iron rails	$12.50 to $13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Relaying rails, standard section, subject to inspection	27.00 to 29.00
Cast-iron car wheels	12.00 to 12.50
No. 1 railroad heavy melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Ordinary bundled sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	5.00 to 5.50
Iron angle bars	10.50 to 11.00
Steel angle bars	9.00 to 9.50
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 9.00
No. 1 dealers' forge	6.50 to 7.00
Cast iron borings	6.00 to 6.50
No. 1 busheling	9.00 to 9.50
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.50 to 4.00
Railroad grate bars	7.00 to 7.50
Machine shop turnings	4.00 to 4.50
Country mixed iron	6.50 to 7.00
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.00 to 10.50
Railroad brake shoes	7.50 to 8.00

Birmingham

BIRMINGHAM, ALA., July 9.

Pig Iron.—From 4000 to 6000 tons of Birmingham iron was booked during the week. The new base seems to be $20.50 for 500 tons and over with $21 and $21.50 for car loads. The market may be said to be down another 50c. with probability that desirable business may now be booked at $20 base. Among other purchases was one of 500 tons by the Sanitary Mfg. Co. and one of like amount by the Southern Pacific Railroad. One maker sold lots of 200, 500 and 1000 tons and another did a week's business of about 1300 tons in relatively small lots. The tendency to buy seems to have increased owing to depleted state of stocks on consumers' yards. Stocks on furnace yards in Alabama July 1 and June 1 were as follows: foundry, 123,000 and 132,000; machine cast, 47,000 and 44,000; basic, 61,000 and 58,000; total 232,000 and 235,000. The total decrease of 3000 tons is not regarded with as much significance as the reduction of 9000 tons in merchant foundry, especially when it is borne in mind that only one merchant stack will be active after the close of this week, the Alabama Co. banking or blowing out on July 15. The Woodward Iron Co. will then be the only operating merchant furnace. Alabama operators seem determined not to take any more losses on iron hereafter made and will not resume unless costs or freights to competitive points go down. The district expects more pipe iron buying after the award of the Detroit and Akron contracts. The Tennessee company is down to four stacks, all on basic, but one banked stack is expected to resume in two weeks. Increased basic iron stocks will be carried for home purposes, it is presumed, and are not regarded as in the market.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$20.50 to $21.00
Basic	19.50 to 20.00
Charcoal	35.00

Cast Iron Pipe.—There was very little new in the high pressure pipe market last week, small orders from Middle Western cities being the principal business. The Akron award is expected this week. Nominal base is $45, but real base is nearer $40. The $40 base on soil pipe continues to be observed very generally with some under-cutting.

Finishing Mills.—Bridge and structural steel plants

in the Birmingham district report a business that keeps them fairly busy. The Tennessee company has been operating its structural mill steadily. Wire drawing mills are at about 30 per cent. The Tennessee company's rail mill is kept going at normal by foreign and domestic orders. Steel hoop, tie and band mills operate intermittently on order accumulations, working two weeks and then shutting down for as many more.

Old Material.—Users of steel scrap are slow in taking their ordered quota. The scrap market has been stagnant so long that there is apparently little interest in quotations.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	16.00 to 17.00
Car wheels	16.00 to 17.00
Tramcar wheels	15.00 to 16.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

New York

NEW YORK, July 12.

Pig Iron.—Increased inquiries and a fair number of sales of moderate tonnage have given a more cheerful aspect to the market. One firm has received inquiries amounting to about 4000 tons, all for small tonnages. Another firm has sold 900 tons of foundry grades in two lots for July delivery, 500 tons of No. 2X for delivery within three months and two lots of 250 tons each for spot delivery, also 1000 tons of basic for immediate delivery. The inquiry for 1000 tons of basic for the American Steel & Wire Co.'s Worcester plant is still pending. Another inquiry is for 500 to 600 tons of foundry grades for the remainder of the year. An inquiry for 1000 tons for export is not taken very seriously. As to prices, little is being said by sellers, as it is recognized that the market is weak. The most encouraging feature to them is that stocks of foundrymen are being so reduced that when sales are made they are almost invariably accompanied by requests for prompt delivery.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$25.52 to $26.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.52 to 25.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	23.52 to 24.52
Buffalo, sil. 1.75 to 2.25	25.46 to 26.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—With the exception of inquiries for a few carloads of ferromanganese, there is no activity. Domestic ferromanganese is obtainable at $70 to $75, delivered, while the nominal price for the British alloy is $75, seaboard, but there has been no real test of the market on either domestic or import iron. Spiegeleisen is dull and a variety of quotations, ranging from $26 to $30, furnace, have been made on the few small inquiries that have come to the attention of selling agents.

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$75.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$67.50 to $70.00
Manganese ore, foreign, per unit, seaboard	22.50c.

High Speed Steel.—The market continues unchanged and prices largely nominal. While most producers are quoting 90c. to $1 per lb. for 18 per cent tungsten high speed steel, sales are reported at 85c. per lb. and lower.

Cast-Iron Pipe.—Business continues satisfactory. An occasional foreign inquiry comes before the trade, but because of conditions of exchange and demands for long time credits, this business is not looked upon with favor. Quotations remain the same, or for carload lots, f.o.b. New York, as follows: 6-in. and larger, $52.30; 4-in. and 5-in., $57.30; 3-in., $67.30, with $4 additional for Class A and gas pipe.

Warehouse Business.—All warehouses in this district, since July 8, have been quoting on a lower schedule. This is the second price revision in about two weeks and brings the spread between mill and warehouse down to about $13 per ton based on 1.90c. per lb., Pittsburgh, for bars. These are now quoted at 2.93c. per lb. for both iron and soft steel and structural material and tank plates are 3.03c. per lb. Hoops are 4.03c. per lb. and bands 3.63c. per lb. Tire steel, iron finish, is 2.93c. per lb. with smooth finish at 3.13c. per lb. Sheets have also undergone a reduction. Blue annealed, No. 10 gage are generally 3.68c. per lb., a drop of about 20c. per 100 lb. Black sheets are down about 25c. per 100 lb. to 4.50c. per lb. for No. 28 gage and galvanized sheets are consistently quoted at 5.50c. per lb. Brass and copper items have registered a slight drop of about ½c. per lb. on brass products and ¼c. per lb. on copper. Although mill prices on standard steel pipe and boiler tubes have been reduced from $4 to $6 per ton on the former and from $4 to $12 per ton on the latter, a new schedule of quotations on this basis has not yet been prepared by the warehouses. Orders, however, are now being booked at a proportionate reduction. We quote prices on page 124.

Old Material.—Although prices of finished steel are being reduced, the level of scrap prices has not changed to any extent. The only notable change is that of old car wheels, which have declined $2.50 a ton. One broker is paying 25c. a ton more for iron and steel shafting than a week ago, his other prices being the same.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$6.50 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	9.50 to 10.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	3.50 to 4.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 7.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	7.00 to 7.50
Old car wheels	10.00 to 10.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Finished Iron and Steel.—About the only effect of the price announcements of July 4 seems to have been that a number of small orders were released, though not totaling much in the aggregate. These were mainly purchases which had been held up as long as possible waiting for some decided reduction. At present the market is exceedingly quiet with buyers very generally of the opinion that still lower quotations are likely, while railroad car repair work appears to be the most promising item in business betterment. Not much of this business is expected for two weeks. The number of bad order cars has now risen to 385,000, and there are many who feel that a car shortage may be experienced in the fall. The Wabash placed 300 steel hopper repairs with the Western Steel Car & Foundry Co. Bar iron makers are quoting 1.90c., Pittsburgh, although a 1.85c. quotation is noted. In fabricated steel lines the new outstanding proposition is a 5000-ton structure for the Central Square Realty Co., New York, on the Grand Central area, a building which is expected to develop keen competition. Manchester, N. H., is in the market for a 1000-ton highway bridge. The Central Railroad of New Jersey is readvertising for an 800-ton bridge, and other new work includes a training school at Cortland, N. Y., 1000 tons, and a telephone building at Stamford, Conn., 300 tons. Awards include the East Junior High School, Norfolk, 775 tons, to the Bethlehem Steel Fabricators, Inc.; two bridges for the Boston & Maine, 250 tons, to the Phoenix Bridge Co.; bridge work for the Philadelphia & Reading, 270 tons, to the Bethlehem Steel Bridge Corporation; a telephone building, Philadelphia, 250 tons, to the Montgomery

Steel Co., and a building in Washington Square, New York, 300 tons, to the Paterson Bridge Co. The concrete portion of the Cohoes-Troy bridge will require 360 tons of reinforcing bars.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.28c.; plates, 2.28c. to 2.38c.; structural shapes, 2.38c.; bar iron, 2.28c.

Cincinnati

CINCINNATI, July 11.

Pig Iron.—The feature of the market during the week was a further recession in prices of iron from all districts. On a sale of 1000 tons of Southern to a melter in this territory, $20, Birmingham, was done. The same melter is reported to have bought 500 tons of Northern iron at a price equivalent to $18.50, Chicago. A sale of 700 tons of southern Ohio iron, part of which was malleable, was made to a melter at $21, Ironton. Part of this tonnage was off grade material, however, and standard foundry iron from this district is quoted at $21.50, furnace. Valley and Lake Front furnaces are quoting $19.50 and $20 respectively. There is very little activity, and with the exception of the above reported sales, little buying is being done. Shipments from furnaces are showing a slight increase as compared with the month of June, but are still very light.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.00
Ohio silvery, 8 per cent sil.	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.02
Basic, Northern	22.52
Malleable	24.02

Finished Material.—The price reductions announced during the week have not stimulated business to as great an extent as hoped for. There has been a little more activity, however, and several inquiries for 200 tons are reported. Some specifications have been received for small tonnages of various steel products, but in the main the attitude of the trade seems to be that the present prices may not hold for any considerable time, and that with conditions as they are at present, nothing would be gained by placing orders. Little new business has been placed. The general contract for the stadium for Ohio State University, Columbus, has been let to the E. H. Latham Co., Columbus, which was low bidder on the project. No award of the steel has been made. The Smallman-Brice Construction Co. has been awarded the general contract for the addition to the Masonic Temple at Birmingham, Ala., involving about 700 tons. Very few new projects are coming up. Some are in prospect, however, including a small bridge at Aurora, Ind., for the public works department and a new union station at Covington, Ky., for the L. & N. and C. & O. railroads. All the sheets mills in this territory are closed, the American Rolling Mill Co., Middletown, having closed on Thursday night after a week's run.

Warehouse Business.—Small orders for immediate shipment are the ruling activity. Local jobbers are expected to announce, some time next week, new prices with reductions corresponding to those made by the mills. It is not expected, however, that the prices on wire and wire nails will be changed for at least a couple of weeks. Jobbers continue to quote:

Iron and steel bars, 3.35c. base; hoops and bands, 4.05c. base; shapes, 3.45c. base; plates, 3.45c. base; reinforcing bars, 3.42½c. base; cold rolled rounds, 1"½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 6.25c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.60 per 100 lb.

Coke.—Some activity is noted in the coke market. A local agency reports two sales of 2500 tons each, and another of 500 tons. One inquiry for 900 tons and two for 300 tons each, are being figured on. Prices have not materially changed, though one producer in the Connellsville field has cut foundry from $5 to $4.50.

Old Material.—There is practically no activity in the scrap market, one dealer stating that it is the quietest in the past 20 years. Most of the mills in this territory are closed, and those that are running are not taking in material. Prices are, if anything, tending to lower levels, but in the absence of trading are quotably unchanged.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$5.00 to	$7.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	3.50 to	4.00
Steel turnings	2.00 to	2.50
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	17.00 to	17.50
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	6.00 to	6.50

Cleveland

CLEVELAND, July 12.

Iron Ore.—The ore market is virtually at a standstill. Sellers have been working on an inquiry for 150,000 tons from St. Louis, but the consumer has decided not to purchase this ore, at least at present. The inquiry may be revived later. Ore shipments from Lake Erie docks during June were 2,028,548 gross tons, showing a gain over May, but only about one-half of the amount shipped during the same month last year, when dock shipments were 4,011,067 tons. Shipments from the docks during the season until July 1 were 3,746,667 tons as compared with 8,258,673 tons during the same period last year. The balance on Lake Erie docks July 1 increased over 300,000 tons as compared with June 1, being 8,417,725 tons as compared with 7,005,050 tons on July 1 last year. Receipts at Lake Erie ports during June were 2,774,580 tons, and for the season, 4,455,480 tons, as compared with 10,331,435 tons up to July 1 last year. Furnaces at Lake Erie ports received 423,384 tons, as compared with 1,600,593 tons during June last year. Receipts at other than Lake Erie ports until July 1 were 1,376,045 tons as compared with 4,477,636 tons during the same period in 1920. There is still talk of further wage reductions in mines. One company having a mine in an isolated location has resumed operations with the 1914 wage scale. In this case the mining company did not plan to operate this year but expressed its willingness to start up the mine and stock the ore if the men desired to go to work at the 1914 wage scale. The miners agreed to the plan. The mining company will not attempt to sell this ore for delivery this season.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The demand for pig iron has been better for the past week than for some time, but prices have again declined $1 a ton and there seems to be no bottom to the market. A number of sales of foundry iron in small lots were made at $20 to $20.50 for No. 2. However, $20 now seems to represent the top of the market, as lower quotations have been made and there are reports that a price as low as $19 has appeared in the Valley district. For Cleveland delivery, quotations have declined correspondingly. A Valley consumer is reported to have purchased 500 to 1000 tons of basic iron at $19. Two other basic inquiries have appeared, each for 5000 tons. The largest sale reported during the week was 2500 tons of No. 2 foundry iron taken by a Cleveland interest at $20, for shipment by an eastern New York furnace to New England over a period of three months. Another interest during the week sold 1500 tons of foundry iron and a third 1200 tons in lots of from carloads to 200 tons at $20 to $20.50. The American Radiator Co. again came in the market for about 1100 tons for its Detroit, Springfield and Titusville plants, and $20 is understood to have been shaded on this inquiry. Low phosphorus pig iron has further declined. We note the sale of two 100-ton lots, one at $36.50 and the other at $37. A carlot sale of electrolytic 10 per cent Bessemer ferrosilicon was

made at $38. Pickands, Mathers & Co. to-day blew out their Perry furnace at Erie, Pa.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.96 to $21.96
Northern No. 2 fdy., sil. 1.75 to 2.25	21.00 to 21.50
Southern fdy., sil. 2.25 to 2.75	28.92
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	36.50 to 37.00

Finished Iron and Steel.—The price reductions have not stimulated buying, but apparently have resulted in the holding up of some orders, particularly in the building field. Many buyers are not inclined to take the new prices seriously and the market is in about as unsettled a state as before the formal reductions. The volume of orders and inquiries continues light. Plates particularly are weak and inquiries from tank shops for 1400 tons for stills, 900 tons for the Standard Oil Co. and 500 tons for the Sinclair Oil Co. are reported to have brought out quotations below 1.80c. Only the 500-ton lot has so far been placed. For small lots of plates a 1.90c. quotation is fairly common, although some mills are adhering to the 2c. price. Various unconfirmed reports are that the 1.90c. price is still being quoted on structural material. An Ohio fabricating shop is inquiring for 2500 tons of plates, bars and structural material and is looking for a price of 1.80c. or lower. No formal price reduction is reported on strip steel and prices on both hot and cold-rolled strips are weak and irregular. The Ford Motor Co. is inquiring for 500 tons of cold-rolled strips and sellers admit that this business is likely to be placed at lower than 4.75c., which has been the prevailing market price. Leading bidders on fabricated steel have brought out unusually low quotations. A Toledo engineering firm has placed 2500 tons for a plant for the United States Sheet & Window Glass Co., Shreveport, La., with the Decatur Bridge Co., Decatur, Ill., at a reported price of $70 a ton, delivered, which is said to be about the pre-war price. The 600 tons for bridges for the Kanawha & Michigan Railroad Co. has been taken by the Mount Vernon Bridge Co. The Pittsburgh Bridge Co. and the Massillon Bridge & Structural Co. have taken two bridges for the Stowe-Fuller Co., requiring 160 tons. Bids have been taken for 700 tons for the Middletown Hotel, Middletown, Ohio. The price on wire rods has been reduced to $42. The reduction in prices has not resulted in any further decline in hard steel reinforced bars, but these had previously declined sharply and are quoted at 1.75c. to 1.80c. The Akron, Canton, Youngstown Railroad, which recently inquired for 600 tons of rails, has announced that it will await a price reduction before placing the order.

Jobbers quote steel bars 2.79c.; plates and structural shapes, 2.89c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.40c. to 3.55c.; hoops and bands, 3.44c.; cold rolled rounds, 4c.; flats, squares and hexagons, 4.50c.

Sheets.—All the mills have adopted the reduced prices on sheets and so far these prices are apparently being maintained. However, as the demand is very light, there has been no real test of the new prices.

Warehouse Business.—Cleveland jobbers have reduced prices, the reductions corresponding to the cuts in mill prices on various items.

Coke.—One large producer has reduced its prices on standard Connellsville foundry coke from $5 to $4.50. Quotations on this grade range from $4 to $5. A few carlot sales are reported at the latter price.

Bolts, Nuts and Rivets.—There is a little better feeling in the bolt and nut trade owing to the expectation of more railroad buying and an improvement in inquiry from the automobile trade. Several new inquiries have come from the latter source including one from the Ford Motor Co. for 8,000,000 bolts and nuts. Prices have settled down to about the maximum discounts that have been quoted recently, but the cut in steel bar prices has apparently had little effect on the price situation, as this reduction in steel had been anticipated. Rivets are quiet and weak. General quotations now are 3.75c. for structural rivets and 3.85c. for boiler rivets and a reduction in steel bar prices may be reflected in further concessions on rivets.

Old Material.—There is virtually no activity in the market. Mills are not buying, and trading between dealers is limited to a few carlots, as they have very few orders except for material on which mills have held up shipments. There is a little demand for compressed steel for shipment to Weirton and as there is no local demand, this grade has declined 50c. a ton. Cast borings and mixed borings and turnings are also about 50c. a ton lower.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings (nominal)	7.00 to 7.50
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	6.50 to 7.00
Compressed steel	6.00 to 6.50
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 casting	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in	5.50 to 6.00
Drop forge flashings, under 10 in	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

NOT INCREASED

Business at Youngstown Shows no Improvement Due to Lower Prices

YOUNGSTOWN, OHIO, July 12.—Both the Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co. will meet the reductions made by the Steel Corporation of from $2 to $12 a ton on pipe and tubular products and $5 a ton on wire and wire nails. "This is a radical reduction," states President James A. Campbell of the Sheet & Tube company, "but we are compelled to meet the lower prices set by the Corporation or get out of business."

The new steel prices are now being openly quoted by all Valley independent interests, though tonnage had been accepted at the lower levels for some time.

That the concessions have failed to stimulate new business, however, is indicated by the low operating rate for the current week. But six of 46 blast furnaces in the Mahoning and Shenango Valleys are active—two at the Ohio Works of the Carnegie Steel Co., two in the East Youngstown group of the Sheet & Tube Co. and one each of the Republic Iron & Steel Co. and the Brier Hill Steel Co.

Nineteen of the 66 open-hearth furnaces are charged, including nine of the Carnegie Steel Co. units. But one of the three Bessemer plants in the Mahoning Valley—that of the Carnegie company—is active. One of the Valley's four plate mills is under power. The only active sheet mills are those operated by the Newton Steel Co., which has its full quota of 10 in production.

The Youngstown Steel Car Co. at Niles has been asked to bid on repairs to several thousand railroad cars, and the activity of the railways in this respect promises to react favorably on the plate market.

Some improvement is noted in the demand for common and galvanized sheets, especially with non-union interests. This is unquestionably due to the automatic elimination of makers subscribing to the Amalgamated association scale, through expiration of the 1920-21 wage agreement. Union mills accepted a number of orders during the period of suspension and will work off such accumulations when they resume. Reduced prices on sheets are being generally quoted. The full-finished market has dropped $5 per ton in line with other grades, bringing the base price on No. 22 gage auto body stock to 4.70c. Extras are unchanged.

There is little evidence that the plate market will stabilize at the 2c. level, inasmuch as tonnage is moving below this figure. Car repair interests, now the most active influence in the market, are holding off for lower quotations and declare that concessions are being offered for attractive tonnage.

British Iron and Steel Market

Fuel Uncertainty Still Unsettling to Pig Iron—Continental Steel Competition Disturbing

(By Cable)

LONDON, ENGLAND, July 12.

Pig iron conditions are in a transitional stage, owing to uncertainty regarding what is to be the future cost of fuel. Certain blast furnaces have been restarting operations to meet urgent needs, but many others will remain idle until fuel prices become stabilized. Number 3 Cleveland foundry iron is being quoted at £6 15s. ($24.44) for July and £7 ($25.34) for August shipments for home trade; but premiums are demanded for export.

In finished material, sentiment is somewhat better, and with more inquiry, but the great bulk of the buying is done on the continent. Some tin plate works have already re-started, but it is improbable that the output will reach any considerable figure until Autumn, though 250,000 boxes of oil sizes are wanted for the East. There is a better inquiry for galvanized sheets, but not much business is being actually placed.

Continental steel is offered freely. Business placed includes German billets at £6 15s. ($24.44) to £7 ($25.34) c.i.f.; Belgian and French billets at £6 2½s. ($22.67) to £6 5s. ($22.63) f.o.b.; German merchant bars at £7 15s. ($28.06) to £8 ($28.96) f.o.b.

Galvanized wire, 8 gage, is quoted at £12 ($43.44) f.o.b.; wire rods, 5 gage, £11 ($39.82), cost and freight to Japan. Wire nails are given as 16½s. ($2.99) cost and freight to Japan. Belgian plates are quoted at £9 10s. ($34.39) f. o. b.; German plates, at £8 10s. ($30.77) f.o.b. For India, an order of 13,500 tons of rails has been booked at £10 2½s. ($36.65) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.62 per £1 as follows:

Durham coke	£2 2		$7.60
Cleveland basic	6 0		21.72
Cleveland No. 1 foundry	6 5		22.63
Cleveland No. 3 foundry	6 0		21.72
Cleveland No. 4 foundry	5 19		21.54
Cleveland No. 4 forge	5 17½		21.27
Hematite	7 0*		25.34
East Coast mixed	8 0 & £7 5*		28.96 & $26.25
Ferromanganese	18 0 & 15 0*		65.16 & 54.30
Ship plates	14 10		52.49
Boiler plates	19 0 to 21 0		68.78 to 76.02
Tees	14 10		52.49
Channels	13 15		49.78
Beams	13 10		48.87
Round bars, ¾ to 3 in.	13 10		48.87
Rails, 60 lb. and up	10 0 to 15 0		36.20 to 54.30
Billets	11 0 to 11 10		39.82 to 41.63
Sheet and tin plate bars, Welsh	10 10		38.01
Galvanized sheets, 24 g.	22 10 to 23 10		81.45 to 85.07
Black sheets	19 0 to 20 0		68.78 to 72.40
Tin plate base box	1 4½ to 1 8		4.51 to 5.07
Steel hoops	17 0		61.54

*Export price.

To Restart Plants Costs Must Not Exceed 75 to 100 Per Cent of Pre-War Basis

LONDON, ENGLAND, June 29.—Whether the new scale of coal mine wages, whatever it may be, will permit coal to be sold at a figure enabling manufacturing operations to be resumed, remains to be seen. That coal getting can be renewed on the old scale is definitely impossible, for many pits are flooded and will not be reopened. The financial position is as unsatisfactory as that of industry, and combined with the appalling taxation, and the unceasing wastefulness and prodigality of the Government, there is an almost entire lack of incentive to capital, while the unwillingness of labor to work assists materially in maintaining a set of conditions which is not paralleled in modern experience.

Labor Inefficiency Evaluated

Some official figures have been issued by Richardsons, Westgarth & Co., marine engineers, setting out their experiences. The comparison between 1913 and 1920 is so striking that it may well be set forth in table form:

Pre-War and Post-War Labor Conditions

	Pre-War	Post-War
Working hours	2,597	2,303
Absenteeism in hours per man per annum.	122	258
Actual hours worked per man per annum.	2,475	2,045
Average hours per week	50.5	41.8
Hours per day	8½	7

The net result of shortened hours and increased malingering is a loss of 37½ per cent in output, which put in another way means that post-war production is only five-eighths of the pre-war total. The average wage per hour is now about three times greater than before the war, while actual costs are about four times as high. As this is typical of working conditions generally in this country, it needs no words to explain why we are ceasing to count as an industrial nation.

On all hands are complaints that our business is being taken by overseas competitors, and the announcement that America has picked up a contract for steel axles from that closely kept preserve of British manufacturers, the India State Railways, has caused some fluttering in the dovecotes, especially as the American price is said to be 30 per cent under the lowest British tender. The Australian Government order for rails (10,000 tons) has now been placed with the Continent. An order for 60,000 tons of steel rails for Russia has also been lost to this country, and has been taken by Germany. There is indeed no end to this process under existing conditions.

The National Federation of Iron & Steel Manufacturers, representing employers, and the Steel Trades Confederation, representing the workmen, have now presented to the Premier a statement regarding the condition of our iron and steel industry. According to this the chief factor affecting European competition is the low level of real wages in Germany, but it is added that British industry cannot restart until costs are reduced to a level not far removed from those ruling on the Continent, and it is the considered opinion of the employers that the British iron and steel works will not be able to restart unless fuel, as well as other items of cost, is reduced to a level not higher than 75 per cent to 100 per cent above the pre-war level.

The British Cast Iron Research Association has been formed as a company to conduct research and experimental work in connection with the cast iron trades and industries. The management is vested in a council, and among the first members are Lord Weir of the Holm Foundry, Cathcart, Glasgow (president), and D. Vickers (chairman of Vickers). The secretary is T. Vickers, and the registered office at Central House, New Street, Birmingham.

With regard to shipbuilding, a prominent builder here stated that there were at present 10,000,000 tons more shipping afloat than before the war, which meant that for many years ships would not be wanted except for special purposes.

Probable Effect of the President's Message

WASHINGTON, July 12.—The message of the President to the Senate this afternoon, meant to hasten economic and industrial readjustments, is considered to have killed proposed legislation for the soldier bonus. In substance, it calls for speedier action on legislation along the line previously recommended with modifications. The more essential parts of the program look to elimination of the excess profits tax and the fixing of a corporation tax with a rate of approximately 15 per cent. Congress is expected to devote its time more closely from now on to two important purposes, tariff and tax, but it is a question whether tax revenue revision will be given precedence over the tariff, although there is much support for this plan.

FOREIGN RAILROAD BUYING

Mexico Buys Locomotives—Bidding Closed on 30 Locomotives for Chile—Inquiry from India

NEW YORK, July 12.—Activity of foreign trade today compared with the activity of a few months ago shows a marked improvement, although transactions are still few and orders small, with the exception of foreign government railroad buying. This branch of export trade is quite active. The National Railways of Mexico, which are in need of equipment of all kinds, have placed orders with the American Locomotive Co. and the Baldwin Locomotive Works for a total, when arrangements are finally completed, of 90 locomotives, about 45 to each builder, of which about 40 are Consolidation type, 30 Mikado type and 20 Pacific type. This is the second large purchase of the Mexican railroads, the previous one consisting of 97 second-hand locomotives of a heavy type, of which 91 were bought from the Illinois Central Railroad and 6 from the Southern Railway.

On July 7 and 8, the Chilean State Railways, with a New York office at 141 Broadway, opened in Chile the bids submitted on its tender for 30 locomotives and a number of freight and passenger cars. The tenders on about 35 locomotives, 300 freight and 40 passenger cars for the Pekin-Kalgan Railroad and the Pekin-Suiyan Railroad in China, which were to be opened June 29 and 30, have been postponed indefinitely. It is reported that this contract will probably be let without public bidding.

Japan Buys in Germany

The 450 steel poles for the South Manchurian Railroad, recently placed with a New York exporter, are part of a total of about 4000 such poles, which will eventually be purchased by this railroad. Japanese buyers are purchasing in Germany, influenced by the low quotations and the favorable exchange rate, but recent reports of the extensive use of shell steel and other scrap in the present production of German steel, is believed by the Japanese to affect the quality of German products and despite the low prices there is a tendency to refrain from buying there. Orders for light gage black sheets and bars continue to be placed by Japanese consumers and there are inquiries for sheets and bars in the market from Cuba.

South America is also showing some railroad activity. There is about 5000 tons of 55-lb. rails in the market from Buenos Aires, Argentina, on which it is reported that a bid of £10 17s. ($39.43) c.i.f. Buenos Aires has been submitted by a Belgian seller. As it would be difficult even with present market conditions in the United States for an American mill to approach this quotation, it is generally expected that the business will go to Europe. Cuban railroads have issued tenders for 3300 tons of 60-lb. rails, which will be closed shortly.

Inquiries From India

McLeod & Co., 44 Whitehall Street, New York, are handling an inquiry from India calling for conveying machinery for use in factories, warehouses and mines. Printed matter and estimated prices for export have been requested by the exporter. The Burma Finance & Mining Co., Ltd., Hermyingi, India, contemplates the erection of a small crushing and concentrating mill to treat from 150 to 200 tons of ore per day. During 1920 the Hermyingi mine produced 1226 tons of mixed wolfram and cassiterite concentrate.

Specification No. 95, issued by the Commissioners of Electricity of the State of Victoria, Australia, covering steel work, etc., for a new power house at Morwell, has been amended to accommodate 5 generators of 12,500 kw. each. The engine room will have 8 bays. The crane capacity will be 60 tons. The amended tenders should be obtained from and mailed to the Australian Trade Commissioner, 161 Broadway, New York, before Aug. 31. The time limit on specification No. 99 has been extended to Aug. 31 by the Commissioners in Melbourne.

The bridge over the Yellow River in China, requiring something like 40,000 tons of steel, which has been figured on in the past several months by builders in no less than 19 countries, including several firms in the United States, is expected to go to the Continent of Europe on the score of price. There are some doubts, however, about the financing of this great project.

It is now expected that the rails for the Pekin-Mukden Railway, which have been before the rail makers of Europe and the United States for some time, will be let in the latter part of this month. The tonnage originally was 11,000, but it is now expected that 17,000 tons will be bought.

ARGENTINE RAILS

Orders for 9500 Tons Awarded to La Providence Works—British Prices Forced Down

(Special Correspondence)

BRUSSELS, BELGIUM, June 29.—The depression in all markets in Belgium is intense, many large establishments, considered to be in good condition, having closed down. New construction is at a standstill. Coke prices are still too high, despite reductions, and further cuts will probably be made in coke as well as in iron and steel generally. British manufacturers are making an effort, thus far unsuccessful, to reduce the importation of material from continental sources, particularly bars. Steel bars, produced in England, which have been selling up to £33 per ton, are down to £22 10s. per ton, one cut alone having totaled £6. Belgian pig iron has been shipped into England at £7 per ton, causing the British price to drop to £5 15s.

Rails Sold to Argentina

Against severe competition, the order for 9500 tons of rails for Argentine railroads was booked by La Providence works at 469 fr. ($35.66, with 1 fr. = 7.6c.) per ton, c.i.f. Santa Fe. The Providence works also took the fish plates at 620 fr., the bolts at 1200 fr. and the spikes at 890 fr. The following table shows the bids submitted by mills in various countries:

Ougree-Marihaye works (Belgium)	528 fr.
Sambre et Moselle works (France)	660 fr.
Usines de Wendel (France)	528 fr.
Acieries de Longwy (France)	532 fr.
Normand de Metallurgie (France)	562 fr.
Normand de Knutange (France)	562 fr.
Consolidated Steel Corporation	$62.15
United States Steel Products Co.	$65.00
Krupp works (Germany)	2550 m.
Westphalian works, Bochum (Germany)	£11 9s.
Deutsche Luxemburgische (Germany)	2500 m.
Phoenix G. (Germany)	£11 10s. 6d.
W. H. Muller & Co. (Germany)	$48.00
Bidermann & Co., Prague (Bohemia)	$54.50

The Argentine railroads are reported to be about to issue a new tender for about the same tonnage of rails as the one just placed.

Worcester Companies Consolidated

The Arcade Malleable Iron Co. and the Baldwin Chain & Mfg. Co., both at Worcester, Mass., have been consolidated. The stock interests of the two companies have been much the same for some time. The former officers of the Arcade Co., Geo. T. Dewey, president; H. P. Blumenauer, vice-president, and Wm. H. Gates, treasurer, will hold the same offices in the consolidated company. The business of this company will be continued separately on the same basis as previously, with the additional foundry facilities secured by the recent purchase of the adjoining property of the Richard French Iron Works. The management of the Arcade plant will remain unchanged, with H. P. Blumenauer continuing as general manager, A. L. Scott, sales manager and John Jordan, plant manager.

The American Manganese Mfg. Co., has posted notice of a 40 per cent reduction in wages, effective July 1. This cut, which affects miners, coke-plant and blast furnace workmen, means that common labor goes from 36c. to 22c. per hour. The company last year paid common labor as high as 48c. per hr.

BASIC DAY ABROGATED

Steel Corporation Makes Announcements As to Prices and Overtime Pay

Judge E. H. Gary, chairman United States Steel Corporation, last week made two important announcements. The first adopted the prices announced July 4 by the Bethlehem Steel Co., and abolished the basic 8-hr. day in the following words:

We have decided to recommend to our subsidiary companies that they reduce selling prices to correspond with the existing prices of competitors. These include products and prices as follows:

Bars	$1.90	Blue annealed sheets	$2.65
Structural shapes	2.00	Black sheets	3.50
Plates	2.00	Galvanized sheets	4.50
Sheet bars	35.00	Tin plate	5.75
Billets, 4 x 4	33.00	Skelp	2.00
Slabs	34.00		

Also pipe and possibly some other products relatively.

Also to abrogate, as of July 16, 1921, the so-called "basic" or "overtime" day put into effect during the war as an emergency measure.

July 6, 1921.

Further Price Changes

The second announcement was made Friday, July 8 and was as follows:

Referring to our statement of July 6 instant concerning selling prices, and in accordance therewith, we have decided to recommend to subsidiary companies that the present prices of tubes be reduced as follows:

	Per Ton
Standard steel pipe:	
¼ in. and ⅜ in.	$2.00
½ in. to 6 in., inclusive	4.00
7 in. to 12 in., inclusive	6.00
Sizes above 12 in.	4.00
Boiler tubes:	
1¾ in.	4.00
2 in. to 3 in., inclusive	12.00
3¼ in. and larger	10.00

and that wire nails be reduced to $2.75 per keg base, plain wire to $2.50 per 100 lb. base, and other wire products relatively.

July 8, 1921.

Abrogating the Basic Eight Hour Day

The number of men employed 10 and 12 hours varies greatly at different times according to the pressure upon the mills for output. At the present time, owing to the efforts of the Steel Corporation to provide work for as many men as possible, few are working longer than eight hours, and the total curtailment in wages falls far short of what it would be if mills were in full operation. For example, in the Pittsburgh district Steel Corporation subsidiaries, when in full operation, gave employment to about 125,000 men, but at present the number is much smaller as the corporation plants are not running more than 35 per cent capacity. The rate of the Steel Corporation is 37c. per hour and that of the independents 30c.

Effect in the Youngstown District

YOUNGSTOWN, OHIO, July 12.—In so far as actual working conditions are concerned, elimination of the basic 8 hour day will have comparatively little effect upon the steel industry in the Mahoning Valley. Independents are virtually on an 8 hr. basis, which has been generally adopted in order to afford employment to a larger number of men during the current period of slack operations.

In the Carnegie Steel Co. plants, Youngstown district, the immediate effect will be to reduce wages. Operating officials state that there will be no change in working hours with exception that some of the shopmen have been reduced from 10 to nine hours because of the condition of business. Effective from July 16, under the order, men working 12 hours will be paid for 12 hours work, instead of 14 as heretofore, while employees working 10 hours will be paid for 10, instead of 11. This will reduce the common labor rate for 12 hours from $5.18 to $4.44 and for 10 hours $4.07 to $3.70, on the basis of 37c. per hour.

An additional wage reduction by the leading interest is anticipated by steel makers in this district, in view of the cut by independents effective July 16, to 30 cents per hour for common labor.

In its Mahoning Valley plants, the Ohio Works, Upper and Lower Union mills, McDonald bar mills and the Niles blast furnace, the Carnegie company ordinarily employs 5000 men, many of whom will be affected. Large numbers are also employed by the Steel Corporation in plants of subsidiary companies in the Shenango Valley.

President James A. Campbell of the Youngstown Sheet & Tube Co. points out that the more important steel producing groups throughout the country have now abolished the basic eight hour day and do not pay higher rates for time over eight hours. He states the institution of the shorter day by the Sheet & Tube company is merely temporary and that the longer hours will be restored when business conditions become more nearly normal.

Another Wage Reduction

YOUNGSTOWN, OHIO, July 12.—For the second time this year, Valley independent steel companies have reduced wages, effective July 16, the reduction in common labor approximating 19 per cent. The new common labor rate will be 30c. and it is predicted that it will still further decline to 25c. before the wage liquidation is completed. The new rate compares with a war peak of 47c. with time and a half for overtime.

An independent official expresses little hope of the steel market stabilizing at the current levels. Any further decline in prices will have to be offset by a further downward readjustment in wage rates, he declares. "We have cut wage rates to offset some of the loss from the price reduction. If we had not reduced wage rates we would have been obliged to suspend operations completely, as we could not have sold our product at the lower prices and continued wages on the former basis." The affected companies are the Sharon Steel Hoop Co., Republic Iron & Steel Co., Brier Hill Steel Co., Youngstown & Tube Co. and Trumbull Steel Co.

Sharon Steel Hoop Co. Reduces

Pittsburgh, July 12.—The Sharon Steel Hoop Co., announces a reduction in the wage for common labor from 37c. to 30c. per hour effective July 16. Tonnage rates and salaries will be revised downward in like proportion. Other independents are expected to make a similar cut. The Sharon Steel Hoop Co. eliminated time and one half for overtime on May 16 last.

Bids on Plates for the Navy

WASHINGTON, July 12.—On bids for 950 tons of plates for the Portsmouth, N. H., Navy Yard, opened yesterday by the Bureau of Supplies and Accounts, the Worth Steel Co. was lowest at a price equivalent to 2c., Pittsburgh, on 90 per cent of the tonnage, ranging up to 100 in. wide. On the greatest widths, 120 to 125 in., this company bid the equivalent of 2.26c., Pittsburgh. Delivery of the entire tonnage is to be made "probably within 30 days." The Carnegie Steel Co. bid a flat price for all tonnage equivalent to 2.11c., Pittsburgh; Cambria Steel Co., a flat price equivalent to 2.12c., Pittsburgh; the Jones & Laughlin Steel Co., bid equivalent to 2.11c., Pittsburgh, up to 100 in., and equivalent to 2.16c., Pittsburgh on 100 to 110 in. The Lukens Steel Co. bid equivalent to 2.06c., Pittsburgh, up to 100 in. and 2.32c. on 120 to 125 in.

The Bureau is to open bids on Aug. 5 for approximately 6500 tons of plates, bars and shapes for various Navy yards. The lots are divided into about 2800 tons of plates, 2100 tons of bars and 1600 tons of shapes.

The Champion Engineering Co., Kenton, Ohio, has taken an order for a 10-ton crane with 40-ft. span for the galvanizing plant of the Empire Rolling Mill Co., Cleveland.

IRON AND INDUSTRIAL STOCKS

Little Selling of Steel Issues Because of Cut in Mill Quotations

Some selling of steel and allied shares the past week unquestionably was based on the new prices recently announced by the mills, coupled with the steel, ingot production figures for June and the continued drop in the monthly unfilled tonnage on the books of the United States Steel Corporation. But the great army of investors in such securities long ago recognized the fact the steel industry is passing through a period of deflation. There has been no rush of late to unload steel and allied stocks. On the contrary, the number of investors in at least some instances is on the increase, as is attested by the number of owners of United States Steel common. Money continually is working easier and freer. It is true, however, that banks are not inclined to release large funds until after crop moving requirements are more defined.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	31 - 32	Lackawanna Steel.	37 - 41
Allis-Chalm. pf...	— - 72½	Midvale Steel.....	23½ - 24⅞
Am. Can com...	26 - 27⅞	Nat.-Acme	— - 15½
Am. C. & F. com.	123½-126⅞	Nat. E. & S. com.	44½ - 46
Am. Loco. com....	80 - 83¾	Nat. E. & S. pf...	— - 90
Am. Loco. pf.....	— -104	N. Y. Air Brake..	58 - 59
Am. Steel F. com.	25¼ - 27¼	Pittsburgh Stl. pf.	— - 80
Bald. Loco. com.	69½ - 77⅝	Press. Steel com..	70½ - 71½
Beth. Steel com..	43 - 48⅜	Ry. Stl. Spg. com.	81⅝ - 83
Beth. Stl., Cl. B..	45 - 51½	Replogle Steel.....	18 - 19¾
Beth. Stl., 8% pf..	96½ - 99	Republic com.....	45 - 51¾
Chic. Pneu. Tool..	49½ - 51	Sloss, com.....	34¾ - 35
Colorado Fuel.....	26½ - 27	Superior Steel....	29⅜ - 31½
Cruc. Steel com..	54½ - 60⅜	U. S. Pipe com...	14½ - 15
General Electric..	126 -129	U. S. Pipe pf.....	43 - 44
Gt. No. Ore Cert..	27 - 29¼	U. S. Steel com...	73½ - 76¼
Gulf States Steel.	33 - 35	U. S. Steel pf.....	109 -110
Int. Har. com.....	73½ - 82½	Vanadium Steel...	28 - 31¾
Int. Har. pf.....	— -100	Westingh'se Elec.	42¾ - 45½

Dominion Steel Report

The annual report of the Dominion Steel Corporation, Sydney, N. S., for the year ending March 31, 1921, which will be presented to shareholders at the annual meeting on July 20 next, shows earnings of $7,212,750, after deducting all expenses incident to operations, current repairs, taxes, administrative and selling expenses, and after making provision for shrinkage in the value of inventories and investments and allowance for possible loss on accounts receivable. In the previous year the earnings were $5,532,529. During the year under review the sum of $1,583,662 was set aside for depreciation of plant and properties and sinking funds, and $970,777 for interest on outstanding bonds, leaving a balance of $4,658,312 as net profit for the year. Regular quarterly dividends upon the preference shares of the corporation and preferred stocks of the Dominion Coal Co. and Dominion Iron & Steel Co. amounted to $980,000. The balance of the year's earnings, $3,678,312, was transferred to profit and loss account. Four quarterly dividends aggregating $2,226,000 were paid on the common shares of the corporation. The balance at credit of profit and loss account on March 31, 1921, was $9 663,548, an increase of $1,452,312 over the balance at the beginning of the fiscal year.

Plans of New Companies

The Victor Piston Ring Co., American Building, Baltimore, recently incorporated with a capital of $500,000, expects to have piston rings made by contract until it can obtain a desirable site for building. The company, after looking around, finds property so high and building material so costly, that it has decided to postpone building.

The Signal Wick Co., Plainfield, N. J., recently incorporated, will continue manufacturing its railroad signal specialties as heretofore. It does not expect to build in the near future.

The Johnson Auto Body Corporation, 159 Franklin Street, Boston, recently incorporated, has taken over the Kelley & Trefry Body Co., West Roxbury, which formerly built bodies for the concern recently incorporated. The company builds passenger bodies for all standard chassis and heavy duty trucks. Its factory extension plans are incomplete, but during the summer it may need a small amount of new equipment.

The Stafford Appliance Co., La Porte, Ind., recently incorporated, has elected the following officers: Herbert A. Thomas, La Porte, Ind., president; Abel E. Stafford, Niles, Mich., vice-president; Harvey A. Gridley, Niles, Mich., treasurer, and Leonard R. Henoch, La Porte, Ind., secretary. The company was organized to manufacture and distribute improved garage tools and automobile appliances and accessories.

Trade and Office Changes

The Foster-Songer Co., Pittsburgh, has appointed Theodore L. Dodd & Co., Chicago, district sales agent for the Middle West. The line consists of seamless lap weld and charcoal iron boiler tubes; also seamless steel mechanical tubing, pipe and casing.

The Wright-Alexander Co., 201 Devonshire Street, Boston, room 302, has been made sales representative for the Millholland Machine Co., Indianapolis, line of turret lathes for all New England, Connecticut excepted.

The business and works of Buechele Iron & Tool Co., 4130 Liberty Avenue, Pittsburgh, manufacturer of structural and ornamental steel work, fire escapes, fire proof porches, wire works, etc., have been taken over and will be continued by the Builders' Steel Works Co. R. O. Belles and Fred C. Werry, formerly associated with Taylor & Dean, are respectively president and vice-president of the Builders' Steel Works Co., and Thomas H. Werry, Jr., is secretary and treasurer.

The New York Central Iron Works Co., Inc., Hagerstown, Md., has discontinued its Baltimore representation which was located in the Builders' Exchange. All inquiries from the Baltimore district are now being handled by the company's home office at Hagerstown.

W. H. J. Fitzgerald & Co., 165 High Street, Boston, have been made exclusive sales agents in New England, Connecticut excepted, for the Standard Lathe Works Co.

The Foster Machine Co., the Kempsmith Mfg. Co. and the Giddings & Lewis Machine Tool Co., for which L. S. Devos is export manager, have decided to close their New York export office at the Grand Central Palace because of the present export depression.

The Heine Safety Boiler Co., St. Louis, will change its name on July 7 to the Heine Boiler Co.

Topping Brothers, heavy and marine hardware and railroad and contractors' supplies, New York, have appointed as representatives in the New England states the Spencer Reed Co., 1265 Boylston Street, Boston. Frank S. Spencer represented Joseph T. Ryerson in that territory for a number of years.

C. Markhart, formerly of the engineering firm of Brown, Eagerman & Markhart, and H. R. Thayer, recently of the Carnegie Institute of Technology, have formed the Markhart-Thayer Engineering Co., with offices at 1319 Fulton Building, Pittsburgh. The company will specialize in estimates, designs, etc., for foundations, bridges and buildings.

The American Steel & Wire Co. announces that it has taken over as of June 30, the business and good will of the J. C. Pearson Co., Inc., Boston, which company it has owned and operated since its organization in 1913, and will now carry on the business direct. The Pearson company manufactures coated nails.

The Pennsylvania Forge Co. has opened an office in New York at 50 Church Street to facilitate handling its business in the metropolitan district. George H. Raush, Jr., has been appointed district representative, in charge of this office. He was with the Midvale Steel & Ordnance Co. for a number of years both in the manufacturing departments and in the New York and other branch sales offices.

The New York office of the Morrison & Risman Co., jobber in new and relaying rails and track accessories, has been moved to 26 Cortlandt Street, telephone Cortlandt 4405. The company's general offices and works are at Buffalo, and district sales offices are also maintained in the Drexel Building, Philadelphia, and Park Building, Pittsburgh.

The Walworth Mfg. Co., whose general offices have been at the Boston factory, First and O streets, Boston, have moved them to Pearl and High streets, Boston. This building embraces an entire block on High Street. The general offices comprise two floors where are located the president, vice-president in charge of operating, vice-president in charge of engineering, vice-president in charge of sales, treasurer, together with the entire general accounting force, branch house department, purchasing department and the sales promotion department.

The Wheeling Steel Products Co. has moved its Cincinnati district offices from the St. Paul Building to 709-10 Union Trust Building. A. F. Scherer is sales manager in charge of the district, which includes southern Ohio, Indiana, Kentucky and Tennessee. F. H. Alger, P. T. Barrett and E. F. Greisheimer have recently been added to the sales force of the Cincinnati district.

The Pittsburgh office of the American Manganese Mfg. Co., has removed from room 940, Oliver Building, to room 647 of the same building. L. S. Kerchner is resident manager.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.355
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $3.15; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65 to $2.75
Large boiler rivets.....$2.75 to $2.85
Small rivets .....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
  Smaller and shorter, rolled threads.65 and 10 per cent off list
  Cut threads .....60 and 10 per cent off list
  Longer and larger sizes.....60 and 10 per cent off list
Lag bolts .....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
  Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
  Smaller and shorter.....60 and 5 per cent off list
  Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
  ¼ to 9/16 in. inclusive U. S. S..80, 10 and 10 per cent off list
  Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
  ⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....4c. to 4.20c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $43; chain rods, $43; screw stock rods, $48; rivet and bolt rods and other rods of that character, $43; high carbon rods, $51 to $58, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in., and 7/16-in., $3 base; 5/16-in., $3 base. Boat and barge spikes, $3.20 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 to $4.20 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.90c. from mill. Refined bar iron, 2.50c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½-	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade an additional 5 and 2½ per cent are allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	+10
2 to 2¼ in.	36	1¾ in.	List
2½ to 3 in.	47	2 to 2¼ in.	—10
3¼ to 13 in.	52	2½ to 2¾ in.	—15
		3 to 3¼ in.	—16
		3½ to 4½ in.	—20

Carload Discounts on Standard Commercial Seamless—Cold Drawn

1 in.	56	2 to 2½ in.	17½
1¼ in.	49	2¾ and 4 in.	20
1½ in.	48	4½ to 5 in.	7½
1¾ in.	25		

Hot Rolled

3 to 4 in. 30

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.55	Nos. 11 and 12	2.75
Nos. 9 and 10 (base)	2.65	Nos. 13 and 14	2.85
		Nos. 15 and 16	2.95

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.30	No. 28 (base)	3.50
Nos. 22 to 24	3.35	No. 29	3.60
Nos. 25 and 26	3.40	No. 30	3.70
No. 27	3.45		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.50	Nos. 25 and 26	4.20
Nos. 12 to 14	3.60	No. 27	4.35
Nos. 15 and 16	3.75	No. 28 (base)	4.50
Nos. 17 to 21	3.90	No. 29	4.75
Nos. 22 to 24	4.05	No. 30	5.00

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.30	No. 28 (base)	3.50
Nos. 17 to 21	3.35	No. 29	3.55
Nos. 22 to 24	3.40	No. 30	3.55
Nos. 25 to 27	3.45	Nos. 30½ and 31	3.60

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
July	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
6	.....12.75	12.62½	29.00	4.40	4.35	4.85	4.35
7	.....12.75	12.62½	28.75	4.40	4.35	4.85	4.35
8	.....12.75	12.62½	28.87½	4.40	4.35	4.85	4.35
9	.....12.75	12.62½	....	4.40	4.35	4.85	4.35
11	.....12.75	12.62½	29.12½	4.40	4.35	4.85	4.35
12	.....12.75	12.62½	28.50	4.40	4.35	4.80	4.30

New York

NEW YORK, July 12.

The markets continue very quiet. Copper is steady in price, but inactive, the undertone being slightly firmer. Tin prices have fluctuated a little during the week; there are few sales. Lead is firm, with little business. Spelter turned slightly softer in price to-day.

Copper.—There has been a slight lull in export buying and the domestic market continues quiet. Nevertheless, prices are quite firmly held, and the number of producers from whom prices lower than 13c. can be obtained is narrowing. Electrolytic is quoted by the leading producers at 13c., but some of the smaller producers continue to name 12.62½c. Lake copper is quoted at 12.75c. to 13c., delivered, but those naming the higher price are getting practically no business. While German business has been an important factor in the market for some months, British orders have fallen off, due probably to the drop in exchange recently. Preliminary estimates indicate that the total copper production in the United States for the first half of 1921 was approximately 408,000,000 lb. Imports during the same period were about 185,600,000 lb., indicating a refined production of 613,600,000 lb. Deliveries for domestic consumption are estimated at 360,000,000 lb. and export shipments 266,500,000 lb. This shows a wearing down of surplus stocks, as total domestic and export deliveries during the six months were 13,000,000 lb. in excess of production.

Tin.—The market has been quiet throughout the week; the only activity worthy of note was on Monday, when 300 to 400 tons was sold, mostly for shipment from June to September from the Straits Settlement. Prices on these transactions ranged from 28c. to 28.25c. per lb. A good portion of the tonnage sold is for consumers' account, the remainder of the trading being between dealers. Otherwise the market has been featureless. The fact that there is no reported improvement in the tin plate industry tends to keep the market in the narrow groove it has occupied for some time. Spot Straits tin, New York, has ranged during the week from 28.50c. to 29c. The London market was lower than a week ago, to-day's price being £166 5s. for spot Straits, with futures £168 5s.

Lead.—Lead is quiet and firm. The American Smelting & Refining Co. has the field pretty much to itself at its price of 4.40c., New York. None of the independent producers is willing to sell at this figure, but are asking 4.62½c. and will sell only small quantities even at this price. The lead industry is declared to be in good condition, though business continues very dull.

Zinc.—Though zinc was quoted during all of last week at 4.35c., St. Louis, or 4.85c., New York, the market turned slightly softer to-day, the metal being obtainable at 4.30c., St. Louis. Business continues dull, and it is not expected that there will be any sound improvement until the sheet mills experience a considerably larger demand for galvanized sheets. The brass industry, also a large user normally, continues dull and is buying very little.

Antimony.—No activity of moment is reported and the price continues unchanged at 4.75c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is still quoted by the leading producer at 28c., f.o.b. producer's plant. Foreign metal of like grade is available at 22.50c. to 23c., New York, and 98 to 99 per cent remelted metal at 20c. to 20.50c., New York.

Old Metals.—There is little change in conditions this week, business being practically impossible. Values are generally unchanged. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12 00
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	10.50
Brass, heavy	7.00
Brass, light	5.25
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	5.25
Lead, heavy	4.00
Zinc	3.00
Lead, tea	3.00

Chicago

July 12.—The market is exceedingly quiet and the only metal which has changed price is tin. Lead is held at 4.45c. by sellers with buyers offering less. Old metal prices remain unchanged. We quote lake copper at 13.25c. in carload lots; tin, 30.50c.; lead, 4.45c.; spelter, 4.45c.; antimony, 7.50c. On old metals we quote copper wire, 7.50c.; crucible shapes, 7.50c.; copper clips, 7.50c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 21c., all being buying prices for less than carload lots.

St. Louis

ST. LOUIS, July 8.—There is still hardly any activity in the non-ferrous markets. Lead and spelter are 10c. higher, each being quoted at 4.35c. in car lots. We quote Lake copper at 13.68½c. in car lots; tin, 29.74½c. and antimony, 5.48½c. On old metals we quote: Light brass, 4c.; heavy yellow brass, 6c.; heavy red brass, heavy copper and copper wire, 9c.; light copper, 7.50c.; pewter, 17c.; tinfoil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c.; aluminum, 9c.

Reduction of Rates on By-Product Coke Ordered by Commission

WASHINGTON, July 12.—Rates on by-product coke from seaboard, New Jersey, to destinations in New England, New York and New Jersey were condemned as unreasonable and unduly prejudicial in a decision handed down yesterday by the Interstate Commerce Commission and are to be superseded by a mileage scale operative on Nov. 1, which, in general, will mean a reduction of approximately 20 per cent. The new scale will begin with 90c. a ton for distances not greater than 10 miles and will proceed with 10c. increases for each additional 10 miles up to 110 miles and then by 10c. increases for the next 15 miles, followed by 10c. increases for 25 miles up to 600 miles at which rates become $3.90 per ton. These rates are subject to the general advance in rates made last August. The commission also denied through routes and joint rates from seaboard to destinations on the New York, New Haven & Hartford Railroad, by way of New York harbor and ordered discontinuance of relief from the fourth section on coke. Reparation was awarded on findings as to the character of specific rates. The general finding was that the rates applied over all rail routes to the destinations involved from Aug. 14, 1917, to January 21, 1918, inclusive, were unreasonable and unduly prejudicial to the extent they exceeded 80 per cent of the rates shown in the distance scales outlined and that except to points on the west shore in New Jersey over intrastate routes are unreasonable to the extent of their excess over the rates shown in the scale, subject to the general advance mentioned. Rates increased under that advance will apply on a minimum of 50,000 lb. in open cars and 40,000 lb. when loaded in box or stock cars, except that when cars are loaded to cubic or visible capacity actual rates will apply. The decision was the result of a complaint made by the Sea-Board By-Product Coke Co.

PERSONAL

Walter S. Tower, who has been trade adviser of the Consolidated Steel Corporation, New York, took up on Monday, July 11, work with the Department of Commerce to which he has been assigned by Secretary Hoover. While Mr. Tower's position has not been clearly defined, it is stated, contrary to press reports, that he will not be the chief of an industrial division on iron and steel, at least not in the immediate future. His first task is expected to be in connection with a request made by the United States Shipping Board to the Department of Commerce, to assist the former in the organization of work looking to the gathering and analysis of shipping statistics. Mr. Tower, who is 40 years of age, was born in West Bridgewater, Mass., where he obtained his public school education. He is a graduate of Harvard, getting the degrees of A.B. and A.M. in 1903 and 1904, respectively, and also graduated from the University of Pennsylvania with the degree of Ph.D. in 1906. For a series of years, and up to 1917, he was engaged in teaching and traveling. While traveling he studied trade conditions, chiefly in North and South America. After that, he became connected with the Shipping Board. He has written several articles concerning Latin-American trade conditions. During the war he was associated with the Division of Planning and Statistics of the Shipping Board. Upon the resignation, in March, 1919, of E. F. Gay, as director of that division, he was succeeded by Mr. Tower, who remained in that position until June, 1919, when he went with the Consolidated Steel Corporation.

John S. Oursler, general superintendent of the Homestead, Pa., works of the Carnegie Steel Co., is very seriously ill at Lakeside Hospital, Cleveland, following an operation.

A cablegram from Paris announces that Ambrose Swasey, president Warner & Swasey Co., Cleveland, and past president American Society of Mechanical Engineers, has been honored by election in two prominent French societies. He has been elected an officer of the Legion of Honor, of which organization he has been a chevalier since 1900, and has also been made an honorary member of the Society of Civil Engineers of France. Mr. Swasey is a member of a delegation of American engineers who recently went to Europe to present the John Fritz medals, awarded to Sir Robert Hadfield and to Dr. Eugene Schneider.

George H. Hannum, general manager Oakland Motor Car Co., Pontiac, Mich., and A. B. C. Hardy, general manager Olds Motor Works, Lansing, Mich., have been made vice-presidents of the General Motors Corporation. John Scott, formerly assistant factory manager of the Olds Motor Works, has been made factory manager.

Prof. Arthur M. Greene, Jr., professor of mechanical engineering Rensselaer Polytechnic Institute, will assume the duties of dean and professor in mechanical engineering of the enlarged school of engineering of Princeton University in the fall of 1922. The school will give courses in civil, chemical, electrical, mechanical and mining engineering, these courses extending over four years. A fifth year will be required for an engineering degree. Professor Greene was born in Philadelphia in 1872, was graduated from the University of Pennsylvania in 1893 with the degree of B.S., securing an M.E. degree the next year. In 1916 this university gave him the honorary degree of D.Sc. He has taught at Drexel Institute, University of Pennsylvania, University of Missouri and Rensselaer Polytechnic Institute, where he established the mechanical engineering department for which Mrs. Russell Sage donated $1,000,000. During the war Professor Greene served as a member of the advisory committee of technical societies aiding the Naval Consulting Board; he was chairman of the plant committee for Rensselaer County, New York, for the Fuel Administration and served as a member of the Engineering Council of the United Engineering Societies. He is the author of several books and has contributed to the technical press and to the proceedings of the American Society of Mechanical Engineers, of which society he has served as manager and vice-president.

William P. Palmer, president American Steel & Wire Co., Cleveland, has established summer headquarters at the company's North Works, Worcester, Mass. He will pass week ends with his family at Bluehill, Me., where he plans to erect a summer home.

Joseph Michaels, vice-president Hyman-Michaels Co., Chicago, accompanied by his family, sailed for Europe on July 4, for a four months' vacation.

L. A. Holmes, engineer, McClintic-Marshall Co., Potstown, Pa., has been transferred to the Boston office of that company.

Col. R. P. Lamont, president American Steel Foundries, Chicago, recently sailed for London to attend the meeting of the International Chamber of Commerce, as a representative of the Illinois Manufacturers' Association.

C. H. Lydell, Mertz & McLellan, consulting engineers, London, Eng., who is inspecting American public utilities, spent several days in Milwaukee the past week to visit the new Lakeside power plant of the Milwaukee Electric Railway & Light Co., at St. Francis, Milwaukee county, an important installation of steam generating equipment operated with pulverized fuel.

H. J. Freyn, president Freyn, Brassert & Co., Chicago, sailed for Europe on an extended business trip through England, Belgium, Holland, France and other countries. Mr. Freyn is expected to return in October.

Harry Quinn, vice-president Fairbanks Co. and manager of the New Orleans branch, has resigned. He had been with the Fairbanks Co. since 1907, during which time he rose from the position of special accountant to vice-president and branch house manager; holding in the interval the positions of auditor of disbursements, branch house auditor, general auditor, comptroller, assistant to president, general manager, general manager and second vice-president, vice-president and manager of the New Orleans branch. He spent a year in Europe, reorganizing the European branches of the Fairbanks interests. In 1919 Mr. Quinn took over the New Orleans house.

Isaac Harter has been appointed general superintendent of the Babcock & Wilcox Co., succeeding the late James P. Sneddon. Mr. Harter's advance has been a continuous one. On graduating in 1901 from the University of Pennsylvania he entered the employ of the Altman & Taylor Machinery Co., Mansfield, Ohio, a corporation of which his father had been president. He began at the bottom in the boiler department as a gang boss on inventories, and was transferred later to the cost department, where he became familiar with the details of each branch of the business. He was elected a director of the company while in this department, and a little later was appointed acting superintendent of the boiler department. In September, 1905, the company sold its boiler business to the Stirling Co., and Mr. Harter joined the staff of E. R. Stettinius, the business head of the latter company, which was absorbed by the Babcock & Wilcox Co. in 1907. When L. I. Summers resigned the superintendency of the Stirling works at Barberton, Ohio, Mr. Harter succeeded him, and in 1911 became superintendent of the Bayonne, N. J., works. He served in this capacity until about a year ago, when he became assistant to the president, in New York, where his office will remain as general superintendent.

I. D. Bielostozky, representing Morris & Bramer, Petrograd, Russia, has arrived in New York to secure the representation of American machine tool manufacturers in Russia. His headquarters are with the W. P. Neth Co., 44 Whitehall Street, New York. He wishes to receive catalogs and price lists. His firm intends also to extend its activities to China, Japan and Finland.

Frank F. Sims, for several years with the Pacific Coast Steel Co. as sales engineer, has opened offices for the practice of industrial engineering at 1306 L. C. Smith Building, Seattle. He will handle industrial

engineering and make investigations of proposed engineering operations.

F. E. L. Whitesell, for several years with the sales department of the Railway & Industrial Engineering Co., Greensburg, Pa., has been appointed New England representative, with headquarters at 136 Federal Street, Boston. Mr. Whitesell is a graduate of Washington and Jefferson College and during the world war served with the ambulance corps in France.

H. W. Bishop, Jr., for 10 years attached to the general sales office of LaBelle Iron Works, Steubenville, Ohio, and since the consolidation of LaBelle Iron Works, the Whitaker-Glessner Co. and the Wheeling Steel & Iron Co., identified with the Pittsburgh sales office of the Wheeling Steel Products Co., resigned, as of July 1. It is understood that he will make a connection with an Eastern steel company.

Charles V. McIntire has resigned as chief engineer of the International Coal Products Corporation to enter the field of consulting engineering, in association with A. Stephen Knowles, 66 Broadway, New York. He will specialize in by-product coke oven work, low temperature distillation of coal processes and other systems pertaining to the preparation and treatment of coals. Mr. Knowles was engaged for a number of years in the design and construction of by-product coke ovens; first, during six years service with the Koppers Co. and later, covering a period of five years, as chief engineer of the Wilputte Coke Oven Corporation, New York.

Carl Carlson has accepted a position with the Woonsocket Wagon Mfg. Co., Woonsocket, R. I., as general superintendent in its drop forge department. He was formerly assistant general superintendent at Billings & Spencer.

F. E. Myers & Bro. Are Incorporated

F. E. Myers & Bro., Ashland, Ohio, force and lift pumps, hay tools, etc., after operating for 45 years as a partnership, have been incorporated at $6,000,000 as the F. E. Myers & Bro. Co. F. E. and P. A. Myers started manufacture in a basement with a few hand tools, limited capital and no outside help. The industry has grown to one employing 850 men and producing two pumps a minute of working hours and a corresponding number of cylinders, hay tools, door hangers, etc. It is known as one of the largest co-partnerships under one continuous management in Ohio. The business will be conducted the same in the future as in the past. The officers of the company as as follows: F. E. Myers, president; P. A. Myers, first vice-president and general manager; John C. Myers, second vice-president; Guy C. Myers, third vice-president; F. B. Kellogg, secretary and treasurer, who together with A. N. Myers, T. W. Miller and G. D. Myers constitute the board of directors.



F E. MYERS

Francis E. Myers is the organizer, salesman and financier of the partnership, while Philip A. Myers is the inventor. Previous to the formation of the partnership, F. E. Myers was a successful salesman. Their career as manufacturers began in 1879 after P. A. Myers invented a double acting force pump. He has secured more than 70 active patents. F. E. Myers has just given up the presidency of the Cleveland & Southwestern Railroad; he is president of the First National Bank of Ashland and director of the Union Trust Co., Cleveland. Both brothers are prominent in civic and charitable affairs and have given money and land for public enterprises.

OBITUARY

HENRY S. MANNING, a one-time partner of Manning, Maxwell & Moore, Inc., machine tools, 119 West Fortieth Street, New York, died July 9 in his apartment in New York. He was 76 years old. He was studying at Yale with the class of 1862 when he left to fight for the Union, rising to the command of a colored regiment. The present corporation of Manning, Maxwell & Moore, Inc., had its origin with Mr. Manning, who, having been in business individually for several years, established the concern of H. S. Manning & Co., with headquarters at 111 Liberty Street, New York. In 1873 Eugene L. Maxwell became a partner in H. S. Manning & Co. and continued his connection with the establishment until his death in 1894. Charles A. Moore joined the firm in 1880, at which time the present corporation name was adopted. In 1905, Henry S. Manning and Charles A. Moore being the only remaining partners, Mr. Moore purchased Mr. Manning's interest and Mr. Manning invested heavily with Milliken Brothers, structural iron and steel manufacturers, New York, who failed, thereby causing a heavy financial loss to Mr. Manning. He then joined the International Banking Corporation, 61 Wall Street, and later withdrew and maintained offices at 49 Wall Street. He was a member of the American Society of Mechanical Engineers and the Union League Club.



HENRY S. MANNING

Prof. FRANCIS BACON CROCKER, founder and vice-president Crocker-Wheeler Co., Ampere, N. J., and one of the foremost electrical engineers in the United States, died July 9 at his home in New York at the age of 60. He was born in New York and was graduated from the Columbia School of Mines in 1882, later receiving the Ph.D. degree. He founded the School of Electrical Engineering at Columbia University, serving as the head for 20 years. Together with Charles G. Curtis and Dr. Schuyler S. Wheeler he created the commercial motor, first put to use in 1886. In 1917, with Peter Cooper Hewitt, he developed a helicopter which was able to fly. He was a former president of the American Institute of Electrical Engineers, the Electric Power Club, the New York Electrical Society and a past sceretary of the International Electrical Congress. He was active in the standardization of electrical equipment throughout the world and was one of two American delegates to the International Electrotechnical Commission in London. He was the author of several books in the electrical field.

JAMES HARRISON STEEDMAN, vice-president Curtis & Co. Mfg. Co., St. Louis, died on July 1 at Santa Barbara, Cal., where he had gone for his health in January. His illness began with a breakdown during the war from overwork, when he was a lieutenant-commander in the navy, supervising the conditioning of engines in the ships of the Atlantic fleet. Prior to the war, he was an officer in the Naval Reserve Corps. Mr. Steedman was born in St. Louis 54 years ago, and was graduated from the St. Louis Manual Training School and Washington University. He was president of the St. Louis Steel Foundry Co. from 1889 to 1891, since which time he has been connected with the Curtis concern, of which his brother, Edwin H. Steedman, is president.

GEORGE P. POPE, a prominent member of the sales department, Minneapolis Steel & Machinery Co., Minneapolis, and well known in the fabricating trade, died July 7.

Machinery Markets and News of the Works

TOOL PLANTS CLOSED

Most of the Larger Factories Are Idle for Indefinite Period

No Improvement in Buying of Machine Tools —Stocks on Hand Will Meet Demand for Months

Many of the larger machine-tool manufacturing plants are closed and will remain so indefinitely. Nearly all of these companies have made up sufficient stock to last for at least six months, and unless there should be a larger demand for tools during the last half of the year than is expected, the plants will remain closed until the first of the year. Some companies have experimental work under way and this will be continued until new tools recently designed have been perfected for the market.

At Chicago, where some railroad buying has been in prospect, no action has been taken. The Illinois Central and Rock Island inquiries are still pending, and a few additional machines have been inquired for.

The Automatic Electric Co., the Acme X-Ray Co., both of Chicago, and the Aerial Cutlery Mfg. Co., Marinette, Wis., have inquired for lists of tools in the Chicago market.

Federal vocational schools, which are being started throughout the country, offer possibilities of business. The McKinley School, Canton, Ohio, has inquired for about 25 machines.

A carpet company in New England was a purchaser of tools last week. A Revere, Mass., manufacturer also bought a few machines.

An inquiry has been issued by a Detroit company for 40 to 50 automatic screw machines, but the placing of the business is contingent on the closing of a pending order for automobile parts.

In general the machine-tool business throughout the country continues very dull, but inquiries in some sections are better.

New York

NEW YORK, July 12.

No signs of improvement in machine-tool inquiry and buying are apparent. The situation the past week has been the same as in preceding weeks, with the dullness intensified by the recent holidays. The only inquiry of note before the trade is that of the Bethlehem Steel Co., reported last week.

While the number of cranes sales reported the past week is small, the market generally is showing more activity. A fair number of inquiries is on hand, one for a total of 22 electric cranes, ranging from 7½-tons to 15-tons capacity being in the hands of at least one crane builder. This business, however, probably will not be placed for at least six months. The 12-ton hand power crane for the Government of Porto Rico, on which bids were submitted through New York exporters, will be awarded shortly. There is an inquiry in the market from Ray Houck, Reading, Pa., for a 5-ton, 40-ft. span overhead traveling crane for a client.

Among recent sales were: Shepard Electric Crane & Hoist Co., an electric hoist equipped with a 2-yd. bucket to the Broken Hill Proprietary Co. in Australia; Maris Brothers, a 10-ton electric crane to the Viscose Co. for its new plant at Lewiston, Pa., and a 5-ton crane for export to Cuba; Chisholm-Moore Mfg. Co., three 3-ton and one 4-ton hand power cranes to Marc Eidlitz & Son, 41 East Forty-second Street, New York, for the new building of the American Telephone & Telegraph Co., New York.

I. D. Bielostozky, representing the machinery firm of Morris & Bramer, Petrograd, Russia, is in the United States with a view to arranging to represent American manufacturers of machine tools at Vladivostok. Morriis & Bramer also intend to extend their selling activities to China, Japan and Finland. Mr. Beilostozky desires catalogs and price lists, his address being in care of the W. P. Neth Co., 44 Whitehall Street, New York.

The Crane Co., 490 Cherry Street, New York, manufacturer of valves, steam specialties, etc., with headquarters at Chicago, has awarded a contract to the Gabler Construction Co., 402 Hudson Street, for its new building, adjoining the present works, 100 x 145 ft., to cost about $28,000.

The Standard Change-Making Corporation, New York, has been incorporated with a capital of $250,000 by S. Bernstein, K. Sperberg and M. Sindel, 621 Broadway, to manufacture special machinery and parts.

The Butler Kwik Lift Co., Brooklyn, has been incorporated with a capital of $50,000 by E. M. and Z. M. Butler and H. E. Haupt, to manufacture lift devices and elevating equipment for automobiles, and other garage apparatus. It is represented by W. B. O'Connor, 375 Fulton Street, Brooklyn.

The W. F. Mangels Co., 2863 West Eighth Street, Brooklyn, manufacturer of mechanical amusement equipment of heavy type, as carousels, etc., is planning for the erection of a one-story addition, 90 x 200 ft.

Ashley Garages, Inc., New York, has been incorporated with a capital of $150,000 by J. R. Ashley, 351 West Eighty-sixth Street, to manufacture portable metal garages and attachments.

Simon Gasner & Son, Inc., 1876 Pitkin Avenue, Brooklyn, has completed plans for a three-story automobile service and repair building, 100 x 100 ft., at Glenmore Avenue and Powell Street, estimated to cost about $125,000.

The Rogel Lighting Fixture Mfg. Co., New York, has been incorporated under State laws to manufacture electric and gas fixtures. The incorporators are C. G. Robin and L. and I. Gelfland. It is represented by I. T. Fiatto, 261 Broadway.

The American Gage Corporation, Brooklyn, has been incorporated under Delaware laws with capital of $2,500,000 to manufacture gages and other equipment for automotive service. The incorporators are M. E. Nolan, E. C. Ballantyne and S. C. Berry, Brooklyn. The company is represented by the Capital Trust Co., Dover, Del.

The Die-Casting Specialty Corporation, Brooklyn, has been incorporated under State laws to manufacture diecastings and similar products. The incorporators are F. M. Cohen, C. Gould and A. Janssen. The company is represented by M. B. Sennett, 32 Court Street, Brooklyn.

S. B. Wight, agent for the New York Central Railroad Co., Grand Central Terminal, New York; Cleveland, Cincinnati, Chicago & St. Louis Railway Co., Michigan Central Railroad, and other affiliated lines, will receive bids up to 12 o'clock noon, July 22, for general repairs of 50 locomotives similar to class H-5 Mikado freight locomotives. Each bid must be accompanied by a $50,000 bond.

L. B. Redner, 200 West Seventy-first Street, New York, is taking bids for a new two and three-story automobile service and repair building, 25 x 100 ft., at 327-33 West Sixty-ninth Street, estimated to cost about $125,000.

The Pathe Freres Phonograph Co., 18 East Forty-second Street, New York, manufacturer of talking machines and parts, is being reorganized with W. W. Chase, president and general manager White Sewing Machine Co., Cleveland, as head of the company.

The Trumpbour-Whitehead Brass & Copper Co., 309

Canal Street, New York, has leased property at 265-67 Canal Street, for a new local establishment.

The 29 Jackson Street Garage Corporation, New York, has acquired the three and four-story buildings at Monroe and Jackson streets, extending to 372-76 Madison Street, totaling 75 x 100 ft., for an automobile service and repair works.

The MacCracken Garage Equipment Co., 373 West 125th Street, New York, has leased property at 433-47 East 124th Street for a long term of years, and will build a new one-story works building to occupy the entire plot, 100 x 188 ft.

Freight handling and conveying equipment will be installed on the new piers to be erected by the city of New York, Dock Commissioner Murray Hulbert in charge. The first structure, 1000 ft. long, will be built at the foot of Canal Street, North River, and plans and specifications will be completed about Aug. 1. Five other piers of the same size, approximately, will be constructed in this vicinity.

The Master Bake Pot Corporation, Bayonne, N. J., has been incorporated with a capital of $100,000 by M. M. Hogan, A. D. Harz and Percival H. Cruden, 14 North Street, to manufacture metal cooking utensils.

Gundiliere Brothers, 45 Hickory Street, Orange, N. J., are taking bids for a new one-story foundry, 32 x 60 ft., for iron casting production, at the rear of address noted. Albert P. Nucciarone, 206 Central Avenue, is architect.

The Safety Gas Apparatus Co., Inc., Hoboken, N. J., has been incorporated with a capital of $100,000 by William Wirt, William J. Connolly and Paul Devarco, 355 Fourteenth Street, to manufacture gas-burning equipment.

Fire, July 8, destroyed the automobile body manufacturing plant of Max Leowitz, Roosevelt, N. J., with loss estimated at about $20,000, including equipment.

The National Radio Electric Sign Co., Jersey City, N. J., has been incorporated with a capital of $25,000 to manufacture electrically operated signs. It is represented by Cornelius A. Cole, Hackensack, N. J.

The Metal Materials Co., Asbury Park, N. J., has been incorporated with a capital of $125,000 by Roscoe G. Tagle, Frank V. B. Young and Isaiah Matlack, 601 Mattison Avenue, to manufacture metalware products.

The E-Z Product Mfg. Co., 180 Amherst Street, East Orange, N. J., has filed notice of organization to manufacture filters and other mechanical specialties. Charles E. Wiltsey, 152 Halsted Street, heads the company.

The Henry R. Worthington Co., Harrison Avenue, Harrison, N. J., has made an offer of $8,459.27 to the Town Council for the purchase of 14 lots on Wilhelm and Sussex streets, for proposed plant extensions. The company manufactures pumps and pumping machinery.

The Williams Specialty Co., 9 Walnut Place, Montclair, N. J., has filed notice of organization to manufacture razor plate and kindred products. James Williams heads the company.

The Hudson Auto Body Co., Union Hill, N. J., has been incorporated with a capital of $100,000 by Joseph Solomon, Morris Bernstein and Carl Weitz, 8 Bergenline Avenue, to manufacture automobile bodies and equipment.

Oven equipment and other mechanical apparatus will be installed in the addition to be constructed by the Ward Baking Co., Ampere, East Orange, N. J., to cost about $450,000. A permit for the work has just been issued, and includes a one-story service department for automobile trucks.

The Zolleis Mfg. Co., East Orange, N. J., has been incorporated with a capital of $100,000 to manufacture valves and kindred mechanical equipment. Harry H. Picking, 525 Main Street, represents the company.

Louis J. Holzmann, 393 South Twenty-first Street, Irvington, N. J., manufacturer of chutes and other iron products, has secured permission for the erection of a new plant at 107-109 Montgomery Avenue.

The Electric Heating Apparatus Co., Newark, N. J., manufacturer of electrical equipment, has removed its plant from 123-25 Sussex Avenue to 18-34 Nesbitt Street, where increased facilities will be provided.

The New Jersey Chemical & Rubber Works, Inc., Newark, has been incorporated with a capital of $100,000 by Nathaniel Ginsburg, Meyer E. Gusman and Jacob Janoff, to manufacture rubber products. It is represented by A. Milton Jacobs, 9 Clinton Street.

The Miniature Bulb Co., Warren Street, Newark, has filed notice of organization to manufaoture incandescent electric lamps. Angelo Palone, 695 Ridge Street, heads the company.

Alexander, Morrison & Co., Inc., Newark, has been incorporated with a capital of $500,000 by L. M. Scheer, E. T. Adams and Maurice A. Potter, 111 Gotthart Street, to manufacture boilers and kindred equipment.

The Flexible Products Co., 65 Clinton Place, Newark, has filed notice of organization to manufacture flexible tubing, etc. Herbert Bingham heads the company.

Fire, July 2, destroyed a portion of the factory of the L. S. Wright Machine Works, 9 Alling Street, Newark, with loss estimated at about $10,000. The company has been planning for removal to a new location at High and Boyden streets, and, it is said, will re-establish the works at this location.

The Board of Freeholders, Newark, will break ground at once for a new industrial building at the Overbrook Hospital, near Caldwell, to be equipped for vocational work. It is estimated to cost about $125,000. Chairman of the Building Committee, Mr. Ball, is in charge.

The Superior Auto Parts Co., 221 Plane Street, Newark, has filed notice of organization to manufacture automobile parts and other mechanical equipment. George Murphy and Carl Bettinger head the company.

New England

BOSTON, July 11.

The bulk of the machine tools moved the past week was sold by one concern. The purchase of tools by the Bigelow-Hartford Carpet Co., to replace equipment at its Clinton, Mass., plant, which was split up among three machinery houses, is the outstanding feature of the market. Among the tools taken were three Flather lathes, 24 x 26 in., 18 x 21 in., and 14 x 6 in.; a 16-in. shaper, 3-ft. radial drill, 36-in. x 16-ft. Liberty open side planer, and a Milwaukee milling machine, as well as some wood-working equipment. The company did not cover on grinders, drills, and other small tools on which it inquired. The Eastern Machine Co., Revere, Mass., bought one ¾-in. turret lathe, one 6-spindle and one 2-spindle drilling machine, while a Lancaster, N. H., interest took an Ohio milling machine. Other purchases for the week include a No. 25 Ohio milling machine by the Dennison Mfg. Co., Framingham, Mass., paper products; a used 6-spindle drilling machine by a Providence manufacturer; 6-spindle drilling machine and a No. 2 Southworth screw machine by the Rhode Island Machine & Tool Co., Woonsocket, R. I.; one 4-spindle drilling machine by a Cambridge, Mass., firm, and one 4-ft. Dreses plain radial drill by a local concern.

The Maine Central Railroad Co. has not covered on the lathe, shaper and drill on which it inquired recently and appears in no hurry to do so. The General Electric Co., West Lynn, Mass., which some time ago issued a list, bought only a few lathes against it. The other equipment needed was taken from other plants belonging to the company. School business is coming in slower than anticipated. The Worcester Consolidated Gas Co., Worcester, is in the market for a 12-in. grinder, a pipe machine and other equipment. Otherwise, inquiries are scarce. The demand for machine tools in Connecticut is unusually quiet. It is estimated approximately 67 per cent of the iron and steel-working industries of that State are closed for inventories, repair or other reasons, for periods ranging from 10 days to three weeks. Not in the history of the trade has the demand for machinery, tools, hardware and other iron and steel products been as light as it is to-day. Massachusetts appears relatively better off industrially than other New England States, but gaps are beginning to open and it is conceded by many that conditions will be quieter before the close of July. Leading machinery making interests of Boston, who some months ago contemplated purchasing machine tools but withdrew from the market because prices at that time were considered out of line with other commodities, this week again sounded the market only to immediately withdraw tentative inquiries on prices named by dealers.

The Wood Worsted Mills, a subsidiary of the American Woolen Co., asked prices on a 50-ton crane, but has decided not to purchase at this time. The Amoskeag Mfg. Co. is still negotiating on its 60-ton crane with a view to securing lower quotations. The difference between original and present bids made by crane interests in some instances is $6,000 to $7,500.

Stone & Webster, Boston, acting for the Ford Motor Co., has purchased four 2000-hp. hydraulic turbines for the proposed Green Island, N. Y., hydro-electric plant from the Allis-Chalmers Mfg. Co.

The Norton Co., Worcester, Mass., and the American Emery Wheel Works, Providence, R. I., have announced a reduction approximating 10 per cent in grinding wheels.

The adoption by manufacturers of machine screws of the National Standard Thread Schedule is a widely discussed topic in New England machine shops. Under the new schedule the old sizes, 14-20, 20-18 and 24-16 are eliminated and ¼-in.-20, 5/16-in.-18 and ⅜-in.-16 substituted. The discontinued sizes are considered specials except when

ordered in quantity lots. The new schedule also provides fine threads which sell at the same price as the standard.

The William E. Quinn Co., Northampton, capitalized for $50,000, has been granted a Massachusetts charter to manufacture saws, tools, machinery and supplies. Harry M. Chamberlain, Bardwells Ferry, is president, and Albert G. Beckman, Northampton, treasurer.

Harry L. Donahue, 1460 Tremont Street, is president and treasurer of the Daniels Mfg. Co., Boston, with a capital of $600,000, recently incorporated under Massachusetts laws to manufacture fastening devices. Charles T. Mackay, 95 H Street, South Boston, and Edwin J. Giblin, 17 Mt. Vernon Street, Dorchester, Boston, are interested in the company.

The General Electric Co., West Lynn, Mass., will erect additions to buildings Nos. 34, 36 and 51.

The H & H Foundry & Machine Co., Stamford, Conn., last week was damaged by fire to the extent of $25,000.

The city of Worcester, Mass., is in the market for two electrically driven pumps of 60 gal. per min. capacity each.

Plans are being drawn for a one-story, 170 x 300 ft. plant for the Meisel Press Mfg. Co., 944 Dorchester Avenue, Dorchester, Boston..

A Massachusetts charter has been given the Hygienic Coin Lock Co., Boston, capitalized for $100,000. Isaac J. Segel, 30 Warren Avenue, Malden, is president and treasurer.

The Shambow Shuttle Co., Woonsocket, R. I., manufacturer of shuttles and other textile mill equipment, is having plans prepared for a new three-story factory, 84 x 158 ft., on North Main Street, to cost about $100,000 with equipment. Lockwood, Greene & Co., Boston, are architects and engineers.

The Economy Electrical Mfg. Co., New Haven, Conn., has been incorporated with a capital of $25,000 by A. I. Lapides, S. D. Pardoll and S. Jacobson, 1 Lawrence Street, to manufacture electrical equipment.

Mercer Brothers, 280 Main Street, Nashua, N. H., have had plans prepared for a new two-story automobile service and repair works, 100 x 100 ft., to cost about $100,00 with equipment. Hutchins & French, 8 Winter Street, Boston, are architects.

The United States Screw & Stamping Co., Worcester, Mass., has been incorporated with a capital of $25,000 to manufacture screw products, metal stampings, etc. Robert C. S. Whittemore is president, and Henry Beland, 26 Baker Street, treasurer.

The Columbia Enamel Mfg. Co., Hartford, Conn., has filed notice of dissolution under State laws.

The David Brown Co., Foster Street, Lawrence, Mass., manufacturer of bobbins and other textile mill equipment, has awarded a contract to the E. W. Pitman Co., Bay State Building, for a two-story and basement addition, 40 x 104 ft., to cost about $40,000.

The Electrical Specialty Mfg. Co., 51 Beaufort Street, Providence, R. I., has filed notice of organization to manufacture electrical equipment. W. B. and L. J. Hopkins head the company.

The Arrow Tool & Mfg. Co., 200 Cannon Street, Bridgeport, Conn., formerly known as the Arrow Tool Co., will devote a large portion of operations to the manufacture of a new electric expansion plug, and which will be placed on the market at an early date. Other departments of the works will manufacture tools, dies and special machinery. H. S. Forsberg is president.

The Essandell Tire Co., Boston, has been incorporated with a capital of $250,000 to manufacture automobile tires. Franklin G. Saylor is president, and George A. Lufkin, 173 Shirley Avenue, Revere, Mass., treasurer.

Otto Fichtenmayer & Brother, New Bedford, Mass., operating a forge works at 326 South Water Street, have awarded contract to Samuel Gray & Son, Pine Street, for a two-story shop, 44 x 60 ft., for automobile repair work.

Buffalo

BUFFALO, July 11.

New construction at the works of the Buffalo Forge Co., 490 Broadway, Buffalo, plans for which were recently filed, will consist of remodeling the mechanical fan shop, increasing the department to a total of 64,235 sq. ft. of floor area, including about 23,800 sq. ft. of galleries for assembling operations.

The Ideal Electric Dumbwaiter Co., Buffalo, has been incorporated with a capital of $50,000 by G. A. Irvin, J. D. Hillery and J. A. Wechter to manufacture electrically-operated dumbwaiters and other lift equipment. It is represented by Sullivan, Bagley & Wechter, Chamber of Commerce Building.

Fire, July 7, destroyed a portion of the plant of Corning Brick, Terra Cotta & Tile Co., Corning, N. Y., with loss estimated at about $40,000, including equipment.

The new plant to be erected by the Mayer Coating Machines Co., 205 St. Paul Street, Rochester, N. Y., on Scottsville Road, will be one-story, 125 x 320 ft. G. Morton Wolfe, 1377 Main Street, Buffalo, is architect. G. W. Mayer is head.

The Atmospheric Nitrogen Co., Syracuse, N. Y., affiliated with the Solvay Process and Semet-Solvay companies, is planning to place the first unit of its new plant in service early in August, with construction work up to the present time representing an investment of about $3,000,000. Tentative plans provide for the erection of a second unit at an early date.

The Abott Electric & Supply Co. has incorporated for $10,000 to manufacture electrical appliances and do electrical contracting. William F. Burket, 61 Eaglewood Avenue, Buffalo, is the principal stockholder.

The Houde Engineering Corporation, 1392 West Avenue, Buffalo, will erect a factory to cost $50,000 for the manufacture of shock absorbers.

Philadelphia

PHILADELPHIA, July 11.

Frank P. Florentine, Park Avenue, Philadelphia, has awarded a contract to the Stewart Brothers Co., 2526 North Orkney Street, for a one-story machine shop on Park Avenue, for automobile parts manufacture and repair work.

The Electro Sherardizing Co., Philadelphia, has been incorporated with a capital of $25,000 to manufacture metal specialties. J. E. Gibson, Wood-Norton Apartments, is treasurer.

Davis Brothers, Inc., Philadelphia, is being organized by E. P. and Edward L. Davis to manufacture railroad spikes, bolts, nuts, etc. Application for a State charter will be made on July 25. Bayard Henry, Land Title Building, represents the company.

The Safety Oiling System, Inc., Philadelphia, has been incorporated with a capital of $100,000 to manufacture mechanical oiling devices and oiling systems. Arthur Baruch, 2064 North Sixty-second Street, is treasurer.

A one-story power plant will be constructed by the Logan Baking Co., Philadelphia, in connection with the erection of its new three-story and basement plant, 50 x 125 ft. T. Frank Miller, 1012 Walnut Street, is architect in charge of the work.

The McFarlan-Philadelphia Co., Philadelphia, is being organized to manufacture automobile and aeroplane parts and equipment. Application for a State charter will be made on Aug. 1. The company is represented by Illoway & Felix, Bulletin Building.

The F. J. Stokes Machine Co., Seventeenth and Cambria streets, Philadelphia, has disposed of its two-story plant, 45 x 195 ft., to W. H. Stehle, for $42,500. No announcement has been made by the new owner regarding character of operations in the future.

The McFarland-Meade Co., Seventieth Street and Kingsessing Avenue, Philadelphia, manufacturer of windows, etc., has filed plans for a new one-story metal shop, 100 x 125 ft.

Property of the Winfield S. Barnes Co., Twentieth and Erie streets, Philadelphia, manufacturer of automobile equipment, steel products, etc., will be sold at once by the receivers, Winfield S. Barnes and Otto R. Heiligman, the disposition to include the plant and entire machinery installation.

The Tri-Plex Safety Razor Co., Inc., Philadelphia, has been incorporated with a capital of $200,000, to manufacture safety razors, knives, etc. The incorporators are Herman and Melvin Perlish and Edward Somerson, care of the U. S. Corporation Co., Commonwealth Building.

A total of 60,245 lb. of mild steel angles, 1½ x 1½ x ¼ in., and 1069 bars, 24 ft. lengths, will be offered at public sale at 10 a. m., July 18, at the warehouse of the Harold McCalla Co., Beech Street and Columbia Avenue, Philadelphia.

Morris Jones, Inc., Philadelphia, is being organized by Morris Jones and associates to manufacture automobile engines, tractor equipment, etc. Application for a State charter will be made on July 20. The company is represented by John Weaver, Commercial Trust Building.

The Lane Signal Accessories Co., Sayre, Pa., has been incorporated with a capital of $500,000 by William H. Lane, Harry S. Fish and Raymond L. Gebhardt, Sayre, to manufacture signal devices and other electrical and mechanical equipment.

Fire, July 1, destroyed a portion of the plant of the Read Machinery Co., Inc., York, Pa., with loss, including surrounding property, estimated in excess of $80,000.

Fire, July 5, destroyed the machine shop of the Charles H. Nadig Mfg. Co., 14-24 North Fourth Street, Allentown, Pa., with loss reported in excess of $40,000. The factory

is one and two-stories, 60 x 100 ft., with wing, 49 x 50 ft., occupied as a foundry. Charles H. Nadig is head of the company.

Chicago

CHICAGO, July 11.

Although neither the Illinois Central nor the Rock Island have yet bought against their lists, the latter road has issued an inquiry for two additional machines, a 36-in. x 36-in. x 12-ft. planer and a 26-in. shaper. The Chicago, Indianapolis & Louisville has asked for prices on a punch and shear. Buying remains at a low ebb, but inquiries from industrial companies are more numerous than for some time. The Automatic Electric Co., Chicago, is in the market for a two-spindle and a four-spindle plain-bearing drill press, 15-in. drill press, 20-in. wheel and lever feed drill press, No. 3 Niagara, or equivalent, inclinable power press No. 4 Niagara, or equivalent, inclinable power press, hand milling machine, motor-driven filing machine, an automatic tappng machine, a No. 42 and a No. 82 Niagara lever press, combination surface, disk and tool grinder, two Wells No. 140, or equivalent, hand screw machines, a Burke sensitive motor-driven drill, and a 2-ft. or 6-ft. brake. These machines are for delivery at the company's Fort Dodge, Iowa, plant. The Acme X-Ray Co., Chicago Avenue and Orleans Street, Chicago, has taken figures on the following machines: A 16-in. shaper, No. 2 milling machine, 14-in. x 6-ft. engine lathe, 20-in. drill press, an 11-in. speed lathe, hack saw, punch press, squaring shear and a gas tempering furnace. Of this list the shaper and the milling machine are understood to have been bought, used machines having been purchased. The Aerial Cutlery Mfg. Co., Marinette, Wis., is in the market for three polishing and buffing lathes, a balancing tool and a grinding wheel stand with protection hood.

The Federal vocational schools which are being started throughout the country by the Government are expected to result in machine tool business. Such a school has been established at Jacksonville, Ill., and one is contemplated at Valparaiso University, Valparaiso, Ind.

The prospective settlement of a definite wage scale for building mechanics has tended to increase building in Chicago. Permits were issued in June for 675 buildings involving a frontage of 18,510 ft. and a cost of $7,484,200, as compared with 428 permits, 11,076 ft. frontage and $2,967,750 for May, 1921, and 315 permits, 10,468 ft. of frontage and $6,836,900 for June, 1920.

The Hudson Battery Corporation, manufacturer of electrical supplies, 155 North Market Street, Chicago, has purchased from G. S. Blakeslee & Co., makers of dishwashing machines, a one-story plant, 115 x 234 ft., at 2856 Quinn Street, and will occupy the building.

The Curtis Leger Fixture Co., 1119 West Jackson Boulevard, Chicago, manufacturer of display fixtures, has purchased 300,000 sq. ft. of land on Eighteenth Street, extending from Forty-sixth Court to Forty-seventh Avenue. It will erect a series of one and two-story buildings when building conditions permit. These structures will be occupied by itself and its allied corporation, the National X-Ray Reflector Co., 235 West Jackson Boulevard. The first units to be constructed will cost $400,000.

The Universal Battery Co., 3410 South La Salle Street, Chicago, will occupy a one-story plant, 50 x 138 ft., 3419-25 Wentworth Avenue, the contract for the construction of which has been awarded.

E. J. Sekt, 64 West Randolph Street, Chicago, has been granted a permit to construct a one-story garage 150 x 173 ft., 1238-52 Morse Avenue, to cost $70,000.

The plant of the Mann Corporation, Bradley, Ill., has been purchased by M. C. Rosenbaum and Henry Borenstein, New York, who will utilize it in conjunction with an Eastern factory for the manufacture of ironing machines and other household appliances. The new owners are contemplating the erection of an assembling building at the Bradley plant this fall.

The Keith Furnace Co., care R. S. Keith, Court Avenue, Des Moines, Iowa, has taken bids on the construction of a one and two-story plant, to include a foundry, on East Twenty-sixth Street, near Dean Avenue, estimated to cost $150,000.

The Twin City Motor Bus Co., 344 North Exchange Street, St. Paul, Minn., has taken bids on the construction of a one-story garage and office building, 120 x 150 ft., to cost $40,000.

The Miller, Bryan, Pierce Co., 225 River Street, Aurora, Ill., manufacturer of typewriter supplies, is planning the construction of a three-story plant, 60 x 150 ft., to cost $160,000.

The Edward Valve & Mfg. Co., East Chicago, Ind., is completing plans for a new structure to replace the plant destroyed by fire several months ago. The new building will cost $400,000.

The Lewis Motor Mfg. Co., Chicago, care of Ralph C. Harris, architect, 190 North State Street, has plans under way for the erection of a new one and three-story plant at Peru and North Streets, Michigan City, Ind., to cost about $200,000 with machinery.

The Great Western Sand Blast Co., 833 South Oakley Boulevard, Chicago, has been chartered under State laws to manufacture sand blast equipment. The incorporators are Fred W. Turner and Frank Silverthorn.

Fire, July 1, destroyed a portion of the plant of the Paxton & Vierling Iron Works, Seventeenth Street, Omaha, Neb., with loss estimated at about $50,000.

The Gurney & Selleck Co., 122 Michigan Boulevard, Chicago, has been organized to manufacture furnaces and kindred equipment. It is headed by Theodore G. Selleck and Richard K. Gurney.

The Swing-a-Wing Mfg. Co., Madison, Minn., has been incorporated with a capital of $50,000 by Benjamin Schmaal, Frank B. and William B. Lessman, Madison, to manufacture gates, and other iron and steel products.

The American Wire Fabrics Co., Western Avenue and 136th Street, Blue Island, Chicago, has completed plans for a new one-story galvanizing plant, 45 x 145 ft., to be constructed in conjunction with a new warehouse and both structures are estimated to cost about $100,000. E. M. Newman, 80 West Washington Street, Chicago, is architect.

The St. Paul & Sault Ste. Marie Railway, St. Paul, Minn., has been granted permission to issue notes for $2,400,000, the proceeds to be used in connection with the purchase of new equipment, estimated to cost $3,303,685.

Baltimore

BALTIMORE, July 11.

Fire, June 30, destroyed the power house and pumping plant of the Dorchester Water Co., and the plant of the Cambridge Ice Co., Cambridge, Md., with loss estimated at about $70,000.

The Victor Piston Ring Co., 608 American Building, Baltimore, recently incorporated with a capital of $500,000 to manufacture piston rings and other automotive products, is planning for the acquisition of an existing building for its proposed works, with adjoining property for expansion. Jackson Brandt is president and J. E. Butler, manager.

The Adamantex Brick Co. of Maryland, Baltimore, has been incorporated by officials of the Adamantex Brick Co., Brooklyn, N. Y., with capital of $1,000,000, for the establishment of a new plant at Arbutus, near Baltimore, to manufacture sand-cement bricks. The initial works will be equipped for a daily capacity of over 200,000 bricks, and will comprise 10 machines with auxiliary equipment. It is proposed to have the plant in service in about 60 days. Louis F. Ducker, president of the Brooklyn organization, will act in a similar capacity for the Baltimore subsidiary. Blum & Makover, Equitable Building, Baltimore, are corporate representatives.

The National Utensil Mfg. Co., 207 Guilford Avenue, Baltimore, has been incorporated with a capital of $125,000 to manufacture metalware, heating devices, etc. Henry L. Mendal is president and W. J. Demar, vice-president.

The Automatic Bearing Machine Co., Wilmington, Del., has been incorporated with a capital of $400,000 to manufacture machinery and tools. It is represented by Harry K. Hoch, Delaware Trust Building.

The Laurel Ice Co., Laurel, Del., has completed plans for a new ice-manufacturing and refrigerating plant, to be ready for service early in the fall.

The National Fibre & Insulation Co., Yorklyn, Del., has filed plans for the erection of a two-story addition, 140 x 160 ft. Warren Marshall is president.

The Darco Corporation, du Pont Building, Wilmington, Del., a subsidiary of the Atlas Powder Co., has disposed of a bond issue of $1,500,000, the proceeds to be used for a new carbon refining plant in Louisiana. A site is being selected in the northern part of the State, and initial machinery will provide for a capacity of 6000 tons per month. W. J. Webster is president of both companies.

The Board of Harbor Commissioners, Wilmington, Del., will install freight handling and conveying machinery and other equipment at the new docks and terminal to be constructed on the waterfront, bonds for which have been issued. Bids have been taken for the dock and warehouse construction, the lowest figure being received from the Hughes-Foulkrod Co., Commonwealth Building, Philadelphia, at $1,311,000. The available appropriation is $1,800,000.

The Common Council, Dover, Del., is having plans pre-

pared for the construction of a new municipal power plant. W. E. S. Dyer, Land Title Building, Philadelphia, is engineer.

The Grottoes Foundry & Machine Co., Grottoes, Va., has been incorporated with a capital of $25,000 to manufacture machinery, castings, etc. Charles M. Walker, Grottoes, is president, and Edward C. Martz, Harrisonburg, Va., secretary.

The Norfolk & Western Railway Co., Roanoke, Va., will receive bids up to 12 noon, July 20, for 18 steel coil engine truck springs; 200 bevel soft steel bars; 120 rods of wire fencing; 2500 steel angle bars, and 100,000 dating nails, with electrical material and apparatus. J. H. Clemmitt, Roanoke, is purchasing agent.

The Broadfoot Iron Works, Wilmington, N. C., is arranging to rebuild the main building at its plant, recently destroyed by fire.

Milwaukee

MILWAUKEE, July 11.

While tangible evidence of a revival in machine tool business is slow in development, nevertheless manufacturers in this market believe they are able to discern some improvement. The betterment is principally in inquiries, which were almost lifeless the latter part of May and during June. A small volume of orders is being received, but almost they invariably are for single machines. Production remains at a low point, as much of the business coming in can be filled promptly out of stock. Competition from used tools continues very strong, many of these being machines never set up for practical use, but despite their newness are available at a very great price advantage under new tools.

The Highway Trailer Co., Edgerton, Wis., sustained an estimated loss of $100,000 by fire of unknown origin which destroyed the main factory building and assembling floor, erected about 10 months ago. It was 188 x 950 ft., of brick and mill construction. Only a small part had been equipped, but this is a total loss. It is planned to start work on a new building as soon as insurance adjusters have completed their work. The original factory, now used mainly as a machine shop, was saved. James W. Menhall is president and general manager.

The Reliance Oil Burner Co. of Saukville, Wis., has been incorporated with a capital stock of $250,000 to manufacture heating devices using kerosene as fuel. The incorporators include Fred C. Keller and R. A. Sharp, officials of the Milwaukee Reliance Boiler Works, Milwaukee, and H. J. Cary, Saukville, Wis. The new concern takes over all of the assets and liabilities of the Ozaukee Heater Co. and the Ozaukee Sales Co., a subsidiary. The present plant will be continued in operation and later will be enlarged as demands require. Mr. Cary will remain in charge of the Saukville factory.

The Board of Education, Spooner, Wis., has engaged W. L. Alban, architect, St. Paul, Minn., to design a junior high and vocational training school, to be erected during the fall at an estimated cost of $100,000. W. C. Crocker is clerk of the board.

The Grant Furniture Co., 502-508 Sixth Street, Racine, Wis., will build a new three-story factory, 80 x 120 ft., of brick and mill construction, estimated to cost $65,000. The architect is D. R. Davis, Racine. Work will begin about July 20. Considerable wood-working machinery, with individual electric motor drive, will be required.

The Pelton Steel Co., 672 Kinnickinnic Avenue, Milwaukee, has disposed of its plant site, 300 x 720 ft., to the Milwaukee Electric Railway & Light Co., which requires the acreage for extensions of its car barns and shop adjoining the works. The transfer, however, will be made piecemeal and the operation of the foundry will not be affected for some time. The Pelton company intends to purchase a new site, probably in the West Milwaukee manufacturing district, and erect a new foundry between now and the time the Electric company finally takes possession. William H. Schuchardt is vice-president and general manager of the Pelton company.

The Dependable Baggage Co., Stanley, Wis., has started work on the reconstruction of its factory, which was gutted by fire March 3. The new building will be 100 ft. sq., of brick and mill construction, and will be equipped almost entirely with new machinery for manufacturing trunks, cases, luggage carriers, garment hangers and other wood specialties. J. F. Grubb is general manager.

The Hartenberger Double Wall Silo Co., Sheboygan Falls, Wis., has decided to relocate in the city of Sheyboygan, occupying a new factory on Calumet Drive recently erected by Alex Locke. It has increased its capital stock from $50,000 to $125,000 to accommodate the transfer and enlargement of the operation. Robert Hartenberger is president and general manager.

The Sunbeam Domestic Appliance Co., Milwaukee, manufacturer of electrically operated household devices, has moved into its new factory, containing 16,000 sq. ft. Oscar F. Fischedick, 1379 Richland Court, Shorewood, Milwaukee, is vice-president, treasurer and general manager.

The W. C. Dicke Motor Co., Manitowoc, Wis., has awarded contracts for a brick and concrete garage, 60 x 120 ft., with a basement, 45 x 60 ft., to be ready about Oct. 1. The machine and repair shop will occupy a space 38 x 75 ft. Equipment is now being purchased.

Morris Wald, president U. S. Radiator Co., 185 Fourth Street, Milwaukee, has engaged A. N. Strack, 693 Marshall Street, local, to design and erect a machine shop, 50 x 122 ft., two stories, on Twelfth, near Walnut Street, for general machine and automotive repairs and service. Work will start at once.

The Moloch Co., Kaukauna, Wis., manufacturer of automatic stoking devices, power hammers, etc., has completed the transfer of its operation to its new plant, erected at a cost of $200,000. The machine shop was moved early in June, and the foundry was transferred July 1, resuming operations July 5. Each building is 100 x 150 ft., of brick and steel. The Moloch Co. is a consolidation of the Kaukauna Machine Works Co. and the Moloch Stoker Co.

The Marathon Electric Mfg. Co., Wausau, Wis., manufacturer of small electric-motored appliances and devices, contemplates the erection of a one-story brick and steel addition, 40 x 180 ft., to be equipped as a machine shop, assembling floor, shipping room, offices, etc. The work is in charge of Oppenhamer & Obel, architects, Wausau.

The Co-Operative Axe & Tool Co., Chicago, with branch factory at Cleveland, is establishing a second branch plant at Green Bay, Wis. A lease has been taken of an existing three-story building, which will be equipped for machine work, manufacture of handles, etc. For the present the supply of forgings will be made under contract with the Green Bay Drive Calk Co., but later a forge shop and a steel refining plant will be added. The present installation includes polishing and electro-plating equipment, grinders, etc. E. D. Woods, general manager, will supervise the initial operations.

The Zwebell Brothers Co., 482 Milwaukee Street, Milwaukee, has let the general contract to the Northwestern Bridge & Iron Co., Milwaukee, for erecting a one-story brick and steel shop building, 60 x 110 ft., at Slinger, Wis., to manufacture vulcanizing machines, retreading devices, tire molds, and similar specialties. The architects are Judell & Bogner, Milwaukee.

The Board of Industrial Education, LaCrosse, Wis., will soon be in the market for miscellaneous equipment for the Longfellow vocational training institute, which is being remodeled and enlarged at a cost estimated at $50,000. Wells E. Bennett, local architect, is in charge.

Detroit

DETROIT, July 11.

Within the last year the machine tool market in the Detroit district has declined, one might say, from bucketfuls to thimble measures. Dealers are no longer in a position where they merely take orders, but instead they are "prospecting" for them, in all that the term implies. And before any selling can be done, considerable prospecting has to be done. A review of war-time expansion of both plant space and equipment offers little to cause optimism unless one looks beyond the immediate future.

It is probably true that a majority of plants in the city and State are equipped for future business needs during a period of at least five years, unless there comes another feverish demand for products such as characterized the last three or four years. Such a demand is not forecasted, and consequently dealers are becoming convined that the increase in business, which a short time ago was confidently looked forward to, will be very gradual and the needs for equipment remain moderate for a long time.

Whereas not long ago machines, such as turret lathes, drill presses and other bulky equipment, were sold in "squadrons," it is probable that during the next year, at least, they will be sold one at a time, here and there, and the field will have to be carefully canvassed. It is certain that wherever a machine is sold, the demand will be for every element of service that the manufacturer and dealer can give.

The demand to "deliver whatever you have that can be used on this job" now is changed to "look over my problem first and then deliver what I need to do this work most efficiently and at the lowest cost. If you can't solve my problem to the best possible advantage, I'll have to look elsewhere." This is an experience already widely met with by dealers and manufacturers selling machine tools to automotive parts industries.

When the automotive industry greatly increased the range of possibility in the machine tool field and demanded more specialization, owing to the keen competition for quantity production, the result was that specialization of machines was carried to great lengths and at great cost. Production engineers leaned toward special equipment that would make possible rapid production with the simplest possible operations.

Tools for these special machines were made in the tool rooms of the factories, as required, and as a result were extremely expensive. The expense of custom-built machinery and tools has been much greater than was realized.

But now the time has come when these items of expense must be closely examined. It is probable that automotive production engineers will turn around and demand less specialized machinery and tools, which may be had at less initial cost. Consequently it is probable that we will see machine manufacturers standardizing their products to some extent, at least in connection with the automotive field. The tool manufacturers will also discover a demand for a more standardized line of tools.

Whatever the type of demand that may develop the next year or so, there can be no doubt that manufacturers and dealers must look almost entirely to replacements for their business. It is certain that as much effort will have to be expended in selling one machine as was expended to sell a "flock" of them a short time ago.

According to one dealer in Detroit, the sale of machine tools the last three or four years has been twice as great as it would have been normally. He says that if he can sell during the next year or two 50 per cent of the number of machines sold in war time he will be selling 25 per cent more than he sold five or six years ago.

A great many of the smaller machine shops, which were turned exclusively to automotive parts production during the period of great demand, have been left high and dry by the falling off in the demand for automotive parts. Many of these are turning to other lines of production. This will create a demand for equipment changes, which should result in some business.

The brass-working industry in Detroit and Michigan is gaining. There is a field here for machine tool business that should become richer as time progresses. In fact, there are probably many such fields in Detroit and Michigan that have not yet been touched.

Meanwhile, dealers and manufacturers' agents are getting their organizations in shape, with particular regard to the increased sales engineering facilities which they will require in future, and are establishing service policies, It is observable that many dealers and agents are enlarging their stocks and equipment to make a good showing in the fight for business that is just beginning.

The Illinois Tool Works, Chicago, will soon start work on the construction of additional manufacturing units, duplicating the present plant, at Marysville, Mich. It has more than 100 men working at the Marysville works and the demand for its product is so brisk that various departments are operating day and night shifts. The company makes steering gears, oil pump spiral driven gears, oil pump vertical shaft assembly, speedometer drive pinions and gears, tools, jigs, fixtures and gages.

The Michigan Agricultural College, East Lansing, Mich., will erect a power plant, one story, 50 x 136 ft.

The Acme Chair Co., Reading, Mich., contemplates building a new factory with 80,000 ft. of floor space, and a 300-kw. power plant, at a cost of about $250,000, complete.

The Ann Arbor Mfg. Co., Ann Arbor, Mich., has been organized by Francis L. Lapointe, president, and David A. DeLong, secretary, with a capital stock of $10,000 to make automobile accessories and household specialties. Mr. Lapointe is also president of the American Broach & Machine Co.

The Utility Compressor Co., Adrian, Mich., has started construction of a new plant. It will have a frontage of 240 ft., with wing 70 ft. long paralleling the Wabash Railroad tracks.

The Ross Valve & Mfg. Co., Detroit, has been organized with a capitalization of $20,000 by C. A. Ross, 1263 West Grand Boulevard, C. C. Rosser and S. J. Cameron, to manufacture valves and other mechanical devices.

Bids will soon be asked by L. J. Heeman and F. G. Strauss, architects, 30½ West Pike Street, Pontiac, Mich., for a new one-story foundry, 40 x 50 ft., to cost about $30,000. The name of the owner will be announced at an early date.

The Dennis Wrench Co., Detroit, has been chartered under State laws to manufacture wrenches and tools, and operate a general machine works. The incorporators are Alva L. Dennis, 4081 Seyburn Avenue; A. L. Milham, and Harold E. Hotchkiss.

The Cheney Talking Machine Co., Grand Rapids, Mich., manufacturer of talking machines and now occupying a portion of the former plant of the Berkey & Gay Furniture Co., has tentative plans under consideration for a new plant on local site. No definite time has been fixed for the construction and the project is still in a preliminary stage.

The Regenerator Co., Detroit, has been chartered under State laws to manufacture carburetors, heating equipment, etc. The incorporators are Frank T. Armstrong, G. B. Sayre, and Robert D. Nesbitt, 607 Blaine Avenue.

The Angle Steel Stool Co., Otsego, Mich., is considering the erection of a new plant at Plainwell, Mich., and negotiations are under way for a local site. The initial unit, tentative plans for which have been prepared, will be 70 x 300 ft., and will provide for large increase over the present production. It is planned to remove the existing works to the new location.

Pittsburgh

PITTSBURGH, July 11.

The stagnation in the machinery market still is unbroken. Machine tool dealers report occasional sales of individual tools, usually out of stock and for quick delivery. There are no inquiries from the big steel companies in this district and, while there has been a material improvement in the financial standing of the railroads as a result of economies effected through the wholesale dropping of men and there is a likelihood of further savings from lower wage rates, it is generally expected that it will be at least a couple of months before the carriers will revive old inquiries. The Shepard Electric Crane & Hoist Co., through its Pittsburgh office, has secured a 5-ton monorail hoist and a 2-cu. yd. grab bucket monorail hoist for the Pittsburgh Screw & Bolt Co., and a 1-ton coal hoist for a Youngstown high school. The International Nickel Co. has awarded the Mesta Machine Co. seven gear drives for its new plant at Huntington, W. Va., and also has placed two tilting tables and three roll lathes, the latter with a Pittsburgh district manufacturer. The Duquesne Slag Products Co. is in the market for a 2-ton electric hoist with motor driven trolley. W. S. Read is purchasing agent for this company.

The Crane Co., 636 South Michigan Avenue, Chicago, manufacturer of pipe, fittings, steam specialties, etc., has awarded a contract to the Bates & Rogers Construction Co., 37 West Van Buren Street, for its new pipe and pipe-bending shop at Thirty-fourth Street and the Allegheny Valley Railroad, Pittsburgh, with new warehouse adjoining, It is said that the new plant will cost about $800,000.

Fire, July 3, destroyed the four-story, brick building at Fourth Avenue and Fancourt Street, Pittsburgh, occupied by the Electrical Mfg. & Repair Co., the Raylo Corporation and other industrial interests, with total loss estimated at $50,000.

The Wellsburg Refrigerating Co., Wellsburg, W. Va., has been incorporated with a capital of $25,000 by W. J. Harvey, J. O. Fisher and John R. Elson, Wellsburg, to manufacture refrigerating apparatus.

The Lovill-Dix Co., Mount Airy, W. Va., is arranging for the erection of a new cold storage and refrigerating plant.

The National Pump & Mfg. Co., Wheeling, W. Va., has been incorporated with a capital of $750,000 by John L. Kirkland and W. S. Romaine, Wheeling, to manufacture gasoline pumping equipment. The corporate agent is the Delaware Registration Co., Ford Building, Wilmington, Del.

The Cosmopolitan Mfg. Co., White Sulphur Springs, W. Va., recently organized with a capital of $25,000, will operate a local plant for the manufacture of spark plugs and will purchase steel and brass rods, wire and other products. G. P. Brown is president, and W. M. Sullivan, vice-president.

The Welch Automobile Co., Welch, W. Va., has awarded a contract to the King Lumber Co., Charlottesville, Va., for a new three-story service and repair building, estimated to cost about $50,000.

The Buckhannon Light & Water Co., Buckhannon, W. Va., will commence the erection of the superstructure for its new electric power plant at an early date. Leo Hudson, 808 Wabash Building, Pittsburgh, is engineer. Enoch Bellis is president.

Cleveland

CLEVELAND, July 11.

The McKinley School, Canton, Ohio, has issued an inquiry for about 25 machine tools and quite an assortment of small tools for machine shop equipment for the manual training department, and is also inquiring for complete equipment for a foundry, forge shop and electrical shop. Bids will be received July 29. An inquiry has come from Detroit for 40 to 50 automatic screw machines, but it is stated that the purchase is contingent on the placing of

a large pending order for automobile parts. With the exception of these inquiries the market is dull, although manufacturers of automatic screw machinery report an improvement in single tool inquiries. Sales by local dealers are limited to single tools. Several recent inquiries, involving numerous machines, have not yet resulted in orders. The Empire Rolling Mill Co., Cleveland, has an inquiry out for a 10-ton crane for its new galvanizing department. Among orders placed the past week was one for two 14-in. lathes for the Ohio State University, Columbus, and another for a No. 6 vertical milling machine, purchased by the Erie Stove & Mfg. Co., Erie, Pa.

The following are the principal items on a list issued by the McKinley School, Canton:

Four 14-in. engine lathes.
Seven 12 or 13-in. engine lathes.
One 16-in. plain shaper.
One 16-in. universal shaper.
One 3-in. radial drill.
One 10 x 30-in. cylindrical universal grinder.
One universal milling machine.
One vertical milling machine.
One universal tool room grinder.
One 20-in. upright drill.
One hacksaw.
One wet tool and drill grinder.
One large and one small arbor press.
One dry grinder.
One 2-ton elevating platform truck.
One portable floor hoist.

The Western Reserve Cotton Mills Co., Kent, Ohio, has had plans prepared by Lockwood, Green & Co., Hanna Building, Cleveland, for a three story mill for the manufacture of tire fabric. The project has been held up temporarily but it is expected that bids will be asked shortly. The estimated cost of the plant is about $300,000.

Stockholders of the Hydraulic Steel Co., Cleveland, upon recommendation of the directors, have rejected the plans proposing a merger with the Detroit Pressed Steel Co., Detroit. It was also decided to give up an option taken on the Detroit plant.

The Republic Electric Mfg. Co., 1820 East Eighteenth Street, Cleveland, has placed contract for the construction of a three-story factory and office building, 47 x 57 ft.

The City Council, New Philadelphia, Ohio, has decided to substitute electric for steam pumps at the municipal water works pumping station. City Engineer Arnold was instructed to prepare plans and estimates for the three pumps, each with a daily capacity of 750,000 gal.

Cincinnati

CINCINNATI, July 11.

Practically all of the larger machine tool manufacturing plants are closed. As most of these have made up sufficient stock to take care of needs, judged by the present rate of sales, for the next six months, it is expected that they will remain closed indefinitely. Skeleton forces of picked men are being maintained in the shops for experimental purposes and some greatly improved tools will be on the market within the next year. There has been very little activity the past week. None of the railroads at present are purchasing against their lists before the trade and a list from an aeroplane manufacturer involving approximately $60,000 worth of miscellaneous tools has been withdrawn for the time. A local frog and switch company purchased eight electric hoists the past week. Dealers report scattered orders for tools and a slight increase in inquiries.

The Venue Phonograph & Needle Co., Cincinnati, has been incorporated with a capitalization of $20,000 by Frank Herringer, Frank L. Gamble, W. G. Koch and Joseph W. Silver. While plans have not been completed, it expects to establish a local factory for the manufacture of phonographs and needles.

The Superior Oxy-Acetylene Machine Co., Hamilton, Ohio, has purchased a three-story building at the corner of South Seventh and Walnut streets. This was made in anticipation of future expansion, but will not be occupied at the present time. It is planned to make improvements to the present factory.

The plant of the Solar Metal Products Co., Columbus, Ohio, manufacturer of metal specialties, which has been merged with a Chicago concern, will continue in operation. The new company will be known as the Solar-Sturges Mfg. Co., with head offices in Chicago. C. R. LeSauvage is president and manager of the new concern.

The Clifton-Pratt Co., selling agent for foundry equipment and a general line of new and used machinery, 1224 West Eighth Street, Cincinnati, is in the market for the following used equipment: Two turbo-generator sets, three phase, 60 cycle, 440 volt; two 400-hp. Sterling water tube boilers; one 75-100 kw. unit, three phase, 60 cycle, 220 volt, direct connected to a Skinner, Ball or equal high speed engine; one 1000-hp. Cookson heater, steel buildings approximately 50 x 200-300 ft.

Indiana

INDIANAPOLIS, July 11.

The Pendergast Fence Co., Stillwater, Minn., has plans under way for a new one-story and basement factory on Division Street, Elkhart, Ind., estimated to cost about $25,000.

The American Generator Co., Poseyville, Ind., has been incorporated with a capital of $100,000 by E. D. Fletchall, O. E. Caudell and Valentine Bender, Poseyville, to manufacture electric equipment for lighting, heating and cooking. A branch of operation will be devoted to the manufacture of galvanized tanks and other metal equipment for farm service.

The Indiana Oil Refining Co., Columbus, Ind., will commence work at once on the superstructures for its new oil refinery on a site about three miles from the city. It will consist of five buildings, and with machinery is estimated to cost about $500,000. O. L. Bartlett is president.

The Charles A. Marks Mfg. Co., Elkhart, Ind., has been incorporated with a capital of $50,000 by Charles A. and John Marks and C. A. Thompson, Elkhart, to manufacture automobile equipment and other metal products.

The Mutual Ice & Coal Co., Columbus, Ind., recently organized, has plans under way for a new ice and cold storage plant to cost about $60,000. J. R. Dunlap is president and Courtney Moore, treasurer.

The Crown Fuel Saver Co., Richmond, Ind., has been incorporated with a capital of $50,000 by L. E. and A. H. Harter and J. W. Hansel, Richmond, to manufacture equipment and appliances for fuel saving.

The India Rubber Corporation, 310 West Ewing Street, South Bend, Ind., is completing plans for a two-story addition, estimated to cost about $50,000. W. W. Schneider, 120 South Main Street, is architect.

The Central South

ST. LOUIS, July 8.

The machine-tool business in this section is the quietest the trade has ever known. Most of the industries are closed and no new inquiries are out. The only hope lies in the railroad demand, and it is not known when that will manifest itself.

Fifty additional men were added on July 6 to the locomotive department of the Missouri Pacific shops at Sedalia, Mo.

The Scanlan & Haynes Piston Ring Co. 3001 LaSalle Street, St. Louis, has been organized by Daniel J. Scanlan, Jeremiah J. Hayes and Raymond J. Ambs, with a capital stock of $50,000 fully paid.

The Common Council, Marble Hill, Mo., has preliminary plans under way for the construction of a new municipal electric power plant, to cost about $50,000. C. Alexander, Lutesville, Mo., is in charge.

The Pennsylvania Tank Line, Third National Bank Building, St. Louis, is perfecting plans for an addition, to be equipped primarily for repairs to oil tank cars.

The Mayo Oil Service Co., Eleventh and Front streets, Ashland, Ky., is planning for the erection of a new local oil refinery. The company has recently been organized, with John C. C. Mayo as president and treasurer.

The Terrill Tire & Rubber Co., Clinton, Mo., is planning for the erection of a new two-story plant, 90 x 150 ft., estimated to cost about $65,000, including machinery.

The Curtis-Bentley Woodworking Co., Oklahoma City, Okla., has preliminary plans under way for the erection of buildings to replace its works recently destroyed by fire, with loss of about $500,000, including machinery. A new power house will be constructed.

The Universal Swinging Joint Mfg. Co., Chattanooga, Tenn., has plans under way for a new plant to manufacture flexible metallic pipe and pipe joints. The company was recently incorporated with a capital of $400,000. W. L. Mitchell and J. V. Brandon are heads.

The Farm Club Cold Storage Co., Clinton, Mo., recently organized, is planning for the erection of a new ice-manufacturing and refrigerating plant, estimated to cost about $50,000.

The Raines-Torstrick Co., Louisville, recently chartered, under State laws, will operate a local plant for the manufacture of automobile bodies, with department for general repair and rebuilding work. Verner V. Raines and Edward W. Torstrick, Louisville, head the company.

The Garfield Refining Co., Enid, Okla., has acquired

the properties of the Oil State Petroleum Co., the Penn-Oklahoma Oil Co., and the Healdton Oil Co., all operating in this district, with total acquisition valued at about $4,000,000. The new owner is planning for a number of improvements at the different refineries.

The Magnolia Petroleum Co., Duncan, Okla., has completed plans for the erection of two new one-story buildings at its refinery, 40 x 260 ft., and estimated to cost about $100,000 with equipment.

The Hermitage Marble Works, Nashville, Tenn., is planning for extensive development work in connection with quarrying operations. It has a tract of about 300 acres of coal lands. The installation will include grinding and crushing machinery, parts, etc. Lewis Butler is general manager.

The Missouri Farmers' Association, Kirksville, Mo., is planning for the erection of a series of new ice-making and cold storage plants. Two of the structures at Kirksville and Moberly, Mo., will be built at an early date.

The Missouri, Kansas & Texas Railroad Co., St. Louis, has plans under way for enlargements and improvements in its repair shops and engine houses at Houston, Fort Worth, Smithville and Waco, Tex. F. H. Ringer is chief engineer.

The Pacific Coast

SAN FRANCISCO, July 5.

The feature of the local market is an order being filled by a prominent interest for tools for shipment to New Zealand, involving mostly lathes and drilling machines. On the whole, there is a slightly better feeling in the trade, but the situation is by no means clarified yet. Movement of miscellaneous tools has been fair, and some prospects are in sight. The heavy supply of second-hand stock is still a serious obstacle to business in new machinery, and it is felt that the probable retirement of numerous small operators, by reason of insufficient business, will throw additional used materials on the market.

The Bethlehem Shipbuilding Co., San Fancisco, is arranging facilities at its local plant, as well as at the works at Alameda, Cal., for the manufacture of American-Diesel marine engines on a large scale. J. J. Tynan is general manager.

The Barley Motor Car Co., Kalamazoo, Mich., which makes Roamer cars, has purchased the business and equipment of the Roamer Motor Car Corporation, San Francisco, Cal., for a branch factory.

The B. H. Delay Aircraft Co., Venice, Cal., has been incorporated with a capital of $200,000 by B. H. and C. F. Delay, to manufacture aeroplanes and parts. It is represented by Francis Heney, 1009 Title Insurance Building, Los Angeles.

The S. P. Brick & Tile Co., Fresno, Cal., has been incorporated with a capital of $250,000 to manufacture brick, tile and similar products. A local plant will be established. The incorporators are H. W. Shields, Fresno; W. D. Trewhitt, Hanford, and L. E. Hayes, Exeter, Cal.

M. F. Marsh, Long Beach, Cal., has awarded a contract to Fred E. Tucker, 913 Olive Street, Long Beach, for a new one-story forge shop at 1322 Coronado Street.

The Owens Tire & Rubber Co., Euclid Avenue, Cleveland, is planning the erection of works at Los Angeles, estimated to cost close to $1,000,000. It is expected to give employment to more than 1000 men. Robert Owens is president of the company.

Fire, June 24, destroyed a large portion of the plant of the Swayne Lumber Co., Oroville, Cal., with loss estimated at close to $500,000, including machinery, etc.

The Anderson Ornamental Iron Works, 1143 San Pedro Street, Los Angeles, has filed notice of organization to manufacture iron products. Gustaf A. Anderson, 4516 Gramercy Place, heads the company.

Bagby & Mott, Modesto, Cal., operating an automobile service and machine repair works, are arranging for the immediate rebuilding of the plant, recently destroyed by fire, with loss of about $100,000, including equipment.

The California Wire Co., Orange, Cal., recently organized to manufacture electrical wires and cables, has plans under way for its new factory, one-story, 80 x 134 ft. Louis Koth, president of the company, is in charge.

The Gulf States

BIRMINGHAM, July 11.

The Texarkana Spring Bed Co., Texarkana, Tex., recently organized under State laws, will operate a local plant for the manufacture of bed springs and cots. R. L. Marshall, Dallas, Tex., is president, and L. A. Stewart, Texarkana, secretary and general manager.

The White Eagle Refining Co., Augusta, Kan., is considering the erection of a new refinery in the vicinity of Fort Worth, Tex. A site has been acquired.

The Knowlan Machine & Supply Co., Victoria, Tex., will erect two buildings each about 40 x 75 ft., instead of a single structure, as previously announced, and will remove its present works to the new location. Bids for the buildings, one of which will be equipped as a general machine works, have been received. Frank Knowlan is president and manager.

The Taft Packing Co., Taft, Tex., has completed plans for a new two-story fertilizer manufacturing plant, 65 x 115 ft., and power house. Construction will begin at an early date. H. S. Green, 415 Euclid Avenue, San Antonio, Tex., is architect.

The Reclamation Oil Co., Orange, Tex., has been incorporated with a capital of $2,000,000. Plans for a refinery have been prepared. J. E. Pike is president.

The Baton Rouge Electric Co., Baton Rouge, La., is planning for extensions and improvements in its electric plant and system to cost about $200,000. T. L. Small is manager.

B. A. Lewellen, Florence, Ala., is organizing a company to build a plant for the manufacture of automobile truck bodies. Preliminary plans are under way. The Chamber of Commerce is interested in the project.

The Bronson Mfg. Co., Bronson, Fla., has plans in preparation for the construction of a new electric light and power plant, and ice-manufacturing and cold storage plant. B. B. Stokes is secretary.

The Isthmus Co., Corpus Christi, Tex., has tentative plans under way for the construction of a new gasoline distillation plant, estimated to cost about $150,000 with machinery.

The American Motors Export Co., Jacksonville, Fla., has acquired about 30 acres of land for a new plant for the manufacture of automobiles and parts, to cost in excess of $150,000. Bids for the buildings will be taken at once. Henry L. Innes is president.

The Blue Ribbon Refineries, Box 295, Brownwood, Tex., are planning for the installation of new equipment at their plant, including filters, dryers and other apparatus. P. J. Baney is president.

The El Dorado Refining Co., El Dorado, Ark., is planning for the construction of a new oil refinery comprising two units, each with 1000 bbl. capacity per day. Later the refinery will be increased to a daily output of 5000 bbl. W. J. Brown is head.

Canada

TORONTO, July 11.

The Canadian machinery and machine tool market continues quiet. The demand for all classes of equipment is small and buyers are sending out inquiries only when in need of a single tool for some particular work. The railroads have been out of the market for some time and the makers of automobiles have also ceased to buy equipment. Even the demand for wood-working equipment, which was one of the main features of this market for a few months has dropped off. Second-hand equipment continues in better demand than new lines, but sales are small. Small tools are in fair demand and some good buying has recently been done. Prices continue unchanged.

J. D. Robertson, deputy minister, Department of Public Works, Calgary, Alta., is receiving bids for the construction of a power house to cost $150,000. R. F. Blakey, Parliament Buildings, Edmonton, Alta., is architect.

R. C. Desrochers, secretary Department of Public Works, Ottawa, Ont., will receive bids until July 22 for the supply and installation of an oil engine and generator in the power house at William Head, B. C.

The Standard Paper Box Co., 8 St. Paul Street East, Montreal, is building a factory to cost $200,000.

The lumber mill owned by the Robert Stewart Lumber Co., Wyndham Street, Guelph, Ont., was destroyed by fire with loss to machinery and building of $200,000. It will probably be rebuilt.

W. A. Galbraith, secretary Utilities Commission, Wingham, Ont., will receive bids until July 19, for one pumping unit; construction of pump house, etc.

The Municipal Council, Bagotville, Que., will build a hydroelectric plant to cost $30,000. L. P. Chayer is secretary.

Joseph Langevin, Coteau du Lac, Que., will build a power house and electric line to cost $20,000.

The plant of the Haileybury Brick & Tile Co., Haileybury, Ont., was destroyed by fire June 28, with a loss to building and equipment of $25,000.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.93c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.93c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.03c.
Channels, angles and tees under 3 in. x ¼ in., base	2.93c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.93c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.13c.
Toe calk, ½ x ⅜ in. and larger	3.60c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.63c.
Squares, flats and hex	4.98c. to 5.13c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.03c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.68c.
No. 12	3.73c.
No. 14	3.78c.
No. 16	3.88c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c.	.....
Nos. 22 and 24	4.35c.	5.60c.
No. 26	4.40c.	5.65c.
No. 28	4.50c.	5.75c.
No. 30	4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.50c.
No. 16	4.75c.
Nos. 18 and 20	4.90c.
Nos. 22 and 24	5.05c.
No. 26	5.20c.
No. 27	5.35c.
No. 28	5.50c.
No. 30	6.00c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—46	—30	¾ in. Butt...	—18	List
¾ in. Butt...	—52	—37	1-1½ in. Butt.	—20	— 2
1-3 in. Butt..	—54	—40	2 in. Lap	—14	+ 3
3½-6 in. Lap.	—49	—35	2½-6 in. Lap.	—18	— 2
7-12 in. Lap..	—40	—24	7-12 in. Lap..	— 7	+10

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c.
Annealed soft	4.50c.
Galvanized annealed	5.25c.
Coppered basic	5.00c.
Tinned soft Bessemer	6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c. to 23 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$6.80	$6.55
			90 lb.	6.90	6.65
			100 lb.	7.00	6.75
IC	$10.60	$9.50	IC	7.20	6.95
IX	11.80	10.75	IX	8.10	7.85
IXX	13.60	12.25	IXX	9.10	8.85
IXXX	15.60	14.25	IXXX	10.50	10.25
IXXXX	17.20	16.00	IXXXX	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	32c.
Bar	38c. to 40c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	24c.
No. 1 solder	21c.
Refined solder	18c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 30c. to 33c.

Old Metals

Conditions are generally unchanged, business being practically nil. Values are unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.25
Copper, light and bottoms	8.00
Brass, heavy	4.75
Brass, light	4.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

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Disposing of Scrap Systematically

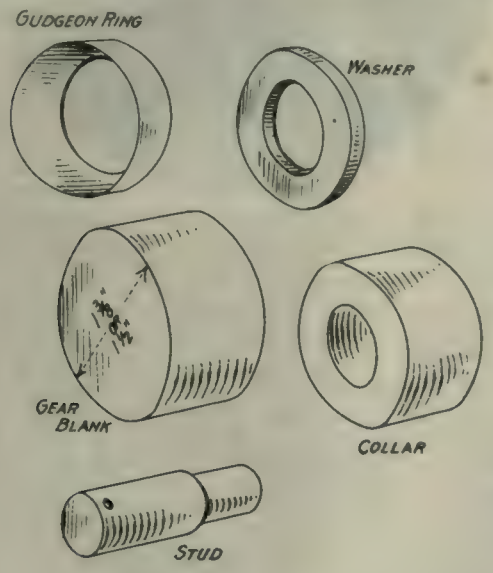
The Crompton & Knowles Loom Works Makes Discarded Material Over Into Other Useful Articles—Scrap Committee Formed

BY GERARD FRAZAR

SELLING waste material as such only when it cannot be made over into another useful article is the recent policy of the Crompton & Knowles Loom Works, Worcester, Mass., which has created a department especially for the economical disposal of waste.

In 1917 this company established within its organization a scrap committee for the purpose of devising means of utilizing to better advantage large quantities of steel and wood scrap accumulating from time to time. Since the committee's inception it has become an important adjunct to the organization as a whole, its field of activity having been materially widened to include anything that can be classified as scrap.

The committee is composed of a representative body of departmental foremen and executives, who are in



Gudgeon Rings Were Produced from Short Pieces of Scrap Pipe. Though not so shown in the sketch, one end of the ring is a very thin edge, while the other end is about ⅛ in. thick. Washers were made from rusted flat steel scrap. Gear blanks, collars and studs were made from short pieces of cold-drawn steel

direct contact with such materials that are used in loom construction from which there results a certain percentage of scrap. Each member has a certain class of material to cover. The principal items are wood, cold-drawn steel, hot-rolled steel and iron, tool steel, pipe and miscellaneous items such as sandpaper, glass rods, solder, etc. The activities of the committee are not limited to material alone, however, for obsolete machine tools, motor trucks, and, in fact, anything becoming inefficient that is owned by the corporation comes under the jurisdiction of this committee, as well. The chairman of the committee is a member of the purchasing department, who is in a position to determine the relative value of articles recommended to be manufactured from scrap material, compared with prevailing market prices.

The committee meets the first of each month and the chairman calls on each member separately concerning scrap produced during the previous month for which he is responsible. A report is then submitted as to the quality of the scrap on hand according to classification. Each class is then considered separately to determine whether or not the salvaging of the respective articles would be advantageous, and at the same time the chairman ascertains the relative value of the material under discussion so that the committee may decide intelligently as to final disposition.

The object in view at all times is to consider the salvaging of all such materials that can be fabricated further and used as a part toward construction of looms or otherwise. During 1920 when materials, especially iron and steel, were costly and difficult to obtain, many hundred dollars' worth of scrap material was salvaged. In addition, greater care in working up material developed throughout the various departments in this large plant, thus resulting in an additional saving.

Salvaged material is properly cared for in stockrooms, where men in charge are familiar with department raw material requirements. When requisition is made at the stockroom for material it is the duty of the one in charge there to apply salvaged material whenever possible. The labor charge of working up salvaged material naturally is larger than it would be otherwise, but not sufficiently so to more than offset the saving in raw material costs. Workmen much prefer not to handle salvaged material, consequently there is the tendency to eliminate it as much as possible.

In the company's foundry a Make-Every-Ton-Count-Committee is incorporated to work in conjunction with the main plant reclaim committee. Its purpose is to make every piece of casting from a mold count for something. The day of workmen carelessly throwing castings against other hard substances, and large percentages of breakage, has passed. The welding department is materially reduced as a result. Not only is breakage much smaller, but better castings have resulted, thereby increasing the efficiency of the foundry organization.

Ways of disposing scrap materials are varied. It is not always possible to net the company a profit, especially on falling markets, but instances cited here illustrate the resourcefulness of committee members in the early part of last year. Previously, wood scrap was sold to employees at a nominal price representing a loss to the company, or was consumed in the boiler department. The committee classified the scrap, selling four cars of ash butts at 4c. per ft., netting a profit,

and apple wood butts to manufacturers of handles. Such accumulations of wood pieces that cannot be further used are sold to employees during the summer months at a small price which barely covers the cost of handling.

The committee is at present considering whether or not it would be profitable to invest in a machine for separating shavings from sawdust, there being a ready market for the latter. Worn out sandpaper rolls yield 4-in. to 6-in. strips, which are cut into convenient pieces for general hand purposes. Short pieces of glass rods are sometimes used to advantage in the production of Jacquards, while scrap paper is sold at prevailing market prices. Solder, accumulating in the emery wheel department, is reclaimed and used in babbitting boxes and in lead hammers. All used files are sent away and recut at a cost of less than 15c. each. Last year the company saved about 25 per cent in its file purchases by using recut files, and, in, addition, disposed at a good price of recut stock after worn out.

At one time there was an accumulation of several thousand pounds of rusted flat steel scrap on hand. From this a supply of washers was obtained at comparatively little expense and at a period when deliveries of washers were uncertain. Obsolete sizes of high-speed tool steel and of high-speed steel drills and reamers have been converted into usable sizes, 1 in. to 1½ in. Short pieces of cold drawn steel, nothing less than 14 in., are stored in separate racks according to size. When possible, they are used in the production of studs and collars. Pieces 1½ in. and 1 15/16 in. in diameter sometimes are used in making upright shafts, and pieces 1¾ in. in diameter welded and used for bottom shafts. Short pieces 1⅜ in., 1 3/16 in. and 1½ in. in diameter commonly are utilized in making gear blanks and collars, while pieces 1 15/16 in. in diameter have been welded and used for girts for worsted looms.

The company annually consumes a considerable tonnage of pipe. Its disposition of smaller sized scrap pipe offers an illustration of the thoroughness of the committee's methods. It decided gudgeon rings could be produced from 1¾-in. and 2-in. short pieces in place of malleable iron rings, when conditions warrant, to considerable advantage. In 1920 there resulted a saving of 1.31c. each and 3.08c. each on the No. 37 and No. 47 rings, respectively, in that these were produced from short pieces of pipe, as against the purchase price of malleable iron rings.

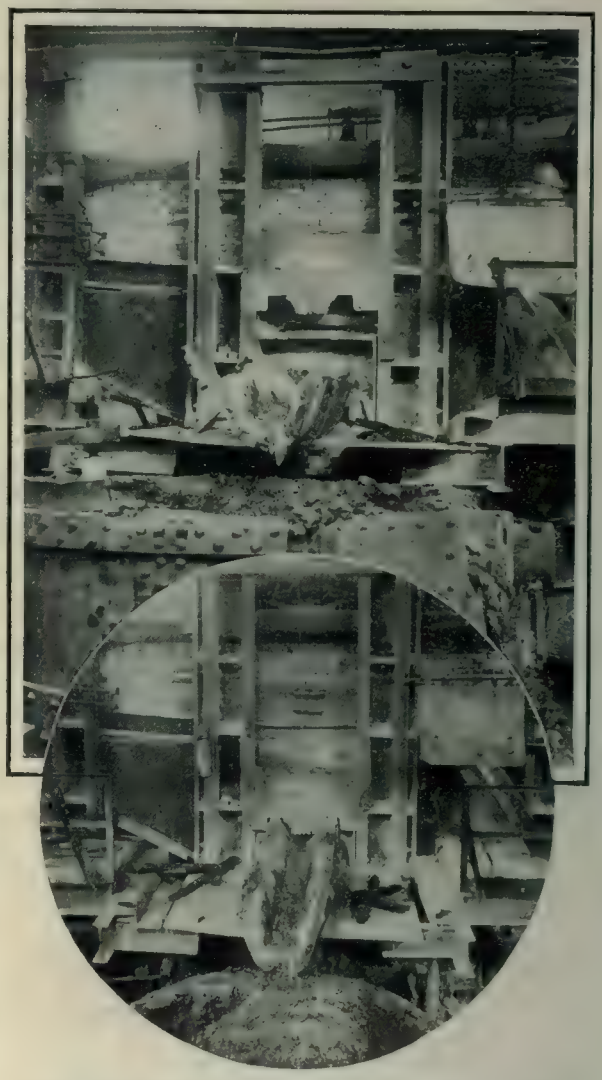
Salvaged pieces of 2-in. channel iron are used for reinforcing and repairing transportation platforms for shipment of looms. Interesting problems come up before the committee, which are outside its jurisdiction, and assigned to proper plant executives or committees.

It should not be construed that the reclaim committee permits indiscriminate working up of salvaged material to the detriment of manufacturing costs. As a matter of fact working up costs, as related to raw material and scrap material prices, constantly are compared by members of this committee with a view to determining the most advantageous manner of disposing of property. If, for instance, the market for gear blanks is such that it is cheaper in the end for the company to buy from outside interests rather than work up salvaged cold drawn steel stock, scrap material is sold at going prices. Care also is taken not to overstock on products derived from salvaged material. Whether the committee can save money for the company this year is problematical, due to liquidation of raw material markets in general. It nevertheless is serving its purpose, for ways and means are being constantly studied and put into practice whereby waste is eliminated as much as possible, which, of course, means a saving to the Crompton & Knowles Loom Works.

American Consul W. Duval Brown reports from La Paz, Bolivia, that an American concern has recently purchased tin ore lands in Bolivia valued at about $2,000,000. He states that the output of this property is not large and that it has little effect on the total Bolivian output.

Kinney Tapping-Hole Shield

A tapping hole shield, consisting of a steel plate with a fringe of chains, has been developed by Charles L. Kinney, Jr., superintendent of the open-hearth department, Illinois Steel Co., South Chicago, Ill., for



In the Upper Photograph the Shield, Consisting of Plate and Chains, Is Raised. Below, it is in position ready for tapping

use on open-hearth furnaces, blast furnaces and at the capping and uncapping platforms in Bessemer plants. The company has found such a shield effective for preventing burns from molten metal.

The shield is attached to the open-hearth furnace by angle irons bolted to a buckstay on each side of the furnace spout and is operated by pulleys and weights. The fringe, or guard of short chains in the center, is made of ¾-in. links to fit the tapping hole.

According to Robert J. Young, manager department of safety and relief, Illinois Steel Co., this shield was developed in 1917. The shield formerly used was known as the Conway shield, which covered the tapping hole only partly. After a second helper at No. 1 open-hearth was burned in a break-out of the heat, Mr. Kinney evolved the protector described. Experience with this shield has demonstrated that even though a heat does break out while the hole is being opened, the workman is protected by the Kinney shield.

Dam Contracts Awarded

BIRMINGHAM, ALA., July 18.—The Alabama Power Co. has let company railroad and other contracts for building the $8,000,000 Mitchell power dam on the Coosa river and work has begun. The dam is to be completed in two years. It will have initial installation of 60,000 hp. with eventual of 120,000.

Explosion Hazard and Its Prevention

Analysis of Characteristics of Fuels and Other Combustible Materials, with Special Reference to Powdered Coal Installations — Explosive Mixtures and How They Are Formed

BY JOSEPH F. SHADGEN*

EXPLOSION hazards in all industries treating purposely with dust of all nature, or dealing incidentally with it, have recently received special attention through the joint efforts of the United States Department of Agriculture and the Bureau of Mines. An educational campaign familiarizing manufacturers with the dangers due to the possibilities of explosion caused by dust has been carried on. It has been pointed out that fire hazards are distinctly different from explosion hazards, and that the same precautions do not guard against both calamities. This seems contradictory, but the facts are undeniable.

Last December the Industrial Commission of Ohio called to Columbus several powdered coal equipment manufacturers, and some users of that method of burning coal, to discuss the explosion hazards in connection with pulverized coal. Several accidents had occurred in that State and the authorities sought a multitude of opinions, dealing with the problem from all stand-

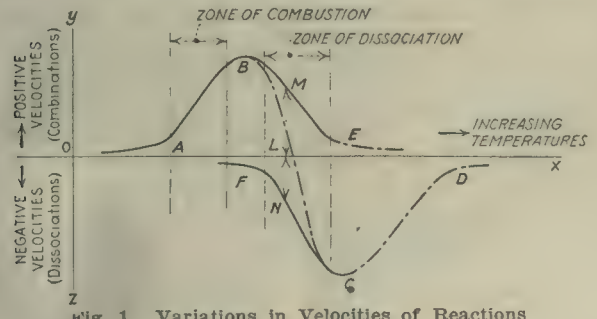


Fig. 1. Variations in Velocities of Reactions

points, before making preventive recommendations to the legislature. In conjunction with that meeting the writer made a short investigation of the subject for a New York concern.

Complete absence of comprehensive literature explaining the problem involved, or dealing with the subject from the safety standpoint, are the reasons for this independent study. A mass of material is loosely spread in different publications of all nations, as explosion problems have been investigated for a number of years in conjunction with military objects, and for safety purposes in mining. The classic studies of Mallard and LeChatelier on the danger of "fire damp" are known to the whole technical world. The object of this essay is to co-ordinate in comprehensive form the knowledge gleaned from various sources.

That a theoretical study of the problem is necessary will hardly be denied by anybody, in spite of the sarcastic sneers of some hard-headed business men, who always point out the difference between theory and practical experience. Only exact and full knowledge can father remedies of real value, as compared with the hit-and-miss precautions due to slow practical evolution. There is no difference between real science and practical facts. It is the half-knowledge that is too often misleading.

Explosions—Fires—Oxidation Reactions

All explosions, as well as fires, are in last analysis the result of an oxidation, meaning the chemical combination of a material with the oxygen of the air. Hence the study of those chemical reactions forms the foundation of all research.

All chemical reactions are due to affinity of one material for another, and the release of this energy always produces either an absorption or a generation of heat, another form of energy. If heat is generated the reaction is called exothermic, while endothermic reactions are those which absorb heat. It must be emphasized that the heat phenomena are only the effect, not the cause of the reactions.

Most oxidation reactions are exothermic; in other words, they produce a surplus of heat, specific to each case. Table 1 is a compilation of the results of oxidation of various material, as found experimentally by investigators.

Reversibility of Reactions

As a typical example of an oxidation, let us take

$$CO + O = CO_2 \qquad (1)$$

oxide of carbon in presence of oxygen producing carbonic acid. It is well known that the result of that reaction can be destroyed either by dissociation, caused by a considerable increase in temperature, as expressed by

$$CO_2 = CO + O \qquad (2)$$

or by the influence of a third body, whose presence disturbs the balance (catalytic action) also expressed by

$$CO_2 = CO + O \qquad (2)$$

or by the interference of a third body producing a new reaction called reduction

$$CO_2 + C = 2\,CO \qquad (3)$$

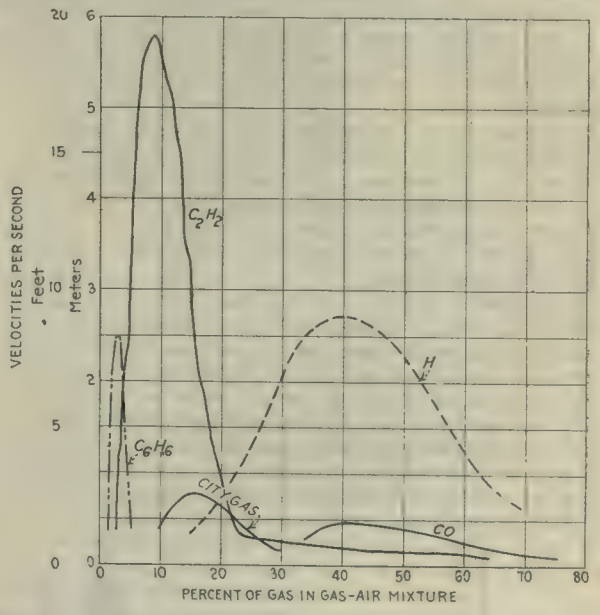


Fig. 2. Relative Inflammability of Certain Air-Gas Mixtures, Showing Upper and Lower Limits of Percentages at Which the Gases Are Actively Combustible

This seems to prove that it is more accurate to write

$$CO + O \rightleftarrows CO_2$$

meaning that most of the chemical reactions are reversible and that the direction depends entirely upon the conditions under which the reaction takes place.

Intensity of Reactions

It follows that, if outside factors govern the direction of most of the reactions, either positive one way or negative the other way, these same conditions will influence their intensities. If a certain number of molecules of CO are in presence of O, they may combine one at a time, ten at a time, one hundred at a time or all at a time. In other words, the velocity of reaction, representing the ratio of the number of molecular reactions actually taking place per unit of

*Consulting engineer, New York.

time to the number of molecular reactions possible, may be great or small, depending on favorable conditions or retarding circumstances. This velocity of reaction expresses the speed at which the phenomena take place and is of the greatest importance in all practical applications.

The temperature, reflecting the heat concentration

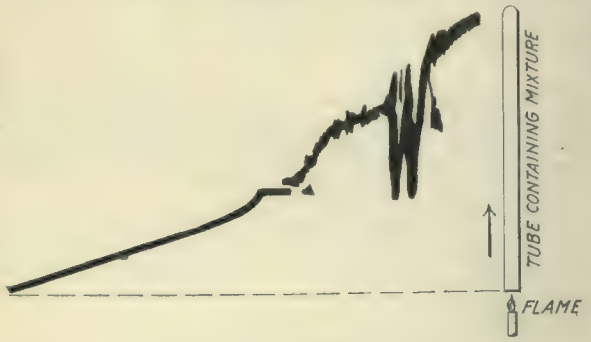


Fig. 3. Schematic Representation of Vibrating Character of Flame Propagation

of the reacting materials, influences most of the velocities of the chemical changes. An increase in temperature usually accelerates the speeds at which the oxidations occur, and a decrease of temperature reduces those velocities. This well known and accepted fact led to the theory of the absolute zero temperature (— 273 deg. C. or — 459 deg. Fahr) where all reaction-velocities are nil, where absolute lethargy exists and no combinations of any nature are possible.

In all exothermic reactions the temperature is increased, as the heat generated is usually superior to the loss by transmission to the neighborhood; this causes the speed to reach a point where the intensity of the reaction becomes violent and visible, and all combustion phenomena of industrial value are quick oxidations of fuels, accompanied by the production of light and fire.

Similarly it is found that endothermic reactions do require certain temperatures which, if reduced, slow down the phenomena and often cause its freezing up.

These variations of the velocities of reaction are often graphically represented as in Fig. 1. Suppose *OX* the line of increasing temperatures, *OY* the line of positive velocities and *OZ* the line of negative velocities, and consider the case of the exothermic reaction (1). With increasing temperature the velocity rises gradually but slowly along *OA*. From *A* the velocity increased rapidly along *AB*, and that zone, of great industrial importance, is called "zone of combustion," in the case of a fuel. If the temperature continues to rise, the speed drops along *BE*, while the opposite reaction according to formula (2) starts with increasing intensity, as indicated by *FC*. That belt is called "dissociation zone," where variable proportions of *CO*

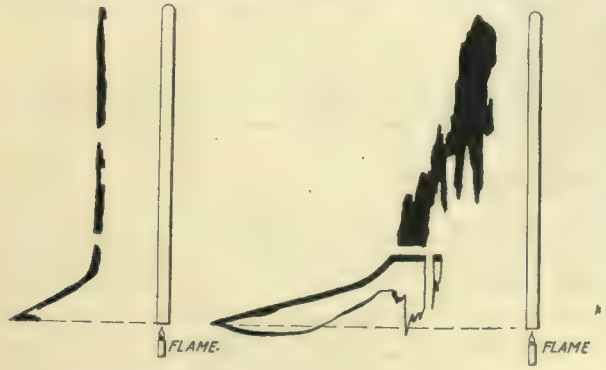


Fig. 4 and Fig. 5. Typical Examples of Sudden, Explosive Combustions

and CO_2 mixed are in equilibrium, according to the temperature level. The reaction (2) reaches its maximum intensity at *C;* after that temperature the velocities diminish gradually, as graphically expressed in the curve *CD*.

Study of this example brought out the existence of a certain temperature (point *A*, Fig. 1), called temperature of reaction, that marks a noticeable increase in the intensity at which the combination takes place. For fuels this is usually called temperature of ignition, and corresponds to the lowest temperature assuring the continued combustion of the fuel. At the temperature of ignition the oxidation of a few molecules generates enough heat to maintain the heat level high enough to guarantee the continuity of the reaction at high speed. For a large number of materials this temperature has been determined experimentally under various test conditions, using different principles, of which Table 2 gives incomplete compilation. Besides the temperature, the speed of reaction of many materials is influenced by the pressure and the presence of foreign materials such as platinum, or large cooling surface, etc., that may accelerate or retard the intensity, according to circumstances.

It follows (1) that oxidation of a material can take various forms, involving the time factor, and the difference between combustion or fire and an explosion is merely a matter of seconds or fractions of a second; (2) that explosions are not only not limited to fuels in the industrial sense, but that under certain circumstances the hazard exists with all materials liable to oxidation.

Close Contacts for Intense Reactions

All chemical affinities are active only at close distances. It is well known that gases react more quickly

TABLE 1
Heat Generated by Oxidation Reactions

Material	Symbol	Combinations with Oxygen	Kg. Cal. per Mol. Gram	Kg. Cal. per Kg. Material	Kg. Cal. per Kg. Oxygen
Aluminum	Al	Al_2O_3	380.2	7,014.7	7,920
Phosphorus	P	P_2O_5	370	6,014	4,624
Ethylene	C_2H_4	$2\,CO_2+2\,H_2O$	333.3	11,904	3,472
Acetylene	C_2H_2	$2\,CO_2+H_2O$	310	11,923	3,875
Methane	CH_4	$CO_2+2\,H_2O$	211.9	13,243	3,311
Silicon	Si	SiO_2	184.5	6,496	5,766
Magnesium	Mg	Mg O	143.3	5,970.8	8,956
Potassium	K	K_2O	97.1	1,240	6,069
Carbon	C	CO_2	96.96	8,080	3,030
Sodium	Na	Na_2O	91	1,978	5,687
Zinc	Zn	Zn O	85	1,307	5,312
Iron	Fe	Fe O	75.7	1,350	4,725
Sulphur	S	SO_2	71.1	2,222	2,222
Oxide of Carbon	CO	CO_2	67.96	2,427	4,228
Tin	Sn	Sn O	67	568	4,225
Hydrogen	H	H_2O	58.1	29,050	3,630
Copper	Cu	Cu O	37.2	585	2,325

than liquids, and that liquid solutions combine more easily than solid materials. This is because the intensity of the reaction is a matter of close contact; each molecule has to find its mate without physical difficulties. As the molecules of gases mix by diffusion, and present an enormous surface of contact, their reaction possibilities are the least interfered with by the material form.

That is why combinations of gases are controlled with great ease, why the laws governing reactions are studied on typical gaseous mixtures, and why for many industrial purposes solids and liquids are transformed into quasi-gaseous material by vaporization and pulverization to obtain better and quicker results. This is particularly true for oxidation reactions, because in most applications the oxygen is supplied by the air, its most economical form.

The second part of the study is therefore clearly defined and reduced to the analysis of how mixtures of air and materials liable to oxidation behave under conditions practically possible. These mixtures may be gas and air, such as hydrogen, methane, oxide of carbon, coke oven gas or producer gas and air; liquids and air, such as alcohol vapors, gasoline evaporates, sprayed oil or atomized kerosene and air; solids and air, such as finely pulverized coal; sawdust; flour meal or metal flakes floating in the air. These are only a few practical examples of the same principle. An individual study will bring out the specific peculiarities of each class.

All mixtures are characterized by two main qualifi-

cations that have the greatest influence on their properties; these are their ratio of constituency and their uniformity. Two materials may be mixed in any proportions; the ratio of volumes or weights of the one constituent against the other is of greatest importance; and, expressed by the density of the mixture, the concentration or dilution of one material in the other. Furthermore, as the materials mixed may have different specific weights or may present various specific tensions, it can easily be understood that within a given volume the constituents may be segregated or stratified. The uniformity of mixture has a very definite influence on the reactions that are liable to take place, and their intensities as well.

TABLE 2
Temperatures of Ignition of Some Materials

Material	Conditions of Experimentation	Source of Publication	Temperature of Ignition	
			Deg. Cent.	Deg. Fahr.
Oxide of Carbon	$CO+O+CO_2$	Mallard	700	1,292
	$2\ CO+O_2+N_2$	Falk	644	1,191
	30% CO +70% Air	Mallard	654	1,209
Hydrogen	$2\ H_2+O_2+4\ N_2$	Falk	649	1,200
	30% H_2+70% Air	Mallard	555	1,031
Methane	$CH_4+2O_2+N_2$	Mallard	650	1,202
Acetylene	. . . . .	. .	450	842
Alcohol	Air Mixture	Holm	450	842
Gasoline	Air Mixture	Constan	510	950
Kerosene	Air Mixture	Constan	380	716
Benzine	Air Mixture	Constan	350	662
Mazut	Air Mixture	Constan	380	716
Fuel Oil	Air Mixture	Constan	430	806
Tar Oil	Air Mixture	Constan	600	1,112
Benzol	Air Mixture	Holm	520	968
Lubricating Oil	Air Mixture	Holm	400	752
Lignite	Air Mixture	Holm	250	482
Coal	Air Mixture	Holm	390	734
Anthracite	Air Mixture	Holm	440	824
Dextrine	Air Mixture	Price	540	1,004
Sulphur	. . . . .	Bacon	248	478

REMARK: Temperature of Ignition and Flash Point of Liquid Fuels differ.

To Avoid Combustible-Air Mixtures

Before going further it seems logical to draw an *a priori* conclusion by recommending as best precaution against fires and explosions the avoidance of all mixtures of air with combustible matter. Thus will all danger be guarded against. Logical it is, but not practical, because these inflammable mixtures are often purposely wanted, to obtain a definite industrial result while sometimes their existence is accidental or incidental to a process. Therefore this radical precaution has to take the more tolerable form: "Reduce dangerous mixtures of air with combustible material, as much as possible."

This general principle is clad in innumerable forms in the various industries, such as: Keep gas conduits tight, because not only will gas be saved, but unnecessary mixtures of gas and air, that may create a hazard, will be avoided. Store inflammable liquids in tight reservoirs and keep the cover on the gasoline tank, because vaporization will not only produce a loss of fuel, but also create a dangerous air-vapor mixture. Reduce the production of dust in factories, avoid whirling up of dust clouds, because they are objectionable from the hygienic standpoint of welfare to workmen, and they may create a hazard if the material is of oxidizable nature. Therefore, it should never be forgotten that to prevent all unnecessary inflammable mixtures is the first elementary rule of safety.

TABLE 3
Upper and Lower Limits of Inflammability

Gas	Reaction Formulas (With Volumes)	Ratio		Theoretical Mixture	Limits of Inflammability	
		Gas	Air	Percent of Gas	Percent of Gas in 100 Percent Mixture	
					Lower	Upper
Hydrogen	$2\ H_2+O_2+4\ N_2$ (2+1+4)	2	5	28.6	10	70
Carbon Monoxide	$2\ CO+O_2+4\ N_2$ (2+1+4)	2	5	28.6	16	75
Methane	$CH_4+3\ O_2+12\ N_2$ (1+3+12)	1	15	6.25	6	16.5
Acetylene	$C_2H_2+3\ O_2+12\ N_2$ (1+3+12)	1	15	6.25	3	65
City Gas	1 cu. m., about 5000 Cal. or 1 cu. ft., about 565 B.t.u.	1	6.5	13.5 (about)	8	25
Water Gas	1 cu. m., about 2600 Cal. or 1 cu. ft., about 300 B.t.u.	1	33	30 (about)	15	32

Gas Mixtures—Methods of Flame Propagation

Suppose a combustible mixture of two gases such as city gas with air, and let us raise its temperature locally to the ignition point, either by an outside flame, such as a Bunsen burner, or by an electric spark. The ignition will be propagated to all the mixture. The time from start to the ignition of the last gas molecules is called the duration of the phenomenon. In dividing the distance between the first and last point of ignition by the time of duration, a ratio will be obtained called average velocity of propagation of the flame, or flame velocity. In a uniform and quiet mixture the flame will spread until it reaches the sides of the receptacle in all directions; the surface of advance will have a spherical form. For ease of experimentation these phenomena have always been studied in cylindrical tubes, that permit a linear study of the phenomena.

Mallard and Le Chatelier used in their pioneer experiments tubes from 10 to 40 mm. (⅜ in. to 1½ in.) inner diameter, 1 to 3 meters (3 to 10 ft.) long, closed at one end, open at the other. After the mixture had been introduced a Bunsen gas flame was brought close to the open end to produce the ignition, and the results were determined by the photographic impression of the light on a film strip moving at a known velocity.

TABLE 4
Variations of Flame Velocities of Various Gas-Air Mixtures (after Le Chatelier)

Hydrogen H	Percent of Gas	8	10	20	30	40	50	60	70	75
	Velocity in M. per Sec.	0	0.6	1.9	3.3	4.3	3.4	2.3	1.1	0
	Ft. per Sec.	0	1.97	6.23	10.8	14.1	11.2	7.55	3.61	0
Methane CH_4	Percent of Gas	5	6	8	10	12	14	15	16	17
	Velocity in M. per Sec.	0	0.03	0.23	0.42	0.61	0.36	0.2	0.1	0
	Ft. per Sec.	0	0.1	0.75	1.25	2.0	1.18	0.66	0.33	0
City Gas	Percent of Gas	7	8	10	12	15	17	20	24	25
	Velocity in M per Sec.	0	0.3	0.5	0.7	1.05	1.3	0.8	0.4	0
	Ft. per Sec.	0	0.98	1.64	2.3	3.44	4.27	2.62	1.31	0
Acetylene C_2H_2	Percent of Gas	2.8	3	5	7	9	15	22	40	65
	Velocity in M. per Sec.	0	0.2	2	4	6	3	0.4	0.22	0
	Ft. per Sec	0	0.66	6.56	13.1	19.7	9.84	1.31	0.72	0
Carbon Monoxide CO	Percent of Gas	16	20	25	30	40	50	60	70	75
	Velocity in M. per Sec.	0	0.2	0.4	0.6	0.5	0.35	0.2	0.1	0
	Ft. per Sec.	0	0.66	1.31	1.97	1.64	1.15	0.66	0.33	0

The first observation was that gas mixtures of the various natures tested are characterized by a uniform flame velocity so long as the equilibrium of the gas mass is not disturbed by secondary effects, such as cooling of walls, currents within the gas volume or vibrations of the mixture.

These flame velocities have been found experimentally for various gases, CH_4, H, CO, water gas, city gas. The densities of the mixtures were varied and it was found that if the concentration or dilution of the gas in the air were too great no propagation occurred; this led to the conception of the upper and lower limits of inflammability. Table 3 is a compilation of these limits for various gases mixed with air. Beyond and below these proportions it was impossible to maintain any flame, and no ignition of the mixture occurred. These data have an important industrial value, as they form precise information for guidance. It is regrettable that no figures are available for industrially important gases, such as natural gas, coke oven gas, clean producer gas, etc.

Table 4 is a compilation of experimental results made to find the influence of the mixture densities on the flame velocities. These data are only indicative, as the results of each test depend on the diameter of the tubes used and other circumstances. Especially

with *CO* are difficulties encountered, because its flame is hardly visible and the photographic impressions are not clear. If the same gases are mixed with pure oxygen the reactions are greatly activated and the velocities increased with *H* up to 22 meters (72 ft.) per sec., with *CO* up to 2 meters (6½ ft.) and with C_2H_2 up to 200 meters (656 ft.). Fig. 2 reproduces in diagrammatic form the results of Table 3. It must be emphasized that these results have only relative value, and that not all experimenters are in accord on individual figures. The problem is so complex that it would be surprising if it were otherwise.

This simple method of propagation of the flame is explained by Mallard and Le Chatelier by the direct heat transmission; each zone ignites its neighboring strata by heating them up to the temperature of ignition through contact and radiation.

The second observation was that, under certain circumstances, the propagation of the flame took the form of a vibrating motion with a greatly increased average velocity. Fig. 3 reproduces schematically the film impression recorded of this phenomenon; it must be remembered that these very rapid oscillations sometimes reach 100 per sec. In the diagram the difference between the two methods of propagation is clearly visible. These vibrations seems to be due to local compressions caused by temperature increase, and disturbances of the quiet equilibrium of the mixture.

A third distinct observation was made by Berthelot and Vieille; during their experiments the velocities sometimes increased above 1000 meters (3280 ft.) per sec. to as high as 2800 meters (9200 ft.), and the propagation took the form of an explosive wave. These experiments have been repeated by Dixon, who found that the explosive wave phenomena never could be produced gradually. They were always sudden occurrences, of which the sketches of Fig. 4 and Fig. 5, copied from photographic records, are typical examples. Explosive waves are always accompanied by enormous pressures that make experiments difficult and dangerous, as the effects of such waves are always destructive. The existence of these extremely quick combustion reactions is explained by self-ignition of all strata of the mixture, due to the pressure created by the large volumes of high temperature gases. These explosive waves hardly occur with air mixtures; in the laboratories they are always produced with pure oxygen, but the possibility of their occurrence always exists when high pressures exist.

Concentration versus Dilution

From these theoretical data we can draw the practical conclusion that, if inflammable gas mixtures are created, their inflammability can be counteracted by either a too great concentration or a too high dilution, as under those circumstances the flame is not transmitted. In the one case the fire dies from want of oxygen, in the other from lack of combustible. Furthermore, it has been shown that explosions become particularly destructive if the expansion due to the changes in temperature are interfered with. In those cases the gases will be compressed, which increases considerably the reaction velocities and may give birth to an explosive wave causing destruction.

In industry this has been recognized, and so-called explosion doors or flap valves or safety traps are provided, in all gas mains, which open automatically to relieve any possible excess pressure inside the line in case of fires or local combustion. A third point of precaution is the prevention of an ignition through an outside source. If no kindling takes place, if fires are kept away, if electric sparks are made impossible, the danger can lie only inside, through self-ignition, which has to be prevented also by all means.

All these prescriptions are known to the gas industry in all fields, be it city gas, producer gas or blast furnace gas, and experience has proved to those interested that they have to be rigorously observed to guarantee the safety of the operators and to maintain the equipment in working condition.

In fuel gas engineering the combustible gas is never mixed with air except at its immediate point of utilization. The two gases (air and fuel) usually meet only within the burners, close to the furnaces themselves, and their combination is therefore progressive. In fact, the greatest care is taken to prevent the existence of any mixture in the distribution lines that might create a hazard. This applies to acetylene welding as well as the autogenous cutting torches with hydrogen gas, to water gas burners as well as open-hearth furnace ports.

(*To be concluded*)

Electrical Machinery Manufactured

WASHINGTON, July 18.—Manufacturers of electrical machinery and apparatus in 1919, according to figures issued by the Census Bureau, amounted to $1,014,373,000, compared with $359,432,000 in 1914, an apparent increase of 182 per cent. But it must be remembered that unit prices in 1919 were far higher than in 1914. With "index" at 87 in 1914 and 161 in 1919, the 1919 product, on the basis of 1914 prices, would have been about $548,139,000, the corresponding increase being 52½ per cent.

In the following table are the reported figures for the total and for the principal items of interest. The great development of household electrical devices will be noted; also the effect of the wireless upon the production of telegraph apparatus. Automobiles accounted for much of the growth of batteries.

	1919	1914
Number of establishments	1,483	1,121
Value of products	$1,014,373,000	$359,432,000
Of which—		
Motors (not including starters or controllers)	116,898,000	44,176,000
Generating apparatus and parts	86,266,000	23,233,000
Insulated wire and fittings	84,217,000	69,506,000
Batteries, storage, dry, liquid	92,506,000	23,402,000
Incandescent lamps	59,372,000	17,350,000
Magneto-ignition apparatus, etc.	47,389,000	22,261,000
Telephone apparatus	46,340,000	22,816,000
Telegraph apparatus, all types	12,816,000	2,248,000
Industrial and household apparatus and devices	54,998,000	4,049,000
Transformers and feeder potential regulators	31,691,000	13,120,000
Electric locomotives	8,161,000	3,721,000

Blast Furnace CO Not Permanently Harmful

Frequent exposure to carbon monoxide causes headache and malaise, but no evidence has been found of a cumulative harmful effect, according to a report of Dr. Henry S. Forbes, Division of Industrial Hygiene, Harvard Medical School, published in a recent issue of the *Journal of Industrial Hygiene*. The report is based on a survey of metal mines, coal mines, blast furnaces and producer gas boilers and engine rooms in eight states. "Carbon monoxide," says the report, "as met with in metal and coal mines and about blast furnaces in this country rarely causes late after-effects following acute severe gassing. When such effects do appear, there is evidence, almost always, of a pre-existing pathological condition. A recent advance in treatment has been made by adding carbon dioxide to the oxygen inhalations administered. Recovery is three times as rapid as when oxygen alone is used."

Shipyard Wages Cut

Wage reductions, effective Aug. 1, or shortly thereafter, have been planned in nearly every shipbuilding district between Maine and Texas. The plan includes complete reclassification of labor, and adjustment of wage scales according to ability. The cut will affect both piece work rates and hourly rates for it is pointed out that, except for a 10 per cent cut in March, the wartime rates have been maintained.

It is expected that the Delaware River district will be first affected, announcements having already been made that the new scale will be put into effect Aug. 1 by the New York Shipbuilding Corporation, Merchant Shipbuilding Corporation and Sun Shipbuilding Co. It is stated that a still further cut may be required, if the new scale fails to reduce construction costs enough to meet competition.

The Fore River Works, Quincy, Mass., Bethlehem Shipbuilding Corporation, is to cut its working force one-third, bringing it down to approximately 5000. A reduction in wages, amounting to 15 per cent, goes into effect July 15.

Percentage of Defective Castings Too High

Many Foundry Losses Could Be Prevented by the Proper Study of the Human Factors—Responsibility of the Purchasing Department

BY HERBERT W. RAMP*

EVERY person intimately connected with the foundry industry realizes the importance of the entry "Defective Castings" in the records of the business and views the percentage with apprehension when it begins to ascend. This is the most constant point of leakage in the foundry and shows a clear-cut wastage that is often quite unjustifiable.

Defective castings are to the foundry what leaky containers are to the shipper. They stand out as a tangible loss that never fails to impress the executive. They may run at an ordinary average for months and then, without apparent cause, burst forth like a regular epidemic, causing expensive analysis and attention. Equipment will be changed, material rejected, or men replaced in the effort to correct the condition, and often the troubles will be ironed out until it seems that defective work will be the rare exception, when suddenly out of a clear sky the trouble will start again and refuse to yield to the treatment that cured it before and another cycle of loss and delay will follow.

An excessive proportion of bad castings is a menace to the successful conduct of the business, for it interferes with two most important fundamentals—production and low cost. A foundry must have a reputation for promptness in deliveries in order to procure and hold trade, as well as be in line on the price question.

It is scant satisfaction to a customer to know he gets a slightly superior quality, or a little lower price, if he cannot get the material to fill the orders on his books, or maintain his schedule because the foundry has made so many defective castings, and it is equally galling to the management to see its profits absorbed by this item.

The old questions are still being asked: "Why is it that 5 to 15 per cent of the castings made have to go back to the cupola as scrap?" "Why can a molder make ten good castings and then lose five?" "Has the foundry business no real foundation for its practice?" One answer often given, "It is the human element," has more significance than is usually accorded it and some points in its application may be profitably considered.

The Foreman Factor

There are few standards or definite formulas in foundry work. Every foreman is a law unto himself. He has been educated, not in the school of chemistry or mathematics, but in first-hand experience. No one prescribes for him how his sand must test, what percentage of moisture it may contain, or how he must pour or vent a certain piece. He has worked on certain lines with certain material and produced satisfactory results; he naturally feels that he is the Moses to lead the way out of the wilderness, and often a temporary success makes him feel his judgment is infallible. He closes his eyes and ears to what others are doing, with the result that when trouble comes he has nothing but his own experience to fall back on. He has contested or discounted every other man's efforts until he is unable to absorb others' ideas, and he has to stand or fall upon his own necessarily narrow information.

This is the first "human element" in the foundry—the mind that directs the practical operations. The foreman must be broad enough and clear enough of vision to keep in touch with the progress and development made by his men if he expects to conduct the business profitably.

Variables in the Workman

Again, workmen in the average foundry do little routine or automatic work. They may be employed upon the same class of product, or even the same pattern, but the changes in the material or conditions, the character of the operations, the dependence of one branch of the work upon another, call for the constant exercise of judgment on every casting made. The molder must make the casting, not as the contractor builds the house, according to plans and specifications, but so that the completed casting will be satisfactory. He may often be called upon to make one that has never been molded before, for which there are no gages or templates, text books or standards to guide him. He must be the pioneer and blaze his own way to success. His judgment and interest in his work make him a good mechanic or a poor one.

Coupled with these variations of work, a great influence is exerted by the physical and mental condition of the workman. His habits of life, his health, the state of his home life, all have a bearing on the quality of the work he produces, and this "human element" demands that the foreman study the individual ability and habits of his men to determine their fitness to produce the kind of work desired.

Because a certain molder is paid the ruling rate of wages or has served a regular apprenticeship at the trade does not decide that he is capable of making a good automobile cylinder, or a lathe bed. Hire and educate a hundred molders and you will find a hundred varying shades and degrees of workmanship and ability. It is as important to select the right man to perform the work as it is to choose the material or equipment used in its production, for foundry work is rarely routine. You cannot set the speed and feed and leave the workman to stop and start the machine. He must use his brains and when he neglects to do this defective castings increase and costs ascend.

Changes in Raw Materials

The material furnished the foundry is another important factor. It is not enough that it should be a standard make, or that it meet certain chemical specifications. It should above all else be uniform. This is often more important than the grade of material purchased. The foundry foreman and employees learn by practical contact with the supplies the best way to use them. Often without warning changes are made without the knowledge of the foundry. A new brand of pig iron or a new coke has been purchased; sand has been secured from different pits, or other supplies furnished from new sources. While the materials may be equal in quality to what they were using, it is strange country to the men and the foundry goes through a period of experimentation and loss before they forget how to use the old material and learn how to use the new.

The "human element" has been at work in the purchasing department. In their desire to make a showing for their end of the business, the buyers have substituted new material for that against which there was no complaint, perhaps because the new could be purchased slightly cheaper, and the results in the foundry may be loss and defective castings. When the foundry complains of this substitution, the purchasing agent usually replies: "Brown & Brown use this material and find it all right; why can't you?" or "It analyzes the same as what you were using." He fails to realize that Brown & Brown may have spent much time and money learning to use it and continue for that very reason. They know the cost of a change.

A Case in Point

I have in mind a case where castings kept coming bad for several months. One week they would be good,

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the next week they were condemned. Everything possible in the way of practice was tried without avail until a survey of all the material used showed the contract for the sand used in making the molds had been divided. Part was furnished by a dealer who knew what the foundry wanted and part by a new dealer who did not know. The sand from both was unloaded in one bin for the winter's supply. One grade was all right and the other was not. When the sand that was unsuitable was used the castings were bad; when a vein of the good sand was struck they were satisfactory.

The small saving effected in purchasing was lost a hundred times over in the foundry. The purchasing agent's duty to buy cheaply is unquestioned, but he should consider, first, that satisfactory material is of the greatest importance; that different men give their material different treatment. If it seems wise to change and often it may be, the change should be made with the co-operation of the shop man. The material should be tested and proved out by the men who must use it and a uniform and constant quality supplied as far as it is humanly possible.

Changes Require Infinite Care

Due to the lack of standards and the need of uniformity in supplies furnished the foundry, it becomes a fertile field for experimentation. When trouble occurs and defective castings result, the man in charge turns to other methods and ways of doing the work and that is the time when sound judgment must be used.

There are so many ways to make a casting bad; so many different things can cause the same defects; so many workmen contribute to its making that the real cause of trouble is often obscure and sometimes the best men fail to diagnose the symptoms correctly, so that when a radical change is made it must be watched and tried and tried again.

Don't declare the new method a success because it worked all right the first few times. Get an average over a period, see if it stands the test of time when the special interest and attention that are given to something new are withdrawn. Prove it right before you make a carload of work that may be rejected, for the most experienced may overlook some point or some unforeseen trouble may develop. Don't avoid new methods; search for them, cultivate them. It is the road to progress and good castings; but don't let enthusiasm over an apparently successful new method lead you into a bad hole and a heavy loss.

The Right Sort of Preparatory Work

A common reason for defective castings is that many foremen do not prepare ahead of time to overcome known trouble. A certain casting will be ordered and many will be spoiled; but finally the order will be filled and the pattern sent back to storage. Later the same casting will be ordered again and the same troublesome period will be gone through until that particular pattern grows to be considered a Jonah and is feared by the entire organization.

These are the jobs that run up the percentage of defective castings—the ones that are not mastered. When one loss has been sustained on a pattern, the foreman should set himself to work to control and correct that trouble. The time for experiment and study is when there is no order crying for production, when careful research can be made even though it means making some castings that are not on order and may never be used. It is a great deal more economical to make a few castings experimentally that will be scrapped than to lose 10 or 20 per cent of an order when the shop demands the product. Besides, this is taking the right attitude toward defective work—meeting it face to face and fighting it out, not heaving a sigh of relief when the order is filled.

Design Real Reason for Many Defects

Again, many of our troubles arise out of the design. The engineer makes his designs as he wants them. He does not know that the changing of the thickness of a section, the addition of a lug or boss, may change the manner in which the shrinkage of the iron occurs.

It may seem impossible that a small deviation from a tried design will give the foundry trouble; yet this is often true. And the foundryman may look everywhere else—to his iron, his coke and his sand—before he finds out that the design was the real reason for the defects. This point must be studied by the foundryman. He cannot expect his engineer to know how molten metal acts in a mold. He does not always know himself. The engineer must be open-minded enough to co-operate and change his design where practical and when requested by the foundry. An hour's work in the engineering department has often saved thousands of dollars in the foundry.

Ruling As to Rates on Bars

WASHINGTON, July 19.—The Interstate Commerce Commission has handed down a decision ordering the application of the same rates to cold-rolled steel bars as are given to merchant bars, on or before Oct. 1, on shipments from Cumberland, Md., in the Atlantic Seaboard territory, and from Beaver Falls, Pa., and other points adjacent to but not in Seaboard territory, to Galveston, Tex., by way of New York. The decision involves a complaint of the Texas Carnegie Steel Association vs. the Baltimore & Ohio et al. The commission held that the combination rail-and-water rates on cold rolled or drawn steel bars, bar iron (polished), and shafting are unreasonable and unduly prejudicial in so far as they exceed the rates on merchant bars and also that they violate the fourth section in that they are higher than the rates contemporaneously in effect over the same route by way of Galveston to Houston and other points in Texas.

Commissioner Hall, who prepared the decision, described processes with regard to the manufacture of the different kinds of bars to show that there are instances in the market where merchant bars are more valuable than shafting or cold-rolled bars. This was done to support the position that the difference in value is not sufficient justification for a variance in rates. The New York-Galveston water component was the one specifically attacked. It is 19c. higher on the cold-rolled bars and shafting than on merchant steel bars. The carriers defended the higher rate on the ground that the polished bars, used in making machinery shafting, automobile axles, etc., being covered with grease, were harder to handle and more likely to cause damage to ships by slipping out of the slings. It was also claimed that bending of the polished bars is more serious than the bending of merchant bars. Commissioner Hall said that the boat lines, while alleging the greater danger in handling the polished bars, had not introduced any evidence to show that they had ever paid any loss and damage claims on shafting which were attributable to the greater difficulty in handling or the fact that they were bent while in transit. Attention was called to the fact that the railroads make no distinctions between cold-rolled and other kinds of bars.

P. J. McBride and George B. McClennen, heretofore part owners of the Delta Equipment Co., 148 N. Third Street, Philadelphia, have purchased the company and now have sole ownership. The company will be continued under the same name. It recently purchased for its exclusive use the four-story building in which it is located. The Delta Equipment Co. deals in machine tools, electric motors and generators, boilers, engines, feed water heaters, pumps, air compressors and similar equipment.

Effective July 15, the Colonial Steel Co., Pittsburgh, announces a cut ranging from 8 to 15 per cent in all grades of tool steel. The company now is quoting No. 6 oil-hardened steel at 30c. per lb.; No. 7 Vanadium 24c.; No. 14 special 21c.; and its red star brand tool steel at 13½c.

Reasons for Wage Revisions Are Explained

President James A. Campbell Fears Prices Must Be Still Further Reduced—Believes Present Conditions Due Largely to High Freight Rates

"STEEL products have declined from $20 to $30 per ton since the prices were fixed by the Government, and my fear is that further reductions must take place in order to equalize with the farmer," states President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, Ohio, and a director of the American Iron and Steel Institute, in explaining the general wage reductions by independent interests, effective July 16. "These cannot be made without further reduction in costs. We have no assurance at present of a reduction in freight rates. Hence, we can only reduce our costs by reducing wages, which is unfair to our employees, as railroad wages have not yet been reduced to correspond.

"Not only the steel industry but all lines of industry, from the farm to the factory, and not only in this country but the world over, are seriously affected by this depression. The majority of the farmers have not yet sold all of their last year products—grain and cotton—and there are large stocks of these still on hand. Many of the farmers were advised by their bankers not to sell when they had the opportunity, on account of prices being lower than they expected to prevail later, but on the contrary, all of the products of the farm are now selling at lower prices than at any time since 1915, with some of them at lower prices than obtained prior to the war.

"There is some reason for every depression. In 1907 it was a financial depression, caused very largely by fear on the part of the people as well as on the part of the banks. With our improved Federal Banking system, the time, I believe, has happily gone by when we will have financial panics; so that we must look in some other direction for the cause of the present depression in all lines of business."

Cause of the Slump

Mr. Campbell attributes the current slump largely to high freight charges. "Since the first of January, I have talked with a large number of people on the subject of freight rates and their relation to the business depression, because this has been foremost in my mind all the time, and nearly every well informed man discussing it with me agrees that my diagnosis is correct," he adds.

"Our company has lost a large percentage of its export business, and I fear we can hope for little improvement in this respect as long as there is such a great disparity in exchange and wage rates as at present. It therefore behooves us to 'get our own house in order' so that the domestic business of the country can go on with as little disturbance as possible.

"If we have located the trouble, what is the remedy? The railroads are still paying a higher rate of wages than during the war. The union leaders, who control railroad labor, are refusing to make concessions. Even at present, with the small amount of transportation offered, many of the railroads are not breaking even; and while the War Labor Board ordered a wage reduction of about 12 per cent, effective July 1, this will give little relief.

Results of Reclassification

"The classification of railroad labor is even worse than the rate of wages the roads are paying, as in some cases railroad men who were receiving $60 a month prior to Government control were by reclassification raised to $240 per month under Federal control. Common laborers who were oilers of the block signals, receiving about $1.75 to $2 per day before Government control, were paid as high as $6 and $7 per day, reclassified as electricians. This classification was made under what is called the 'National Agreement' and was arranged by labor leaders who were called in consultation by Mr. McAdoo, when he was Director General of the railroads. Very recently there was considerable pressure brought to bear on the Railroad Labor Board to have it abolish the National Agreement, which it did, but in doing so specified that the railroads must make their own classification in agreement with their own workmen. Now these workmen, through the union labor leaders, are demanding that no change be made in the classification from that specified in the National Agreement.

"The railroad managers' hands are tied, and the railroads are under what might be called the triple control, with their managers looking after the operation of the railroads, the War Labor Board fixing the wages of railroad employees, and the Interstate Commerce Commission fixing the income, or rates received, which are based largely on the financial returns of the companies. Until this triple control is done away with and the railroad managers are held responsible for the operation of their lines, for the adjustment of wages with their employees, and for the freight rates charged, we cannot hope to get anywhere.

Favor Reasonable Wages

"I believe, of course, that railroad labor should be paid reasonable wages; but these wages should be in line with the prices of commodities and also in line with wages paid for other activities in the communities which the roads traverse. For instance, wages in the South are usually considerably less than those prevailing in New York, Chicago or Pittsburgh, or other congested districts because it costs less to live in many sections of the country than it does in other sections; and for that reason railroad wages should not be as they are now, alike the country over, but should be in line with the cost of living in each section; and only selfish wage earners or demagogic politicians believe, or pretend to believe, that railroad wages should remain as they were while the price of every commodity is being reduced.

"Many men in this community are walking the streets without employment. Most of these are willing to accept work at reasonable wages, and I am anxious to do everything I can to help them secure employment. The American Federation of Labor, at its recent meeting in Denver, made the statement that it would resist every reduction of wages in all lines. This is at least a selfish viewpoint. It is unfair to the workmen of this and every other community to suffer reduction of their earning power and at the same time be taxed, as they are on everything that they eat or wear, to keep the wages of railroad employees above what they are willing to accept for their own services."

Unique "No-Accident" Campaign

An impressive "No-Accident" campaign was launched July 14 at the Farrell, Pa., works of the American Steel & Wire Co., to show a clean safety sheet. The desirability of exercising caution at all times was stressed in talks by operating officials and by a pageant. John McHugh, assistant superintendent of the Farrell plant, acted as chairman. One float in the pageant represented four pallbearers bearing a casket which contained the remains of "Mr. Carelessness." A mule that has been working at the plant for 14 years bore a banner with the following inscription printed on both sides: "I am a dumb animal and have served 14 years without an accident. Have I more sense than you? Get some new sense." A truck loaded with old and new tools also conveyed the importance of the drive.

STEEL SHIPMENTS TO CANADA

New Regulation by the Dominion Government as to Imports from the United States

TORONTO, July 18.—Firms having occasion to import material from the United States are having an opportunity of seeing in action the proposals set forth by Sir Henry Drayton, Minister of Finance, in his last budget speech at Ottawa.

THE IRON AGE correspondent saw an invoice going through the office of the United States Steel Products Co. here, and on the bottom was the following wording:

> We certify that the fair market value as shown on this invoice is not less than the cost of production of similar goods on the date of shipment to Canada, plus a reasonable profit thereon.

To get at the meaning of this, one must turn to the situation confronting the authorities at Ottawa, when they were faced with the action of the United States Government in placing further barriers against the selling of farm produce in the United States. Previously much of this was bought by the United States for re-export to Europe, but this is out of the question now. Ottawa feels that either Canada is not selling enough to the United States, or the United States is selling too much to Canada. Of our total trade during the past year, 57 per cent was with the United States. Of total imports of $1,240,125,056, those from the republic to the south were no less than $856,593,470, or 69 per cent of the whole.

Sir Henry Drayton's Views

Speaking in the House of Commons, on May 8, Sir Henry Drayton, Minister of Finance in the Meighen Government, said: "As already pointed out, temporary tariff legislation of the United States would place a barrier against our exports to that country, amounting to no less than $168,000,000. Such or similar action made permanent, of necessity would require a careful and permanent revision of the Canadian tariff for the purpose of insuring the proper continuance of Canadian business—of insuring employment and Canadian stability—a matter of gravest moment to all our people. . . . Much of the unemployment at present existing results from the importation into Canada of goods at prices below the cost of production. In so far as the public is concerned, little price advantage has accrued to them from these importations. . . . Goods ought to be valued for customs purposes, not at forced-sale prices, justified by temporary quotations in the foreign market, but having regard to the regular standard value in that market and to cost of production, and a reasonable profit thereon."

What Amendment Says

Following the declaration of his principles, Sir Henry went on to propose the following amendment to the Canadian customs act:

> Provided that the value for duty of new or unused goods shall be in no case less than the actual cost of production of similar goods at date of shipment direct to Canada, plus a reasonable profit thereon, and the Minister of Customs and Inland Revenue shall be the sole judge of what shall constitute a reasonable profit in the circumstances.

The amendment was adopted, and came into effect on June 30. Toronto dealers, jobbers and warehouse interests believe the ruling will interfere with business coming from the United States. One dealer says, "The Government evidently does not know that the great bulk of steel business is being carried on just now without any 'reasonable profit' attached to it. The business of liquidation is still in progress. I think it will mean that we will be unable to take advantage of chances that come up of buying in lots from mills and jobbers at very advantageous prices, which we always try to pass on to our customers. Shipments are very light at the present time. Were they heavier, and business normal, the ruling probably would have never been made, for there would have been no reason for it. On the face of it, it seems as if the price to Canadian users will have to be marked up, to the advantage of Canadian steel makers."

Another Clause

The number of firms in the United States that have opened banking accounts here and are taking payments in Canadian money must run into hundreds if not thousands. The charge has been made several times that the absorption of the exchange has been used as another means of beating out the anti-dumping law, which makes it necessary for American goods to be sold here within 5 per cent of the selling price in the United States. The new ruling covering the computing of tariff charges from countries where Canadian money is not at par is as follows:

> Notwithstanding any of the provisions of this section, in computing the value for duty of the currency of an invoice, no reduction shall be allowed in excess of 50 per cent of the value of the standard of proclaimed currency of the country from whence the goods are invoiced to Canada, irrespective of the rate of exchange existing between such country and Canada on date of the shipment of the goods, and in respect of goods shipped to Canada from a country where the rate of exchange is adverse to Canada, the value for duty of the currency of the invoice shall be computed at the rate of exchange existing between such country and Canada at the date of the shipment of the goods.

The trade in Canada agree that the foregoing is aimed at the importation of goods from the United States to this country. Machine tool dealers differ as to the probable effect. Some of them hold that the better class of machine tools are not sold "at a price" at any time, and there will be little difficulty in selling, no matter which way the amount of duty is collected. Several of them have stated that the trouble will be in trying to get a Canadian substitute for certain lines which they have been bringing from across the border.

The steel and machine tool trade in general seem to accept the two rulings as part of the Ottawa Government's policy to protect Canadian trade from further depletion owing to the increased adverse exchange rates, and at the same time to do something for the manufacturing interests in the Dominion which have been persistently calling for support of the "Made in Canada" idea on the plea that it would help right exchange difficulties.

An Explanation Offered

BUFFALO, July 18.—Some explanation of the Canadian Government's ruling, referred to in the Buffalo market report in THE IRON AGE of July 7, with reference to information as to costs and profits appearing on shipments into Canada, has been made to mills and offices and the drastic nature of the ruling is modified to some extent. Steel men are informed that the purpose of the ruling was not to prohibit shipments from the States, but was aimed at Central European competition in steel products. In other words, the Canadian interests said the influx of materials from Europe threatened to interfere seriously with domestic manufacturers and the ruling followed. It is known that a number of shipments from the United States have been held up and the invoices returned to the shipper with directions to supply the information as to costs and profit. American shippers now understand that a reasonable assurance that goods are made at cost plus a reasonable profit will expedite shipping.

Fairbank & Co., Cleveland, have been appointed exclusive sales agents by the Chippewa Iron Mining Co., operating in St. Louis County, Minn., on the Vermilion Range. A considerable tonnage is available for shipment this year and the firm will be in position to ship between 300,000 and 400,000 tons during the season of 1922. There will be several grades of ore of both soft and hard hematite.

The sixth annual convention of the National Association of Purchasing Agents will be held Oct. 10-13 at Indianapolis, Ind.

Production and Uses of Cold-Drawn-Steel

Extensive Application in Many Industries—Annual Output Estimated at 900,000 Tons —Automobile Field Largest Consumer

BY C. E. BREGENZER

COLD-DRAWN steel has a wide field of application and there are few industries which do not use it in some form. The annual output last year is estimated at about 900,000 tons, or close to 3 per cent of the total finished steel.

The automobile industry has been one of the largest consumers. Its favored use for screw machine products and the fact that about 33 per cent of cold-drawn steel is handled through jobbers makes it a matter of some difficulty to determine accurately the relative percentages used by various industries, particularly as manufacturers have markets in some lines where others are



Group Showing Wide Range of Special Cold-Drawn Steel Shapes

not represented. A survey of the field gives approximately the following percentages:

Industry	Percentage
Automobile	30
Screw machine products	23
Agricultural machinery	15
Machine tools, textile machinery, printing machinery, etc.	8
Electrical machinery	5
Typewriters, cash registers, sewing machines, washing machines, etc.	7
Shafting	6
Export	6

These percentages of distribution showed considerable variation during the latter part of 1920 and early part of 1921, especially in the automotive and the agricultural machinery field.

Uses

The main uses of this steel are indicated in the table showing allocation of percentages in the various industries. It can be used for all purposes for which finished steel is used and has a well established place as a product of the greatest utility to machinery and automotive parts manufacturers, and new uses are being discovered constantly. One of the best known is for stock for automatic screw machines, semi-automatic screw machines, wire feed screw machines and turret chucking machines where it has proved most uniform for cutting, threading, forming and parting. Wear on tools is also reduced. It owes its popularity in the automotive industry to the high-speed production which it makes possible due to its free cutting qualities and to the fact that, when it is used as a substitute for drop forgings, it saves machining. A list of uses follows:

Adding machine parts
Aeroplane parts
Arbors
Automobile parts
Agricultural machinery parts
Automobile accessory parts
Axles
Ball races
Balls
Bag filling machine parts
Baking machine parts
Billing machine parts
Bolts
Bicycle parts
Cranes
Connecting rod keys
Candy machine parts
Center tit keys
Camera parts
Clutches
Carpet sweeper parts
Crank shafts
Cash register parts
Calculating machine parts
Casket handles
Chair rims
Clasps
Cones
Concrete mixing machine parts
Cream separator parts
Culinary utensils
Cups
Curtain rods
Cutlery
Dovetail keys
Dowel pins
Driving shafts
Electrical machinery parts
Electrical appliances
Electrical iron shells
Elevator guides
Fan shafts
Firearms parts
Flat taper keys
Furniture molding
Furniture parts
Furniture trimming
Gages
Gears
Gibs
Go-cart trimmings
Grain drill parts
Guides
Guns
Hand bag frames
Hardware specialties
Hubs
Instruments
Jar caps
Keys
Lantern frames
Locomotive parts
Lock washers
Marine engine parts
Machine tool parts
Machine gun parts
Mine car parts
Mining machinery parts
Motorcycle parts
Moving picture projector parts
Motor truck parts
Molding
Novelties
Nuts
Numbering machine parts
Package machine parts
Phonograph parts
Propeller shafts
Piano hardware
Pinions
Pin stock
Piston rods
Plates for electroplating
Pneumatic machinery parts
Propeller shafts
Printing machinery parts
Pump rods
Racks
Rear axle shafts
Roller skates
Roller chain parts
Rollers for bearings
Roller bearing hangers
Round end feather keys
Rivets
Screws
Screw drivers
Sewing machine parts
Stove parts
Stove trimmings
Shafting
Shoe eyelets
Shoe horns
Scale parts
Spark plug shells
Show case parts
School desks
Skate runners
Slides
Small tools
Special gib head keys
Splines
Spindles
Studs
Textile machine parts
Telephone instrument parts
Textile machinery parts
Threshing machine parts
Tool steel keys
Toy parts
Tractor parts
Turnbuckles
Typewriter parts
Type
Vacuum cleaner parts
Watch parts
Washing machine parts
Woodruff keys
Wrenches

The following list shows further uses of cold-drawn steel in some of the products noted above under parts:

Automobile, Motor Truck and Motorcycle Parts

Magneto,
Interrupter levers
Armature gear blanks
Starting motor shafts
Switch sleeves
Pole piece section
Distributor shaft
Axles
Spark plug shells
Conduit clamps
Cable clamps
Washers
Steering wheel pivot pins
Cam rollers
Push rods
Cams
Armature shafts
Wrist pins
Transmission countershafts
Bearing balls
Bearing rollers
Propeller shafts
Spindles
Rocker arms
Valve lifters
Shifter rods

Rifle, Revolver and Machine Gun Parts

Barrel spline
Bolt stop screw
Bolt stop spring rest
Butt plate spring screw
Butt swivel
Extractor collar
Floor plate
Front sight carrier
Guard screws (various)
Band pin
Band screw
Bolts
Screws
Nuts
Safety lock holder
Sleeve
Stock bolt
Butt plate bracket
Butt swivel plate
Magazine end
Rear sight slide
Front sight carrier pin
Sear
Sear stud
Sear pin
Trigger pin
Cocking piece
Floor plate catch
Safety lock plug
Striker

Typewriter, Billing Machines, Etc., Parts

Carriage frame rails	Ribbon spool driving ratchet pawl
Tabulator rack	Drop platen
Carriage frame front roll bracket	Line finder lower wire bracket
Margin stops	Line space driving shaft cam
Actuator driving pawl	Line space lever shaft bracket
Tabulator blade frame	Way rod

Hardware Specialties

Bells	Knives for food choppers
Chest handles	Locks
Door knobs	Metal furniture
Door plates	Metal molding
Door stops	Mince knives
Drawer pull	Push plates
Electric fan base	Sash lifts
Escutcheons	Sash locks
Ferru'es	Slides
Hack saw frames	Stove ornaments
Keys	Trunk hardware

Steel and Alloys Used for Cold-Drawing

All grades of steel, including alloy steels, are used for cold-drawing. Bessemer steel is the most suitable for stock for screws, bolts, nuts, spark plugs, gun and automotive parts, sewing machines, typewriters and practically every product of automatic screw machines. It is free cutting, accurate as to size, concentricity and straightness.

Open-hearth steel is also used for screw stock. It does not machine as freely as Bessemer but is used where more strength is required. Nickel steel, 3 to 3.50 per cent, is used for parts highly stressed, subjected to shock and vibration and possibly requiring threading. It is much used in the automotive industry and gives good service for shafts, ball and roller bearings, gears, spindles, axles, bolts, studs, piston rods, crank shafts, propeller shafts, clutches, turnbuckles, engine motor, machine and transmission parts. Nickel steel of 1 to 1.50 per cent is used where a better quality than plain open-hearth steel is required, also for minor structural purposes in machine manufacturing.

Chromium steel machines readily and has a good range especially for ball races, cups and cones. Chrome-nickel steel is used for important structural parts as it is very tough and has great ability to withstand shock. It should be heat-treated after cold-drawing, otherwise there is no gain commensurate with the increased cost. Chrome-vanadium machines more readily than chrome-nickel and is used for the most important case-hardened or heat-treated parts. It is suitable for shafts, gears, axles and important machine parts. Vanadium steel is used when increased elastic limit, tensile strength and durability are required.

The illustration shows some of the special shapes which have been cold-drawn. Any shape can be drawn for which a die can be made. The experience gained by American manufacturers in the manufacture of cold-drawn products indicates accuracy as to shape and high finish as to smoothness of surface. Investigations abroad show that British and German cold-drawn steel does not equal American products, the former lacking accuracy and the latter being brittle.

United States Copper Production

Figures of the United States Geological Survey show that the smelter output of copper in 1920 amounted to 1,209,061,040 lb., compared with 1,286,419,329 lb. in 1919 and considerably larger amounts in the four preceding years, as shown in the table. The value of production in the United States in 1920 is given as $222,467,000, as compared with $239,274,000 in 1919 and considerably larger amounts in the four preceding years. It is to be noted that the low figures of value in 1919 and 1920 are evidence of the lower price at which copper has been sold during the past two years.

	Thousands of Net Tons					
	1915	1916	1917	1918	1919	1920
Smelter output	694	964	943	954	643	605
Mine production	744	1,003	948	955	...	...
Consumption, new copper	568	739	697	831	457	527
Exports, metallic	341	392	563	372	258	312
World production*	1,189	1 496	1,569	...	1,101	...
Copper ore produced	43,404	57,863	58,483	62,289	...	...
Average yield, per cent	1.66	1.70	1.60	1.51	...	...
Average price, per lb.	17.5c.	24.6c.	27.3c.	24 7c.	18.6c.	18.4c.
Value, millions	$242.9	$474.3	$514.9	$471.4	$239.3	$222.5

*All other figures are for United States only.

Figures are not yet available for the production of the mines in either 1919 or 1920, nor for the production of copper or average yield of copper per ton in those years. The latest figures for copper ore produced are those of 1918, with a total of 62,289,069 short tons, from which the average yield of metallic copper was 1.51 per cent. The average price of copper in 1918 is given as 24.7c. per lb. compared with 18.6c. in 1919 and 18.4c. in 1920; the present price is under 13c.

Figures for the world production of copper for 1920 are wholly incomplete. For 1919 figures are available for most of the countries producing large amounts. If the 1919 production of the other countries be estimated at the same figures as obtained for the last year for which figures are available, the grand total for the world is 2,202,885,000 lb. American production in 1919 represents, therefore, 58.4 per cent of the total world production, compared with 64.4 per cent in 1916.

By adding to the United States stock of copper at the beginning of the year the total supply of new copper, and then deducting from the sum the amount of copper exported and the stock at the end of the year, an estimate is obtained of the apparent consumption of copper by the United States. This figure for 1920 is 1,053,838,558 lb. as compared with 914,471,572 lb. in 1919 and considerably larger quantities in the four preceding years.

Sheet and Tin Mill Workers Reduced

Average invoiced selling price of Nos. 26, 27 and 28 gage plain sheet steel shipped by Mid-Western mills during the 60-day period ended June 30 was disclosed as 3.85c. per lb., at the bi-monthly examination of sales sheets July 14 at Youngstown, Ohio. This was a decline from 3.95c. revealed two months before, and sheet workers as a consequence sustained a reduction of 3 per cent on the base rate for the July-August period. The actual working reduction, however, from the rate paid in May and June is less than 2 percent. The tonnage rate for sheet mill employees is still 51 per cent above base, as compared with 109½ per cent at the peak rate during the war.

Tin mill workers sustained a larger loss in tonnage rate, however, as the examination disclosed a reduction in the price of tin plate per base box to $5.95 from $6.50, on which the May-June rate was based. This decline in selling price produced a reduction of 11 per cent in the base rate, or an actual cut on the going rate of 7 per cent. Tin mill employees are now paid a rate which is 49 per cent above the base.

The average shipment price of tin plate during the past two months compares with a nominal market quotation of $5.75 per base box, and in the case of sheets 3.50c. per lb. As neither of these prices is regarded as firm, it is likely that wage scale adjustments will continue to trend downward.

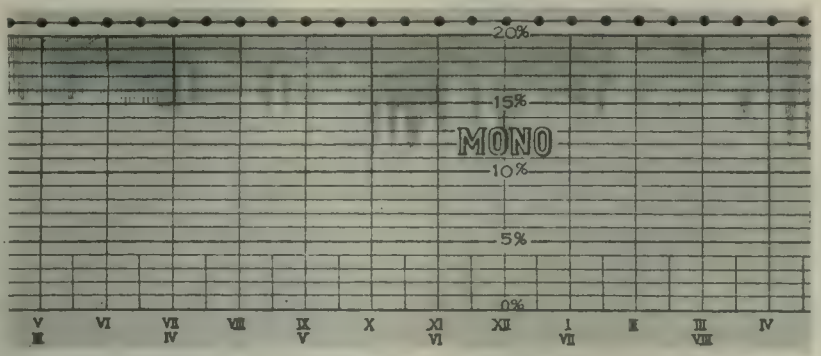
The settlement was conducted by representatives of the Western Sheet and Tin Plate Manufacturers' Association and the Amalgamated Association of Iron, Steel and Tin Workers.

Chicago will likely be selected as the meeting place for the adjourned conference to adjust the bar iron scale. Representatives of both the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers will convene on Monday, July 25, in separate conferences, and will meet in joint session on July 26. At the previous conference in Atlantic City early in June, manufacturers and the men were unable to agree upon the new contract.

RECORDS COMBUSTIBLE GAS

Duplex Mono Indicates Both CO_2 and Escaping Burnable Gas

A gas recorder which not only shows the amount of CO_2 in the flue gases of a boiler furnace, but the escaping combustible gases as well, is being manufactured by the Mono Corporation of America, 25 West Broadway, New York, the instrument being known as the Duplex Mono. The maker calls attention to the fact that the maximum efficiency in firing is secured when the highest amount of CO_2 results without the accompaniment of combustible gases and that the Duplex Mono gives a complete indication of all the elements of waste heat.



The White Space at the Bottom Represents Carbon Dioxide. The lightly shaded areas represent combustible gases

No moving mechanical parts are used to force the gas through the apparatus. Mercury is used instead and also performs the functions of valves. The apparatus is dust-proof and is found to require little attention.

The accompanying flue gas recorder chart was produced in tests of a boiler furnace. The clear space at the bottom represents CO_2 in the flue gases, while the lightly shaded areas between the white area and the heavily shaded area indicate combustible gases. The chart reveals as a whole by the continual presence of combustible gases, improper firing and poor draft regulation, in spite of the high amount of CO_2.

The Duplex Mono serves to make sensible heat and combustible gas losses visible to the fireman and the plant executive. No limit should be placed on how high the CO_2 should be kept by the fireman, provided he avoids combustible gases in the flue. Under this régime, the fireman who maintains the highest average CO_2 record with the least evidence of combustible gases is the best man, provided, of course, that he carries his share of the load.

By-Product Coke Production

WASHINGTON, July 19.—Reports from operators of by-product coke ovens again are being received by the Geological Survey, after having been discontinued at the close of the war. The Survey as a result has resumed publication of production figures, and in its weekly report of July 16 gives current statistics for June in a preliminary and estimated form. The total output, on this basis, for that month was 1,540,000 net tons. In comparison with the monthly average for 1920, this was a decrease of 1,025,000 tons, or 40 per cent. As the present maximum capacity of the by-product ovens in the United States is in round numbers 3,510,000 tons of coke per month, the bulletin states, it will be seen that the industry was operating during the month of June at only 44 per cent of capacity. Of the 81 plants reporting, 10 were closed down entirely. As with active demand an average production of 85 to 90 per cent of capacity is to be expected, it is pointed out that the June output of by-product coke was less than half of normal. The depression is declared to be more significant when the virtual cessation of beehive coke manufacture is remembered.

The coal charged in June is estimated at 2,210,000 tons. The normal monthly consumption of the ovens, assuming 85 per cent operation, would be 4,300,000 tons. The by-product ovens therefore were getting along with some 2,090,000 tons of coal per month less than they would be using if business were active.

The monthly output of by-product coke in the United States in net tons, exclusive of screenings and breeze, is reported as follows:

	Coke Produced	Coal Charged
1917 monthly average	1,870,000	2,625,000
1918 monthly average	2,166,000	3,072,000
1919 monthly average	2,095,000	2,988,000
1920 monthly average	2,565,000	3,685,000
June, 1921	1,540,000	2,210,000

Rate Not Unreasonable

WASHINGTON, July 19.—Rates applied on steel ingots from San Francisco and South San Francisco to Seattle, Wash., between Oct. 24, 1918, and June 18, 1919, were not unreasonable or unduly prejudicial, according to an opinion of the Interstate Commerce Commission based on the complaint of the Pacific Coast Steel Co., vs. Southern Pacific, et al.

It is the contention of the complainant that the rate applicable to castings should have been imposed on the shipments of the large ingots which, though a raw product, took a higher rate than castings. Seventy-three car loads of the ingots were to be forged into ship shaftings and moved on rates of 52.5c. from San Francisco and 55.5c. from South San Francisco. The steel company held that the rate of 44c. on castings should have been charged. The lower rate on castings was due to the competition of ships for business between San Francisco and Portland.

High Wages in Germany

WASHINGTON, July 19.—According to the statistics of the Union of German Metal Workers, the largest trade union in Germany with a membership of 1,600,000, about 63 per cent of these workers are receiving wages which are more than 800 per cent greater than those of 1914. About 36 per cent are receiving wages from 500 to 800 per cent greater and the remainder are receiving wages which have not increased as much as 500 per cent since 1914. The increase in wages in the German metal industry has been set forth in a report made to the Bureau of Foreign and Domestic Commerce by Economist Consul Maurice Parmelee, Berlin, based on figures prepared by a statistical bureau of the union showing wages and cost of living for those engaged in the metal industry. The investigation included not only members of the union but many other workers in the metal industry, so that the report covered 2,300,000 workers. It is stated that it is not possible from the statistics to arrive at an average wage increase for the whole of this group of workers.

The trade unions estimate that the entire cost of living for a family of four has increased about 1550 per cent since 1914, while Calwer's Bureau, a private statistical bureau, which usually makes use of official statistics, estimates that the cost of food alone for a family of four has increased about 1470 per cent since the year mentioned.

C. W. Leavitt & Co., New York, have been appointed selling agents in the United States for Mines de Manganese, Marquesa-Baja, Chili, producers of high grade manganese ore. New equipment now being installed at the mines will place that company in a position to ship up to 300,000 tons of ore per annum.

The General Fireproofing Co., Youngstown, Ohio, has instituted a general wage reduction of 15 per cent.

Labor Costs in Belgium

Hourly wages in the iron and steel industries of Belgium, with conversion into American values at the rate of 7.6c. per franc, are shown in the following table:

Steel Works

	Francs	U. S. Cents
Converters:		
Smelters	3.15	23.94
Retort hands	3.15	23.94
Cupola hands	3.05	23.18
Sheets:		
Heaters	4.17	31.69
Rollers	4.19	31.84
Laborers	2.02	15.35
Stamping and rolling:		
Heaters	3.58	27.21
Rollers	3.60	27.36
Hammerers	4.33	32.93

Open Hearth

	At Furnaces		Casting	
	Francs	U. S. Cents	Francs	U. S. Cents
Founders (melters)	3.09	23.48	2.42	18.39
Furnace hands	3.05	23.18	2.38	18.09
Laborers	2.75	20.90	2.31	17.56
Boys	1.58	12.01	1.43	10.87
Masonry:				
Masons	297	22.57	...	....
Laborers	1.83	13.91	...	....

Blast Furnaces

	Francs	U. S. Cents
Founders, maximum	2.50	19.00
Founders, minimum	2.30	17.48
Laborers	2.48	18.85
Overseers	2.38	18.09

Foundries

	Francs	U. S. Cents
Molders	3.00	22.80
Core makers	3.00	22.80
Modelers (pattern makers)	3.00	22.80
Mechanics	2.70	20.52
Chippers	2.50	19.00
Laborers	2.35	17.86
Apprentices, maximum	1.60	12.16
Apprentices, minimum	0.50	3.80

Machine Shops

	Francs	U. S. Cents
Turners (lathe hands)	2.60	19.76
Planers	2.45	18.62
Milling machine men	2.60	19.76
Drillers	2.60	19.76
Borers	2.40	18.24
Mortisers	2.50	19.00
Mechanics	2.55	19.38

Boiler Works

	Bridge Work		Boiler Work	
	Francs	U. S. Cents	Francs	U. S. Cents
Tracers (layers-out)	2.90	22.04	2.90	22.04
Fitters	2.60	19.76	2.65	20.14
Riveters	2.60	19.76	2.60	19.76
Machine tool operators	2.55	19.38	2.65	20.14
Boiler makers	2.50	19.00	2.50	19.00
Laborers	2.10	15.96	2.10	15.96
Forges:				
Smiths	...	....	*2.50	19.00
Stampers	...	....	*2.00	15.20
Laborers	...	....	1.90	14.44

*Receive bonus of 35 per cent.

Prices of iron ore used in Belgium are reported to be 18 francs ($1.37) per ton for 35 per cent ore of Belgian origin, this being the price at the mine. Spanish ore containing 52 per cent iron, for hematite pig, costs 85 francs ($6.46) per ton. Blast furnace coke has sold since June 1 at 112 francs ($8.51) per ton.

American Automobiles in Norway

American automobiles predominate in the Norwegian market but English, French, Italian, Dutch and German cars also are offered. Most of the importations during 1918-1920 period came from the United States. American cars owe their supremacy, it is stated, to superior motors, but the European car is less expensive, as a rule, owing to the lower cost of its transportation to Norway. The number of motor cars of all classes in use in Norway rose from 1007 in 1913 to 7915 in 1919, according to a report from United States Consul General Osborne at Christiania. More than 5000 cars were imported in the first eleven months of 1920, and the total number now in operation is estimated at more than 12,000. The distribution among a population of some 2,600,000 is now at the approximate rate of 1 to 216 persons.

In 1918-1920 American manufacturers obtained advance payments before accepting orders, although Norwegian importers objected to this practice. Since the war, this requirement has been modified, and in some cases ninety day drafts are now being accepted in lieu of cash in advance.

Trucks of the heavier type are not in such demand as the light. Delivery cars of the lighter kind are also preferred.

Steel in New American Ships

Figures of the Bureau of Navigation of the Department of Commerce show that at the close of the fiscal year, June 30, the number of American documented vessels was 28,500, of a total of 18,350,000 gross tons. Comparison is made with the British tonnage of one year before, at 18,330,424 gross tons, comprised in 8561 vessels of 100 tons and over. The American figures include a great many vessels under 100 tons, which would heavily affect the number of vessels, but only slightly affect the total gross tonnage.

American sea-going vessels of 500 tons and over number 3723 of a total of 13,234,401 gross tons. Great Lakes vessels, 2850 in number, counted over 2,625,000 gross tons. This makes a total of 15,859,000 gross tons of large vessels, compared with 7,928,688 gross tons of all vessels in 1914. The increase during the last fiscal year was about 2,025,000 gross tons, or something more than 12 per cent.

This increase, having been almost wholly in steel vessels, must have represented fully 1,000,000 tons of iron and steel, of which perhaps 750,000 tons consisted of plates and shapes. This is more than 10 per cent of the 1920 production of 7,338,420 tons in shapes and in plates ¼ in. thick or over.

United States Foreign Trade

Preliminary figures for the fiscal year ended June 30 show imports valued at $3,666,769,537 and exports valued at $6,519,365,734. This represents a total trade of $10,186,135,271, which, with the exception of the two immediately preceding years, is the largest on record. Comparative figures are shown in the table. January of this year ended a period of 31 consecutive months during which the exports did not in any month fall below $500,000,000. December, 1920, ended a period of 22 consecutive months during which the imports did not in any month fall below $250,000,000. These two stretches of high figures are the greatest, both in duration and in value, which we have ever experienced.

*Millions of Dollars, United States Foreign Trade**

Year Ending	Imports	Exports	Total Trade	Export Excess
June 30, 1917	$2,659	$6,290	$8,949	$3,631
June 30, 1918	2,946	5,920	8,866	2,974
June 30, 1919	3,096	7,232	10,328	4,136
June 30, 1920	5,238	8,109	13,347	2,871
June 30, 1921	3,667	6,519	10,186	2,852

*Excluding movements of gold and silver.

Decline in German Machinery Exports

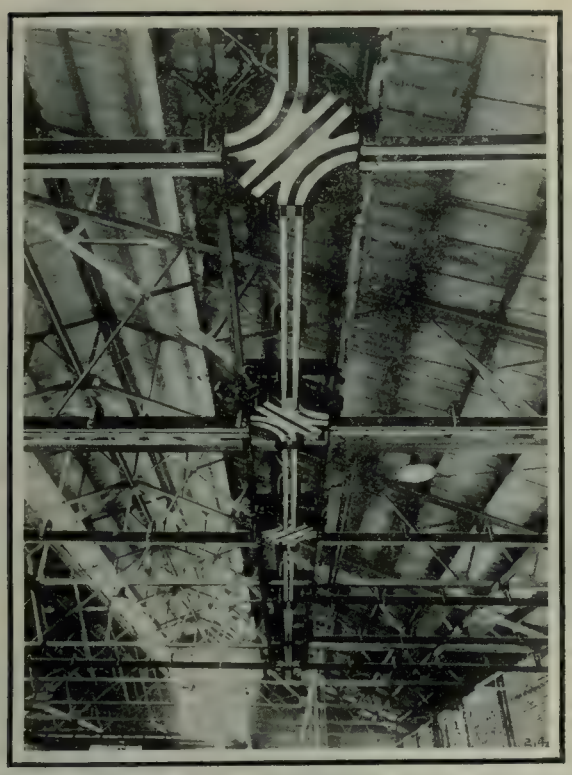
The association of German machine builders (*Verein Deutscher Maschinenbau Anstalten*) held its annual meeting in Berlin June 8. The opening address by Dr. E. von Borsig, according to *Stahl und Eisen*, emphasized the necessity of increasing the export of high priced products, because of the tax burden which had been imposed on export by the peace terms. The annual report showed that in May, 1921, 944 individual firms and 40 branch works representing over 550,000 employees were members of the association. In view of the vital importance of export, the association has, in co-operation with other industrial branches, worked out a preliminary draft for a new tariff, and has already investigated its probable effect in Switzerland, Sweden and Czecho-Slovakia. Since October, 1920, 20,000 export orders have been the monthly average.

The address of Dr. von Borsig showed that the machine building industry now employs 700,000 men. The industry, according to official reports, exported six milliards marks ($90,000,000) of machine products in 1920, but this year has shown a decrease, with generally poorer business conditions in the industry. The discussion at the meeting bore on the necessity of quality to hold export markets, also of more economic production.

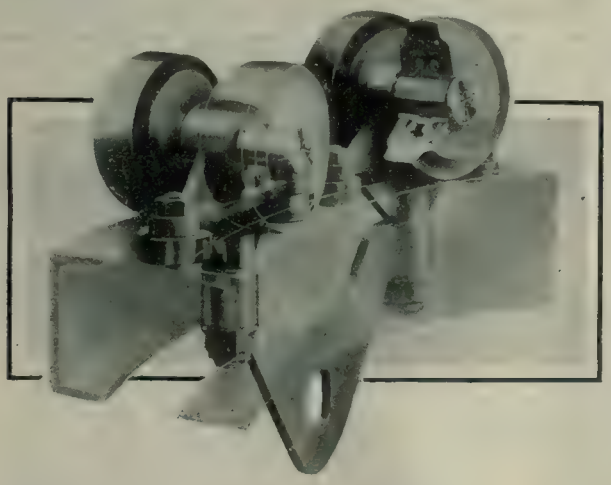
Short-Turn Overhead Trolley System

A short-turn overhead trolley system comprised of tracks, trolleys and switches has been placed on the market by the Whiting Corporation, Harvey, Ill. A section of an installation of the system is shown in the accompanying illustration.

The track, consisting of two parallel standard rolled channels spaced 2⅛ in. between flanges and held in place by champs, is designed to carry loads with no intermediate supports except at the splices, corners and switch points and is fabricated to meet the requirements of each installation. Spanning a long span over a driveway, from one building to another, can



Short-Turn Overhead Trolley System. The track has no intermediate support except at the splices, corners and switch points. Trolleys run on the level top of the channel tracks



also be done without intermediate supports by using a heavier section, keeping the channels 2⅛ in. between flanges but extending down to the depth of the channel.

Right and left 90-deg. switches, right and left 45-deg. switches, and universal switches are part of the equipment. Each corner and switch connection is interchangeable and can be removed at any time and a double or a universal switch bolted in the same place. All of the short turn corners and switches have a track curvature of 18 in., turning the load practically at a right angle, a feature especially advantageous in foundries in getting up and serving a row of brass furnaces or machines close to the wall without losing space by long sweeping curves. It is likewise adaptable to freight and terminal houses.

The track is equipped with special trolleys having 2, 4, or 8 wheels, ball bearing mounted, and having guide rollers which run between the toes of the channels. The trolleys run on the level top of the channel tracks and are designed so that they can swing in the same 18 in. radius curves.

Electric hoists may be used as well as chain blocks. Binding of the trolleys and the possibility of trolleys running off the track is said to have been effectively eliminated. The sections of track are built and erected as single units, a feature advantageous to low erection costs.

Molding Sand Research

In co-operation with the National Research Council, the American Foundrymen's Association is undertaking an investigation of natural and synthetic molding sands and of the employment of greater proportions of used sands in molding operations; also a study of refractory sands and refractory and plastic clays. The program as laid out at present is:

1. To collect all published information available on these subjects in this and foreign countries. This work is now well under way.

2. To study and formulate by field operations of a practical technical investigator, the practices in the best foundries of the country.

3. To submit all information so obtained to a committee composed of practical foundrymen and technical experts, with a request that this committee formulate suggestions for promising lines of research that might be followed to attain the desired end.

The bibliographies were prepared by the National Research Council. The work of the technical investigator is made possible by funds placed at the disposal of the American Foundrymen's Association for research work.

President W. R. Bean, in a letter to the members of the association, submits a questionnaire the answers to which are expected to be of help to the committee. Members who have been able to get greater tonnage from their sand by special mechanical mixing, by the use of old core and molding sand, or in other ways are asked to give details.

Decrease in Steel Corporation's Orders

Unfilled orders on the books of the United States Steel Corporation June 30 were 5,117,868 tons, compared with 5,482,487 tons May 31. This is a decrease of 364,619 tons and compares with one of 362,737 tons in May, 439 541 tons in April, 649,102 tons in March, 639,297 tons in February and 574,958 tons in January, and represents the eleventh consecutive monthly decrease reported. The unfilled tonnage a year ago was 10,978,817 tons, or 5,860,949 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28	6,933,867	9,502,081	6,010,787	9,288,443
Mar. 31	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30	5,845,224	10,359,747	4,800,685	8,741,882
May 31	5,482,487	10,940,465	4,282,310	8,337,623
June 30	5,117,868	10,978,817	4,892,855	8,918.866
July 31	.....	11,118,468	5,578,661	8,883,801
Aug. 31	.....	10,805,038	6,109,103	8,759,042
Sept. 30	.....	10,374,804	6,284,638	8,297,905
Oct. 31	.....	9,836,852	6,472,668	8,353,293
Nov. 30	.....	9,021,481	7,128,330	8,124,663
Dec. 31	.....	8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

The Isthmian Steamship Co.'s vessel, Atlanta City, sailed July 12 from Mobile, Ala., for Darien and Yukow with 5000 tons of steel rails and a heavy tonnage of splice-bars, nuts, bolts and rivets for the Manchurian railroad, cargo coming from mills of the Tennessee company. The Charlton Hall sails July 14 with 5400 tons of steel rails for Seward, Alaska, for the Alaskan railroad. A considerable tonnage of angle bars was also taken. This cargo was also from the Tennessee company mills and is one half of a recent order.

June Steel Ingot Output at New Low

The steel ingot statistics of the American Iron and Steel Institute for June show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output last month of 1,003,406 gross tons, as compared with 1,265,850 tons in May. The decrease was 262,444 tons, or about 20.7 per cent. Estimating the production of the other companies on the basis of those reporting, the total production of ingots in June was 1,191,693 tons, or 47,667 tons per operating day, counting 25 working days to the month, against an estimated total of 1,503,206 tons, or 57,815 tons per operating day in May. This is a decrease of 311,513 tons or 10,148 tons per day. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920...	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920...	26,197,843	8,112,753	121,656	34,432,252
January, 1921...	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406

The June ingot production was at the yearly rate of 14,824,437 tons, counting 311 operating days to the year. This compares with a rate in May of 17,980,465 tons, of 17,242,773 tons in April, and of 21,258,405 tons in March. The decrease of 311,513 tons in the estimated ingot output of all companies in June from that of May compares with a decrease of 156,388 tons in the June pig iron output from that of May.

Iron and Steel in Four Countries

Comparison in production of pig iron and steel ingots and castings for the United States, Great Britain, France and Belgium may be made, up to the end of May, figures for Germany not being available. The figures shown are all on the basis of monthly averages, giving the averages for 12 months in 1913, 1919 and 1920, for five months of 1921, and the figures for May alone.

Average Production per Month, in Gross Tons

	United States	Great Britain	France	Belgium
Pig Iron				
1913	2,580,513	855,000	427,000	203,800
1919	2,584,614	617,000	198 000	20,600
1920	3.077,167	667,300	272,100	92,700
1921, 5 months..	1,672,667	313,100*	287.700	97,700
1921, May	1,221,221	13,600*	280,000†	74,600
Steel Ingots and Castings				
1913	2,608,406	639,000	385,000	202,300
1919	2,889,269	658,000	179,000	27,400
1920	3,511,078	754,700	242,900	101,300
1921, 5 months..	1,900,000†	282,500*	254,600	97,100
1921, May	1,503,000†	5,700*	250,000†	62,800

*Showing effects of the coal strike. †Estimated.

Steel Employment Still Falling

WASHINGTON, July 12.—Unemployment in the iron and steel industry showed a further decline of 19,701 workers in June, amounting to 5.7 per cent, according to the monthly survey of the United States Employment Service. The number engaged in the iron and steel industry in June was 21.3 per cent of the total reported employed in the 14 groups dealt with. The figures of the Employment Service relate to 1428 firms in 65 principal industrial centers, employing a total of 1,600,000 workers, and show a net decrease of 46,414, or 2.9 per cent on the pay rolls in June. According to these figures, therefore, the decrease in employment in the iron and steel industry was 42.7 per cent of the total net decline.

Stating that detailed examination of the returns clearly indicate the fundamental causes of the protracted industrial depression and the tide of unemployment, the report says:

"Continued unsatisfactory conditions of transportation, with freight rates in many instances considered almost prohibitive; lack of anything like a normal foreign market; the present low value of farm produce; stagnation in iron and steel; high costs of construction and general dullness of the retail trade stand out prominently as leading factors in the situation."

It is stated that there are indications at some points of resumption of building operations, though for the most part on a restricted scale. Industry generally is declared to be optimistic, and while the likelihood of a dull summer in most lines is fully recognized, the tendency is to count on employment improvement by fall and a healthy, though not spectacular, business revival by the spring of 1922. Twenty-six states scattered over all sections of the country reported employment increases in some lines, while 39 showed decreases in employment for the month of June.

The following table is from the Bureau of Labor Statistics:

Month	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
May, 1921.....	119	118,802	$5,957,985	$50.15
June, 1921.....	117	111,540	4,896.331	43.90
June, 1920.....	117	184,537	13.989,510	75.81
Automobiles				
May, 1921.....	44	93.296	*3,126,958	33.52
June, 1921.....	47	96,254	*3,154,773	32.77
June, 1920.....	47	154.082	*5,230 496	33.95
Car Building and Repairing				
May, 1921.....	54	39,276	2,545,577	64.80
June, 1921.....	56	37.945	2,515,988	66.31
June, 1920.....	56	64,965	4,084,912	62.87

*Weekly.

Cost of Living Slowly Falling

Wholesale prices declined 2 per cent during June, according to figures of the Bureau of Labor Statistics. The heaviest declines were of 4.35 per cent in metals and metal products and 4.55 per cent in house furnishing goods. Only one group (farm products) is now lower than metals and metal products; one year ago, metals and metal products were lower than any other group. House furnishings are still 2½ times 1913 prices and building materials more than double their 1913 level, although all commodities, combined, show but 48 per cent above 1913 prices. Except for the last line, the following table represents wholesale prices.

Index Numbers of Wholesale Prices, by Groups of Commodities
(1913 equals 100)

	1920 June	1921 May	1921 June	Decline in One Year Per Cent	Per Cent of the Advance Over 1913
Farm products.....	243	117	113	53.5	90.9
Food, etc.	279	133	132	52.7	82.1
Cloths and clothing....	335	181	180	46.3	66.0
Fuel and lighting.....	246	194	187	24.0	40.4
Metals and metal products	190	138	132	30.5	64.5
Building materials.....	337	202	202	40 0	57.0
Chemicals and drugs..	218	166	166	23 9	44.1
House furnishing goods	362	262	250	30.9	42 7
Miscellaneous	247	151	150	39.3	66.0
All commodities.....	269	151	148	45.0	71.6
RETAIL FOOD COSTS	219	145	144	34.2	63.0

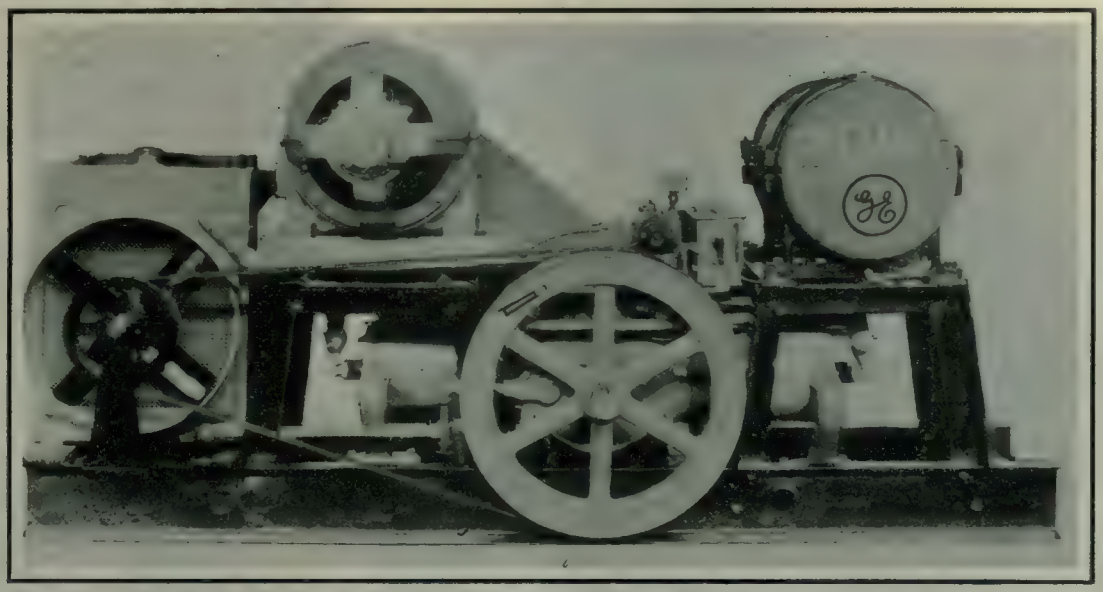
Continued rapid progress is being made in the construction of the plant of Durant Motors, Inc., in Lansing, Mich. Flooring work is now being done. Deliveries have been started on 300,000 brick by the Briggs Co. of Lansing, which also has supplied 65 tons of reinforcing steel.

The Stahleisen Publishing Co., Düsseldorf, Germany, publisher of *Stahl und Eisen*, has acquired the publishing rights of *Das Ferrum* which suspended publishing in 1916 on account of the war.

New Portable Arc Welding Sets

The General Electric Co., Schenectady, N. Y., has placed on the market two types of gas engine driven arc welding sets, one for medium, or intermittent duty, and the other for heavy duty. Both outfits are adapted to industrial plants where the work to be done is located in odd places and where installation of permanent equipment is not warranted. Their particular field, however, is in places where electric power is either unavailable or inconvenient or costly to secure, such as marine work, or for welding experts who own their set, and travel about in localities where there is no electric power.

The medium duty equipment was designed particularly for intermittent duty. The generating unit consists of a type WD 10-4 kw. 1200 r.p.m., 60-20 volt 200 ampere generator directly connected by a flexible coupling to a Matthews, Model F, 4 cylinder, 4 cycle, 20 hp. gasoline engine. The engine, radiator, generator and welding panel are assembled on a rigid cast iron base, which, in turn, is mounted on wooden skids. The set is 86 in. long, 28 in. wide, and has a net weight of about 2000 lb.



The Arrangement of the Various Units of the Portable Arc Welding Set, Compactly Mounted on a Structural Steel Base, Makes It Flexible for Work in Odd Places

The heavy duty equipment can be arranged to supply either one or two welding circuits. It consists ordinarily of a 20 hp. 2 cylinder opposed Reliable Heer, model 00, gas engine, a type WD 9 generator and welding panel, the whole mounted on a welded structural steel base with a net weight of 2400 lb. for the single-operator equipment and 3200 lb. for the double operator equipment.

Declared a Common Carrier

WASHINGTON, July 19.—The Benwood & Wheeling Connecting Railroad, owned by the National Tube Co., and operating along the Ohio River at Benwood, W. Va., where it performs terminal switching services to and from trunk lines, is a common carrier, according to an opinion handed down last Saturday by the Interstate Commerce Commission. Having been officially given this status, the commission states that the railroad is entitled to receive divisions out of joint rates or absorptions of switching charges under appropriate tariff provisions. The privileges given the road were sought in a complaint it made against the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad, et al.

A finding of unreasonableness and an order of reparation have been issued by the commission in connection with a complaint of the Illinois Steel Co. vs. Elgin, Joliet & Eastern Railroad. The commission held that a rate of $5 per car plus 15c. per net ton on movements of coke from the ovens to unloading points in complainant's plant at Gary, Ind., was unreasonable to the extent it exceeded $6.50 per car. Reparation is to be made on the basis suggested on 15,448 carloads of coke shifted from the ovens to blast furnaces in the period between June 25 and Sept. 22, 1918.

Great Bridge Proposed

SAN FRANCISCO, July 8.—J. Vipond Davies and Ralph Modjeski, distinguished tube and bridge engineers, have just issued their preliminary report on the proposed structure to join San Francisco and Alameda counties, in which a combined mole, bridge and tunnel are recommended. It is estimated that four years will be required to complete it, at a cost of around $40,000,000.

The proposed plan involves a tube passing from San Francisco beneath the bay channel at a depth of at least 40 ft. below mean low water and rising thence to connect with a bridge of 40 short spans; this in turn to be continued to the Alameda shore by a trestle and solid fill. There would be 3500 ft. of tube, 11,500 ft. of bridge, 3600 ft. of pile trestle and 12,000 ft. of fill or mole. The crossing would provide for two railroad tracks and a vehicular roadway through the tube 20 ft. in width. Provision would be made for the future construction of a second tube to meet the bridge, over whose span, as well as on the trestle and fill, the driveway would at once be constructed at a 40-ft. width.

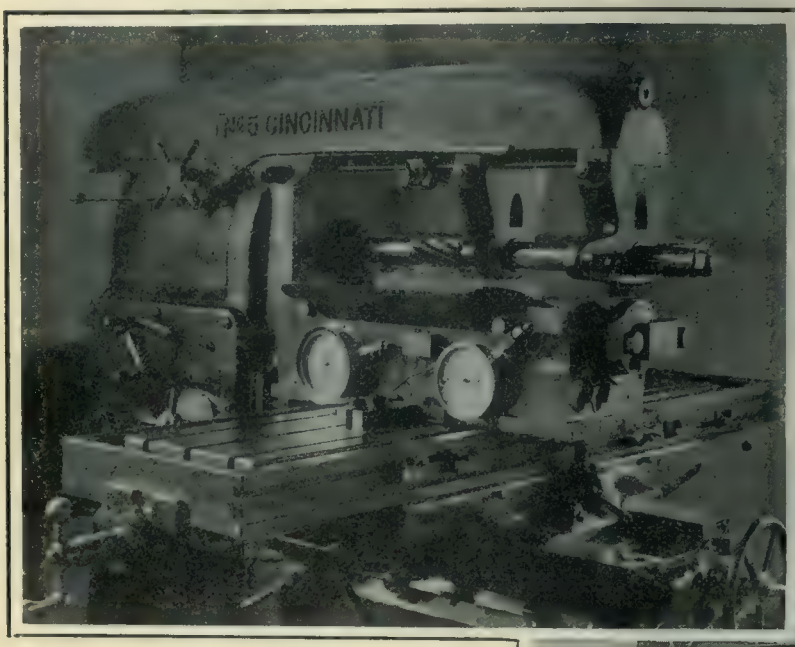
A comparison calibration of the 2,000,000-lb. chain testing machine located at the Boston Navy Yard has been completed using the calibration bar extensometer method. In this case a large 5¼-in. bar of nickel steel was used, the deformation of which was measured by means of a special extensometer. The bar was first loaded in the large Emery testing machine of the Bureau of Standards and the elongation measured for 10,000 lb. increments of load. The bar and extensometer were then taken to the Boston Navy Yard and 6 loadings to 1,000,000 lb. were made in a similar manner. A comparison of the results obtained from the two machines indicated that the chain testing machine was reading about 3.4 per cent higher than the large Emery machine.

To prevent accidents when oiling and repairing crane trucks, as well as to save time and labor, the Illinois Steel Co. has provided safety platforms at its South Chicago works, a platform being located at each end of a crane and attached to the crane girders, according to the *National Safety News*. Formerly temporary scaffolds had to be built, or the men lay across the tracks, serious accidents resulting. The platforms are guarded by railings, toe boards and a center bar. Two or three hours are saved on each job of changing brasses or truck wheels.

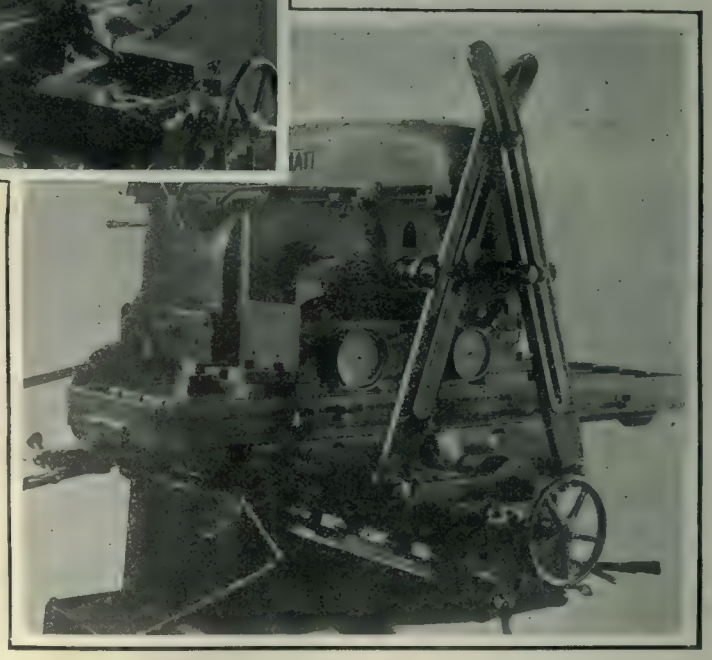
Milling Machine Dynamometer

A dynamometer for determining the pressures exerted by a milling cutter on the various working parts of a milling machine, although it is also adaptable for making tests on planers, shapers and with slight variations, drill presses, has been built by the Cincinnati Milling Machine Co., Cincinnati, from the designs of R. Poliakoff. The instrument provides a means for reading the pressures exerted on any milling cutter while at work, in two directions, the readings being taken directly from the dials shown in the accompanying illustrations.

The value of accurate knowledge of the pressures in question to designers of milling machines as well as to designers of fixtures and cutters for use on them has been long recognized. Accurate knowledge of this kind is also of assistance to designers of machine parts which are to be milled because in the final analysis the pressure of the cutter is first exerted on the piece itself and transmitted from it first to the fixture and then to the milling machine. In determining these pressures the makers state that the Poliakoff dynamometer has proved accurate and reliable.



The Vertical Downward or Upward Pressure of Cutter Is Read from Left Hand Dial



For Crosswise Pressure the Dynamometer Is Mounted as Shown and Readings Taken from Right-Hand Dial

The dynamometer is shown attached to a milling machine taking a heavy cut in steel. The vertical downward or upward pressure of the cutter is read direct from the left hand dial, the longitudinal pressure from the right hand dial. If it is desired to obtain the crosswise pressure, i. e., the pressure in line with the machine arbor, as for example the end-thrust pressure of a spiral milling cutter or a face milling cutter, the instrument can be mounted crosswise on the table and readings taken from the right hand dial.

The instrument consists of a working table supported by a base plate which is in turn bolted to the table of the machine. The work platen is supported at each end by a wide Emery plate fulcrum, their lower ends resting on two levers which carry a definite portion of the vertical load on the platen to a hydraulic chamber placed centrally under the work table. The hydraulic chamber is connected with the left hand gage which is graduated by trial in terms of the vertical load in pounds.

The horizontal load is transmitted through bars which are flexible vertically to the crosshead which in turn transmits the load to the hydraulic chamber. Heavy springs are used to put initial loads on each chamber so they will show loads in either direction. The Emery plate fulcrums carrying the loads to the levers are rigid against vertical and cross loads but flexible to horizontal loads, neither system interfering with the action of the other. Guards are provided so that any lubrication or flooding of the cutter may be used.

The working surface of the table is 18 in. long and 10 in. wide and is provided with three T-slots. The height of the working table above the bottom of the base is 8 in. The total size of the base is 35 in. long x 14 in. wide. The dynamometer has the capacity to withstand loads of 25,000 lb. longitudinal, and also loads of 4000 lb. in the opposite direction, vertical downward pressures of 10,000 lb. and upward pressures of 7000 lb.

In offering the instrument the makers point out that its value is not confined to manufacturers of milling machines and milling cutters but is valuable as well for automobile, experimental and other shops where milling operations are studied and given proper attention.

The instrument is also of value to technical schools and colleges, problems attending standardization of machines and cutters being more readily solved with its aid.

The Apex Motor Corporation, Ypsilanti, Mich., is looking about for a suitable plant to be used for the manufacture of motors, to be used in the production of the Ace motor car, which is manufactured by the company. The present capacity is only 50 motors a week, but this is to be increased. The company would like to purchase a plant building already erected.

The Motor and Accessory Manufacturers' Association will hold its 1921 credit convention in Detroit on Sept. 14 to 16, at the Hotel Statler. Detroit was selected because of its convenient location to the 400 parts manufacturing concerns affiliated with the association. It is planned to bring to the convention speakers of national importance in the automotive industry, banking, industrial and government circles.

Objects to Giving Information on Costs

Federal Trade Commission Indicates Informally Its Position in Regard to Furnishing Statements of Facts to Members of a Business Association

WASHINGTON, July 19.—Supplying by trade associations of information to its members relating to manufacturing costs and lists of given work, showing costs, based on tests in plants of members, is looked upon by the Federal Trade Commission as being a means to lessen competition "and to restrain trade, even to create monopoly."

The attitude of the commission was made known in a letter written by Acting Chairman Nelson B. Gaskill of the commission, made public yesterday, in reply to a letter received from F. J. Moss of the American Sash & Door Co., Kansas City, who had asked for an opinion as to the legality of the formation of the proposed Millwork Cost Information Bureau. The reply of Mr. Gaskill is exceptionally interesting and is important in view of the attitude of business interests generally and many Government officials, including Secretary of Commerce Hoover, who have expressed the belief that the commission should be given authority to make rulings in advance as to legality of trade association so as to do away with uncertainties as to their standing in law. The commission is opposed to the granting to it of such authority, as has been stated by Chairman Thompson, who was quoted recently by THE IRON AGE on this matter. The willingness of the commission, however, to give a statement on the subject as to the general principles involved, but with the distinct understanding that it is merely an informal opinion, is made plain by the reply of Mr. Gaskill to Mr. Moss and has come as something of a surprise. It had been doubted that the commission would even attempt to give an informal opinion. The reply therefore is accepted as establishing a new policy of the commission which may be far reaching in character and act as a guide for performances of trade associations and perhaps revision of present practices, even though the Gaskill reply specifically does not commit the commission to any stated policy that would establish a precedent. But with a set of general principles and in "proper cases," as the Gaskill letter indicates, business interests apparently will be given co-operation by the commission to the extent of its ability. The Gaskill letter, therefore, is considered to be a valuable contribution to the subject involved and definitely gives the views of the commission toward the educational work of trade associations in connection with cost accounting, despite the fact that the commission has no legal power to approve or disapprove of such projects as that named by Mr. Moss while in its present stage.

Doubt as to Legality of Bureau

"Its opinion in the matter must be apparent," Acting Chairman Gaskill points out, after stating his serious doubt as to the legality of the proposed bureau. "One thing is sure. If you do not publish a uniform cost list nor endeavor to educate your membership to the use of a standard cost, you will so far as this subject is concerned, be within the law."

In substance the commission, the pioneer governmental organization to urge adoption of a uniform system of cost accounting for business interests of the country, holds that the proper function of a trade association is to educate in proper methods so that the member may know as accurately as possible and compete with knowledge of his own business. But its desirable purpose, so far as the public good is concerned, stops there, and it is for each member to make his own price list and not for an association to issue to members price lists, costs, etc.

Mr. Gaskill points out to Mr. Moss that Congress purposely struck out of the law the power to make authoritative rulings so as to remove in advance legal uncertainties of proposed cost accounting associations.

"The commission is desirous of co-operating with business, however," Mr. Gaskill states, "and in proper cases, where it can by the expression of what is merely an opinion stated in general principles, contribute to the elimination of legal uncertainties, does not hesitate to do so. The application of these principles, however, to particular cases as they arise, must depend upon the facts adduced in the particular case. And the expression in such a letter as this is not to be construed as a judgment in any particular case.

Proposal to Incorporate

"It seems from your letter that the Millwork Cost Information Bureau is a group of planing mill houses which submit to a central agency their actual costs on completed products from which average or standard costs are computed. There is compiled and published a book containing the items or products and their costs for the use of estimators in planing mills.

"Sample pages submitted show such captions as the following:

"'Flush doors—Veneered' and after specifications the following: 'Basis list price per square foot. Figure square footage—breaking on 2 in. each way, at the following prices, and add for each door, $2.50.' Then follow prices for different size doors of different woods.

"You now propose to incorporate 'Millwork Cost Bureau' and your proposed charter among other purposes states that the bureau is to furnish from time to time information to its members relating to the manufacturing and distributing costs of various kinds of mill work . . . to supply its members with suitable schedules or lists of mill work, from time to time, showing the cost thereof, based on tests made in the factories of its members.

"You state in your letter that this list is subject to such discount as a member may see fit to apply.

"The issue of this list seems to be open to question because of its tendency to induce those who use it to disregard their actual and individual costs and to adopt a standard or average which does not relate to their business and upon this uniform basis, to add the margin. The result is a trend toward uniformity of selling price and the lessening of competitive sales on the basis of efficiency. The effect might be—in the absence of an ability to forecast consequences, we cannot say it will be—to characterize the bureau as a combination to lessen competition and to restrain trade, even to create monopoly.

"One of the most valuable functions of a trade association is education in proper methods of cost accounting so that the member may know as accurately as possible and compete with knowledge of his own business. He must make its own prices. And any concerted effort to substitute for the individual's actual cost what may be to him a highly arbitrary and uniform cost basis, seems to be a dangerous misuse of the bureau's processes. It takes away the necessity for individual cost accounting by creating an arbitrary cost standard. It deprives the efficiency of the competitive advantage which efficiency gives and tends to raise the selling price to the consumer. Furthermore, the pressure toward the arbitrary use of standard costs disregards the fact that these costs vary continuously not only with the several mills but with the whole industry, and that those changes cannot be reflected to the consumer under the uniform cost list as promptly as by the individual producers each working from his own mill."

In a terrific wind and rain storm which struck Sault Ste. Marie, Ont., July 13, No. 1 ore bridge of the Algoma Steel Corporation was blown down, causing damage to the extent of $300,000.

Air-Operated Forging Hammers

The experience of a steel mill in Italy with air operated forging hammers has been reported by the Chicago Pneumatic Tool Co., New York. Although the cost of coal in the United States was far below coal prices prevailing in Italy at the times the figures were compiled, the following data may prove interesting from a comparative standpoint.

Air Operated Hammers

	Lire
New plant cost, including buildings, air compressors, and motor transformers	1,200,000
Electric energy consumed (hydro-electric supply) 1500 kw. for 300 days of 8 hr.	276,000
Labor, 2 men (1 electrical, 1 mechanical) @ 20 lire per day	12,000
Water (circulation), 432 cu. m. per day	13,000
Maintenance	20,000
Lubricating oil	36,000
Depreciation of plant	100,000
Annual cost	457,000

Steam Operated Hammers

Boilers had heating surface of 11,250 sq. ft. (1050 sq. m.)

Consuming 28 gross tons per day—8500 tons per annum @ 300 lire per ton	2,550,000
Labor, wages of 22 firemen @ 20 lire per day	132,000
Water	2,500
Insurance and maintenance of boilers	36,000
Maintenance of steam hammers	45,000
Annual cost	2,765,500

Whether such economies can be effected in other steel mills is a matter depending, it is pointed out, upon the abundance or scarcity of coal as a fuel, the size of the steel mill, the distance from the source of power to the forging hammers operated, labor costs, manufacturing methods, etc.

At the July meeting of the Pittsburgh section of the Industrial Cost Association, Morgan B. Schiller, American Foundry & Construction Co., Pittsburgh, gave a graphic talk on "Practical Cost Problems," in which he outlined a cost system for a steel pipe plant, with special reference to the matter of determining the machine hour rate, and problems of depreciation. At the August meeting of the local section, the question of "Idle Plant Facilities and Handling Abnormal Overhead Expenses," which has been under discussion at the meetings of the section for the past three months, will be voted upon.

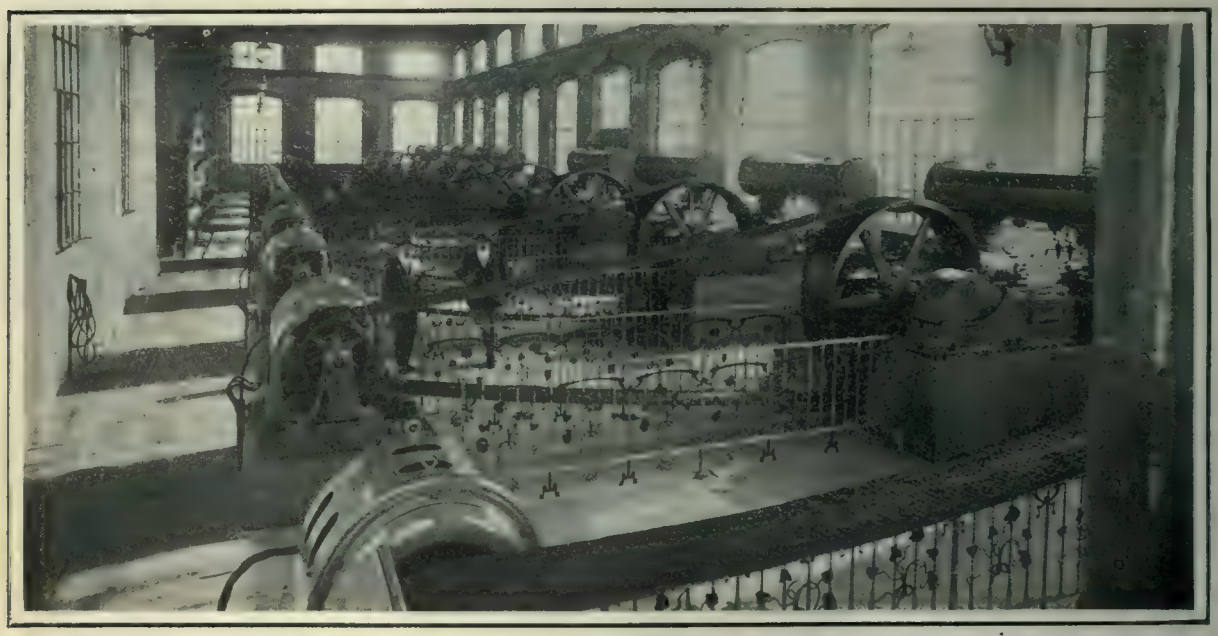
The Hinkley Motors Corporation, Detroit, has purchased seven and one-half acres in Ecorse, Mich., a down river village adjoining Detroit, on which to build a plant. Plans have been drawn and the excavating work has been started.

Will Confer with Trade Organizations

WASHINGTON, July 19.—Following a conference between Secretary of Commerce Herbert Hoover and President John E. Edgerton of the National Association of Manufacturers, Director of the Census William M. Steuart has asked the association to assemble a conference of representatives of trade and craft organizations to discuss the manner and methods of carrying out Section 32 of the Census act of March 3, 1919, by "such schedules as in his judgment may be necessary" to collect and publish for the year 1921 "statistics of the products of manufacturing industries." Secretary Hoover has also given directions to the Director of the Census to collect current commodity statistics under the provisions of Section 8 of the act of Congress of Feb. 14, 1903, which authorizes the secretary to make such special investigations and reports "which he, himself, may deem necessary and urgent." The primary design of this conference, the association has announced, is to determine the character and form of the schedules to be used in the collection of the census of 1921, which work begins Jan. 1, 1922, and to relate such work to the collection of such current commodity statistics as are desired by the Secretary of Commerce and which may be useful to the industries of the country.

The conference will be of the same general character as that assembled by the National Association of Manufacturers at the invitation of the Director of Census in 1919 and which proved of such value as to call for commendation of the director in the annual report for the year 1920.

President Edgerton will promptly issue a call for the conference which, it is stated, may result in the working out of a method of direct co-operation between trade and craft organizations with the Bureau of the Census, whereby they may collect for and on behalf of the census and themselves the figures relating to their industry and improve the legitimate activities of such organizations, particularly as related to statistical work. It is expected that the Bureau of the Census will bring to the conference tentative forms and schedules for discussion by the representatives of organizations assembled.



Nine Chicago Pneumatic Belt-Driven Air Compressors Installed in an Italian Steel Mill for Supplying Air to Forging Hammers

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Wage reductions were put into effect last week by the Central Iron & Steel Co., Harrisburg, Pa. The reductions, in every case, brought the rate down to the scale now being paid by the Bethlehem Steel Co. The rate for common labor was reduced from 32c. to 27c. an hour, and adjustments were made in the payroll of all department employees. Every employee is affected by the reduction, officials have announced.

Courts Liberal to Injured Workmen

Loss of Use of Members As Well As Loss of Members Being Compensated Under Workmen's Compensation Acts

BY CHESLA C. SHERLOCK*

THE workmen's compensation acts, among other things, provide relief for an injured workman who has sustained injuries in the course of his employment which cause the "loss" of a member such as finger, hand, arm, toe, foot or leg, or any appreciable portion thereof.

These injuries are technically known in the compensation service as "scheduled injuries" for the reason that they are specifically set out in a schedule incorporated in the acts themselves, which define down to the penny the actual amount of compensation which an employer owes to a workman for a certain specified loss.

It should be kept in mind by employers that the acts impose liability upon them because the workman has suffered a loss in earning capacity. In all cases where there is not a clear schedule injury the burden of proof is upon the workman to show that his earning capacity is, in fact, impaired or lost beyond recovery.

But in the case of scheduled injuries, as where a workman loses a finger, the law steps in and presumes that the workman's earning capacity has been impaired to the extent specified by the law, and the employer must pay this compensation regardless of whether the loss of that finger has in any way impaired the workman's usefulness in the particular employment. Proof, then, is beside the question, for the presumption of the law is greater than the fact in the case.

Distinction Between "Loss" and "Loss of Use"

Ordinarily, we might mention the schedule of injuries in the average compensation law and pass on. Anyone could look up the schedule and determine in a few seconds' time just where he stood, but the courts have only recently commenced to draw a new construction around this point in the law. They have, in fact, come to a new idea in the matter, and instead of compensation wholly along the old line of the "loss of a member," they are commencing to draw a distinction between "loss" and "loss of use" of the member, which seems to be so far-reaching in its effect upon the employer's liability that an extended examination of recent decisions seems advisable.

A workman in Connecticut had lost two phalanges of a finger and had been incapacitated for three months following the injury. The Connecticut court said: "The word 'loss' is used in the sense of deprivation. It designates the handicap under which the employee will suffer in the future. Compensation is based upon this loss. It is not measured as are the other injuries resulting in partial incapacity by impairment of earning power. Each class of injuries results in partial incapacity, but the compensation for each is based upon a different theory. To support the respondent's claim, 'loss' in some cases must be construed to mean disability, and in other cases disability plus deprivation. These two classes are distinct classes of partial incapacity. *There is no reason why an injury under each class should not be compensated,* and, if the injuries in question be as the respondent insists, the loss of the use of the two phalanges and the loss of two phalanges, these are two independent injuries for each of which compensation is provided, measured as to amount and duration. The loss of two phalanges carries a named compensation, and the loss of the use of two phalanges carries a similar compensation. *There is nothing in the act which prevents compensation for any number of several injuries specifically provided for.* Payment for one does not pay for any but the one injury. And if there has been a partial incapacity followed by the loss of a member, there is nothing in the act which forbids the award of compensation for each. And whether the loss of a member follows an injury to a member resulting in a loss of its use or follows an injury to some other member, is quite immaterial; the injuries are equally distinct."

Formerly, the courts made no distinction between "loss" and "loss of use" of injured members so far as awarding compensation for each as a distinct injury was concerned. It was recognized, however, that where there was a total loss of use of a member that it amounted to the same thing as if the member had been amputated, and compensation was then awarded on the basis of loss of the member.

In one instance that came under my personal attention, where the incapacity of a workman who had suffered an injury to his right foot, exceeded the statutory limitation fixed for loss of the foot, he was awarded additional compensation, not for loss but for partial incapacity, as the best medical evidence available testified that in time he would regain the use of the foot. But, at that time, this decision was considered revolutionary and in contravention of the expressed intention of the law and the employers raised a great racket about it.

Double Compensation to be Awarded in Future

The compensation theory is extending its influence every day, and there can be no getting away from the fact that the above decision, and those quoted later, mark a new milestone in the employer's liability under that theory. It means that double compensation, so far as we have previously understood the compensation law, is going to be awarded in the future for what looked like, under the old way of looking at things, as only a single injury.

In a New York case it was shown that the injured workman had suffered the loss of the index, second and third fingers, and the fourth became stiff and practically worthless. Compensation was allowed for the specific injuries and later the industrial commission made an award for the loss of use of the *hand.* The employer contended that the commission was without power to make more than the awards specifically provided for by the New York compensation act for loss of fingers. The Appellate Court affirmed the award.

Many times commissions have said that the mere fact that an injury incapacitated a man from doing his regular employment did not entitle him to extra consideration. If he could work at all, in any kind of employment, even though foreign to his trade or calling, that fact was taken into consideration and compensation adjusted accordingly. Thus machinists who lost one hand were deemed capable of running elevators or other similar light work, and the probable earning capacity they might have in other fields of endeavor was taken into consideration in arriving at a basis for an award.

The compensation laws clearly draw a distinction between the loss of fingers and the loss of a hand. The practice, however, is growing to allow compensation on the basis of a loss of the hand where the fingers are gone or rendered useless.

A hand may not be worth much if the fingers are gone; still a workman who has the palm intact is considerably better off than the workman who loses the hand at the wrist, as the acts seem to contemplate in the scheduled compensation awarded. Then, again, a

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workman may be injured so that all the fingers, even though intact, are rendered stiff and useless. He might be better off had the fingers been amputated. To say that he should receive compensation only for partial disability would not be just to him nor just to the employer. Such a case inevitably forces the impartial mind to the admission that there is some ground for the wider latitude the courts are giving the commissions in respect to "loss" and "loss of use."

In a New York case the industrial commission found that the workman had lost "all the fingers of his left hand except his thumb, and including the entire metacarpal bones of the middle, ring and little fingers, and the major portion of the metacarpal bone of the index finger, thereby removing the entire palm from the hand," by reason of which the loss of use of the left hand occurred. Judgment was affirmed by the Appellate Court.

Loss of Principal Fingers Equivalent to Loss of Hand

In another New York case the workman lost the first, second and third fingers of the right hand and the first phalanx of the fourth finger. It was agreed that the loss was equivalent to the loss of the hand, "from a vocational point of view."

Said the court: "The fact, if it existed, that the injuries barred the claimant from the employment or the particular occupation or vocation he was engaged in where he received them does not, in and of itself, tend to prove that the hand or the use of it was lost. It is not within the letter or the spirit of the law or the legislative intention that an injury to a hand or member of an employee incapacitating him for a particular employment should establish that he was incapacitated for employment permitting or involving the use of the limb or member as injured. It is a matter of common observation and knowledge that a hand, arm, foot or leg incompetent, through injury, for certain employments is competent and useful for other employments. The expressions 'loss' and 'loss of use,' as used in the law, should be given their unrestricted and ordinary meaning. In the case at bar, the hand, or the use of it, was not lost, provided it could fulfill, in a degree fair and worth considering, in any employment for which the claimant was physically and mentally fitted or adaptive, its normal and natural functions.

"In case the hand was destroyed by amputation, directly or indirectly, caused by the injuries, to such an extent that it could not thus fulfill its natural functions, it was, within the purview of the law, lost. While the loss of a hand naturally involves the loss of use of it, and the loss of use of a hand does not involve the actual loss of the hand as a physical member, a distinction the law recognizes and observes. The question here is whether the first or second rate of compensation should be awarded. The uncontradicted evidence established that the hand was not lost and that the first rate should be awarded."

In a case involving fracture of a leg the court held that the fact that the plaintiff had sustained a compound fracture of the leg between the ankle and knee does not create a presumption that he has permanently lost the use of the member, but that the burden is upon him to prove it.

"A permanent loss of the use of a foot," said the court, "was not shown under the Workmen's Compensation Act, as a result of the compound fracture of the lower leg; was not shown where the testimony of physicians differed as to the extent of the disability, and it appeared that the claimant had some use of the foot, although he would be unable to continue his former occupation of house painting."

A question naturally arises as to what extent the law may be construed as forcing men injured in the course of their employment out of that employment in order to seek some means of livelihood. While it would not appear just to compel the employer to pay compensation in such a case as this one for permanent disability where some use of the injured member still remains; on the other hand, the fact that the loss of use, although not sufficient to amount to a loss, in fact drives a man out of his trade, is coming in for some recognition at the hands of the courts.

The workmen's compensation acts, as we have repeatedly pointed out in these discussions, seeks to share the loss occasioned to a workman in his earning capacity by reason of the accidental injury. If an accident forces a workman out of his chosen trade or calling permanently, even though it does not deprive him of the total efficiency of a limb, he certainly ought to come in for more consideration and a more liberal award than in the case of a man similarly injured but who has not been forced to give up his occupation or trade.

Cases Pertaining to Loss of Vision

It is interesting to note an Illinois case, where a workman, while wiring an automatic staple machine, was injured by a piece of wire flying from the said machine, striking his eye so as to destroy the crystalline lens. He could, as a result, only distinguish light and moving objects. It was held that there was a complete destruction of vision in that eye.

In another case, however, loss of 80 per cent of the vision in one eye was not considered as a total loss of vision. Said the court:

"Here the claimant can make use of the sight remaining in his right eye in many ways. He may not be able to follow any vocation which requires reading or other relatively fine work, as the evidence is, but he can pursue some calling similarly situated to that in which he was engaged when injured."

There can be no hard and fast rules for the determination of cases under the compensation acts, for the simple reason that these cases, in their very nature, defy classification. Each case must be decided "by the facts and circumstances immediately surrounding it," by the application of principles rather than by the application of precedents.

But the trend of the courts is changing on the question of loss and loss of use, and that means that the decisions of cases involving this point in the future are going to change. The trend is toward the broader and surer ground, not because there is a looser conception of the employer's liability, but because simple justice demands it.

Tractors Again Reduced

The International Harvester Co., Chicago, has announced a further reduction in prices on all sizes of tractors, in anticipation of the fall plowing season. The reductions range from $100 to $200 and constitute the second cut made this year. The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has made a reduction of 10 per cent on practically all motors and motor control apparatus. This is the second 10 per cent cut in motor prices this year.

Pig Iron in New South Wales

WASHINGTON, July 19.—Increased production of pig iron in New South Wales is reported by the Mines Department for 1920, according to advice received by the Bureau of Foreign and Domestic Commerce. The total production was 26,096 tons, valued at $3,181,939, which represented an increase of 5155 tons, valued at $974,649, over 1919.

Erroneous impressions appear to prevail as to the functions of the Bureau of Standards, Washington, as indicated by requests that certain devices be tested by the bureau and placed on its "approved list" for such appliances. Because of this apparent impression, the bureau has issued a statement pointing out that it does not have any regulatory function. In other words, it has no police power and while it might issue an approved list of appliances, such a list would not in any way be binding.

The California Metal Trades Association announced on July 15, a wage reduction effective Aug. 1, affecting approximately 50 classes of workers and averaging 10 per cent less than the wage scale now in effect. More than 25,000 men in the shipyards and other industries will be affected.

CONTENTS

Disposing of Scrap Systematically 125

Crompton & Knowles Loom Works Makes Discarded Material Over into Useful Articles — Scrap Committee Formed

Explosion Hazard and Its Prevention 127

Analysis of Fuels and Other Combustible Materials, with Special Reference to Powdered Coal

Percentage of Defective Castings Too High 131

Losses Could Be Prevented by Proper Study of Human Factors—Responsibility of Purchasing Department

Production and Uses of Cold-Drawn Steel 135

Annual Output Estimated at 900,000 Tons — Automobile Field Largest Consumer

Objects to Giving Information on Costs 143

Federal Trade Commission Indicates Its Position Regarding Furnishing Statements to a Business Association

Courts Liberal to Injured Workmen 145

Loss of Use of Members as Well as Loss of Members Being Compensated Under Compensation Acts

Only Minor Changes in Metal Schedule 153

Despite Attacks, Ferromanganese Tariff Rates Were Adopted by House — Bill Will be Passed Thursday

Steel Makers Oppose Duties on Manganese 155

Free Ore Urged with Conservation of Domestic Supply — Ferromanganese Duty Could be Lowered and Still be Protective.

Kinney Tapping-Hole Shield.....126
Electrical Machinery Census.....130
Blast Furnace Carbon Monoxide Not Harmful 130
Wage Reductions 130
Freight Rates 132, 137
Labor Notes 133, 136, 140
Steel Shipments to Canada.....134
United States Copper Production.....136
Combustible Gas Recorder.....137
By-Product Coke Production.....137
Wages in Germany.....137
Labor Costs in Belgium.....138
Foreign Trade Notes....138, 152, 157, 170, 173
Steel in New American Ships.....138
Short-Turn Overhead Trolley System.....139
Molding Sand Research 139
Steel Corporation's Orders.....139
June Steel Ingot Output.....140
Iron and Steel in Four Countries.....140
Cost of Living Statistics.....140
Portable Arc Welding Sets.....141
Milling Machine Dynamometer.....142
Air-Operated Forging Hammers.....144
To Confer with Trade Associations.....144
Editorials 148
Wage Rates and Commodity Prices—Machine Tool Improvements—Steel and Other Outputs—Value of the Dollar—Electric Steel Last Year
Correspondence — Cancellations and the Large Stocks of Steel.....151
Welfare for Workers.....170
New Model of Revolving Crane.....175
Book Reviews 176
Trade and Office Changes.....177
Industrial Finance 178

Iron and Steel Markets 158
Comparison of Prices 159
Prices Finished Iron and Steel, f.o.b. Pittsburgh 171
Non-Ferrous Metal Markets 172
Personal Notes 174
Obituary Notes 175
Machinery Markets and News of the Works 179
New York Jobbers' Prices 186

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Wage Rates and Commodity Prices

When the world makes progress through the adoption of improved methods and appliances in production, people are entitled to receive more in commodities for the service they render. How the matter is expressed in dollars is merely a detail. If one works with the same energy and ability as his father displayed, and the father was able to buy a bushel of wheat with the proceeds of a day's labor, the son should be able to buy more than one bushel. If he does not want more than one bushel he can spend the extra money on a phonograph record, something the father did not get. The rule applies only as improvements in production occur, only as there is an increase in efficiency in converting service into commodities.

It is impossible, in general, to secure higher wages or larger salaries, measured by what the remuneration will purchase, in any other way. Some agitators have preached that "capital" should divide more with labor. The difficulty, or rather impossibility, about that is that what capital gets or is able to retain is so small in proportion to the total salaries and wages paid that to take a larger percentage from what capital has hitherto retained would add only a small percentage to the wages and salaries.

Investigations made by Dr. Ralph G. Hurlin, statistician of the Russell Sage Foundation, have carried index numbers of commodity prices in the United States back to the year 1810, and average wage rates of common labor and five classes of artisans back to 1820. These presentations enable one to see whether the rule has worked out and which has varied in dollar value, the wages or the commodities. Cutting out the period of fancy prices just after the war of 1812 and the similar period of the past few years, or in other words making the comparison approximately between 1820 and 1910, commodity prices declined a very few per cent while wages nearly tripled. A week's wages would buy about three times as much of the representative commodities in 1910 as in 1820. The increment was not of course perfectly steady during the period, but it was moderately uniform.

The period is so long that there must be something important in the showing. The greater reward for services is due to productive methods and appliances being improved. It cannot be due to employers giving their employees three times as big a share in 1910 as was done in 1820. The practical question now is whether much progress in methods and appliances, or in efficiency, has been made in recent years, and the next question, seeing that the answer to the last question cannot be very encouraging, is how much progress can be made in future.

While the general or average rate of compensation, in the form of salaries and wages, cannot vary greatly from a standard when measured by purchasing power of the money received, there can be rearrangements between classes of employment. It might be that in 1914, after paying for food, etc., the coal miner could buy more phonograph records than the railroad engineer, but that in 1922 the railroad engineer could afford to buy the larger number of records, or vice versa. That changes in the division between workmen are probable is suggested by the fact that the men who do the least work in a year, such as coal miners and bricklayers, have been receiving particularly high rates per unit of work. As we are passing into a period of years of hard work all around, modifications in distribution among classes of workmen are to be expected.

A very interesting point shown by Doctor Hurlin's wage investigation, already cited, is that in a whole century the ratio between common labor and skilled labor (five classes — carpenters, house painters, machinists, blacksmiths and compositors —being taken) remained practically constant, at 100: 180. Great changes in industry, in immigration and other things occurred in that century, hence it is a reasonable inference that a human element is involved, for all other things have changed. Most recent cases of particularly high wages being secured by one class or another of so-called "skilled" labor can be identified as cases in which it was found that the particular service involved could be made a commodity, and a sort of trust formed for the commodity—as with coal mining, bricklaying or holding a job under the

"national agreements" of the railroads. Such trusts need to be broken up for the benefit of wage earners in general.

Machine Tool Improvements

Contrary to a belief expressed now and then in recent months, it does not appear that we are on the threshold of epoch-making departures in machine tool design. To be sure a new grinding machine doubling previous capacity is one development, and a gear hobbing machine which all but thinks has been created, but instead of many new and wonderful things being about to burst upon the machine tool world, we are simply in the midst of unusual activity in the refinement of design, consequential though this is. The improvements are being carried along more or less conventional lines, but they are important not alone in the promise of greatly increased efficiency but, so far as the machine tool builders are concerned, in giving them an outlet for their manufacturing facilities, in that it will pay many metal-working establishments to scrap old equipment and purchase the new.

Unsold stocks of machine tools will come under the handicap of competitive machines equipped for greater output and they will undoubtedly be disposed of largely on the basis of long time credits, particularly for export where such accommodation is demanded. Such seems a likely way of liquidating the accumulations, in that the home market will be confined for some time to replacements based on the increased efficiency of the new tools.

The betterments which designing departments are expected to offer are in part as follows: Greater accuracy, this in many cases meaning greater rigidity. Better lubrication, preferably of an automatic character. Elimination in the notably powerful tools of the excessive physical endurance sometimes required of the operator. So far there is still a clinging to expensive grades of material where that is not always necessary; but keen competition may modify the tendency. Large plants conspicuous for mass production will continue to be supplied with single purpose machines. All in all, machine tool builders are showing what recent months of survey, analysis and investigation are doing toward getting their business on a healthy basis.

Steel and Other Outputs

Some statements concerning the rate of pig iron and steel production in the United States have given an exaggerated idea of the existing depression, unparalleled as it is. In June some published estimates put the activity at iron and steel works at about 20 per cent of capacity. Pig iron production last month averaged 35,494 gross tons per day, equivalent to a yearly rate of 12,946,310 tons. That figure is 32.8 per cent of the greatest year's output of pig iron—39,434,797 tons in 1916—and 25.8 per cent of the country's theoretical blast furnace capacity—50,222,400 tons—shown by the American Iron and Steel Institute at the close of 1919—a capacity much beyond possible attainment in output under practical working conditions.

The steel ingot production in June, as indicated by returns from 30 companies, was at a rate equivalent to 14,824,000 gross tons for a year of 311 working days. This is 34 per cent of the greatest output of steel ingots—43,619,200 tons in 1917—and 27 per cent of the country's theoretical capacity in open-hearth and Bessemer steel, as given by the American Iron and Steel Institute—54,250,760 tons at the end of 1919, a figure, like that for pig iron, well beyond attainment, with due allowance for repairs and breakdowns and the unbalanced relation of connected rolling mill capacity.

In this connection it is interesting to note the estimates prepared by the Federal Reserve Bank of New York, covering not only the production ratios of pig iron and steel ingots, but also of anthracite and bituminous coal, cement, cotton, sugar, flour, wool and the slaughtering of meat. In each case the figures given show the percentage which each month of 1921 bears to the average for the corresponding months of 1919 and 1920.

Commodity	Jan.	Feb.	March	April	May	Aver.
Anthracite coal mined	103	137	122	118	100	116
Bituminous coal mined	88	85	75	80	86	83
Cement production ...	88	92	115	121	112	106
Cotton consumption...	64	83	87	78	85	80
Wool machinery active	46	79	91	96	104	85
Sugar meltings	56	73	117	87	79	82
Wheat flour milled...	76	82	95	100	89	88
Meat slaughtered	84	99	96	100	93	94
Pig iron produced....	77	66	49	46	46	57
Steel ingots produced.	73	63	53	50	53	56
Average	76	86	90	88	85	85

It is evident from the above table that both pig iron and steel show an activity far below any of the other products, and hence cannot be regarded as a close index of the business conditions prevailing in the United States to-day. The fact that practically all of the items show a marked reduction from the average of the two previous years merely points to the general stagnation of industries, and indicates in some measure the extent of that stagnation. The figures given, however, emphasize the fact that too broad deductions cannot be drawn from the excessive slump in iron and steel lines.

The Value of the Dollar

The purchasing power of the dollar continues on its course toward the pre-war level, though it will not travel the whole distance in anything like the near future. A distinction must be made between the purchasing power of the dollar, when used to buy commodities or engage the services of employees, and its value when used to represent the worth of real or personal property. Bonds, mortgages, life insurance policies and things of that sort are in essence expressed in gold, and relative to these things the value of the dollar did not greatly change. When a thousand dollars would buy only one-third or one-half as much material or labor as before the war it would still buy a thousand-dollar bond or pay a thousand-dollar mortgage or be a full settlement of a thousand-dollar life insurance policy.

For a time there was a question in some men's minds whether the dollar in all aspects had not decreased in value; whether if a dollar would buy

only one-half as much in commodities and service, the wealth of the country, the buildings, mines, bridges, factories, etc., had not doubled in nominal or dollar value, but so many things have a fixed value, as just indicated, that these would tend to swing the general value of the dollar back toward its former position.

In this department of THE IRON AGE of Jan. 30, 1919, reference was made to this influence, in a discussion of the general trend of commodity prices. Noting that an argument for the continuance of high prices was that wages were up and could not be reduced materially, it was observed: "As to wage rates and commodity rates having the ability to support each other, that is a case of 'the blind leading the blind.' Neither has an element of stability. . . . There is another factor, however, that in the long run always has a very great influence, and that is the wealth of the country, expressed in the real and personal property of the people. At pre-war valuation, this stands at $200,000,000,000 or $250,000,000,000."

The Chamber of Commerce of the United States having made a pronouncement (THE IRON AGE, June 23, 1921, page 1699) that the wealth of the United States in 1920 was $290,464,000,000, it is of interest to compare this with previous statements by the Bureau of the Census. Since 1900 the bureau has computed the wealth in a non-census year. The last statement was made for 1912 and the next is set for 1923. The average annual increase in wealth from one statement to the next has been as follows, in per cent:

1850-1860	8.52
1860-1870	6.40
1870-1880	3.80
1880-1890	4.07
1890-1900	3.13
1900-1904	4.88
1904-1912	7.27
1912-1920	5.60

These percentages conform quite closely with the commercial history of the periods involved. There are low rates of increase between 1870 and 1880 and again between 1890 and 1900, decades embracing long periods in which there was much unemployment and therefore lessened production of wealth. Probably there has been some revaluation because of changes in commodity prices, but the change in valuation can have been only slight. To illustrate: commodity prices were not much more than half as high in 1890 as in 1870, and if properties had been valued in proportion there would have been shown scarcely any increase at all in "wealth" in the 20 years. The Chamber of Commerce statement of wealth in 1920 seems to be in logical sequence to the census statements of preceding years.

An idea of the weight that the wealth of the country can throw into the scale to make the dollar find its level, so that it will be of equal value whether buying commodities, labor or property, may be had by comparing the wealth with the wage and salary income of the people. The wealth in 1920, according to the statement cited, was about 290 billions. Estimating incomes in 1910, and allowing for increase in population against the number reported engaged in gainful occupations in 1910, the wage and salary income of the people of the United States in 1920, with full employment but at 1910 rates of remuneration, would be between 30 and 40 billions. The total value of commodities produced would be somewhere in the same neighborhood. Obviously "the wealth" of the country is going to have a great deal to do with determining the value of the dollar.

Electric Steel Last Year

Several striking developments in the progress of the American electric steel industry in 1920 appear in the statistics of the country's steel output, compiled by the American Iron and Steel Institute. The production of steel ingots and castings in electric furnaces was next to the largest ever recorded. At 502,152 gross tons it was only 18 per cent less than the war-time high record of 511,364 tons in 1918 and nearly 10 times the production 10 years ago of 52,141 tons.

As between ingots and castings the larger expansion has been in castings. Electric steel ingots made last year totaled 346,956 tons, or 8.48 per cent of the total ingot output, as against a percentage of 9.36 in 1918, the record year. Ten years ago ingots made in electric furnaces amounted to only about 2 per cent of the total or 52,141 tons. Significant, however, has been the progress made in electric steel castings. Last year the output exceeded all records, even the war years, at 155,196 tons. Of the total of all grades of steel castings last year electric furnace castings constituted 12.4 per cent as contrasted with 11.4 per cent in 1919 and only 4.50 per cent in 1917. The marked progress in this branch of the industry is emphasized by the fact that 10 years ago only 1320 tons was made, or an expansion in the decade of over 100 fold.

Still more important as well as significant is the growing use of electric alloy steel. Here again last year's output of electric alloy steel ingots was only exceeded in 1918 at 287,885 tons against 233,862 tons last year but in the case of electric alloy castings the contrast is sharp. From 1916 on, the making of electric steel alloy castings has made rapid strides. In that year only 926 tons were made but in 1920 this total was 11,710 tons or 17.1 per cent of the total electric alloy steel against 1.3 per cent in 1916. Even in one year the percentage of electric alloy castings of the total of alloy castings by all processes increased 4 per cent.

Our annual review of the electric steel industry in January showed an increase of 10 per cent over 1919 in the number of electric furnace installations. The production data reveal even more remarkable progress, the feature of which is not only the large total of electric ingots and castings but the marked advance in the foundry phase of the industry. The most important development, however, is the rapid growth of the demand for high-grade alloy steel castings made in such furnaces. The record made in 1920 by this comparatively new industry under peace conditions is prophetic of what may be expected when more normal conditions return to the country and the world at large.

CORRESPONDENCE

Cancellations and the Large Stocks of Surplus Steel

To the Editor: After reading over your article on "Cancelitis" on page 91 of this week's issue of THE IRON AGE, I feel impelled to write you on the same subject.

As far as the steel business is concerned, the writer's impression is that the cancelling of orders was not as severe as many of us were led to believe some months ago. There were some adjustments made between steel makers and their customers and as far as my knowledge goes the adjustments were satisfactory, in the main, to both sides. When the buyer is confronted with a situation which calls for his placing purchase orders from four months to a year ahead of his possible requirements, he is most certainly going to protect himself as far as possible. When business slumped over night as it did last year, he was further going to protect himself as far as possible by making such adjustments with his source of supply as was agreeable to both sides. The writer can speak rather freely on this subject, because in a normal year he would purchase from 3000 to 4000 tons of bars, plates, structural shapes, shafting, etc. When the slump came last year his adjustments of steel orders with the steel makers totaled considerably less than 100 tons and some of this tonnage had only been specified a few days when the adjustment was made, while on the remainder the shipping dates requested by the writer had been exceeded by the mills. In fact, on the majority of the tonnage promises of shipment by the mills had been exceeded. At that time we had a considerably larger amount of steel specified and which we accepted in the usual way when shipped. This steel was shipped inside of the date promised by the mills, and the writer felt that the proper thing to do was to accept the shipment even though it caused a surplus stock of certain items.

So having cleared my skirts as to cancelitis, as I cancelled no tonnage outright, but had arrived at a basis of agreement with several mills, (the amount was considerably less than 100 tons, but I never figured it out exactly), I wish to state that I believe that the larger part of the excessive surplus of steel that seems to be available to-day was caused by speculation and hoarding, possibly assisted by stocks which our Government and foreign governments have thrown on the market.

I know of a certain lot of steel bars now available and which was rolled by one of the leading independent steel companies. I inspected this steel this week, or at least I inspected part of it, as I did not take the time to go over the whole area. The bars of steel are scattered along for possibly a half mile. There are ½-in. rounds, ⅝-in. rounds, ¾-in. rounds, angles, flats, billets, etc. I believe some of the material has been sold, but not so long ago the list totaled somewhere around 5000 or 6000 tons. On this steel are the figures in white paint, "3-17-19," which would indicate March 17, 1919. Also other figures for April and May, 1919. In other words, this steel was available during the steel shortage. At one time there were 600 tons of one size, namely, ⅝-in. round, from 0.16 to 0.22 carbon, in bars 15 to 20 ft. long. As far as yearly tonnage is concerned, these 6000 tons would be a drop in the bucket, but how many other piles were there scattered through the United States?

In the last paragraph of your article you state that the steel maker did not complain as loudly about cancelitis as did many others; and my experience through the beginning of the depression period was that there were few complaints from the steel makers outside of those relating to the cancellations from the automotive industry.

One of the cries that have been set up by the so-called reformers has been that the American people were too extravagant, and as far as that point of view is concerned I heartily concur. But to-day the majority of the American people are practicing enforced economy and that applies both to public and private life. And an economical state of mind, in public and private life, does not produce prosperity in the country, because even when we are in an uneconomical frame of mind we produce approximately 40 per cent more than we can possibly consume. And when this economical state of mind, among buyers and users of steel products, is coupled with an excessive surplus of steel bars, etc., then it would not seem possible for the steel mills to have another period of prosperity until we get out of the economical state of mind and the excess stocks of steel have been absorbed. At this moment it does not look as though we could export very much in the line of bars or other mill products or finished machines of which the steel would be a part.

We shall probably remain in this economical state of mind until we wake up some morning and decide that the readjustment period has about reached the end; but that will not be until we have ironed out many wrinkles that still exist. To-day's is strictly a buyer's market as far as the manufacturing end of the game is concerned. It is also a buyer's market as far as the factory selling end is concerned; that is, on a great many products. The wholesaler is possibly on the same basis. But what transpires between the wholesaler and the retailer is outside of the writer's ken. What transpires between the retailer and the customer is plain to any of us who have our eyes open and wish to use them for the purpose of seeing and comparing.

H. A. RUSSELL.

York, Pa., July 15, 1921.

A New Journal of Management

The first number of *Management Engineering*, a monthly, sub-titled *The Journal of Production*, has been issued by the Ronald Press Co., New York. The editor is Leon P. Alford, who was for a number of years editor of the *American Machinist* and later of *Industrial Management*. His experience, both in journalism and in the practice of engineering, equips him in an unusual way for his new work. It is the announced purpose of the new journal "to help executives—the men of management—better to discharge their duties in preparing, organizing and directing industry to secure maximum production." The 64 pages of this first number impress the reader as much more than a preliminary flourish; they give evidence of plans well thought out and of a purpose to occupy a field that has been well surveyed. The featured articles are "The Pioneer Spirit in Engineering," "Training as a Factor in Reducing Labor Costs," "The Essentials of Storekeeping," "'Yield Value' Variations in Woodworking," "The Unexpected Trend in Accident Prevention," and "Basic Principles of Cost Reduction."

Courage must be added to the other requisites in bringing a new industrial publication into being at such a time as this; but the sponsors for *Management Engineering* evidently sense an opportunity in the country's crying need of greater production in all industry.

The Iron Age and Its Readers

The metal schedule of the Fordney tariff bill has been published in many ways by many periodicals and newspapers, but in only one place has it been published in full, with the proposed new rates presented in comparison with the rates of the present Underwood law and those of the Payne-Aldrich act; that is, in the columns of THE IRON AGE.

In THE IRON AGE of July 7 the new tariff bill was analyzed by our Washington correspondent from the standpoint of iron and steel interests; next a page and a half was devoted to the explanation of the metal schedule as made by Chairman Tilson of the sub-commitee; then the metal schedule was given in full, including complete comparison of rates as above stated. The progress of the tariff bill, with particular reference to the metal schedule, has been closely watched and reported from week to week.

BETTER TONE IN GERMANY

But Pig Iron and Ore Decline—French and British Plan Agreements With German Mills

(*Special Correspondence*)

BERLIN, GERMANY, July 1.—German export interests estimate the present iron and steel consumption of Holland, Italy, Switzerland and other iron and steel consuming countries of Europe at about 25 per cent of the pre-war tonnage, a fact that must be considered in German exports. The volume of inquiries from abroad is satisfactory, but competition is keen and there is active price cutting by other Continental producers. A change for the better has evidently taken place, the reports from the wire market being particularly illustrative of the change in the tone of the market.

Negotiations with Argentina for delivery of 9500 tons of rails and track supplies have not been successful, the contract being booked by La Providence company in Belgium. The Argentine railroads are reported to be arranging another call for bids on 10,000 tons of rails and supplies, and should the German mark remain at its present low level, the German industry will undoubtedly stand a good chance of getting the contract. The recent order for 60,000 tons of rails placed by the Russian Soviet Government was booked at $47 per ton, 20 per cent cash in gold and the balance against documents. Shipment of the first part is now being made. Recently negotiations were entered into at Berlin for another order of 100 locomotives, 3000 cars and 150 tons of rails.

Plans are being made for joint action of British and German companies in working the German market; representatives of the Vickers and Armstrong companies recently arrived and started negotiations with certain German interests. Negotiations are also pending between the French Schneider-Creuzot concern and a rival concern of the Hugo Stinnes group, but no details have been given out as yet. The recent locomotive awards have given increased employment to some mills and several large rail orders for Swedish account have also been secured.

Finished Material Improves and Pig Iron Slumps

Some deals in wire rods have been closed with Belgian customers probably as the result of the prolonged strike at the Ougrée-Marihaye works. On the other hand, export of wire products to Spain has slumped badly owing to the high provisional import duty. In general, export prices are being figured on a basis of bar iron at 78 to 80 Dutch florins per metric ton.

Pig iron is still dull, and whether the announced reduction of certain grades will influence the tone of the market remains to be seen, as the decision on the coal tax increase is still pending. The pig iron syndicate has reduced prices for Siegerland iron and steel-making iron, poor in copper, by 50 m. per ton and for spiegeleisen 6 to 8 per cent and 8 to 10 per cent Mn. by 75 m. per ton, from July 1. Other prices remain unchanged. Imports of Luxemburg iron are on a very small scale, with prices limited to 1000 m. The steadily depreciating exchange will probably render this price obsolete within a few days. Blast furnace ferrosilicon is already offered at 1900 m. compared with the official quotation of 1980 m.

In the finished material market there is a decided improvement in wire and a growing disinclination of producers to make price concessions. Terms of delivery have been extended in some departments, though generally sufficient material is on hand to effect delivery within 2 to 3 weeks from date of order. Works have resumed the issuance of warehouse stock lists of large quantities of assorted grades and shapes, which has not been done for several years past.

Coincident with the relief of the finished material market, offers of semi-finished products are less pressing. We quote 1250 m. for ingots, 1350 m. for cogged blooms, 1400 to 1500 m. for billets and 1450 to 1550 m. for sheet bars. Contradictory reports are being received from rail mills, some parties reporting very satisfactory employment while other works are curtailing production. Terms of delivery average 4 weeks. Heavy rails are quoted at 2300 m., while 1850 m. is named for light rails for mines, all f.o.b. maker's mill. Business in structural shapes is relatively light. It is assumed that the winter orders of the State railroads will stimulate the market, especially in car shapes. Prices have receded to 1700 to 1750 m. Business in bar iron is "hand-to-mouth," quotations fluctuating around the 1800 m. level. The situation in the sheet market is reflected by the dissolution of the heavy sheet syndicate. Prices exhibit a softening tendency. We quote heavy sheets, regardless of gage, at 1700 to 1800 m., base, Essen; medium sheets at 1750 to 1850 m. and light plates at about 1800 m., f.o.b. maker's mill. Warehouse stocks may be had at lower prices without guarantee of condition and quality. High-grade sheets are offered at the light plate price plus, according to quality. Black sheets bring 2200 m., sheets for stamping, double planished, 5000 to 5250 m., according to gage.

Wire Rods Active

The wire rod market has been improving rapidly during the past fortnight, especially in export sales. Prices are rather erratic, and while speculative lots may still be obtained at about 1650 to 1700 m., the majority of works are now naming 1800 to 1850 m. per ton and the latest export quotations range between 1950 and 2000 m., f.o.b. Rotterdam or Amsterdam. This price is obviously for overseas shipments since quotations given for other countries are on the inland market level. The wire convention has at last been dissolved, having lost its official character by being transformed into a commercial association. Prices have been given free since July 1. Business at hoop iron mills leaves much to be desired. Hot rolling mills report sluggish business, the best grade of hoops being offered as low as 2000 m. per metric ton.

Low Continental Steel Prices Quoted in England

The extent of the competition which British iron and steel companies are likely to meet from Continental steel is indicated by the following quotations on typical products recently made in response to British inquiry. The quotations are f.o.b. Antwerp or other Continental port and were made by manufacturers in the three countries named. The conversion has been made from British money into dollars and cents on the basis of recently prevailing exchange. The billet price is per gross ton and the other prices per 100 lb.:

	Belgium	France	Germany
Billets	$22.26	$24.11	$22.26
Structural steel	1.36	1.36	1.24
Bars	1.40	1.40	1.20
Tube strip	1.32	1.49	1.49
Plates	1.24	1.36	1.24

The description of plates is not stated. British ship plates were quoted recently at the equivalent of about $52 per gross ton, maker's works; beams at about $49; bars, $49; billets, $39 to $40. Some purchases of Continental rail blooms by British mills have been reported recently at £7 10s., c.i.f.

Officials of the Continental Motors Corporation, Detroit and Muskegon, Mich., have confirmed the recent report that a very large order for engines has been placed with the corporation by Durant Motors, Inc. Corporation officials will not state the size of the order, but report has it that it is for 100,000 engines. The four-cylinder Durant engine will be made at the Muskegon plant.

The Baltimore & Ohio Railroad Co.'s commercial development department, Baltimore, has just issued a very attractive series of pamphlets, giving a large amount of information in regard to natural resources of the districts through which the lines of the company pass. The pamphlets are edited by G. P. Grimsley, geologist.

Only Minor Changes in Metal Schedule

Despite Attacks Upon Duty on Ferromanganese, It Was Adopted Tuesday by the House—Congressman Tilson Disclaims Responsibility for Some Unpopular Features

BY L. W. MOFFETT

Washington, July 19,
THE IRON AGE BUREAU,
816 Fifteenth Street.

WITH only comparatively unimportant amendments made to it, the metal schedule of the permanent tariff bill was disposed of in the House late this afternoon after discussion of less than an hour and a half, duties on ferromanganese constituting the chief points of attack. Those assailing the duties not being Republican members of the Committee on Ways and Means, were unable under the rules to offer amendments and consequently did not try to do so. The amendments adopted, about 20 in all, were offered by Representative Tilson and principally were in phraseology in order to correct clerical errors. The bill will be passed Thursday.

One amendment classifies spiegeleisen as an alloy containing less than 45 per cent manganese and ferromanganese as an alloy containing 45 per cent manganese or more. In paragraph 305, the required content of molybdenum in order to get the additional duty of $1.25 per pound, was changed from 1 to 1½ per cent, and a similar change was made with regard to tungsten content before application can be made of the additional duty of 72c. per lb. The wire paragraph, 316, was broadened so that all wire coated by dipping, galvanizing, etc., shall pay a duty of 1c. per lb. additional to the rate imposed on the wire of which it is made.

In replying to numerous attacks on ferromanganese duties, Representative Tilson made vigorous denial that they were suggested by the Steel Corporation and said that, contrary to the charges, the Steel Corporation's representative had opposed the duties. Among those attacking the ferromanganese duties were Representative Cooper, Republican, of Wisconsin, and Representative Carew, Democrat, of Arkansas. Representative Burton, Republican, of Ohio, attacked the rates on ferrosilicon and ferrotungsten.

The Duty on Ferromanganese

Before the metal schedule was taken up to-day, a number of attacks had been made on it. Some had been directed against the duties on ferroalloys and had come from Republican members who will vote for the bill. Among Republicans attacking the duty on ferromanganese was Representative Stafford of Wisconsin. He stated that he had received many protests from machine manufacturers and foundry interests of the country against the duties of 2 1-5c. per lb. on ferromanganese of more than 1 per cent carbon and 2 1-5c. per lb. and 28 per cent ad valorem on ferromanganese of less than 1 per cent carbon, the duties being based on the manganese content. He inquired of Representative Tilson, chairman of the subcommittee in charge of the metal schedule, why the committee had recommended the ferromanganese duties carried. The reply of Mr. Tilson showed plainly that the duties were not placed upon his personal recommendation, but were adopted against his vote and upon the suggestion of others.

"In view of what took place in the committee and the attitude on this particular matter of the member of the committee now being interrogated by the gentleman from Wisconsin (Mr. Stafford), I prefer that he ask some other member of the committee to explain it," said Mr. Tilson. "I fear that I could not do so satisfactorily."

The Preliminary Debate

It was expected that the ferroalloy duties would be the object of greatest controversy in the metal schedule, and this expectation was fully realized this afternoon. Until to-day, however, the discussion of the metal schedule had been relatively slight and of a decidedly general character. Nothing like a close analysis of it had been made on the floor. This, of course, was partly due to the short time that had been given to the tariff in the House. Other schedules, such as those relating to chemicals, oils, cotton and lumber, received most attention and discussion became heated over them. Administrative features, drawn largely by the Tariff Commission, also came in for considerable argument, this being particularly true as to the American valuation plan.

Hurried Through the House

It can be safely stated, though members of the House resent it, that there is a rather widespread belief that the House bill is being hurried through with the knowledge that it will be greatly changed by the Senate. Some members of the House, for instance, who have received many complaints of the ferroalloy duties, have not even brought them to the attention of that branch of Congress, but are expecting that the Senate Committee on Finance will revise the rates considerably. It is evident, however, that those supporting the rates will ask the Senate to grant duties which are considered necessary to build up a domestic industry. Some who have sent protests against the duties on ferromanganese have declared that those now proposed are "indefensible," but that they favor a moderate protection for the domestic furnace interests.

In the course of a brief discussion of the metal schedule last week, Representative Tilson exhibited a tabulation of imports and domestic prices of products carried in that schedule, covering the years 1913 and 1920. The charts were prepared by the Tariff Commission and give the import value for the two years mentioned, so far as practicable, and the domestic prices of these articles at the time the charts were prepared.

Structural Steel Rate Attacked

Representative James W. Collier, Democrat, of Mississippi, attacked the rate of 7/20c. per lb. carried in paragraph 312 on structural steel. He sought to make a comparison between the imports and exports of structural steel, stating that the former were relatively slight, and that inasmuch as domestic steel was used almost exclusively for the construction of the merchant marine, navy, commercial building, etc., the tariff would be a tax on this work. He went so far as to say that the increase would be so great that perhaps a deficiency bill would have to be brought in, and that the duty would actually destroy the merchant marine. His line

of argument was fairly representative of that made against the metal schedule rates and denotes the lack of information of an illuminating character, and for that reason it was not taken seriously.

Chairman Fordney of the Ways and Means Committee replied that there has never been "under a Democratic free trade tariff bill or any other, a pound of steel brought into this country and put into a bridge that was ever built since the foundation of the Republic."

American Valuation Plan

Representative Longworth, a member of the Committee on Ways and Means, explained at some length the operation of the American valuation plan and denied vigorously that it would result in prohibitive duties. He said that rates in the Fordney bill had been lowered under the Payne-Aldrich rates in order to make allowance for the American valuation plan in the case of ad-valorem duties and to bring the revenues contemplated under the plan to the basis of those of the Payne-Aldrich act. Under the plan, ad valorem duties would be assessed on "home values" in the principal markets and bring about a uniform assessment for the same class of importations from countries having different costs of production. It was asserted by Mr. Longworth that the need for such a plan becomes "infinitely more pressing in these days of chaos in foreign exchange." The price on which the duty is to be assessed will be that prevailing on the date of exportation of the products imported at which comparable and competitive products of the United States were ordinarily sold or freely offered for sale in the usual wholesale quantities. In other words, it would be the general market price of similar articles in the United States. It does not involve the particular price that may prevail at a particular port of entry due to transportation costs or otherwise. In the case of steel, for instance, the price would be that prevailing in the principal market, or on the Pittsburgh basis. Assuming that there was an ad valorem duty of 15 per cent on steel plates and the Pittsburgh price was 2c. per lb. or $40 per net ton, Pittsburgh, and the steel was imported at $30, New York, the importer would pay 15 per cent of the American price, or $6 a ton. The $6, together with the $30, or $36, would represent the cost to the importer to bring the steel plates to New York. In other words, he still would have an advantage of $1.60 per ton over the Pittsburgh maker in the New York market, for the latter would have a rate of 38c. per 100 lb. or $7.60 per net ton to overcome, making the cost of the shipment from Pittsburgh equal to $37.60.

Bargaining Features

Representative Longworth spoke favorably of the bargaining clause carried in the Fordney tariff which authorizes the President to reduce the conventional duties 20 per cent in the case of foreign nations with which he may negotiate trade agreements in return for the United States receiving the benefits of their minimum tariffs on given American products. Mr. Longworth said he could conceive of nothing which will have a more beneficial effect upon the enlargement and retention of American export trade than the bargaining tariff. He said that if other nations know that the President has it in his power to give them certain special advantages in the United States market in return for certain special advantages in theirs, he has every confidence that instead of discrimination against American exports there will be encouragement of them.

Upon passage of the bill by the House, the Senate Committee on Finance will arrange for hearings, lasting a month or six weeks, it is expected, and they probably will begin soon.

MORE MILLS ACTIVE

Schedules of Mills in Mahoning Valley Show Improvement

YOUNGSTOWN, OHIO, July 18.—Independent steel mill schedules in the Mahoning Valley are appreciably improved this week, especially finishing capacity, due in measure to accumulation of tonnage resulting from recent slack production.

Sixteen of the 51 independent open-hearth furnaces are fired, 35 of 105 sheet mills are active and 19 tin mills. Strip mill and pipe furnace schedules are likewise on a larger scale.

The Trumbull Steel Co. has the best operating schedule in many weeks—two open-hearths, two jobbing mills, six sheet and 19 tinplate mills.

Five of the tube mills of the Youngstown Sheet & Tube Co. are active and two of the Republic Iron & Steel Co.

Both the 84-in. and 132-in. plate mills of the Brier Hill Steel Co. are partially engaged.

Plant Operations

The Chicago, Burlington & Quincy Railroad Co. has added about 2300 men to its forces since July 1, 1300 of them to be used in car repair work and the remainder on maintenance of way.

The Nash Motors Co., Kenosha, Wis., has resumed production in the four cylinder car division works at Milwaukee with a force of 750 men, the same number engaged at the time the factory closed down May 31 for balancing of stocks. The entire crew is working on an 8-hr. a day schedule.

The Erie Railroad Co., Buffalo, has resumed operations at its local car and locomotive shops after a shut-down of several months giving employment to about 800 men. The company has also placed its shops at Hornell, N. Y., in service, effective July 11, with a working force of about 1000 men.

The Great Northern Railway has reopened the machine shop department of its division headquarters at Superior, Wis., which was closed May 27 for an indefinite period. About 225 men have returned to work at a reduction in wages. The shops handle most of the new construction and repair work on cars and locomotives used in the ore carrying trade between the Minnesota mines and the Great Northern docks at Superior.

Follansbee Bros. Co., Pittsburgh, is planning to resume operations at its plant at Follansbee, W. Va., in the week of July 25. This plant has been down since June 30.

According to S. W. Wakeman, general manager Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., a further reduction in working forces is in order. A total of 2500 employees will be laid off indefinitely and the remaining 1500 will be put on part time. This reduction follows an announcement from the Navy Department that its allotment of funds for 1921 naval work has been reduced materially under the amount required to carry on work as originally laid out.

The New Departure Mfg. Co., Bristol, Conn., ball bearings, etc., normally employing more than 4000, reports increased orders and consequently re-employment of about 90 per cent of the force engaged in ball-bearing manufacture. The Meriden, Conn., plant remains closed.

The Champion Horse Shoe Co., Pawtucket, R. I., has closed its plant until after Labor Day. Repairs to the furnaces necessitated this move rather than the depression of business. The plant has been operating on an 80 per cent basis and employing 150.

The Cutaway Harrow Co., Higganum, Conn., plows, harrows and other farm implements, normally employing approximately 100 skilled hands, has closed its plant for an indefinite period.

Steel Makers Oppose Duties on Manganese

Free Ore Urged, with Conservation of Domestic Supply—Ferromanganese Duty Could Then Be Lowered and Still Be Protective

WASHINGTON, July 19.—So far as the steel trade has been heard from concerning the proposed duties on manganese ore and ferromanganese, its attitude is one of strong opposition to both duties. Expressions so far made indicate that a determined effort will be made to restore manganese ore to the free list and to secure a very substantial reduction in the duty on ferromanganese. Steel manufacturers are opposed also to the duties on magnesite as excessive. The Metal Schedule of the new tariff bill as reported to the House last week provides for a duty of ¾c. per lb. on calcined magnesite including dead burned and grained, and ½c. per lb. on crude or ground magnesite. The opposition of the principal independent steel producers of the country to the manganese ore and ferromanganese provisions of the new tariff bill is indicated in a statement presented on their behalf to the Ways and Means Committee of the House. Extracts from this statement are given below. It is understood that similar representations will be made to the Finance Committee of the Senate. It will be seen that emphasis is put upon the difference between the position of the United States Steel Corporation as an importer of its own manganese ores and a producer of its own ferromanganese and the position of the independent steel companies, which for the most part are buyers of ferromanganese in the market:

Advantage of the Steel Corporation

"The principal alloy used in the manufacture of steel is ferromanganese, the smelted product of manganese ore. This item furnishes a fair example of what is contemplated by way of a burden upon the cost of producing steel in the plants of the independent steel works of the country. This proposed increase in duty will amount to approximately 33c. per ton of steel, as a duty tax, or an increase in the cost of steel of approximately $6,600,000 per annum, calculated at 33c. per ton on 20,000,000 tons of annual output from these independent plants, not including the output of the United States Steel Corporation.

"Furthermore, this tax upon the independent producers would be in effect a direct benefit to the United States Steel Corporation, our principal competitor, by nearly the full amount of the tax proposed, because the Steel Corporation produces and imports its own manganese ores and manufactures its own ferromanganese. Therefore the proposed duty of 1c. per lb. on the manganese content of manganese ore, which ore averages approximately 48 per cent, would call for about 2.2 tons of ore for the production of one ton of ferromanganese, so that the increased cost on account of the duty paid by the Steel Corporation on imported manganese ore would amount to only about 7c. per ton increased cost of steel produced by them, whereas the independent or smaller producer of steel, who does not consume enough ferromanganese to justify its manufacture by importation of manganese ore, and who therefore must purchase ferromanganese subject to the 2¾c. per lb. duty [The committee later changed this duty to 2.2c. per lb.—EDITOR] would have his cost of steel increased about 33c. per ton, because it requires not less than 15 lb. of ferro per ton of soft steel, and we do not hesitate to say that this added burden to the independent steel producers' cost, taken in connection with their present disadvantages, would seriously weaken their competitive position and drive them into combinations for the manufacture of ferromanganese, to the general detriment of all interests.

"Aside from the discrimination which would result in favor of the United States Steel Corporation, very great injustice would also result to all producers of steel and pig iron, viewed from the standpoint of equitable taxation, because the proposed exorbitant and destructive rates are all out of proportion to the general rates proposed on finished iron and steel under Schedule C.

Iron and Steel Duties Much Lower

"The schedule of duties now recommended by the steel people, based on current values for steel, averages on an ad valorem basis, from pig iron to finished steel products, approximately from 8 to 20 per cent for the principal iron and steel products, whereas the alloy manufacturers, whose product is our raw material (which product has a low labor cost) ranges in duty, on an ad valorem basis at present values, from 48 to 200 per cent. This comparison fairly indicates the injustice of the alloy schedule, as there can be no justification for maximum rates of duty on raw materials carrying minimum labor costs, whereas the highly refined, rolled or forged steel products are entitled to maximum rates, because they carry maximum labor costs.

"We would further state that ferromanganese is a blast furnace product like pig iron; but the manufacture of ferromanganese requires about three times as much coke and about four times the labor cost of pig iron, while the output per furnace is about one-third that of pig-iron, and the cost of ferromanganese, above the manganese ore charge, is about four times that of pig iron. So that it is fair to say, a relative rate of duty on ferromanganese, based on a pig iron duty of $2.50 per ton, would be $18 per ton. With iron ore on the free list, no duty should be placed on manganese ore, because it costs no more to mine domestic manganese ore than to mine domestic iron ore, and therefore there should be no discrimination. Furthermore, as we must import most all of our manganese ore, no obstacle should be placed in the way of a free movement.

"As a further illustration we would state that the proposed duty on ferromanganese of 2¾c. per lb., calculated on the manganese content of ferromanganese, equals about $44 per ton, while the duty proposed on wire nails is 4/10c. per lb. or $8 per ton. In other words, wire nails made from pig iron, then into steel, next into wire rods and finally nails, after undergoing four distinct processes of manufacture, is listed to receive less than one-fifth protection contemplated for ferromanganese, which is part of the raw material required to produce a wire nail.

Protection, But Not High Protection

"Another phase of the situation which we would bring to your attention, although the records speak for themselves, is that when the Payne-Aldrich bill was under consideration, in response to the general sentiment throughout the country for lower duty, the steel manufacturers of the United States recommended to the Ways and Means Committee radical reductions downward in the Dingley bill, which action on their

part resulted in a cut of about 50 per cent of the Dingley schedule and the enactment of the Payne-Aldrich bill. In contrast with the attitude of the steel manufacturers, manufacturers in many other lines urged and obtained unfair rates of duty, which outraged public sentiment, and as a result the Republican party went down to defeat.

"Free raw material is a Republican principle and has been written into the Republican tariff measures. To revoke that principle now, through the substitution of prohibitive rates on alloys and refractories, would not only be politically unwise, but unwise from the standpoint of conservation of our raw materials, because this country's supply of these raw materials is not only meager in quantity but lean in character, and everything that can be done should be done to conserve these meager reserves, by encouraging the importation of these materials, so that in times of national peril home supplies of not only alloys but refractory materials can be more fully depended upon for purposes of national defense."

Lower Duty Urged on Magnesite

The continuance of the Underwood duty of 10 per cent on magnesite is urged on behalf of the manufacturers of steel in the following communication which was addressed to Chairman Fordney of the Ways and Means Committee:

"Steel manufacturers, while advocating the application of the protective principle for the protection of all American manufactured products, do not believe that the proposed rate of $15 per ton on magnesite is necessary for protective reasons, because this rate per ton is nearly 50 per cent of the selling price of magnesite at the Atlantic seaboard; furthermore, we question whether any increase in duty over that of 10 per cent provided under the present law is necessary for protective purposes, because during the year 1920 our total imports of magnesite were not in excess of 50,000 tons, whereas our domestic production was close to 300,000 tons, and it is therefore quite apparent that domestic trade has not suffered any serious competition, even under the Underwood bill.

"We therefore urge that your committee, in fixing the rate of duty, give full consideration to the thought that magnesite is one of the raw materials used in the manufacture of steel, and should be rated like other raw materials, either on the free list or on a revenue basis. Otherwise, cost of manufacturing steel will be unnecessarily increased. Inasmuch as our domestic reserves of magnesite are somewhat limited, importation of part of our requirements is in harmony with the policy of conservation and therefore will strengthen our national position in time of war, and our world's competitive manufacturing position in time of peace.

"With the iron ores of Michigan and other States on the free list, the question may be fairly asked, Why should magnesite production of Oregon and California be entitled to preferential treatment unless for revenue purposes?"

FILLING OLD ORDERS

New Business Light in Mahoning Valley—Price Cutting on Sheets

YOUNGSTOWN, OHIO, July 19.—Considerable tonnages of steel products have been accumulated by Mahoning Valley producing interests recently, accounting for a substantial enlargement in active productive capacity. W. E. Manning, vice-president and general sales manager of the Youngstown Sheet & Tube Co., states that incoming business is in insufficient volume to warrant a statement of general improvement.

It is the consensus of opinion among leaders of the industry in the Mahoning and Shenango Valleys, however, that the low point in the period of depression has been passed, especially in the steel industry. An important manufacturing consumer of various steel lines believes that steel prices in some lines are virtually at the bottom, and that buyers may be expected to come into the market from now on to satisfy their requirements.

Prices are not as firm under the new schedule on some products, however, concessions being offered on sheets and plates. An important district maker reports that 3.25c. and 4.25c., respectively, are being quoted on black and galvanized sheets, which is $5 per ton below the recently stabilized price level in each instance. The lower prices have served to create considerably more inquiry, though actual business placed has been for small tonnages.

Owing to season conditions and the fact that automobile models are being changed at this season, automobile makers are curtailing their full-finished sheet requirements. Producers, as a consequence, who have been virtually operating at full capacity for an indefinite period, are preparing to modify their operations and may fully suspend within a short time.

Tank Plate Orders

Plate business before the trade is largely confined to small-lot orders of tank plates, with the price around 1.90c., which compares with the nominal market quotation of 2c. Negotiation of important car repair contracts is expected to lead to business from these quarters, which will have to be placed, though, at bottom prices to meet the terms of such contracts.

Some improvement is noted in wire and nail buying, the further reduction in prices serving to bring buyers into the market for current needs at least. The market is holding at 2.50c. and 2.75c. on plain wire and nails, respectively. An inquiry involving upwards of 1000 tons of rods has been before the trade and is expected to lead to business. A concession price is anticipated.

Reduction in the price of strip steel has brought out some tonnage, enabling makers in this territory to maintain output at 50 per cent. While a large part of current production is for automobile uses, other buyers are entering the market.

Concessions on tinplate from the $5.75 price are reported. Somewhat more than ordinary activity is reported in this market.

Low Prices on Basic

Weakening of basic pig iron prices brings a hint of $18 for Valley iron, and a sale of 2000 tons at $18.50 by a Valley steelworks interest, which has been purchasing its iron requirements rather than start its own furnace, is reported to have been made. Low phosphorus iron was recently quoted at $35 by a district interest. Bessemer iron has been offered at $21, though the ruling price continues to be $21.50.

Pipe buying is still confined chiefly to the smaller sizes and only in volume sufficient to maintain production at 20 per cent.

The semifinished market is naturally stagnant, with sheet bars available at less than the $35 quotation. Small billets are being quoted at $34 and slabs at $33. The minimum on forging billets appears to be $40, with independent production at less than 10 per cent.

A large fabricator of fireproofing and metal furniture reports increased inquiry, some of which is expected to materialize into business. Fabricators of steel reinforcing materials are getting demand for materials for public buildings, highway and industrial developments. Such buying is maintaining operations at 60 per cent.

Though an occasional carload is moving, the old materials market is lifeless. Railroad scrap is down about 50c. per ton, bringing the market range from $11.50 to $13, depending upon the nature of the material.

Prime Western spelter is quoted at 4.30c., which is down 5c. from the recent level.

JAPANESE ACTIVITY

Orders for Structural Steel, Tin Plate, Sheets and Copper—Canceled Material at New York

NEW YORK, July 19.—The Japanese market continues to be about the only foreign market showing any noticeable activity. The recent bridge inquiry totaling 1500 tons for the vicinity of Tokio has been placed with Mitsui & Co., which also received the previous order for about nine bridges. Takata & Co. has been awarded the order for 5000 boxes of tin plate for the Imperial army. Buying of copper continues, one New York exporter having recently booked an order for about 200 tons of copper ingots for a Japanese consumer. Sheet buying is still a fairly large item from Japan. An American exporter dealing with Japan is quoting on about 100 tons of light gage black sheets and a large Japanese house recently placed an order with a mill, which has never before been in the market to roll sheets for about 400 tons of black sheets, No. 31 gage, packed for export. The inquiries for short mileages of 12-lb., 25-lb. and 30-lb. rails for Japanese consumers have not yet been placed.

Light buying continues by the South Manchurian Railroad, and there is some inquiry and purchasing of electric units and equipment in the Far East. One Japanese house is now quoting on 700 Shelby seamless steel poles, tapered from 2-in. to ¾-in. at the top for use on an electric trolley line in Japan.

Quantities of canceled material are still available at the port of New York. Lots of bars, angles and tees in good condition are reported offered as low as 1c. per lb. This material was originally consigned to South American markets and canceled. One exporter has been negotiating for the purchase of a lot of electrical sheets, which have been offered at 4c. per lb., against an average market price of 7.50c. per lb. These sheets were originally purchased for shipment to an Italian consumer.

The Ulen Contracting Corporation, 120 Broadway, New York, is reported to have a contract from the Bolivian Government for the construction of a new railroad line in that country, extending from Villazon to Atoche, 128 miles, with cost estimated at $10,000,000. The contract is to be completed in 5 years. The specifications call for the installation of American type of track equipment, with similar motive power. Railroad shops and other features are included. This report is not confirmed.

The Cie Centrale de Construction, Haine St. Pierre, Belgium, informs THE IRON AGE that it is interested in hearing from American manufacturers of shapes, steel castings, buffers and drawing bars, couplers, tires, axles, springs, forgings, car hardware, car lighting systems, brakes, car heating systems, reversible and fixed seats and all other rolling stock specialties.

The Chinese Government railroads are reported to have placed an order in Belgium for 30 prairie type locomotives and 6 British type locomotives. Chinese railroads have also placed orders for 300 freight cars with the American Car & Foundry Co. and 600 freight cars with the General American Car Co.

Ajuria y Aranzabal, Barcelona, Spain, has purchased a 1-ton electric furnace for the production of steel castings, from the Pittsburgh Electric Furnace Corporation, Pittsburgh. This is the second electric furnace purchased by the Spanish company from the Pittsburgh company.

AUSTRIAN TARIFF QUESTION

Protection Held Unnecessary by Consumers, Farmers and Labor—Germany Active in Mergers

(*Special Correspondence*)

VIENNA, AUSTRIA, June 22.—Attention has been called to the attempts of the iron producing industry to reintroduce customs duties on pig iron and semi-finished material and increase the present rates on finished products. Consumers as well as the trade and labor opposed this plan and the Government, hard pressed from both parties, eventually submitted the whole question to a committee composed of representatives of producers, consumers, farmers and labor. The producers pointed to the high cost of production and urged the necessity of protection against foreign competition The Government, however, was impressed by the argument that the proposed protection would result in an advance in the cost of raw products by 40 per cent and nullify all attempts that have been made to bring down prices. Representatives of the iron working industry declared that tariff protection would cause a serious crisis affecting as it would 250,000 workers, and the idea of a protective tariff for a country exporting 80 per cent of its production was held to be absurd.

Germany Active in Austria

Germany is as active in the Austrian market as ever. Aside from mere competition, there is "peaceful penetration" in the merging of interests. A joint-stock company for railroad material has been established by the large merchant firm of Otto Wolff at Cologne with the co-operation of the Rheinische Stahlwerke and the Vienna firm of Biedermann & Co. The capital stock amounts to 20,000,000 kronen. Another company recently established is the "Mannesmannröhren-und Eisenhandels Gesellschaft m.b.H.," which is a merger between the Mannesmann tube works and the Freistadt Steel & Iron Works for the purpose of selling tubes in Austria. The black sheet syndicate at Cologne is represented by a newly established company at Vienna and another firm catering to the sheet and rolled material markets is Dobbertin & Co., exporters, Hamburg, with a separate company in Vienna.

Very little activity is noted in the market—the pressure of German supplies accounting for the subdued tone. Demand is light, consumers anticipating further price concessions. Several of the smaller rolling mills have laid off men and price cuts by other works are proving ineffective against German competition. Fabricators are offering large stocks at prices frequently below warehouse or mill prices.

The Demming Co., Salem, Ohio, has resumed operations in its plant which has been shut down about three months.

The American Metal Products Co., Detroit, has let contracts for the construction of a new brick and steel carbide generator plant.

Contracts have been let by the Timken-Detroit Axle Co., Detroit, for the erection of a brick and steel power house on Clark Avenue.

The Herbrand Co., Fremont, Ohio, manufacturers of drop forgings has resumed plant operations with 250 men. The plant had been shut down for some time.

The United States Screw & Stamping Co., 91 Exchange Street, Worcester, Mass., recently incorporated with a capital of $25,000 to manufacture screw products, metal stampings, etc., does not expect to build but will buy more equipment shortly.

United States production of sulphuric acid increased from 2,338,280 tons in 1914 to 3,296,270 tons in 1919, a gain of 41 per cent, according to the Census Bureau. The value of product was $15,395,100 in 1914, or $6.58 per ton; in 1919, $35,638,200, or $10.81 per ton.

Iron and Steel Markets

PRICE CUTTING GENERAL

More Concessions in Plates, Shapes, Bars and Sheets

Sharp Competition in the Chicago District—Railroad Buying Increasing

Cutting of the steel prices announced early in July has been more general in the past week, particularly in plates, structural shapes, reinforcing bars and sheets. The favorable feature has been that more business has come up. In the eagerness of producers to get a share of it prices suffered.

Railroad and construction demand are responsible for most of the week's activity in plates and shapes and the accompanying concessions of $3 to $5 per ton in the prices of the two products. The buying was not such as to indicate any change in the general situation, much of it having been in sight recently awaiting favorable prices.

Steel works operations are on a smaller scale in some districts and in others practically unchanged. The Youngstown district in particular is at a low rate.

Aggressive competition between Steel Corporation and independent steel has been seen in the Chicago market. Pittsburgh basing has gone by the board in that district and on a small plate order from a railroad 1.80c., Chicago, was done. Presumably lower prices were made on 3000 tons of steel for car repairs, 2600 tons placed by one fabricating company and 1200 tons by another. The week's transactions at Chicago show that the extent to which the announced prices are cut depends entirely on the size and character of the order and the hunger of the mill.

At Philadelphia a 5000-ton order for plates and shapes for a fabricating company went at 1.75c., Pittsburgh, for the plates and 1.80c. for the shapes, whereas both are presumably 2c., Pittsburgh. Several lots of about 1000 tons, reported in the New York market, brought out prices of 1.80c. and 1.85c. and in one case 1.70c.

In concrete reinforcing bars 1.70c. has been reported for soft steel. A round volume of such bars is under active negotiation, including 3800 tons for export.

Considerably more car repair work is ahead. The Lehigh Valley's repair and rebuilding program includes 5000 freight cars and the New York Central will do much in both car and locomotive repair. The Illinois Central is expected to buy 140 locomotives.

Sheets have been sold in the past week at $3 to $5 per ton below the so-called stabilized basis. Buying is better and mill operations have increased about 10 per cent.

The wire trade shows little movement either in agricultural or jobbing lines, but there is little disposition to go below the 2.75c. basis, in comparison with what is happening in heavy steel products. Recent mill operations have been around 30 per cent.

A 4000-ton girder rail order has been placed with the Lorain, Ohio, mill by the Chicago Surface Lines.

Cast iron pipe lettings have been above the average in the past week and some attractive business is ahead, including 5700 tons for Detroit and 3000 tons for Hammond, Ind. Prices continue to settle.

Eastern Pennsylvania furnaces have taken the lead in reducing pig iron prices, reductions of from $3.50 to $4 per ton having been made in the past 10 days, the most precipitate drop since the decline began. This has been due largely to keen competition from furnaces at Buffalo, where very low quotations prevail. In other centers, new concessions of from 50c. to $1 have been made. In Alabama, although there is now only one merchant stack in blast and stocks are declining, the market is weak with the tendency still downward. Belgian iron is being offered in this country and a sale of 100 tons has been made at $30, delivered San Francisco, but buyers are slow to place orders in a declining market for foreign iron for which deliveries are uncertain.

In the export trade the most significant fact is that Belgian steel mills, which have been especially aggressive in outside markets, are now filled up for some months ahead. The German works, whose low prices have been an unsettling factor in South America and elsewhere, are also booked to a degree that will make them less of a menace to American mills.

A 12,000-ton rail inquiry from the Chilean Government, withdrawn late last year, is coming up again next month. German mills were low bidders before.

The high manganese ore and ferromanganese duties in the new tariff bill having passed the House against the protests of steel producers, a determined effort will now be made by the industry to secure their reduction by the Senate.

Pittsburgh

PITTSBURGH, July 19.

Although the iron and steel market here is weak and there has been no material increase either in business or in plant activities, the situation sentimentally is better than it has been. The idea is fairly prevalent that the stocks of usable material in consumers' hands as of Dec. 31, 1920, have been pretty well liquidated and that the jobbers' stocks, though still fairly large, constitute less of a hindrance to mill business now than they did a few weeks ago. Consequently, hopes are stronger that orders soon will begin to show some increase.

If anything, price concessions have been more frequent in the past week than they were just following the last effort at stabilization. This development, however, is regarded as a constructive step in that when actual negotiations are started there is not likely to be a wide gap between buyers' and sellers' price ideas to hinder a speedy consummation of deals. Quotations on sheets in the past week of from $3 to $5 per ton below the stabilized prices have been common and tentative inquiries for plates against some of the tank business which recently has been placed have developed a definite quotation of 1.85c., Pittsburgh, and one buyer claims to have been quoted even less. In connection with the shading of quotations, there are reports from reliable sources that the Steel Corporation is disposed to meet competition at least on the major products.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 19, 1921	July 12, 1921	June 21, 1921	July 20, 1920
No. 2X, Philadelphia‡	*$21.85*	$25.50	$25.50	$48.15
No. 2, Valley furnace†	*19.50*	20.50	21.50	45.00
No. 2 Southern, Cin'ti†	24.50	24.50	26.50	45.60
No. 2, Birmingham, Ala.†	20.00	20.00	22.00	42.00
No. 2 foundry, Chicago*	*18.50*	19.00	20.50	45.00
Basic, del'd, eastern Pa.	*21.25*	23.50	25.00	44.40
Basic, Valley furnace	19.50	19.50	20.50	46.00
Bessemer, Pittsburgh	*22.46*	22.96	24.46	47.40
Malleable, Chicago*	*18.50*	19.00	20.50	43.50
Malleable, Valley	*20.50*	21.00	22.50	45.00
Gray forge, Pittsburgh	21.46	21.46	22.96	44.40
L. S. charcoal, Chicago	36.00	36.00	37.50	57.50
Ferromanganese, del'd	70.00	70.00	70.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	33.00	33.00	37.00	65.00
O.-h. billets, Pittsburgh	33.00	33.00	37.00	65.00
O.-h. sheet bars, P'gh	35.00	35.00	39.00	70.00
Forging billets, base, P'gh.	38.00	38.00	42.00	85.00
O.-h. billets, Phila.	38.74	38.74	42.74	69.10
Wire rods, Pittsburgh	*42.00*	43.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh	2.00	2.00	2.00	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.10*	2.15	2.25	4.75
Iron bars, Chicago	*1.90*	2.00	2.20	3.75
Steel bars, Pittsburgh	*1.80*	1.90	2.00	3.50
Steel bars, New York	*2.18*	2.28	2.38	4.02
Tank plates, Pittsburgh	*1.80*	1.90	1.90	3.25
Tank plates, New York	*2.18*	2.28	2.28	3.77
Beams, etc., Pittsburgh	*1.85*	2.00	2.00	3.10
Beams, etc., New York	*2.23*	2.38	2.38	3.27
Steel hoops, Pittsburgh	2.50	2.50	2.50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 19, 1921 Cents	July 12, 1921 Cents	June 21, 1921 Cents	July 20, 1920 Cents
Sheets, black, No. 28, P'gh.	*3.25*	3.50	3.75	7.50
Sheets, galv., No. 28, P'gh.	*4.25*	4.50	4.75	9.00
Sheets, blue an'l'd, 9 & 10.	*2.50*	2.65	2.85	6.00
Wire nails, Pittsburgh	2.75	2.75	3.00	4.00
Plain wire, P'gh	2.50	2.50	2.75	3.50
Barbed wire, galv., P'gh	3.40	3.40	3.85	4.45
Tin plate, 100-lb. box, P'gh.	$5.75	$5.75	$6.25	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$12.50*	$13.25	$13.25	$35.50
Carwheels, Philadelphia	16.00	16.00	18.00	38.00
Heavy steel scrap, P'gh	12.00	12.00	12.75	26.00
Heavy steel scrap, Phila.	11.00	11.00	11.00	22.50
Heavy steel scrap, Ch'go	10.00	10.00	10.50	24.00
No. 1 cast, Pittsburgh	16.00	16.00	16.50	40.00
No. 1 cast, Philadelphia	*17.00*	16.00	17.50	38.00
No. 1 cast, Ch'go (net ton)	12.50	12.50	12.50	36.00
No. 1 RR. wrot, Phila.	13.50	13.50	14.00	33.00
No. 1 RR. wrot, Ch'go (net)	*9.00*	9.25	9.50	24.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$17.00
Foundry coke, prompt	4.00	4.00	4.50	18.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.75	12.75	12.75	19.00
Electrolytic copper, N. Y.	12.62½	12.62½	12.75	19.00
Zinc, St. Louis	*4.25*	4.30	4.45	7.95
Zinc, New York	*4.75*	4.80	4.95	8.30
Lead, St. Louis	4.35	4.35	4.20	8.50
Lead, New York	4.40	4.40	4.40	8.75
Tin, New York	*27.00*	28.50	28.75	49.50
Antimony (Asiatic), N. Y.	*4.65*	4.75	5.12½	7.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 19, 1921, Finished Steel, 2.407c. per Lb.

Based on prices of steel bars, beams, tank plates, open-hearth rails, plain wire, black pipe and No. 28 gage black sheets — These products constitute 88 per cent of the United States output of finished steel.

July 12, 1921,	2.493c.
June 21, 1921,	2.607c.
July 20, 1920,	3.974c.
10-year pre-war average,	1.684c.

Orders for sheets, at least with the leading interest, are a little heavier than they have been and this company has increased its operations in the past fortnight by about 10 per cent. Generally, however, the trading situation is one of jockeying by buyers and sellers over prices without much business resulting. Pipe makers who would meet the prices being offered by the oil companies, would have to go pretty low to secure an order. It also is noted that, on a recent inquiry for plates, shapes and bars for the Washington Navy Yard prices quoted by jobbers were well below those named by several large mills. Actual business in pig iron is light, but every advantage offered by freight rates is seized by middle men. The result is an unsettled and indefinite market.

We note the sale of round lot of basic iron at a delivered price of $19.60 to a Pittsburgh district melter, the iron going from a furnace having a lower freight rate than is enjoyed by Valley furnaces. Figured on a Valley furnace basis with $1.96 per ton freight, this business would mean $17.64 at Valley furnaces. The same condition, more or less, is true of foundry iron.

There continues to be considerable agitation for a cut in railroad freight rates on materials entering the manufacture of iron and steel and in addition merchant producers of high-grade iron are beginning to seek concessions from the present nominal quotations on ore. With lower ore prices, blast furnace interests declare that they might be able to compete with the steel companies on present high iron prices.

Pig Iron.—Outside of a couple of fair-sized sales of basic iron carrying a delivered price of $19.60, business has been entirely of carload lots, and even these have not been especially numerous. The market on Valley basic iron does not appear to be quotable at less than $19. Iron of that grade has been offered at $19, furnace, without takers, but at the moment the price is about as low as any of the steel companies, or merchant producers in that district who have iron for sale, are willing to go. Bessemer iron generally is held at $21, Valley furnace, but it is doubtful whether sales could be made at above $20.50, and we revise quotations accordingly. Some producers still are holding No. 2 at $20.50, Valley furnace, but $20 is about as high as any business has been done lately, and $19.50 in the past few days has become the going base.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.50
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	20.50

Iron and Steel Bars.—Very little demand is developing for merchant steel bars in this district, and prices are entirely nominal. Western mills appear willing to take tonnages at less than 1.90c., Pittsburgh, and naturally buyers here do not think the latter price is likely to hold. The Navy Department will open bids Aug. 5 against a fairly large tonnage of soft steel bars for the several navy yards throughout the country. Reinforcing bars rolled from billets are encountering stiff competition on prices from rerolled rail bars. Iron bars are dead and a quotation is merely what is asked by makers.

We quote steel bars rolled from billets at 1.90c.; reinforcing bars, rolled from billets, 1.90c. base; reinforcing bars rolled from old rails, 1.75c. to 1.85c.; refined iron bars, 2.50c., in carloads f.o.b. mill, Pittsburgh.

Billets, Sheet Bars and Slabs.—Business still is at a standstill and quotations are untested and nominal. It is evident, however, that the stabilized quotations are not being strictly adhered to, as a Cumberland, Md., maker of tin plate recently was able to buy about 1500 tons of sheet bars at around $35 delivered, which is

equivalent to about $33, Pittsburgh. It is said that the business was taken by a western Pennsylvania manufacturer.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $33; 2 x 2-in. billets, $35; Bessemer and open-hearth sheet bars, $35; slabs, $34; forging billets, ordinary carbons, $38, all f.o.b. Youngstown or Pittsburgh mills.

Ferroalloys.—Inquiries are few and rarely are for more than a carload of material. Actually there is so little business that it is impossible to do anything more than name approximations of what might be done if there was business. Makers' quotations are the same as they have been for several weeks, but there is no question that real orders would develop concessions.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 to $28 furnace quoted by makers on direct business and $25 to $26 furnace on resale tonnages; 50 per cent ferrosilicon, $65 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Wire Rods.—The price of $42, Pittsburgh, for the base size of soft rods, recently announced by the American Steel & Wire Co., has been adopted by independent makers. Very little demand is noted even at this concession of $6 per ton from the April 13 base. The margin between wire rods and plain wire is now $12 a ton and while this is a comfortable margin for the integrated plant, it is said to be cheaper for the non-integrated mills to buy wire. Prices are given on page 171.

Structural Material.—Structural awards with shops here still are few and mostly of less than 200 tons. The Engineer's Office, Nashville, Tenn., recently awarded two barges for Mississippi trade to the Tredwell Construction Co., Midland, Pa., and three to the Marietta Mfg. Co., Point Pleasant, W. Va. About 1000 tons of steel will be required for these barges, and it is said that successful bidders are well covered. The Jones & Laughlin Steel Co. has taken 125 tons for a machine shop for the Clearfield Machine Shop, Clearfield, Pa., while the McClintic-Marshall Co. reports 150 tons for a coke bin and conveyor for the Seaboard By-product Coke Co., Jersey City, 150 tons for three machine shops for the Amy Supply Base, Brooklyn; 150 tons for a truss span and suspension bridge placed by the Baldwin Locomotive Works, for erection in Colombia, and 350 tons for four schools in Johnstown, Pa. Plain material still is inactive and the quotation of 2c., Pittsburgh, is merely an asking price. Buyers regard 1.90c. as maximum, and believe that if they had a sizable tonnage to place they would be able to get an even lower price. Plain material prices are given on page 171.

Wire Products.—Jobbers anticipating a good fall business are showing more interest in the market, at least to the extent of trying to find out if present prices are to be maintained over the remainder of the year. None of the manufacturers will give this assurance, however, and consequently, purchases continue of a hand-to-mouth order. There is no tangible evidence of important deviation from the stabilized bases, but the market is extremely quiet.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Steel Rails.—The official quotation of 2c., Pittsburgh, for light rails is finding little or no basis in sales. Inquiries are rather few and usually for small tonnages, and it is reported that rails rolled from new steel have been offered as low as 1.90c. The lowest price reported on these rails rolled from old standard sections is $40 per gross ton, but that price figures back to about 1.80c. per lb.

We quote 25 to 45-lb. sections, rolled from new steel, 2c.; rolled from old rails, 1.80c. to 1.90c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—No appreciable improvement yet is noted in the demand for nuts and bolts and quotations are largely nominal. Track bolts appear to have definitely settled to $4 per 100-lb. base for lots of 200 kegs or more. For lots of less than 200 kegs, there is an increasing disposition among makers to revive the card of extras adopted in December, 1917, which provided for an extra charge of 1c. per lb. Such a charge is made for small lots of rivets, and bolt makers feel they are entitled to the same advance on small lots. Rivets still are inclined lower and there is not much basis in sales for prices of more than 2.65c. for large structural and ship rivets and 2.75c. for large boiler rivets. Prices and discounts are given on page 171.

Spikes.—The railroads are specifying more freely against old orders for large spikes and a fair amount of interest is being shown in small spikes, particularly by jobbers serving the coal companies. Business is better, but still far from active, and does not provide a real test of the revised quotations. Prices are given on page 171.

Cold-Finished Steel Bars.—There are two "official" quotations, the American Steel & Wire Co. naming 2.75c. base, and the independents 2.80c. The latter price is reported to have ruled on several carloads taken by one maker in this district, but on sizable orders it is doubtful whether buyers would have to pay more than 2.75c., if, indeed, they would have to pay that price. The absence of price cutting may be explained by the fact that inquiries run generally to small and unattractive proportions and also because makers who have to buy their hot-rolled bars have found it hard to interest the mills in orders at less than 1.90c. base.

Hoops and Bands.—The market is quotable from 2.50c. to 2.60c. base, Pittsburgh. The higher price is that of the Steel Corporation, while the independents are quoting 2.50 and 2.55c. So little is going on that quotations are entirely nominal.

Cotton Ties.—Although harvesting of the new cotton crop has started in the more southerly parts of the producing area, demand for the ties remains disappointingly small. Makers are quoting $1.35 per bundle of 45-lb., Pittsburgh, for July shipment, and are indisposed to shade this price to meet German competition.

Plates.—Several fair-sized inquiries are before makers that are slow to close because of the difficulty buyers and sellers have had in getting together on prices. About 2000 tons will be required for seven tanks recently placed with the Riter-Conley Co. by the South Penn Oil Co., and the Pittsburgh-Des Moines Steel Co. has not yet covered on the plates required for the tanks recently awarded it by the U. S. Shipping Board. These tanks call for about 2800 tons of plates, but the company has some in stock and some Government stocks also are available and the actual tonnage now sought is 1200 tons. A definite quotation of 1.85c. has been made on plates and there are intimations that as low as 1.75c. would be made to secure an order involving a couple of thousand tons.

We quote sheared plates ¼ in. and heavier, tank quality, at 1.80c. to 1.90c. f.o.b. Pittsburgh.

Iron and Steel Pipe.—Business does not improve appreciably despite the recent price cuts, and until the oil situation becomes more settled and there is more building throughout the country, it is doubtful whether demand will increase much because there is considerable shifting and sizing up of stocks among jobbers and the oil companies seem to have ample supplies for immediate production requirements. Some line pipe inquiries are reported to be out, but they are regarded as feelers in view of the fact that most of the important oil producers have surplus stocks which they are offering at substantial concessions from the mill quotations. If there is any price cutting by the mills, it is largely in line pipe in competition with resale offers. Discounts are given on page 171.

Sheets.—The American Sheet & Tin Plate Co. has enjoyed a fairly good increase in orders and specifications, and mill operations are at least 10 per cent heavier than they were a fortnight ago. Sheet mill

operations in general are somewhat heavier than they have been, as some business was secured or had accumulated during the recent period of suspension by a number of mills operating under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers. Concessions of $5 per ton in black and galvanized sheets have been rather freely offered by some makers and it is currently stated that even less than 3.25c. on black and 4.25c. on galvanized could be done on really sizable orders. On blue annealed sheets the more common quotation now is 2.50c. for the base gage. Prices are given on page 171.

Steel Chain.—Effective July 18, leading manufacturers have revised prices, the new quotation showing declines of 75c. per 100-lb. in proof, BB, and BBB grades in sizes 3/16-in. to ½-in.; of 35c. per 100-lb. in sizes from 9/16-in. to 1¼-in.; 75c. per 100-lb. in wagon chain, and 50c. per 100-lb. in steel loading chain. The new base for 1-in. proof coil chain is $5.90 per 100-lb., with the old differentials applying on sizes from 9/16-in. to 1¼-in., while on the sizes from ½-in. down the differentials have been cut 40c. per 100-lb. The new prices f.o.b. Pittsburgh, per 100-lb. follow:

	Proof	BB	BBB
3/16-in.	$10.25	$11.75	$12.75
¼	9.25	10.75	11.75
5/16	7.75	9.00	9.50
⅜	6.50	7.75	8.25
7/16	6.25	7.50	8.00
½	6.00	7.25	7.75
9/16	6.65	7.65	8.15
⅝ to 11/16	6.55	7.55	8.05
¾ to 13/16	6.40	7.40	7.90
⅞ to 15/16	6.15	7.15	7.65
1-in. to 1¼-in.	5.90	6.90	7.40

Cut Nails.—Prices have been revised by leading makers in keeping with the recent decline in wire nails. Carloads now are quotable at $3 to $3.25 per 100-lb, keg f.o.b. mill, or $3.50 delivered Pittsburgh.

Hot-rolled and Cold-rolled Strips.—Independent makers of cold-rolled strips have met the price of $4.25, base, recently announced by American Steel & Wire Co. The market on hot-rolled strips is quotable from 2.50c. to 2.60c. base, with most makers quoting the higher figure. Extra for pickling hot-rolled strips, 1½-in. and wider, has been cut 15c. per 100-lb. Narrower stock does not share in this change. Extra for annealing has been reduced from 50c. to 30c. per 100-lb. Quantity, cutting and slitting differentials have not been changed. The reduction in pickling and annealing charges is expected to stop price concessions, as it is stated that sales recently made at 2.35c. and 2.40c. merely anticipated this change, which it seems has been under discussion for some time. Business is rather spasmodic.

Steel Skelp.—The new base of 2c. does not appear to be stimulating the demand and makers who have quoted this price against the small inquiries which have been current have failed to obtain the orders, the report being a lower price has been quoted.

Boiler Tubes.—Leading makers of charcoal iron boiler tubes have adopted new discounts, effective July 14, cutting prices from $14 to $20 per ton. The change has been accompanied by a regrouping of the sizes to conform more closely with those employed in quoting steel boiler tubes. Manufacturers in this district are doing very little business, but it is reported that Eastern makers are fairly busy. One important Eastern producer has been running for about two months at 66 per cent capacity and has a sufficient number of orders to maintain this rate of operation for several weeks. The National Tube Co. has not yet made public the new discounts on seamless tubes and for this reason no discounts are published on these tubes on page 171. Other discounts are given on page 171.

Tin Plate.—Demand for tin plate for perishable food containers still is purely hand to mouth and the indications are that the year is going to be a very lean one in this kind of material. Manufacturers supplying tin plate for other kinds of containers are getting a fair amount of business and there is an impression that last quarter of the year will develop a fair amount of general line business. There is general observance of the stabilized base of $5.75 per base box, Pittsburgh, for standard coke.

Coke and Coal.—The recent inquiry of Wickwire Spencer Steel Corporation, Buffalo, for 30,000 tons of furnace coke for August and September shipment still is under negotiations. The impression prevails that this business will be placed at not over $3 per net ton oven and may possibly go under that price, because producers look upon these months as likely to be lean ones and are pretty anxious for the business. There is no change in the spot furnace coke situation, the market being quotable from $2.75 to $3 per net ton oven. Large operators are not disposed to go below the latter price, but the smaller producers seem able to keep going presumably because of a very favorable wage scale and to take business at 2.75c. Spot foundry coke is quotable generally from $4 to $4.25, but occasionally some loaded cars can be bought as low as $3.75, while on the other hand $4.50 is the price to consumers on some choice brands. Eastern by-product plants are finding it difficult to compete with Connellsville coke at present prices because of the high freight rate on coal. Meanwhile, some of the steel companies having by-product ovens have such heavy accumulations of coke that it is reported that some made sales were made as low as $1.25 a ton at oven. The coal market still is dull and weak, especially on by-product grades, which lately have sold as low as $1.50 per net ton, from non-union districts, and rarely commands more than $1.65 for run of mine grade. Non-union steam coal is quotable from $1.50 to $2 and gas coal from $2.25 to $2.50.

Old Material.—No material change is noted in the general situation. Interest in the market on the part of melters is extremely light and dealers seem unwilling to add to their stocks, in the lack of any tangible evidence of increased steel plant and foundry operations in the near future. There is so little business doing that prices of necessity are nothing more than appraisals of what might possibly be done.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.50 to 10.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	16.00 to 16.50
Railroad malleable	12.00 to 13.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	14.50 to 15.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	12.00 to 12.50
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

For use in designing and detailing roof construction the Federal Cement Tile Co., Chicago, has published a pamphlet of 20 blueprint sheets of standards on a scale suitable for use in the drafting room. The company has also issued an unusually attractive booklet covering the various styles of tiles which it makes for the so-called "indestructible roof." This publication includes the interior and exterior views of plants showing various applications, and also construction diagrams. The roofing tiles are made of pre-cast stone concrete reinforced.

Chicago

CHICAGO, July 19.

The new steel prices announced two weeks ago are no longer holding in this territory. Weakness is more pronounced in some commodities than in others. Last week a public letting of 164 tons of plates by a Western railroad brought out the unusually low price of 1.80c., mill, or the equivalent of 1.45c., Pittsburgh. At the present moment there does not appear to be a ruling market price on either plates or structural shapes, and sheets likewise are soft, although not in such a pronounced degree. Some shading is also reported on mild steel bars, but some business is still moving at 1.90c., Pittsburgh. The new wire prices are holding rather firmly, but without bringing out much business.

The trend of pig iron prices is still downward, a further slump of 50c. a ton having taken place this week.

There have been few changes in the operating situation. The Illinois Steel Co. continues to operate eight blast furnaces and is producing steel at 30 per cent of capacity. The Inland Steel Co. did not blow out a blast furnace last week as intended, but expects to take such action within the next few days unless there is an unexpected turn for the better in bookings. At present, however, it still has two out of three furnaces in blast while its steel output is on a 25 per cent basis. Its rail carbon steel bar mill at Chicago Heights is idle this week, as is the mill of the Calumet Steel Co. at the same place. The Interstate and Republic bar iron mills at East Chicago are both inactive this week, but expect to resume operations soon. The South Chicago steel works and bar mill of the Interstate Iron & Steel Co. are operating on a fairly satisfactory basis, while the Wisconsin Steel Works has one out of three blast furnaces and about 25 per cent of its mill capacity active.

Pig Iron.—Buying is light and going prices are about 50c. below those of a week ago. In fact, many melters regard present furnace quotations as at the bottom or so close to bottom that little risk would be involved in placing orders for iron. It is true that the average price for the 10-year period before the war was $2 or $3 under the present quotation, but there were two years in that decade when prices were considerably higher than they are now. A further factor to consider in judging the present level of the market is the added burden of increased freight which enters into the costs of pig iron producers as it does in the costs of all other manufacturers. Notwithstanding the fact that price considerations no longer deter buying, purchases of size are not being made. This fact merely indicates that melters have little work ahead and therefore have no reason to buy much iron. Until the industrial readjustment now going on results in increased foundry operations, the hand-to-mouth buying which has characterized the pig iron market for months will continue. The fact that the liquidation of pig iron prices is completed, or nearly so, means, however, the one important obstacle to the revival of business has been removed. The Beloit Iron Works has not yet closed for 150 tons of 3 per cent foundry and 75 tons of charcoal. The American Radiator Co. is reported to have bought 3000 tons of iron for its Western and Northern plants, but confirmation is lacking. A carload of resale copper free low phosphorus has been sold at $40 delivered Chicago.

Quotations on Northern foundry, high phosphorus, malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.00 to $36.50
Northern coke, No. 1, sil. 2.25 to 2.75	19.00 to 19.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	18.50 to 19.00
Northern high phos	18.50 to 19.00
Southern foundry, sil. 1.75 to 2.25	26.67
Malleable, not over 2.25 sil	18.50 to 19.00
Basic	18.50 to 19.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	35.00
Silvery, sil. 8 per cent	37.53

Ferroalloys.—A carload of resale spiegeleisen has been sold at less than $37, delivered, Bettendorf, Iowa. Generally all of the ferroalloys are exceedingly quiet.

We quote 78 to 82 per cent ferromanganese, $78 delivered; 50 per cent ferrosilicon, $80 delivered; spiegeleisen, 18 to 22 per cent, $36 delivered.

Structural Material.—Lettings of steel work have been fairly heavy the past two weeks, but without having a sustaining effect either on the prices of the mills or of the fabricators. Plain material has been bought at 1.80c., Pittsburgh, and on some tonnages even lower prices are reported. Fabricating bids are also low. On 1200 tons for a local job, the successful bid was $61 per ton delivered. On the Ohio State University stadium involving 4500 tons of steel, less than $80 per ton erected has been bid. An award is expected this week. On 2600 tons for the United States Window Glass Co. plant at Shreveport, La., the fabricating award of which was announced last week, the successful bid was $70 delivered. The erection was let at $12 per ton, while the erection of about 800 tons of old work was awarded at $14 per ton. The steel for the Shreveport job will be rolled by a local mill and 1200 tons for the repair of the Armour Grain Co. elevator, Chicago, will also be supplied by a Chicago mill. Fabricating awards include:

Chicago & Northwestern Railroad elevator, Armour Grain Co. lessee, Chicago, 1225 tons, to Morava Construction Co.

Federal Reserve Bank, Minneapolis, foundation work, 835 tons, to Minneapolis Steel & Machinery Co.

Lake Shore Trust & Savings Bank, Chicago, 339 tons, to Union Foundry Co.

Pressure tank, Los Angeles, Cal., 144 tons, to Baker City Iron Works.

A. M. Castle Co., Chicago, warehouse, 330 tons, to Milwaukee Bridge Co.

Joseph Schlitz Brewing Co., Milwaukee, Commercial Building and reconstruction Schlitz Palm Garden, 270 tons, to Milwaukee Bridge Co.

Pending business includes:

Joliet High School, Joliet, Ill., 800 tons, Hansell-Elcock Co., low bidder.

Missouri Pacific Railroad, two 100-ft. deck turntables, 175 tons.

Mark Mfg. Co., new roof, butt-weld pipe mill, Evanston, Ill., 120 tons.

Orpheum Theater, Wichita, Kan., 140 tons, general contract awarded to Vaughan Construction Co., Omaha.

The mill quotation is 1.80c. to 2c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.03c. for materials out of warehouse.

Plates.—The stabilized prices generally adopted two weeks ago are rapidly becoming nominal so far as this section is concerned. In a public letting of 164 tons of tank plates and 13½ tons of structural shapes by the Burlington Railroad last week, the successful bid on the plates was 1.80c. f.o.b. Western mill, while the structurals were awarded at 2.18c., delivered Chicago. The fact that such low prices were brought out by a small tonnage emphasizes the pronounced weakness and uncertainty of the market. It is evident that competition is keen for such business as is appearing and that the extent to which mills will deviate from the prices announced a fortnight ago depends on the size of the tonnage offered and the character of the specifications. At present writing, it is impossible to name a ruling going price on tank plates. A local mill has been awarded 3000 tons of steel, principally plates, to be used on the repair of 400 gondola cars for the Illinois Central by the Haskell & Barker Car Co. That considerably more car repair work may be looked forward to as a source of steel tonnage is indicated by the fact that the New York Central has issued an inquiry for figures on the repair of 10,000 freight cars of various types. Oil companies continue to undertake work involving plates. The Magnolia Petroleum Co., Beaumont, Tex., is in the market for three storage tanks requiring 600 tons, while the Standard Oil Co. is taking bids on stills for Whiting, Ind., involving about 450 tons. Other inquiries include one from the Allis-Chalmers Mfg. Co. for 350 tons of plates.

The mill quotation is 1.80c. to 2c. Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.03c. for plates out of stock.

Bolts and Nuts.—The market continues weak and the prices quoted on page 171 are to be regarded as

the top of the market rather than as ruling discounts. The tendency of sellers is either to revise the discounts downward or to waive part or all of the freight from Pittsburgh. Revisions of discounts include small rivets, which some makers are quoting at 70 and 10 off list; large machine bolts, which have been quoted at as low as 70 and 5 off, and large carriage bolts, on which 65 and 10 off has been named. The railroads continue to figure in the market. The Louisville & Nashville has bought 700 kegs of nuts and the Illinois Central is inquiring for 300 kegs of rivets. The Ford Motor Co. is reported to have placed a large order for bolts and nuts last week. Jobbers are buying sparingly and the agricultural implement makers remain out of the market.

Jobbers quote structural rivets, 4.03c.; boiler rivets, 4.13c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Prices on mild steel bars are as ill-defined as those on plates and structural shapes. Demand is of much the same character as heretofore. Car repair business is steadily growing larger in scope as indicated in other paragraphs, and there continues to be a fair amount of reinforcing work. A Masonic temple at Davenport, Iowa, will require 500 tons and a grain elevator for the Burlington Railroad at St. Joseph, Mo., 200 or 300 tons. Railroad purchases of bar iron are still small, involving 100 to 200 tons or less. A current inquiry from the St. Paul Railroad calls for 150 tons. Prices range from 1.90c. to 2c., Chicago, and even lower prices have been reported. There has been no material change in the demand for rail carbon steel bars, and prices have slumped to a maximum of 1.90c., Chicago. Bed manufacturers are prominent among present buyers of hard steel bars.

Mill prices are: Mild steel bars, 1.85c. to 1.90c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.90c. to 2c., Chicago; rail carbon, 1.90c. to 2c., mill or Chicago.

Jobbers quote 2.93c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.35c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—The market is weak and going prices are below those generally announced two weeks ago. On No. 28 galvanized, 4.25c., Pittsburgh, is rather commonly quoted, while 4.10c. has been done. On No. 28 black, 3.25c., Pittsburgh, is the ruling quotation and as low as 3c. has been named. On No. 10 blue annealed, 2.45c., Pittsburgh appears to be the market. Demand is still subnormal, but compares favorably with that for plates, shapes and bars. One important Western maker is employing about two-thirds of sheet mill capacity. Japan continues to buy light gage sheets; in fact, more of this class of business is being offered than local mills care to take.

Mill quotations are 3.25c. for No. 28 black; 2.45c. for No. 10 blue annealed and 4.25c. for No. 28 galvanized, all being Pittsburgh prices subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.68c.; No. 28 black, 4.90c.; No. 28 galvanized, 5.90c.

Railroad Rolling Stock.—The Mather Stock Car Co. is contemplating entering the market for 500 steel center sills for stock cars.

Warehouse Prices.—Further price adjustments by jobbers include reductions on chain and charcoal iron boiler tubes. Chain has been reduced 75c. for sizes 3/16 in. to ½ in. and 35c. for sizes 9/16 in. to 1¼ in. Prices are now $11.88 on 3/16 in., $7.63 on ½ in., $7.93 for 9/16 in. and $7.53 for 1¼ in. Charcoal iron boiler tubes have been reduced 3½c. per foot, 4 in. now being quoted at 59½c.

Cast Iron Pipe.—Prices have settled to a maximum of $40, Birmingham, for 6-in. and larger. Lettings have been fairly heavy during the past week and some attractive business is in prospect. Detroit is preparing to ask for figures on 4200 tons of 42-in. and 1500 tons of 8-in. Hammond, Ind., will ask bids soon on 3000 tons of 36-in. This week Akron, Ohio, receives bids for a third time on 6500 tons of 48-in. Recent lettings include:

Fort Wayne, Ind., 470 tons, to United States Cast Iron Pipe & Foundry Co.

Forest Lake, Minn., 200 tons, to United States Cast Iron Pipe & Foundry Co.

Faribault, Minn., 100 tons, to James B. Clow & Sons.

Dubuque, Iowa, 150 tons, to United States Cast Iron Pipe & Foundry Co.

Evansville, Ind., 100 tons, to National Cast Iron Pipe Co.

Pending business includes:

Akron, Ohio, 1000 tons, 4 to 16-in., National Cast Iron Pipe Co. low bidder.

Duluth, Minn., 600 tons, Lynchburg Foundry Co. low bidder.

Decatur, Ill., 100 tons, bids from general contractors, in July 18, to be sublet to pipe manufacturer.

Harrodsburg, Ky., 200 tons, original bids rejected, new bids in July 29.

Detroit, 250 tons of 24-in., July 22.

Milwaukee, 275 tons of 16-in., July 25.

Two Rivers, Wis., 150 tons of 4- and 6-in., July 28.

Manitowoc, Wis., one carload 6-in., July 28.

We quote per net ton, f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $52.10; 6-in. and above, $49.10; class A and gas pipe, $3 extra.

Rails and Track Supplies.—As forecast last week, tie plates have been reduced, the new price being 2.30c Chicago mill. The demand for fastenings and car wheels improves slowly as the railroads gather their car repair and maintenance of way programs under way. The Illinois Central has bought 4000 kegs of track spikes. The Chicago Surface Lines have ordered 4000 tons of girder rails from the Lorain Steel Co.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.90c. f.o.b. makers' mills.

Standard railroad spikes, 3c., Pittsburgh; track bolts with square nuts, 4c., Pittsburgh; steel tie plates, 2.30c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.30c., f.o.b. makers' mills.

Wire Products.—Considering the fact that summer is a dull season, present demand is of fair proportions. Jobbers, however, continue to hold back, notwithstanding the fact that their lack of stocks often handicaps them in filling the orders of their customers. As fall approaches, more generous buying is looked for. Railroad purchases continue small. For mill prices see finished iron and steel f.o.b. Pittsburgh, page 171.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Old Material.—Consumers continue to hold aloof from the market and prices of some grades have again declined. Such purchases as have been made by users confirm the quotations given below. A large local foundry bought 500 tons of selected heavy melting at $10.50 per gross ton. A bar iron mill purchased 700 tons of No. 1 busheling at $8.25 and $8.50 per net ton. Railroad lists include the Rock Island, 3750 tons; the St. Paul, 1200 tons, and the Chicago & Alton, 550 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	12.50 to 13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50

Per Net Ton

Iron angles and splice bars	13.25 to 13.75
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
No. 1 busheling	8.25 to 8.75
No. 2 busheling	5.75 to 6.25
Cut forge	8.75 to 9.25
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Steel knuckles and couplers	10.25 to 10.75
Coil springs	11.50 to 12.00
No. 1 machinery cast	12.50 to 13.00
Low phos. punchings	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.25
Machine shop turnings	3.00 to 3.50
Cast borings	4.50 to 5.00
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	9.75 to 10.25
Railroad malleable	11.25 to 11.75
Agricultural malleable	11.25 to 11.75
Country mixed	7.00 to 7.50

New York

NEW YORK, July 19.

Pig Iron.—Following the increased inquiry reported last week, the market dropped back to the dullness which had characterized many weeks. The sales made within the last few days have been few and at low prices. There is keen competition between Buffalo and eastern Pennsylvania irons. The latter is selling as low as $20 furnace base, and the former at $19. A sale of 500 tons was made to a Connecticut melter for prompt delivery on a basis of about $20 eastern Pennsylvania furnace. A sale of 800 tons is about to be closed at $21.50, eastern Pennsylvania furnace, for No. 2X. A marked feature of the limited buying is that foundries are urging prompt shipment. Some Belgian iron has been offered at low prices, but this iron does not seem to be attractive to anyone. One reason given is that the iron is not of satisfactory analysis, being high in phosphorus, but a more important reason is that melters hesitate to place orders for foreign iron on a declining market when time of delivery is uncertain.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.02 to $25.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.02 to 24.52
East Pa. No. 2 fdy., sil. 1.75 to 2.25	22.52 to 23.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—There is so little inquiry for ferromanganese and spiegeleisen that the market is not well defined. Nominally ferromanganese is quoted at $70, delivered, for the domestic and $70, seaboard, for the imported, but these prices would be shaded if any real business were to be had. Spiegeleisen is available at $26, furnace. Ferrotungsten is quoted at 42c. to 43c. per lb. of contained metal, duty paid; ferrovanadium is lower at $4.50 per lb. of contained vanadium. Manganese ore cannot be sold at any price, but the nominal quotation is 22c. per unit, seaboard. We quote prices as follows:

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$70.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Ferrotungsten, per lb. of contained metal	42c. to 43c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr	16c. to 16.50c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00
Manganese ore, foreign, per unit, seaboard	22c.

Cast-Iron Pipe.—The volume of small orders is satisfactory and prices remain about the same. We quote, f.o.b. New York, carload lots, as follows: 6-in. and larger, $52.30; 4-in. and 5-in., $57.30; 3-in., $67.30, with $4 additional for Class A and gas pipe.

Warehouse Business.—The market shows no change despite the recent reduction of prices in this district. No change in prevailing prices is reported this week, but some shading of current quotations is reported in special cases. Warehouses handling wrought iron and steel pipe, boiler tubes, etc., have not yet issued any official revision of prices to meet the reductions of the mills on both wrought iron and steel pipe. Quotations on inquiries are proportionately lower since the mill reduction, but until the market becomes more stable, probably no official schedule will be issued by these warehouses. We quote prices on page 186.

High-Speed Steel.—The market continues extremely inactive with few orders and considerable shading of prices. We quote 18 per cent tungsten high speed steel at 90c. per lb., with sales reported at 85c. per lb. With the new tariff in force, it is believed that there will be a slight increase in prices, as with the protection afforded, the cost of tungsten will undoubtedly increase.

Finished Iron and Steel.—Specific orders of large size have brought out low prices, as was expected. On 1120 tons of structural shapes 1.85c., Pittsburgh, was done and on 1200 tons, 1.80c. On 900 tons of plates for locomotives the contract basis was 1.70c., Pittsburgh. On 300 tons of bars the basis of the purchase was 1.70c., Pittsburgh. A round volume of bars largely for reinforced concrete work is under active negotiation, one lot of 1100 tons, another of 400 and an export order said to total 3800 tons. Not much as yet has materialized in the way of railroad business in the East. The Lehigh Valley is in the market for part repairs and part rebuilding of 5000 cars, principally box cars; 400 additional cars are to be repaired by the Haskell & Barker Car Co. for the Illinois Central. It is expected that the New York Central will come into the market for considerable locomotive repair work. The Illinois Central, taking prices on 500 tons of forgings for the repairs and rebuilding of locomotives, is expected also to buy 140 new locomotives. Little new work has appeared in fabricated steel lines, but the following awards are noted: For a coal breaker for the Lehigh Coal & Navigation Co., 2200 tons, to the Bethlehem Steel Bridge Corporation; for the Boston & Maine, 125 tons, to the McClintic-Marshall Co.; for the Dental and Oral College, East Thirty-fourth Street, 250 tons, to the Hinkle Iron Co.; for the Rhinelander apartment, Lexington Avenue and Ninetieth Street, 900 tons, to the Hay Foundry & Iron Works, and for the New York Telephone Co., at 146th Street and Convent Avenue, 600 tons, to the Hinkle Iron Co.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.18c. to 2.28c.; plates, 2.18c. to 2.38c.; structural shapes, 2.18c. to 2.38c.; bar iron, 2.28c.

Old Material.—There are no signs of improvement in the scrap market, the chief activity being in heavy melting steel, pipe and stove plate. Dealers in scrap do not look for more activity until steel mills start operating at greater capacity.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$6.50 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	9.50 to 10.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.00 to 10.50
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	3.50 to 4.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 7.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	7.00 to 7.50
Old car wheels	10.00 to 10.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Boston

BOSTON, July 19.

Pig Iron.—Buying of eastern Pennsylvania iron silicon 1.75 to 2.25, by the Gurney Heater Co., Framingham, Mass., for last half delivery, featured the market the past week. The company is credited with taking 2000 tons, half at $21 furnace or $25.06 delivered, and half at a slightly higher price. Some furnaces could not meet manganese and phosphorus requirements. Other eastern Pennsylvania iron sales include 200 tons, silicon 2.25 to 2.75, to a Massachusetts foundry, third quarter delivery, at $21 furnace, and 300 tons, delivery next three months, to another Massachusetts melter at the same price. Differentials in these cases were ignored. No. 2X iron is offered as low as $20.50. The best price obtained this week was $25.75 furnace or $29.81 delivered, for No. 1X, August delivery, by a furnace with $1 differentials, from a Massachusetts foundry. Sales of Buffalo are confined to car lots, third quarter shipment, on a basis of $21 furnace for No. 2X Buffalo. No. 2 plain is offered at $20.50. The Griffin Wheel Co., Chelsea, Mass., wants 300 tons, silicon 2.25 to 2.75, third quarter delivery, and about a dozen other melters 100 to 300 tons, mostly No. 2

plain or No. 2X. A Connecticut foundry bought 100 tons malleable at $24 furnace. Malleable is offered at $22, with a long freight, to $26 furnace. A small tonnage of Alabama, silicon 2.75 to 3.25, was taken by a Massachusetts melter at $36.02 dock, Providence. Delivered pig iron prices follow:

East. Penn., sil. 2.25 to 2.75	$25.06 to $28.81
East. Penn., sil. 1.75 to 2.25	24.56 to 28.31
Buffalo, silicon 2.25 to 2.75	25.96 to 28.96
Buffalo, silicon 1.75 to 2.25	25.96 to 28.46
Virginia, silicon, 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	32.16 to 32.66
Alabama, silicon 1.75 to 2.25	31.66 to 32.16

Warehouse Business.—Black and galvanized sheets have been cut 50c. per 100 lb. to $5 and $6 respectively. Small iron rivets are 10 per cent lower in some instances, the market being 50 to 60 per cent discount, while structural are generally down to $5 per keg base and in light demand. Wire nails have dropped 25c. per keg to $3.85 base, and bolt and nut quotations have been revised according to mill lists recently issued. Barbed wire is 25c. per 100 lb. cheaper. Consumption of iron and steel, if anything, is less than previously reported and warehouse interests are not making fresh mill contracts at any price.

Jobbers now quote: Soft steel bars, $2.98 per 100 lb. base; flats, $3.98 to $4.08; concrete bars, $2.50 to $3.25¼; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.63 to $4.08; steel hoops, $4.33; toe calk steel, $5.25; cold rolled steel, $4.35 to $4.85; structural steel, $2.98 to $3.13; plates, $3.08 to $3.28; No. 10 blue annealed sheets, $3.83; No. 28 black sheets, $5; No. 28 galvanized sheets, $6; refined iron, $2.98 to $5; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Coke.—The reduction in prices announced a week ago by the New England producers of foundry coke, bringing spot and forward deliveries down to $10.91 delivered where the local freight does not exceed $3.40, failed to cause much of a ripple in the market. Virtually no increase in spot buying is noted and signing up of last half contracts has proceeded in about the same ratio as heretofore. About 40 per cent of contracted coke a year ago remains unbooked. New England by-product ovens in operation have not increased in number since last reports. One broker reports a sale of 15 cars, prompt shipment, Connellsville coke at $4.50 f.o.b. ovens, which is a few cents below the base price on New England made fuel.

Old Material.—A partial revival of pig iron buying by the New England foundries the past month or so has not been followed by increased interest on their part in machinery cast, stove plate or other old material, as was anticipated by scrap dealers. The withdrawal of Pennsylvania steel mills from the market for heavier grades of scrap has but added to the unsatisfactory local situation. There is, perhaps a slightly easier market for stove plate, but prices have little opportunity to change in the absence of transactions. A Massachusetts melter took one car brake shoe scrap at $11.50 delivered, and others, scattered car lots of No. 1 machinery cast at prices ranging from $15.50 to $16.90 delivered. A broker bought a car of turnings at $2.50 f.o.b. shipping point, against an old mill contract, while New York brokers paid $4.65, shipping point, for selected chemical turnings and is inquiring on 100 tons additional, but expects to buy for less money. The old material market otherwise is devoid of trading features. Yard owners are not trying to push sales inasmuch as much of the material on hand was bought at prices well above those ruling to-day.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $17.50
No. 2 machinery cast	15.50 to 16.00
Stove plate	14.50 to 15.50
Railroad malleable	14.00 to 15.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Buffalo

BUFFALO, July 19.

Pig Iron.—The total sales last week were 2700 tons but with the three sellers now active, inquiry seems to have fallen off. Improved shipping on old contracts by one furnace has brought about a withdrawal as to 1.75 to 2.25 silicon iron and this furnace for new business is now concentrating on lower silicons. Its sales last week—about 700 tons—were booked at prices ranging from $20 to $23 base. The most active competitor in the district sold 1500 tons at the same range; 100 tons of malleable was sold at $23 and a quantity of iron (silicon almost 4 per cent) was booked at $25. The first ore to be delivered at this port arrived last week and coupled with the fact that the consignee is known to be in the market for a considerable tonnage of coke, it is speculated that a furnace will be blown in August 1. Part of an order of 2200 tons bought by the largest buyer in this vicinity, went to a furnace here at $19.75 base, silicon 1.25 to 1.75. Only three furnaces are in blast and one of these may be blown out the first of August. One seller has several small inquiries and no sales. The campaign to sell a steel-maker's iron seems to have come to a finish—no new inquiries and sales slightly under 500 tons.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.75 to $22.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75 to 22.00
No. 2 plain, 1.75 to 2.25 sil.	20.00 to 21.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—Improvement in inquiry with respect to volume and variety brings a better feeling, but orders have not improved to any appreciable extent. Previous price reductions this year did not bring out the optimism that recent reductions have developed. Consumption of material is certainly in excess of production and that long-looked for period of absolute liquidation of stocks is closer to hand. Bids have been opened in Albany within the week for a new State normal school at Cortland, N. Y. Operation is less than the preceding week—one open hearth now represents the entire program of a mill which has been fairly busy all year. Several small rail orders have been booked—one of 300 tons for the Toronto street railway system and another of 200 tons for the International Railway Co., Buffalo. Small orders for piling engage one mill. Railroad inquiry has not developed but improvement in the structural situation with particular reference to Buffalo is looked for with the settlement of the ironworkers' strike—the men agreeing to take a wage cut. Fair bar business developed with new prices; one order for 400 tons in three or four sizes and several orders for lesser tonnages. Two inquiries for pipe aggregate 1200 tons. No betterment in sheets came with new prices.

Warehouse Business.—Price changes have brought out a number of orders which apparently were held back awaiting the announcement. Dealers are not over enthusiastic as to the improvement, not seeing any permanency. Inability of mills to supply small tonnages continues to help warehouse business, in one instance the mill directing a prospective purchaser to the warehouse with a resulting order. Railroad inquiry, expected with the reopening of shops and the urgent need of repairs to rolling stock, has not developed into the order stage. In fact, there is but little railroad inquiry in hand and the instructions to purchasing agents not to buy seem to be still in effect.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.05c.; plates, 3.05c.; plates, No. 8 gage, 3.65c.; soft steel bars and shapes, 2.95c.; hoops, 3.65c.; blue annealed sheets, No. 10 gage, 3.70c.; galvanized steel sheets, No. 28 gage, 5.80c.; black sheets, No. 28 gage, 4.80c.; cold rolled strip steel, 7.15c.

Coke.—Inquiry is better and there is a disposition in evidence that buyers are willing to buy ahead. One inquiry calls for delivery of 800 to 1000 tons per month.

Old Material.—If possible, dealers say, the market

is slower than any time this year. There is a particular weakness in cast scrap and a great surplus on the market. In heavy melting steel, the largest consumer has indicated a willingness to buy small tonnages but refuses to pay more than $10 and insists that if his offer is taken, the material must be first grade.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$11.50 to $12.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Cincinnati

CINCINNATI, July 19.

Pig Iron.—The market was very quiet during the week. Inquiries and sales have been confined almost entirely to carload lots. The Lunkenheimer Co. has been in the market for 150 tons and it is reported that a cash register company has entered the market for 160 tons of Southern iron of special specification. The Alabama Co. put out its Etowah furnace at Gadsden July 19, leaving but one merchant furnace active in the entire South, and it may blow out at any moment. The Globe Furnace of the Globe Iron Co., Jackson, on account of a mine tipple burning down, will be blown out about Aug. 1.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.00
Ohio silvery, 8 per cent sil.	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	23.52

Tool Steel.—Pickup business is about the only activity. High speed steel, 18 per cent tungsten, is being quoted at $1 per lb. base.

Finished Material.—Buying continues light, orders being for the most part small and for immediate delivery. There is still no stimulation to be observed as a result of the recent price reductions and it appears doubtful as to whether the lower prices will initiate increased activity. The 600 tons for bridges for the Kanawha & Michigan Railway Co., previously reported, went to the Mt. Vernon Bridge Co. Bids for the 450,000 tie plates aggregating about 2500 tons, recently called for by the Big Four Railroad, were opened July 18. It is understood that 100 tons of reinforcing bars will be given out shortly by the E. H. Latham Co., Columbus, general contractor, for the construction of the stadium of Ohio State University, and other tonnages will be placed as the erection proceeds. Bids will be received up to July 28 for the proposed new passenger station at Covington, Ky., to cost about $80,000 and to be erected jointly by the C. & O. and L. & N. railroads. Specifications calling for bids on approximately 1200 tons of black sheets, issued by the Bureau of Supplies and Accounts, Navy Department, have been received by a mill in this district. The mills of the American Rolling Mill Co., Middletown, have been operating during the week and are expected to continue next week. The plant of the Newport Rolling Mill Co. is still shut down.

Warehouse Business.—Local jobbers report good volume of orders but quantities light. It is felt by some that further price reductions may stimulate more activity, others are of the opinion that general conditions are the governing factor. New prices went into effect July 12, prices being now as follows:

Iron and steel bars, 3.15c. base; hoops and bands, 3.85c. base; shapes, 3.25c. base; plates, 3.25c. base; reinforcing bars, 3.22½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, 4.92c.; No. 28 galvanized sheets, 5.92c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.10 per 100 lb.

Coke.—Inquiries for coke during the week were light, but there has been some carload business, one inquiry for 900 tons and two for 300 tons, previously reported, are expected to be placed at end of the week. Prices remain unchanged.

Old Material.—Activity in the scrap market is at a standstill. Prices are, if anything, tending to lower levels, but in the absence of trading remain unchanged by most dealers. One dealer, however, is now quoting as follows: Bundled sheets, $4 to $5; cast borings, $2 to $3; steel turnings, $1; iron axles, $15 to $16; pipes and flues, $4 to $5.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$4.00 to $5.00
Iron rails	11.00 to 12.00
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.00 to 11.00
Heavy melting steel	8.50 to 9.50
Steel rails for melting	9.00 to 10.00
Car wheels	11.50 to 12.50
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	2.00 to 3.00
Steel turnings	2.00 to 2.50
Railroad cast	11.00 to 12.00
No. 1 machinery	12.00 to 13.00
Burnt scrap	6.50 to 7.50
Iron axles	15.00 to 16.00
Locomotive tires (smooth inside)	8.50 to 9.50
Pipes and flues	4.00 to 5.00

St. Louis

ST. LOUIS, July 18.

Pig Iron.—Three sales of Northern malleable were made this week that are considered of consequence in these days when orders are few and far between. A southern Illinois melter bought 500 tons, an eastern Kansas foundry bought 300 tons, and 100 tons went to a Belleville, Ill., stove factory. Some little carload business was done, and four or five inquiries for carloads were out.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern malleable	$22.80 to $23.30
Basic	22.80 to 23.30
Southern foundry, sil. 1.75 to 2.25	25.74 to 26.24

Finished Iron and Steel.—Recent reductions so far have not had the effect of stimulating business, and such orders as are being placed are not attributed to lowering of prices. The Unit Construction Co., St. Louis, has sublet the contract for the concrete work for the University of Kansas Stadium at Lawrence to J. P. Sprague & Co., Kansas City, 200 tons of reinforcing bars being involved. Inquiries were received here from the Southern Wire & Iron Co., Dallas, Tex., for 500 tons of reinforcing bars for a job in Galveston, Tex. The Mississippi Valley Bridge & Iron Co., Leavenworth, Kan., got the order for the structural steel (1100 tons) for the motor transport division of the Army there, which St. Louis fabricators eagerly sought. The Lincoln Steel & Forge Co., St. Louis, received an order from the Missouri Pacific Railroad for 500 sets of underframes, involving 320 tons of structural steel. Inquiries from railroads were confined to less than carload lots, being material for filling in, such as car wheels, axle bars, etc. Warehouse business is dull.

For stock out of warehouse we quote: Soft steel bars, 3.02½c. per lb.; iron bars, 3.02½c.; structural shapes, 3.12½c.; tank plates, 3.12½c.; No. 10 blue annealed sheets, 3.77½c.; No. 28 black sheets, cold rolled, one pass, 5c.; No. 28 galvanized sheets, 6c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, $4.12½ per 100 lb.; boiler rivets, $4.22½; tank rivets, 7/16 in. and smaller 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and tapped, $3.00 off list.

Coke.—Very little business is being done in coke, and that little is being handled by the local and Granite City by-products plants. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis, Granite City by-products meeting this price, while Laclede by-product foundry is quoted at $11.50 ovens, or $11.70 delivered in the St. Louis industrial district.

Old Material.—Trading in old materials has been very light, even transactions between dealers being almost entirely suspended. There were no railroad

lists before the market this week. The trend of prices is still lower, although the nominal prices of last week remain unchanged, except No. 1 railroad heavy melting steel, which is $1 lower at $10 to $10.50.

We quote dealers' prices, f.o.b. consumer's works, St. Louis industrial district and dealers' yards as follows:

Per Gross Ton

Iron rails	$12.50 to $13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Relaying rails, standard section, subject to inspection	27.00 to 29.00
Cast-iron car wheels	12.00 to 12.50
No. 1 railroad heavy melting steel	10.00 to 10.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Ordinary bundled sheet	4.00 to 4.50

Per Net Ton

Heavy axle and tire turnings	5.00 to 5.50
Iron angle bars	10.50 to 11.00
Steel angle bars	9.00 to 9.50
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 9.00
No. 1 dealers' forge	6.50 to 7.00
Cast iron borings	6.00 to 6.50
No. 1 busheling	9.00 to 9.50
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.50 to 4.00
Railroad grate bars	7.00 to 7.50
Machine shop turnings	4.00 to 4.50
Country mixed iron	6.50 to 7.00
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.00 to 10.50
Railroad brake shoes	7.50 to 8.00

Birmingham

BIRMINGHAM, ALA., July 19.

Pig Iron.—By the end of last week the Birmingham iron market was on a $20 base. Car loads were selling at $20.50, but $20 was the admitted schedule for any real buying. Some disturbance of the $20 base was caused by the appearance in the market of some resale iron, how much is not known, but it was encountered in more than one direction. This iron was offered at $19.50. That seems to be the lowest that is reported anywhere. Melters and makers appear to be nearer a common agreement that prices of iron are lower than they have yet been and there is less disposition on the part of the melter to hammer the market. Only one foundry stack is in blast in Alabama, the Woodward Iron Co. having blown out its Gadsden stack to-day. There will be another reduction of merchant iron stocks this month. Strategically Alabama iron is stronger than in some time. The going business is in small lots, with the sanitary pipe shops coming in regularly for immediate requirements, while one sanitary pipe interest recently ordered 2000 tons to cover requirements of several months. Southern iron makers are insistent in their demand for lower rail rates to competitive points, asking for a compromise between the pre-war rates and those now in existence. For instance, they ask an $8 rate to the East compared with a pre-war rate of $6 and the present rate of $10.26. Other requests are on the same base. The Southern iron melt is increasing owing to greater activity at stove plants and other foundries. The total volume of business last week was not great, but indications of an increasingly steady buying movement are much better.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$20.00
Basic	19.00
Charcoal	35.00

Cast Iron Pipe.—Anniston shops of the United States Cast Iron Pipe & Foundry Co. have resumed after being down two weeks for repairs. The National Cast Iron Pipe Co. received an order for 140 tons from Minneapolis, but no large bookings were made. There is a fairly active inquiry for pipe for industrial purposes. The sanitary shop of the Emory Pipe Co. at Anniston resumed during the week and promises full operations. Sanitary pipe is at about 50 per cent of productive capacity. The base is $40. The real base of high pressure pipe is about $40.

Finishing Mills.—The Gulf States Steel Co. has notified its workers of a reduction of bonus from 25 to 15 per cent. It is operating at less than 30 per cent in finishing mills and idle in other departments. The Tennessee company is operating the plate mill and rail mill and car plants. The car plant has turned out its first car, doing so exactly one month after the plant started. It was a 100,000-lb. capacity steel low-side gondola for the Louisville & Nashville, which has ordered 600 cars.

Coal and Coke.—The Cotton Belt route has placed its Texas coal tonnage of 12,000 a month with Walker County mines. Domestic coal has begun appearing in Birmingham at $5 from nearby mines, hauled in trucks over hard roads. Standard foundry coke has receded 50c. and sells at $6 to $6.50. Semet-Solvay Co., at Ensley, has reduced operations since the Alabama Co. blew out at Gadsden and quit taking coke. The National Cast Iron Pipe Co. was the successful bidder on 1000 tons of water pipe for Akron, Ohio, Friday. This plant is at near capacity of operations.

Old Material.—Scrap was never duller and prices are nominal.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Philadelphia

PHILADELPHIA, July 19.

A few occurrences within the past week lend interest to an otherwise dull iron and steel market. One of the most important in its effect on steel prices was the purchase of 5000 tons of plates and shapes by the Belmont Iron Works from an Eastern steel company at prices reported to be 1.75c. for the plates and 1.80c. for the shapes, Pittsburgh. In addition the Belmont Works bought 1000 tons of surplus shipyard structural steel, 1500 tons of black corrugated sheets and a small tonnage of bolts and nuts. On all items there was keen competition for the business, with marked sacrifices in prices. The sheets are reported to have been placed at a price close to 3c., base, Pittsburgh, with usual extras. Although makers of bolts and nuts had reduced prices only last week, the competition for about 50 tons of bolts and nuts brought out still lower figures.

A better inquiry for pig iron also caused a scramble for business at the expense of prices. Not since the decline in pig iron started in October, 1920, have prices dropped so precipitously as within the past 10 days. Eastern furnaces, which only recently were holding for $24, base, for shipment into this district are now quite willing to sell at $20 to $20.50, a drop of $3.50 to $4. The encroaching competition of Buffalo furnaces is partly responsible for the decline, but the determination of some pig iron companies to reduce their inventory, even at a considerable loss, is also a factor.

There was also a flurry in steel scrap when news leaked out that an Eastern steel company had bought a tonnage at $12, delivered, which was $1 higher than was generally obtainable last week.

There are indications from several directions that consumers are beginning to take more interest in the market, but such indications are not yet well enough defined to become the basis for any optimistic predictions as to early recovery in business. However, it is significant that the sales departments of steel and pig iron companies are more hopeful than they have been at any time in months.

Pig Iron.—For some weeks the makers of foundry pig iron in eastern Pennsylvania have been actively competing with Buffalo furnaces for business in New

England and in the New York territory, and on such inquiries they have made quotations considerably lower than they were willing to make for delivery at Philadelphia or vicinity. Within the past week, however, the Buffalo furnaces have encroached further into this territory. An inquiry for about 200 tons from a Flemington, N. J., foundry, for example, brought out such low prices that the market again was wide open, and the Eastern furnaces abandoned the efforts that had been made to hold No. 2 plain iron at $24, furnace, for shipment within this immediate district. Quotations as low as $20 to $20.50, furnace, for No. 2 plain and $21 to $21.50, furnace, for No. 2X have been made within the past few days. Carload lots do not command quite such low prices as larger tonnages, one selling office having sold No. 2X iron on the same day at prices ranging from $21 to $23, furnace, depending on the tonnage and the competition to be met. Basic iron has declined with foundry grades. A sale of 1000 tons of basic was made to a Harrisburg consumer at a price reported to be about $20, furnace. Whether this was the actual selling price or not, basic iron is to-day available at $20, furnace, and on a large tonnage for immediate shipment, even lower might be done. There has been better inquiry and more active buying of iron within the past week. Sales have totaled several thousand tons. One office within the week sold 3500 tons, which exceeded in quantity the business booked in the whole month preceding. Among the individual sales worthy of note was one of 1000 tons of No. 2 plain iron and another of 300 tons of the same grade; in addition to which was the 1000-ton lot of basic mentioned above. There was keen competition among Eastern furnaces for two New England orders, one of which, that of the Crane Co., Bridgeport, Conn., for 500 tons was placed with a Buffalo furnace at a price reported to be about $22.60, delivered, for No. 2 plain. This iron will be moved by canal from Buffalo. The decline in eastern Pennsylvania foundry iron prices for the week is about $3.50 to $4, the largest on record within any similar period since prices started downward in October, 1920.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.85 to $21.25
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.85 to 22.75
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	21.25 to 22.00
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	38.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—The market is dull, with no inquiry of consequence to test prices. Domestic ferromanganese is available at $70, delivered, while British alloy can be made at $70, seaboard, or possibly lower. Spiegeleisen is available at $26, furnace.

Semi-Finished Steel.—The N. & G. Taylor Co., Cumberland, Md., bought 1500 tons of sheet bars from an Eastern steel company at a price reported to be at least $1 or $2 a ton below the $35 quotation recently established. There is little or no demand for billets, which are unchanged in price at $33, Pittsburgh, for rerolling quality and $38 for forging quality.

Plates.—Though there is little business, the plate market has shown further evidence of weakness, particularly in the competition for the order of the Belmont Iron Works, consisting partly of plates. These plates are reported to have been taken at 1.75c., Pittsburgh, but on ordinary quantities, such as are now being quoted upon, the usual quotations are 1.80c. to 1.90c., Pittsburgh. At least one mill is willing to take business, even in carloads, at the former figure, while some other mills quote 1.85c. or 1.90c. The Lehigh Valley Railroad is asking for bids on repairs to 4000 miscellaneous freight cars.

Structural Material.—Of the 5000 tons of plates, shapes and bars placed by the Belmont Iron Works with a leading independent mill, a large part was structural shapes, on which a price of 1.80c. is reported to have been made. On small lots, buyers would now have no difficulty in obtaining quotations of 1.85c. The Belmont purchase included 1000 tons of surplus shipyard material, on which a price somewhat lower was made. The latter order went to a local steel broker. All of this steel was bought for the fabrication of airplane hangars for the Government, on which the Belmont Works was low bidder.

Sheets.—The Belmont Iron Works bought 1500 tons of black corrugated sheets last week at a price reported to be close to 3c., base, Pittsburgh, with usual extras. Prices on sheets are being generally shaded. Blue annealed have been quoted at 2.50c., black at 3.25c. and galvanized at 4.25c., Pittsburgh, these prices being $3 a ton on blue annealed and $5 a ton on black and galvanized below the so-called "official" prices named by some companies just recently.

Bars.—Some shading of the 1.90c. bar price is reported, and the fact that the price is holding as well as it is said to be is due largely to the fact that there have been few inquiries attractive enough to induce the mills to cut. Makers of bar iron have taken off $1 more from their price, the quotation now being 1.75c., base, Pittsburgh.

Wire Products.—A substantial improvement in purchases of wire products, particularly nails, by jobbers has been noted within the past week. This enlarged buying by jobbers also applies to some other steel products. Prices of wire products appear to be holding more firmly than are prices on other steel products. We quote plain wire at 2.50c. and wire nails at 2.75c. per lb., base, Pittsburgh.

Warehouse Business.—No price changes have occurred within the past week. We quote for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ in. x ½ in., 3.20c.; round edge steel, planished, 3.95c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage, 4.50c.; galvanized sheets, No. 28 gage, 5.50c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.75c.; 3/16-in., 4.95c.; ⅛-in., 5.05c.; spring steel, 4.40c.; round cold-rolled steel, 4.50c.; squares and hexagons, cold-rolled steel, 5c.; steel hoops, No. 13 gage and lighter, 3.85c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.60c.; iron bands, 4.20c.; rails, 3.20c.; tool steel, 12c.; Norway iron, 6.50c.; toe steel, 4.50c.

Old Material.—Purchase by the Bethlehem Steel Co. of a tonnage of steel scrap at $12, delivered Bethlehem, was the only activity of note in the scrap market during the week. This price was $1 per ton higher than was generally obtainable from Eastern mills a week ago. Dealers have offered $11 to $11.25 in covering on this contract. A 500-ton sale of No. 1 cast scrap was made at $17, delivered. Pipe is slightly higher. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.00 to $12.00
Scrap rail	10.00 to 10.50
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	13.50 to 14.50
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	8.50 to 9.00
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	No market

The Muskegon Piston Ring Co., Muskegon, Mich., has been organized by George W. Olson, Joseph A. Kitzinger of Muskegon, and John R. Nix of Muskegon Heights, Mich., to manufacture piston rings of iron and steel.

The plant of the Elliott-Fisher Co., manufacturer of bookkeeping and accounting machines, located at Harrisburg, Pa., has been closed for several weeks because of the general dullness of trade.

Cleveland

CLEVELAND, July 18.

Iron Ore.—The Ford Motor Co., which recently sent out an inquiry for ore to a number of producers, has finally placed 135,000 tons with a Cleveland ore firm. This is the only sale reported during the week and no new inquiries have come out. Owing to the absence of orders, shippers are unable to keep in operation all the boats that have been running and several lake freighters were laid up during the week. A cargo of Swedish ore offered for sale at 8c., as reported in THE IRON AGE several weeks ago, is now reported sold at 7½c., seaboard.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market which showed a little spurt for a few days lapsed back into the usual dullness during the week. Sales were limited to a few small lots of foundry iron. One lake furnace interest sold 900 tons in lots of 200 tons and under. One broker booked only 100 tons. The only inquiry of any size that came out was from the Studebaker Corporation for 500 to 1,000 tons of foundry iron. This inquiry, however, indicates an uncertainty whether the order will be placed One inquiry for 100 tons of silvery iron is pending, on which the schedule price has been quoted. The market has virtually settled down to a $20 price for No. 2 foundry iron, but one lake furnace made a few carlot sales during the week at $20.50. For basic iron, $19 is generally considered the market price, although there have been no recent sales in this territory to establish a price for this grade. A western Pennsylvania consumer, on an inquiry for 300 tons of basic iron, reports that he was quoted a price of $19.75 delivered, which figured back to a Valley basis, would mean a $17.79 Valley furnace price. Furnaces have received a few releases of shipping orders from automobile foundries this month, but as a whole July shipments will show a falling off as compared with June. Some of the malleable foundries that cater to railroad work are getting a better volume of business from that source, but this has not brought out any demand for malleable iron.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.96 to $21.46
Northern No. 2 fdy., sil. 1.75 to 2.25	20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	28.92
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	36.00 to 37.00

Finished Iron and Steel.—The demand for finished iron and steel has improved somewhat during the past few days, but the market is weak and unsettled. The recently established prices are not being maintained. On small lots of steel bars, plates and structural material, sales are being made at regular prices, but desirable inquiries are bringing out concessions the amount of which depends on the size of the order. An Ohio fabricating shop is inquiring for 2500 tons of plates, bars and structural material, which has brought out some extremely low quotations and reports indicate that this business is likely to be placed around 1.75c. The improved activity is more pronounced in plates, for which there is a better demand from boiler and tank shops, but plate prices are weaker than bars and structural material, 1.90c. being quite commonly quoted for plates. However, low prices are being named on soft steel reinforcing bars for work on which either soft or hard steel bars can be used. On one inquiry of that character for 100 tons, a quotation on soft steel bars of 1.70c. or lower is reported as compared with 1.75c. for hard steel bars. Encouraging reports are coming from the automobile field. Michigan automobile plants are reported to be operating at an average of 70 to 75 per cent of capacity and expect to be able to keep going at their present schedules through August. There is improvement in inquiry for small lots of steel from automobile makers. A Detroit car builder is inquiring for 120 tons of chrome vanadium and 175 of open-hearth spring steel. Structural work is dragging. Owing evidently to the declining steel prices, much of the pending work is being refigured and some has been held up until fall. The 2300 tons for the Ohio State University stadium, Columbus, is expected to be placed Wednesday. The only award reported is 300 tons for the Harter Bank, Canton, to the Canton Bridge Co. School work in northern Ohio now pending aggregates about 2000 tons in lots of 200 and under. Railroad inquiry also shows improvement. The New York Central Lines are in the market for a large lot of track bolts, angle bars and tie plates and the Wheeling & Lake Erie Railroad is inquiring for 10,000 angle bars.

Jobbers quote steel bars 2.79c.; plates and structural shapes, 2.89c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.40c. to 3.55c.; hoops and bands, 3.44c.; cold rolled rounds, 4c.; flats, squares and hexagons, 4.50c.

Sheets.—Weakness has again developed in the sheet market following the recent price reductions. Concessions of $2 to $5 a ton are being made. On galvanized sheets 4.25c. is being quoted, a concession of $5 a ton, and on blue annealed sheets quotations of 2.40c. to 2.50c. have appeared. Black sheets are firmer than other grades, the largest concession reported on these being $2 a ton to 3.40c. A western Pennsylvania tank shop is inquiring for 300 tons of heavy sheets for mine castings for the Navy Department.

Coke.—Although The Wickwire-Spencer Steel Corporation, Buffalo, has inquired for 30,000 tons of furnace coke, it is reported that this interest will probably buy some pig iron instead of starting up a blast furnace and consequently will not purchase the coke. Foundry coke is very quiet with quotations ranging from $4 to $4.50 for Connellsville brands although a few producers are still asking $5 and carlot sales are reported at the higher price.

Bolts, Nuts and Rivets.—The demand for bolts and nuts has improved. Some large orders were placed during the week by the Ford Motor Co., which recently sent out an inquiry for 8,000,000 bolts and nuts. Some carload orders were placed by railroads and jobbers and inquiries for several million bolts have come from jobbing houses. These are taken to indicate that jobbers think that prices may not go lower and they will stock up. Some releases on suspended shipments have also come out. Prices are being well maintained. Rivets are very dull and irregular. There are large quantities of resale rivets, formerly owned by the Emergency Fleet Corporation, on the market and it is claimed that some of the recent low quotations have been on these resale rivets. Carlot prices are 2.75c. for structural and 2.85c. for boiler rivets, but these can probably be shaded.

Old Material.—The market continues almost at a standstill. There was a little trading during the week between dealers who have small unfilled orders for compressed steel and machine shop turnings for Weirton and other consuming points, but no consumers are in the market. Some of the dealers are trying to get mills interested in buying scrap and laying it down at the present low prices, but without success. Prices are unchanged.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings (nominal)	7.00 to 7.50
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	6.50 to 7.00
Compressed steel	6.00 to 6.50
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

San Francisco

SAN FRANCISCO, July 14.

Pig Iron.—A single sale of 100 tons of Belgian iron is practically the only evidence of activity in the Coast market at this time. The price paid for this lot, which was No. 1 grade, was $30, ex-ship, San Francisco. Recent developments indicate a decided softening tendency in pig iron; this week one interest received an offer of a large quantity of Belgian iron on the basis of about $26, c.i.f. San Francisco. Of course, much of the iron was not highest grade, but some of it contained 3 per cent silicon. Foundry operations continue very greatly restricted and the general situation is dull. There is nothing to report on coke, with the exception of the narrow routine demand, and the arrival of occasional carlot quantities.

Old Material.—A local interest recently purchased 100 tons of heavy melting steel at $9 gross ton, delivered. Still greater weakness is indicated by recent sales, in small lots, of cast iron scrap, which have been reported around $20, with one instance of a considerably lower price. The market generally is unsettled and dull.

Cast Iron Pipe.—Interest in this market has narrowed somewhat during the past week, as indicated by the volume of offerings. Redwood City, Cal., asked bids for 63 tons of 4-in. pipe, and Yuba City is in the market for 48 tons of 8-in., 32 tons of 6-in. and 9 tons of 4-in. pipe. Inquiries from private sources are similarly light. The market remains steady.

Finished Iron and Steel.—Depression still prevails in building construction in San Francisco, although there are indications that point to alleviation of the situation; there is a determined stand for the open shop, which, however, the Building Trades Council is opposing vigorously. A few days ago, an attempt to re-open the planing mills failed in 19 out of 22 cases, and the three had been running with an irregular crew. Since the recent price cuts by the Steel Corporation, the steel market on the Coast has been quiescent, the tendency apparently being to wait for developments. It is understood that there is some independent cutting on plates and shapes. The export market appears slightly more encouraging, with some little demand for sheets and rails from the Orient.

British Iron and Steel Market

Full Prices Still Prohibitive—Pig Iron Higher —Bars and Tin Plate Lower

(By Cable)

LONDON, ENGLAND, July 19.

Blast furnaces are very slow in re-lighting, only four now working in Cleveland. Fuel costs are still prohibitive, and furnace owners will not resume operations until these costs are greatly reduced.

There is plenty of general inquiry for steel, but the bulk of the business goes to the Continent. German billets are being sold at £5 15s. ($20.59) f.o.b.; French sheet bars at £7 ($25.06) c.i.f.; German merchant steel bars at £10 10s. ($37.59) to £11 ($39.38) c.i.f. For Japan, ¼-in. plates are quoted at £8 ($28.64) f.o.b.; 8-gage wire at £15 ($53.70) c.i.f. Japan. German works are getting well booked ahead. Jessops of Sheffield has been closed down indefinitely, and customers have been requested to place their orders elsewhere.

In tin plate the tendency of prices is downward. More mills are being started, but there is very little export inquiry, and the increase in the French duty is a further obstacle to business. Galvanized sheets are easy, the expected demand having failed to materialize.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.58 per £1 as follows:

Durham coke	£2 2		$7.52
Cleveland basic	6 0		21.48
Cleveland No. 1 foundry	7 0		25.06
Cleveland No. 3 foundry	6 15 &	£7 0*	24.17 & $25.06
Cleveland No. 4 foundry	6 15 &	7 0*	24.17 & 25.06
Cleveland No. 4 forge	5 17½		21.03
Hematite	7 0*		25.06
East Coast mixed	8 0 &	7 5*	28.64 & 25.96
Ferromanganese	18 0 &	15 0*	64.44 & 53.70
Ship plates	14 10		51.91
Boiler plates	19 0 to	21 0	68.02 to 75.18
Tees	14 10		51.91
Channels	13 15		49.23
Beams	13 10		48.33
Round bars, ¾ to 3 in.	12 10		44.75
Rails, 60 lb. and up	10 0 to	15 0	35.80 to 53.70
Billets	11 0 to	11 10	39.38 to 41.17
Sheet and tin plate bars, Welsh	10 10		37.59
Galvanized sheets, 24 g.	22 10 to	23 10	80.55 to 84.13
Black sheets	19 0 to	20 0	68.02 to 71.60
Tin plate base box	1 4 to	1 7½	4.30 to 4.92
Steel hoops	17 0		60.86

*Export price.

Welfare Work for Employees

Analysis has been made by the International Labor Office, Washington, of the extent to which American manufacturing and other industries have carried on various classes of welfare work for their employees. The preliminary report covers 159 plants having a total of 453,069 employees, or an average of nearly 3000 each. Of the entire list, 51, or about one-third, are comprised under the headings of metal products, machinery, tools, electrical equipment, etc., automobiles and mining, and hence come fairly under the field served by THE IRON AGE. These 51 plants have a total of 191,024 employees, or more than 40 per cent of those covered by the survey.

Among the 51 plants, 27 employing 158,406 people are engaged in supplying their employees with certain educational facilities. It is reported that more than 30,000 of the employees, or 19 per cent of the number affected, are receiving direct benefit from this work. Some of the establishments give general educational training, some vocational training, some give lectures on safety and other matters and some maintain libraries for the use of their employees.

Of the 51 plants in our field, 38 provide sick or death benefits, 8 make provision for helping employees during slack seasons or periods of unemployment, and 14 provide old age pensions under varying sets of conditions. Some of the plants, of course, take care of all three of these forms of benefits.

Thirty of the establishments in THE IRON AGE field, with a total of 156,929 employees, provide recreational facilities, of which it is reported that more than 45,000, or 29 per cent, of the employees take advantage. Seventeen of these plants maintain separate club houses; 10 others maintain club rooms. There are 30 baseball diamonds, 51 tennis courts distributed among 16 plants, 22 bowling alleys maintained by 7 establishments. Nineteen of the plants have billiard or pool rooms with a total of 173 tables, of which number 100 are maintained by 2 automobile factories. Seven golf courses, 4 swimming pools, 10 gymnasiums, 19 orchestras, 18 bands and 10 glee clubs are maintained by as many establishments, while 26 of the plants have provision for regular outings or picnics.

The Osborn Mfg. Co., Cleveland, recently placed its new foundry at Grafton, Ohio, in operation and all molds for castings for its molding machines, except for the special, large size machines, are being made on a roll-over type of Osborn machine. The management states that operations in this plant indicate that the use of molding machines shows a saving in labor in a jobbing shop that is not engaged in production work. One of the molds for a molding machine housing made in the Osborn shop requires a flask 8 ft. long, 7 ft. wide and the cope and drag are each 36 in. deep. The weight of a cope half after the pattern was rammed was 20,500 lb. The mold was made on the largest size Osborn roll-over jolt molding machine.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65
Large boiler rivets.....$2.75
Small rivets .....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads .....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts .....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S..80, 10 and 10 per cent off list
Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....4c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in., and 7/16-in., $3 base; 5/16-in., $3 base. Boat and barge spikes, $3.20 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.90c. from mill. Refined bar iron, 2.50c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.40–2.55	Nos. 11 and 12	2.60–2.75
Nos. 9 and 10 (base)	2.50–2.65	Nos. 13 and 14	2.70–2.85
		Nos. 15 and 16	2.80–2.95

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.05–3.30	No. 28 (base)	3.25–3.50
Nos. 22 to 24	3.10–3.25	No. 29	3.35–3.60
Nos. 25 and 26	3.15–3.40	No. 30	3.45–3.70
No. 27	3.20–3.45		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.25–3.50	Nos. 25 and 26	4.00–4.20
Nos. 12 to 14	3.35–3.60	No. 27	4.10–4.35
Nos. 15 and 16	3.50–3.75	No. 28 (base)	4.25–4.50
Nos. 17 to 21	3.65–3.90	No. 29	4.50–4.75
Nos. 22 to 24	3.80–4.05	No. 30	4.75–5.00

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.05–3.30	No. 28 (base)	3.25–3.50
Nos. 17 to 21	3.10–3.35	No. 29	3.30–3.55
Nos. 22 to 24	3.15–3.40	No. 30	3.30–3.55
Nos. 25 to 27	3.20–3.45	Nos. 30½ and 31	3.35–3.65

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
July	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
13	12.75	12.62½	28.25	4.40	4.35	4.75	4.25
14	12.75	12.62½	28.00	4.40	4.35	4.75	4.25
15	12.75	12.62½	27.75	4.40	4.35	4.75	4.25
16	12.75	12.62½	....	4.40	4.35	4.75	4.25
18	12.75	12.62½	27.25	4.40	4.35	4.75	4.25
19	12.75	12.62½	27.00	4.40	4.35	4.75	4.25

New York

NEW YORK, July 19.

The markets are exceedingly dull. Copper is quiet and there is some weakness in prices in the outside market. Tin is lower in price because of the British exchange and larger offerings both here and at London. Lead is quiet with prices unchanged. Zinc is dull and weak, prices being slightly lower.

Copper.—Though many of the larger producers of copper are still adhering firmly to 13c., there is a further tendency toward shading in the outside market. There is very little business, both export and domestic demand having fallen off. The lowest prices are being made chiefly by the small producers. An advance report of the United States Geological Survey shows that the total production of primary copper in the United States in 1920 was 1,209,000,000 lb., which, if compared with the production in 1919, shows a decrease of 6 per cent.

Tin.—A little business was done on Tuesday of last week for forward delivery at 28.25c., but the market was almost lifeless during the remainder of the week. On Monday of this week there was a little more selling for forward delivery at 27.25c. There have been no developments of interest. Prices have softened because of the British exchange situation and also on account of freer offerings both here and at London. The London market is declining, to-day's quotation on spot Straits being £161 10s. as compared with £166 5s. one week ago.

Lead.—The American Smelting & Refining Co. continues its price of 4.40c., New York, and is taking most of the limited business that is being placed. In the outside market higher quotations are named; hence trading in the outside market does not amount to much. There are no new features.

Zinc.—Prices are easier, July shipment now being quoted at 4.75c., New York, August, 4.80c. and September, 4.85c. Very little business is being placed. In high grade zinc there is a slightly improved demand.

Aluminum.—The Aluminum Co. of America on July 15 reduced the price of 99 per cent plus ingot virgin aluminum to 25c., f.o.b. shipping point, making the price for the 98-99 per cent 24.50c.; No. 12, 28.80c., and sheets, 39.10c. These prices are still from 2 to 2½c. above the prices quoted on imported aluminum. The market continues very dull.

Antimony.—Lower prices are noted, carloads for July shipment now being available at 4.65c. Recent cables from the Orient indicate fairly large stocks.

Old Metals.—The market is generally unchanged and business is still impossible. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.00
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	10.50
Brass, heavy	7.00
Brass, light	5.25
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	5.25
Lead, heavy	4.00
Zinc	3.00
Lead, tea	3.00

Chicago

JULY 19.—Tin, lead and spelter have declined. The fall in exchange has influenced the slump in tin, while both lead and zinc are being pressed on the market at lower prices. Purhasers who were unable to fill their requirements at the quotations 10 days ago now hesitate to buy. We quote lake copper at 13.25c. in carload lots; tin, 29c. to 29.50c.; lead, 4.35c.; spelter, 4.35c.; antimony, 7.50c. On old metals we quote copper wire 7.50c.; crucible shapes, 7.50c.; copper clips, 7.50c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 21c., all being buying prices for less than carload lots.

St. Louis

ST. LOUIS, July 16.—No interest is being shown in the non-ferrous markets, trade being exceptionally dull. Lead is quoted at 4.40c. in carlots and spelter at 4.25c. to 4.35c. We quote Lake copper carlots at 13.48½c.; tin, 28.86c. and antimony, 5.38½c. On old metals we quote: Light brass, 4c.; heavy yellow brass, 6c.; heavy red brass, heavy copper and copper wire, 8c.; light copper, 7.50c.; pewter, 17c.; tinfoil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c.; aluminum, 9c.

Italian Iron and Metal Market

MILAN, ITALY, June 30.—The current price for finished iron and steel has fallen to 85 lire per 100 kilos, free cars Italy. Same material can, however, be purchased as low as 70 lire from stock as there have been practically no sales and also owing to the fact that many merchants are willing to sell at a loss in order to obtain cash. This condition makes purchases from foreign countries practically impossible. It must be noted that the present duty on iron and steel is from 6 to 9 lire per 100 kilos gold which is equal at to-day's rate of exchange to 18 to 27 lire.

Business is completely at a standstill. There have been several large failures due to depreciation in the value of merchandise. Many importing firms have gone out of business. This was to be expected as since the war there was an over number of small firms, who during the war were able to make a small fortune, but who lost it in a very short time during these last few months of crisis. This will help other firms who will be able to overcome this period of hardship.

Many articles have gone down in prices these last weeks. The Facsisti have been the main reason for these reductions and they have had several killed in fights with Socialists, who have also sustained several losses. They started by obliging the market people and peasants to reduce prices, otherwise they would confiscate all merchandise.

Here are this week's prices in lire, f.o.b. Milan per 100 kg.:

	April 17	May 22	June 30	Cents per Lb. June 30
Copper, electrolytic	630	575	600	13.20
Copper sheets	1100	1020	1020	22.44
Brass sheets	970	900	900	19.80
Brass wire	950	875	875	19.25
Brass rods	580	550	550	12.10
Brass tubes	1150	1070	1070	23.54
Black sheets base, 4 mm.	160	160	150	3.30
Galvanized sheets No. 20	285	250	240	5.28
Tin plate, standard, per case	215	180	165	$8.08

Reduced Coke Production

UNIONTOWN, PA, July 18.—A further decrease in coke production and a slight increase in coal output have marked the past week in the Connellsville bituminous region. Coke production of W. J. Rainey, Inc., has been decreased to about 40 per cent through suspension of ovens at Paul and Revere.

Robesonia Iron Co., Robesonia, Pa., has placed an order for furnace coke requiring delivery of 7000 tons monthly during July, August and September through W. L. Byers & Co., at a price reported to be $3.25 a ton. The coke is being taken from the Herbert plant of the Connellsville Central Coal & Coke Co. An export order of 17,000 tons of coal has been shipped during the past fortnight to Holland.

CZECHO-SLOVAKIAN MARKET

Foreign Competition Felt—Unemployment Benefits Increase—Many Plants Merge

(Special Correspondence)

PRAGUE, CZECHO-SLOVAKIA, June 22.—If there is not an open shop movement over here in Europe, the reasons are to be sought in the entirely changed economic and political post-bellum conditions of revolution-ridden Central Europe. There are plenty of other causes, however, of industrial unrest, and the antagonism between socialist labor unions and the so-called yellow or Christian or national unions has been responsible for many strikes and lockouts. To this antagonism must be traced the origin of the trouble in the Czecho-Slovakian metal industry.

In the middle of May the workers at three of the largest Prague works struck to enforce their demand that none but socialist labor union members should be employed. Employers retaliated by a lockout affecting 54 works with about 25,000 hands, at the same time formulating the following demands: Reduction of wages by 10 per cent; dismissal of 10 per cent of the workmen, and a shortening of working hours by 10 per cent. They claimed that the prevailing slump justified a greater reduction in the number of hands and that living costs had dropped by far more than 10 per cent. A protracted struggle went on for several weeks, when eventually a settlement was reached through the arbitration of the Ministry of Social Welfare. On the surface it would appear that labor scored, since the employers had to withdraw all of their demands and a compromise was reached in respect to labor's share in the management. Labor, however, won a Pyrrhic victory, since it cost the unions about 50,000,000 kronen and the employers gained by the stoppage during the business depression.

Unemployment Benefits Large

The general stagnation of business in Czecho-Slovakia continues to gain. Unemployment benefits were paid 30,000 persons in May, of which 45 per cent were in the textile industry, 20 per cent in the building trades and 5 per cent in the metal industry.

The removal of tariff protection which existed before the war has permitted severe competition by French and German products aided by the high freight rates paid on foreign ores, the poor quality of domestic ores, the unfavorable coal situation and the specialization of products by foreign manufacturers. The Witkowitz steel works, to avert a curtailment of operations, are producing certain grades of pig iron and rolled material for stock to be cleared off when the market improves. The Trzynietz iron works of the Mining & Smelting Co. plans to lay off a considerable number of its workers unless the Government comes forward with orders, and the Prague Iron Industry Co. has operated its Kladno plant on reduced schedule for some time.

Price Reductions in June

Iron prices were reduced on June 1, but it remains to be seen whether the cut will stimulate the market. We quote now as follows per 100 kg., f.o.b. maker's mill:

	June 1 Kr.	June 1	May 1 Kr.
Foundry pig iron No. 1	225	$2.95	245
Foundry pig iron No. 3	223	2.92	243
Hematite	250	3.27	270
Tees and channels	360	4.72	385
Iron bars	375	4.91	400
Hoops	420	5.50	445
Rails over 35 kg	370	4.85	390
Rails under 35 kg	375	4.91	400
Sheets			
No. 6 U. S. S. gage and up	450	5.90	480
Nos. 6 to 11	460	6.02	500
Nos. 11 to 20	470	6.15	510
No. 20 gage and smaller	480	6.29	520

The last price reduction took place in February, when prices were cut by 50 to 60 kronen, on the average.

Numerous Merger Negotiations

Indications are that the iron and engineering industry are depending upon a co-ordination of efforts to regain lost foreign markets. Following the lead of the machine builders, the iron industry has also organized an export association, the Prague Iron Industry Co., the Mining & Smelting Co. and the Witkowitz Steel Works having established a community of interests organized on the lines of a syndicate. Agreements have been reached on concentration, and specialization of production, uniform sales conditions, etc., and a joint sales office has been established at Bruenn with a branch at Prague. The merger was largely influenced by fuel and raw material conditions. The Prague Iron Industry Co., while possessing ore mines, is short of coke, of which the Witkowitz works has a large surplus since shipments to Austria have considerably diminished. The principal countries with which trade will be sought are Austria, Jugo-Slavia, the Balkan States and the Russian border states. The Prague Iron Industry Co. and the Mining & Smelting Co. have established consignment stores in Jugo-Slavia to prevent foreign competition. The Government is lending active support to the movement. Negotiations are also pending between the Prague Iron Industry Co. and one of its principal customers, the Mannesmann Tube Works, Ltd., at Komotau, for the establishment of a working agreement to be reached by an exchange of shares.

Machinery Market Depressed

Very little improvement is reported in the machinery industry. There have been some orders from Roumania, but the general situation is far from satisfactory. The association of agricultural machinery and implement manufacturers under pressure of foreign competition has been forced to reduce prices. Orders booked by the locomotive and rolling stock builders have not met expectations and negotiations with France for the delivery of factory equipment for sugar plants are still pending. The bicycle industry reports a slump in exports by about 80 per cent since Russia, the Balkan markets and Poland appear to have covered their supplies by now, while the other Central European countries are barring imports by a prohibitive customs tariff.

Hearings in Ferromanganese Case Ended

Hearings in the case of alleged British dumping of ferromanganese in the American market were closed in New York, July 19, with the final session before the representative of the Federal Trade Commission, Examiner Edward M. Averill. The commission's counsel was Major Lambert. The respondents, Crocker Brothers, C. W. Leavitt & Co., and Frank Samuel, were represented.

Prices of ferromanganese current in 1919, as quoted by various trade journals of the United States and Great Britain, were offered in evidence, as well as the statistics of the United States Bureau of Mines, showing the consumption of ferromanganese in the United States over a 10-year period. Following the giving of testimony of the firms represented, both sides rested their case.

Respondent for C. W. Leavitt & Co. during the hearing pointed out that the British sellers in lowering the price for ferromanganese sold in the United States were merely anticipating the diminishing value of the pound sterling and that their quotations in dollars were based upon how many pounds sterling these dollars would buy. Joseph E. Davies, former chairman of the Federal Trade Commission, who represented Crocker Brothers, stated that the figures produced by the commission as representing the actual market price of ferromanganese in England were unreliable and that sales that had been made by Crocker Brothers in the United States were in most instances in excess of the prevailing British price. He added that when American producers had been charging as high as $430 per ton, Crocker Brothers were selling at not to exceed $200 per ton, which was greatly to the advantage of American consumers.

The case is in the hands of Federal Examiner Averill, who will report his findings to the Federal Trade Commission for final action.

PERSONAL

Walter S. Tower, trade adviser of the Consolidated Steel Corporation, New York, has taken up work with the Bureau of Foreign and Domestic Commerce, Department of Commerce, as mentioned in last week's IRON AGE. Mr. Tower's first duties will consist of co-operating with the United States Shipping Board in gathering statistics, such as those relating to trade routes, etc. Later he will go abroad to study trade conditions and will give particular attention to the iron and steel industry, which is considered to be the key to reconstruction. Upon his return to Washington, it now has been announced, Mr. Tower will head the iron and steel division of the Bureau. He has traveled extensively in North and South America, studying trade conditions, and has written several articles on that subject.



WALTER S. TOWER

B. M. W. Hanson, formerly vice-president and general manager Colt's Patent Fire Arms Mfg. Co., has become president of the Hanson-Whitney Machine Co., Hartford, Conn.

F. Karl Schneider has purchased the plant and equipment of the Albion Engineering Co., Philadelphia, operating it as a general engineering and machine shop. He has left the Krebs Pigment & Chemical Co., Newport, Del.

N. Price Whitaker, vice-president Whitaker-Glessner Co., has been appointed a member of the West Virginia state highways commission by Governor Morgan, and has accepted the appointment. This commission will have charge of the expenditure of $50,000,000 recently approved by voters of the state for road improvements.

I. A. Baum has reorganized the La Salle Engineering Co., Chicago, under the name of Boyer, Baum & Co., with offices in St. Louis, for consulting engineering in structural steel, reinforced concrete and timber structures.

Edmund S. Glauch, formerly assistant mechanical engineer for the Harrisburg Foundry & Machine Works, Harrisburg, Pa., recently opened an office as mechanical engineer in Harrisburg.

L. J. Campbell, president Electric Alloy Steel Co., Youngstown, Ohio, who served as a lieutenant colonel with the United States Army during the war, has been chosen as one of the representative Americans to officially receive the thanks of the French Government for the part this country took in the war. The Americans are to tour the leading cities of France next month as guests of honor, to attend the unveiling of many memorials and to otherwise receive attentions which will have historical significance.

Franklin G. Hubbard has become president and mechanical engineer of the Lacey Mfg. Co., Bridgeport, Conn., specializing in die and tool work. He was formerly associated with the H. E. Harris Engineering Co. and Hubbard & Harris, consulting engineers, Bridgeport.

C. H. Mount, formerly sales engineer Jeffrey Mfg. Co., Cleveland, has accepted a similar position with the Stearns Conveyor Co., Cleveland.

Charles W. Hughes, formerly with the Norwalk Iron Works Co., South Norwalk, Conn., is now with the Dixie Engineering & Insulating Co., Atlanta, Ga., a sales organization of the Norwalk company.

D. V. Waters is now mechanical engineer with Gould & Eberhardt, Irvington, N. J., having formerly been assistant to the chief engineer of the Ivers-Lee Co., Newark, N. J.

Henry Rodemeyer has become superintendent of the George A. Hebb Spring Co., Newark, N. J., having resigned from the Cook Spring Co., New York and Ann Arbor, Mich.

W. L. Neff has become New York representative of the Davenport Machine Tool Co., Rochester, N. Y. He was formerly with the Brown & Sharpe Mfg. Co. at New York. C. R. Burt, until recently with the Davenport company, has become president and general manager of the New Process Gear Corporation, Syracuse.

W. A. Carew, formerly general superintendent Morgan Engineering Co., Jersey City, N. J., has become superintending engineer for Row & Davis Engineers, Inc., New York.

R. K. Stockwell, until recently general sales manager Robins Conveying Belt Co., New York, has been appointed British engineering manager for that company, with headquarters in London.

Frank J. Fahey, vice-president Gillette Safety Razor Co., Boston, sailed July 16 for Europe on the White Star liner, Olympic, to visit the company's European branches.

Everett Morss, president Simplex Wire & Cable Co., Boston, has been elected president of the Boston Chamber of Commerce. Mr. Morss is chairman of the executive committee and a member of the corporation of Massachusetts Institute of Technology.

George H. Kennedy, formerly a machinist at the William Tod works, Youngstown, Ohio, of the United Engineering & Foundry Co., Pittsburgh, has accepted a position as instructor of machine shop practice in the Kamehameha School, an endowed institution, in Honolulu.

Peter Eyermann, who during the war was connected with steel work in Austria and since the armistice has been manager of the Bohemian State Steel Works, was recently appointed manager of the Austrian arsenal at Vienna. Mr. Eyermann was engaged in steel work engineering in the United States about 20 years ago, particularly in connection with the introduction of the blast furnace gas engine. Later he had offices at DuBois, Pa. On going to Europe some years ago he was connected for a time with the steel works at Witkowitz, Austria.

J. H. Drury, treasurer Union Twist Drill Co., Athol, Mass., and Robert B. McSkimmon, director S. W. Card Mfg. Co., Mansfield, Mass., who sailed for Europe early in May, returned last week.

Robert S. Hammond, district sales manager Whiting Corporation at Pittsburgh, has been transferred to Chicago in the same capacity.

Morris Ferer has associated himself with Abe Feinberg, Muncie, Ind., as general manager. He was formerly a member of the firm of Aaron Ferer & Sons, St. Louis. The company will continue to specialize in scrap iron and steel.

F. E. Norris, formerly general superintendent of the Sharon and Farrell works of the Carnegie Steel Co., is expected to return about Aug. 1 from France, where he has resided for two years. He has been supervising construction of an open-hearth plant and rolling mills for the M. Berliot Automobile Co., near Lyons, France. It is understood the company has abandoned plans for additional work after about half completing its plant.

F. R. Dravo, Dravo Contracting Co., Pittsburgh, recently was elected president of the Standard Scale & Supply Co., succeeding A. D. Black, resigned. C. H. Chapelle has been named treasurer of the company. J. B. Johnson and H. W. Keller, vice-presidents, have resigned and their duties are being attended to by Mr. Dravo.

James M. Cherrie, Springfield, Vt., has been appointed superintendent of the foundry of the Athol Machine Co., Athol, Mass., to succeed George Croak, who recently resigned to engage in the foundry business at Boston.

Edward H. Mangan, for several years plant engineer for the Norton Co. at Niagara Falls, has entered the employ of the General Abrasive Co. as sales manager.

Charles E. Hildreth, general manager Morgan Grinder Co., Worcester, Mass., recently acquired by the Greenfield Tap & Die Corporation, Greenfield, Mass., has resigned. His action is based on a desire not to leave Worcester, where he has made his home for more than 50 years.

Daniel N. Bates, traffic manager American Steel & Wire Co., Worcester, Mass., has been retired on pension after 36 years service with the company. Arthur D. Fiske, assistant division freight agent, succeeds Mr. Bates. Charles M. Booth, Worcester district sales agent, likewise has been retired on pension after 27 years service with the company. Albert R. Webb will take over Mr. Booth's duties.

S. V. McLeod has been appointed purchasing agent of the Algoma Steel Corporation, Ltd., with headquarters at Sault Ste. Marie, Ont., vice L. L. Jacobs, resigned, effective July 1.

Robert D. Black, formerly assistant sales manager Black & Decker Mfg. Co., Towson Heights, Baltimore, Md., has been appointed manager of the company's Philadelphia branch office, with headquarters at 318 North Broad Street. He succeeds W. C. Allen, who has been made a special factory representative, with headquarters at the company's Cleveland branch office, 6225 Carnegie Avenue.

William Robert Wilson has been elected president of the Maxwell Motor Corporation. He previously served in important executive capacities with the Studebaker Corporation and with Dodge Brothers.

John D. Nicklis has been appointed manager of supplies and purchases of Manning, Maxwell & Moore, Inc., and affiliated companies, with headquarters at 119 West Fortieth Street, New York.

S. M. Marshall, of Perin & Marshall, New York, who has been in India for the past two years in connection with new construction at the works of the Tata Iron & Steel Co., returned to New York this week.

John Duncan, who has been president of the Wheeling Steel & Iron Co., a subsidiary of the Wheeling Steel Corporation, since about a year ago, resigned recently to go into the coal and railroad business with his brother in St. Louis. Mr. Duncan retires from the steel business after an experience covering more than 30 years. He had been identified with the Wheeling Steel & Iron Co. since 1909, and from 1914 until 1920 was vice-president as well as general manager of sales of that company. Previously, beginning in 1889, he was with the National Tube Co. in St. Louis, the Western Tube Co., Kewanee, Ill., and again with the National Tube Co. as assistant general manager of sales in Pittsburgh.

New Model of Revolving Crane

The Byers Machine Co., Ravenna, Ohio, has developed a new 7-ton model of revolving crane, which can be furnished with steam, electric or gasoline power, mounted on road wheels, railroad trucks of any gage, on so-called crawlers or stationary base for use on barges, flat-cars or piers.

Of the total weight of the crane, 90 per cent is of steel, the gearing, travel mechanism, and all wearing parts, except engines, friction surfaces and parts exposed to wear of cables being of this material.

The crane is ordinarily furnished with 30 or 35 ft. boom which will operate a ¾-cu. yd. clamshell bucket in any material the bucket will handle. For coal handling the machine will operate a 1-yd. bucket. An orange-peel bucket of any type, if not excessive in weight, can also be operated. The machine can be equipped with a 4 kw. generating unit and a 36 in. lifting magnet, pile-driving set, drag line bucket or special steam shovel attachment.

OBITUARY

CHARLES F. BEAMAN, an expert on sheet-metal and sheet-metal working machinery, died on July 7 at St. Catherine's Hospital, Omaha, Neb., after a stroke of paralysis while in Omaha on a business trip for the Adriance Machine Works. He was born in Independence, Iowa, and left home at an early age and engaged in the sheet metal working industry. He was employed by the E. W. Bliss Co. for 32 years. After Mr. Bliss died, Mr. Beaman joined the Adriance Machine Works, remaining until his death, a period of 17 years. Mr. Beaman was a pioneer in introducing sheet metal working machinery into Mexico and was granted special privileges by the Mexican government.

JOHN JERNBERG, since 1882 instructor in forge practice at the Wooster Polytechnic Institute, Worcester, Mass., recently died suddenly from a shock at his old home in Sweden, according to cablegram. He left Worcester in May accompanied by Mrs. Jernberg, to pass the summer vacation abroad. Mr. Jernberg, who was 60 years old, was an expert metallurgist. A son, Henry Jernberg, is manager of the New York office of Fairbanks, Morse & Co., and another son, G. Robert Jernberg, is in charge of publications in the Worcester district of the American Steel & Wire Co.

HERBERT G. PARKER, for 30 years with the Pittsburgh Coal Co., Pittsburgh, and who during the war served with the Fuel Administration in Washington, died in New York July 14, following a long illness. After ending his service with the Fuel Administration, Mr. Parker became affiliated with the Iron Trade Products Co., Pittsburgh, in charge of coal and coke sales, and more recently was identified in a like capacity with A. M. Moreland & Co., Pittsburgh.

JOSEPH C. J. WAINWRIGHT, founder of Joseph C. J. Wainwright & Son, 23 Beverly Street, Boston, metals, died last week at his home in Stoneham, Mass. He was born in Birmingham, Eng., Dec. 10, 1851, coming to this country at the age of 19. He founded the firm which bears his name 30 years ago.

JOHN W. MILLS, president Rhode Island Supply & Engineering Corporation, Providence, R. I., died, July 12, after a long illness at his home, 30 Arnold Avenue, Edgewood, R. I., in his 70th year. He was born in England and came to this country at an early age.

FRANCIS REED, founder of the Francis Reed Co., 43 Hammond Street, Worcester, Mass., sensitive drilling machines, died at his home in that city, July 11. He was 69 years old and a native of Danbury, N. H. In 1889 he purchased the business of George Burnham on Hermon Street and developed it into the present company. He is survived by two sons, Ralph G. and Merton F., both of whom are connected with the company.

CHARLES P. BERRY, secretary, treasurer and general manager Oil City Boiler Works, Oil City, Pa., died at Memorial Hospital, Norwalk, Ohio, July 5, as a result of injuries sustained in an automobile accident. He was about forty-five years of age.

THOMAS H. RABE, 92 years old, secretary-treasurer Canton Malleable Iron Co., Canton, Ohio, died at his home in that city, July 16. He was born in Washington C. H., Ohio, and moved to Pittsburgh when a boy and made his home in that city for about 60 years. He went to Canton in 1892 and established the Canton Malleable Iron Co. He was active in prohibition work.

J. L. LARSON, sales manager Foote Bros. Gear & Machine Co., Chicago, died in that city on July 14.

Property of the Penn Steel & Iron Corporation, Lancaster, Pa., was sold at bankruptcy sale last week to Attorney John E. Malone, Lancaster, as representative for John F. Steinman, Lancaster, trustee. All real estate, equipment, buildings and grounds, which were sold separately, were purchased for a total of $183,000.

BOOK REVIEWS

The A B C of Iron and Steel. Fourth edition. Edited by A. O. Backert. Pages, xxiv + 408, 7½ x 10½ in.; illustrations, 269. Published by the Penton Publishing Co., Cleveland.

Three additional chapters have been added in this edition, treating of the manufacture of rails, tubular goods and tin plate, all by John D. Knox. The illustrations have been increased from 244 to 269. The previous edition had brought up to date of July 1, 1919, the directory of the iron and steel works of the United States and Canada. In the fourth edition the directory is brought up to Jan. 1, 1921, and contains the titles of the companies, their products and the names of their executive officers.

The A B C of Iron and Steel was intended to give a bird's-eye view of the industry and the various editions have adhered to the original purpose. Naturally a book which aims to treat the industry in a popular manner does not satisfy all engineers and practical men who have had extensive experience in manufacturing, but it does meet the popular demand in a satisfactory manner, being especially helpful to young men who are going into the iron business or men who are desirous of obtaining more information about some branch of the business with which they are not directly connected.

Handbook of Standard Details for Engineers, Draftsmen and Students. By Charles H. Hughes. Pages x + 312, 4¾ x 7 in. Published by D. Appleton & Co., New York.

Compiled to place before engineers and draftsmen, in convenient form, drawings, tables and formulæ of standard details for use in designing, this publication gives a wealth of material ordinarily scattered and not otherwise obtainable all in one volume. It is divided naturally into eight sections: drawings; fastenings; power transmission; pipes, tubes and fittings; rope and chain fittings; miscellaneous details; structural details and useful tables, being completed by an 8-page index. Except for the section on tables, it is well illustrated with different types of details for serving various purposes, each drawing being accompanied for the most part with tabular matter showing the variations in dimensions of different sizes of the detail.

As an addition to the library of those engaged in designing machinery of every description this book ought to find a ready demand. Most of the illustrations are very clear. If any criticism be offered, however, it must be based on the fact that some of the cuts have been made from drawings not specifically designed for illustrating a book.

The Slide Rule: A practical manual. By Charles N. Pickworth. Pages 133, 4⅞ x 7 in. Published by D. Van Nostrand Co., New York.

Slight revisions, together with descriptions of some new types of slide rules, mark this seventeenth edition of a well-known work, which, besides explaining the logarithmic theory upon which all slide rules operate, provides many practical examples illustrating the use of the instruments, and useful conversion tables of quantities in common use. The appendix describes some 15 new types of slide rules, and gives methods for extracting fifth roots, for solving algebraic equations, etc.

Year Book of the American Bureau of Metal Statistics. Pages 62, 8¼ x 10½ in.

There is just now activity in the compilation of production statistics in the country's leading industries that is without parallel. In some cases there is the resumption of detailed compilations which were interrupted by the war, but apart from that there has been the starting of new tabulations. Manufacturing associations are going into this in some instances, notably the National Machine Tool Builders. The statistical work carried on at Harvard and other universities has been broadened. From the American Bureau of Metal Statistics, 115 Broadway, New York, W. R. Ingalls director, there has just come the first issue of its statistical year book, dealing with production, consumption and commercial movements of copper, lead and zinc in the principal countries of the world in the past 10 years. The compilers were occupied principally with filling in gaps in the war period and have been so successful that now the statistical record of the world's production of the leading non-ferrous metals is practically complete to the end of 1920. Many governmental sources have been drawn upon in the compilation.

New Books Received

General Geology and Stratigraphy. By Dr. A. Born. A research record of advancement in geology and stratigraphy from 1914 to 1918. Published by Theodor Steinkopff, Dresden and Leipzig, Germany. Written in German.

Heat Treatment of Soft and Medium Steels. By Frederico Giolitti. Translated by E. E. Thum and D. G. Vernaci. Pages vii + 374; 6 x 9 in. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Export Trade Directory—1921 Edition. By B. Olney Hough. 1036 pages; 6 x 9 in. Published by the Johnston Export Publishing Co., 370 Seventh Avenue, New York.

Employee Training. By John Van Liew Morris. Pages xxiii + 311; 8 x 5½ in. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Foundrywork. By Ben Shaw and James Edgar. Pages xi + 115; 4 x 6½ in. Published by Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, W. C. 2, London.

Handbook of Standard Details, a compilation of the standard types, dimensions, sizes, weights, etc., of the materials and manufactured parts used in the construction of machinery and engineering structures. By Charles H. Hughes. Pages 312; 4½ x 7 in. Published by D. Appleton & Co., New York.

Case-Hardening of Steel. By Harry Brearley. Pages xi + 207; 5½ x 8½; illustrations 97. Published by Longmans, Green Co., Fourth Avenue and Thirtieth Street, New York.

Engineering Index. 1920 Edition. Pages 586; 6½ x9½ in. Published by the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York.

Iron and Steel in Sweden. Descriptions of works, with lists of products and producing capacity. Pages 183, 7½x9½ in., profusely illustrated. Published for Jernkontoret (Iron Masters' Association) by Aktiebolaget Svenska Teknologföreningens Förlag, Stockholm, Sweden.

The Federal Administration and the Alien, a supplement to Immigration and the Future. By Frances Kellor. Pages xiv + 80; 5½ x 8 in. Published by George H. Doran Co., 244 Madison Avenue, New York.

A book on belt conveyors has been published by the Link-Belt Co., Chicago. It describes the uniroll and multiroll idlers recommended by the company. Among features of the book, which is known as No. 215, are methods of figuring belt conveyors, price lists, examples suggesting the correct types of belt conveyors for the handling of bituminous coal, by-product coke, sand and gravel, crushed rock, etc. Illustrations of typical installations.

The Link-Belt Co., Chicago, has issued a new steel chain data book, No. 475. In this is presented the heavier rugged steel chains used for power transmission, and also including elevating and conveying chains.

Trade and Office Changes

Vance McCarty, one of the prominent men in the leather belting industry, has been elected vice-president of the Chicago Belting Co. He leaves the Edward R. Ladew Co., a subsidiary of the Graton & Knight Mfg. Co., where he was vice-president. The first six of his 22 years experience in the leather belting industry were spent in various departments of manufacturing. For the last 16 years he has been associated largely with sales work. Vance McCarty started in the leather belting business when he was 18 years old. His first job was in the Riverside Tannery of Fairweather & Ladew, tanners of oak leather. A year later, in 1900, he began to make leather belts in the belting plant of Fairweather & Ladew, at Houston and Eldredge streets, New York. From 1900 to 1905 he worked in every department in the entire plant and at every individual operation in the manufacture of belting. From 1905 to 1918 he was first a salesman for the Pittsburgh branch and, later, in 1907, took charge of that branch and built up a large volume of belting sales. In 1918 Mr. McCarty went to New York and took charge of all belting sales of the Ladew company. He will make his headquarters at the New York branch of the Chicago Belting Co., 127-129 Water Street, New York. He will have charge of all sales in New York, Pennsylvania, Connecticut, Rhode Island, New Jersey, Maryland, Delaware, Virginia, West Virginia, District of Columbia, and will also have supervision over all export sales. He has specialized in selling of belting to the iron, steel and allied industries.



VANCE MCCARTY

The Pharo Mfg. Co., manufacturer of the Pharo governor, has moved its business from Detroit to Bethlehem, Pa., to give increased manufacturing facilities. At a recent meeting the following officers were elected: R. P. Hutchinson, president; R. D. Chapman, and G. C. Pharo, vice-presidents; W. B. Myers, treasurer; I. W. Gangawer, secretary; B. C. Sawyer, purchasing agent.

The Burroughs Adding Machine Co., Detroit, has acquired the Moon-Hopkins Billing Machine Co., St. Louis, for $750,000 through a sale authorized by the United States District Court in Detroit. The Moon-Hopkins company was organized in 1907 to manufacture a combination typewriter and billing machine. It employs 125 people and occupies a two-story building. John C. Moon, president of the company, said that the sale was made because the company was not making money and needed additional capital, which it could not get in St. Louis. "The sale was necessary," he said, "to forestall bankruptcy, not immediate, but eventual." Other adding machine manufacturers had contested the sale on the ground that the Burroughs company was endeavoring to get a monopoly of the business. The Moon-Hopkins company has an authorized capital stock issue of $2,500,000, but the actual capitalization is not so large. Standish Backus, president of the Burroughs company, in a telegram to St. Louis newspapers, said that as far as they can foresee they shall continue to operate the Moon-Hopkins plant and "hope to increase production in the near future."

The Koto Trading Co., Ltd., exporter and importer, has opened a branch office at 15 Park Row, New York, in charge of T. Kusanobu, formerly manager of Murai Trading Co., Ltd., New York. The directorate of the company consists of M. Shiohara, president; T. Furuya and K. Ishikawa, managing directors, and T. Kusanobu, New York representative. Mr. Shiohara is managing director of Sankyo Co., Ltd., Tokyo. Both Mr. Furuya and Mr. Ishikawa were formerly the managing directors of Murai Trading Co., Ltd., which has withdrawn from the field of trading business.

The Canadian Chicago Bridge & Iron Co., Ltd., Bridgeburg, Ont., and Montreal, Que., has changed its corporate name to Horton Steel Works, Ltd., according to an announcement made by C. H. Scheman, general manager of the company. The new name has been selected in honor of the late Horace E. Horton, who founded the organization in the United States in 1865. The Canadian organization was first incorporated in 1913 and the plant at Bridgeburg, Ont., was constructed in that year. Mr. Horton was one of the pioneer engineers of North America. Starting with a timber bridge at Orinoco, Minn., in 1865, Mr. Horton developed a large business in the design, fabrication and erection of bridges, steel tanks, etc. In the early nineties, he invented the hemispherical-bottom elevated steel tank. A few years ago his son, George T. Horton, now president of the Horton Steel Works, Ltd., invented the elliptical bottom tank with riveted steel riser. In addition to Mr. Scheman, G. S. Sangdahl is district sales manager at Montreal, C. C. Gregory is manager of plant and F. E. Gregory superintendent of erection. The main office and works are at Bridgeburg, Ont.

The name of the parent company, the Chicago Bridge & Iron Works, 37 West Van Buren Street, Chicago, is not changed.

The Foster-Songer Co., Pittsburgh, has appointed William T. Dunn, 10 High Street, Boston, as district sales agent for New England territory for the company's line of pipe and seamless tubing.

The Shields Cutter Co., formerly the Cleveland Milling Machine Co., Cleveland, after Aug. 1 will maintain a branch office and store at 192 Chambers Street, New York, (phone, Barclay 8796), in charge of J. V. Carlin, district manager, for the purpose of serving that district with milling cutters and special metal cutting tools.

B. M. Jones & Co., Inc., Cleveland branch, 115 St. Clair Avenue, N.W., is now being managed by the Connelly & Kendal Co., which has moved into the above address. Messrs. Harry Connelly and Joe Day are giving their personal attention to the sale of Double Mushet high-speed steel and Titanic carbon tool steels. Crerar Adams & Co., Chicago, Western sales agents for B. M. Jones & Co., Inc., will carry Double Mushet high-speed steel and Titanic carbon tool steels in Chicago, as well as Taylor's best Yorkshire iron. R. G. White, manager for the B. M. Jones & Co., Inc., Cleveland branch, has been appointed special Western representative, and will be located in Chicago. His headquarters will be with its Western sales agents, Crerar Adams & Co., 259 East Erie Street.

Barbour, Love & Woodward, Inc., machine tool dealers, formerly of 149 Broadway, New York, have moved from their temporary office and warehouse at 131 Washington Street to their new offices and show rooms at 45 West Eighteenth Street. Surplus stock will be carried in the building for the convenience of those desiring to inspect machines.

The San Francisco office of the Pawling & Harnischfeger Co., Milwaukee, has been moved from the Monadnock Building to 32 Beale Street. R. M. Taylor, district manager for the Pacific Coast, has his headquarters now at the Beale Street address. J. MacFerran Taylor is a new member of the Pacific Coast sales district.

The firm of Davis Brothers, Philadelphia, manufactures railroad spikes, ship, bridge and wharf spikes, and was founded in 1890 by Charles Gibbons Davis, and owned by him. Mr. Davis died April 20, 1921, and the firm is now managed by Edward L. Davis. The estate of Charles Gibbons Davis has applied for a charter of incorporation, so that the business can be continued. Bayard Henry is representing the new corporation. He is the attorney for the estate of Charles Gibbons Davis. The firm is represented by Edward L. Davis, and will continue to be represented by him.

The Gardner General Foundry Co., Gardner, Mass., has notified the Secretary of State, Massachusetts, that its 7 per cent preferred stock has been exchanged for a similar amount of 8 per cent preferred stock.

A Massachusetts charter has been granted the Spencer Thermostat Co., Boston, capitalized for $25,000 in preferred stock and 250 shares of common stock of no par value. F. Wilder Pollard, 14 Commonwealth Avenue, is president and assistant treasurer, and Laurence K. Marshall, 44 Rogers Avenue, West Somerville, vice-president and treasurer.

The National Machinery Co., bolt, nut and forging machinery, Tiffin, Ohio, has opened an Eastern sales office, room 637, Knickerbocker Building, Broadway and Forty-second Street, New York, in charge of F. J. Mawby.

The Auslander Safety Lock Co., New York, has been incorporated under State laws to manufacture locks and locking devices. The incorporators are J. and B. Zuckerman and J. Halpert. It is represented by Manheim & Wachtell, 1328 Broadway. The former company of this name has filed notice of dissolution.

IRON AND INDUSTRIAL STOCKS

Less Investing Going On and Movement of Quotations Is Narrower

Less investing interest was shown in stocks the past week, consequently there were smaller variations in quotations for same. Usually at this season of the year people with means spend as much time as possible away from business, which in a large measure accounts for the lagging interest in iron and industrial issues. In addition, however, there has been nothing inspiring happening in the steel industry for the demand for mill products has been decreasing with the tendency of prices downward. On the surface it is evident that liquidation in steel securities has passed, otherwise the market for them would have gone lower than it has since last reports. Where net losses are noted, there was no urgent selling, rather a sagging under their own weight, as might be expected with investing buying minimized. Shareholders are awaiting with much interest the outcome of the next meetings of the Bethlehem and United States Steel Corporation directors.

Unmistakable signs are that funds are beginning to accumulate to finance a business expansion movement, but the banks continue to exercise caution in loaning funds on anything but short term notes. Investment in miscellaneous bonds is running close to or above that in Government issues, on average day to day transactions, which in banking circles is taken as an encouraging sign. In past years, an increased demand and higher prices for bonds usually preceded an upward movement in stock values. With some of the important measures before Congress out of the way, it is believed in financial quarters steps will be taken to re-establish our export business through an extension of further credits or by some other means. The domestic railroad situation continues to improve slowly and the time when the carriers will be in the market for steel mill products is drawing closer.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	30⅝ - 31¼	Int. Har. com.	71¼ - 75½
Allis-Chalm. pf.	70½ - 71⅝	Int. Har. pf.	— -100⅜
Am. Can com.	25¼ - 26¾	Lackawanna Steel.	37⅛ - 40
Am. C. & F. com.	123 -125	Midvale Steel.	23 - 23⅞
Am. C. & F. pf.	109 -110	Nat.-Acme	14 - 15
Am. Loco. com.	80 - 82	Nat. E. & S. com.	44½ - 45⅛
Am. Radiator, com.	— - 68⅜	N. Y. Air Brake.	55 - 56
Am. Steel F. com.	26 - 26⅞	Nova Scotia Steel.	— - 28⅛
Am. Steel F. pf.	80¼ - 80½	Press. Steel com.	71 - 73⅜
Bald. Loco. com.	72 - 76½	Replogle Steel.	18½ - 19
Bald. Loco. pf.	97 - 97¼	Republic com.	44⅞ - 49
Beth. Steel com.	— - 43½	Republic pf.	— - 81
Beth. Stl., Cl. B.	45¼ - 49	Sloss, com.	34 - 36
Beth. Stl., 8% pf.	99 -100	Un. Alloy Steel.	— - 25
Chic. Pneu. Tool.	50 - 50¾	U. S. Pipe com.	— - 15
Colorado Fuel.	— - 26½	U. S. Steel com.	71⅜ - 74⅝
Cruc. Steel com.	51 - 56¾	U. S. Steel pf.	108⅝ - 109⅛
General Electric.	119⅞ - 127½	Vanadium Steel.	27½ - 29½
Gt. No. Ore Cert.	27¼ - 28½	Westingh'se Elec.	41⅛ - 44
Gulf States Steel.	30 - 30⅛		

Merger Postponed

Action on the proposed merger of the Central Steel Co., Massillon Rolling Mill Co. and National Pressed Steel Co., Massillon, Ohio, has been deferred until July 21. At a recent meeting of the stockholders at which there was representation in person or by proxy, of about 85 per cent of the common and preferred stock, the proposed merger was discussed and it is stated that there is apparently not a dissenting stockholder. However, it was thought best to defer action to give all stockholders an opportunity to give their consent to the consolidation. The companies have sent out a new circular letter to their stockholders, in which they state that they have determined that there must be practically a unanimous vote on the merger.

Assets of Ford Motor Co.

In view of all that has appeared in the public press during the past six months or so regarding the financial condition of the Ford Motor Co., Detroit, the accompanying statement, dated April 30, last, filed by that company with the Massachusetts Commissioner of Corporations, when compared with a statement of condition as of June 30, 1920, filed by the Ford company last year, is interesting.

Because of the disparity of dates covering the following figures, it would be unfair to draw final conclusions based on a period of a year. It is interesting to note, however, that on April 30, last, the company actually owed $4,597,753 net less than it did ten months previous, as is shown in comparing "accounts" and "notes payable" in the liabilities. At the same time the company was $24,437,886 better off on cash and accounts receivable. These figures would not suggest Mr. Ford's credit being strained, as some writers tried to make out a short time back.

Another salient feature is the large amount charged off to depreciation, nearly $25,000,000 more than was recorded June 30, last. The merchandise item shows a shrinkage of $33,009,854, which may be taken to mean the company pushed cars into representative's hands in the early part of 1921, and then drew down on drafts against such concerns.

Assets of Ford Motor Co.

	April 30, '21	June 30, '20
Real estate	$71,329,719	$85,549,726
Machinery	46,459,046	41,661,136
Merchandise	63,848,157	96,858,011
Furniture, fixtures, tools, autos, trucks and teams	44,779,634	
Notes	58,252	
Accounts receivable	51,268,976	62,499,026
Cash	35,667,936	
Securities	10,361,963	18,921,608
Patent rights	81,397	77,858
Miscellaneous investments	501,814	1,126,742
Good will	20,517,985	
Profit and loss	265,674	
Total	$345,140,557	$306,695,109
Liabilities		
Capital stock	$17,264,500	$17,264,000
Accounts payable	44,993,754	15,958,115
Notes payable	3,892,385	35,112,973
Deferred credits	3,027,120	4,861,613
Depreciation	43,493,393	18,654,489
Insurance	89,570	
Taxes	49,502,136	49,163,974
Surplus profit and loss	182,877,696	165,679,132
Total	$345,140,557	*$306,695,109

The personnel of the company on the two above mentioned dates compare as follows:

1921		1920
Edsel B. Ford	President	Edsel B. Ford
	Treasurer	F. L. Klingensmith
B. J. Craig	Assistant Treasurer	
Henry Ford	Director	Henry Ford
Edsel B. Ford	Director	Edsel B. Ford
Alfred Lucking	Director	F. L. Klingensmith

A temporary receiver has been appointed for the Fabricated Steel Products Co., Leetonia, Ohio, on application of three creditors with claims totaling $4,860. The plant will continue to operate under the receiver, it is announced.

First mortgage 6 per cent real estate notes to the extent of $40,000 of the Axelson Machine Co., Los Angeles, Cal., have been offered in the St. Louis market. The security is the land and plant recently acquired for a branch in St. Louis.

Lackawanna Steel Co. Suffers Deficit

Nearly a million dollar deficit was the outstanding feature of the report of earnings for second quarter of the Lackawanna Steel Co. This contrasts sharply with a profit of $1,881,946 for the corresponding quarter of 1920. The deficit for the first half of 1921 was $974,392. The first quarter of 1921 resulted in a profit of $8,735. The surplus on Dec. 31, 1920, was $33,812,601. A summary of earnings for second quarter and first half follows:

	Second Quarter		First Half	
	1921	1920	1921	1920
Total net earnings after taxes and ordinary expenses	†*$384,761.81*	$2,786,107.42	$282,933.28	$3,123,017.97
Deduct: Interest on bonds and other obligations:				
Lackawanna Steel Co.	221,912.50	251,745.84	444,137.50	486,325.00
Subsidiary companies	36,979.17	39,266.66	74,791.66	79,366.66
	$258,891.67	$291,012.50	$518,929.16	$565,691.66
Balance	*$643,653.48*	$2,495,094.92	*$235,995.88*	$2,557,326.31
Less—Appropriations:				
For extinguishment of mines and mining investment	9,199.15	59,641.03	62,760.37	113,420.27
For depreciation and accruing renewals	330,274.81	553,507.87	675,635.75	1,011,680.11
	$339,473.96	$613,148.90	$738,396.12	$1,125,100.38
Deficit for second quarter	*$988,127.44*	*$1,881,946.02	*$974,392.00*	*$1,432,225.93

*Profit. †Italics signify deficit.

Machinery Markets and News of the Works

MORE INQUIRY IN WEST

Eastern Markets Quiet, but Chicago Reports Slight Improvement

Reductions of About 15 Per Cent Made by Manufacturers of Sensitive Drilling Machines

Although the machine-tool market continues inactive in the East, some improvement over last month is noted in the Middle West, particularly at Chicago, where a fair amount of prospective business is before the trade. Among the inquiries is one from the H. W. Johns-Manville Co. for 15 machines. Several purchases of small lists of new and used tools have been made in Chicago.

Some Cleveland dealers likewise report a little improvement in inquiry, but at Cincinnati, Boston and New York the markets are extremely dull, with both orders and inquiries at low ebb.

The International Nickel Co. still has some equipment to buy for its new plant at Huntington, W. Va.

The United States Glass Co. is expected to put out a list at Pittsburgh soon for equipment for a plant to be built at Shreveport, La.

The Illinois and Rock Island lists, which have been pending at Chicago for some weeks, are still held up and the purchasing departments of these roads are reported to have stated to machine-tool builders that purchases will not be made until substantial reductions have been made in machine-tool prices.

Some of the sensitive drill manufacturers will reduce prices this week about 15 per cent. A lathe company is offering lathes at a discount of about 20 per cent from recent prices.

New York

NEW YORK, July 19.

The best that any of the local machine-tool sellers are doing is an occasional sale of a single machine. Even such orders are not plentiful. Inquiries are likewise few in number and great difficulty is experienced in closing business.

A reduction in prices of about 15 per cent will be made this week by some makers of sensitive drilling machines. The leading manufacturers of motors and controllers have announced reductions of about 10 per cent.

N. D. Jonovitch of Serbia arrived in New York last week to purchase machinery. He may be addressed in care of the Serbian Consulate General, 442 West Twenty-second Street, New York City.

The crane market continues to improve slightly from the standpoint of inquiries and a few sales are reported. The greatest activity the past two or three weeks has been in hand power cranes, some inquiries calling for as high as 15 and 20-ton capacities. An inquiry is being handled by Naylor & Co., 120 Broadway, New York, for a gantry crane equipped with a 2½-cu. yd. bucket for export to France. John A. Savage & Co., Crosby, Minn., have asked for quotations on a 30 to 40-ton, 8-wheel locomotive crane for their Sagamore mine, Riverton, Minn.

Among recent sales are: Industrial Works, a 20-ton, 50-ft. boom locomotive crane to Luria Brothers, Lebanon, Pa., for a new scrap yard in Pittsburgh; Champion Engineering Co., 30-ton, 55-ft. span overhead traveling crane to the American Steam Shovel Co., Marion, Ohio; Milwaukee Electric Crane & Mfg. Co., a 5-ton, 64-ft. span overhead traveling crane to the Lehigh Wilkes-Barre Coal Co., Wilkes-Barre, Pa.; Shepard Electric Crane & Hoist Co., a 4-ton electric hoist with 2-cu. yd. bucket for coal handling and a 5-ton electric hoist to the Pittsburgh Screw & Bolt Co., Pittsburgh, and the Hoisting Machinery Co., 50 Church Street, New York, a 15-ton, 50-ft. boom second-hand Brownhoist locomotive crane to the Dutton Lumber Co., Poughkeepsie, N. Y.

The Swadeshi Brass & Iron Works, 233 Kika Street, Bombay, No. 4, India, of which T. Jagjiwandas & Co. are sole proprietors, is in the market for the following equipment: Cotton ginning and weaving machinery and spare parts; spinning machinery parts only; rolling mills with all equipment for producing square, flat and round angle iron from ¼ to 4-in. sizes and sheets 1-32 to ⅝-in. thick from iron scrap, average production eight to 12 tons per day; complete plant and equipment for manufacturing hardware, such as hammers, shackles, shovels, axles, nails, flat and wire, each one ton per day; machinery for wood and metal screws, 200 to 250 gross per day capacity; machinery for cutlery and surgical instruments; machinery for making iron bolts and nuts from 1 to 2-in. diameter; complete plant for making one ton of steel castings per day from hematite pig iron and iron and steel scrap; also equipment for foundry for casting three to 10 tons per day, with equipment for pattern shop; equipment for blacksmith's shop employing 20 smiths.

The Richmond Screw Anchor Co., Pulitzer Building, Park Row, New York, manufacturer of heavy hardware, has leased the buildings at 251-55 Bush Street and 362-64 Smith Street, Brooklyn, for the establishment of a new plant. The property will be occupied early in August.

The Harrisville Ore & Steel Corporation, New York, has been incorporated with a capital of $500,000 by H. G. Conway, E. G. Kerr and M. F. Dudek, to manufacture steel products, operate iron ore properties, etc. It is represented by Peaslee & Compton, 501 Fifth Avenue.

The Du Bois & Depollier Co., Brooklyn, has been incorporated with a capital of $1,000,000 under Delaware laws, to manufacture watch cases and precision specialties. It will succeed to the business of the Du Bois Watch Case Co., 316 Herkimer Street.

The Rudy Way Mfg. Co., New York, has been incorporated with a capital of $25,000 by J. Harris, W. E. Armstrong and A. Fuchelocher, to manufacture radiator air valves and valve protectors, etc. It is represented by M. Eichner, 1545 Broadway.

The Rooney Pump & Transmission Co., New York, has been incorporated with a capital of $50,000 by M. B. Salzberg, S. Shookoff and P. J. Rooney, 22 William Street, to manufacture pumping equipment and kindred products.

The Perfect Brick & Hollow Tile Co., New York, has been incorporated with a capital of $3,200,000 under Delaware laws, by Frederick G. Stoehr, Rae Taustine and Thomas G. Chamberlain. The company is represented by the Capital Trust Co., Dover, Del.

The New York Edison Co., 130 East Fifteenth Street, New York, has filed plans for a one-story addition to its 'Waterside' powerplant, 83 x 94 ft., at Fortieth Street and First Avenue, to cost about $125,000.

The Moore Patents Corporation, New York, N. Y., has been incorporated with a capital of $500,000 by C. W. Moore, S. Dressler and A. Berres, to manufacture pipe, pipe fittings, plumbing fixtures, etc. It is represented by H. G. Littau, 391 East 149th Street.

The Stevens-Webb Co., New York, has been incorporated with a capital of $50,000 by R. D. Goldberg, B. Levy and W. S. Doernberg, 1133 Broadway, to manufacture farming implements and other agricultural equipment.

The Dexter Folder Co., 300 Fifth Avenue, New York,

manufacturer of paper folding machinery, feeders, etc., is taking bids for a two-story addition to its plant at Pearl River, N. Y. W. E. Truesdell, 5 Beekman Street, New York, is engineer.

Fire, July 10, destroyed a portion of the plant of the Royal Metal Furniture Co., 125-37 Eighth Street, Brooklyn, with loss estimated in excess of $200,000, including machinery.

The Rite Electric Lamp Co., New York, has been incorporated with a capital of $20,000 by I. Rendelman, M. Sonin and S. J. Berkowitz, 898 Broadway, Brooklyn, to manufacture incandescent electric lamps.

The Ringless Piston Co., recently organized under Delaware laws to manufacture automobile engine equipment, will operate in New York, with capital of $1,000,000. It is represented by J. C. Henriques, 103 Park Avenue.

The Adirondack Power & Light Corporation, Amsterdam, N. Y., has disposed of a bond issue of $1,000,000, the proceeds to be used for extensions, betterments in plant and system, general operations, etc. J. Ledlie Hees is president.

The Farmers' Portable Mill Corporation, New York, has been incorporated with a capital of $250,000 by E. T. Thomas, M. Stephens and G. Luehing, to manufacture mechanical equipment for farm service. It is represented by the Thomas Engineering Co., 176 Greenwich Street.

Plans are being perfected for a reorganization of the Willys Corporation, 11 Pine Street, New York, manufacturer of automobiles and automobile equipment. It is said that the two subsidiaries, the Auto-Lite Corporation, Toledo, Ohio, and the New Process Gear Co., Syracuse, N. Y., will be merged into one operating unit, while the new plant on Elizabeth Avenue, Elizabeth, N. J., comprising the former works of the Duesenberg Motors Corporation and additions, will be operated as a separate plant division for the production of the Chrysler six automobile. The reorganization plans include a new bond issue to total about $20,000,000.

The Kentucky Midland Pipe Line & Refining Co., New York, has been incorporated under Delaware laws with capital of $5,000,000, to construct a refinery in the Kentucky oil field district. It is represented by Arthur W. Britton, 65 Cedar Street.

The superintendent of lighthouses, Tompkinsville, N. Y., will receive bids up to 3 p. m., July 29, for approximately 300 tons of ¾ to 2-in. open and stud link iron mooring chain, also shackles and swivels.

The Percy-Welton Machine Co., New York, has been chartered under State laws to manufacture machine products. The incorporators are S. Waxman, S. B. Klee and L. E. Felix, 217 Broadway.

In connection with plans to commence the manufacture of automobiles at its plant at Long Island City and Oakland, Cal., the Durant Motors, Inc., 1764 Broadway, New York, is said to have placed an order for 50,000 automobile motors with the Continental Motors Corporation, Detroit, Mich., with delivery by Aug. 1. The motors will be shipped at the rate of 150 a day. Production of the Durant cars will begin at about this same time.

The Keystone Appliance Corporation, New York, has been incorporated under Delaware laws with capital of $2,500,000 to manufacture electrical appliances and equipment. The incorporators are Thomas E. Halle, James L. Watson and F. H. Butchorn. It is represented by the Corporation Trust Co., 37 Wall Street.

The Automatic Coin-Change & Record Machine Co., Bound Brook, N. J., has been incorporated with a capital of $1,500,000 by Irving J. Palmer, Fred A. Probose and Jeremiah J. Regan, to manufacture coin machines and other automatic machinery and parts. It is represented by John P. Cullen, 403 East Main Street, Bound Brook.

An electric power plant will be erected by the City Council, Gloucester City, N. J., in connection with a new electrically operated pumping plant for the waterworks system, filtration plant and other improvements, estimated to cost about $202,000. Remington & Vosbury, Camden, N. J., are engineers.

The Modern Optical Mfg. Co., 357 DeWitt Street, Belleville, N. J., has been organized to manufacture optical mountings and other precision specialties. Charles Presbey heads the company.

The Smith Rubber & Tire Co., Inc., Midland Avenue, Garfield, N. J., is arranging for increased production at its plant to develop a maximum output of 600 tires per day. Winfield Clearwater is president.

The Koehler Machine & Tool Co., Newark, N. J., has been incorporated with a capital of $125,000, by Henry Koehler, Joseph Klopak and John J. Evans, to manufacture machinery, tools, jigs, dies, etc. It is represented by J. Howard Conover, 763 Broad Street.

The Lehigh Valley Railroad Co., Jersey City, N. J., will install two new ore and coal unloaders at the foot of Chapel Street, of 15- and 5-ton capacity, respectively, estimated to cost about $461,000, exclusive of foundations. The latter work will cost $40,000.

The Slip-On Chain Co., Newark, has been incorporated with a capital of $100,000 by Paul G. Bennett, Ernest E. Ryman and Ernest G. Stauber, to manufacture skid chains, automobile parts, etc. It is represented by Harry L. Tepper, 800 Broad Street.

The Public Service Gas Co., Public Service Terminal, Newark, has filed plans for a one-story addition to the engine department at its plant at 15 Congress Street.

New England

BOSTON, July 18.

The machine tool market continues inactive. Even sales of individual machines are conspicuously lacking and with the exception of a 60-ton crane for the Amoskeag Mfg. Co., dealers lack live prospects. This is partly attributed to the fact that a large majority of New England metal-working industries are either closed or working on greatly reduced schedules. The outlook for business, however, is not as discouraging as appears on the surface. It is conservatively estimated that $1,000,000 worth of inactive prospects are in the hands of dealers. Prices have been quoted on this amount and prospective customers are waiting until business conditions warrant the expenditure of funds.

Prices on machine tools show little, if any, change. Some producers, however, are offering larger discounts. The Little Giant Hammer Co., Mankota, Minn., is offering machinery at 30 per cent discount from list, or 10 to 15 per cent more than heretofore. The Pittsburgh Machine Tool Co., Braddock, Pa., lathes, is offering its product at 20 per cent discount. It is understood other manufacturers, while not coming out openly with larger discounts, will accept them.

The S. A. Woods Machine Co., Boston, which went into the production of motors last March, reports a good demand for a new motor recently brought out. It has lately equipped one shop and is installing many others in textile mills. Other motor builders state the demand from textile interests is satisfactory but far below normal.

Manufacturers of high speed cutters have reduced prices 15 per cent, and on high speed end mills, 10 per cent. Some interests are quoting straight shank drills at 50 and 5 per cent discount, as against 50 per cent a week ago. The market on popular selling oil cans, used in machine shops, is 10 per cent lower.

Plans for the proposed one-story repair shop at Greenville, Me., 102 x 218 ft., for the Great Northern Paper Co., Millinockett, Me., are being revised.

Landers, Frary & Clark, New Britain, Conn., have begun operations in a small way in their newly acquired plant, the Greenwood Mills, New Hartford, Conn. Vacuum cleaners will be made.

The business of the Morgan Grinder Co., Worcester, Mass., formerly Churchill-Morgan-Crittsinger, Inc., recently acquired by the Greenfield Tap & Die Corporation, Greenfield, Mass., will immediately be moved to the latter city, instead of waiting until fall, as originally planned.

L. F. Fales, Walpole, Mass., special machinery, contemplates some minor changes in foundry equipment made necessary by the installation of a No. 5 Whiting cupola of 40-ton capacity. This department nominally employs about 100 molders but to-day has only 40 on the payroll and is operating three days a week. S. A. Merrill is superintendent.

The Silentflush Valve Mfg. Co., Springfield, Mass., capitalized for $300,000, has taken out a charter. Arthur W. Morris, 54 Buckingham Street, is president, and Robert M. Keating, 73 Taylor Street, treasurer.

The Builders Iron Foundry, 9 Coddington Street, Providence, R. I., will erect a one-story addition, giving approximately 12,000 sq. ft. of increased floor space.

A new power house will be erected at the textile mill of the Ansonia O. & C. Co., Ansonia, Conn., in connection with a new manufacturing extension, estimated to cost about $75,000.

The New Egland Power Co., 35 Harvard Street, Worcester, Mass., has disposed of a bond issue of $1,250,000, the proceeds to be used for the erection of a new power plant, with initial generating capacity of about 5500 hp.

Allis Freedman, 27 Church Street, Springfield, Mass., is planning for the erection of a new one-story, brick machine shop to cost about $20,000.

The Richard French Iron Works, Worcester, Mass., has acquired property on Howe Avenue, Millbury, Mass., for a new plant to replace its Worcester works, recently purchased by the Arcade Malleable Iron Co. Plans for a number

of buildings are in preparation, with main structure to be one-story, 50 x 120 ft. Construction will begin at an early date to have the plant ready for operation in the fall.

A new power plant, with 100 ft. stack, will be erected by the M. J. Whittall Associates, Worcester, in connection with the erection of a new weave shed at their carpet mills, estimated to cost about $125,000.

The Atlas Die Casting Co., Worcester, Mass., recently organized with a capital of $200,000, has leased space in the building at 41 Jackson Street, for its new works.

The Industrial Appliance Co. of New England, Boston, has been chartered under State laws to manufacture mechanical and engineering specialties. William W. Cummings is president, and Gordon W. Russell, 235 Brewster Terrace, Brookline, Mass., treasurer.

The Robinson Anti-Splash Tire Co., Boston, has been incorporated with a capital of $200,000, to manufacture automobile tires. Charles A. Robinson, 3960 Washington Street, is president and treasurer.

The Frank H. Fargo Co., Bridgeport, Conn., has been incorporated with a capital of $75,000 by Frank H. Fargo, Stratford, Conn.; H. W. Graves, New Haven, Conn., and J. J. Beckwith, Jr., 61 Livingston Place, Bridgeport, to manufacture steel and metal furniture and parts.

The Two-In-One Signal Lamp Corporation, New Haven, Conn., has been incorporated with a capital of $50,000 by J. M. Chapnick, 279 Whalley Avenue, and I. Fine, 607 Elm Street, New Haven, to manufacture electric lamps and signal devices.

The Connecticut Metal Bed Co., New Haven, Conn., has been incorporated with a capital of $25,000 by G. E. Tester, 625 Orange Street, and associates, to manufacture metal bedsteads and similar products.

Philadelphia

PHILADELPHIA, July 18.

The American Motor Body Co., Glenwood Avenue near Eighteenth Street, Philadelphia, has filed plans for an addition. Improvements will also be made in the present works.

The Philadelphia Machine Screw Works, Inc., Philadelphia, has been incorporated with a capital of $25,000 to manufacture machine screw products and other mechanical specialties. A. L. Barbier, 2132 North Eighteenth Street, is treasurer.

The Kilbourne & Jacobs Mfg. Co., Commercial Trust Building, Philadelphia, has arranged for a bond issue of $900,000, to be used in connection with general operations for the manufacture of wheelbarrows, scrapers, trucks, trailers, etc. J. R. Kilbourne is president and general manager.

The Union Tank Car Co., 21 East Fortieth Street, New York, has leased a portion of the Hog Island Shipyard, Philadelphia, comprising the section known as steel yard "A," and will use the property in connection with its repair shops now in the Point Breeze district.

The Tioga Engineering & Pattern Co., Philadelphia, is being organized by Albert G. Schleber, Jr., William S. Cox and Benjamin G. Slaughter, to manufacture machinery and parts, and other metal products. Application for a State charter will be made Aug. 12. It is represented by J. Edgar Butler, 1524 Chestnut Street.

The M. J. Dougherty Co., Philadelphia, Pa., manufacturer of piping, etc., has removed its plant to new quarters on Washington Avenue, occupying the block from Twenty-fourth to Twenty-fifth Street, where increased fabricating and production facilities will be provided.

The Pennsylvania Rubber Products Corporation, Philadelphia, has been incorporated under Delaware laws with capital of $500,000 to manufacture mechanical rubber products. The company is represented by F. R. Hansell, Land Title Building.

The American Chemical & Sugar Machinery Co., Colonial Trust Building, Philadelphia, has acquired the plant of the Harrison Chemical Co., fronting on the Delaware River, Chester, Pa. The new owner will remodel the buildings, and plans for the installation of equipment at an early date. It is said that employment will be given to 200 operatives.

The Coodel Pneumatic Valve Co., Camden, N. J., has been incorporated with a capital of $75,000 by Thomas F. Delaney, Charles H. Cooke and William C. Casperson, to manufacture valves and other mechanical products. It is represented by the New Jersey Corporation Guarantee & Trust Co., Camden.

The Pennsylvania Supply & Mfg. Co., Allentown, Pa., is being organized by Charles B. and George A. Kuhns, Shamokin, Pa., operating a local works under the name of Kuhns Brothers, for the manufacture of cornices, ceilings, ventilators and kindred metal products. The new company will specialize in a similar line of manufacture, including architectural metal work, skylights, etc., and has acquired about 15,000 sq. ft. of floor space at Church and Chestnut streets, Allentown. It is planned to commence production early in August. Myron R. Miller, Allentown, is also interested in the new company.

John E. Malone, Lancaster, Pa., has acquired the plant of the Penn Iron & Steel Corporation, Plum Street, for $108,000, covering ground, buildings and equipment. The miscellaneous machinery will be disposed of in individual lots. The plant at one time was known as the Norris Locomotive Works.

The Pennsylvania Department of Forestry, Harrisburg, Pa., is planning for the installation of 50 steel towers in different parts of the State forests, to be used for observation purposes in connection with fires.

The Pennsylvania Rubber Co. of America, Philadelphia, has leased the entire building at 857 North Broad Street, totaling about 14,000 sq. ft., for a local establishment.

The Schimmel Electric Supply Co., Philadelphia, Pa., has been incorporated with a capital of $330,000 to manufacture electrical equipment and supplies. It will take over the business operated under this name at 318 Market Street. I. D. Schimmel is treasurer.

W. E. S. Dyer, Land Title Building, Philadelphia, engineer, has completed plans for the erection of a new one-story power house at the plant of W. H. and E. A. Margerison & Co., Front and Lehigh streets, manufacturer of towels, etc.; and for a new power house and coal storage plant at the works of the Enterprise Furniture Co., Glen Rock, Pa. Construction of both plants will begin at once.

Buffalo

BUFFALO, July 18.

Fire, July 10, caused damage of $60,000 to the plant and machinery of the Archer-Daniels Linseed Oil Co., Louisiana Street, Buffalo.

L. G. Schoepflin & Co., Buffalo, automobile trucks, now temporarily located at Ellicott and Washington streets, has had plans prepared for a new two-story service and repair works at 306 Franklin Street, estimated to cost about $60,000.

The Sinclair Consolidated Oil Corporation, 120 Broadway, New York, is said to be negotiating for the purchase of property at Niagara Falls, N. Y., as a site for a new oil refinery, estimated to cost in excess of $2,000,000 with machinery.

A new one-story power house will be erected by the Oswego Shade Cloth Co., Oswego, N. Y., at its plant on Utica Street.

The Rochester Gas & Electric Co., Rochester, N. Y., has disposed of a bond issue of $7,000,000, the proceeds to be used for plant extensions and improvements, general operation, etc. Robert M. Searle is president.

Arrangements are being made for dismantling the plant of the Rochester Auto & Tool Co., Rochester, N. Y., and the removal of the equipment to Jasio, Poland. It is organized under State laws with capital of $75,000, and the stockholders are of Polish descent. The works were established about two years ago.

Baltimore

BALTIMORE, July 18.

The Seaboard Iron & Steel Co., 905 Lake Drive, Baltimore, has awarded contract to J. Henry Smith, 1426 Light Street, for the erection of its new plant on South Pica Street. Construction will begin at once.

The General Steel Products Co., 33 South Gay Street, Baltimore, has been incorporated with a capital of $50,000, and 500 shares of stock, no par value, by Edgar F. Kirwan, William G. Levinson and Henry L. Fleming, to manufacture metal products.

A. L. Flint, general purchasing officer, the Panama Canal, Washington, will receive bids until 11:30 a. m., Aug. 3, for material for the Canal Zone, including steel, boiler tubes, wire and cable, motors, pumps, electrical equipment, tractor mowers, nails and other equipment, all as set forth in Circular 1453. The assistant purchasing agent is located at 24 State Street, New York.

The American Aircraft, Inc., 1304 Fidelity Building, Baltimore, has been incorporated with a capital of $1,000,000 by William H. Campbell, George O. Blome and Robert J. Stewart, to manufacture airplanes, hydroplanes, motors, etc.

The City Council, Frostburg, Md., has perfected plans for the installation of new electrically operated pumping ma-

chinery for the municipal waterworks, to consist of one pumping unit with capacity of 300 gal. per min., and one of 100 gal. per min., with motors, switches, controlling apparatus, etc.

The Wrapping Ad Machine Co., Towson, Md., has been incorporated with a capital of $100,000 by Jorgen I. Haase and Jesse T. Dowling, Towson, to manufacture paper wrapping machinery, paper holding equipment, etc.

The Tyler Airless Tube Co., 757 Calvert Building, Baltimore, has been incorporated with a capital of $100,000, by Edgar L. Wade and William J. Murphy, to manufacture automobile tires and tubes.

A. L. Flint, general purchasing officer, the Panama Canal, Washington, will take bids up to 10:30 a. m., Aug. 31, for the purchase of 15 locomotives, offered for sale by the department, as set forth in Circular 1454.

The Flame Ignition Unit Co., 614 West North Avenue, Baltimore, has been incorporated with a capital of $110,000 by William H. Martin, John K. Brown and Allen F. North, to manufacture flame ignition unit devices.

The United States Shipping Board, Washington, is planning for the construction of a new electric power plant at Craney Island, near Norfolk, Va., and the installation of an electrically operated pumping plant.

The Thompson Mfg. Co., Washington, has been incorporated with a capital of $350,000 under Delaware laws by James T. Thompson, H. Leroy Goff, and H. N. Wayne, Washington, to manufacture electric lighting and heating equipment and devices. It is represented by the Colonial Charter Co., Ford Building, Wilmington, Del.

A new one and two-story electric power plant and ice-manufacturing plant, estimated to cost $75,000, will be constructed at the State Hospital for the Insane, Goldsboro, N. C., Dr. W. W. Faison, director. Plans are being prepared by Wiley & Wilson, Lynchburg, Va., engineers. Bids will be asked at an early date.

The Red Cedar Chest Co., Altavista, Va., will break ground at once for rebuilding its plant, recently destroyed by fire. The new factory will be 60 x 500 ft., and is estimated to cost $125,000 with machinery. Lockwood, Green & Co., 101 Park Avenue, New York, are engineers.

The Bacher Machine & Grinding Co., Wilmington, Del., has been incorporated with a capital of $100,000 by Horace G. Eastburn, Franklin S. Bunting and George J. Bacher, 305 Delamore Street, Wilmington, to manufacture machinery and tools.

Ohio

CLEVELAND, July 18.

Some dealers report a little improvement in inquiry for small lots of machinery for equipping new shops, but prospective purchasers are slow in placing orders and aggregate sales the past week were very light. The Osborn Mfg. Co. has taken an order from the Navy Department for seven power molding machines for the Philadelphia navy yards and for a large power molding machine for an Eastern foundry. Inquiries for molding machines have improved somewhat. A manual training school in Erie, Pa., is inquiring for a number of machine tools. A Cleveland dealer has sold three carloads of used machinery, amounting to $16,000, from the plant of the Enterprise Mfg. Co., Cleveland, for the Federal vocational school, Valparaiso University, Valparaiso, Ind.

Manufacturers of punching and shearing machinery are getting practically no inquiries. Local machine-tool manufacturers and dealers do not look for much change in the situation within the next few weeks, but expect some revival in buying early in the fall.

In Cincinnati there are no apparent signs of improvement in inquiries or orders for machine tools, although the market is not entirely devoid of either. Inquiries are reported from Mexico, and a company manufacturing planers is understood to have shipped an order for three machines to a foreign buyer. During the past week an inquiry for a number of tools came through the office of the National Machine Tool Builders' Association for a school in India. A manufacturer of conveying machinery reports activity, the shipments being made East. The Big Four has not purchased against its recent inquiry nor has the Illinois Central taken action yet in regard to its recent list, previously reported. Resumption of railroad shop work has begun in the Zanesville shops of the Baltimore & Ohio Railroad, which have been closed for the past six months. The market for used machinery is generally quiet, although some sales have been made.

The Fisher Lock Co., Hamilton, Ohio, has been recently incorporated for $50,000. The plant is located at Seventh and Walnut streets. It is understood that most of the equipment has been installed and work will begin very soon. The incorporators include Wilbur R. Black, Joseph Fisher, Thomas Zollers and Walton Bowers.

The Bowman-Vaughn Co., Lisbon, Ohio, will erect a new factory for the manufacture of toys.

The Central Welding Co. is a new company which has started a plant at 1005 Twelfth Street, Canton, Ohio. Glenn E. Wilson, formerly with the Oxweld Acetylene Co., Chicago, is president and general manager and Harvey Winkleman, vice-president and assistant manager.

The Acme Cultivator Co., Salem, Ohio, recently incorporated with capital stock of $50,000, contemplates the erection of a plant for the manufacture of cultivators.

The Lima Sheet Metal Products Co., Lima, Ohio, has under erection a new plant, involving an expenditure of $110,000 and is reported to have placed orders for $40,000 worth of equipment. The works will include a main building, 60 x 234 ft., and three wings, each 40 x 60 ft.

The Chisholm-Moore Mfg. Co., Cleveland, has taken an order for a complete overhead track system for the new Huntingdon, Pa., plant of the Pierce, Butler & Pierce Co., Syracuse, N. Y., manufacturer of plumbing, heating and steam equipment.

Pittsburgh

PITTSBURGH, July 18.

Both actual and prospective machinery business in this section is excessively dull. The International Nickel Co. has yet to buy the tables, small motors, saws and shears for its new plant at Huntington, W. Va., and the United States Glass Co., which soon will start work on a new plant at Shreveport, La., is expected to put out an inquiry for the necessary equipment. An inquiry has reached this market from the Wagner Mfg. Co., Sidney, Ohio, aluminum ware, for a vertical milling machine for milling steam cookers. It is possible that this requirement will be met from a used machine. A local manufacturer's agent reports the sale of three motor-driven wood-working machines for shipment to a West Virginia lumber company, and also has disposed of two wood-working machines for a manual training school in that State. The same house sold a 16-in. quick change gear engine lathe to a Johnstown, Pa., coal mining company. All of these machines were taken from stock and replacement orders are unlikely for the reason that it is the inclination of this seller and others to get stocks down to the minimum before entering new orders. Little or nothing is going on in cranes at present. The Wheeling Steel Corporation has put out an inquiry for a 5-ton overhead for the Beech Bottom, W. Va., plant of the Whitaker-Glessner Co. The Greenville Steel Car Co. is expected to close for a crane late this week, but it is announced that the Crane Co., Chicago, which is putting up a warehouse here, has decided to defer the construction of the building in which it was planned to install three cranes. Another reduction of 10 per cent, the third so far this year, has been announced in the price of the motors by leading manufacturers.

The Waugh Foundry & Machine Works, Box 667, Williamson, W. Va., recently organized with a capital of $50,000, has awarded contract to the Truscon Steel Co., Youngstown, for a one-story foundry and machine shop, 50 x 150 ft. The company will specialize in the manufacture and repair of mining machinery. A list of equipment to be installed has been prepared. C. S. Waugh is president, and J. R. Hill, general manager.

Fire, July 9, destroyed the plant of the Janelow Products Co., Janelow, near Clarksburg, W. Va., manufacturer of wood products, with loss of about $85,000, including machinery. L. J. Hittinger, Clarksburg, is head.

Mark H. Russell and M. T. Perseger, Williamson, W. Va., are organizing a company, capitalized at $1,000,000, for the erection of an ice-manufacturing and cold storage plant.

The American Cotter Pin Co., Pittsburgh, has filed notice of dissolution under State laws.

The Replacement Auto Parts Co., Pittsburgh, is being organized by F. F. Hall, E. H. Lecrone and O. O. Schucker, to manufacture automobile parts and equipment. Application for a State charter will be made on July 25. John A. Metz, 707 B. F. Jones Law Building, represents the company.

The Universal Visible Calculator Co., Pittsburgh, has been incorporated with a capital of $25,000 to manufacture calculating machines and parts. A. S. Dick, 632 Duquesne Way, is treasurer.

Fire, July 6, destroyed a portion of the works of Carl C. Miller & Co., 835 Penn Avenue, Wilkinsburg, Pa., operating a brass finishing and plating plant.

The Brown Puncture-Proof Tube Co., Pittsburgh, has been incorporated with a capital of $25,000 to manufacture automobile tubes and other rubber specialties. C. E. Johnson, 2112 Wightman Street, is treasurer.

A. J. List, Tyrone, Pa., has awarded contract to J. Van

Hildebrand, Tyrone, for a new two-story automobile service and repair works, on East Tenth Street, 60 x 100 ft., estimated to cost about $55,000.

The Nitro Foundry Co., Nitro, W. Va., has been incorporated with a capital of $50,000 by W. A. O'Neill, Ralph Matthews and M. S. Aldrich, to manufacture castings.

The Twelfth Street Garage, Wheeling, W. Va., has filed plans for a five-story and basement automobile service and garage building, with machine and repair department, 85 x 130 ft., at Twelfth and Main streets, to cost $150,000. E. A. Baden is president.

Chicago

CHICAGO, July 18.

The market shows some improvement over last month in sales and inquiries. The H. W. Johns-Manville Co. has put out the following list covering repair shop equipment for its new Waukegan, Ill., plant:

One 24-in. engine lathe.
One 16-in. engine lathe.
One 14-in. engine lathe.
A No. 2 plain milling machine.
An electric floor grinder.
Plain cylindrical grinding machine.
Universal grinding machine.
Hack-saw.
One 20-in. shaper.
One 21-in. drill press.
One 14-in. drill press.
One 30-in. open side planer.
Pipe machine.
One 3½-ft. radial drill.
One 4-ft. radial drill.

Local dealers are working on this list, but it is understood that purchases will be closed in New York. The Automatic Electric Co., Chicago, has bought the equipment listed in this column last week, for its Fort Dodge, Iowa, subsidiary, the Monarch Telephone Mfg. Corporation. The Acme X-Ray Co., Chicago, bought second-hand machines, principally, to fill its requirements, as enumerated last week. The Milwaukee Tank Works, Milwaukee, is inquiring for a 24-in. engine lathe and a No. 1½ milling machine. Lists of equipment for Federal vocational training schools at Jacksonville, Ill., and Valparaiso, Ind., are before the trade. The Jacksonville inquiry includes a universal milling machine, Brown & Sharpe No. 1-A, or equivalent; a 14-in. x 5-ft. engine lathe; 12-in. or 14-in. stroke shaper; 20-in. drill press; wet floor grinder, and a portable electric center grinder, ½-hp. with 2½-in. x 6-in. medium grade carborundum wheels. The Stephens-Adamson Mfg. Co., Aurora, Ill., is inquiring for a ¼-in. plate bending roll, ⅝-in. stake riveter, ¼-in. circle shear and a 5-ft. brake for its Los Angeles, Cal., plant.

The Illinois Central and Rock Island lists are still unbought. The vice-president in charge of purchases for the latter road states that machine tool prices are still too high and no buying will be done until substantial reductions are made.

The Teeter Toy Mfg. Co., 1519 North Artesian Avenue, Chicago, has been organized with $11,000 capital stock, to manufacture metal toys. The incorporators include J. S. Jefes, Herman Driehouse, N. P. Coerens, Frank Anderson, and Jacob J. Hank.

The G. A. Ball Bearing Mfg. Co., 3051 West Lake Street, Chicago, is taking bids through Burrett H. Stephens, engineer, 37 West Van Buren Street, on a one-story plant, West Lake Street and Albany Avenue, to cost $65,000.

The New Owatonna Mfg. Co., manufacturer of drills, seeders, and ensilage cutters, is having plans drawn for works on West Fifth Street, Winona, Minn., to cost $225,000, exclusive of equipment. It will include an office building, garage, machine shop, 160 x 220 ft.; foundry, 120 x 140 ft.; covered material storage, 80 x 100 ft., and possibly an additional warehouse, 100 x 120 ft. Frank D. Chase, Inc., Chicago, is architect and engineer.

The Mit-Shel Stamping Mfg. Co., 510 Jersey Street, Quincy, Ill., has been incorporated with a capital of $50,000 by Edward H. Mitchell, Theodore Schell and William Spohr, Jr., to manufacture stamped metal products.

The Wheeling Corrugating Co., 2547 Arthington Street, Chicago, has taken bids for a one-story addition, 90 x 125 ft., estimated to cost about $40,000. Paul Gerhardt, 64 West Randolph Street, is architect.

The Twin City Separator Works, 2830 Colfax Avenue, Minneapolis, Minn., manufacturer of grain-cleaning machinery, etc., has awarded contract to the Pike & Cook Co., 416 South Fifth Street, for a two-story addition, 62 x 148 ft., on Madison Street, N. W., estimated to cost about $30,000. C. O. Paulson is secretary and treasurer.

The Utility Battery Co. of America, Mount Prospect, Ill., has been incorporated with a capital of $5,000,000 under Delaware laws to manufacture electric storage batteries and kindred equipment. The incorporators are T. C. Fredericks, M. Luce and H. L. Wuerffel, Mount Prospect. The company is represented by the Capital Trust Co., Dover, Del.

The Chicago & Northwestern Railroad, 399 West Jackson Boulevard, Chicago, has plans under way for a two-story ice-manufacturing plant at Clinton, Iowa, estimated to cost about $50,000.

Schaffer Brothers, 2207 South Central Park Avenue, Chicago, manufacturers of metal products, have taken bids for a new one-story sheet metal-working shop, 50 x 140 ft. The Walter Engineering Co., 38 South Dearborn Street, is architect.

The American Accumulator Co., Owatonna, Minn., manufacturer of electric storage batteries, has awarded a contract to Hammel Brothers & Anderson, Owatonna, for a new one-story plant, 90 x 106 ft.

The Common Council, Corning, Iowa, has approved a bond issue of $60,000 for the construction of a municipal electric light and power plant. W. C. Chubb is city clerk.

Detroit

DETROIT, July 18.

The Niles Fence Co., Niles, Mich., recently organized to manufacture wire fencing, has plans under way for the establishment of a factory with an initial daily output of about 15,000 ft. of material. M. Thompson is president.

The Ideal Pattern & Machine Co., Grand Rapids, Mich., has filed notice of dissolution under State laws.

The plant of the Below Sawmill Co., Marinette, Mich., was destroyed recently by fire with loss estimated at about $90,000, including machinery. No announcement has as yet been made regarding the rebuilding of the works.

Fire, July 10, destroyed the forge shop, wood-working plant and a portion of the powerhouse and pumping plant at the works of the Bates Iron Mining Co., Iron River, Mich., with loss estimated at about $30,000.

The Wabash Railroad, 144 South Clark Street, Chicago, has acquired about 65 acres near Detroit, to be used for the establishment of new shops, yards and other terminal buildings.

The Belmont Sand & Gravel Co., Fourth National Bank Building, Grand Rapids, Mich., recently organized, is planning for the immediate installation of equipment at its proposed new plant at Belmont, near Grand Rapids, to consist of crushing machinery, washing equipment, hoisting and conveying apparatus, etc., with power house, equipped with oil-engines. Maurice Sluyter is president, and I. R. Blandford, secretary.

Milwaukee

MILWAUKEE, July 18.

Inquiry for machine tools from the automotive industries has picked up to some extent the past week or 10 days, but thus far little actual business has been passing. Production of tools is now at a minimum, as makers and dealers have no difficulty in filling the majority of orders out of stock. Business is considered more active than in June, and while improvement is slow, confidence is expressed that the remaining months of 1921 will furnish a material increase over the first half.

Gray iron founders report some improvement in demand, but steel foundries are operating at a decreased production schedule because of the lack of new orders.

Structural shops are kept fairly busy with a steady run of small jobs, principally in the nature of public garages, school buildings and public works. Sizable tonnage contracts are scarce.

The Sommers & Son Co., Chicago and Milwaukee, manufacturer of machinery and equipment for milk condensing plants, has broken ground for a new foundry and machine shop, 38 x 117 ft., one story, of brick and concrete, at Thirty-first and Burleigh streets, Milwaukee. It will be ready about Sept. 1, at which time the present leased quarters at 3022-3026 Galena Street will be abandoned. F. X. Sommers is vice-president and general manager at Milwaukee.

The Rogers Mfg. Corporation, Milwaukee, has been organized with an authorized capital stock of $50,000 to manufacture carbureters and other auxiliary devices and appliances for gas engines, motor vehicles, etc. The incorporators are William A. Hyde, Bert Vanderveldt and Claude J. Hendricks, attorney, 1504 First Wisconsin National Bank Building.

The Riverview Foundry Co., Silver Lake, Wis., has been organized with a capital stock of $10,000 to engage in the gray iron foundry business. The incorporators are Charles B. Bohen, R. C. Dixon and I. F. Dixon.

The Manitowoc Church Furniture Co., Waukesha, Wis., will build a power plant addition and a new stack and will install a 125-kw. generating unit. Charles F. Schuetze is general manager.

The Stewart-Galvin Co., Marshfield, Wis., has been incorporated with a capital stock of $50,000 to manufacture storage batteries. It represents a merger of interests of the Stewart-Galvin Battery Co. and the Stewart Storage Battery Co. For the present production will be carried on in the major part of the Marshfield-Franklin Garage. Later a new factory will be erected. Amos Roll, A. C. Felker and R. R. Williams, all of Marshfield, represent local interests in the enterprise.

The Wisconsin Screw Co., Racine, Wis., recently increased its capitalization from $30,000 to $60,000 to accommodate the development of its business. It manufactures automatic screw machine products.

The Monarch Tractor Co., Watertown, Wis., which was bid in at bankruptcy sale for $44,000 by E. B. Cadwell of New York, a principal creditor, has resumed operations on a limited scale, following the confirmation of the sale and transfer of the property to Mr. Cadwell. J. L. Hornbeck has been retained as works manager.

The Kinsey-Davidson Electric Welding Co., 208 Mayer Building, Milwaukee, has changed its style to the Davidson Electric Welding Co., following the purchase of the interest of John I. Kinsey by W. B. Davidson. Mr. Kinsey is engaging in another line of business.

The Filer & Stowell Co., Milwaukee, has started work on alterations, repairs and improvements in its foundry department, to cost about $25,000.

The Green Bay Investment Corporation, Green Bay, Wis., has let the general contract to the Ludolf M. Hansen Co. for the erection of a four-story building, 100 x 200 ft., to be equipped as a cold storage warehouse. A large refrigerating unit and two electric elevators will be installed.

The Foster Construction Co., 413 Grand Avenue, Milwaukee, has taken the general contract to erect a new high, graded and vocational training school at Goodman, Marinette County, Wis. It will cost about $120,000 complete.

The Gulf States

BIRMINGHAM, July 18.

The Stringer Brothers Foundry Co., 109 North Dearborn Street, Chicago, manufacturer of pipe, brass goods and other plumbing specialties, has begun the erection of a new branch plant at Gadsden, Ala., to include iron and brass foundry, assembling, finishing and other general works departments. It is proposed to commence production at the earliest possible date. A company to be known as the Stringer Brothers Co., capitalized at $200,000 and chartered under Alabama laws, will operate the plant. Charles C. Stringer is president.

The Texas Oil Co. and the Gulf Refining Co., Meridian, Miss., are planning to rebuild their local plants, destroyed by fire, June 28, with loss estimated at $150,000, including equipment. The adjoining plant of the Acme Planing Mill was also destroyed with loss of about $35,000.

The Richard Carter Co., Gulfport, Miss., manufacturer of gasoline engines for automobiles, etc., is planning for enlargements and the installation of new equipment.

The F. H. Koretke Brass Mfg. Co., 922 Magazine Street, New Orleans, is planning the erection of a one-story addition to its foundry. E. W. Gosselin is vice-president and general manager.

The Frohlichs Marine Repair Works, New Orleans, is planning for the early operation of its new floating machine shop and marine repair works, now being completed at a cost estimated at close to $250,000, including machinery. The plant has been established on a barge, 110 ft. long, with 26 ft. beam and 6 ft. draft.

The Gadsden Clay Products Co., Gadsden, Ala., has been incorporated with a capital of $25,000, to manufacture building tile and kindred specialties. Robert Riley is president, and Gordon Hood, treasurer.

Electric motors, presses, transmission and other machinery will be installed in the new one-story plant, 100 x 100 ft., to be erected at Tampa, Fla., by the United Paper Co., Atlanta, Ga., for the manufacture of paper wrappers for fruit. The building contract has been let to E. W. Parker, Curry Building, Tampa. Louis Wellhouse is president.

The Grove Land & Timber Co., Asheville, N. C., is planning for the construction of a new electric light and power plant at St. Petersburg, Fla., in connection with the improvement of a large tract of land in this section. E. W. Grove is president.

The Cisco Clay & Coal Co., Cisco, Tex., has plans under way for the erection of new works for the manufacture of brick, tile and kindred products. It will be constructed in units, and later a second section will be erected for the production of face brick, etc.

W. A. Rogers, Houston, Tex., has acquired the oil refinery of the Ryan & Fisher Refining & Production Co., Waco, Tex. The new owner plans for extensions and improvements in the plant, and will increase the capacity from 500 to over 1000 bbl. per day.

The H. & A. Wood Products Co., St. Petersburg, Fla., manufacturer of toys, is planning for enlargements in its factory to double the present capacity.

Indiana

INDIANAPOLIS, July 18.

About $600,000 will be expended by the American Coating Mills Co., Elkhart, Ind., for the addition to its coated paper manufacturing plant at the foot of Division Street. It will be three stories, 50 x 150 ft., and 50 x 50 ft. Construction will begin at once. C. C. Colbert is president and treasurer.

The Rockport Planing Mill Co., Rockport, Ind., is arranging to rebuild its plant, destroyed by fire, July 9. Charles Wilbern is president.

The M. G. Miller Mfg. Co., Columbia City, Ind., has been chartered under State laws to manufacture refrigerators and similar equipment. The incorporators are M. G. Miller, Lloyd Crouch and A. J. Freed, Columbia City.

A new power house will be erected at the Wiley High School, Terre Haute, Ind., by the Board of Education, in connection with general remodeling and improvement of the structure, estimated to cost about $120,000. Bids will be asked at once. Miller, Johnson & Miller, 105 South Seventh Street, are architects.

The Standard Oil Co. of Indiana, Indianapolis, is planning to rebuild its refinery at Whiting, Ind., destroyed by fire, July 5, with loss estimated at close to $2,000,000.

The Central South

ST. LOUIS, July 18.

Very little machine tool business is being transacted in this section. Railroads are not sending out any inquiries, and automobile plants are running on small capacity.

The Kaw Boiler Works, Kansas City, Kan., bought a 5-ton crane through a manufacturer's representative in St. Louis.

The N. O. Nelson Mfg. Co., 928 Chestnut Street, St. Louis, manufacturer of sanitary ware, plumbing fixtures, etc., is completing plans for extensions and improvements in its plant at Noblesville, Ind., to cost about $50,000.

The Western Tractor Co., Joplin, Mo., has completed negotiations with the Chamber of Commerce, Wichita, Kan., for the acquisition of local site for the erection of a new plant to manufacture farm tractors and parts. The present works, representing an investment of close to $500,000, will be removed to the new location.

The Lock Joint Pipe Co., Webb City, Mo., is planning for the erection of a new works for the manufacture of reinforced cement pipe, estimated to cost about $125,000 with machinery. The Missouri Pacific Railroad Co. at this place is interested in the project.

The American Washing Machine Co., Muskogee, Okla., has been incorporated with a capital of $25,000 by J. M. Sims, W. F. Bickford and E. V. Vernor, Muskogee, to manufacture electrically operated washing machines and parts.

The Chickasha Auto Top Co., Chickasha, Okla., operating an automobile top and equipment manufacturing plant at 114 Kansas Avenue, has preliminary plans under way for the establishment of new works as an extension to the present factory.

The Prewitt Shock Absorber Co., Bolivar, Tenn., has been incorporated with a capital of $25,000 by M. L. Prewitt, A. C. Osborne and W. S. Follis, Bolivar, to manufacture automobile shock absorbers and other kindred equipment.

The Usona Mfg. Co., 826 South Eighteenth Street, St. Louis, manufacturer of electrical specialties, has awarded a contract to the Kremer & Voiril Construction Co., Century Building, for its new one and two-story plant, 100 x 150 ft., at Chateau and Spring streets. F. C. Long is president.

The Magnolia Petroleum Co., Duncan, Okla., has awarded a contract to the Austin Co., Euclid Avenue, Cleveland, for three new one-story buildings, 40 x 260 ft., 40 x 40 ft., and 25 x 65 ft., estimated to cost $50,000.

The Battery Service Co., Muskogee, Okla., manufacturer

of storage batteries and equipment, is planning for the erection of a new one-story factory, 110 x 170 ft. J. H. Schmidt is president and manager.

The Motor Oil & Refining Co., Chickasha, Okla., recently organized, is perfecting plans for the construction of a new refinery with daily initial capacity of about 5000 bbl., and estimated to cost close to $300,000 with machinery. R. C. Parks is general manager.

The Marland Refining Co., Ponca City, Okla., has acquired property in St. Charles Parish, near New Orleans, for a new refinery and general oil terminal plant. It is said that the proposed works will cost in excess of $1,000,000 with equipment.

The Missouri Public Utilities Co., St. Louis, is planning for the rebuilding of its power plant at Sikeston, Mo., recently destroyed by fire.

A new two-story plant to cost about $50,000 with machinery will be constructed by the Central West Grease Co., 212 North Fifth Street, St. Joseph, Mo. Preliminary plans are under way. A. B. Snoddy is president.

The Cooper Battery Co., Jackson, Tenn., is planning to rebuild its plant recently destroyed by fire. R. L. Beare is head.

The Twin Pin Clothesline Co., Charlotte, N. C., has been organized to manufacture wire clothes pins and similar products. It is headed by D. S. and W. J. Boyles, Charlotte.

The Sash Weight Foundry Co., Sand Springs, Okla., has been chartered under State laws to manufacture sash weights and other iron castings. The incorporators are L. C. Hinds, A. C. Spitznagel and E. M. Tyler.

California

SAN FRANCISCO, July 12.

The most conspicuous business of recent date was the sale of about 20 machine tools, including lathes, drills and grinders, to the San Joaquin Power & Light Corporation, Fresno, Cal., which supplies power for the entire San Joaquin Valley. While the consideration involved has not been made public, it is said to run into five figures. There has been a fair business in some machine lines, notably in mining and automobile equipment, but the general situation does not present a very encouraging aspect.

Samuel Kraemer, Placentia, Cal., has filed plans for a new one-story machine shop, 40 x 130 ft.

The Pacific Platinum Works, Glendale, Cal., has been incorporated with a capital of $20,000 by A. S. Hoyt and A. M. Draper, to manufacture metal products.

The Pacific Clay Products Co., American Bank Building, Los Angeles, is completing plans for its new plant at Los Nietos, Cal., for the manufacture of firebrick and other refractory products. It will replace the plant recently destroyed by fire and will have an initial daily output of about 25,000 firebrick.

The Interlocking Tile & Sewer Pipe Co., Indio, Cal., has been incorporated with a capital of $250,000 to manufacture tile, brick, sewer pipe and kindred products. J. A. Gordon is president; J. P. McNally, secretary, and J. W. Wilson, treasurer.

The Electric Utensils Co., 1405 South Hill Street, Los Angeles, has filed notice of organization to manufacture electrical specialties. Kenneth H. Woolson, 910 Third Street, heads the company.

The National Cornice Works, 1323 Channing Street, Los Angeles, manufacturer of metal products, has filed plans for extensions and improvements in its plant.

Bagley & Co., 901 Nineteenth Avenue, Oakland, Cal., operating a boat repair plant, have plans for a one-story shop addition, for general repair work.

Fire, July 5, destroyed the power house, operating plant and mechanical buildings of the Sultana Mining Co., Angels Camp, Cal., with loss estimated at about $100,000, including machinery.

The Consolidated Wagon & Machine Co., West Third Street, Salt Lake City, Utah, is planning to rebuild the portion of its works destroyed by fire, July 2, with loss estimated at $75,000.

The Utah Refining Co., Salt Lake City, Utah, is adjusting the insurance on its oil refinery, recently destroyed by fire, with loss estimated in excess of $300,000, and has plans under way for rebuilding.

Canada

TORONTO, July 18.

The machine tool market in this section has been exceptionally quiet the past week. Very few manufacturing concerns in Ontario or Quebec are operating above 50 per cent capacity and the majority are running between 10 and 15 per cent. Very little is being done in the way of new construction, which is at a lower point than for a number of years. There is, however, a small demand for certain lines of wood-working tools. Small tools continue in fair demand, but users are not stocking up, being content to buy as needed. No further softening in prices has been announced.

H. E. Montgomery, town clerk, Timmins, Ont., is receiving bids for a direct connected motor-driven blower and electrical fittings for a sewage disposal plant.

The town of Daysland, Alta, is contemplating spending $14,000 on an electric light plant and equipment.

Cie Electricite, St. Prime, Que., is erecting a power house at a cost of $40,000.

Menary & Wetherill, Wetaskiwin, Alta., have purchased the Wetaskiwin Welding Works and have opened a machine shop. They are asking for catalogs, lathes, etc.

The Rapid Electric Co., Ltd., Sault Ste. Marie, Ont., has been incorporated with a capital stock of $40,000 by Charles T. Toombs, George L. Wilson, Arthur P. Crawford and others to manufacture electrical machinery, tools, etc.

The H. W. Steel Shank & Specialty Co., Ltd., Preston, Ont., has been incorporated with a capital stock of $50,000 by Samuel H. Parker, Henry W. Steel and others to manufacture metal and wood products, etc.

The Auto Signal Light Co., Ltd., Leamington, Ont., has been incorporated with a capital stock of $50,000 by Robert Fairful, Robert D. Sloane, George A. Brown and others to manufacture automobile signal lights, accessories, etc.

The ratepayers of Thorold, Ont., carried a by-law giving a fixed assessment of $20,000 to the Gove Motor Car Co., Detroit, which will establish a plant. It has secured an option on a 5-acre site and construction work will soon begin.

Plans of New Companies

Henry Althof's Sons Co., 121 East Twenty-third Street, Erie, Pa., which was recently incorporated under the laws of Pennsylvania, was formerly conducted as a co-partnership. There is no change in the personnel, the former co-partners being the sole owners of the corporation. The officers are as follows: George T. Althof, president; Henry A. Althof, vice-president; Edward W. Althof, secretary and treasurer. The business has been established for more than half a century, and three generations of the Althof family have been interested in it within that period. It was conducted for many years under the name of the Erie City Iron Fence & Wire Works but for the past few years has been conducted as Henry Althof's Sons. The company is not contemplating the purchase of any new equipment at this time.

The Dawn Mfg. Co., 552 Fairfield Avenue, Bridgeport, Conn., manufacturer of washing machines, which was recently incorporated, may be in the market within a month or two for lathes and drills.

The Decker Mfg. Co., 251 Elm Street, Newark, N. J., recently incorporated, will manufacture blow torches and kindred products. The company advises that it is not in the market for new equipment.

The Martin Automatic Fishing Reel Co., Mohawk, N. Y., has been incorporated recently, though the business was established some years ago. No additions to the plant or equipment are contemplated at this time.

The Detroit Alloy Steel Co., 1436 Lafayette Boulevard, Detroit, Mich., which was recently organized for the purpose of making tool steel, reclaiming Stellite and making centers for milling machines and lathes, will specialize on the latter work. The company claims that it will make a center that will give service at ratio of 10 to 1.

The Metal-Craft Mfg. Co., 64 West Randolph Street, Chicago, recently incorporated, manufactures metal office furniture and all kinds of sheet metal fixtures and equipment for factories and shops, such as bins, shelving, cabinets, benches, tool stands and racks, machine guards, boxes, barrels and lathe pans; also stampings, dies and jigs. An illustrated pamphlet describing the Metal-Craft special sanitary locker and the complete line of office furniture will be mailed on request.

The Sani Products Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000 by John S. Duggan, 114 Kendal Avenue; Willis B. Sturrup, 6 Adelaide Street East, Thomas S. H. Giles and others to manufacture metal and wood products.

The Canuck Tool Mfg. Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Sumner W. Graham, 62 Richmond Street West; Percy C. Innes, Frederick E. Claxton and others to manufacture tools, implements, machinery, etc.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.93c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.93c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.03c.
Channels, angles and tees under 3 in. x ¼ in., base	2.93c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.93c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.13c.
Toe calk, ½ x ⅜ in. and larger	3.60c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.63c.
Squares, flats and hex	4.98c. to 5.13c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.03c.

Sheets

Blue Annealed	Per Lb.
No. 10	3.68c.
No. 12	3.73c.
No. 14	3.78c.
No. 16	3.88c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c.	.....
Nos. 22 and 24	4.35c.	5.60c.
No. 26	4.40c.	5.65c.
No. 28	4.50c.	5.75c.
No. 30	4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.50c.
No. 16	4.75c.
Nos. 18 and 20	4.90c.
Nos. 22 and 24	5.05c.
No. 26	5.20c.
No. 27	5.35c.
No. 28	5.50c.
No. 30	6.00c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—46	—30	¾ in. Butt...	—18	List
¾ in. Butt...	—52	—37	1-1½ in. Butt.	—20	— 2
1-3 in. Butt..	—54	—40	2 in. Lap	—14	+ 3
3½-6 in. Lap.	—49	—35	2½-6 in. Lap.	—18	— 2
7-12 in. Lap..	—40	—24	7-12 in. Lap..	— 7	+10

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c.
Annealed soft	4.50c.
Galvanized annealed	5.25c.
Coppered basic	5.00c.
Tinned soft Bessemer	6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c. to 23 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14x20	Primes	Wasters
		80 lb....	$6.80	$6.55
		90 lb....	6.90	6.65
		100 lb....	7.00	6.75
IC..	$10.60	$9.50	IC... 7.20	6.95
IX..	11.80	10.75	IX... 8.10	7.85
IXX..	13.60	12.25	IXX... 9.10	8.85
IXXX..	15.60	14.25	IXXX... 10.50	10.25
IXXXX..	17.20	16.00	IXXXX... 11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	24c.
No. 1 solder	21c.
Refined solder	18c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	30c. to 33c.

Old Metals

Business is very quiet and values remain stationary. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.25
Copper, light and bottoms	8.00
Brass, heavy	4.75
Brass, light	4.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

THE IRON AGE

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Increasing Revolving Ferrous Scrap Fund

Permanent Loss of Iron Reserves Pointed Out—Importance of Scrap for Steel Manufacture—Effect of Imports of Scrap or Ore

BY WALTER GRAHAM*

WAR taught the necessity of iron, not only for the advance of civilization, but also for its protection and its potency (in the hands of the Germans, for its destruction.) Because of this, 75 per cent of the iron reserves of Germany have been given to France; this is probably the most important restriction placed upon Germany. If France can secure sufficient good coking coal, which is doubtful, or develop her hydroelectric power, of which she has more than any other European country, about 6,200,000 hp., and succeed in converting these ores of Lorraine annexée electrically (she now has 69 electric furnaces), France may become second only to the United States as a producer of steel.

The United States is divesting itself rapidly, permanently, of its iron reserves. This is a more important consideration than the other vastly important question of the quick exhaustion of its oil reserves, which can be conserved by substitutes, as oil shales, coal and hydroelectric power. The iron ore reserves, of grades now used, are estimated to last only two generations; this reserve will go into scrap, but there is an estimated annual permanent loss of upwards of 20,000,000 tons of iron ore, of 50 per cent iron content.

Production and Sources of Scrap

Ferrous scrap is produced by discarding or rejecting iron and steel in process of manufacture, and by gathering, preparing and grading old or disused iron and steel products. It is "secondary metal" as distinguished from "primary metal," smelted from ores. It has a higher Fe content than pig iron, has been converted and refined and is cheaper than pig iron.

During the war every effort was made to gather it. As the larger producers of scrap know its value and carefully sort it, the War Industries Board found that the total supply could be increased only by inducing the farmers and town people to gather their scrap; the Red Cross and other agencies made a patriotic appeal to the people to cooperate in this. There are no reliable statistics of the total domestic production of scrap; by a formula, described below, the 1919 production is estimated to have been about 18,000,000 tons.

Our scrap imports are small, amounting in 1913 to 41,512 tons and in 1918 to 65,693 tons. Steel making countries, which are the largest producers, use their own scrap, so there is not a large tonnage available by importation to replace the exhaustion of our iron reserves, estimated to be about 10,000,000 tons a year. The large scrap producing countries, other than the United States and Canada, are across the Atlantic, and all large producers of scrap are also large users of it. Our imports are mostly from Canada (1913, 26,333 tons; 1918, 45,518 tons). Exports from the United States are mostly to Canada and Italy (1913, 102,201 tons; 1918, 22,385 tons); both these countries lack pig iron.

The scrap industry is an important factor in the conservation of iron ore, coke and limestone. As the annual turnover of scrap increases, less pig iron is needed, and consequently less blast furnace, coke oven and quarry capacity, and less transportation facilities are required. The importance of the last mentioned saving is seen from the fact that transportation costs on raw materials per ton of pig iron have increased from $4.79 in 1912 to $10.55 in 1921. A ton of scrap may replace a ton of pig iron, which is made of two tons of iron ore, a ton of coke and half a ton of limestone, or 3½ tons, approximately.

Common Uses of Scrap

As 50 per cent or more of the charge of the open-hearth steel furnace is scrap, its importance as a raw material is high, becoming more so as up to 100 per cent of the charge of the electric steel furnace may be scrap. Scrap is also used in blast furnaces and chemical works; and, without melting, by rerolling, forging and stamping and by piling and rolling into bars of iron. Pig iron can be made from scrap in the blast furnace and the electric furnace by adding carbon and silicon. Cast iron scrap is practically pig iron, and is remelted simply in the cupola for castings.

Wherever scrap and electric power can be obtained, the highest grades of steel can be made, even from low grades of scrap, as the electric furnace process is wonderfully refining, eliminating not only phosphorus, but sulphur. Steel can be made, in the absence of iron ore or coke, by utilizing scrap in the place of pig iron and substituting electric power for coke and gas coal, or oil. A nation with cheap electric power, hydroelectric preferably, can become a steel producer, competitively, even though it possesses no iron ore or coal; once possessed of large tonnages of iron and steel in place, in the form of equipment and structures of iron and steel, a country may support a considerable steel industry on the continual reclamation of scrap.

As the conversion of scrap into steel involves an oxidation loss of some 3 per cent, and since in the long run 95 per cent only of the steel is recovered as scrap, a persistent depletion of some 8 per cent occurs. These losses are increased by exports of iron and steel, the scrap from which is not returned by countries manufacturing steel, their production being largely based on the scrap supply, for which there is competition.

Quantities of Scrap Recovered and Consumed

Statistics of domestic recovery and consumption of scrap are incomplete; by a formula explained below, the following estimates are arrived at:

	1910	1913	1916	1918
Tons	8,846,816	9,742,000	15,854,588	18,372,773
Value		$109,104,000	.....	$551,183,190

To arrive at these figures it is necessary to take

*Captain, United States Army (Ordnance), investigating raw materials and blast furnace and steel works practice; special steel expert, United States Tariff Commission.

into account the oxidation of carbon and silicon in the pig iron and of iron in the conversion into steel; taking these losses into consideration a formula may be used to estimate the scrap supply approximately. The formula is: 103,092 per cent of the steel made, minus the Fe in the Bessemer and basic pig iron made, equals 85.5 per cent of the scrap supply. The remainder, 14.5 per cent, represents rolled and rerolled iron. This formula gives a scrap total for 1916 of 15,854,588 tons. The formula is based on the figures for one year only.

Efforts are being made to obtain other figures, with which to revise these estimates of scrap production. It is understood that the figures of exports and imports enter into this, but as the average ratios for years 1910-1918, of exports to production is 0.65 per cent and of imports 0.55 per cent, a difference of only 0.1 per cent, it is felt that until needed figures are obtained and a revision of estimates made, the present estimates can be used as fairly informative.

Oxidation Losses Requiring Neutralizing

Under the head of oxidation: the Bessemer process is highly oxidizing, as it blows compressed air through molten iron; iron losses, in the atmosphere and in the slag, may be conservatively stated to be from 3 to 6 per cent. The puddling process loses 5 per cent of iron in the slag as oxide. The open-hearth process loses 3 per cent of metallic iron, as iron oxide in the slag. There are iron losses also in heating furnaces and from weathering. An average of 3 per cent loss by oxidation, applied to the tonnage of steel output, is taken as a conservative figure. Pig iron losses are approximately 5 per cent by oxidation of carbon, silicon and manganese.

The excess of exports of iron and steel over imports in 1917 was 5,779,474 tons. The year of largest production is used, because the steel business is increasing, and it is felt that figures based thereon do not overestimate future conditions of the industry.

Imports of scrap in 1917 nearly balanced exports, being 223,834 tons for the former and 238,666 tons for the latter. Imports of machinery, cutlery, tools, etc., although a part of the consumption, are not taken into account, as total tonnage figures are not available and the amount is but a small fraction of the total steel production.

Calculation of Permanent Losses

The total permanent annual loss of iron (Fe) may be stated as follows:

	Tons
3 per cent of 46,978,364 tons* (oxidation loss)....	1,407,850
5 per cent of 47,011,358 tons† (not returned).....	2,350,567
Exports less imports.....	5,779,474
Total estimated permanent annual loss....	9,537,891
Equivalent iron ore (50 per cent iron content)....	19,075,782

The steady reduction of iron reserves of the United States may be judged from the above estimate. The increase of production of scrap, estimated, by the formula given above, more than doubled in 8 years, being in 1910, 8,846,816 tons, in 1918, 18,372,773 tons.

Scrap Formerly Held in Low Esteem

In the early days of the iron industry there was a remarkable disregard of the value of scrap, the old iron works paying little attention to anything but the hammered bars, which passed current almost as coin, in Virginia, at 6c. per lb. During the past generation, old slag dumps of charcoal iron works have been used in blast furnaces, having been found to contain much metallic iron of pure quality, as well as iron oxide, which made this material more valuable than iron ore. The great use of scrap began with the rapid development of the open-hearth process, about 1890; the scrap business has grown to large proportions with the growth of the basic open-hearth process, particularly.

Scrap Production Vastly Increased During War

The war produced vast amounts of scrap, not only by destruction and wear but in process of manufacture. The average rejection of shell steel at the steel mill before forging and machining was 42 per cent for rolled steel and 22 per cent for cast steel. These percentages of rejection are interesting, as the cast steel slugs were made in inverted, hot top molds, the riser, or hot top, being practically the total rejected steel. This is a strong argument in favor of the inverted, hot top mold. The percentage of steel in the hot top (over 20) should be noted, as only 10 per cent is allowed in some works experimenting with this type of mold.

Turnings of guns and shells were a large item of scrap production. Blast furnaces used up to 100 per cent of these fine turnings, and open-hearth furnaces increased the percentage of scrap up to 75 per cent, and even in one case to 90 per cent. But fine scrap turnings and borings are liable to rust and admixture of dirt, and are hence not desirable in the open-hearth furnaces, and they are of unknown composition. To meet this the use was advocated of high manganese pig iron for high initial and residual manganese in the steel bath.

Alloy steel scrap is increasing and is valuable, but requires expert preparation and use. The unknown percentages of nickel getting into the scrap supply, particularly from the Cuban ores, is troublesome to the crucible steel makers, who use purest scrap, as the process is not a converting or refining one as are the others, particularly the electric process.

An interesting use of steel scrap in the blast furnace in a high phosphorus iron ore section is the making of Bessemer grade pig iron from basic open-hearth steel scrap, for ingot molds, to save high transportation costs. Wrought iron scrap is valuable, as it is fibrous and is made into bar iron, by piling, heating and rolling. Because of its crystalline structure, steel scrap is not permissible in the higher grades of bar iron.

Where the Scrap Comes From

About 20 per cent of the scrap supply is "country scrap," miscellaneous iron and steel gathered from towns and farms by peddlers and traders into scrap yards, where it is sorted and prepared for use by scrap dealers. About 25 per cent of the scrap supply is "railroad scrap," carefully gathered by the railroads, and graded and sold to dealers and consumers; some of it is made into bars, bolts, etc., by the railroads for their own use. Some 30 per cent of the scrap is "industrial scrap" made in works and rejected in processes of manufacture, such as crop ends.

Much scrap never comes on the market, being returned to the furnaces and remelted by the works making it. So well do the works appreciate the value of scrap in these days that slag dumps are hunted through for it. As scrap losses show in the monthly cost sheets, the manager endeavors to reconvert his scrap monthly.

It would be well if the country at large would take this view of the scrap question. The possible permanent exhaustion of domestic iron reserves at the rate of 10,000,000 tons a year, which doubles (Hewitt's formula) every ten years, and which will increase with the world need of our steel and the efforts being put forth by increased export agencies, merchant marine, etc., calls for constructive suggestions for its replacement. If an amount of scrap equal to the losses of iron could be imported, the remedy would be easily found, but this cannot be expected, so consideration must be given to the iron ore supply.

Use of Vast Reserves of Low Grade Ores

It is argued that the immense reserves of low grade iron ores can be utilized indefinitely, but the question arises: "Can the United States maintain the comparative advantage in the manufacture of steel by using iron ores that require expensive beneficiation, or extra fuel, flux, labor and transportation charges with lessened furnace production?" It is an axiom with blast furnace men that high grade iron ore produces high grade, low cost pig iron and large furnace output, and low grade ores the reverse.

Very pure ores need low grade ore to increase the slag, for good furnace working and to carry off the sulphur from the coke and limestone and ore. Large

*Ingot production, figured "up" to allow for oxidation, which, when deducted, leaves the net production.
†Same as above, with wrought iron added.

numbers of blast furnaces are located near coke and flux and some low grade iron ores, by which hundreds of empty coal cars are returning daily from the Atlantic ports, which could bring back cheaply as return freight imported iron ore.

If all the world were using low grade ore or ore concentrates, no doubt the United States could use low grade ores, but a study of the iron reserves of the world shows that there is a vast reserve of pure iron ore in Brazil that is barely touched, and which the Germans looked to before the war, and the English are now planning to develop on a large scale, by building modern ore ships, docks and railroad and mining equipment.

Ore Imports as Offset to Scrap and Oxidation Losses

If Brazilian iron ores can penetrate to the Pittsburgh district, about 30,000,000 tons of Lake ore would be released annually as a reserve for the middle West, to which the center of population and of the steel business is drifting. The by-product coking coals of West Virginia and Kentucky, a wonderful field of low sulphur, low ash, low cost coals, meet at the Lakes the Lake ores, which are almost automatically discharged into blast furnaces, at which are located by-product coke ovens. All the Lake ores are needed to match these coal reserves, and the growth of the United States will absorb the steel made from them.

Imports of Brazilian ores would obviate the long rail haul on Lake ore to the Eastern steel works, and replace our losses of iron reserve and place these works in position to export the higher grade steel, for which there is the necessary skilled labor, trained for a century. Exports of steel under these conditions would not be a detriment.

Urged to Buy Coal Now

WASHINGTON, July 26.—Warnings to consumers of bituminous coal again are being sent out by the Government, urging them to lay in their supplies now, in order to prevent a shortage this winter, due to the lack of cars or other conditions. Recently, the Interstate Commerce Commission sent out notices to this effect to public utility organizations and a similar appeal has been subsequently issued by the Secretary of Commerce. Mr. Hoover says that there is every indication that there has been an undue slackness in the purchase of coal which may accumulate to large demands in the autumn. He expressed the conviction that due to the general depression in the prices of bituminous coal at the mines, it is not too high at the present time, in fact, he was of the opinion that numbers of operating coal companies are making no profits whatever.

"If there should be a recovery of business activities in the autumn, taken in conjunction with the large increase in percentage of disabled cars (from 5 per cent to 16 per cent during the past six months) and the inability of the railways to finance their maintenance, there are possibilities of development of a most serious situation as regards coal movement," Mr. Hoover stated.

Ladd Metric System Bill

WASHINGTON, July 26.—Efforts are being made by Senator Edwin F. Ladd, of North Dakota, to have the Senate Committee on Manufactures conduct a short hearing at the present session on his bill, providing for the compulsory adoption of the metric system. After the convening of the regular session in December, he hopes to reopen the hearings and go into the matter at length. Present indications are, however, that no hearings will be held at the present session. Senator La Follette, of Wisconsin, chairman of the committee, has stated that he is favorable to the granting of the hearing but doubts that it would be possible to secure the consent of any three members of his committee to act as a subcommittee to conduct the hearings. It is the opinion of Senator LaFollette that there is other legislation now before Congress which he considers to be of greater importance than the so-called metric system bill, and he is unwilling to undertake the conduct of the hearing personally.

SALES STOPPED

Step Toward Central Bureau for Sale of Government Surplus

WASHINGTON, July 26.—Pending the establishment of co-ordinating machinery for the supervision and control of all Government sales of surplus material, Director of the Budget Charles G. Dawes will continue in force the order issued by him last Thursday, stopping all sales of this kind, with the exception of perishable property. The order carries no particular significance so far as it concerns surplus quantities of steel held by different branches of the Government, as there have been no important sales attempted recently, and the Shipping Board, which has the greatest bulk of surplus steel, amounting to some 300,000 tons, recently stopped all sales. The other branches having sizeable tonnage are the War and Navy Departments, whose combined total of surplus is estimated at not over 40,000 tons.

The order, however, derives most interest from the fact that it is the entering wedge to some form of a centralized bureau for the sale of all Government surplus property, though it may be of a general character with given branches of the Government still in control as to certain details with regard to the disposal of materials. Lack of co-ordinating control, according to General Dawes, has resulted in large and currently accruing loses to the Government and it is the purpose of the Budget office to absolutely check this loss until the machinery for supervising the sales can be formed.

Building material, steel, cement, lumber, furniture, ships, automobiles, textiles, food supplies, buildings, etc., said General Dawes, are owned by the United States and available for current use. It is the purpose to have a central body to supervise the sale of this material.

"In the face of a large supply on hand," his order to department and bureau heads said, "because of the lack of a co-ordinated control and system of survey, with facilities for bringing to the knowledge of all departments the requirements of each, the different departments of the Government have been buying different classes of material in the open market with little recourse to stocks on hand.

"The cause of this situation, while it is primarily due to the lack of co-ordinating machinery of supervision and control, is aggravated by the delay on the part of the different departments in declaring as surplus certain property unnecessary to their purposes. It is also aggravated by the delay in the preparation of inventories which are now incomplete."

Preparing to Increase Output

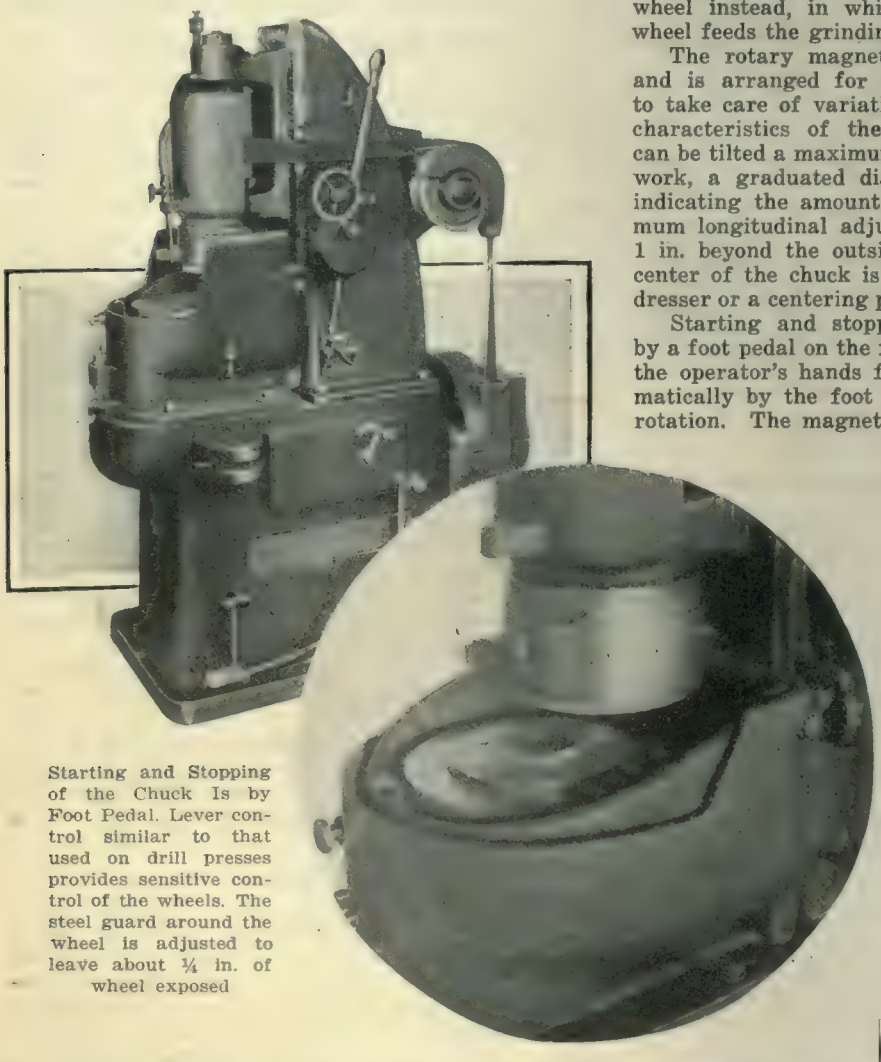
The Athol Machine & Foundry Co., Athol, Mass., vises, is readjusting its production machinery with a view to increasing output 150 per cent when business conditions warrant. Approximately two dozen machine tools, including large drill presses, have been discarded and a broaching machine and two other less important pieces of equipment purchased. Various machines are being placed in batteries, and in sequence, according to required machining operations. A modern tool crib has been installed on the second floor of the plant, and a large number of jigs and fixtures made. In addition, a new stock department has been established, all patterns have been redesigned, a new directing head secured for the foundry department and heat treating and oil tempering equipment installed. The company's entire line of vises has been revamped and standardized and all parts made interchangeable and in other respects improved. New products also are being placed on the market. S. F. French, general manager and superintendent, has been succeeded by H. R. Linton.

During the first six months of 1921, industries at Youngstown, Ohio, disbursed $29,458,814 in wages, as compared with $45,923,170 distributed during the corresponding six-month period of 1920. The June payroll of $3,764,116 was $283,425 less than that in May, and compares with $7,723,830 in June of 1920.

New Rotary Grinder

An 8-in. rotary surface grinder has been brought out by the Pratt & Whitney Co., Hartford, Conn. The machine is designed for grinding disks, rings and cylinders requiring flat and parallel surfaces and is provided with sensitive adjustments for the rapid production of gear blanks, washers, cutter hubs or other work requiring close accuracy. In addition, it is provided with means for grinding concave or convex surfaces.

The machine is regularly arranged for belt drive, with idler pulleys equipped with double ball bearing mounting. The main driving pulley is 26 in. in diameter, taking a 4 in. belt, and the tight and loose pulley, 16 in., taking a 6½ in. belt. The speed of the countershaft is 450 r.p.m. A 7½ hp. constant speed semi-enclosed motor running at 1800 r.p.m. can be furnished if required in which case the motor is mounted on an adjustable base and a spring idler provided to automatically tighten the driving belt.



Starting and Stopping of the Chuck Is by Foot Pedal. Lever control similar to that used on drill presses provides sensitive control of the wheels. The steel guard around the wheel is adjusted to leave about ¼ in. of wheel exposed

The main drive shaft is mounted on radial ball bearings and the chuck driving clutch equipped with a ball thrust bearing to take the load at this point. A secondary shaft, carrying a chuck driving pinion and sliding two-speed gears is mounted on bronze bearings and equipped with a flexible coupling to take care of chuck tilt and alignment. The entire mechanism runs in oil, the bearings being lubricated by splash.

The spindle is mounted on ball bearings amply lubricated and protected from dirt and moisture. Means for eliminating end play are provided and adjustments for wear can be made. The wheel is 8 in. in diameter, 3 in. high, has a rim ⅝ in. thick, runs at 2000 r.p.m., and is mounted on a holder in a manner to facilitate easy mounting and changing. Two mounts are furnished. A safety band is clamped around the wheel which is again surrounded by a steel guard, adjusted to leave about ¼ in. of the wheel exposed when grinding. As the wheel is raised to the idle position the guard automatically covers the wheel so that the work on the chuck can be handled with safety. The guard is adjustable for wheel wear.

Lever control, similar to that used on drill presses, gives sensitive control of the wheel when grinding and an easy quick movement to the upward or idle position is provided where liberal clearance under the wheel is allowed for handling work. A positive mechanical stop is provided to grind to specified thickness when the lever feed is used. Finer adjustments for wheel wear and varying thicknesses are made by hand wheel graduated to 0.0002 in., operating through a worm and wheel. The hardened points of this stop are so positioned that the backlash in the worm and wheel is neutralized and the wheel and slide are overweighted in order to obtain very close accuracy. For certain classes of work the lever may be locked in position and the hand wheel for finer adjustments used as a feed wheel instead, in which case one turn of the hand wheel feeds the grinding wheel down 0.05 in.

The rotary magnetic chuck is 10 in. in diameter and is arranged for two speeds, 50 and 100 r.p.m., to take care of variations in the diameter or physical characteristics of the material ground. The chuck can be tilted a maximum of 2 deg. for convex or concave work, a graduated dial on the outside of the guard indicating the amount of tilt in minutes. The maximum longitudinal adjustment brings the chuck center 1 in. beyond the outside diameter of the wheel. The center of the chuck is bored to receive a safety wheel dresser or a centering plug used when grinding washers.

Starting and stopping of the chuck is controlled by a foot pedal on the right side of the machine, leaving the operator's hands free, and a brake operated automatically by the foot pedal rapidly retards the chuck rotation. The magnet current, 110 or 220 volts direct current, is controlled by a switch on the right of the machine. The switch also acts as a demagnetizer.

A pump and piping convey the cutting lubricant from a tank within the column to the inside of the wheel, the volume of flow being regulated by valves. In addition, a hose is provided on the outside for washing the work and the chuck. Access to the tank for cleaning purposes is provided through a sliding settling pan located in front of the column. The flow of cutting lubricant ordinarily is controlled by the movement of the feed lever, which automatically turns on the water when grinding or shuts it off when the wheel is in the work handling position. This control may be disconnected by a simple pull knob, allowing hand operation of the water supply. The spray is confined to the table by a cast guard, the front section of which can be dropped by releasing a pull knob, thus giving additional clearance while handling the work.

Cost of Living Almost Stationary

July figures of the National Industrial Conference Board, 10 East 39th Street, New York, show that the cost of living for the month is 61.6 per cent above the corresponding figure for July, 1914. Last month the excess was 61.9 per cent, while July of 1920 showed an excess of 104.5 per cent. Rent and light are both above the figure for last year, food and clothing are both far below the figure for last year, fuel and sundries have shown practically no change.

Arthur G. McKee & Co., Cleveland, have completed the erection of a five-unit Kling-Weidlein dry gas cleaner for the Shelton Iron & Steel Co., Stoke-On-Trent, Staffordshire, England. This is the first Kling-Weidlein Gas Cleaner to be erected in England.

Wages in the British Steel Industry

War Advances Were Large, but Readjustments Are Now in Progress—Not Many Employees Were Reduced Before April—Workers Still Limit Output

BY PAUL M. TYLER*

AFTER more than six years of steadily advancing wages, Great Britain has entered on a period of readjustment that must inevitably result in a nation-wide reduction in the earnings of her workers. While it is doubtful if wage rates reached an unwarranted level during the period when commodity prices were at their peak and the whole world was clamoring for goods, the pendulum swung too far and liquidation of labor prices was delayed well into the period of industrial depression that swept over the world during the late months of 1920. Whereas the prices of raw materials in England reached their highest level in February, 1920, and the cost of living attained its maximum at the end of October, wages generally continued to increase until January. Except for those trades in which there is regulation by sliding scale agreements under which wages fluctuate according to the Ministry of Labor index number of retail prices and rents, or according to the prices of the product, comparatively few workers suffered any reduction in their nominal earnings up to the end of April.

Many Idle Workers

Even prior to the coal strike, unemployment in the British Isles had reached alarming proportions with the result that the total earnings in many important trades were greatly reduced. Unfortunately, however, this situation did not result in any considerable pressure upon the nominal wage levels. This condition is attributable to various causes, among which may be mentioned the granting of unemployment doles and the organized resistance of the powerful national unions. In certain cases labor contracts are still in force which prevent an early readjustment to meet the needs of the present situation. The payment of unemployment doles—amounting in the case of a single man to 20s. a week—removes the argument of the hungry stomach and the mass of unskilled workers consider that if they accept employment, they are working only for the difference between the wages which they get and the dole they would receive without working at all.

The attitude of the labor unions is clearly indicated by the stand taken by the coal miners, who refused to work except on condition that a national wages board were set up to facilitate collective bargaining with their employers and earnings under time rates for about 30 hours' work a week that will maintain an even higher standard of living than they enjoyed before the war on the basis of a full week. While there is a real need for improvement in total earnings of British workers as compared with pre-war standards, even in the event that the cost of living should return to the same levels, the workers and particularly their leaders are still consistently refusing to make up the difference by increasing efficiency. "Ca' canny" or the deliberate restriction of output is the persistent policy of a large group of British workmen and the wage cost of many commodities is due more to slack performance on the part of the workman than to the daily or weekly wages being high. The fallacy of British labor's economics has been urged persistently by the employers' associations and the press during and since the war and some progress has been made among the more intelligent classes of workers, but the theory that there are not enough jobs to go around is too firmly imbedded to give way easily in spite of the fact that from one-third to one-half of all the products of British industry must be sold abroad in competition with those of other countries whose standards of living are lower or whose methods of production are more efficient.

Cost of Living

In considering the probable readjustments in general wage levels, it is necessary to give some attention to the cost of living. The Ministry of Labor publishes a figure monthly which purports to represent the "increase in the cost of maintaining unchanged the average pre-war standard of living of the working classes." This figure does not strictly represent the actual increases in expenditures of the average family owing to the fact that variations in the amounts of increase in the prices of different commodities have tended toward the purchase of different proportions of some of the items included in making up the index and because the standard of living has been raised in many families whose earnings have been increased in greater proportion than prices. These figures, however, are probably more representative than any others that can be readily obtained of the general increase in the cost of living in England since 1914 as they include allowances for food, rent, clothing, fuel and light, and miscellaneous items.

A tabulation of the above index number indicates that the cost of living in England increased gradually but steadily from a few months after the outbreak of the war until the armistice, when it was 120 per cent above the pre-war average. In 1919, there was a slight fall during the spring and summer, but in the fall of that year it increased again to 125 per cent above pre-war. The increases during the greater part of 1920 were more rapid than during any previous period, reaching the maximum of 176 per cent above the pre-war level, but falling at the end of the year to 165 per cent. Living costs declined precipitously during the early months of 1921, reaching 133 per cent above the pre-war average on the first of April. On that date food prices were 238 per cent above pre-war, rent was 144 per cent higher, and clothing was 325 per cent more costly; the increase in the expenditure for fuel and light was estimated at 245 per cent and in the case of miscellaneous items 210 per cent. Material reductions were made in the cost of clothing during April and food continued to become cheaper. While predictions are dangerous, the cost of living may reasonably be expected to fall to less than double the pre-war average within a few months.

Wages Fall with Living Cost

The cost of living figures as published by the Ministry of Labor are accepted in an increasing number of trades as the basis for the readjustment of wages. While the cost of living was advancing, the workers were quick to recognize the relation between living costs and earnings and readily accepted contracts which incorporated a cost of living bonus in addition to a basis rate. In the majority of cases, there has been no trouble in the adjustment of payments to the workers in accordance with these agreements.

Railroad Workers Contest Sliding Scale

In the case of railroad workers, however, there was a difference of opinion as to the interpretation of the sliding scale adjustment when the index number showed a decrease instead of an increase. The rates of wages of railroad men in the conciliation grades are made up of certain standard rates (agreed upon in March, 1920, and retroactive to Jan. 1, 1920), which represent the average pre-war weekly rate of pay in each

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group plus 38s. a week, and also further increases (ranging from 2s. to over 8s. per week) granted in June, 1920, the total wages in every case being subject to a reduction or increase of 1s. per week for each fall or rise of five points in the "cost of living." Adjustments of earnings in accordance with this agreement are considered at quarterly meetings of the Central Wages Board comprising representatives of the railroad managers and of the two unions involved. When this board met in March to determine wages for the three months beginning April 1, the relevant index number was 141 as compared with 169 at the last meeting. The trade union representatives argued that the previous ascertainment had been based upon a figure of 165, owing to the provision that only a full five points affected the result. According to the workers' contention, the difference between the two figures was 165 less 141, or 24, and the reduction in the cost of living bonus should be only 4s. The representatives of the railroad companies, however, urged that the cost of living index figures should carry exactly the same amount of bonus when descending as when ascending and, since on May 1, 1920, the index number of 141 had carried an agreed bonus of 3s., the proper reduction in the cost of living bonus was 5s. In short, the employers argued that all adjustments of bonus should go back to the starting point of the scale, viz., the index number of 125 in December, 1919, from which the original bonus dated. After discussion the union's claims were accepted, but a new scale was adopted in anticipation of further changes. Henceforth when the cost of living is falling, index numbers of 160 to 156 involve a bonus of 7s. a week on the basis rates, 156 to 151, one of 6s. a week, etc.; when the cost of living is rising, index numbers of 145 to 149 involve a bonus of 4s. a week, 150 to 154 one of 5s. a week, and so on.

Coal Miners' Wages

Owing to the wide differences in the economic state of coal mining in the different parts of the British Isles, it is doubtful if any British industry has as great variation in wage scales in the various sections. As a result of the several flat additions and bonuses granted to colliery employees since 1914, the differences are now less important than they were before the war, but, in March, 1921, just before the national strike, the average earnings of all classes of employees varied from less than £4 per week in Somerset and North Staffordshire to over £5 per week in Scotland and certain parts of Yorkshire. The wages of different grades of workers on company account seem to be remarkably similar, skilled workers receiving only comparatively little more than those who are totally unskilled. Miners and timbermen in South Wales, for example, received about 89s. 2d. per week, while "haulers" got 80s. 9d. and underground laborers received 73s. 11d. In Cumberland the differences were even less, colliers receiving 80s. per week while other underground labor received 78s. 8d. and surface laborers got 71s. 4d.

These earnings are for employees on time work, whereas most of the more experienced miners were on tonnage rates and for such workers, weeky earnings of £10 or more were not uncommon. It is stated, however, that the average earnings of all classes of employees in and about British coal mines in January, 1921, were £22 1s. 9d., or about £5 per week, and this can be taken as the maximum average earnings for all classes of workers in any one month. Prior to the war the average earnings of all classes of colliery employees were about £7 10s. per month. In addition to their actual wages, however, the coal miners in England are furnished with house coal at nominal prices, and in many instances live in houses owned by the coal mine proprietors who ordinarily charge much less rent than other British workers have to pay for similar accommodations.

The wages of iron miners and quarrymen generally come under sliding scale agreements according to the selling price of pig iron. Among the best paid miners are those in the Cumberland district, whose wages reached 26s. 1d. per shift in January and were reduced to 23s. 10d. in March. In the Furness district iron miners were reduced to 16s. 6d. per shift in March as compared with a maximum rate in January of about 20s. Limestone quarrymen in West Cumberland were reduced in March by 1s. 8½d. per shift. Subsequent to the change, the wages of skilled workers ranged between 18s. and 19s. per day, while laborers got about 1s. per day less.

Wages in Iron and Steel Largely Scaled

The wages of almost all classes of workers in the iron and steel industry in Great Britain are adjusted more or less automatically according to the ascertained prices of the products. Most of the workers in these trades are relatively unskilled, but during and since the war they have been relatively well paid. The wages paid in the different sections of the country vary somewhat, but the average nominal wage of unskilled workers just prior to the slump in February, when they were at the maximum, was approximately 70s. 4d. per week of 47 hours. The actual average weekly earnings of all classes of employees in the iron and steel industry reached a maximum of 108s. per week in September when most of the works were operating full time. Owing to restricted operation of plants as a result of the coal strike in October, actual earnings declined in October and November, but again increased in December, owing to better working conditions. The maximum wages, however, were being paid in February when the nominal earnings of all classes of employees in the British iron and steel industry averaged approximately 132s. per full week or about 18s. to 19s. per shift of eight hours. Blast furnace employees were getting approximately 20s. a day in most districts, while the wages of common labor in the steel works were somewhat less. Open-hearth heaters and mill men are ordinarily paid on tonnage rates, the most recent adjustment in South Wales (March, 1921) fixed the wages of "teemers" at 8s. 4d. per shift plus 1d. per ton on the make of the shop between three heaters. The earnings of ladlemen were, for first helpers, 6s. 3d. and for second helpers, 5s. 3d. per shift plus 1/6d. per ton on the output of the shop between three heaters divided among three men of each of these grades.

Puddlers are invariably paid on a tonnage basis. The basis rate is 13s. 6d. per ton and this appears to be standard throughout the country. The additions to this base rate, however, vary somewhat in the different parts of the country according to the ascertained prices of wrought iron bars obtained by selected firms in each district. Decreases, amounting to from 20 to 25 per cent were recorded about April 1, bringing the puddling rate in Cleveland down to 202½ per cent above standard and in Scotland to 212½ per cent above the standard, or 40.8 and 42.2s. per ton, respectively.

Large Earnings of Skilled Men

The spread between the wages of highly skilled workers and common labor is greater in British iron and steel works than in other countries. Nearly all the men who are in charge of processes (such as head rollers, blast furnace keepers, etc.) are paid on a tonnage basis. Their earnings vary greatly in different plants, but are always high, many of these men getting £25 a week or more.

The wage advances in the iron and steel industry as compared with pre-war scales vary widely according to the class of work performed, being much greater for low paid men than for those who received good wages in 1914. According to figures published by the National Federation of Iron and Steel Manufacturers, the average actual earnings of all classes of workers in the iron and steel industry in Great Britain were at the rate of about £250 per year in 1920 as compared with £92 annually before the war, an increase of 172 per cent. Due to the fact that employment was generally better in 1920 than before the war, the increase in nominal wages was doubtless a little greater. Probably the largest increase for any single class was in the wages of common labor in the steel mills, which advanced from about 22s. 6d. per week in 1914 to 70s. 4d. in February, 1921, or over 212 per cent.

As a result of the established custom of fixing wages in most branches of iron and steel manufacture by means of wages boards for each class of workers in the various sections, the readjustment of wages in this industry to meet changing conditions of trade is not accompanied by the difficulties now encountered in other British industries. The principle that the workers' wages should be adjusted according to the selling prices of the products is accepted by both parties concerned. The work of the different wages boards consists mainly in the ascertainment of the average sales prices for certain specified products, as shown by the books of specified firms. These can be ascertained easily and quickly and wages are adjusted accordingly. The wages boards ordinarily meet every three months to fix the wages for the following quarter on the basis of prices prevailing during the preceding three months. Under this system, it will be seen that the workers gain the benefit on a declining market, whereas, when prices are rising, the employers have the advantage. In order to make the system even more flexible a few wages boards meet every two months.

Engineering and Shipbuilding

The wage increases to machinists and other employees in the engineering and shipbuilding trades have taken the form of flat increases to the basis rates as existing in different sections before the war together with various war bonuses. The last advance was at the end of May, 1920, when the basis rates had been advanced a total of 13s. per week and war bonuses totaling 26s. 6d. plus an additional bonus of 12½ per cent on the total weekly earnings had been given to all male employees over 20 years of age. Owing to the variations in local rates, the final wages of skilled workers in these trades vary somewhat in different sections of the country. In February, 1921, the wage for ordinary skilled machinists (fitters) ranged from 83s. 9d. to 89s. 4d. Millwrights and erectors generally received from 3s. to 5s. more per week. The 47-hour week is now standard throughout the country. Prior to the war the wages of skilled machinists averaged about 38s. per week of 53 hours.

Maintenance men in steel works and tin plate mills in South Wales were paid on a different basis until March 27 when they were given a flat rate of 100s. per week in place of the former arrangement of a basis wage of 43s. plus the then ascertained bonus (on the basis of steel prices) of 177 per cent. This wage, however, is still higher than that obtaining in other parts of the country where mechanics of similar skill get the same wages whether employed in engineering shops or on repair and upkeep of machines in other classes of production.

Apprentices are largely used for running semi-automatic machines and their wages will vary according to the class of work they perform. The wages for boys and youths, however, were fixed in the Midlands on March 21, 1921, on a new scale superseding the former arrangement, which included war wages of 10s. 9d. per week for all such workers. The present scale is as follows:

Machine Shops—Boys (Per Week of 47 Hours)

Age	Basis Rate		Bonus		Total Wages	
	s.	d.	s.	d.	s.	d.
14	10	0	4	0	14	0
15	12	0	5	0	17	0
16	14	0	7	0	21	0
17	16	6	8	6	25	0
18	19	0	12	0	31	0
19	21	6	14	6	36	0
20	23	6	18	6	42	0

The above rates do not apply to youths advanced to work as stampers in drop forging nor to apprentices already serving.

Iron molders, although belonging to a different union from that of the engineering workers, are paid on a similar basis. The variations in the basis rates are somewhat greater than in the engineering trades, ranging from 49s. to 62s. 8d. plus the war wages, totaling 26s. 6d. plus 12½ per cent on the total weekly earnings (i.e. from 84s. 10d. to 104s. 10d. per week of 47 hours, according to district).

Shop laborers in engineering works and foundries get from 61s. 6d. to 66s. 6d. plus 12½ per cent, or 69s. 2d. to 74s. 10d. per week, according to the district.

Wages of Women Workers

Considerable numbers of female workers were employed in the heavy machine trades during the war, but most of them have been weeded out and replaced by men or boys. A great many women, however, are still employed on light machine work and in the hollow ware and hardware trades. They are also found in the foundries as coremakers, etc., and in brass manufacture, operating capstan lathes or polishing. During the greater part of 1920 the wages paid to such labor in the Midlands averaged about 41s. 6d. per week. In the middle of March, 1921, a new scale was adopted resulting in decreases ranging from 2s. 9d. to 8s. 5d. per week. The rates now increase from 14s. 6d. per week for girls of 14 years up to 35s. per week at 20 years or over. On lighter work, or where little experience is required, the wages of women are only 32s. per week of 47 hours.

Piece work is common in many shops, but is not favored by the workers. The usual arrangement of piece rates is such that an average worker can earn 25 per cent more on piece work than on time work.

Wages in the engineering trades had not been reduced at the end of April, but conferences were being held for a general reduction. In certain districts, notably around Birmingham and Coventry and in Scotland, the individual shops had been able to induce their employees to remain at work and accept reductions of from 20 to 35 per cent. It is expected that the 12½ per cent increase on the total weekly earnings of time workers and the corresponding war bonus of 7½ per cent granted to piece workers will be removed before long and the basis rates and flat war advances will be reduced by at least 5s. per week. If this is done, the wages of skilled mechanics in England will be approximately 70s. per week or only about double pre-war wages.

Other Metal Trades

In general, the wages of workers in other classes of metal work are similar to those paid in the engineering trades, although not adjusted on a national basis. Sheet metal workers in Halifax, for example, receive 2s. 3d.. per hour, or slightly more than an ordinary skilled machinist. Male jewelry workers in London get 2s. 5d. an hour, while women in the same trade get 1s. 3½d. an hour. First-class electricians are paid about 2s. an hour. In the metal bedstead trade (Birmingham) the stockfitters in charge get 85s. per week, second-hands 70s., while "improvers" are paid on hourly rates of 1s. 4d. per hour for frame setters, 1s. 3d. per hour for cupola men and benders, and 1s. 1½d. per hour for other workers; all the workers in this trade receive an additional 10 per cent on basis time rates plus 30s. per week as a flat war bonus to all workers over 18 years of age.

In the manufacture of light castings, the standard rates for grinders and polishers are 41s. per week; blacksmiths, 38s.; fitters and pattern makers, 37s.; sheet iron workers, dressers, box fitters and berlin blackers, 35s. per week; all of these being subject to a flat war wage of 40s. per week plus 12½ per cent on the total weekly earnings.

The Trade Board governing the wages of employees working on stamped and pressed metal have established the minimum rates for male workers of 21 years and over at 1s. 4½d. per hour and of female workers of 18 years and over at 0s. 9d. per hour. These rates, however, are lower than those ordinarily paid in the district. In these trades the 47-hour week is established and only 4½ hours are worked on Saturday. Time and a half is provided for all times over 4½ hours on Saturday, even if the total number of hours worked per week does not exceed 47. Double time is allowed on Sundays and legal holidays.

The directors of the St. Louis Chamber of Commerce have decided upon a referendum vote to ascertain the sentiment of its membership on the question of the open and closed shop. The chamber has a membership of about 4800.

PRINCIPLES OF STORAGE

Experience and Practices of Pittsburgh Railways Summarized

Orderly piling, maximum visibility, absence of drawers, proper packaging and everything on wheels are the factors emphasized as essential for proper storekeeping, according to M. T. Montgomery, recently general storekeeper for the receivers of the Pittsburgh Railways Co., Pittsburgh, and now assistant to the general manager. He gave a paper on "Stores Engineering" before the Engineers' Society of Western Pennsylvania, which is published in the January, 1921, proceedings of that society. He states:

"Of all phases of operation which form the entity of a plant the question of caring for materials has not generally received the consideration it deserves. It was not considered of sufficient importance because the development of facilities entering into the manufacturing of products demanded most of the attention of those who kept pace with the times. Since intrinsic value of materials greatly increased, the investments in unapplied materials assume large proportions.

"The first requisite of stores engineering is cleanliness and nothing can be kept clean unless piled in orderly fashion." The Pittsburgh Railways Co. even piles its bolts. In reference to this Mr. Montgomery



(Above) An Old Case with 480 Drawers Was Converted into Modern Bins, with Everything in Sight

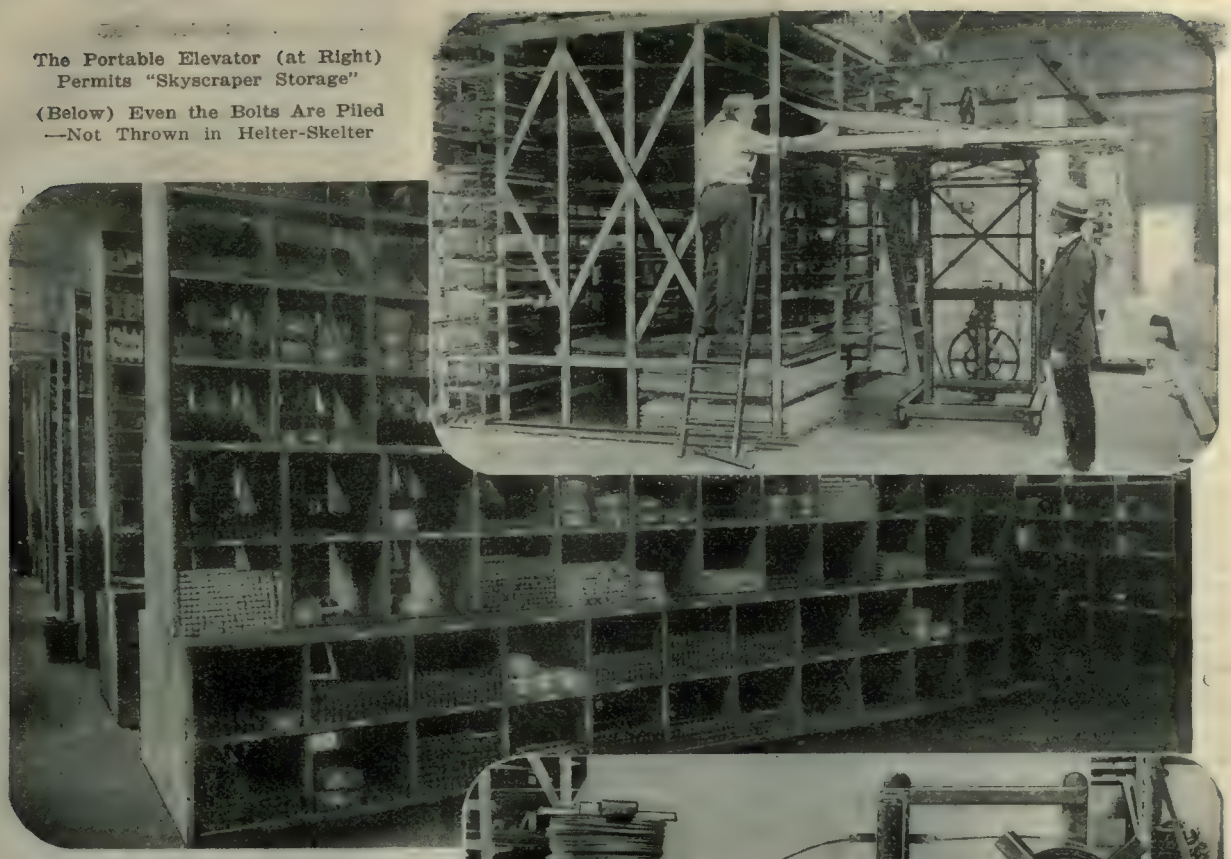
(Left) Ladders Are Equipped with Non-skidding Shoes

(Top, Right) "Everything on Wheels" — Even Barrels

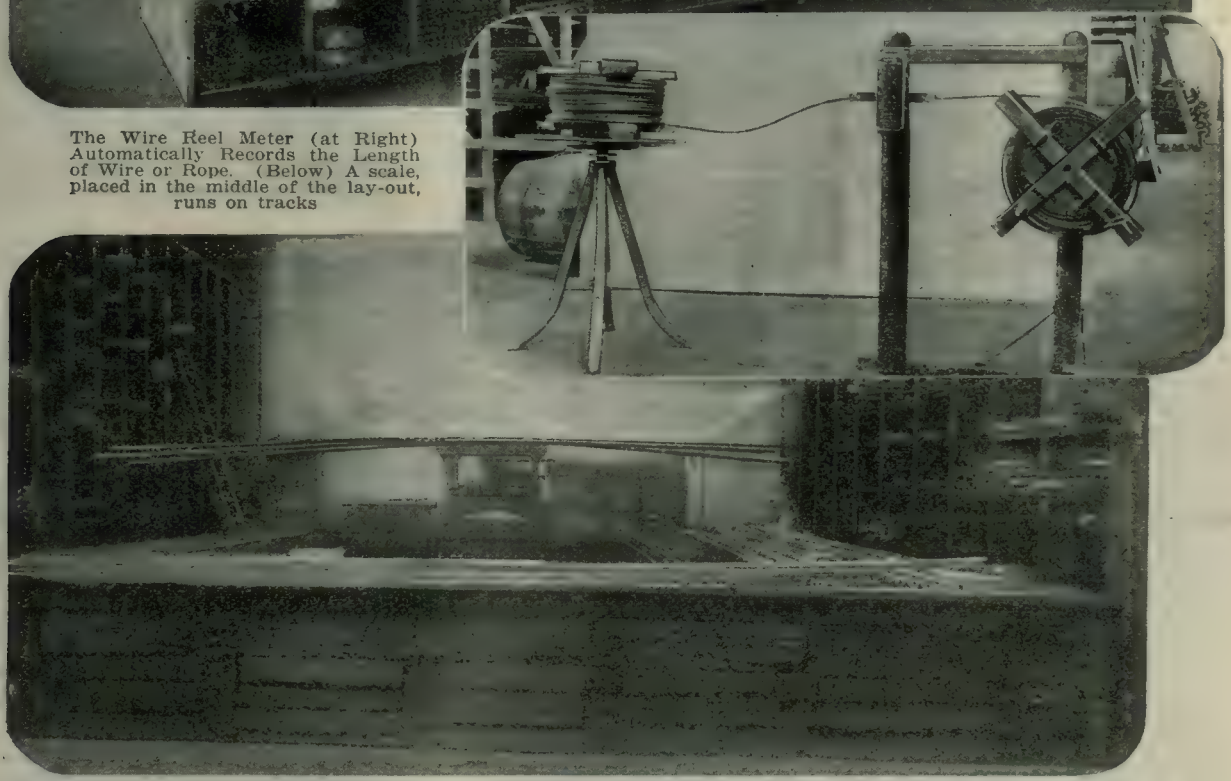
(Bottom, Right) A Traveling Hoist, Starting from the Receiving Floor, Runs the Length of the Warehouse

The Portable Elevator (at Right) Permits "Skyscraper Storage"

(Below) Even the Bolts Are Piled —Not Thrown in Helter-Skelter



The Wire Reel Meter (at Right) Automatically Records the Length of Wire or Rope. (Below) A scale, placed in the middle of the lay-out, runs on tracks



states: "Most people who saw our arrangement viewed this particular phase with a certain amount of misgiving. It seemed to them more or less a hobby and an expensive one at that, rather than an absolute necessity. It is a great deal more economical to pile goods in an orderly way than to throw material helter-skelter into receptables.

"Since we count our stock once a month it is necessary to do the work as quickly as possible and as accurately as possible. Our stores department calendar provides six days for actual taking of stock. The stock men do this, attending to their regular duties in addition. If materials were piled in a disorderly fashion this could not be accomplished; neither would we get anywhere if the bulk of the stock had to be counted by handling each piece. To count most of our material without actually handling it, we designed screen backs for our cases. As we insist upon counting materials without handling, we did away with drawers.

"Contrary to the belief of most operating men it does not cost any more to have vendors ship material in specified containers instead of according to the regular commercial practice. For instance, most manufacturers ship line ears, which support the overhead trolley wire, in barrels of from 180 to 220. We insist that they be shipped in boxes of 50. Small screws which are not of the standard commercial variety we order shipped in packages of 100.

"Economic operation depended on getting the most work done for the least number of man hours expended. Our success in this line may be attributed to the common-sense application of automatic lifting trucks and platforms, which means potentially 'everything on wheels.'" Among the devices are: A traveling hoist which starts from the receiving floor and runs the length of the warehouse; a device which automatically records the length of wire or rope; ladders equipped with non-skidding shoes; portable elevators for lifting sheets, tubing, etc., into the special racks.

"As the material is received, it is examined and

if ordered to certain specifications or blueprints, the engineer in charge is notified to pass on the goods. If the specifications call for a certain chemical analysis, samples are taken at random and sent to the laboratory for testing. Articles of small dimensions are tagged and the tag gives all the information necessary to trace the material to its source. Every package is opened and material examined; this, of course, does not hold good on standard packages of screws, nails, etc. We weigh the iron received by means of a portable scale in our iron rack.

"On our property we sell annually many thousands of dollars' worth of scrap. Ferrous scrap is taken to the scrap docks, where it is sorted according to kind and cut into charging-box size, if necessary. For this work use is made of an alligator shear and a cutting torch. The scrap is then put into bins. The non-ferrous scrap is segregated according to commercial practice and is handled at the general stores. The copper is put into shape for melting and when ready for sale is placed on lifting truck platforms—another instance of 'everything on wheels.' It is the custom at some points to dispose of the scrap once a month irrespective of market conditions, or else on a contract for the year based on the fluctuation of new metal. We have found it an additional source of revenue to follow the market. All scrap is sold to the highest bidder. We have a mailing list of scrap dealers and mills constantly in the market. We sell our scrap f.o.b. loading point and insist upon cash deposit for the value of each shipment before it is actually forwarded."

Will Confer with Manufacturers

WASHINGTON, July 26.—President John E. Edgerton of the National Association of Manufacturers has issued a notice to members of the association advising them that the conference it is to hold with officials of the Bureau of Census with regard to the biennal census covering "statistics of products of manufacturing industries" which are to be taken for the year 1921 will take place at Hotel Washington, Washington, at 10 a. m., Friday, July 29. Request is made that representatives of the different branches of industry who are affiliated with the association attend the conference. It is expected that Secretary of Commerce Hoover will be present to open the conference and participate in its deliberations.

"The Director of the Census desires this conference with representatives of the associations in order that he may consult with them concerning the number, nature and form of the various inquiries and the general scope and work of the Census Bureau," President Edgerton states, "as well as the methods of co-operation with the officials of the Bureau and Department to facilitate the work and accomplish the best and most useful results to American industry."

Among organizations asked to send representatives to the conference are the American Iron and Steel Institute; American Supply and Machinery Manufacturers' Association; National Association of Engine and Bolt Manufacturers; National Association of Brass Manufacturers; National Pipe and Supplies Association; Heating and Piping Contractors National Association; Railway Car Manufacturers' Association; American Hardware Manufacturers' Association; National Implement and Vehicle Association; Refractories Manufacturers' Association; Electrical Manufacturers' Club; National Automobile Chamber of Commerce and the National Coal Association.

The June output of the Ford Motor Car Co. in the United States was 108,962 passenger cars and trucks, which is an average of 4190 cars for each of the 26 working days. This is the high mark in the history of the company, breaking the May record by 7486. The schedule for July calls for 109,000 cars and trucks. The sales department reports that the demand for closed cars has been exceptionally strong, but that all models are in greater demand than production facilities can provide.

The Changed Status of Southern Blast Furnaces

In its weekly comment on pig iron conditions the Matthew Addy Co., Cincinnati, goes into particulars concerning the way in which Southern producers of pig iron have had their sphere of operations limited by high freight rates:

"Some of the things that distress pig iron may be deduced from the fact that there is only one merchant furnace in blast in the states of Tennessee and Alabama. Ordinarily there are about twenty-five furnaces in blast in the South. Birmingham used to supply all the iron needed on the Pacific Coast. The freight rate in the old days was $12.32 per ton, but to-day the rate is $22.40 per ton. And all the iron that is needed on the Pacific Coast is coming by sea, most of it from Belgium.

"The present cost of very high-grade coke from Connellsville is $4.50 per ton. In the old days the rate to California was $11.30 per ton; the present rate is $19.76. And all the coke that California and the Pacific Coast uses is now coming from Germany. The old freight from Birmingham to Cincinnati used to be $2.75; it is now $4.50. The freight on pig iron to St. Louis before the war was $2.75; to-day it is $5.25. The South has just about gone out of the pig iron business because freight rates are so high as practically to build a wall around the Southern furnaces. It is not necessary to make any elaborate argument in the face of such features, and in a greater or less degree all the iron business in America is confronted with just such changes in freight rates which have profoundly and tremendously altered all economic conditions. It may be that freight rates were too low, but American business has been built up on cheap transportation and plenty of it, so to speak, and of late we have been having highly expensive transportation and mighty little of it.

"During the war the higher the price and the more things cost, the better—'the more the merrier' seemed to be the program. But not now. We are going back with great rapidity in all directions to the solid ground of the past. But the railroads are still at the peak. Immense progress has been made in some directions, but the railroads are now distinctly holding things back."

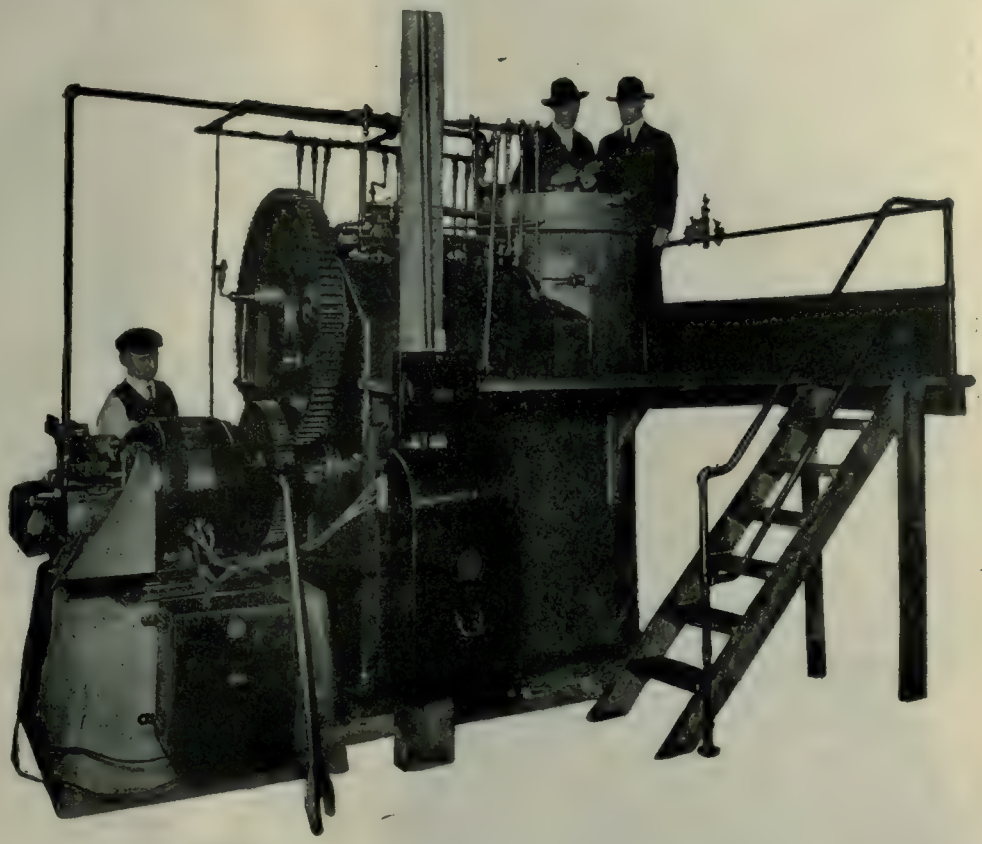
New Chief of Division of Commercial Laws

WASHINGTON, July 26.—The appointment of Archibald J. Wolf of New York to take charge of the newly created Division of Commercial Laws, announced last Thursday, creates a feature of the work of the Bureau of Foreign and Domestic Commerce, Department of Commerce, which departmental officials consider particularly necessary at this time owing to the many changes or modifications in the commercial codes of the most important countries of the world which have taken place since the armistice. It is intended that Mr. Wolf will immediately take steps to obtain reliable information regarding foreign commercial laws for the benefit of American business men interested in foreign trade. His work will deal with such subjects as the incorporation of American firms abroad, status of American firms in foreign countries from a legal standpoint, legal steps necessary in connection with the establishment of American branch plants or sales rooms abroad, etc.

Several years ago, Mr. Wolf was an active member of the field staff of the Bureau of Foreign and Domestic Commerce and in that capacity conducted several foreign investigations. One of his best-known products, from an official viewpoint, is a report on the credit practices and methods in vogue in foreign countries known as Special Agents Series No. 62—"Foreign Credits." Some of his other official reports deal with commercial organizations in Germany, France, Switzerland and the United Kingdom. He is also the author of several well-known unofficial books on export trade, and financial and legal subjects.

Cuts Teeth of a Gear at One Operation

The Stevenson Multiple Shaper and How It Operates and Its Field



THE Stevenson Gear Co., Indianapolis, has developed a new type of gear cutting machine known as the Stevenson multiple shaper, which cuts all or a multiple number of teeth in a gear or similar product at one operation. The essential member of the machine is a special tool head which consists primarily of a series of radially disposed tools spaced about the circumference of the blank to be cut. Operation is the same as an ordinary vertical shaper except that the tools are held stationary and the gear blank reciprocated past the tools. The mechanism consists essentially of a ram carrying a blank-supporting arbor and the multiple tooled head for operating upon the blank.

The frame of the machine is a casting of rectangular box section with a vertical cylindrical portion at one end in the center of which the ram is mounted. The tool head is placed above the ram at the top of the cylindrical portion. The crank shaft which drives the ram is journaled near the top of the rectangular section and is provided with an adjustable crank head at the end next to the ram and is driven through back gears by an individual motor. The arbor which carries the gear blanks fits in a socket in a spindle which is journaled inside the ram and is free to rotate independently of the reciprocating motion imparted to it by the ram. An intermittent indexing movement is imparted to the spindle after each cutting stroke by an intermittent gear train. The machine illustrated is 7 ft. high, weighs 17,000 lb. and when operating to full capacity is driven by a 100 hp. motor. Its capacity is for gears 12 in. in diameter, 6 in. face, 4 diametral pitch.

The tool head consists of a flat, steel disk 3 ft. in diameter, provided with a hole at the center and a number of radial grooves cut in its face in which the tool bits are arranged about the circumference of the gear. Successive feeding movements are given the tools by an annular sectional cam ring. As the gear blank is reciprocated past the cutting tools, the tools are gradually fed in by successive cuts to the full depth of the tooth. At the completion of each stroke of the ram and before the next cut begins, the gear blank is indexed a space equal to one tooth, thereby presenting a different tool to each tooth from the one which made the previous cut. After the tools have been fed in to full depth, they are held stationary in that position while the cutting process continues until the gear has indexed one complete revolution, thereby giving each tool an opportunity to take one last cut on each tooth. This final complete index is intended to give uniformity of spacing of the teeth in the gear equal to that of the indexing mechanism. Uniformity of the tooth form is secured even though the tools themselves may not be uniform, because if any tool is longer or wider than any other that portion of it which is longer or wider will take one last cut on the corresponding portion of each tooth in the gear, thereby eliminating variation which may have been caused by previous cuts. This process of finishing all the teeth of a gear with a single finishing tool is intended to provide accuracy; and the speed is multiplied by the number of tools operating on the gear blank at one time.

To a designer the most interesting individual mechanism on the machine is the tool head. In the illustrations given Fig. 2 is a top view showing the tool head as it would appear when in operation, Fig. 3 is a bottom view as it would appear when taken off of the machine ready for disassembly or adjustment. Fig. 4 shows the tool head partly disassembled with the principal details of its mechanism exposed. When mounted on the machine the only working parts to be seen are the points of the tool bits surrounding the gear blanks and the small depth adjustment dial. The four pairs of T slots are for attaching a piloting device, which is used on extremely long and slender arbors which may need an outer support.

Two tool heads are provided for each machine, and while one is in use the tools of the other are being sharpened and reset. The tool head is held in place by 8 studs and nuts, which when it is desired to set up a new job or to sharpen the tools, are taken off and the tool head lifted bodily and replaced by the other tool head. This arrangement is calculated to eliminate loss of time on account of set-up and sharpening tools. As the tool head is taken off it is turned bottom side up on trunnions, the clamp and gear plate being removed, exposing the tools and the feeding mechanism.

The tool bits are rectangular in section except the

lower side, which is in the form of a V. The gear tooth profile is formed at the inner end of the tool and is backed off to permit sharpening without changing the form. The outer end of the tool rests against a spiral cam surface and is ground in the form of an exact radius. A small pin near the back end fits in a groove which has an opposing spiral surface and retains the tool in close contact with the other cam surface, providing correct contact and withdrawing the tools to their starting position after the cut is finished.

Individual cam lugs are mounted on a large ring which encircles the tool bits and spacing plate, and are held down by T bolts fitting in a circular T slot in the ring. The bits are adjusted for depth independently by moving the cam lugs individually along the T slot relative to the cam ring and each other. Simultaneous feeding movements are imparted to the cam ring through two idler gears, seen in the lower part of Fig. 4.

The final depth to which the tools are fed is determined by an adjustable stop which positively limits the rotary feeding movement of the cam ring. This feed mechanism being spring actuated, the position of the depth controlling stop can be varied within reasonable limits without resetting of the feed mechanism. The dial which controls this adjustment can be quickly reset whenever desired.

To provide relief for the tools on the back stroke

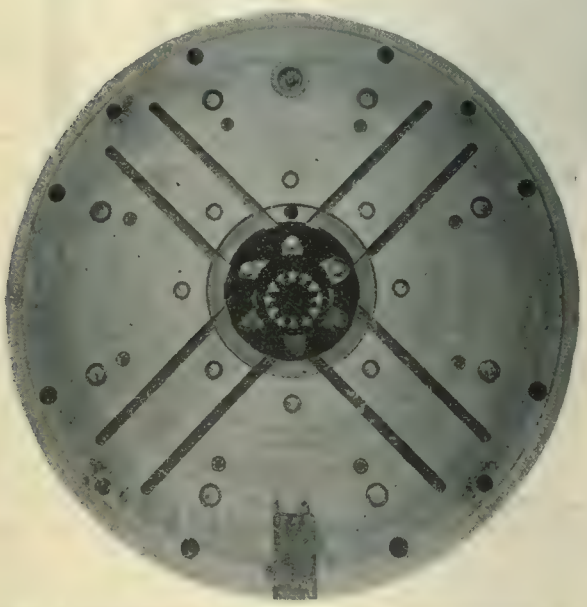


Fig. 2—Top View of Tool Head As It Would Appear in Operation

of the ram, a reverse feeding movement is imparted to the cam ring, and before the beginning of the cutting stroke, the forward feeding movement of the cam is made great enough to compensate for the slight retraction for relief and also to provide the necessary additional feed for the depth of the next cut.

The large gear and plate shown in Fig. 3 are used to intermittently clamp and release the tool bits during the cutting and feeding operation. The lower central plate is mounted directly above the tool bits and is provided with adjustable set screws and lock nuts above each tool. The outer gear member is free to rotate about the central plate and is provided with screw threads which engage a corresponding threaded portion of the tool head base. A rotary reciprocating motion imparted to this gear by a cam operated segment clamps the tools during the cutting operation and releases them during their relief and feeding movements. This clamping arrangement by forcing the V-shaped seat on the tool bit into a corresponding seat on the spacing plate in the tool head serves to centralize and accurately locate the cutting point of the tool, in addition taking up clearance and looseness, eliminating vibration and chatter.

The feed and clamping mechanism shown in Fig. 5 comprises the segments and cams for actuating the tool



Fig. 3—Bottom View of Tool Head As It Would Appear When Taken Off of Machine for Disassembly or Adjustment

head feed cam and the tool clamping gear. The feed cam segment which is shown near the center of this illustration swings about the central stud as a fulcrum, and is moved directly by a spiral cam, which is rotated intermittently by a ratchet on which it is mounted and can be adjusted to produce various feeding motions. The cam has a long gradual slope for the feeding movement and a sharp descent for quickly returning the tools to their starting position at the completion of the cutting operation. The slight retraction for producing the relief movement is accomplished by mounting the fulcrum stud eccentrically on a shaft which is given a partial rotation by a face cam on the large driving gear. The tool clamping gear segment seen in the lower part of the illustration is actuated directly by a push rod in contact with another face cam on the large driving gear. The releasing movement is accomplished positively, but the clamping movement is effected by means of a spring in order to eliminate the possibility of breaking some part if the clamping mechanism were accidentally adjusted too tight.

The indexing mechanism as shown in Figs. 6 and 7 consists of a split bushing guide, one-half of which is attached to the ram spindle, the other half being attached to a revolving drum on which is mounted a worm gear driven by a worm and an intermittent gear train. The intermittent indexing movement is derived from a Geneva wheel and is transmitted through a set of



Fig. 4—Tool Head Partly Disassembled with Principal Parts of Mechanism Exposed

change gears to the worm and worm wheel. By varying the ratio of the change gears in the train, indexing movements for any desired number of teeth may be obtained. Minute angular adjustments of the spindle position varying by one second of arc, for locating keyways, teeth of cluster gears, etc., are obtained by means of a differential clutch between the worm and worm shaft.

The main crank shaft is connected to the large back gear by a quick return crank of the drag link type, giving a slow cutting stroke and quick return. The driving motor is mounted on a sliding base and drives through a single set of speed change back gears, the drive for the indexing mechanism being taken direct from these gears. The motor is controlled by a push button switch, automatic compensator and solenoid electric brake.

The work arbor used in this machine has a taper shank and thrust collar, and fits the tapered socket in the ram spindle. The gear blanks are put on the arbor and fastened in place by a nut, while the arbor is held in a vise-like fixture attached to a bench at the side of the machine. After loading, the arbor is dropped into the taper socket in the ram spindle and the machine is ready to work. The thrust of the cut forces the taper back into the socket until it strikes the shoulder of the arbor. While one arbor of gears is being cut, another arbor is being loaded with blanks. As the arbor is finished the operator, holding the arbor of uncut blanks in one hand, stops the machine, presses a foot pedal, knocks out the arbor of completed gears, and catches it in the other hand. He then drops the arbor of uncut blanks into the open socket, the operation of stopping, changing arbors and starting again, it is claimed, consuming less than ½ min. The total time of completing an arbor of gears ranges from 1 to 3 min.

In cutting some gears, it is desirable to use as many tools as there are teeth in the gear. In others it is more practical to use only half or a third as many tools as there are teeth, in which case a tool head equipped with any number of tools could cut gears having any number of teeth which is a multiple of the number of tools used. Thus a spacing plate having 10 tools could be made to cut 10, 20 or 30 teeth, etc. In a case like this, if it is desired to cut a number of teeth greater than the number of individual tool bits which can conveniently be placed within the space a gang tool bit is used in which each tool cuts two or more teeth. This is particularly advantageous in cutting gears having a large number of very fine teeth, because although the amount of power required for cutting all of the teeth is small, it would nevertheless be practically impossible to use as many individual tools as there are teeth in the product.

To cut a gear having an odd number of teeth and where it is not practical to use a tool for every tooth, as in the case of a 29-toothed gear, for example, ten

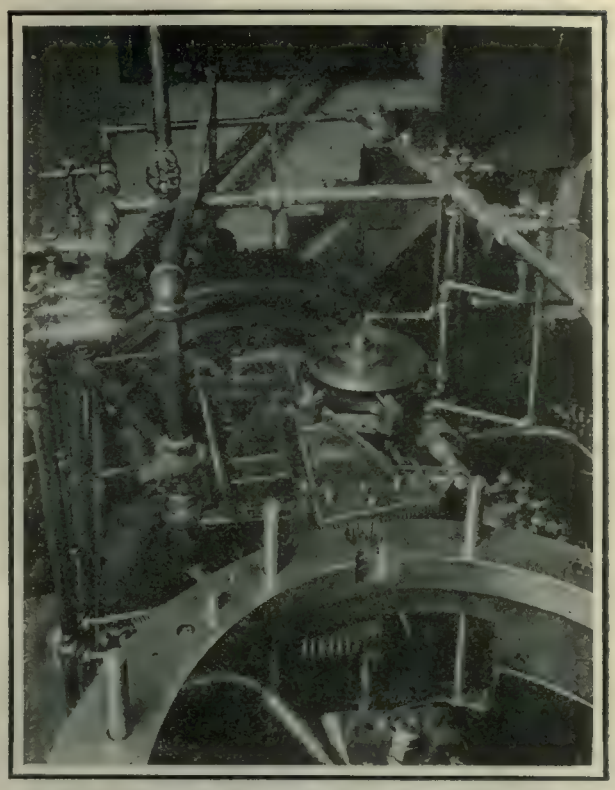
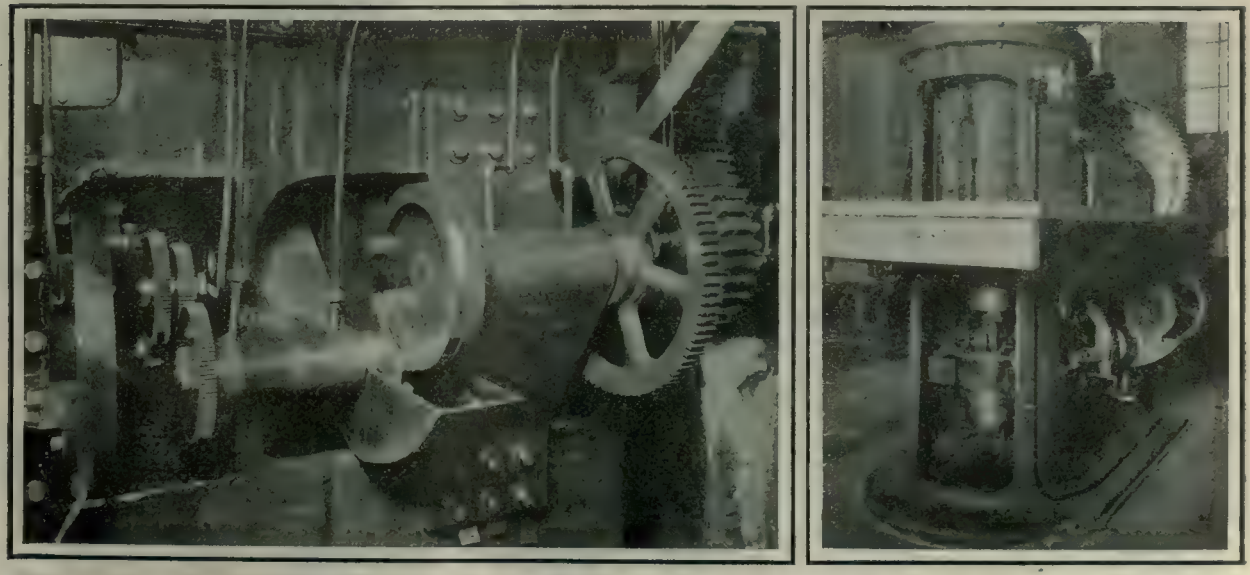


Fig. 5—Toothed Segments for Actuating the Head Feed and the Tool Clamping

tools might be used. Nine of the spaces between tools would be equal to 3/29 of a circle each and the tenth space equal to 2/29. While the service on one tool would be slightly less than that on each of the other 9, the difference would be scarcely appreciable.

In some cases, it is desirable to make every other tool in the form of some sort of a roughing tool, either a square nose gashing tool or a stepped roughing tool of the usual type and so adjust them that they will remove most of the stock from the tooth space. The alternate tools are then made in the usual type of finishing tools and take the last few finishing cuts. At other times, a special cam is provided for one tool, it is held back during the stock removing cuts and is then suddenly fed forward ahead of the other tools to take the finishing cuts on all of the teeth. These various arrangements are merely suggestive of a few of the possibilities in this line, but a number of possible combinations will readily suggest themselves to tool designers and set-up men.

Although the multiple shaper is classed as a gear cutting machine, it is adapted to the production of all



Figs. 6 and 7—The Intermittent Indexing Movement Is Derived from a Geneva Wheel and Is Transmitted Through a Set of Change Gears to Worm and Worm Wheel

cylindrical products having teeth or grooves such as sprockets, splined shafts, reamers, taps, milling cutters, saws, ratchets and knitting machine rolls. The advantage of cutting the teeth on the various products with the Stevenson multiple shaper compared with standard one tooth machines, varies as the number of the teeth or grooves in the product or the number of tools used. The reason for this is that the standard machines ordinarily cut one tooth at a time and the Stevenson shaper ordinarily cuts all the teeth at once and consequently the products having the larger numbers of teeth have a greater capacity for increase than those with small numbers of teeth.

A few examples of the cutting time records which have been made on various products are shown in the following table, and will serve to illustrate the remarkable time saving made by the Stevenson process. Ordinarily a machine is considered as quite an improvement if it saves 5 or 10 per cent on a product, but a saving of 50 to 80 per cent is indeed a rare feat of engineering and invention. The standard machines were operated very close to their maximum speed capacity, while the Stevenson machine was run at a very moderate speed. If its speed had been increased to equal that of the others, the time saving would have been still greater.

Comparative Tooth Cutting Time for Various Products Cut on Standard Gear Cutters and on the Stevenson Multiple Shaper

Product	10 P24T ½-In. Face Gear	3-In. Diam., ⅝-In. Pitch Sprocket	1½-In. Splined Shaft	1-In. Machine Reamer	3-In. Milling Cutter	2¾-In. Screw Slotting Saw
No. teeth in product..	24	12	6	8	12	72
No. tools used in Stevenson multiple shaper	12	12	6	8	12	36
No. blanks on arbor..	6	16	1	1	8	120
Cutting time per piece (standard gear cutter), min.	1.6	1.04	3.3	3.24	3.6	0.48
Cutting time per piece (Stevenson multiple shaper), min.	0.4	0.23	1.35	1.04	0.36	0.01
Per cent saving in time by Stevenson shaper	75	78	59	68	90	96

An interesting example of one advantage of the machine was found in fluting 1 in. taper shank machine reamers. The holder first made for this purpose was provided with a tapered socket for holding the tapered shank of the reamer and also a collar for supporting the neck of the reamer up near to the flutes. As soon as the job was put in to operation it was found that the cutting pressure was so evenly balanced that the neck support was entirely unnecessary and therefore it was not used. The reamer was held by the taper shank only, with an over-hang of 5 in.

Another example of the advantage was found in cutting gears of different materials stacked on the same arbor, such a combination of steel, brass, raw-hide, etc. Eight blanks of different materials, such as steel, cast iron, fiber, bronze and aluminum, were stacked on the same arbor and cut at the same time. It was demonstrated that the variations in pressure caused by the different materials were unable to affect the accuracy of the tools.

Improvement in Fabricated Steel

The amount of fabricated steel business that was contracted for in June, according to the records of the Bridge Builders and Structural Society, George E. Gifford, secretary, 50 Church Street, New York, was 66,900 tons. This corresponds to 37 per cent of the capacity of the bridge and structural shops of the country and is the largest monthly volume since September, 1920. The total for the first half of 1921 is 283,400 tons, which compares with 324,900 tons for the first six months of 1919, when business was recovering from the stagnation following the signing of the armistice.

"Pittsburgh Plus" and Good Roads

The American Farm Bureau Federation has issued statistics showing the added cost to good roads which is due to "Pittsburgh plus." The figures were obtained from the State highway commissioners of the states mentioned and represent estimates of the amount of steel to be used on roads to be constructed within the next four years. The excess cost of freight on steel from Pittsburgh to typical points in each State as compared with the cost from the nearest steel mill was set down as the "average cost of Pittsburgh plus." The figures show that in 10 states the extra toll paid to "Pittsburgh plus" during the next four years will amount to nearly $2,000,000 for roads alone. According to the Farm Bureau Federation, this will be paid in taxes largely by the farmers. The data follow:

State	Amount of Steel to Be Used	Average Cost of "Pittsburgh Plus" (Per Ton)	Total
Illinois (4000 miles, 16½ tons per mile)	66,000 tons	$7.60	$504,000
Alabama	12,000 tons	10.00	120,000
Montana (amount for bridges unknown)	900 tons	7.00	6,300
Nevada	1,450 tons	7.00	10,150
Arizona	1,200 tons	7.00	8,400
Michigan	16,000 tons	2.00	32,000
Washington	28,000 tons	7.00	196,000
Wisconsin	50,000 tons	7.60	380,000
Arkansas .....25,000 to	30,000 tons	7.00	200,000
Minnesota	60,000 tons	7.60	456,000
Ten states .....260,000 tons		Total cost	$1,912,850

The resolution condemning the Pittsburgh basing point for steel prices, adopted by the House of Representatives of the State of Missouri on June 21, was concurred in by the State Senate on July 13. This makes five State legislatures which have gone on record as opposing "Pittsburgh plus," those which took previous action being Minnesota, Wisconsin, Illinois and Iowa. A like resolution is expected to be adopted by the legislature of Georgia which is now in session.

Wages in New York Factories

The Bureau of Statistics of the New York State Industrial Commission reports average wages during the month of May in factories in the State at $25.86, a reduction from the $28.45 per week in May, 1920, but a figure much higher than that obtaining in the corresponding month of any previous year. It is more than double the $12.74 of May, 1915.

Figures for the "Metals, Machinery and Conveyances" group of industries are consistently higher than the average. In this group the average weekly wage in May of this year was $28.16, compared with $31.50 last year and $14.61 in 1915.

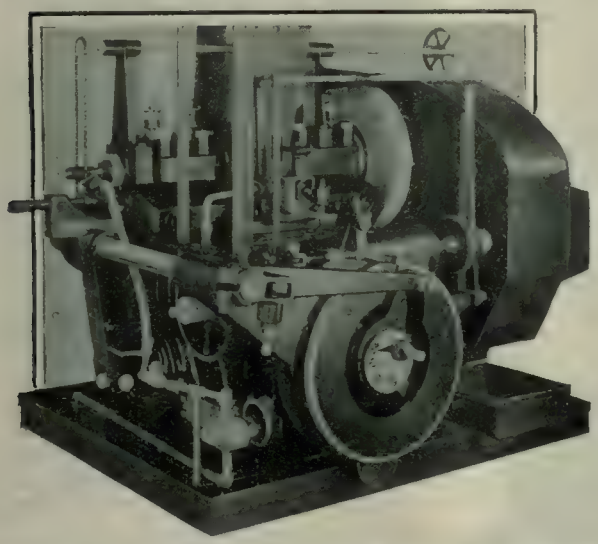
The high water mark of earnings expressed in dollars per week was reached in October, 1920, with an index figure of 228, based on June, 1914, at 100. There has been a consistent drop month by month since October (except that March was a little heavier than February) to a figure of 204 for May. This leaves the wage increase at 104 per cent above the figure for June, 1914.

Compared with this, the retail food price of the United States Bureau of Labor Statistics shows that food is only 46 per cent above the figure for June, 1914. Corresponding figures for retail food prices in New York City and Buffalo show respectively 45 per cent and 39 per cent above the figure for January, 1915. In both these cities, as well as in the United States as a whole, the maximum of food prices was reached in July, 1920, since which time a reduction of approximately one-third has materialized.

The Mutual Enamelware Co., Chattanooga, Tenn., a subsidiary of the Crane Co., Chicago, is installing a 292-kw. connected electric vitreous enameling furnace capable of heating up to a temperature of 1700 deg. Fahr. The furnace will be used for bath tubs and other bathroom and lavatory fixtures, and is being built by the George J. Hagan Co., Pittsburgh, in collaboration with the General Electric Co.

New Automatic Surface Grinding Machine

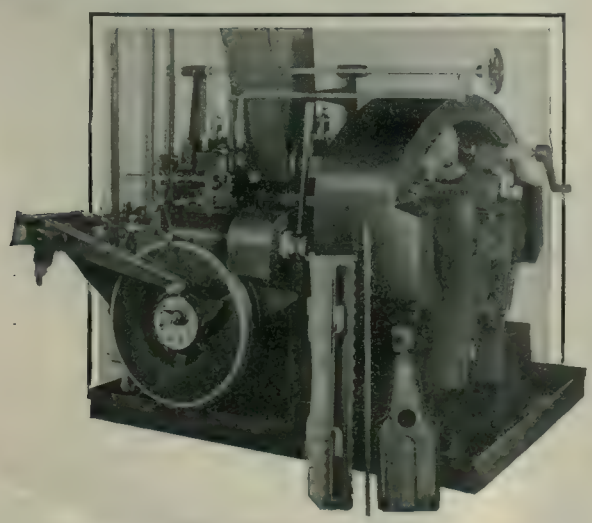
An automatic surface grinding machine of unusual design has been built by William Osterhom, consulting engineer, 2301 North Knox Avenue, Chicago. The machine embodies a number of operating features which will prove of particular interest to shops in which the surfacing of parts up to 12 x 40 in. is part of the daily routine. The general view of the machine shows it equipped for grinding plain surfaces, such as are shown in the foreground. One of these castings is a radiator top for a motor truck, 4 in. wide by 32 in. long, of very flimsy section. The other piece is a small drill



Work Is Locked in Fixture Mounted on Tilting Table, Hinged on Swinging Arm. This view shows position for grinding

press base, about 10 x 20 in. The chucking time from floor to floor was 13 sec. and the actual grinding time 45 sec. About 3/32 in. of metal was removed from the castings in that space of time.

The machine is completely automatic except for locating the work and locking it in the fixture. The latter is mounted on a tilting table, which is hinged on a swinging arm and thrown into proper relation with the surface of the emery wheel by means of an



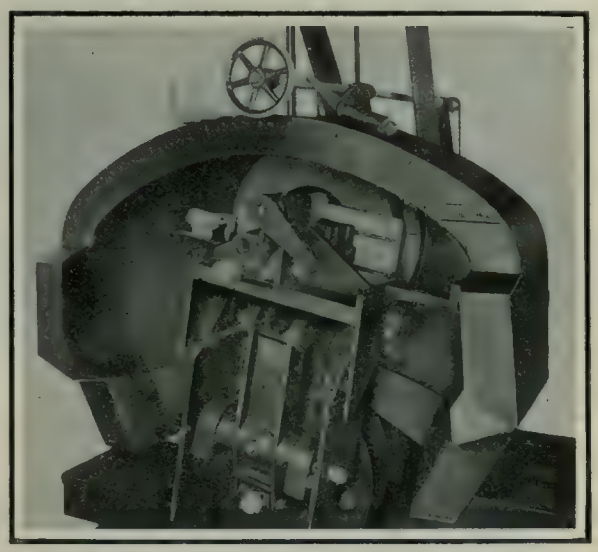
Rear View of the Machine

operating cam. With the completion of the cycle of the cam, the fixture automatically tilts back 45 deg. away from the emery wheel surface, giving the operator a clear field for removing his work. The work arm carrying the fixture oscillates back and forth across the emery wheel during the course of operation.

For dressing the wheel an emery wheel dresser is inserted in the fixture with the tilting table in grinding position. The swinging of the work arm in front of the wheel gives the latter a true surface relative to the oscillation of the arm. In accordance with the requirements of different jobs, the length of the stroke of the swinging arm may be varied from 2 in. to 24 in. and, by means of a change gear box, the time element may be varied from 10 sec. to 2 min. Thus, if it is determined that a certain piece can be finished in 45 sec., the gears are so set that the operating cam makes the cycle in that time.

Water is automatically turned on and off with the opening and closing of the tilting table. This arrangement protects the operator who would otherwise get drenched while locating his work on the fixture. A rotary pump supplies the cooling water through the center of the spindle to the emery wheel, and if delicate parts, such as harvester knives, edged tools, hardened steel pieces, etc., are to be faced, water is also supplied through the fixture.

The feed of the emery wheel is automatically controlled by a cam, the wheel being fed gently forward on to the work by a series of steps. This insures a true surface for the wheel and prevents the rounding of corners, thereby lengthening the life of the abrasive. Actual grinding is not started until the work has been placed in position, it then being accomplished by pulling a handle on top of the machine. The handle throws a belt on a tight pulley behind an arrest lever which holds the belt shifter in place until the cycle of the operating cam has been completed. The sheer drop on the cam releases the arrest lever and also raises the work into grinding position. By means of a lever and roller a series of steps on the radial part of the cam communicate the rotary action to the lever shaft



Inside of Wheel Housing, Showing Work in the Fixture in Process of Being Surfaced

which in turn drives the wheel housing forward a preconceived distance against the work. A quick return of the lever to its original starting point traps the shifter arrest lever, unlocks the tilting work table and stops the action of the machine. An emergency stop adjacent to the throw-in lever has also been provided. This stops the action of the grinding machine instantly. A noteworthy feature of the feed lever is the fact that it has been cushioned so that in heavy grinding of irregular castings the wheel is not subject to destructive resistance but has an opportunity to adjust itself through the action of the cushion spring taking the shocks and allowing the wheel to cut itself free.

Wear of the wheel, as well as the proper placing of the wheel housing in relation to the work surface is taken care of by a hand wheel, graduated in thousandths of an inch, convenient for the operator. Another lever adjacent to the change gear box allows the operator to stop the rotation of the cam without stopping the swinging of the work arm. This is advantageous when dressing the emery wheel, as feed during dressing would result in an irregular surface.

The entire working mechanism is supplied with positive oiling devices. The spindle, which is 42 in.

long and 4 in. in diameter, has forced lubrication. It is also equipped with a system of thrust bearings to counteract the thrust of the wheel.

The machine may be equipped with automatic magazine feed if so desired. In this case, two magazines would be used, one for receiving and one for delivery. If the receiving magazine should get clogged up, the machine would automatically stop. Likewise, if the raw material magazine is emptied to a certain point, the machine will stop. This method of grinding is desirable on such work as facing thin hardened pieces of steel up to 6 x 6 in., thrust washers, reamer plates, and, in fact, anything that can be stacked and magazined properly.

The weight of the machine is 7800 lb. and its floor space, 72 x 84 in. A 20 in. diameter cylinder wheel, 8 in. thick and with a 10-in. hole is used. A 20-hp. motor is required when operating at maximum cutting speed.

Mr. Osterhom, the designer, has patents pending in the United States and foreign countries. He was formerly mechanical engineer of the International Harvester Co., Chicago.

Large Cores for Turbine Castings

Difficult Foundry Operations in Making Castings for Steam Turbines for Scout Cruisers —Methods Employed in Making Cores

STEAM turbine castings for two scout cruisers, involving large core work, were a feature of after the war work of the Farrell Foundry & Machine Co., Ansonia, Conn. They were made by the Fore River works at Quincy, Mass., of the Bethlehem Shipbuilding Corporation, Ltd. During the war the Farrell company delivered considerably more than 100 of these castings to the shipbuilding company and as a result of this war work was awarded the 1921 sub-contracts. Each scout cruiser is equipped with four shafts and each shaft has one high, one intermediate and one low pressure turbine, making a total of twelve turbines to each vessel and necessitating 24 castings having a total approximate weight of 100 tons.

The steam turbine castings presented difficulties on account of their size and the danger of damage to cores in assembling. The cores were set by measurement. The final coring up was difficult because the bottom core prints were relied on to eliminate trouble during the lowering of the drag and cheek on the cores. It invariably was necessary to true up the larger cores by rocking, allowing fine sand to run in under the core during this process. In the case of the low-pressure turbine castings, illustrations of which are shown, there were eight cores in the upper half and nine in the lower.

The average thickness of the castings was ⅞ in. and the weight approximately 8200 lb. They were required to pass Government inspection before leaving the foundry. Specifications called for a transverse strength of 2200 to 2800 lb. per sq. in. and a tensile strength of 20,000 per sq. in.

In making the main cores the core box was set up on a plate, rammed up and bound by cast iron arbors. These arbors were provided with five hooks, which were screwed into nuts cast in the bottom of the arbors. The cores were picked up green, slicked up with a stiff blacking, placed on the oven car and thoroughly baked. After baking they were set up, preparatory to casting, the hooks were removed, and the resulting holes were filled with sand and smoothed over. The large cores were made by the same method, only fewer hooks were used. Small cores were made in the usual manner.

Each core, after being set in place, was carefully slicked to eliminate chipping of the finished casting. In view of the nature of the work there were few fins.

All inside surfaces of the castings, especially those in which the turbine blades operate, were machined at the Fore River works, but the amount of stock removed in this operation was slight. Machining was for the purpose of removing any particles of metal that might affect the course of the steam through the turbine. On the cope side of the machining surfaces an extra finish was allowed to take care of any dirt, but, aside from this and the flanges, little machining on the outside of the castings was necessary.

One illustration shows a pattern being rammed up, immediately in the rear of the cores assembled in the foreground. In this practice the drag is laid down and leveled and the bottom swept up 4 in. below the joint of the flask. The bottom flange is then laid down on the swept space and rammed up level with the joint of the flask. There the parting is made. A cheek is next laid down 18 in. deep, and arbors, cast to fit inside the flask ⅛ in. to ¾ in. away from the pattern, are laid in and hooked up to the top of the cheek. The cheek is then rammed up to the joint. Another is placed to complete the height of the flask to the top level of the pattern. These two cheeks are clamped together and the second rammed up to the joint, where parting is made. The cope, 10 in. deep, is then rammed on top of the cheek and pattern.

The cope is next taken off and the cheeks lifted complete, leaving the heavy pattern lying on the bottom of the flask. The molds are then slicked up with a very stiff blacking and placed in ovens, where they remain about 42 hr. As a rule the arbors are not broken after casting, as the workmen exercise care in extracting them from the sand. The flasks are 7 x 9 ft., inside measurement.

In assembling the drag is placed in a pit approximately 20 in. deep dug in the casting floor. The cores are then placed and anchored with chaplets. The cheek is then lowered into place and the cope set on, the whole being securely clamped down. The time consumed in making ready the flask for pouring is about three days. The flask is weighted down 14 or 15 tons just before pouring.

The patterns are made of 1½ in. white pine and require approximately 10,000 running feet of stock for a set of four patterns and the necessary core boxes. Those in use at Ansonia were made by the Hartford Pattern & Model Co., Hartford, the time consumed in this work being about two and one-half months. At the Fore River works, the upper half of the turbine castings are braced by seven 1¾ in. staybolts, and the lower half by one. In both instances the bolts are provided with inside as well as outside nuts to guard against internal and external collapse. The two castings are held together by 1¼ in. bolts.

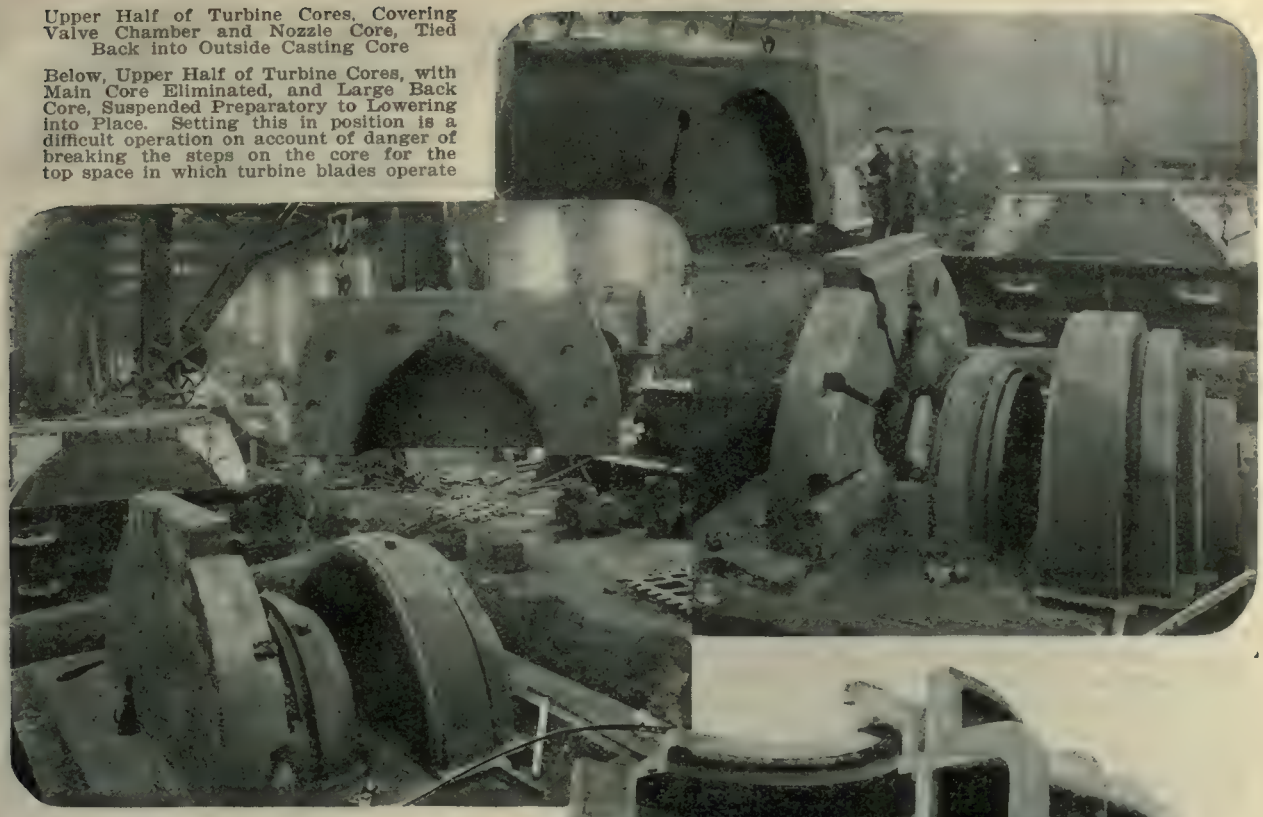
Non-Ferrous Electric Furnace Built by Students

A 60-kw. electric brass melting furnace of 200 lb. capacity, designed, built and operated by students, has recently been installed in the chemical engineering laboratories of the College of Engineering, University of Wisconsin, at Madison. This is believed to be the smallest commercial furnace of this type in the United States, and the state university is the only institution of its kind which possesses such a unit.

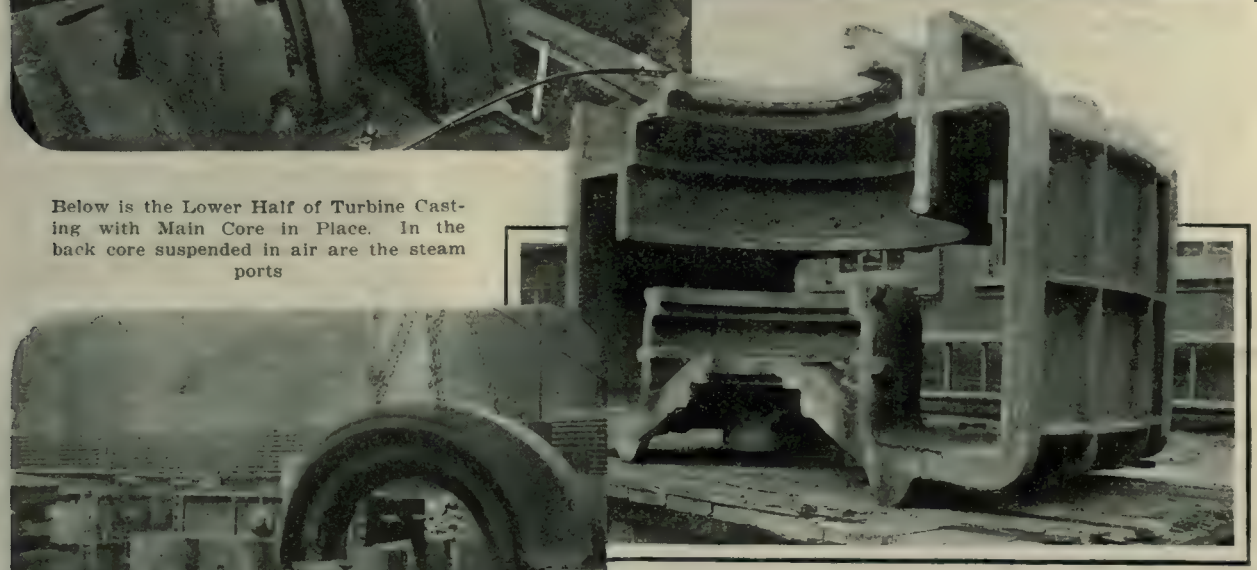
The shell and driving mechanism were made in the university mechanicians' department; the fire sand was produced in an electric resistor furnace in the chemical engineering laboratories. The foundation and lining were built entirely by students. The actual cost was $350, compared with a market price of $1,000 for a commercially manufactured unit.

Upper Half of Turbine Cores, Covering Valve Chamber and Nozzle Core, Tied Back into Outside Casting Core

Below, Upper Half of Turbine Cores, with Main Core Eliminated, and Large Back Core, Suspended Preparatory to Lowering into Place. Setting this in position is a difficult operation on account of danger of breaking the steps on the core for the top space in which turbine blades operate



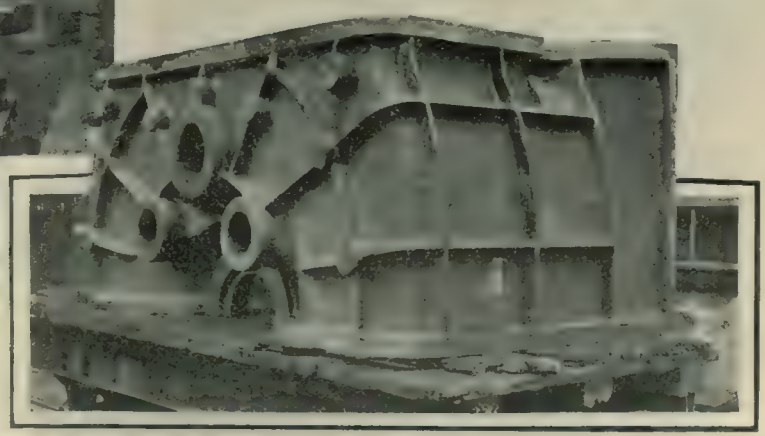
Below is the Lower Half of Turbine Casting with Main Core in Place. In the back core suspended in air are the steam ports



Interior View of Completed Casting



At Right Is Exterior View of Completed Casting



The furnace will melt copper, brass, bronze, zinc, tin and practically any non-ferrous alloy at a rate of 200 lb. per hr. and is of the rocking type. It is being operated several days a week throughout the summer session and handles a small volume of commercial alloy casting work for foundries in Madison which possess no such facilities.

The design and construction of the furnace was a development of the work of the chemical engineering laboratories at Wisconsin University, which are working on electric furnace processes in recognition of the need of conserving coal, oil and gas, and the greater efficiency obtainable from the electric furnace in comparison with fuel-fired types.

First Electric Steel Furnace for the Philippines

According to the American Chamber of Commerce *Journal*, Manila, P. I., the Atlantic, Gulf & Pacific Co. will have its electric steel furnace completed in the near future. It is the first installation of its kind in the Philippine Islands and will be used for manufacturing steel castings for cars for carrying cane sugar.

WHEELING OPERATIONS

Many Plants Still Idle—Resumption May Be Complicated by Union Labor Problem

WHEELING, W. VA., July 25.—Operations of the steel plants in this district remain at an extremely low notch and the promise is not very bright for an early revival. At the present time the activities of the Wheeling Steel Corporation are entirely centered at the Steubenville, Ohio, works of LaBelle Iron Works, where eight sheet mills, a jobbing mill and four open-hearth furnaces are in operation. The plant of the National Tube Co. at Benwood, W. Va., just outside this city, is entirely suspended and other plants of the Steel Corporation near here are down or running at a very low rate. As far as Wheeling proper is concerned, the issue is whether the plants will be operated on a closed or an open shop basis, and even with the receipt of orders it is doubtful whether some of the plants of the Wheeling Steel Corporation could be started without labor troubles.

It seems that before the formation of the Wheeling Steel Corporation two of the constituent companies, the Wheeling Steel & Iron Co. and the Whitaker-Glessner Co., worked under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers, while the other subsidiary, LaBelle Iron Works, operated on an open shop basis. It is said that while the Wheeling Steel & Iron Co. and Whitaker-Glessner Co., as individual companies, were prepared to participate in the wage conference with the Amalgamated Association, and to renew the agreement, officials of the Amalgamated Association insisted upon the Wheeling Steel Corporation signing the agreement as a unit. This would have unionized the plants of LaBelle Iron Works without effort on the part of the Amalgamated Association and the result was an impasse. Neither the Whitaker-Glessner Co. nor the Wheeling Steel & Iron Co. was represented at the wage conferences, first at Atlantic City and later at Columbus, Ohio. Consequently these companies have not renewed their agreements with the Amalgamated Association.

Notices have been posted at the plants affected to the effect that the company hereafter will deal only with its own men. The notice also states that the scale of wages will be the same as that paid in mills operating under an agreement with the union. It can hardly be said that a strike exists for the reason that the Yorkville, Ohio, plant of the Wheeling Steel & Iron Co. and the several plants of the Whitaker-Glessner Co., which have been operating as union mills, all are down at the present time. No doubt a strike will be called by the union officials on the first attempt by the Wheeling Steel Corporation to start up at the affected plants. A test probably will not come for a few weeks at least, because current demands for sheets and tin plate are not especially large or urgent, and in anticipation of possible trouble, fairly large stocks were accumulated and these are likely to be ample to meet such demands as come out in the near future.

Plant Operations

The Remy electric division of the General Motors Corporation, at Anderson, Ind., has resumed operations with nearly 1000 employees.

The plant of the McGuire Car Works, Paris, Ill., idle since the close of the war, will be reopened, it is announced, a large order having been booked for cars for the Detroit municipal traction line.

The Clark Brothers' Bolt Co., Milldale, Conn., plant has resumed operations following a period devoted to inventory.

The Peck, Stow & Wilcox Co., Southington, Conn., tools, employing approximately 700 hands, has resumed operations after a shutdown of two weeks for inventory.

Operations have been resumed at the plant of the Velco Mfg. Co., Greenfield, Mass., broaching machines and broaches, after two weeks' shutdown. J. T. Sellar is general manager.

The Bristol Brass Co., Bristol, Conn., plant, closed for several weeks after running on short time for nearly a year, has resumed operations in several departments, with prospects of an increase in the near future to nearly normal capacity.

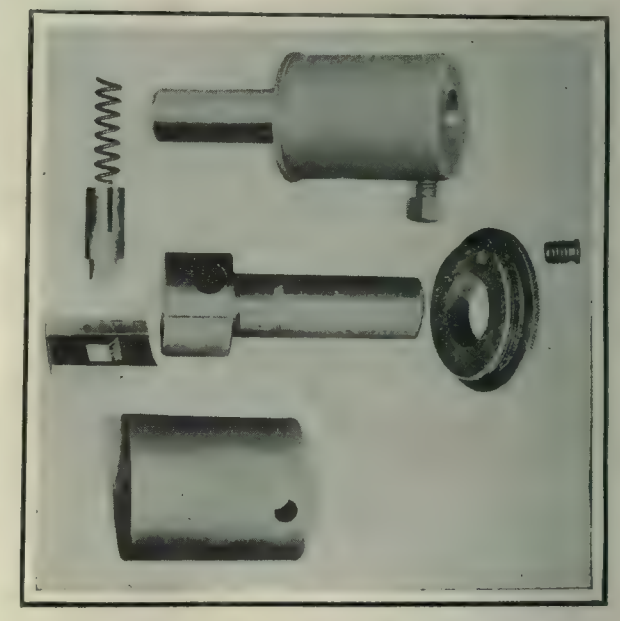
The Production Machinery Co., Greenfield, Mass., foundry, after a period of inactivity, has resumed operations with reduced forces, having secured considerable lawn mower castings business. Molders are receiving 40c. per hour for eight hours' work and extra compensation for overtime. This price compares with 90c. an hour in 1920-21. The company's machine shop remains closed.

Prospects for reopening important Greenfield, Mass., plants August 1, as anticipated July 1, when they closed, are not especially bright. It is estimated some 2000 are out of employment in that city, as against 700 during June. That the number is not larger is due to the fact that hundreds formerly employed in shops have secured work on New Hampshire, Vermont and Massachusetts farms and in cotton and woolen mills. On Jan. 1, 1920, Greenfield had a population of 15,462. The increase between that date and Jan. 1, 1921, according to unofficial estimates, has been lost and more too.

The Rowe Calk & Chain Co., Southington, Conn., following a shutdown of several weeks, has resumed operations on a 10-hour per day, six days per week schedule. The company has sufficient business on its books to keep the plant operating on this schedule for a period of three months.

New Clutch Tap and Die Holder

A new clutch tap and die holder exceedingly simple in design and containing only eight parts, but embracing all the features found in the company's old tool of this type, has been brought out by the Warner & Swasey Co., Cleveland. The new tool holds either



The New Warner & Swasey Holder May Take Either Right or Left Hand Taps or Dies

right or left hand dies or taps, making it two tools in one. To change from right to left a screwdriver is the only tool needed. After releasing one small tightening screw the change can be completed with the hands.

The difference in the tool when used for right and when used for left hand work is in the position of the pawl. To change from one to the other the pawl is turned half way around in its hole. A small pin holds the pawl in the position placed. When threading, the pawl holds the tool rigid by a metal to metal contact until the turret stop is reached, then the head moves forward on the work, pulling the cam over the pawl. This releases the head and allows it to revolve freely. The spring cushions the pawl so that the release is without a jar and practically noiseless.

Explosion Hazard and Its Prevention

Analysis of Characteristics of Fuels and Other Combustible Materials, with Special Reference to Powdered Coal Installations—Explosive Mixtures and How They Are Formed

BY JOSEPH F. SHADGEN*

VERY early the oil industries recognized the danger in connection with mixtures of vapors with air, and to-day all installations using combusible liquids are designed according to an accepted safety code, based on the same principles that guided the gas industry. All leaks are carefully avoided, and stop valves and automatic cut-off valves are provided to isolate lines, to separate units in case of danger. Under no circumstances are open tanks, permitting free vaporization, permissible. All pipes should be completely filled with liquid, and the formation of air pockets or dead holes should be impossible in the complete circuit of pipe lines.

Liquid fuel has been applied in a diversity of industries in connection with its production (refineries, etc.) as well as its uses (heating and combustion) for a period of time long enough to permit the development of the well-known requirements of the underwriters and insurance companies on the subject. Application of the lessons learned from accidents have served to reduce the risk. The fact that liquid combustibles are extensively used in internal-combustion motors, using the explosion of fuel-air mixtures, helped considerably to create an early understanding of the problems involved. In other words, the question was carefully studied for immediate utility and economy of use, which incidentally spread the realization of the dangers involved and called for methods of prevention.

Under this heading falls also the hazard in connection with sewers. Sewer pipes are built for a maximum flow, which seldom occurs, and therefore the lines are most of the time only partly filled with the soiled liquids to be disposed of. From the nature of the refuse waters. putrefaction may set in or vaporization may be produced, which both create dangerous air mixtures liable to oxidation. In case of ignition from any source, be it a glowing cigar stub dropping in through a manhole opening, a lightning spark or any other irony of fate, accidents may become inevitable under favoring circumstances. Such an accident occurred in New York in a sewer fed by the off-waters of a district where a large number of garages were located. The curative medicine will be quick removal of the air mixture, together with the water, to avoid accumulation in dangerous quantities, and the preventive medicine will be purification of the waters in the feed lines before reaching the main line, by syphons, separating or neutralizing the soiling oils that create the hazard.

Solid Explosive Mixtures

Dangers and risks in connecton with mixtures of air with finely divided solid materials of inflammable nature, or liable to oxidation, are not so obvious. Everyday familiarity with dust and the general ignorance concerning accidents create a sentiment of false safety that is the cause of general carelessness, or rather the ordinary underestimation of hazards really existing with fine dust and air mixtures. As knowledge and realization are the first steps to prevention, the Federal authorities have started an educational campaign to familiarize the industrial public with the hidden danger. After interest has been aroused, financial inertia will be overcome by the simple argument that all preventives are in the long run very profitable.

Most dust problems have also a hygienic side, as the majority of dusts are injurious to health. They are also very undesirable from the mechanical standpoint, as finely divided materials often are abrasive, and thus increase maintenance and lubricating costs. Elimination of all dust was first studied from these angles, as they were considered the main objections. They still remain the principal aims in installations dealing with dust or fine powders that cannot combine with the oxygen of the air.

In all other cases the explosive hazard has been pushed to the front, mainly on account of the enormous damage caused in case of conflagration. The annals of industries like coal mines, flour mills, sugar refineries, starch factories, relate scores of disasters due to explosions of dust mixtures. A kitchen-ware factory was recently the scene of a serious accident in its buffing department, where very fine aluminum dust exploded in an exhaust fan. Coal mines have always fought the dangers due to the fine coal dust, and the mining authorities of all countries have devoted an enormous amount of time and money to safeguard them. That pulverized fuel plants have to be designed to cope with these problems is obvious. Recurrences of such accidents must be made impossible by all means, in order not to compromise the future of this very efficient method of burning solid fuels.

In all industries producing impalpable powders the existence of dust and air-dust mixtures is inevitable. The contamination of the neighborhood by the dust should be minimized either by loose hoods over the machines or, better, by a completely tight design with no connection with the outside air. Even better is the solution when crushing, pulverizing, grading or mixing apparatus is installed to work under a slight vacuum, to render impossible all escaping and spreading of dust. Such machines are now on the market, and as they are superior from the safety standpoint, their use should be favored.

As pulverizing plants for the mechanical preparation of fuels have been largely standardized, as all operations are automatic and as all handling is done mechanically, preventive design is relatively simple. All elevators should be of inclosed type, all conveyors should be covered, all pulverizing mills of dust-tight design, mostly operating under vacuum. The only open machines used are the crushers, which really produce so little fine dust that they can hardly be called dangerous, although a hooded construction may be recommended.

Factors Governing Inflammability of Dusts

Before attacking the question of dust mixtures, it seems logical to study first the various characteristics of powders, and to analyze the factors governing their inflammability.

Of greatest importance is the fineness of the dust, for the simple reason that this fineness determines the surface of contact between material and air. Coarse material, furthermore, does not permit an intimate mixture, as the difference in specific gravity between solids and air produces a quick deposit. The fineness of a powder is characterized mostly by a sieve test, or what the author proposed to call a factor of fineness. Pulverized materials coarser than 60-mesh present no danger at all, but the fine particles passing the 100-mesh sieves do, and the impalpable powders, passing through the 200-mesh sieves, present so large a surface of contact as compared with their volume that the chemical affinities are hardly interfered with by the physical form of the material.

This leads to the natural conclusion that the finer the dust the greater the precaution needed. Practical experience confirms this rule every day. Crushing plants are not considered dangerous at all, while pul-

*Consulting engineer, New York. The article is concluded from page 130. Copyrighted, 1921, by Joseph F. Shadgen.

verizing or milling plants are rightly so considered, and equipped with all preventives to avoid dust-air mixtures.

The dryness of the powder is the second factor of importance, which is closely linked to the fineness. Moisture has to be excluded in some processes for the production of very fine materials to obtain economic conditions of production. Even a small amount of water produces coagulation of the dust to larger volumes by reason of adhesive surface tensions between material and liquid. These moist balls hinder the screening operations and reduce the capacity of production by dry-milling machines, and naturally reduce the relative surface of contact between material and air. Hence in all wet processes dust presents no dangers; only in installations dealing with dry and impalpable powders does the possibility of quick reactions exist.

The third factor governing the inflammability of a finely pulverized dry material is its nature itself. Some materials are easily combustible, others are hard to burn, and this relative eagerness to combine with oxygen influences the possibility of trouble. In other words, the intensity of the chemical affinity of the material for oxygen is a decisive factor. An expression of this force may be the heat generated per molecule-gram, as given in Table 1. This shows aluminum oxidation to be the most intense, with phosphorus a close second, and the various hydrocarbons near the top of the list. An aluminum explosion will be extremely destructive because of the great heat generated, and sugar, flours or starches, being mostly made up of hydrocarbon combinations, will create disasters.

Nowhere has the writer found this reasoning applied for gaging the inflammabilities of solid materials. It applies to coals, in particular to finely pulverized coals. As coals are heterogeneous solids containing, besides carbon, hydrocarbons of various composition and impurities of mineral nature, their reactions of combustion are the composite oxidation formulas of the different ingredients. It has been found in laboratory tests that finely divided dry coals and high volatile coals are more liable to explode than low volatile.

L. D. Tracy's report of December, 1919, of the Bureau of Mines, brings out this point very clearly, as the following quotation proves: "From experiments made with the Fraser apparatus it was believed that the division point between inflammability and non-inflammability would be found in dust containing between 10 and 15 per cent volatile matter." In other words, finely pulverized anthracite containing less than 12 per cent volatiles are inexplosive. This may not be absolutely true, as other factors interfere, and the Bureau of Mines would render the industries a real service by making a series of tests under comparable conditions, with varying factors of fineness, with a series of coals from various fields of origin and of typical analysis.

Dealing With Coal Dust Mixtures

Having determined the inflammability of the material itself, and the factors influencing the intensity of the reactions, the mixtures of those powders with air must be studied, and the method of propagation of the flame within those mixtures. The practical value of exact knowledge on this subject cannot be denied, especially on account of its influence on the safety of underground coal mines. The trap-like conditions in mines, with only one or two connections with the outside world, make it imperative to protect the worker by all means, and to reduce all hazards to an absolute minimum. Numerous accidents drew the attention of the authorities of all nations to this vital problem, which resulted in the experimental stations in Lievin, France; in Frameries, Belgium; in Altoft, England; in Babitz, Austria; in Gneisenau, Germany, and in Pittsburgh, Pa.

Valuable investigations on all phases of the problem were made by the best minds of each country. Most of the results were obtained in large galleries, where the explosion was started by the ignition of a small capsule of dynamite that stirred up the coal powder lying in shelves and produced the dust-air mixture. The original ignition was propagated or died out according to the circumstances. The results may be summarized for the purpose of this study as follows:

1. Very small quantities of coal dust will form an inflammable mixture.

2. The coal dust has to be well mixed with the air so as to float or to produce a cloud. This expresses the uniformity of mixture that characterizes all mixtures, as seen above. For mixtures of solids with air, the difference in specific gravity requires a certain agitation to obtain that effect. Practically, air currents of all natures, or previous explosions, produce that agitation. If the mixture is quiet, the coal dust separates by gravity in the form of a deposit and becomes harmless, the surface of contact between coal and air being reduced to such an extent that no quick reaction can take place. If the velocity of the air currents carrying dust is smaller than 1 meter (39⅜ in.) per second, the flame is extinguished, while currents above 4 meters (13 ft.) per second move the dust too rapidly to permit continuity of ignition.

3. The source of ignition has a great bearing on the inflammability of the mixtures. The higher the temperature of the igniting medium, the easier the mixture will respond. If the start is accompanied by a concussion, producing whirls, eddies or currents, the inflammability is greatly increased and the danger is multiplied many fold. For instance, a mixture of finely pulverized sugar with air propagated the combustion, with an arc lamp at a density of 72 grams per cubic meter, with a kerosene lamp at 180 grams per cubic meter and with an electric spark at 370 grams per cubic meter. (Respectively, 0.072, 0.18 and 0.37 ounce per cu. ft.) The ignition temperature of the sugar has previously been determined to be about 425 deg. Cent. (about 800 deg. Fahr.). This example shows the great influence of the nature of the ignition starting the phenomena. Our knowledge on this phase of the problem is still very fractional, but laboratory tests and investigations duplicating practical conditions are being made, and it is to be hoped that results will soon be available.

4. The cloud density or ratio of coal to air is most important. If the cloud contains too much coal, the presence of the solid checks the flame, and too much air kills the propagation for lack of combustible. In other words, there are an upper and a lower limit of inflammability for each solid material mixture, just as for gas mixtures. This varies with the nature of the coals. For anthracites with 15 per cent volatiles it has been found that 1 lb. of coal dust to 120 cu. ft. of air is the higher limit, and 1 lb. of coal dust to 220 cu. ft. is lowest limit; while for bituminous coals containing 30 per cent volatiles, 1 lb. to 60 cu. ft. of air is the highest limit and 1 lb. to 400 cu. ft. of air the lowest limit. These data must be considered as purely indicative, influenced by volatile matter content, dryness and fineness. For comparison it may be assumed that each coal requires 150 cu. ft. of air per pound for theoretical combustion.

5. The propagation of the flame takes place at slow velocities that vary with the cloud concentration. These velocities never exceed 1 meter (39⅜ in.) per sec., no matter how correct the agitation and uniformity of mixtures are. Mallard and Le Chatelier consider the propagation of the flame to be a complex function of the temperature of combustion, the temperature of ignition and the distillation of volatile matters contained in the dust. This last factor means the case of gasification of the hydrocarbons, which adds more or less to the mixture and creates most important side effects. The observed flames are mostly lazy, and contrast distinctly with the vivid aspects of the same phenomena in connection with gas mixtures.

6. Presence of foreign matter accelerates or retards the propagation of the flame, according to its nature. Water and mineral dust work against the phenomena, and porous surfaces and the presence of gases increase the original intensity.

7. Higher temperature of the mixture influences very favorably the oxidation effect, and considerably increases the liability to inflammation.

(*Continued on page* 239)

CONTENTS

Increasing Revolving Ferrous Scrap Fund 187

Loss of Iron Reserves Pointed Out—Importance of Scrap for Steel Manufacture —Effect of Imports of Scrap or Ore

Wages in British Steel Industry 191

War Advances Large, but Readjustments Now in Progress—Few Reductions Before April—Workers Still Limit Output

Large Cores for Turbine Castings 202

Difficulties in Making Castings for Steam Turbines for Scout Cruisers—Methods of Making Cores

Explosion Hazard and Its Prevention 205

Characteristics of Fuels and Other Combustible Materials, with Special Reference to Powdered Coal Installations

Year's Iron and Steel Exports About Normal 212

Heavy Exports in First Eight Months Offset by Later Reductions—Machinery Increases

Senate Committee Begins Tariff Hearings 214

Protests Against Duties on Ferromanganese and Manganese Ore—Changes Made by House

Causes of Wastes in Metal Trades 216

Management of Operations and of Men Blamed for Largest Share—Cost Nearly One Billion Dollars

Ladd Metric System Bill 189
Government Sales Stopped.....189, 229
New Rotary Grinder 190
Cost of Living 190
Principles of Storage 194
Manufacturers to Confer on Census 196
Changed Status of Southern Furnaces ... 196
Stevenson Multiple Shaper..... 197
Improvement in Fabricated Steel 200
Pittsburgh Plus and Good Roads 200
Wages in New York Factories 200
New Surface Grinding Machine 201
Electric Furnace Built by Students 202
Electric Furnace for Philippines 203
Plant Operations 204
New Clutch Tap and Die Holder 204
Editorials 208

Lower Freight Rates and Lower Steel—Steel Mills in the Running—Prosperity and Prices.

Correspondence—British Coal Strike 210
Foreign Trade Conditions.....211, 232
Cleveland Pig Iron Association 213
Tin Plate Census 213
Ore Rate Hearing at Chicago..... 229
Steel Corporation Quarterly Statement ... 231
Secondary Metals in 1920 234
Sales Halted in Disposal of Surplus Steel. 235
Freight Carried by Railroads 235
Engineering Employment Bureau..... 237
Labor Notes 237
Book Reviews 238
Causes of Dust Explosions..... 240
Drying of Pulverized Coal 242
Bids on Surplus Material 242
To Make Factory Truck Hardware 242
British Turning to Oil Fuel..... 242
Motion Pictures from Bureau of Mines ... 242
Erection of Blast Furnace in India 247
Industrial Finance 251
Trade and Office Changes 251

Iron and Steel Markets.....218
Comparison of Prices.....219
Prices Finished Iron and Steel, f.o.b. Pittsburgh.....233
Non-Ferrous Metal Markets.....234
Personal Notes.....236
Obituary Notes.....237
Machinery Markets and News of the Works.....243
New York Jobbers' Prices.....252

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Lower Freight Rates and Lower Steel

Few will dispute the justice in the demand of the railroads that they be allowed the benefit of the advanced freight rates and the reduced wage scales for a period long enough for putting their houses in order. The plea of the railroads that when the time comes for a rate reduction it should not be a horizontal or flat reduction is also reasonable and that opinion we have expressed heretofore. But some of the propaganda the railroads are putting out on the subject of freight rates is not likely to help their case. Whether in the publications issued directly by the railroads or in statements of their executives or otherwise, it must be said that there is altogether too much effort to show that the present rates mean only a few cents on a pair of shoes, a barrel of flour, a suit of clothes or a dozen lemons, while reference is carefully avoided to such commodities as iron, steel, coal and coke, on which freights are now so high as to be an obstacle to recovery from the depression.

Producers of iron and steel are losing money on every ton of material sold to-day. They feel that they owe something to their workmen, and in some cases they are able to get business at prices entailing less loss than would come from a complete shutdown. But there is a freight charge of $10 in assembling the materials for a ton of pig iron, and in some producing sections it runs higher. With pig iron selling at from $18 to $20 at furnace for the more common grades, there is left only $8 to $10 to cover the primary costs of the materials, depreciation, labor and all other expenses. It does not make any difference that many blast furnaces are idle to-day and that not much iron is being produced; for the ore that is being used and that will be used during most of the remainder of this year is "loaded" with present freight rates and such fuel and limestone as are being used or are on the furnace yards are loaded in the same way.

Labor costs and market prices have been reduced steadily in iron and steel in the effort to get the market down to levels which will stimulate demand. But it is unfair that labor and capital in this industry should stand the whole burden of the deflation. Freight rates should bear part of it. Such a reduction would help appreciably in bringing steel and iron prices down to levels where more business would be done. The railroads would benefit in buying steel at lower prices and would profit also by the increased traffic that lower steel prices would produce.

There should be no overdoing of the poverty plea of the railroads as a means of delaying needed reductions of rates on coarse freight. They have profited by the weeding out of unnecessary workers. The latest statements of earnings give encouraging proof of this. Higher man efficiency has worked savings of greater significance in many instances than those due to the wage reductions of July 1. Railroad executives have not been disposed to gainsay the claim of many shippers, made when the 40 per cent advance in rates became effective, that to raise freights on mineral and other bulk traffic by that amount was a serious injustice. With so much at stake, early consideration should be given to righting that injustice.

During the war, particularly in 1916 and 1917, the world's supply of zinc came almost entirely from the United States. The American zinc industry then enjoyed a prosperity unequaled in its history and unsurpassed in any other country. While the present depression in that industry is due to a large extent to the inactivity in galvanized sheets and brass products, the decline in foreign demand is no small factor. An examination of export statistics shows, however, that foreign demand for zinc in recent months has been heavier than before the war. In 1913 exports of American zinc were 15,365,324 lb., but for the eleven months ended with May of this year they were 39,831,883 lb. This is over two and one-half times the 1913 rate, though only a fraction of the 1917 total, 403,919,783 lb., representing the peak of the war demand. Great Britain has been the chief purchaser since the war, with France and Japan ranking next, but German competition is now being felt and American exports in May fell to 135,365 lb., of which 112,000 lb. went to Japan. The paralysis of British industry had stopped pur-

chases from that quarter. Undoubtedly the domestic zinc industry will revive with any improvement in business, but it is hardly likely that foreign demand will equal that before the war, with the revived German and Belgian zinc industries as competitors. England is already buying from those countries, having imported 18,913 tons from Germany and 5800 tons from Belgium in the first half of this year and only 274 tons from the United States.

Steel Mills in the Running

With a steel demand in the past few weeks equal to not more than one-fourth of the productive capacity, it is a notable thing that nearly all steel mills stay in the running. A few plants have closed for indefinite periods, but they are the smaller ones in all cases, such as have closed in past years when the decline in demand was much less extensive. The mills that have made no steel at all in the past 30 days probably do not represent more than about 10 per cent of the total capacity at the outside.

Obviously mills are not staying in business in expectation of making profits at this time. Production is at very high cost when the rates of output are so low, counting as cost simply the items of expense that would be eliminated by a complete closing. The overhead expense which would have to be stood in any event is of course a large item. The steel makers, however, have exhibited quite a different spirit from that shown in some other lines of industry in the past six months, where manufacturers have quit production, apparently piqued because they could not secure profits to which they had come to believe they were entitled.

To the steel industry as a whole, considered simply as a going concern, it no doubt would be advantageous if some mills withdrew altogether. The others would have a larger operation and could produce more cheaply. The large steel mills, however, show no disposition to make contributions of this sort. They wish to retain or build up clientele, and wish to give their employees such work as can be provided for them.

While the disposition of steel mills to stay in the running is conspicuous, there is seen another outstanding feature when comparison is made with the spirit that actuated manufacturers in many lines a quarter century or so ago. Those were the days when "destructive competition" or attempts at destructive competition were not uncommon. Some manufacturers then had the notion that if there was not enough business to go around a solution was to reduce the number of competitors. It was a short-sighted policy, and that is one reason why it was abandoned. It was possible in some cases to destroy a competitor, as a solvent corporation, but that did not destroy the plant. The promoter might come along, raise a little working capital among the townspeople by promising that there would be payrolls, and set up competition that had no regard for actual cost, and belonged to the general class known familiarly then as "bankrupt competition." In these more enlightened days there is no likelihood of there being "destructive competition" in steel or any other important commodity.

The steel industry is not making profits these days, but the average producing company is probably losing less than it would lose if it stopped entirely and met its fixed expenses by drafts upon surplus, and the probability is that this will be continued. As time passes the period is being approached, whenever it really is to come, that will see a materially heavier operation, and meanwhile costs are being reduced. At the farthest the time will be short compared with the preceding period of large earnings and each mill is disposed to continue actively in business until that time arrives.

Prosperity and Prices

In the past few months frequent references have been made by speakers and writers to the clash between the older and newer generation of business men in the past few years on various subjects of policy, arising from the divergence in training. While there have been numerous fluctuations, the general trend of prices was downward from 1865 to 1896, and upward from 1896 to 1920. Naturally men who had their business training in the one period would clash with those who had their experience largely in the other period.

The older generation had seen that it was a bad thing to mortgage a property or issue bonds. As values declined the obligation became a heavier and heavier burden. The newer generation found that the simplest way to make money was to borrow money and buy a property, payment proving easy if good judgment had been used in the purchase and the subsequent development. In the 1896 political campaign much was heard of "bloated bondholders" who were thought to be getting more than they really ought to get. In 1920 the bondholder was pitied, like the college professor, and promises were made that the cost of living would be reduced.

The tables had been turned. A vital question to-day for forward-looking business men is whether the tables have been turned again. Prosperity is not connected directly with either rising prices or falling prices, but for the individual is determined by the relation between income and outgo. The older generation was filled with the idea that producing at lower and lower cost resulted in prosperity, the newer generation that selling at higher and higher prices results in prosperity. Neither was right, of course. Profits can be made both when the general trend of prices and values is downward and when that general trend is upward. The individual should first decide which way the general trend is likely to be, and then adopt a system of conducting his business that will suit the expected trend.

While prosperity and an advancing market are associated in the average mind, one can scarcely avoid confessing that, viewed in the abstract, falling values furnish in the long run an incentive to men to work hard and efficiently. The years in the eighteen-nineties, following the Baring failure, brought declining prices for iron and steel. They

were also years of new and marked economies in the making of pig iron and steel. It is true, of course, that the fear of declining prices causes buying to be postponed and influences men to defer the inception of construction projects, just as the expectation of higher prices influences them to place orders and make contracts. It is to be noted, however, that it is not the higher prices but the expectation of the higher prices that induces men to buy or contract. This is an important difference and one that has been overlooked by those who noticed before the war that more construction work occurred when prices were at their higher levels than when they were at their lower levels, but did not ascertain that many of the contracts covering the construction had been made long before, in a period of low prices.

Many of the older generation of manufacturers and merchants found that money could be made even when the general tendency of prices was downward. Employment is the great essential. Once the amount of unemployment begins to decrease, the spending power is increased and that results in more employment. When falling prices are not causing an increase in unemployment they are not doing much harm. In the present movement they may have done their worst in that respect already.

The world-wide slump in demand for steel is clearly reflected in the American and British export data for May, the latest figures. British steel exports in that month fell to 99,000 gross tons, or about one-third of what they were in May, 1920, and only 24 per cent of the May movement in 1913. In the case of the United States, the May steel exports were only 104,000 tons or about 50 per cent of the 1913 rate and only 25 per cent of the 1920 exports. Taking the combined exports of these two countries as representative of present world demand, the May total of 203,000 tons compares with a monthly average of 684,500 tons in 1920 and of 655,100 tons in 1913. This is a falling off of over 66 per cent in either case. It is worth noting also that the combined exports of the two countries in 1913 and 1920 were about the same, with the exception that of the total the share of the United States in 1920 was about 60 per cent, whereas in 1913 Great Britain's proportion was about 62 per cent. At present the exports of the two countries are on about the same level. What this relation will be in the coming months depends on many conditions too uncertain to forecast.

German Competition in Japan

WASHINGTON, July 26.—German makers now are bidding on contracts for machines, tools, etc., in Japan, at prices from 30 to 50 per cent cheaper than American quotations, according to a report received by the Bureau of Foreign and Domestic Commerce. While the consumer has to agree to pay any export tax levied by the Allies, it is stated that, even if such a tax is as high as 25 per cent, prices of German materials will be less than for similar articles of American manufacture. This being the case, it is declared that to hold the market in Japan or to extend it, price reductions by American manufacturers will be necessary.

CORRESPONDENCE

The British Coal Strike Settlement and Domestic Labor Problems

To the Editor: The struggle between the British public and its Government on the one hand and the miners on the other in the attempt of the latter to effect nationalization of the coal industry has been watched by the writer, keeping in mind that though separated by thousands of miles this country had a lively interest in the outcome.

The *Coal Trade Bulletin* states that in the settlement the miners have gained a profit-sharing plan by which 83 per cent of all money earned after all charges have been paid is to be given to the worker and 17 per cent to the owner. While the fight for nationalization was lost, the miners can afford to discount that almost 100 per cent, as they secured the further concession of a subsidy of £10,000,000 to tide them over the low-wage period. This in itself is a great step toward socialization.

Of course, the leaders of the United Mine Workers of America have followed closely this controversy and will consider its outcome as altogether satisfactory. They no doubt feel that their stand against any reduction in wages, when that question again comes up for adjustment, will be greatly strengthened in that any terms will be acceptable to the owners in preference to combating an effort to nationalize our mines.

One daily paper remarks: "Should profit sharing solve the British coal mining problem enormous impetus will be given the movement generally." But it will not. Even if the miners had succeeded in imposing nationalization on the British public the problem would not have been solved. There are two reasons for arriving at this conclusion.

Whenever any class is persuaded that it is not getting all that is coming to it invariably the pendulum swings to the other extreme and, no matter what is conceded, it believes that something is held back or there is still more to be desired. This was illustrated in this country in connection with the Adamson law. If any of your readers had an opportunity to converse with individual members of the Big Four, how many were found that were satisfied with what they got?

The other reason is one which the leaders themselves failed to foresee, or if they did we must assume their advocacy of nationalization to have been dictated from motives of expediency if not solely a threat. If the industry were nationalized and there were no longer any owners against whom the leaders could direct that spirit of unrest and discontent which they have fostered, the attention of the workers would be focused upon these same leaders with unpleasant results. Their position eventually would become untenable because no condition which they succeeded in creating for the worker, whether it be nationalization or on the line of the present agreement, could secure uninterruptedly the benefits which have been so readily promised.

In view of the still insecure foothold which the doctrines of confiscation of private property and wage subsidizing have in this country, it is exceedingly doubtful that the United Mine Workers of America will do any more than threaten to make either an issue at present. Before the British plan can be used as a real argument on this side of the water we shall have observed its failure as a solution of Britain's coal mining problems or other labor troubles.

H. D. MURPHY.

Medford Hillside, Mass., July 19, 1921.

The cold-drawn department of Ellwood Works, National Tube Co., Ellwood City, Pa., has been awarded the prize for ranking first among the 139 plants of the Steel Corporation in safety work. This department has not had a lost-time accident in the past 20 months.

FOREIGN RAILROADS BUY

Chile, China, Morocco and Soviet Russia Active —Bolivian Projects—Belgian Iron Imported

NEW YORK, July 26.—While Japan and the Far East continue to improve from the standpoint of taking exports, the lower prices prevailing in Continental countries, although they exclude selling of American products, are enabling those exporters that have turned to importing under present conditions, to put down European material at American ports at sufficiently low prices to interest consumers here. The tendency in transactions of this kind is to deal entirely in dollars in order to avoid possible losses through the fluctuation of exchange. Despite the continued decline of pig iron in the three principal producing countries on the Continent, prices put down at ports on the Atlantic coast are still too high for even limited business, but with the high freight rates from Eastern furnaces to the Pacific coast, exporters in New York, who have taken over the representation of Belgian and German furnaces are finding it possible to deliver Belgian foundry iron, c.i.f. Pacific port, as low as $26 per ton. Little competition from this iron appears possible in the East, however, as the lowest quotation at present is in the neighborhood of $24 per ton, c.i.f. New York. One sale of 150 tons of Scotch iron from a Belgian furnace is reported to a California consumer.

Although stocks of canceled material at South American ports are still large and exchange rates generally show a decline, inquiries and orders from South American markets show a marked increase over conditions of a few months ago. Exporters with connections in Porto Rico report a fairly active demand for sheets and bars from this source. But orders are generally small and include a wide range of sizes, evidently being purchased for stock. An old 1000-ton inquiry for 35-lb. rails issued by a large sugar centrale at Manila has been revived and new quotations requested.

Chile in Market for Annual Rail Purchase

Foreign railroad buying continues to lead in export activity. An inquiry is in the hands of the New York office of the Chilean State Railways, 141 Broadway, calling for 12,000 tons of 90 to 100-lb. rails, switches, bolts, fish plates, crossings, frogs, etc. for 5-ft. gage track. This is the annual requirement of the railroads and will be closed about the end of August. Previous rail purchases made by the Chilean railroads have been placed either in the United States or with British mills.

The contract received by the Ulen Contracting Corporation, 120 Broadway, New York, from the Bolivian Government, reported in THE IRON AGE, July 21, calls for the construction of 128 miles of railroad from Atoche to Villazon. This will be a connecting link in trans-continental railroad construction that will give a complete coast to coast railroad of one gage. To finance this project the Bolivian Government is preparing the issue of $7,000,000 worth of 8 per cent bonds, backed by the entire equipment and income of the Bolivian railroads, with interest guaranteed by revenues from mineral taxation. These bonds will be underwritten by the Ulen Contracting Corporation and floated in the United States. Fred C. Lavis, construction engineer, and Paul C. Campbell, chief engineer of the company, will sail about Aug. 1 for surveys and location of the railroad, on which actual work is expected to begin about Jan. 1. The Ulen company is now finishing a contract for water supply and sewage systems at La Paz, Bolivia.

Rail Tenders from Morocco

It is reported from China that the Robert Dollar Co. has been awarded a contract by the Pekin-Suiyan Railroad for 17,000 tons of 85-lb. rails at a price said to be $38 per ton, f.o.b. New York. The tenders on a large tonnage of 85-lb. rails for the Pekin-Mukden Railroad will be closed this week. In addition to other rail inquiries in the market from foreign sources, the American Consulate-General at Tangier, Morocco, reports that American companies have been invited to submit proposals on 3000 metric tons of 36-kg. (about 72½-lb. per yd.) rails and 8000 pairs of fishplates for the Tangier-Fez railroad. Bids will be opened Aug. 20 by the Commission Generale des Adjudications et des Marches, Tangiers. Blueprints and specifications are in possession of the Bureau of Foreign and Domestic Commerce, Custom House, New York. They call for 5200 rails of 12 meters, 455 rails of 11.97 meters, 900 of 11.94 meters, 160 of 6 meters, 210 of 8 meters, and 210 of 10 meters. Delivery is to be made within 80 days at the port of Kanitra.

A $2,000,000 order for oil tank cars has been received by the Canadian Car & Foundry Co., Ltd., Montreal, from the Russian Soviet Government. The contract, which was obtained by the president of the company, W. W. Butler, while in Berlin in competition with European bidders, calls for 500 tank cars.

Chinese Buy American Copper

A number of orders for electrolytic and casting copper have recently been placed and are still pending from Chinese sources. One exporter, now shipping about 30 tons of casting copper to a Chinese consumer, is bidding on about 330 tons of electrolytic, 180 tons of casting and an additional 220 tons of casting copper for China. American sales of copper to the Orient have been rendered possible through the decline of the domestic copper market to a point where it is possible to bid on a basis as low as 12.50c. per lb. Japanese stocks purchased with copper 100 per cent higher and Australian copper are both unable to compete with the American trade at current prices.

Germany as a Competitor

Following a protracted visit in Germany, Fred Kling, chief mechanical engineer of the Carnegie Steel Co. in the Youngstown district, predicts that Germany is not likely to be a serious competitor of the American iron and steel industry in foreign markets for a number of years.

Mr. Kling points out that Germany lost 30 per cent of her steel making capacity by the terms of the peace treaty and 10 per cent of her population. "Her own reconstruction and the intensive industrial program being mapped out in addition to the relatively larger population to steel capacity, will leave no great tonnage for export—possibly 1,000,000 tons per year against 5,000,000 tons before the war," he states. "Furthermore, it is unlikely that the former German steel plants in French hands will be so efficiently managed for a period of several years at least. When world affairs become normal, there will be plenty of need for American iron and steel."

The Iron Age and Its Readers

Occasionally a reader asks why we do not publish the table of contents on the front cover, as do some other papers. The reason can be made perfectly clear. So much of THE IRON AGE is made up of articles in which the news factor is important, while many of the market pages consist of telegraphed matter which is not in the office until several days after the front cover has been completely printed, that any table of contents printed on the cover would necessarily be incomplete. It could not possibly include the last-minute information, nor could it take account of the fact that frequently, because of the compelling importance of some of this late news, articles which had been scheduled for the issue have to be left out at the last moment, which fact would make a contents page on the cover of no value.

For many months it has been the practice to print, on the upper right corner of the cover, the number of the inside page on which the table of contents would be found. This has proved of great help to those using it.

Year's Iron and Steel Exports About Normal

Heavy Exports in First Eight Months Offset by Later Reductions—Machinery Increases—Imports Fall Off About Half

WASHINGTON, July 26.—Figures of the Bureau of Foreign and Domestic Commerce for June, 1921, completing the fiscal year 1921, reflect an interesting study of imports of iron and steel and exports of iron and steel and machinery, showing that the imports made a large drop, while the exports of iron and steel showed a slight decline and exports of machinery registered a large increase as compared with the fiscal year ending with June, 1920.

Imports of iron and steel for the fiscal year just closed totaled 239,871 gross tons, valued at $44,236,077, as against 489,803 gross tons, valued at $37,423,289, for the corresponding period of last year. Exports of iron and steel for the present year totaled 4,168,619 gross tons, valued at $1,027,976,000, as compared with 4,212,732 gross tons, valued at $932,550,863. Machinery exports for the fiscal year 1921 totaled $441,497,245, as against $397,330,191.

Declines were shown in both imports and exports for June, when compared with May. Imports aggregated only 8,929 gross tons, valued at $2,539,926, as compared with 23,498 tons, valued at $3,144,643, in May. Exports of iron and steel for June amounted to 119,081 tons, valued at $39.975,035, as compared with 142,551 tons, valued at $41,365,886, for May. The imports of June, 1921, compare with 40,554 tons for June of last year, and were valued at $5,268,126, the values in all instances taking into account the entire total rather than merely those included in the tables herewith presented, and figures are given in accordance with revisions by the bureau.

Exports for June, compared with 402,707 tons for the same month of last year, which were valued at $88,787,349, give a clear idea of the decline since one year ago. Exports of machinery for June, $22,044,833, compare with a value of $36,493,736 for the same month of last year, and also show plainly the decrease made. Manganese ore imports for June totaled 17,169 tons, valued at $80,602, as compared with 54,663 tons for May, and for the 12 months totaled 682,770 tons, valued at $10,199,612, as compared with 323,901 tons, valued at $8,086,001, for the fiscal year ending with June, 1920. The sharpest decrease in exports in June was reflected in steel plates, the figure being 7,781 tons, as compared with 18,518 tons in May.

Distribution of some of the principal products, for the fiscal year 1921, was in gross tons in part as follows: Wire nails, 14,023 to Japan; 8,855 to United Kingdom; 8,742 to China; 6,689 to Dutch East Indies; 6,211 to Cuba; 1,744 to Canada; cast pipe, 22,202 to Mexico and 20,003 to Cuba; welded pipe, 154,884 to Mexico; 40,407 to British India; 30,650 to Japan; 25,753 to Dutch East Indies and 20,069 to Peru; steel rails, 79,430 to Dominican Republic; 60,302 to Japan; 56,320 to Dutch East Indies; 49,580 to Chile; 40,186 to China and 24,177 to Brazil; galvanized sheets and plates, 26,019 to Canada; 8,833 to Cuba and 7,610 to Argentina; plates, 183,860 to Canada; 137,718 to United Kingdom; 77,987 to Japan; 52,541 to the Netherlands; 50,940 to France and 45,180 to Italy; sheets, 57,741 to

Imports of Iron and Steel

	Gross Tons			
	June		Year Ending June 30	
	1920	1921	1920	1921
Ferromanganese	5,694	265	38,973	43,197
Ferrosilicon	1,497	520	16,855	7,361
Pig iron	11,036	3,688	126,264	51,757
Scrap	12,106	1,372	202,062	82,657
Bar iron	363	33	3,080	3,815
Structural steel	212	72	1,234	1,394
Billets, without alloys	779	245	68,758	995
All other billets	2,191	51	5,414	3,216
Steel rails	5,876	2,585	23,804	37,583
Sheets and plates	177	48	1,418	2,781
Tin and terne plates	27	26	377	503
Wire rods	596	24	1,564	4,612
Total	40,554	8,929	489,803	239,871
Manganese ore and oxide	80,329	17,169	323,901	682,770

Exports of Iron and Steel

	Gross Tons			
	June		Year Ending June 30	
	1920	1921	1920	1921
Ferromanganese	275	...	2,374	3,335
Ferrosilicon	31	52	398	577
Pig iron	16,799	1,637	245,854	125,629
Scrap	24,153	3,587	81,464	182,478
Bar iron	3,268	326	36,530	38,752
Wire rods	15,134	492	111,823	61,567
Steel bars	53,559	8,009	583,418	468,995
Billets, ingots, blooms	29,811	1,106	288,766	82,549
Bolts and nuts	3,061	1,175	34,910	37,613
Hoops and bands	3,488	1,302	45,188	38,405
Horseshoes	250	32	2,567	1,505
Cut nails	212	29	4,002	3,462
Wire nails	7,808	951	55,681	67,017
All other nails, including tacks	1,663	197	9,745	9,626
Cast pipe and fittings	3,764	4,076	46,415	54,183
Welded pipe and fittings	17,654	25,813	221,064	439,762
Radiators and cast house boilers	338	261	6,745	4,943
Railroad spikes	1,631	699	17,190	14,219
Steel rails	49,620	20,308	553,860	549,558
Galvanized sheets and plates	10,454	2,942	99,313	93,155
All other sheets and plates	3,049	948	33,354	22,722
Steel plates	61,555	7,781	721,828	761,022
Steel sheets	15,383	10,296	151,324	155,841
Ship plates, punched and shaped	1,112	1,951	26,926	32,089
Structural steel	34,669	18,058	339,908	526,482
Tin and terne plates	18,604	2,727	207,296	178,299
Barb wire	8,109	1,757	118,878	86,936
All other wire	17,253	2,569	166,411	167,898
Total	402,707	119,081	4,212,732	4,168,619

Exports, January, 1919, to June, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551*	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549

*Revised figure.

Machinery Exports

	June 1920	June 1921	Year Ending June 30, 1920	1921
Adding machines	$ 523,962	$ 239,846	$ 4,325,104	$ 5,978,541
Air-compressing machinery	407,016	292,807	4,371,107	5,675,504
Brewers' machinery	44,274	4,542	334,028	454,099
Cash registers	413,560	165,654	5,551,993	3,805,661
Parts of	74,561	37,613	402,821	407,985
Concrete mixers	55,462	41,102	516,949	1,024,026
Cotton gins	37,651	3,947	302,266	283,726
Cream separators	127,841	32,778	1,133,068	801,851
Elevators and elevator machinery	140,136	188,935	1,976,279	2,024,254
Electric locomotives	.....	252,771	1,464,157	825,753
Gas engines, stationary	50,876	65,173	803,151	643,544
Gasoline engines	2,965,458	699,901	33,190,177	23,526,568
Kerosene engines	1,026,138	7,222	8,543,699	6,235,530
Steam engines	4,509,466	4,336,935	46,381,621	50,265,517
All other engines	337,687	143,329	3,387,579	3,898,616
Boilers	315,853	209,263	6,358,175	8,893,878
Boiler tubes	477,373	165,386	4,459,253	6,614,227
All other parts of engines	1,783,935	713,807	21,763,421	20,363,872
Excavating machinery	158,792	124,573	1,441,857	2,756,581
Milling machinery, flour and grist	117,965	58,198	1,639,948	2,238,374
Laundry machinery	73,950	56,477	1,105,118	1,139,309
All other	77,778	18,956	519,917	827,933
Lawn mowers	34,566	29,710	376,603	584,696
Lathes	846,583	131,140	8,915,519	5,375,690
Other machine tools	1,127,297	267,344	12,950,721	10,060,505
Sharpening and grinding machines	395,903	60,499	4,371,978	2,576,498
All other metal working machinery	1,134,940	1,029,230	22,790,373	16,427,727
Meters, gas and water	57,149	73,302	743,214	805,432
Mining machinery, oil well	419,235	1,234,392	4,195,119	12,007,423
All other	376,508	471,489	8,243,034	9,613,392
Paper mill machinery	185,449	108,908	2,686,274	3,562,585
Printing presses	700,111	357,004	6,283,729	10,383,632
Pumps and pumping machinery	1,130,687	827,624	10,617,940	16,804,050
Refrigerating and ice making machinery	245,045	102,631	2,422,789	3,390,763
Road making machinery	150,952	81,447	1,207,000	1,182,183
Sewing machines	1,188,709	483,820	14,617,065	11,280,128
Shoe machinery	160,067	110,675	2,628,857	2,802,105
Sugar mill machinery	1,010,080	1,596,972	1,547,518	29,108,909
Textile machinery	2,395,800	1,045,095	12,378,115	13,513,228
Typesetting machines	297,022	166,136	3,875,947	4,536,013
Typewriting machines	2,478,623	723,797	23,012,903	18,867,513
Windmills	145,228	84,265	1,419,758	2,762,657
Wood working machinery, saw mill	78,218	54,941	922,838	1,392,454
All other	254,520	110,653	3,319,529	3,835,711
All other machinery and parts of	7,969,719	4,965,949	79,981,888	99,356,649
Total	$36,493,736	$22,044,833	$397,330,191	$441,497,245

Canada; 39,152 to Japan and 13,108 to Argentina; structural steel, 116,159 to Canada; 78,037 to Japan; 59,232 to British India and 50,661 to Cuba; tin plate, 44,107 to Canada; 25,004 to Japan; 13,436 to Brazil and 12,052 to China; barbed wire, 18,537 to Brazil; 13,283 to Argentina and 12,283 to Canada; other wire, 47,842 to Argentina; 24,708 to Canada and 21,156 to Australia.

Meeting Cleveland District, Pig Iron Association

Sentiments that the pig iron market may be at the bottom and that buying may be expected to gradually increase were voiced July 21 at a meeting of the Cleveland District of the American Pig Iron Association, held at the Youngstown Country Club, Youngstown, Ohio. T. W. Friend of Pittsburgh, president of the association presided. John A. Penton, Cleveland, related impressions of his recent trip to Europe.

The inability of Joseph G. Butler, Jr., chairman of the board of directors, founder and for many years president of the organization, to attend was the occasion of many expressions of regret.

Will Handle U. S. Shipping Board Claims

WASHINGTON, July 26.—Unliquidated claims to the amount of $211,000,000 will be handled by the United States Shipping Board Claims Commission whose appointment was announced last Friday by Chairman Lasker of the Board. The chairman of the commission is Judge Walter D. Meals, former associate justice of the Appellate Court of Ohio. The associate members are President Homer Ferguson of the Newport News Shipbuilding & Dry Dock Co.; F. W. Wood, former president of the Maryland Steel Co.; Captain Richard W. Watt, construction corps, United States navy and Arthur W. Teele of the accountant firm of Patterson, Teele & Dennis.

The Truscon Steel Co., Youngstown, Ohio, is erecting a large warehouse in Chicago. Cranes and electrical equipment are now being installed under supervision of G. A. Hughes, electrical engineer.

Tin-Plate and Terne-Plate Manufacture

WASHINGTON, July 25.—A preliminary statement of the 1920 census of manufactures with reference to the tin-plate and terne-plate industry has been issued by the Census Bureau. The bulk of the tin and terne-plate product is made by establishments that roll the black plates, and in most cases the report for the rolling mill carries the general statistics for the dipping department. Only in cases where the dipping plant is separate and distinct from the rolling mill, or the black plates were purchased, was the establishment included in the classified industry, though at previous censuses full segregated reports were made and the dipping departments were included in the classified industry.

Present figures are based upon returns from 43 establishments with products valued at $181,789,200. This includes 23 establishments constituting the classified industry, with products amounting to $97,398,700; 17 dipping departments of rolling mills, with $82,920,700; and 3 establishments primarily engaged in other lines of manufacture, but making tin and terne-plate products to the value of $1,469,800. The foregoing includes 8 retinning establishments with products valued at $143,700, chiefly custom work. At the census of 1914 there were 31 establishments in the classified industry, with products valued at $68,343,000 and 1 establishment making some terne-plate as a subsidiary product, for which figures could not be published.

The increase in value of products, 1914 to 1919, was $113,446,200, or 166 per cent. The production of tin-plate in 1919 was 2,388,867,000 lb., valued at $165,846,100, as compared with 1,901,332,000 lb., valued at $60,258,100, in 1914, an increase of 25.6 per cent in quantity, and in unit value from 3.17c. per lb. to 6.94c. This was chiefly coke plate, the production of charcoal tin-plate in 1919 being but 36,550,000 lb., 19.5 per cent less than in 1914; the comparative unit values being 4c. in 1914 and 8.4c. in 1919. The output of terne-plates was 124,920,376 lb., and 50,860,455 lb. of long ternes, a total of 175,780,800 lb., valued at $11,351,462, a quantity increase of 15 per cent, and in unit values from 3.94 to 6.46c. per lb.

There were used 2,655,481,000 pounds of black plates, all of domestic origin, of which only 1.6 per cent was purchased; 43,897,000 pounds of pig tin, an increase of 20 per cent with respect to 1914; 870,800 pounds of pig lead, a decrease of 62 per cent and 7,687,400 pounds of purchased terne mixture, an increase of 16 per cent. The increases in unit values were, for black plates, 1.9c. to 3.8c.; pig tin, from 39c. to 58c.; pig lead, 4.14c. to 6.3c.; and terne mixture, from 11.8c. to 19.8c.

Tin Plate and Terne Plate

	1919 Quantity, Thousands of Pounds	1919 Value	1914 Quantity, Thousands of Pounds	1914 Value
Total products	.....	$181,789,200	.....	$68 343 000
Tin plate	2,388,867	165,846,100	1,901,332	60,258,100
Coke	2,352,317	162,762,100	1,855,893	58,450,900
Charcoal	36,550	3,084,000	45,439	1,807,200
Terne plate	124,920	8,296,600		
Other sheets (long ternes)	50,860	3,054,900	152,624	6,012,300
Plates redipped and amount received for custom work	.....	177,800	.....	2,072,600
All other products, including tin dross, scruff, scrap, etc.	.....	4,413,800		
Principal Material		Cost		Cost
Black plates or sheets, steel	2,655,481	$100,444,300	2,107,788	$39,803,600
Produced by the establishment reporting	2,612,635	99,123,900	2,084,537	39.335,100
Purchased (all domestic)	42,846	1,320,400	23,250	468,500
Coating metals	52,455	27,124,000	45,430	15,044,800
As purchased:				
Pig tin	43,897	25,545,700	36,543	14,167,200
Pig lead	871	55.100	2,269	94.000
Terne mix.	7,687	1,523,200	6,618	783.500
Metal totals:				
Tin	45,659	.....	38,050	.....
Lead	6,796	.....	7,381	.....

Hartford, Conn., structural iron workers have agreed to a reduction from $1.06¼ to $1 per hour, effective at once, following a conference of representatives of employers and employees.

Senate Committee Begins Tariff Hearings

Plans to Expedite Passage of Fordney Bill—Strong Protests Against Duties on Ferromanganese and Manganese Ore—Details of Changes Made by House

BY L. W. MOFFETT

Washington, July 26,
THE IRON AGE BUREAU,
816 Fifteenth Street.

BECAUSE of its desire to report the tariff bill to the Senate and to act on it as quickly as possible, the Committee on Finance expects to devote only two weeks to hearings, which were begun yesterday with the American valuation proviso as carried in the House measure taken up first. Opponents and proponents of this basis of assessing duties will be given until Thursday to present their views. So that duplication may be avoided, the committee proposes that persons desiring to submit their views regarding the same item agree upon one representative and it is planned to devote less than a day to each schedule, hearings on which will be held according to their order in the bill. Many protests against items and provisions throughout the bill already have been received. The duties on ferroalloys and on certain ores, such as manganese, and tungsten are the object of protests before the Finance Committee and it is assumed representatives in favor of and against these duties will appear before the committee. Independent steel manufacturers are strongly opposed to the House duties on manganese ore and ferromanganese and are expected to protest. There is also considerable opposition by steel makers against the duties of ¾c. per lb. on grain magnesite and ½c. per lb. on crude or ground magnesite, left unchanged from the way they were reported to the House.

Proposed Duty on Magnesite

Supporters of the proposed duty on magnesite state that it was originally intended in passing the Underwood bill to put crude magnesite on the free list and have a tariff of 10 per cent on magnesite brick, but a decision put grain magnesite on the free list. Grain magnesite is the prepared calcined material which reduces one-half in burning from the crude material, and magnesite brick are merely formed from this material and re-burnt. So all material came over in this form and no duty has been paid under the Underwood law. The manufacturers contend that the Fordney bill straightens this matter out, as it provides a duty on calcined grain magnesite, so that some revenue can be obtained from this material by the Government and protection can be given the manufacturers who developed material in this country during the war. It is further stated that all of the crude material for magnesite in this country is in Washington or California, and that the tariff asked for on the Fordney bill does not cover the difference in freight from California and Washington to the steel producing districts in Pennsylvania, which is now about $24 per net ton against the present freight rate from abroad of 30 shillings, or about $7.50 per net ton. Therefore, it is asserted, the American manufacturers are asking only for a protection against the difference in freight rate.

The opposition to the duties on fluorspar has been increased as the result of the adoption of an amendment offered by Chairman Fordney of the Ways and Means Committee, which fixes the duty on a net ton basis instead of the gross ton basis, usually recognized in importations, but which was not specifically mentioned in the paragraph as originally drafted. The duties proposed are $5 per net ton, immediately effective, and $4 per net ton after one year following passage of the act.

The bill passed the House last Thursday by a vote of 289 to 127, seven Democrats voting for and seven Republicans voting against it. As stated in THE IRON AGE of last week, changes made in the metal schedule were only of a comparatively minor character. In addition to those published, two others were made, the latter being acted upon during the last day the House had the bill before it when it resolved itself into the Committee of the Whole House on the State of the Union. One of these changes affected the zinc ore paragraph, 390, and increased duties as follows: 10 per cent or more zinc and less than 20 per cent, from ¼c. to ½c. per lb.; 20 per cent or more zinc and less than 25 per cent, from ½c. to 1c. per lb., and 25 per cent or more zinc from 1c. to 1½c. per lb. These higher duties were originally carried in second proviso of the paragraph, which were to apply to the zinc ores for two years beginning on the day following passage of the act, the proviso being struck out. The effect of the change is to make the higher rates permanent. The other change made and not previously noted increased the duty on quicksilver from 7c. to 35c. per lb. This was done on the strength of a letter from Secretary of War Weeks, who pointed out that mercury is necessary to the manufacture of munitions and that the domestic industry, now depressed, partly because of importations, should be encouraged.

Debate on Ferroalloys

The most spirited debate in the House in connection with the metal schedule related to duties on ores for making ferroalloys and on ferroalloys, Representative Wingo, Democrat, of Arkansas attacking especially the duties on manganese ore and ferromanganese, while others also criticised them.

Representative Wingo assailed an amendment made by Representative Tilson, in charge of the metal schedule, adding the words "manganese or silicon" to the alloy steel paragraph 305 providing an additional duty of 15 per cent when the alloying material is in excess of 1 per cent manganese or silicon. Representative Wingo stated that the schedule carried a duty of 1c. per pound on manganese ore or concentrates on the manganese content when in excess of 30 per cent and asked Mr. Tilson if it were the intention to put the same rate on the crude manganese ore as applied to the concentrate. Mr. Tilson said the amendment related only to the metallic content and that if it is a concentrate there is a greater metallic manganese content.

"As a matter of fact, if you put it on the ore which contains a certain metallic content—that is, on a percentage basis—would not the tariff on that be a great deal higher?" inquired Mr. Wingo.

"Well, the freight rate would be more on the leaner ore," replied Mr. Tilson. "The concentrate, of course, would have less weight to pay freight upon than the ore; but the duty is upon the metallic content."

"No, it is on either the manganese ore or concentrate with the metallic content in excess," said Mr. Wingo. "In other words, you might have more than 30 per cent or 31 per cent of metallic ore and yet you might have a concentrate that had an arbitrary figure of 60 per cent. Would not there be a difference?"

"Not at all, because it is only upon the metallic content that the duty is laid," Mr. Tilson contended.

Mr. Burton Receives Protests

Representative Burton, Republican, of Ohio, said that he had received strong protests against duties on ferrosilicon and manganese ores. He said he did not

think these exist in commercial quantities in the United States sufficient to afford more than a bare minimum of supply and consequently was compelled to enter dissent in regard to these duties.

"Again, a very important invention, designated as alpax, has recently been made as a substitute for aluminum, for which ferrosilicon, 95 per cent and more of silicon, is the essential raw material," said Mr. Burton. "I understand that silicon, 95 per cent pure, cannot be obtained in this country. That duty, which, I believe, is 8c. per lb., is sure to be a serious handicap in the manufacture of this new metal, which is a substitute—I do not say it is exactly a substitute—for aluminum. At least it is a very similar metal."

Representative Green, Republican, of Iowa, a member of the Committee on Ways and Means, said the committee would consider a brief of protest if it were presented, stating that the matter of using ferrosilicon for the new substitute had not come before the committee. Representative Burton replied that he had written a letter to the chairman of the committee.

Mr. Burton also said he had received a letter from a maker of high speed tools for which tungsten is a requisite, saying that the tungsten duty amounts to about 300 per cent and might place the maker referred to out of competition in the markets of the world. Representative Cooper, Republican, of Ohio, said he had received similar protests from Ohio steel makers. Representative Timberlake, Republican, of Colorado, a member of the metal subcommittee, attempted to support the rate by saying the cost to consumers would amount to not more than 3c. per ton of steel, and Chairman Fordney made a similar reply. Representative Wingo interrupted to say, humorously, "I know enough about it to know that when you seek to defend it (the duty) by suggesting that the tax will amount to only a few cents on a ton of steel you might as well say that a tax on feathers would be a tax on angel wings."

Increases of the molybdenum and tungsten content to more than 1½ per cent in paragraph 305 in order to get additional duties of $1.25 and 72c. per lb., respectively, were explained by Mr. Tilson. Like most other amendments, the change was recommended by the Tariff Commission and was made, Mr. Tilson said, because it was found that a number of steels contain a minute fraction above 1 per cent of the alloys affected and that the amount of computation and calculation necessary to ascertain the additional duty would be great. By raising the content to 1½ per cent, it was stated, customs officials are relieved of much labor.

Details of the Changes

A telegram from Washington, published on page 153 of THE IRON AGE of July 21, gave the important news of the passage of the metal schedule of the Fordney tariff bill by the House of Representatives and indicated in brief the changes which had been made since the bill was introduced. More explicitly these changes are stated as follows, so that those who wish to do so can compare the amended sections with the sections as found in the bill as introduced in the House and published in THE IRON AGE of July 7:

In paragraph 301, after the word spiegeleisen the words "containing more than 1 per cent of carbon" are inserted, and spiegeleisen is defined for the purpose of this act as an iron-manganese alloy containing less than 45 per cent of manganese.

In paragraph 302 ferromanganese is defined as such iron-manganese alloys as contain 45 per cent or more of manganese and the words "and spiegeleisen" are inserted after "ferromanganese" in line 16, so that ferromanganese and spiegeleisen when containing not more than 1 per cent of carbon take a duty of 2 1/5c. per pound of manganese content plus an ad valorem rate of 28 per cent. The change is not particularly significant and was made at the suggestion of the Tariff Commission. There is only one concern in the United States making spiegeleisen containing 1 per cent or less of carbon and the material, made in extremely limited quantities, and selling at 80c. per lb., is used by the chemical industry as a compound.

In paragraph 304 "tapered or beveled" bars are omitted as is also the word "mill" before shafting. The Tariff Commission suggested the first words omitted added nothing to the word "bars," and that the word "mill" before shafting limited the meaning of the word "shafting," the intention of the framers of the schedule being to include all shafting.

In paragraph 305, the required content of molybdenum in order to get the additional duty of $1.25 per lb. was changed from 1 to 1½ per cent and a similar change was made in regard to tungsten content before application can be made of the additional duty of 72c. per lb. The amended provisos read as follows: "That manganese and silicon shall not be considered as alloying material unless present in steel in excess of 1 per cent manganese or silicon; Provided further, That an additional cumulative duty of $1.25 per lb. on the molybdenum content in excess of 1½ per cent, and 72c. per lb. on tungsten content in excess of 1½ per cent shall be levied, collected and paid on any articles containing molybdenum and tungsten."

In paragraph 316 (wire), a change was made so as to include wire made of "iron, steel and other metal" instead of "iron or steel," coated by dipping, galvanizing, sherardizing, electrolytic and any other process with zinc, tin or other metal, the duty being 2/10 of 1c. per lb. in addition to the rate imposed on the wire of which it is made. The revision was explained by Representative Tilson on the ground that copper, brass and other wire was struck from paragraph 378, taking rates ranging from 1½c. to 4c. per lb.

In wire paragraph 317 words "except gold, silver, or platinum" struck out because articles of this description whose value consists chiefly of these metals are covered in paragraph 393.

In paragraph 350, relating to pins, an amendment makes the paragraph read as follows: "Pins with solid heads, without ornamentation, including hair, safety, hat, bonnet, and shawl pins; and brass, copper, iron or steel or other base metal pins with heads of glass, paste or fusible enamel; all the foregoing not plated with gold or silver, and not commonly known as jewelry, 28 per cent ad valorem."

In paragraph 354 relating to penknives, pocket knives, etc., amendment is made so that blades, handles or other parts of knives or erasers shall be dutiable at not less than the rates imposed upon knives and erasers valued at more than 50c. and not exceedingly $1.25 per dozen; that is, 5c. each and 30 per cent ad valorem.

In paragraph 377 amendment made so as to include nickel silver with German silver, unmanufactured, the rate being unchanged at 20 per cent ad valorem.

In paragraph 378 by omitting the words relating to "wire not coated or covered," copper wire and copper-clad wire coated with tin, brass wire and bronze wire, these wire products become automatically covered by the basket clause, (paragraph 393) which assesses ad valorem duties of 45 and 35 per cent, as compared with specific duties ranging from 1½c. to 12c. per lb., originally contained in paragraph 378.

In paragraph 383 relating to quicksilver duty was increased from 7c. to 35c. per lb. as a result of letter to committee on Ways and Means from Secretary of War Weeks stating that importations of mercury, essential to manufacture of munitions, had depressed domestic mining which it was urged should be encouraged as a matter of national defense.

In paragraph 390, relating to zinc-bearing ores, words "including calamine" struck out with explanation that "calamine" is a zinc-bearing ore and therefore need not be specifically mentioned; and duties on 10 per cent or more of zinc and less than 20 per cent increased from ¼c. to ½c. per lb. zinc content; on 20 per cent or more zinc and less than 25 per cent increased from ½c. to 1c. per lb. on zinc content and on 25 per cent or more increased from 1c. to 1½c. per lb. on zinc content. The entire proviso of this paragraph which contained the increased rates mentioned was struck out so that higher rates become permanent instead of obtaining for two years after the passage of the act.

Causes of Wastes in Metal Trades

Management of Operations and of Men Blamed for Largest Share—Cost Placed at Nearly One Billion Dollars

IDLE men and machinery are causing an annual loss of nearly $1,000,000,000 a year in the metal trades industry, says a report issued by the Committee on Elimination of Waste in Industry of the American Engineering Council. This estimate covers the value of labor only, and does not include the value of materials that would be utilized if the productivity of labor were increased. The value of increased possible production in the United States even in normal time would, it is estimated, be over $500,000,000.

The metal trades findings are a part of the general report made by the committee on its national assay of industrial waste, directed by L. W. Wallace as vice-chairman. The metal trades investigation was in charge of Fred J. Miller and William B. Ferguson. The report presents the views of managing executives in 32 of the plants visited. Being asked their opinion as to the main cause of waste or inefficiency, their answers were as follows:

Eight plants referred particularly to present business conditions, and cited the most important cause as the uneven volume of business, or the fluctuation in the demand for the product; lack of enough business to keep going at normal capacity. In four plants the cause given concerned the railroad situation and the functioning of the Railroad Adjustment Board. In three plants the cause given was lack of standardization of design of products. In two plants the cause given was labor turnover and strikes, one executive saying that these had been caused by war-time conditions.

In four plants the cause given was lack of planning —the exact words used being "lack of proper planning and routing"; "lack of correct planning and material control," "unscientific planning and management," and "lack of efficient planning and management methods." In six plants the cause given was lack of co-operation between management and labor. Other causes given in various plants follow:

Lack of intensive study of methods; cost control systems needed; daily cost reports needed; lack of scientific management applied to all phases of the business; inefficiency of labor; excessive overhead.

In other plants special causes in the machine tool business were given, including failure of machine tool builders to supply what the public wants. Most of the metal trades shops are very small, and require personal handling by the manager of such important problems as are handled elsewhere by systems of production control. Insufficient capital is available to develop sales and to improve facilities. Purchasing in small quantities, by the small plants places them at a disadvantage as to favorable prices and as to transportation and handling expense.

General Business Conditions Responsible for Waste

The major cause of waste or non-production in the metal trades industry at present is the unemployment of available labor and equipment, due to general business conditions which affect all other industries, the report says, adding:

The United States Bureau of Labor Statistics reports on a survey of 1423 firms in the metal trades industry, employing 1,643,253 men, that the decreases in the number on the payroll from February, 1920, to February, 1921, were 24.2 per cent in the iron and steel industry, 42.3 per cent in the automobile industry, and 16.6 per cent in the car building and repairing industry*. The Employers' Association of Detroit reported March 10, that 79 shops were employing 67,137 hands, compared to 198,705 employed April 7, 1920. In Philadelphia, out of 150,000 hands employed in the metal trades in July, 1920, about 30,000 were out of work March 1, 1921.

Present industrial conditions in the United States and abroad affect the metal trades very seriously, and the industry as a whole is operating at only about 60 per cent of normal output. Manufacturers can undoubtedly hasten a return to normal conditions by producing goods as economically as possible, so as to make selling prices low enough to attract buyers.

Management Held Responsible for Most of Waste

There are nearly 2,000,000 people engaged in the establishments of the metal trades industry, and an enormous increase in total production is possible. It is estimated that at present about 80 per cent of the responsibility for waste, or non-production, rests with management; i. e. with the managers and executives in the plants.

The estimated waste in fifteen representative plants selected by the committee averages 28 per cent for them all, and ranges from 8 per cent waste for the best plant to 56 per cent for the worst. The size of the plant, whether large, medium or small, does not necessarily affect its efficiency, as some large plants as well as some small ones have a large waste factor.

The metal trades, says the report, constitute the largest manufacturing industry in the United States, in the number of employees engaged and in the value of products. The industry is pretty much concentrated east of the Mississippi River, in the New England States, the Middle Atlantic States and in the Middle West. Pennsylvania and Ohio lead in the industry; then follow New York, Illinois, Massachusetts, Connecticut and New Jersey. The metal-making branch of the industry is not included in this survey—that is, the branch which produces what are usually known as "raw materials," plates, shapes, wire, pipe, etc.

Proper Relations Between Management and Labor Needed

A comprehensive study and survey was made of fifteen representative plants, of various sizes and types, distributed through the states which lead in the industry. In addition to these detailed surveys, a number of other plants were studied, and general information obtained through the co-operation of various metal trades associations.

The major causes of waste or non-production, applicable to normal times as well as to the present abnormal times, are attributed to instability of labor employment and to inefficient management. Most of the plants surveyed gave very little thought to the instability of labor employment.

Proper relationship between management and labor, such as exist in the most productive plants investigated, is more than ever a controlling factor. The plants with the highest labor turnover (which reflects discontent) are in general the most wasteful of human effort; hence secure the smallest production per man-hour. It is found further that, generally, the best relationship exists, and the best understanding and least friction prevail, in plants where the most thorough and scientific study of organization methods and standards have been made by the management in co-operation with the workers.

Careful planning of work, providing and moving materials by means of effective and recognized methods of material control; comparison of output of departments and of individuals with fair standards of performance, fairly and scientifically determined; these are the practices of those concerns which have been most free from labor unrest, and where greatest

*These figures were given on page 719, THE IRON AGE, March 17. Later figures of similar import have since been published, as they became available.

mutual confidence and co-operation exist between employer and employed.

Provision by the management of proper facilities and conveniences for developing the latent productivity of the workers, and provision of fair incentives for those who "make good," play a large part in eliminating waste in the best establishments. It is shown by experience of the plants visited, as well as by general experience, that considerable improvement can be brought about by means of modern employment methods, which provide, among other features, for a close study of "why men quit."

Heavy Cost of Labor Turnover Stressed

Dealing with the cost of labor turnover, the report says:

The average labor turnover for the year 1920, for the plants covered by these studies (wherever records were kept, which was the case in less than half of the plants), was 160 per cent, the percentage given in most cases being the ratio between the number of "separations" and the average number on the payroll. The highest turnover was 366 per cent.

There is a practical minimum to the labor turnover in a shop or factory, which cannot be excelled in special cases. There are separations that are unavoidable, due to deaths, marriages, etc., for which 60 per cent may be allowed, which still leaves an avoidable or preventable turnover of (say) 100 per cent annually. This of course can be eliminated only by a most thorough understanding and co-operation of all concerned: management, labor and the public.

In this industry, then, with its 2,000,000 employees, with the average plant virtually renewing its entire working force, or filling each position, every 8 months, we have 2,000,000 unnecessary separations, the equivalent of 2,000,000 workers annually leaving and rehired somewhere else, and at what cost? Expert estimates of the cost of labor turnover vary from $50 to $250 per employee hired, trained and separated. An average figure of only $50 each, applied to 2,000,000 employees turned-over, means an average waste of $100,000,000, due to avoidable labor turnover, in this one industry.

Instability of labor employment resulting from strikes and lockouts has not been as serious in the metal trades industry as in some others, with the exception of the shipbuilding branch of this industry.

Co-operation and Frank Conferences Urged

Open interchange of ideas and business results by managements, both in the particular industry and in other industries, should lead to a higher level of methods, service and general business ethics. If carried on through definite channels, such interchange might easily result in a combined study of the possibilities of the future, and the avoidance in the years to come, of such conditions as we are now facing. It is evident that management of labor must be elevated to a higher plane. Because labor is the major factor in most if not all industries, it should be led by recognized intelligence, rather than by radical agitators on the one hand or by stupid reactionaries on the other.

Remarkable and very favorable results have been secured in labor relations and in improvement of efficiency, simply by establishing frank and open conferences and free interchange of opinions, usually in genuine open shops (shops in which no prejudice or discrimination is allowed to exist either for or against men who do or do not belong to labor organizations); and sometimes by collective bargaining and dealing with a shop committee, to which is delegated all responsibility for keeping the men to agreements fairly made between management and employees.

Standardization of Design Called For

The great variety of designs called for by those who buy street cars, locomotives, trucks and other transportation equipment, is well known to be capable of beneficial limitation if all manufacturers and users could, through some agency, get together and by scientific study of the problems, not only from a utility or service standpoint, but from a manufacturing standpoint as well, reduce as much as possible the enormous number of varieties, styles, and types now required to be built. Many of these varieties are largely a matter of personal opinion or judgment of the buyers, who have not had opportunity to study the subject in all its phases. A great deal can be done toward standardizing the designs of these products, and thus promoting the best interests of all concerned.

The report cites numerous examples of waste elimination through improved management methods. Regardless of the industry or of the method by which it is conducted, human nature is always to be dealt with, if the highest success is to be attained. The report emphasizes the necessity of adequate cost control methods. Successful plants have management systems, says the report, which concludes:

"It will take time to bring the entire industry up to the higher level. During that time some establishments will probably be eliminated by the competition of the more advanced; but in this direction lies the only hope of eliminating industrial wastes."

LOWER PRICES

Reductions on Silica Brick at Chicago and on Kentucky Fire Clay Brick

PITTSBURGH, July 25.—There is no improvement in the demand for refractories and in the lack of any appreciable increase in blast furnace and steel plant activities, not much hope is entertained of early betterment. The monthly charts of the Refractories Manufacturers' Association giving production, shipments, unfilled orders and stocks on hand of fire clay and silica brick note a moderate increase in production, a decrease in shipments and a consequent gain in the stocks on hand as of June 30. Unfilled orders for fire clay brick at the end of June were practically the same as those at the end of May, or slightly in excess of 45,000,000 brick. Unfilled orders for silica brick declined rather heavily in June, the bookings as of June 30 amounting to somewhat in excess of 15,000,000 brick as compared with about 18,000,000 one month before. The figures for July are not expected to show any change in the drift.

Although business lately has been extremely quiet, it is evident that some inquiries are coming out for we note lower prices on silica brick in the Chicago district and also on Kentucky fire clay brick, and it is doubtful whether these reductions would have been made unless there were inquiries. Chicago silica brick now is quotable at $38 to $43 per 1000, f.o.b. works, a drop of $2 to $4 per 1000 from the former quotations. The decline in Kentucky fire clay brick is a matter of about $3 per 1000. Other quotations are unchanged but are purely nominal and probably would be shaded on the appearance of attractive orders. Plant operations, taking the country as a whole, are about 15 per cent of capacity.

We quote per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$36.00 to $43.00	$30.00 to $36.00
Ohio	36.00 to 40.00	30.00 to 35.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	40.00 to 45.00	30.00 to 40.00
Missouri	45.00 to 50.00	35.00 to 40.00
Silica Brick:		
Pennsylvania		35.00 to 40.00
Chicago		38.00 to 43.00
Birmingham		46.00 to 50.00
Magnesite Brick:		
Standard size, per net ton		70.00 to 75.00
Chrome Brick:		
Standard size, per net ton		60.00 to 65.00

The W. R. Miller Co., designers and builders of metallurgical furnaces, Pittsburgh, has moved from the House Building to Boggs and Jasper streets, where it has erected its own office building. The company recently received patents on a new mechanical gas producer.

Iron and Steel Markets

PRICES GO LOWER

Sharp Declines in the Central West

Further Domestic and Export Inquiries from Railroads

Further settling of steel prices has come in the past week and in some products the downward movement has been rapid. Informal announcement of a 1.75c. price for steel bars and of 1.85c. for plates and structural shapes—a $3 per ton cut below the July 5 schedule—was made in the week by several independent producers, but already somewhat lower prices are reported, indicating more aggressive competition in practically all markets.

Some encouragement is found in the larger tonnage under inquiry, but it is well recognized that in such a market no approach to price stabilization is to be expected. Every producer is meeting competition as it develops.

That the Steel Corporation's earnings for the second quarter were better than most predictions is ascribed in part to its unique advantage in railroad ownership and the fact that for nearly all the second quarter Chicago business was done on the Pittsburgh base. Lake navigation and cement earnings were also a factor.

The Central West has developed the most marked price concessions of the week. In semi-finished steel the new level is about $3 per ton below what has been considered the market. Sheet bars have sold at $32, Pittsburgh, as against $35. A Cleveland inquiry for 2500 tons of slabs has brought out some low quotations. On rerolling billets $30, Pittsburgh, is now the market and $35 for forging billets, both down $3.

In sheets several late Ohio transactions indicate a third reduction of $5 per ton within five weeks, and at that the market is irregular. The basis on the larger sales is 3c. for No. 28 black, 2.25c. for No. 10 blue annealed, and 4c. for No. 28 galvanized. The Ford Motor Co. has been a buyer of high-grade blue annealed sheets for crank cases.

A Mt. Vernon, Ohio, inquiry for 6900 tons of bars, plates and shapes has brought out new low prices, about two-thirds of this tonnage being for the stadium at Columbus on which the accepted bid was $69.50 for the steel erected. On 1000 tons of hard bars for reinforcement work on the stadium the low price was 1.62c., Pittsburgh.

Prices on hoops, bands, hot rolled strip steel and light rails have weakened in line with heavier products.

Operations by Steel Corporation mills are running close to 30 per cent this week, an improvement over the previous July average.

There is new pressure from blast furnace and steel companies for lower freight rates. An early meeting between these interests and traffic officials of lines serving Pittsburgh and Valley districts will be held at Pittsburgh.

The expected opening of bids next week on the Bombay, India, pipe line, requiring more than 70,000 tons of plates is of moment to large steel and contracting interests in this country and Great Britain. The advantage in price rests with this country and this may yet outweigh British Government influence.

More optimistic sentiment in some parts of the country in respect to pig iron is due to insistence of buyers upon prompt delivery rather than to increased demand. At several important centers the downward trend of prices seems to be arrested, at least temporarily.

Railroad car repair work is gradually being arranged for. The New York Central has distributed orders among eight builders for 4000 cars and may double the amount. One late contract is for 500 car repairs for the Buffalo, Rochester & Pittsburgh. The tank work for the 500 tank cars reported taken from the Russian Soviet Government by the Canadian Car & Foundry Co. would probably be undertaken in the United States.

Railroad material inquiries continue to feature the international markets. In August 12,000 tons of rails are to be bid on for Chile and 3000 tons for Morocco. Some 12,000 tons will be bought for a new Bolivian railroad and 1000 tons of light rails are wanted in Manila. Germany is figuring on 8000 tons of heavy rails for Finland, and Switzerland is sounding the market.

A second reduction in wages at the Steel Corporation's Lake Superior iron mines is announced, effective Aug. 1. It amounts to 10 per cent, whereas the May 16 reduction was 20 per cent. The corporation will also curtail further its mining operations. At all Lake Superior mines the outlook for winter work has grown more unfavorable as pig iron production has declined.

Pittsburgh

PITTSBURGH, July 26.

Sentiment in iron and steel trades here is still inclined toward hopefulness, notwithstanding that the past week has seen further slashing of prices in practically all steel products. Independent steel companies quite generally have revised "official" quotations downward, and now are on a basis of from $3 to $5 per ton below the prices established in the first week of July. So far there has been no public announcement of a change by the Steel Corporation, but it is generally understood that this company is meeting the reduction of the independents. Price concessions have been more severe in sheets than in any other finished product, at least two mills having gone to 3c. on black sheets for production tonnage against an inquiry recently put out by a Pittsburgh fabricating interest. This compares with 3.50c., the nominal quotation of the American Sheet & Tin Plate Co., and 3.25c., the quotation regarded as "official" by a number of independent makers. A quotation of 3.75c. is reported to have been made to a Pittsburgh district consumer on galvanized sheets and this also is said to have been for production sheets as distinct from those out of stock. Little real stability is observed in the prices of any of the steel products, but apparently more business is developing as a result of the fact that buyers can come pretty near naming their own prices, and this seems to be the basis for feeling that the industry is rounding the corner from the recent intense dullness.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 26, 1921	July 19, 1921	June 28, 1921	July 27, 1920
No. 2X, Philadelphia‡	*$21.35*	$21.85	$25.50	$49.15
No. 2, Valley furnace†	19.50	19.50	21.00	45.00
No. 2 Southern, Cin'ti†	24.50	24.50	26.00	45.60
No. 2, Birmingham, Ala.†	20.00	20.00	21.50	42.00
No. 2, foundry, Chicago*	18.50	18.50	20.00	46.00
Basic, del'd, eastern Pa.	21.25	21.25	23.50	44.40
Basic, Valley furnace	19.00	19.00	20.50	46.00
Bessemer, Pittsburgh	22.46	22.46	24.46	47.40
Malleable, Chicago*	18.50	18.50	20.00	46.50
Malleable, Valley	20.50	20.50	22.50	45.00
Gray forge, Pittsburgh	21.46	21.46	21.96	44.40
L. S. charcoal, Chicago	36.00	36.00	37.50	57.50
Ferromanganese, del'd	70.00	70.00	70.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	*30.00*	33.00	37.00	65.00
O.-h. billets, Pittsburgh	*30.00*	33.00	37.00	65.00
O.-h. sheet bars, P'gh	*32.00*	35.00	39.00	70.00
Forging billets, base, P'gh.	*35.00*	38.00	42.00	85.00
O.-h. billets, Phila	*35.74*	38.74	42.74	69.10
Wire rods, Pittsburgh	42.00	42.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh	*1.90*	2.00	2.20	3.25
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.10	2.10	2.25	4.75
Iron bars, Chicago	*1.85*	1.90	2.15	3.75
Steel bars, Pittsburgh	*1.75*	1.80	2.00	3.50
Steel bars, New York	*2.13*	2.18	2.38	4.02
Tank plates, Pittsburgh	1.80	1.80	1.90	3.25
Tank plates, New York	2.18	2.18	2.28	3.77
Beams, etc., Pittsburgh	1.85	1.85	2.00	3.10
Beams, etc., New York	2.23	2.23	2.38	3.27
Steel hoops, Pittsburgh	2.50	2.50	2.50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 26, 1921 Cents	July 19, 1921 Cents	June 28, 1921 Cents	July 27, 1920 Cents
Sheets, black, No. 28, P'gh.	*3.00*	3.25	3.75	7.50
Sheets, galv., No. 28, P'gh.	*4.00*	4.25	4.75	9.00
Sheets, blue an'l'd, 9 & 10.	*2.40*	2.50	2.85	6.00
Wire nails, Pittsburgh	2.75	2.75	3.00	4.00
Plain wire, P'gh	2.50	2.50	2.75	3.50
Barbed wire, galv., P'gh	3.40	3.40	3.65	4.45
Tin plate, 100-lb. box, P'gh.	*$5.50*	$5.75	$6.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$12.50	$12.50	$13.25	$35.50
Carwheels, Philadelphia	16.00	16.00	18.00	40.00
Heavy steel scrap, P'gh	12.00	12.00	12.00	27.00
Heavy steel scrap, Phila.	11.00	11.00	11.00	23.00
Heavy steel scrap, Ch'go.	10.00	10.00	10.25	24.50
No. 1 cast, Pittsburgh	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	38.00
No. 1 cast, Ch'go (net ton)	*11.50*	12.50	12.50	36.00
No. 1 RR. wrot, Phila.	13.50	13.50	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	9.00	9.00	9.50	24.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$3.00	$18.00
Foundry coke, prompt	4.00	4.00	4.25	19.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*12.50*	12.75	12.62½	19.00
Electrolytic copper, N. Y.	*12.25*	12.62½	12.62½	19.00
Zinc, St. Louis	4.25	4.25	4.25	7.85
Zinc, New York	4.75	4.75	4.75	8.20
Lead, St. Louis	4.35	4.35	4.15	8.75
Lead, New York	4.40	4.40	4.40	9.00
Tin, New York	*26.00*	27.00	29.00	48.50
Antimony (Asiatic), N. Y.	4.65	4.65	4.87½	7.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 26, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

July 19, 1921,	2.407c.
June 28, 1921,	2.607c.
July 27, 1920,	3.974c.
10-year pre-war average,	1.684c.

Some slight increase in plant activities is observed here and there. The Carnegie Steel Co. this week started up its Clairton, Pa., plant which had been idle for several weeks and the American Steel & Wire Co. has turned on the blast at one of its furnaces at Donora, Pa. The American Sheet & Tin Plate Co. this week started up its Guernsey works at Cambridge, Ohio, increased the number of active hot mills at Shenango works at New Castle, Pa., and is planning to start up its National works at Monessen, Pa., at an early date. While these increases are due to the fact that stocks have dwindled to a point where they need replenishing, they are important as showing that stocks in second hands are growing smaller and needs are increasing. It is probable that steel plant operations will continue irregular for a time because at the moment there is nothing to give buyers real confidence in prices and consequently they are likely to continue to take on supplies as they are needed. Such buying makes difficult the building up of rolling mill schedules. Outside of the Steel Corporation plants, where the rate remains 37c. an hour for common labor, the going rate in this and nearby districts is 30c. an hour. Structural interests view with some satisfaction the recent action of a bricklayers' union here in adopting a wage schedule cutting the rate from $12 to $10.40 per day. There is no scarcity of labor here at present; in fact, the contrary is the case and thousands of men are seeking work at practically any rate the employers will pay. It is noted that railroad labor now is the best paid of any class. Deflation of labor has been pretty drastic and in the iron and steel industry there is a fairly general belief that only the deflation of freight rates remains to complete the cycle.

The downward drift of pig iron prices seems to have been halted temporarily at least and some seem to believe that the market is dragging on bottom, and even with a drop in ore prices and in freight charges current prices are low enough. The coke market has been featured by the sale of 30,000 tons of furnace grade for a Buffalo consumer for August and September shipment at a price of $2.75 per net ton, Connellsville oven.

Ferroalloys.—Business shows no improvement and prices are quite as nominal and indefinite as they have been for several weeks. Ferromanganese is held by domestic producers at $75, delivered, for 80 per cent material and $72.50 for 76 to 78 alloy, but against one or two small inquiries selling agents were instructed not to let the business get away, if a cut of $3 or $4 a ton would get the order. There are no definite offers of English material much under $70, Atlantic seaboard, but the reports will not down that $65 and even $60 would be accepted on contracts. Spiegeleisen still is inactive and prices are holding only because production is nil and available stocks small. Inquiries are out for a few carloads of 50 per cent ferrosilicon against which $65, furnace, freight allowed, has been quoted by a couple of makers. Indications are that this business will be closed at less than that figure.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $67.50 to $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 to $28 furnace quoted by makers on direct business and $25 to $26 furnace on resale tonnages; 50 per cent ferrosilicon, $65 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Pig Iron.—The market again has lapsed back into dullness, sales having run entirely to lots of one to

two carloads, but there seems to be a more optimistic undercurrent in the trade, due possibly to the fact that the consumers of foundry iron have been pretty insistent on early delivery of their purchases. We make no change in our quotation on Valley iron this week. Possibly some further liquidation of furnace yard stock will bring even lower prices than now prevail, but it is noted that if buying has not increased lately, at least consumers are showing more interest in the market and have been asking whether purchases of supplies for the remainder of the year would not be safe at current levels. Selling prices are so far out of line with actual costs that it may be said safely that none of the idle merchant furnaces is likely to be blown in until there is either an appreciation in the price or a decline in costs. Lower prices for ore are being urged, but blast furnace interests generally regard freight charges as the obstacle to a reduction in producing charges. We note one sale of 150 tons of No. 2 foundry iron from a western Pennsylvania furnace at $19.50. The most recent business in basic iron was at a delivered price equivalent to about $17.75 at Valley furnaces, but the iron moved from a furnace having a low freight rate to the consuming point.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.50
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	20.50

Billets, Sheet Bars and Slabs.—There has been some matching by independents of "official" quotations with those which have been privately quoted against such recent inquiries as have been up. The Steel Corporation as yet has made no change in its schedules, but is reported to be meeting lower quotations when provided with the right sort of evidence. The new prices average about $3 per ton below those named as of July 5. Sheet bars, which it is reported recently sold down to $32, now are being quoted at that price, and slabs are available at $31. A recent inquiry for a sizable tonnage of slabs brought a quotation of $31, but the business was not obtained, the report being that the price was $2 or $3 a ton above what the material could be had for.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Bessemer and open-hearth sheet bars, $32; slabs, $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—All makers still are quoting $42 for the base size of soft rods, but this price is finding almost no basis in sales. There is almost no stability to prices of rivets and bolts, and suggestions are common that on wire products the prices established the first week of July are being shaded. Inquiries for rods are altogether insufficient to provide a test of the price. Prices are given on page 233.

Plates.—The independent mill price has quite definitely settled to 1.85c. Pittsburgh, but this figure is looked upon as referring merely to small tonnages and would be shaded on sizable lots. Indeed, 1.75c., Pittsburgh, recently was quoted against an inquiry for 1200 tons of tank plates. Railroad equipment companies in this district are getting very little business, even in repair work, but hopes are strong that the Government financing of the railroads will be productive of purchases. Most of the companies are carrying fairly large stocks of steel and railroad buying might not instantly bring plate orders.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Structural Material.—Fabricating interests in this district have not been successful bidders against any of the important structural projects recently placed. The largest of these was the new stadium for the Ohio State University which involves about 4100 tons of steel and went to the Mt. Vernon Bridge & Iron Co., Mt. Vernon, Ohio. This job is said to have been let at $70 per ton, fabricated and delivered. Plain material prices are weaker in that independents now are publicly quoting a base of 1.85c. for plates and structural shapes. This base is observed fairly well against small lot inquiries, but on sizable tonnages some mills have given protection at a lower figure. Plain material prices are given on page 233.

Iron and Steel Bars.—Independent makers of soft steel bars generally are quoting 1.75c., and this price, it is understood, is being met by the Steel Corporation. No very large inquiries are out, but orders for small lots for prompt shipment are fairly numerous. The Navy Department inquiry, for which bids were to be opened Aug. 5, and which included a large tonnage of bars, has been withdrawn. [The policy of the Government is explained in our Washington correspondence.—Editor.] Reinforcing bars rolled from billets also are quoted at 1.75c., base, with only a moderate inquiry. These bars, rolled from old rails, are quoted at 1.75c., but this price hardly can be obtained in competition with new steel bars. Iron bars are inactive and nominal at 2.50c. for refined iron. Representatives of the Amalgamated Association of Iron, Steel and Tin Workers and the Western Bar Iron Association are in conference in Chicago in an effort to agree upon a wage scale for the year ending June 30 next. The Atlantic City conference early in June adjourned without results. Union mills are in operation because the Amalgamated contract allows an additional month beyond the scale year for the reaching of an agreement.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets, 1.75c. base; reinforcing bars rolled from old rails, 1.75c.; refined iron bars, 2.50c., in carloads f.o.b. mill, Pittsburgh.

Steel Rails.—Light rails rolled from new steel are no longer quotable at above 1.90c. for 25-lb. to 45-lb. sections. Tonnages are freely offered at that price and a quotation of even 1.85c. has been made against some recent inquiries. These prices would indicate about 1.75c. for light rails rolled from old sections, as there usually is a spread of $2 to $3 per ton between the two kinds. Demands are few and small.

We quote 25 to 45-lb. sections, rolled from new steel, 1.85c. to 1.90c.; rolled from old rails, 1.75c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—Quoted discounts and prices mean absolutely nothing as far as sales are concerned. Desire to sell is much more urgent than the desire to buy, and prices all along the line are being shaded. Manufacturers outside the Pittsburgh district are leading the way in price cutting and makers here, rather than lose a regular customer, are meeting the lower prices. Price cutting in nuts is especially severe and also is sharp in bolts. It is frankly admitted that quotations are above what can be done, but the disposition of Pittsburgh makers is to wait on more settled conditions before naming new quotations. Prices and discounts are given on page 233.

Spikes.—Shading of the prices established early this month has begun to crop out, and the stabilized price of $3 per 100 lb. has become merely an asking quotation. A price as low as $2.75 is reported. Demand is purely hand to mouth. The Pittsburgh Railways Co., which is in the market for 69,000 tie plates, is reported to have been quoted less than 2.50c., the nominal quotation of makers. Prices are given on page 233.

Cold-Finished Steel Bars.—Settling of the price of hot-rolled bars to 1.75c. is reflected in a price of cold-finished steel bars, which now are obtainable in carloads at 2.50c. base. Makers feel that a conversion charge of $15 per ton is as little as they can get by on, in view of the character of the current demand which seldom calls for more than a carload and usually involves a number of sizes.

Hoops and Bands.—Demand shows no appreciable increase and the going price is very indefinite. Nominally makers are quoting 2.50c. to 2.60c. base, but 2.50c. is maximum on sales and buyers with orders to place would not have to try hard to get a lower quotation.

Hot-Rolled and Cold-Rolled Strips.—Public quotations are unchanged at 2.50c. to 2.60c. for hot-rolled and 4.25c. for cold-rolled strips. However, some business in hot-rolled recently has been placed as low as 2.40c. and cold-rolled strips have been placed at 4c. flat. Demand shows some increase from both automobile manufacturers and the makers of builders' hardware, but there is still considerable eagerness on the

part of some makers to get orders and this explains the shading of prices.

Iron and Steel Pipe.—Reports from jobbers indicate a good movement of merchant pipe, sales for June having shown a substantial increase over those for May, while the May sales were larger than those for April. This development is finding some reflection in orders upon the mills, but the jobbers are careful not to over-order and are merely specifying for supplies to round out the depleted sizes. Oil country pipe still is in light demand because of the curtailment of drilling. Some inquiries still are coming out for line pipe and we note one sale of 10 miles of 18-in. pipe to the Ohio Fuel Supply Co. Discounts are given on page 233.

Steel Skelp.—The stabilized price of 2c. is finding no basis whatever in sales and it is believed that an inquiry, even of moderate proportions, would bring the price of 1.90c. and possibly less.

Wire Products.—Business still is of extremely limited proportions because buyers are not convinced that prices have struck bottom and consequently are merely taking on only such supplies as are urgently needed. Buyers generally are stipulating that they must be guaranteed against a decline in prices on such business as they are placing. Some manufacturers are meeting such requests while others are refusing them. Rumors have been common lately of quotations of $2.50 on nails, but makers deny having made such a concession, although there seems to be some equalizing of freights on competitive business. Ironton, Ohio, makers are reported to be quoting nails at 2.75c. f.o.b. Ironton, which in some of the territories served by these mills would figure back close to $2.50, Pittsburgh.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Sheets.—Business in general is somewhat better than it has been, evidence of which is found in a further slight gain in mill operations. The American Sheet & Tin Plate Co. last week operated 40 per cent of its sheet mills and had the best run of orders and specifications of any week this year. Independent plant operations have increased somewhat since the agreement was reached with the Amalgamated Association of Iron, Steel and Tin Workers on a wage scale for the year to end June 30, 1922. The drive for business, however, still is pretty strong, and some very low prices are being named to attract orders. The American Sheet & Tin Plate Co. nominally is quoting the July 7 bases of 3.50c. for black, 4.50c. for galvanized and 2.65c. for blue annealed, in the base gages. The company, however, is meeting competition when provided with the right sort of evidence by its regular customers. Independent mills are quoting as low as 3c. on black sheets, 4c. on galvanized sheets, and 2.40c. on blue annealed. These quotations are said to be against material in stock and not for new rollings, but a quotation of 3.75c. recently was made on galvanized sheets and the mill naming it gave as a reason that it was desirous of starting up some idle capacity. The situation in sheets is extremely indefinite as to prices. Each maker seems to have his own ideas as to prices and the terms are largely a matter of negotiation. A Pittsburgh fabricating interest which has an inquiry out for 750 tons of sheets for roofing and sidings in connection with an Eastern structural project has been quoted 3c. for production sheets by two makers and 3.10c. by another. Prices are given on page 233.

Tin Plate.—There is still a fair amount of business in tin plate for condensed milk cans and for tobacco boxes, but in other kinds of material demand still is extremely slack and hopes are low of any decided betterment over the remainder of the year. The more common quotation on production plate still is $5.75 per base box Pittsburgh, but some makers operating their plants on an open shop basis recently revised wage scales of tonnage men to a point where they can take on business at $5.50 and even less, and escape serious loss. The market is quotable at $5.50 to $5.75 per base box, Pittsburgh, but it is not firm at these prices.

Coke and Coal.—The Wickwire-Spencer Steel Corporation, late last week, closed against its inquiry for 500 tons a day of furnace coke for August and September shipment, at a price of $2.75 per net ton oven. Otherwise the market has developed no new features. Spot tonnages of furnace coke continue to be available at $2.75, oven, although the larger operators are holding to $3 and are disinclined to sell for less. The claim is set up that a price of less than $3 should not be regarded on the ground that the coke is not going to blast furnaces. But the fact that coke is not finding the ordinary use is ascribed to the small number of active blast furnaces. Foundry activities are increasing and this finds reflection in the demand for standard 72-hr. coke. Prices are unchanged, ranging from $4 to $4.50 per net ton, oven, but there is more firmness within that range than there was recently. Reduction in the freight rates on coal that will make possible the shipment of Pennsylvania coal into such markets as Chicago, on practically even footing with Illinois and Indiana coal, has not yet found reflection in sales. Prices remain rather weak in this market. Mine run steam coal ranges from $1.50 to $2 per net ton, mines, and the same range will cover a recent business in by-product grade. These prices refer to coal from non-union fields. Gas coal is almost exclusively the product of union fields and while the demand often before has been better, operators seem disinclined to consider less than $2.25.

Cut Nails.—Both the Reading Iron Co. and the Wheeling Steel Products Co. now are quoting a base of $3 per keg, f.o.b. mill, for carload lots, and 3.10c. for less than carloads. Demand is very light in this district.

Old Material.—No material change can be made in quotations which, as for some time, represent largely what dealers would pay for material to throw down on their yards, but if there is any definite tendency, it is in the direction of firmness, due to an increasing tendency among railroads and other producers to hold rather than sell their material at current quotations. The Pennsylvania Railroad, Eastern Region, withdrew 11,000 tons of old rails offered in the July list because the bids were regarded as too low. These rails and some other material will be offered in the August list. Current prices on turnings also are so low that the automobile companies and other producers are letting their stocks accumulate. Some users of turnings who have been seeking tonnages find that bids of $7 and even $7.25 have not brought out many. Bids of $14 for heavy breakable cast have been equally without responses. Steel companies which would lay down some heavy melting steel at $12 to $12.50, have not been offered much material at those prices. Dealers have cut the prices they are willing to pay for some grades, but this may be ascribed to the fact that present signs do not indicate an early revival of demand and they are keeping in mind the carrying charges when figuring the prices they will pay. Indicative of the difference between prices the dealers and mills are paying, it is noted that a Pittsburgh independent recently bought some scrap rails at $13.50 per gross ton from the Pennsylvania Railroad and for some knuckles and couplers about $1 a ton more.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	15.50 to 16.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.00 to 9.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	15.50 to 16.00
Railroad malleable	11.50 to 12.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	13.50 to 14.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	11.50 to 12.00
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	11.50 to 12.00
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

Chicago

CHICAGO, July 26.

With the announcement of a further price reduction of $3 per ton on plates, shapes and bars, the independent steel companies have again taken official cognizance of the price cutting which has been going on for some weeks. The Steel Corporation, following its policy of meeting competition, is also quoting the new prices, which are 1.85c. for plates and shapes and 1.75c. for bars. These are to-day's ruling prices for small-lot business, but in case of plates and shapes particuarly, tonnages had been sold prior to the announcement at prices lower than those which the independent companies now name as their official quotations.

The effect of the reduction mainly is to give both buyers and sellers a new basis from which to work. In other than these three major products, there is also marked price weakness, particularly in sheets. Open bids taken by the Big Four Railroad on 450,000 tie plates brought out a price as low as $40 per net ton, Pittsburgh.

Mill operations in this district continue virtually unchanged, the leading interest maintaining a 30 per cent rate and the leading independent a 25 per cent rate. A slight improvement in operation of sheet mills and wire mills is noted. Wire trade during the past week has shown a marked betterment, jobbers buying in fair quantities for quick replenishment of stocks.

Pig Iron.—The principal purchases of pig iron during the past week were made by a cast-iron pipe company for its Ohio plant. A few thousand tons of No. 2 foundry were divided among two or three sellers, some of the business going at $18, Northern furnace. Although some sellers report a slight improvement in demand for iron, business is confined almost entirely to carload lots, on which the ruling quotations are $18.50 for No. 2 and $19 for No. 1. An inquiry from the St. Paul Railroad for 2500 tons of malleable is still pending.

Quotations on Northern foundry, high phosphorus, malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.00 to	$36.50
Northern coke, No. 1, sil. 2.25 to 2.75	19.00 to	19.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	18.50 to	19.00
Northern high phos	18.50 to	19.00
Southern foundry, sil. 1.75 to 2.25		26.67
Malleable, not over 2.25 sil	18.50 to	19.00
Basic	18.50 to	19.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free		35.00
Silvery, sil. 8 per cent		37.53

Ferroalloys.—A car wheel company is in the market for 300 tons of ferromanganese. The quotation on carload lots has been around $78, delivered, but it is believed that a tonnage the size of the one inquired for can be bought for $75. Fifty per cent ferrosilicon has been sold at $71, delivered, for a single carload.

We quote 78 to 82 per cent ferromanganese, $78 delivered; 50 per cent ferrosilicon, $71 delivered; spiegeleisen, 18 to 22 per cent, $36 delivered.

Plates.—A $3 per ton reduction by the leading independent mills which has been met by the Steel Corporation, now fixes the "official" price at 1.85c., Pittsburgh, but lower prices have been quoted, it being possible to buy at 1.75c., Pittsburgh, even in relatively small lots. The rapidity with which steel prices have softened in the past few weeks has left buyers in an uncertain state of mind with regard to the future course of the market, with the result that this week there is comparatively little business of importance upon which to quote.

The mill quotation is 1.75c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.03c. for plates out of stock.

Structural Material.—The new price of 1.85c., Pittsburgh, on plain material is merely an official recognition by the mills of the prices which have been quoted on some structural jobs during the past two or three weeks. One recent order placed by a fabricator, amounting to 1200 tons, is said to have been taken at 1.80c., Chicago, equivalent to 1.42c., Pittsburgh. In that instance the fabricator's price for the material fabricated and delivered was extremely low—$61 per ton. A number of projects which have lately come into the market are still pending. Among the lettings of the past week are the following:

Palace Theater Building, South Bend, Ind., 300 tons, Rochester Bridge Co.

Extension to township high school, Joliet, Ill., 774 tons, to Hansell-Elcock Co.

State of Montana, three steel truss spans across Clark's Fork, Noxon, Mont., 366 tons, to unnamed fabricator.

Commercial National Bank Building, Madison, Wis., 138 tons, to unnamed fabricator.

Midwest Refining Co., two oil storage tanks and one additional steel roof, 544 tons, to Chicago Bridge & Iron Co.

Bids have been taken by the United States Smelting & Refining Co. on 180 tons for a steel plate flume at Salt Lake City, Utah.

The mill quotation is 1.80c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.03c. for materials out of warehouse.

Bolts, Nuts and Rivets.—There has been continual shading of prices on bolts, nuts and rivets. New discounts are brought out with almost every inquiry. Some mills decline to go to the extreme limits which their competitors are quoting to get business. The market is quite irregular and prices are not well defined. Jobbers' prices unchanged.

Jobbers quote structural rivets, 4.03c.; boiler rivets, 4.13c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—The new price on bars with the $3 per ton reduction announced by independent mills and met by the Steel Corporation is 1.75c., Pittsburgh, but even this price, now but a few days old, has been shaded. Bar iron is also lower, it being quite easy to do 1.85c., Chicago mill, with every indication that a fair-sized order would bring out an even lower quotation. No new concrete reinforcing work is reported and some of that which was reported last week is still pending. Rail carbon steel bars are quoted freely at 1.90c., Chicago, it no longer being possible for the mills to get above that figure. Jobbers' prices on bars are unchanged, except that an effort is being made to obtain an $8 spread over the mill price on hard and deformed steel bars for reinforcing purposes. That is, jobbers are quoting 2.53c., Chicago, but it is still possible to buy at 2.38c., Chicago.

Mill prices are: Mild steel bars, 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.85c., Chicago; rail carbon, 1.90c., mill or Chicago.

Jobbers quote 2.93c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.35c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—The sheet market is very weak, and while the usual prices are 2.45c. for No. 10 blue annealed, 3.25c. for No. 28 black and 4.25c. for No. 28 galvanized, Pittsburgh, sales have been made at lower figures. The bottom quotations at which sales have been made appear to be 2.25c. for blue annealed, 3c. for black and 4c. for galvanized. Demand is light, but the low prices have brought out some business.

Mill quotations are 3.25c. for No. 28 black, 2.45c. for No. 10 blue annealed and 4.25c. for No. 28 galvanized, all being Pittsburgh prices subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.68c.; No. 28 black, 4.90c.; No. 28 galvanized, 5.90c.

Rails and Track Supplies.—Following the reduction a week or so ago to 2.30c., Chicago mill, on tie plates, bids were opened on 450,000 tie plates, about 2250 tons, for the Big Four Railroad. These were open quotations, the lowest being $40, Pittsburgh, by the Dilworth-Porter Co., the others being uniformly $46 per net ton, Chicago. The Chicago, Burlington & Quincy Railroad will shortly issue an inquiry for tie plates. Fair orders for railroad spikes are being received by Western mills.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.90c. f.o.b. makers' mills.

Standard railroad spikes, 3c., Pittsburgh; track bolts with square nuts, 4c., Pittsburgh; steel tie plates, 2.30c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.30c., f.o.b. makers' mills.

Warehouse Prices.—No further price changes have been made in the past week by local warehouses.

Cast Iron Pipe.—Detroit has advertised for 1500 tons of 8-in. Class B pipe, bids closing July 29. Hammond, Ind., has set Aug. 8 as the closing date for bids on 4000 tons of 36-in. pipe. Litchfield, Ill., is getting preliminary figures on about 800 tons, but formal bids will not be asked for until estimates have been compiled. Bay City, Mich., will receive bids up to Aug. 8 on 5000 tons of 20, 24 and 36-in. water pipe. On the Bay City job bids are also asked for on steel and wood pipe.

We quote per net ton, f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $51.10; 6-in. and above, $48.10; class A and gas pipe, $3 extra.

Wire Products.—A gradually improving demand for wire products, especially wire nails, has been in evidence during the past three weeks. Orders in the past week were surprisingly good, ranging from carload lots to 100 tons, but there was a considerable number of them, indicating that jobbers' stocks have run pretty low. Nearly all of the orders were for rush shipment. The better business has already been reflected in a slight improvement in mill operation especially by the leading maker. Prices are holding fairly well, there being less talk of price cutting on wire and nails than on any other steel products.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Railroad Equipment.—The New York Central has placed orders with several car builders for the repair of 4000 freight cars. The Chicago & Northwestern Railroad may be in the market soon for car repairs.

Old Material.—The most important business of the past week was the purchase by two mills of about 2000 tons each of heavy melting steel. In one instance $10, delivered, was paid and in the other $10.50 to $10.75, delivered. A mill also bought machine shop turnings at $3.50, delivered. New railroad offerings include 5000 tons by the Chicago, Burlington & Quincy and 2500 tons by the Pennsylvania Northwestern Region, while blank lists have been issued by the New York Central and Big Four.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	12.50 to 13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	13.25 to 13.75
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
No. 1 busheling	8.25 to 8.75
No. 2 busheling	5.75 to 6.25
Cut forge	8.50 to 9.00
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.25 to 9.75
No. 2 railroad wrought	9.00 to 9.25
Steel knuckles and couplers	10.25 to 10.75
Coil springs	11.50 to 12.00
No. 1 machinery cast	11.50 to 12.00
Low phos. punchings	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.25
Machine shop turnings	3.00 to 3.50
Cast borings	4.50 to 5.00
Stove plate	11.00 to 11.50
Grate bars	9.50 to 10.00
Brake shoes	9.50 to 10.00
Railroad malleable	11.00 to 11.50
Agricultural malleable	11.00 to 11.50
Country mixed	7.00 to 7.50

The paper on the use of powdered fuel under steam boilers presented by H. D. Savage, of the Combustion Engineering Corporation, 43 Broad Street, New York, before the American Iron and Steel Institute, at its May meeting, has been printed in pamphlet form for general distribution by the company. The paper is offered as a complete summary of powdered coal progress up to date.

New York

NEW YORK, July 26.

Pig Iron.—The effect of the prolonged period of reduced production and decreasing stocks in the hands of furnaces and melters is being shown in the increasing difficulties of foundrymen in obtaining deliveries promptly on the iron which they need. As many of them have followed a policy of buying from hand to mouth, they need immediate delivery when they place orders, and not infrequently discover that their favorite iron or iron of the analysis desired cannot be promptly obtained. This is an indication that before long there must be a buying movement, although heavy buying is not expected. Inquiries this week are more numerous than the preceding week and amount to from 1500 to 2000 tons for prompt shipment. Difficulty is also being experienced in obtaining prompt delivery of coke.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.02 to $25.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.02 to 24.52
East Pa. No. 2 fdy., sil. 1.75 to 2.25	22.52 to 23.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—Absolute stagnation is reported in the market for all grades of ferroalloys. Prices for ferromanganese and spiegeleisen are nominal and represent the asking price of sellers, but not the prices which it is believed a fair test of the market would bring out. It is confirmed that a carload lot of domestic ferromanganese was recently sold at $72.50, delivered, but the asking price is still $75, delivered. Some sellers of British alloy are quoting as low as $70, seaboard. There is no demand for spiegeleisen and the quotation varies from $26 to $31, furnace, depending upon the analysis, quantity and delivery. There is no demand for manganese ore. Ferrosilicon, 50 per cent, is nominally unchanged, the sale of two cars having been reported at around $65, delivered, in the Middle West. We quote prices as follows:

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$70.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Manganese ore, foreign, per unit, seaboard	22c.

Warehouse Business.—Slackness continues and with recent lower prices by mills, warehouses here are looking forward to another reduction of prices in a short time. In brass and copper, business is poor and further reductions within a fortnight are generally considered inevitable. While the majority of dealers in sheets are maintaining a price of 4.50c. per lb. base on black sheets; 3.68c. per lb. base for blue annealed and 5.50c. per lb. base for galvanized sheets, there is a tendency to shade these prices, particularly in galvanized sheets, sales of which are being made by some dealers at 5.25c. per lb. Warehouses handling pipe are meeting competition on a basis proportionate to the mill reductions, but generally have not issued any new price schedule. The pipe prices quoted on page 252 represent the basis of from 60 to 70 per cent of sales, the remaining transactions being from 5 to 10 per cent under these discounts. In all materials, prices are largely nominal.

High-Speed Steel.—The market shows no change for the better. A few small orders continue from textile machinery builders. Producers generally are quoting about 90c. per lb. for 18 per cent tungsten high-speed steel with some sales reported at 85c. per lb. A good order would probably bring out a price satisfactory to the purchaser.

Finished Iron and Steel.—One of the interesting developments of the week is the placing with a jobber of 750 tons of concrete reinforcing bars for the Federal Reserve Bank at John and Nassau streets. A stipulation that the bars must be delivered in small lots on 24 hr. notice, cut to length, and thus requiring storage and cutting facilities not far remote from the point of use, was enough of an obstacle to keep mills from bidding low enough to get the work. It is understood that the unit price was somewhat higher than the minimum mill quotation on a delivered New York basis. Steel bars are now pretty generally obtainable

at 1.75c. base, Pittsburgh, and the common quotation for both plates and structural material is 1.85c., although these quotations are made on such relatively small lots that they do not represent what could be done on a large attractive order. Railroad car repair work is slowly materializing. It is believed that the New York Central has already distributed among eight car builders orders for repairs on 4000 cars and that possibly the volume of work will be doubled. The Buffalo Steel Car Co. will do the repairs on 500 cars for the Buffalo, Rochester & Pittsburgh Railroad; this car builder is also reported to have booked like sized orders for the Delaware & Hudson and the Erie. Elsewhere is reported the contract placed with the Canadian Car & Foundry Co. for 500 tank cars for Russia; it is believed that the tank parts at least will be made in the United States. In fabricated steel lines some activity is noted in apartment house construction on the part of builders who have refrained for months until now to engage on such ventures. One involving 1100 tons is to be erected at 110th Street and Riverside Drive. Another actively considered is to go up at Madison Avenue and Eighty-fourth Street. According to the report of the Bureau of Buildings for the Borough of Manhattan, business buildings other than those of the office type increased in number, measured by construction permits, about 67 per cent and in estimated cost about 150 per cent in the first six months of 1921 against the corresponding period of 1920. New tenement and apartment houses have increased from 15 last year to 42 this year. A viaduct at 134th Street and Riverside Drive is a project of the immediate future and will take 350 tons. The marine terminal at Wilmington, Del., 1000 tons, is still open. Contracts awarded include 900 tons for the Nesquehoning bridge of the Central Railroad of New Jersey to the Bethlehem Steel Bridge Corporation, which has also taken 250 tons for two or three bridges; 750 tons for the Amoskeag bridge to the Phoenix Iron Co., for which the Boston Bridge Works will do the erecting; 4800 tons for 50 tanks for the Sinclair Consolidated Oil Co., one-half to the Chicago Bridge & Iron Works and one-half to the Graver Corporation, Chicago.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c. to 2.28c.; plates, 2.18c. to 2.38c.; structural shapes, 2.18c. to 2.38c.; bar iron, 2.28c.

Cast Iron Pipe.—The usual mid-summer lull has finally struck this line of industry, there being a halt to inquiries and orders. Some pipe foundries are shutting down temporarily, ostensibly to make repairs, but probably because of lack of business as well. The 1500 ton contract which the City of New York was to have awarded last week has been postponed, specifications having been recalled and no reasons given. We quote f.o.b. New York, carload lots, as follows: 6-in. and larger, $52.30; 4-in. and 5-in., $57.30; 3-in., $67.30, with $4 additional for Class A and gas pipe.

Old Material.—The chief feature last week was the buying of an eastern Pennsylvania consumer, other than the Bethlehem Steel Co., of heavy melting steel at a delivered price of $12 a ton, which it has laid down in its yards. Some of the purchases were made in this district. There is less change in prices this week than for some time, indicating perhaps that prices have reached a somewhat permanent bottom.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.00 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	9.50 to 10.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.00 to 10.50
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	3.50 to 4.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 7.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	7.00 to 7.50
Old car wheels	10.00 to 10.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Buffalo

BUFFALO, July 26.

Pig Iron.—The volume of sales from week to week does not change and while the week just closed was no better than its immediate predecessors in point of tonnage, there is an appreciable feeling of optimism. Depletion of the stock of iron with one combination interest to the point where it must blow in a furnace or buy iron elsewhere, will probably result in the former step—thus accounting for its inquiry for a large tonnage of coke and the receipt of the first ore of the season. Decision to operate a blast furnace for its own use is expected daily. Present prices on pig iron are not attractive to this producer and the furnace operation will be generally confined to tonnages sufficient for its own use. In the same connection this interest continues to quote at $25 and $26, but of course these prices are prohibitive. On the basis of present sales the furnace which expected to blow out its only stack in blast will find sufficient to keep going for the present. Its total movement last week was 1000 tons at $20 and $22 base. Inquiry has fallen off with the steelmaking producer which sold Buffalo iron at Eastern points and total orders are less than 500 tons. The necessity of filling orders on old contracts has practically forced one producer out of the market—at least for new business. Its stocks are depleted to the point that it will not figure actively on inquiries amounting to 4100 tons. Sales of 100 tons of malleable at $23 and 500 tons of extra high silicon at $23 represent the only new business. The largest local buyer is known to be in the market for 1700 tons for use in Buffalo plants.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.75 to $22.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75 to 22.00
No. 2 plain, 1.75 to 2.25 sil.	20.00 to 21.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—Several factors unite to justify an expression of better feeling. There is a probability of increased operation and requests are in for bids on a number of sizable structural jobs which have been held up many months awaiting normal prices. The general trend of mill business is about the same scale which has characterized this year's activity. Bars and pipe show better movement while plates are dull. Branch offices of national mill interests have been instructed on new prices they will quote. Pipe business shows local improvement with the purchase of 500 tons for use in the plumbing work on the new Hotel Statler and an inquiry for 800 tons for the steamfitting work on the same job. A number of orders for steel piling, ranging in size from 100 to 300 tons, reveal improvement. In structural work bids for the J. N. Adam hospital at Perrysburg, N. Y., involving 1000 tons; and three buildings as additions to the Eastman Kodak Co., Rochester, N. Y., exceeding 1000 tons, and announcement by the successful bidder for the new schools at Buffalo, to the effect that the city will be refunded any saving resulting from further reduction in prices of materials, all indicate improved demand. Bars are now quoted at 1.75c.; shapes 1.85c. and plates 1.85c.; black sheets 3.25c. and galvanized 4.25c. Canadian business is quiet and in proportion mills are doing less than their border competitors. A number of reinforcing bar inquiries are out, but the one mill which is the chief contender for the business and which expects to start operations if the business comes its way has not announced the names of the prospective customers or the tonnages involved. A sheet mill down for several weeks expects to operate August 1.

Warehouse Business.—Price reductions are expected daily with announcements from mills that new schedules are in force. Orders have been more frequent—particularly for structural shapes and sheets. Railroad inquiry indicates not only repairs to rolling stock but a definite program for new equipment. Some of this is in the warehouses, but the general volume of

railroad business is small. A more settled feeling is reflected among warehouse customers; in substance, it is that the next price announcement will be the last and that a stabilized market will follow.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.05c.; plates, 3.05c.; plates, No. 8 gage, 3.65c.; soft steel bars and shapes, 2.95c.; hoops, 3.65c.; blue annealed sheets, No. 10 gage, 3.70c.; galvanized steel sheets, No. 28 gage, 5.80c.; black sheets, No. 28 gage, 4.80c.; cold rolled strip steel, 7.15c.

Old Material.—Inquiry for heavy melting steel revived talk that the railroad equipment maker who bought heavily in the winter was again in the market, but no sales were consummated. While trading is at a standstill, in general dealers are more encouraged.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$11.50 to $12.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Boston

BOSTON, July 26.

Pig Iron.—One New England melter this week bought two 500 ton lots special analysis iron at a price based on $21 Buffalo furnace for No. 2X, an eastern Massachusetts foundry increased an order for 200 to 500 tons eastern Pennsylvania No. 1X at $23.50 furnace or $27.56 delivered, and another Massachusetts concern purchased 300 tons Lake charcoal iron at a price understood to have been below the market, but aside from these transactions, business was confined to scattered car lots, mostly to Massachusetts melters. Indications are the flurry in buying has spent itself inasmuch as the ratio of daily melts, the amounts of iron in yards and due foundries on old contracts are such that further purchases other than filling-in orders to round out mixtures are not warranted. Buffalo high silicon iron is offered on a basis of $20 furnace for No. 2 plain in large lots and at $20.50 in small. The supply of eastern Pennsylvania iron at $20 is drying up, while Virginia and Alabama furnaces are not anxious for business on any such basis. Delivered pig iron prices follow:

East. Penn., sil. 2.25 to 2.75	$25.06 to $28.81
East. Penn., sil. 1.75 to 2.25	24.56 to 28.31
Buffalo, silicon 2.25 to 2.75	25.96 to 28.96
Buffalo, silicon 1.75 to 2.25	25.96 to 28.46
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	32.16 to 32.66
Alabama, silicon 1.75 to 2.25	31.66 to 32.16

Coke.—Additional tonnages of coke were booked this week on a $10.91 delivered basis where the freight rate does not exceed $3.40. The volume of new business was not sufficiently large to noticeably change the ratio of production and daily shipments of New England by-product fuel makers. Among foundries there appears a tendency to buy on a spot basis rather than a contract. One large textile machinery interest, however, this week covered on last half requirements for one of its plants.

Old Material.—Consumers' interest in old material continues at a minimum. A large majority of the New England foundries have sufficient material on hand to supply needs during the next month or two, at least. For that reason, yard interests are more inclined to shade prices on stock consumed in this section. Massachusetts melters this week took four cars No. 1 machinery at $16.50 to $17 delivered, otherwise the market is lifeless, according to local dealers. Two cars of stove plate were taken by nearby foundries at $14.50 and $15 delivered, or about 50c. a ton under the general quotation a fortnight ago. A small tonnage of relaying rails sold at $1.65 per 100 lb. and another lot at 2¼c. per lb. shipping point, which in this case was Cape Cod. Negotiations are on between dealers for a round tonnage of steam car wheels, but there is some hitch on price. Three cars of rolling mill borings were taken by Pennsylvania mills at $9 a ton delivered. Sentiment among New England yard interests is that steel mills will be in the market for large tonnages of heavy melting material by the middle of August provided they can purchase at prices ruling to-day or cheaper.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$16.50 to $17.00
No. 2 machinery cast	15.00 to 15.50
Stove plate	14.50 to 15.00
Railroad malleable	12.50 to 13.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Cincinnati

CINCINNATI, July 26.

Pig Iron.—An increase in both inquiries and sales over last week is noted in nearly every quarter. In most cases, however, only carload lots for prompt shipment are wanted, but two 100-ton lots of Southern iron for the Pittsburgh district are included in the inquiries. A West Virginia steel maker was in the market last week for a car of 50 per cent ferrosilicon which it is believed was bought at $65, delivered, and a carload sale of Bessemer ferrosilicon, 10 to 12 per cent, to an Illinois car manufacturer was made at lower than $45.25, delivered. A radiator company is inquiring for 250 tons of foundry iron. A Michigan melter is considering prices on 3000 to 5000 tons for shipment to Dec. 31 next.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.00
Ohio silvery, 8 per cent sil	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	23.52

Finished Iron and Steel.—There is a slight improvement noticed in both inquiries and sales, although quantities continue light. Orders for the most part specify immediate delivery. In wire and wire nails, the demand has been fair, prices being fairly firm. In pipe, despite the recent price change, the volume of business remains virtually the same. A carload sale of cold-rolled steel is noted and some activity in cotton ties is reported. The Masonic Temple at Birmingham involving 180 tons, was awarded to the Ingalls Iron Works, Birmingham, during the week. The Covington station project, previously reported, will involve 80 tons of structural material. The proposed plans of a new 11-story club house for the Business Men's Club, Cincinnati, are on display for the members. No actual work is contemplated, however, until expected adjustment of wages and materials in the building trades has taken place. The plant of the American Rolling Mill Co., Middletown, is expected to continue in operation throughout next week. The plant of the Newport Rolling Mill Co. is still shut down.

Warehouse Business.—Local jobbers report that buying is, if anything, better, although quantities are still light and for current needs. Orders for plates and concrete bars, in one house at least, have been the leading activity. Prices remain unchanged.

Iron and steel bars, 3.15c. base; hoops and bands, 3.85c. base; shapes, 3.25c. base; plates, 3.25c. base; reinforcing bars, 3.22½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, 4.92c.; No. 28 galvanized sheets, 5.92c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.10 per 100 lb.

Coke.—The coke market was very quiet during the week. A sale of 1150 tons and another of 1100 tons

are noted. There has also been some scattered carload business. Prices remain unchanged.

Old Material.—The scrap market continues at a standstill. There is practically no trading.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

St. Louis

ST. LOUIS, July 23.

Pig Iron.—A sale of 300 tons of foundry iron to the American Radiator Co. for its Edwardsville, Ill., plant is reported at about $18.25 Chicago for No. 2. A survey of foundries in this territory made by a manufacturer reveals that for the most part they are running very light and are well stocked. But there is some improvement in the demand for a general line of castings from the railroads and foundries catering to that trade are operating 50 per cent or more of capacity. A St. Joseph, Mo., foundryman here this week was optimistic over the railroad situation. There was an inquiry in this market for one car of ferromanganese and the first sale in months of a car of spiegeleisen was reported.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$21.30 to $21.80
Northern malleable	21.30 to 21.80
Basic	21.30 to 21.80
Southern foundry, sil. 1.75 to 2.25	25.74 to 26.24

Finished Iron and Steel.—A stir was caused here this week by the announcement of a cut to 1.75c. Pittsburgh for bars and 1.85c. for structural shapes by one of the large independents, which was quickly met by other independents. The Illinois Steel Co., the Steel Corporation's subsidiary here, has made no change from its readjustment of July 5. A few sales of bars were made at the price quoted. Additional inquiries for structural steel create a better feeling in the trade. Sanguinet & Staats, architects, Dallas, Tex., are receiving bids until August 1 for the Frost National Bank Building, San Antonio, involving 350 tons of structural steel and 350 tons of reinforcing bars. For the new Missouri Pacific hospital, 150 tons of bars will be required. The building trade labor situation looks better, the unions now voting on the final draft of an agreement designed to prevent strikes and lockouts and to fix wages by arbitration. The railroad situation is improving. The Missouri Pacific let a contract for repairs to 500 cars to the Sheffield Car & Equipment Co., Kansas City. While these are wooden freight cars, a fair tonnage of castings is involved. The Western Steel Car & Foundry Co., Davenport, Ia., has an order to repair 300 combination cars for the Wabash. These two lettings are regarded as hopeful signs of a resumption of railroad car activities. Then, too, the railroads are beginning to buy wheels, structural shapes and bars in small lots for repairs. The purchase by the St. Louis Terminal Railway of two carloads of standard track spikes is reported. The railroads and the United (Street) Railways seem well covered on rail tonnage. Warehouse business is light and so far mill reductions noted above have not been met.

For stock out of warehouse we quote: Soft steel bars, 3.02½c. per lb.; iron bars, 3.02½c.; structural shapes, 3.12½c.; tank plates, 3.12½c.; No. 10 blue annealed sheets, 3.77½c.; No. 28 black sheets, cold rolled, one pass, 5c.; No. 28 galvanized sheets, 6c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, $4.12½ per 100 lb.; boiler rivets, $4.22½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and tapped, $3.00 off list.

Coke.—The demand for coke is still confined to a few carload orders, with most of the business being handled by the Laclede and Granite City by-product plants. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis, Granite City by-products meeting this price, while Laclede by-product foundry is quoted at $11.50 ovens, or $11.70 delivered in the St. Louis industrial district.

Old Material.—Consumers continue to decline to come into the market and prices of some grades have again declined. Re-rolling rails, however, are holding firm at $12 to $12.50. One dealer reports the sale of a tonnage of light section relaying rails around $30, gross ton, St. Louis. The following railroad lists were before the market this week: Chicago, Burlington & Quincy, 5000 tons; Texas & Pacific, 750 tons; Kansas City Terminal, 200 tons.

We quote dealers' prices, f.o.b. consumer's works, St. Louis industrial district and dealers' yards as follows:

	Per Gross Ton	
Iron rails	$12.50 to	$13.00
Steel rails, rerolling	12.00 to	12.50
Steel rails, less than 3 ft.	10.00 to	10.50
Relaying rails, standard section	28.00 to	30.00
Cast iron car wheels	11.00 to	11.50
No. 1 railroad heavy melting steel	9.50 to	10.00
No. 1 heavy shoveling steel	9.00 to	9.50
Ordinary shoveling steel	8.50 to	9.00
Frogs, switches and guards, cut apart	9.50 to	10.00
Ordinary bundled sheet	4.00 to	4.50
	Per Net Ton	
Heavy axle and tire turnings	$5.00 to	$5.50
Iron angle bars	10.50 to	11.00
Steel angle bars	8.00 to	8.50
Iron car axles	17.00 to	17.50
Steel car axles	12.00 to	12.50
Wrought iron arch bars and transoms	12.50 to	13.00
No. 1 railroad wrought	9.00 to	9.50
No. 2 railroad wrought	8.50 to	9.00
Railroad springs	9.50 to	10.00
Steel couplers and knuckles	9.50 to	10.00
Locomotive tires, 42 in. and over, smooth inside	8.00 to	8.50
No. 1 dealers' forge	6.00 to	6.50
Cast iron borings	5.50 to	6.00
No. 1 busheling	9.00 to	9.50
No. 1 boilers cut in sheets and rings	5.50 to	6.00
No. 1 railroad cast	11.50 to	12.00
Stove plate and light cast	10.50 to	11.00
Railroad malleable	9.00 to	9.50
Agricultural malleable	9.00 to	9.50
Pipes and flues	6.50 to	7.00
Heavy railroad sheet and tank	6.00 to	6.50
Light railroad sheet	3.00 to	3.50
Railroad grate bars	7.50 to	8.00
Machine shop turnings	4.00 to	4.50
Country mixed iron	6.00 to	6.50
Uncut railroad mixed	7.00 to	7.50
Horseshoes	9.00 to	9.50
Railroad brake shoes	7.50 to	8.00

Birmingham

BIRMINGHAM, ALA., July 26.

Pig Iron.—The last week in July began with a base of $20, the bulk of business being done at that figure, but some at $19.50 and some was reported but not confirmed at $19. Indications pointed to settling around the $20 base. The largest transaction coming to the fore was 500 tons for a sanitary manufacturing interest. One furnace interest sold 1500 tons during the week ending July 23 and two others in proportion. The make had dwindled to one merchant stack and four on basic for company use. Manufacturing interests not now making iron have turned over customers to one another when out of certain grades on yards. Ill assortment of stocks is becoming more pronounced and begins to interest the consumer. Furnace operators do not report much progress in requests for lower assembling and shipping rates that have been made to the trunk lines. The only reductions of importance have been those in export rates, which, effective July 15, became, to Mobile, as follows: Pig iron, $2.75 instead of $4.13; pipe, $3.13 instead of $4.60. These rates are the same as the rates to Mobile when products are intended for the Pacific Coast.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.50 to $20.00
Basic	19.00
Charcoal	35.00

Finishing Mills.—The Tennessee company closed down the Fairfield plate mill at the end of the week, but will operate its Bessemer mill in a small way. Four blast furnaces will continue in operation and the rail and car mills are around normal. The new car plant

is taking on additional men and speeding up. Ingalls Iron Works is on full turn, making steel bridges for the Philippines, office buildings and structural steel with more business in sight. The Conners-Weymann Co.'s steel hoop mill at Woodlawn resumed at Woodlawn on single turn this week. The Gulf States Steel Co.'s bar mill went from two to five days turn this week. New business shows a marked gain over the recent low mark.

Coal and Coke.—By-product coke is offered at $6 with beehive ruling at $6.50. Coke market is fair. Governor Kilby will announce Aug. 1 his fair price list on domestic coals for householders.

Cast Iron Pipe.—Little was done in high pressure pipe, the United States Cast Iron Pipe & Foundry Co. and the National Pipe Co. securing small Middle Western orders. Flange pipe for oil wells is not heard of at this time. The leading interest is operating part time at Bessemer and Anniston, while Birmingham and Chattanooga are down. The base is $40 for large sizes and desirable business. The Emory Pipe Co., which recently resumed, is on full turn in its Anniston sanitary pipe shop. The base is $40.

Old Material.—The scrap market remains listless with no interest outside of No. 1 cast and similar materials.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Cleveland

CLEVELAND, July 26.

Iron Ore.—With not an inquiry developing nor a sale reported during the week, the market is at a standstill. Shippers expect that there will be virtually no sales within the next few weeks but look for a limited volume of business early in the fall from consumers who will want a little more ore to carry them over the winter. Only one report has appeared of any price shading on Lake Superior ore. A concession from the regular schedule was offered by a small mining company that markets its own ore and its production is not of sufficient size to make it any factor in the market. It is not unusual for a few of the very small producers to shade regular prices during a dull season. July shipments will show little gain over June. The lake coal traffic has fallen off and more boats are being laid up.

Reports from Duluth announce that the Oliver Iron Mining Co. has made a further reduction in miners' wages of approximately 10 per cent to become effective August 1. This is the second wage reduction by this company, the first being 20 per cent, which was placed in effect May 16. A further curtailment in the company's mine operations will also be made.

Semi-Finished Steel.—While a further reduction of $3 a ton has been announced on billets, sheet bars and slabs, prices on these are not established. A Cleveland mill is in the market for 2500 tons of slabs on which it has been quoted $31 by a Pittsburgh district mill, but claims to have previously been able to purchase slabs at $30.40, Youngstown, and expects to be able to shade that price considerably.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Some of the furnaces in the Cleveland district seem inclined to take no further part in the downward movement in prices and state that $20 for foundry iron is as low as they will go at present. Although lower prices have appeared in the Pittsburgh district, $20 for foundry iron is generally quoted as the minimum base price in this market, but there is considerable irregularity in the price differential for higher silicon irons. The volume of business during the week was very light. One interest sold 1100 tons in lots of 200 tons and under at $20 and $20.50 for No. 2. Almost no sales were made in the immediate territory. Quotations were named on inquiries for 200 tons for the U. S. Sanitary Co., Pittsburgh, 250 tons for the Union Radiator Co. and 200 tons for the American Radiator Co. The Ford Motor Co. is reported to have taken additional work away from Ohio foundries and centered it in Detroit, and this has had the effect of curtailing the consumption of Ohio iron, although the Ford company has for some time been supplying these foundries with much of the iron for its own castings. Two sales of low phosphorus iron, each of 100 tons, are reported at $36 and $36.25. A Valley producer reports that Alabama competition in low phosphorus iron has developed in the Northwest, where this grade has been offered at $33, Birmingham.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.46 to $20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	28.92
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	36.00 to 36.25

Coke.—The market shows no change. Quotations on standard Connellsville foundry coke range from $4 to $5, and sales during the week were limited to a few car lots, mostly of the higher priced grades.

Bolts, Nuts and Rivets.—Bolt and nut prices are weak, regular quotations being shaded from 5 to 10 per cent on desirable orders. However, in spite of the recent price reductions on steel bars, makers do not seem inclined to make a further formal price reduction, saying that present steel bar prices were fully anticipated in the reductions that had been made on bolts and nuts. The market is a little more active. Some fill in orders are coming from the jobbers and there is more inquiry from the railroads. The rivet market continues very dull. The leading Cleveland maker is declining to shade 2.75c. for structural rivets and 2.85c. for boiler rivets, although prices $2 a ton lower are evidently appearing in other districts.

Finished Iron and Steel.—Prices on finished iron and steel again declined sharply during the week and there is now an open market on nearly all items. Several mills late in the week informally made a $3 a ton reduction on steel bars, plates and structural material from the prices that were formally named July 5 but which were not closely adhered to. These new prices are 1.75c. for steel bars and 1.85c. for structural material. While these prices may be holding a little better than the previous ones, lower quotations are appearing. The plate market particularly is weak with quotations as low as 1.70c. for tank plates. However, it is claimed that boiler plates are holding fairly well at 1.85c. While the Steel Corporation has made no formal announcement of lower prices, it is meeting competition. The lower prices are bringing out more inquiry for small lots, mostly for immediate delivery, indicating that stocks are low. Interest in the price situation is centered in an inquiry from the Mt. Vernon Bridge Co. for 6900 tons of steel bars, plates and structural material. This company during the week took the steel work for the Ohio State University stadium, Columbus, 4360 tons, for $303,000, or $69.50 a ton delivered and erected, and is about to place the steel for this and other work taken recently. It is freely predicted in the trade that this steel will be purchased at about 1.60c. Regular quotations on hard steel bars have declined $1 a ton to 1.70c., but an inquiry for 1000 tons for reinforcing work for the Ohio State University stadium brought out a quotation of 1.90c. delivered or 1.62c., Pittsburgh. A local order for 230 tons of reinforcing bars for an apartment house was taken by a Cleveland warehouse for stock shipment at about 2c. delivered on the job. Following a court order enjoining the placing of a contract for the Baldwin reservoir, Cleveland, the city has decided to readvertise for that work requiring 1700 tons of reinforcing bars. Some round lot business in soft steel bars has been taken at 1.75c. Lower quotations than have

previously appeared are being made on various items. Hoops are quoted at 2.40c. or lower, bands on a 1.90c. bar base with the old bar card extras, hot-rolled strip steel at 2.35c. to 2.40c. and light rails at 1.75c. to 1.80c. Akron has awarded 1800 to 2000 tons of lock bar pipe to the East Jersey Pipe Co. of New York.

Jobbers quote steel bars 2.79c.; plates and structural shapes, 2.89c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.40c. to 3.55c.; hoops and bands, 3.44c.; cold rolled rounds, 4c.; flats, squares and hexagons, 4.50c.

Sheets.—The sheet market is weak and unsettled with prices appearing on all grades $5 a ton lower than those that prevailed a week ago. Quotations are being made as low as 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, and there are reports of a 3.90c. quotation on the latter. Price reductions have done little to stimulate sheet business. The Ford Motor Co. during the week placed 1000 tons of high grade blue annealed sheets for crank cases with a Valley district mill at 2.50c. Mills report small lot sales at 3.15c. for black and 4.15c. for galvanized.

Warehouse Business.—A leading local jobber has reduced warehouse prices $5 a ton on black and galvanized sheets and $3 a ton on blue annealed sheets. Other local warehouse prices have not yet been changed. Detroit jobbers reduced warehouse prices July 22 from $3 to $5 a ton.

Old Material.—The market is almost at a standstill and many dealers are not attempting to do any business. One local mill is still accepting shipments of heavy melting steel on old contracts and dealers are paying $11 for selected material to fill its orders. One dealer is buying heavy melting steel for yard stock, making purchases of this grade at $10.50 to $10.85. Prices generally are unchanged, although cast scrap is lower, evidently being affected by the recent decline in pig iron prices.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	6.50 to 7.00
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	6.50 to 7.00
Compressed steel	6.00 to 6.50
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 cast	15.00 to 15.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in	5.50 to 6.00
Drop forge flashings, under 10 in	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

Hurrying Taxation Legislation

WASHINGTON, July 26.—Speeding up of the revised tax legislation in response to the demands of the country is indicated by the fact that it was stated by high authority to-day that the House may be able to pass the measure and turn it over to the Sena e by Aug. 6. While not assured this will be done, efforts are understood to be under way in that direction, despite the claim of prominent House leaders that the measure cannot pass the House before Sept. 1.

Hearings on tax revision were begun to-day before the Committee on Ways and Means. The evidence points to the fact that some of the fundamental principles of tax revision will include elimination of excess profits tax, modification of the surtax and restoration of a higher tax on first-class mail in order to make up the deficit of the parcel post. An effort is to be made by Congress to bring about diminution of taxes by reducing expenditures, though some leaders of Congress think decrease, if any made, will be small. Should the new tax bill get over to the Senate before the completion of hearings on the tariff, which will last two weeks or more, it is proposed to pass the tax legislation first. Sentiment for a recess of Congress after tax legislation passes the House is increasing.

Philadelphia

PHILADELPHIA, July 26.

Further price reductions have been made in semi-finished steel and mild steel bars, to which is attributed improvement in orders, particulary from jobbers who are taking this opportunity to round out stocks. The improvement has inspired one prominent steel company with plants in both eastern and western Pennsylvania to increase operations to a general average of 40 per cent, new business having come in just when some departments were on the point of shutting down.

Rerolling and forging billets and slabs have been reduced $3 from a week ago, now being quoted at $30, $35 and $31, respectively. Mild steel bars have been lowered to 1.75c. from 1.90c. a week ago.

A Buffalo steel plant, doing business in the Philadelphia district and down for some time, is rumored to be on the point of starting up in a week; the Midvale Steel & Ordnance Co., favored with some of the Belmont Iron Works orders and other new business, has either resumed idle departments or failed to shut down departments which it previously contemplated doing. The Reading Iron Co. started two mills Monday. The Alan Wood Iron & Steel Co. expects to resume partial operations next week.

On the contrary, two furnaces are seriously considering going out of blast. A certain degree of optimism exists in the pig iron trade, though to a less extent than in steel lines, because of the severe price slashing. There are 100,000 tons of iron piled in furnace yards in eastern Pennsylvania. Though no sales absolutely prove it, foundry iron is obtainable at $19 base.

Brokers in old material realize that there is a scarcity of scrap, owing to low production of manufacturers. Consequently they are hastening to cover on short buying.

There is a report of a purchase by an oil refining company of 8000 tons of plates, 1200 tons of bars and shapes and 15 or 20 carloads of pipe. There is one inquiry for 600 tons of foundry iron.

Pig Iron.—Furnaces have viewed with some concern the keen competition which has brought iron down to a $20 base. Now, positive offerings have been made at $19, base, though no sales at this figure have come to light. Prices are very mixed, in some cases little price distinction being made between No. 2 plain and No. 2X; some of the higher silicon iron has been sold at a rate that, if the usual $1 were observed, would bring the base, price below $20, the old-time differentials being ignored. Some optimism is expressed on the part of those who believe that the recent slash was the last and that the market will work upward. However, it is estimated that there are 100,000 tons of iron piled in eastern Pennsylvania yards and that it will take considerable buying to raise prices. There is talk of two more furnaces going out of blast, one of which recently blew in on low phosphorus. The Ingersoll-Rand Co. is inquiring for 700 tons of foundry iron, 500 of which is 1.75 to 2.25, the rest 2.25 to 2.75 silicon. There is another inquiry for about 250 tons of foundry iron, half of which is No. 2 plain and half No. 2X. A sale of 100 tons of basic was made a few days ago at $23, furnace, but it is agreed that basic could be obtained at $20 today, and possibly $19, furnace. One iron agent reports sales for July as five times as great in volume as in June. Some state that no more iron will be sold at a sacrifice for liquidating purposes because the banks are now more ready to loan cash.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.35 to $20.75
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.35 to 22.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	21.25 to 22.00
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	38.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Because of the low operations of steel plants, there is but little demand for ferromanganese or spiegeleisen. The most general quotation for the former is $75, delivered east of the Mississippi, for do-

mestic, and $75, seaboard, for British. It is rumored that it was offered to a West Virginia steel plant at $65. Spiegeleisen is generally quoted at $27. The Bettendorf Co. is reported to have bought a carload of spiegeleisen.

Plates.—The price at which the plates were sold recently to the Belmont Iron Works is carefully kept secret, but a lower price is reported. It is rumored that the Gulf Refining Co. has purchased 8000 tons of plates, part of which will be used for storage tanks on the Delaware River. No action will be taken on bids on plates for ships for the Red D line for a month. The chief plate demand is for oil tanks, with some inquiries from railroads for car repair work. The rumor persists that the Pennsylvania Railroad will soon ask for large tonnages.

Structural Material.—It is also stated that the Gulf Refining Co., in addition to its purchase of plates, has bought 1200 tons of shapes and bars. Structural shapes are generally quoted at 1.85c., but there are evidences of shading. There are considerable inquiries for structural shapes for new buildings and especially for extensions and remodeled structures, though few orders result.

Semi-Finished Steel.—The Midvale Steel & Ordnance Co. now asks $30 for re-rolling billets, $35 for forging billets and $31 for slabs, all Pittsburgh, which is a $3 reduction within a week on each.

Sheets.—It is rumored that a Youngstown plant secured the order for the 1500 tons of sheets bought by the Belmont Iron Works. Blue annealed are usually quoted at 2.50c., black at 3.25c. and galvanized at 4.25c., Pittsburgh.

Bars.—Steel bars are uniformly 1.75c., Pittsburgh, as against 1.90c. a week ago. Bar iron is also 1.75c. The Reading Iron Co. started some of its mills Monday.

Pipes and Tubes.—The Midvale Steel & Ordnance Co. has revised its schedule on charcoal tubes as follows: 1¾ and 1⅞ in., list, less 10 per cent; 2 and 2¼ in., list, less 20 per cent.; 2½, 2¾ and 3 in., list, less 25 per cent; 3¼, 3½ and 4 in., list, less 27 per cent.

Bolts and Nuts.—The Belmont Iron Works is asking for 7000 turnbuckles and 2500 bolts, both ¾ in. Railroads are fairly active in buying spikes and bolts.

Old Material.—A better feeling exists, and it is more difficult for brokers to obtain material from dealers at present prices. Brokers who bought short are hastening to cover requirements. The improvement is partly due to the purchases by the Bethlehem Steel Co. of railroad and industrial heavy melting steel at the higher price of $12, delivered Bethlehem. Two concerns have been furnishing the bulk of this material, one in New York, the other in Philadephia. There has been some inquiry for stove plate and borings for delivery to the Philadelphia district, but at the prices offered difficulty was experienced in obtaining it. One inquiry called for No. 1 cast delivered to Baltimore.

No. 1 heavy melting steel	$11.00 to $12.00
Scrap rail	11.00 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	13.50 to 14.50
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	11.00 to 12.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	No market

Warehouse Business.—Price revision downward was contempated Wednesday of this week, in view of the lower prices offered by mills. Jobbers have been inspired by reductions to lay in more stock and have themselves made sales of a trifle greater tonnages.

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ in. x ½ in., 3.20c.; round edge steel, planished, 3.95c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage, 4.50c.; galvanized sheets, No. 28 gage, 5.50c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.75c.; 3/16-in., 4.95c.; ⅛-in., 5.05c.; spring steel, 4.40c.; round cold-rolled steel, 4.50c.; squares and hexagons, cold-rolled steel, 5c.; steel hoops, No. 13 gage and lighter, 3.85c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.60c.; iron bands, 4.20c.; rails, 3.20c.; tool steel, 12c.; Norway iron, 6.50c.; toe steel, 4.50c.

Will Consider Freight Rates

PITTSBURGH, July 26.—The question of railroad freight rates on ore, coke and limestone will be thoroughly threshed out at a meeting to be held here soon between traffic officials of the railroad serving this section of the country and blast furnace and steel plant interests of the Pittsburgh and Valley districts. Statistics compiled by the traffic manager of one of the Pittsburgh independent steel companies shows that the present cost of assembling the materials used in making a ton of pig iron, including a charge of 40c. for slag disposal, is $10.44. This compares with $5.18½ in 1913 and $5.34½ in 1912. Comparison is made with 1912 and 1913 as being the last normal years prior to the war. In view of the fact that the market for basic pig iron in this district is not quotable at higher than $19 per ton at furnace, and that some iron recently has been sold at even less, pig iron producers must produce the raw materials, pay the cost of conversion and absorb other expenses for about $8.50. This, of course, cannot be done. If ore were still further reduced 50c. a ton to around $5 per ton at lower lake docks for non-Bessemer, it still would be impossible, even with labor at 30c. an hour, according to furnace operators, to get the producing cost of a ton of pig iron below $20 on current freight charges. These features of the situation will be presented to the railroad officials in the hope that something will be done in the direction of reducing freight rates.

Ore Rate Hearing at Chicago

On Monday, Tuesday and Wednesday of this week hearings were held at the Great Northern Hotel, Chicago, in the complaint of 82 independent iron mining companies against the ore carrying railroads of Minnesota, Wisconsin and Michigan. The hearing was held before Examiner Hosmer, acting for the Interstate Commerce Commission. The ore mining companies contend that the present freight rates on ore carried from the mines to upper lake ports are excessive and above the actual cost of the service plus the 6 per cent return to the railroads guaranteed under the Cummins-Esch law. The complainants in their brief filed with Examiner Hosmer say that the rates should be 70c., 60c. and 50c. per ton from the three rate districts in the ore region. The Lake Superior Iron Ore Association was represented at the hearing by its counsel, Jean Paul Muller, of Washington.

Associations Would Like to Intervene

WASHINGTON, July 26.—A petition was filed to-day with the United States Railroad Labor Board at Chicago by the National Association of Manufacturers, the National Founders' Association and the National Erectors' Association asking for permission to intervene as shippers in the case known as the Federated Shop Crafts, a union labor organization, against the Pennsylvania Railroad bearing on a decision of the Labor Board and relating to the negotiation of labor agreements. The decision is a substitute for the so-called national agreements effective under Government control of the railroads, and under it the Pennsylvania, through a ballot, attempted to ascertain who should represent its employees in negotiation with its officers. Unions of the shop crafts objected and sent out a counter ballot, warning all shop crafts employees not to vote the company's ballot, but to vote the union's ballot. A blank space on the union ballot would permit a vote for any other organization, but not for an individual representative.

British Iron and Steel Market

Iron Makers Starting to Resume Production—Continental Competition Active

(*By Cable*)

LONDON, ENGLAND, July 26.

Five Cleveland furnaces are now working, and it is expected that two more will be relighted shortly; but as ironmasters generally decline to resume production until costs are cheaper, stocks of the better grades of iron are diminishing, despite the fact that consumers are holding off on orders.

Continental producers are still receiving the bulk of the steel orders. German merchant bars are subject to irregular quotations ranging from £7 15s. ($27.59) to £8 5s. ($29.37) f.o.b. Quarter-inch plates are being sold at £8 5s. f.o.b. Number 5 gage wire rods are selling at £11 5s. ($40.05) cost and freight to Japan.

Vickers has been closed until Aug. 9, on account of a strike of woodworkers. No orders for ships or machinery have been received this year. Some North Lincolnshire steel works have restarted operations.

Tin plate quarters are sold to the East at 26s. to 27s. ($4.63 to $4.81) f.o.b. Prime stock plates of 20 x 14 in. are practically unobtainable at 28s. ($4.98) basis f.o.b. More mills are starting up; it is anticipated that there will soon be 20 per cent in operation.

Sellers of Belgian 24-gage galvanized sheets are asking £26 ($92.56) cost and freight to Buenos Aires. German 24-gage black sheets for galvanizing are being sold at £12 10s. ($44.50) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.56 per £1 as follows:

Durham coke	£2	2				$7.48			
Cleveland basic	6	0				21.36			
Cleveland No. 1 foundry	7	0				24.92			
Cleveland No. 3 foundry	6	15	&	£7	0*	24.03	&	$24.92	
Cleveland No. 4 foundry	6	15	&	7	0*	24.03	&	24.92	
Cleveland No. 4 forge	5	17½				20.92			
Hematite	7	0*				24.92			
East Coast mixed	8	0	&	7	5*	28.48	&	25.81	
Ferromanganese	18	0	&	14	0*	64.08	&	49.84	
Ship plates	14	10				51.62			
Boiler plates	19	0	to	21	0	67.64	to	74.76	
Tees	14	10			*	51.62			
Channels	13	15				49.95			
Beams	13	10				48.06			
Round bars, ¾ to 3 in.	13	10				48.06			
Rails, 60 lb. and up	10	0	to	15	0	35.60	to	53.40	
Billets	11	0	to	11	10	39.16	to	40.94	
Sheet and tin plate bars, Welsh	10	10				37.38			
Galvanized sheets, 24 g.	22	0	to	23	0	78.32	to	81.88	
Black sheets	18	10†				65.86			
Tin plate base box	1	4	to	1	8	4.27	to	4.98	
Steel hoops	17	0				60.52			
Cold rolled steel strip, 20 g.	26	10				94.34			

*Export price. †Nominal.

Resumption of Operations Slow—Pig Iron Scarce —Continental Competition

LONDON, ENGLAND, July 14.—Now that the coal trouble is settled and work resumed in the mines, there is a natural disposition to look for some revival in trade. It is beginning to be realized that improvement is going to take much longer than was formerly thought. At one time it was believed that whenever the coal trouble was out of the way, brighter conditions would at once follow. This is now seen to be impossible, but there is a confident feeling that the worst is over and, now that labor has settled down and that there are prospects of some settlement of the Irish question, there is a feeling of confidence without, however, undue optimism.

About the beginning of the month work was begun in all the collieries where conditions were favorable, but large bodies of men were nevertheless unable to find employment. Supplies of coal are now coming forward and at cheaper prices, but the figure demanded is still too high to enable economic working in many industries. Apparently 20s. per ton is considered to be the ideal price for coal if iron and steel manufacture is to be conducted at a profit and, despite pessimistic utterances that cheaper fuel seems a long way off, other opinions tend to the belief that such prices will be seen before the year is out. A fact to be remembered is that a decline in the demand for British pig iron may react on the coke demand. It is understood that very little blast furnace coke is being bought. It is also understood that coke will ease in price before long, and if so it will certainly be a great help to the iron and steel trades.

Up to last week there had been little resumption among iron and steel plants of the country. This was partly due to the fact that the amount of coal drawn from the mines had been disappointing, while prices have been prohibitive. It is believed, however, that when the first demand for fuel has been filled there will be a fall in values, but nobody can foretell accurately what the cost of industrial coal will be, and ironmasters are in no hurry to commit themselves to a resumption of operations until they have some more assurance that they will be able to produce at a profit. Meanwhile the cost of production of pig iron has been reduced in another direction. The official ascertainment of the average selling price of No. 3 Cleveland G. M. B. for the past quarter showed the figure to be 126s. 11.56d. per ton. As a result of the sliding scale, the blast furnacemen's wages on the North East Coast will be further reduced, which means that taking into account the reduction a few months ago, their wages are reduced this year from 170¼ per cent to 72¾ per cent above the standard.

At the moment supplies of foundry pig iron are pretty nearly exhausted owing to the stoppage of production. Consequently when foundries get started again it is likely that prices will firm up, although, of course, imports of foreign pig iron will increase. This competition continues keen and it is obvious that if the industry is to live here at all, lower selling prices must be made practicable.

In manufactured material, the resumption of operations must necessarily be slow. One or two works started last week and it is expected that some more will begin during this week, while in other cases it is possible operations will not be started for some time. As a matter of fact the bulk of these works are short of orders and, although there is a certain amount of inquiry, business is slow to mature, as the low quotations for Continental material naturally lead to the expectation that domestic manufacturers must make further cuts in prices. Fuel is, however, being accumulated for a resumption, but in some cases the managements are making no move and say they will not do so until there is a radical change in the situation.

Early Good Results Expected

WASHINGTON, July 26.—Impetus to iron and steel and other industries from which railroads buy heavily is expected to result from the request made of Congress by the President to-day in a special message asking that the War Finance Corporation be empowered to purchase railroad funding securities accepted by the Director General of the Railroad Administration in expediting settlements with carriers.

The President states, as had been anticipated, that $500,000,000 may be necessary, and that no appropriation from Congress will be required. His message carried nothing that had not been anticipated, but nevertheless was the source of considerable satisfaction and verified the understanding that the Administration and carriers had agreed upon a plan looking to quick settlement between the Government and the railroads by the latter informally agreeing to waive claims based on inefficiency of labor. This had been the greatest obstacle in conducting negotiations. It is believed the legislation required will be quickly enacted and that railroads will use money not only to settle obligations they owe to manufacturers, car builders and other suppliers of equipment, but will come into the market for new requirements, the amount of which has not been indicated. This, it is stated, will be an important factor in stimulating industry.

Sentiment Growing Better, Says Judge Gary

Issues Statement Following Meeting of Finance Committee of Steel Corporation — Sharp Decline in Earnings with Deficit After Paying Dividends

THE report of the United States Steel Corporation for the second quarter of 1921 shows the smallest net earnings since the first quarter of 1915, being $21,892,016, compared with $32,286,722 for the first quarter of 1921 and $12,457,809 for the first quarter in 1915. The lowest net earnings on record were for the last quarter of 1914, being $10,933,170. After deducting from the net earnings all charges and allowances and interest on bonds there remained a balance of $8,087,032 for the second quarter of 1921. The usual dividends of 1¾ on preferred and 1¼ on common were declared, requiring $12,638,700 and leaving a deficit of $4,571,668 compared with a surplus of $2,816,905 for the first quarter of 1921. The net earnings for the quarter ending June 30, the preceding quarter and the preceding three years were as follows:

Quarters	1921	1920	1919	1918
First	$32,286,722	$42,089,019	$33,513,384	$56 961.424
Second	21,892,016	43,155,705	34,331,301	62,557,391
Third	.....	48,051,540	40,177.232	42,961,589
Fourth	.....	43,877,862	35,791,302	36,354,165
Net earnings each year	.....	$177,174,126	$143,813,219	$198,834,569

The statement of earnings for the quarter ending June 30 was as follows:

Earnings

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
April, 1921	$8,010,975	$674,320	$7.336,655
May, 1921	8,404,522	672.873	7.731.649
June, 1921	7,496,424	672,712	6,823,712
	$23,911,921	$2,019,905	
Net earnings			$21,892,016
Less charges and allowances for depreciation, and sinking funds on bonds			8,665,507
Net income			$13.226,509
Deduct:			
Interest for the quarter on U. S. Steel Corporation bonds outstanding		$4,934,477	
Premium on bonds redeemed		205,000	
			5,139,477
Balance			$8,087,032
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent		$6,304,919	
Common, 1¼ per cent		6,353,781	
			12,658,700
Deficit			$4,571,668

Judge Gary's Statement

Following the meeting of the finance committee Judge Gary, chairman of the board, issued the following statement in regard to the business outlook:

"The business results of the Corporation for the last quarter, which were not exactly determined until to-day, are not surprising to anyone familiar with general conditions.

"Shipments have been small and prices received on products delivered have been very low compared with the cost of production. Many manufacturing concerns have been operating at a loss. This is about as censurable as insisting upon unconscionable profits. It cannot be long continued.

"We have been paying somewhat higher wage rates than many other basic lines of industry. We think reductions in these rates should follow, rather than lead, selling prices, particularly those involving the costs of living, which in some respects are still unreasonable. These are being surely, if slowly, forced down to a fair basis by the withholding of purchases on the part of consumers. Up to the present time, we believe, wage earners generally have not been paid too much, excepting always certain trades or vocations in which rates were, during the war, on one pretext or another, arbitrarily tripled or quadrupled, and still are attempted to be maintained. This does not apply to the steel industry.

"While business in many lines, including iron and steel, is still dull and hesitating, the outlook is not discouraging or doubtful. Sentiment has been for some time, and still is, growing better.

Headed in Right Direction

"As stated at the meeting of the American Iron and Steel Institute last May, industry is headed in the right direction. This means a great deal, for at some date in the future there awaits the biggest business this country has ever witnessed. The fundamental facts for this conclusion are assured. The undisputed figures amount to a demonstration.

"Just at present there are many reasons for believing our conditions are improving, even though we may not as yet have experienced, to a large extent, the good results. Readjustments were necessary and they have been and are progressing with beneficial effect. During the war extravagance in expenditures in many ways and departments, from the Government down, was stupendous. Energy and effort were bent in the direction of building up new and expensive organizations ostensibly to assist in winning the war; and hundreds of millions were squandered. There was an orgy of overcharging, over-spending and waste. This was natural and perhaps inevitable. Now we are witnessing a contrary disposition, also from the Government down, although not every man, woman and child is yet included in the effort to reduce, to economize and to save.

Co-operation After Conflict

"Apparently, we shall soon have actual peace throughout the world. Construction, co-operation and wisdom will supplant destruction, conflict and folly. Legislation will be calculated to assist rather than obstruct legitimate progress. Taxes, which now burden almost to the point of stagnation, will surely be gradually and reasonably modified. Our President has said publicly that business is the biggest thing in the world, which is equivalent to saying that food, shelter and clothing are first to be considered in discussion; therefore prosperity is essential to the progress and happiness of the nation. International, national and industrial peace will become stabilized, not as a result of combined force, but because of the good will and honest desire of righteous-minded people.

"The financial aspect of this country and other countries has been improving, and to most of us at least, looks bright. The banking institutions of the United States are sound. Our resources are enormous. Our people are ready, anxious and able to do business. Everyone is called upon to do his or her part in the endeavor to return to a sane and reasonable basis, and the sooner this opinion becomes practically unanimous the earlier will we reach the goal of prosperity, the apparent distance of which depends upon individual vision.

"We need not shout in triumph, but we are not compelled to feel despondent. The world has been very sick. Therefore full recovery is longer delayed. The further we proceed in the direction we are now going the faster will be the pace. With the continuous maintenance of law and order, securing individual freedom of action in legitimate effort, the economic position of this country will be invincible."

GERMAN MARKET IMPROVES

Demand Good Particularly for Export—Foreign Buying of Rails and Rolling Stock

(By Aerial Mail to London)

BERLIN, GERMANY, July 12.—Improvement in the tone of the German iron and steel market has made rapid progress during the past 10 days and compared with the recent dullness, demand for some rolled products has become pressing. The condition of the export market confirms the assumption that there is a general improvement. Not only is there an increase in foreign inquiries but the number of transactions closed and contracts awarded is larger. Germany is benefiting by the fact that England is at present counting very little in iron and steel export and added to this is the curtailment of production in the United States. Thus, the world's business in iron and steel is at present largely shared by the three principal Continental iron countries—Belgium, France and Germany. This has resulted in a slight relaxation of ruthless price cutting, but business with the Entente countries is still impeded by the prevailing uncertainty in regard to the 26 per cent export levy.

Average export prices to Holland at the beginning of July were as follows:

	Per Ton Fl.	
Bar iron	79	$24.57
Heavy sheets	79	24.57
Medium sheets	81	25.19
Light plates	84	26.12
Wire, rolled	82	25.50
Wire, drawn, per 100 kg	9.65	3.00

Rhenish-Westphalian mills are booked with orders until October and many works are introducing new shifts. Industrial circles feel confident that business will register further improvement by autumn. Although the coal quota for smelters has been cut, supplies are regarded sufficient for present requirements. French minette ore is still offered in large quantities but demand is rather light, active propaganda being carried on to urge smelters to withhold purchases pending the removal of the Entente sanctions. Supplies of Swedish ore are satisfactory. There is slightly more activity in pig iron demand but there is still the pressure of stocks on hand. Foundry iron No. 3 (1.80-2.50 per cent silicon, 1 per cent manganese, 0.9 per cent phosphorus, 0.06 per cent sulphur) which is officially quoted at 1100 m. per ton ($14.30) plus a rebate of 50 m. per ton, is offered in the free market at 990 m. ($12.87). Ferromanganese, 75 per cent of English origin, is offered at £13/10 ($48.15) c.i.f. Dutch, and £15 ($53.50) German, seaboard.

Foreign Railroads Buy in Germany

Indications are that structural shapes are livening up. Fabricators have lately booked substantial export orders. Jugo-Slavia recently placed a large bridge order with two German firms. In the rail market, price changes have been slight. Finland is reported to be in the market for 8000 tons of rails and the Swiss Federal Railroads are also expected to invite tenders for rails before long. A movement is in progress to establish a German rail syndicate to handle foreign business more efficiently. Inquiries for bar iron are brisk and terms of delivery now average 6 to 8 weeks. Several mills, such as the Gutehoffnungshütte and the Rheinische Stahlwerke, are booked solid for the third quarter. Demand for sheets is slightly better but prices still tend downward. Following upon the dissolution of the wire convention, quotations immediately dropped below official list prices. Drawn bright wire last quoted at 230 m. per 100 kg. is now 200 m., while nails have receded from 270 m. to 230 m. Only the large works are in a position to close at these prices, the smaller plants being unable to follow in face of the high prices for rods, which have steadily advanced during the past fortnight and are now quoted around 2000 m. per ton. Supplies from the larger mills, as Krupp's, Gutehoffnungshütte, and the Hösch steel works, are limited, causing a scarcity in the market. We quote:

	Per Metric Ton Marks	
Ingots	1170	$15.21
Billets	1300	16.90
Iron bars	1800	23.40
Shapes	1750	22.75
Angles and tees	1670	21.71
Reinforcing bars	1780	23.14
Hoop iron	2200	28.60
Hoop iron, cold rolled	3400	44.20
Rounds, drawn, bright	2730	35.49
Flats	1730	22.49
Squares	1720	22.36
Rounds	1740	22.62
Sheets, heavy	1750	22.75
Sheets, medium	1800	23.40
Plates, light	1850	24.05
Plates, tank	2200	28.60
Wire rods	2000	26.00

Negotiations have been opened at Berlin with the Russian Soviet Government for another order for 100 locomotives, 3000 cars and 150 tons of rails. Representatives of Vickers, Ltd., of London, have arrived in Berlin to confer with German interests on joint action in Russia. The Saechsische Maschinenfabrik, vorm, Richard Hartmann Aktien Gesellschaft, at Chemnitz, recently booked an order for 500 locomotives for Japan. An offer has been made to the Jugo-Slav government by Germany to settle part of the war indemnity by the delivery of 85 complete railroad trains (locomotive and 50 cars) through the Barkhaus works. The cabinet council is stated to have principally accepted this offer provided no objections are raised by the Entente.

German manufacturers and exporters are displaying activity in the Palestine market. The Standard Bau und Industriebedarfs G.m.b.H. of Berlin, an oriental trading company specializing in trade with Palestine and border countries, which lately booked several orders for industrial equipment for Palestine, has consolidated with the Berlin export company of Hecht, Pfeiffer & Co.

Return to Piece Work

A statement has just been issued showing that the return to piece work is progressing. At the Erfurt plant, for instance, 50 per cent of the present pay roll is for piece work, compared with 16 per cent at the beginning of the year while the figures for the Lippstadt, Kassel and Spandau plants are 57 per cent against 20 per cent, 28 per cent against 7 per cent, and 50 per cent compared with no piece work, respectively.

M. Stomoniakoff, the newly appointed representative of the foreign trade department of the Russian Soviet Government at Berlin, is stated to have resumed negotiations with the trade organizations of the German machine tool industry for the delivery of precision machine tools. From a reliable source it is learned that an order for textile machinery, for which flax and wool are offered, is also under consideration. The monthly capacity of the rolling stock department of the Rheinische Metallwaren und Maschinenfabrik Aktien-Gesellschaft, at Düsseldorf, is given as 30 locomotives and 300 cars. Locomotives form one of the new products of this company.

Living Costs Increase

The employers' associations in the Thuringian metal and engineering industries have decided upon a wage cut of from 1 to 16 per cent in the machine industry, and 10 to 50 per cent in the small iron ware industry, for competitive reasons. The heavier cuts will be made in the wages paid to juvenile workers. The cost of living is again on the increase. The index number of German wholesale prices comprising 77 commodities and compiled by the *Frankfurter Zeitung* is given at 1466 at the beginning of July, compared with 1375 at the beginning of June and 100 in the middle of 1914. A further rise is believed certain in view of the further depreciation of the mark and impending taxation. The Wanderer works at Chemnitz have plenty of orders for all lines, excepting machine tools. This company ranks among the leading bicycle and typewriter manufacturing concerns. The turnover in typewriters during the past 9 months is stated to have reached nearly 100,000,000 m., and business in bicycles and motorcycles is equally brisk.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65
Large boiler rivets.....$2.75
Small rivets .....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅝ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads .....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts .....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S..80, 10 and 10 per cent off list
Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....4c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.85 to $3 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.85 to $3 base; 5/16-in., $2.85 to $3 base. Boat and barge spikes, $3 to $3.20 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.50c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.30–2.55	Nos. 11 and 12	2.50–2.75
Nos. 9 and 10 (base)	2.40–2.65	Nos. 13 and 14	2.60–2.85
		Nos. 15 and 16	2.70–2.95

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.70–3.20	No. 28 (base)	3.00–3.50
Nos. 22 to 24	2.75–3.25	No. 29	3.10–3.60
Nos. 25 and 26	2.90–3.40	No. 30	3.20–3.70
No. 27	2.95–3.45		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00–3.50	Nos. 25 and 26	3.70–4.20
Nos. 12 to 14	3.10–3.60	No. 27	3.85–4.35
Nos. 15 and 16	3.25–3.75	No. 28 (base)	4.00–4.50
Nos. 17 to 21	3.40–3.90	No. 29	4.25–4.75
Nos. 22 to 24	3.55–4.05	No. 30	4.50–5.00

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80–3.30	No. 28 (base)	3.00–3.50
Nos. 17 to 21	2.85–3.35	No. 29	3.05–3.55
Nos. 22 to 24	2.90–3.40	No. 30	3.05–3.55
Nos. 25 to 27	2.95–3.45	Nos. 30½ and 31	3.10–3.65

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
July	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
20.....	12.62½	12.50	26.50	4.40	4.35	4.75	4.25
21.....	12.62½	12.50	26.75	4.40	4.35	4.70	4.20
22.....	12.50	12.37½	27.00	4.40	4.35	4.70	4.20
23.....	12.50	12.37½	....	4.40	4.35	4.70	4.20
25.....	12.50	12.25	26.50	4.40	4.35	4.75	4.25
26.....	12.50	12.25	26.00	4.40	4.35	4.75	4.25

New York

NEW YORK, July 26.

All the markets are spasmodic as to buying and in some cases quotations are difficult to define. Buying of copper is light and confined to second hands with prices lower. The tin market has been moderately active at a lower level. Lead is quiet and fairly firm. The zinc market continues stagnant with prices fairly steady.

Copper.—As the month of July draws to a close it is evident that some copper held by dealers for speculation has had to be sacrificed and this has resulted in sales of moderate quantities at price concessions which have weakened the market. Various reports are current as to the levels at which some sales of electrolytic copper have been made. An unconfirmed report is to the effect that one sale was made as low as 12.12½c., delivered, but the general level of prices at which the limited amount of sales have been made and at which further sales could be negotiated is 12.25c., New York, or 12.50c., delivered, from some of the smaller producers and dealers. The leading producers are fairly firm in maintaining quotations at 12.75c., delivered, or 12.50c., New York. Buying for foreign account is reported as fair with larger producers disinclined to sell much at present low levels. The Lake copper market is exceedingly dull at 12.50c. to 12.75c., delivered.

Tin.—About the middle of last week there was moderate activity which resulted in sales of about 500 tons of future shipment Straits tin, dealers and consumers being buyers with the former predominating. Outside of that there has been but little business since. There have been few sellers as well as few buyers, the latter being confident of lower prices, and this was justified by a sharp drop in the market yesterday and to-day, Straits tin being quoted at 26c., New York, to-day, as against 27c. to 28c. last week. London prices are also lower to-day, with spot standard quoted at £158 5s., future standard at £165 5s. and spot Straits at £158 15s. per ton, all lower than a week ago. Arrivals thus far this month have been 1270 tons with 2865 tons reported afloat.

Lead.—This market is exceedingly dull and barely steady. There is apparently enough metal at the price of the leading interest to supply the light demand and very little is heard of offerings in the outside market. We quote the market at 4.35c., St. Louis, or 4.40c., New York, for early delivery.

Zinc.—A slight improvement is reported in inquiry as well as sales this week over last week, which has been characterized by one seller as the quietest ever recorded, there having been no inquiries of any kind for three successive days. Metal which was being offered as low as 4.20c., St. Louis, last week, from one or two sources, has disappeared and the market is slightly firmer for prime Western for early delivery at 4.25c., St. Louis, or 4.75c., New York. Sales of several 100-ton lots are reported, mostly to galvanizers who have orders to fill.

Antimony.—Wholesale lots for early delivery are unchanged in a dull market at 4.65c., New York, duty paid.

Aluminum.—The quotation of the leading interest continues at 24.50c., f.o.b. plant, for virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery. Imported aluminum of the same grade is obtainable at 22c. to 23c. per lb., New York.

Old Metals.—Business is very quiet and the tone of the market is easy. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	10.50
Brass, heavy	7.00
Brass, light	5.25
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	5.00
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3 00

Chicago

July 27.—Copper and tin are lower in this market. Very little business is being done. We quote Lake copper at 13c., in carload lots; tin, 28c. to 28.50c.; lead, 4.35c.; spelter, 4.35c.; antimony, 7.50c. On old metals we quote copper wire, 7.50c.; crucible shapes, 7.50c.; copper clips, 7.50c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 17.50c.; block tin, 20c., all being buying prices for less than carload lots.

St. Louis

JULY 22.—The non-ferrous markets are duller than they have been for months. Lead is quoted at 4.20c. and zinc at 4.25c., car lots. We quote Lake copper car lots at 12.98½c. to 13.23½c.; tin, 28.11c., and antimony, 5.38½c. On old metals we quote: Light brass, 4c.; heavy yellow brass, 6c.; heavy red brass, heavy copper and copper wire, 8c.; light copper, 7.50c.; pewter, 17c.; tinfoil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c.; aluminum, 9c.

Secondary Metals in 1920

Recovery of secondary copper, brass, lead, zinc, tin, antimony, aluminum and nickel during 1920 is reported by the United States Geological Survey at $188,507,260, compared with $181,841,500 in 1919. Quantities increased for nearly all items, as shown (in short tons) in the following table.

	1919	1920	Per Cent Increase
Brass scrap remelted	249,700	259.800	4.0
Other copper	112,400	130.600	16.2
Lead as metal	55,684	56.350	1.2
Lead in alloys	66.416	68.300	2.8
Zinc as metal	39 910	42 850	7.4
Zinc in alloys,* etc	6,062	7,650	26.2
Tin as metal	5,977	7.200	20.5
Tin in alloys	18,056	16,300	9.7†
Antimony as metal	48	200	..
Antimony in alloys	4.351	5.400	24.1
Aluminum as metal	6.017	5,000	16.9†
Aluminum in alloys	12,674	10.500	17.2†
Nickel as metal	163	270	65.6
Nickel in non-ferrous alloys	2,284	1,930	15.5†
Total	579,742	612,350	5.6

*Other than brass. †Decrease.

The Youngstown Metal Products Co. has been formed at Youngstown, Ohio, with a capital of $50,000 and has acquired the property on Manning Avenue and the business of the Ungar Sheet Metal Products Co. The new owners will continue the manufacture of stovepipe and will add a line of metal specialties. Samuel H. Weinreich, president, will have charge of sales and Fred S. Ullman, secretary and treasurer, will direct production. A. M. Frankle is vice-president. E. H. Hughes will continue as plant superintendent.

Plans have been completed for the second basket picnic, this year, of the National Tube Co., Pittsburgh, to be held at Kennywood Park, July 30. The program includes a baseball game, novelty events, racing, various contests and dancing and music, in addition to the usual amusements at the park. The following executive committee is in charge: William B. Schiller, Taylor Alderdice, J. H. Nicholson, Edward Worcester, P. C. Patterson, S. M. Lynch, B. C. Moise, Peter Boyd, John Fritz, J. A. Beattie, E. C. Jaycox, W. A. Cornelius and Andrew Telfer.

HOPEFUL FEELING

Youngstown Sees Signs of Improvement, but Orders Are Not Numerous

YOUNGSTOWN, OHIO, July 26.—Improved steel buying commencing with September and continuing through the fall and early winter months is predicted by a leading independent executive. Crop movement will cause the farmers to do some buying, while the railroads will begin to make needed purchases, he believes. The period between the present and the middle of September will be marked by an irregular market, it is believed. While the general tendency is undoubtedly for more activity in the industry, indicated by a somewhat marked improvement in inquiry, actual buying still lags. Recent enlargement in active productive capacity in the Valleys has been disproportionate to the inflow of new business, and is largely attributable to the working off of a backlog of tonnage. Business now being negotiated will mean fairly sizable plate, bar, angle, bolt and nut orders.

A railroad car repair contract now in course of negotiation will involve upwards of 20,000 tons of plates, for instance, though the tonnage will probably be strung out over a considerable period. District makers recently figured on an inquiry for 1000 tons of rods, but when the business was placed it was for a much smaller tonnage. The Trumbull Steel Co. is working off a substantial order for strip steel placed by the Ford Motor Co. An inquiry for 500 tons of automobile seconds in sheets elicited varied quotations, one interest offering to supply the material at 3.50c.

Turn for Better Indicated

It is generally believed that such activity prefaces a turn for the better, though some time will probably elapse before the improved tone is shown in the actual placement of business. Consumers, it is stated, are less deterred by price uncertainties than for some time past, sensing the fact that quotations are reaching bottom. A definite market is gradually being shaped ranging from $3 to $5 per ton below nominal quotations on finished products.

The problem of operating losses, arising in part from recent reductions and from the low state of operations, is an important one before producers. Owing to the recent price reductions and the low state of operations, losses are now heavier than at any time this year.

Low Prices on Sheets

The sheet market is still spasmodic. An Eastern manufacturing consumer has purchased 1500 tons of copper bearing sheets from a Valley interest at a price under going quotations. Prevailing sheet prices are 3.25c. for No. 28 black; 4.25c. for No. 28 galvanized and 2.40c. for No. 10 blue annealed. These are all concessions from the recently announced levels. It is stated that 4c. for galvanized and 3c. for black are being quoted by Eastern competitors and could probably be done under pressure in the Valleys. An important producer expresses the opinion that the market will not stabilize until prices generally reach the lower levels.

There are signs of a let-up in the full finished market and the principal district maker is preparing to curtail production, which has been steadily maintained for several months. One sheet maker is turning out material largely for the Ford Motor Co., while another, the Brier Hill Steel Co., is working off tonnage for the Dodge Bros. Co. A non-integrated interest, the Falcon Steel Co., which has been idle for several weeks, is preparing for a complete suspension to continue for possibly two months.

While somewhat more activity has been in evidence in the plate market the past two weeks, it is not of a sustaining nature. Accordingly schedules are still gaged largely on day-to-day business. The range on prices is from 1.85c. to 2c.

SALE HALTED

Government Will Not Dispose of Surplus Steel Until Inventories Are Made

WASHINGTON, July 26.—In compliance with the recent order to stop all sales of surplus property, the Shipping Board to-day rejected without opening the only bid submitted for the purchase of 110,000 tons of structural steel at Hog Island. The single tender made was by the Bethlehem Steel Co. When it was received the announcement was made that it would not be opened and no additional bids on any surplus property will be considered until the inventory of surplus property, now under way, is completed. The physical work of making the inventory is almost completed, it was stated, but only a small part of the bookkeeping done. The steel at Hog Island consists of plain, fabricated and assembled material, the greater portion being fabricated plates. The policy as to disposition of the Government surplus is to sell, following inventory, after different branches of the Government have been given an opportunity to make requisition for needed supplies, in accordance with the recent order of Director Dawes. This was made clear to-day as the result of a conference between the budget director, Assistant Secretary of War Wainwright and Colonel Hartshorn, director of sales, War Department, after which it was announced the War Department will proceed with the sale of the surplus during August which has been scheduled for disposal, other branches having made requisitions for material from these lots. Included among the lots to be sold are miscellaneous iron and steel tonnages held in different sections of the country by the Quartermaster Corps. The biggest tonnage is to be sold Aug. 15, among which is about 3500 tons of shapes.

Along with the stopping of sales of surplus stocks, with the exception mentioned, the Government has held up proposed purchases. In line with this policy, the Bureau of Supplies and Accounts, Navy Department, has announced its withdrawal from market of approximately 8000 tons of plates, shapes, bars and sheets. Bids for furnishing these tonnages had been asked and were to be opened Aug. 5. The bureau also has withheld the award on approximately 900 tons of plates on which bids recently were received. These plates were to be delivered to Portsmouth Navy Yard, but it is understood the question of design of submarines is being given further study before the award is made and expected new bids will be asked later. Withdrawal of the request for bids for other steel, which was to furnish stock for six months, is attributed to the fact that stocks on hand first will be inventoried.

Freight Carried by U. S. Railroads

"Class One" railroads carried 2,249,567,625 tons of freight in the calendar year 1920. Coal and other products of the mines accounted for more than 1,200,000,000 tons, or 53.6 per cent. Grain and other agricultural products carried amounted to 220,000,000 tons, or 9.78 per cent. Lumber and other forest products carried weighed 197,000,000 tons, or 8.74 per cent. Meat and other animal products amounted to nearly 45,000,000 tons or 1.99 per cent. Manufactured and miscellaneous articles comprised 21.91 per cent, or about 493,000,000 tons. The balance—some 90,000,000 tons, or 3.98 per cent—was the total of the "less-than-carload" shipments, not classified as to character.

Federal Expenditures Drop

During the fiscal year ended June 30, United States Government ordinary expenditures amounted to $5,115,927,689, as compared with $6,403,343,841 last year. During the same period the disbursements on account of public debt fell from $17,038,039,723 to $9,182,027,170.

A Mahoning Valley fabricating interest has been figuring on 150 large boilers for the Navy Department, basing its estimate on price of plate stock considerably below the current market, at which it confidently maintains plates may be purchased.

PERSONAL

G. Grant Porter and W. Henry Twigg, managing director and director, respectively, of the Perfection Enamelling Painting Co., Ltd., London, have decided to embark in a business of representing American manufacturers in Europe. They have already made arrangements to represent some makers of machinery and equipment suitable for railroad use and shipyards, certain American devices and machines being regarded as having an attractive field of use in the railroads of Europe and in the metal-working industries. They left New York for France on Monday and have established headquarters at 11 rue de Edouard VII, Paris. They plan to cover Belgium, Germany, England and Italy. Mr. Porter has long been identified with English business activities, having first been engaged as an electrical engineer on the building of the Yerkes underground railroads of London. Mr. Twigg was for some time a consular representative of Great Britain in Venezuela.

Thomas B. Sweeney has become superintendent of the Dillon Boiler Works, Fitchburg, Mass., succeeding Joseph Scott.

W. Forster Browne, mining engineer, London, England, who has been in Canada for some time, examining properties of the British Empire Steel Corporation, also visited the United States and sailed from New York last week.

P. T. Irwin, Lincoln Twist Drill Co., Taunton, Mass., has been made sales manager, drill and reamer division, Greenfield Tap & Die Corporation, Greenfield, Mass., with headquarters in Greenfield. Galen Snow has been made advertising manager.

H. F. Randall, former manager of the New York office of the G. H. Williams Co., Erie, Pa., has succeeded E. F. Jones as general manager, Mr. Jones having resigned.

R. D. Love has been made manager of sales of the Warren Iron & Steel Co., Warren, Ohio, with headquarters at Warren, Ohio. He was formerly manager of sales and buyer for the Betz-Pierce Co., Cleveland, and later was connected with the sales department of the United Alloy Steel Corporation, Canton, Ohio.

A. C. Anderson, mechanical engineer Putnam Machine Works, of Manning, Maxwell & Moore, Fitchburg, Mass., is now engaged in engineering work for the William A. Hardy & Son Co., 133 Water Street, Fitchburg, brass founder.

David E. Roberts, consulting engineer, Cardiff, Wales, who has spent some months in China in connection with the proposed construction of additional iron blast furnaces, sailed from New York for England this week. Mr. Roberts has made a number of trips to the United States in recent years, visiting leading iron and steel plants.

Edgar L. Keithley, recently with the Seattle Plumbing Supply Co., has established an office at 1323 Alaska Building, Seattle, Wash., as a representative of the Central Foundry Co., maker of cast iron pipe, soil pipe and general castings. He will assist his father, E. A. Keithley, the company's representative at San Francisco, and will cover Oregon, Washington, neighboring States and British Columbia.

John D. Hurley, president Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, sailed from New York on the Olympic July 16 for an extended trip on business and pleasure throughout continental Europe. He was accompanied by Mrs. Hurley.

E. W. Crellin, former president Pittsburgh-Des Moines Co., has retired from active duty. The following officers have been elected: W. H. Jackson, president; O. E. Guibert, vice-president; George A. Smith, secretary and treasurer; W. W. Hendrix, vice-president. Mr. Smith has removed from Des Moines to Pittsburgh. A. C. Pearsall has been appointed general manager of the Des Moines branch.

J. C. Davies, managing director of Baldwins, Ltd., Swansea, Wales, who has spent some weeks in Canada at the plants of his company, sailed from New York on Tuesday.

Robert Wilson has resigned as superintendent of the Fabricated Steel Products Co., Leetonia, Ohio, to become identified in an official capacity with the Adams Mfg. Co., East Palestine, Ohio.

F. A. Hastings has been appointed assistant sales manager of the Pittsburgh Bridge & Iron Works, Pittsburgh. He has been with the American Bridge Co., and formerly of Wheeling, W. Va.

W. R. Hartline, for the last two years in the refinery construction department of the Texas Co., Houston and New York, has been added to the sale department of the Traffic Motor Truck Corporation, St. Louis, to assist in the promotion of sales to contractors and engineers. He was a flying engineer officer in the Army air service during the war. He is a junior member American Society of Civil Engineers.

President Lloyd Booth of the Falcon Steel Co., Niles, Ohio, announces that W. T. Brangham, assistant general sales manager, will have charge of the sales department during the next few months, under executive direction, due to the resignation of George E. Harris as general manager of sales. Mr. Harris has resigned to engage in business for himself in Detroit.

William J. Todhunter, for almost 35 years with the Illinois Steel Co. at South Chicago, Ill., has resigned as superintendent of the slab and plate mills at South Works to become manager of the American Forge Co., Chicago, a subsidiary of the Ajax Forge Co. Charles Horn, who has been assistant to Mr. Todhunter, succeeds him.

Paul C. Bandy, who formerly handled the sales work in the industrial heating department of the Cutler-Hammer Mfg. Co. in the Western district, is now manager of the industrial heating department of the Russell Electric Co., Chicago, who recently entered the industrial heating field in an extensive way.

George D. McDougall, general superintendent of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., has been appointed chief engineer of the British Empire Steel Corporation, and Archie McColl, for many years secretary of the former company and assistant to the president, will be general manager of the Nova Scotia Steel & Coal Co., according to official announcement made by D. H. McDougall, vice-president of the British Empire Steel Corporation.

Clement C. Smith, Milwaukee, has succeeded Holden A. Evans as president of the Baltimore Dry Docks & Shipbuilding Co., Baltimore. He was chairman of the board and will continue to serve in that capacity. Mr. Evans also will serve on the board.

E. C. Welborn, 29 South La Salle Street, Chicago, has opened offices as business and engineering counsel in the solution of financial, business and engineering problems. Mr. Welborn graduated from Indiana University in 1897 and from the mechanical engineering course at Cornell University in 1903. He has been identified with the Illinois Steel Co., the Allis-Chalmers Mfg. Co., the Standard Separator Co., and for the past two years has been vice-president of the Hanna Engineering Works, Chicago, in charge of engineering, development, manufacturing and sales.

H. M. Salisbury, export manager Maxwell Motor Sales Corporation, Detroit, has gone to Europe to study conditions in England, France and Holland.

Charles S. Newmann, assistant secretary Union Mfg. Co., New Britain, Conn., will sail for home from Southampton, England, Aug. 3, following a three months trip.

Stewart C. Wilson has been appointed Pittsburgh district sales manager of the Whiting Corporation, Harvey, Ill., succeeding Robert S. Hammond, recently transferred to Chicago.

OBITUARY

James W. Porch

JAMES W. PORCH, for 23 years sales manager at New Orleans for the Lukens Steel Co., Coatesville, Pa., died July 21 after an operation. He was 63 years of age. Speaking of him, the New Orleans *Times-Picayune* of July 22 said: "Mr. Porch, from the day he came to New Orleans 23 years ago, was one of the city's outstanding personalities. Aggressive, a keen student of affairs, he took a leading part in virtually every movement launched in the last 20 years looking toward the development of New Orleans as a great port and a commercial center. He was a waterways enthusiast, one of the first of the little group of men who fought for revival of river traffic and who finally watched their following grow with the result the Government actually undertook that revival with its barge lines on the Mississippi and Warrior rivers. Another of his activities which was perhaps best known was his connection with the Public Belt. He was one of the first advocates of this city-owned facility and one of the most able campaigners in making it a reality."

Before going to New Orleans, Mr. Porch, under the Cleveland Administration, was the American consul general at Mexico City for a number of years. He is survived by his wife and two married daughters.

AUGUST C. KIECKHEFER, founder and former president Kieckhefer Elevator Co., Milwaukee, a manufacturer of freight and passenger elevators, died suddenly of heart disease in the Northwestern Station at Chicago on July 20 while waiting for a train to Milwaukee. He was 67 years of age and a native of Milwaukee.

BERNARD H. WENZEL, secretary Jaeschke Bros. Foundry Co., Milwaukee, died July 19 following a long illness. He was 29 years of age.

FRANK P. STANLEY, head of the Stanley Mfg. Co. and the Stanley Marine Engineering Co., died at his home on Puritan Lane, Swampscott, Mass., July 18, following an attack of heart disease, at the age of 71.

JONATHAN E. PORTER, founder of the Porter Machine Works, Hatfield, Mass., lathes, died of heart trouble at his summer home at Crescent Beach, Conn., July 21, at the age of 72. He was born at Hatfield, Nov. 22, 1849.

Federated Employment Bureau of the Engineering Societies

The Federated American Engineering Societies has taken over as part of its work the employment bureau for engineers which the national engineering societies had maintained for some time at 29 West Thirty-ninth Street, New York. Representing a combined membership of about 50,000, the Federated Engineering Societies plans to make this clearing house of engineering service increasingly valuable to employers and to engineers of every variety of training and experience. It is required that applicants be members and that they submit complete educational and professional records. The records are carefully classified and as the special requirements of any position are received the equipment and experience of men of suitable qualifications are submitted for consideration. The services of the bureau are free to employers and members alike. Since the arrangement was made for this joint conduct of the employment work of the various engineering societies the effectiveness of the service has been increased to a marked degree.

Cast Iron Pipe for Milwaukee

MILWAUKEE, WIS., July 26.—The city of Milwaukee closes bids Aug. 10 on 3510 tons of 54-in. cast-iron pipe and 343 tons of 54-in. special castings, f.o.b. Milwaukee, for delivery in 45 days.

DISSATISFIED WORKERS

Youngstown Employees Object to Wage Cuts—Many Preparing to Go Elsewhere

YOUNGSTOWN, OHIO, July 26.—While workers in the iron and steel industry are glad to secure employment, in the majority of cases, at almost any wage, the most recent wage reduction by independent producers, effective July 16, has caused considerable dissatisfaction. As a consequence of the moderate wage rate, many employees are preparing to seek work elsewhere or in other lines when business conditions are righted.

Wages earned by many men are a third or a half of their earning capacity during the war and they contend that living costs have not been proportionately reduced. Irregular employment, furthermore, has still further curtailed their income, with the result that socialistic and bolshevik tendencies are evident. Mill men state that radical sentiments are cordially received by many workers, owing to their dissatisfaction with current conditions.

Many men who were attracted to the mills by high wages during the war have either left the industry or are preparing to do so. In some departments of the industry, men have worked steadily less than a month during the past eight months. One sheet mill roller has worked 63 days this year, while there are many others who have worked less.

Generally the men feel that operating economies should not be compelled to bear the brunt of the readjustment, but that the executive and sales departments should be proportionately scaled. While salaried men have been cut an average of approximately 10 per cent and in some cases 15 per cent, workers in the mills claim such reductions have not equaled the cuts for operatives.

New Pittsburgh Scale

A break in the Pittsburgh building trades tie-up which has existed since June 1, because of the failure of the contractors and unions to agree on wage scales, is indicated by the action of the bricklayers' union recently in adopting a new scale reducing the rate from $12 per day of eight hours to $10.40, and cutting the overtime charge from double time to time and a half, except on Saturday afternoons, Sundays and holidays. There are no indications that this offer will be accepted by the contractors, who some time ago offered to sign an agreement with the unions calling for $1.12½ per hour or $9 a day of eight hours, and are not disposed to raise the offer. It is encouraging to those hoping for an early settlement of the building trades dispute that the bricklayers are showing signs of a desire to get to work. Meanwhile, union bricklayers on strike in Pittsburgh are said to be working in places just outside Pittsburgh as low as 80c. an hour and drawing strike benefits from the Pittsburgh union.

Unemployment Increasing

Unemployment still is increasing in most districts of Pennsylvania, according to the latest report of the State Bureau of Labor and Industry, covering the situation as of July 15. In the Altoona district there was a decrease from 22,050 on July 1, to 20,850 on July 15, the explanation being found in the resumption in the Pennsylvania railroad car shops in that district. Unemployed in the Pittsburgh district on July 15 numbered 50,850 as compared with 48,100 two weeks before. In the Erie district, 14,775 were idle against 14,635 on July 1. Harrisburg reports 20,850 out of work on July 15, against 14,245 on July 1; Johnstown 19,290, against 17,090; McKeesport 5890, against 5850; New Kensington 10,250, against 9820; Philadelphia 116,000 men and 11,550 women, against 105,000 and 11,150, respectively; Scranton 15,375, against 20,250, and Williamsport 6650, against 5950.

BOOK REVIEWS

Protection Our Proper Permanent Policy. By James T. McCleary. Pages 544. 5¾ x 9 in. Published by the National Tariff Institute, Inc., Washington and St. Paul.

Mr. McCleary is well known to the iron and steel trades for his successful administration of the affairs of the American Iron and Steel Institute for a number of years preceding 1920. He was representative in Congress from a Minnesota district for a series of terms and was assistant postmaster general under the Roosevelt administration. In all his public speaking, covering many campaigns, he brought to the discussion of national questions an unusual candor, clearness and teaching power. His method is the method of an honest instructor, who in arguing a proposition seeks, without any of the mere fencing of a contender, to lodge his thoughts in the minds of his readers or hearers, in just the way in which they were formed in his own mind. The art of doing this is rare.

Mr. McCleary is a protectionist, there is no doubt about that—a protectionist of the school of James M. Swank and "Pig Iron" Kelley. Not many of that type are to be found. Mr. McCleary's view is that protective tariff rates cannot be too high. In the chapter on "What Shall Be the Rates of Duty?" he writes:

"When we remember that under a protective tariff the duty is not a tax on our own consumers but a license fee on the foreign producers (and it is vital that every American citizen get this clearly established in his mind), all fear of getting the duties too high will disappear; and it will become the more evident the more clearly the subject is understood, that the only mistake possible is that of getting the rates of duty too low."

If that be the protectionist's confession of faith, it will have to be said that a good many among the present generation of American business men are apostate. The more one knows of the amount of practical politics entering into a tariff bill, the less reverence he has for protection as expressed in actual legislation, sound as he may consider himself to be in the faith as delivered to the fathers of a protective tariff. In connection with the Fordney bill that passed the House with so little consideration nothing has been plainer than that the sentiment of the business men of the country, without regard to party, favored moderate rates—more moderate than those decided on by the Ways and Means Committee. Foreign countries on whose products high duties are levied at American ports are led to discriminate against American products, and sentiment has grown among our exporting manufacturers in favor of a bargaining tariff.

Mr. McCleary has presented clearly and fairly, and withal most interestingly, the history of tariff legislation in the United States. He takes issue not only with the tariff reform and "revenue only" doctrines that now and then have carried a Congressional election, but combats what he considers heresy in some of the tariff views that have had a following in his own party, referring particularly to the declaration in its platform of 1892 that the duties levied should be "equal to the difference between wages abroad and at home." He objects to this on the grounds that the difference between foreign and domestic wages cannot be definitely learned, that rates so adjusted could not continue a proper measure of wage differences, because of changes, and in any event such an adjustment would not be properly protective. The book is a consistent preachment of Simon-pure protection, unmodified by any of the latter-day developments in our foreign trade. It illustrates how far apart men can be on this matter of the proper fiscal and impost policy of the American Government, yet with each side confident that its view will insure the largest prosperity to the largest number.

It can hardly be said that the liberal quotations from newspaper editorials and addresses of public men which intersperse the various chapters have added strength to the book. Mr. McCleary has done his work so well that these quotations are rather dilutions. But evidently the thought was to make these sidelights on American economics and business contribute to the author's purpose to prepare a complete handbook of protection. Enthusiasm in the cause is written on every chapter, and the reader will not miss the purpose to give protection as a national policy a standing with the present generation of American business men such as it had for 30 years following the Civil War. Mr. McCleary's long public service and his years of study of the tariff equip him in an unusual way to write a textbook of protection, and even the reader who may not agree with him will not withhold admiration of the stalwartism of his defense of the faith.

Armco in Picture and Fact, a book of 247 pages, traces the history of Armco ingot iron from the mines of the Lake Superior district through the blast furnace, the open-hearth furnace, the soaking pit and the blooming and bar mills to the sheet mill, where it takes its final shape. Then the processes of annealing, pickling, galvanizing and cold rolling are described, with the various auxiliary leveling, resquaring and inspection. Specialties are outlined, together with the methods of their manufacture. About 85 pages in the rear of the book are devoted to tables designed to aid the user of sheets. It is published by the American Rolling Mill Co., Middletown, Ohio.

Facts and Figures of the Automobile Industry, published by the National Automobile Chamber of Commerce, 366 Madison Avenue, New York, records in its 96 pages the volume of the automobile industry in production during 1920, with comparative figures for earlier years; the distribution of cars by states and by countries external to the United States; the exports and imports of cars, both pleasure and truck. It gives figures of the consumption of fuel, production of rubber, and number of dealers and service stations. It shows the steady increase of cars in the United States, from 2,445,664 in 1915 to 9,211,295 in 1920, and lists 8,369,605 of the latter as passenger cars. Of the world registration of 10,922,278 cars, 83 per cent are in the United States. Extracts from State laws show annual fees and general requirements.

Greenfield, Mass., manufacturing interests have established an attractive permanent exhibition of their products in a large room leading out of the sun parlor, Weldon Hotel, that city. Among those concerns having exhibits are: the Greenfield Tap & Die Corporation, taps, dies, drills and other small tools, as well as machine tools; Ruggs Mfg. Co., lawn, hand and hay rakes and wood and steel snow shovels; Velco Mfg. Co., broaching machines and broaches; Greenfield Machine Co. Division, Greenfield Tap & Die Corporation, a No. 1 external grinding machine; Russell Mfg. Co., screw plates with double reversible dies; Production Machine Co., a type R utility grinding and polishing machine, and Goodell-Pratt Co., small tool display. It was through the efforts of F. O. Wells that the exhibit was made possible.

According to a cablegram from Commercial Attache C. H. Cunningham, Madrid, a decree published July 19 makes the duties specified in the new Spanish customs on coal and coke effective at once. These duties had been suspended since 1915. The duties levied in the new tariff are as follows: Coal, 7.50 pesetas per 100 kilos, and coke and briquets, 9 pesetas per 100 kilos. (Peseta, normal value, 19.3c.; 100 kilos, 220.46 pounds.)

The conference between the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers reconvened July 25 at Chicago, to negotiate a new wage agreement. The conference was adjourned in June at Atlantic City following failure to agree after a week's negotiation. Manufacturers demand a practical return to the 1915-16 scale, which would amount to a reduction of $1.87 per ton for boilers on the base paid at present.

Explosion Hazard and Its Prevention

(*Continued from page 206*)

In coal mines the most used correctives are among others; (a) the use of water to moisten the dust and counteract its floatibility in the air, by the use of sprinklers or chemicals such as deliquescent salt (calcium chloride); (b) the localization of the danger by dividing the mine into safety zones separated by positive barriers to conflagrations. For that purpose stone dust has been used, as tests have proved that any flame could be stopped by a shower of fine mineral dust of a certain magnitude; (c) the prohibition of certain explosives, and the use of explosives that generate only low temperatures, and that fail to ignite existing coal dust mixtures (safe explosives); (d) the prescription of safety lamps that do not propagate their flames; (e) good aeration to assure only very lean mixtures. The question of coal mines is very complicated and somewhat outside of the industrial field. The writer has no pretension of being complete. This summary merely outlines what has been done, and is full of suggestions.

Pulverized Fuel Applications

Of all other applications of coal dust, the pulverized fuel plants are the most important, because they are built to produce on a large scale coal dust of impalpable fineness in dry form. That poses the questions: Are there any coal dust-air mixtures used in pulverized fuel plants? And how far is their operation safeguarded?

In the milling plants, before the fuel reaches the pulverizers, it is in such coarse form that really no explosion danger exists. After it has been pulverized there are three distinct operations creating coal dust-air mixtures: (1) the screening operation (2) the pneumatic distributors (3) the burners.

All pulverizers work in connection with a sifting device whose object it is to maintain a certain degree of fineness of the product delivered. These contrivances may be based on mechanical principles and use sieves, or may use air currents of various velocities and changing directions. Both devices create fuel-dust-air mixtures that are practically safe. Air separation mills use a cloud density of 1 lb. of coal powder to 30 to 60 cu. ft. of air. Their circuit is short, always below 100 yd., including return lines, which correspond to a great localization. They never handle more than 5 lb. of coal per sec. in one unit. Their pipe lines are usually very much inclined and never should be less than 60 deg. from horizontal to avoid deposits of any dust in the lines in case of unforeseen shutdown of the fan. The velocities of the air currents in the pipe lines are above 4000 ft. per min.

The only weak point is the cyclone separator, where possibility for unfavorable safety conditions exists because of the low velocities that have to prevail there for functional reasons. Thus the danger, if any, is localized in one particular point that should be placed outside of the buildings and be provided with suitable safety valves to relieve possible pressures. In that manner all trouble inside the building is avoided. Furthermore, as hardly any chances for ignition exist, reasonably safe conditions are assured, which is proved practically by the high reputation and the increasing popularity of this method of separation in all industries.

Pneumatic distributing devices also create, purposely, fuel-powder mixtures with air. They are divided into two classes, according to their principle of operation. The emulsion type uses a mixture less than 3 cu. ft. of air per lb. of coal, according to the various features of the systems developed. They are practically explosion-proof, as their dust concentration is extremely high, and in their complete circuit no contact with any fire or outside source of ignition exists.

Suspension methods of distributing fuel powder use cloud densities varying from 40 to 120 cu. ft. per lb. of coal transported, according to the distance of distribution and the varying conditions in the operation of the system. These cloud densities approach often, and sometimes are beyond, the high limit of inflammability. To counteract this shortcoming, and also to reduce pipe diameters and avoid deposits, great current velocities are used. Speeds varying from 3000 to 6000 ft. per minute are common.

This corrective should exist in the complete circuit; whenever cyclones are used they should be placed under all circumstances outside of all buildings, without unnecessary connections to any other part of the equipment, in order to isolate the danger point as much as possible. Explosion relief valves are absolutely necessary to prevent the building up of any pressures, as well as safety back pressure devices segregating part of the lines. The suspension system of distribution can be made reasonably safe for short distances, where densities of 40 to 70 cu. ft. per lb. of coal might suffice to maintain the flotation of the dust; beyond those limits its safety becomes precarious, especially because, in their actual commercial forms, direct connection to furnaces exists.

The third point in using mixtures of fuel dust and air concerns the burners of the furnaces or boilers. The mixtures may be the primary air-fuel dust in the ratio of 1 lb. of coal to 20 cu. ft. or less of air, for distances up to 100 ft., or secondary (volume) air and fuel in the ratios of 1 lb. of coal to 150 or 200 cu. ft. of air, depending on the nature of the flame wanted. The first mixture is only a means to transport the coal powder from the bins to the furnaces, and the second mixture is produced in those very dangerous proportions for immediate combustion purposes. The ignition is wanted continuously, and the temperature in the combustion chamber is raised very high with that aim in view. To be safe, burners must first confine the combustion to the combustion chamber, which is easily done by maintaining the flow velocities in the burner pipes higher than the flame velocities of fuel-air mixture at the high temperatures, and by having their air and fuel dust supply interlocked and under instant control of the operators.

In designing various machines and devices along the lines developed above, or in incorporating minor changes suggested, there is no doubt that, with proper engineering skill, the various pieces of apparatus making up powdered coal installations can be made safe to a point of practical exclusion of any explosion hazard.

Ignition and Self-Ignition

The one problem that remains to be discussed is the cause of ignition. Just as an explosive is relatively harmless without a detonator, a dust-air mixture is not absolutely dangerous by its mere existence. An ignition source is necessary to produce an explosion. These sources, which may be external or internal, must be carefully avoided, to assure safe conditions.

All outside fires, like Bunsen burners, open flames, torches, connections to furnaces, should be prohibited in the close neighborhood of any inflammable mixture. The use of electricity should be preferred anywhere, with the obvious precaution that sparks should be prevented by the choice of proper motors and current characteristics, a.c. versus d.c., by the use of correct wiring to avoid all chance of short circuits, by the installation of properly protected lights (no arc lamps allowed) and by the use of properly grounded neutral connections that counteract stray-currents, as well as electro static or electro dynamic tensions. Electricity, besides being the most convenient prime mover, permits with the simplest means compliance with these logical prescriptions, and presents the added advantage of permitting easy interlocking of all drives for greater mechanical safety.

The internal source of combustion with fuels is usually called self-ignition. This phenomenon, known to all interested, exists with storage of coal independent from its physical form, be it run of mine or crushed or pulverized. As coals are heterogeneous materials, soiled with all kinds of impurities, there should be nothing mysterious about self-ignition in the light of the above technical reasoning. It is merely a slow oxidation effect, starting perhaps with a pyrite impurity, and causing a local rise in temperature. The phenomenon may die out or propagate, according to circumstances. If the coal is rich in hydrocarbons, this

increase in temperature may distillate some low volatile gases liable to create dangerous mixtures with air. With finely pulverized fuels, the chances for these reactions are increased by reason of the large surfaces of contact and the ease of distillation of some hydrocarbons out of small particles of coal. This slow burning of stored coal is accompanied by a penetrating odor, and often by the formation of smoke, that make it easily noticeable.

Remedies against self-ignition are:

1. Store the coal preferably in the raw or crushed form, and dry and pulverize it only according to the needs of operation of the plant.

2. The storage capacity of dried and pulverized coal should be such as to avoid all danger from self-ignition.

3. Pulverized fuel should be stored preferably in close proximity to its place of combustion.

The first rule, besides being a safety recommendation, is the expression of the sound manufacturing principle: Ample storage of raw material and progressive transformation. The size of bins for storage of dried and pulverized coal is essentially dependent upon the coal quality and the time involved. No general rule will apply, and to prescribe maximum time and maximum storage capacity would be unfair to certain coals. The best suggestion is a time test of each coal quality. By duplicating practical operating conditions, this question can be settled without guess and interference of side issues. The coal bins located next to furnaces can easily be emptied by burning up their content without danger.

For raw coal, aeration has proved a reliable antidote against self-ignition, because air currents cool down the coal and retard the oxidation effect, and accumulations of gases in quantities are avoided.

Besides the pulverized coal itself, existing only inside of the various machines, bins and handling devices, it is necessary to consider also the so-called mill-dust which, in the course of time, accumulates everywhere in any industrial building—on roof trusses, in corners, on top of flat surfaces. This mill dust is often of inflammable nature and its accumulations are a constant source of danger. The removal of mill dust is an absolute operating necessity from the safety standpoint, and cleanliness is not only a hygienic virtue but a preventive, whose importance cannot be emphasized enough. The most economical method of dust removal is the well-known vacuum dust-collecting system, that incidentally permit a complete recovery of the dust, often of commercial value.

These vacuum devices should be in every factory, and no pulverized fuel plant should be without them. Of the various systems offered by the trade, those are to be preferred where the exhaust fan is located beyond the point of collection, on account of their superior efficiency and safety.

Understanding Essential to Progress

Prejudice and ignorance are some of the greatest enemies of progress. Only by frank, unbiased study and diligent research will antiquated opinions be shattered and real knowledge diffused. As industrial safety is a corner stone of prosperity, a better understanding of the nature of explosions, their hazards and their remedies will be essential to further industrial welfare. The writer hopes that this analysis will contribute to that end.

Causes and Occurrence of Dust Explosions*

Static Electricity an Important Contributory Cause but Dust Proportion the Vital Element

RECENTLY the engineers of the Department of Agriculture were asked to investigate an explosion of rubber dust occurring in the recovery of hard rubber. That was a new form of explosion. It cost the lives of nine men and indicated that certain by-products in certain industries are now being utilized, in which very fine dust is produced. That may account or some of the explosions that have taken place in some industries that we have not hitherto regarded as dangerous.

We might cite an example of that in the cereal industry, where in recent years the oat hull has been utilized and is now being ground for the manufacture of cattle feed. That by-product some years ago was more or less waste; and in other industries we may explain the frequency of explosions by the utilization of by-products that were, not many years ago, considered as waste. In the grinding or manufacturing process very fine dust is, therefore, created and the explosion follows.

The theory of dust explosions should not be difficult to understand because, upon analysis, it is very simple. It has been found in tests that the finer and the drier the dust, the more explosive its condition. This is quite natural, because the finer the dust, the nearer its molecules approach the size of gas molecules, and what occurs in a gas explosion is very similar in form to what occurs in the dust explosion, in fact, almost identical.

Dust "Explosions" Simply Rapid Combustion

Dust does not explode, of course, like dynamite. It is simply a rapid propagation of flame. Just what occurs when the explosion takes place is somewhat debated at present. Some physical chemists claim that the dust, upon being heated, distills explosive gases; others state that that is not the case, but that the combustion is so rapid that the rapid rate of flame travel creates a tremendous pressure and the explosion follows.

In the industrial plant one explosion, only, rarely takes place—there are usually two and in some instances three. That has been explained in this way: the original dust explosion might be just the ignition of small quantities of dust and air, which produces sufficient concussion to jar or shake into the air any dust lodged on girders, beams or ledges in any part of the plant. This dust feeds and propagates the flame from the primary explosion, resulting in the secondary or vital explosion, which is the one that usually causes the extensive damage.

Static Electricity Causes Explosions

The Department has been asked in recent years to look into many interesting cases of explosions, not only in industrial plants, but in the operation of farm machinery. One particular problem between the Cascades and the Rockies, in the Pacific Northwest, has shown that in some seasons as many as 600 explosions have occurred in five weeks' time in the threshing of wheat in the vicinity of Spokane, Wash. Although at first the operations of the I.W.W. were assigned as the cause of the explosions, investigation showed scientific developments. The wheat in the territory was diseased with smut dust that was very explosive, and the remarkable part of the investigation was that the machines operating in the field generated a large static electric voltage.

Engineers have tried to measure that discharge, and in some cases it runs as high as 52,000 volts, although it is, of course, at very low amperage. But it made a very hot spark, and the passing of the spark from the cylinder teeth to the concaves in the threshing machine ignited the dust. Of course, the thresher operator laughed at the idea at first that he was generating enough electricity with his machine to burn

*Abstract of paper read before Cleveland section of Association of Engineers, on "Explosibility and Prevention of Explosions of Grain Dust," by L. A. Fauth, Jr., and C. L. Brown, of the Bureau of Chemistry, United States Department of Agriculture. Mr. Fauth has been in charge of grain dust explosion investigations, United States Department of Agriculture, Bureau of Chemistry, before the Western Society of Engineers.

him up or blow him up, but nevertheless the scientific investigations disclosed that to be the fact, and the wiring of those machines has controlled the frequency of the explosions.

A year or two later the Department was asked to look into a series of frequent fires in cotton gins in the South. This happened during the war, in 1917, and of course they were all "pro-German cases," in which matches were being introduced with the cotton, supposedly. But an investigation disclosed that the fires were very similar to the cases in the Pacific Northwest. The friction of the cotton on the galvanized pipe, in passing from the wagon to the gin, built up the charge which ignited the cotton. This led to a grounding arrangement which materially reduced the fires.

Explosion Lessons Result in Reforms

All the way down the line we find that explosions are occurring in representative lines of industry, and in the operation of certain machines or equipment where these conditions exist or the dust is present. The explosion that occurred in Minneapolis, May 2, 1878, when the Washburn-Crosby Mills blew up, led to the introduction of improved types of dust collecting equipment.

Professors Peck and Peckham, then called upon by the coroner to investigate the cause of this explosion, constructed a box containing about 2 cu. ft. of air space and by blowing 2 oz. of flour dust onto a Bunsen burner inside the box they were able to lift two men standing on the box lid. That 2 oz. of flour dust, when ignited, would raise the weight of 300 lb. A physical chemist, with the chemical composition of flour known, has taken that calculation and found that, if it were possible to release a sack of flour, and diffuse it at that ratio, on the basis of that experiment, that one sack of flour would life 2500 tons 100 ft. high.

Coal Dust Highly Explosive

In another investigation the Bureau of Mines finds that 0.02 ounce of coal dust per cu. ft. of air space is sufficient to produce an explosive mixture. The explosive range of methane gas is from 5½ to 14 per cent. That means that with methane having less than 5½ per cent there is no explosion; with over 14 per cent there is too much gas present, but the range is between those two extremes. With 0.02 ounce of coal dust per cu. ft. of air space there is a mixture that could produce an explosion. That is taken as a standard, because we have made coal dust the standard in the tests, but grain dusts are more explosive, so it would probably take less grain dust than it would coal dust.

Figures are usually monotonous and uninteresting, but they will give some idea of the tremendous pressures created when explosions of this kind occur. On the basis of 0.02 ounce per cu. ft., only 80 ounces would be needed in a room 20x20x10 ft.; 5 lb. of dust diffused in proper proportions through the air in a room of that size would be sufficient to blow it apart.

In the laboratory experiments, by using 75 milligrams (1/380 ounce) of dust, just a small quantity, in a little vessel of 1400 cu. cm. capacity (88 cu. in., equivalent to 4x4x5½ in.) we have produced as high as 20 lb. pressure per sq. in. These figures show the terrific explosive force contained in dusts when mixed with the right proportions of air and subject to conditions that are favorable to explosion.

Summarized in Three Conclusions

First there are certain engineering problems that must be solved before we can expect to control or prevent these dust explosions. Recent cases that have occurred have taken place in the most modern, well-constructed and well-equipped plants. It has been demonstrated that a so-called "fire-proof" plant, a plant built of fire resistive materials, by no means is explosion-proof. If it is well constructed, it must be well maintained. Construction engineers must recognize the hazard and danger of dust explosions, and not permit any opportunity for the accumulation of dust in any manner whatsoever, because an accumulation of dust, when forced into supervision, will naturally permit the propagation of the flame from the primary explosion.

Second is the progress recently made in determining that electrical sources are largely responsible in many cases for disastrous explosions. A recent case in the Southwest indicated that the breaking of an incandescent lamp bulb by a workman carrying something on his shoulder ignited the dust and caused an explosion. That point was not accepted by the electrical engineers at the time, on the basis that breaking the bulb destroys the filament and thereby removes the possible source of ignition.

But the Bureau of Chemistry took up the matter with the manufacturers of electric lamps and conducted a series of co-operative experiments at the Nela Park laboratory of the National Lamp Works, Cleveland. These tests established definitely that there is not a type of electric lamp made but that, when the bulb is broken, will produce dust explosions immediately, if there is the proper proportion of dust in the air. That introduced a new element of danger, in that the use of electric bulbs in dusty atmospheres is unsafe. They must have vapor-proof coverings; a mere wire guard is not sufficient. Upon introduction of a lamp into a bin or a dusty part of the plant, if the bulb is broken, the explosion follows immediately.

It also developed in that investigation that the dust settling on the lamp globe may result in fires. Certain kinds of dust reach the point of incandescence and fire follows. If the dust particles that have been set afire drop onto the floor fire ensues, or if they drop through the air in which the dust is suspended in proper proportion the explosion will follow.

That simply means that we have got to recognize what we consider the advanced lighting methods in our industrial plants as affording a possible cause of dust explosions. We must take the necessary steps to control the static electric conditions that produce sparks in certain types of milling machines, and which will ignite dust, beyond question.

The third important matter is a subject for very grave discussion which will have to be decided in this country and Canada very soon, before we can attempt to make progress on control of dust explosions. The flour milling industry has made progress in explosion prevention by introducing improved types of dust collecting systems. It is rather difficult now to do that in a grain elevator, but I do not believe we are ever going to prevent explosions in grain elevators until we come in some way to a system for collecting the dust.

The possibility of suction or aspiration on the grain from the time it enters the elevator until it leaves should be looked into—in other words, we might put an application of suction at every point where the grain is thrown or handled. That cannot be done in any large terminal elevator now, because the possible difference of weights between the shipper and the receiver prevents. But if they were handling a material that had gasoline or dynamite or something else like that in it, they would take it out, probably very quickly.

Pulverized Coal Dangerous

Investigations of the United States Bureau of Mines have given rise to the following notes:

A small stream of pulverized coal leaking down from a defective joint in a coal transport line does not attract much attention, whereas a leak in a natural gas line under similar circumstances receives immediate attention. As a matter of fact, if by any means the dust cloud should come in contact with an open flame or hot metal, the effects would be as disastrous as if it had been gas.

One of the most serious troubles with which users of pulverized coal have had to contend has been the number of fires in the storage bins for pulverized coal. It has been somewhat difficult to determine the exact cause of these fires, but undoubtedly spontaneous combustion has played an important part in the origin of some of them.

Care should be taken that pulverized coal is not

delivered to storage bins at a high temperature; and to avoid this, the gases of combustion from the drier furnace should not be allowed to become hot enough to overheat the coal. Storage bins for pulverized coal should not be placed in any position where they may become heated from furnaces, steam pipes, or hot flues.

If a plant has been shut down for several days, delivery of coal from the storage bin through transport lines to the place of consumption should not be permitted before an examination is made to ascertain whether the coal has become heated to such a point that it will ignite when brought in contact with a current or blast of air.

The Drying of Pulverized Coal*

One of the biggest and most expensive pieces of machinery in the preparation plant is the drier. In the past it has been considered necessary to dry the coal down to 1 or 2 per cent of moisture in order properly to pulverize, feed and burn it. Latest practice indicates that it is not necessary to have the coal anywhere near this low percentage of moisture, and in some cases it is possible to operate without using driers, and to design and install the plant without them. The Allegheny Steel Co. has operated for three years without driers, and the new Ford Motor Co. installation has been built without them.

There is no doubt, also that progress will be made in perfecting the driers, where they are used, so as to reduce the cost of installation and operation. There is, in addition, a strong possibility of development so as to dry the coal either in steam driers or by the utilization of waste gases, where drying is deemed necessary.

The net over-all efficiency is about the same, whether the moisture is taken out of the coal by predrying or evaporated from the coal in the boiler furnace. There is, if anything, a slight advantage in favor of the latter.

*Abstracted from a paper by Loren L. Hebberd before the Technical Association of the Pulp and Paper Industry.

Bids on Surplus Material

WASHINGTON, July 26.—A price of $9.37 per gross ton for cast iron pipe and 8 1/3c. per lb. for copper was received by the Ordnance Salvage Board, War Department, for approximately 2527 gross tons of surplus pipe and 127,075 lb. of surplus copper rotating bands in the form of cast iron proof projectiles, with copper rotating bands assembled on them, the Bridgeport Iron & Metal Co., Bridgeport, Conn., being the purchaser. Aside from this company, the bidders were: E. J. Ellis, Washington; National Metals Co., New York; Boston Iron & Metal Co., Baltimore; Hyman-Michaels, Chicago; Max Solomon, Pittsburgh, and Briggs & Turivas, Chicago. The sale was announced last Wednesday.

Elevator Company to Have New Plant

The Graves Elevator Co., Inc., 426 Exchange Street, Rochester, N. Y., has increased its capital stock from $30,000 to $250,000 to raise funds to purchase a site and erect a new building. The site chosen is in Lincoln Park, across from the General Railway Signal Co.'s works and adjacent to the new plant of the Rochester Casting Co. Loren O. Graves, president Graves Elevator Co., is secretary of the Rochester Casting Co., which will furnish the elevator company with castings. Plans for the new building call for a one-story structure, 100 x 400 ft. Work will be started within six months. The location permits sidings from the Buffalo, Rochester & Pittsburgh and the New York Central.

A bulletin of the phono-electric wire made by the Bridgeport Brass Co., Bridgeport, Conn., has been issued printed in French. It covers the physical and electrical characteristics of the wire and contains tables necessary for the intelligent selection of the sizes of wire needed.

To Make Factory Truck Hardware

Hardware for making up a factory truck is a feature of business on which the Oliver Machinery Co., manufacturer of woodworking machinery and machine tools, Grand Rapids, Mich., has embarked. It is in a position to manufacture the complete truck, but on the basis that it will serve furniture factories, pattern shops, wood shops of various kinds and foundries, which are likely to have carpenters or woodworkers in their employ, it expects to find a wide field for the sale of the hardware needed in connection with the woodwork for building factory trucks.

The plan is to sell the hardware on a foundry basis, that is, at a net price that will be low enough to make the purchases attractive and obtain a lower freight classification than would apply to the manufactured truck. With each order will be sent a blueprint showing how to cut each piece of lumber to make it fit. The hardware includes wheels and their supports, various brackets, bolts and screws and the castings into which stanchions are fitted.

British Turning to Oil Fuel

One outstanding result of the big strike in the coal mines of Great Britain has been an increasing use of oil as fuel, in place of the coal almost universally used heretofore. Fuel oil imported into the United Kingdom in the first five months of 1921 aggregated 198,000,000 gal., as compared with 319,000,000 gal., in the entire twelve months of 1920 and 185,000,000 gal. in the whole of 1913. Monthly averages show 39,600,000 gal. in 1921, 26,500,000 gal. in 1920 and 15,400,000 gal. in 1913.

Announcement early in June of the conversion of three locomotives of the North Staffordshire Railway from coal burners to oil burners indicates a movement which is already well under way, in the changing over of railroad fuel to oil. The system adopted is reported to be the same as that in use on the Midland Railway, which is said to have been chosen because of its extreme simplicity and ease and cheapness of fitting. No structural alteration was required in the firebox or ash pan, and it is said that either oil or coal, or both combined, can be burned in the engines as now fitted up.

The burner, placed in the firebox, is supplied with oil from a 450-gal. tank fitted on top of the coal bunker. Steam is supplied to it from a stop valve on the boiler, and the oil is regulated by a simple plug cock. It is said that, with a very little practice, the engineer can regulate the supply of oil and steam in such a manner as to produce satisfactory results. The capacity of the tank is sufficient for more than a full day's work, and engines so fitted are reported to have done exceedingly well in both passenger and freight service.

Motion Pictures Obtainable from Bureau of Mines

Two educational motion pictures illustrative of the mineral industry have recently been completed, the United States Bureau of Mines announces. The first of these, the story of abrasives, shows the generation of power at Niagara Falls, its utilization for the production of carborundum (silicide of carbon), and aloxite (aluminum sesquioxide), and finally the numerous interesting and important industrial operations that are performed with the aid of the abrasives thus manufactured.

The story of rock drilling shows the use of modern types of rock drill, not only for shaft-sinking and underground operations, but also for quarrying and the cutting of the new hydro-electric power canal to connect Lake Erie with Lake Ontario. Requests for the loan of these films for showing at public gatherings where no admission fee is charged should be addressed to the Bureau of Mines, 4800 Forbes Street, Pittsburgh, Pa.

Machinery Markets and News of the Works

AWAITING REDUCTIONS

Rock Island Railroad Will Not Buy Until Prices Are Lowered 40 Per Cent

Vocational Schools Furnishing Business—July Better Than June in Chicago

Only in one center is it definitely reported that July is a better month than June. This is Chicago, where railroad business has given a little life. The Illinois Central has ordered some of the smaller equipment asked for and was expected to close on the remainder early this week, the total purchases not exceeding $100,000. The Rock Island has added two lathes to its list and has informed dealers that it will not buy until there is a 40 per cent price reduction. Action on the H. W. Johns-Manville Co. list will not be taken for a month.

Vocational schools are among the chief current buyers. The public schools of Philadelphia have purchased about 40 machines, principally speed lathes and drill presses. The McKinley school, Canton, Ohio, will receive bids July 29 on a list amounting to nearly $50,000. In several centers the used tool business is more lively than that of new equipment.

Fifteen tools have been purchased by Dwight P. Robinson & Co., New York, for a project in Brazil, additional purchases to be made in the near future. The American Sugar Refining Co. has sent out a revised list of 16 machines for its Baltimore refinery.

Recent price reductions include the following: Ten per cent on motors of the General Electric and Westinghouse companies; 20 per cent reduction in high speed drills; a reduction of 15 per cent from 1919 prices by a Paterson, N. J., maker of upright drills; 10 per cent reduction on grinding and buffing machinery and disk grinders by a Grand Rapids, Mich., maker. Some makers of taps and dies in New England contemplate further reductions.

New York

NEW YORK, July 26.

The largest machine-tool purchases of the past week were made by Dwight P. Robinson & Co., 125 East Forty-sixth Street, New York, and for a project in Brazil. About 15 tools were bought and other purchases will be made within the near future. The American Sugar Refining Co., New York, has issued a revised list of about 16 tools for its new Baltimore refinery. A few months ago this company issued an inquiry for about 50 machines, a few of which, including punching and shearing machines and pipe machines, were purchased. The remainder of the list has been issued in revised form with a part of the tools formerly inquired for eliminated. Otherwise the market is extremely dull, purchases being confined to single tools and few of these.

The crane market is quiet, little activity either in inquiries or orders being reported. On the few inquiries that are active competition is keen. The Lehigh Valley Railroad, 143 Liberty Street, New York, has asked for bids on two coal-handling units for erection in New Jersey. There are a few export inquiries in the market and some transactions in hand-power cranes. The New Jersey Foundry & Machine Co. was recently awarded the two 10-ton, 20-ft. span hand-power cranes purchased by the United States Engineer's office, Norfolk, Va. The Chesapeake Iron Works has sold to the American Sugar Refining Co. four overhead traveling cranes of about 3-tons capacity, 25-ft. 2-in. span, equipped with three trolleys, each with a lifting capacity of 2275 lb. for installation at the Baltimore plant of the company.

The Kingsbridge Iron Works, Inc., 405 East Ninety-ninth Street, New York, has acquired the old Morris Park race track, near Fowler Avenue, comprising 14 lots, for $50,000. The property will be improved for the establishment of a new plant for the manufacture of ornamental iron products.

The G. E. Fixture Co., New York, has been incorporated with a capital of $25,000 by H. Firman, J. Moscoff and J. N. Chamkin, to manufacture gas and electric fixtures. The company is represented by H. Solomon, 332 Broadway.

The Electro Thermo Co., New York, has been incorporated with a capital of $100,000 by C. C. Trautmann, W. L. Strauss and P. Becker, to manufacture electrically operated washing machines. It is represented by C. A. Oberwager, 233 Broadway.

L. Robaczynski, 96 Meserole Street, Brooklyn, manufacturer of knitting machines and parts, has had plans prepared for a new one-story machine shop, 41 x 96 ft., on Grand Avenue, to cost about $12,000. Louis Allmendinger, 20 Palmetto Street, is architect.

The McFarland-Clum Corporation, Brooklyn, has been incorporated with a capital of $75,000 by G. T. McFarland, R. V. Clum and J. G. Snyder, 256 Broadway, New York, to manufacture electric devices for automobiles and similar products.

The National Metal Box Co., Brooklyn, has been chartered under State laws to manufacture metal boxes and containers. The incorporators are M. B. Gulbin, M. Feld, and R. Barko, 51 Chambers Street, New York.

The Multiple Storage Battery Co., Van Wyck Avenue, Jamaica, L. I., manufacturer of storage batteries, has arranged a list of equipment for installation in its one-story addition, 50 x 120 ft., estimated to cost about $55,000.

Charles L. Cadle, Superintendent of Public Works, Capitol Building, Albany, N. Y., will receive bids until 12 o'clock noon, Aug. 17, for furnishing and installing two 3-ton, semi-portal, revolving jib cranes at the Barge Canal terminal, Gowanus Bay, Brooklyn.

The Neth Wire Tying Machine Corporation, New York, has been incorporated under Delaware laws with capital of $500,000 by E. A. Perry, Jr., J. L. Ward and G. Dixon Raine, Jr., New York, to manufacture wire baling machinery and parts. It is represented by the Corporation Service Co., Wilmington, Del.

The Super Clarion Corporation, New York, has been chartered under State laws to manufacture special machinery and parts. The incorporators are G. Fleck, J. J. Platzman, and L. W. Dinkelspiel, 5 Beekman Street.

The Roman Bronze Works, 275 Greene Street, Brooklyn, has leased a one-story building, 50 x 60 ft., to be erected by M. T. Kelly at Provost and Greene streets, at a cost of $20,000, for a new foundry. The construction contract has been let to C. C. Woodruff, 213 Tenth Street, Long Island City.

The New York Central Railroad Co., Grand Central Terminal, New York, will receive bids until 12 o'clock noon, Aug. 3, for shop material, covering requirements up to Sept. 1, as follows: Black, galvanized and blue annealed sheets; driving and truck tires for freight and passenger service; seamless steel tubing; car and tender axles; car axles for axlelight system; driving and trailer truck axles; front engine truck axles; standard wire nails; galvanized and polished fence staples; steel bars; steel shapes; steel plates; galvanized tie dating nails; and woven wire fence. Bids will also be received until 12 o'clock noon, Aug. 1, for the following: Track bolts, track spikes, angle bars, tie plates, frogs, switch points, switches, switch plates, crossing frogs, terminal stud track bonds, guard rails, knuckle rails, and movable points for crossings, all in accord with standard plans and specifications of the company on file at the

office of W. C. Bower, general purchasing agent, Grand Central Terminal.

The Henry, Millard & Henry Co., New York, has been incorporated under Delaware laws with capital of $150,000 to manufacture iron and steel products. The incorporators are H. H. Walker and J. F. O'Connor, Brooklyn. The company is represented by the Capital Trust Co., Dover, Del.

The Netherlands Aircraft Mfg. Co., Amsterdam, Holland, represented in the United States by R. B. C. Noorduyn, Hazelhurst Field, Mineola, L. I., is planning for the establishment of works in the vicinity of New York for the manufacture of airplanes, airplane motors, etc. Anthony G. H. Fokker is head of the company.

Fire, July 20, destroyed a portion of the plant of I. Block & Son, 393 Pearl Street, New York, manufacturer of oil and gas stoves, with loss estimated at about $150,000.

The Westinghouse Electric & Mfg. Co., 165 Broadway, New York, with main plant at East Pittsburgh, Pa., has taken a contract for furnishing electric machinery and equipment for the electrification of the Chile State Railroad, operating from Santiago to Valparaiso, at a cost of approximately $3,000,000.

The Thatcher Propeller Co., Albany, N. Y., care of Pember & Campaigne, architects, 24 James Street, manufacturer of airplane and boat propellers, has plans under way for new works. It is understood that bids will be asked in August.

The Steelcraft Corporation of America, 2341 East Sixty-ninth Street, Cleveland, manufacturer of safes, locks, etc., is planning for additions to the plant of Howell, Field & Goddard, Inc., Review Avenue, Long Island City, following the purchase of a controlling interest in this organization. The Long Island city works are devoted to the metal-clad doors and other metal fireproof products, with present output totaling about 200 doors per day. This capacity will be increased. The Steelcraft company also operates the Stiefel & Freeman Works, Lititz, Pa. B. H. Sinks is president.

The Giant Drill Extracting Machine Co., Jersey City, N. J., has been incorporated with a capital of $100,000 by Henry L. Berstleman, Gilbert C. Cadwaller and James F. McCormack, 76 Montgomery Street, to manufacture special machinery and parts.

The Florence Pipe Foundry & Machine Co., Florence, N. J., has awarded a contract to the Austin Co., Bulletin Building, Philadelphia, for a one-story addition on Front Street, 40 x 100 ft., to cost about $25,000.

The Davis Equipment Co., Bayonne, N. J., has been incorporated in Delaware with a capital of $250,000 to manufacture machinery and parts. The incorporators are Julian Rice and John V. Corcoran, Bayonne. The company is represented by the United States Corporation Co., Dover, Del.

Fire, July 15, at the oil refinery of the Tide Water Oil Co., Constable Hook, Bayonne, N. J., caused a damage estimated at about $200,000.

The loss, caused by fire at the plant of the Warner Quinlan Asphalt Co., 79 Wall Street, New York, at Linden, N. J., July 18, estimated at $3,500,000, included the tool and machine shops, power plant, laboratory and other buildings, as well as 18 asphalt tanks, 33 oil tanks, 12 gasoline tanks and 16 oil stills. The insurance is now being adjusted, and the company plans for the early rebuilding of the works. Charles Almquist is superintendent.

The Ward Electric Shop, Inc., Boonton, N. J., recently organized with a capital of $25,000 to manufacture electrical specialties, has acquired a plant at 813 Main Street. It is headed by Nelson C. Doland, Joseph A. and William E. Ward.

The Essex Fells Water Co., Essex Fells, N. J., will install a new electrically operated pump at its plant at Verona. A new 350,000-gal. water reservoir will also be constructed.

Thomas A. Edison, Inc., West Orange, N. J., manufacturer of electrical products, is planning for the erection of an addition to the power house.

Swift & Co., 154 Ninth Street, Jersey City, N. J., will build an addition to the power house at their local packing plant to cost about $25,000.

The Cook New Method Engine Co., Irvington, N. J., has been incorporated with a capital of $125,000 by J. Thomas Cook, Alfred T. Goullet and Fred H. Hill, 180 Laurel Place, Irvington, to manufacture engine equipment for automotive service.

The Eastern Metal Stamping Corporation, Newark, has been incorporated with a capital of $250,000 by William G. Viall, Thomas W. Paterson and Frederick A. Slater, Newark, to manufacture metal goods. It is represented by Karl Z. Kiefer, 810 Broad Street.

Property of the Accurate Screw Machine Co., comprising a machine works and equipment at Fifth and Cross streets, Harrison, N. J., will be sold by Mortimer Lowy, receiver for the company.

The International Water Heater Co., Newark, has been incorporated with a capital of $500,000 by James B. Adams, Frank Williams and Charles H. Giese, 142 Market Street, to manufacture water heaters and similar products.

The Behrens Crane Co., Merchantville, N. J., has been incorporated with a capital of $125,000 by Albert Burling and J. N. Wilkins, Merchantville, to manufacture cranes, parts, etc.

New England

BOSTON, July 25.

The machine tool market the past week has been devoid of features. Inquiries, classified as active prospects, apparently are no nearer the closing stage and new prospects are lacking. Based on New England industrial conditions the outlook for improved business within the next month, at least, is not particularly encouraging. Sales the past week were confined to about a half-dozen individual tools, which went at prices considerably below list quotations. A. Paterson, N. J., manufacturer of upright drills has issued a new price list showing an average reduction of 15 per cent from 1919 quotations. July will close as one of the leanest months on record for a majority of local machine tool houses.

Some New England manufacturers of taps and dies contemplate a further reduction in prices in the hope of moving large stocks on hand. During the period from Jan. 1 to June 30, one of the largest makers is understood to have made $136 worth of stock for every $100 sold, notwithstanding a steady reduction in operations until 40 per cent of normal was established.

Contract has been let for the erection of a power plant addition, 60 x 64 ft., by the United Illuminating Co., New Haven, Conn.

The Collins Co., Collinsville, Conn., agricultural tools, hammers, axes, etc., will expend considerable money in repairs and in renovating its small press grinding department.

Nathan D. Cass, president N. D. Cass Co., Athol, Mass., toys, with others, proposes to open a plant in Manchester, Vt., under the firm name of the N. D. Cass Toy Co. of Vermont. A saw mill will be erected.

The Bakers Standard Equipment, Inc., Boston, with a capital of $100,000, has taken a Massachusetts charter. Leo R. Zusman, 50 Russell Street, Brookline, is president, and S. Mitchell, 106 Lucerne Street, Dorchester, treasurer.

A Massachusetts charter has been granted the Oxford Steel Products Co., Boston, capitalized for $300,000, of which Clarence E. Dodge, 2 Myers Street, Boston, is president, and Maurice T. Viall, 155 Armington Street, Cranston, R. I., treasurer.

Marx C. Kristek, 17 Court Street, is president, and Harry A. Katz, 7 Jones Street, treasurer, Kristek Mfg. Co., Worcester, Mass., capitalized for $50,000, recently granted a charter to manufacture taper pins, firearm pins, clock studs, etc.

Plans are being figured for a two-story plant, 75 x 125 ft., for the Chandler Machine Co., Ayer, Mass. Part of the building will be used as a garage.

The Sterling Roofing Co., New Bedford, Mass., will erect a one-story manufacturing plant, 75 x 150 ft.

Contract has been let for the erection of a one-story and basement repair shop, 102 x 218 ft., at Greenfield Junction, Me., for the Great Northern Paper Co., to cost $100,000.

Additions to the machine and finishing departments to cost about $30,000 will be made at the paper manufacturing plant of Tileston & Hollingsworth, Hyde Park, Boston. Plans have been completed.

The Marcy Tool Works, Inc., Putnam, Conn., has been incorporated with a capital of $100,000 by H. Devine and A. W. Marcy, Hillcrest Grandview Avenue, Putnam, to manufacture tools, hardware specialties, etc.

The Lindquist Engineering Works, Inc., Marlborough Street, Portland, Conn., recently incorporated to manufacture mechanical products, has been organized with C. O. Hedstrom, Main Street, as president, and E. A. Lindquist, Middletown, Conn., secretary and treasurer.

The Central Maine Power Co., Augusta, Me., has arranged for a bond issue of $3,000,000 for extensions, improvements, general operations, etc. Harvey D. Eaton is president.

The American Tube & Stamping Co., 471 Hancock Avenue, Bridgeport, Conn., is planning the erection of a one-story addition on Wordin Avenue for the manufacture of rolled steel specialties.

The Capitol Auto Top Co., 28 Goodman Place, Hartford, Conn., has filed notice of organization to manufacture automobile tops and kindred equipment. D. N. Renken, 55 Shultas Place, heads the company.

The J. M. Craig Brass Foundry, Arch Street, Hartford, Conn., has awarded a contract to Charles P. Waterman,

Inc., 75 Pratt Street, for extensions and improvements in its plant.

O. P. Thompson, 145 State Street, Springfield, Mass., and associates, are having plans prepared by R. B. Warner, architect, 168 Bridge Street, for the erection of an eight-story automobile service and repair works on Dwight Street, 100 x 190 ft., estimated to cost about $600,000 with equipment.

Philadelphia

PHILADELPHIA, July 25.

Business in second-hand machinery is better than that in new tools. One used machinery company contemplates furnishing part, or all, equipment toward a $40,000 outlay for tools; it also expects to get some or all of the business of a $90,000 expenditure. Inquiries have been received in this district by second-hand machinery dealers for sizable lists, both from Chicago and Milwaukee dealers. The chief second-hand demand is for fabricating machinery, such as bending rolls and punches and shears.

Principal purchases are by vocational schools. Twenty-four speed lathes, eight drill presses, four 14 in. x 5 ft. engine lathes, one arbor press and three double-end emery wheel stands were sold July 18 to three new schools in Philadelphia, the Tilden Junior High School, the Mitchell Junior High School and the Thomas Junior High School. A vocational school at Scranton also purchased some tools.

There has been a fair number of inquiries, but many are for appraisal purposes and buying on others is deferred in the hope of further recessions in prices. Recent reductions include one of 10 per cent on motors by the General Electric and Westinghouse companies, effective July 11, and a 20 per cent reduction on high speed drills. Steam hammers have now been reduced to less than half the price prevailing during the war.

Several Philadelphia dealers received business from the Government which used up some of its surplus money, held over at the end of the fiscal period on June 30, for the purchase of tools. Export business is reported about one-tenth of that in 1913 and 1914.

Business is so slack that some houses are reducing their selling and office forces. Most dealers are making expenses and consider themselves fortunate in so doing.

The O'Brien Machinery Co., 119 North Third Street, Philadelphia, has rejected bids for its proposed four-story and basement building at 113 North Third Street, and will call for new bids at a later date. H. F. Schultze, 11 South Sixteenth Street, is architect.

The Automatic Clutch & Transmission Co., Philadelphia, has been incorporated under Delaware laws with a capital of $1,200,000 to manufacture power transmission and controlling equipment. F. R. Hansell, Land Title Building, represents the company.

The Danda Co., Philadelphia, has been chartered under State laws to manufacture valves and similar products. Kern Dodge, 5135 Pulaski Avenue, is treasurer.

The Bridgman Brothers Co., 120 South Thirtieth Street, Philadelphia, manufacturer of pipe, steam fitters' supplies, etc., is completing plans for a new one-story building at Thirty-first and Walnut streets. Clarence E. Wunder, 1415 Locust Street, is architect.

The Pneumatic Street Cleaner Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 by Robert L. Holliday and Mirabeau Sims, Philadelphia, to manufacture street-cleaning machinery and parts. A general iron foundry will also be conducted. The company is represented by James Saulsbury, Equitable Building, Wilmington, Del.

The Victor Talking Machine Co., Camden, N. J., closed its plant, July 25, for two weeks, during which time repairs and improvements will be made to machinery. It is now giving employment to about 12,000 operatives.

The F. M. Hall Refrigerating Co., Camden, N. J., has been chartered under State laws with 20,000 shares of stock, no par value, to manufacture refrigerators and refrigerating equipment. The incorporators are E. and Frank M. Hall, and John A. Penn, 428 Market Street.

Milton Mirkens, Trenton, N. J., has acquired the former Ewing Rubber Mill on Hilton Avenue, for the establishment of a new plant to manufacture rubber goods. The building, on a site 206 x 235 ft., will be remodeled and machinery installed at an early date.

Plans have been filed for the erection of a new one-story power house and engine plant by the Enterprise Furniture Co., Glen Rock, Pa. W. E. S. Dyer, Land Title Building, Philadelphia, is engineer.

The Reading Knob Works, Inc., Reading Pa., has been incorporated with a capital of $175,000 to manufacture door knobs and kindred products. James A. Yuill, Wyomissing, is treasurer.

The Lehigh Coal & Navigation Co., Lansford, Pa., will commence the immediate erection of a new coal breaker at Coaldale, Pa., estimated to cost about $1,000,000, including machinery, to replace the structure recently destroyed by fire.

The Myers Machine Tool Co., Columbia, Pa., has preliminary plans under way for a one-story building, estimated to cost about $10,000. Granville E. Paules, Bucher Building, is architect.

The Enamel Products Corporation, East Stroudsburg, Pa., has been incorporated with a capital of $50,000 to manufacture enamelware specialties. Louis Rupprecht, East Stroudsburg, is treasurer.

The International Mfg. Co., Weatherly, Pa., recently acquired by new interests, will begin production early in August on window screens, ventilators and other metal products. Howard A. Koch, Fleetwood, Berks County, is treasurer.

The Pennsylvania Edison Co., Reading, Pa., has disposed of a bond issue of $125,000 for improvements and extensions in electric plant and system, general operations, etc.

The Bee Automobile Co., 620 Linden Avenue, Allentown, Pa., has acquired the property now occupied, and adjoining land, extending to Court Street. It is operating a complete repair department with machine and forge shops, and a portion of the site will be used for the erection of a new building. Frank H. Bachman is president, and R. H. Bachman, secretary and treasurer.

The Capitano Steel Squares Co., Pittston, Pa., has been incorporated with a capital of $30,000 to manufacture steel specialties. Alexander Capitano, Pittston, is treasurer.

Chicago

CHICAGO, July 25.

The Illinois Central has placed orders for some of the smaller equipment on its list and will probably close for the remainder early this week. The total purchase by this road will probably not exceed $100,000. The Rock Island has added a 36-in. x 14-ft. and an 18-in. x 6-ft. lathe to its list and at the same time has informed dealers that no buying will be done until prices have been reduced 40 per cent below present levels. The prospects of an early purchase by this road are therefore not considered bright. Although business is still dull, the purchase by the Illinois Central and orders received from industrial concerns will bring sales totals for July above the unusually low record for June. The Stephenson-Adamson Mfg. Co., Aurora, Ill., has bought the tools for which it was reported as inquiring last week. Action on the H. W. Johns-Manville Co. list, published last week, will not be taken for about a month, and there is some doubt as to whether orders will be placed by the Milwaukee or the New York purchasing offices of the company.

No action has been taken on the lists for the Federal vocational schools at Jacksonville, Ill., or Valparaiso, Ind. Purchases for the latter school are to be made at Cincinnati. As noted in this column some weeks ago, second-hand equipment was bought for a Federal vocational school at Karlov and Polk streets, Chicago. It is now reported that further purchases are to be made.

The Valley City Machine Works, Grand Rapids, Mich., has reduced prices 10 per cent on its grinding and buffing machinery and disk grinders.

The Sewell Clapp Envelope Co., 23 North Des Plaines Street, Chicago, has let a contract for a factory, 209 x 300 ft., at 4201-4219 Belmont Avenue, to cost $250,000.

The Illinois Central Railroad Co. is having plans prepared for a one-story repair shop and four-stall roundhouse at Herrin, Ill., to cost $60,000.

The American Tar Products Co., 208 South La Salle Street, Chicago, has purchased 40 acres at the southwest corner of Pershing Road and Fifty-second Avenue as a site for a new plant to cost $1,500,000. It now has works at St. Louis, Milwaukee, Youngstown, Birmingham, and Steubenville, Ohio.

The Automatic Control & Signal Corporation, 202 South Clark Street, Chicago, has been incorporated with $500,000 capital stock to manufacture safety devices and accessories. The incorporators include H. E. Bourdette, A. J. Brookins, R. L. Laird, W. H. Potter, et al. Correspondent: Laird, Scheyer & Sullivan, 127 North Dearborn Street, Chicago.

The Potter Specialties Co., 140 North Dearborn Street, Chicago, has been incorporated with $100,000 capital stock to manufacture automobile devices and accessories. Prominent among its products will be a signalling device for automobiles. Incorporators include M. E. Koch, Leo W. Gardner, and Carle F. Potter. For the present the company

will contract for the manufacture of its products, but later a factory will be secured. Correspondent: Ela, Grover & March, 140 North Dearborn Street.

The Waukegan Foundry Co., Waukegan, Ill., has the construction of its foundry well under way. The building will be 276 ft. in length and will have 15,300 sq. ft. of floor space. A 35-ft. Whiting cupola has been installed and operation is expected to start about Aug. 1.

The Sapihl Electric Tool Co., manufacturer of electric grinders and drills, has taken quarters in the Willis Mfg. Co. building, Galesburg, Ill., and will begin at once to equip it for manufacturing purposes. The company will employ about 15 skilled men to start with.

The Metal-Craft Mfg. Co., 64 West Randolph Street, Chicago, recently incorporated, will manufacture metal office furniture, sheet metal fixtures and factory and shop equipment, such as bins, shelving, cabinets, tool stands, lathe pans and jigs. N. M. Cottrell is president.

Fire, July 13, destroyed the plant of the Lewis Roofing Co., Moline, Ill., with loss estimated at about $200,000, including equipment.

The North American Car Co., 328 South La Salle Street, Chicago, has preliminary plans under way for a new one-story shop, 80 x 120 ft., at 135th Street and California Avenue, Blue Island, Ill., to cost about $40,000. It is expected to call for bids early in August.

The Russell Grader Mfg. Co., 2037 University Avenue, Minneapolis, Minn., has preliminary plans under way for its new one-story plant in the new Industrial District for the manufacture of agricultural machinery. It will comprise several one-story buildings and is estimated to cost about $450,000 with machinery. Sund, Dunham & Ludwig, 514 Essex Building, Minneapolis, are architects.

The Hercules Powder Co., du Pont Building, Wilmington, Del., is planning for extensions and betterments in its plant at Rayville, Ill. The works have been closed for some time past and it is proposed to resume production early in the fall.

Fire, July 17, destroyed a portion of the plant of the Midwest Refining Co., Casper, Wyo., with loss estimated at about $50,000.

The City Council, Corning, Iowa, has commissioned C. K. Munns, engineer, Corning, to prepare plans for the proposed municipal electric light and power plant, estimated to cost about $60,000.

The Bettendorf Co., Davenport, Iowa, manufacturer of steel cars, machinery, etc., has acquired the plant and business of the B. L. Schmidt Co., Davenport, manufacturer of cylinder grinding machines. It will be continued in operation and no immediate changes, it is said, are planned.

Pittsburgh

PITTSBURGH, July 25.

Never before in the memory of those now active in the machine tool trade has business been so nearly at a standstill as at present. Dealers report a dearth of inquiries the past week and very few sales. In cranes and the heavier lines practically nothing has been closed since last accounts and there seems to be no life to inquiries that have been before manufacturers for several weeks. It does not seem to be so much a matter of price but more a question of whether this is the time to buy. General business, however, is not reviving as rapidly as could be expected.

The Troop Mfg. Co., 218 First Avenue, Pittsburgh, manufacturer of stoves, heaters, ranges, etc., has acquired property on Jane Street, heretofore held by the Enterprise Machine Co., 120 x 120 ft., improved with a two-story building, to be used in connection with its works.

The Reliance Boiler Works, Inc., Pittsburgh, has been incorporated with a capital of $40,000 to manufacture boilers, tanks, etc. H. C. Feldstein, 1608 Center Avenue, is treasurer.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, has preliminary plans under way for a new plant on Sixteenth Street. The W. G. Wilkins Co., Westinghouse Building, is architect and engineer. The company is also said to be arranging details for its new plant at Kings Highway and Slevin Avenue, St. Louis, estimated to cost about $1,000,000 with machinery. Joseph W. Marsh is president.

The Builders' Steel Works Co., Pittsburgh, has been incorporated with a capital of $50,000 to manufacture steel and iron specialties. W. H. Miller, 44 South Howard Street, Bellevue, Pa., is treasurer.

The Robinson Ventilating Co., Harmony, Pa., has completed plans for a new one-story machine shop, 60 x 120 ft., estimated to cost about $25,000. Two electric traveling cranes will be installed.

The Board of Directors, Uniontown Hospital, Uniontown, Pa., has filed plans for the erection of a new power house at the institution.

The Hawkins Traction Flange Co., Pittsburgh, has been chartered under State laws to manufacture railroad flanges and kindred equipment. A. C. Pauley, 352 Fingal Street, is treasurer.

The Euclid Auto Construction Co., Pittsburgh, is arranging plans for extensions in its truck and automobile body manufacturing department for increased production.

The South Penn Oil Co., Morgantown, W. Va., is planning for extensions and improvements at its local plant to cost about $300,000.

The Romisch Mfg. Co., Morgantown, W. Va., will break ground early in August for a new two-story foundry and machine shop, 50 x 50 ft., on Beechurst Avenue, to replace its building recently destroyed by fire. Anthony Romish is head.

The Tri-State Equipment & Repair Co., Kenova, W. Va., has been incorporated with a capital of $50,000 for the operation of a local plant to manufacture automobile parts and equipment, with general repair department. The company is headed by J. W. Havner, Huntington, W. Va., and W. D. Sutton and A. S. Glenn, both of Ashland, Ky.

The Logan Machine Shops, Logan, W. Va., has awarded a contract to the McClintic-Marshall Co., Pittsburgh, for its new two-story machine shop, 60 x 100 ft., to replace the structure recently destroyed by fire.

The Marion Motor Co., 304 Jacobs Building, Fairmont, W. Va., recently organized with a capital of $40,000, will soon commence the erection of a new plant, 42 x 70 ft., to manufacture automobile parts and equipment. L. Glenn Roop is president and J. R. Cole, secretary and treasurer.

The former plant of the Williams Rubber Co., Buena Vista, near McKeesport, Pa., has been acquired by new interests, with company now forming. The works will be remodeled and machinery installed for the manufacture of mechanical rubber specialties.

The W. W. Martin Co., 5847 Center Avenue, Pittsburgh, has filed plans for a new three-story automobile service and repair works, 100 x 140 ft., at Ravenna Street and North Highland Avenue, to cost about $150,000.

The West Virginia Foundry & Stove Works, Huntington, W. Va., has plans under way for a one-story foundry, 50 x 120 ft., and works building, 30 x 130 ft. The present plant will be removed to the new location, and additional equipment installed to double, approximately, the present capacity. Frank C. Boggess is manager.

The Century Mfg. Co., Charlestown, W. Va., recently organized with a capital of $250,000, is planning for the establishment of a new plant to manufacture talking machines and parts, including spring motors, attachments, etc. The company is headed by William Lehmeyer, L. A. Tinder and E. A. Reid, Charlestown.

The Buckhannon Light & Power Co., Buckhannon, W. Va., is planning for the immediate erection of its proposed new power plant.

Detroit

DETROIT, July 25.

The Whitehead & Kales Co., Detroit, has begun construction on the structural steel work for the new plant of the Durant Motors, Inc., Lansing, Mich., to be finished in six weeks. More than 500 men are employed on the site.

The National Alloys Co., Detroit, has been organized with an authorized capitalization of $200,000 to manufacture brass, bronze and aluminum castings and is seeking a plant. The incorporators are W. J. Reardon, John G. Collins, and Horace H. Lane, 2320 Dime Bank Building.

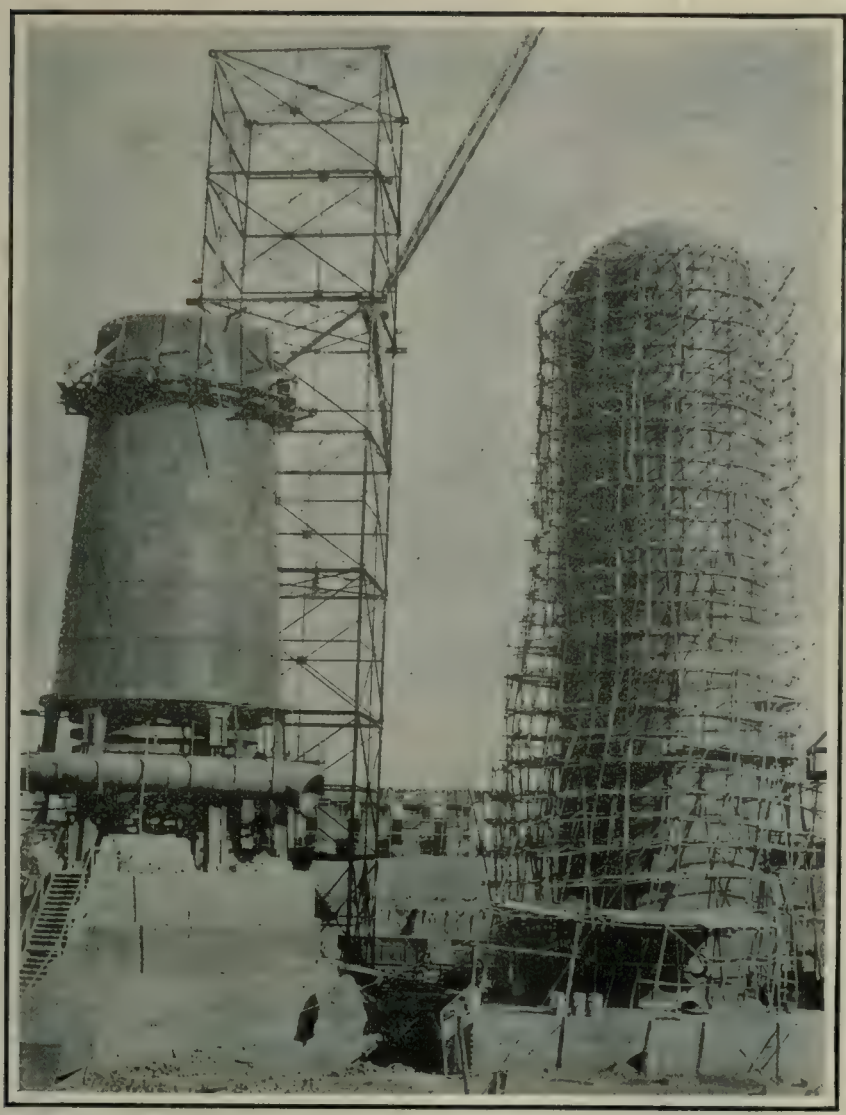
The Benton Tool Co., Benton Harbor, Mich., has been incorporated by Frank L. Sharer, S. W. Trick and A. S. Lindenfeld to manufacture hardware specialties and other metal products. It is expected to begin production in a few weeks in an established plant. The capitalization is $100,000.

The Continental Motors Corporation is tooling up its Detroit and Muskegon plants to handle an order from Durant Motors, Inc., for 2500 motors. Several fair-sized orders for equipment have been placed.

The City Council, Detroit, has placed with the Kuhlman Car Co., Cleveland, an order for 50 one-man trolley cars at a cost of $351,250.

The W. J. Baird Machinery Co., Detroit, has purchased a six-story building, 63 x 100 ft., at Jefferson Avenue and Brush Street, which will for the present be leased to companies wishing space for light manufacturing.

The Detroit Street Railway System, Detroit, Ross Schram, secretary, Murphy Building, Detroit, is taking bids for the erection of the new municipal car shops at St. Jean and Shoe-



Erection of Blast Furnace in India

At the left there will be found a construction view of the new blast furnace plant being erected by Arthur G. McKee & Co., Cleveland, for the Indian Iron & Steel Co., at Asansol, India, near Calcutta. The work is being done by native labor, which is not breaking any records for speed in construction. As shown in the picture, a bamboo scaffold was built around the stove. The McKee company has not been informed whether this scaffold was used in building the stove, or was erected only for use in putting on the dome. The photograph shows that a traveler of rather familiar design is being used in erection work, and the picture of the furnace stack indicates that usual construction methods are being followed in building the stack.

All the steel for the furnace was fabricated in the United States and marked for erection purposes. Part of the plate work was shipped ready for erection and part shipped straight, being curved in rolls after reaching its destination. The construction of the No. 1 furnace shown on the photograph is now well along and the McKee company has started the erection of the second stack.

maker streets, one-story, 260 x 370 ft. William C. Markha, 312 Marquette Building, is engineer.

The Algonac Machine & Boat Works, Inc., Algonac, Mich., has been incorporated with a capital of $25,000 by J. M. and C. C. Smits and J. DeBruyn, Algonac, to operate a general machine and repair works.

The Britton Axle Co., Alma, Mich., has been incorporated with a capital of $3,500,000 by William M. Britton, Alma; W. J. Wickes and Frank H. Payne, Saginaw, Mich., to manufacture automobile axles and kindred equipment.

The Renulife Electric Co., 614 Marquette Building, Detroit, manufacturer of electrical specialties, has rejected all bids for the erection of its new three-story plant, 42 x 90 ft., at 1234 Abbot Street, and the project will be held in abeyance. The plant was estimated to cost about $75,000. A. Frank Herman and H. T. Simmons, 411 Owen Building, are architects.

The Muskegon Piston Ring Co., Muskegon, Mich., has been incorporated with a capital of $20,000 by George W. Olson and Joseph Kitzinger, Muskegon; and John R. Nix, Muskegon Heights, to manufacture piston rings and other automotive products.

The Acme Etched Products Co., Detroit, has been incorporated with a capital of $28,000 by Fred S. Osborn, Howard Atoshian and Paul C. Renaud, 99 Willis Avenue, to manufacture metal name plates.

The Hinkley Motors Corporation, 3420 West Fort Street, Detroit, has awarded contract to the H. G. Christman Co., Stevens Building, for its new plant at Ecorse, Mich., for the manufacture of gasoline engines. The initial works will comprise a main one-story plant, brick and reinforced-concrete, 250 x 340 ft., and one-story power house, 50 x 62 ft. Albert Kahn, 1000 Marquette Building, is architect. H. M. Butzel is secretary.

The Utility Compressor Co., 1161 East Harper Avenue, Detroit, manufacturer of air compressors, has commenced foundation work for its new plant at Adrian, Mich., estimated to cost about $40,000.

The Common Council, Reed City, Mich., is arranging for a bond issue of $70,000 for the erection of a municipal electric light and power plant.

Baltimore

BALTIMORE, July 25.

The American Locomotive Co., 30 Church Street, New York, is planning for the erection of a new one-story forge shop at Richmond, Va., 85 x 160 ft.

The Roanoke-Vinton Ice Co., Roanoke, Va., is planning for the erection of a new ice manufacturing and cold storage plant to cost about $100,000. T. B. Witt is manager.

The Bureau of Yards and Docks, Navy Department, Washington, will break ground at once for a new one-story machine shop and wood-working plant at the Navy Yard, Hampton Roads, Va., to cost about $108,500.

The Clary-Cumming Battery Co., 1218 Hampton Street, Columbia, S. C., is planning for the operation of a local factory for the manufacture of storage batteries and similar equipment. E. M. Cumming is secretary.

Fire, July 16, destroyed the plant of the Roanoke Fiber Board Co., Roanoke Rapids, N. C., with loss estimated at about $300,000, including machinery.

The City Council, Wilmington, Del., has approved an ordinance providing for a bond issue of $600,000, to be used by the Board of Harbor Commissioners in connection with the marine terminal project. A total appropriation of $2,500,000 is available, to be utilized as the work proceeds. The project will include a number of piers and docks, equipped with freight-handling machinery, conveying and hoisting equipment, etc., Contracts for certain features of the work will be awarded at an early date.

Clarence E. Bright and Lawrence J. Mangan, Washington, care of James E. Cooper, architect, 1421 F Street, have plans in preparation for the erection of a new three-story and

basement automobile service and repair building, 145 x 160 ft., on K Street, estimated to cost about $250,000.

The Ray-Shield Mfg. Co., Wilmington, Del., has been incorporated with a capital of $200,000 by Thomas F. and John W. Hogan and Harry E. Algard, to manufacture automobile bodies and parts. P. Warren Green, du Pont Building, represents the company.

The Victor Piston Ring Co., 608 American Building, Baltimore, recently incorporated, contemplates establishing a plant in the near future, but in the meantime will have the rings made by contract.

Clendenin Brothers, Inc., Keyser and Regester streets, Baltimore, has been incorporated with $250,000 capital stock to manufacture metal products. The incorporators are James G. Corckran, James R. Adams and Harold Tschudi.

The Waycross Packing Co., Waycross, Ga., has been purchased by W. H. Baxley, president and manager. The plant is being enlarged and additional machinery will be installed.

The Baltimore Power Plant Co., 743 Calvert Building, Baltimore, has been incorporated to manufacture engines, automobiles, automobile bodies, etc. The incorporators are J. Frank Biddinger, Charles D. Sener and James G. Christhilf, Jr.

The Maryland Metal Building Co., Inc., 801 Munsey Building, Baltimore, has been incorporated with $100,000 capital stock to manufacture portable structures. The incorporators are Frederick J. Maisenholder, William L. Henderson and Aubrey Pearre, Jr.

Buffalo

BUFFALO, July 25.

The Board of Supervisors of Erie County, Buffalo, Maintenance Department, has completed plans for the erection of a one-story automobile service building and machine repair works for county trucks and cars, 62 x 120 ft., at Hamburg, N. Y. Charles Speich, 583 Ellicott Square, Buffalo, is architect.

City Commissioner Graves, Buffalo, has been directed by the City Council to secure estimates of cost relative to the establishment of a municipal electric power plant, as now being projected.

The Kominz New Chain Mfg. Co., Rochester, N. Y., has been incorporated with a capital of $50,000 by M., A., and J. S. Kominz, to manufacture chains. It is represented by Wile, Oviatt & Gilman, Granite Building.

The Jamestown Carving Works, West Fifth Street, Jamestown, N. Y., has awarded contract to Shellberg & Lindquist, 35 Bush Street, for a two-story addition, 48 x 63 ft., to cost about $20,000.

The Triangle Tool & Die Co., Rochester, has been incorporated with a capital of $25,000 by J. A. and G. E. Ryan and S. J. Emerick, Rochester, to manufacture tools, dies and kindred products. It is represented by Webster, Meade & Straus, attorneys, Rochester.

The Syracuse Cold Storage Co., 101 North West Street, Syracuse, N. Y., is planning to rebuild the portion of its plant destroyed by fire, July 14, with loss estimated at about $25,000, including equipment.

Cleveland

CLEVELAND, July 25.

The improvement noted in the machinery market last week continues, but is more in inquiries than orders. A few buyers are looking around and trying to line up machinery they expect to purchase, but are advising the trade that they will not place orders until business revives. The only inquiry of any size pending is that for equipment for the McKinley School, Canton, previously noted, on which bids will be received July 29. This list amounts to from $40,000 to $50,000.

Some business in single machines was placed at Cleveland and one order from a local manufacturer of automobile parts was for four machines. Reports from Detroit indicate that while automobile manufacturers are operating their plants at probably a better capacity than at any previous time this year, there will be little demand from that source for machinery for some time. Some Detroit manufacturers of automobile parts have a great deal of equipment that is either not being operated at all or only part of the time. With the market for additional equipment so limited some sales organizations are devoting their efforts to attempts to induce manufacturers to supplant present machinery with more modern and more productive equipment.

The Bryan Pattern & Machine Co., Bryan, Ohio, is reported to have taken a large order for pistons for the Ford Motor Co. and may install some additional equipment.

In Cincinnati the machine tool market continues dull, inquiries and sales being confined for the most part to single machines. The inquiry of the Bethlehem Steel Co., Bethlehem, Pa., which includes a 42-in. lathe, is still pending and no action is yet reported on the tools for the American Sugar Refining Co.'s Baltimore plant. The list issued by the Canton, Ohio, Board of Education calling for 25 tools, has been received by manufacturers in this district. There is some activity in used machinery.

The American Tool Works Co., Cincinnati, will close its plant Aug. 1. When in full operation a force of 1200 is employed, although for several months it has only numbered 400.

The London Motor Plow Co., London, Ohio, was recently incorporated for $50,000 for the purpose of building tractors. The company's present model will be changed to include an enclosed rear axle and transmission unit in place of the bull gears and pinions of the present design. The officers include E. H. Daniel, president; P. J. Kirwin and H. Emerick, first and second vice-presidents, respectively; Ray Dunham, secretary, and H. Plimell, treasurer.

The Stewart Phonograph Corporation has moved from Canada to Cleveland and has opened a plant in the Tool & Auto Products Building, St. Clair Avenue and East Forty-ninth Street, and will shortly begin the manufacture of phonographs. L. S. Greenbaum is president and general manager.

The Telestyle Umbrella Co., Findlay, Ohio, has been organized with a capital stock of $150,000 to manufacture telescoping umbrellas. It will acquire the plant formerly used for the manufacture of a similar line of products. Karl L. Schwartz and others are interested.

The General Machine & Tool Co., Akron, Ohio, has been formed to do general machine shop work and will open a plant at 941 Yale Street Extension.

Indiana

INDIANAPOLIS, July 25.

Elwood Haynes, president Haynes Automobile Co., Kokomo, Ind., with other Kokomo capitalists and George J. Marott, Indianapolis, have taken over the holdings of the Holton Tractor Co., Indianapolis. The reorganized concern will be known as the Haynes Tractor Co. and will have $2,000,000 capital. The new tractor, combining the features of the Holton and Powell tractors, will be manufactured at Kokomo, to which city the equipment of the Holton company will be moved. Some of the buildings of the Haynes company will be used until a separate factory is erected.

The Marquette Electric Engineering Co., Chicago, which recently bought the Hotpoint Electric Co., is erecting a plant at Wanatah, Ind., at a cost of $50,000.

The LaBelle Mfg. Co., Indianapolis, has been incorporated with $250,000 capital stock and is seeking a plant with about 75,000 sq. ft. of floor space for the manufacture of washing machines. The officers are J. F. Scott, president; C. S. Walker, secretary-treasurer; H. R. Victor, vice-president.

The Generator Corporation, Poseyville, Ind., has been incorporated with $100,000 capital stock to manufacture galvanized tanks, lighting plants, troughs and other farm equipment. The directors are Otto E. Caudell, Valentine Bender and U. M. Caudell, Evansville; E. D. Fletchell, P. H. Anyle, George Nix and Joseph L. Schafer, Poseyville.

The Johnson Motor Wheel Co., South Bend, Ind., has been sold to G. A. Farabaugh, representing a group of creditors, for $60.000. The formation of a new company is contemplated to manufacture a motor, the invention of Mr. Johnson.

The Marion Foundry Corporation, Marion, Ind., has been moved to Auburn, Ind., where it has established offices with the Auburn Foundry. Castings will be made for a moving grate, the product of the Marion company, and for the Auburn stoker for power plant engines. B. O. Fink is president of the Marion Foundry Corporation, which has a capital stock of $100,000.

The Corcoran Pressed Metal Co. has taken a three-year lease on the Starr Building, Meridian Street and the Belt Railroad, Indianapolis, where it will manufacture sanitary milk cans. It has $100,000 capital stock. L. A. Corcoran is president; L. A. Painter, Pittsburg, Ill., vice-president, and Wilson C. Atkinson, Pittsburg, secretary-treasurer.

The Triangle Steel Products Co., Chicago, care of T. C. Casse, 163 Washington Street, Chicago, architect, has plans under way for a new plant at Michigan City, Ind., one-story and basement, 250 x 500 ft. It is estimated to cost about $75,000.

The Newcastle Casting Co., Newcastle, Ind., has been incorporated with a capital of $100,000 by William T. Applegate and Homer Steinbrink, Newcastle, to manufacture metal castings.

The Advance Rumely Co., La Porte, Ind., manufacturer of agricultural implements, dairy equipment, etc., has preliminary plans under way for a one-story brick and concrete addition. J. C. Llewellyn, 38 South Dearborn Street, Chicago, is architect.

Fire, July 13, destroyed the plant of the Consolidated Stone Co., Bloomington, Ind., with loss estimated at about $250,000, including crushing machinery, stone handling and other equipment. A. E. Dickinson, Bedford, Ind., heads the company.

The Union Steel Mfg. Co., 2955 West Grand Street, Chicago, manufacturer of high-speed steel tools, dies, die castings, etc., with branch works at Brazil, Ind., is arranging for the erection of a new plant at Washington, Ind., where the two present plants will be consolidated and additional equipment provided for increased production. Negotiations with the local Merchants' Association for a site are practically completed. The new plant is estimated to cost close to $100,000.

The Central South

ST. LOUIS, July 25.

The Terrill Tire & Rubber Co., 1512 McGee Street, Kansas City, Mo., has awarded a contract to Frank Woodruff, Clinton, Mo., for the erection of a new two-story and basement tire manufacturing plant at Clinton, 90 x 150 ft. A. C. Terrill is president.

The Automatic Self-Leveling Clock Co., Kirksville, Mo., has tentative plans under way for a new two-story, brick and steel plant, estimated to cost about $100,000. J. T. Dodd is head.

The City Council, Weleetka, Okla., is arranging for a bond issue of $82,500 for the construction of a municipal electric light and power plant. L. T. Newton is city clerk.

The Constantin Refining Co., Tulsa, Okla., operating local oil refineries, has arranged for a bond issue of $4,000,000 for extensions, betterments and general operations. E. Constantin, Sr., is president.

The Common Council, Pawhuska, Okla., is considering the construction of a new municipal electric light and power plant. Estimates of cost and details will be arranged at an early date.

The Southern Brick Co., Bristol, Tenn., is being organized by Charles T. Kilgore, Bristol, and associates, with capital of $90,000, to manufacture brick, tile and kindred products.

The Louisville & Nashville Railroad Co., Louisville, will break ground at once for the erection of its proposed new electric power plant at Paris, Tenn. W. H. Courtenay is chief engineer.

The Hugo Hydroelectric Power Co., Hugo, Okla., is being organized by officials of the local Chamber of Commerce to construct a series of hydroelectric generating plants in this section. Application has been made to the Federal Water Power Commission, Washington, for permission to utilize waters from the Mountain Fork River, Little River and Kiamichi River, the plants to have capacities of 150,000 hp., 100,000 hp. and 50,000 hp., respectively. The project is estimated to cost in excess of $2,500,000, including equipment and systems.

The Ford Tire Machinery Co., Akron, Ohio, is considering plans for the establishment of a new branch plant at Joplin, Mo.

Swift & Co., Union Stock Yards, Chicago, are planning to rebuild the portion of their packing plant at Sedalia, Mo., recently destroyed by fire with loss estimated at about $125,000.

The Board of Education, Wichita, Kan., is arranging a list of equipment to be installed in the manual training department at the proposed new high school.

The Duncan Lubricant Oil Works, Inc., Duncan, Okla., has been incorporated with a capital of $50,000 to operate a local plant for refining lubricating oils. The company is headed by Roy K. Wilson and J. R. Frensley.

The Gulf States

BIRMINGHAM, July 25.

The Turning Basing Compress Co., 302½ Main Street, Houston, Tex., recently organized, has plans under way for a new cotton compress plant, 100 x 100 ft., with machinery estimated to cost about $100,000. Robert E. Goree is president, and G. M. Edel, secretary.

The Southern Brass & Plating Co., Houston, Tex., is planning to rebuild the portion of its plant recently destroyed by fire.

Fire, July 19, destroyed a portion of the sugar refinery of the Morsihan Sugar Co., New Iberia, La., with loss estimated at about $300,000, including machinery.

The Gibstown Electric Light & Power Co., Gibstown, La., recently organized, is planning for the immediate erection of a new local electric generating plant. E. W. Merritt is president, and J. H. Houck, secretary and treasurer.

The Co-operative Ice Co., Clearwater, Fla., recently organized, is planning for the erection of a new ice-manufacturing plant with initial daily capacity of about 25 tons, estimated to cost about $35,000. F. L. Hendrix is secretary and treasurer.

The Henderson Cotton Oil Co., Shreveport, La., is completing plans and will soon take bids for the rebuilding of its local cottonseed oil manufacturing plant, recently destroyed by fire with loss estimated at about $300,000, including machinery.

The Common Council, Moore Haven, Fla., is planning for the installation of a municipal electric light and power plant. A bond issue will be arranged.

E. G. Edwards, Wetumpka, Ala., and associates are organizing a company to construct a local cold storage and ice-manufacturing plant. Plans will be arranged at an early date.

The Gulf Coast Oil Refining Co., Gulfport, Miss., recently organized, has acquired about 20 acres for the construction of a new plant. George L. Dodds is president and Charles T. Madison, vice-president and general manager.

The State Bond Improvement Co., Jackson, Miss., will break ground at once for a new one- and two-story power plant at the Mississippi Agricultural College, Starkville, Miss., estimated to cost about $50,000.

The Union Sawmill Co., Stamps, Ark., is planning to rebuild its local plant, recently destroyed by fire with loss estimated at close to $1,000,000 with machinery. J. W. Adkins, construction engineer, is in charge; F. W. Scott is general manager.

Motors, oil engines, pumping machinery and other mechanical equipment will be installed by the Board of Aldermen, Amite, La., in connection with extensions and improvements at the local waterworks. Massena L. Culley, Jackson, Miss., is consulting engineer. M. R. Williams is clerk of the Board of Aldermen.

Milwaukee

MILWAUKEE, July 25.

Probably the most encouraging prospect before machine tool builders is the settlement of the Government obligation to railroads in part at least within the coming 30 to 60 days. The release of approximately $500,000,000 into railroad channels is expected to make possible a fairly heavy aggregate of machine tool and general equipment purchases which have been held in abeyance awaiting proper financing. Current inquiry, coming principally from the automotive, textile and shoe machinery industries, is relatively good, but orders are slow in development. July sales of tools so far are at least equal to those of the entire month of June and most makers and dealers expect to show a small gain by the close of the period.

The Tomahawk Steel & Iron Works, Tomahawk, Wis., expects to start work about Aug. 10 or 15 on the erection of a new foundry and machine shop in place of the plant destroyed by fire two months ago. It will be of brick and steel, 100 x 160 ft., with a basement 50 x 60 ft., and is estimated to cost $75,000 with equipment, most of which will require replacement. The new plant will occupy a site on the Chicago, Milwaukee & St. Paul main line. W. P. Ireland, Tomahawk, and L. A. DeGuere, Wisconsin Rapids, Wis., are associated architects and engineers on the project. The Tomahawk company operates as a commercial foundry and machine shop but manufactures special logging and woodworking machinery and specializes in repair work for saw and planing mills and wood-working plants in the lumber region of Northern Wisconsin.

The Meigs-Powell Co., 582-584 Sixteenth Avenue, Milwaukee, manufacturer of gages, micrometers and other precision instruments, sustained a heavy loss by fire which destroyed the adjoining building, occupied by the Max Schuelke Pipe Organ Co., on July 20. It is intended to reconstruct the building at once. Some retooling will be necessary. John D. Powell is secretary and treasurer of the Meigs-Powell Co.

The Biggam Trailer Co., Milwaukee, has been incorporated to manufacture trailers, trailer trucks and similar specialties for the automotive industries, and to license motor truck manufacturers for the production of such units. The capital stock consists of $250,000 preferred stock and 15,000 shares of common stock without par value. The incorporators are H. F. Biggam, Leo G. Smith and Waldemar C. Wehe, attorney, 425 East Water Street, Milwaukee.

The Riverview Foundry Co., Silver Lake, Wis., a new corporation with $10,000 capital, is erecting a one-story building, 50 x 120 ft., which will specialize in jobbing work for agricultural implement and automotive shops and also manufacture stoves. Operations will begin about Sept. 1. The principals are Charles R. Bohrn, R. C. Dixon and E. I. Dixon, all of Silver Lake.

The Cook & Gardiner Sanitary Rake Co., Beloit, Wis., has been organized by W. R. Cook and E. M. Gardiner to manufacture an automatic cleaning lawn rake and other garden tools. The factory of the former Weber Fanning Mill Co., at Rockton, Ill., suburb of Beloit, has been leased and is being equipped. It is two stories, 30 x 80 and 30 x 60 ft., and will be in operation about Aug. 10.

William J. Cary, county clerk, Milwaukee, is taking bids for furnishing the Milwaukee County Courthouse power plant department with one medium duty thread cutting engine lathe and one horizontal piston pattern, simplex design, Burnham high duty boiler feed pumping unit.

The Acme Valve Grinding Machine Co., Milwaukee, has been organized with a capital stock of $25,000 to manufacture special machinery and tools for automotive shops, etc. The incorporators are George W. Leitsch, V. A. Roberts and George A. Fullips, 3507 Chambers Street, formerly superintendent Badger-Packard Machinery Co., Milwaukee.

The Wisconsin State Board of Control, M. J. Tappins, Madison, Wis., secretary, expects soon to call for bids for the construction and equipment of a $60,000 cold storage plant and warehouse in connection with the State prison at Waupun, Wis. The architect is Arthur Peabody, Capitol Building, Madison.

The Brunett Heating System Co., Rice Lake, Wis., recently incorporated with a capital stock of $100,000, has acquired an 80-acre site on the Chicago & Northwestern and Soo Line tracks, for its proposed foundry and machine shop. It will manufacture heating units designed by M. R. Brunett of Minneapolis and adapted especially for farm and rural communities. Construction work will start Aug. 1.

The Valley Paper Mill Co., Neenah, Wis., a new $300,000 corporation, has engaged E. A. Wettengel, architect, Appleton, Wis., to design a one- and two-story brick and concrete mill and power plant, 100 x 300 ft., estimated to cost about $150,000 with equipment. Albert C. Ehlman, 114 Grand Avenue, Milwaukee, is president. George W. Burnside, Neenah, is general manager.

The Oliver Mfg. Co., Milwaukee, which was organized several months ago and is now manufacturing lifting packs and other automotive specialties, has changed its corporate style to the Oliver-Barth Jack Co., to better express the nature of its business.

The J. M. Royal Engineering Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture machinery, specialties, etc. The principals are James M. Royal and Howard A. Schroeder. Emmett J. McLeod, 128 Grand Avenue, is attorney.

The Seamweld Equipment Co., 814 Winnebago Street, Milwaukee, has been organized to manufacture welding equipment, transformers and electrodes under the Fay patent. The officers are Fred Pabst, president; Harry W. Marsh, vice-president and treasurer; P. C. McNulty, Jr., vice-president and general manager, and Joseph W. Fay, vice-president and chief engineer.

California

SAN FRANCISCO, July 19.

The Schartzer Illuminated License Plate Co., West Nineteenth Avenue, Oakland, Cal., manufacturer of metal license plates, has awarded contract to Edward DeMar, 3080 Claremont Avenue, Berkeley, Cal., for its new one-story plant on West Nineteenth Avenue, estimated to cost about $75,000 with machinery.

Weldon & Glasson, Thirty-first Street and Woolman Avenue, San Diego, Cal., operating a wood-working plant, are planning to rebuild their works, destroyed by fire, July 7, with loss estimated at about $75,000, including machinery.

The Hoff Magnesite Co., Monadnock Building, San Francisco, has acquired about one acre of land at San Pablo, Cal., for the erection of a new plant. Preliminary plans are under way.

The Severin Motor Car Co., Kansas City, Mo., manufacturer of automobiles and equipment, is considering the purchase of land at Oakland, Cal., for the erection of a Pacific Coast plant.

The Moore Shipbuilding Co., foot of Adeline Street, Oakland, Cal., has filed plans for a new one-story foundry for the manufacture of brass castings.

The Albany Engineering Works, Berkeley, Cal., is planning for the erection of a new one-story machine shop and foundry.

The Bastian Combination Water Heater Co., Los Angeles, manufacturer of water heaters, etc., has filed notice of change of name to the General Water Heater Corporation.

The Board of Education, Sacramento, Cal., is planning for the purchase of machinery and equipment for manual training work at the local high school to cost about $18,000. A list is being prepared.

The Board of Supervisors, Oroville, Cal., has directed Frank Boyle, County Purchasing Agent, Oroville, to purchase a rock crushing machine with screens, asphalt heating plant, road grader and other equipment for the Highway Department.

Canada

TORONTO, July 25.

Although dealers have been receiving more inquiries than usual the past two or three weeks for machinery and tools only a very few have turned into actual sales and the market continues quiet. Some dealers, however, have been doing a fair business in second-hand tools, but the demand is usually for replacement purposes. Small tools are moving quietly.

The Bell Thread Co., Ltd., Hamilton, Ont., is in the market for a 25-hp., three-phase, 25-cycle, 220 volt motor; also one of 5-hp., three-phase, 25-cycle, 220 volt.

The lumber mill of the Richards Mfg. Co., Ltd., Campbellton, N. B., was destroyed by fire July 19 with a loss of $60,000.

The National Slag Production Co., Hamilton, Ont., has secured a site on the Canadian National Railway and the beach line of the Grand Trunk Railway and will establish a plant. The new concern is capitalized at $300,000 and is headed by Edwin J. Robertson.

The Dominion Oxygen Co., Ltd., is about to start work on the erection of a plant in Montreal to cost $250,000, which will be a duplicate of its Toronto works and double the capacity of the organization.

Republic Company Suffers Deficit for Quarter

Additional evidence bearing on the condition of the steel industry earlier in the year is found in the report of the Republic Iron & Steel Co. for the three months ended June 30 last. This report shows a net operating loss for that period of $508,447, contrasted with a profit of $2,793,687 for the corresponding period last year. Subsequent figures show, after taxes and charges, a deficit of $883,673, as against a surplus of $104,611 for the preceding quarter, or 42c. a share on the company's $25,000,000 preferred stock, and a surplus of $2,305,500, equivalent to $6.22 a share on the $30,000,000 common stock, after preferred dividends, for the like period last year.

This showing, in part, at least, is due to a broad policy in providing for depreciation and renewal charges, amounting to $175,675 for the period just ended, as against $177,797 for the quarter ended March 31 last, as well as increased bond interest charges. The total deficit for the June quarter amounted to $1,321,173; for the corresponding period last year there was a profit of $418,000.

Unfilled orders on the books of the company, as of June 30, were 97,265 tons, as against 121,498 tons for the corresponding period last year.

Based on earnings for the first six months of 1921, the company's surplus, which on Dec. 31, 1920, stood at $37,441,571, has been reduced to $35,337,509.

Great Northern Ore Properties

The total receipts from all sources by the trustees of the Great Northern Iron Ore properties in 1920 were $5,952,816, comparing with $5,844,000 in 1919. A total of $6,000,000 was paid out to holders of certificates of beneficial interest, which represented two semi-annual dividend payments of $2 per share each. The small deficit was charged against the undistributed receipts fund, and at the end of 1920 there was $208,000 left in this fund.

The total number of tons of ore shipped under the old leases in 1920 was 2,423,445, and the average royalty was 15.52c. This compares with a total tonnage shipped in 1919 of 1,824,510, and average royalties of 17.52c. per ton. The 1919 receipts were the lowest in the history of the property since 1911, and the 1920 receipts show only small improvement.

Steel Corporation Taxes

The following statement was made July 22 by Elbert H. Gary, chairman United States Steel Corporation, in response to questions by newspaper men:

In making our income tax returns to the Government for 1917 and 1918, we raised questions concerning items involving approximately $60,000,000 of taxes. Believing these were not taxable, we claimed credit for them in our returns. Recently the Government representatives have been discussing with us the questions relating to these items. They have not been decided nor has any of them been decided. We have no way of determining when a decision will be reached.

IRON AND INDUSTRIAL STOCKS

Low Prices Beginning to Attract More Investment Buying

While the market for securities is by no means active, low prices are beginning to attract more investment buying. For a long period the rank and file have paid more attention to minorities than to majorities; to pessimism than to optimism. That the country is financially sounder and industrially more active than it was a month ago cannot be disputed, and unmistakable signs are developing that strongly suggest greater activity in fundamental trades heretofore suffering from an apathy of the buying public. The increased buying of steel products by the railroads, which are nearer to receiving claim money from the Government than they have been before, is of importance notwithstanding mills are inclined to cut prices for their goods. Such purchasing should form a backlog for the steel mills and it seems logical to assume will encourage industry as a whole to go forward, providing the buying public loosens its purse-strings.

As to the latter, we have increasing savings deposits and a strengthening in cash reserves of National and Federal banks, which mean a huge buying power sooner or later and an ability of industry to borrow funds with which to conduct business. Our indicated and present grain supplies are enormous, the carriers already cracking under the strain of moving them. Packing house interests are selling larger amounts of foodstuffs. Leather, cotton and woolen industries give further evidences of having passed beyond the depression point. Other straws indicate reviving general business the country over.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	30¾ - 32	Gulf States Steel.	30 - 31
Allis-Chalm. pf...	69½ - 72	Int. Har. com.....	72¾ - 75⅜
Am. Can com.....	26 - 27½	Lackawanna Steel.	— - 37½
Am. Can pf.....	— - 81	Midvale Steel.....	22¾ - 23½
Am. C. & F. com.	122 -126	Nat.-Acme	14¾ - 15¼
Am. C. & F. pf...	109½-110	N. Y. Air Brake..	— - 54
Am. Loco. com....	80½ - 84	Press. Steel com..	— - 73
Am. Radiator com.	— - 68½	Ry. Stl. Spg. com.	81 - 82½
Am. Steel F. com.	25⅝ - 26⅝	Ry. Stl. Spg. pf...	— -100
Bald. Loco. com..	73 - 78¼	Replogle Steel....	19 - 19½
Bald. Loco. pf....	— - 97	Republic com.....	44⅛ - 47
Beth. Steel com..	42 - 43	Republic pf.....	— - 83
Beth. St., Cl. B..	45¼ - 48¾	Superior Steel....	30 - 34¼
Beth. Stl., 8% pf..	98 - 98¼	Un. Alloy Steel...	23⅞ - 25¾
Chic. Pneu. Tool..	— - 50	U. S. Pipe com...	14 - 14⅞
Colorado Fuel....	26 - 26⅜	U. S. Steel com...	71¾ - 73¼
Cruc. Steel com...	52¾ - 53¾	U. S. Steel pf.....	108⅞-109⅜
Cruc. Steel pf.....	— - 82	Vanadium Steel...	27⅞ - 29¼
General Electric..	117¾-122¼	Va. I. C. & Coke..	— - 70
Gt. No. Ore Cert..	27 - 27½	Westingh'se Elec.	41⅝ - 44⅝

Industrial Finances

The Peck, Stow & Wilcox Co., Southington, Conn., small tools, has called a stockholders' meeting for July 27 for the purpose of electing directors and to vote on accepting an amendment to the company's charter, sanctioned by the Connecticut General Assembly last March, authorizing an increase in the capitalization from $1,500,000 to $4,000,000.

The General Electric Co. offers its employees the privilege of subscribing to new $10 bonds and subscription stamps under a perfected savings plan. The 5 per cent supplementary compensation for continuous service for five years or more, for the first half of 1921, will be paid early in August in employees' 7 per cent investment bonds, issued in denominations of $10. Balances above multiples and amounts less than $10 will be paid as nearly as possible in non-interest bearing employees' subscription stamps in denominations of 50c.

The Westinghouse Electric & Mfg. Co. has filed with the Massachusetts commissioner of corporations a statement of its financial condition dated March 31 last, which shows total assets and liabilities of $196,748,534, contrasted with $146,283,560 at the close of the previous year. During the year there was no increase in the share capitalization of the company, but $30,000,000 bonded indebtedness was created, and a mortgage of $6,275,000 was assumed. The surplus account shows a shrinkage of approximately $1,500,000, standing as it does at $37,000,682.

Directors of the Lincoln Motor Co. are making arrangements for a $2,500,000 bond issue, half of which will be placed within the near future and the remaining half held as a backlog. There will be no public offering of the bonds inasmuch as directors and large stockholders have subscribed for the entire issue to be floated for the present.

The Gulf States Steel Co. operated at a profit of $34,396 during the quarter ended June 30, last. After making deductions for taxes, depreciation and other charges, there was a deficit of $53,353, contrasted with one of $102,917 for the preceding three months period.

The regular quarterly dividend of 1¾ per cent on the outstanding preferred stock of the Taylor-Wharton Iron & Steel Co. for the three months ended June 30, 1922, has been declared payable Aug. 1.

Trade and Office Changes

The Curran Motor Products Co., Detroit, has changed its name to Western Motor Products Co., Inc. It is capitalized at $100,000.

Lasker & Minck have been appointed the Eastern sales agents for the Evans & Howard Fire Brick Co., St. Louis; they have also been appointed sole distributors for Koppax paint in Mexico.

The Economy Baler Co., Ann Arbor, Mich., has sent W. H. Fogelsong, scrap metal press expert, to Cleveland to take charge of the Cleveland office, opened recently at 508 Schofield Building.

W. H. J. Fitzgerald & Co., 165 High Street, Boston, have been made sales representatives in Maine, New Hampshire, Vermont and Massachusetts for the John Steptoe Co., Cincinnati, line of standard lathes.

The W. H. Anderson Tool & Supply Co., Detroit, has leased the property at 303 Bridge Street, N. W., in Grand Rapids, Mich., and will open an office and warehouse there. George D. Bresch has been appointed district manager. The building has been altered and will be ready for occupancy about Aug. 1.

The Oxweld Acetylene Co., Newark, N. J., manufacturer of welding and cutting equipment, has removed the offices of its foreign sales department from Newark to 30 East Forty-second Street, New York. Separate departments for sales, engineering, advertising, shipping and accounting have been established, each in charge of a competent man of long experience in the export field.

The M. J. Dougherty Co., piping fabricator and engineer, Philadelphia, has secured the Tomlinson Steam Specialty Co., Cleveland, Detroit and Akron, to represent it in the upper half of the State of Ohio and all of Michigan.

The Positive Lock-Bolt Co. has purchased the entire assets of the Safety Nut & Bolt Co., Cleveland. The new organization is a $250,000 Ohio corporation with the following personnel: C. C. Murphy, president; J. N. Leatherman, vice-president; M. D. Neff, secretary; Edna B. Craft, treasurer; W. H. Burke, general manager; H. L. Jollay and William F. Koehn, directors. The purchaser will complete equipping the factory, work of which was well under way when the old company met with difficulties, and will proceed within a period of 90 days to manufacture on a quantity basis, not only the lock-bolt, but several other specialties to which the locking device is applied and patents of which we have also purchased.

The Cleveland office of the Sullivan Machinery Co. was moved on July 1 from 810 Park Building to room 824, Kirby Building. Ralph T. Stone is manager at Cleveland. The company has established a supply depot and service station for coal mining machinery supplies and repair parts at Seventh Avenue and Thirteenth Street, Terre Haute, Ind., with H. T. Wiley, formerly of the engineering department at the Claremont, N. H., Works, in immediate charge. This service station will be under general charge of M. C. Mitchell, manager for Illinois and Indiana, at the Railway Exchange Building, St. Louis.

Peter A. Frasse & Co., Inc., machinery, tools, supplies, New York, has been appointed the sole agent for the metropolitan district for the drilling machines made by the Sibley Machine Co., South Bend, Ind.

The partnership heretofore conducted by W. Nelson Mayhew and Samuel Frank, trading under the firm name of Steward & Stevens Iron Works, and the partnership heretofore existing between Joseph N. Dalsen, Samuel Frank and W. Nelson Mayhew, trading as Montgomery Iron & Steel Co., have been merged, and the business heretofore conducted by the Steward & Stevens Iron Works and the Montgomery Iron & Steel Co. will hereafter be conducted by W. Nelson Mayhew, Samuel Frank and Joseph N. Dalsen, co-partners trading as Montgomery Iron & Steel Co.

The first issue of *The Dart*, a house organ published by the Medart Patent Pulley Co., St. Louis, appeared June 1. The articles include a discussion of business conditions and an outline of the development of Philip Medart's process of shafting manufacture. Size 4 x 9 in.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.93c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.93c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.03c.
Channels, angles and tees under 3 in. x ¼ in., base	2.93c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.63c.
Squares, flats and hex	4.98c. to 5.13c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.03c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.68c.
No. 12	3.73c.
No. 14	3.78c.
No. 16	3.88c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c.	.....
Nos. 22 and 24	4.35c.	4.70c.
No. 26	4.40c.	4.75c.
No. 28	4.50c.	4.85c.
No. 30	4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.25c. to 4.50c.
No. 16	4.50c. to 4.75c.
Nos. 18 and 20	4.65c. to 4.90c.
Nos. 22 and 24	4.80c. to 5.05c.
No. 26	4.95c. to 5.20c.
No. 27	5.10c. to 5.35c.
No. 28	5.25c. to 5.50c.
No. 30	5.75c. to 6.00c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	5.00c. to 5.25c.
Coppered basic	4.75c. to 5.00c.
Tinned soft Bessemer	6.25c. to 6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c. to 23 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$6.80	$6.55
		90 lb....	6.90	6.65
		100 lb....	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....30c. to 32c.

Old Metals

The market is still very discouraging and buying values are slightly lower. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.25
Copper, light and bottoms	7.75
Brass, heavy	4.75
Brass, light	3.75
Heavy machine composition	8.25
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

THE IRON AGE

New York, August 4, 1921

ESTABLISHED 1855 VOL. 108: No. 5

Continuous Stores Keeping Cuts Investment

System of Checks and Almost Automatic Control of Ordering Materials Economizes in Space Required and in Amount Carried

IN an effort to minimize the amount of stores and repair parts carried in the storehouse, the Erie Forge & Steel Co., Erie, Pa., has developed a system of keeping track of stores under which the amount of any item carried in stock is the smallest amount which could be purchased advantageously at one time, unless a larger amount is required because of rapid use. The whole thing has been worked down to a basis which might be described as almost scientific, with a definite allotment of each size and kind of material as the amount to be carried on hand, and a rigid determination of the point in the consumption of that material where a new order should be put in, so that delivery may be made before the remaining balance of the old stock is consumed.

In the stores building, which, despite this arrangement, carries some $150,000 worth of material at all times, the bins for different materials are all carefully marked, so that new as well as old employees may readily find the material wanted, with the least possible delay.

Each bin has a board within it, which effectually and physically separates one portion of its contents from another. This board gives a warning that, when it is reached in the gradual issuing of stores, it is time to order a new stock if they are to be on hand when needed. As soon as this point is reached, the storeroom clerk makes out a requisition upon the office to order as promptly as possible a certain specific amount of the material.

Taking the example shown by the cards herewith illustrated, it will be noted that the so-called "order point" of Gold Dust washing powder is fixed at 20 packages, it having been found by experience that 20 packages will last, in the ordinary run of events, just about the length of time required to get the order



These Six Cards or Forms Are Described in the Text

through and the new supply into the bin. This time is shown also, on the card, to be about three weeks. The amount ordered each time is 48 packages, or four cases of 12 packages each. The yellow card, Fig. 2, containing this information, is tacked on the bin where this particular material is kept.

To the new material, when received, a manila tag, Fig. 3, is attached. As the material is unpacked and placed in its proper bin, this tag is hung on a hook on the side of the bin, until all of the material covered by the shipment has been issued, when it is stamped to that effect, and sent to the balance clerk in the stores office.

In order that stores may be used up in the order in which they are received, it is customary to remove the small balance of the old material and place this on top of the new, when the new is placed in its bin. Thus no material is allowed to lie in the bin, month after month, without being put into service in its regular rotation. This is important in connection with certain materials which might spoil if left too long.

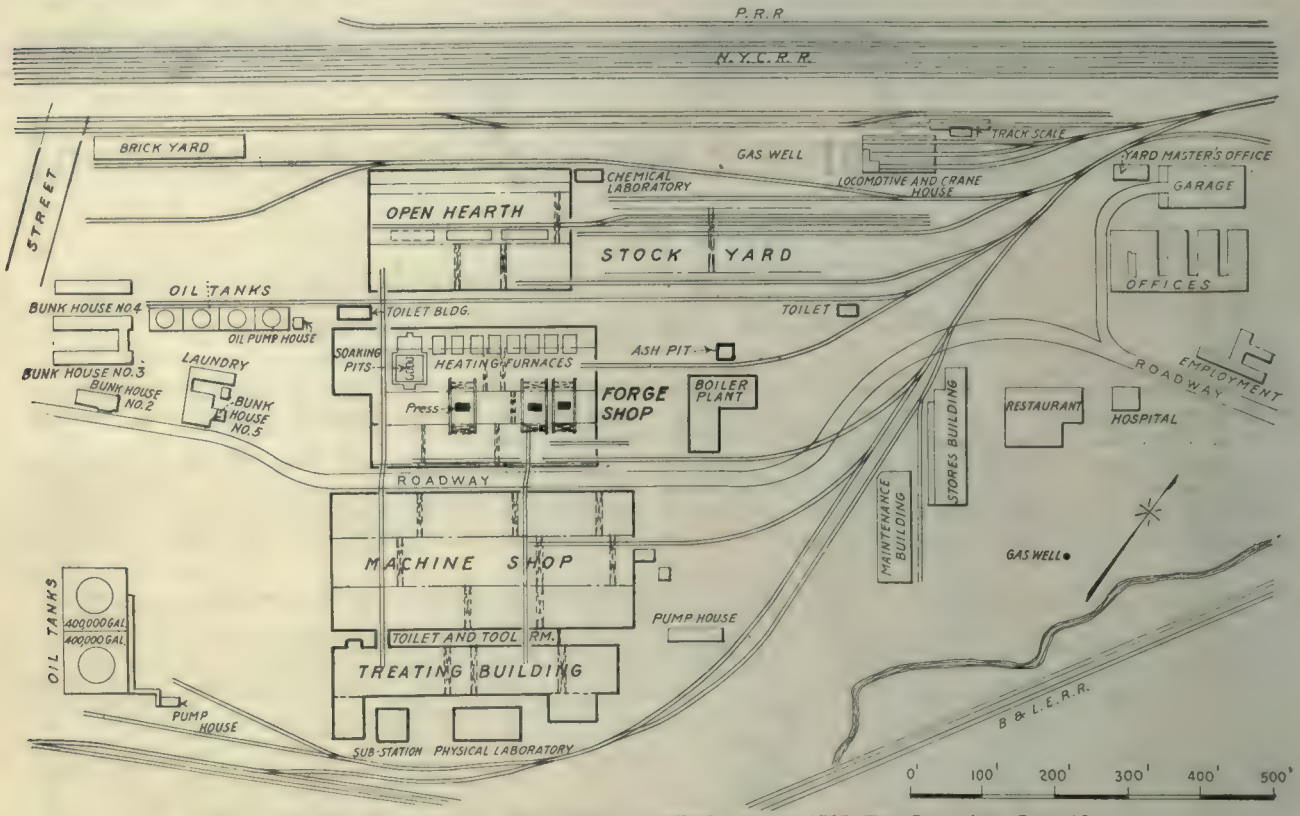
The white card, Fig. 4, kept by the balance clerk in the stores office, is used as a perpetual inventory of material on hand. All deliveries of materials are entered on one of these cards, and all withdrawals of material also are entered, so that the difference between the two will always represent, barring error, the amount actually on hand. This is subject to check at necessary intervals, but is found so generally reliable in service that it is considered correct at all times.

A red card, Fig. 5, is attached to the label on the bin as soon as a requisition is made out for the placing of a new order. This is done primarily as a guide to the clerk in the stores building, so that the order will not be duplicated through lack of his remembering that it has already been placed.

The yellow slip, Fig. 6, and its pink duplicate, serve as requisitions for drawing out materials from stores. This is posted on the balance card when used, and also on the cost records. Extensions of the amount are made by the cost department, and the proper amount charged to the department receiving the material.

By means of this system, both the balance clerk and the storeroom clerk have a ready check upon the condition of the stores in each particular. If the balance clerk finds that an order should come through for certain items, and does not receive it, he immediately goes to the storeroom to learn why. In this way the storeroom clerk is not permitted to overlook sending in his requisition for materials as the several bins become depleted.

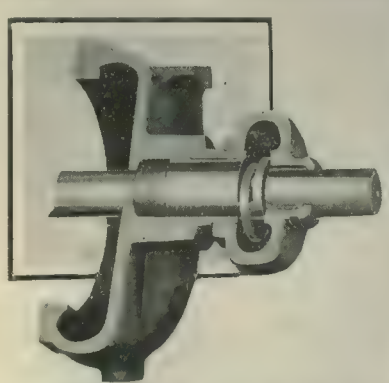
Perhaps the best thing that can be said about the system as a whole is that it works, and that the company is much pleased with the way it works.



General Layout of the Plant, Which Was Described on page 1595, THE IRON AGE, June 16

Pump with Ring-Oiled Packing Gland

Centrifugal and other rotary types of pumps which will incorporate a packing gland designed with the ring oiling feature will be manufactured by the Arrow Pump Co., Buhl Building, Detroit. It is claimed that the ring oiling feature eliminates leaky glands and scored shafts, increasing the life of the pump by efficient lubrication at the glands.



Packing Gland Incorporating the Ring Oiling Principle. The gland is also used as a bearing to eliminate long overhang

The illustra- shows one example of this construction. The packing gland is arranged in combination with an adjustment nut and oil reservoir to permit the use of the ring oiling principle of lubrication. A constant flow of oil is supplied to the gland making it practical to use it also as a bearing, the shaft being supported close up to the load, eliminating overhang and the necessity of outboard bearing. Deflection of the shaft is said to be prevented and the seal of the packing undisturbed. With deflections and vibration of the shaft prevented the metallic packing affords all the resiliency necessary to seal without scoring the shaft.

This method of lubrication is designed to keep a film of oil between the packing and the rotating shaft, and in the bearing. The packing is not subject to the wear it would otherwise have, and is calculated to hold its seal for long periods without adjustment.

British Steel Exports Very Low in June—Imports Relatively Larger

British steel exports in June, this year, excluding iron ore and including scrap, were only 66,301 gross tons as compared with 101,202 tons in May, 161,508 tons in April and 183,373 tons per month for the first quarter. The June exports last year were 287,655 tons. The average per month in 1920 was 274,881 tons per month, while in 1913 it was 420,757 tons per month. The 1919 rate was 188,519 tons per month. The June outgo is therefore much less than even the 1919 monthly average and smaller than any month in the war years. Imports in June were 88,083 tons, which contrast with 89,348 tons in May, 111,536 tons in April, and with 186,040 tons per month in the first quarter. The 1913 imports were 195,264 tons per month and in 1920 they were 128,685 tons per month.

Gross Tons	Exports	Imports
Aver. per mo., first quarter, 1921	183,373	186,040
April, 1921	161,508	111,536
May, 1921	101,202	89 348
June, 1921	66,301	88,083
Aver. per mo., second quarter, 1921	109,670	96 320
Aver. per mo., 1919	188,519	50.801
Aver. per mo., 1920	274,881	128.685
Aver. per mo., 1913	420,757	195.264

The trend of some of the prncipal exports is shown by the following data in gross tons:

	Average per Month 1913	1920	June 1920	June 1921
Pig iron	78.771	38,505	43,358	10,269
Steel rails	41,676	11,213	8,948	1,173
Steel plates	11,162	16,571	14,882	1,336
Galvanized sheets	63,506	34,244	45,826	4,471
Steel bars	20,921	30,322	34,292	2,115
Tin plates	41,208	29,418	32 756	8,801
Black plates	5,679	3,026	3,167	419
Steel sheets	....	....	11,014	684

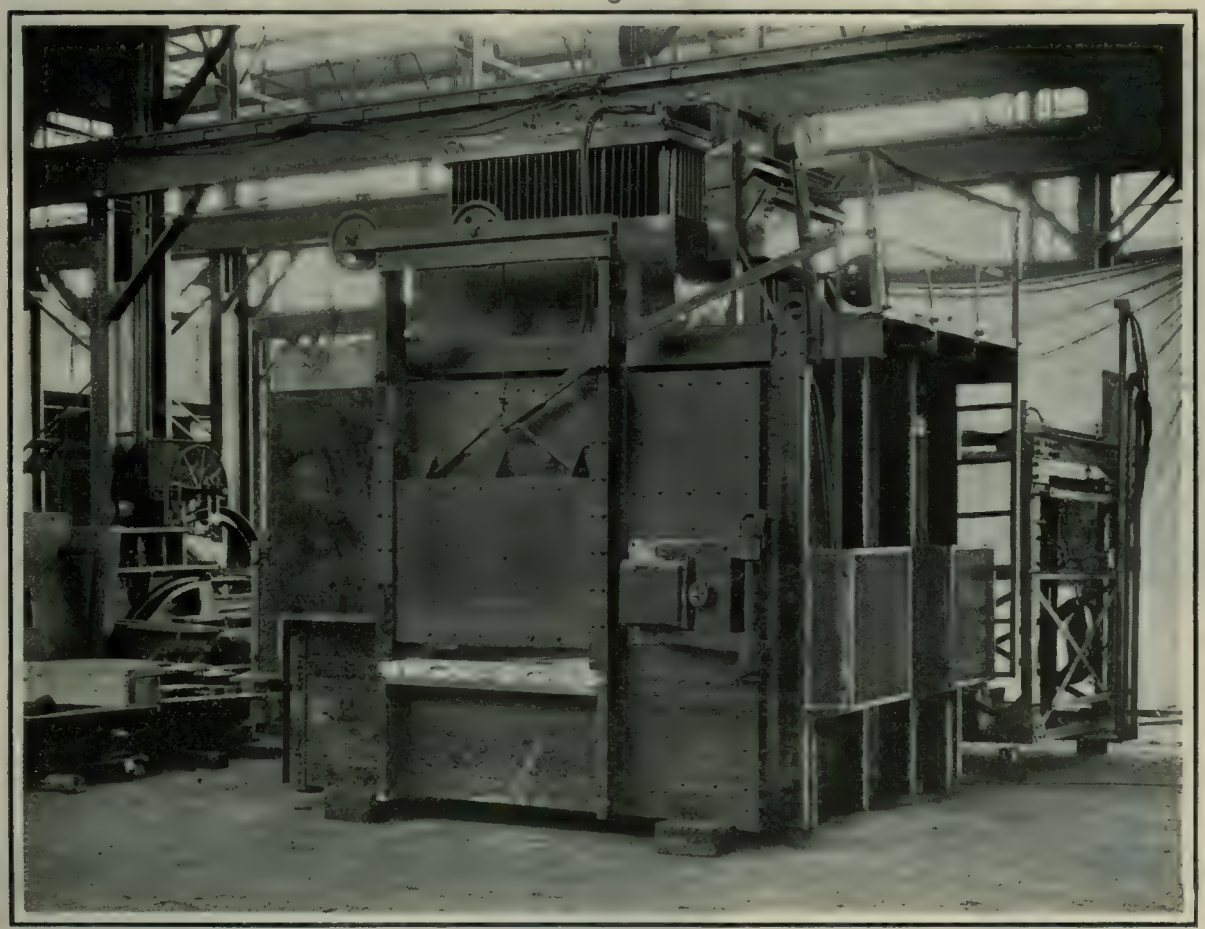
Iron ore imports in May were only 34,209 tons, as compared with 541,742 tons per month in 1920. In June, 1920, they were 675,179 tons. The total for the first six months was 1,284,166 tons, as compared with 3,459,508 tons in the first six months in 1920.

Manganese ore imports were 8334 tons in June against 37,717 tons per month in 1920 and 50,098 tons per month in 1913. The total to July 1 this year was 142,038 tons against 179,066 tons for the same six months last year.

Resistance Type of Electric Furnace Installed for Heating Sheets

In the manufacture of automobile body and fender stampings it is of the highest importance that the heating operations be conducted with as little scaling as possible, for any pitting due to this action requires considerable additional labor in getting the defects sandblasted to sufficient extent to get a good finish.

The Mullins Body Corporation, Salem, Ohio, with this in mind, recently installed in its new plant a Baily electric furnace specially designed for this work. Since a large part of the pressing or drawing to shape is performed cold and only one or two hot runs are required for perhaps six or seven cold operations on the press, it was desirable to build a furnace of the portable type which could be handled by a crane and taken from place to place so that there would be no idle furnaces while the material was receiving its cold runs. This necessitated a furnace with four eye bar connections at the top, one at each corner, for hooking on the crane chains; and also that the transformer and control equipment be located on the top of the furnace, as shown.



Baily Electric Resistance Furnace for Heating Sheets Previous to Stamping and Forming

The furnace is rated at 100 k.w. in electrical capacity, and has a hearth 3 ft. 4 in. wide by 6 ft. 5 in. long with a door opening 3 ft. 4 in. wide by 2 ft. 2 in. high. It has a capacity for heating 750 lb. of material to 1800 deg. Fahr. per hr. In plants where a crane is not available for moving the furnace, the equipment is designed for mounting on a car which may be moved at will on a truck running parallel to the presses.

One of the features of this equipment is the remarkable uniformity of temperature obtained on the sheets, a condition which it is claimed is not possible to attain in fuel-fired equipment where the doors must be opened frequently. Scaling is also reduced to an almost negligible item, making very much smoother sheets than is possible in fuel-fired practice.

Features of German Machine Tool Plant

Color of Buildings Considered—Prevailing Winds Aid in Reducing Dust and Noise—Welfare of Apprentices and Workmen Emphasized

A MACHINE tool plant in which important consideration was given to the color of the outside as well as the inside of the buildings, to the prevailing winds as a factor affecting the reduction of dust and noise, and to the welfare of apprentices and workmen, was built for the Fritz Werner Co., Marienfelde near Berlin, Germany. The plant was constructed under war time exigency, but appears to have been able to meet fully post-war economic conditions. At the time the war department called for greater production the plant was located within the city limits of Berlin and expansion was impossible. Accordingly it was decided to use previously acquired property in the suburbs.



Pattern Storage Building, Connected with Engineering Department by an Archway to Permit Study of Patterns on Hand

The plant occupies about 265,000 sq. ft. The main building, which houses the executive offices and the shops, is located at the southwest corner of the grounds, as this is the shortest route to the nearby railroad station. Advantage was taken of the prevailing west winds in locating the foundry as far as possible from the other buildings, in order to reduce the noise and dust so far as they were concerned.

Traffic is maintained by means of paved streets, standard gage railroad sidings connected with the nearby main line and a system of industrial tracks. The works are divided by a paved main street into a large western area, where the main building is located and a smaller eastern section. In the eastern section are located the pattern storage house, the pattern shop, heat treating shop, boiler house, foundry, foundry material storage shed and garage.

The standard gage tracks consists of two switching and receiving tracks, also a classification track at the northern extremity, which in turn serves four distribution tracks by means of turntables. The outer of the eastern tracks serves to bring materials for the foundry, boiler house and pattern shop; the inner one for raw materials for the machine shops. The two western tracks are used for shipping. Switching within the grounds is carried on by a locomotive using benzol as fuel, which is small enough to use the turntable at the same time with the cars.

Allowance was made for ample clear space between the buildings, partly to secure yard storage and partly to enhance the lighting of the buildings. The main building is U shaped. The wings are about 328 ft. long, connected by the office building 308 ft. long. Between the wings there is a 230 x 492 ft. one story building, where the heavy machinery is placed. The wings are used as shops for work for which heavy machinery is not required.

In the basement of the executive building are located the wash and locker rooms for the workmen. Above this are the shop offices, the floors of which are elevated 5 ft. above the shop floor for supervision. A hallway 10 ft. in width, outside of the offices, serves as a connecting link between the offices and shops. The sales department is located on the upper floor and on the floor beneath the engineering department. The school for apprentices is located on the third floor.

The main one-story shop consists of a 46-ft. center bay, equipped with 10-ton electric cranes, four 23-ft. bays on the east side, equipped with special devices for handling the transmission parts of the machine tools, and four 23-ft. bays in the west side, equipped with 3-ton electric cranes for assembling. The testing department is also located in this building. Machine tools are tested for production and operating speed according to rated capacity with direct-current motors. Tests are also made for foundations for new type machines.

Connected to the main shop and located on the ground floor of the wings is part of the steel storage, the tool room, cutting-off machines, general storage, storage for semi-finished products and transformer station. Electric power is derived from public service lines at 6000 volts alternating current and transformed to 220 volts. The transformer station is located at the center of distribution of electric power consumption of the whole works in the interest of economy of electrical losses. The foundry is the only other unit having a



Interior of Pattern Storage Building, Showing Arrangement of Fireproof Rooms, Each of Which Serves to Store Patterns and Cores Belonging to One Type of Machine



A Section of the Workshop Showing Good Light Treatment, Also Group Drive. No special foundations are used for machines with rotary motion

transformer station, as it was shown that this reduced installation and operating cost. The works require from 1000 to 1200 kw., distribution to individual motors being effected partly by means of underground cable and partly through pipe conduit. The motors average 20 hp. used for group drive by means of shafting 65 to 72 ft. long.

The roof is of concrete tile construction. All skylights face the north to keep direct sunlight away from the machinery and the workmen. The heating pipes are located just under the skylights and appear to be part of the construction members of the building.



The Workshop of the Apprentice School. The management is very solicitous about this department and devotes particular attention to it

The floor of the main workshop is of wood block on a concrete base and has proved serviceable. Only the heaviest of the machine tools, especially those with reciprocating motion, have special concrete foundations; all other machines are mounted on skids. The shops located in the wings are notable for their light treatment which is accented by good fenestration, comparatively narrow working floor space of 40 ft., and the light color of the ceiling and floor. The floors of these shops are of jack-arch construction supported on I-beams for taking heavy floor loads.

Elevators 6½ x 10 x 13 ft. in size establish communication between the various floors. The elevator shaft, the stairs and toilets form a separate group in the building.

The storage and distribution of the lubricating oils is one of the features of the works. The oil is stored in the basement in iron reservoirs of 500, 1000, 2500 gal. capacity, from which pipe connections lead to the railroad siding. The oil is forced out of barrels, or tank cars into the reservoirs by carbonic acid gas. Accurate measuring devices are installed to keep account of all oil used. Oil used in automatic screw and other machines is centrifugally cleansed and then filtered for further use.

The outside walls of the large buildings are carried out in slag of a brown violet color. This material possesses the advantage of not showing the accumulation of grime and smoke, unavoidable in works of this character. The inner walls of the U are of glazed tile in order to help the lighting of the one-story shop building.

The pattern storage building is one of the economic features of the works. It is an absolutely fireproof structure of eight stories including the basement, each 8¼ ft. high, divided into a number of small fireproof rooms. Each room serves as a storage place for the patterns belonging to one type of machine, together with the cores. This allows of very easy inspection and is a safeguard against damage by fire. A 3000-lb. capacity elevator is used for the transfer of the patterns to and from the various floors.

The pattern storage building is connected to the engineering department in the executive building by means of an arch gallery. This is to allow the designers to check up old patterns, so as to avoid as much as possible making of new ones. The space above the arched gallery is used for blueprinting apparatus using natural light. Next to the pattern storage building is the pattern shop which is a two-story slag structure. A special compartment is provided for machines causing dust and making noise.

The laboratory for testing materials is located in the heat treating shop. This includes a metallographic, a chemical and physical laboratory. The foundry has its own laboratory for testing pig and cast iron.

The boiler house is used for heating the entire plant.



The Wash and Locker Rooms Are of White Tile Wall Construction, with Hot and Cold Running Water



The Workmen's Dining Room Is Light and Airy. Meals are served here at noon

It is equipped with two fire-tube boilers with automatic grate stokers. The heat in the flue gas is utilized for heating the feedwater by means of a heat exchanger. Outside the boiler house is a 1500-ton coal storage yard. A crane equipped with a grab bucket takes the coal to the bunkers in the boiler house from which the automatic stokers are fed. Two or three workmen only are required for all of this work. The boiler house is so planned that in case of necessity a power house can be added, equipped with steam turbines, in which case the exhaust steam would be used for heating. Adjourning the boiler house is a building containing fire apparatus, also a building for the compressors, which serves the entire plant with compressed air.

The foundry has a casting floor 71 x 325 ft., constituting the center bay, with lean-tos on either side. In the eastern section are located the cupolas, dryers, sand and core makers and in the western the raw materials, patterns, wash, locker rooms and shop offices. The foundry is equipped with a number of stripping plate molding machines and jarring machines. Sand blast apparatus and pneumatic chipping tools are used for cleaning castings. The foundry is connected to the coke shed by a tunnel, the top of which is equipped with hoppers. The hopper valves serve coke cars, which are taken by elevator direct to the cupolas. The cupolas are equipped with sprinkler systems to prevent fire damage from flying sparks.

Hot air is used for heating the foundry in winter. During the summer months the same system is used for admitting fresh air from the outside, which has proved a great comfort during casting operations. The crane runways extend in the open at both ends in order to facilitate the handling of flasks and finished castings. Provision is made so that the upper part of the end walls can be pushed out in the crane runway and replaced when the crane enters the building.

The firm is particularly solicitous for its apprentices. Practical education is given in a special workshop equipped with all types of machine tools. In addition there are two class rooms, a large drafting room, a lecture hall, library and research department. A large sodded playground with a covered turn hall are used for the physical development of the apprentices.

Installations pertaining to the welfare of the workmen, such as dining room, washrooms, bathrooms, locker rooms and toilets are systematically arranged and well equipped to conform to modern hygienic practice. These rooms are readily cleansed and are easily accessible. The fundamental observed in their location was that all unnecessary steps must be avoided.

The main wash and locker room is located in the basement and is lined with white glazed tile to a height of 6½ ft. It is equipped with rows of wash basins with hot and cold water bibs. The lockers, one assigned to each man, are also located in this room. The place is lighted electrically and heated. The workmen on the upper floors have similar provisions. The toilets are equally divided on a ratio basis of one cell to 12 workmen. In addition to the wash room there is a special bath house equipped with 10 showers and 10 tubs.

The dining room and kitchen are located in the mansard with a capacity for the preparation of 1200 quarts of food. The kitchen has a white tile floor and is equipped with four steam cooking kettles. In adjoining rooms are electrically driven potato pealers, meat choppers, dish washing machines, knife cleaners, etc. The food is passed from the kitchen to the dining hall through large window openings, which is efficient and allows the workmen to survey the kitchen. Special smaller dining rooms are assigned to the officials and foremen.

In addition to the ground occupied by the plant, the company owns 40 acres of land, which is rented to the workmen for gardening at a nominal price. There are about 200 vegetable gardens. Water for sprinkling is provided by the company.

The plant which is planned to employ from 1000 to 1500 workmen is so laid out that 50 to 100 per cent additions can be made without disturbing the present arrangement.

Less Cast Iron Pipe Made

Figures of the Census Bureau show a heavy reduction in the production of cast iron pipe in 1919, compared with 1914, the figures being 702,550 tons in 1919 and 1,120,720 tons in 1914. This reduction is wholly under the heading of gas and water pipe and fittings, which fell from 909,070 tons in 1914 to 447,880 tons in 1919. There was a healthy increase in production of soil and plumbers' pipe and fittings, from 211,650 tons in 1914 to 254,670 tons in 1919.

Values of various kinds of pipe and cast iron fittings, however, showed a large increase under all headings. The total value of the products of the industry advanced from $28,102,600 to $51,902,800. Unit values of cast iron pipe and fittings, per ton of 2000 lbs., in 1914, were $23.18, as compared with $69.05 in 1919.

Under the two large tonnage items, the unit value for gas and water pipe and fittings in 1914 was $21.87 as compared with $62.79 in 1919. Similarly, the unit value of soil and plumbers' pipe and fittings has advanced from $29.17 in 1914 to $80.07 in 1919.

Cast Iron Pipe—Census Bureau's Summary Concerning the Industry—1919

	1919		1914	
Kind	Tons 2000 Lb.	Value	Tons 2000 Lb.	Value
*Total value of products	....	$51,902,800	....	$28,102,600
Cast iron pipe and fittings	702,550	48,514,600	1,120,720	25,979,200
Gas and water pipe and fittings	447,880	28,124,100	909,070	19,805,500
Bell and spigot pipe	375,200	19,257,700	828,900	16,669,600
Flanged pipe	23,790	1,714,200	27,290	706,500
Culvert pipe	5,660	344,000	11,010	246,500
Fittings	43,230	6,808,200	41,870	2,182,900
Soil and plumbers' pipe and fittings	254,670	20,390,500	211,650	6,173,370
All other castings	16,400	1,614,500	13,580	681,700
All other products	....	1,773,700	....	1,441,700

*Includes 59 establishments primarily engaged in the manufacture of cast iron pipe with products valued at $50,235,100 in 1919 and $26,659,360 in 1914; and seven establishments in 1919 and nine in 1914 in other lines of manufacture, reporting cast iron pipe to the value of $1,667,700 and $1,443,240 respectively.

Hare's Motors, a corporation formed a year or so ago to take over the management and operation of the companies manufacturing the Mercer, Simplex and Locomobile automobiles, is to be dissolved. The companies making those cars will operate once more as separate units. No definite plan has been made for a reorganization of the Locomobile concern, but have been for the Mercer Motors Co., which owns the Simplex Automobile Co.

Chemical Reactions in Foundry Cupolas

Actions and Reactions — Combustion, Cupola Gases, Carbon Ratio, Melting Efficiency, Metal Losses and Gains — Cupola Balance Sheet

BY Y. A. DYER*

IN a strict sense, combustion is rapid oxidation accompanied by flame—the product of combustion being a gas or vapor. It may be stated, in the case of cupola combustion, that the carbon in coke and oxygen in air have such strong chemical affinity for each other in the presence of heat that they unite with violence. By the force of their chemical union, combustion is instantly produced and intense heat evolved. The higher the temperature, the more rapidly will combustion proceed. As air is the vehicle which carries oxygen into the cupola and coke the medium of carbon supply, a general acquaintanceship with air, oxygen, nitrogen, carbon and their behavior in the presence of heat becomes necessary to a full understanding of cupola actions and reactions and the products of combustion.

Air and Its Constituents

One cu. ft. of dry air under standard conditions (32 deg. Fahr. and 29.93 in. of mercury) weighs 1.293 ounces, or 0.0808 lb.† The volumes of all permanent gases under uniform pressure increase uniformly with uniform increase of temperature. Expressed in the Fahrenheit scale, a gas expands $\frac{1}{491}$ for each degree increase above 32 deg. Fahr. The volume is proportional to the absolute temperature; that is, to $T - 32 + 490$ ($= T + 458$), where T is the temperature in deg. Fahr.

But the volume of a gas is inversely as the pressure upon it, therefore doubling the pressure halves the volume. The density of a gas varies inversely as its absolute temperature. For practical metallurgical purposes the composition of air may be stated in the following ratios and percentages:

	Ratios		Percentages	
	By Volume	By Weight	By Volume	By Weight
Oxygen	21	3	20.8	23.1
Nitrogen	80	10	79.2	76.9

Oxygen (O_2) has molecular weight of 32, density of 16; and one cu. ft. under standard conditions weighs 1.44 ounces or 0.09 lb. Nitrogen (N_2) has molecular weight of 28, density of 14; and one cu. ft. weighs 1.26 ounces or 0.0787 lb. The nitrogen gas of the air is practically inert; remains unchanged in the cupola, and merely dilutes the air and gases, thereby very materially lowering temperatures.

Carbon in the Coke

Coke is a solid fuel containing a high percentage of carbon, and is generally used in the cupola melting process. By the union of its carbon with oxygen an intense heat is produced. The products of this union are carbon dioxide (CO_2) and carbon monoxide (CO) gases or vapors. The quantity of heat generated by a fuel burned in oxygen, its heat of combustion or heat value, is expressed in terms of calories or heat units. The British thermal unit (B.t.u.) is the quantity of heat required to raise the temperature of 1 lb. of pure water 1 deg. Fahr., at or near its maximum density (39.1 deg. Fahr.).

Carbon has a molecular weight of 12; its specific heat above 1832 deg. Fahr. is 0.50; therefore it has atomic specific heat (0.50×12) $= 6$. The boiling point of carbon under atmospheric pressure, is reported as 6692 deg. Fahr. Diamond is assumed as relative standard for carbon in the calculation of thermic results, and its heat of combustion is approximately 14,580 B.t.u. Thus the heat of combustion from one pound of solid carbon, exclusive of heat of vaporization, is 14,580, or in round numbers 14,500, B.t.u. when burned to carbon dioxide.

The heat of vaporization of carbon may be obtained by subtracting the heat of combustion of solid carbon from that of the carbon in the gas. The heat of combustion of solid carbon to carbon monoxide is 4370 B.t.u., effected by 1 lb. of carbon uniting with 1.333 lb. of oxygen to form 2.333 lb. of carbon monoxide. The 2.333 lb. of monoxide gas, in burning to carbon dioxide, generates (2.333×4370) $= 10{,}195$ B.t.u., or in round numbers 10,200; therefore, ($10{,}195 - 4370$) $=$ 5825 B.t.u. represents the heat of vaporization of carbon. Then, the total heat of combustion becomes ($14{,}580 + 5825$) $= 20{,}405$ B.t.u., of which 14,580 are sensible or available heat units for melting and superheating, and 5825 are latent heat units, or heat necessary to vaporize carbon.

Carbon Vapors or Gases

As the gases of the cupola are the products of combustion, or union of carbon and oxygen, and are the heat producing agencies for the melting and superheating of iron, their relative values will be discussed.

Carbon dioxide (CO_2) gas has molecular weight of 44, density of 22; one cu. ft. weighs 1.98 ounces or 0.1236 lb. under standard conditions; and one pound requires for its complete combustion ($\frac{32}{12}$) $= 2.667$ lb. or 29.6 cu. ft. of oxygen, or 11.517 lb. or 142.44 cu. ft. of air. Carbon dioxide contains 12 parts of carbon and 32 parts of oxygen in 44 parts of gas.

It may be stated that the gas is formed in the cupola by one atom of carbon taking up or uniting with two atoms of oxygen, forming one molecule of carbon dioxide; or 1 lb. of carbon uniting with (12:32::1:2.667) 2.667 lb. of oxygen, forming ($1 + 2.667$) $= 3.667$ lb. of carbon dioxide, creating perfect combustion and generating approximately 14,500 B.t.u. The flame temperature of carbon burned to carbon dioxide in air is reported by LeChatelier as being 3700 deg. Fahr.

Carbon monoxide (CO) gas has molecular weight of 28, density of 14; weighs 1.26 ounces or 0.07875 lb. per cu. ft.; and 1 lb. requires for its complete combustion 1.333 lb. or 14.8 cu. ft. of oxygen; or 5.759 lb. or 71.22 cu. ft. of air. Carbon monoxide contains 12 parts of carbon and 16 parts of oxygen in 28 parts of gas.

It may be stated that the gas is formed in the cupola by the molecule of carbon dioxide (3.667 lb.) taking up, or uniting with, one atom of carbon (1 lb.), forming 2 molecules of carbon monoxide gas (4.667 lb.); or 1 lb. of carbon, by this transfer, is united with only (12:16::1:1.333) $= 1.333$ lb. of oxygen, forming ($1 + 1.333$) $= 2.333$ lb. of monoxide gas, creating imperfect combustion.

The absorption of heat by carbon monoxide gas is at the rate of approximately 10,200 B.t.u. per pound of carbon charged in the cupola, and the net amount of heat given out when one pound of carbon forms monoxide gas is approximately only ($14{,}500 - 10{,}200$) 4300 B.t.u., or less than one-third of the heat generated in the formation of carbon dioxide gas. Hence, in the matter of melting and superheating metal, the advantages to be derived from the carbon dioxide flame become very apparent. The flame temperature of carbon burned to carbon monoxide in air is reported by LeChatelier as 2335 deg. Fahr.

Should the CO gas pick up another atom of oxygen in its ascent through incandescent carbon in the cupola, combustion may be completed. Therefore, if 2.333 lb. of CO takes up 1.333 lb. of oxygen, 3.667 lb. of CO_2

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†All ounces, pounds and tons in this article are Avoirdupois; tons are of 2000 lb.

will be formed, and the heat produced per lb. of carbon will be 10,206 B.t.u. The heat produced in oxidizing 1 lb. of CO to CO_2 amounts to approximately $\left(\frac{10206}{2.333}\right) = 4375$ B.t.u. Carbon monoxide burned to carbon dioxide in air has a flame temperature of 3810 deg. Fahr., according to LeChatelier.

Nitrogen Present in the Air

Since 1 lb. of oxygen is contained in 4.32 lb. of air, the amount of air required to burn 1 lb. of carbon to CO_2 is $(2.667 \times 4.32) = 11.52$ lb.; and since each lb. of air contains 0.769 lb. nitrogen, the total nitrogen is $(0.769 \times 11.52) = 8.85$ lb. In the matter of formation of CO gas, the amount of air necessary is $(1.333 \times 4.32) = 5.76$ lb.; therefore, the amount of nitrogen is $(0.769 \times 5.76) = 4.43$ lb.

If more air be supplied to the cupola than is necessary to satisfy each atom of carbon with oxygen, the excess weight of air will absorb additional heat from the fuel and the oxygen present will be left free or uncombined; therefore it will suffer no interference in its attack on the metal.

Carbon Ratio and Flame Temperature

Because of its nonvolatility, no flame is produced in burning solid carbon. But when the temperature in the cupola becomes sufficiently high to raise a portion of the carbon to incandescence, flame is produced by the burning gases. While in the solid state, in the presence of heat, carbon remains incandescent; as it decomposes a gas or vapor is produced in the form of finely dissociated carbon particles that are seen to burn in the cupola and produce flame. The following formula for carbon burned to carbon monoxide illustrates the principle of calculating approximate flame temperature of carbon burned in air:

Parts by weight of oxygen and carbon	2.333
Specific heat of carbon monoxide at 3200 deg. Fahr.	0.278
Parts of nitrogen introduced	4.430
Specific heat of nitrogen at 3200 deg. Fahr.	0.278
B.t.u. generated	4,385

$$\frac{4385}{2.333 \times 0.278 + 4.43 \times 0.278} = 2{,}332 \text{ deg. Fahr.}$$

If carbon be burned to monoxide in oxygen, the flame temperature would be approximately:

$$\frac{4385}{2.333 \times 0.278} = 6{,}746 \text{ deg. Fahr.}$$

Therefore, some idea may be formed of the devitalization or drop in temperature caused by the presence of nitrogen in air mixture supplying oxygen for combustion; also of the possible thermal effects of combustion by oxygen.

It will have been noted that the actions and reactions which produce the dioxide and monoxide gases create the flame and heated volume of gases which rise in the cupola and mingle with the descending charges. However, it should be paramount in the mind of the melter that the gas which supplies the intense flame is carbon dioxide, therefore any condition which tends to minimize its formation or lower its flame temperature—such as insufficient air, excessive coke bed and intermediate charges, or excessive air delivery, creating dilution by excess nitrogen and uncombined oxygen—should be eliminated as far as possible.

Sundry tests by many successful melters have proved that the height of fuel bed should be such at all times during the process of operation that at its upper level practically all the oxygen of the air blown into the cupola will have been combined with the carbon in the coke. Such condition will result in the utilization of the maximum flame temperature at the critical point. Ordinarily the greatest constant heat occurs in the cupola between 18 and 36 in. above the tuyeres (depending on size, construction and operation of cupola), where the zone of fusion exists. At this point the theoretical maximum flame temperature created by carbon burning to dioxide would be approximately $\frac{14{,}580}{3.666 \times 0.382 + 8.85 \times 0.278} = 3{,}777$ deg. Fahr.

In well regulated cupolas the gases usually approximate, by volume, the following range of analyses at the critical point in the melting zone area:

CO_2	15.00 to	16.00	per cent
CO	10.00 to	8.00	per cent
N_2	74.50 to	75.50	per cent
O_2	0.50 to	0.50	per cent

thus creating a carbon ratio $\left(\frac{CO_2}{CO}\right)$ of 1.5 or 2 to 1. Under the conditions met in ordinary practice, an ideal cupola working carbon ratio may be stated as 2 to 1, and with such existing conditions a melting ratio of 10 to 1 will obtain, provided first-class coke is used.

At the zone of fusion the temperature may actually range from 3150 to 3250 deg. Fahr. under approximate gas conditions as stated above—that is: 60 to 67 per cent carbon dioxide and 40 to 33 per cent carbon monoxide; temperatures of the two gases being based on LeChatelier's figures. The temperatures at which the gases leave the cupola vary with rate of driving and height of charging area—ranging from 600 to 700 deg. Fahr. in high cupolas to 1000 to 1100 deg. Fahr. in very low cupolas.

It should be the aim of the melter to select suitable coke, ascertain definite melting zone and so arrange charging conditions, air volume and pressure that as small a portion as possible of the carbon in the coke of upper charges will be transferred to carbon monoxide or consumed as such before reaching melting zone. This feature has an important bearing on the equilibrium of the carbon ratio. Water spraying of intermediate coke charges is often resorted to in extreme cases of too free burning coke. However, the author contends that this method is an expedient—a temporary remedy, not a cure. There is a basic cause, and if coke above the melting zone burns away too readily the character of the coke should be closely examined, cupola construction checked closely, or charging and operating conditions remedied.

Actions and Reactions Simple

Cupola chemical actions and reactions are comparatively simple and stable, compared with blast furnace reactions and chemical equilibrium. In facilitating these actions and reactions the important members of the cupola charge to be dealt with are coke and air. The air blown through the tuyeres supplies oxygen, which immediately sets up a chemical action by combining with the carbon in the coke.

While there is no way of definitely determining which action takes place first, it is reasonable to assume that the carbon of the coke is burned to dioxide instantly, then becomes carbon monoxide by burning solid carbon, which in turn is burned back to carbon dioxide—therefore the actions and reactions become reversible or interchangeable. However, in the cupola the re-burning of monoxide to dioxide occurs too high above the melting zone to be of service for melting. Chemical actions and reactions in the cupola are equated below in substantially the form and order in which they occur:

1 Carbon burns to dioxide gas $= C + O_2 = CO_2$
2 Carbon dioxide is reduced by carbon $= 2C + O_2 = 2CO$
3 Water and moisture are decomposed $= C + H_2O = CO + H_2$

Under average working conditions, temperature about 62 deg. Fahr., barometer 29.6 in., humidity 65 per cent, 1 cu. ft. of air weighs $\left(0.0808 \times \frac{490}{520} \times \frac{29.60}{29.93}\right) = 0.0754$ lb. and contains by weight $(0.0754 \times 0.231) = 0.0174$ lb. of oxygen. To supply 1 lb. of oxygen under these conditions requires $\left(\frac{1}{0.0174}\right) = 57$ cu. ft. of air. But 2.666 lb. of oxygen are required for complete combustion of 1 lb. of carbon to carbon dioxide gas; therefore, $(2.666 \times 57) = 152$ cu. ft., or 11.46 lb. of air will be required to supply the necessary oxygen to burn 1 lb. of carbon.

If coke has a fixed carbon content of 88 per cent, then each pound of coke will contain 0.88 lb. of carbon. Maintaining intermediate coke ratio to iron charged of 1 to 10 means that the actual melting ratio will be nearer 8 to 1, or about 250 lb. of coke for each 2000

lb. of metal, when account is taken of the portion of coke bed which burns away during the melting process; therefore it will be safe to compute the burning of an average of 250 lb. of coke in melting 2000 lb. of iron; and that coke will contain $(0.88 \times 250) = 220$ lb. of carbon.

Inasmuch as only 60 to 65 per cent of the carbon is finally present at the melting zone as CO_2, and 40 to 35 per cent as CO gas (an average of 2.16 lb. oxygen to pound of carbon), there will be actually needed for combining weights $(220 \times 0.62 \times 2.67) = 364$ lb. of oxygen for CO_2 and $(220 \times 0.38 \times 1.33) = 111$ lb. oxygen for CO—a total of 475 lb. of oxygen, carrying $(475 \times \frac{10}{3}) = 1583$ lb. of nitrogen, or $(1583 + 475) \div 0.0754 = 27{,}295$ cu. ft. of air. However, on account of blower slippage, bends in pipe, pipe friction, leakage and obstructions, approximately 10 per cent more air must be blown in order to insure the free delivery of this quantity, or $(27295 + 2729) = 30{,}024$ cu. ft., which practically tallies with the generally accepted blowing unit of 30,000 cu. ft. for each ton of metal charged.

BALANCE SHEET
(Per 2000 Lb. Charge)

Materials Charged	Per Cent	Lb.	Unit Weight	Casting Weight		Slag Weight		Gas Weight	
Iron:		1950							
Fe	93.11		1815.64	Fe	1808.39	FeO	9.32		
C	3.60		70.20	C	70.20				
Si	1.95		38.02	Si	36.07	SiO_2	4.17		
S	0.06		1.17	S	1.17				
P	0.63		12.29	P	12.29				
Mn	0.65		12.68	Mn	9.75	MnO	3.78		
Sand and dirt:		50							
SiO_2	75.00		37.50			SiO_2	37.50		
Al_2O_3	22.00		11.00			Al_2O_3	11.00		
Alkalies	3.00		1.50			Alkalies	1.50		
Coke:		244							
Free carbon	88.00		214.72					C	214.72
Volatile hydrocarbons	1.30		3.17					CO	3.17
Moisture	0.70		1.71					H_2O	1.71
Ash	9.35		22.82			SiO_2 Al_2O_3 FeO CaO	10.95 5.71 4.45 0.49		
Sulphur	0.65		1.58	S	0.60	CaS	2.20		
Limestone:		50							
$CaCO_3$	98.00		49.00			CaO	27.44	CO_2	21.56
$MgCO_3$	0.38		0.19			MgO	0.09	CO_2	0.10
SiO_2	0.97		0.48			SiO_2	0.48		
Al_2O_3	0.65		0.33			Al_2O_3	0.33		
Air:		2010							
O_2	23.1		464.00					O	458.86
N_2	76.9		1546.00					N	1546.00
		4304	4304.00		1938.47		119.41		2246.12

Heat Balance and Melting Efficiency

The heat balance of a cupola, or distribution of heating value of coke—heat utilized for melting and superheating iron, melting and heating slag, expelling water vapor from air and gas (CO_2) from limestone, etc.—may be fairly accurately computed by the aid of certain practical and theoretical factors. Thus—a cupola burning 244 lb. of coke (containing 88 per cent fixed carbon) to melt and superheat 1950 lb. of iron, supply heat for slag and other purposes—with escaping gas containing by volume 14 per cent CO, 10 per cent CO_2 and 76 per cent nitrogen—will yield the following results:

Carbon in coke passing to gases:

$$244 \times 0.88 = 214.72 \text{ lb.}$$

Carbon in cu. ft. gas:

CO	$0.14 \times 0.03375 =$	0.00473 lb.
CO_2	$0.10 \times 0.03375 =$	0.00337 lb.
		0.00810 lb.

Gases produced: $\frac{214.72}{0.0081} = 26{,}508$ cu. ft.

Heat power in cu. ft. CO gas: $7654 \div 22.22 = 344$ B.t.u.
Heat of CO in gases: $0.14 \times 344 = 48$ B.t.u.
Heat absorbed by CO gas: $26{,}508 \times 48 = 1{,}272{,}384$ B.t.u.
Heat power of coke:

$$244 \times 0.88 \times 14{,}500 = 3{,}113{,}440 \text{ B.t.u.}$$

The gases escaping at 800 deg. Fahr. will carry out the following sensible heat:

Volume CO and CO_2: $\frac{214.72}{0.03375} = 6{,}362$ cu. ft.

Volume nitrogen introduced: $\left(\frac{6362}{0.14 + 0.10}\right) - 6362 =$ 20,146 cu. ft.

Volume of gases:

CO_2	2,672	
CO	3,690	
N	20,146	26,508 cu. ft.

Heat losses from escaping gases:

N and CO $23{,}836 \times 0.0196$
CO_2 $2{,}672 \times 0.029$
$\times 800$ deg. $= 435{,}728$ B.t.u.

According to Ledebur, the total heat in 1 lb. of cast iron melted at 2192 deg. Fahr. is 441 B.t.u. These figures represent the heat units in such cast iron just melted at 2192 deg. Fahr. The mean specific heat for cast iron, from 32 deg. to t deg. Fahr. as reported by Richards, is $0.12 + 0.000046t$. Therefore, to superheat 1 lb. of such metal to (say) 2357 deg. Fahr. would require $2357 \times 0.224 = 528$ B.t.u., or 87 additional B.t.u. for superheating. A gray iron which melts at approximately 2260 deg. Fahr. requires $2260 \times 0.22 = 497$ B.t.u. for melting, and to superheat to (say) 2460 deg. Fahr. would require $2460 \times 0.23 = 565$ B.t.u.

By reason of the lower melting point of white or mottled iron, relatively less heat will be required—thus: assuming a white iron to melt at about 2075 deg. Fahr., it will require $2075 \times 0.21 = 435$ B.t.u. to melt; and to superheat to say 2275 deg. Fahr. will require $2275 \times 0.22 = 500$ B.t.u., or 65 additional B.t.u. for superheating. Because it is more easily oxidized, white iron will not admit of the same degree of superheat as gray iron. It is safe to assume 545 B.t.u. for melting and superheating ordinary gray iron.

It requires approximately 900 B.t.u. to melt and heat a pound of calcium-aluminum-silicate slag. It requires 1846 B.t.u. to expel 1 lb. of gas (CO_2) from limestone. At about 62 deg. Fahr. the air, if saturated, would contain 4.92 grains of water vapor per cu. ft. With humidity of 65 per cent, the air would contain $4.92 \times 0.65 = 3.20$ grains, or $\left(\frac{26{,}650 \times 3.20}{7000}\right) =$ 12.18 lb. of water vapor per ton of iron melted. It requires 5780 B.t.u. to decompose 1 lb. of water vapor. Coke exposed to the weather absorbs moisture rapidly—as much as 4 to 17 lb. of water per 100 lb. of coke when exposed to drenching for a period of 2 to 72 hr.

Therefore, if wet coke be used there will be a substantial drawing on the heat balance of the cupola to expel moisture from that source. It requires 1091.7 B.t.u. to vaporize 1 lb. of water.

In summing up the heat losses, and considering the heat necessary to melt the iron and slag, the following theoretical cupola heat balance sheet will fairly represent the useful energy expended for work and energy escaped per 244 lb. of coke consumed in melting and superheating 1950 lb. of metal:

Heat power of coke:

		B.t.u.
244 × 0.88 × 14,500		3,113,440
To melt and superheat iron:		
1950 × 545	1,062,750	
To melt and heat slag:		
120 × 900	108,000	
To expel water vapor:		
12.18 × 5780	70,400	
To expel gas from stone:		
21.66 × 1846	39,985	
Improper combustion:	1,272,384	
Escaping gases:	435,728	
Radiation and conduction:		
By difference	124,393	3,113,440

Melting efficiency: $\frac{1,062,750}{3,113,440} = 34.13$ per cent.

Improper combustion: $\frac{1,272,384}{3,113,440} = 40.86$ per cent.

Cupola Charge Balance Sheet

The following theoretical balance sheet graphically illustrates the final form in which all the materials entering the cupola are disposed of by the melting process. Figures used are taken from a test heat made by the author, using 39-in. cupola at the Alamo Iron Works, San Antonio, Texas. Total metal charged was 18,500 lb., composed of 58 per cent machinery scrap, 30 per cent pig iron and 12 per cent soft steel scrap; 2250 lb. Solvay coke and 426 lb. Texas limestone. Total metal, by actual weight, received from the heat was 17,761 lb.; total slag produced 1150 lb.

Reduced to ton basis—iron produced, 1920.1 lb.; coke consumed, 244 lb.; stone burned, 50 lb.; slag produced, 124 lb. Difference in weight between total metal charged and metal received, 739 lb., or 79.8 lb. per ton of iron melted, as shown by cleaning room record—total loss from all sources, 3.99 per cent. Coke ash analysis, exclusive of sulphur, was 48 per cent silica, 25 per cent alumina, 19.5 per cent iron oxide, lime 5 per cent and magnesia 2.50 per cent. Following are metal mixture and casting analyses:

Slag Analysis:	Per Cent
SiO_2	44.46
Al_2O_3	14.27
Fe O	11.53
Ca O } Mg O }	23.48
Mn O	3.16
Alkalies	1.26
CaS	1.84
	100.00

	Metal Mix	Metal Analysis
Total carbon	3.60 per cent	3.60 per cent
Silicon	1.95 per cent	1.855 per cent
Sulphur	0.06 per cent	0.089 per cent
Phosphorus	0.63 per cent	0.640 per cent
Manganese	0.65 per cent	0.546 per cent

A New Rail Specification Proposed

Provides for Rolling Tie Plates from Top of Each Ingot—Treatment in Soaking Pits—Lenient as to Cold Straightening

CAPT. ROBERT W. HUNT, head of the firm of Robert W. Hunt & Co., Chicago, inspection, testing and consulting engineers, addressed a letter on Aug. 1 to railroad officials interested and to the principal officers of steel rail manufacturing companies in respect to rail specifications. His connection with the manufacture of steel rails over the entire period of their production lends special weight to any consideration by him of the subject, which in the present case is a specification which he believes will help in rail manufacturers and rail consumers uniting.

A copy of the specification is given below. The principal points of difference between it and other specifications are printed in italics, thus to be easily distinguished.

Captain Hunt admits to claiming for years that each ingot cast on a heat is a unit unto itself and deserving of being tested and treated as such. On Jan. 22, 1912, he recommended the nick and break test on every ingot, and that the method is practicable he now mentions that practically all rails made in Canada for the last six years have been so tested. "But, because of the loathness of American manufacturers to permit it, the system has not been given a thorough trial in the States; and I am now proposing that in lieu of this plan of testing, if the manufacturer desires, the top rails of each ingot can be rolled into tie plates to be hot punched, sheared and annealed, and which the purchaser agrees to accept in place of the tonnage of "A" or top rails that he would ordinarily obtain under his contract. Tie plates made from such steel have given good satisfaction for several years and, no doubt, those manufacturers whose works are not now properly equipped will be glad to install the necessary machinery for producing them in order to aid the railroads in obtaining better rails."

For a number of years he has been convinced, and actual experiences have proved "that the cold straightening of rails can be very much minimized and in some cases eliminated without detriment to the track conditions, and with such obvious saving to the manufacturers as would more than cover the cost of milling the ends of the rails square and free from burrs. Better attention to the soaking pit practice and restricting the cold straightening, I believe, will ultimatelly afford relief from the development of internal fissures."

The specifications follow:

Specifications for Open-Hearth Steel Rails

80 lb. to 110 lb., Inclusive, Per Yd.

Inspection

ACCESS TO WORKS

1. Inspectors representing the purchaser shall have free entry to the works of the manufacturer at all times while the contract is being executed, and shall have all reasonable facilities afforded them by the manufacturer to satisfy them that the rails have been made and loaded in accordance with the terms of the specifications.

PLACE FOR TESTS

2. All tests and inspections shall be made at the place of manufacture, prior to shipment, and shall be so conducted as not to interfere unnecessarily with the operation of the mill.

Material

MATERIAL

3. The steel shall be made by the open-hearth process.

Chemical Requirements

CHEMICAL COMPOSITION AND ANALYSES

4. (a) The chemical composition of each heat of steel from which the rails are rolled shall comply with the following:

Carbon, not less than	0.60 per cent
Manganese, not less than	0.60 per cent
Phosphorus, not more than	0.04 per cent
Silicon, not less than	0.10 per cent

(b) Rails rolled from heats containing more than 0.75 per cent of carbon shall have the flanges near the ends painted yellow and be shipped separately, provided, however, that such heats do not have either the manganese content over 0.90 per cent or the phosphorus content over 0.03 per cent.

(c) A chemical analysis for each element above mentioned, including sulphur, shall be made on each heat of steel cast for rails. The analysis shall be made on approximately equal portions of carefully mixed drillings taken from two ladle test ingots, one representing the steel going into the second regular ingot cast, and the other that going into the next to the last regular ingot. The methods for making the analyses shall be those adopted by the American Society for Testing Materials.

(d) The ladle test ingots shall be of such shape and size as to induce quick sound setting of the steel, and, if necessary, a few pellets of aluminum may be added to the dipper to insure soundness. The drillings for analyses shall be taken not less than ⅛-in. beneath the surface.

(e) The complete analyses of each heat cast for rails shall be available for the inspector as promptly as possible and he shall always be furnished with a copy of it before the rails are loaded.

(f) The inspector may witness the manner of obtaining the drillings for analyses and the methods employed for analyzing, and he may take a portion of the original drillings at any time for checking purposes.

Physical Requirements

METHOD OF TESTING

5. The physical qualities shall be determined by the drop test.

DROP TESTING MACHINE

6. The drop testing machine used shall be the standard of the American Railway Engineering Association.

(a) The tup shall weigh 2000 lb. and have a striking face with a radius of 5 in.

(b) The anvil block shall weigh 20,000 lb. and be supported on springs.

(c) The supports for the test pieces shall be spaced 3 ft. between centers and shall be a part of, and firmly secured to the anvil. The bearing surfaces of the supports shall have a radius of 5 in.

PIECES FOR DROP TEST

7. Drop tests shall be made on pieces of rail not less than 4 ft., and not more than 6 ft. long. These test pieces, except as otherwise provided for, shall be cut from the top end of the rails rolled from the top of the second, middle and last full ingot cast on each heat.

TEMPERATURE OF TEST PIECES

8. The temperature of the test pieces shall be between 60 and 100 deg. Fahr.

HEIGHT OF DROP

9. The test piece shall be placed upward on the supports, and be subjected to impact of the tup falling free from the following heights:

For 80 to 91 lb. rail	17 ft.
For 91 to 101 lb. rail	18 ft.
For 101 to 111 lb. rail	19 ft.

DROP TESTS

10. (a) *If two of these test pieces do not break at the first blow, all of the rails of the heat shall be accepted, subject to the requirements of section* 11.

(b) *If two of the test pieces break at the first blow, all of the top rails of that heat shall be rejected.*

(c) *Second tests shall then be made from three test pieces selected by the inspector from the bottom end of the top rails of the same heat and ingots. If two of these test pieces do not break at the first blow, all of the remainder of the rails of the heat shall be accepted, subject to the requirements of section* 11.

(d) *If two of these test pieces break at the first blow, all of the second rails of the heat shall be rejected.*

(e) *Third tests shall then be made from three test pieces selected by the inspector from the bottom end of the second rails of the same heat and ingots. If two of these test pieces do not break at the first blow, all of the remainder of the rails of the heat shall be accepted.*

(f) *If two of these test pieces break at the first blow, all of the remainder of the rails of that heat shall be rejected.*

DESTRUCTION TESTS

11. (a) *A test piece representing the top end of the top rail from each ingot of each heat rolled, which has passed the drop test requirements of section* 10, *shall be nicked and broken to determine whether the interior metal is sound. If an interior defect shows on the fracture, the top rail of the ingot represented shall be rejected and a second test piece cut from its bottom end shall be nicked and broken to determine the character of the metal of the second rail. If an interior defect shows on the fracture, the second rail shall be rejected and a third piece cut from its bottom end for retesting. Thus the rails of each ingot shall be tested progressively from the top downward until the fracture shows sound metal, following which the rails of the ingot represented shall be accepted.*

(b) *An interior defect is interpreted to mean seams, laminations, cavities or interposed foreign matter, or a distinctly bright or fine grained structure in the center of the section evidencing segregation, made visible by the destruction tests, the saws or the drills.*

(c) *Rails represented by test pieces found to be segregated shall be accepted as No. 2 rails.*

(d) *If, under the drop test requirements of section* 10, *the "A" and "B" rails of a heat have been rejected, but the "C," "D," "E," etc., rails accepted, the destruction tests herein specified will be waived on the accepted rails of that heat.*

OPTIONAL CONDITIONS

12. (a) *In case the manufacturer elects after due notice, the purchaser agrees to accept hot sheared, punched and annealed tie plates rolled from the steel that would, in the ordinary course of the manufacturer's practice, be rolled into "A" or top rails from the ingots cast under this specification. It is understood that such tie plates shall be in accordance with purchaser's drawings and specifications.*

(b) *When a top discard of not less than 20 per cent is made on all ingots from which rails are offered for test and inspection, section* 11 *shall be waived.*

NO. 1 RAILS

13. No. 1 classification rails shall be free from injurious defects and flaws of all kinds.

NO. 2 RAILS

14. (a) Rails which, by reason of surface imperfections, or for causes mentioned in section 11 hereof, are not classed as No. 1 rails, will be accepted as No. 2 rails, but No. 2 rails which contain imperfections in such number or of such character as will, in the judgment of the inspector, render them unfit for recognized No. 2 uses, will not be accepted for shipment.

(b) No. 2 rails to the extent of 5 per cent of the whole order will be received. All rails accepted as No. 2 rails shall have the ends painted white and shall have two prick punch marks on the heat number side of the web at both ends of the rail, but so placed as not to be covered by the joint bars.

Details of Manufacture

QUALITY OF MANUFACTURE

15. (a) The entire process of manufacture shall be in accordance with the best current state of the art.

(b) *The steel must be well deoxidized in the furnace or ladle before the ingots are teemed, and the use of aluminum in the molds to insure the quiet setting steel desired will not be permitted.*

(c) *Heats or ingots, the metal for which has been poured over the top of the ladle or cast with a full running stopper not under control of the operator, will not be rolled.*

(d) *Special care must be taken to insure the casting of good, clean, sound ingots, free from scabs and cracks and with reasonably flat tops. Bled ingots shall not be rolled.*

(e) *Treatment of the ingots in the soaking pits must be such as to insure thorough soaking with the subsequent increase of temperature necessary. Overheated or burned or white sided ingots shall not be rolled, neither shall ingots that have once been allowed to get cold.*

LENGTHS

16. The standard length of rails shall be 33 ft., at a temperature of 60 deg. Fahr. Ten per cent of the entire order will be accepted in shorter lengths varying by 1 ft. from 32 ft. to and including 25 ft. A variation of ¼ in. from the specified lengths will be allowed. No. 1 rails less than 33 ft. long shall be painted green on both ends.

SECTION

17. The section of rails shall conform as accurately as possible to the template of the section ordered by the railroad company. A variation in height of 1/64 in. less or 1/32 in. greater than the specified height, and 1/16 in. in width of flange, will be permitted; but no variation shall be allowed in the dimensions affecting the fit of the joint bars.

WEIGHT

18. The weight of the rails specified in the order shall be maintained as nearly as possible, after complying with section 17. A variation of ½ per cent from the calculated weight of section, as applied to an entire order, will be allowed.

PAYMENT

19. Rails accepted will be paid for according to actual weights.

STRAIGHTENING

20. (a) The hot straightening shall be carefully done, so that gagging under the cold presses will be reduced to a minimum. Any rail coming to the straightening presses showing sharp kinks or greater camber than that indicated by a middle ordinate of 4 in. in 33 ft., will be rejected. The distance between the supports of rails in the straightening presses shall not be less than 42 in. The supports shall have flat surfaces and be out of wind and the gags shall have their corners rounded to a radius of at least ⅛ in.

(b) Rails heard to snap or check while being straightened shall at once be rejected.

DRILLING

21. Circular holes for joint bolts shall be drilled to conform to the drawing and dimensions furnished by the railroad company, a variation of 1/32 in. in size and location being permitted.

FINISHING

22. (a) *All rails shall be smooth on the heads, without rough crescent-shaped marks, and the bases shall be free from guide marks and scratches. They shall be milled square on both ends, but a variation of* 1/32 *in. in a vertical direction to make head-long rails will be permitted.*

(b) *All rails shall be free from twists, waves, kinks or short bends, but rails containing a uniform sweep, the middle ordinate of which does not exceed* 1 *in. in* 33 *ft., will be accepted without cold straightening.*

(c) Rails improperly drilled or straightened, or from which the burrs have not been removed, shall be rejected, but may be accepted after being properly finished.

(d) When any finished rail shows an interior defect at either end, or in any drilled hole, the entire rail shall be rejected.

BRANDING

23. Rails shall be branded for identification in the following manner:

(a) The name of the manufacturer, the month and year of manufacture, and the weight and type of section of rail and the letters "O-H" shall be rolled in raised letters and figures on the side of the web. The type shall be marked by letters, which signify the name by which it is known, as for example:

Sections of American Society of Civil Engineers.....A.S.C.E.
Sections of American Railway Association.....R.A.-A. (or B)
Sections of American Railway Engineering Association..R.E.

(b) *The number of the heat and of the ingot number in the heat and a letter indicating the portion of the ingot from which the rail was made shall be plainly stamped on the web of each rail where it will not be covered by the joint bars. The top rails shall be lettered "A" and the succeeding ones "B," "C," "D," etc., consecutively; but in case of a top discard of* 20 *per cent the letter "A" will be omitted, the top rail becoming "B."*

SEPARATE CLASSES

24. All classes of rails shall be kept separate from each other in loading.

LOADING

25. Rails shall be carefully handled and loaded in such a manner as not to injure them.

Announcement is made that the new 600-ton blast furnace erected by the Trumbull-Cliffs Furnace Co. at Warren, Ohio, will not be started for an indefinite period. The stack was virtually completed and ready to light on July 1.

By-Product Coke Plants in Operation in the United States, May 1, 1921

Owner or Operator—Location	Number of Ovens	*Kind of Ovens*	Annual Capacity, Net Tons Coal	Coke
ALABAMA				
Alabama By-Products Corporation, Birmingham	50	Koppers	335,000	235,000
Gulf States Steel Co., Alabama City	37	Koppers	237,000	175,000
Tennessee Coal, Iron & Railroad Co., Ensley	240	Semet-Solvay	760,000	530,000
Central Iron & Coal Co., Tuscaloosa	60	Semet-Solvay	290,000	220,000
Sloss-Sheffield Steel & Iron Co., Birmingham	120	Semet-Solvay	864,000	622,000
Tennessee Coal, Iron & Railroad Co., Fairfield	434	Koppers	2,560,000	1,920,000
Woodward Iron Co., Woodward	200	140 Koppers, 60 Wilputte (30 Koppers being rebuilt)	1,330,000	997,200
COLORADO				
Colorado Fuel & Iron Co., Minnequa	120	Koppers	720,000	550,000
ILLINOIS				
Chicago By-Product Coke Co., Chicago	100	Koppers building	667,000	437,000
Coal Products Mfg. Co., Joliet	53	35 Koppers, 18 Wilputte	340,000	238,000
Illinois Steel Co., Joliet	280	Koppers	1,500,000	1,200,000
International Harvester Co., South Chicago	88	Wilputte	578,000	376,000
North Shore Gas Co., Waukegan	13	Semet-Solvay	55,000	38,500
St. Louis Coke & Chemical Co., Granite City	80	Roberts	400,000	250,000
By-Products Coke Corporation, South Chicago	280	Semet-Solvay	1,300,000	975,000
INDIANA				
Central Indiana Gas Co., Muncie	22	Klonne	40,000	28,000
Citizens' Gas Co., Langsdale	41	Semet-Solvay	255,000	182,900
Citizens' Gas Co., Prospect	140	100 United-Otto, 40 Wilputte	567,000	409,400
Illinois Steel Co., Gary	700	Koppers	4,400,000	3,480,000
Indiana Coke & Gas Co., Terre Haute	60	30 Gas Mach., 30 Koppers	292,000	205,000
Inland Steel Co., Indiana Harbor	130	Koppers	890,000	666,000
Linton Gas Co., Linton	3	Gas. Mach.	15,000	9,300
Steel & Tube Co., Indiana Harbor	120	Semet-Solvay	864,000	622,000
KENTUCKY				
Kentucky Solvay Coke Co., Ashland	108	Semet-Solvay	864,000	648,000
MARYLAND				
Bethlehem Steel Co., Sparrows Point	360	Koppers	2,190,000	1,576,000
MASSACHUSETTS				
New England Fuel & Trans. Co., Everett	400	United-Otto	650,000	455,000
MICHIGAN				
Ford Motor Co., Dearborn	120	Semet-Solvay	864,000	622,000
Michigan Alkali Co., Wyandotte	54	United-Otto	169,200	118,400
Semet-Solvay Co., Detroit	215	Semet-Solvay	1,343,000	1,009,000
MINNESOTA				
Minnesota By-Product Coke Co., St. Paul	65	Koppers	400,000	300,000
Minnesota Steel Co., Duluth	90	Koppers	600,000	450,000
Zenith Furnace Co., West Duluth	67	United-Otto	160,000	112,000
MISSOURI				
Laclede Gas Light Co.	56	Koppers (8 Piette building)	320,000	240,000
NEW JERSEY				
Camden Coke Co., Camden	100	United-Otto (37 Koppers building)	240,000	68,100
Seaboard By-Product Coke Co., Kearny	165	Koppers	1,200,000	900,000
NEW YORK				
Donner-Union Coke Corporation, Buffalo	150	Koppers	1,000,000	650,000
Empire Coke Co., Geneva	46	Semet-Solvay	146,000	102,200
Lackawanna Steel Co., Lackawanna	530	188 United-Otto, 282 Rothberg, 60 Semet-Solvay	1,350,000	972,000
Semet-Solvay Co., Solvay	40	Semet-Solvay	65,000	45,000
Wickwire Steel Co., Buffalo	60	Semet-Solvay	386,000	289,500
OHIO				
American Steel & Wire Co., Cleveland	180	Koppers	1,080,000	750,000
Brier Hill Steel Co., Youngstown	84	Koppers	520,000	379,000
Hamilton-Otto Coke Co., Kokotto	100	United-Otto	240,000	168,000
McKinney Steel Co., River Furnaces	204	Koppers	1,300,000	960,000
National Tube Co., Lorain	208	Koppers	1,200,000	850,000
Penn Iron & Coal Co., Canal Dover	24	Roberts	144,000	100,000
Republic Iron & Steel Co., Youngstown	143	Koppers	1,020,000	744,600
Otis Steel Co., Cleveland	100	Semet-Solvay	450,000	337,500
Ironton Solvay Coke Co., Ironton	60	Semet-Solvay	432,000	311,000
Portsmouth-Solvay Coke Co., Portsmouth	108	Semet-Solvay	770,000	559,000
Toledo Furnace Co., Toledo	94	Koppers	560,000	408,800
United Furnace Co., Canton	47	Koppers	280,000	204,400
The Youngstown Sheet & Tube Co., Youngstown	306	Koppers	2,050,000	1,425,000
PENNSYLVANIA				
Allegheny By-Product Coke Co., Glassport	120	United-Otto	260,000	195,000
Bethlehem Steel Co., Bethlehem	424	Koppers	2,400,000	1,920,000
Bethlehem Steel Co., Lebanon	90	Semet-Solvay	640,000	465,000
Bethlehem Steel Co., Steelton	180	120 Semet-Solvay, 60 Koppers	876,000	621,500
Cambria Steel Co., Franklin	492	210 United-Otto, 92 Koppers, 190 Cambria-Belgian	1,839,000	1,226,000
Cambria Steel Co., Rosedale	60	Cambria-Belgian (60 Cambria-Belgian building, 885 Semet-Solvay building)	*286,000	192,000
Carnegie Steel Co., Clairton	768	Koppers	4,800,000	3,360,000
Carnegie Steel Co., Farrell	212	United-Otto	830,000	581,000
Jones & Laughlin Steel Co., Pittsburgh	300	Koppers	2,000,000	1,300,000
Philadelphia Suburban Gas & Electric Co., Chester	40	Semet-Solvay	125,000	87,500
Pittsburgh Crucible Steel Co., Midland	100	Koppers	667,000	435,000
Rainey Wood Coke Co., Swedeland	110	Koppers	800,000	600,000
American Manganese Mfg. Co., Dunbar	110	Semet-Solvay	248,000	173,000
RHODE ISLAND				
Providence Gas Co., Sassafras Point	40	Koppers	240,000	165,000
TENNESSEE				
Chattanooga Coke & Gas Co., Alton Park	24	Semet-Solvay	175,000	125,000
WASHINGTON				
Seattle Lighting Co., Seattle	20	Klonne	24,000	18,000
WEST VIRGINIA				
Domestic Coke Corporation, Fairmont	60	Koppers	400,000	260,000
La Belle Iron Works, Follansbee	94	Koppers	610,000	445,000
National Tube Co., Benwood	120	Semet-Solvay	270,000	189,000
WISCONSIN				
Milwaukee Coke & Gas Co., Milwaukee	160	Semet-Solvay (150 Koppers building)	750,000	562,500
Steel & Tube Co. of America, Mayville	108	United-Otto	450,000	384,000

*Refers to 60 Cambria-Belgian ovens now standing.

BY-PRODUCT OVENS

Steady Progress of the Modern Method of Coke Making in the United States

According to a report by the U. S. Geographical Survey, supplemented by a check up by THE IRON AGE, there were built and building in the United States as of May 1, last, 12,245 by-product coke ovens, with an annual coal carbonizing capacity of almost 59,000,000 net tons, yielding almost 44,000,000 net tons of coke. Actual figures of coal and coke capacity cannot be given for the reason that data are lacking pertaining to some of the ovens in course of construction. The figures given, which include all plants now standing and some which are being built, however, provide reasonably close approximations and as such convey a clear idea, when supplemented with figures as to the total production of coke, of how big a part the by-product plants have in supplying the coke requirements of the country. In the war period, pressure of the demand for iron, steel and other metals smelted with coke as the principal fuel, sent up the production of coke sharply, a total production of 56,478,185 net tons being reached in 1918. The following year saw a big drop in production, due to labor disturbances in the steel and coal industries. But from a total of 44,821,000 net tons in 1919, the coke production jumped to approximately 51,500,000 net tons in 1920. The normal annual requirements of the country may be placed at between the production for 1919 and 1920, or about 47,000,000 net tons. On that basis, the by-product ovens would be capable of producing more than 93 per cent of the coke needed, and this fact strengthens the oft-repeated assertion that in a short time all of the coke used in this country will be from by-product ovens.

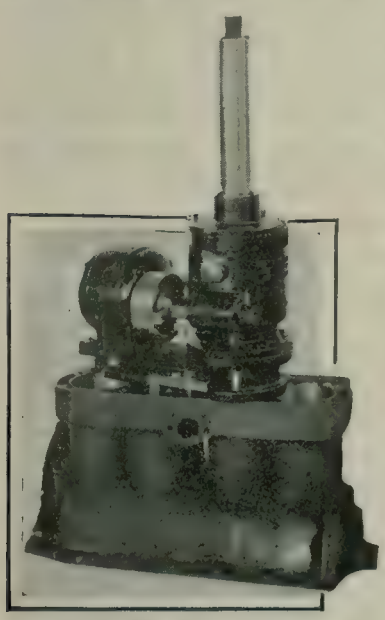
New by-product coke oven construction in the past year has been light, due to the high cost of labor and materials, but it is interesting to note the steadily upward slant of installations over a period of years. Between 1893 and 1908, there were put into operation 3799 ovens of this kind, capable of producing 4,201,226 net tons of coke. In 1918, according to Geological Survey data, there were 9282 ovens with an annual capacity of 32,200,000 net tons of coke. Thus in 10 years, there was a gain in installations of more than 240 per cent. The gain in the war period was marked, 3011 new ovens being constructed from 1915 to 1918, inclusive. This showing in no small measure is accountable to the war time demands for the coke oven by-products, exclusive of coke. As is quite natural, the increase in the number of by-product ovens has been accompanied by a decrease in the number of the older type ovens. In 1910 there were in this country 100,362 beehive coke ovens; at the end of last year there were 84,635, Geological Survey reports show. Production figures show that in 1919, the output of by-product oven coke for the first time went ahead of that from beehive ovens. The total production that year was 44,821,000 net tons, of which beehive ovens produced 19,650,000 tons and by-product ovens 35,171,000 tons. Last year, when total production was 35,505,000 net, the distribution was 30,680,000 tons of by-product and 20,825,000 tons of beehive oven coke.

Pennsylvania has the greatest number of by-product ovens of any State in the Union, the number being 3951, distributed among 13 plants and having a capacity of 11,156,000 net tons of coke a year. Ohio stands next with 1658 ovens capable of producing 7,197,000 tons of coke and Indiana third with 1216 ovens having a capacity of 5,601,700 net tons. Alabama has 1141 ovens with a capacity of 4,699,200 tons; Colorado 120 ovens, with a capacity of 550,000 tons; Illinois 894 ovens which can turn out 3,861,000 tons; Kentucky 108 ovens with a capacity of 648,000 tons; Maryland 360 ovens with a capacity of 1,576,000 tons of coke a year; Massachusetts 400 ovens with a potential production of 455,000 tons; Michigan 389 ovens having an output per year of 1,749,000 tons; Minnesota 220 ovens and 862,000 tons; Missouri 64 ovens and 240,000 tons; New Jersey 302 ovens and 968,000 tons; New York, 826 ovens and 2,058,000 tons; Rhode Island 40 ovens and 165,000 tons. Tennessee 24 ovens and 125,000 tons; Washington 20 ovens and 18,000 tons; West Virginia, 274 ovens and 894,000 tons and Wisconsin 418 ovens and 946,500 tons.

A summary of the ovens built and building shows 11,185 built and 1240 in process of construction. There are 6156 Koppers ovens built and 287 building; 2455 Semet-Solvay ovens built and 885 building; 1657 United-Otto ovens built; 282 Rothberg ovens built; 250 Cambria-Belgian ovens built and 60 building; 206 Wilputte ovens built; 104 Roberts ovens built; 42 Klonne ovens built; 33 Gas Machinery ovens build and 8 Piette ovens building.

Cylinder Reboring Tool

The Van Dresser electric tool for reboring cylinders now has the motor built in a unit with the tool, as shown by the accompanying reproduced photograph. It has a range from 2¾ to 5 1/16 in. The bearings are 10¼ in. in length. It has a tapered arrangement for fitting the boring head into the feed bar, emphasized as ensuring accuracy, and a quick return feature that allows the boring head to be brought instantly to the starting point. Another feature is the elimination of split guide rings. Without making changes, this tool can be used by a hand or drill press. The machine is marketed by the International Purchasing & Engineering Co., McKerchey Building, Detroit.



Cylinder Reboring Tool Having Motor an Integral Part of Unit

German Pig Iron Production

For nearly two years past the Association of German Iron and Steel Manufacturers has kept back the statistics of the home production of pig iron and of steel materials, but recently the German Ministry of Commerce and Industry published a set of figures stating that the capacity of output within the present frontiers of Germany is approximately 960,000 (metric) tons of pig iron monthly, or, in round figures, 11,500,000 tons a year, says the London *Ironmonger*. This does not include the Saar district, which is capable of producing 1,300,000 tons yearly, but is at present under French control. It is stated that the production of pig iron throughout the years 1919 and 1920 averaged between 400,000 and 500,000 tons monthly, or only one-half of the capacity. These returns do not agree with the figures already published by the Association of Iron and Steel Manufacturers. These are available until the end of October, 1919, and show a total output of 5,281,025 tons for the first 10 months of that year, or an average of 528,000 tons per month.

The Republic Rubber Corporation, Youngstown, Ohio, has resumed operations at its plant after a suspension of several weeks, under the direction of H. C. Booth, receiver. Employment will be given to about 700 operatives for an indefinite period.

Electric Furnace Heat Treatment

Dies and Forgings Well Handled in Metallic Resistor Furnaces—Uniformity of Product a Big Feature

BY E. F. COLLINS*

IT is being rapidly and conclusively demonstrated that electric heat will offer advantages equal or greater, in reheating and general heat treatment of steel, than it has done in melting and refining. A striking expansion in the use of the electric resistance furnace for the heat treatment of steel is shown in the past five years, and progress in the demands of industry is sure henceforth to require the overall economy and high quality which accompany the use of electric heating for such processes, as (1) annealing, (2) carburizing, (3) hardening, and (4) tempering or drawing of steels.

Important heat treating processes, in which the forge shop should be interested, and for which the metallic resistor electric furnace is peculiarly adapted, will be enumerated and briefly described, so that the working field for such a type of furnace may be clearly indicated. We may, for convenience, consider electric heat treating furnaces under two heads, viz., (1) those used in production of dies and metal cutting tools and (2) those employed in the heat treatment of drop forged parts.

Four Separate Processes Considered

The production of drop forge dies involves the following heat treating processes: (1) annealing, (2) carburizing, (3) hardening, (4) drawing.

In hardening drop forge die blocks, it is claimed that much trouble is obviated by annealing the blocks before performing machine operations on them. Bringing blocks up to the proper annealing temperature at a rate of perhaps 45 min. for each in. of thickness, followed by cooling in the furnace, insures against trouble such as warping and checking or cracking on hardening. The proper annealing temperature varies with the carbon content and the width of the critical range varies likewise. The Committee of the American Society for Treating Materials recommended the following range in temperatures:

Carbon Content	Annealing Temperature Range
Less than 0.12%	1607 to 1697 deg. Fahr. (875 to 925 deg. Cent.)
0.12 to 0.25%	1544 to 1598 deg. Fahr. (840 to 870 deg. Cent.)
0.30 to 0.49%	1499 to 1544 deg. Fahr. (815 to 840 deg. Cent.)
0.50 to 1.00%	1454 to 1499 deg. Fahr. (790 to 815 deg. Cent.)

Steel should be held at the annealing temperature for a period of time which varies with the size and shape of piece. It is important that the piece be heated through uniformly at the annealing temperature. Where quality of output is the watchword, modern heat treatment is not attempted without first carrying out correct annealing treatments as a proper foundation for subsequent processes.

Automatic Control With Autographic Records

Graphic record from an electric annealing furnace employing two thermocouples, one on the surface of the steel charge and the other near the resistor, shows the furnace controlled automatically. With the charge entering at 11.05 a. m., its surface reaches the desired annealing temperature of 1500 deg. Fahr. at 4 p. m. Complete equalization of the temperatures in the charge has occurred at 4.40 p. m. From this time on, the piece maintains a uniform temperature until removed from furnace or until power is shut off.

Here the perplexing question as to when the steel is heated uniformly throughout is not answered by guess, but it is clearly and definitely shown on the record of automatically controlled temperatures for the annealing cycle. Further description of this temperature chart would not be necessary to demonstrate that such equipment as this is practically ideal for annealing drop forge die blocks. Coupled with this heat control is a furnace atmosphere free from injurious products of combustion, and a heating by uniform radiation rather than by cyclonic convection blasts of hot gases met within the ordinary fuel-fired furnace.

Forging, forming and cutting dies may be made from high carbon steels (0.70 to 0.95 per cent carbon), hardened and drawn, or from low carbon steel (0.15 to 0.25 per cent carbon) case-hardened, the latter virtually eliminating the danger which exists with high carbon steel of spoiled dies through warping and cracking.

Heat Control Essential for Hardening Also

All theories concerning hardening are united upon the necessity of heat control as outlined for annealing. Hence the electric furnace, already described as suited to annealing, may be used just as successfully for heating high carbon steel dies which are to be hardened by quenching. No doubt can exist in the mind of the operator of the electric furnace as to the exact time when the die block, be it large or small, has reached an absolutely uniform temperature throughout. Hence, other things being equal, successful hardening can be thwarted only by improper quenching.

The electric furnace has important advantages for the carburization stage of the case-hardening process, where it is evident that close regulation and control of temperature, as well as uniform delivery and distribution of heat, are essential for best results. Uniformity of product requires that each part of the charge be subjected as nearly as possible to the same heat cycle, whether it be near the center of the carbonizing box or near its outer walls. The electric furnace with its automatic control will bring each part of a charge of material to the same temperature, through the control of a surface couple on that charge. Electric furnaces may be designed to give practically the same heat in each carbonizing box constituting the furnace charge, even though the control is actuated from pyrometer on a single box. In other words, uniform heating conditions exist throughout the heating chamber.

Remarks already made concerning the use of the electric furnace for hardening high carbon steel dies apply equally to heating for the quench of carburized dies.

Why and How to Draw the Temper of Dies

The temper should be drawn on all hammer dies, to relieve strains and to give resiliency or spring, resulting in better wearing qualities. An oil tempering bath electrically heated is a most satisfactory tool, and the hardened dies should immediately go into it even before the die is quite cooled from the hardening operation. The temperature of the oil bath should be about 400 deg. Fahr. In other words, hardened stock is "tempered" by being reheated to about 400 deg. Fahr., where it loses considerable brittleness and yet little of its hardness, making it suited for dies and metal cutting tools; reheated to 480 deg. Fahr. it is less brittle and suited for use in rock drills, stone cutting tools, etc.; at 525 deg. Fahr. it is suited to dental and surgical instruments, hack saws, etc.; at 570 deg. Fahr., the maximum usually employed, it may be used for wood saws, springs, etc. Sudden cooling after tempering does not affect hardness or softness of steel; hence

*Consulting engineer, Industrial Heating Department, General Electric Co. Abstract of paper read at meeting of American Drop Forge Association, Chicago, June 24.

when taken from the oil bath, it may cool either rapidly or slowly.

Sizes and Types of Electric Furnaces Used

Electric furnaces for heat treating drop forge dies and metal cutting tools are usually of the box type. Such furnaces, of the metallic resistor type, operate at temperatures up to 1800 deg. Fahr., and may be had with automatic control as previously described. A large furnace suited to heating large dies, punches and cutters at temperatures not exceeding 1800 deg. Fahr., and equipped with automatic control, made the following performance, as compared with a similar oil-fired furnace on the same work:

	Electric	Oil-Fired
Dimensions, heating chamber	30 x 36 in. x 22 in. high	48 x 24 in. x 20 in. high
Average temperature held	1450 deg. Fahr.	1400 deg. Fahr.
Fuel or power to hold at 1400 deg. Fahr.	8.04 kw.	1.65 gal. per hr.
Cost per hr. to hold 1400 deg. Fahr.	*10c.	†23.1c.
Amount of steel heated per hr.	84 lb.	84 lb.
Fuel or power for heating steel	13.35 kw.	1.9 gal. per hr.
Cost fuel or power per hr.	16.7c.	26.6c.
Cost per lb. heating steel	0.199c.	0.317c.

*At 1.25c. per kw. hr. †At 14c. per gal.

These results may be surprising to those who base their calculations solely on relative B.t.u. costs for oil and electricity. Were the upkeep costs included, the difference in favor of the electric furnace would increase, since in the past two years, the upkeep of this furnace has been practically zero.

Treatment of Drop Forgings Analagous to That of Tools

The foregoing has applied to the electric furnace for heating processes in producing drop forge dies and metal-cutting tools. A much greater field for the electric furnace lies in the heat treatment of drop forgings. Here we meet again the annealing, hardening by quenching, case hardening, and tempering or drawing processes. The metallic resistor furnace is here again ready to demonstrate its superiority in heating processes involving 1800 deg. Fahr. or less. The designs of furnace must comply with methods of handling a production having volume and tonnage. Electric heat can be utilized with practically all types of furnace, such as car bottom type, pusher type, conveyor type, box or tunnel type, either of vertical or horizontal construction. All furnaces may be well heat lagged without danger to refractories, and at the same time secure low thermal capacity, resulting in quick heating.

Performance Figures for Forging Heat Treatment

A vertical design of furnace has been constructed in capacities of from 200 kw. to 2700 kw. per unit; the latter has the ability to heat forgings weighing 320,000 lb. per charge. Actual performance figures for this type of furnace, when used for hardening and drawing, may be seen in the following table:

Charge	Weight, Charge and Holders (Heated to 1450 Deg. Fahr.)	Energy Kw. Hr. (400 Kw. Connected)
12 3-in. gun tubes	21,900 lb.	1874
7 4-in. gun tubes	22,300 lb.	1880
3 4-in. gun jackets	21,700 lb.	2080
Total	65,900 lb.	5842

Average lb. per kw. hr. $\frac{65,900}{5,842} = 11.25$

Average kw. hr. per ton $\frac{2,000}{11.25} = 178$ kw. hr.

Energy cost at 1.25c. per kw. hr. = $2.23 per ton.

Drawing work back to 1100 deg. Fahr., a yield of 24 lb. per kw. hr. was realized, equal to 84 kw. hr. per ton. Combined power consumption for hardening and drawing per ton was 262 kw. hr., or with power at 1.25c. per kw. hr., a cost of $3.28 per ton. In other words, 7.7 lb. of steel was hardened at 1450 deg. Fahr. and drawn back to 1100 deg. Fahr. for every kw. hr. Four furnaces operating for one month, continuously hardening and drawing at 1450 deg. Fahr. and 1100 deg. Fahr. respectively, showed a total gross power consumption of 325 kw. hr. per ton of steel treated.

New Methods of Manipulation Unnecessary

The use of the electric furnace does not call for new methods of manipulation of present heating processes, but rather fits itself into standard and generally accepted heat treating requirements admirably, removing practically all uncertainties connected with proper application of heat; and eliminates almost entirely the handicaps inherent in fuel-fired furnaces.

For quality heat treating the electric furnace is rapidly replacing the fuel-fired furnace. Its simplicity, its dependability, its low upkeep, its improved products, its ability to turn out repetition work free from defects, are some of the factors which contribute to economy of operation in such a degree that, with prevailing rates for electric heat and fuels, the electric furnace usually shows an "overall" cost per piece less than that treated in the fuel-fired furnace. The writer has in mind a case where the saving in rejects alone, due to the use of electric heat over gas, was sufficient to pay for the total current used for heating, more than 75 times.

Discussion by Harold F. Wood*

We have followed with interest the many factors in the development of electric furnaces for the heat treatment of steel. The majority of industrial electric heat treating furnaces in use up to this time are for the treatment of finished machine parts such as gears, pinions, dies, etc. In this type of work we must secure freedom from distortion as well as freedom from decarbonization of the finished surface. Many thousands of dollars worth of finished parts are lost, due to the above causes, which loss can be reduced to a minimum by the use of a properly designed electric furnace.

Drop forgers have wished many times that they could have a safeguard against decarbonization in the heat treatment of dies in which the impression has already been sunk. With complete freedom from surface decarbonization, the life of dies is materially increased. Electric heat surely is the logical method to employ on this type of work, as the ultimate cost is the important cost, and this is the item to consider rather than a purely technical comparison on a B.t.u. basis.

Dependability of Drop Forgings and Castings

Drop forging is the only method whereby parts can be made one like another and free from blow holes, dross, etc., which are the defects that cause castings to be undependable. The drop forge industry is, therefore, vitally interested in the heat treatment of forgings. The forge shop is the logical place to heat treat forgings, as it enables the drop forger to supply his customer not only with a product that is within the tolerances demanded but also one that will show the proper physical characteristics and thereby give the proper service.

In other words, it becomes quite necessary from a metallurgical standpoint that the modern drop forger buy material to a chemical specification and sell the finished forgings to a guaranteed physical specification. This requires a very efficient heat treating department. In the production of a forging like a crank shaft, it is a fact that over half the labor cost of the

*Chief metallurgist Ingalls-Shepard Division, Wyman-Gordon Co., Harvey, Ill. Paper before American Drop Forge Association, Chicago, June 24.

crank shaft is consumed in performing operations after it leaves the forge shop proper, of which heat treating is a vital factor.

In the case of a forging, the question of scaling during the heat treating operation is not an important item if any degree of judgment is used by the furnace operator. Distortion is an important item, but from actual experience the difference in distortion on forgings heat treated in an electric furnace and a fuel fired furnace cannot be detected, as it is too small to interfere in any way in meeting the specifications with ordinary straightening operations. The up-to-date forge shop is equipped with a modern circulating system for fuel oil, and the cost of supplying oil to oil-fired furnaces consists merely in running feeder lines from the main circulating line. The furnace-hour burden on this is at most a very small item.

The drop forger, therefore, must study the electric furnace vs. the fuel-fired furnace on the following items, and be guided accordingly in making his decision on which type of equipment to install to produce lowest ultimate cost of heat treating:

1. Total fixed charges
   (a) Land and buildings factor
   (b) Equipment factor
      1. Interest
      2. Taxes
      3. Depreciation
      4. Repairs
2. Indirect labor
3. Supplies other than repairs
4. Power or fuel
5. General factory burden
6. Miscellaneous charges
7. Direct labor
8. Uniformity of results as determined by per cent practice obtainable; which in turn is determined by the heat uniformity of the furnace, provided the forgings are of proper chemical analysis and all from the same melt of steel.

If we take for purposes of comparison a battery of electric furnaces and the same number of oil fired furnaces, both types having the same hearth area and able to produce the same tonnage per furnace hour, we can easily see which type of installation is the most economical to install. The following factors are the same on either installation:

Land and buildings, Indirect labor, Supplies, General factory burden, Miscellaneous charges, Direct labor.

Equipment Factor Variable

Interest and taxes on the electric furnace are approximately twice those of the oil, because the first cost is in this proportion. Depreciation and repairs on a well built oil furnace will be approximately at a 5 per cent higher annual rate than on a well built electric furnace. Due to the higher first cost of the electric furnace, the actual dollars and cents loss from depreciation and repairs over a period of a year amounts to more in the case of an electric furnace, in spite of its lower percentage rate.

Power or Fuel Consumption

Mr. Collins gives in his paper a value of 262 kw.hr. per ton power consumption for hardening at 1450 deg. Fahr., and tempering at 1100 deg. Fahr. on a single heat, and a value of 325 kw.hr. per ton as a total gross power consumption on four furnaces operating for one month on continuous duty. The latter figure is the important one, as it indicates what can be accomplished in actual production over a period of time. On the electric furnace at our Harvey plant we have watched the power consumption very closely, and find a value of 318 kw.hr. per ton for hardening at 1525 deg. Fahr. and tempering at 950 to 1000 deg. Fahr., for a period of three months. This is in very good agreement with the value given by Mr. Collins. A power consumption of 318 kw.hr. per ton treated represents a thermal efficiency of 68.2 per cent.

On well-built oil-fired furnaces we have secured a total gross oil consumption of 30 gal. per ton treated, using 1525 deg. Fahr. hardening heats and 950 to 1000 deg. Fahr. tempering heats. On the basis of 140,000 B.t.u. per gallon, an oil consumption of 30 gal. per ton treated represents a thermal efficiency of 17.62 per cent.

Uniformity of Results in Oil-Fired Furnace

Mr. Collins states in his paper that it is possible to regulate electric heat to plus or minus 5 deg. Fahr., and fuel fire to plus or minus 50 deg. Fahr. Our experience in regard to regulation of electric heat agrees very closely with this; however, we cannot agree with him on the regulation of a fuel-fired furnace. We have several oil-fired furnaces in operation in our plants which we control to a variation of plus or minus 10 deg. Fahr., while coming up to heat, and to a total variation of plus or minus 5 deg. Fahr. during the soaking period. This is about the limit of uniformity that can be obtained in commercial practice by either an electric or oil-fired furnace. From a uniformity standpoint there is, therefore, no preference in one type of furnace over the other.

It is seen, therefore, that in the selection of heat treating furnaces for treating drop forgings, the factor which determines the most economical installation is cost per 100,000 B.t.u. effective. In the following table are given the corresponding costs per kw.hr. and per gallon of oil, based on the above conclusion that 318 kw.hr. are equivalent to 30 gal. of oil:

Cost per Kw. hr.	Cost per Gal. of Oil	Cost per Kw. hr.	Cost per Gal. of Oil
0.20c.	2.12c.	1.20c.	12.72c.
0.30c.	3.18c.	1.30c.	13.78c.
0.40c.	4.24c.	1.40c.	14.84c.
0.50c.	5.30c.	1.50c.	15.90c.
0.60c.	6.36c.	1.60c.	16.96c.
0.70c.	7.42c.	1.70c.	18.02c.
0.80c.	8.48c.	1.80c.	19.08c.
0.90c.	9.54c.	1.90c.	20.14c.
1.00c.	10.60c.	2.00c.	21.20c.
1.10c.	11.66c.		

In going over the above table one can tell at a glance which type of installation is the more economical to install, based on the particular contract prices on power and oil possible to obtain in a given locality. This table indicates that there are very few sections in the country at the present time that would make an installation of electric furnaces for heat treating drop forgings an economical investment.

This, however, should not in the least discourage the friends of electric furnaces for heat treating drop forgings, as the drop forge plant offers wonderful possibilities for the generation of electricity from waste exhaust steam by means of low pressure steam turbine generators. It is now possible to generate electricity by this means at a total cost, including all overheads on generator plant and transformer equipment, at a price not to exceed 0.40c. per kw.hr. This will show a very large saving over the very best price that can be secured on oil now or in the future, and is without doubt the most economical installation for the heat treatment of drop forgings.

The plant of the recently organized Damascus Tool Co., Oakmont, Pa., has begun operations. This company, which specializes in the manufacture of pneumatic hammer snaps and also makes punches, punch dies, pneumatic chisels and bull dies, is headed by T. S. See as president and general manager, with J. L. Conner as vice-president and general superintendent. Mr. See formerly was superintendent of the Keystone Works, Jones & Laughlin Steel Co., Pittsburgh, and Mr. Conner also formerly was identified with Jones & Laughlin Steel Co., having been master mechanic at Southside Works of that company. M. F. O'Conner is sales manager of the company.

The George J. Hagan Co. recently secured an order from the Mutual Enamel Ware Co., Chattanooga, Tenn., for one twin chamber electric furnace to be used for enameling bathtubs. This furnace has a total connected load of 399 kw. for operation on 440 volts, 3-phase, 60-cycles. The company also has taken a contract from the Illinois Watch Co., Springfield, Ill., for a special rotary electric furnace to be used for enameling watch dials. This furnace has a rating of 31 kw. and is for operation on 220 volts, single phase, 60-cycles.

Improvement in Open-Hearth Details

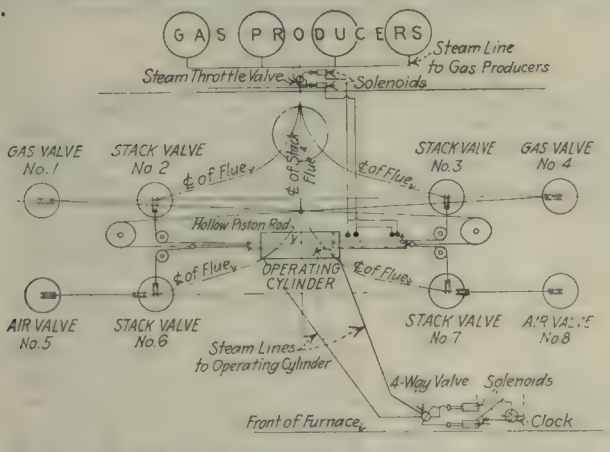
New Arrangement of Reversing Furnace Valves Promotes Economy—Burners for Liquid Fuel and Tar—Results in Operation

—— BY A. G. SCHUMANN* AND A. F. SCHUMANN ——

AS the valves of an open-hearth furnace have important duties to perform, it is necessary that they be well constructed, and so arranged as to prevent loss of fuel both during the furnace operation and while being reversed. The latter requirement makes it advisable that they be arranged to reverse as quickly as possible. They should also be handled in such a way as to require little of the furnace man's time and energy.

For proper furnace operation it should be possible to regulate independently both the amount of incoming gas and air and the flow of the outgoing gases through the gas and air regenerators. This is important in maintaining a proper ratio of temperatures between the two, and is of particular importance in economical furnace operation of furnaces of large capacity.

Study of open-hearth furnaces in the United States shows that many of them have reversing valves operating on crude principles which make the operation of the furnaces less efficient and economical than it should



Diagrammatic Plan Showing Arrangement and Operation of the Eight Valves, All from the Action of One Operating Cylinder

be. In efforts to overcome this, complicated and expensive mechanism has sometimes been installed which requires too large a part of the furnace man's time and energy. Besides, too much time is taken in reversing the furnace, resulting in leaving the gas off so long as to slow up the furnace operation and retard the heat.

Water seals on the stack draft, and allowing water to be drawn into the furnace with the incoming air and gas, will also cause a slowing up of the time of the heats, and may eventually require the shutting down of the furnace because of clogging up of the checkers due to moisture in the incoming gases. This causes long delays and results in heavy expense for the labor of cleaning out the regenerators. In case valves need repairs while the furnace is in operation, further delays are encountered, for it is rarely possible to do anything to the valve without shutting down the furnace temporarily, or running it over-long in one direction. Besides these delays, heavy investments in spare parts in stock usually have to be carried.

All water cooled apparatus in the path of incoming and outgoing gases will collect dirt and tar, etc., particularly if producer gas is used. This results in the loss of gas up the stack, a reduction in the draft of the stack and makes one end of the furnace pull against the other. Valves, however, which have no protection whatever against the intense heat to which they are subjected, will very shortly warp, with consequent leakage.

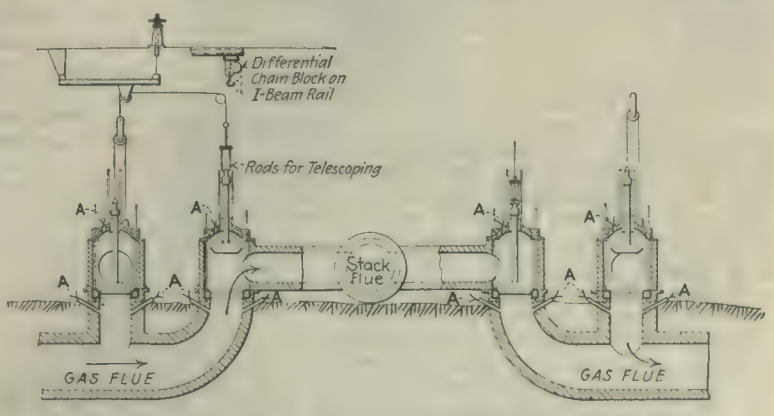
New Automatic Reversing Device

A reversing apparatus developed by the writers has been applied to four 200-ton tilting furnaces at Sparrows Point. The previous valves were continually leaking producer gas, because of the dirt and tar accumulating on the water-cooled valves and seats. The use of the mushroom-turning valve stopped these leaks, and kept the seats clean of the dirt and tar from the gas. The arrangement is such that it is possible to take the valve and seat out for repairs, when necessary, without delaying the operation of the furnace.

The diagrammatic plan of the arrangement of valves and operating mechanism shows that the control is located in a clock-work, which reverses the furnace valves every 15 or 20 minutes by means of solenoids, actuating a four-way valve controlling the steam supply to the long cylinder, which moves the furnace valves. By a system of pulleys and take-ups the operation of closing one valve and then immediately opening the other is performed without taking the attention of the furnace man, and without the loss of time so frequently required when the man has to walk from one end of the furnace to the other or clear across the charging floor to get at the different valves. By properly adjusting the timing mechanism, the reversing takes place with great regularity instead of depending upon a man's thoughtfulness or lack thereof, which results frequently in leaving gas on one end of the furnace much longer than on the other, with consequent lack of uniformity in temperature of the entering flame.

In the design shown here, the valve movement for complete opening and closing is placed at 5 ft. The piston in the operating cylinder travels a total of 7 ft. 8 in., and is so connected with the valves by the telescoping piston rods and the series of pulleys that the proper motion is applied to the several valves. Referring to the diagram:

While the piston travels 30 in., gas valve No. 1 will travel 60 in. and be closed, valve No. 3 will be lowered 30 in. and No. 7 will be lowered 60 in. Valves Nos. 2, 4 and 6 will be telescoped 30 in. The piston



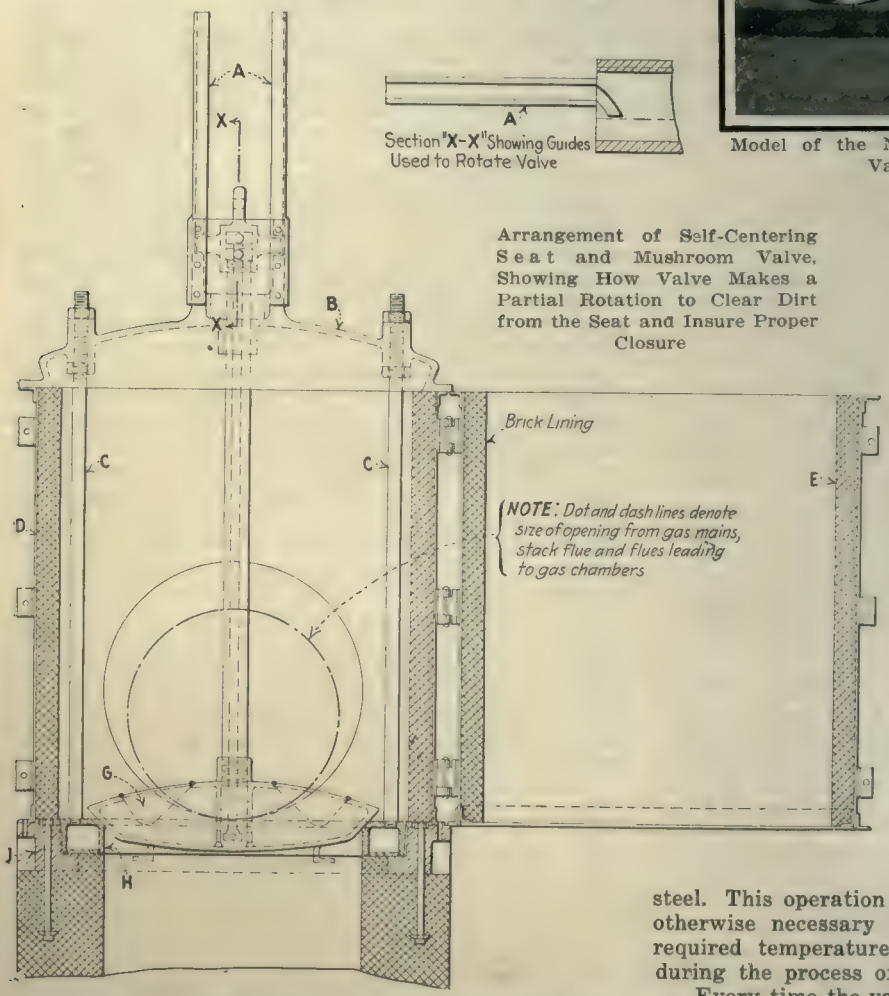
Section Showing How the Automatic Reversing Valves Are Interconnected and How a Valve Needing Repairs Is Handled

*Master mechanic, Bessemer and open-hearth departments, Bethlehem Steel Corporation, Sparrows Point, Md.

will then travel 2 in. farther to allow the gas valve No. 1 to be seated properly. This drops valve No. 3 an additional 2 in., telescopes No. 7 about 2 in., and increases the telescoping effect on Nos. 2, 4 and 6 to 32 in. After the piston travels 30 in. farther, valve No. 2 will be open 30 in., No. 6 will be telescoped 60 in. and Nos. 3 and 7 will be closed with a telescope of 32 in. At this point gas valve No. 4 will be telescoped 62 in. During the next 30 in. travel of the piston, valves Nos. 2, 4 and 6 will be opened 60 in., No. 3 will be telescoped 32 in. and Nos. 1 and 7, 62 in. The air valves are closed by the stack valves Nos. 6 and 7, and regulated by the stand on the charging floor.

This operation requires the cylinder to have a total stroke of 7 ft. 8 in. for a valve travel of 5 ft. When the furnace has started to reverse, the travel of the piston rod forms a contact to operate one of the solenoids in the gas producer building. This closes the steam throttle and shuts off the steam on the gas producer. When the furnace is completely reversed, the rod forms another contact which operates the other solenoid, and thus opens the steam throttle valve.

Each time the valves come within 3 or 4 in. of seating, the guides *A* (shown in the detail of the valve and chamber) will slightly rotate the valve, and thus grind all the foreign matter off of both the valve and its seat, and allow it to seat properly. The cover *B*, valve *G* and seat *H* are held together in one unit by



Arrangement of Self-Centering Seat and Mushroom Valve, Showing How Valve Makes a Partial Rotation to Clear Dirt from the Seat and Insure Proper Closure

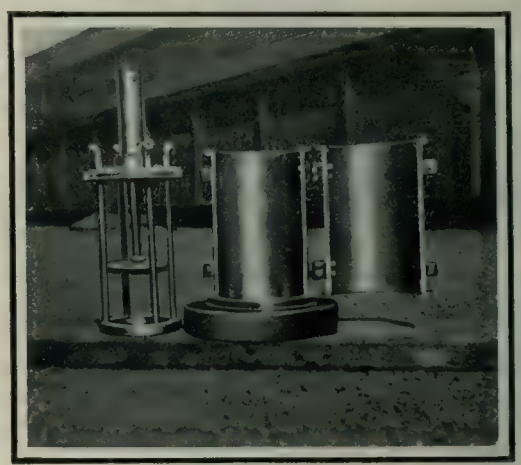
the water inlet and outlet pipes furnishing cooling water to the valve seat. The valve casing (*D* and *E*) is split in halves, one half being on hinges so that it may swing open, and permit the hood, valve and seat to be removed by means of a chain and block arranged over the valve, as shown in the vertical section.

A spare valve and seat may then be swung into place and located on the cast iron holder *J*. After the casing is swung shut and bolted together, the furnace is again ready for reversing. Preparatory to taking out and replacing a valve, a sand damper is placed in the gas main leading to that valve, thus blocking off the gas until the exchange can be effected.

To standardize the valves, and thus reduce the investment in spare parts, the valves on all the gas and air flues are made of the same size, and are interchangeable. The inlets and outlets for the valves, however, will be smaller for the gas flues than for the air flues, so as to maintain the proper ratio of stack draft for the air and gas chambers.

Furnace Equipped for Oil Fuel

To enable the furnace to utilize either light or heavy crude oils, as well as tar recovered from the by-product coke ovens, an arrangement of burner, to go with the form of the valve described above, has been applied to the 200-ton furnaces, which are arranged



Model of the New Reversing Valve, Showing Valve Out of Casing

so that they may burn either producer gas or the liquid fuel. The change between the two forms of fuel is effected easily, for the burner and burner coolers may be taken out of the gas ports or reinstalled without delaying the operation of the furnace.

A section in the longitudinal diagram shows the arrangement of one of these furnaces, which has been on the oil and tar burning system for the last two years; while five 50-ton tilting furnaces at the same plant have used this system for five years.

One incidental advantage, resulting from the ease of changing between systems, appears when the furnaces are running on producer gas. At such times the burners are put back into the gas ports during the period while the gas mains are being burned out, and the furnace is thus kept in operation to make bottom or melt steel. This operation saves both the time and the fuel otherwise necessary to get the furnace back to the required temperature after it has been cooled down during the process of burning out the mains.

Every time the valves are reversed, the same mechanism pulls back into its cooler, to a distance of about 1 in., the burner which has just been in operation, and at the same time shifts into position the burner at the other end of the furnace. This protects the burner not in use from the intense heat of the tip of the outgoing flame, projected across the furnace from the other burner. At the same time, the oil or tar and the vaporizing steam are shut off the burner going out of use, and turned on back of the burner going into use.

This dual operation is performed by a cable device operating triple cut-off valves, shown in the detail view of the burner arrangement at one end of the furnace. The operation of this device is so quick that, while the

flame is going off of one burner, the flame from the opposite burner is following it across the furnace. If, for any reason, hand operation is desired, the 4-way valve may be operated by hand independently of the clock.

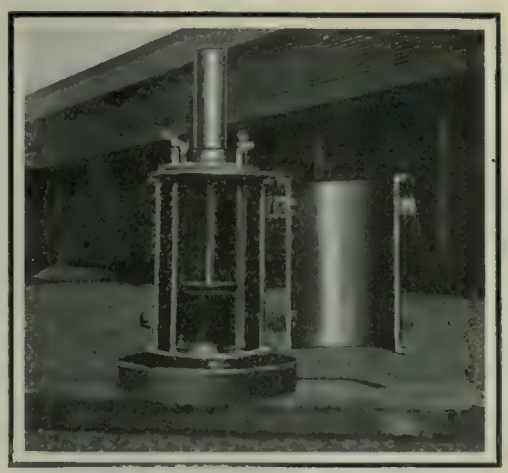
Temperature control of the automatic reversing device is possible by aid of properly constructed pyrometers in the two regenerators. As soon as one regenerator is brought up to the predetermined temperature at which reversing should take place, contact is made by the pyrometer to operate the solenoid, just as the clock does it. Alternative methods, such as the small cylinder shown in the detail of the furnace end, may be used to operate the burners.

Electrically operated reversing valves may readily be used in place of those operated by a steam or hydraulic cylinder, by using a single motor, a train of gears or a worm and worm gear and one drum. This would require a limit switch to control the automatic operation of the valve. By placing the drum on a crank shaft, it could be arranged to make the valve mechanism fool proof, in case the limit switch fails to operate properly.

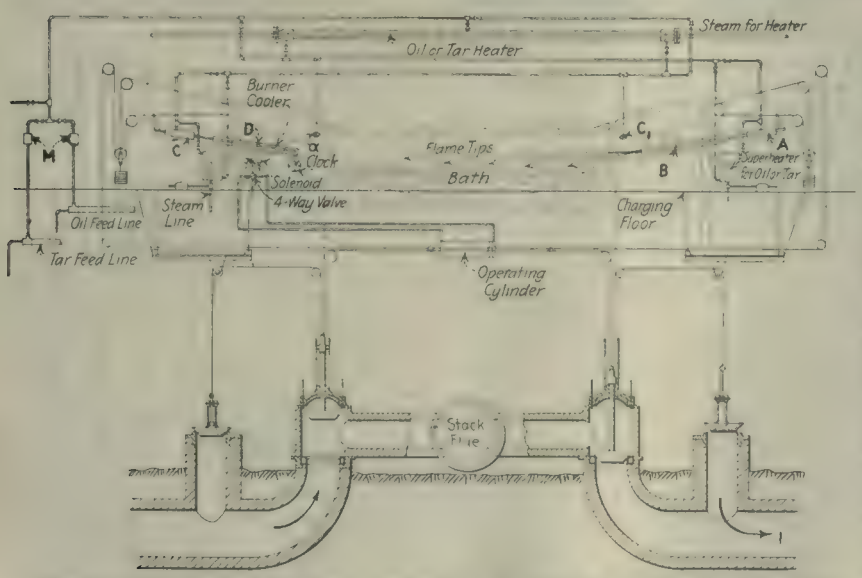
The main features of the automatic operation of this burner include perfect control of the temperature of the entering flame, simplicity of operation of burners, both while reversing the furnace and between reversals, and absence of leaky valves for shutting off oil and steam, as the triple cut-off valves can be made absolutely tight. This system also obviates frequent changing of the burner tips.

Each burner has at its tip a number of fuel-discharge ports from which the combustible vapor is projected in jets. Uniting, at a short distance from the burner, with the preheated air from the air port above the burner, the combustible from these jets produces a long flame, of which the tip will reach and extend over the entire surface of the metal in the bath. The use of shallow ports permits the flame to reach its objective sooner and, by having fuel-discharge ports of various depths, the jets have various lengths, resulting in the flames reaching over the surface of the bath more uniformly than if the entire mass of combustible vapor and air were projected uniformly. This results in heating the portions close to the burner, as well as those in the center and near the other end of the furnace, and promotes uniformity of temperature throughout the entire area.

As the several fuel-discharge ports are inclosed in one casing and controlled by one regulation, this permits the delivery of the flame at any desired distance from the burner. The fuel is atomized in each port at the tip of the burner, where the steam or air is at its highest velocity. This is due to the meeting at the restricted portion of each port, of the fuel with the steam or preheated compressed air.



Assembled Model of Reversing Valve



Diagrammatic Section Showing Application of Balanced Automatic Reversing Device to Regenerative Open-Hearth Furnace Using Liquid Fuel

Since the atomized fuel and the air or steam expand immediately after this atomization, the mixture becomes so thorough that heavy fuel, such as tar or Mexican crude oil, may be burned efficiently. The length and intensity of the flame are regulated by controlling the admission to the burner of the air or steam and the oil or tar. By thus obtaining great uniformity in temperature throughout the bath, a more even oxidation of the bath is secured Results from operation of furnaces fitted in this manner are shown in the table.

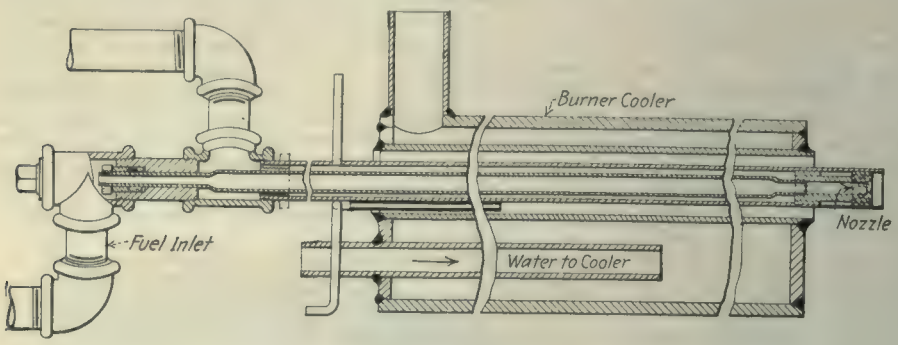
Test number	I	II	III	IV	V	VI
Size of furnace (tilting)	50-ton	200-ton	200-ton	200-ton	200-ton	200-ton
Charge (in lb.):						
Hot metal.....	40,000	80,000	.....	.....	60,000	55,000
Plate scrap....	45,000	33,000	85,000	95,000	170,000	175,000
Pit scrap.....	10,000	.....				
Tin scrap	20,000	79,900	40,000	40,000		
Broken molds.	15,000	48,200	75,000	75,000	55,000	55,000
Pig iron, cold.	.....	.....	70,000	60,000	.....	.....
Crop ends.....	.....	33,600	.....	.....	.....	.....
Total	130,000	274,700	270,000	270,000	285,000	285,000
Manganese (tapping) ...	..	1,300	..	..	..	..
Limestone	..	..	28,000	..	28,000	..
Burnt lime....	..	..	..	17,000	..	17,000
Time (in hours):						
Charging	..	1⅔	2	2	2	2
Melting and making	..	8	9½	9½	8	8
Total for heat.	7½	9⅔	11½	11½	10	10
Product, ingots, Lb.	..	259,900	..	..	..	..
Tons	..	116	..	..	..	..
Yield, per cent..	..	94.2	..	..	..	..
Kind of steel....	Plate	Plate	Sheet bar	Plate	Sheet bar	Plate
Tar consumption (gal. per ton of ingots)	35	29	34	34	31.5	31.5

It may be noted that the 200-ton furnaces are emptied at each heat, and are not used on the Talbot process. The bottoms in the furnace have been raised so that the capacity has been reduced to about 150 tons. The ladle used, while rated at 110 tons capacity, will hold as much as 125 tons of steel, which is the maximum amount to which the furnaces are charged.

While open hearth managers have long been accused of lack of attention to those details of design and operation which would make for efficiency in the consumption of fuel, it is believed that both of the designs described in this article will go a long way to prove that the charge is not universally true. There is less unburned fuel going into the regenerators and up the stack by this means than under ordinary producer gas operation; this is shown by the fact that only a tiny tip of flame may be seen going into the discharge ports of the furnace, when looking between the chills at the furnace end. This compares with the heavy flame visible, passing this point when producer

gas is used, or with certain other types of burners.

Another exceptional feature which should promote long life for the furnace roofs and walls lies in the uniform temperature from one end of the furnace to the other, in place of the alternate heating and cooling, relatively speaking, which accompanies other methods of operation. This should save much money in repairs and much time in furnace operation, especially as compared with the extreme cases where the roof is actually sweating on one end and not much more than cherry red at the incoming end.



Section of the Oil and Tar Burner, Showing Arrangement of Parts

Uniformity of temperature and consequent equality of oxidation of the bath are made manifest when comparing the final and semi-final tests taken from the steel ladle. These show average analyses with much less variation than were obtained when using producer gas or other types of burners. This would promote that homogeneity in the steel so necessary under modern specifications.

It is possible to design the burner to suit the peculiarities of the furnace for which it is intended, and to produce the type and direction as well as dispersion of flame required. The burner may be designed for tar or oil or coke oven gas. For the latter, the gas is forced to the burner under several ounces of pressure, while preheated air, either from an air compressor or a positive fan, is used to mix with the gas for producing the length of flame required.

By reducing the lost time at and following reversal of the furnace, quicker melting and more uniform oxidation are obtained, and the heat of steel is made in less time. This also should increase the yield, due to a smaller percentage of oxidation of the metal. Comparison of yield figures, before and after the new arrangement was installed, show a gain of from 3 to 4 per cent. The effect of the gain in yield is shown by the fact that three of the 200-ton furnaces under the new arrangement were producing as much steel as the entire group of four furnaces using producer gas or the former type of burner, and this steel is reported to be of better quality.

A blower has been placed on top of the stack flue, similar to the blowers used under producers, to siphon out the hot gases from the flue and use them to dry ladles, stopper rods, converter bottoms, etc. A newly lined 30-ton recarburizing ladle was recently dried by this gas in the same length of time an oil burner would have required. The consumption of compressed air for this purpose was about one-half as great as that required to atomize the oil or tar for the burner previously used for this same type of ladle. Arrangements are now being made to dry all the ladles with this waste heat.

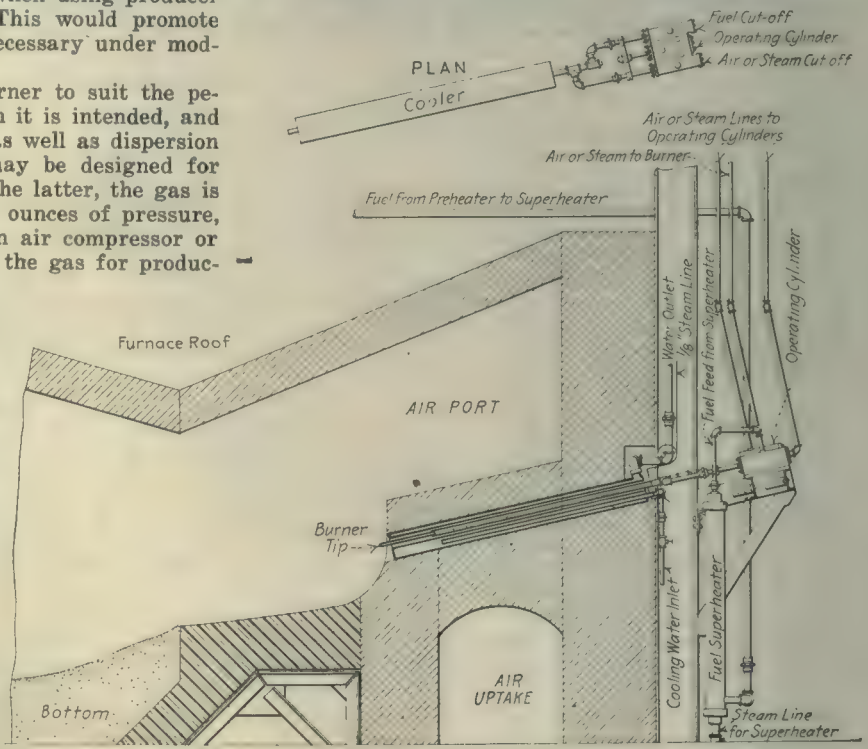
Of course, where a furnace is equipped with a waste heat boiler, the hot gases can be taken off for boiler use after leaving the fan. The same fan can be designed to force the hot gases to the place of their utilization, without hindering the operation of the furnace, due to loss of draft from interposed resistance.

During the month of May comparison was made between furnaces operated with the new type burners and reversing valves, using tar, and others using producer gas. Based on 165,000 B. t. u. for one gallon of tar and 12,000 B. t. u. for one lb. of coal, it is estimated that the new burners save 23 per cent of the fuel value required by the old ones, and 32 per cent of the fuel value required when using producer gas. The time of making a heat of 120 tons of steel was reduced by 1½ to 2 hours and the yield increased by 2 to 3 per cent. Calculation of the cost of making steel at the Maryland plant, compared with other Bethlehem plants, showed that the Maryland plant made it at about $3.50 less per ton than at Bethlehem, and $6 less per ton than at Steelton.

New Warehouse for A. M. Castle & Co.

Work has been started by A. M. Castle & Co., Chicago, on the construction of a new steel warehouse at Blackhawk and North Branch streets, Chicago. The building will be 211 x 232 ft., of steel with pressed brick facing walls, steel sash, concrete floors and cement tile roofing, making a thoroughly fireproof building. The west 75 ft. is to be two stories in height and the second floor will afford an office space 75 x 211 ft. for the general offices of the company.

The main building will be used for the storage of sheets, tubes, cold rolled shafting, rivets, bolts, bars and boiler accessories. Materials will be handled by means of four electric traveling cranes, with entrances for trucks from the street under each crane. Carload shipments will be handled from switch tracks that terminate within the building after passing under each crane runway. With this new plant, the buildings of A. M. Castle & Co. will cover over five acres.



Section Through Center Line of Port and Plan of Burner, Cooler and Cylinder Arrangement

The Alvord Reamer & Tool Co., Millersburg, Pa., has reduced operations to a three-day week schedule. The company has been working on full time in the majority of departments.

Thomas Devlin: A Pioneer in the Malleable Foundry Business

SIXTY-SEVEN years in the malleable foundry business is the record of Thomas Devlin, president of three companies, the Thomas Devlin Mfg. Co., with plants in Philadelphia, and Burlington, N. J., Hardware & Malleable Iron Works and the National Specialty Co., both of Philadelphia. And, although 83 years old, he is still very active in business, going to his Philadelphia plant early each morning and taking charge of operations. He missed but two days at the plant in the past year; he has never had a vacation, except for five trips to Europe, including Ireland, and three trips to the Pacific Coast.



THOMAS DEVLIN

Thomas Devlin is the oldest active malleable iron man in the United States, from standpoint of both age and period of service. His success is indicated by his extensive membership in business organizations, some 30 in number, including the Philadelphia Foundrymen's Association, of which he is president; the National Association of Foundrymen; the American Foundrymen's Association, of which he is an honorary member; the Hardware Merchants and Manufacturers' Association; the Engineers' Club of Philadelphia; the Philadelphia Chamber of Commerce; the National Chamber of Commerce and the Manufacturers' Club. He is a happy example of a self-made man, his school education having consisted of the meager training which the common schools of Ireland could give, supplemented later by night school studies in this country. He came to the United States at the age of 16. His business career started with him in the role of office boy at $1.50 a week, paid to him on Mondays rather than Saturdays, lest he be tempted to spend this munificent sum with reckless abandon during the week end.

He has seen some great changes in the foundry business. In 1854, for instance, the best molders received $1.50 a day for a 10 or 11 hr. day; now his molders get $7.20 for an eight-hr. day. Molding machines have largely replaced hand molding; annealing methods have changed; the pots are piled four high, instead of two high; there were not over 50 employees in the foundry and finishing department in which he started to work, while the three plants can now employ from 1800 to 2500 when running at full capacity. Because some of the customers preferred to substitute drop forgings for castings, he recently installed drop forging equipment, thereby retaining these customers of half a century.

In speaking about the evolution in the use of pig iron, Mr. Devlin reminisced as follows: "All of the old foundrymen thought they must have Scotch iron in the early days to produce good machinery and hardware castings. Then they used pig iron to make malleable iron castings which was made in New York and known as Sterling, and we thought the 'jig was up' when we couldn't get it. Later we discovered that good iron was being made from Lake Superior ore. We also used some Crown Point iron in our mixture for malleable purposes. All came by rail, except some which we imported from Sweden. We have thought that recent prices for pig iron were the highest in history. I remember when the company had to pay $60 for malleable pig iron in the early days; it was smelted with charcoal and hence the high cost. Lehigh Valley irons were also popular."

The merchandising methods of Mr. Devlin's enterprises are unique in that they have never employed salesmen. The only sales activities are the publishing of advertisements in the trade journals. His companies sell through commission houses in New York and through them, until recently, much export business has been received. One of the New York connections has been handling their products exclusively for the past 38 years. Customers in California who patronized Mr. Devlin 35 years ago, still buy his products.

The long periods of service of many of the employees is a feature of the business. The oldest worker has been with Mr. Devlin for 55 years and never worked for any other concern, and several others have passed the half century mark of service. Employees' holdings total 32 per cent of the outstanding capital of the companies. Four of the directors are employees of the companies. One of the companies has originated a system by which employees are given the earnings of $1,000 worth of stock for a term of five years on the condition that the employees give to the company continued and faithful service during that period, and that the employees contribute $2 a week, this being retained by the company towards the purchase of the $1,000 worth of stock. Many, spurred on by the enjoyment of dividends before completing the purchase, have added more to the first $1,000 worth. Mr. Devlin has had but one strike since he has been a manager. He expresses the outcome in a paradox that would do credit to G. K. Chesterton: "We won, but we lost—we won the strike, but we lost $50,000 because of suspension of operations."

Mr. Devlin's companies make fittings for steam, water and gas, harness hardware, saddlery hardware, marine and awning hardware, registers, dampers and jobbing work. The original company made experimental castings for the first sleeping car berths about 1856 through Kimball & Gordon, car builders, who were later succeeded by J. G. Brill Co.; it manufactured castings for Blake & Willard mowing machines, Reyburn & Hunter lightning rod fasteners, Conrad Liebrick trunk locks and work for Henry Disston & Sons. For several years, it made castings for molasses faucets for a company before it decided to build its own factory.

The Philadelphia Hardware & Malleable Iron Works was started by Thomas R. Wood & Co. in 1852. The firm changed to E. Hall Ogden Jan. 1, 1855. It was the first bench shop in Philadelphia, the first malleable shop in Pennsylvania and was one of four malleable shops in the United States.

When THE IRON AGE representative called at the home of Mr. Devlin, he found a man whose appearance belied his 83 years of age. He found a short, well set-up man, with alert eyes and good complexion, wearing a grey suit with small black checks, whose trimness a younger man might well copy. He had been reading the *Literary Digest*, an indication that his interest is broader than affairs of gray and malleable iron. The quick replies to the many questions placed before him showed a mind as alert as his appearance. He tells the story of his career as follows:

"On Aug. 4, 1854, I was engaged as office boy by E. Hall Ogden, who was with the company of Thomas R. Wood & Co. I received as compensation $1.50 per week with the understanding that I would get an ad-

vance of 50 cents every six months. I continued until early in 1857 when there was a money panic. The shop was closed and I went to school for four months. The shop reopened in October, 1857. I went to work again and continued until 1865, when I was given an interest in the Philadelphia Hardware & Malleable Iron business with Mr. Carr, a salesman, and Mr. Crawley, the bookkeeper, each getting one-eighth of the net profits without salary, Mr. Ogden getting five-eighths. The first year my interest was a little over $5,000 and Mr. Ogden had more net profit that year than he had ever made before. That interest, without salary, continued until 1870 when Mr. Ogden, being in ill health, sold the business to Carr, Crawley & Devlin.

"Our firm started officially on Jan. 1, 1871. Outsiders, who did not know conditions, supposed that I was taken into the business as partner in consequence of the knowledge that I had of manufacturing and that Carr and Crawley had the capital, when the truth was that I had more money invested in the business than the other two. The names were arranged according to age, Carr being the oldest, etc.

"Carr, Crawley & Devlin continued in business until 1880 when I became dissatisfied because we were not progressing. Four years after the dissolution Carr & Crawley failed and after their double failure, Mr. Ogden's son attempted to run the business, but lost money. Our company made him an offer for the business which he accepted and we took it over in 1892 and have made money ever since."

Mr. Devlin had 11 children, eight of whom are still living. Two sons are associated with him: William J. Devlin, vice-president and manager of the plants at Third and Lehigh avenues, Philadelphia, and Burlington, N. J., and Frederick M. Devlin, vice-president and treasurer, located at the plant at Ninth and Jefferson streets, Philadelphia.

Interchangeable Manufacture Discussed*

Fundamental Principles—High Cost of Unnecessary Accuracy—Analyzing Conditions—Holding Extremely Accurate Dimensions to Minimum

IN dealing with so broad a subject as interchangeable manufacture, it is well to remember that in the course of time many false traditions and pseudo-scientific conditions are built around a process or system, either glorifying it unduly or condemning it beyond its deserts. This makes it necessary to be iconoclastic and tear down that we may build upon a firmer foundation, sometimes rearranging the former material and sometimes rejecting it. Likewise, it is well to start out with certain fundamentals plainly stated, and any discussion or theory that contravenes these fundamentals is useless for our purpose. True, we may dispute the fundamentals and possibly disprove them, but the statements hold until that shall have occurred. Personally, however, the author disbelieves in fundamentals, and prefers to employ the term "progressive standards."

Fundamental Principles

The first fundamental is that no two things are alike; the second, that the difficulty of maintaining accuracy increases in geometric ratio with each added accurate dimension on the same piece; the third, that no machine or tool under stress can be accurate; the fourth, that the manufacture of interchangeable parts in quantity is a matter of percentage; and the fifth, that irrespective of the method used, quality is a matter of insistence.

Nowhere, either in the arts or crafts, do we find two things alike. Nature herself has never succeeded in making two leaves or two grains of sand the same as far as man has ever been able to determine. Poe, in one of his essays, states that analysis consists of taking two things exactly alike and looking at them and continuing to look at them until we discern that which differentiates the one from the other, and our ability in that direction indicates our power of analysis.

The nearest approach to mechanical perfection that we know of is found in the Johansson gages, or was until the advent of the Hoke gages; but within their limits these are by no means interchangeable and the interferometer shows not only a variation in size but a difference in parallelism of the same piece.

Securing one very accurate dimension on a piece is a comparatively simple matter. The ease of securing two accurate dimensions, however, depends upon the relation of the second to the first. The figures given in the following table are based upon practice and general impressions, but the author believes them accurate enough to justify their publication for the purpose of showing the high cost of unnecessary accuracy:

No. of Dimensions on One Piece	Probable Number of Perfect Pieces	Per Cent Estimated Increase in Ratio of Cost per Operation
1	100	0
2	90	30
3	50	75
4	15	100
5	5	200
6	0	500

In making the foregoing statements the author has in mind automatic and other machines where the close-dimension work is done at one setting and in manufacturing quantities. Some will dispute the figures given in the table and will declare that it is not good practice to attempt finishing pieces in the automatic, but that they should be roughed out there and finished on a shaving lathe or elsewhere. This brings us to our third fundamental and we may ask, Why should they not be finished complete when a good automatic must, in the nature of things, be (and is) as accurate as a single-purpose machine on a single accurate dimension? It is not accurate on several close ones, however, and accepted practice confirms this statement; and the reason why it is not and cannot be accurate is because of conflicting stresses.

The extent to which we may go in accuracy of interchangeability is often determined by the price that can be secured for the finished product. This is also true where the system of building rather than manufacturing is followed, and where a much better class of labor is necessary.

Unnecessarily Close Tolerances Often Specified

There are many firms the engineering departments of which really believe they are producing an interchangeable product of close dimensions, but their inspection and manufacturing departments could tell a different story. It is not bad workmanship or lax inspection that is responsible for their failure to produce such work, but the —ofttimes—unnecessarily close tolerances specified on unimportant dimensions, or the insistence of close ones on several dimensions of the same piece, and it is well to stop and consider what may happen, say, to a piece of apparatus after it has been in service for some time when initially it required the centers of two shafts to be held within one-half thousandth of an inch.

Interchangeable manufacture requires both **relative tolerance** and **specific tolerance.** Relative tolerance has to do with its relation to the part to which it assembles and does not necessarily affect the tolerance of the spe-

*Paper presented by Chester B. Lord, Battle Creek, Mich., at the spring meeting of the American Society of Mechanical Engineers, Chicago.

cific dimension. Specific tolerance is that tolerance on a specific dimension required to render a particular part easy to manufacture, or to take care of the wear on tools. Any part increases in cost with each succeeding operation, and the probability of loss should decrease in the ratio of its added value. This result should be obtained, first, by a design having in view its relation to subsequent machining operations, and, second, through the proper sequence of operations relative to their difficulty, and sufficiently divided. This leads us up to the question of registration. Automobile-engine builders cast lugs on their cylinders to insure parallelism of bore; adding-machine and phonograph castings sometimes have bosses cast on, to take the pressure of milling or drilling operations. It is also true that sometimes we insert a pin in a drilled hole to guard against movement, but we do it only at times and usually as a matter of convenience, whereas it is a matter of neces sity; and it will usually cost less to drill special holes or machine special lugs for registration and resetting than to attempt to do the work in fewer complex operations.

A Piece Under Stress Cannot Be Accurate

And nearly as important as registration is the question of clamping. One of the fundamentals laid down was that a machine under stress could not be accurate. This is just as true of a piece being machined, and unless a part is designed with its subsequent machining operations in view; unless it is supported sufficently near its pressure centers; unless it has a three-point support with the holding or clamping pieces immediately over them (and in the case of a drill jig, independent of the part that carries the bushings), then that piece cannot be accurate. This is true of drilling always, of milling generally, and of turning sometimes.

How tolerances shall be indicated; whether they shall be identical, independent, or overlapping; what the law of probability and what actual trial demonstrate as the probability of overlapping or identical tolerances interfering; the percentage that may be expected at different parts of the tolerance, and the lessons to be learned therefrom are subjects calling for extended treatment by themselves. The same is true of inspection, of machining methods, of analysis of product.

The automatic screw machine will, of course, always be with us, for in that we meet ideal manufacturing conditions as nearly as they may be met. But the fact that the single-spindle screw machine persists and is even exclusive in the small-part field, is still further corroboration of the price we must pay for accuracy. The question of accuracy is of course relative, as is the question of rigidity of machine; but it is important in its bearing upon the cheapness of manufacture by determining the number of cuts, retapping, reaming, grinding, etc., that are necessary.

Quality does not depend upon the method under which work is done, but it is usual to assume that men working for day wages take more time and consequently turn out better work than those on a piecework or premium basis. I believe people who reason thus are wrong in their psychology for the difference between the two methods does not in itself carry any incentive either to do better work or worse work. It is the remuneration received on the premium basis that gives the incentive; and where a premium does not work a wrong by inducing over-exertion, it lessens fatigue by increasing the workman's interest in his task; and as Taylor says, "Speed is a function of quality."

Commonsense In Interchangeable Manufacture

The law of compensation applies to mechanics as well as elsewhere in industry, and when we attempt to work to closer limits at the expense of increased operations, we must pay somehow. This is not to be considered as an argument against such a procedure, but an appeal for common sense in interchangeable manufacture—not to make the work easier, but to reduce the cost—and the firms that are really making a good interchangeable product are those that have analyzed all the different conditions and hold the extremely accurate dimensions at a minimum.

Neither should it be thought from what has been said that close dimensions may not be necessary or desirable. Some companies require them much closer than do others. It then becomes a question of whether the price received for the finished apparatus is commensurate with the close limits imposed. If not, then it is a matter of increasing the tolerances so as to permit manufacture on a cheaper basis. In other words, the percentage of rejections that can be tolerated must be figured out and kept within that limit. For instance, on an apparatus costing $10, for which a liberal price is asked and received, an allowance of 50 cents per apparatus for rejections may not be excessive. If, on the other hand, the price is close, 50 cents may mean the difference between profit and loss. This is a matter of policy to be settled by the administration and not by the shop, although we very often lose sight of this fact.

In the author's opinion there are no such things as close tolerances. All are relative and we only court trouble when we try to take too many steps at once. One-half thousandth is only five per cent of ten thousandths, and the chance of securing that accuracy in quality in one step is about five per cent multiplied by the extra cost. But one-half thousandth is fifty per cent of one thousandth and the probabilities are increased in the same ratio, so we may lay it down as a truism that subdivided operations are a function of accuracy.

Liberal Allowances Advocated

Analyzing our fundamentals, we find that there are three ways in which interchangeable parts may be secured: 1. By obtaining a percentage of good ones, with close tolerances; 2. by giving individual attention to each piece; 3. by employing liberal allowances.
The first is wasteful and the second is not manufacturing; the third one means liberal unnecessary allowances and close necessary ones, with the operations so divided that each individual working upon the part has but one thing to do. Thus, on a small shaft with six diameters all ground to a 0.0005-in. limit, there should be six roughing and six finishing operations because different wheels may be used; because less skilled men may be employed with less chance of scrap; because the wheel will be in better condition and will not need dressing so often and the operator will not have to change his sense of proportion, "hog off" material one moment and hardly touch it the next; because the finishing operations may always be done on the most accurate machine; and last, but not least, because as a rule one man can finish more work to close dimensions in four operations than four men can in one operation.

Let us not delude ourselves, however, that interchangeable manufacture or standardization is all profit and has no penalties. The French, even in large business, recoil from the idea of standardization, and this feeling has saved them through the ages from the rigidity of an arrested civilization. I am not competent to say whether the artistic qualities of the French are the result of their fight against standardization or whether it is the cause. Suffice it to say that no country that manufactures on the scale that France does and employs standardized methods, can either duplicate her excellence of manufacture or produce the artistic or scientific results she obtains. We must somehow pay for the repetition we call standardization, specialization, or interchangeability, and as usual the toll is collected from the intellectual.

Pump Associations Merged

WASHINGTON, Aug. 2.—Manufacturers of hydraulic and compressed air pumps at a conference last Wednesday with Secretary of Commerce Hoover, decided to consolidate the two associations representing the respective branches of the industry and to select a committee for the purpose of co-operating with the department in supplying statistics in order that the department may aid the industry in increasing foreign trade. Like representatives of other industries, the pump manufacturers intend to supply the department with vital statistics that are required to expand the foreign business.

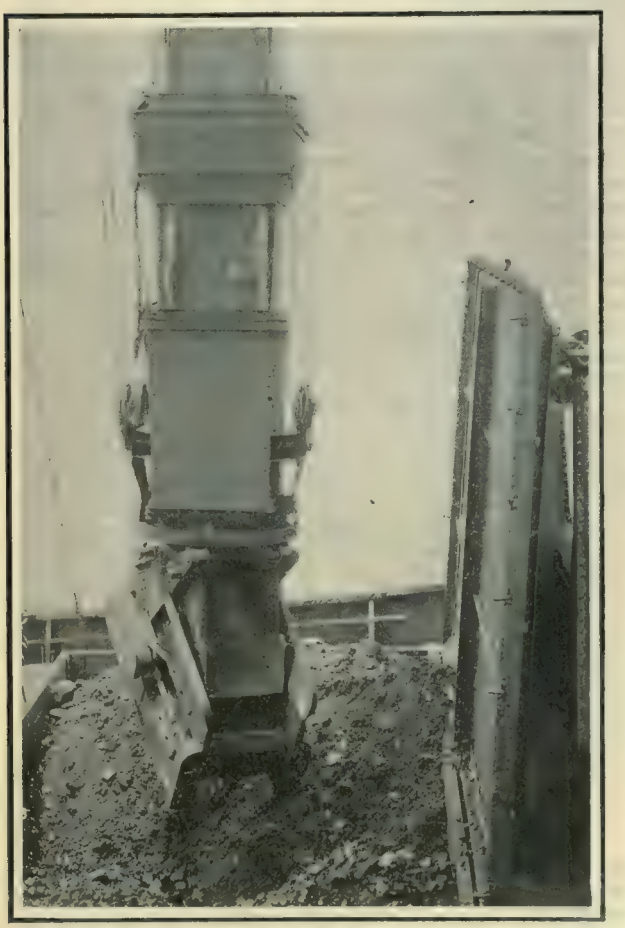
A committee representing manufacturers of implements and vehicles has been formed and is co-operating with the Bureau of Standards in connection with work of standardization.

Mechanical Coal Trimmer

A mechanical coal trimmer that can be attached to any type of coal handling machine has recently been brought out by the Wellman-Seaver-Morgan Co., Cleveland, having been designed by A. F. Case, engineer of the coal and ore handling equipment department of that company. The first trimmer of this type has been installed at the coal handling plant recently completed by the Wellman-Seaver-Morgan Co. for the Western Maryland Railway Co. at Baltimore.

The coal trimmer consists of a rotating cowl and a pivoted frame carrying the trimming conveyor and driving motor. The cowl is divided into two sections, the upper of which is fixed to the lower end of the telescopic chute and forms a support for the lower or rotating section. This lower portion is in the form of an elbow which deflects the coal horizontally as it is discharged from the chute, giving it the proper direction to be handled by the trimmer belt. Rotation is accomplished by means of a motor, mounted on the upper section, driving a pinion which meshes with a rotating gear on the lower cowl.

The conveyor frame is pivoted to the upper front side of the rotating cowl and is arranged to swing about this pivot as desired. When the frame is fully extended, all of the coal leaving the cowl passes over the trimmer belt and is projected, by the high speed of the belt, in a horizontal direction into the portions of the ship's hold which are inaccessible to a gravity flow. When the frame is retracted the belt occupies a position at the rear of the cowl where it is not touched by the coal discharged from the cowl. The

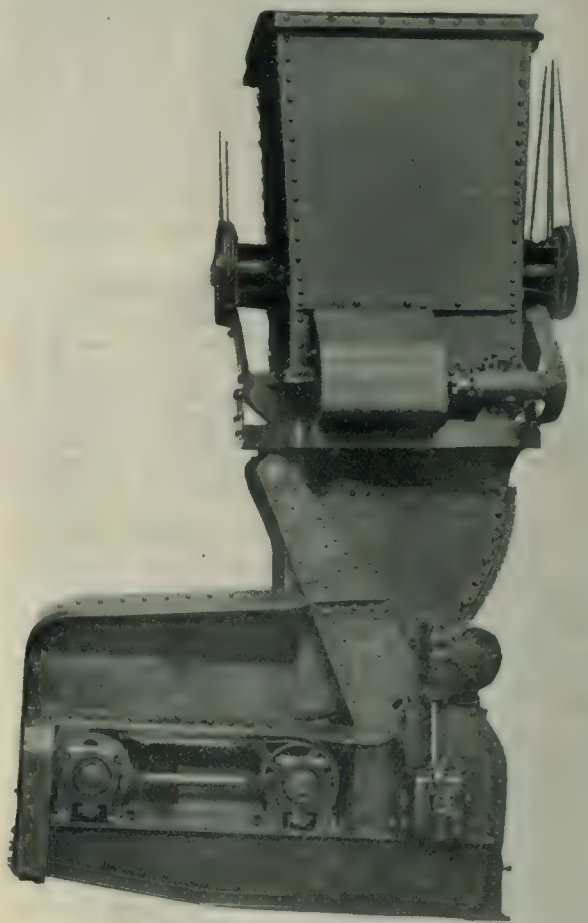


At Work in the Hatchway of a Ship, with Hatch Cover Showing at Right

trimmer belt can be easily and quickly moved to either position by power derived from the conveyor motor, through a selective reversing bevel gear and self locking worm gearing which drives two pinions meshing with gear segments attached to the cowl. A double throw hand lever on the side of the conveyor frame operates a jaw clutch to engage this drive and this clutch is automatically disengaged and thrown into neutral position at each limit of swing.

The trimming conveyor, approximately 4 ft. in length, is carried in the front part of the conveyor frame in proper position to receive the coal discharged from the cowl. This conveyor consists of fabric belting 36 in. wide and provided with protecting clips. It is carried on two steel pulleys supported in roller bearings connected to the conveyor frame. The bearings are adjustable and a takeup is provided on either side to keep the belt taut.

Power for driving the belt is applied to the rear



Side Elevation of the Coal Trimmer Shows the Essential Working Parts

pulley through a silent chain drive connected to the motor shaft. The motor is supported in a tight enclosure at the back of the conveyor frame. This motor box is provided with a hinged cover and made as tight as possible to exclude dust from the motor. The motor is of special construction provided with a ventilating attachment and has a rating of 50 hp. The chain drive is proportioned to give a belt speed of 2750 ft. per min.

On account of the severe service to which the belt is subject, frequent renewals are necessary, and in order to secure as long life as possible it is essential to eliminate all sources of weakness such as splices, etc. For this reason a continuous belt is used. The belt is made up in the required length and is slipped over the ends of the pulleys. One of the distinctive features in the design of this trimmer is the facility of endless belt renewals, accomplished by removing the bearings at one side of the trimmer, thus presenting the free ends of the pulleys over which the belt can be easily placed. Another feature is the guard plate which covers the return flight of the conveyor preventing coal dust from falling on the inside of the belt and passing between the belt and the pulleys, and causing rapid belt deterioration.

With this device it is possible to trim from 1000 to 1500 tons of coal per hour, when the material is delivered in a uniform volume to the trimmer. The distance to which the coal may be thrown will vary from 35 to 50 ft. according to the class of coal handled. It is stated that the trimmer will save the labor of from 150 to 200 men.

GOVERNMENT BUYING

Progress Made in Co-ordinating Control as Proposed by Director Dawes

WASHINGTON, Aug. 2.—Creation of a central co-ordinating control over Government purchases and the disposition of surplus property of the Government, brought about by an executive order of the President last Wednesday, was an expected development of plans devised by Director of the Budget Charles G. Dawes. The co-ordination is to be effected through the use of existing agencies, and while the control is general, special pressure will be directed at first toward the interdepartmental transfer of property which will prevent the departments from continuing purchases in the open market by one department where a surplus of the article in question exists in another. A partial list of those who will have charge of co-ordinated purchases and sales has been named. Col. H. C. Smither has been selected as chief co-ordinator of general supply. Those selected as co-ordinators on duty in areas include Maj. Joe R. McAndrews, Maj. T. W. Hammond, Lieut. Col. J. C. Rhea and Maj. D. A. Robinson. Officers of the Navy Department to be detailed will be announced later.

While it is doubtful whether it will have any sweeping effect either on Government purchases or sales of iron and steel, machinery, foundry supplies, etc., these products unquestionably will be purchased and sold by the Government on a more intelligent basis. Relatively, however, it is claimed that there has been but little overlapping in transactions of this nature. One of the best results of the order, it is believed, will be to establish more uniform practice as to bidding terms, requirement of bonds, etc., by manufacturers in these lines. The surplus iron and steel and machinery on hand has been inventoried with considerable thoroughness and requisitions made by departments wanting such material from others having it have not involved a great amount and probably will not. Because of this condition the quartermaster corps of the War Department has been authorized to dispose of surplus iron and steel which has been scheduled for sale in August, the tonnage being of a miscellaneous character and of a comparatively small amount. The greatest iron and steel surplus is held by the Shipping Board and is estimated at 300,000 tons, most of it being structural steel. While sales of this material have been held up pending completion of inventory, it is not thought any of it will be required by other departments, both because it is not of the kind or type other departments now need and also because it has been exposed to weather conditions to such an extent that it probably can be used for scrap purposes only.

While the necessity for using existing agencies to promptly meet the general situation, according to a statement by Mr. Dawes, requires for the co-ordinated control the detail to this duty of those already in different departments of the public service, this organization is independent of any department. Attention is called to the fact that the wording of the order must not create the impression that the War and Navy Departments are being placed in control of the organization, because of the fact that, for supply and purchase co-ordinating purposes, the country is divided along the lines of the present corps areas of the Army and some Army and Navy officers may be used in it. Experienced men, it is stated, will be selected, irrespective of the present departmental status.

The co-ordinating machinery set up does not interfere with existing departmental authority, save in the matter of co-ordination of action, which can be properly accomplished by executive order alone. Under the order there is set up the machinery to facilitate interdepartmental transfers of property. Negotiations between the departments as to price at which surplus material is transferred from one to another are rendered unnecessary by the authority given to the co-ordinating supply officers in the different corps areas to fix the price at which the bookkeeping entries incident to such transfer are made. This co-ordinating machinery will also be concerned in the systematizing of Government purchases. By the establishment of this machinery, immediate relief to the existing situation is expected, and it will continue to function pending the study of the question of whether or not better machinery can be instituted through legislation. The Director of the Budget stated that its operation will provide an opportunity for the Executive and Congress to determine whether or not the purchase and surplus supply situation will be better handled by a central organization created by law, or by the continuance and improvement of this system, which is one of the co-ordination of existing agencies.

Under the terms of the order, the co-ordinators have broad powers in their respective areas and are required to see that no branch of the Government purchases property in the open market where it can be obtained from another department and to keep fully informed regarding material needs and supplies both in their respective areas and in the areas of other co-ordinators. They also will be required to confer with officials of every executive department having activities in their areas.

TAX LEGISLATION

Pressure to Push It Ahead of the Tariff and Other Measures

WASHINGTON, Aug. 2.—Pressure for quick passage of tax legislation and its precedence over tariff legislation is coming from business interests of the country with increasing force. Considerable sympathy for this view has been expressed in Congress, while the Administration, apparently feeling that it is a question for the legislative branch of the Government to decide, has not gone on record. There are some who favor the idea of combining tax and tariff legislation, among them being Representative John Q. Tilson of Connecticut. Chairman Fordney of the House Committee on Ways and Means, now considering tax legislation, estimates that it will require two weeks to draft a bill following the recommendations of treasury and internal revenue experts at executive sessions. Under this plan the measure would probably reach the House about the middle of the present month. It is uncertain how long the measure may remain in the House, but it probably will be only a short time, some members predicting its consideration will require only a few days.

One difficulty the House Committee on Ways and Means encountered at hearings, according to members, was the lack of concrete suggestions for substitute taxes to take the place of those it is maintained should be repealed or modified. As a result it appears likely that Administration recommendations will be used as the principal basis for legislation. These include the repeal of the excess profits tax, making up the deficit through a modified tax on corporate profits, or a flat additional income tax upon corporations; repeal of the existing $2,000 exemption pertaining to corporations, to yield revenue estimated at from $400,000,000 to $500,000,000 annually; readjustment of the income tax rate to a maximum combined normal and surtax of 40 per cent, and the imposition of new taxes necessary to bring the total revenue up to $4,000,000,000 annually; increase of the first class postage rate from 2c. to 3c. which Postmaster General Hays estimates would yield between $75,000,000 and $80,000,000 annually. Except for the latter feature the proposals follow to a large extent those embodied in a bill introduced early during the present session by Representative Longworth of Ohio.

Suggestions of the National Association of Manufacturers for the adoption of a sales tax as a substitute for war excise taxes apparently have not met with much favor at the hands of the House Committee. The committee refused to admit testimony dealing with the sales tax under the claim that it is not germane to present plans. Secretary of the Treasury Mellon declined to endorse the proposition and Secretary of Commerce Hoover was non-committal. The indications are, therefore, that the sales tax will not be considered in the new measure. James A. Emery, general counsel of the association, told Secretary Hoover, as he later

told the committee, that one-third of the income of corporate business is paid in State and National taxes and that the excise taxes, excess-profits taxes and other special taxes make it impossible for business to forecast definitely what costs are going to be. He insisted that under a non-discriminatory sales tax, properly administered, business would not be confronted with the uncertainties of the present system and could figure its cost of taxation accurately. J. Philip Bird, general manager of the association, expressed a similar view at the conference between the association and officials of the Bureau of Census last Friday.

W. H. Stackhouse of Springfield, Ohio, president of the National Implement and Vehicle Manufacturers' Association, in appearing before the committee, urged repeal of all excise taxes and of all surtaxes to the 20 per cent group and the funding of the entire war debt for a period of 50 to 75 years. His alternative was a sales tax. E. F. McGrady, for the American Federation of Labor, presented a resolution adopted at the Denver convention in favor of retaining the excess profits and income taxes. The Chamber of Commerce of the United States has urged a general turnover tax on all business transactions, repeal of the excess profits tax and war excise taxes, both those on transportation and communications and those levied in relation to particular business.

Should it be concluded to enact tax legislation before the Senate receives the tariff bill, it is believed by some that Congress would take a recess after the new internal revenue law had been enacted and take up the tariff bill immediately after convening.

PLANNING THE CENSUS

Secretary Hoover Expects to Effect Saving by Cutting Out Dead Wood

WASHINGTON, Aug. 2.—Plans for cooperation between the Bureau of the Census, Department of Commerce, and the National Association of Manufacturers and its members, in compiling the 1921 biennial census were made at a conference here last Friday. Proposals to simplify and expedite the work and to save money were especially emphasized and a committee was selected to bring this about. It is the desire of the bureau officials and the association to determine what possibilities of simplification can be developed in the census schedules for 1921, which raised the question as to the scope of the undertaking. The first point involves the scope of the establishments to be considered and the need of limiting it. For example, it was pointed out that the iron and steel schedule of 1919 regarded a manufacturing establishment as an institution employing five or more persons producing material valued at $500 or more annually. On this basis there were 285,000 establishments of all kinds included in the schedule. In 1914 only 4.7 per cent of the value of products was produced in establishments whose individual output was valued at less than $20,000. It is contemplated for the 1921 census to include only establishments whose products have an annual value of $25,000 and more and to approximate values below that figure, based on past figures, which was held to be a logical plan in view of the fact that it was shown that 35 per cent of the plants have an annual production of less than $100,000 each. It also will be the purpose to set forth only essential facts.

Another object of the conference was the linking of the National Association of Manufacturers and the particular industries with the Department of Commerce in order to supply information to be carried in the monthly survey of business conditions. This has a bearing on the census figures as shown by the statement of Secretary of Commerce Herbert Hoover, who, in addressing the conference, said governmental statistics on industrial production will be gathered in the 1921 biennial industrial census on a commodity basis. He asked for and was promised cooperation. Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, explained the commodity relation of the new industrial divisions of the bureau to business and trade associations. With the bureau reorganized on a commodity basis, he stated that *Commerce Reports*, the official publication of the Department of Commerce, soon will be issued weekly instead of daily, as at present, and information will be carried under commodity heads in accordance with the new industrial divisions created and being established. The iron and steel division was the first one organized with Walter S. Tower in charge, while the heavy machinery division was the third one to be established, with Walter H. Rastall in charge. The work of preparing information for publication under commodity heads will be under the direction of the heads of the industrial divisions.

Secretary Hoover said that proper and accurate statistical information would be vital equally to the Government in determinations of policy and to industry itself in its daily necessity of ascertaining the economic trend.

"These statistics hitherto have been secured in terms of money," Mr. Hoover stated. "I think we all realize now how uncertain and indeterminate monetary values can be, and therefore we have decided to place it next year on a commodity unit basis, as well as monetary.

"We want to get these facts without plaguing industries, and we also want to get it in a form that will be of practical utility to the industry when it is obtained. Thus, nobody but the manufacturers can tell us in what form to proceed."

The secretary said that about $23,000,000 had been provided for expenditures of the Department of Commerce this year and that it was planned to "save between $2,000,000 and $2,500,000 of it by elimination of dead wood and elimination of services," but that notwithstanding it was intended to spend extra money in the study and promotion of foreign trade and the manufacturing census.

J. Philip Bird, general manager of the National Association of Manufacturers, presided at the conference.

INDEPENDENTS EXCLUDED

Steel Corporation Alone Will Respond to Pittsburgh Base Complaint

WASHINGTON, Aug. 2.—The Federal Trade Commission has decided to center its attack in the Pittsburgh base case upon the United States Steel Corporation exclusively. This fact has been made evident by the refusal of the commission to grant requests of independent steel companies to intervene. The attitude of the commission has been a source of surprise. The presumption has been that it was desired to obtain all the information possible concerning the case, but it is pointed out that this cannot be done if the independents are not privileged to present their views which necessarily take a form of their own. The contention is made that the great majority of the independent steel companies operate only in a single district and that in such cases their entire output, when produced outside of the Pittsburgh district, would be affected by a change of practice, save in those instances where material is invoiced at flat prices. Even in the case of the latter it is desired to maintain the present custom as a sound business principle.

During all previous hearings, the commission accepted testimony from independent steel companies, but its complaint was directed against the Steel Corporation only. It was not believed, however, that this meant that the independents would be denied the right to intervene, and refusal to permit such intervention has been vigorously resented. The commission apparently is of the opinion that it will simplify the case and strengthen its own position by concentrating the attack on the Steel Corporation solely. The hearings, according to plans, will begin early in September.

Commissioners of Allegheny County, Pa., have voted to submit to the voters on primary election day, Sept. 20, a bond issue of about $38,000,000 to be used for new roads, new bridges, the raising of old ones, for a new building at Ross and Diamond streets, Pittsburgh, and the remodeling of the old county courthouse.

CONTENTS

Continuous Stores Keeping Cuts Investment 253
Economies Effected by System of Checks and Almost Automatic Control of Ordering Materials

Features of German Machine Tool Plant 256
Color of Buildings Considered—Prevailing Winds Aid in Reducing Dust and Noise—Welfare of Workmen Emphasized

Chemical Reactions in Foundry Cupola 259
Combustion, Cupola Gases, Carbon Ratio, Melting Efficiency, Metal Losses and Gains—Cupola Balance Sheet

New Rail Specification Proposed 262
Provides for Rolling Tie Plates from Top of Each Ingot—Treatment in Soaking Pits—Cold Straightening

By-Product Coke Plants in United States 264
The Various Plants According to Geographical Distribution—Statistics of Coal and Coke Capacity—Summary of Ovens Built and Building

Electric Furnace Heat Treatment 266
Dies and Forgings Well Handled in Metallic Resistor Furnaces—Uniformity of Product Big Feature

Improvement in Open-Hearth Furnace Details 269
Reversing Furnace Valves Promotes Economy—Burners for Liquid Fuel and Tar —Results in Operation

Interchangeable Manufacture Discussed 274
High Cost of Unnecessary Accuracy—Holding Extremely Accurate Dimensions to Minimum

July Pig Iron Production 286
Daily Output 7605 Tons Per Day Less Than in June—Down Close to 1903 Record

Against Restrictions on Manganese Imports 288
Possible Exhaustion of Domestic Ores in Six or Seven Years and High Grade Native Ores in Only Two Years

Pump with Ring-Oiled Packing Gland 254
British Steel Exports and Imports 255
Electric Furnace for Heating Sheets 255
Cast Iron Pipe Census 258
Cylinder Reboring Tool..... 265
German Pig Iron Production 265
Thomas Devlin 273
Pump Associations Merged 275
Mechanical Coal Trimmer 276
Government Buying 277
Tax Legislation 277, 285
Planning the Census 278
Pittsburgh Basing Case 278
Editorials 280
Why High Duties on Manganese—Subnormal Steel Demand—German Metal Industries Active—Prospects for Building

To Guarantee Belting on Mileage Basis .. 282
Correspondence 283
Who Made Swords for American Revolution — Electric Melting of Cast Iron Scrap—"The Man at the Fire"
Farm Implements Made in 1920..... 284
Bar Iron Association Agreement 287
Refractories Market 289
Workmen's Dependability..... 304
Foreign Trade Conditions.....307, 310
Head of Heavy Machinery Division 309
Steel Corporation Prices 310
Rates for Special Purpose Machines 311
Industrial Finance 312

Iron and Steel Markets.....292
Comparison of Prices.....293
Prices Finished Iron and Steel, f.o.b. Pittsburgh.....305
Non-Ferrous Metal Markets.....306
Personal Notes.....308
Obituary Notes.....309
Machinery Markets and News of the Works.....313
New York Jobbers' Prices.....320

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Why High Duties on Manganese?

In the recent debate on the tariff bill in the House a Congressman asked Chairman Tilson, of the sub-committee in charge of the metal schedule, why his committee had recommended the high duty provided for ferromanganese. The reply was that Chairman Tilson had opposed the duty of 2.2 cents per pound of contained manganese, but that it had been adopted against his vote. The Congressman who inquired said he had received many protests against the ferromanganese duty. These protests will go also to the Finance Committee of the Senate and it already appears that various members of the House who voted for the bill will not oppose reductions the Senate may make in the ferroalloy paragraph when the final try-out comes.

We have called attention already to the high rate of duty imposed on manganese ore. To-day a ton of foreign manganese ore can be bought, f.o.b. Atlantic port, at 22 cents per unit of contained manganese. That would mean, for a 50 per cent ore, $11.20 per ton duty, or slightly over 100 per cent on the sum of the foreign price, the ocean freight and insurance. For a mineral, which in mining and handling cost is comparable with iron ore, such a rate is so high as to call for a full statement of the reasons which led to its imposition.

Figuring that it takes 2.2 tons of a 50 per cent manganese ore to produce a ton of 80 per cent ferromanganese, the duty on that amount of ore, under the bill, would be $24.64. The interest of the domestic producer of manganese ore was apparently the controlling factor in the drafting of the manganese rates. The producer of ferromanganese, with all his investment in blast furnace property, which is subject to greater depreciation than that devoted to pig iron, turning out a product that on to-day's market is six or seven times as valuable as manganese ore, ton for ton, has only about 60 per cent as much protection on his operations as the bill gives to the ore entering into a ton of ferromanganese. In other words, the duty on a ton of 80 per cent ferromanganese is $39.42, under the Fordney bill, and the duty on the ore necessary to produce a ton of 80 per cent ferromanganese (assuming 50 per cent ore to be used) is $24.64. The protection to the ferromanganese maker is thus $14.78.

Assuming 16 pounds of 80 per cent ferromanganese to a ton of steel ingots, the duty of $39.42 on a ton of imported ferromanganese would mean 28.15 cents per ton of steel ingots. As the finished steel yield is roughly 75 per cent of the ingot output, the 28.15 cents on a ton of ingots becomes about 37.5 cents on a ton of finished steel. That is the handicap, in other words, which the Fordney bill imposes on a ton of American finished steel going into the export trade, as compared with the present condition of free manganese ore and free ferromanganese.

It is hard to believe that the facts concerning manganese ore supply and the status of American manganese mining and ferromanganese production were seen by the Ways and Means Committee in their right light. The manganese problem is not free from complications. It would require a voluminous pamphlet to present the facts fully. The Tariff Commission did well in putting them in permanent form, even though the import of this well-digested information was not grasped by the framers of the pending bill. From another pamphlet, which argues the question from the standpoint of American users of ferromanganese, we present extracts on another page. The pivotal fact in the situation as there emphasized is that high-grade manganese ores exist in the United States in scarcely more than negligible quantities, compared with the requirements of our steel industry. Alongside that fact stands another significant one—that the one considerable twelve-months' output of domestic ores, that of 1918, required for its stimulus ferromanganese prices six to ten times those prevailing before the war.

Sufficient reasons have not yet been given for imposing a new burden of 37.5 cents on every ton of finished steel exported by independent steel manufacturers. To maintain a weak manganese mining industry at home our steel manufacturers are asked to pay millions of dollars annually on the imported manganese ores that must continue to come from abroad. And that annual outlay would tend, not to the development of a native manganese supply against the next war, but rather

to the exhaustion of the domestic reserves, such as they are, with the alternative of entire dependence on foreign mines when the country again faces a national crisis.

The Subnormal Steel Demand

The most important fact in the steel market situation at present is that of late the demand upon the mills has been below a normal relation with the general business or industrial activity of the country. Some reference to this fact was made in THE IRON AGE, July 21, page 149, a comparison being given showing relative activity in iron and steel and in several other industries.

The production of steel recently dropped to about 20 per cent of capacity, or about 25 per cent of the rate maintained during the greater part of last year. The rate in tonnage was about 30 per cent of the rate from July 1, 1912, to July 1, 1913, in which period the pre-war record in freight ton-mileage was made. Of late, however, the freight movement on the railroads has been only a few per cent less than in that period, while steel production is about 70 per cent less. Debits to individual accounts at banks, which the Federal Reserve Board itself says "are indicators of the volume of the nation's business" have been running only 20 or 30 per cent less than those of a year ago.

These comparisons do not prove that the production of steel lately has been at a rate less than is requisite for the country to continue indefinitely its present industrial activity, but they are strongly suggestive. It is true that if one take conditions such as obtained in the United States in 1906 and eliminate construction work the steel industry would suffer a larger percentage of loss than would business or industry in general, but there is some construction work, regarded as absolutely necessary, going on now and other work in immediate prospect, and the quantity of steel required to keep the country going, without any construction, is large.

The flow of steel from mill has been held back by the existence of stocks of steel in the hands of jobbers and manufacturing consumers, the existence of stocks of manufactured wares in the hands of manufacturers and wholesale and retail dealers and the persistence in use of old machinery, implements, tools, etc., which in normal conditions would be replaced with more freedom than has lately been exhibited. The stocks are being liquidated, the things in use are wearing out, and eventually they must be replaced. The demand upon the mills has undoubtedly been below a normal relation to the general activity of the country of late, and is bound eventually to return to a normal relation, such improvement being entirely apart from what may come at one time or another by betterment in business activity generally and the development of more favorable conditions for construction work of a strictly investment character.

That the country is not loaded with wares made from steel is a reasonable assumption. There was much extravagance in 1920, but there was no particular evidence of extravagance in the purchase of things made of steel. Much has been said about extravagance in buying automobiles, but there has been buying of automobiles in the past few weeks. Carpenters did not throw away all their old tools and buy new ones. Over a year ago the National Hardware Association issued an extensive compilation showing percentages of price advances, Jan. 1, 1915, to June 1, 1920. Carpenter's augers were at three and a third prices, common braces at four prices and planes at three prices. Many comparisons could be made, suggesting the improbability that the ordinary everyday consumers of wares made from steel bought in such a way that they will not have requirements in future.

The matter of the buying power of the people being reduced is not involved in this issue, for the point is that demand upon the steel mills should return to a proper relation with the buying power that exists, as employment and earnings stand to-day. Before the war the steel industry felt that the minimum requirements of the country, even in a period of depression, represented about 50 or 60 per cent of the productive capacity, and the dictum rested upon experience rather than theory. A 20 or 25 per cent demand was unthinkable and has been brought about by unprecedented conditions. It could not last for any length of time with the country as a whole running as it now is.

German Metal Industries Active

The Berlin correspondent of the New York *Times*, discussing the marked revival in German industry, cites the fact that German manufacturers can secure all the American cotton and copper they need at rock bottom prices. He quotes a leader in the German electrical industry as saying that exports of brass and copper tubes for Russian locomotive repairs have been heavy and that Germany is getting all its copper from America at "cost-of-production price." Recent export statistics bear out this statement as to Germany's activity in the American copper market. Whereas in 1919 Germany bought no American copper and in 1920 was third in the list of foreign buyers, for the eleven months ended with May that country had bought more of our copper than any other, taking over 27 per cent of the total exports. Of the total purchases of the 11 months nearly 72 per cent was bought in 1921, or from January to May inclusive. Germany's recent purchases are not far short of her 33 per cent of the total in 1913 when she was preparing for war. The significance of this movement is not light; it is clearly indicative of a revival of industry in that country which means much to the world in many ways. Concerning the German iron industry, late reports are that it is "going strong, the mills having orders sufficient to keep them busy until the first of the year."

Not in many years have British imports of iron ore been at so low a rate as at present. Against a monthly average in 1913 of 620,100 tons, iron ore imports for the first half of 1921 were only 214,028 tons per month, while May and June had

less than 25,000 tons each. During the war the ore imports did not reach the 1913 figures, nor were the latter equaled in 1920. Spain has always contributed by far the greater part of Great Britain's foreign supply of iron ore, the imports from that country in 1920 having been about 70 per cent of the total. Sweden, which formerly stood second on the list, is now quite outranked by Algeria. The slump in ore demand not only means much to the exporting countries, but is an index of the very low ebb of the British iron industry.

Prospects for Building

The cost of building has lagged conspicuously on the road toward a level comparable with pre-war conditions. Railroad freight rates have not even started. Coal has had a great decline, but presents the spectacle of profits being absent while prices are still relatively high. In the three cases the influence of labor unions is seen, and indeed if the unions in these three lines of activity are deducted there is not much left of labor unionism. The three cases are different. Coal mining wages are extremely high, relative to other things, largely through the accident of there being a wage scale signed to April 1 of next year. The railroad wage situation is gradually being worked out. In the building trades there has been some introduction of the open shop principle and there have been some adjustments by agreement with labor unions, slightly reducing wages and improving working conditions.

On the whole, however, the cost of building is conspicuously high when compared with wage rates in general or commodity prices in general. There are a number of reasons, some of them being rather well concealed. In some districts there is too much co-operation between contractors and unions of building trades artisans to produce the competition the public expects when it proposes to pay out money. There has been work in progress that the builders could not afford to delay for the purpose of conducting a contest. Wage rates had gotten so extremely high that compromises presenting the appearance of involving materials concessions left rates very high still.

While forces are at work that will undoubtedly bring about a proper adjustment in time in the cost of building the adjustment seems to lag. The lagging can be understood better by consideration of the attitude or position of those who build or might build. A common tendency is to consider building construction as a simple thing, like bread or coal. Nearly all bread is produced for consumption to sustain human life, while nearly all coal is produced for the single purpose of burning to produce heat. Building construction on the other hand, represents a wide variety of purposes and there is a wide variety in the attitudes of the builders toward the work. This complexity in construction demand accounts for the slowness in the readjustment of building costs, when from a narrow viewpoint it might appear that the readjustment could be forced very quickly by a "strike of buyers."

The character of the occasion for considering a building project ranges all the way from a mere notion to an absolute necessity. A man who lives in his house and owns a vacant lot adjoining may feel in the morning that he would rather like to put up a better house on the lot and live in it, while in the evening he may feel that he does not want to bother. At the other end of the list may be a storekeeper who sees that he is missing trade that would come to him voluntarily if he would merely enlarge his store. Some students have endeavored to classify by calling some building "necessary" and some "optional." The terms are not adequate, of course, but they bring out the antithesis.

This correct conception of the variations in character of demand or desire in connection with building was ignored by those who last year were shouting that the country "needed" a certain number of homes, some putting the number in the hundreds of thousands and others setting it at a million or one and a half millions. The obvious fact is that some men will indulge in building construction no matter what the cost, some will be encouraged to embark by declines in cost of one percentage or another, some, particularly those whose incomes have been greatly reduced, have been reducing what may be called their bids faster than the offers have declined, while others will require extremely favorable conditions before they will even think of building. They must have a real bargain. Building costs will presumably decline from time to time as it becomes necessary to pick up one class after another. The call for building, or what may be called by the generic term of "demand," ranges all the way from absolute necessity down to a mere whim, and the building market will cater to as much of the demand as it needs.

Our Half-Yearly Index

The index of THE IRON AGE for the half year January to June, 1921, inclusive, has been compiled and printed and is now ready for distribution. It will be forwarded promptly to those who have entered their names on our list as desiring it. Others who may have use for copies can obtain them by addressing our Circulation Department.

Brazilian Iron and Steel Production

The production of pig iron in Brazil is about 15,000 tons per year, the Esperanca Works, in Minas Geraes, being the only producer, according to the London *Ironmonger*. There are two electric furnaces in operation in San Paulo, one making steel and the other producing iron castings. The Companhia Electro-Metallurgica Brasileira by the end of the year will have in operation at Ribeirao Preto a steel-rolling mill. The Anglo-Brazilian Iron and Steel Syndicate also intends to erect not far from the city of Rio de Janeiro iron and steel works.

To Guarantee Belting on a Mileage Basis

Selling leather belting on the basis of mileage has been determined on by the Olmstead-Flint Co., Cambridge, Mass. As the company expresses it, it is taking a leaf from the book of the tire manufacturers, and it plans to guarantee the service of two of its brands of leather belting, Pacemaker and Oilskin. The guarantee has been established at 250,000 miles, to be determined from the belt speed and the number of hours of use.

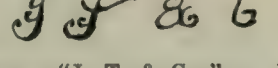
CORRESPONDENCE

Who Made Swords for the Generals of the American Revolution?

To the Editor: Where and by whom were the swords manufactured which the American officers carried during the French and Indian war and during the American Revolution, a period approximately 1750 to 1780?

I have run through the pages of most of our standard histories, searched the libraries in our largest cities, the museums and historical societies, and consulted our own American authority on arms and armor —Bashford Dean of the Metropolitan Museum of Art, New York; Charles Foulks, curator of the armories, Tower of London, England; the State Department and the historical branch of the War Department at Washington; and that great institution founded for the purpose of disseminating knowledge and yearly costing us in upkeep approximately $750,000—the Smithsonian Institution—the U. S. National Museum, Washington, D. C., with its cases and cases of swords, arms and uniforms, could not tell me where or by whom those swords on exhibition, carried by the American officers during the above mentioned period, were made.

I wish this information to designate and locate more particularly the maker of an old sword on whose blunt edge, near the hilt, are stamped into the metal these initials:



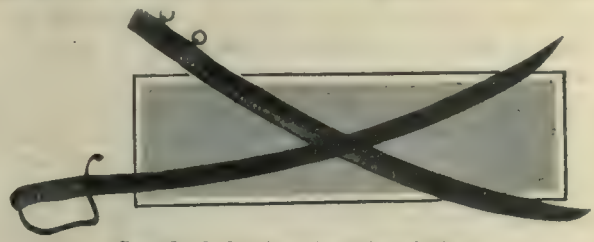
I read these as "J. T. & Co.," or, being old type script, they might be "I. T. & G."

The legend in connection with this sword is that it was carried through the French and Indian war in Vermont and later by the same general through the American Revolution with the Green Mountain boys. I have promised this sword to a historical society in New England, in the little town where the general who carried it lived, and I desire to give at the presentation something of its technology of manufacture. I know that some 24 of General Washington's associate officers were from the furnace and forge, but I am unable to link any of them with actual sword making or to find any of their names which fit to the initials stamped in my blade. The Sterling Iron Works at Chester, N. Y., where the great chain was made, was succeeded by Peter Townsend and later by James Townsend & Co. John Taylor, of Sarum, Pa., the famous nail maker of the colonies, whose nails "rattled" through the halls of Parliament, also had a forge and furnace. Both of these names might fit the initials on my sword, if I could connect them with sword making.

One of the five swords of General Washington was made by J. Bailey, Fishkill, N. Y., where the Continental Army supplies were stored. His name does not fit the initials and I do not associate him with sword making apart from this particular one which undoubtedly was in the beginning a presentation sword. The Ames Sword Co., Chicopee Falls, Mass., reputed the oldest sword maker in the country, could not answer my inquiry and from Victor Clark, editor of the *Living Age*, Boston, an authority on early American industries, I learn that the blister steel made at the Sterling Works probably did not find its way into important weapons of that date, and he is of the opinion that sword blades of that period were of English make.

I enclose a picture of the sword, together with some rough pencil sketches of the four gold etchings on the blade. The steel of this blade is blue annealed and in its day it undoubtedly was a bright and shining weapon. I am of the opinion that you or some one connected with your well known publication, may be familiar with some of the smaller artisans of that period, who may have made swords and whose name might fit the stamped initials on my blade.

The sword of Commodore Oliver H. Perry used in the battle on Lake Erie, 1813, is similar in shape and



Sword of the American Revolution

design and mounting. It was made by Capt. David Dobbins of Erie, Pa., in 1812.

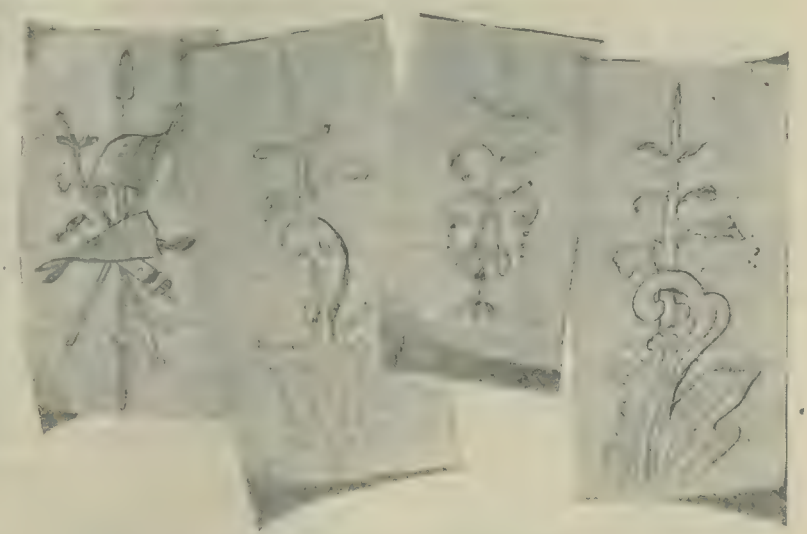
Likewise, the sword of John Brown, found between the mattresses of his cot in prison at Harper's Ferry, was similar in size, shape and etchings, but bears no maker's marks. This sword is now in possession of the Chicago Historical Society, Chicago. None of the present owners of these similar swords knew of other earlier makers of swords.

EDWIN R. BURDICK.

Kalamazoo, Mich., July 20, 1921.

Electric Melting of Cast Iron Scrap

To the Editor: THE IRON AGE of June 23, photographs and particulars are given of tests run at Alliance, Ohio, on a resistance type of furnace in which the heat is generated in troughs lying over the charge, reflected on to the roof and from the roof to the charge. The furnace was used for melting cast iron borings and the article states that this is an application in a new field.



Gold Etchings on the Sword Blade

I should like to state that quite a number of electric furnaces have been operating with success for some time on the melting of cast iron borings. We have had Greaves-Etchells arc resistance type of electric furnaces doing this work for the past four years.

While the tests made at Alliance are not a new application, there is undoubtedly a very large and fertile field for the electric furnace as applied to the melting or refining* of cast iron. The present cupola iron is made almost identically with that from even pre-historic times. The type and design of furnace have been changed little if any in centuries, and the ancients often had a crude device of leather bellows for forcing an air draft through the cupola. The chief trouble with cupola iron has always been that impurities are increased rather than decreased by the process.

A paragraph appeared in THE IRON AGE, Jan. 6, on a 1-ton Greaves-Etchells furnace installed at the

Holmes Foundry Co., Port Huron, Mich. Unfortunately a printer's error occurred in giving the sulphur content in the hot metal from the cupola. This should have been 0.102 per cent, not 0.012 per cent as stated. This hot cupola iron containing 0.102 per cent of sulphur was put into the electric furnace and in 40 minutes the sulphur was reduced to 0.023 per cent. On a cold charge consisting of cylinder scrap and iron borings, which was melted down and poured in 65 min., the sulphur in the final product was reduced to 0.013 per cent. The time and the sulphur reduction compare most favorably with the 6 hr. and 10 min. taken at Alliance with a hot furnace where the sulphur increased from 0.021 per cent in material charged to 0.047 per cent in the finished charge.

In connection with this melting or refining of iron borings, it is very important to take into consideration the design and proper application of electric heat. In the Alliance tests, the furnace used was one in which the heat is generated in a trough containing granular resistance carbon and this trough is suspended over the bath. The heat goes first up to the roof and then is reflected down on to the charge. The figures given would show that 657 kw. hr. of energy were used to bring 1500 lb. of pig iron to a pouring temperature; 317 lb. and 325 lb. of iron borings were added later. Apparently on the kilowatt hours used for melting the 642 lb. of borings in a 1500-lb. bath of metal already molten, figures were calculated based on the energy put into the furnace after the small quantity of borings was added and it was assumed that by increasing the kilowatt hours correspondingly a larger weight of cold borings could have been melted at the same rate. This is by no means correct, as an increase in the weight of cold scrap added to the molten bath would probably have doubled the kilowatt-hour consumption.

The point that I wish to bring out is that the type of furnace which was suitable for the lower temperatures of brass and non-ferrous melting is not at all suitable for the high temperatures required for melting or refining iron. Heat reflected to a furnace roof and from there to the charge cannot be as economical as a direct arc playing on the charge. The temperatures required are too high and at these high temperatures the life of the granular resistance elements and the refractories as used in the furnace at Alliance will suffer severely.

The simplest and the obvious way of melting cast iron borings, and one we have consistently advocated, is a direct application of the arc to the charge either by a 3-ton electrode type of furnace or the Greaves-Etchells type, where two phases of the three-phase supply are attached to the top electrodes and the third phase to the furnace hearth.

One of the most important features in connection with the melting or refining of iron borings is the reduction of sulphur. This increased instead of decreased in the Alliance test. The simple, direct arc type of furnace also occupies considerably less foundry space than the furnace illustrated in your recent article.

FRANK HODSON, President,
Electric Furnace Construction Co.

Philadelphia.

[*It should be stated that the article referred to by Mr. Hodson did not claim any refining efficiency, but was a suggestion regarding melting scrap iron only.—EDITOR.]

"The Man at the Fire" and Others

To the Editor: We were surprised to note in the leading editorial, "Now He Is Bossing Dad," of the July 13 issue of *Chemical and Metallurgical Engineering*, an agitated criticism of our recent advertisement, which appeared on the front cover of THE IRON AGE in the form of the poem, "The Man at the Fire."

We are sorry to have been responsible for any censure your publication may have suffered from our illustrious and esteemed friends of *Chemical and Metallurgical Engineering*, but at the same time we are amused at and pleased with the results of our advertising effort.

We believe if the poem had been carefully studied the editorial criticism would never have been written, because the poem warns against "rule of thumb" methods.

Fortunately our position in the metallurgical field is so sound, viewed from the standpoint of progressiveness in either manufacturing or heat treating methods, that we cannot take seriously the conclusion of the editorial as contained in the four points—a, b, c and d.

We are proud of the fact that one of our officials is a poet as well as an expert maker of fine steel. The criticism has inspired further effort and our opinion of and answer to the editorial can be best expressed as follows:

The Practical Man or the Technical Man—
Which has the right to boast
That he is the one that brings success,
That Industry needs him most?

The driving wheel or the steering wheel,
Ignition or carbureter,
Which is the most essential part?
Which would you call the better?

Airman, gunner or engineer—
Which do you think did more?
General Staff or infantryman—
Who was it "won the war"?

If by a chance you had the power
To fashion yourself again,
Would you omit your arms and legs
And put in an extra brain?

Then let us forget this foolish talk
Of "whom do we most require";
Why—the Technical Man and the Clerical Man
And the Practical "Man at the Fire"!

FIRTH-STERLING STEEL CO.,
Roy H. Davis, General Manager.

Pittsburgh, July 29, 1921.

Census Bureau Will Issue Price Bulletins

WASHINGTON, Aug. 2.—Following the announced greater activity of the Department of Commerce in the economic-statistical field, the Bureau of the Census is preparing to issue at once a monthly compilation of building material prices, along with those on other commodities. The building items will number about 25, upon which it is proposed to secure prices. Among the products to be included are nails, pipe, reinforcing steel bars, structural steel, lumber, cement, etc. Price information is to be obtained from builders' exchanges throughout the country. The figures will represent prices paid on the first of each month by contractors delivered at a local distributing point, such as car, siding, pier, yard, or warehouse.

Farm Implements Manufactured in 1920

Gas tractors stand far above all other items of farm implements in value produced last year. According to a bulletin of the Department of Agriculture, there were 203,207 tractors made by 90 firms, the aggregate value being reported at $193,563,000, or an average of $953 each. Four-fifths of these were sold in the United States; 29,143 were exported and about 11,000 added to stocks. Other articles, under the same heading of farm equipment, which were made in 1920, are shown in the following table:

Manufacture of Farm Equipment in 1920

Implements	No. of Firms	No. Manufactured	Total Value	Average per Unit
Gasoline tractors	90	203,207	$193,563,000	$953
Steam traction engines	15	1,766	4,661,000	2,639
Plows and listers	79	1,361,578	43,222,000	32
Tillage implements	92	.....	22,919,000	...
Planting machinery	84	472,248	20,097,000	43
Cultivating machinery	61	580,179	15,186,000	26
Haying machinery	29	411,556	24,703,000	60
Harvesting machinery	53	232,177	41,015,000	177
Machines for preparing crops for market or use	128	196,772	35,612,000	181
Horse-drawn vehicles	85	449,095	42,423,000	94
Other items	..	.....	93,544,000	..
Total	583		$536,945,000	

It will be noted that the total value produced was $536,945,000, of which $471,442,000 represent the value of domestic sales, while sales for export account for $78,614,000.

In a recent interview at Youngstown, Ohio, H. Koppers, maker of by-product coke ovens, expressed the belief that Germany will get back to normal as soon if not sooner than France or England. The fact that Germany is not hampered by upkeep of extensive armament is assisting materially in her industrial rehabilitation, it was stated.

TARIFF BILL PLANS

Decision as to American Valuation May Have Important Effect on Rates

BY L. W. MOFFETT

WASHINGTON, Aug. 2.—Recognizing that determination of its policy on the American valuation basis for assessing duties is the first essential to framing a tariff bill, the Senate Committee on Finance will go into executive session on Thursday of the present week to reach an agreement on the subject. This system of fixing ad valorem rates has been the source of widespread differences which have been presented to the committee since it began its hearings, and the question plainly is one which underlies the entire matter of arriving at duties to be carried. In the event the American valuation as passed by the House is adopted, it is known that there will be a general revision downward of rates throughout the bill. Should the American valuation plan be eliminated, prominent members of the committee, some of whom are not attracted by the plan, contend that the whole bill will have to be worked over as to administrative and other features and that hearings will be more extended than was originally planned. Because of the desire to close the hearings as early as possible and to get the legislation enacted, they apparently are ready to adopt the plan as it passed the House or to accept it in a modified form.

Compromise Plan

A probability of the latter alternative being decided upon is seen in the fact that the Treasury Department has prepared a tentative draft for the committee which is said to follow the lines suggested by George C. Davis, in charge of the comparative value report bureau, customs division, Treasury Department, in New York. He opposed the plan carried in the House bill on the ground that it would be difficult of administration and that it would also be difficult to adjust the rates to meet the new plan. His idea is to have the American producer prove the comparability of his article with that which is imported and in competition with the domestic product. Where the comparability was shown, the imported product would be appraised at the domestic price, but not the gross, and taken out of the domestic price would be the rate of domestic transportation, the bringing of the merchandise to the United States, and a reasonable profit and expense, not to exceed 8 per cent. This is explained as building from the American selling price of the domestic article a fair and constructive foreign market value to be applied to the imported articles that are directly comparable to the American-made article. In instances where the interested party comes to some one, preferably the Secretary of the Treasury, Mr. Davis told the committee, and proves the comparability, the secretary could proclaim the article, and all such articles coming from foreign countries would be appraised on those articles. As to the remainder, where none can be appraised, the duty would be assessed at the foreign market value.

Wide Difference of Opinion

The variance among Government officials regarding the plan was shown by the testimony of Chairman Thomas W. Page of the Tariff Commission, who opposed it, and of two other members of that body, William S. Culbertson and William Burgess, who favored it. Mr. Walker was of the opinion that the plan "will cause confusion in the customs laws, will make foreign business highly speculative and add another element of uncertainty to a business situation already chaotic." He thought, however, that the plan could be administered successfully "ultimately." Mr. Culbertson said that the plan "has become important at the present time because of the very disturbed economic conditions in foreign countries, and I feel, personally, that it will tend to help meet the very unusual conditions which you are confronted with today." Mr. Burgess said that "the advantages of the American valuation plan so far outweigh the difficulties as to make the latter seem insignificant." Domestic interests strongly urged the adoption of the plan, while importing interests are strongly opposed to it.

The plan has found strength in the fact that, aside from the proposal of Mr. Davis, no satisfactory substitute has been offered for it, and it is generally conceded that it would be a difficult problem to fix ad valorem duties on the existing foreign market valuation system with an idea of protection in mind.

The Metal Schedule

The American valuation plan could be applied to the metal schedule without any difficulty, it has been stated by members of the committee, because of "comparability" and "competitive" nature of the products carried in it. Moreover, the plan would not apply to the greater number of the metal products because of the specific duties applying. But the question of determining a policy as to the plan is vital to all schedules because of the effect it will have on rates. It appears to be a foregone conclusion that ad valorem rates in the metal as well as in other schedules will be reduced by the Senate Committee if the American valuation plan incorporated in the House bill is adopted. At least that is plainly the intention of leading Republican members of the committee, and it goes without saying that lowering of rates would be acceptable to the Democratic members. Whether specific rates may be lowered apparently is to be determined.

The committee will continue hearings over to-morrow, after hearing witnesses on the American valuation plan and on the chemical schedule, and after determining its policy at executive session, to be held Thursday, will resume hearings on the schedules. It is not possible to say when the metal schedule will be reached, but the committee is expediting the hearings, and it is assumed the iron and steel producers will be given an opportunity to be heard soon. The committee is accepting briefs and statements, and it is said that a number have been filed by iron and steel interests, with attacks on House duties on ferroalloys as a notable feature.

Hot mills of the N. & G. Taylor Co., Cumberland, Md., which have been idle since June 30, were started up July 25.

The Iron Age and Its Readers

The Composite Price shown week by week following our "Comparison of Prices" table (appearing this week on page 293) is the average of the prices of the seven principal forms of finished steel.

Steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets, the seven products whose prices enter into the composite, constituted 88 per cent of the country's output of finished steel in each of the past two years. They are the forms of finished steel most commonly thought of in gauging consumption or market prices at a given time. In the 10 years preceding the war the average of the weekly quotations on these seven products was 1.684c. per lb. This week the Composite Price is 2.364c. per lb. or 40 per cent above the 10-year pre-war average.

IRON OUTPUT VERY LOW

July Production 7605 Tons Per Day Less Than in June

Down Close to 1903 Record—Net Loss of Seven Furnaces

A new low record for many years was made in July for the output of the blast furnaces of the country. According to the data gathered by telegraph, the pig iron output last month was close to the lowest record made in the last 19 years. In the panic of 1903-04 the country's output in December, 1903, was 846,695 tons, or 27,312 tons per day, while in January, 1904, the corresponding figures were 921,231 tons, or 29,717 tons per day. The July total this year falls between these two figures at 864,555 tons, or 27,889 tons per day. This is a decline of 199,278 tons, or 7605 tons per day from the June figures, or nearly 20 per cent.

The production of coke and anthracite furnaces in July, a 31-day month, amounted to 864,555 gross tons, or 27,889 tons per day, as compared with 1,064,833 tons, or 35,494 tons per day in June, a 30-day month, and with 846,695 tons, or 27,312 tons per day in December, 1903, a 31-day month. In July, 1920, the total output was 3,067,043 tons, or 98,931 tons per day. The total furnaces in blast on Aug. 1 was 69, as compared with 76 on July 1 and with 201 on Jan. 1. The 69 furnaces in blast Aug. 1 had a capacity of 28,175 tons per day, as compared with 32,195 tons per day for the 76 furnaces on July 1. There were 10 furnaces blown out or banked and three blown in in July, making the net loss for the month seven furnaces and for the last 10 months 250 furnaces. Only about one-sixth of the total normally active furnaces of the country were in operation on Aug. 1.

The July output of ferromanganese and spiegeleisen was about 1000 tons larger than that in June, or 5524 tons, as compared with 4536 tons. Of the July total only 1509 tons was ferromanganese. This is the smallest production of this alloy ever recorded.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from July, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
July	71,954	26,983	98,937
August	72,740	28,789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94,473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	39,768
May	73,015	108,422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107,820	110,354	78,340	98,931	27,889
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	.....
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	.....
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	.....
Nov.	101,244	110,394	106,859	111,802	79,745	97,830	.....
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	.....

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302,260	3,015,181	2,416,292
Feb.	2,645,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
Apr.	3,384,960	3,288,211	2,478,218	2,739,797	1,193,041
May	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
June	3,270,055	3,323,791	2,114,863	3,043,540	1,064,833
July	3,342,438	3,420,988	2,428,541	3,067,043	864,555
7 mos.	22,412,330	21,423,560	18,462,349	21,206,029	10,292,721
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	.....
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	.....
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	.....
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Total, yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.

Pig Iron Production by Districts, Gross Tons

	July (31 days)	June (30 days)	May (31 days)	April (30 days)
New York	34,407	34,241	37,202	41,223
New Jersey	5,554	6,051	10,291	9,875
Lehigh Valley	24,059	29,929	42,289	45,329
Schuylkill Valley	19,210	21,172	24,471	21,279
Lower Susquehanna and Lebanon Valleys	20,401	25,809	26,491	24,799
Pittsburgh district	185,643	243,025	281,391	304,308
Shenango Valley	none	12,077	27,981	30,763
Western Penna.	47,680	63,802	73,661	70,930
Maryland, Virginia and Kentucky	14,201	15,289	20,781	17,575
Wheeling district	16,167	18,207	17,981	1,991
Mahoning Valley	92,305	88,515	87,090	102,826
Central and Northern Ohio	80,150	116,003	133,801	107,747
Southern Ohio	6,266	25,798	29,103	11,843
Illinois and Indiana	201,175	214,834	249,671	239,585
Mich., Minn., Mo., Wis., Colo. and Wash.	50,764	56,857	65,004	68,058
Alabama	66,573	93,224	94,013	94,910
Tennessee	none	none	none	none
Total	864,555	1,064,833	1,221,221	1,193,041

Capacities in Blast Aug. 1

The following table shows the number of furnaces in blast Aug. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast July 1:

Coke and Anthracite Furnaces in Blast

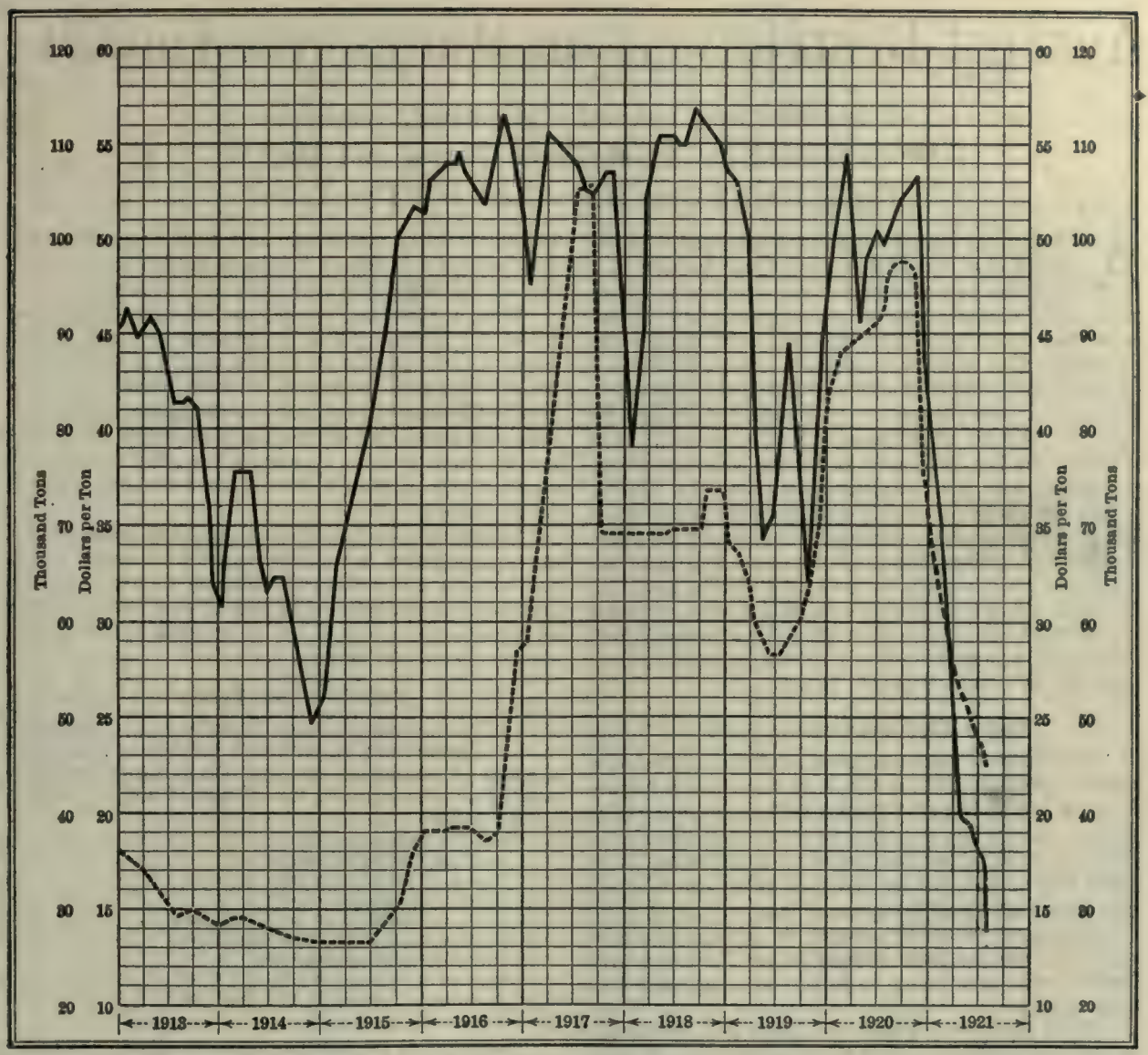
Location of Furnaces	Total Stacks	Aug. 1 In Blast	Aug. 1 Capacity per Day	July 1 In Blast	July 1 Capacity per Day
New York:					
Buffalo	22	3	1,110	3	1,140
Other New York	4	0	....	0	....
New Jersey	4	1	180	1	175
Pennsylvania:					
Lehigh Valley	18	2	775	2	900
Spiegel	2	0	....	0	....
Schuylkill Valley	15	1	620	2	705
Lower Susquehanna	10	1	395	1	380
Lebanon Valley	8	2	260	1	135
Ferro	2	0	....	0	....
Pittsburgh District	55	17	7,000	16	7,550
Ferro and spiegel	4	1	180	1	110
Shenango Valley	19	0	....	0	....
Western Penn.	26	4	1,540	6	2,100
Maryland	6	1	340	1	335
Wheeling District	15	1	520	1	600
Ohio:					
Mahoning Valley	27	7	3,330	6	3,000
Central and Northern	26	5	2,650	6	3,220
Southern	16	1	100	2	200
Illinois and Indiana	42	12	6,125	13	7,000
Mich., Wis. and Minn.	11	1	510	2	850
Colorado and Missouri	6	2	775	2	740
The South:					
Virginia	16	1	110	2	175
Kentucky	7	0	....	0	....
Alabama	41	5	1,655	8	2,880
Tenn., Ga. and Texas	16	0	....	0	....
Total	418	69	28,175	76	32,195

The following furnaces were blown in during July:

The Robesonia furnace in the Lebanon Valley; one Donora furnace of the American Steel & Wire Co. in the Pittsburgh district, and Mary furnace in the Mahoning Valley.

Among the furnaces blown out or banked during July were the following:

The Perry furnace and the second Josephine furnace in western Pennsylvania; the Alleghany furnace of the Alleghany Ore & Iron Co. in Virginia; the last of the four River



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

furnaces in northern Ohio; the Globe furnace in southern Ohio; the last of the three Calumet furnaces in Illinois; the last of the two Mayville furnaces in Wisconsin and the last Clifton furnace of the Alabama Co., the Alabama City furnace of the Gulf States Steel Co. and one Ensley furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,430,022	2,232,455	1,932,159	32,787	23 957	22.228
Feb.	2,209,470	2,181,679	1,625,695	28,105	28 038	29,013
Mar.	2,277,507	2,480,668	1,323,443	26,644	35,275	41,294
Apr.	1,838,677	1,968,542	1,015,621	17,308	27,628	24,310
May	1,586,805	1,128,720	1,024,678	14,604	33,407	9,232
June	1,655,944	2,209,770	883,312	14,254	34,751	4 536
July	1,906.604	2 230.567	715,664	14.805	36,789	5,524
Aug.	2,108,566	2.254,943	.....	17,419	36,985	.....
Sept.	1,828,613	2,247,250	.....	20,631	39,546	.....
Oct.	1,295,690	2,393.644	.....	20,238	34.786	.....
Nov.	1,727,656	2,150,075	.....	19,964	26.944	.....
Dec.	1,916,249	2,047,167	.....	15,718	28,023	.....

Bar Iron Association Agreement with Amalgamated

CHICAGO, Aug. 1.—The Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers came to an agreement on Saturday last on tonnage rates for iron puddling and rolling. The new scale comes within 3 per cent of the pre-war rates. The workers accepted a reduction to the scale of 1919-1920. On the basis of the new agreement, the rate for puddling at the July-August average selling prices of $2.30, under which the men are now working, is $11.38 per gross ton compared with a rate of $12.52 a ton figured on the same selling average. This is a reduction of 9.01 per cent. On bar mill heating, the recent rate was $1.116 per ton based also on the $2.30 average, and the new rate is $1.041 per ton. On ½ and 9/16 in. sizes the rate is reduced from $2.567 to $2.445 and on ¼ in. the reduction is from $5.452 to $4.957. Taking the base rate of $1 under the old scale, the new agreement is 62 per cent above base, whereas the 1919-1920 agreement was 74½ per cent above base.

The National Works of the American Sheet & Tin Plate Co., Monessen, Pa., a plant of 25 hot tin mills, will resume operations Aug. 1, after a shutdown of more than three months.

Against Restrictions on Manganese Imports

Domestic Ores, if Used Exclusively, Would Be Exhausted in Six or Seven Years, and High Grade Native Ores Would Last But Two Years

AN important contribution to the literature of manganese ores and of ferromanganese is made in a pamphlet prepared by the raw materials department of the Midvale Steel & Ordnance Co. and published under the title "Why the Importation of High-Grade Manganese Ores and Ferromanganese Alloys Should Not Be Restricted," and the sub-title, "National Defense Endangered by Any Restriction on Imports of Manganese Ores and Alloys of Manganese." The compiler has brought together the facts as to the consumption of manganese ores and ferromanganese in the United States, the sources of supply and the amount and quality of domestic manganese ores, in support of the argument that the dependence of the American steel industry is very largely on foreign supplies and that therefore the admission of manganese ores and of foreign-made ferromanganese should not be restricted. The line of argument followed in the pamphlet is indicated in the summary quoted below:

Native High Grade Ores Scarce

"For the steel industry, manganese is an absolutely essential raw material for which no substitute is known. As an alloy, it is added to the steel as the final constituent and carries with it some deleterious impurities. To keep these impurities down to a minimum, high grade alloys must be used and such alloys can be made only from high grade manganese ores.

"Such ores occur abundantly in foreign countries but are almost entirely lacking in the United States. Lower grade ores occur in fairly large quantities in this country.

"From these lower grade ores alloys are made which can be and are largely used by manufacturers of steel, but the higher grades, desirable in nearly all cases, are necessary in the fabrication of such important lines as plates, structural steel, open hearth rails, spring steel, locomotive, freight and passenger car wheels, tires, axles and all war materials.

"While inferior alloys made from domestic ores were used as a matter of necessity during the war, this was only done by sacrificing quality of product.

"Domestic reserves of manganese-bearing ores cannot meet all or even a major part of the nation's requirements, although they can to some extent be substituted. If they could be used exclusively the supply would be exhausted in six or seven years, leaving this country with no reserves of this raw material so essential in times of war.

"Domestic ores are as a rule in small deposits, widely scattered, to a considerable extent remote from railroads and at great distances from points of consumption. Rail transportation alone frequently amounts to more than the delivered cost of higher grade foreign ores.

Tariff Cannot Create Ore Deposits

"The proposed tariff on manganese ores and manganese alloys will not protect an American industry from foreign competition. The industry of mining manganese ores does not and cannot exist in this country. A tariff cannot create raw materials. It will force to some extent the use of inferior substitutes produced by expensive methods and transported long distances by rail at excessively high rates. The importation of foreign manganese will continue because requirements can be met in no other way. The net result will be to add to the cost of steel for domestic consumption and put an increased burden on that portion of the industry which seeks a foreign market.

"Only a few exceptionally well located manganese mines in this country can be operated profitably at the prices which will prevail if this tariff [as proposed in the Fordney bill] is imposed, and the benefits from the tariff will extend to but a few individuals. It does not appear to be the part of wisdom to stimulate artificially the depletion of our inadequate reserves in order to benefit a few at the expense of our individual and national welfare.

"Manganese is the only raw material necessary for the production of steel, the reserves of which within our borders are entirely inadequate to meet requirements in times of war. The lack of this material must be considered as one of the very weak points in our system of national defense."

Survey of the Problem

The facts concerning the importance of manganese to the manufacture of steel and foreign and domestic supplies of manganese ores and the domestic manufacture of ferromanganese are presented under the following heads:

1. Uses of Manganese
2. Ores and Alloys of Manganese
3. Alloys in the Manufacture of Steel
4. Sources of Supply
5. Domestic Manganese Ore Production
6. Requirements of the Steel Trade
7. Reserves of Manganese Ore
8. Quality of Foreign and Domestic Ores
9. Location of Domestic Ore Reserves with Reference to Points of Consumption

Two maps of the United States are given. The first indicates, State by State, the reserves of manganese ores of 35 per cent manganese and over; the second shows the distance of the principal domestic manganese ore supplies from the approximate center of the steel producing industry.

Sources of Supply

"Previous to the late war," the pamphlet says, "95 per cent of the manganese consumed in the United States was imported from India, Russia and Brazil. Some of it was imported in the condition of ore and some had been smelted in foreign countries and entered the United States as ferromanganese. Because of the great necessity of conserving shipping space, an effort was made in the late years of the war to substitute wherever possible lower grade domestic ores and alloys, with the result that in 1918 the domestic output supplied 40 per cent of the requirements as compared with 5 per cent in former years. This increase in the use of domestic ore, however, was effected only by submitting to a material sacrifice in the quality of the product. [It should be stated also that the stimulus to such a production of domestic manganese ore was an advance in the price of ferromanganese to ten times the price prevailing just before the war. The peak was $450, while the average of weekly quotations was $327 in 1917 and $277 in 1918.—EDITOR] In 1918 the imports amounted to 491,303 tons of ore and 27,168 tons of ferromanganese, equivalent to a total of 559,223 tons of ore."

Imports and Domestic Production

In the following table the imports of manganese ores and of ferromanganese are shown for 1910 to 1920 inclusive and a comparison is made of imported ores and domestic production:

Year	Imports Ferro-manganese, Gross Tons	Imports Ore, Gross Tons	Imports of Ore and Alloy in Terms of Ore Averaging About 50% Mn.	Domestic Product'n 35% Plus Ore	Domestic Product'n 15–35% Ore†
1910	114,228	242,348	771,266	2,258	61,101*
1911	80,263	176,852	554,361	2,457	44,437*
1912	99,137	300,661	548,503	1,664	51,517*
1913	128,070	346,070	666,245	4,048	59,403*
1914	82,997	283,294	490,786	2,635	98,265*
1915	55,263	320,778	458,935	9,613	70,202
1916	90,928	576 321	803,461	31,474	176,130
1917	41,969	629,972	734,894	129,405	730,759
1918	27,168	491,303	559,223	305,869	818,003
1919	33,022	333,344	415,899	55,322	211,632
1920	59,000	607,000	754,500	94,000	416,000

In the 11 years 1910-20 about 62,000 tons of spiegeleisen was imported, and this is represented in the figures for ore in the third column of the table.

*Includes ores containing less than 15 per cent manganese.

†Exclusive of ore used for flux.

Requirements of the Steel Trade

The production of steel and the consumption of manganese ores in the making of ferromanganese are set forth as follows:

During the years 1915 to 1919 inclusive the average annual production of steel amounted to 39,823,800 tons. The average consumption of imported manganese in terms of ores was 592,500 tons, domestic ores, over 35 per cent manganese, 106,300 tons—total ferro-grade ores 698,800 tons. Ores from 10 to 35 per cent manganese—spiegel grades—401,300 tons. The ferromanganese consumption amounted to 273,670 tons per year.

The average production of steel for these years, 40,000,000 tons, is probably a reasonable estimate of the future production in this country over a period of ten years. Substitution of low-grade alloys was carried to the limit during these years. The normal consumption of ferro would exceed the above figures with a corresponding decrease in the use of spiegel.

From these calculations, based on records of recent years, it appears that the steel manufacturers in this country will require about 300,000 tons annually of high-grade ferromanganese to maintain a normal rate of manufacture. This is the equivalent of about 750,000 tons of high-grade manganese ore. The experience of the last few years has shown that the lower grade domestic product can, to some extent, be substituted, but the use of high-grade alloys in a very large proportion of cases is absolutely necessary. The above tables of imports and production clearly show how, with the necessity for substitution largely removed, the use of domestic ores has been practically discontinued.

Reserves of Manganese Ores

The pamphlet next considers the reserves of manganese ores, particularly at home:

"(1) Foreign: Russian reserves of high grade ore are estimated by various observers at from 50,000,000 to 100,000,000 tons, Brazil, India and Chile likewise contain large reserves of high grade ore, although definite estimates of tonnage are not available.

"(2) Domestic reserves: During the war the United States Geological Survey working in the interests of the War Industries Board examined nearly all known deposits of manganese and promising localities in the United States.

"A summary of domestic reserves in 1918 from Mineral Resources for 1919 as determined by the United States Geological Survey is given below:

	Gross Tons
Manganese ores containing 35 per cent manganese and average 40 per cent	699,750
Possible additional reserves	1,130,000
Manganiferous ores containing 5–35 per cent Mn, over 20 per cent silica and less than 30 per cent iron	1,323,000
Possible additional reserves	480,000
Manganiferous iron ores containing 5–35 per cent manganese, over 30 per cent iron and less than 20 per cent silica	16,157,800
Additional reserves in prospect	2,150,000
Total all grades	21,940,550

Life of Domestic Supplies

In discussing the domestic supply of manganese ores in their relation to the requirements of steel production in the United States the pamphlet makes this summing up:

"Of the domestic reserves 699,750 tons are suitable for the manufacture of *low grade* ferromanganese with a possible domestic 1,130,000 tons additional. While most of these ores are too high in silica and low in manganese to be of the most desirable quality, they will make a usable grade of ferromanganese. The known and possible reserves *represent about two years' consumption of steel makers in the United States.*

"Of the balance of the reserves estimated, 11,374,000 tons on the Cuyuna Range in Minnesota contain less than 10 per cent manganese and high percentages of phosphorus, making them unfit even for the manufacture of spiegeleisen.

8,719,800 tons contain a possible average of 18 per cent manganese and although much of this is high in silica, can be used for the manufacture of spiegeleisen or silico-spiegel and will produce approximately 3,480,000 tons of these alloys. The manganese content of this spiegel will be less than one-fourth as great as standard ferromanganese, so this is the equivalent of about 800,000 tons of ferromanganese *or two and one-half years' supply.*

"It thus appears that the domestic reserves, both known and possible, which can be used to make the standard alloys or an alloy approaching them in composition, *amount to about four years' supply for the steel trade.*

"The 11,374,000 tons classed as unsuitable for the manufacture of spiegeleisen contain about 1,135,000 tons of manganese. If it be granted that this manganese can be effectively utilized as high manganese pig iron, thus saving an equal amount of additions, and an effective recovery of 75 per cent be assumed, 851,750 tons of manganese are added to the reserves. This would prolong the life of domestic reserves *about two and one-half years.* All the manganese ores and manganiferous iron ores containing over 5 per cent manganese estimated in the United States will meet domestic requirements for but six or seven years."

Brick Manufacturers Reduce Prices

PITTSBURGH, Aug. 1.—Effective July 28, manufacturers of fire clay and silica brick outside of Kentucky and the Chicago district, reduced prices $2 to $3 per 1000. Prices of Kentucky fire clay brick were cut about a week earlier, as were also those for Chicago district silica brick. A few Pennsylvania makers of fire clay brick still are quoting high duty brick up around $45 per 1000, but the general maximum is $40 and this price refers chiefly to small lots. The going prices on large lots of this grade range from $34 to $37. There has been some increase in blast furnace and steel works activities in the past week or two, and this development finds reflection in a large inquiry for brick. Republic Iron & Steel Co. is referred to as a prospective buyer. The reduction in prices may be ascribed to lower producing costs, through a reduction of 10 per cent in wages, common labor going from 30c. to 27c. per hour, and also to a realization that recent quotations could not be obtained. Actually, the cut is merely public affirmation of prices which previously had been named against inquiries. Magnesite brick also are lower, because supplies are large and competition for the small amount of business offered is extremely sharp.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $40.00	$28.00 to $34 00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	40.00 to 45.00	35.00 to 38.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 42.00
Birmingham		45.00
Magnesite Brick:		
Standard size, per net ton		65.00 to 70.00
Chrome Brick:		
Standard size, per net ton		60.00 to 65.00

In June the United Engineering & Foundry Co., Pittsburgh, shipped 2300 tons of finished products from its Youngstown district plants, as compared with 1900 tons in May. Ninety per cent of the June shipments was on foreign orders, all of which were boxed and crated for ocean shipment. Much of this material was consigned to France and some to Japan. The company has erected one 2000-tons and one 800-ton forging press at the U. S. Navy yard, Mare Island, Cal.

COKE WAGES REDUCED

Frick Company Lowers Rates Ten Per Cent—May Resume Operations

UNIONTOWN, PA., Aug. 1.—A further reduction of 10 per cent in wages, which would affect, under normal operations, 40,000 men, was announced in notices posted at noon July 30 by the H. C. Frick Coke Co., subsidiary of the United States Steel Corporation. The new scale carries Frick wages back approximately to the wage scale of Nov. 10, 1917. The rates of the new scale, compared with those of the independents, follow:

	Frick Scale— Aug. 1, 1921	May 16, 1921	Independent
Pick mining and loading room and rib coal per 100 bu.	$2.38	$2.65	$2.06
Pick mining and loading heading coal per 100 bu.	2.63	2.92	2.27
Pick mining and loading wet heading coal per 100 bu. (Pick miners to drill holes and furnish powder)	2.77	3.08	2.45
Loading shortwall machine coal per 100 bu. (Company to drill holes and furnish powder)	1.50	1.65	1.50
Drawing coke per 100 bu. charged	1.40	1.51	1.30
Drivers, rope riders, cagers, track-layers, blasters, timbermen (shafts and slopes) per day (8 hr.)	5.05	5.55	4.55
Same (drifts) per day (8 hr.)	5.00	5.50	4.50
Assistant track-layers and timbermen per day (8 hr.)	4.35	4.75	3.95
Fire bosses per day	6.30	7.00	5.40
Mine laborers per day (8 hr.)	4.15	4.55	3.75
Leveling per oven (hand)	.20	.22	.19
Outside day labor per day (9 hr.)	3.00	3.30	3.00

Action of the Frick company at this time was unexpected. While observers had expected a further reduction from the May 16 scale, still none believed that the reduction would come before fall. The independent operators, on July 1, put into effect their second reduction of the year, carrying approximately a 20 per cent reduction and which now is still beneath the new scale put into effect by the Frick company to-day.

The action is considered highly significant and as indicative of an early resumption on the part of the Frick company. All coke ovens of the Frick company are idle and coal production is now about 35 per cent normal.

The Pittsburgh Steel Co., which resumed operations at Monessen this week to the extent of giving employment to an additional 2500 men, ordered simultaneously resumption at Alicia No. 1 and Alicia No. 2 mines, near Brownsville, which the company recently acquired. The mines are operating at about 70 per cent normal under reduced wage scales and shipments are being made by river. Three hundred ovens were put into operation by the Bourne-Fuller Co. this week. Reports that this company has landed a part of the Spencer-Wickwire contract lack confirmation.

Promoting Group Enthusiasm

United Effort is the title of the publication started by the United Engineering & Foundry Co., Pittsburgh, for its employees, the first issue of which appeared in July. In an introductory article, President F. C. Biggert, Jr., states that "an organization is successful in proportion to the amount of 'group enthusiasm' which it possesses. The man whose every hammer blow is for the good of the group is among the most valuable assets an organization can have. His is the spirit of all the great things men have accomplished. He is possessed of that high type of self-interest which realizes that what is good for the group is good for him. He is a 'getter-done.' He does not stand out momentarily as does the individualist, but slowly and surely takes his permanent place of importance."

It is to promote this spirit of "group enthusiasm," Mr. Biggert explains, that the company instituted social and business meetings of department heads, a suggestion system, provided group life insurance and publishes the monthly bulletin.

Effective Aug. 1, the American Can Co. of New Castle, Pa., reduced wages of its employees 10 per cent. The company's plant is operating at 80 per cent, which rate it is planned to increase if the present volume of business continues.

MORE MEN EMPLOYED

Large Increase in Forces Working in Detroit Automobile Plants

DETROIT, July 30.—The question as to whether automobile sales are really increasing and whether the outlook in the automotive industry is really brighter is best answered by the labor statistics that cover the automotive plants.

The report of the Employers' Association of Detroit for the two weeks of July 12 and 19 show that a total of 6500 men was added during that period. On July 5 there were 108,798 men employed in the 79 plants of the association, and on July 19 there were 115,397. Normally three-quarters of these men would be in the automotive plants.

The Packard Motor Car Co., during the last week has added 700 men to the payrolls, making a total of 4000 now employed in the plants. This because of additional business on hand and in sight.

Figures compiled by Detroit newspapers for Saturday, July 30, show that automotive production in the city has now reached 87 per cent of normal.

Conditions in Indianapolis

The foundrymen's association of Indianapolis has just made a survey of the labor situation in foundries in that city to counteract rumors which it was reported the molders' union was circulating, to the effect that union foundries in Indianapolis, following their recent wage reduction from 90c. to 75c. per hour, eight hours per day, had entered into a year's agreement with the union. The association in its report states that there are 34 foundries in Indianapolis, one of which has always been a union shop. Of the 33 remaining foundries, eight are union shops, but only two of these have any agreements whatever with the molders' union for any definite period of time, these two being stove foundries. Five are non-union shops, 19 are open shops and one has not started operations. The 24 open and non-union shops do not deal with the union at any time. The six union foundries other than the two stove foundries have no agreement with the union, and since the 15 cent reduction in wages, their molders have been working from day to day without any agreement. The two union stove foundries are bound by an agreement with the Stove Founders' National Defense Association. A third stove foundry is operated on an open shop basis.

May Not Sign Amalgamated Scale

Recent developments indicate that the A. M. Byers Co., Pittsburgh, operating the largest puddling mill plant in the world at Girard, Ohio, may not sign the bar iron agreement with the Amalgamated Association of Iron, Steel and Tin Workers this year. The company was not a party to the conference which was held at Atlantic City in June nor to the conference last week in Chicago. It was announced that the company would await developments and indicate its position following scrutiny of the scale agreed upon. It is stated that some extra concessions may be demanded from the boilers before the scale is signed. In years past the Byers company refused to sign the Amalgamated scale and accepted instead the agreement of the Sons of Vulcan, composed of dissatisfied members of the Amalgamated who broke away from that organization. Subsequently there was a fight against the Sons of Vulcan scale and the company went back to the Amalgamated scale, thereby causing the virtual disintegration of the Sons of Vulcan.

The works of the Nash Motors Co. at Kenosha, Wis., is now operating five and one-half days a week with 3000 employees. Its payroll there never exceeded 5000.

Because since last fall some employees have had wages reduced three times, some twice and others only once, the Spencer Wire Co., Spencer, Mass., Wickwire-Spencer Steel Corporation, has placed the payroll on an average scale, which represents a wage reduction average of about 8 per cent. The plant has been operating on a four-day week schedule, but beginning Monday, last, will operate five days a week.

Jones & Laughlin Production

A reduction in the rate of pay of common labor to 30c. an hour from 37c. will become effective Aug. 1, in the works of the Jones & Laughlin Steel Co. It is understood that adjustments will be made in the pay of all other wage and tonnage employees, effective the same date. The new rate will be approximately the same as already has been established by the other Pittsburgh and Valley independents.

Reductions in Chicago

Following the example of Eastern steel mills, Chicago district steel makers are making further cuts in wages. The Republic Iron & Steel Co. at East Chicago, Ind., and the Interstate Iron & Steel Co., East Chicago, Ind., and Chicago, have reduced common labor to 30c. an hour. The Inland Steel Co. expects to take similar action.

In the Field of Labor

The final draft of a blanket agreement designed to prevent strikes and lockouts in the building industry and to fix wage scales by arbitration is being voted on this month at St. Louis by the unions affiliated with the Building Trades Council and the employing contractors in the Building Industries Association.

Union blacksmiths, helpers and dropforgers employed at the New York, New Haven & Hartford Railroad Co. Readville, Mass., shops have voted to reject working rules submitted by the management and have demanded the retention of the national agreement put into effect under Government control of the carriers.

Molders in Boston and the vicinity, for the second time within a year, have accepted a reduction in wages. The present reduction is from $6.25 per 8-hr. day or 78c. plus per hr. to $6 per day or 75c. pe hr., is effective Aug. 15, and continues until Feb. 15, 1922. The previous wage agreement ran for three months only. The $6 per day rate compares with $7.20 per 8-hr. day or 90c. per hr. during the war, and with $3.50 per 9-hr. day or practically 39c. per hr. prior to the war.

Employees' Suggestions

Following adoption of a plan which would enable employees to make suggestions for their welfare and that of the company, the United Engineering & Foundry Co., Pittsburgh, received from its various plants 145 suggestions, of which 62 were accepted. Prizes as high as $100 were awarded for these ideas. One useful suggestion was to the effect that a cheaper form of letter head be used for inter-department letters. The interest of an employee in the company's efficiency was revealed in a suggestion that tool room service be improved so as to prevent the loss of time due to a line of men waiting at the tool room window. A scheme of insurance was proposed, which, while not adopted, had some influence in urging action by the company on another plan which it had under consideration and has since inaugurated.

The P. & F. Corbin plant, American Hardware Corporation, New Britain, Conn., has established a 44-hr. weekly schedule, as against 32 heretofore.

The Milwaukee works of Nash Motors Co., Kenosha, Wis., manufacturing four-cylinder passenger cars exclusively, which resumed operations July 5 after a recess of a month, has increased its working force to capacity, namely, 1000 men, and is producing 50 cars a day, the limit of existing facilities. Construction of additional units, including a foundry, probably will not be undertaken until next spring. B. W. Twyman is general manager at Milwaukee.

The New York Central Railroad has resumed operations in its Collinwood shops at Cleveland, employing about 500 men, or half the normal force. These shops have been closed five months.

The Timken-Detroit Axle Co., Canton, Ohio, has resumed operations on a 50 per cent schedule.

PLANT OPERATIONS

Increased Operations at Pittsburgh and Wheeling

PITTSBURGH, Aug 1.—Steel plant activities in this and nearby districts are on the increase and while it is probable that plants which have started up in the past week or ten days may be forced to slow down again before steady work is established, it is generally believed that early July saw the low ebb of operations. A number of idle units started up last week after suspensions varying from a few weeks to several months, and this week has brought several additions to the active list. Exhaustion of mill stocks, due to more frequent, if not of really heavy, demands from consumers and distributers, is behind the resumption at some plants, while at others it may be ascribed to an accumulation of orders during the recent period of non-production. It is probable, therefore, that in the immediate future plant activities will be intermittent, for real price stabilization is lacking and consequently, until price declines seem to have run their course, buyers will continue to order supplies only when needed. Such buying is not conducive to the building up of order books or of constant mill and steel works operation.

In the Wheeling district, the Wheeling Steel & Iron Co. to-day started up a portion of its tubular plant at Benwood, W. Va. The schedule for this week follows:

Wheeling Steel & Iron Co.—Top furnace idle; Martins Ferry furnace idle; Belmont furnace and plate mills idle; Benwood steel plant and tube works operating 40 per cent; Yorkville plant idle.

LaBelle Iron Works—Steubenville plant operating 30 per cent; Wheeling plant operating 40 per cent.

Whitaker-Glessner Co.—Martins Ferry plant idle; Beech Bottom plant idle; Portsmouth plant idle.

U. S. Steel Corporation—Carnegie Steel Co. plant, Bellaire, idle; Laughlin plant, American Sheet & Tin Plate Co., Martins Ferry, idle; LaBelle plant, American Sheet & Tin Plate Co., Wheeling, idle; Riverside plant, National Tube Co., Benwood, idle.

On July 27 the Pittsburgh Steel Co. turned on the blast at one of its blast furnaces, which had been idle since July 1, and resumed making steel in six open-hearth furnaces at Monessen, Pa. This represents about 50 per cent of capacity. On June 30, the entire plant shut down. National works of the American Sheet & Tin Plate Co., also at Monessen, Pa., resumed operations today after a suspension of several weeks. Of the 139 blast furnaces in the territory extending from Johnstown to Wheeling, W. Va., to Pittsburgh and Youngstown, 29 now are in blast. These are distributed as follows: Cambria Steel Co., 2; Carnegie Steel Co., 14; Jones & Laughlin Steel Co., 2; Weirton Steel Co., 2; Pittsburgh Steel Co., 1; American Steel & Wire Co., 1; National Tube Co., 2; Weirton Steel Co., 1; Republic Iron & Steel Co., 1; Youngstown Sheet & Tube Co., 2; Brier Hill Steel Co., 1; Sharon Steel Hoop Co., 1; American Manganese Mfg. Co. (merchant), 1.

An interesting feature in connection with the operation of the active blast furnace of the American Steel & Wire Co., which is at Donora, Pa., and recently went into blast, is that the experiment of operating it on three 8-hr. shifts is being tried. This step primarily is for the purpose of providing work for as many men as possible, but it also will give the management a line on the possibilities of this plan.

Railroads Add to Forces

The Union Pacific Railroad has ordered the taking back of 1500 men on the Mountain division between Cheyenne, Wyo., and Ogden, Utah. The Chicago Great Western Railroad has opened the locomotive department of its shops at Oelwein, Iowa, which had been shut down for two months. Several hundred men were re-employed. The officers of the Chicago, Rock Island & Pacific Railroad have voluntarily recommended to the board of directors and the board has approved a 10 per cent reduction in the pay of all executive officers and also such a reduction in the pay of supervisory officers as will meet changed conditions.

Iron and Steel Markets

PRICES IRREGULAR

Further Business at the Low Figures of Last Week

New Low Record in Pig Iron Production—Somewhat Better Operation

The latest transactions in steel products have shown substantially the same low prices that were uncovered in the previous week, with here and there a new decline, sheets and plates apparently being the lines of least resistance. Willingness to name a price that will take the business, where the tonnage is larger than usual, is still the attitude of the leading steel companies, albeit sentiment is better in view of a somewhat larger volume of orders and inquiries and the feeling that improvement in other industries will soon be felt in iron and steel.

Some publicity has been given to what is called a new and lower schedule of prices by the Steel Corporation, particularly on bars, plates, shapes, tin plate and sheets, but the figures given have been the basis of ordinary transactions for more than a fortnight.

The general average of steel mill operations in the Pittsburgh, Youngstown and Wheeling districts is somewhat higher this week, due largely to the starting of departments that have been idle in some cases for several weeks. A maintenance of the new rate of activity is dependent in most cases on the developments of the next few weeks.

The returns of July pig iron production confirm the week-to-week reports last month that iron and steel works operations were declining. In the 31 days of July 864,555 tons of pig iron was made. This was at the rate of 27,889 tons per day, or more than 20 per cent less than the June rate of 35,494 tons per day, the June total being 1,064,833 tons.

Not since December, 1903, nearly 18 years ago, when 846,695 tons was produced, has the country seen so small a pig iron output as last month's.

July showed a net loss of 7 in active furnaces, 69 being in blast Aug. 1, with a capacity of 28,175 tons per day, against 76 on July 1, representing a daily capacity of 32,195 tons. The July output was at a yearly rate of about 10,000,000 tons, or not far from 20 per cent of the country's capacity.

Pittsburgh, Cleveland and Chicago reports agree as to continuing irregularities in nearly all finished products. Some bars have been taken at 1.70c., Pittsburgh. At Chicago 1.60c. to 1.70c., Pittsburgh, on plates has been the usual range, whereas Cleveland reports 1.70c. to 1.75c. Smaller transactions are at $2 to $3 per ton above these levels.

The $5.25 price on tin plate which is referred to in some quarters this week as new, is the formal recognition of recent competition, aided by the new wage scale. Hoops and bands have shown new price cutting, and in all markets irregularities are reported in nuts, bolts and rivets.

The Western Bar Iron Association has reached an agreement with the Amalgamated Association on the wage scale, the workers going back to the 1919 basis, which is about 3 per cent above pre-war rates. The reduction from present labor cost is about 10 per cent.

The orders for repairs to 6500 cars distributed by the New York Central Lines will require about 30,000 tons of steel. Repairs to over 900 cars are planned by the Illinois Central, on about 275 by the Pittsburgh & West Virginia and on 500 to 1000 in addition to the 500 awarded last week by the Buffalo, Rochester & Pittsburgh. Car builders feel that the turn has come in railroad purchases, though the increase in volume of business will be gradual for some time.

While bids on the 105-mile Bombay water pipe line, a $10,500,000 project requiring about 78,000 tons of steel, were opened last week, the award is not yet known. It is known that American bids on lock bar pipe were not the lowest, but that fact does not determine that American pipe and American plates are out of the running.

Pig iron price reductions include $1 on charcoal and 50c. on foundry grades at Chicago, $1 on basic and 50c. on Bessemer and malleable at Pittsburgh and $1 on Southern iron; while in the East very little change has taken place and some improvement in demand is reported. In ferroalloys prices of silveries have been marked down $8 and of Bessemer ferrosilicon $8.50.

A set back to the recent promising improvement in the fabricated steel trade is generally reported but new work totaling 8400 tons has appeared and awards for the past week cover 11,000 tons.

Pittsburgh

PITTSBURGH, Aug. 2.

Interest in the steel trade here centers largely in the placing of about 7000 tons of plates, shapes and bars recently inquired for by the Mt. Vernon Bridge Co., Mt. Vernon, Ohio. This is the largest piece of business that has been before manufacturers and its allocation is the subject of much speculation in view of the fact that the Ohio State University stadium, which will take more than half of the total tonnage, was placed at a price which would indicate a plain material base of around 1.60c. It is said the Mt. Vernon company did not have protection at a price anywhere near that low. While the general average of steel plant and mill operations is somewhat higher this week than it has been, and the more cheerful sentiment of the past few weeks continues, actual business has not grown appreciably and the improvement in the undertone seems to have been generated largely by the lowering of the Federal Reserve Bank discount rate, the improvement in the condition of the banks of the country, the attitude of the Administration toward tax reductions, the disarmament proposal and other developments that are in the making and outside, rather than within, the industry itself. The fact that two or three large automobile interests which a short time ago were on the ragged edge in a financial way have in the recent past been refinanced also has helped sentiment. As a rule, increases which have come in plant activities are due to accumulations of orders or to the

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 2, 1921	July 26, 1921	July 5, 1921	Aug. 3, 1920
No. 2X, Philadelphia‡	$21.35	$21.35	$25.50	$49.15
No. 2, Valley furnace†	19.50	19.50	21.00	46.00
No. 2 Southern, Cin'ti†	*23.50*	24.50	25.50	45.60
No. 2, Birmingham, Ala.†	*19.00*	20.00	21.00	42.00
No. 2, foundry, Chicago*	18.50	18.50	20.00	46.00
Basic, del'd, eastern Pa.	21.25	21.25	23.50	44.40
Basic, Valley furnace	*18.00*	19.00	20.00	46.50
Bessemer, Pittsburgh	*21.96*	22.46	23.46	48.40
Malleable, Chicago*	18.50	18.50	20.00	46.50
Malleable, Valley	*20.00*	20.50	21.50	46.00
Gray forge, Pittsburgh	21.46	21.46	21.96	44.40
L. S. charcoal, Chicago	*35.00*	36.00	37.50	57.50
Ferromanganese, del'd	70.00	70.00	70.00	225.00
Rails, Billets, Etc. Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	30.00	30.00	33.00	65.00
O.-h. billets, Pittsburgh	30.00	30.00	33.00	65.00
O.-h. sheet bars, P'gh	32.00	32.00	35.00	70.00
Forging billets, base, P'gh.	35.00	35.00	38.00	85.00
O.-h. billets, Phila	35.74	35.74	38.74	69.10
Wire rods, Pittsburgh	42.00	42.00	45.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	*1.85*	1.90	2.00	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.10	2.10	2.25	4.75
Iron bars, Chicago	*1.75*	1.85	2.10	3.75
Steel bars, Pittsburgh	1.75	1.75	1.90	3.25
Steel bars, New York	2.13	2.13	2.28	4.02
Tank plates, Pittsburgh	1.80	1.80	1.90	3.25
Tank plates, New York	2.18	2.18	2.28	3.52
Beams, etc., Pittsburgh	1.85	1.85	2.00	3.10
Beams, etc., New York	2.23	2.23	2.38	3.27
Steel hoops, Pittsburgh	*2.40*	2.50	2.50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Aug. 2, 1921	July 26, 1921	July 5, 1921	Aug. 3, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	3.50	7.50
Sheets, galv., No. 28, P'gh.	4.00	4.00	4.50	9.00
Sheets, blue an'l'd, 9 & 10.	2.40	2.40	2.65	6.00
Wire nails, Pittsburgh	2.75	2.75	3.00	4.25
Plain wire, P'gh	2.50	2.50	2.75	3.50
Barbed wire, galv., P'gh.	3.40	3.40	3.65	4.45
Tin plate, 100-lb. box, P'gh.	*$5.25*	$5.50	$5.75	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$12.50	$12.50	$13.25	$37.50
Carwheels, Philadelphia	16.00	16.00	18.00	40.00
Heavy steel scrap, P'gh.	12.00	12.00	12.00	27.00
Heavy steel scrap, Phila.	11.00	11.00	11.00	23.00
Heavy steel scrap, Ch'go	10.00	10.00	10.00	24.50
No. 1 cast, Pittsburgh	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia	17.00	17.00	16.00	38.00
No. 1 cast, Chi'go (net ton)	11.50	11.50	12.50	36.00
No. 1 RR. wrot, Phila.	**14.00**	13.50	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	9.25	9.25	9.50	24.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$3.00	$18.00
Foundry coke, prompt	*3.75*	4.00	4.25	19.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*12.00*	12.50	12.75	19.00
Electrolytic copper, N. Y.	*11.75*	12.25	12.62½	19.00
Zinc, St. Louis	*4.20*	4.25	4.35	7.70
Zinc, New York	*4.70*	4.75	4.85	8.05
Lead, St. Louis	*4.20*	4.35	4.25	8.75
Lead, New York	4.40	4.40	4.40	9.00
Tin, New York	**26.50**	26.00	29.87½	48.50
Antimony (Asiatic), N. Y.	*4.60*	4.65	4.75	7.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 2, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

July 26, 1921,	2.364c.
July 5, 1921,	2.557c.
Aug. 3, 1920,	3.939c.
10-year pre-war average,	1.684c.

building up of mill stocks, which have been depleted by recent demands.

Possibly there is a little more adherence to the quotations recently established than there was to the previous schedules. It is too soon, however, to venture the suggestion that an open market has disappeared. A good many manufacturers are complaining of the losses entailed on to-day's prices, but others seem to have thrown their cost books into the discard and in a market such as the present one the prices are established by the lowest seller. Tin plate has settled since last reports another $5 per ton to $5.25 per base box, while the price of hoops and bands is not more than 2.40c., Pittsburgh, a drop of $2 per ton from the recent base. The latter change points to a further revision downward of hot-rolled strips. The market is very unsettled in nuts, bolts and rivets and prices of track fastenings are steadily working downward.

The pig iron market has fallen to $18 on basic grade at Valley furnaces, but even this price would have to be shaded on Pittsburgh district business to compete with furnaces having a more favorable freight rate.

An interesting development in the coke market is the fact that the fuel for the furnace of the Sharon Steel Hoop Co., which went into blast last Saturday, will be provided from by-product instead of beehive ovens. The by-product coke in this instance was obtained at least 25c. a ton below the prices quoted on beehive oven fuel.

Pig Iron.—The price of Valley basic pig iron has dropped $1 a ton since last report, on a sale of 2000 tons, which moved at $18, furnace. Even at this figure, Valley furnaces have not much chance of getting business within the Pittsburgh district for the reason that iron of this grade is available at a lower delivery figure from furnaces which have a lower freight rate. No business recently has been done in Bessemer iron, but it is being offered at $20 from Valley furnaces, and we revise our quotations accordingly. Business in foundry iron is entirely of small lots on which prices varying anywhere from $19.50 to $20 furnace for No. 2 grade are claimed to have been paid. The W. P. Snyder & Co. averages for July show that sales of basic grade from Valley furnaces moved at an average price of $18.802, against $20.70 in June, and Bessemer at $20.875, against $23 in the previous month.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.00
Bessemer	20.00
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	20.00

Ferroalloys.—Price tendencies still are down. Against a recent inquiry for a moderate tonnage of ferromanganese a quotation of $69 delivered, was made on 76 to 80 per cent domestic material and one maker was willing to provide 80 per cent alloy at an advance of only $1 per ton over that price. The general asking price of domestic producers is $75 delivered, but $70 measures to-day's maximum price possibility, on sales. Current quotations of $67.50 to $70 seaboard on English ferromanganese are nominal as far as business in this district is concerned. It is believed that substantial concessions would be made against an inquiry calling for future shipment and involving a fair sized tonnage. English makers are not pressing for business, evidently waiting to see what is done with regard to the American tariff. The protest against the supposed duties by American steel manufacturers is so strong that the belief prevails here that manganese ore will be put back on the free list and a moderate tariff allowed on ferromanganese. Spiegeleisen is quoted at $25 to $30 furnace.

for average 20 per cent material, with no business doing in this district. One large consumer of this alloy is said to be considering changing over to ferromanganese on the ground that the latter is the cheaper material. The most recent business in 50 per cent ferrosilicon was a carload at $64 delivered. A Valley steel maker is asking prices on a carload but figures on buying it at around $60 delivered. Bessemer ferrosilicon has been reduced $8.50 and silvery has been reduced $8.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $67.50 to $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $25 to $30 (nominal) furnace; 50 per cent ferrosilicon, $64 to $65 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces as follows: 9 per cent, $33; 10 per cent, $36.50; 11 per cent, $41; 12 per cent, $43.10. Silvery iron, 6 per cent, $24; 7 per cent, $25.50; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $32; 11 per cent, $35.30; 12 per cent, $38.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The recent cut of $3 per ton in prices does not seem to have materially stimulated the demand, which also as yet has failed to reflect the increased sheet and bar mill operations. The explanation probably is to be found in the fact that finishing mills generally still have rather large stocks of high-cost steel which they are anxious to work off.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Bessemer and open-hearth sheet bars, $32; slabs, $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The general quotation is $42 Pittsburgh on common soft rods of the base gage, but makers here frankly admit that only small tonnages can be moved at that price and it is also stated that a substantial tonnage would bring out a lower price. Prices are given on page 305.

Plates.—Practically all of the inquiries developing in this market are for small tonnages for early delivery and only occasionally does an individual sale reach as much as 500 tons. Against such inquiries the recently established price of 1.85c. is fairly well observed.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Structural Material.—Only small jobs lately have been coming to fabricating shops in this district and the number of such awards have been few. The Memphis Steel Construction Co. recently took 650 tons for a new hotel at Greensburg, Pa., and McClintic-Marshall Co. reports 100 tons for three-deck plate girder stands for Stephen Sanford & Sons, Amsterdam, N. Y. The common complaint of fabricators is that only by sacrificing all profit and even going into their own pockets is it possible to secure an order these days. Competition for orders in plain material is pretty sharp and the public quotation of 1.85c. is said to refer only to small tonnages. Prices are given on page 305.

Iron and Steel Bars.—There has been no decided improvement in the demand for soft steel bars, but small lot orders are slightly more numerous than they were recently and some makers have accumulated enough of such orders to put on some idle capacity. There is not much disposition by makers here to shade 1.75c., Pittsburgh. Reinforcing bars rolled from new billets also are held at 1.75c., but are encountering considerable competition from such bars rolled from old rails. The latter nominally are quoted at 1.75c., but this price is understood to have been shaded $2 to $3 per ton. Refined iron bars are quoted at 2.40c., base, but this is purely against small lots, and it is admitted that a sizable inquiry would develop a price as low as 2.25c.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets, 1.75c. base; reinforcing bars rolled from old rails, 1.60c. to 1.75c.; refined iron bars, 2.25c. to 2.40c., in carloads, f.o.b. mill, Pittsburgh.

Steel Rails.—Railroads tributary to Pittsburgh are not specifying at all freely against their orders for standard rails placed early in the year. Business in light rails also is pretty limited. The Delaware, Lackawanna & Western Railroad recently inquired for 2000 tons of light rails in connection with its coal mine operations, and is understood to have had a quotation of 1.85c. Pittsburgh on rails rolled from new billets, and of $40 per gross ton delivered Scranton, on rerolled rails.

We quote 25 to 45-lb. sections, rolled from new steel, 1.85c. to 1.90c.; rolled from old rails, 1.75c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—There is no improvement in business and prices are unsettled and weak. It is reported that makers outside this district recently have taken business in large machine bolts at 65, 10 and 10 off list. This is below the ideas of makers here, but rather than lose regular customers, some are meeting this price. Rivets have had a further drop of about $3 per ton, being quotable at $2.50 for large structural rivets and $2.60 for large boiler rivets. Small rivets are quoted at 70 and 5 off list. Makers here are inclined to doubt that large structural rivets have sold as low as $2.40, although there have been fairly authentic reports of that character. Track bolts are down to 3.80c. base for carloads of one size, with an extra charge of 1c. per lb. for less than carloads of one size. Prices and discounts are given on page 305.

Spikes.—The market shows very little activity in spikes or other track fastenings in this district. Such inquiries as are coming out for spikes produce intense competition, and the result is that prices are very much in buyers' favor. Some makers still are asking $3 base on all except bolt and barge spikes but with a number of makers willing to take orders at $2.75 base, the higher merely is a quotation. Tie plates are quotable at $2 to $2.05, such prices having been named against recent inquiries. Prices are given on page 305.

Cold-Finished Steel Bars.—Prices are not very well defined. The "official" quotation of most manufacturers is 2.60c. base, but at least one maker has taken business at 2.50c. and it is stated that on some purchases recently made by a large automobile manufacturer a price of 2.40c. was done. Conversion charges vary with the different manufacturers; hence the difference in price ideas. Business still is of moderate proportions.

Hot-Rolled and Cold-Rolled Strips.—The decline in the past week in the hoop and band base to 2.40c., Pittsburgh, is expected to bring a revision in prices of hot-rolled strips to the same quotation. Hoops, bands and hot-rolled strips, in recent efforts to stabilize prices, all have been quoted at the same figure. Some makers of hot-rolled strips still are quoting 2.50c. to 2.60c., according to the specifications, but these prices may be said to be passing as a basis of sales. Cold-rolled strips range from 4c. to 4.25c. base. Business still is spasmodic, running well one day only to fall away the next.

Hoops and Bands.—The price has settled since last reports to 2.40c. base, Pittsburgh, but this seems to be more of a quotation than a selling price, as mills which ordinarily make no effort to secure cooperage or band business now are competing actively with those which always have catered to this trade. Reports are current that some business recently was done at 2.30c. base.

Cotton Ties.—The August price is 1.36c. per bundle of 45 lb., this being the July price plus 1c. a bundle per month, the carrying charge. Demand still is light and although rollings were much curtailed, they promise to be quite ample for this year's requirements.

Iron and Steel Pipe.—There is gradual improvement in the demand upon the mills from jobbers of merchant pipe, but trading between jobbers has not entirely ceased and the orders going to the mills do not yet reach a volume that is at all satisfactory. It is evident that a good many of the current orders are being supplied from mill stocks, as plant operations do not exceed 30 per cent of capacity. Oil country goods still are very slow of sale. There is general adherence to the July 7 price card, except possibly in the case of line pipe, in which manufacturers who want business are obliged to compete with the oil companies having a surplus supply which they are anxious to dispose of. Discounts are given on page 305.

Boiler Tubes.—A slightly better demand is noted for lap welded steel tubes, but there still is considerable

room for improvement, which is not expected to develop until the railroads are better off financially. Seamless tubes are finding such a limited demand that makers still are withholding quotations. Discounts are given on page 305.

Steel Skelp.—Plates and skelp having been placed on the same basis on previous price revisions and owing to the fact that 1.85c. now is maximum on plates, efforts to get more for skelp are proving futile. There is a little better market in both pipe and tubes, but the increase as yet has not been sufficient to create much demand for skelp.

Wire Products.—Rather more business is being done than was the case recently, but all makers are not sharing alike in the improvement. Some companies still report business as extremely slack. Manufacturers willing to guarantee buyers against a decline in prices seem to be faring best in the matter of orders, but it cannot be said that there is any pronounced breaking away from the hand to mouth buying policy on the part of jobbers, and because a bushel of grain will buy considerably less wire and fence than a year ago, demand from the agricultural districts is pretty slim. Public quotations on nails and wire are unchanged at $2.75 per keg and $2.50 per 100-lb., respectively, but reports of shading on nails are still frequent.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Sheets.—The market appears to have settled to 3c. base, for black, 4c. base, for galvanized, and 2.40c. base for blue annealed. These are the quotations of the leading independent manufacturers and while the American Sheet & Tin Plate Co. has quotations about $5 per ton higher, it is no secret that it is meeting the independent prices on desirable business, or where there is danger of its losing any of its regular customers. Demand for sheets is slowly but steadily expanding and this is finding reflection in a gradual increase in mill operations. The American Sheet & Tin Plate Co. is running about 40 per cent of its sheet mills and independent operations, as a whole, are about the same ratio to capacity. One large Valley sheet maker last week announced a re-establishment of the stabilized bases of 3.50c., 4.50c. and 2.65c. respectively for black, galvanized and blue annealed sheets and another has announced that its minimum prices were 3.25c., 4.25c. and 2.50c. on the three kinds. At the same time, $5 per ton below the latter prices is being freely quoted and in the Chicago district a price as low as 2.25c. has been quoted on blue annealed sheets by the leading independent of that district. Because there are such wide variations in prices of the different manufacturers, buyers lack confidence and consequently are not inclined to order very far ahead, although a number of them are known to be running pretty low in supplies. Prices are given on page 305.

Tin Plate.—The market still is a limited affair with the demand coming chiefly from manufacturers of condensed milk and tobacco and dry food containers. Even the demand from these sources is below normal and the important outlet for tin plate in perishable food containers and oil cans could increase 100 per cent and still be unsatisfactory. The packers and the oil companies still are carrying heavy stocks of tin plate and are withholding specifications until they have begun to make some inroads on them. Recent quotations of $5.50 or more, on production tin plate have disappeared and $5.25 now measures the top of the market. On stock items as low as $4.75 per base box now is possible.

Coke and Coal.—The Sharon Steel Hoop Co., which blew in its furnace at Lowellville, Ohio, last Saturday, will use by-product coke, presumably from one of the three steel company plants in the Youngstown district. The contract runs for the remainder of the year and is understood to have been placed at about $2.50, Connellsville base. Otherwise, the situation shows little change. On spot furnace coke the general asking price of bee-hive oven operators is $3, but there is so little demand that notwithstanding a very limited production, this price is being shaded anywhere from 10c. to 25c. per ton. Larger operators are declining to take business at $2.75, on the ground that this means only $1.70 per ton for coal and that they are able to sell the coal as high as $2 per ton. Foundry coke is quotable from $3.75 to $4 per net ton, oven, generally, but some operators are not inclined to go below $4.25 to consumers. There is a fair demand for foundry coke, but it is entirely in small lots. The coal market still is inactive and not especially firm, except possibly on slack grade. Owing to the fact that little coal is moving to the lakes, not much is being screened and slack consequently has become pretty scarce. This grade readily is salable at $1.75 to $1.90. Mine run grade of steam coal ranges from $1.50 to $2.15, the latter for coal from union fields while by-product grade is quotable from $1.50 for "distress" tonnages to $2 for fresh production. Gas coal coming chiefly from the union districts is quotable from $2.25 to $2.50.

Old Material.—Prices show no material change from those of the past few weeks, but the undertone of the market is a little stronger, due to the fact that slightly heavier steel works operations are reflected in more willingness on the part of the several companies to take in contract tonnages and there is some new buying by some companies which have stocks of desirable material bought at reasonable prices which they do not want to melt. Bids were opened yesterday by the Pittsburgh & Lake Erie Railroad on 25 carloads, or approximately 1000 tons, of old material, and the Pennsylvania Railroad, Eastern Region, August list closed yesterday. In the latter about 22,000 tons of material was offered.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	15.50 to 16.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.00 to 9.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	15.50 to 16.00
Railroad malleable	11.50 to 12.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	13.50 to 14.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	11.50 to 12.00
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	11.50 to 12.00
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

Opposition to Secretary Mellon's Suggestions

WASHINGTON, Aug. 2.—Opposition common to all tax proposals has developed in Congress as the result of the suggestions of Secretary Mellon for revision of the internal revenue laws, and while they may not be accepted in full, it is believed they indicate the trend legislation will take. In addition to protests coming from the country against the proposed flat tax of $10 on automobiles, there is considerable protest by business interests against the suggested increase of 50 per cent on first-class postage and the 2c. tax on bank checks. The suggestion for elimination of excess profits tax and $2,000 exemption on corporation income with increase from 10 to 15 per cent on corporation taxes had been anticipated and the former approved warmly by business interests. The House Committee on Ways and Means, which received the suggestions, is now engaged in framing rates and Chairman Fordney hopes to report the bill in two or three weeks.

The annual convention of the Ohio State Association of Electrical Contractors and Dealers was held July 27-28 at Toledo.

Chicago

CHICAGO, Aug. 2.

The past week has brought out further low prices on nearly all steel products. The so-called "official" prices of 1.85c. on plates and shapes and 1.75c. on bars, announced a little more than a week ago, have not held. Prices are erratic and there is no telling to-day what to-morrow's prices may be, gaged by the manner in which competition has been waged during the past week. Steel bars have sold as low as 1.65c., Pittsburgh, shapes at 1.70c., Pittsburgh, and plates at 1.60c. to 1.65c., Pittsburgh. Sheets are now freely offered at 2.25c. base for blue annealed, 3c. base for black and 4c. base for galvanized, all f.o.b. Pittsburgh. Bar iron is $2 lower at 1.75c., Chicago mill, and this price appears to-day to be the top rather than the bottom of the market. Further low prices have been made on bolts, nuts and rivets. Railroad spikes and track bolts are $3 per ton lower and tie plates are freely quoted at 2.25c., Chicago, with interest centered in bids this week on 400,000 wanted by the Chicago, Burlington & Quincy Railroad, which may bring out even lower figures. Warehouse prices have been reduced $3 a ton in line with recent adjustment of mill prices. Extremely low prices have been made in public bids on cast iron pipe, one company quoting $41.95, delivered, Detroit, on 1500 tons for that city, while the low bid on 275 tons of 16-in. pipe for Milwaukee was $44.35. A little business has been done in semi-finished steel at the recent reduction of $3 per ton.

While the Pittsburgh base is usually quoted on inquiries, buyers with a fair amount of tonnage to place have little difficulty in getting Chicago mill prices that compare very favorably with Pittsburgh prices, leaving the freight rate out of consideration. There are many wild rumors of extremely low prices which are difficult to confirm, such, for example, as 1.70c., Chicago, on steel bars. At any rate, there is no apparent bottom to the steel market at the moment, some of the mills having abandoned all effort to get even cost out of their products in the scramble to find a level at which buyers will take hold more aggressively.

The Western Bar Iron Association has come to an agreement on wage rates with the Amalgamated Association of Iron, Steel and Tin Workers, as reported in another column, the workers going back to the 1919-1920 basis, which is about 3 per cent higher than the pre-war rates. The new rates become effective immediately and will reduce costs roughly about 10 per cent.

Railroad Equipment.—Despite the great number of bad order freight cars, inquiries for car repair work are coming very slowly from the railroads. The past week has brought nothing of importance either in inquiries or orders. Those in close touch with the car situation admit the possibility of a car shortage this fall unless something is quickly done to put a large part of the useless railroad equipment in serviceable condition.

Pig Iron.—Lower quotations on nearly all grades of pig iron are appearing in the local market. Foundry iron, silicon, 1.75 to 2.25, has been sold to several consumers within the past week at $18 furnace, a reduction of 50c. per ton, with No. 1 foundry, 2.25 to 2.75 silicon, at $18.50. A new price of $30, Valley furnace, has been quoted on standard low phosphorus iron, making the delivered price $35.32, Chicago. Jackson County makers of silvery iron have announced an $8 per ton reduction. [The new prices, effective Aug. 1, will be found in our Pittsburgh market report.] Lake Superior charcoal iron is now available at $34 and $35, delivered, Chicago, the higher price being named by the principal makers. There is a slight improvement in foundry iron buying and inquiries are more numerous, indicating that more melters are reaching the bottom of their stock piles. Inquiries range from carload lots to 200 or 300 tons. Consumers, though realizing that pig iron prices are now extremely low, are not interested in speculative buying. Some have stated that they would rather pay a dollar or two more for iron next month or the month after than to buy more iron now than they actually need for week to week requirements.

Quotations on Northern foundry, high phosphorus, malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$34.00 to $35.00
Northern coke, No. 1, sil. 2.25 to 2.75	18.50 to 19.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	18.00 to 19.00
Northern high phos.	18.50 to 19.00
Southern foundry, sil. 1.75 to 2.25	26.67
Malleable, not over 2.25 sil.	18.50 to 19.00
Basic	18.50 to 19.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	30.00
Silvery, sil. 8 per cent	32.82

Ferroalloys.—A car wheel company which recently inquired for 300 tons of ferromanganese has not yet bought. Business is not sufficient to test the market, which remains nominally on the basis of $75, delivered east of the Mississippi River. A recent authorization by an Eastern maker to quote $72.50, delivered, has been withdrawn, due, it is said, to the expectation that the new tariff, if adopted, may place the market on a firmer basis. Spiegeleisen is not in demand, but is obtainable at $25, Eastern furnace, with a freight rate of $10.07 to Chicago. A price of $71, delivered, for a carload of 50 per cent ferrosilicon, reported last week, stands as the lowest reported figure on this alloy.

We quote 78 to 82 per cent ferromanganese, $75 delivered; 50 per cent ferrosilicon, $71 delivered; spiegeleisen, 18 to 22 per cent, $35.07 delivered.

Plates.—The so-called "official" price of 1.85c., Pittsburgh, on plates is too high to-day to take anything but the very smallest orders. On fairly large lots, which to-day mean anything from a carload upward, prices have ranged from 1.60c. to 1.70c., Pittsburgh. There appears to be as much uncertainty about prices among sellers as among buyers. At the moment there is no bottom, and just how far the mills will be willing to go to find a level at which a greater number of buyers will become interested is a matter for conjecture. The price situation changes almost from day to day. It seems certain that any fairly good-sized tonnage could be bought at 1.80c. to 1.85c., Chicago, prices which have been previously made. Although quotations are being put out on a Pittsburgh basis, the actual competition for business generally results in a price at Chicago mill. The astute buyer can usually place an order on a Chicago base. This situation applies to all finished steel. Jobbers have reduced plates out of stock $3 a ton.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—Some of the business in plain material in the past week has been taken at 1.70c., Pittsburgh, and this price appears to be easy of duplication on any fairly good tonnage. The price quoted on small lots is 1.85c., Pittsburgh. A high school building at Omaha, Neb., requiring 1500 to 2000 tons of shapes, will probably be let within the next week, and on a job of this size it is expected some low prices will come out. Among the lettings of the past week are the following:

Viaduct at Racine, Wis., 170 tons, to Worden-Allen Co.

City of Des Moines, Iowa, water works extension, 110 tons, to unnamed fabricator.

East St. Louis, Columbia & Waterloo Railway, 121 tons, plate girder spans, to American Bridge Co.

Zion Co-operative Mercantile Institution, Salt Lake City, Utah, 189 tons, to American Bridge Co.

Orpheum Theater and Office Building, Wichita, Kan., 136 tons, to Christopher & Simpson.

Atlas Life Insurance Co. Building, Tulsa, Okla., 655 tons, to Kansas City Structural Steel Co.

The mill quotation is 1.70c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 2.88c. for materials out of warehouse.

Bolts, Nuts and Rivets.—There has been some fairly good buying of cold-punched nuts by the automobile industry. The Ford Motor Co. last week bought several million nuts and is in the market for a considerable quantity of bolts, there being 750,000 of one size in the inquiry. Some railroad orders are also coming out. All business is being taken at the expense of prices which are low and irregular. In large machine

bolts, some makers have quoted discounts of 70, 10 and 5 per cent off list; on hot-pressed nuts from 5c. to 7c. per lb. off list. Cold-punched nuts are quoted by a leading maker at 4.65c. per lb. off list for tapped and 5c. per lb. off list for blank. Small rivets, 7/16 in. and smaller, are being quoted at 70 and 10 per cent off list by some manufacturers, while going prices for structural and boiler rivets are 2.40c. and 2.50c. per lb., respectively.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Steel bars have been shaded at least $2 a ton, sales having been made within the past week at 1.65c., Pittsburgh. The top price to-day for bar iron is 1.75c., Chicago mill, and on a fairly good order this price doubtless could be shaded. Jobbers have reduced their prices $3 a ton.

Mill prices are: Mild steel bars, 1.65c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.80c. to 1.90c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—Sheet mill are now definitely on the lower price basis mentioned in this report last week, namely, 2.25c. for No. 10 blue annealed, 3c. for No. 28 black and 4c. for No. 28 galvanized. For small lots about $5 a ton above these prices is asked. The low prices have stimulated some business.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.53c.; No. 28 black, 4.65c.; No. 28 galvanized, 5.65c. Hoops and bands, 3.48c.

Rails and Track Supplies.—The Chicago, Burlington & Quincy Railroad will close bids on Aug. 5 on 400,000 tie plates, about 2000 tons. On ordinary lots of tie plates, either iron or steel, the uniform quotation for Chicago mills is 2.25c. per lb., Chicago. Railroad spikes and track bolts are lower, the mill quotation being 2.85c. on standard railroad spikes; track bolts with square nuts, 3.85c.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.85c. f.o.b. makers' mills. Standard railroad spikes, 2.85c., Pittsburgh; track bolts with square nuts, 3.85c., Pittsburgh; steel tie plates, 2.30c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, steel and iron, 2.25c., f.o.b. makers' mills.

Warehouse Prices.—Local jobbers have reduced prices $3 per ton on plates, shapes, bars, hoops and bands, cold-rolled steel bars, all grades of sheets, and 35c. per 100 lb. on structural and boiler rivets.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Cast Iron Pipe.—Some extremely low prices were brought out in the public opening of bids for 1500 tons of 8-in. cast iron pipe at Detroit. The Lynchburg Foundry Co. was low bidder with $41.95, delivered. The National Cast Iron Pipe Co., the second lowest bidder, put in a figure only slightly above this. The National Cast Iron Pipe Co. was low bidder on 275 tons of 16-in. pipe for Milwaukee, its price being $44.35, delivered. These prices are considerably below the figures quoted in the paragraph below, which are for carload lots. Milwaukee will close bids Aug. 10 on 3500 tons of 54-in. pipe; Detroit is in the market for 500 lengths of 6-in. class B, about 100 tons, bids closing Aug. 5. Bids close in Minneapolis this week on 200 tons of 6, 8 and 12 in., and in Saginaw, Mich., on 800 tons of 6, 8 and 12 in. Bids closed Monday in St. Paul on 125 tons.

We quote per net ton, f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $49.10; 6-in. and above, $46.10; class A and gas pipe, $3 extra.

Semi-finished Steel.—There has been a slightly better demand for billets at the new price of $30, Pittsburgh.

Jobbers quote out of stock 2.59c. on billets, 0.15 to 0.25 carbon, and 2.63½c. on 0.35 to 0.45 carbon.

Old Material.—There is a slightly improved tone in the scrap market, not so much due to any actual increase in demand from consumers, but to the expectation of the scrap dealers that the present improvement in steel trade, slight though it is, will be steadily maintained, and will therefore result soon in a demand for old material. Within the past week, there has been a little better speculative buying by dealers, but those who have scrap and are not forced to sell are holding their stocks in the expectation of a rise in the market prices. Where transactions have occurred, they have been at prices from 25c. to 50c. a ton above those quoted last week.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	12.50 to 13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	13.25 to 13.75
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.50 to 13.00
No. 1 busheling	8.25 to 8.75
No. 2 busheling	5.75 to 6.25
Cut forge	9.00 to 9.50
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	9.25 to 9.50
Steel knuckles and couplers	10.25 to 10.75
Coil springs	11.75 to 12.25
No. 1 machinery cast	12.00 to 12.50
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.25 to 10.75
Machine shop turnings	3.00 to 3.50
Cast borings	4.50 to 5.00
Stove plate	11.00 to 11.50
Grate bars	9.50 to 10.00
Brake shoes	9.50 to 10.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.50 to 12.00
Country mixed	7.50 to 8.00

New York

NEW YORK, Aug. 2.

Pig Iron.—A number of agencies report that as furnaces which they represent are out of blast and have exhausted stocks, they have no iron to sell. They are receiving few inquiries, but agencies representing furnaces that are still in the market report very fair activity. Within the week, sales amounting to 2500 to 3000 tons have been made, the largest being for 500 tons, and inquiries for about 3000 tons are pending. The sales were for foundry iron, nearly all for prompt delivery. One was for delivery over the remainder of the year at about the same as prevailing prices. The price situation shows little change. Reports have been current of eastern Pennsylvania iron being offered for sale at $19, furnace, but $20 is apparently the present minimum and sales have been made at higher figures. One reason for the slow delivery of iron in many cases is that furnaces are, as a rule, loading only two days a week and have no labor available on other days.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.02 to $25.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.02 to 24.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	22.52 to 23.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—In the last week inquiries for ferromanganese have appeared from various consumers totalling 700 to 800 tons, but no definite buying is reported yet. Quotations are nominal for both the American and British alloy and it is conceded that demand would bring out lower prices. One representative of a British producer has a limited amount in storage for prompt delivery, for which he is asking $70, delivered, within a reasonable distance from the seaboard. There are inquiries for a few carload lots of spiegeleisen for which the quotation remains unchanged. There is very little demand for 50 per cent ferrosilicon, nor has there been any business reported in high-grade manganese ore, though there are inquiries for two carloads. Sales are reported as low

as $62.50 per ton, delivered, and the alloy can be bought as low as $60. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$70.00
Spiegeleisen, 20 per cent, furnace, per ton...	$26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal...	55c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	16c. to 16.50c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00

Ores

Manganese ore, foreign, per unit, seaboard..	22.00c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2	55c. to 60c.

Warehouse Business. — Despite the reduction of prices earlier in the month, effective July 29, the warehouses in this district made a second price drop, reducing soft steel bars from 2.93c. per lb. to 2.78c. per lb. This is a correction of warehouse quotations to the prevailing mill price of 1.75c. per lb., Pittsburgh, based on a spread of about $13 per ton. Structural material is now 2.88c. per lb. as well as plates ¼ in. thick and heavier. Hoops are generally quoted at 3.88c. per lb. and bands at 3.43c. per lb. Sheet prices are also down, blue annealed sheets, No. 10 gage, being offered at 3.53c. per lb.; black sheets, No. 28 gage, at 4.25c. per lb., and galvanized sheets, No. 28 gage, at 5.25c. per lb. Dealers in wrought iron and steel pipe report conditions dull. The following prices are now quoted on lap-welded and seamless steel boiler tubes:

Lapwelded Steel Boiler Tubes

1¾ in.	+ 6
2 and 2¼ in.	—12
2½ to 3¼ in.	—26
3½ to 4½ in.	—32

Seamless steel boiler tubes, cents per ft.: 1½-in., 19c.; 1¾-in., 24c.; 2-in., 20c.; 2¼-in., 22c.; 2½-in., 26c.; 2¾-in., 30c.; 3-in., 33c.; 3¼-in., 33c.; 3½-in., 34c.; 3¾-in., 37c.; 4-in., No. 10 gage, 43c.; 4-in., No. 9 gage, 47c.

The foregoing prices represent a 20 to 25 per cent reduction, some items having been reduced as much as 50 per cent. Brass and copper warehouses report no improvement, although mills have resumed operations on half time. We quote prices on page 320.

High Speed Steel.—The market continues sluggish, although some producers report a slight improvement in the number of orders. Prevailing quotations on 18 per cent tungsten are nominal and range from 90c. to $1 per lb. with some selling at 85c. per lb.

Finished Iron and Steel.—Assertions of a betterment in business sentiment are increasing. Sellers say that their representatives are bringing reports of increased interest on the part of buyers, because of the disappearance of stocks and the active consideration of new projects. It remains that the most tangible fact is the broadening activity of railroad buying, evidenced chiefly in car and locomotive repair work; in fact in some quarters it is believed that railroad buying has taken a turn and that it will be gradually and increasingly better. It also seems that a slight stiffening has occurred in the price situation, due perhaps to the fact that there are less large attractive items for early settlement than there were a few weeks ago. At the moment the fabricated steel outlook is not so bright as it recently promised. The New York Central has distributed repairs for 6500 cars, involving 30,000 tons of steel, and may of course exercise an option to double the amount within a month or two. This business was placed among nine companies: 1500 each to the American Car & Foundry Co. and the Standard Steel Car Co.; 500 hopper cars each to the Buffalo Steel Car Co. and the Youngstown Steel Car Co., and 500 box cars to each of the following: Illinois Car & Mfg. Co., the Ryan Car Co., the Pressed Steel Car Co., the Streator Car Co. and the Haskell & Barker Car Co. The Lehigh Valley has reduced its inquiry from 5000 to 1000 box and hopper cars. The Illinois Central is inquiring on some 900 car repairs, and the Buffalo, Rochester & Pittsburgh is expected to place 500 to 1000 additional car repairs. The Pittsburgh & West Virginia has placed 250 to 300 car repairs with Koppel Car Repair Co. New fabricated steel work includes an office building in Philadelphia, 1000 tons; a hospital at Hackensack, N. J., 600 tons; a highway bridge in North Carolina, 550 tons; mine head frame, Providence, Pa., 400 tons, and a savings bank, Fifty-seventh Street, New York, 400 tons. The Florida East Coast Railroad has closed on 450 tons of bridge repair work, and the Porcupine Boiler Works, Bridgeport, Conn., will supply 300 tons for a telephone exchange at Stamford, Conn. The Turner Construction Co. will erect a large factory at Avenue A and Seventy-first Street, New York City, for P. Lorillard Co.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c.; plates, 2.18c. to 2.23c.; structural shapes, 2.18c. to 2.23c.; bar iron, 2.23c.

Cast-Iron Pipe.—Due to the decline in the price of pig iron and other raw materials the market price of cast-iron pipe is approximately $5 a ton lower. The city of New York, which withdrew bids for 1500 tons of pipe, has again placed its specifications on the market, bids to be received Aug. 3. We now quote f.o.b., New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—There is a slight raise in prices in railroad wrought, clean cast borings and specification pipe, with no declines in prices apparent this week. It would seem as though the market were on the upturn. Feeling is better, though there is not much tangible evidence of improvement. Prices are more stable than they have been for many months. When lists of material to be scrapped are placed before brokers, there is a great uniformity of prices offered, usually not varying more than 25 cents.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.00 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	9.50 to 10.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	4.00 to 4.50
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	7.00 to 7.50
Old car wheels	10.00 to 10.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Belgian-American Coke Ovens Corporation

The Belgian-American Coke Ovens Corporation has been formed by a group of American and foreign capitalists to introduce and develop in this country the Piette by-product coke ovens. The company will have a capitalization of $10,000,000 of preferred stock and 200,000 shares of no par value common stock.

Included among the directors are Thomas F. Ryan, Emile Francqui, president of the Banque d'Outremer and director of the Societe Generale of Belgium; F. S. Landstreet, president, 25 Broad Street, New York; Hector Prud'homme of Brussels, vice-president; Herbert H. Vreeland, associate of Mr. Ryan; Olivier Piette, inventor of the oven; G. H. Walker, president W. A. Harriman & Co.; Adolphe Stoclet, representing Belgian interests; Lambert Jadot, director of the Banque d'Outremer, and William H. Page, general counsel.

Mr. Ryan and Mr. Francqui have been associated for many years in extensive developments in the Belgian Congo. Their attention was directed three years ago to the Piette coke ovens. Mr. Landstreet then went to Belgium and Mr. Piette with his associates visited this country, with the result that the company was formed.

Buffalo

BUFFALO, Aug. 2.

Pig Iron.—There is less movement with local producers than has been manifest this year. Talk of better feeling is general, but certainly orders do not justify any such sentiment. One producer blew in a furnace to accumulate a stock of iron for its own use and a subsidiary located outside Buffalo. Operation for four weeks is planned and conditions at the expiration of that period govern plans beyond that time. A decided dropping off in inquiry is noted—3000 tons with one producer and its sales but 200 tons. Its ruling price is $22 for silicon 2.25 to 2.75; $23 on silicon 3.25 to 3.75. Iron freely offered by a steel interest is now moving in carload lots only and $20 is the base price. Less than 1000 tons was moved by one maker whose prices range from $19 to $21 base. Inquiries are for small lots and furnace operation is determined from week to week only.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.75 to $21.75
No. 2X foundry, 2.25 to 2.75 sil.	19.75 to 20.75
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Coke.—Receipt of several inquiries for 500 ton lots has given rise to better feeling. Greater furnace operation is hinted at.

Old Material.—About 500 tons of heavy melting steel has been sold to a large mill interest; the price is understood to have been $10, with absolute insistence that the material be first grade. Dealers are not anxious for business at this price. With the exception of steel which has weakened through this purchase, prices generally are unchanged from last week.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$10.00 to $11.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Warehouse Business.—There is a decided increase in the number of orders and inquiries. Prices which have been reduced in conformity with mill announcements, seem to be in favor with the trade and a number of orders have been booked following the receipt of the new schedules. Road work and bridge construction have developed some new business. Structural orders are only fair.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.55c.; galvanized steel sheets, No. 28 gage, 5.55c.; black sheets, No. 28 gage, 4.55c.; cold rolled strip steel, 6.40c.

Finished Iron and Steel.—Improved mill operation marked the beginning of August. Generally orders are more frequent, but little improvement is noted in tonnages. Buyers fully believe drastic price cuts have all been made and that any price adjustments made from now on will be unimportant. Inquiry is on a more definite basis and none is too small to get attention. Buyers are, on the whole, satisfied with present prices. An accumulation of bar orders together with confidence in prospective business brought about the decision to start three open hearth furnaces this week. Demand is more evenly distributed for bars and shapes and a decided betterment is noted in the demand for cold-finished material. Pipe and wire business was better in July than the preceding month. Structural work is quiet. Bids for the J. N. Adam hospital at Perrysburg have been rejected and new ones called for the latter part of the month. A number of bridge jobs in Canada engage fabricators on this side of the border. The customs ruling explained in previous issues of THE IRON AGE is accepted willingly by domestic shippers and the customs officials are understood to be liberal in their interpretation of regulatons which threatened for a time to interfere with Canadian business. A filtration plant for Charlotte, N. Y., near Rochester, requiring 200 tons, is being figured.

Boston

Pig Iron.—Sales the past week were confined to perhaps half a dozen cars of eastern Pennsylvania and Northern furnace and resale iron at prices well above those quoted on round tonnages, and one car of lake charcoal iron at $35 furnace base. General inquiries include one for 500 tons No. 1 X and 200 tons No. 2 plain, August delivery, from the Saco-Lowell Shops, Boston; 200 tons No. 1 X, August and September delivery, from the Framingham Foundries, Framingham, Mass., and 100 tons No. 2 plain, prompt shipment, from a Pawtucket, R. I., melter. Various brokers have under negotiation possibly an aggregate of 3000 tons. Foundries, however, are in no hurry to purchase because New England meltings during July dropped to small proportions. Eastern Pennsylvania iron is openly offered at less than $20 furnace for silicon 1.75 to 2.25, and buyers claim Buffalo has been offered on the same basis, although confirmation of actual sales is lacking. The available supply of Buffalo iron is smaller, the largest producer having withdrawn from the market until a time when selling prices are back on a profitable basis. Local Alabama and Virginia prices are purely nominal. Furnaces are unable to compete with eastern Pennsylvania and Buffalo irons due to the disparity in freight rates. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$24.56 to $27.56
East. Penn., silicon 1.75 to 2.25	24.06 to 27.06
Buffalo, silicon 2.25 to 2.75	25.96 to 28.96
Buffalo, silicon 1.75 to 2.25	25.46 to 28.46
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	32.16 to 32.66
Alabama, silicon 1.75 to 2.25	31.66 to 32.16

Finished Material.—The New England Structural Steel Co., Inc., is awarded 106 tons structural for a boiler shop, Cambridge, Mass., 450 tons for a Manchester, N. H., school, 100 tons for the Washington Mills, Lawrence, Mass., boiler house, and 150 tons for the India building, Boston. The Phoenix Bridge Co. will furnish 800 tons for the Manchester, N. H., Amoskeag bridge, and 250 tons for two Boston & Maine R. R. bridges at Inwood, Vt. The American Bridge Co. is awarded 300 tons for a Mystic, Conn., bridge, and the Boston Structural Steel Co., Inc., 400 tons for a Boston municipal building. Contracts uncovered include: Allston, Mass., theatre 300 tons; Pawtucket, R. I. theatre, 600 tons; Ford Co., Green Island, N. Y., plant, 300 tons; Berlin, Me., high school, 144 tons. The bottom price on sheared and boiler plates is 1.85c., f.o.b. Pittsburgh. Buying is confined to carload lots, but aggregate sales are increasing. One eastern Pennsylvania rolling mill, not rolling anything under ½-in., offers bars at 1.67½c. f.o.b. Pittsburgh, but all other mills are holding at 1.75c. and securing better business.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. have reduced their price on spot and contract foundry coke 25c. per ton, from $10.91 to $10.66, delivered, where the local freight rate does not exceed $3.40 a ton. Connellsville oven interests are more active in this market. A limited tonnage was placed early in the week with Connecticut foundries at $4.25 f.o.b. ovens, but, within the past few days good grade fuel has been offered at as low as $3.50 and $3.75 ovens.

Warehouse Business.—Local warehouse prices on refined iron have been lowered 15c. to 25c. per 100 lb., on cold rolled steel 20c., and on soft steel bars, flats, reinforced bars, structural, plates, bands and hoops 15c. Individual orders for iron and steel still run to small lots, but aggregate sales for the week show improvement. Galvanized sheets are 25c. per 100 lb. lower at $4.75 base for No. 28, and black at $4.75 base for No. 28, and blue annealed 10c. lower at $3.78 for No. 10. Demand for sheets is more active, but individual orders continue small. Wire nails are $3.85 per keg base, as against $4.10 heretofore, and standard cut nails $4.50 contrasted with $5. Hardened steel cut nail prices are

no lower. Standard horseshoes are 50c. per keg lower at $7 base, and fancy shoes are down as much. Most jobbers quote bolts on a basis of 50 and 10 per cent discount for ⅜ x 4-in. machine with H.P. nuts, but in some cases this price is shaded another 5 per cent. The market on chain is 25c. to 35c. per 100 lb. lower.

Jobbers now quote: Soft steel bars, $2.83 per 100 lb. base; flats, $3.33 to $3.93; concrete bars, $2.50 to $3.10¼; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.48 to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.98 to $3.13; plates, $2.83 to $2.93; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—A sale of 1000 tons No. 1 machinery cast to a Massachusetts foundry, delivery during August, September and October, at an indicated price of $16.50 delivered, and scattered sales aggregating possibly 300 tons No. 1 cast to Massachusetts melters at $16.50 to $17 delivered are noted. Otherwise the old material market the past week has been dull and firm. An order for 100 tons No. 1 cast at $16.90 delivered where the freight is $3, is going begging. Efforts to place heavy turnings at $2.50 f.o.b. Watertown, Mass., have been unavailing, the best price obtained by the shipper being $4 delivered. Important dealers report more sounding out of the scrap market by eastern Pennsylvania mills and actual orders are anticipated within the next week or ten days.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$16.50 to $17.00
No. 2 machinery cast	15.00 to 15.50
Stove plate	14.50 to 15.00
Railroad malleable	12.50 to 13.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Steel Makers Will Urge Freight Rate Reduction

A conference of steel makers is to be held in New York early in August to formulate plans for a concerted move against existing freight rates. A general reduction in carrying charges on steel of at least 20 per cent is to be asked. Independent makers in a number of districts have come to the conclusion that they are being kept out of the market by reason of high freight rates and if the carriers expect business, they must lower the rates to a point where the delivered price of steel may be made such that it will attract buyers.

Cincinnati

CINCINNATI, Aug. 2.

Pig Iron.—While there is very little activity, there is apparent a disposition on the part of the furnaces not to go below the level of prices below quoted. This was shown during the week when a Chicago interest turned down a firm offer of $18 on 1000 tons, the operator stating that before selling iron below $18.50 he would close down. The same disposition is apparently held by operators in other districts, for some of them have been turning down business offered below present schedules. The largest sale reported during the week was one of 250 tons to a West Virginia melter, the iron coming from a Valley furnace. Another lot of 100 tons of malleable was taken by the same interest on the basis of $20.50, Ironton. A Michigan melter who recently inquired for 3000 to 5000 tons for delivery during the remainder of the year is reported to have bought 500 tons. It is said that he was unable to get a furnace to contract that far ahead at present prices. A sale of 300 tons of low phosphorus to a Michigan melter was made at an unnamed price. Several inquiries for ferroalloys are before the trade, mostly from railroad equipment companies in the Chicago district. Prices are quotably lower. Jackson county silvery makers have reduced their prices on silvery irons $8 a ton, and on Bessemer ferro-silicons $8.50. Southern iron is available at $19, Birmingham, and southern Ohio makers are quoting $20 to $20.50. Chicago iron is quoted in this territory at $18.50, furnace, and Valley iron at $19 to $19.50. There are no inquiries of size and carload business continues as the customary activity.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—The lower prices in effect have apparently stimulated buying. Sales managers of practically all the steel mills, report business as 50% better during July than was the case in June. This applies to practically all finished products. The feature of the week was undoubtedly the placing of approximately 7000 tons of structural material by the Mt. Vernon Bridge Co. for various projects. The 4500 tons for the Ohio State University stadium has been placed with the Cambria Steel Co., and 1500 tons for the Licking River Bridge and 800 tons for bridge work on the K. & M. railway, are reported to have gone to the Steel Corporation. Fabricators are figuring on a number of small jobs and an addition to the plant of the Columbus Forge & Iron Co., Columbus, Ohio will involve 100 tons; while a bridge over the Little Miami River, to be built by the Hamilton County Commissioners, will take approximately 450 tons. Bids on this structure will close Aug. 23, with A. E. Mittendorf, chairman, Cincinnati. A hotel at Middletown, bids for which were opened some time ago, will probably be erected of reinforced concrete and bids are being taken for a structure of this kind. Bids closed on July 29 for a Union Station at Covington, Ky., involving 80 tons, but no award has yet been made. There has been some activity in the sheet market, and several 100-ton orders have been placed. Prices are holding at 2.25c. for blue annealed; 3c. for black, and 4c. for galvanized. It is reported that several carloads of nails have been placed at $2.50 per keg Pittsburgh, but confirmation is lacking. The Big Four will likely place orders for 2500 tons of tie plates within the next 10 days. A large number of bids have been received and these are now being tabulated. An inquiry for 900 tons of plates for a Louisville manufacturer is still pending.

Old Material.—Some dealers profess to see a better tone to the scrap market. Some small sales were reported during the week. It is beginning to be the general opinion that the bottom of the price situation has been reached, and that the up-turn will be in evidence in about 30 days. The Pennsylvania Lines West and The New York Central Lines will close lists this week. No price changes are noted.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$4.00 to $5.00
Iron rails	11.00 to 12.00
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.00 to 11.00
Heavy melting steel	8.50 to 9.50
Steel rails for melting	9.00 to 10.00
Car wheels	11.50 to 12.50
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	2.00 to 2.50
Steel turnings	1.00 to 2.00
Railroad cast	11.00 to 12.00
No. 1 machinery	12.00 to 13.00
Burnt scrap	6.50 to 7.50
Iron axles	15.00 to 16.00
Locomotive tires (smooth inside)	8.50 to 9.50
Pipes and flues	4.00 to 5.00

Coke.—With the exception of an inquiry for 2200 tons from a western sugar maker, there is little activity in the coke market. Prices are, if anything, softer, Connellsville furnace being quoted at $2.75 to $3 and foundry $3.75 to $4.50. No changes have been made in the Wise County and New River schedules. By-product furnace coke is quoted at $5, and foundry at $6.50, Connellsville basis.

Warehouse Business.—Small orders for immediate shipment is the prevailing activity. Local warehouses will reduce their prices approximately $3 per ton to

correspond to the recent reduction made by the mills. This reduction is expected to be made on Wednesday of this week.

Iron and steel bars, 3.15c. base; hoops and bands, 3.85c. base; shapes, 3.25c. base; plates, 3.25c. base; reinforcing bars, 3.22½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, 4.92c.; No. 28 galvanized sheets, 5.92c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.10 per 100 lb.

Birmingham

BIRMINGHAM, ALA., Aug. 2.

Pig Iron.—No large business developed in the Birmingham iron market the past week. Competition for the small lots for prompt shipment brought the market more clearly to a $19 base toward the close of the week. Some car lots are still bringing $20, but $19 can be done on 100 tons and up. One sale of 150 tons of 2.75 to 3.25 silicon at $19.50 was reported by well-informed operators. This is a base of $18.50 with accustomed silicon differentials. The latter have little remaining standing. The feature of the week was the announcement that the Woodward Iron Co. will blow in a second stack at Woodward before this week ends. President Crockard said: "We will blow in another stack because we have no iron on yards. There are not over 600 to 700 tons between blast furnace and yards. To remain in the iron business and accommodate our customers, we are forced to resume at a second stack. I believe we have turned the corner and that there will be a substantial outward movement of pig iron by the middle of September." The Woodward Iron Co. enjoys the distinction of having the only active merchant stacks in Alabama at this time. Undoubtedly yard stocks have decreased during the past month. In spite of the unsatisfactory volume of business, furnace operators are more optimistic than in many months. But for desire to realize cash, there would be no $19 iron. Last week inquiry was not notable and sales were confined to the noncompetitive South.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19 00 to $19.50
Basic	18.00 to 18.50
Charcoal	35.00

Finishing Mills.—The Tennessee company's operating schedule is the same as for the past six weeks with exception of doubling production at the tie-plate mill after receiving machinery and speeding up at the new car works. The rail mill is on normal turn and plate mills at Bessemer and Fairfield average two days a week apiece. The total of operations is about 40 per cent. The Gulf States Steel Co. is receiving more new business than in some time and will resume at its blooming mill on Aug. 15.

Coal and Coke.—Demand for coke is intermittent, but is always in car lots and for rush shipment. Prices rule from $6 to $6.50.

Cast Iron Pipe.—Little new business came in during the week, but several large lettings are expected in the near future by the high pressure pipe makers. The level is $40. The sanitary pipe shops are enjoying a fair business at $40 base. Some pipe is going to the Pacific Coast, the Hammond-Byrd Iron Co. and Bessemer Soil Pipe Co. being the shippers. The movement is by ship out of Mobile. National Cast Iron Pipe Co. and American Cast Iron Pipe Co. have shipped about 1500 tons of high pressure pipe to the Pacific Coast by the same route in the past week.

Old Material.—The scrap market is absolutely stagnant. Consumers are most conspicuous by their absence. A fair amount of cast scrap is moving. The price list is nominal.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12 00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

St. Louis

ST. LOUIS, Aug. 2.

Pig Iron.—The sale was reported this week of 200 tons of Northern foundry iron to a stove factory at Quincy, Ill., for prompt shipment, the price not being divulged. Several lots of 100 tons each were purchased by St. Louis melters. Another local concern that had out an inquiry for 100 tons decided to wait before placing the order. A few orders for carloads were placed during the week. The Commonwealth Steel Co. has an inquiry out for two carloads of ferromanganese.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$21.30 to $21.80
Northern malleable	21.30 to 21.80
Basic	21.30 to 21.80
Southern foundry, sil. 1.75 to 2.25	24.74 to 25.74

Finished Iron and Steel.—The first inquiry of importance from the railroads for some time was brought forth this week. It was from the Missouri Pacific for 500,000 tie plates for prompt delivery. For a hotel at Grand and Lindell avenues, St. Louis, an order for 232 tons of reinforcing bars was placed with the Laclede Steel Co. The Terminal Railroad Association placed an order for 350 kegs of track spikes at a price said to be better than 3c., Pittsburgh. The recent declines have not resulted in any increase in inquiries or orders. However, there seems to be a better feeling among the trade. A number of projects requiring structural steel are in process of development. The warehouse business is very light, and recent mill reductions have been met.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.62½c.; No. 28 black sheets, cold rolled, one pass, 4.75c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and tapped, $3.00 off list.

Old Material.—Consumers still decline to entertain any proposition and some of the dealers are trying to get mills interested in buying old material to lay down at the prevailing low levels, but without success. It is reported that one of the large consumers recently purchased 1500 tons of heavy melting steel, but this has not been confirmed. The following railroad lists are before the market this week: Pennsylvania System, 4500 tons; C. C. C. & St. Louis, 3000 tons; St. Louis Southwestern, 300 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$12.50 to $13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	10.00 to 10.50
Relaying rails, standard section	28.00 to 30.00
Cast iron car wheels	11.00 to 11.50
No. 1 railroad heavy melting steel	9.50 to 10.00
No. 1 heavy shoveling steel	9.00 to 9.50
Ordinary shoveling steel	8.50 to 9.00
Frogs, switches and guards, cut apart	9.50 to 10.00
Ordinary bundled sheet	4.00 to 4.50

Per Net Ton

Heavy axle and tire turnings	$5.00 to $5.50
Iron angle bars	10.50 to 11.00
Steel angle bars	8.00 to 8.50
Iron car axles	17.00 to 17.50
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	9.50 to 10.00
Steel couplers and knuckles	9.50 to 10.00
Locomotive tires, 42 in. and over, smooth inside	8.00 to 8.50
No. 1 dealers' forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	9.00 to 9.50
No. 1 boilers cut in sheets and rings	5.50 to 6.00
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agriculture malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	7.50 to 8.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	6.00 to 6.50
Uncut railroad mixed	7.00 to 7.50
Horseshoes	9.00 to 9.50
Railroad brake shoes	7.50 to 8.00

Coke.—A few carload orders for coke are being received, but there is very little business being placed on contracts. There is enough local foundry and home con-

sumption to take care of the output of the Granite City by-product plant. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis, Granite City by-products meeting this price, while Laclede by-product foundry is quoted at $11.50 ovens, or $11.70 delivered in the St. Louis industrial district.

Cleveland

CLEVELAND, Aug. 2.

Iron Ore.—No sales were reported during the week and no new inquiry came out. A Buffalo district consumer released 250,000 tons for shipment, but this did not involve any new buying, as the ore will come from the consumer's own mines and from other mining companies with which it had long-time contracts.

Following the 10 per cent wage reduction made by the Oliver Iron Mining Co. August 1, some of the other mining companies plan further wage reductions this week. With the last reduction, wages of common labor employed in the Steel Corporation's mines have been reduced from $4.25 to $3.80 per day. Some independent companies are paying $4 per day for common labor, but uniform wage scales have about disappeared among the independent mining companies in the Lake Superior district. There was 30,000,000 tons of Lake Superior ore on docks and in furnace yards July 1, according to figures just compiled. This is an increase of over 2,000,000 tons over June 1, in spite of the light shipments of ore and reflects the further decrease in consumption. The gain in the amount of ore on hand July 1 compares with an increase of 240,000 tons June 1 as compared with May 1. The amount consumed in June was approximately 1,470,000 tons, a decrease of over 250,000 tons as compared with May. The June consumption was less than one-third of the amount consumed during June, 1920, consumption during that month being over 4,500,000 tons.

Lake Superior shipments of iron ore during July were 4,047,687 gross tons as compared with 3,600,989 tons during June. The movement to Aug. 1 was 10,418,914 tons as compared with 26,079,111 tons during the same period last year.

We quote delivered lower lake ports: O'd range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market continues very dull. Shipping orders are light and indicate little improvement in the August consumption, although one interest reports a better volume of shipping orders than a month ago. Sales are still limited to small lots. One interest reports orders taken during the week aggregating 1100 tons of foundry iron, mostly in carloads, and other producers sold only a few car lots. Most of the sales were made at $20 for No. 2, but some of the business was booked at $20.50. One or two producers are holding firmly to $20 as the minimum, but others seem more inclined to meet the Valley district price of $19.50. There are reports of quotations as low as $19 and if this price has not already been named, it is believed that a round lot inquiry would bring out a $19 quotation. The only new inquiries reported are one from the American Radiator Co. for 200 tons of foundry iron for its Springfield plant and another for a like amount from a Barnesville, Ohio, consumer. As a result of the long shutdown of many furnaces, a scarcity of certain grades of iron has appeared in some sections. However, other producing centers still have large stocks that include iron of all specifications. Jackson County producers have made another sharp price cut on silvery iron and Bessemer ferrosilicon, reducing the former $8 a ton and the latter $8.50 a ton and making some changes in the differentials, particularly in the reduction of differentials on silvery iron.

New quotations f.o.b. furnace are as follows: Silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. Bessemer ferrosilicon, 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.46 to $20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	28.92
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	36.00 to 36.25

Coke.—There is very little activity in the market. A few car lot sales of standard Connellsville foundry coke are reported at $4.50 to $5 per ton. Quotations on other grades range down to $4.

Bolts, Nuts and Rivets.—The improvement previously noted in the bolt and nut market is holding up, this being largely due to small lot buying by the railroads. The New York Central Railroad took bids Monday on 9000 kegs of track bolts. The price situation is unchanged. While regular quotations are unchanged, these represent the top of the market, concessions of 5 to 10 per cent being made on desirable orders. Local makers continue to quote rivets at 2.75c. for structural and 2.86c. for boiler rivets, but quotations $2 a ton lower seem common. The rivet market is very dull.

Finished Iron and Steel.—The volume of orders and inquiries increased somewhat during the week and the sentiment in the trade is better. However, orders are only for small lots for immediate requirements. Some plants are operating a little better. The Bourne-Fuller Co. resumed operations in its Upson Steel plant, Cleveland, Tuesday, starting up two open-hearth furnaces. The market is still in a very unsettled condition regarding prices. Some mills seem inclined to adhere to the regular open prices, but desirable orders are still bringing out concessions. It is understood that the 6900 tons of steel bars, plates and structural material recently inquired for by the Mt. Vernon Bridge Co. for the Ohio State University stadium and other work has been divided between the leading interests and an independent mill. However, this business was not placed with the Cleveland sales offices and definite information as to the prices finally quoted is not available here. The price irregularity is most pronounced in plates, which are being freely quoted at 1.75c. with some mills going to 1.70c. A Cleveland mill took two lots of 600 tons each for oil refining work and the Ford Motor Co. has placed an additional 500 tons of light plates with a Valley mill. A moderate volume of steel bar business is coming out with 1.75c. as the generally prevailing price. Quotations on hard steel reinforcing bars are 1.75c., but a good inquiry would probably bring out a lower price. In a reduction of local warehouse prices a 2.40c. mill price has been taken as the basis on hoops, although mill prices on both hoops and bands are irregular. Hot-rolled strip steel is unchanged at 2.35c. to 2.40c. The structural market is quiet. The only new inquiry on which bids have been taken is for 225 tons for three school buildings in Elyria, Ohio.

Sheets.—The demand shows some improvement, but a wide range of prices is being quoted. New low prices of 2.90c. for black and 3.75c. for galvanized sheets have appeared, but the more common quotations are 3c. for black, 4c. for galvanized and 2.25c. for blue annealed. However, a large Valley producer is adhering to prices $5 a ton higher. One independent mill is quoting the low prices only for immediate delivery and is suggesting to its customers the restoration of the plan of allocating material for future shipment to be billed at prices prevailing at the time of delivery.

Warehouse Business.—Cleveland jobbers have reduced warehouse prices $3 a ton on steel bars, plates and structural material, following the recent $3 cut in regular mill prices. Similar warehouse reductions have been made on cold-rolled steel, hoops and bands.

Jobbers quote steel bars 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.40c. to 3.55c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Old Material.—There is a little demand for small lots of scrap from mills for early requirements, but consumers are not inclined to buy material to lay down in their yards. Prices show no change and some of the dealers are inclined to believe that the bottom

has been reached. A Canton mill during the week purchased 2000 tons of heavy melting steel and a Weirton plant some shoveling turnings, the latter at $8.75. Local dealers report offers of $7.25 for machine shop turnings for Brackenridge delivery.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	6.50 to 7.00
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	6.50 to 7.00
Compressed steel	6.00 to 6.50
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 cast	15.00 to 15.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in	5.50 to 6.00
Drop forge flashings, under 10 in	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

Philadelphia

PHILADELPHIA, Aug. 2.

It is more difficult to secure pig iron under $20 base and it would seem that price tendency is upward. Considerable pig iron has changed hands, one seller reporting that the last two weeks in July has resulted in more sales than for any entire month in a year past. A seller who made a price of $19.50 for No. 2 X late last week has raised his asking price to $21 for this grade. Buying of a considerable tonnage by a pipe maker who usually senses the bottom of the market has had the effect of halting the downward trend.

More mills are starting up, such as the Phoenix Iron Co. and the Schuylkill Iron Works of the Alan Wood Iron & Steel Co. Two blast furnaces are still contemplating blowing out, in which case the market will be stiffened.

Higher prices are prevailing in the old material trade and mills are finding it more difficult to cover at the lower prices of a few weeks past. The Lehigh Valley railroad is asking for steel for repairing about 5000 steel hopper cars. Promising business in plates for oil storage tanks has not materialized and the market is weaker. The lack of transactions in finished material makes difficult the gaging of market values.

Pig Iron.—There are some indications that not only has the bottom been reached, but that prices are stiffening. For instance, one furnace, which late last week sold some No. 2 X iron for $19.50, furnace, is now asking $21 for the same grade. It is stated that if but one more furnace went out of blast, the shortage would be keen and prices tend to rise. Consumption is now probably greater than production. Another factor which stiffened prices was the purchase by a large pipe company of at least 5000 tons in this district, divided among four furnaces, three of them getting 1000 tons each, the fourth securing 2000 tons. Optimism generally prevails, being based for some on a fair volume of actual orders, and for others on sentiment. One seller reports officially: "Sales for the last half of July were heavier than for any previous entire month for a year past." One seller has disposed of 7000 tons in two weeks, chiefly to foundries and pipe makers. Another seller disposed of 800 tons in four lots on Monday, the largest being of 300 tons. Haines, Jones & Cadbury, Inc., Norristown, Pa., has bought 200 tons of 1.75 to 2.25 sil. iron and 100 tons of No. 2 X. A sale of grey forge iron was made at $20.50, furnace, with freight of $1.82; copper-bearing low phos sells at $35.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.35 to $20.75
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.35 to 22.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	21.25 to 22.00
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	38.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—The rumor persists that a sale of ferromanganese was made at $68, though this may have been resale material. Scarcity of sales prevents a real test of the market. Some domestic furnaces, however, name $70 delivered and British material is to be had at $70 seaboard, though others still quote $75. Spiegeleisen is quoted at $26 or $27.

Semi-finished Steel.—Sheet bars have dropped $3 per ton to $32, Pittsburgh, along with the decline to $30 for rerolling billets and $35 for forging billets and $31 for slabs, as mentioned last week. Very few sales have been made in these materials.

Plates.—Plates are soft and sellers freely admit that lower than the 1.85c. price can be done. Inquiries for oil storage tanks have not resulted in orders and many have been withdrawn. Railroad car repair work will demand some. The Lehigh Valley railroad is asking for material for repairing from 4000 to 5000 steel cars, chiefly hopper cars. The Chesapeake & Ohio asks for over 50 tons of plates. New warehouses on the river at Wilmington, Del., will require a small tonnage.

Structural Material.—Prices are not being shaded as extensively as on plates. The price of 1.85c., Pittsburgh, is being named, but attractive tonnages could be purchased for less. About 1000 tons will be required for warehouses on the Delaware River at Wilmington, Del., the Du Pont Engineering Co. having been awarded the contract by the Board of Harbor commissioners at $1,372,570 for the total construction involved. Of this, $90,000 will be spent for the fabricated steel. Bids will be opened this week for a bank at Chelsea, Atlantic City, requiring 200 tons of structural steel. The Chesapeake & Ohio railroad asks for 75,000 lb. of angles.

Bars.—The C. & O. asks for 50,000 lb. of steel bars for repair work. There is a present seasonal demand for deformed bars for concrete work. The price of 1.75c., Pittsburgh, is quoted uniformly for both iron bars and steel bars.

Bolts, Nuts and Spikes.—Large bolts are quoted at list less 70 per cent; small bolts at list less 70 and 10 per cent, but it is understood that the Belmont Iron Works recently bought 2500 bolts at a concession from these discounts. The Philadelphia & Reading has been a buyer of a fair amount of material, including bolts, nuts, rivets and spikes.

Sheets.—Blue annealed sheets are quoted openly at 2.40c. and black sheets at 3.00c., which is a slight decline from recent prices. The Alan Wood Iron & Steel Co. started up its sheet mills at fair capacity this week.

Old Material.—Prices are apparently on the upward swing and a much better feeling exists. Mills are being required to pay more for heavy melting steel. One steel plant is now offering $11 for this grade but is not finding many sellers at this figure, though a few weeks ago would have had no difficulty in obtaining plenty of material. A fair volume of pipe has been sold to a plant in the Lebanon Valley for $13, delivered. A railroad supply builder has been inquiring for stove plate for three plants, but has found little response at the prices it offers. Both stove plate and borings are scarce. We quote per gross ton, delivered to consumers in the Philadelphia district as follows:

No. 1 heavy melting steel	$11.00 to $12.00
Scrap rail	11.00 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	11.00 to 12.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Iron car axles	No market
Steel car axles	No market

Warehouse Business.—A cut in all lines became effective last week, bars being reduced from 2.90c. to 2.75c., other changes having been made proportionately.

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.65c.; round edge iron, 2.95c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4.20c.; squares and hexagons, cold-rolled steel, 4.70c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 6.50c.; toe steel, 4.50c.

San Francisco

SAN FRANCISCO, July 27.

Pig Iron.—Dullness prevails in this market on the Coast, with actual sales confined to small lots for the most part. No very conspicuous transactions have been reported lately, but a few carlot quantities of good Belgian material changed hands at prices ranging from about $30 to as high as $33.50, ex ship, San Francisco. Poorer grades are quite freely offered, without takers. Foundry operations at present are extremely small. Those that are not completely shut down are operating on a very much restricted schedule. Demand for castings is almost negligible.

Coke.—Two inquiries worthy of mention have been made during the past few days, one involving 400 tons of sacked coke for the account of the Mare Island Naval Base. The other is for approximately 200 tons. Beyond these evidences of life, business in coke in this market is very quiet, as might be expected when foundry activity is on such a small scale.

Old Material.—Holders of heavy melting steel are asking about $9 a gross ton, delivered, but buyers are not disposed to take much active interest. Cast iron scrap similarly is very dull at around $20 a net ton, delivered, and some foundries are offering at a much lower price.

Cast Iron Pipe.—This market has displayed a softening tendency of late, and prices are being quoted at around $40, against the former market of $45. There has been some business in pipe, principally from municipal sources, since private inquiries are sporadic and involve small quantities. Santa Barbara was asking for bids on 200 tons of 6-, 8- and 12-in. pipe. Los Angeles was in the market for 329 tons of 24-in., and Santa Cruz will open bids on Aug. 2 for 93 tons of 8- and 10-in. pipe.

Finished Iron and Steel.—In San Francisco and environs the situation is one of general disruption and inactivity. Labor troubles are still unsettled, especially in the building trade circle. At present, moreover, there is a good deal of talk of a general sympathetic strike tieing up all industries, but the probability of its becoming operative is questioned. The marine strike is practically dissolved, and coastwise shipping once more is being resumed, making possible the movement of steel products to various Coast points. This has had the effect of relieving congestion somewhat. But the actual steel market is at this time chaotic. There have been several inquiries and a few sales, but there is no stability to prices. Underbidding has been prevalent. Plates are now around 2c., tidewater, and galvanized sheets 4c., base, Pittsburgh, but these prices can hardly be called a market. Last week 300 tons of sheets were placed for a Los Angeles firm's credit, and an inquiry from the South for 1000 tons of shapes is now pending. A small railroad is understood to be in the market for 2000 tons of each of the sizes 45-, 60- and 70-lb. rails and complete accessories. There is also an inquiry for 100 tons of alloy steel forging billets for S. A. E. specifications, together with some interest shown in concrete reinforcing bars.

The Worth Brothers Steel Co., Claymont, Del., is operating at about one-half of normal capacity, or at the rate of approximately 11,000 tons of finished steel plate a month. Both open-hearth mill and rolling mill are in service.

WORKMEN'S ADAPTABILITY

German Engineers Discuss Qualifications for Blast Furnace, Open Hearth and Other Work

In discussing the processes developed by Dr. Moede, of the Technical High School, of Charlottenburg, Germany, for testing the vocational fitness of industrial workers, especially in the steel industry, Dr. Huettenhain, and engineers Roser and Daiber of the Verein Deutscher Eisenhuttenleute made further pertinent comment, according to *Stahl und Eisen*, in which the following was emphasized:

"The application of vocational fitness tests will undoubtedly be of importance to steel and iron works. As in the machine industry, the plants require highly qualified and expert labor, the choice of men for which should be made with care, especially as the work is difficult and involves a frequent change of personnel. On account of the attendant heat and dust and other unfavorable sanitary conditions, physical fitness is of greater importance than even in the machine industry. The necessary tests are therefore to be conducted by a physician familiar with industrial conditions in their plants.

"Physical fitness ranks with good physique in importance. The melter at the blast furnace must judge pig iron and slag by appearance and from the manner in which it acts; he therefore requires a sensitive eye for color changes and spark formation. His hearing must be keen as he must judge of the proper conditions by the sound of the cooling water in the tuyeres and also that of the hot blast. In the interests of safety both for workmen and the plant, alertness is requisite, even under the soporific influence of the heat; it requires, furthermore, that he have presence of mind, be free from fear and have the ability to act with speed and directness in the face of danger.

"The requirements are similar for melters at the open-hearth furnaces and converters. The open-hearth furnace operator must judge the temperature by the eye and regulate fuel and air pressure; the operators at the converter judge progress that the metal is making by the gases given off. They also require keen hearing, alertness and presence of mind. The engineer in charge of the blowing engines must be able to judge the condition of the machinery by sound. He must have good eyesight to note signals, also good color sense, coupled with alertness and the ability to act with presence of mind at unexpected alarm.

"The roller in rolling slabs and sheets judges the requisite pressure by the glow of the billet, requiring sensitive eyes for color. In addition alertness and quick reaction to danger alarms are necessary. The latter qualities must be emphasized in wire mills, where the operators must be adept at changing from groove to groove on the rolls. The test here includes manual dexterity.

"Crane operators require above all ears sensitive to sound; also color sense, presence of mind, quick reaction in case of danger. Dexterity is also required in manipulation of control levers. Practical tests for machinists, lathe operators and locomotive engineers are already in use, but for steel workers are still in the empirical stages. In these tests moral development and constructive thinking receive considerable attention."

Engineer Roser shows practical application of tests and points for which applicant for position is marked. For eye test and ability to judge measurement, the following are given: Counting screw threads and gear teeth; distinguishing between right and left threads, judging sizes of drill holes and centering, selecting master keys, selecting taps, bolts, dividing angles and estimating degree, plumbing rods and drawing parallels. Similar tests are made for hearing, functioning of the arms and other members, sense of touch, memory, judgment, fatigue, etc. Engineer Daiber discussed some tests made on applicants at Dortmund.

The Mary furnace, Sharon Steel Hoop Co., Lowellville, Ohio, went into blast July 30, after having been out since the first of the year.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65
Large boiler rivets.....$2.75
Small rivets.....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads.....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts.....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S...80, 10 and 10 per cent off list
Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70,10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....4c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.75 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $3 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 base per 100 lb. Tie plates, $2 to $2.05 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.25c. to 2.40c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+ 27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

¼	46½	29	¼ to ⅜	+ 9½	+ 42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.30–2.40	Nos. 11 and 12	2.50–2.60
Nos. 9 and 10 (base)	2.40–2.50	Nos. 13 and 14	2.60–2.70
		Nos. 15 and 16	2.70–2.80

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.70–2.95	No. 28 (base)	3.00–3.25
Nos. 22 to 24	2.75–3.00	No. 29	3.10–3.35
Nos. 25 and 26	2.90–3.15	No. 30	3.20–3.45
No. 27	2.95–3.20		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00–3.25	Nos. 25 and 26	3.70–3.95
Nos. 12 to 14	3.10–3.35	No. 27	3.85–4.10
Nos. 15 and 16	3.25–3.50	No. 28 (base)	4.00–4.25
Nos. 17 to 21	3.40–3.65	No. 29	4.25–4.50
Nos. 22 to 24	3.55–3.80	No. 30	4.50–4.75

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80–3.05	No. 28 (base)	3.00–3 25
Nos. 17 to 21	2.85–3.10	No. 29	3.05–3.30
Nos. 22 to 24	2.90–3.15	No. 30	3.05–3.30
Nos. 25 to 27	2.95–3.20	Nos. 30½ and 31	3.10–3.40

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
July	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
27	12.37½	12.12½	26.25	4.40	4.35	4.75	4.25
28	12.00	12.00	26.50	4.40	4.30	4.75	4.25
29	12.00	11.87½	26.50	4.40	4.25	4.70	4.20
30	12.00	11.75	.....	4.40	4.25	4.70	4.20
Aug.							
1	12.00	11.75	26.75	4.40	4.20	4.70	4.20
2	12.00	11.75	26.50	4.40	4.20	4.70	4.20

New York

NEW YORK, Aug. 2.

There is no activity in any of the markets and prices, except those for copper, are fairly steady. Demand for copper is extremely light and prices are lower. The tin market is only moderately active at intervals. The lead market continues quiet and firm. Demand for zinc is still very small and prices are little easier.

Copper.—The sale of speculative and other lots of electrolytic copper in the latter part of July resulted in bringing the whole market down to the lowest level in weeks. A few of the small producers are meeting the market which may be quoted at 12c., delivered, or 11.75c., New York, for August delivery, but the amount of metal sold at these prices is exceedingly small, most consumers having no need to purchase and the volume of exchange holding back most of the foreign demand. Some of the large producers will not entertain business at less than 12.50c., delivered. Some sellers report a slightly firmer market to-day, due to the inauguration of the new month and elimination of a large part of the copper held in weak or speculative hands. Most of the producers of Lake copper are out of the market and it is difficult to quote values, an appraisal being 12c., New York, or 12.25c., delivered, nominal, for early delivery. It is interesting to note that official statistics of exports of refined copper show that with the 11 months ended with May, this year, Germany took about 27 per cent, which compares with 33 per cent of her share of the exports in 1913. Germany now ranks as the largest foreign buyer of American copper and it is also a fact that, of the total taken in the last 11 months, 70 per cent was purchased in the first five months of this year.

Copper Averages.—The average price of Lake copper for the month of July, based on daily quotations in THE IRON AGE, was 12.59½c. The average price of electrolytic copper was 12.46c.

Tin.—For the most part the market has been exceedingly quiet, with the exception of July 27, when a fair business in future shipment of Straits tin was done, amounting to 200 to 250 tons. Consumers were fairly heavy buyers. Because of the bank holiday in London yesterday the market here was quiet and has continued so to-day, with quotations largely nominal. Straits tin is quoted to-day at 26.50c., New York. London quotations to-day are practically the same as those of a week ago, spot standard being quoted at £158 10s., future standard at £160 10s. and spot Straits at £159 per ton. Deliveries into consumption for July are reported as 1525 tons with 1721 tons in stocks on July 31 and 800 tons being landed. Imports for the first seven months of this year are returned at 10,418 tons against 31,613 tons for the first seven months of 1920.

Lead.—There appears to be more disposition on the part of independent sellers to offer lead and the result is that more metal has been offered than current inquiries call for. While the leading interest continues to quote 4.40c., both New York and St. Louis, the outside market is quiet at 4.40c., New York, and 4.20c., St. Louis.

Zinc.—Some prime Western zinc is being offered at 4.20c., St. Louis, or 4.70c., New York, which we quote as the market for early delivery. Demand continues spasmodic and confined to small lots on which most producers in this market quote 4.25c., St. Louis, or 4.75c., New York.

Antimony.—The market is lifeless with wholesale lots for early delivery obtainable as low as 4.60c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by the leading interest at 24.50c., f.o.b. plant, in wholesale lots for early delivery, while the same grade from foreign sources can be procured as low as 21c., New York.

Old Metals.—The market is sluggish and values are slightly off. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	10.00
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	4.75
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Chicago

AUG. 2.—Copper, lead and spelter are lower. There is almost no demand. We quote Lake copper at 12.75c. in carload lots; tin, 28c. to 28.50c.; lead, 4.30c.; spelter, 4.30c.; antimony, 7.50c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 1.—Consumers of non-ferrous metals are doing virtually nothing and the markets are extremely dull. Lead is quoted at 4.20c. and zinc at 4.20c., car lots. We quote Lake copper car lots at 12.73c. to 12.98½c.; tin, 27.36c., and antimony, 5.38½c. On old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. aluminum, 9c.

GREAT OUTPUT

Allegheny County Industries Made a New Record in 1920

PITTSBURGH, Aug. 1.—Allegheny county industries in 1920 produced manufactures having a value of $2,580,915,800, approximately $680,000,000 more than the value of 1919 products and $250,000,000 greater than in 1918, when a county record was established, according to figures made public recently by Secretary of Internal Affairs Woodward following completion of a survey of industrial Allegheny by the Bureau of Statistics and Information of the Pennsylvania Department of Internal Affairs. The figures show that there were employed in the county last year 243,333 persons. In 1919 there were 221,621 employed and in 1918 282,458.

Metal production in Allegheny county last year was the greatest in the country, the value being $1,995,619,300, of which $1,526,293,900 represented primary metal products. Secondary products were worth $469,325,400. Iron and steel ingots were worth $317,653,300. The metal trades last year gave employment to 146,324 persons, who were paid an aggregate of $279,304,100. Capital invested in metal plants was $701,083,300. In 1919 metal production was worth $1,448,495,400. In that year there were 126,479 persons employed who were paid $202,914,500. Capital invested in 1919 was $515,624,600.

BELGIAN MARKET DULL

Economic Union with Luxemburg Opposed—Prices Continue to Slump—French and German Competition

(By Aerial Mail to London)

CHARLEROI, BELGIUM, July 19.—Although the Comité Paritaire appointed by the Belgian and Luxemburg governments has been studying the proposed economic and customs union between Luxemburg and Belgium for more than six weeks very little headway seems to have been made. It is realized that the opening of frontiers would doubtless result in cut-price competition, as the present duty averages 30 fr. per ton on finished steel. Moreover, the danger of increased German competition presents a grave aspect. Should the union come about, it is argued, there is nothing to hinder German capital from moving to Luxemburg and establishing works there, where, under the cloak of Luxemburg enterprises, the Belgian market could be swamped with cheap material.

The recent establishment of the Société Luxemburgeoise pour Enterprises Electriques, a branch establishment of the German Allgemeine Elektrizitaets Gesellschaft, clearly shows that German industry is considering Luxemburg as a field for regaining her position in the world's markets. This would, of course, provide a method for circumventing the 26 per cent export levy on German goods by the Entente.

More Plants Close

The general situation seems to be drifting from bad to worse, with no improvement in sight. More plants have had to close down lately, including the basic steel works of the Cockerill concern, while the Espérance-Longdoz Co. is also contemplating a shutdown of its steel works. A faint ray of hope for a revival of the international iron market is offered by the conclusion of the miners' strike in the United Kingdom. German competition has, for the time being at least, become somewhat less formidable as German mills are stipulating longer terms of delivery, but in prices Belgian producers are still struggling to hold their own.

More and more the conviction is gaining ground that improvement must come from a considerable wage reduction. Industrial circles are estimating that a 50 per cent wage cut will be necessary, but in face of the stubborn opposition of labor, opinion as to the possibility of carrying through a reduction on that scale is somewhat divided. It appears that labor would eventually consent to a substantial reduction provided the Government guarantees a liberal unemployment benefit.

Pig Iron Continues to Slump

The first effects of the removal of control from French pig iron and semi-finished products found expression in desperate efforts by producers to get as much British business as possible before French competition appeared. Quotations for foundry iron were cut to £5 per ton, while £7 was asked a few weeks ago. These low prices were apparently quoted by overstocked producers, since the average prices ruling throughout the past week were £5.10 c.i.f. United Kingdom port.

Blast furnace coke has been reduced to 110 fr., screened coke, to 145 fr. and special grades to 150 fr. Foundry iron No. 3 has receded to 205 fr., basic, to 175 to 190 fr., at furnace. Against these, Luxemburg foundry iron is offered at 195 fr. per ton, f.o.b. Belgian frontier, and Lorraine iron as low as 180 to 185 fr. As a matter of fact, plants are accepting almost any price consumers feel disposed to pay. Germany is offering spiegeleisen, 10 to 12 per cent, at 1825 to 1850 m. per ton. British hematite prices are hardening, latest quotations being £7.5 to £7.10, c.i.f. Antwerp.

Semi-Finished Material Stationary

The change in prices compared with quotations during the last weeks is not considerable. Average quotations on basic Bessemer steel during the past 10 days were as follows:

	Fr. per Metric Ton
Ingots	270 to 280
Blooms	300 to 310
Billets	315 to 320
Sheet bars	330 to 345

Lorraine producers are actively pushing cogged blooms at about 275 fr. per ton.

Finished Material Drops

The slump in prices proceeds almost automatically week by week, bar iron now having passed the 400-fr. level; 385 to 395 fr. is named for No. 2 wrought iron, 385 to 415 fr. for No. 3, and 400 to 405 fr. for soft steel. The latter is offered as low as 379 to 390 fr. for export, f.o.b. Antwerp, while the export quotations for Nos. 2 and 3 wrought iron are 380 to 395 fr. and 385 to 410 fr., respectively. Hoops have slightly recovered from the heavy drop of last week from 625 fr. to 550 fr., a slightly better demand bringing the price to 575 fr. again. The sheet market under the pressure of French and Luxemburg offers showed a weaker tone. We quote basic sheets No. 6. U. S. standard gage for export at 485 to 495 fr., but Lorraine and Luxemburg mills are naming 450 to 460 fr. and 455 to 470 fr., f.o.b. Antwerp, respectively.

Exports of boiler plates to the United Kingdom developed favorably, but are now meeting keen German competition, the Germans cutting Belgian quotations of £13.10 to £14, c.i.f. Glasgow, by 30 to 40s. per ton.

Rail Market Slightly Active

The La Providence company was awarded an Argentine rail order for 8000 tons at a price of 469 fr. per ton and another works is just reported to have booked an order for 10,000 tons of rails at 460 fr., c.i.f. Brazilian port. Generally rail export quotations are from 460 to 475 fr. per ton. The Chilean Government is inquiring for about 1200 tons of tool and spring steel, plates, etc., and other material for its railroads. In the beam market, orders for heavy shapes are particularly sought and mills are accepting offers as low as 380 fr. per ton compared with the ruling price of 400 to 410 fr. There are indications that the wire market may also be affected by the general depression, though prices for nails are maintained at 15s. per cwt., f.o.b. Antwerp, plain bright wire bringing £1.

The Belgian Congo Katanga Railroads have placed an order with inland works for 90 cars of 40 tons each, totaling in value about 3,000,000 fr.

Increased Activity at Youngstown

YOUNGSTOWN, OHIO, Aug. 2.—Valley iron and steel plants are on the heaviest production schedule this week since January, reflecting improved demand. While some manufacturers are inclined to believe the current movement is simply a spurt and will recede, others express the hope that it may be the beginning of the upturn that shall carry the industry back to normal. After being idle since May 24 Mary blast furnace at Lowellville, Ohio, of the Sharon Steel Hoop Co., Sharon, Pa., has been started. The stack made its first cast on Monday of this week. All Bessemer departments of independent interests and the Carnegie Steel Co. are active, 26 of 66 open-hearth furnaces are melting, while 60 of 105 sheet mills in the Mahoning Valley are under power, the largest number since early in the year. Bar mills of the Republic Iron & Steel Co. are being operated after a long suspension. Hoop, band and strip steel production shows an improvement this week.

With the relighting of Mary furnace, seven of 46 stacks in the Mahoning and Shenango Valleys are in blast, two being operated in the Ohio Works battery of the Carnegie Steel Co., two in the East Youngstown group of the Youngstown Sheet & Tube Co. and one each of the Republic company and the Brier Hill Steel Co., The Sharon company has 160,000 tons of ore on hand which is to be worked off. Since the furnace has been suspended the company has purchased its pig iron requirements from Valley steelworks interests. An inquiry which it had put out for 2000 tons of basic has been withdrawn in view of the operation of its own furnace.

PERSONAL

Charles J. Hunter, vice-president and treasurer Wheeling Steel & Iron Co., has been named to succeed John Duncan as president of the company. Mr. Hunter has been associated with the Wheeling Steel & Iron Co. for many years, and has served in practically every capacity from clerk to the highest executive office in the company. Mr. Duncan was tendered a farewell reception at the Wheeling Company Club, Wheeling, W. Va., on July 29, by the former associates and was presented a diamond stickpin. He is to become president of the Illinois Co., a holding corporation with headquarters in St. Louis, controlling coal lands, iron ore mines and railroad lines.

George E. Harris has resigned as general manager of sales of the Falcon Steel Co., Niles, Ohio, in order to engage in the steel business for himself in Detroit, and has made connections with some important producers covering practically all lines of steel. He will specialize on strip steel, sheets, tubing, steels of special analysis of carbon and alloy steels. Mr. Harris has spent 30 years in the steel industry, starting as water boy in the Pacific Rolling Mills in San Francisco, of which his father was one of the organizers. A large portion of this time was spent in the operating end of the industry. His last operative job was division superintendent of the Nova Scotia Steel & Coal Co., New Glasgow, Nova Scotia, where he had charge of the company's forge and axle shop and bar mill. He also served as superintendent of A. Finkle Sons, Chicago, and was associated with other mills in their operating departments. In the sales end of the steel business, he spent several years with the Peter A. Frasse Co., Buffalo, in charge of its steel department and was also director of sales of the Hawkridge Brothers Co., Boston, resigning that position to become associated with the Falcon Steel Co., During the war, he was an approval officer in the finance department of the air service.



GEORGE E. HARRIS

Alfred J. Eichler, vice-president Walworth International Co., sailed July 26 on the Aquitania for England and the important cities on the Continent. Early in September he plans to leave England for Buenos Ayres, returning to New York by way of other East Coast cities, arriving in New York late in November.

R. K. Swift has resigned from the Ingersoll-Rand Co. after eight and a half years as manager of the New England sales branch office and a previous 10 years as a salesman for that company. He will take a much-needed rest at his camp at East Weymouth, Mass.

J. P. Keene, president and general manager of the Youngstown Tank & Boiler Co., Youngstown, Ohio, has assumed the duties of W. H. Heywood, who has resigned as vice-president and treasurer. A successor will not be elected to Mr. Heywood until the first of next year. Prior to becoming identified with the Youngstown Tank & Boiler Co. 18 months ago, the latter was in the sales department of the Youngstown Sheet & Tube Co.

Joseph G. Butler, Jr., is slowly convalescing from the effects of an accident over a year ago when he was struck by a motor truck near his home in Youngstown, Ohio. For the past three months he has not been at his office in the Stambaugh Building, Youngstown. His condition has improved, however, to such an extent that he left on Monday of this week for Atlantic City, where he will stop at the Traymore Hotel during August and possibly longer.

Joseph Wolf, president Cincinnati Electrical Tool Co., arrived in New York July 30, having completed a trip through England, Belgium, France and Holland where he visited his selling connections. He found business extremely quiet in his line because of the severe German competition.

Roy Davey, who has been manager of the Detroit branch for the American Bosch Magneto Corporation, has been given larger responsibilities at the main office of the corporation at Springfield, Mass. He is now acting as manager of the manufacturers' trade department.

A. W. L. Gilpin, who has been manager of the Milwaukee branch and assembling plant of the Ford Motor Co., has been promoted to district manager, in charge of branches at Detroit, Milwaukee, Chicago, Cleveland, Cincinnati, Columbus, Indianapolis and Louisville.

Floyd E. Meeks, for the past four years Pittsburgh district manager of the Shepard Electric Crane & Hoist Co., has been transferred from the sales to the service department of the company, with headquarters at Montour Falls, N. Y. Mr. Meeks will have charge of service, erection and repairs. His successor in the Pittsburgh office is W. C. Minier, formerly connected with the Pittsburgh office and who for the past few years has been in charge of the Cleveland office of the company. It is the intention of the company to combine the Cleveland and Pittsburgh offices, with Mr. Minier in charge.

Frank S. Spencer, 1265 Boylston Street, Boston, has been appointed representative of the Witherow Steel Co., Pittsburgh, for the sale of variable section rolled products in the New England district.

H. Voges, Jr., has resigned as vice-president and general manager of the Webster & Perks Machine Tool Co., Springfield, Ohio.

Percy Tetlow has been appointed director of industrial relations of Ohio, being made a member of the cabinet of Gov. Harry L. Davis, a recently enacted State law providing for a governor's cabinet. Mr. Tetlow is a native of Washingtonville, Ohio, and has been very active in labor union affairs.

I. W. Hawes, New Britain Machine Co., New Britain, Conn., automatic screw machines, has returned from a nine months' trip to Europe.

O. K. Carpenter, superintendent New England Steel Castings Co., Springfield, Mass., has resigned to accept a position as salesman for the Electric Steel Products Co., Turners Falls, Mass., steel castings and tools.

Charles E. Hildreth, who recently resigned from the Morgan Grinder Co., Worcester, Mass., has been appointed receiver for the Springfield Screw Machinery Corporation, Fitchburg, Mass.

H. F. Boersma, of The Hague, Holland, sailed from New York July 30 on the *Rotterdam*. He has just completed a trip around the world during which he studied the latest developments in steel building construction. He is prominent in building contracting in Europe, among other things, having built the Peace Palace at The Hague.

Henry Dreses, Dreses Machine Tool Co., Cincinnati, left New York July 30 for a visit to Europe to be gone until early in October.

W. N. Dickinson, for some years identified with the elevator business, including the Otis and Standard Plunger companies, and during the war attached to the Ordnance Department of the U. S. Army, has opened an engineering office in the Aeolian Building, New York, to specialize in the handling of materials.

Appointed Head of Heavy Machinery Industrial Division

WASHINGTON, Aug. 2.—Walter H. Rastall, of Dayton, O., a mechanical engineer and marine draftsman, who has had extensive experience with iron and steel and machinery manufacturing interests and has served in different capacities for the Government, took up his duties last Friday as chief of the heavy machinery division of the Department of Commerce. This is one of the new divisions provided for by Congress recently under the export industries act, and Mr. Rastall was selected for his new position by Secretary of Commerce Herbert Hoover because of the practical experience and broad knowledge Mr. Rastall has in the machinery line.

Born in Burlingame, Kan., Mr. Rastall is 41 years of age, and obtained his primary and preparatory school training in Chicago and at Hebron Academy, Hebron, Me. This was followed by a course of three years in civil engineering with electrical electives at the University of Maine and a course of two years in mechanical engineering with electrical electives at Cornell University. He was given the degree of mechanical engineer in 1904. He also took a course in naval architecture.



WALTER H. RASTALL

Previous to graduation, Mr. Rastall was engaged as a marine draftsman with the Bath Iron Works, Bath, Me., and the Eastern Shipbuilding Co., New London, Conn., and as chief draftsman with the Latrobe Steel & Coupler Co., Melrose Park, Ill. He is a member of the American Society of Mechanical Engineers. His first foreign experience covered the period from 1904 to 1911, inclusive. As resident engineer of the American Trading Co. at Kobe, Japan, Mr. Rastall was responsible for the engineering and commercial features of a business involving the sale of American industrial machinery to Japanese buyers and increased that company's business from practically nothing to $500,000 annually. The concern represented about 20 American machinery manufacturers, including the Allis-Chalmers Co., the Ingersoll-Rand Co., Henry R. Worthington, Erie City Iron Works and the Jewel Export Filter Co. In this work, Mr. Rastall handled a large variety of equipment, mining machinery, pumping machinery, power plant equipment, gas engines, ice plants, water works, paper mills, cement making machinery, railroad and shipyard supplies, steam engines and boilers and many other lines. He is credited with having installed the first mechanical filter plants used for municipal supplies in China, Korea and Japan, the plant at Kyoto, Japan, being an unusually important undertaking. The largest single contract Mr. Rastall ever took included the building and completely equipping of a plant at Formosa requiring 500 tons daily of sugar cane whose juices were converted into white sugar. This involved the delivery of about 2000 tons of machinery.

In addition to miscellaneous engineering work in the United States, Mr. Rastall was sales engineer for the Worthington Pump & Machinery Corporation from 1913 to 1917. As a war measure, he joined the Bureau of Aircraft Production in March, 1917, as aeronautical mechanical engineer and was given charge of production in the Dayton district, extending from Buffalo to Kansas City.

In October, 1918, the Department of Commerce requested Mr. Rastall to leave the Bureau of Aircraft Production to investigate the markets for industrial machinery in the Far East. This was started at once and has involved visits to practically every port in Asia from Karachi and Bombay to Yokohama, including Ceylon, the Dutch East Indies and the Philippine Islands. The trip recently was completed and the report on the investigation is in course of preparation.

Mr. Rastall will study especially the problems connected with the marketing of American heavy machinery throughout the world. It is the view of department officials that the situation in this respect is unusually attractive at this time, owing to the strong nationalistic spirit which the experiences of the war have created in many countries. This spirit, it is pointed out, is manifesting itself particularly in Latin-America and the Far East where the business men have learned the dangers of complete dependence on outside sources for essential industrial supplies. As a result, department officials believe that the potential market for American heavy machinery is promising and the hope is expressed that the work of this new division may be instrumental in the sale of much American equipment of this character in industrializing the less developed countries of the world.

OBITUARY

WILLIAM ROBERT PARK, consulting engineer Hancock Inspirator Co., Boston, died July 29 at the Morton Hospital, Taunton, Mass., following an operation. Mr. Park was born in Brooklyn, Aug. 19, 1831. An orphan at the age of ten, he became a helper in a machine shop at North Scituate, Mass. While in his twenties Mr. Park was made superintendent of the Grover & Baker Sewing Machine Co. plant, Boston, and remained with the firm until it dissolved in 1876, when he was made manager Hancock Inspirator Co., Boston. The Government presented him a gold medal for his mechanical achievements. He was a member of the A. S. M. E. He is survived by a daughter and two sons, Charles F. Park, professor engineering department Massachusetts Institute Technology, and W. R. Park, Jr., engaged in conducting a business established at Taunton by his father.

WILSON L. FENN, president Fenn Mfg. Co., Hartford, Conn., special machinery, and one of the incorporators of Taylor & Fenn Co., that city, machine tools, died July 26 at the Charter Oak Private Hospital, Hartford, after a short illness, in his sixty-third year. Mr. Fenn was born at Plainville, Conn. As a young man he was employed by the Pratt & Whitney Co., Hartford. Later he was superintendent Woodward & Rogers, that city, and in 1900 established the Fenn Machinery Co. In 1907, the Phoenix Iron Works and the Fenn Machinery Co. combined under the firm name of Taylor & Fenn Co. In 1914 Mr. Fenn severed his connection with that company and the next year, with his son, formed the Fenn Mfg. Co. He is survived by this son, Wilson A. and a daughter, Mrs. Stephen G. Pierce, Hartford.

WILLIAM PAUL SIEBERT, Jr., Eastern sales manager, the Weirton Steel Co., Weirton, W. Va., died July 29, in Roswell, N. M., where he had gone for his health. He was the oldest son of William P. Siebert, assistant general manager of sales, the Carnegie Steel Co., Pittsburgh, and was born in Pittsburgh about 31 years ago. Prior to assuming the position of Eastern sales manager for the Weirton Steel Co., he had been attached to the Clarksburg and Weirton plants of that company. He had a wide acquaintance in steel and tin plate trade circles.

WILLIAM T. HOFSESS, New York sales representative of the Wallace Barnes Co., Bristol, Conn., spring manufacturer, met death by drowning Monday night, July 25, while in swimming at Lake Compounce, Conn. Mr. Hofsess was born in New York July 25, 1885, and on moving to Bristol entered the employ of the Bristol Brass Co. in 1900, holding the position of assistant superintendent when he left there. In 1916, he entered the sales force of the Wallace Barnes Co., and made many friends among manufacturers with whom he came in contact.

JAPANESE BUYING CONTINUES

Small Orders for Sheets, Structural Material and Rails—German Quality Is Improved—Welded Steel Ship Launched

NEW YORK, Aug. 2.—Purchases from foreign markets, although small, are beginning to be steady and would probably be more numerous if prices were sufficiently lower to compete with European material, c.i.f. foreign ports. German quotations are but slightly affected by the special import barriers against German material erected by various of the allied nations, as such taxes are paid by the German Government instead of the manufacturer or exporter.

Japanese buyers continue to place small orders in the United States, but considerable purchasing of German material is reported, the Japanese claiming that the quality and workmanship is improving. Sheet buying continues, but although the total of recent purchases by Japan in this country is fairly large, practically all purchases have been of black sheets, Nos. 28 to 31 gage, the heavier sheets being placed with British makers, which are not in a position to quote as advantageously on the lighter gages as the American mills. Low prices are insisted upon by Japanese buyers.

One exporter in New York, who recently quoted a price to Japan, based on $43 per ton, Pittsburgh, for a tonnage of 35-lb. rails, including splice bars, bolts and plates, was informed that a quotation about 15 per cent lower had been received. A bid of 1.65c. per lb., Pittsburgh, on an inquiry for 800 tons of bars to be rolled to specifications was also turned down by a Japanese buyer, who stated that the price was too high. An inquiry is now in the market from Japan for about 430 tons of structural steel for a bridge which will probably be awarded some time this month. One Japanese exporter recently booked an order for about 630 tons of 80-lb. rails for the South Manchurian Railroad.

An inquiry calling for mild steel, wrought iron and wire for use in the construction of a wharf in New Zealand has been received by the Marchand Export & Import Co., 220 West Forty-second Street, New York. All material supplied, however, must be of Canadian manufacture. The Strong & Trowbridge Co., 17 Battery Place, New York, is handling a small order for hollow stay steel.

Electric Welded Ship Launched

An entirely electrically welded ship was recently launched from the yards of the Electric Welding Co., Goteborg, Sweden. The ship, which is 52 ft. 6 in. long with a beam of 13 ft. 1½ in. and a draft of 3 ft. 6 in., is built of steel plates 0.28 in. thick on the bottom and 0.25 in. thick on the sides. Some of the plates are overlapped, while others, particularly those on the sides, are welded edge to edge. It is reported that the welded sides were found stronger and lighter than riveted connections and less plating was required.

New Chinese Iron Mining Company

It is reported from Japan that a bridge, largest in the Orient, is projected across the Sumida River, connecting the Ryogoku railroad station with the Manseibashi elevated railroad station. Actual work on the bridge will not be started until 1925. Arrangements are being made in Shantung for the incorporation of the Yu Tung Mining Co. with an initial capital of $20,000. The head office of the company will be at Tsinanfu. It is intended to operate deposits of 70 per cent iron ore at Chinkiang. Although the capital stock of the company is small, the recently organized Lishan Coal Mining Co., near Fuchow, formed with a capital of $50,000, was later increased to $250,000.

A meeting of the stockholders of the Central Steel Co., National Pressed Steel Co. and Massillon Rolling Mill Co. to consider the proposed consolidation of the three companies will be held Aug. 4, having again been postponed to secure the assent of a greater number of stockholders. The management is desirous of having as nearly as possible a 100 per cent approval of the merger.

STEEL CORPORATION PRICES

Chairman Gary Says Reductions Were Made to Meet Those of Independents

When his attention was called to an article which appeared in the *Wall Street Journal* of Aug. 2, and he was asked to make comment, Judge Gary replied:

"The statement published in the *Wall Street Journal* Aug. 2 concerning prices of steel products is substantially correct, with the modification that our subsidiaries have not made any reductions except to meet the prices of leading independent manufacturers. Prices generally would seem to have reached the low point, as many, if not most, of the manufacturers are at present selling below the cost of production."

The article published by the *Wall Street Journal* is as follows:

The United States Steel Corporation, although making no official announcement of a new price schedule, is meeting the new low prices quoted by independent producers on steel products and appears to be setting the pace in at least one product. Reports of this have been contained in news dispatches for some time and, in the past week, the corporation has sent letters to its customers quoting prices on various products from $3 to $10 a ton below the official prices of July 5.

In most cases, the new prices meet the late prices of the independents, but tin plate, which is now quoted at $5.25 a 100-lb. box (coke), went below the independent level of $5.50 a box and has forced several of the independents to reduce their quotations. The Steel Corporation's price on tin plate as of July 5 was $5.75 a box.

Other reductions were in steel bars to $1.75 per 100 lb. from the July 5 price of $1.90, in plates to $1.85 per 100 lb. from $2, in black sheets to $3.25 per 100 lb. from $3.50, and in galvanized sheets to $4.25 per 100 lb. from $4.50. These prices, of course, have been quoted by a number of the independents for several weeks.

It may be added that these prices are only for orders involving fairly large tonnages. But it is reported that if orders are sufficiently attractive, an even better price might be made.

Following table gives a comparison of some of the new prices with the prices officially quoted on July 5, on April 13, and with the Industrial Board prices:

	New Prices	July 5	April 13	Industrial Board Prices
Tin plate	$5.25	$5.75	$6.25	$7.00
Bars	1.75	1.90	2.10	2.35
Plates	1.85	2.00	2.20	2.65
Galvanized sheets	4.25	4.50	5.00	5.70
Black sheets	3.25	3.50	4.00	4.35

This lowering of prices bears out predictions made by observers of the steel trade that, after July 5, there would probably be no further official cutting of prices, but that prices would be made, as time went on, that would take business.

Reports from various trade centers for the past ten days have pointed out an increase in inquiry for steel products. To take this new business, it is only natural at the present time that lower prices would be made.

Will Help Employees

The McKinney Steel Co., Cleveland, has decided to relieve its employees at the Lake Superior mines of some of their living expenses during their present period of unemployment owing to the shutting down of the mines. No rent will be charged to employees living in company houses, if no work is available for them, and men working on half time will be charged half rent. Doctors' fees, which have been deducted from the men's pay in the past, will be paid by the company. In addition the company will pay charges for water supplied to employees occupying houses that have water piped from the city lines. Where possible, the company is providing a little work for men cleaning up around the mines.

Valley Wages Not to Be Reduced

YOUNGSTOWN, OHIO, Aug. 2.—Valley steel interests plan no wage reduction at present, to follow the reported action of the Cambria Steel Co. in cutting the day labor rate to 25 cents. Independent mills are paying 30 cents for common labor and the Steel Corporation units 37 cents. Johnstown and Eastern centers have uniformly paid less than Youngstown and Pittsburgh districts.

MORE HOPEFUL SIGNS

Youngstown Pleased with Developments—Increased Demand for Some Products

YOUNGSTOWN, OHIO, Aug. 2.—Cumulative evidences strengthen the growing conviction that the steel industry has "turned the corner" and is headed toward more prosperous days. One of the leading independents reports that the volume of inquiries has appreciably increased within the past week for a miscellaneous variety of finished products, and emanating from all parts of the country. Large jobbing interests which have bought cautiously for a number of months are seeking larger tonnages, while manufacturing consumers of steel are more active in the market. Specifications against contracts and new buying have shown considerable new life, resulting in improved mill operations. Following three months of inactivity, the industry enters August with more hopeful signs than have been evident since the first of the year.

Recent sheet business placed in the Valley aggregates in excess of 3000 tons. At its Western Reserve works, near Warren, the Brier Hill Steel Co. has been working off an order for special blue annealed sheets for the Ford Motor Co., under rigid inspection of the buyer's representatives. Rod and wire business placed within the past week with a district maker has enabled the enlargement of production in affected units. A tank and boiler interest has received enough business in the past ten days to increase production to 100 per cent. An inquiry being figured by Valley interests calls for 6800 tons of plates and has been put forth by oil interests at Shreveport, La.

Claiming that ferromanganese is cheaper and may therefore be used more advantageously than spiegeleisen, a steelworks interest operating blast furnaces is in the market for 50 tons of ferromanganese. In view of quotations ranging from $28 to $31, furnace, on 20 per cent spiegeleisen, as compared with 80 per cent ferromanganese quoted at $70 or less delivered, the latter may be substituted.

Prices Still Uncertain

While prices are generally uncertain, it is felt that the bottom has either been reached or is being approached on many finished products, at least until freight charges are revised. While plates, for instance, are generally quotable in the Valley from 1.80c. to 1.85c., a consuming interest states that they are purchasable in the Chicago district at 1.50c. or less, and that Valley makers stand ready to offer substantial concessions to release tonnage. Most of the current buying is for car repair material and for tank building.

More activity is being shown in the sheet market than at any time this year, the product to be used for a variety of purposes. Galvanized for car roofing is in specially strong demand. A producer of full finished has sheets in warehouse for delivery to a large number of automobile makers besides Ford. This particular maker has produced a highly polished sheet that has proved especially successful for auto body stock. Concessions are being accepted on production tonnage from the 4.70c. quotation for No. 22 gage material.

Prices of 3c for No. 28 black and 4c for No. 28 galvanized more fully represent the trend of the market at the present time and it is authoritatively stated that galvanized has been offered by makers in a nearby district at less. While some mills are not openly quoting these prices, they will meet them under the stress of current competitive conditions. An encouraging feature is that consumers in widely scattered sections, some of whom have been out of the market for months, are sending out inquiries.

Bars More Active

Steel bars are displaying more activity, the bulk of the inquiry coming from the automobile trade. A number of 1000-ton inquiries have elicited bids and 1.75c. base has been offered on attractive tonnage. Various motor companies have been negotiating for a total of 9000 tons of bars.

Better tin plate business has been stimulated by the $5.50 base price, though this market is still far from normal. Increase in the production rate of American Sheet and Tin Plate Co. mills in the Shenango Valley indicates the placement of larger orders with that interest.

For the time being, pipe is not sharing in the upward movement, though new buying of butt weld sizes for construction is holding its own. One interest is rolling lap weld sizes on an export order.

Foundries are buying pig iron in larger quantities than formerly, though large tonnages of basic are piled in independent yards. The market remains at $18.50 to $19, with further liquidation expected to bring lower quotations.

Buying of plain wire and wire rods is showing more strength for the time being and operations are well sustained at 30 per cent. Plain wire at the 2.50c. base is one of the commodities which has apparently escaped the general movement to a lower price level. Wire rods are selling at the $42 basis of the leading interest.

In the semi-finished market, it is reported that orders impend for an aggregate of 10,000 tons of sheet bars at the quoted price of $32.

Steel Bridges for Alaska

SEATTLE, July 26.—The Washington Sales Engineering Co. of this city has been awarded the contract for furnishing steel to be used in the construction of five bridges in Alaska to be erected by the Alaska Road Commission. The commission maintains head offices at Juneau, Alaska, although communications can be addressed to and business transacted with local headquarters in the United States Engineers' office here.

Four of the bridges to be erected by the commission will be 100-ft. spans, the other 120 ft. One will be located at Ruby, one at Fairbanks and three at Chitina.

Recently the Washington company furnished steel for two similar spans for the Road Commission which are now under erection at Juneau, and also supplied the steel for a 100-ft. steel bridge at Le Grade, Ore., by the Union Bridge Co.

Belgian bars are offering here at $1.75 per 100 lb. f.o.b. shipside, but it is reported that there is little interest. Buyers declare that the domestic market has fallen to such an extent that imports will have to be quoted lower to invite any trading.

Jobbers here report that the unsettlement of the steel market is grave. Inquiring from an Eastern mill this week for a car of sheets, the mill replied, "Let conscience be your guide." According to the tenor of the replies from the mills on sheets and plates, it is practically a buyers' market.

Rates for Special Purpose Machines

"Setting Machine Rates for Special Purpose Machines" is discussed in a five-page bulletin, published by the National Association of Cost Accountants, 130 West Forty-second Street, New York. According to the bulletin, "The rate of the regular purpose machine is based upon the hours that the machine has run during a period of normal business activity. When an attempt is made to set a machine rate for the special purpose machine on the same basis, the rate seems too high." The questions then asked are: "Should the question be solved by arbitrarily assigning to the special purpose machine a standard monthly operating time equivalent to the standard monthly time used in connection with the machine rate for the regular purpose machine? Would this procedure penalize the costs of the product made by the special purpose machine, or would it demonstrate that the special purpose machine does not pay for itself?"

Six "answers" to the above questions follow. Concluding, "The consensus of opinion in the answers given is that the cost per hour of running the special service machine should be based on the normal hours that this machine is supposed to run for the special purpose intended, even though it runs only two or three hours a week. Since this machine is purchased for a specific purpose, it would seem logical that the carrying out of this purpose should stand the cost."

IRON AND INDUSTRIAL STOCKS

Prices Irregular but Generally Slightly Higher During the Past Week

In a few instances stocks displayed weakness the past week due to certain conditions surrounding the individual issues. Iron and industrial securities in general, however, have ruled slightly higher because of broader constructive developments. For instance, the omission of the $2 quarterly dividend on Pressed Steel Car Co. common stock caused some holders to sell out, and certain owners of Railway Steel Spring shares unloaded in sympathy, yet the equipments as a group held closely in view of indicated improved business. General Electric was sold freely on reports of comparatively poor business, people evidently forgetting the strong financial condition of the company. On the other hand, the quarterly earnings statement of the United States Steel Corporation stimulated a demand for the common shares, investors feeling the bottom in the steel industry depression practically has been reached and that gradually improving conditions are before the steel industry as a whole.

At best the market has been irregular, yet mostly higher. The better feeling in banking and business circles to a large extent is based on money market conditions. Money for the first time in two years really is plentiful as loaning rates indicate. Commercial paper is moving in larger volume than it has before in many months. Bond issues are absorbed as fast as appearing on the market, regardless of size. General industry has liquidated, although in particular instances it is not completed. Manufacturing plants have remained idle or have operated on reduced schedules sufficiently long to have created a real demand for certain products, at least.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	31 - 32	Nat.-Acme	14½ - 15¼
Allis-chalm. pf...	.. - 73	Nat. E. & S. com.	46 - 48
Am. Can com....	26¼ - 28⅛	N. Y. Air Brake.	55 - 57
Am. Can pf.....	81⅛ - 82	Nova Scotia Steel	.. - 23
Am. C. & F. com.	122⅛ - 127½	Pittsb'gh Stl. pf..	79⅞ - 80
Am. Loco. com..	79½ - 85	Pressed Stl. com.	56 - 74⅛
Am. Rad'tor com.	68⅝ - 69	Pressed Stl. pf...	.. - 85
Am. Stl. Fy. com.	25½ - 26⅞	Ry. Stl. Spg. com.	67 - 83¼
Am. Stl. Fy. pf..	80½ - 80⅝	Ry. Stl. Spg. pf..	.. -100
Bald. Loco. com..	77 - 80½	Replogle Stl.....	.. - 20½
Bethl. Stl. com..	.. - 47	Republic com....	45⅝ - 47
Beth. Stl. Cl. B..	47⅜ - 50½	Republic pf.....	.. - 84
Beth. Stl. 8% pf.	98½ - 99	Sloss com.....	35 - ..
Chi. Pneu. Tool..	50 - 50¼	Superior Stl.....	.. - 30
Colo. Fuel	22 - 26	Transue-Williams.	31½ - 32¼
Cruc. Steel com..	54⅜ - 56¼	Un. Alloy Stl....	25 - 25⅞
Gen. Electric....	116 -123½	U. S. Pipe com..	14⅞ - 15
Gt. No. Ore Cert.	27¼ - 27⅝	U. S. Pipe pf....	.. - 44½
Gulf States Stl...	.. - 32½	U. S. Steel com..	73 - 74⅞
Int. Har. com...	70¾ - 75	U. S. Steel pf....	109¼ - 109½
Int. Har. pf.....	99¾ -100¾	Vanadium Steel..	28 - 29¼
Lackawanna Stl..	37½ - 39	Westingh'se Elec.	41¾ - 44¼
Midvale Stl.....	23¼ - 23½		

Industrial Finances

The Holyoke Valve and Hydrant Co., Holyoke, Mass. has increased its capitalization from $50,000 to $100,000 and declared a 100 per cent stock dividend to apply to undivided surplus earnings.

The Otis Steel Co. stockholders are being asked to approve a $15,000,000 mortgage bearing not more than 8 per cent interest, of which $5,000,000 will be issued within the near future to refund outstanding obligations, to provide working capital, etc.

The Six Wheel Truck Co., Fox Lake, Wis., recently incorporated, is now floating a loan for $50,000 for the erection of a building for assembly work, and expects to be in the market for equipment about the first of the year.

The Standard Pulley Co., Cincinnati, manufacturer of pulleys, and operating a foundry and machine shop, has been placed in the hands of a receiver through an application of its president, J. H. Jewett. The company is financially sound, but, on account of the present business depression, is having difficulty collecting its outstanding accounts. The property will be operated by Mr. Jewett, who has been named as the receiver.

For the year ended Dec. 31 the Sharon Steel Hoop Co. reported net profits, after charges and Federal taxes, of $693,861, equivalent to $2.61 a share at $50 par value, earned on the 265,746 shares of outstanding capital stock. Net earnings from operation amounted to $2,115,395.

An involuntary petition in bankruptcy has been filed against the Pfau Motor Pump Co., 829 Forest Home Avenue, Milwaukee, Wis., by the M. J. Walsh Machinery Co., F. R. Dengel Mfg. Co. and the Western Iron Stores Co., all of Milwaukee. Oscar C. Schwemer, Pereles Building, has been appointed receiver.

Directors of the Pressed Steel Car Co. have deferred action on the regular quarterly dividend of 2 per cent on the common stock due at this time. The regular quarterly dividend of 1¾ per cent was declared on the preferred stock, payable Aug. 30, to stock of record Aug. 9. It was stated after the dividend meeting that the common stock disbursement was deferred on account of business conditions and uncertainty as to the future.

Bethlehem Business Improves

New business taken by the Bethlehem Steel Corporation in the second quarter of the year showed a great improvement over the first quarter, according to Eugene G. Grace, president, in a statement issued July 28 after the quarterly meeting of the board of directors.

The directors declared the usual quarterly dividends of 1¼ per cent on both classes of common stock, payable October 1 to stockholders of record September 15. The dividend on the common was more than earned for the entire six months' period, Mr. Grace said.

"The value of orders on the corporation's books as of June 30," he said, "is $84,000,000, compared with $110,000,000 March 31. Although the amount of new business booked during the quarter was $26,000,000 less than the billings, it showed a marked increase over the first quarter. This would indicate that the low point had not only been reached, but actually turned, and that a gradual increase in the volume of business is to be expected. Railroad and railroad supply and equipment company buying is estimated to represent anywhere from 35 to 50 per cent of the demand of the steel industry. It is, therefore, believed that just so soon as the railroads are in position to enter the market a definite and substantial improvement will be noted in the steel business.

"With steel prices relatively at the lowest point in 20 years, it is evident that the steel interests have done their full share in liquidating values to a point where business should go forward, provided other conditions are similarly adjusted."

Standard Parts Co. Finances

Frank A. Scott, receiver of the Standard Parts Co., Cleveland, has issued a report of the company's operations and finances for the period from March 1 to June 30, in which he states that he has a cash balance of $1,538,219, out of which he made application for authority to pay a dividend of 10 per cent upon the indebtedness of the company. The receiver's report shows that during the four month period gross sales were $3,321,087 and that the loss for the four months, after all allowances for depreciation, etc., amounted to $129,521. Disregarding the item of depreciation the company's plants were operated at a profit of $126,447 during the period. The receiver stated that it was felt that the company had gone through its worst and that while the future may be uncertain, there will be business enough to admit of successful operation. During the four month period, business was booked by different units of the company in the following amounts: Standard Welding division, $1,500,000; Perfection Spring division, $600,000; Eaton Axle division, $1,565,000; Pontiac Spring division, $1,400,000.

Plans of New Companies

The Marcy Tool Works, Putnam, Conn., recently incorporated, has taken over the business established and conducted by A. W. Marcy, under the name of the Marcy Tool Works. Its intention is to enlarge the line of production and provide additional equipment and working capital as increasing business may require, although no new buildings or equipment are contemplated immediately. Wood turning equipment may later be installed to manufacture tool handles. The company is now and has been continually operating full time during the present business depression, and believes that the benefits of incorporation will materially strengthen its position to take care of the increased demand of normal times. The personnel of the corporation is as follows: A. W. Marcy, president and treasurer; M. C. Marcy, vice-president and secretary, and Helen E. Devine, assistant secretary and treasurer.

The Koffee Saver Mfg. Co., 18 West 18th Street, New York, recently incorporated with a capital of $100,000 to manufacture metal coffee urns and kindred products, does not expect to start manufacturing until fall.

The Dow Co., Louisville, Ky., formerly the Dow Wire & Iron Works, recently increased its paid-up capital from $100,000 to $300,000. It is spending about $30,000 putting in a new Grinnell sprinkler system and other improvements.

The Fairfield Metals Co., Inc., 342 Madison Avenue, New York, recently organized to manufacture iron, steel and other metal castings, will have its work done by contract and is not in the market for equipment.

Machinery Markets and News of the Works

REDUCTIONS MADE

Prices Cut from 20 to 35 Per Cent on Attractive Business

Considerable Activity in New England, But Chiefly in Used Tools

The price reductions made when attractive business is in sight are the feature of the week. Prices were cut from 20 to 35 per cent last week when the Illinois Central purchased about 50 machines for about $150,000, dividing up the orders among several houses. The McKinley School, Canton, Ohio, received bids July 29 for about 25 tools, discounts of as high as 20 per cent having been offered, whereas the usual discount to schools is about 5 per cent.

The Central Railway of Georgia has bought about 10 machines. The contemplated purchases of the Rock Island and Santa Fe have been postponed until probably fall. The most optimistic reports come from New England where more tools have been sold than in many weeks, though these were mostly used tools. Here there is an improved demand for cylindrical grinding equipment from the automotive interests. The first export business for some time from this district was the sale of about six tools to a machine shop in Cuba. One New England house is about to close for $25,000 worth of machine tools.

July proved to be practically no better than June. A few builders in Cincinnati closed their plants July 30 for an indefinite period, though several of the larger ones still operate. An auction sale of about 100 tools will be held Aug. 4 at the plant of the Industrial Research Corporation, New Haven, Conn.

The Jones & Lamson Machine Co. has reduced prices on lathes about 15 per cent.

The United States exported the greatest value of metal-working machinery in June to Japan, according to a report of the Department of Commerce. This totaled $599,419. France was second, with $161,900, while British India was third with $115,519.

New York

NEW YORK, Aug. 1.

The Central of Georgia Railway Co. has purchased about 10 tools, including a shaper, boring mill, radial drill, car wheel lathe and drive wheel lathe. The Brunswick Refrigerating Co., New Brunswick, N. J., has bought some tools, including grinders, and will buy more, its equipment consisting of engine lathes, turret lathes, boring mills and grinders, etc. A sale of two turret lathes was made to a manufacturer of automobile locks in New Jersey.

One current inquiry includes a 42-in. lathe and a 48-in. planer. It is rumored that the machine tools in a large plant in Long Island City, engaged in making airplane motors during the war, will be sold. More demand is noted for used tools than for new. Business is at a low ebb, with no immediate prospects of improvement.

The Jones & Lamson Machine Co. has reduced its quotations on lathes 15 per cent.

From the standpoint of inquiries there is some activity in the crane market, but sales still continue few. Quotations are as a rule low and competition keen. Among current inquiries is one from the Virginian Railway, Norfolk, Va., for a 10-ton, 73-ft. span overhead traveling crane for an engine house at Elmore, Va. The Centre Iron Works, 608 East 137th Street, New York, is receiving quotations on a 5-ton, 50-ft. span overhead traveling crane and the New Haven Boiler Works, New Haven, Conn., is in the market for a 10-ton overhead traveling crane.

Bids on the 12-ton hand power crane for the Government of Porto Rico were opened in New York, but will be passed upon in Porto Rico. The lowest quotation was submitted by the New Jersey Foundry & Machine Co. through Fox Brothers, New York. The Armington Engineering Co. quoted $1,320 and Manning, Maxwell & Moore $1,338 on a Shaw crane.

Among recent sales are: Shepard Electric Crane & Hoist Co., eight 3-ton, stationary type electric hoists to the York Mfg. Co., York, Pa., and a 3-ton, 23-ft. 3-in. span, single I beam crane to Weil McLain, Michigan City, Ind.; the Pawling & Harnischfeger Co., a 10-ton, 51-ft. span and a 5-ton, 21-ft. 9½-in. span overhead traveling crane to the Hendricks Mfg. Co., Carbondale, Pa.

M. Cohn & Co., Inc., manufacturer of corset steels, 218 West Twenty-sixth Street, New York, has awarded contract to the White Construction Co., Inc., 95 Madison Avenue, New York, for a new three-story and basement factory, 100 x 160 ft., at Evergreen Avenue and Cook Street, Brooklyn, at a cost of about $200,000. Russell G. Cory, engineer, prepared the plans.

The H. W. Sweet Shipyard & Machine Works, Inc., Greenport, N. Y., has been incorporated with a capital of $75,000 by H. W. Sweet, F. B. Corey and C. W. Thorn to operate a shipbuilding plant and general machine construction and repair works. It is represented by H. L. Fordham, 111 Broadway, New York.

The United States Sand Blast Mfg. Co., New York, has been chartered under State laws to manufacture sand blast equipment. The incorporators are W. Danzelsen, W. Fischer and H. Greenblatt. It is represented by P. E. Jackson, 302 Broadway.

The Hoffman Enameling Corporation, Brooklyn, has been incorporated with a capital of $25,000 by P. H. Hoffman, B. C. Sprague and A. V. Maday, to manufacture enamelware. It is represented by Murray, Hollaman and Lockwood, 66 Broadway.

The Handy Machine Tool & Engineering Co., New York, has been chartered under State laws to manufacture tools and other mechanical products. The incorporators are A. and R. Friedman and H. Rubin, 302 Broadway.

J. Charles Teepe, Inc., 15 Wilbur Avenue, Long Island City, has leased the four-story building at Nott and Vernon avenues, totaling about 40,000 sq. ft. of space, for the manufacture of woodenware specialties. Considerable machinery will be installed, in addition to the equipment now at the present works and which will be removed to the new plant. The company has an option to purchase the structure. L. J. Viehmann is head.

The Faspray Corporation, New York, has been incorporated in Delaware with a capital of $200,000 by John D. Wholey, C. B. Kunldsen and George E. Hite, Jr., Brooklyn, to manufacture washing, polishing and kindred machinery and parts. It is represented by the United States Corporation Co., 65 Cedar Street.

Charles E. Campbell, Inc., Elmhurst, L. I., has been incorporated with a capital of $50,000 by Charles E. Campbell, K. K. Hillabrant and I. G. Wolf, Elmhurst, to manufacture rubber products. It is represented by Bauchler & Ganty, 51 Chambers Street, New York.

The United States High Speed Steel & Tool Corporation, 489 Fifth Avenue, New York, has filed notice of organization to operate with an active capital of $2,600,000.

The Improved Metal Weather Strip Co., New York, has been chartered under State laws by L. Lipson and M. Rothenberg, 5 Beekman Street, to manufacture metal weather strips and kindred metal goods.

The Loop Lock Corporation, New York, has been incorporated with a capital of $50,000 by T. Resnik, L. Herold and M. Schenkman, 56 Pine Street, to manufacture locks and other hardware products.

The American Engineer Factories, Inc., New York, has been incorporated under Delaware laws, with capital of $500,000 to manufacture machinery and parts. It is represented by Samuel B. Howard, 65 Cedar Street.

Bear Tractors, Inc., New York, has been incorporated with a capital of $500,000 by W. J. Greacen, P. Sawyer and E. Conway, 233 Broadway, to manufacture tractors and parts, automobile engines, etc.

Durant Motors, Inc., 1819 Broadway, New York, is organizing the Durant Motor Car Co. of Indiana to take over the plant of the Sheridan Motor Car Co., a division of the General Motors Corporation at Muncie, Ind. Possession will be taken early in August. The new company will be capitalized at $3,000,000, and will use the works for the manufacture of a new six-cylinder automobile.

The Raven Screen Corporation, New York, has been chartered under State laws to manufacture metal screens and kindred metal goods. The incorporators are F. A. and A. L. Raven and E. O. Friedman. It is represented by A. P. Hawkins, 165 Broadway.

The Atlas Elevator Devices Corporation, Brooklyn, has been incorporated with a capital of $100,000 by W. H. Dinspel, E. Weigele and E. R. Gippert, Brooklyn, to manufacture elevator equipment and other mechanical apparatus. It is represented by Pennie, Davis, Marvin & Edmonds, 165 Broadway.

The Brooklyn Edison Co., 360 Pearl Street, New York, has arranged for a bond issue of $3,000,000 for extensions, improvements, general operations, etc. M. S. Sloan is president.

Mooney, Douglas & Pearson, Inc., New York, has been incorporated with a capital of $100,000 to manufacture electrical equipment and hardware specialties. E. I. Cullen, 250 Ninety-third Street, Brooklyn, is the principal incorporator.

Fire, July 23, destroyed a portion of the machine shop and marine repair works of A. J. Wolcott & Son, Vernon Avenue, Long Island City, with loss estimated at about $12,000. The adjoining plant of the Doncaster Planing Mill Co. was also partially destroyed, with loss of about $25,000, including equipment.

The Titan Power Hammer Corporation, New York, has been incorporated under Delaware laws with capital of $750,000 by J. P. Caylis, George Ayles and M. L. Savarese, Brooklyn, to manufacture power hammers and other heavy equipment. It is represented by the Capital Trust Co., Dover, Del.

The Bureau of Yards and Docks, Navy Department, Washington, has completed plans for a new power plant at Iona Island, N. Y., estimated to cost about $27,000.

M. Thompson, 189 Montague Street, Brooklyn, has filed plans for the construction of a two-story automobile service and repair works, 112 x 200 ft., on Avenue A, between Sixtieth and Sixty-first streets, New York, to cost about $135,000.

The Burroughs Adding Machine Co., 217 Broadway, New York, has leased about 17,500 sq. ft. of space in the building at 801-805 Broadway. A portion of the property will be used as an assembling department.

The Everhold Brake Appliance Co., Gloversville, N. Y., recently incorporated to manufacture brake equipment for automotive service, is planning for the erection of new works. Emanuel Zannetti is president and H. S. Cromwell, general manager.

The Comfort Safety Razor & Novelty Co., West Hoboken, N. J., has been chartered under State laws to manufacture safety razors and other cutlery. The incorporators are Vaclaz Abraham and Frederick Kulhawk, 588 Central Avenue.

The Tungsten Steel Mfg. Co., Boonton, N. J., has been chartered under State laws to manufacture tools, saws, knives and kindred products. The incorporators are Theodore L. Harrison, 198 Teaneck Road, Ridgefield Park, N. J.; Patrick M. Kelly, 343 Fairmount Avenue, Jersey City, N. J.; and William F. McDermott, 165 Broadway, New York. The company is represented by Parker W. Sweet, Boonton.

Fire, July 27, destroyed the saw mill at the plant of the Empire Steel & Iron Co., Oxford, N. J., with loss including power department, sawing machinery, engine, boilers, etc. The structure will be rebuilt.

The New Jersey Storage Battery Mfg. Co., Jersey City, N. J., has been chartered under State laws to manufacture storage batteries and other electrical equipment. The incorporators are Daniel E. Lenthe and Andrew J. Weger, 26 Tyson Place.

The State Highway Department, Trenton, N. J., has construction under way on a one-story building at Hammonton, N. J., 80 x 100 ft., to be equipped as an automobile service and repair works for county motor trucks and cars.

The Electro-Magnetic Wave-Bath Corporation, Newark, N. J., has been chartered under State laws to manufacture electrical instruments and equipment. The incorporators are William S. Benson, Frank B. Schanne and James B. Reilly, 31 Clinton Street.

The General Sheet Metal Works, 150 Broome Street, Newark, has been organized to manufacture sheet metal goods and similar products. It is headed by Samuel Kinland, address noted.

The Safety Auto Lock Co., 31 Clinton Street, Newark, has filed notice of organization to manufacture locks and locking devices for automobiles. Warren J. MacCroy, 7 North Tenth Street, heads the company.

The Uglay Mfg. Co., 10 Johnson Avenue, Newark, N. J., has filed notice of organization to manufacture precision instruments and other equipment. Stephen Uglay, 128 South Seventh Street, heads the company.

R. Neumann & Co., Willow Avenue, Hoboken, N. J., have completed plans for the erection of a one-story power house, 40 x 100 ft., at their leather manufacturing plant.

New England

BOSTON, Aug. 1.

More machine-tools have been sold the past week than in many preceding weeks. Business, however, is largely confined to used equipment, quotations on which are so far below those on new tools as to attract buyers. Certain kinds of machines, however, such as used 20-in. upright drills, appear to be scarce.

Sales the past week include six No. 2 Consolidated, one Standard bench and 17 Standard foot presses, to a Boston concern. The Naumkeag Steam Cotton Co., Salem, Mass., bought a new 18-in. motor-driven engine lathe and a 3-ft. motor-driven radial drill, while the Yates Machine Co., Salem, metal specialties, purchased a used upright drill, shaper and a miscellaneous lot of small shop equipment. A Greater Boston rubber goods manufacturer closed on a new No. 1 B Milwaukee universal milling machine; a Boston concern a used Dreses radial drill; a South Boston manufacturer, two used bench presses, and a Fall River interest, a used Lincoln milling machine. The city of Boston took a new Le Blond cutter and reamer grinder for its normal art school, while Laconia, N. H., purchased a new No. 2 universal milling machine, two 13-in. and two 11-in. tool room lathes.

A Massachusetts manufacturer of valves bought two new Pratt & Whitney 16-in. lathes with complete equipment, while a Greater Boston firm covered on 9-ft., 5-ft. and 4-ft. used plate bending rolls, and a large punch and shear. An improved demand for cylindrical regrinding equipment from automobile interests is noted. One local house is about to close on an order for approximately $25,000 worth of machine tools for one concern. David Beal & Co., Boston, report the sale to a Havana machine shop of an 8-ft. lathe, 6-ft. high-speed lathe, 20-in. back geared drill, and a 4-ft. planer, all used tools, as well as two indexing heads, miscellaneous new small tools and a large marine engine. This export business is the first in this market for some months.

The following companies are reported in the market for equipment: Warren D. Letchell, Dexter, Me., a used 18-in. x 10-ft. engine lathe, 20-in. upright drill, No. 2 Universal milling machine, small shaper, small planer and a wet tool grinder; city of Boston, a new No. 2 Universal milling machine with geared head and miscellaneous tools for schools; Weed Engineering Works, Bridgeport, Conn., used semi-automatic radial drill; American Bosch Magneto Corporation, Springfield, Mass., machine for grinding small cams; Federal Supply Co., Bridgeport, Conn., used pipe machine for cutting threads 4-in. to 10-in.; Boston Navy Yard, miscellaneous machine shop equipment.

Considerable interest is shown in the auction sale Aug. 4, by J. E. Conant & Co., Lowell, Mass., of approximately 100 machine tools at the plant of the Industrial Research Corporation, New Haven, Conn.

Activity among machine-tool builders is on a lower scale than at any time this year. The Pratt & Whitney Co., Hartford, Conn., machinery and small tool departments closed Aug. 1 for two weeks.

The Greenfield Tap & Die Corporation, Greenfield, Mass., has issued a new discount on taps and dies, showing a reduction in prices. The Norton Co., Worcester, Mass., has made a slight reduction in prices on bench grinders and floor stands. The Skinner Chuck Co., New Britain, Conn., has lowered quotations eight points on drill chucks. The market for Flynn micrometer boring heads is 5 per cent lower at 25 per cent discount. In common with companies making a similar line of goods, the Carborundum Co., Niagara Falls, has made a reduction in prices on Carborundum and Aloxete wheels.

The International Silver Co., Wallingford, Conn., has let a contract for an addition to factory L.

The Malden Electric Co., Malden, Mass., will erect an addition 68 x 70 ft., to its power station at Broadway and Oakland Avenue, Everett, Mass.

The Optical Abrasive Co., Southbridge, Mass., emery and other products used for lens grinding and polishing, has purchased property at Phillipsdale, Mass., which will be remodeled to meet its requirements. John J. Hogan, Jr., 60 Everett Street, Southbridge, and John E. Lowe, Coombs Street, are interested.

The Washington Mills, Lawrence, Mass., contemplates the erection of a new boiler shop within the next two months.

The R. P. Hazard Co., Gardner, Me., is planning the erection of a six-story and basement plant, 50 x 112 ft.

The Chandler Machine Co., Ayer, Mass., has awarded contract for a two-story plant, 60 x 120 ft.

F. A. Robinson will erect a boiler shop at the corner of Second and Binney streets, Cambridge, Mass. The New England Structural Steel Co., Inc., is the engineer.

The Sterling Roofing Co., New Bedford, Mass., has started the erection of a one-story plant, 75 x 150 ft.

The Apex Tire & Rubber Co., Providence, R. I., has been incorporated with a capital of 250 shares of stock, without par value, to manufacture automobile tires and other rubber products. The incorporators are John M. Franklin, Charles H. Sprague and David W. Smith, 104 Franklin Street.

Fire, July 28, destroyed the handle manufacturing plant of J. H. Tatem & Sons, Putnam, Conn., with loss estimated at about $35,000, including equipment.

The Peerless Mfg. Co., Providence, R. I., manufacturer of machinery and precision equipment, has removed its works from 175 Potter Avenue to 268 Rugby Avenue, where increased facilities will be provided. Lewis A. Hagan is head of the company.

O. P. Thompson, 145 State Street, Springfield, Mass., has abandoned plans for the construction of a new eight-story automobile service and repair works on Dwight Street, estimated to cost about $600,000.

George F. Spooner, Quincy, Mass., has filed plans for a new one-story machine shop on Cherry Avenue.

The City Council, Springfield, Mass., is planning for the erection of a new two-story automobile service and repair works for municipal trucks and cars on Summer Street, estimated to cost about $75,000. F. H. Clark, city engineer, is in charge.

The David Brown Co., Lawrence, Mass., manufacturer of shuttles, bobbins and other textile machine equipment, has filed plans for its two-story addition, 40 x 100 ft., estimated to cost about $40,000.

The Yankee Carbon Monoxide Burner Co., 9 Homer Street, Providence, R. I., has filed notice of organization to manufacture carbon burners, etc. James W. Craig, 1397 Broad Street, heads the company.

Chicago

CHICAGO, Aug. 1.

Distribution of the Illinois Central Railroad machine-tool orders was made last week, the total being close to $150,000. The tools bought include a driving wheel lathe, car wheel lathe, boring mill, large planer, several engine lathes, a radial drill, bending rolls, shapers, 13 motor-driven grinding machines and some small upright drills, in all about 50 tools. It is admitted by sellers that, with the exception of two or three tools, prices were cut from 20 to 35 per cent. Orders were distributed among several sellers. Other contemplated railroad purchases by the Rock Island and Santa Fe railroads have been postponed, probably until fall.

Otherwise the local market continues dull, with few inquiries or sales. However, one dealer reports the sale last week of two machines from his floor stock, sales of this character having been very rare of late.

The G. A. Roth Mfg. Co., Hastings, Neb., has issued the following list:

One turret lathe, 1½-in.
One plain milling machine.
One universal grinding machine.
One screw machine.
One multiple spindle drilling machine with two or three spindles.
One geometric threading machine.
One 16-in. engine lathe, 8-ft. bed.

The Ajax Forge Co., 2503 Blue Island Avenue, Chicago, has purchased one or two machines and is expected to buy the remainder on its recent list within a few weeks.

The Economy Machine Products Co., manufacturer of air brushes, 4755 London Avenue, Chicago, has let contract for a one-story factory on Lawrence Avenue near Milwaukee Avenue at a cost of $20,000. August Kopinski is president.

The Reedy Foundry Co., 4600 Iowa Street, Chicago, has increased its capital stock from $75,000 to $150,000 preparatory to engaging in the oil refining business. Its foundry equipment is being offered for sale.

The John M. Ryan Foundry Co., 506 Forty-first Street, Rock Island, Ill., announces the purchase of exclusive manufacturing rights of Ackerman metal for bearings for automobiles and tractors. A new company will be organized and the plans contemplate the construction of a manufacturing building.

G. E. Long, for many years president Ottawa Mfg. Co., Ottawa, Kan., manufacturer of oil engines, has sold his interest in that company and has purchased an interest in the Cherryvale iron foundry, Cherryvale, Kan. He has also organized the Long Mfg. Co. to manufacture gasoline engines and wood saws.

The Illinois Steel Co. has taken out a building permit for the construction of a three-story brick and steel electric power station at its South Chicago works. The cost will be about $250,000.

The Waterway Paper Co., Kedzie Avenue and Thirty-second Street, Chicago, is completing plans for the construction of a new one-story plant, 80 x 180 ft., with one-story power plant, 33 x 60 ft., estimated to cost $175,000, with machinery. Frank D. Chase, Inc., 645 North Michigan Avenue, is architect and engineer.

The Badger Concrete Mixer Co., 221 Grand Avenue, Milwaukee, has completed plans and will soon break ground for the construction of the initial unit of its new plant at Winthrop Harbor, Ill., for the manufacture of concrete mixing machinery. It will be one-story, 80 x 260 ft., and is estimated to cost about $60,000. E. McVicker is manager.

The Johnson Automotive Service Co. of America, 1201 Plymouth Building, Minneapolis, Minn., has preliminary plans under way for its three-story and basement automobile service and repair building, estimated to cost about $90,000. Albert A. Johnson is president.

The Board of Water Trustees, Des Moines, Iowa, is completing plans for the construction of a new electrically operated pumping plant, to cost about $150,000, with machinery. Alvord & Burdick, room 1418, 8 South Dearborn Street, Chicago, are engineers.

Philadelphia

PHILADELPHIA, Aug. 1.

The Board of Directors, Philadelphia General Hospital, Philadelphia, has filed plans for a new powerhouse, estimated to cost about $20,000.

E. P. Alexander & Son, Inc., Philadelphia, has been incorporated with a capital of $60,000 to manufacture mechanical belting. V. H. Alexander, 3417 Race Street, is treasurer.

The General Motors Products Co., Philadelphia, has been incorporated under Delaware laws, with capital of $1,000,000, to manufacture automobiles and parts. F. R. Hansell, Land Title Building, represents the company.

The Keystone Automotive Corporation, Philadelphia, is being organized by Louis Kumpf, A. J. Shinn and Eugene L. Ellwanger to manufacture mechanical and electrical equipment for automobiles. It is represented by J. Rech Guckes, Real Estate Trust Building.

Hoisting and conveying equipment and other mechanical apparatus will be installed on the two new piers to be constructed by the Department of Wharves, Docks & Ferries, Philadelphia, Director Sproul in charge.

The Pennsylvania Power & Light Co., Allentown, Pa., has had plans prepared for the erection of a large central machine shop and repair works at its electric generating plant at Hauto, Pa. It will be built by the Phoenix Construction Co., an affiliated organization. Both companies are operated by the Electric Bond & Share Co., 71 Broadway, New York.

The Pharo Mfg. Co., Detroit, has removed its business to a plant recently acquired at Bethlehem, Pa., and will continue operations for the manufacture of automobile equipment. The plant at Detroit will be discontinued. R. P. Hutchinson is president.

The Lancaster Concrete Tile Co., Lancaster, Pa., has been incorporated with a capital of $150,000 to manufacture concrete tile and kindred products. Edwin Rutter, Lancaster, is treasurer.

The Floyd-Wells Co., Royersford, Pa., manufacturer of stoves, ranges, heaters, etc., has taken bids for a two-story addition, 32 x 120 ft. A. S. Kepner, 121 Hanover Street, Pottstown, Pa., is architect. Russell Wells is head of the company.

F. A. Sieberling, Akron, Ohio, formerly head of the Goodyear Tire & Rubber Co., and associates, have acquired the plant and business of the New Castle Rubber Co., New Castle, Pa. The name of the company will be changed to the Lehigh Tire & Rubber Co. A number of improvements will be made and the plant placed in service at an early date. It is proposed to develop an initial output of 500 tires and 50 tubes per day.

The New Boston Coal Co., Hazleton, Pa., will electrify its local colliery, with service to be furnished by the Pennsylvania Power & Light Co. Motors, controlling devices and other equipment will be installed at once.

The plant of the Standard Process Steel Corporation, North Broad Street, Phillipsburg, N. J., has been sold by the liquidating committee to Col. W. P. Barba, Thirteenth and Cherry streets, Philadelphia, for about $50,000. A company is being formed, represented by Colonel Barba, to take over the works and establish a plant for the manufacture of steel products. It is expected to begin operations at an early date.

The American Chemical Machinery Co., Philadelphia, has been incorporated under Delaware laws, with capital of $500,000, to manufacture special machinery and parts. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Regal Spring Bed Co., Philadelphia, has been incorporated with a capital of $30,000 to manufacture metal bedsteads, springs, etc. A. Charnofsky, 5742 Pine Street, is treasurer.

The Standard Carrier Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 by Samuel C. Adams, Joseph Smyth and Charles T. Rouss, Philadelphia, to manufacture metal frames and carriers. The company is represented by the Capital Trust Co., Dover, Del.

The Trenton Chilled Die & Casting Co., Trenton, N. J., recently organized, has established a plant at the foot of Houghton Avenue, for the manufacture of dies, castings and other mechanical products. John H. Conover is president and R. B. Newton, treasurer.

Reorganization plans are under way by Hare's Motors, Inc., Trenton, N. J., for the separation of its three manufacturing units and the dissolution of the parent organization. The plant and business of the Mercer Motor Co., Trenton, will revert to the control of those formerly in charge, with T. E. A. Barthel as vice-president and William A. Smith, general sales manager. Reorganization of the Locomobile Co. of America, Bridgeport, Conn., is now being arranged, as are the plans for similar action at the works of the Simplex Automobile Co., New Brunswick, N. J., another operating unit of the organization.

Plans for a new two-story ice-manufacturing plant, 80 x 80 ft., estimated to cost about $75,000 with machinery, are being prepared by the Germania Brewery, 1808 Ninth Avenue, Altoona, Pa. Bids will soon be asked by Miller & Rider, 1510 Eighteenth Street, architects.

The Board of Public Grounds and Buildings, Harrisburg, Pa., is perfecting plans for the immediate rebuilding of the six industrial structures at the Western Penitentiary, recently destroyed by fire, with loss estimated at $133,000, of which $80,000 represents machinery and equipment. The Prison Board will advertise for bids for machine shop and other equipment at an early date.

The Allen Typewriter Co., Tenth and Turner streets, Allentown, Pa., has acquired the plant of the Allen Chemical Co., between Fourteenth and Fifteenth streets, for about $26,000. It will be used by the new owner for the manufacture of typewriter parts and machinery will be installed at an early date. Assembling operations will be conducted as heretofore at the Tenth Street plant. James K. Bowen is head.

The State Highway Department, Harrisburg, Pa., has plans under way for a two-story machine and repair works and automobile service building at North and State streets, 100 x 200 ft., to be used for county motor trucks and automobiles. Samuel B. Rambo, deputy superintendent, will be in charge of the work.

Pittsburgh

PITTSBURGH, Aug. 1.

The demand for machinery and equipment in this market is still very limited. About the only encouraging feature is that when a purchase is made, shipping instructions are immediately given. It seems to be the tendency of buyers to delay replacements until the last minute, and to place orders only where assured of immediate delivery. The crane market is inactive, with as many inquiries being withdrawn as are coming out. The Wheeling Steel Corporation has yet to place three cranes for its new galvanizing plant at Beech Bottom, W. Va. This inquiry calls for one 5-ton, 3-motor overhead of 71-ft. span, one 5-ton, 3-motor, overhead of 54-ft. span, and one 5-ton, 4-motor revolving jib crane. The city of Pittsburgh recently opened bids for ash-handling equipment, on which R. H. Beaumont & Co., Pittsburgh, were low bidders.

The American Laundry Machinery Co. has placed through the Pittsburgh office of the Northern Engineering Works, Detroit, an order for two 3-ton, 2-motor electric traveling cranes.

The Pittsburgh Screw & Bolt Co., Preble Avenue, Pittsburgh, Pa., manufacturer of bolts, rivets, nuts, etc., has filed plans for a one-story addition, estimated to cost about $89,000.

The Tarentum Boiler Works, Inc., Tarentum, Pa., has been incorporated with a capital of $75,000 by Frederick and L. A. Scharf and F. V. Cooper, Tarentum, to manufacture boilers, tanks and other plate products.

The Oberndorf Mfg. Co., 7509 Thomas Boulevard, Pittsburgh, manufacturer of pipe, steam fittings, etc., is taking bids for a one-story addition, 160 x 200 ft., estimated to cost about $90,000. The W. G. Wilkens Co., Westinghouse Building, is architect. Edward Oberndorf is president.

The Brown Puncture-Proof Tube Co., Pittsburgh, has been chartered under State laws to manufacture automobile tubes and other rubber products. C. E. Johnson, 2112 Wightman Street, is treasurer.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has taken an order for electrical equipment totaling $1,200,000 from the Midi Railway, operating from Bordeaux to Cette, France. It will be used on the line from Pau to Toulouse, and consists of generating apparatus, substation machinery, etc.

The Point Spring Co., Pittsburgh, has been chartered under State laws to manufacture steel springs, iron products, etc. F. G. Darlington, Jr., Sewickley, Pa., is treasurer.

Roscoe-McGrath, Inc., Pittsburgh, has been incorporated under Delaware laws, with capital of $50,000, to manufacture automobile parts and equipment. The incorporators are B. M. Roscoe, R. J. McGrath and A. M. Barron. The company is represented by the Corporation Trust Co., duPont Building, Wilmington, Del.

Machine-shop equipment and other mechanical apparatus will be installed in the new building now being erected at Liberty Avenue and Fancourt Street, Pittsburgh, for the Pittsburgh School of Auto Engineering. The structure will be eight stories, of reinforced concrete, and space not occupied by the Pittsburgh school at the present time will be used by the Liberty Battery Co. as a battery and electrical works.

The Huntington Coal Mining Co., 601½ Ninth Street, Huntington, W. Va., recently organized with a capital of $600,000, has plans under way for the development of extensive properties at Ferguson, W. Va. The work will include the erection of three tipples and the installation of motors, cars and other mechanical equipment, estimated to cost about $150,000. Bids for equipment will be asked late in August. Paul A. Boothe & Co., Huntington, W. Va., are engineers for the work. C. N. Morrison is president.

The Universal Building Supply Co., Huntington, W. Va., manufacturer of concrete blocks, etc., has plans under way for plant enlargements to double, approximately, the present capacity. The company was recently organized with a capital of $50,000. H. H. Tetrick is head.

The Akka Cement Products Co., Inc., New Kensington, Pa., has been incorporated under Delaware laws to manufacture concrete and cement products. The incorporators are James L. Thompson, Harry A. Rawlinson and Malcolm Stepp, New Kensington. The company is represented by the Capital Trust Co., Dover, Del.

Detroit

DETROIT, Aug. 1.

A group of Detroit men have organized the Rickenbacker Motor Co., with a capitalization of $5,000,000, to manufacture a popular-priced car. B. F. Everitt, at one time connected with the former E-M-F Co., which later became a part of the Studebaker Corporation, will be president and general manager; Capt. Rickenbacker, vice-president and sales manager, and Harry L. Cunningham, secretary-treasurer. Walter E. Flanders, also formerly connected with the E-M-F Co., will head the board of directors. Other directors include Carl Tichnor, Roy Hood and E. R. Evans. Mr. Hood will be purchasing agent. Application for a State charter has been made and negotiations are under way for a factory in Detroit.

The Stokes Mfg. Co., Owosso, Mich., care of the local

Chamber of Commerce, has awarded contract to Malisky & Sons, First Street, for the construction of its new plant for the manufacture of automobile parts and other mechanical equipment. It will be one-story and basement, 50 x 100 ft., estimated to cost about $14,000, exclusive of equipment.

The Peterson Spring Co., Detroit, has been chartered under State laws, to manufacture metal springs, and other wire and steel products. August Peterson, 4762 Townsend Avenue, Detroit, heads the company.

The Peninsula Paper Can Co., Detroit, has preliminary plans under way for the construction of a new plant at Monroe, Mich., for the manufacture of paper containers, cans, etc. The company is being organized with a capital of $500,000, and is headed by R. P. Adams, sales manager of the Detroit Heating & Lighting Co., Detroit.

Officials of the Bissell Carpet Sweeper Co., Grand Rapids, Mich., have organized the Grand Rapids Sweeper Co., to manufacture carpet sweepers and parts, to be operated as an affiliated interest. It is headed by Melville and A. Bissell, 112 College Avenue, S. E.; and C. E. Shanahan.

The Transue-Williams Steel Forge Corporation, Alliance, Ohio, is completing plans for its proposed new plant at Marysville, Mich., and, it is said, will call for bids at an early date. The new works are estimated to cost about $45,000.

The Photo-Electric Bean Grader Co., Ithaca, Mich., has been incorporated with a capital of $150,000 by D. J. Lynch, Ray F. McWilliams, and Henry McCormack, Ithaca, to manufacture grading machinery for agricultural and other service.

Buffalo

BUFFALO, Aug. 1.

The South Buffalo Terminals, Inc., Buffalo, has made application to the City Council to erect a new one-story factory terminal building, 90 x 100 ft., at 310 South Park Avenue, to be equipped with freight handling and conveying machinery, etc. E. C. Randall is president.

The La Falce Safety Turn Motor Lock, Inc., Buffalo, has been incorporated in Delaware with a capital of $50,000 by Palmerino La Falce, Melmoth D. Martin and Edward E. Nelson, Buffalo, to manufacture automatic locks and locking devices. It is represented by Woodburn Martin, Georgetown, Del.

The Iroquois Utilities, Inc., City Bank Building, Syracuse, N. Y., has plans under way for a new electric power plant at Concord, Erie County.

The National Windshield Co., Buffalo, has been incorporated with a capital of $25,000 by W. B. and R. R. Frear and C. Harris, Buffalo, to manufacture windshields and other automobile specialties. It is represented by Botsford, Lytle, Mitchell & Albro, Fidelity Building.

The Stanard-Snyder Co., Syracuse, N. Y., has been chartered under State laws to manufacture automobile equipment. The incorporators are C. H. Stanard, G. Snyder and T. H. Dohm, Syracuse. It is represented by Gannon, Spencer & Mitchell, O. C. S. B. Building.

The Common Council, Old Forge, N. Y., is perfecting plans for the erection of its new municipal electric power plant, H. C. Weller, Old Forge, is engineer. Walter D. Marks is president of the council.

Baltimore

BALTIMORE, Aug. 1.

The Hancock Steel Co., Martinsburg, W. Va., is completing preliminary plans for the erection of the initial unit of its new plant at Hancock, Md., one story, 130 x 200 ft., to be equipped as a foundry and machine shop. It is estimated to cost in excess of $100,000. Ernest McGeorge, 1900 Euclid Building, Cleveland, is engineer. F. Vernon Aken heads the company.

The Union Shipbuilding Co., Fairfield, Baltimore, is planning for enlargements in its plant to cost about $350,000. The work, for the most part, will consist of additional construction and repair buildings and equipment, including a marine railroad line.

The Floatless Carburetor Co., 916 Munsey Building, Baltimore, has been incorporated with a capital of $100,000 by Claude R. Hays, F. Strattner Orem and R. Contee Rose to manufacture carburetors and similar equipment for automotive service.

The Planters' Mfg. Co., Port Norfolk, Va., is planning to rebuild its barrel and crate manufacturing plant, recently destroyed by fire, with loss estimated at about $200,000, including machinery.

The Universal Ice Machine Co., Wilmington, Del., has been incorporated with a capital of $1,200,000 by William T. Morris, Edward W. Couch and Leonard E. Wales, Equitable Building, to manufacture ice and refrigerating machinery.

The Enterprise Foundry Co., Bristol, Va., will remodel the local plant formerly owned by the Virginia Iron, Coal and Coke Co., which it recently acquired. The work is estimated to cost close to $50,000.

The Hickory Power Co., Hickory, N. C., has been incorporated with a capital of $200,000 to equip and operate an electric light and power plant. The incorporators are B. M. Spratt, L. F. Abermathy and J. A. Moretz, all of Hickory.

The Monarch Tractors, Inc., Wilmington, Del., has been incorporated under State laws, with capital of $1,000,000, to manufacture tractors, parts and other automotive equipment. It is represented by the Corporation Trust Co., du Pont Building.

The Superior Anthracite Coal Corporation, American National Bank Building, Roanoke, Va. recently organized with a capital of $200,000, is planning for the installation of new hoisting machinery and other mechanical equipment at its properties at McCoy, Va. Clyde E. Smith is president and general manager and R. L. Keger, secretary and treasurer.

The Carolina Metal Culvert Co., Salisbury, N. C., recently incorporated, will operate a plant for the manufacture of metal culverts, with size ranging from 12 to 50-in. Leo C. Wallace is president and Ernest L. Hardin, secretary and general manager. The company is capitalized at $200,000.

Ohio

A somewhat better feeling has developed in the Cleveland machinery market and manufacturers and dealers seem more hopeful regarding the outlook for orders. Inquiries have improved slightly but the volume of business placed the past week shows little change, with but very few orders except for single tools. July business on the whole was probably as light as during June, and one manufacturer states that his July sales were less than any previous month this year. The largest order reported was for five or six used machines placed by the Reynolds Spring Co., Jackson, Mich.

Interest during the week centered on an inquiry for 25 machines for the McKinley school, Canton, for which bids were received July 29. This business resulted in keen competition and brought out some low prices. It had been the practice of the trade to allow a discount of 5 per cent on machines sold to schools, but on this inquiry discounts as high as 20 per cent were quoted on some tools. The Big Four Railroad the past week asked for quotations on a boring mill, which is supplementary to machines for which it had previously sent out inquiries. Dealers have no information as to when this business will be placed.

Manufacturers report an improvement in inquiries for electric motors and generators in small units. Preliminary inquiries have come out for 5 or 6 hydroelectric installations ranging from 100,000 to 300,000-hp. The city of Nashville has taken bids for a 20-ton electric traveling crane.

In Cincinnati some scattered inquiries are being received but orders are still running very light. A few more machine-tool plants which had been running on short time, closed July 30 for an indefinite period. Some of the larger shops are still operating, however, and expect to continue for several weeks at least. Local dealers report the market very quiet both for new and old tools. A better tone is evidenced, however, and improvement is looked for with the coming of cooler weather. No lists have made their appearance and while a few purchases have been made on some of those now out, the bulk of the business still remains to be placed.

The Edwards Mfg. Co., Cincinnati, sheet metal manufacturer, has purchased property adjacent to its plant on Eggleston Avenue, and is contemplating additions. Preliminary plans are under way for extensions aggregating over $1,000,000. E. W. Edwards, is president.

The Great Western Lathe & Tool Co., Cincinnati, has been incorporated with a capitalization of $25,000 to manufacture precision and bench lathes. Definite arrangements regarding the location for a plant will probably be announced within the next week. Henry Aeberle, 128 Opera Place, is one of the prime movers in the organization of the company.

G. P. Young, formerly associated with the Hadfield-Penfield Steel Co. and A. W. Wheeler, previously with the Allen Motor Co., will open a machine shop in Bucyrus, Ohio, in a portion of the plant formerly occupied by the Bucyrus Machine Tool Co., and will engage in general repair work.

The London Motor Plow Co., London, Ohio, manufacturer of tractor plows, has been incorporated with a capital stock of $50,000. E. H. Daniels is president and general manager; P. J. Kirwin, first vice-president; H. Emerick, second vice-president; R. Dunham, secretary, and H. Plimell, treasurer.

The Apex Spring Cover Co., 6508 St. Clair Avenue, Cleveland, has placed a contract for a one-story factory, 30 x 38 ft.

The Wellman-Seaver-Morgan Co., Cleveland, has taken an order for a 325-hp. hydraulic turbine with 200 ft. head and operating at 900 r.p.m. for the city of Cookeville, Tenn.

The Heltzel Steel Form & Iron Co., Warren, Ohio, recently placed an order with Bertsch & Co., Cambridge City, Ind., for one ½-in. x 144-in. squaring and splitting shear.

Indiana

INDIANAPOLIS, Aug. 1.

The Knox & Sullivan County Light & Power Co., Carlisle, Ind., has been incorporated with a capital of $75,000 to operate a local electric light and power plant. It is headed by Murray Owen, J. D. Boswell and N. S. McGillivray, all of Carlisle.

The Frankfort Ice & Coal Co., Frankfort, Ind., has awarded a contract to John Paden, Frankfort for rebuilding the portion of its ice manufacturing plant at 300-306 West Ohio Street, recently damaged by fire. It will be one-story, and is estimated to cost about $60,000.

The United States Gravitation Mail Post Co., Sullivan, Ind., has been incorporated under State laws to manufacture metal mail chutes and kindred products. It is headed by Jacob Nicholson, Thomas Bickel and Solon Shepherd, all of Sullivan.

The Board of Directors, St. Elizabeth Hospital, Lafayette, Ind., will soon break ground for a new power house in connection with the erection of a hospital extension at the institution, estimated to cost about $150,000. D. X. Murphy, Louisville Trust Building, Louisville, is architect.

The Shrader Battery Co., New Albany, Ind., has been chartered under State laws to manufacture electric storage batteries and affiliated equipment. The incorporators are Daniel and W. A. Shrader and Julius Maier, New Albany.

The Common Council, Linton, Ind., has commissioned Shrouds, Stone & McCormick, 510 Tribune Building, Terre Haute, Ind., architects and engineers, to prepare plans for the new municipal electric light and power plant, one-story, 75 x 95 ft.

Milwaukee

MILWAUKEE, Aug. 1.

A small volume of orders for new machine tools is coming from scattered sources, making a fair aggregate in view of the restricted business recently placed. Business in July showed a small percentage of increase over June, which was the dullest month this year. The automotive industries have again become a principal factor, although so far their needs have been limited. Orders consist largely of single tools, which are wanted for immediate shipment.

The General Industrial X-ray Co., Milwaukee, a new corporation with $100,000 capital, on Aug. 1 began manufacturing operations at 246 West Water Street, in a two-story addition to the factory and warehouse of the E. H. Karrer Co., manufacturer of surgical instruments and appliances. Officers of the new company are: President, E. H. Karrer; secretary, William Gilliaume; treasurer, Otto Herrmann.

The Board of Education, Durand, Wis., is taking bids until Aug. 30 for the erection and equipment of a junior high and vocational training school the cost not to exceed $100,000. The architects are Oppenhamer & Obel, Wausau, Wis. H. A. Miles is secretary of the board.

The Standard Steel Corporation, 1251 Thirtieth Street, Milwaukee, has increased its capitalization from $300,000 to $750,000, consisting of $600,000 of common and $150,000 of preferred shares. It manufactures steel barn, stable and toilet equipment and recently completed a new plant.

The Industrial Heating & Engineering Co., 143 Oneida Street, Milwaukee, has incorporated with a capital stock of $75,000, consisting of $40,000 common and $35,000 of preferred shares. The incorporators are A. F. Bowers, H. S. Bowers and E. W. Spencer, attorney.

The Lux Typewriter Co., Luxemburg, Wis., has been organized with an initial capitalization of $20,000 to manufacture writing machines and similar devices. The incorporators are Anton C. Svoboda, Joseph M. Ramesh and Louis A. Karel.

The Marathon Rubber Products Co., Wausau, Wis., has awarded contracts for a one-story brick and steel factory, 60 x 120 ft., to the Wisconsin Engineering & Construction Co., local, which sublet the steel work to the Worden-Allen Co., Milwaukee. It will purchase equipment and motors.

The Wisconsin Battery & Ignition Co., Green Bay, Wis., has been incorporated with a capital stock of $25,000 and will establish a shop for manufacturing and repairing storage batteries and electrical equipment for passenger and commercial automobiles. The incorporators are Ernest J. and Anton J. Balza and Ralph R. Ramey, all of Green Bay.

The General Motors Corporation, Detroit, has completed the transfer of its Samson motor truck manufacturing operation from Flint, Mich., to the main works of the Samson Tractor Co., Janesville, Wis., where production was resumed Aug. 1. For the present the principal parts will be manufactured at Flint and shipped to Janesville for assembling.

The Peerless Electric Co., 2028 Fond du Lac Avenue, Milwaukee, will award contracts Aug. 6 or 8 for a brick and concrete machine and repair shop building, 45 x 120 ft., at Eighteenth Street and North Avenue.

The Soloun-Stuchlek Specialty Co., Milwaukee, has been incorporated with a capital stock of $80,000 to manufacture machinery, machines, devices, implements, etc. The incorporators are Martin V. Soloun, John M. Stuchlek and Arthur A. Glanz, 820 Tenth Street, Milwaukee.

The Central South

ST. LOUIS, Aug. 1.

The Grandfield Refining Co., Kansas City, Mo., has plans under way for the construction of a new refinery at Little Rock, Ark., to cost about $250,000, including machinery.

The Southern Refrigeration Co., Johnson City, Tenn., recently organized with a capital of $400,000, has plans under way for a new ice manufacturing and cold storage plant, estimated to cost in excess of $100,000.

The Board of Directors, University of Missouri, Columbia, Mo., L. Cowan, secretary, is completing plans for a new one-story and basement power plant to cost about $150,000.

The H. F. Wilcox Oil & Gas Co., Bristow, Okla., is planning for the construction of a new refinery, with initial daily output of about 500 bbl. H. F. Wilcox is head.

Mechanical equipment and machinery, including hoisting apparatus, conveyors, and general mining machinery to cost about $300,000, will be installed by the Central Coal & Lumber Co., Vinia, Okla., at its properties. The company is a subsidiary of the Central Coal & Coke Co., Kansas City, Mo.

The Richerger Light & Specialty Co., 126 South Second Street, Memphis, Tenn., is planning for the organization of a subsidiary company to establish a plant for the manufacture of kerosene oil burners and burner parts.

The Commercial Coal Mining Co., Lexington, Ky., recently organized, is planning for the installation of mechanical and electrical equipment at its properties. J. H. Hall heads the company.

The City Council, Osborne, Kan., will break ground at once for its proposed one-story municipal electric light and power plant, estimated to cost about $75,000. E. T. Archer & Co., 609 New England Building, Kansas City, Mo., are architects.

The Gulf States

BIRMINGHAM, Aug. 1.

The Jaffé Iron & Metal Co., Birmingham, Ala., has plans under way for the erection of a new building at its works to replace a structure recently destroyed by fire, with loss reported in excess of $100,000, including equipment.

The American Motors Export Co., Jacksonville, Fla., has awarded a contract to the O. P. Woodcock Co., Jacksonville, for the initial unit of its new plant for the manufacture of automobiles and parts. It is estimated to cost about $150,000 with equipment. The company recently acquired a large tract of land for the new works. Henry L. Innes is president.

The City Council, Webster, Fla., will call for bids this month for the construction of a new municipal electric light and power plant. A bond issue to cover the work recently has been sold.

The Monroe Oil & Refining Corporation, Fort Worth, Tex., recently incorporated with a capital of $1,000,000, has preliminary plans under way for the construction of a new refinery, estimated to cost about $500,000. The company is headed by V. S. Monroe, Fort Worth, and R. W. Perry, Polytechnic, Tex.

The Navajo Sanatorium Co., Sarasota, Fla., recently organized, has plans in preparation for a plant to manufacture surgical instruments. Dr. Y. Nabona is treasurer and general manager.

A hydroelectric power plant will be constructed by the Planters & Merchants Mill Co., Austin, Tex., in connection with a new cotton mill at New Braunfels, Tex. The company is now being organized with a capital of $1,000,000. Lockwood, Greene & Co., 101 Park Avenue,

New York, and Boston, Mass., architects and engineers, will prepare plans for the project. S. M. Ransopher, director of industrial education, University of Texas, Austin, heads the new company.

The Hercules Brick Co., Dallas, Tex., has preliminary plans under way for new works with a daily output of about 150,000 brick. It has acquired about 16 acres on the Trinity River, and the new plant is estimated to cost about $75,000, with equipment. A. B. Salam is general manager.

The Burnwell Coal Mining Co., Burnwell, Ala., is planning for the installation of electrically operated hoisting and haulage equipment at its properties.

The Nu-Tex Brick Co., Tampa, Fla., has completed plans for a new works with a daily capacity of about 30,000 bricks. Erection will begin at once.

California

SAN FRANCISCO, July 27.

After the little activity in the machinery market, business again has become quiet. Inquiry for new machine tools has been very light, with a few scattering sales of small types. The second-hand market is moderately active, and is attracting most of the buyers.

The Richardson Welding & Mfg. Co., Oakland, Cal., has arranged for the removal of its plant to the buildings recently occupied by the Pacific Coast Shipbuilding Co., lately acquired. The new works will be developed for considerable increase in production.

The Pacific Machine Shop, 112 East Seventeenth Street, Los Angeles, has filed notice of organization to operate a machine and repair works. Charles H. Husk, 1424 Vermont Avenue, heads the company.

The Western Automatic Sprinkler Co., Los Angeles, has been incorporated with a capital of $25,000 by Charles E. Felt, S. F. Martin, and C. L. Chandler, 434 Investment Building, to manufacture sprinkler devices, spraying systems, etc.

The California Car Co., 496 Twelfth Street, Oakland, Cal., manufacturer of automobiles and automotive equipment, has plans under way for a new one-story plant. C. R. Manbert, address noted, is architect.

The Republic Steel Package Co., 7930 Jones Road, Cleveland, has commissioned L. F. Hyde, architect, Oakland, Cal., to prepare plans for its proposed Pacific Coast plant, to be one-story, 60 x 300 ft.

The Belcher Aerial Mfg. Co., Los Angeles, has been incorporated with a capital of $200,000 by O. T. Belcher, F. P. Snow, and C. F. Holland, 1022 Citizens National Bank Building, to manufacture aircraft, motors, and parts.

The Sierra Oil & Refining Co., Oxnard, Cal., is considering plans for the construction of a new refinery. It is proposed to break ground at an early date.

The Miller Auto Electric Mfg. Co., Los Angeles, has been incorporated with a capital of $100,000 by Robert C. Camp, J. F. Nelson, and L. T. Mayhew, 338 Byrne Building, to manufacture electrical equipment for automotive service.

Canada

TORONTO, Aug. 1.

Only a small demand exists for machine tools in this market. Inquiries have been coming in larger numbers, but have in no way stimulated the demand for equipment, which is principally for single tools. Canadian railroads have made no move to enter the market and until makers of railroad equipment are in a position to resume operations dealers do not look for much buying from this source. The plant of the Canadian Car & Foundry Co., has started work on the construction of tank cars for the Russian Government and it is expected that this order will keep the works operating at capacity for three or four months. The demand for small tools is very light and wood-working equipment is also quiet. No change in prices has been announced this week, although a reduction of 10 per cent was made last week on twist stock carbon and wood-boring drills, the new discount being 42½ per cent.

Peters, 43 Yonge Street, Toronto, are in the market for an 18 to 24-in. gap lathe, drill, keyway machine, emery stand and buffer.

The Lorne Tractors, Ltd., will establish a plant at Chatham, Ont. A site has been secured in the west end of the city and the company proposes to start building operations within a month. It will specialize in the manufacture of gasoline tractors for farm work.

The Vancouver Rolling Mills Co., Eburne, B. C., is in the market for the following equipment, new or used, if in good condition: A 16 or 18-in. two stand mill with roughing and flat finishing rolls; scrap alligator shears, 30-in. blade, capable of cutting up to 5 or 6-in. cold square steel, prefer style No. 5 or 6 United Engineering or equal, must have steel head.

The Administrative Commission, Montreal, will receive bids until Aug. 20, for the construction of an electric pumping station to cost $500,000. Plans are with A. E. Doucet, engineer.

The City Council, Toronto, Ont., plans harbor drainage work to cost $691,000, including the construction of a pump house, pumping equipment, etc. T. L. Church is chairman of the Board of Control.

The Oro Cement Products, Ltd., Barrie, Ont., recently organized with a capital stock of $40,000, has secured a building which it will equip for the manufacture of brick and cement products, etc.

The lumber mill owned by Gilroy McKay, Port Alberni, B. C., was destroyed by fire with a loss of $75,000. It will be rebuilt and new equipment purchased.

The Great West Farm Machines, Ltd., Milverton, Ont., has been incorporated with a capital stock of $300,000 by Henry C. Mohr, John Boshart, Enos Nafziger and others to manufacture farm implements, tools, etc.

Trade and Office Changes

The grinding and polishing stand and accessory department of the Webster & Perks Tool Co., manufacturer of machine tools, Springfield, Ohio, has been sold to the Hill-Curtis Co., Kalamazoo, Mich., the latter company having acquired all drawings, patterns, jigs and tools, raw and finished materials, finished machines, engineering, production and sales records and data. The Hill-Curtis Co. is an old concern operating a foundry, forge and machine shop, etc. The Webster & Perks Company will devote all attention to the manufacture and sale of universal and plain cylindrical grinding machinery.

The partnership of Cann & Saul, 516 Commerce Street, Philadelphia, has been consolidated with the Cann & Saul Steel Co., Inc., with works at Royersford, Pa., and hereafter will trade under the name of Cann & Saul Steel Co., Inc., maintaining the Philadelphia office. The officers are: David S. Cann, president and general manager; George E. Saul, treasurer; Henry D. Rutter, secretary and sales manager.

The Allied Machinery Co. of America, 51 Chambers Street, New York, has been appointed foreign representative in all countries, except the United States and Canada, for the Universal Crane Co., Cleveland.

The Iron Trade Products Co., Farmers Bank Building, Pittsburgh, has been appointed exclusive sales agent for the Donley mine, shipping station of which is Johnetta, Pa., Allegheny Valley Railroad. Operation has an output of five cars of coal a day.

The Continental Can Co., Inc., New York, has removed to its new plant, Sixteenth and Coles streets, Jersey City, N. J. The Eastern general line sales office, formerly at 616 West Forty-third Street, New York, is now located at the above address, phone, Montgomery 4701.

The Cochrane Steam Specialty Co. of Massachusetts has been organized to represent in New England a number of well-known manufacturers of power plant equipment, including the H.S.B.W.—Cochrane Corporation, manufacturer of feed water heaters, steam and oil separators, V-notch meters and metering heaters, hot and cold process water softeners, flow meters, precision meters, weighing meters, multiport valves and multiport drainers; also the Steam Motors Co., Inc., manufacturer of steam turbines for driving generators, pumps, fans, etc., and the D. Connelly Boiler Co., builder of water tube steam boilers. The office is in charge of Elliott Green, who has long been connected with the several lines mentioned, and is located at 1045 Oliver Building, Boston.

M. M. Wyckoff, formerly engineer, construction superintendent and general purchasing agent for T. A. Gillespie Co., announces the formation of the Wycoff Engineering Corporation for the general practice of engineering, contracting, building; purchasing, sales and efficiency engineering; reports, appraisals and investigations. Offices are at 233 Broadway, Woolworth Building, New York.

Clarence H. Landsittel has been appointed sales engineer for the Climax Motor Devices at Chagrin Falls, Ohio (near Cleveland). For several years the Climax company has manufactured a complete line of magnet and generator couplings and is now ready to put on the market a single cord disk universal. Mr. Landsittel served as purchasing agent for the Templar Motors for three years and prior to that in the same capacity for the Haynes at Kokomo.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅝ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c. to 3.68c.
No. 12	3.58c. to 3.73c.
No. 14	3.63c. to 3.78c.
No. 16	3.73c. to 3.88c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.05c. to 4.30c.	.....
Nos. 22 and 24	4.10c. to 4.35c.	4.70c.
No. 26	4.15c. to 4.40c.	4.75c.
No. 28	4.25c. to 4.50c.	4.85c.
No. 30	4.50c. to 4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.25c.
No. 16	4.50c.
Nos. 18 and 20	4.65c.
Nos. 22 and 24	4.80c.
No. 26	4.95c.
No. 27	5.10c.
No. 28	5.25c.
No. 30	5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

Based Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	5.00c. to 5.25c.
Coppered basic	4.75c. to 5.00c.
Tinned soft Bessemer	6.25c. to 6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c. to 23 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$6.80	$6.55
			90 lb.	6.90	6.65
			100 lb.	7.00	6.75
IC	$10.60	$9.50	IC	7.20	6.95
IX	11.80	10.75	IX	8.10	7.85
IXX	13.60	12.25	IXX	9.10	8.85
IXXX	15.60	14.25	IXXX	10.50	10.25
IXXXX	17.20	16.00	IXXXX	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	37c. to 38c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....30c. to 32c.

Old Metals

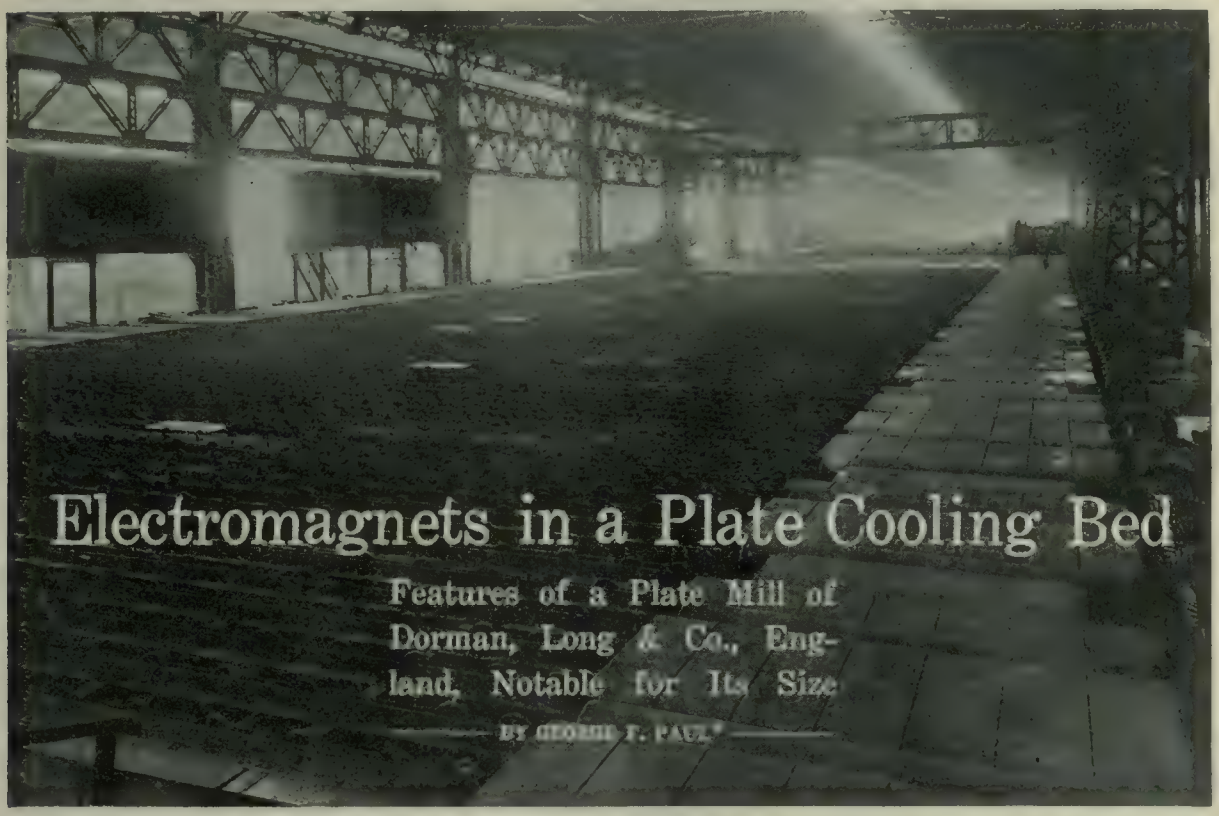
Values are a little lower in sympathy with the new copper market. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.75
Copper, heavy and wire	9.00
Copper, light and bottoms	7.75
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	8.00
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

THE IRON AGE

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ESTABLISHED 1855 VOL. 108: No. 6



Electromagnets in a Plate Cooling Bed

Features of a Plate Mill of Dorman, Long & Co., England, Notable for Its Size

BY GEORGE F. PAUL*

A UNIQUE method of handling the plates on the cooling bed, which is done by means of electro-magnetic skids is a feature of an electrically driven rolling mill at Redcar, England, notable otherwise for its size. The improved means for transferring and handling rolled steel plates on cooling banks is a patent obtained by an official of the company, L. Ennis, general manager for Dorman, Long & Co., Middlesborough, England.

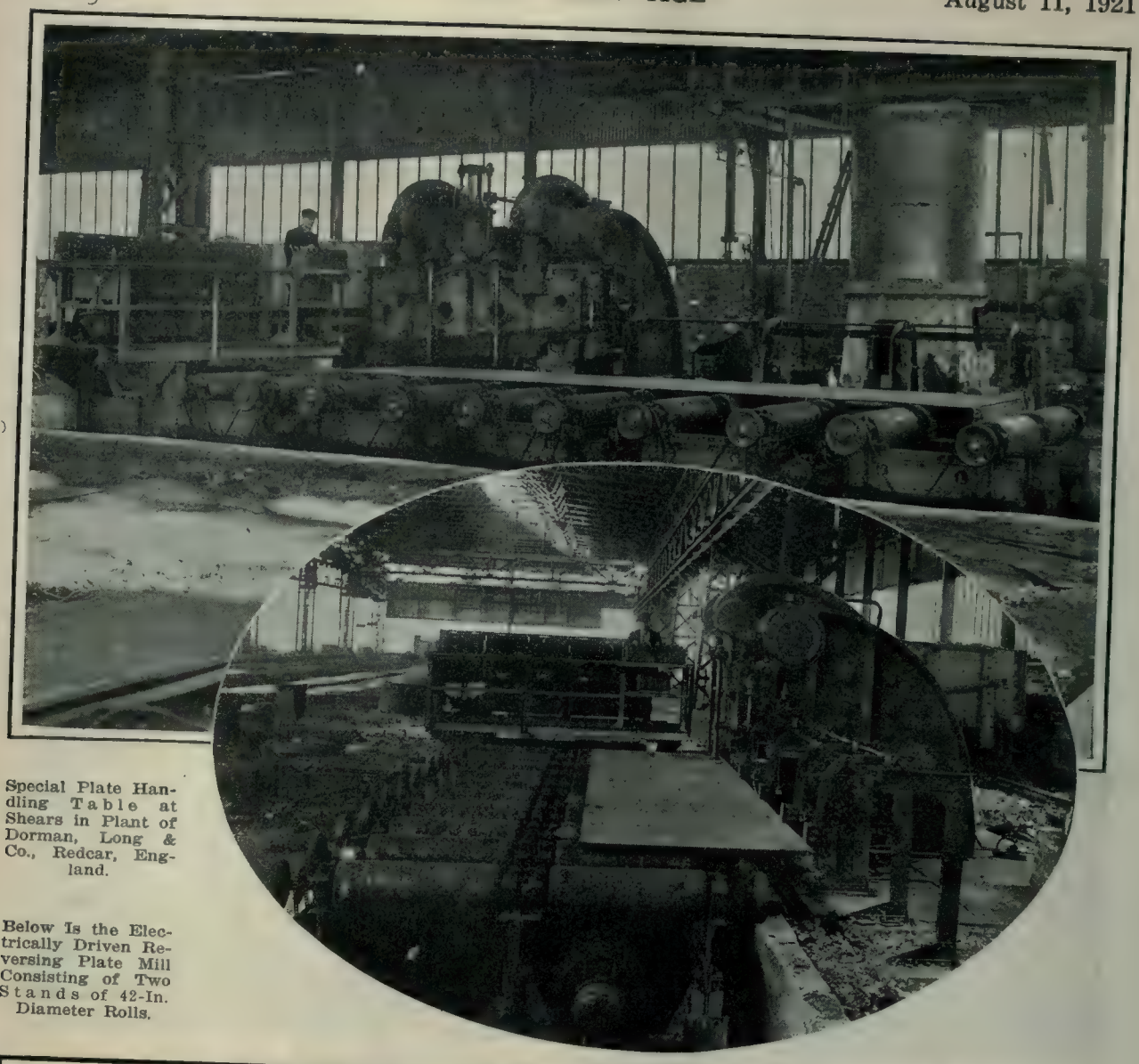
The plates are delivered by live rolls to this plate-handling table at the end of the cooling banks and delivered for side shearing to side shears. The table installed in the Dorman-Long mills, is the first of its kind to be built and is giving highly satisfactory results. In a single shaft of 8 hr., 145 tons of sheared plates have been handled by the machine.

The method is as follows: After the plates leave the finishing rolls they are conveyed by roller track to shears for end shearing and cutting to length. The side shearing of the plates is carried out at two sets of shears, part of the output being dealt with by a set of shears having castors, while the rest of the output is delivered to shears fitted with the plate operating table, and the plates for the latter are conveyed in a straight line from the end shears by roller gear to the end of the cooling banks where they are received by the operating table. The rolls on the operating table are on the same level as the mill roller track. The plate is then adjusted by means of the electro magnets fitted between the rollers on the table and put up to the side shears. The alinement is quickly and accurately carried out by the table operator from the switchboard during the actual operations of shearing. The plate is held in correct alinement by the magnets under the plate. One side of the plate is thus sheared.

Then the plate is turned for the shearing of the other side. The machine is fitted with two sets of separately driven rollers. The plate is rotated by revolving the rollers in opposite directions; this is a very simple operation, the plate being kept under perfect control by means of the magnets, and without the slightest difficulty the unsheared side of the plate is thus presented to the shears and the shearing is completed by a repetition of the first operation already described. By this means a great saving in labor is effected. With the use of the table only three persons are needed; namely, one man on the table, another to operate the shears and a third to remove the shearings.

The 9 ft. 6 in. electrically driven reversing plate mill consists of two stands of 42-in. diameter rolls. This mill is capable of rolling plate from ¼ in. to 2 in. thick and up to 9 ft. in width and any length up to 100 ft. A special feature of this mill is the motor for driving, which has a maximum peak load of 20,500 h.p. when running at 40 r.p.m. The speed can be increased up to 70 r.p.m. by weakening the motor field. The machine is designed to be reversed from 40 r.p.m. in one direction to 40 revolutions in the opposite direction in less than 3 sec.

*904 Ellsworth Building, Chicago.



Special Plate Handling Table at Shears in Plant of Dorman, Long & Co., Redcar, England.

Below Is the Electrically Driven Reversing Plate Mill Consisting of Two Stands of 42-In. Diameter Rolls.



The flywheel of the motor generator is composed of two separate 30-ton wheels mounted side by side on the same shaft. Each of the wheels is built in three parts consisting of a central disk and two rims that are riveted to the central disk. The stored energy in the flywheel when running at 600 r.p.m. is 46,900 ft.-tons and the available energy that the flywheel is capable of giving out while decreasing in speed from 600 to 500 revolutions is approximately 85,000 hp.-sec.

Trent Process for Cleaning Powdered Coal

Agitation Method of Producing an Amalgam and Eliminating Ash from Low-Grade Fuels

BY O. P. HOOD*

DURING the war certain suggestions concerning power production were made by Walter E. Trent to the War Inventions Board and, at the request of the War Department, facilities for experimental work were provided on the grounds of the Bureau of Standards. The experiments were along the line of controlling the conditions of combustion in a closed space. In order to reduce slag troubles, experiments were carried out for removing ash from powdered coal. After the war, work along this line was continued, resulting in the Trent process, which agitates or beats together powdered coal, water and oil.

A new technology had previously been given to ore preparation by the use of small quantities of oil in water with froth flotation, and although the methods, results and mixtures of the Trent process were quite different, yet the same physical phenomena of differential wetting was used, and the possibility of there being interesting results in fuel technology was evident. A co-operative agreement was entered into, whereby the Bureau of Mines was to investigate the underlying physical and chemical facts and make them public, and the Trent Corporation was to pay the cost of the investigation.

The several reports as made have been available to any one interested, and are now to be published. While the Bureau of Mines felt justified in investigating the physical phenomena so far as might be done in a laboratory, and so far as public interest might reach, no attempt was made to discover the commercial possibilities which development might bring. The question of commercial possibilities must be left for commercial enterprise to answer.

What the Process Is and Does

Briefly, the process consists in agitating together powdered coal, water and oil. This produces a partly de-ashed plastic fuel, called an amalgam, the oil selecting the coal particles and largely excluding the water and ash. The amalgam can be freed from water mechanically held by working, much the same as butter is worked. The amalgam can be burned in several ways; for example, it may be shoveled, or forced through pipes by pressure; it can also be stored, under water if desired.

The laboratory results immediately suggest many interesting possible applications. For pulverizing fuel, wet grinding presents many advantages over dry grinding, provided the water can be eliminated afterwards. To be able to reduce the ash in coal may make available great quantities of low-grade coals and material now considered as waste at the mines.

If an oil is used which can be distilled at a temperature below the distilling temperature of the coal, powdered fuel is reclaimed from the amalgam and the oil may be reused. If a heavy oil be used and distilled to dryness, a coke product may be recovered, although the coal used may have had no coking quality. If the distillation proceed only to a heavy pitch, a mass suitable for briquetting may be made. In distilling oil mixed with a finely powdered material, the distillates are similar to those obtained by distilling under pressure, so that the distillation of an amalgam of coal and oil gives quantities often more favorable than the sum of the separate distillations of the coal and the oil.

The amalgam can be used for a gas-making fuel, and gas-house tar emulsions can be dehydrated by mixing with powdered coal, the amalgam being retorted for further gas making. Graphite ore can be separated from its gangue, and coke can be separated from flue dust, by using the Trent process. Clean coal in anthracite sludge will make an amalgam if oil is added.

A paper by G. St. J. Perrott and S. P. Kinney, of the Bureau of Mines, has presented the results of the laboratory-scale tests of the efficiency of the Trent process in cleaning coal. A noteworthy feature of the operation of the process is the cleanness of separation of mineral matter from combustible matter. Combustible recovery has averaged better than 95 per cent. High ash reduction has been obtained with the bituminous coals and anthracites. Sulphur reduction has been good in the case of anthracites but poor with the bituminous coals.

It has not been found feasible to treat the lignites without preliminary carbonization, due to the difficulty of forming a coherent agglomerate of the raw lignite and oil. Finer pulverization than 200 mesh does not give a sufficient increase in ash reduction with most coals to warrant the added expense of the longer period of grinding. Any oil whose viscosity is not too great may be employed in the process. Oil losses in the refuse or water are apparently negligible.

This brief sketch of possibilities revealed by small-scale laboratory work shows that the field for investigation and development is large. The general results show that real benefits are physically possible by treating coal in this manner. The Bureau has interested itself more particularly in the ash separation phenomena or the cleaning of coal, and in the distillation of the amalgam, which will be discussed in a future article.

*Chief mechanical engineer, Bureau of Mines.

Apply for Charter for Temple Furnace Co.

Noteholders of the Seaboard Steel & Manganese Co., who recently bid in the furnace of that company at Temple, Pa., have applied for a Pennsylvania charter under the name of Temple Furnace Co. This action was taken in order that there may be a formal corporate body to which title to the furnace may pass in the event of the confirmation by the United States Court of the receivers' sale.

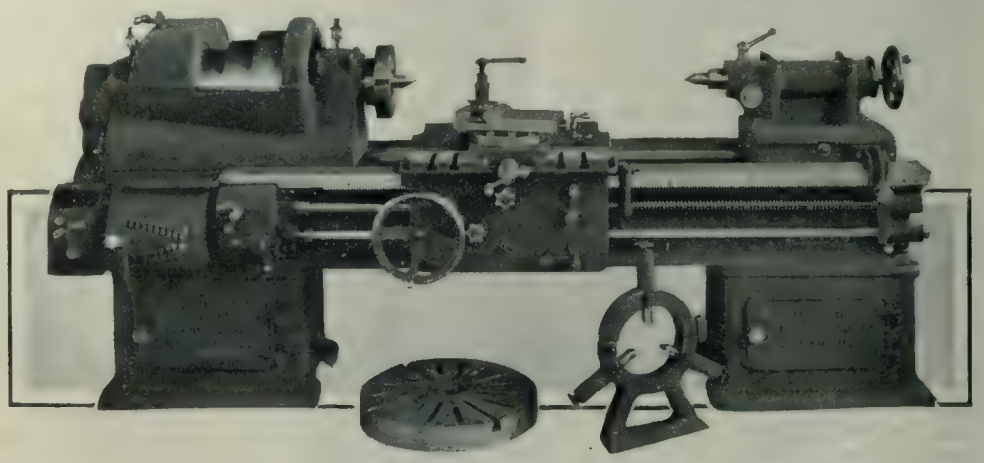
First steps to stage a large exhibition of steel products and those of allied industries in the Pittsburgh district were taken at a recent meeting of the general committee of the Pittsburgh Chapter, American Steel Treating Society. The exposition, the only one of its kind in America, will be held in Motor Square Garden, Pittsburgh, in August or September, 1922, when the national convention of the association will convene in Pittsburgh. Dr. C. M. Johnson, president of the Pittsburgh chapter, M. B. Hoffman and D. W. McDowell were chosen delegates to the 1921 national convention at Indianapolis, Sept. 19 to 26.

Double Back-Geared Engine Lathe

A 22-in. and a 24-in., 3-step cone, double back-geared engine lathe have been added to the line of the Lehmann Machine Co., St. Louis. The makers state that in design the aim has been to include liberality of dimension without exaggeration and to include the most approved features, using best materials in every detail.

The bed has chilled ways and is deep and wide. The cross section at end of bed is cut away to permit overhang to the tailstock or placing the steady rest at the extreme end. The inside front way is flat and a rack is cast in the center of the bed for engaging the pawl on the tailstock. The headstock casting is carried from front to rear boxes on a line with center of the spindle, tieing the bearings rigidly together and protecting the operator from the belt. Nine spindle speeds are provided.

The tailstock is clamped to the bed by four bolts brought up to the top of the barrel. The spindle is provided with a new and improved device for locking consisting of a heavy floating plug set in a bearing below the spindle. The plug is concaved to match the spindle and rests at one end on a shoulder of larger diameter, the other end extending beyond the back of the tailstock casting and fitting into an eyebolt suspended by an overhanging lug. The locking handle sets above this and is threaded to the eyebolt. Movement of the handle draws the plug against the bottom of the spindle, a very light pressure securely locking the spindle. A handle is provided for moving the tailstock on the bed by a pinion engaging a feed rack.



In the Quick Change Mechanism the Range Is Doubled with the Addition of Only Two Gears

The apron has a central oiling system and is tongued and grooved to the carriage. The front plate is removable leaving the mechanism easily accessible. The lead screw and feed rod have bearings in the apron to prevent sagging and undue wear on the half nut and reverse gears. A safety device prevents engagements of feed rod and lead screw at the same time and link connections are provided to the parts of the half nut. The half nut operating the handle has an easy motion, its leverage being slight at the beginning, preventing injury on the top or edges of the thread. As the nut is thrown in further the leverage increases till at the finish the two halves of the nut are locked in position and cannot be spread apart by any internal pressure. The compound rest is graduated up to 90 deg. and is held to the bottom side by bolts placed at a large radius from the center.

The quick change mechanism is designed for simplicity and doubles the range with the addition of only two gears. A cone of gears with sliding rocker arm is employed, the rocker having two central driving gears of different ratios, each with an intermediate which engage the cone of gears. By dropping the rocker arm and sliding it on the rocker shaft one of the intermediates is thrown into mesh and by raising the rocker the other intermediate is thrown into use and the next progressive set of changes are obtained. Thus all changes commonly used are made by a movement of the rocker arm alone. For uncommonly fine or coarse threads or feeds another handle is used. For cutting odd threads and worms a swinging quadrant permits the use of special and compound gears. A central oiling system lubricates the bearings in the quick-change gear box and rocker.

The feed rod does not run when thread cutting and the lead screw is inoperative when the feed rod is employed. The lead screw is of high carbon steel with a 2 pitch Acme thread and has ball thrust bearings at both ends. A thread indicator attached to the carriage can be disengaged when not in use and a micometer carriage stop can be furnished when desired. The steady rest has alloy steel plugs and all adjustments and locking, except to the bed, are accomplished by means of star handles. It can be reversed on the bed. The weight on skids is given as 7500 lb. and 7800 lb. for the 22-in. and 24-in. sizes respectively.

Metal Trades Exhibition in Indianapolis

Metal trade manufacturers in Indianapolis are planning to take part in the Indianapolis Industrial Exposition to be held Oct. 10 to 15 at the Indiana State Fair Grounds, under the auspices of the Indianapolis Chamber of Commerce. The convention of the National Purchasing Agents' Association will be held the same week in Indianapolis.

Space has been taken by some 400 of the 781 different lines of manufacturing in Indianapolis. One of the features of the Exposition will be that the huge Manufacturers' Building will be laid out in replica of the retail district of Indianapolis, with the world-famed Soldiers' and Sailors' Monument towering in the center of the network of streets named after those in downtown Indianapolis.

Gain in Pittsburgh Industries

Pittsburgh in 1920 had 2253 industries reporting to the Pennsylvania Department of Internal Affairs. In 1919 reports were received from 1775. The industries last year gave employment to 118,954 persons and in 1919 to 90,254. The persons employed in the city last year in industry included 107,922 males and 11,032 females. There were paid a total wage of $210,224,110, as compared with $117,602,200 in 1919. The capital invested in the industries of the city last year amounted to $469,286,200, against $354,042,800 in 1919. Industrial products turned out in the city last year were valued at $889,531,900, an increase of 47.6 per cent over 1919, when the value was $602,582,800. Pittsburgh's metal products were worth $536,359,300.

New Standard Samples

A new standard sample of lead-base bearing metal No. 53 is now being issued by the Bureau of Standards with a provisional certificate. This sample has the approximate composition: lead 79 per cent, tin 11 per cent and antimony 10 per cent, and contains in addition small amounts of bismuth, copper, iron and arsenic. The price of this sample is $2 per 150 grams, prepaid or parcel post C.O.D.

Renewal No. 33a of nickel steel No. 33 is also ready for distribution at the price of $2.50 per 150 grams.

Analysis of Costs of Drop-Forging

Comparison of Steam and Board Drop Hammers —Rate of Production Studied as Well as Costs —Dividing Line Established Between Types

BY R. T. HERDEGEN*

IN every manufacturing line one finds differences of opinion regarding the relative merits of different machines or methods for accomplishing a given result. In the drop forging industry one of the most controversial points is the relative merits of steam drop hammers and board drop hammers. In considering the relative merits of these two types of machinery the main point in the final analysis is, which will produce forgings the more cheaply, assuming of course that satisfactory forgings will be produced in either case?

It is generally accepted that for very small work a board hammer is the more feasible unit, while for very large work the steam hammer is the better. The difficulty is to locate properly the dividing line between the two types. It is also true that certain jobs which can readily be made in a steam hammer cannot, due to their peculiar shape, be made satisfactorily in a board hammer; the converse is not true

Definite Sizes of Hammers Compared

In this paper we will consider a 1500-lb. steam hammer vs. a 1600-lb. board hammer. In a few instances a job which can be handled satisfactorily in a 1500-lb. steam hammer may require a 2000-lb. board hammer, but as the difference in the investment and running expenses between the 1600-lb. and the 2000-lb. board hammer equipment is not great we will use the former for comparison. Usually a job that requires a 2500-lb. steam hammer would require about a 4000-lb. have board hammers. The problem is whether, for most of the 1500-lb. class of work—which is liable to be the bulk of the work of most forging companies—board hammers or steam hammers should be used.

Relative Hourly and Monthly Output of the Two Types

It is particularly difficult to convince the average shop man that the board hammer can produce as much work per hour as the steam hammer. The writer has found, however, after a very thorough study involving the forging of millions of pieces, such as connecting rods, pedals, gears, spring hangers, spindles and other common forgings, that the production results obtained from the two classes of equipment show the average output per hour in the steam hammer ran 70 pieces against an average of 80 pieces per hour in the case of the board hammer.

A comparison based on the production per month is even more favorable to the board hammer, due to the fact that shut-downs, necessitated by break-downs, are of much shorter duration in the case of the board hammer than they are in the case of the steam hammer. This means that one can expect more actual monthly hours of operation from a board hammer than from the corresponding steam hammer.

Average steam hammer shop men will not believe that the board hammer production will exceed the steam hammer production, due to the fact that if they have any board hammers they are usually tucked away somewhere in a corner. One may consider it axiomatic

COMPARATIVE HAMMER-HOUR RATES

			Hourly Rates—1500 Lb. Steam	Hourly Rates—1600 Lb. Board
A.	Charges based on weight of output. Basis, 275 lb. per hr.	1. Material handling—unloading and piling stock, shop trucking, shipping, scrap handling and overhead	$1.05	$1.05
		2. Inspection—Hot and cold	.35	.35
		3. Interest on rough stock inventory	.15	.15
B.	Charges involved in heating stock.	1. Fuel oil at 6c. per U. S. gal. delivered	.60	.60
		2. Furnace air—Steam turbine with proportionate coal, boiler charges and overhead	.30	.30
		3. Furnace repairs—Labor and material	.25	.25
C.	Charges involving number and wages of men on hammer.	1. Foremen and timekeepers	.20	.20
		2. Compensation insurance, safety and personnel	.20	.20
D.	Charges involving cost of steam to operate steam hammer and electric power to operate board hammer and presses.	1. Coal at $5.60 per ton delivered	1.30	
		2. Proportionate boiler room charges and overhead	1.70	
		3. Electric power at 2c. per kw. hr. and overhead	.05	.40
E.	Charges incurred in operation of machinery.	1. Upkeep, hammer and press—Labor charges	.60	.25
		2. Upkeep, hammer and press—Repair purchases	.70	.35
F.	Charges based on investment.	1. Upkeep buildings, grounds and equipment	.25	.15
		2. Depreciation buildings, equipment and machinery—Insurance and taxes	.70	.50
		3. Administrative, general office, sales and commercial expense	.60	.50
			$9.00	$5.25
G.	Die charges.	1. Die blocks, die labor and overhead	3.00	2.00
			$12.00	$7.25

board hammer. There would be no object in using a board hammer for most jobs of this size, for the investment would probably be about the same; and the production might very likely be less in the larger board hammer than in the smaller steam hammer.

It would appear, therefore, that for work requiring a 2500-lb. steam hammer or heavier, it is desirable to have steam hammers. For work requiring less than a 1500-lb. steam hammer it is admittedly desirable to that board hammers give satisfaction only when they are removed from the vicinity of the steam hammers, and when they have a separate foreman and a separate repair gang, and are otherwise completely segregated from the steam hammers. When this geographical separation is accomplished, then and then only will one obtain really comparable results.

Three Factors of Cost Involved in Study

In figuring the cost of a forging, there are three factors to be considered: viz: material, labor and overhead.

*Dominion Forge & Stamping Co., Walkerville, Ont. Paper presented before American Drop Forge Association at Chicago, June 22.

We will of course assume that the same weight of steel is required for a job, whether it is made in a steam hammer or in a board hammer. The same piece work rate should be paid for a given piece, whether it is run in a steam hammer or a board hammer. We will, therefore, assume that the productive or directly chargeable labor per piece is the same in both cases.

It is evident, inasmuch as the material and labor costs for a given forging are the same, whether it is made in a steam hammer or a board hammer, that the only difference will be in the overhead cost. The only method of computing this cost, which will give a correct basis for comparison, is the machine rate system. Any conclusion reached from a comparison of these overhead costs obtained by the percentage system would be incorrect and misleading.

Assumption of Equality in Hourly Productivity

Although results obtained from a test involving the making of ten million pieces clearly demonstrate the superiority of board hammers in production, we will assume the production per hour to be the same in both cases. If the machine rates were the same for both classes of equipment, the entire manufacturing cost of a forging would therefore be the same, whether it was made in a board hammer or a steam hammer. To solve the problem correctly it is therefore necessary to determine the hourly machine rate for each class of equipment.

In determining the machine rate, consider a production center consisting of the hammer with a press and furnace. The main units will be a 1500-lb. steam hammer in the one case and a 1600-lb. board hammer in the other. We will use a 55½ Toledo geared press and a furnace with a 36-in. opening, with each hammer. Due to the fact that a steam hammer is a unit requiring considerable heavy dismantling, it should be placed in a building equipped with an overhead crane, whereas, in the case of the board hammer, a building having proper arrangements for a chain fall is all that is necessary. This means that the cost of the building per sq. ft. is greater for the steam hammer than for the board hammer shop. A complete analysis of the comparative hammer-hour rates for these two production centers follows:

In tabulating these hammer-hour rates the various charges have been segregated into seven main groups. In the first three groups the hourly charges are the same for both types of production centers, because the production per hour is considered the same for both types of hammer and because it is customary to pay the same piece price for a forging, whether it is made under a steam hammer or a board hammer.

It will be noted in the above tabulation that the phrase "and overhead" has been added in several instances. This is possible, because the actual overhead has been determined for such non-productive departments as the material-handling department, the oil tanks and furnace equipment, the boiler room, and the electrical department. It is very necessary that this be done, particularly in the case of the boiler room, for if this department's depreciation and other overhead expenses are charged to the general plant account, instead of being segregated against the boiler room, machinery which has no connection whatsoever with the boiler room will be charged with a large overhead resulting from boiler operation.

Power Charges for the Two Hammers

Charges under group "D" represent the cost of producing steam for the steam hammer and electric power for the board hammer. The electric power charged to the steam hammer is the cost of the amount required to run the trimming press. It might appear that the boiler room overhead charges are heavy, but a careful analysis of any boiler plant will show that the investment is great, with a resultant large depreciation charge, and that such costs, together with items of repairs and labor, are much higher per hour of operation than is usually estimated, particularly when the plant is running only one shift.

Charges under group "E" are those incidental to keeping the equipment in operation. The cost of operating the steam hammer is much greater than the cost of operating the board hammer, due to the fact that the actual breakage and the cost of dismantling and reassembling hammers after break-downs are more in the case of the steam unit. These figures are based on data collected over several years, and should not vary much in different plants, providing that the equipment is kept in really first class operating condition at all times.

The charges under group "F" are based on the investment involved in the production center, and are naturally higher for the steam hammer than for the board hammer. Under the subdivision (3) has been grouped all administrative, general office, sales and commercial expense. In certain plants where this runs high it is customary to add this as a fixed percentage on the total manufacturing cost. It is assumed, however, that this is the average jobbing forge shop, where these expenses do not run very high, as they might in the plant which carries a standard line of goods such as wrenches, pliers, and other hand tools.

Final Rate Per Hour, With and Without Dies

The final analysis indicates that the hourly rate for the steam hammer production center, without dies, is $9 per hour against $5.25 per hour for the corresponding board hammer.

For the steam hammer the die charge is $3 per hour, against $2 per hour for the board hammer, which charge includes the cost of die blocks, the labor required in their sinking and the proportionate die room overhead. In other words, it represents the cost of dies, should a forging company be obliged to purchase them from an outside concern. The cost per hour is 50 per cent greater in the case of the steam hammer than for the board hammer, due to the fact that a steam hammer is harder on dies than a board hammer. An investigation was made involving about twenty pieces which were run in both classes of equipment. Data collected from this experiment indicated that in general the life of a die was at least 50 per cent longer under the board hammer than under the steam hammer. Adding the die expense to the other expenses brings the final overhead rate to $12 per hour in the case of the steam hammer, compared with $7.25 in the case of the board hammer.

As we have developed both machine rates, it is possible for us to determine the cost of making a certain forging in either type of equipment. An example of such a cost per 100 forgings is given below:

	1500-Lb. Steam	1600-Lb. Board
Material, 205 lb. at 3½c.	$7.18	$7.18
Direct labor	3.50	3.50
Overhead, 60 pieces per hr.	15.00	8.75
Die charges	5.00	3.33
Total forging cost.	$30.68	$22.76

It will be noted that the material and direct labor charges are considered the same in both instances, in accordance with the conclusion developed early in this paper. The difference in the cost is due entirely to the difference in the overhead cost of producing the forgings in the two different types of equipment.

Profit in One Case; Loss in the Other

It is apparent from the above example that, whereas a manufacturer who was planning on forging this particular piece in a board hammer could satisfactorily sell it for 27c., the forge shop which attempted to make this piece in a steam hammer could certainly not sell it for this figure without suffering a severe loss.

Finally, the result of this investigation would indicate that in general it would not be desirable to install steam drop hammers smaller than 2500 lb. There are, of course, exceptions to this statement, but the exceptions are not so numerous as those unfamiliar with the excellent results obtainable on board hammers may think. Keep in mind the fact that the production obtained on board hammers, when they are installed in the same shop with a number of steam hammers, is never equal to the production which might be obtained on those hammers if they were installed in a separate shop removed from the vicinity of the steam hammers.

The Possibilities of Fusion Welding*

Conditions for This Type of Weld —Control of Welders—Test of Welds—Success with Alloy Steels

BY A. S. KINSEY

NO modern mechanical process possesses more encouraging possibilities than the welding of metals by fusion. The welded joint is not of modern conception, and the forge weld undoubtedly dates back to the earliest working of metals. However, the other kinds of welds have been in use less than 20 years. All welding is done by either one of two principles, plasticity or fusion. The forge, the electric resistance and the thermit compression welds depend upon plasticity, while the electric arc, the thermit cast and the oxyacetylene welds employ the principle of fusion. The respective merits of these two methods of making welds are rapidly becoming well understood. Welding by plasticity has accomplished much. We have but to consider the manufacture of ordinary wrought iron and steel pipe to appreciate the value of the forge plastic weld. The speed and non-oxidizing features of the electric resistance weld also have proved to the greatest advantage, as in the making of steel chain for example.

But the plastic weld is limited in its application and is confined almost entirely to mild steel. The fusion weld however has a broader range of usefulness among the metals. Especially is this true of the oxyacetylene weld which is applicable to mild steel, tool steel, high speed steel, the new alloy steels, cast iron, wrought iron, aluminum, copper, brass, bronze, lead, tin, zinc, in fact all of the commercial metals may be welded by the oxyacetylene torch.

Now the possibilities of a good fusion weld depend on high tensile strength, ductility, density, control of the welders, and a proper method of testing welds.

Tensile Strength

The tensile efficiency of a weld is based on its thickness being the same as that of the base metal. This efficiency is of first importance but it must not be obtained at the expense of ductility, that is the bending and stretching qualities of the metal. In the welding of steel, for example, the ductility is of much importance. Again to secure the proper tensile efficiency the welded metal must be thoroughly fused to the sides of the vee of the base metal. One of the best ways of securing a high tensile efficiency, say in mild steel, is to use a welding rod of nickel steel having a tensile strength nearly double that of the base metal. The result is likely to be a weld of higher tensile strength than its base metal. Of course the simple reinforcing of a weld is common practice.

Ductility

The ductility of a fusion weld, particularly of steel, must be considered, although there now are some who would argue that a weld does not need to have bending qualities. One of the best illustrations of the value of ductility in a steel weld is to be found in the manufacture of welded steel tubing, which can be made cheaper than the seamless drawn tubing. In order to obtain small size tubing the practice is to weld the steel in diameters of from 1 to 2 in. and then cold draw these tubes to the smaller sizes desired, some of them being as low as 5/32 in. outside diameter with 1/12 in. hole. It is to be noted that this tubing has an oxyacetylene fusion weld along its full length of many feet, which must be capable of withstanding the strain of repeated cold drawing as the large tube is reduced to the smallest diameter. The weld not only withstands this treatment but also is found to be ductile enough successfully to stand being flattened, crushed, knurled or bent. The welding of the larger size tube is done at the rate of from 3 to 5 ft. per minute with multiple tips in an automatic machine.

Porosity

One trouble with welds has been the lack of homogeneity of the welded metal, and usually the trouble is due to oxides. This applies to all methods of welding but probably less trouble is experienced with the oxyacetylene weld. In most cases the weld must be absolutely nonporous and the density of its metal should be equal to that of the base metal. A fine illustration of what may be accomplished in this direction may be found in some recent designs of electric sterilizing transformers. In this type of transformer a high voltage terminal is filled with a combination of helium and nitrogen gases held at a constant pressure of about 150 lb. to serve as a gaseous dielectric. Of course it is necessary for the pressure of the gas to be maintained constant and therefore the welded joints of the transformers must not allow the gas to leak away. Many attempts were made to weld these transformers, but the welds proved to be so porous that the gas pressure could not be maintained until the oxyacetylene process was brought into use.

Oxyacetylene welding in this case has proved highly satisfactory and the elimination of oxides has been so complete that the weld is absolutely nonporous so far as the use of gas at high pressures is concerned. Other evidences of the nonporosity of the fusion weld may be found in its use in refrigerating systems where anhydrous ammonia plays an important part. In this case the weld must withstand high pungent gas pressures and be absolutely tight. The oxyacetylene weld has been very successful in this regard.

Control of Welders

There must be a better control of welders. We must know more exactly what these men are doing in all of their work. Much attention is being given to this problem at the present time by the American Welding Society. One plan discussed is to require the shop foreman employing welders to have a thorough knowledge of the possibilities of the art so that he may be capable of inspecting the work of the welders from time to time just as he is familiar with and can pass on the work of other mechanics in his shop. The welders themselves should be trained thoroughly to understand the principles of their work by giving them say an evening course in the practical metallurgy of the subject. With these precautions, and assuming them to be of average intelligence and dependability, the danger of poor welds should be greatly diminished. Many oxyacetylene welding schools are springing up over the country and they will undoubtedly accomplish much good in this direction. There is another plan for controlling welders which is being considered carefully and undoubtedly will meet with much success. We speak of the testing of welds.

Testing of Welds

A number of ideas have been suggested for the testing of welds. Some shops require their welders to make sample welds each month which are tested and the results posted on a blackboard for all the shop men to read. This has both its advantages and disadvantages. Another plan is to cut out a section of a weld, where it is practicable, and examine it for fusion and porosity. If the welder does not know just when his work is to be tested, he is likely to be forced to constant care. We know of some cases where

*From an address delivered to the Cleveland Section of the American Welding Society May 6. The author is professor of shop practice at Stevens Institute of Technology, Hoboken, N. J.

welders are being required, after making a good sized weld, to stamp their initials and the date alongside of the job so that there can be no question as to responsibility of workmanship, if the weld fails. The testing of welds is of vital importance and it will be of interest to many to learn that a special committee of the American Welding Society is devoting considerable attention to the question at the present time.

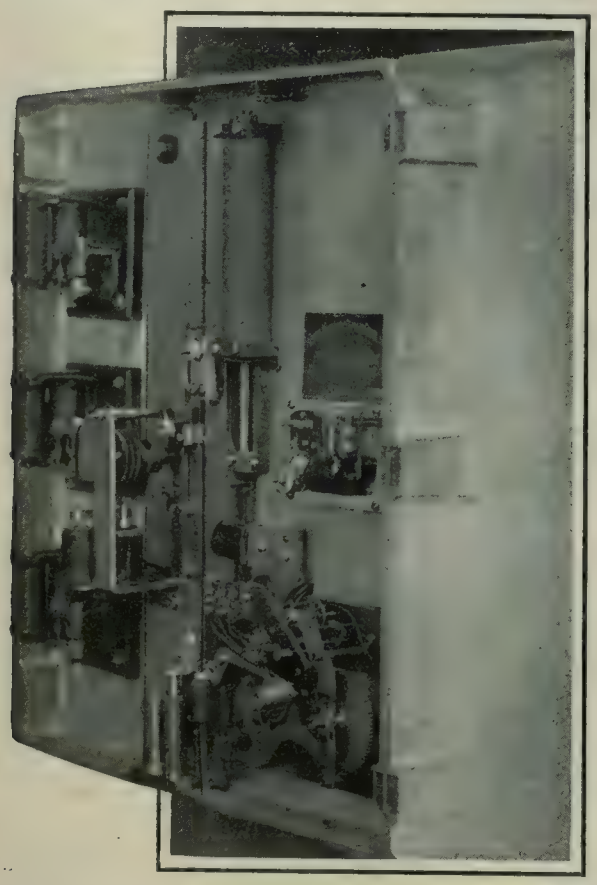
The fusion weld made its debut in the repair shop. During the past 5 years however it has been gradually expanding to the manufacturing plant, where now it is of the greatest value. Its application to the automobile industry is well known. There was a time when nearly all steel tanks were riveted. Now there are millions of them being made each year with all welded joints. The all-riveted locomotive fire box is now being welded. Intricate castings which formerly it was impossible to make are now cast in parts and the parts welded together.

Fine success has been obtained in the experimental welding of steels such as nickel, chromium, tungsten, cobalt and vanadium. The depositing of alloyed steel on cheaper base metals where intense heat and wear are concerned has been successfully accomplished by the oxyacetylene torch. This is opening up a fine new field for fusion welding and making available certain applications of alloyed steels which were not practicable before.

SAVING ELECTRIC CURRENT

Automatic Device for Steel Furnaces for Which Large Economies Are Claimed

An automatic fuel saving device for electric furnaces has been invented and patent applied for by Edward T. Moore, electrical engineer Halcomb Steel Co., Syracuse, N. Y. The inventor states that the use of this device by his company, which produces electric steel on a large scale in several different types of furnaces, has saved about $1,500 each month since they were installed or from October, 1919, to Jan. 1, 1921. A description of the apparatus furnished by the inventor follows:



The Moore Automatic Fuel-Saving Device for Electric Steel Furnaces

The device is known as a maximum demand regulator, in connection with which is also a device known as a maximum demand meter. The regulator when properly connected in the main power circuit will be actuated according to the variations of power. The device has one element which rises at a rate depending upon the rate of consumption of energy, another element operating independent of the first element, but located so as to co-act with same under proper conditions, responding only to a time basis. In other words, it is actuated by a contact closer which makes contact every 15 min. or half hour, depending upon the basis upon which the power is purchased.

Assuming, therefore, the contact to be in its normal position of the time element, with the contact of the energy element somewhat below it, it will be appreciated that as the contacting energy element rises, it will eventually come into contact with the time element, provided the rate of energy consumption is great enough to cause this action. When contact is made, relays interposed in the circuit are actuated, causing a definite fixed resistance to be inserted across one of the circuits of the furnace regulator panel located at the electric furnace. This amount of resistance which can be inserted automatically, can be so adjusted as to cause a load reduction on any one furnace or all furnaces in an installation, and causing a load reduction on each furnace of a predetermined amount. Therefore, when a maximum demand occurs for which the regulator is set, the load is automatically cut on the furnaces at a predetermined amount, said amount being adjusted to a value which will not slow down production or increase the length of the heat being made in the furnace.

Operating coincidentally with the energy element is a pen device which will trace upon a chart driven by a suitable clock, the progress of rise of the energy element during the demand period, about 15 min. At the end of the 15-min. period, suitable contact is made by a clock restoring both the energy element and the time element to their normal position ready to begin another operation. It will thus be seen that the pen will trace upon the chart the maximum demand during any demand period, which can be read off directly in kilowatts if desired, thus eliminating some of the objections of some of the present demand meters.

At the works of our company we have had one of these regulators installed since Oct. 1, 1919, and up to Jan. 1, 1921, we have saved conservatively $1,500 per month. There have been months when we have saved over $2,000 by the use of this device, simply because the demand had been kept down some months over 2000 kw., and, as we pay a demand charge of $1 per kw., the apparent savings will result. Since Jan. 1, 1921, we have been operating only one furnace part of the time, so, naturally the savings can only be in proportion. The power bills during normal production run as high as $25,000 per month, and even greater savings than those indicated might be effected, it being possible to cut the load on the furnace a greater amount than we are doing at present.

On a 6-ton Heroult furnace drawing a normal load of 150 kw., the amount of cutting at the time of peak load can be conservatively fixed at about 400 kw., but during refining, when the normal load is only about 400 to 500 kw., the amount of cutting can not be much greater than 75 to 100 kw. Otherwise, the input into the furnace would be so reduced during the cutting period as to seriously affect the temperature within the furnace, having a deleterious effect upon the steel. The device inherently takes care of this load variation, that is, cutting a relatively large amount when large consumption obtains during melting, but cutting only a small amount relatively when a small load is being taken during refining.

Electrical Cleaning of Blast Furnace Gases*

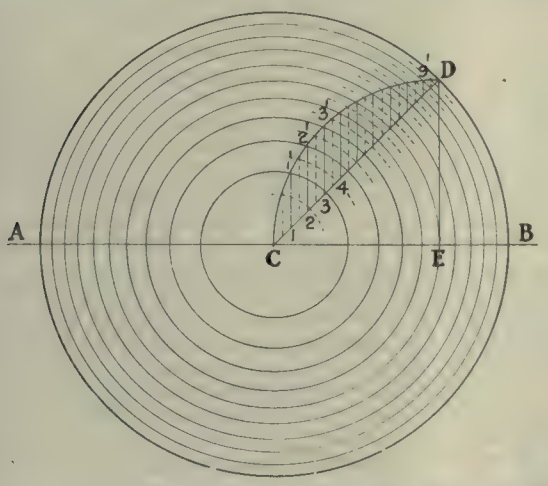
What the Problem Is — Why Present Methods Fall Short of Desired Results— How the Electrical Screen Does Its Duty

—BY N. H. GELLERT†—

IN November, 1919, a paper was read by the writer at the meeting of the Philadelphia section of the Association of Iron and Steel Electrical Engineers on the general subject of "Electrical Cleaning of Gases as Applied to Blast Furnaces." Since that paper was read there have been several changes in the electrical cleaners at the two plants where they have been installed, at Dunbar, Pa., and at Sheridan, causing a decided improvement in the operation of both plants. As a matter of fact, Sheridan has been put into operation since the last paper was read. Naturally, as time goes on, a great deal is learned that is new. Methods and apparatus are therefore developed to further the art of electrical precipitation. It is with this in view that the writer will endeavor to discuss, not so much the actual physical plants now operating at blast furnaces with electrical cleaning apparatus, but methods and features which enter into the general problem of investigation and adaptation of electrical cleaning to blast furnace gases.

General Gas Cleaning Problem

In general the problem, including that of other gases besides those that issue from a blast furnace, may be split into two parts:



To Lay Out Concentric Rings of Equal Area Within a Pipe: On horizontal line AB lay off the diameter of pipe to scale. Draw the circle corresponding to the pipe and through the center C erect 45 deg. radius CD. At intersection D drop line DE perpendicular to line AB. With intersection E as center draw arc of circle CD. Divide radius CD of large circle into desired number of equal parts. Project these points to the arc CD and parallel to DE, intersecting at 1', 2', 3', . . . 9. With C as center draw circles of radii, C1', C2', C3', etc. The annular rings between these circles will be of equal areas. For velocity measurements the Pitot tube should be located at the mean velocity radius of each ring. These radii are determined by laying off on radius CD the points midway between 1 and 2, 2 and 3, 3 and 4, etc. These are projected, parallel to DE on the arc CD. This point of intersection, with C as center, fixes the radius.

1. The cleaning of non-combustible gases,
2. The cleaning of combustible gases.

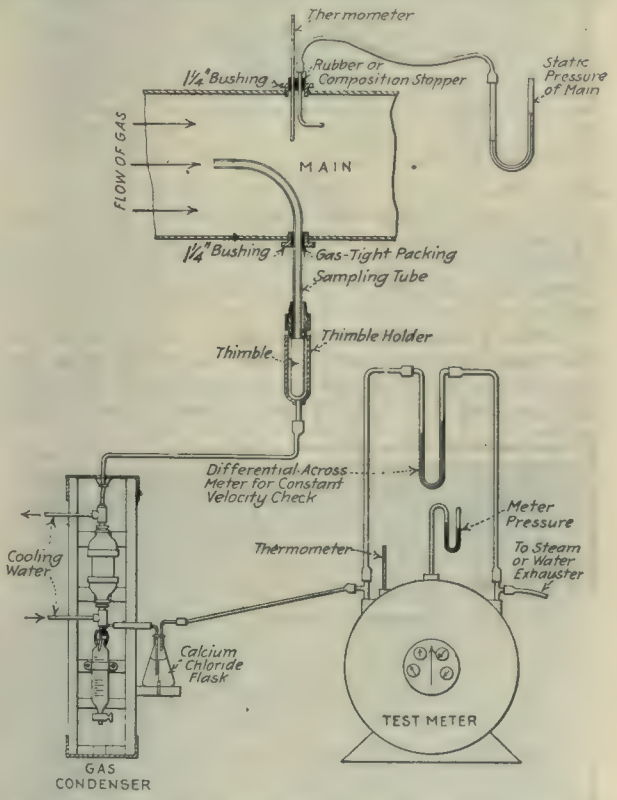
Non-combustible gases usually issue from furnaces or stacks in which gas either has been utilized for combustion purposes or the non-combustible gases are driven off by heat primarily as inert gases.

Combustible gases, in the second part of the general problem, include gases used for industrial purposes, manufactured in producers, in coal gas and water gas plants and also gases issuing from the blast furnace.

In general, blast furnace gases contain 2 to 10 grains of dust per cu. ft. of gas at standard conditions of temperature and pressure, namely at 62 deg. Fahr. and 29.92 in. of mercury, which is atmospheric pressure. This dust exists in the form of both dust and fume. The fume is so finely subdivided, however, that in a great many respects it acts as a perfect gas. To determine how to apply a cleaner to the blast furnace gas, there are at least four things which must be investigated:

1. Temperature,
2. Velocity and volume,
3. Dust content,
4. Moisture content.

It is evident that, since the measurements are made under the most difficult conditions, usually out in the open air and under a varying condition of load with variations in temperature, velocities, dust content and moisture content, the data must be taken over a long period of time if they are to be of any real value. In addition, inaccuracies will be encountered in the actual measurements, due to the fact that it is not as a rule possible to take them under the conditions necessary for extreme accuracy. Nevertheless, the measurements obtained give sufficient information to make it possible for a blast furnace operator to get a fairly good indication of what he is doing, and how to correct any conditions that need correction.



Typical Gas Sampling and Measuring Setup of Instruments

Determining Velocity and Volume of Gas

To make a volume determination a Pitot tube of a standard type, a manometer tube, rubber tubing, some boards and nails, measuring rule and a few tools are necessary. A gas measuring station location should be selected in the gas main where the most uniform gas flow conditions are approximated. The conditions are always adversely affected by bends, connections, offtakes, explosion doors, manholes, etc. It is seldom that a station can be selected in blast furnace gas main systems which will give the ideal flow conditions

*Abstract of paper read before Cleveland section of Association of Iron and Steel Electrical Engineers, Cleveland, April 11.

†President Gellert Engineering Co., Philadelphia.

assumed in theoretical discussions. If a straight portion of main can be found, four to ten times the diameter in length and without valves, offtakes or some other interfering object, the conditions may be assumed to be good for gas measurements.

After this station has been located, it is necessary to determine the inside dimensions of the main in which the flow of gas is to be measured. If the main is horizontal, care should be used in sounding the inside bottom of the main for any deposits of flue dust which may reduce the total cross-sectional area. The area of the circular main should then be calculated.

Velocity of gas flowing through the main is greater at the center than near the walls. Therefore, to get the average gas velocity, it is necessary to take a large number of velocity readings across one or (preferably) two diameters of the main. By dividing the main into equal areas it is possible to get the average main velocity in the simplest way, and with the least expenditure of time. The average velocity of the total gas flow will be the average of the velocities obtained at the mean velocity points of the equal area zones.

If the main is very large and great accuracy is required in the measurements, twenty equal area zones should be used instead of ten. If less accuracy is

Table 1—Ten Area Percentage Table

Diameter and radii of concentric rings for equal areas. Mean velocity points located both as radii percentages and percentage distance from side of pipe. Areas numbered out from center. Inside diameter of pipe equals 100 per cent.

Area	Diameter	Radii as Percentage of Pipe Diameter	Mean Velocity Point Percentage of Pipe Diameter Radii	Distance from Side
1	31.6	15.8	11.2	38.8 and 61.2
2	44.7	22.4	19.4	30.6 and 69.4
3	54.7	27.4	25.0	25.0 and 75.0
4	63.2	31.6	29.6	20.4 and 79.6
5	70.7	35.4	33.5	16.5 and 83.5
6	77.5	38.7	37.1	12.9 and 87.1
7	83.7	41.8	40.3	9.7 and 90.3
8	89.4	44.7	43.3	6.7 and 93.3
9	94.9	47.4	46.1	3.9 and 96.1
10	100.0	50.0	48.7	1.3 and 98.7

permissible, and for ordinary sized mains up to 3 or 4 ft. diameter, only five equal areas need be used. A graphical method of laying out any number of equal concentric areas in a section of a circular main is shown. The directions for doing this are given in the caption.

Tables 1 and 2 give the data for laying off a circular main into ten equal areas, and also into five equal areas, and also show the distance of the mean velocity point for each concentric area from a given



Experimental Apparatus Set Up for Demonstration Purposes



Side View of Experimental Apparatus, with Screen Removed Which Normally Guards the High-Tension Connections

point inside of the main. In all this discussion, this point inside of the main, when used in making measurements, is the inner edge of the lining at the point where the Pitot tube is introduced into the main.

The central area of the main will have the cross section of a circle, while all the other areas will be annular cross sections of varying widths. The outermost ring, closest to the pipe, has the smallest width, while the innermost ring, closest to the center, has the greatest width. This, of course, results from the requirement of having equal areas. When accurate measurements are required and nearby bends or connections cause swirls and eddies in the main, two traverses should be made in the main at right angles to each other, one vertical and one horizontal. For this purpose two holes are made in the main on diameters at right angles to one another. The Pitot tube is inserted first through one of the holes and then through the other.

Under normal conditions of blast furnace operation, the following simple formula, which has been used with sufficient accuracy for air measurements, will be found to apply without appreciable error to blast furnace gases.

$$V = 2.9 \sqrt{TH}$$

V = the gas velocity in ft. per sec.

T = absolute temperature in deg. Fahr. $(t + 460)$ (more closely 459.6)

H = velocity head in inches of water.

This holds true because the density of blast furnace gases is almost identical with that of air. Ordinary

Table 2—Five Area Percentage Table

Diameter and radii of concentric rings for equal areas. Mean velocity points located both as radii percentages and percentage distance from side of pipe. Areas numbered out from center. Inside diameter of pipe equals 100 per cent.

Area	Diameter	Radii as Percentage of Pipe Diameter	Mean Velocity Point Percentage of Pipe Diameter Radii	Distance from Side
1	44.7	22.4	15.8	34.2 and 65.8
2	63.2	31.6	27.4	22.6 and 77.4
3	77.5	38.7	35.4	14.7 and 85.3
4	89.4	44.7	41.8	8.2 and 91.8
5	100.0	50.0	47.4	2.6 and 97.4

air at 32 deg. Fahr. and 29.9 in. mercury weighs 0.0807 lb. per cu. ft., and blast furnace gas under the same conditions will weigh between 0.0794 and 0.0819 lb., depending upon the kind of ore used and the furnace practice. Furthermore, the pressures found in blast furnace mains beyond the first dust catcher seldom

exceed 6 in. of water above atmosphere, which corresponds to only 0.22 lb. per sq. in. added to the normal atmospheric pressure of 14.7 lb. per sq. in.

After a series of Pitot tube readings are made in each one of the ten equal areas, the same kind of measurement is made at right angles to the original measurements. This enables the investigator to get the average velocity of each area. By averaging the velocities of the equal area zones, he can get the closest approximation to the main velocity, and consequently the volume of the gases passing through the main. The formula for the volume is

$Q = 60\,AV$

Where Q = the volume in cu. ft. of gas flowing per minute
V = the velocity in ft. per sec.
A = the inside cross section of the main in sq. ft.

Methods of Cleaning Blast Furnace Gases

Two general methods of cleaning blast furnace gases are in use:

1—Wet cleaning,
2—Dry cleaning.

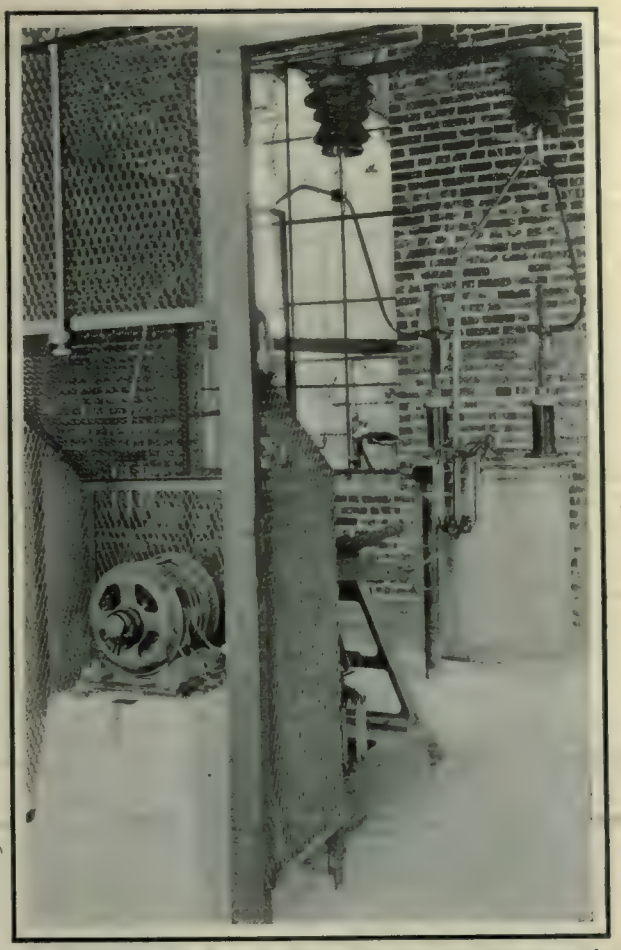
A great deal of money has been spent in developing wet cleaning methods, and a great many wet cleaners are now installed on blast furnace plants throughout the country. Nevertheless, because of certain fundamental undesirable factors, there has been a tendency on the part of operators to get away from wet cleaning and to go to dry cleaning. The main objections to a wet cleaning process are:

1. Loss in sensible heat, due to the reduction of temperature of the gas when using large quantities of water, which are necessary in order to get the best results from this method. A table taken from Mr. Diehl's paper, before the American Institute of Mining Engineers in 1914, shows that nearly 8 per cent greater B.t.u. exist because of the sensible heat in unwashed blast furnace gas at 400 deg. Fahr. and with 35 grains of moisture per cu. ft., as compared with washed gas at 70 deg. Fahr. and with moisture saturation at 70 deg. When using 625 tons of coke per day, at a 500-ton blast furnace, about 50 tons of coke might have been saved per day. At $6 per ton, a saving of $300 per day for 300 days amounts to $90,000.

2. The second objection is the pollution of streams. It has been found that, at several blast furnace plants, fish life and bacteria are eventually destroyed in those streams where the effluent of the washer is discharged. This has resulted in some places in enjoining furnaces from discharging the effluent into the streams. In other places, it has resulted in controversy. The trend of municipal and state authority is toward the prohibition of discharges dangerous to fish life. The elimination of this possible contention is advisable.

3. Wet washers often are not very efficient. The result is, especially where there is much fume in the gas, that the washer does not remove the fume and dust to a sufficiently great degree. The dampened particles of fume and dust deposit in the stove burners and in the boiler burners and, because of their hydraulic qualities, stay in the burners until they become a hard mass, which eventually has to be dug out with chisel and hammer. At some plants, this is a real nuisance and causes money losses due to the necessity of shutting down the stoves and boilers and cleaning them.

4. Another objection is the necessity for large quantities of water. This means a large pumping plant, maintenance and repairs of pumps, a great deal of moving machinery and a large source of supply of water. This is not always available, and more than



Each Motor Is in a Cage Where It Can Be Reached, the High-Tension and Transformer Connections Being Behind the Screen



One Unit of Apparatus Includes Switchboard, Transformer, Rectifier and Motor

one plant has not gone to cleaning its gases, because of its inability to get water.

Throughout this paper, it must be understood that the cleaners discussed are not secondary cleaners or intensive scrubbers, but are primary cleaners, used to remove dust from the gases to such a degree that the gas may be burned effectively in the stoves and boilers, and not at all intended for the cleaning of gases for gas engine purposes.

Dry Cleaners Used Abroad

Practice in Europe has been somewhat different, as there were early efforts to develop dry cleaners. As a matter of fact, dry cleaners have been operating



Dust and Fume Coming Out with the Current On

in Europe for some time, and have been mainly objectionable from two standpoints:

1. Their high cost,
2. Possible damage to the cleaner.

While the cleaners built in Europe (of the bag type) cleaned the gas more effectively than any primary cleaner could, and even went so far as to prepare the gases for gas engine purposes, the bags, being inflammable, necessarily were subject to destruction whenever the heat put through the cleaners exceeded the safe limits of their material. The high cost of installation of this type of cleaner also militated greatly against their adoption, and perhaps was the chief reason why such dry cleaners were not installed in this country. And the sensible heat lost in cooling the gas robbed it of a great deal of the economies which might be obtained were the sensible heat retained.

With dry cleaners able to pass the gas without any considerable reduction in temperature, there is to be added to the efficiency caused by the cleaning of the gas, the efficiencies effected by the use of the sensible heat. Certain difficulties, however, in the cleaning of gases by the dry process must be taken care of.

Any screen type of cleaner which attempts to filter out particles of dust and fume, even when the filtering medium is not destroyed by the normal heat of the blast furnace gas, must be sufficiently fine in nature to present a hole smaller than the finest particle of dust and fume going through, in order to remove successfully the objectionable solid material in the gas. If the screen is so fine that it will remove the particles of fume, the back pressure will be high and the screen will clog up quickly. If the screen is designed with apertures large enough to prevent any considerable back pressure, the fine particles of fume and dust will go through. The problem, therefore, of screening the fume and dust out of the blast furnace gas is not a simple one.

This same difficulty was encountered during the war in the elimination of mustard gas, existing not in the form of gas, but in the form of dust and fume of a very fine nature. When the mask was made with a filter fine enough to keep all of the mustard gas out, breathing was exceedingly difficult. When the mask permitted easy breathing, mustard gas fume at times penetrated it. The American Chemical Warfare Service, at the time of the armistice, had developed an apparatus for removing the danger due to the inbreathing of mustard gas, and the difficulty of breathing through a very closely packed filter. The apparatus which the Service decided to try out was exactly, in principle, the one kind of apparatus now being applied to dust and fume collection from blast furnace gas.

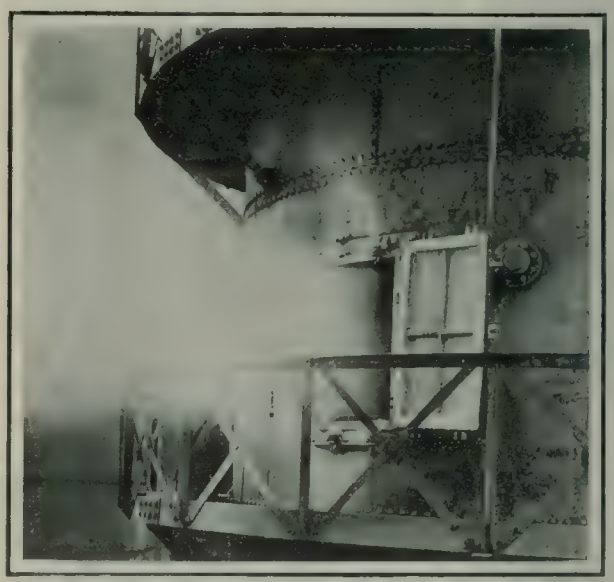
Handling of Hot Gases

It is evident that conditions arise when the gas discharging from the furnace top is very hot, and it is impossible to utilize any system of dry cleaning without destroying the cleaning medium; for instance, in the manufacture of ferromanganese, the gases discharging from the furnaces have temperatures running as high as 1500 deg. Fahr. As steel glows red hot at temperatures of this kind, some necessity arises for cooling the gas to such a point that destruction of the steel does not take place.

As a matter of fact, both at Dunbar,* and Sheridan,† where ferromanganese is made, the problem has been a very serious one. It has not been a question of whether the cleaner could operate or not at such temperatures, but simply of whether steel could maintain its strength or not under such conditions of stress. As all steel men well know, the strength of steel drops very rapidly with the increase of temperature, until at about 1500 deg. the strength is less than one-quarter of the original strength.

Some means must be devised to cool the gases to such a point that they may be safely passed through the cleaner. This problem is not at all present in furnaces manufacturing pig iron, as the temperatures rarely run over 400 to 500 deg., though in exceptional cases they may reach 700 to 900 deg. Steel can be made to stand this strain.

With the hotter gases, however, it is necessary to design coolers that will function without the addition



Dust and Fume Coming Out with the Current Turned Off

of moisture to the gases. If it is desirable to cool the gas from 1300 deg. to 400 or 500 deg., so as not to lose the sensible heat in the gas at this lower temperature, care must be taken not to add water for cooling purposes, as the amount of water present when the gas is saturated at 400 deg. is so great that it would seriously handicap combustion in the stoves and boilers. A cooler, therefore, must be of such type that the heat is transferred from the gas into the water through tubes and not by direct contact.

Electrical Gas Cleaning

Electrical cleaning of gases, as developed several years ago by Dr. F. G. Cottrell, is a very simple process making use of a few fundamental facts in physics. The principle involved is not difficult, and can most easily be understood by conceiving of a gas

*American Manganese Mfg. Co. †Lavino Furnace Co.

passing through an invisible electrical screen so fine that the finest particle of fume cannot pass through, yet occupying no space, having no material body and consequently presenting no source for back pressure. It is by means of this electrical screen interposed between the outlet of the furnace and the inlet to the hot stoves and boilers that blast furnace gas may be cleaned of its dust and fume content to a degree finer than any mechanical screen can clean it without considerable loss in back pressure.

The reason for this is that the electrical screen is woven, not of wires, but of lines of electrical force. The threads of force constituting the screen are so closely knit together that a substance must drop below its molecular form to get through, when conditions are correct for the screen to operate. Yet these lines of force, having no material body, do not interrupt the flow of gas, on which they have no effect whatever. In a simple manner, the action of an electrical cleaner may be described as follows:

The gas is conducted upward through a vertical pipe. An electrode chain or wire, suspended vertically in the exact center of the pipe, is held taut by a weight at the bottom. This electrode is charged with high tension unidirectional current. It therefore must be suspended on the proper insulators, which are capable of withstanding the potential under which they are impressed. The pipe itself is grounded.

Dirty gas, passing through the pipe and coming into contact with the charged electrode, becomes ionized. As the electrode is negatively charged, and has a corona discharge due to the high potential impressed upon it, the ionization of the gas is rapid and thorough. The gas molecules carry the charge to the dust particles, which for the most part are negatively electrified, since the electrons prevail in the gas. Immediately upon being charged, the dust and fume particles are repelled by the electrode and are deposited on the sides of the pipe, which interrupt their flight from the chain.

Within the pipe, therefore, there are three forces in action. There is a vertical force due to the velocity of the gas, which is carrying the dust and fume particles upward. There is the force of gravity, which tends to carry the dust particles downward. Since the force due to the upward velocity of the gas is much greater than that due to the action of gravity, the resultant of these two is a vertical force upward. The third force is that caused by the charging of the dust particles through the ionization of the gas. This is a horizontal force, as the action of repelling the particles from the chain is at right angles to the chain.

The resultant of these two final forces is the diagonal of a parallelogram, having both these forces as sides. If the vertical force is very great, too great for the particular pipe described, the horizontal force may not be sufficient to cause a resultant that would precipitate the particles of dust to the sides of the pipe. While the particle of dust would be acted upon by the horizontal force, the resultant might be such that the particle would not travel to the side of the pipe within its length.

Application of Theory to Practical Conditions

The problem, therefore, in electrical precipitation is to regulate the vertical force so that it is not too great, and to make the horizontal force sufficiently great to form a resultant which will precipitate the particle of dust to the side of the pipe. The principle is not simply one of ionization and is not one of magnetism. The particle of dust does not stick to the side of the pipe because of the magnetism caused by the corona discharge and gas flow, but because it is held there fast by the resultant electrostatic force acting upon it throughout the entire period of operation. It is as though an arm had extended diagonally from a point on the electrode and pinned the particle of dust to the side of the pipe with a finger, and were holding it there without letting go.

Control of the vertical force is, of course, made in the design of sufficient cross sectional area in a precipitator to give what has been found to be the best velocity of the gas for precipitation purposes. To get the horizontal force necessary for precipitation is a question of design of electrical equipment. The voltage that can be impressed on the electrode is limited by the gap between the side of the pipe and the electrode. This has erroneously led to the assumption that the bigger the pipe, and the greater the voltage that may be impressed, the stronger the force that may be secured to act horizontally. This is not true, as the force varies inversely as the square of the distance between the object to be precipitated and the electrode, so that even with higher voltage, the impressed force on the particles may be less than with lower voltage.

To develop the current which will do the work necessary in an electrical cleaner, certain electrical apparatus has been specially developed. The larger electric companies have spent a great deal of money in the research work necessary to develop apparatus wholly dependable under the severe conditions of usage in this work. The pieces of electrical equipment, however, are few in number, and are divided into units.

One unit consists of a switchboard, transformer, rectifier and motor, and the necessary insulators and conductors for getting current into the precipitator. The switchboard is a special panel having on it a circuit breaker, ammeter, voltmeter, double-throw, double-pole switch, set of sockets for voltmeter blocks, three-pole starting switch, and a five-point transformer switch. Back of the panel are the starting rheostats for the synchronous motor, and below are the resistances in series with the transformer. All connections on the panel are of low tension.

All the high tension connections are inside steel guard work, to prevent the operator from coming in contact with the high tension equipment. The circuit breaker is used to break the transformer primary circuit when the voltage exceeds a safe limit for the transformer, while the double-throw switch underneath the instruments is used to cut in the line on the right polarity. The five-point switch is used to obtain a different transformer ratio without leaving the operating position at the switchboard, and without the necessity of going into the high-tension room to make any change in ratio.

The rectifier consists of a rotor and a stator, the former revolving in direct unison with the synchronous motor, as the motor is directly connected with it by a coupling. Since the four-pole synchronous motor, running on 60 cycles, revolves at 1800 r.p.m., and since there are 3600 cycles in each minute, there are two cycles of alternating current to every revolution of the motor, and consequently of the rectifier. The latter acts much the same as an armature on a direct current generator, since it is acting in synchronism with the revolutions of the motor, and consequently with the alternating current.

It is always desirable to apply negative current to the precipitator, and consequently to the transformer and rectifier, if the polarity is right, as may be determined by the method to be described later.

Of special interest is the transformer built for precipitation purposes—very compact, although considerably larger for the same power output than are transformers used on lower voltages. Great care is used in the selection of the silicon sheet steel, cut into strips for the transformer coil laminations, and annealed and treated so that they may be successfully used in the high tension transformer. The low tension coils are wound of copper wire, usually of rectangular cross section covered with a double layer of cotton. If these coils are wound for several voltages, as they are for precipitation transformers, two layers of windings are made with the taps distributed along the middle length of the outer layer. In transformers in use for blast furnace precipitation there are five taps.

Insulation between the high tension and low tension circuits consists of a black varnished material similar to cambric, and is usually wrapped to a thickness of nearly ¼ in. The high tension coils are then assembled in specified order, with the proper insulation over the low tension coils or, in some designs, beside them, after they have been independently wound and insulated.

This portion of the transformer has engaged pos-

sibly the most serious and careful attention of the designer. The service represented by the Cottrell precipitator with a mechanical rectifier in circuit is the most severe which can be imposed upon a transformer. There are about eighteen separate coils in the high tension winding of the usual sized transformers used in precipitation work. These may be divided into the following groups:

1. The buffer or end coils.
2. The intermediate group.
3. The main winding proper.

The buffer or end coils are supposed to receive the most severe electrical strains. Undoubtedly, they do receive the extreme effects due to a very steep electrical wave front impinging on the transformer windings, and accordingly they are provided with extremely heavy insulation between turns.

Some special features in connection with the development of the equipment for precipitation are present in the installation erected at Sheridan. The electrical house, as originally built there, was of brick, 22½ ft. square. It was built independently of any other building but, after it had been erected, one end wall was torn down and the house in which the generator sets were placed was built on to it, so that the whole electrical equipment would be together. These generators were used not only for furnishing power to the precipitator sets, but also for furnishing power to the cars at the bins, supplying the skip hoist. The house was built on an embankment which brought it on the level with the operating platform of the precipitator. There is sufficient room inside of the house for a duplicate set of equipment should that later be desirable.

The three major insulators placed in the high tension compartment, which are the only insulators exposed to the gas, are of the floor bushing type. It is necessary to clean these about once a month. To make it possible to get at these without shutting off the gas from the precipitator, the compartments are equipped with small valves which can be quickly closed, and small doors which can be readily opened. The operator, standing in the open air and extending his hand into the compartment, can readily clean the insulator in a short time. The adoption of this type of insulation has made it possible to operate much more continuously than before, when there were thirteen insulators on the inside of the precipitator, and when cleaning these insulators necessitated the complete shutting down of the plant and the cooling of the precipitator.

Results obtained both at Sheridan and at Dunbar have been satisfactory; at Sheridan, particularly. The precipitator there has been operating continuously and collecting approximately 5000 lb. of dust per day from approximately one-half of the gas output of a 250-ton furnace.

This dust is extremely fine in nature and ignites on exposure to air. It has consequently been impossible to determine the fineness of the dust, as it sinters as soon as it is dumped, and screen tests taken after the dust has cooled off do not indicate the condition of the dust when collected.

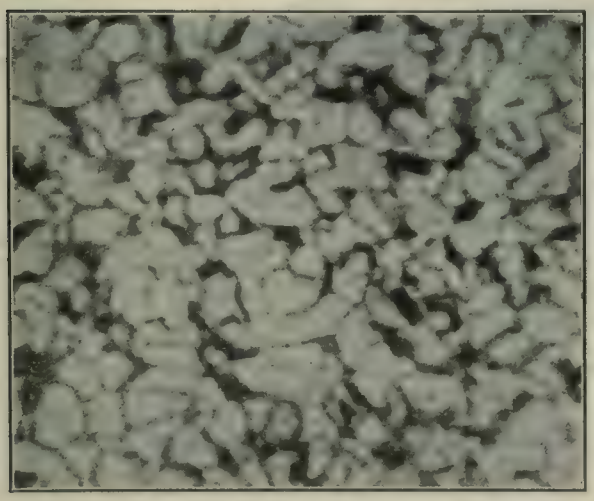
When tests were made on the Dunbar plant, running on pig iron, before it was turned on ferromanganese, the indications were that the precipitator could clean ordinary gases from a pig iron blast furnace to less than 0.1 grain. The two plants now running have clearly indicated that electrical precipitation is on the right road as an effective method of cleaning gases from blast furnaces.

Embrittling Effect of Pickling Upon Carbon Steel

Study of Grain Sizes Shows That Pickling Increases Width of Junction Lines Between Grains

BY C. J. MORRISON*

THE fact has been known for many years that steel after being subjected to pickling processes showed a tendency to brittleness. This embrittling effect is particularly noticeable in wire, small rods and thin sheets



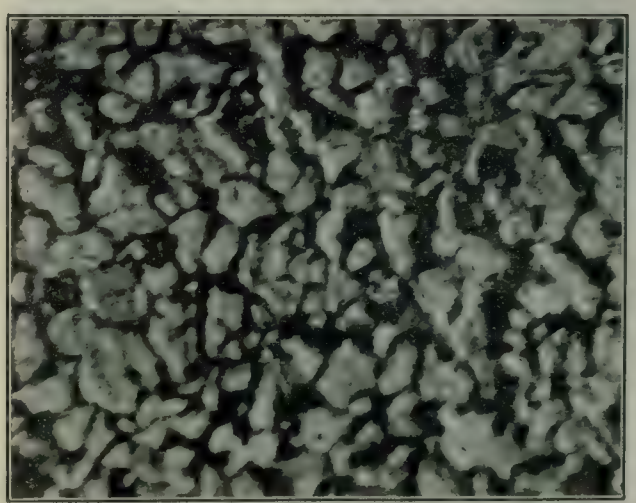
Photograph No. 1 Shows the Sheet as Received

and sometimes renders the metal unfit for use in certain products.

Experiments showed that the steel would apparently return to its original condition if raised to a temperature of about 300 deg. Fahr. and held at that temperature for a few minutes. Many theories have been advanced to explain the phenomenon, but it remained for the microscope to show exactly what takes place in the metal.

An ordinary black sheet 30 x 32 x 0.058 in. was pickled by the sulphuric acid process and then baked for 15 min. at a temperature of 300 deg. Fahr. Samples for the microscope were taken from the sheet as received, after pickling, and after baking, and photographs, here reproduced, were made to show the structure.

The changes that have taken place are clearly shown and the fact that No. 1 and No. 3 are almost identical shows that the metal has been restored to its



Photograph No. 2 Was Taken After Pickling But Before Baking

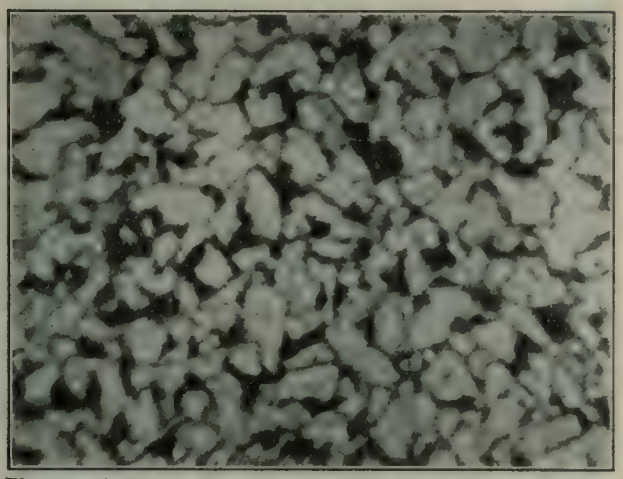
*1156 Carlyon Road, Cleveland.

original condition. An analysis of the micrographs shows what has taken place.

In No. 1 the grain size is 0.0007019 in. and the width of the junction line is 0.0000274 in. The scleroscope shows 31 to 32 H.

In No. 2 the grain size is reduced to 0.0006805 in. while the width of the junction line has increased to 0.0000640 in. This increase in the width of the junction line should be particularly noted. The scleroscope shows no change but gives 31 to 32 H.

No. 3 is practically the same as No. 1 and shows a grain size of 0.0007141 in. and the width of the junction line is 0.0000274 in. Again the scleroscope shows practically no change but gives 29 to 31 H.



Photograph No. 3 Shows the Condition After Baking for 15 Min. at 300 Deg. Fahr.

This analysis shows conclusively that the brittleness is due to the increase in the width of the junction line and also that the baking restores the metal to its original condition.

The micrographs were prepared and the analysis made by C. G. Zanzinger, metallurgist, Atlas Tack Corporation, and to him should be given the credit for solving the perplexing problem of brittleness.

Coal Handling Plant for Melbourne Proposed

WASHINGTON, Aug. 9.—The railroad commissioners of the State of Victoria, Australia, have strongly advocated the erection of a thoroughly modern coal-handling plant at Melbourne, reports Trade Commissioner A. W. Ferrin. It is understood that a site will be selected near the Victoria dock. The estimate of the cost is £150,000 and the provisions for this expenditure will be made in the railroad loan application bill, to be introduced in the State parliament early in the session.

Technologic Paper No. 191, of the Bureau of Standards, entitled, "Some Factors Affecting the Life of Machine Gun Barrels," gives star gage measurements on six machine gun barrels at various stages of firing which indicate that, when the life limit is reached, exhaustion is due to a combination of the abrasive action of the bullet and the abrasion of gases. Amorphous martensite on the surface of the bore has been reproduced by the high temperature from an electric arc, its formation being due to the extremely rapid cooling caused by the large mass of cold metal near the highly heated surface. Cracking of the bore is due to dimensional changes of the hardened brittle surface of the steel resulting from the variations in temperature between separate shots. The cracks originate at irregularities of the surface of the bore.

Scrap metal and iron and steel will be sold through sealed proposals by the salvage division of the arsenal at Rock Island, Ill., bids to be received not later than 2 p. m., Aug. 15. Over 500 tons will be disposed of.

MORE STEEL UNEMPLOYMENT

Falling Off in Business Reflected in Men Out of Work

WASHINGTON, Aug. 9.—Decrease of 24,816 employees in the iron and steel industry in July represented a decline of 7.6 per cent when compared with June, according to figures of the United States Employment Service. Those engaged in this industry constituted 21 per cent of the total employed in 14 groups. In metals and metal products, other than iron and steel, the decline was 1300 workers, or 1.8 per cent. The survey, covering 1428 firms in 65 large industrial centers, each firm normally employing 501 or more, the total being 1,600,000, shows a net decrease of 16,914, or 1.1 per cent on the payroll at the end of July. The net decrease in these same establishments since Jan. 31 has been 117,924, or 7.3 per cent.

Industrial classifications showing increase in employment are vehicles for land transportation; railroad repair shops; leather and its finished products; textiles and their products; lumber and its manufactures; tobacco manufactures and paper and printing. All other classifications show a decrease, the largest decline in unemployment having been in a prominent iron and steel center, Youngstown, Ohio. Amounting to 4,927 workers or 22.8 per cent, this reflects the inactivity of the chief industry in that city.

Iron and steel and metal lines stand out, throughout the report as the darker side of the industrial situation. From mining to manufacturing, the entire industry in all its ramifications has felt the full force of the existing industrial depression. As a result, serious unemployment continues in a great number of inter-related industries and in widely separated sections of the country. The outstanding causes are held to be a falling off in the foreign demand and continued listlessness of the domestic market, creating an almost unprecedented lack of orders.

Analysis of the returns seems to indicate that in the majority of instances where there has been improvement in the employment situation, it is primarily traceable, directly or indirectly, to the harvest and other seasonal agricultural activities. Secondarily, and to some extent as a natural corollary, there have been material gains in railroad occupations, principally in those which have to do with repairs to rolling stocks and roadbeds. Despite an obscured outlook there is manifest a general optimism, which everywhere agrees as to the certainty of an approaching business revival and varies only in the predicted time it is destined to arrive.

Value of Manganese Ore Affected Freight Rate

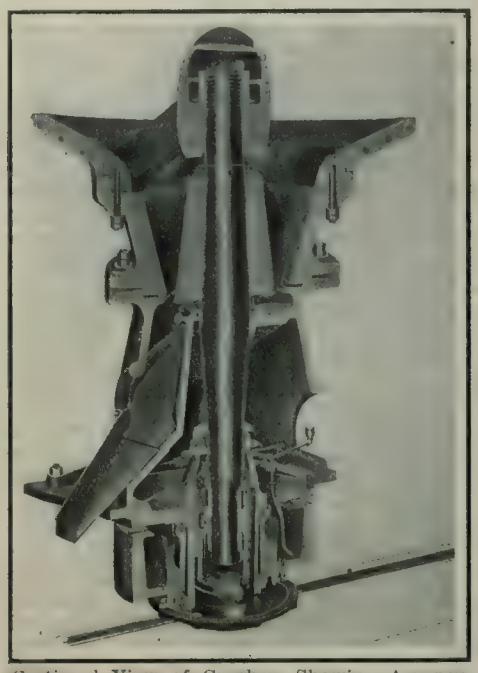
WASHINGTON, Aug. 9.—Examiner J. Edgar Smith of the Interstate Commerce Commission has submitted a tentative report holding that the rate of $5.52 per gross ton on shipments of manganese ore from First Ford, Va., to Pittsburgh and Sharpsburg, Pa., in the period from March 3 to June 2, 1919, was not unreasonable. He based his finding on the value of the commodity, which he stated to be about $2,000 per carload, and recommended that the complaint, filed by C. G. Chevalier, be dismissed. After the shipments, about 20 in number were made, the Railroad Administration reduced the rate to $4.50 per gross ton. The complainant had suggested that the latter rate be regarded as reasonable and made retroactive. The examiner said that a finding of unreasonableness cannot be predicted upon the fact that a rate was reduced subsequent to the movement at the solitication of the complainant.

The Harlan plant of the Bethlehem Shipbuilding Co., Wilmington, Del., is arranging for the resumption of work at its car shops, which have not been operated for a number of years past. Initial production will be devoted to the construction of 10 cars for the Huntingdon & Broad Top Mountain Railroad & Coal Co., Huntingdon, Pa.

Gearless Rock Crusher

Application of the direct drive principle to standard gyratory crushers of all sizes, from the smallest up to and including the No. 60, the largest size of gyratory rock crusher yet built, has been made by the Kennedy-Van Saun Mfg. & Eng. Corporation, 120 Broadway, New York. The machine is said to be simplified, its wearing parts reduced, its power requirements diminished.

The crusher shown contains the ball-joint eccentric, a most important advance in gyratory crusher design, because it maintains alinement of the main shaft and its bearing in the eccentric, and thus eliminates cramping or binding, and consequently prevents heating, high power consumption, rapid wear and loss of eccentricity. The machine has a highly arched spider, permitting the passage of any stone that will enter, and the arrangement of spider ring clear of the top of the concaves, prevents breakage through expansion of the concaves.



Sectional View of Crusher, Showing Arrangement of Parts

The bottom plate sleeve acts as a support for the packed lower dust collar, and as this sleeve does not revolve, the wear on the collar is reduced to a minimum. This sleeve acts also as a support in which the eccentric sleeve and ball are contained, and for supporting the driving dogs. It also forms a journal for the driving pulley, which has ball bearings. The bottom plate sleeve is shouldered on the inside to prevent the eccentric sleeve from moving upward. At the bottom it has a groove and shoulder for receiving the bayonet lock that supports the ball race and pulley.

Made in two parts, the eccentric sleeve is joined by bolts passing through at top and bottom. It has a pocket on the thick side for receiving the locking pin that connects the ball and socket bearing to the eccentric sleeve. This pin, flattened on the sides, provides ample bearing in the pocket, preventing wear. At the bottom, where the eccentric is joined together, it forms a male driving dog for fitting into the female seat.

Driving power is applied through a universal device that eliminates friction and side strain due to the driving of the eccentric, and relieves that grinding and side thrust common to gyratory crushers. Thrust due to pressure against the eccentric is delivered to the eccentric sleeve at the middle of the ball, and thus the eccentric sleeve floats without pressure from top to bottom.

Supported by the bayonet lock method, the pulley is keyed in position. The eccentric is driven by a double male and female connection cast integral with the bottom plate, the latter being bolted to the pulley and the joint packed to prevent oil leakage. When the pulley turns, both bottom plate and driving dog move, turning the eccentric directly and eliminating pull and side thrust on the eccentric.

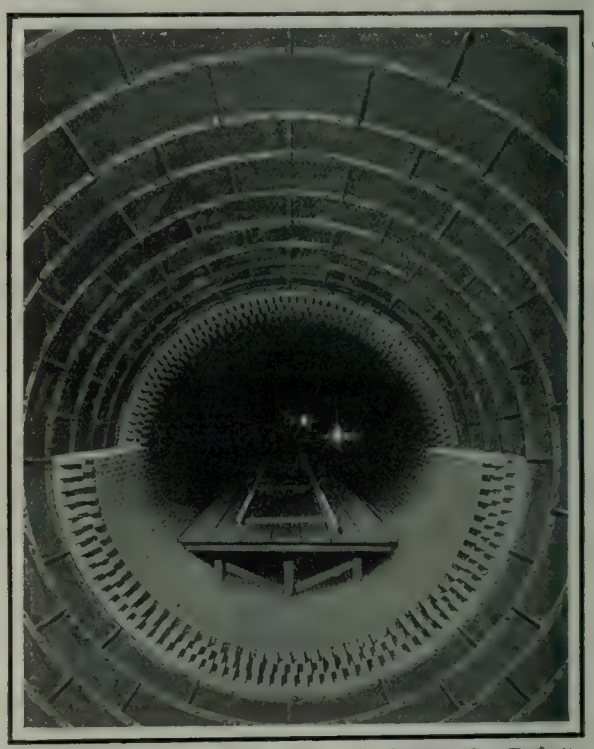
Oil from the eccentric chamber flows freely between the balls, over the top of the pulley hub into the oil well inside the pulley. From this reservoir it is scooped up by centrifugal force and delivered to the top of the eccentric and ball and sleeve. This scoop acts on the same principle as that through which a locomotive in motion scoops water from a canal between the tracks.

As the base of the bottom shell is made square, stone may be spouted in any direction. This enables the operator to set the machine in any position without having to predetermine whether it shall be right hand, left hand or standard. Thus the crusher may be driven from a line shaft by belt or rope drive and the drive pulley can be on the same horizontal plane, or above or below the crusher, as desired.

Pressed Steel Tunnel Linings

Tunnel liner plates and steel forms for concrete construction have now been designed of pressed steel. The plates consist of flanged sections and they are bolted together, making a continuous rigid shell which can be carried forward a considerable distance in advance of the masonry. They are said to be equally satisfactory if used with brick or concrete. Removable steel forms can be used for the inner face of the tunnel.

It is claimed that by providing this rigid steel lining there result safety to workers, convenience, economy and saving in shoring. Tunnelers can keep in advance of the construction forces. These tunnel plates and steel forms are the latest developments of the Truscon Steel Co., Detroit.



Pressed Steel Liner Plates Used in Sewers for Detroit, 12 Ft. to 13 Ft. 8 In. in Diameter

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Increase of the capital stock of the Moline Iron Works, Moline, Ill., from $500,000 to $750,000 was voted recently at the annual meeting of stockholders in the company. Directors for the year were elected as follows: L. E. Nutt, J. J. Creedon, J. T. Miles, L. A. Dorman, C. R. Rosborough, D. E. Miles, B. V. Nutt and M. C. Nutt. Officers were chosen as follows: President, L. E. Nutt; vice-president, J. J. Creedon; secretary, L. A. Dorman; treasurer, J. T. Miles.

TRADE ASSOCIATIONS

Administration Asked to Define Allowable Practices in Collecting and Disseminating Statistics

WASHINGTON, Aug. 9.—Authoritative announcement by the Federal Administration regarding trade association activities in particular relation to statistical work is expected to be made in the near future. The suggestion that a statement of this character be issued has been made by the counsel for the National Association of Manufacturers in a letter written on July 25 to Secretary of Commerce Herbert Hoover. The purpose is to obtain a clear idea as to what trade associations may do with respect to gathering and distributing statistical data among members and how the material may be used without violating the law.

The letter to Mr. Hoover invites his attention to a provision of the Census Act of March 3, 1919, calling for the collection and publication of "statistics of products of manufacturing industries," for the years 1921, 1923, 1925 and 1927, and a provision of the act of Feb. 14, 1903, creating the Department of Commerce, providing for special investigation and reports. It is pointed out that discussion of the Secretary with trade and craft organizations representing particular industries now under way is an endeavor to perfect plans so that reports of the kind mentioned may be secured currently and comprehensively. These reports are to be obtained through the Bureau of the Census and it is claimed that this method thoroughly protects by all the safeguards of the general census act the individual activities of any person, firm or corporation making such reports.

The counsel for the National Association of Manufacturers explains that there are a number of trade and craft organizations which represent a substantial proportion of those engaged in a particular line of industrial activity who have, or maintain, statistical bureaus for the collection of trade information of the same general line or character as it is understood Mr. Hoover wishes to secure for the department and the public. The letter continues:

It is common knowledge that there are organizations calling themselves trade or craft associations which represent only a minor portion of such industry and whose activities in statistical and other lines are subject to very proper interrogation by the agencies of the Government as to whether or not their activities are not subject to serious question as being in violation of existing law and wholesome business ethics.

It is believed that it is not difficult for the department to ascertain, in view of the very complete information in the Bureau of the Census as to the total production in different lines of industry, whether an association represents a substantial portion of its particular industry.

It is the judgment of the writer, and in this judgment he is fortified by the opinion of competent counsel, that the single fact of associations collecting and publishing to their members and the public the facts relating to production, sales, shipments, stocks on hand and prices obtained, all of such being a record of accomplished facts, is not in violation of any Federal law. It is recognized, however, that the use made of such information may or may not be subject to legitimate criticism.

It would be decidedly helpful to American industry to have the governmental viewpoint upon these subjects authoritatively stated as early as possible.

The National Association of Manufacturers is interested in the subject only from the general standpoint of American industry, as it neither maintains nor contemplates the establishment of any statistical activity, it being the belief of the association that any such work is properly an activity pertinent to the work of trade and craft organizations.

Hoover's Comments on Trade Associations

Secretary Hoover, commenting on the work of the recent conference on statistics of production, said:

"For some weeks the department has been making a careful study of the purposes and activities of trade associations. We find that the vast majority of such associated activity is a constructive contribution to national welfare.

"The department wishes to co-operate with such associations as wish it in the collection of information as to production, stocks of raw and other materials, percentage of industry in active operation, total orders, and other accomplished facts of interest to them and in the making of the information available to the whole public.

"The making of such information currently public acts alike to protect legitimate business enterprise and the public interest."

Lake Ore Movement in July

Shipments of Lake Superior ore from upper Lake ports in July were 4,047,687 gross tons, or 5,590,919 tons less than those for July, 1920, or a decrease of 58 per cent. The total of this season's shipments to Aug. 1 was 10,418,914 tons, which compares with 26,079,111 tons to Aug. 1, 1920. The shipments by ports in July and for the season in 1920 and 1921 are as follows:

	July, 1920	July, 1921	To Aug. 1, 1920	To Aug. 1, 1921
Escanaba	1,174,468	238,258	3,117,277	449,062
Marquette	610,321	80,470	1,538,724	133,414
Ashland	1,293,239	434,088	3,606,108	961,025
Superior	2,249,431	875,005	6,694,927	2,591,235
Duluth	2,783,537	1,731,094	7,000,222	4,639,393
Two Harbors	1,527,610	688,772	4,121,853	1,644,785
Totals	9,638,606	4,047,687	26,079,111	10,418,914
Decrease, 1921	.....	5,590,919	.....	15,660,197

The decrease to Aug. 1, this year, in the season shipments was 15,660,197 tons or 60.04 per cent as compared with last year. Duluth contributed 24.88 per cent of the total against 26.84 per cent a year ago, the Great Northern docks showing an increase this year.

Lake Iron Ore Analyses for 1921

The Lake Superior Iron Ore Association, Cleveland, has issued its analysis book for 1921, compiled by its secretary, W. L. Tinker. The number of ores listed is 293, as against 290 in the book for 1920. "Mesabi Sinter" appears in the 1921 book, being the ore obtained from the concentration and sintering of the magnetites of the eastern Mesabi district. It is evidently the successor to East Mesabi Sinter of the preceding book. The guaranteed analysis of this ore shows iron, 64 per cent; phosphorus, 0.027 per cent, and silica, 9.00 per cent, as against 63.27 per cent, 0.008 per cent and 10.58 per cent, respectively, according to the 1918 analysis, which applied also to 1919 and 1920.

Technologic Paper No. 192, of the Bureau of Standards, entitled, "Tests of Centrifugally Cast Steel," is now available. Six castings manufactured by the Millspaugh centrifugal process were examined as to their physical and chemical properties including hardness, tensile, impact, density, internal stress, segregation, soundness, and microstructure, both in the condition as cast and after various heat treatments. This investigation shows the possibilities of substituting heat treatment for forging in this type of casting. An abstract of this discussion was printed in THE IRON AGE, May 24, 1921.

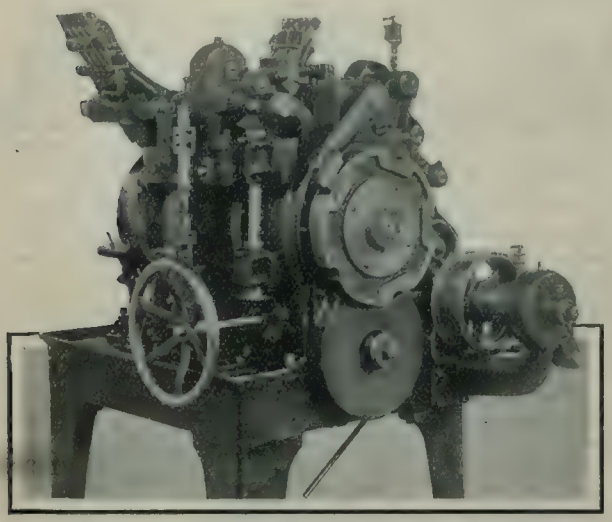
Apprenticeship in Wisconsin has made good progress during the past year despite the industrial depression, according to a report made by the industrial commission. In the year ended June 30, 40 employers were added to the list of those taking on indentured apprentices. In this year 511 boys were indentured, compared with 347 in the previous year. A total of 180 boys completed apprenticeships and were granted certificates. The majority of indentures and certifications are from metal working shops, mainly in Milwaukee.

The United States Government has transferred all the Government owned property known as the Scituate Proving Grounds, Scituate, Mass., to A. A. Brand, Suburban Land Co., Inc., Boston. The property comprises 210 acres and has a mile frontage on the ocean, together with more than fifty buildings and a railroad system.

The Atlas Crucible Steel Co., Dunkirk, N. Y., has posted notices that the local plant will be closed during the month of August, with production to be resumed in September.

Special Machine for Drilling and Tapping Spoke Nipples

The Langelier Mfg. Co., Arlington, Cranston, R. I., has placed on the market a machine for drilling and tapping automobile wire-wheel spoke nipples having a capacity of 15 to 20 pieces per minute. Nipples are drilled and tapped in gangs of five. There are three heads of five spindles each. The first head drills three-fourths through the work, the second finishes the hole, while the third does the tapping. Nipples are held in position and carried to each head by a five station intermittently revolving drum carrier. The first station is for loading; the second, for the first drilling operation; the third, for the second drilling operation; the fourth, for tapping; and the fifth, for ejecting the nipples from the carrier. All operations therefore are



The Disk Wheel and Snubber Arm Prevent Overtravel of the Carrier and Stop It Before Locking in Position

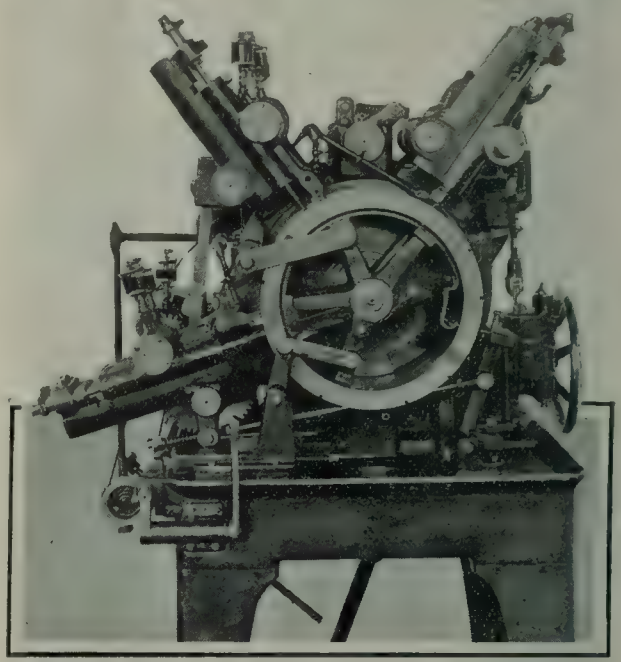
automatic except that of placing the work in the carrier.

The carrier revolves on a horizontal axis and is moved intermittently to each successive station by a one-tooth driver that engages a five-tooth gear with teeth of special design. To prevent possible overtravel of the carrier and to bring it to a stop before locking in position, a snubber arm is used, which engages a disk wheel with five equi-distant semi-circular notches in its periphery, fastened to the rear of the carrier shaft as shown in the illustration. The snubber engages the notches in the wheel under spring contact and is operated by a separate face cam. The carrier is locked positively and accurately at each movement by a cam operated punger that fits itself successively into five equi-distant, tapered-side, hardened-steel blocks embedded into the periphery of a large disk fastened to the rear end of the carrier.

The operator inserts five nipples in the carrier between each of of its movements. Should he not properly seat the square ends of the nipples in the locating bushings, they would project and interfere with the action of the carrier and possibly cause breakage. To prevent this, an automatic machine stop is provided, consisting of an oscillating blade hung inside the carrier and projecting downward sufficiently low to cause improperly seated nipples to come in contact with it when the carrier is in motion. The mechanism for ejecting nipples consists of an oscillating arm carrying a gang of five plungers that push the nipples to the inside of the carrier where they fall into a chute leading to the bed of the machine. This arm operates simultaneously with the feed motion of the first drilling head, the two being connected by a rod. All nipple holders in each station are provided with holding and locating bushings. The carrier itself is made in the form of a drum, one end being open and facing the operator, nipples being loaded with heads up. To prevent these from falling out when the carrier revolves and to provide a resistance for drilling and tapping thrusts, a hard-steel concentric segment ring, stationed and supported on the end of the carrier shaft, is used inside the carrier.

Drilling and tapping spindles have spiral gear drives, run in phosphor-bronze bearings and their outer ends are held in adjustable sleeves, which can be clamped in the feed yoke heads to proper working positions. Spindles have thrust ball bearings for both directions inside the adjustable sleeves. Feeds for drilling and tapping spindles are actuated from a large double path face cam, which engages with cam rolls on the feed yoke bars. The outer path on the face cam actuates the drill feeds for both the first and second drilling heads and the inner path the feed for tapping spindles, its rate of feed being so timed as to follow the lead of taps when tapping. Drills in the first drilling head have guide bushings for accurate starting and centralization of holes in the nipples. The tapping spindle drive has reverse mechanism with a quick return. The movement of the blade operates a knockout, which in turn actuates a No. 4 Carlyle-Johnson clutch in conjunction with a multiple disk brake.

The main drive of the machine is by a 3½-in. belt on a loose 10-in. pulley mounted on the hub of the friction clutch. From thence the drive is to the worm and gear drive by bevel and spur gearing, belt connection being provided for driving the tap reversing snap mechanism cam. A rotary pump supplies cutting



Nipples Are Drilled and Tapped in Gangs of Five. All operations are automatic except placing work in carrier

lubricant, drawing its supply from the tank after the lubricant has been strained. The machine occupies 46 x 58 in. floor space, stands 66 in. high and weighs approximately 4600 lb.

Reynolds Spring Co. Expands

The Reynolds Spring Co., Jackson, Mich., maker of automobile products, will build an extension to its Water Street plant, 132 x 204 ft., two stories, reinforced concrete, steel sash, at a cost of $110,000. It will be ready for occupancy Dec. 1. The company has also installed a trackless trolley system between its Otsego and Water Street plants for its employees, the buses being rubber-tired and getting their power from overhead wires. Watson R. Smith, vice-president Watson Spring Co., will be in charge of building operations. It is planned to increase the present force of 600 employees to 1200. According to the president, July was the best month for the company of any this year, with August promising to be even better.

The American Manufacturers Export Association will hold its annual meeting at the Waldorf-Astoria Hotel, New York, Oct. 5 and 6.

Manufacturers Denied a Hearing in Railroad Labor Case

Judge R. M. Barton, chairman United States Railroad Labor Board, Chicago, has denied the application of the National Association of Manufacturers, the National Founders' Association and the National Erectors' Association for a hearing in connection with the case of the Federated Shop Crafts against the Pennsylvania Railroad. These three associations desired to have their interests as shippers properly presented in connection with what they consider to be an attempt of the Federated Shop Crafts to require all emloyees to belong to a union in order to secure representation in dealings between the railroads and their employees on labor questions. The Railroad Labor Board held that to open its doors to the public at large and the many civic bodies having an interest in railroad labor questions would result in delay and prevent the board from arriving at a prompt decision in matters before it. The letter of Chairman Barton added that the board has in mind and fully appreciates the vast shipping and business interests involved in the questions it decides and at all times gives consideration to these interests.

Increasing Railroad Shop Operations

Since Aug. 1 practically all railroad companies operating in Wisconsin have either reopened or enlarged the working forces of operating shops handling locomotive and car construction and repairs.

At Milwaukee, the Chicago, Milwaukee & St. Paul Railroad Co. is doubling the working hours of the locomotive and car shop, one of the largest operated by the system. The total number of workdays, counting each day worked by each man as one workday, is being increased during August by approximately 35,000 hr. The greatest increase will be in the car department, where 2318 men are employed. These men have been working 10 days a month. During August this will be increased to 19 days, and during September to 20 days. The locomotive shop, employing 1500, will work each present employee 18 days in August, compared with 10 days in July.

At Kaukauna, Wis., the Chicago & Northwestern Railroad Co. recalled 40 men Aug. 1 at a 12 per cent reduction in the former wage. This number of men is 18 per cent of the total laid off April 1. At Janesville, Wis., ten additional men were placed at work in the division shops during the week, with promise of re-employment of a similar number each week during August. At LaCrosse, Wis., the Chicago, Milwaukee & St. Paul increased the working schedule from four days a week to six.

Increased Labor Efficiency in Akron

The efficiency of workers in the Akron, Ohio, rubber plants has increased over 100 per cent since early last year, according to reports from that city. It is stated that 27,000 employees in the nine largest tire plants are turning out 75 per cent of the production obtained 16 months ago with 72,000 men. One factor in the large increase in production is that the rubber companies in re-employing men have selected the better class of workers, weeding out labor of the floater type.

More Unemployment in Pennsylvania

Unemployment in the State of Pennsylvania increased further in the last two weeks of July, according to the semi-monthly report of the Pennsylvania State Department of Labor and Industry. The total number of unemployed as of Aug. 1 was 306,635, as compared with 263,000 on July 1. Unemployment in the metal industry is particularly heavy, being estimated at 67,000 workmen. About 64,700 common laborers and more than 46,000 miners also are idle. District offices of the Department of Labor and Industry make the following reports of unemployment as of Aug. 1 and of July 15: Altoona, 26,335 against 20,850; Erie, 15,200, against 14,775; Harrisburg, 14,405, against 20,850; Johnstown, 20,090, against 19,290; McKeesport, 5275, against 5890; New Kensington, 10,250, against 10,250; Philadelphia, 127,000 men and 11,650 women, against 116,000 men and 11,550 women; Pittsburgh, 55,550, against 50,850; Scranton, 15,130, against 15,375; Williamsport, 5750, against 6650.

Employment Stationary in Cleveland

There is little change in the employment situation in Cleveland during the past month, according to the monthly survey of the Cleveland Chamber of Commerce committee on labor relations. Reports from 99 manufacturers employing 500 or more persons show that on July 31 there were 54,161 employees on their payroll as compared with 54,165 on June 30. The automobile industry kept up about as well through July as in June, according to employment reports from automobile and automobile parts plants. Eighteen companies in this field had 7463 employees on their payrolls July 31, as compared with 7742 on June 30. The peak, 10,310, was on May 30.

Increase in Employment in Detroit

Detroit is one of the 27 American cities to report an increase in employment for the month of July, according to the industrial survey of the United States Department of Labor. The statistics indicate that in the month the payrolls of the larger Detroit firms were increased by 7905, an increase of 6.07 per cent over the figures recorded June 30. The figures upon which the computations are based are actual payroll figures from all firms that employ more than 500 workers.

In the Field of Labor

The allied crafts employed at the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., have taken steps to appeal to Congress through Massachusetts congressmen to secure appropriations which will keep the shipyards in operation.

Effective Sept. 1, wages of all employees, including the president and all other officers, of the Union Twist Drill Co., Athol, Mass., will be reduced 20 per cent. During the war the firm raised wages 10 per cent two times. The plant is closed for a three-week vacation period.

The plants of two implement manufacturers at Louisville, Ky., are operating at only about 10 per cent of normal, while the wagon department of another company is not doing much better, and only about 25 per cent in the automobile and truck departments.

E. F. Holloway, district director of the U. S. Employment Bureau, headquarters at Louisville, Ky., handling Kentucky and several Southern states, in a report released on Aug. 5, shows that unemployment is greatest at this time in the machine, metal working and allied trades, pointing out the very slow conditions at Newport, Covington, Ky., and at points in the South. In Louisville the unemployment situation has not been so bad, due to diversification of industry and absorption. The building trades are shown to be fairly active. No farm labor shortage is reported.

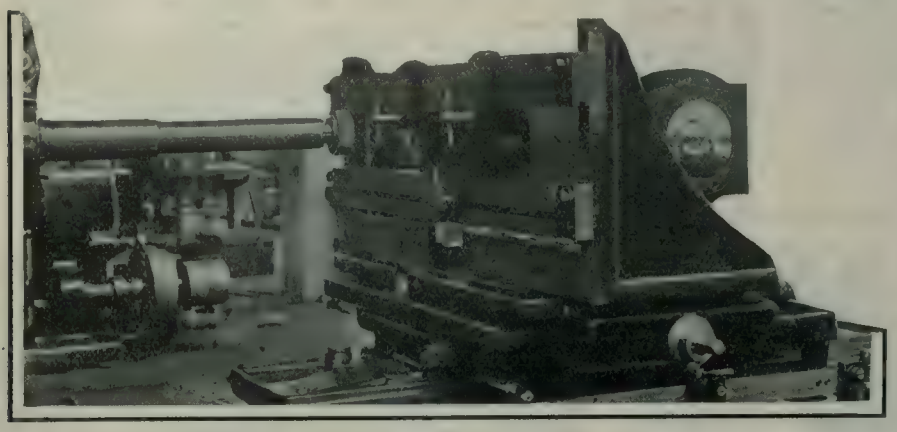
Sale of Dismantled Naval Vessels

WASHINGTON, Aug. 9.—The Navy Department has sold five dismantled naval vessels from which the metal will be salvaged as scrap. The awards were made as follows: To A. Marx & Sons, New Orleans, cruiser Cincinnati, $15,100; gunboat Castine, $12,500; to Barde Industrial Co., Seattle, Wash., cruiser Minneapolis, $36,000; cruiser Marblehead, $11,100; to H. A. Hinter's Sons Co., Philadelphia, cruiser Raleigh, $10,800. The cargo steamer Supply was offered for sale, but no bids were made for it.

Cylinder Block Regrinding Jig

A jig for holding automobile cylinder blocks while being reground, taking the place of the jig heretofore manufactured, is being marketed by the Heald Machine Co., Worcester, Mass. It is adaptable for the company's No. 55 and No. 60 internal grinders, and for the No. 65, a manufacturing machine.

The new jig is known as Universal Quick-Locating and is designed to eliminate the necessity of using the knee to raise and lower the work to the correct position for the grinding operation. It is of cast iron and furnished in but one size, 41 in. It bolts to the grinding machine table and is provided with two bars, each 3 in. wide by 1½ in. thick, the lower bar being dovetailed for holding a bracket and diamond. The upper bar has a zero or indexing marker on each end, which is used with a graduated scale on both sides of the jig. A set of locating brackets movable horizontally and having removable pins of sufficient length and strength to support a cylinder block is also provided for the upper bar.



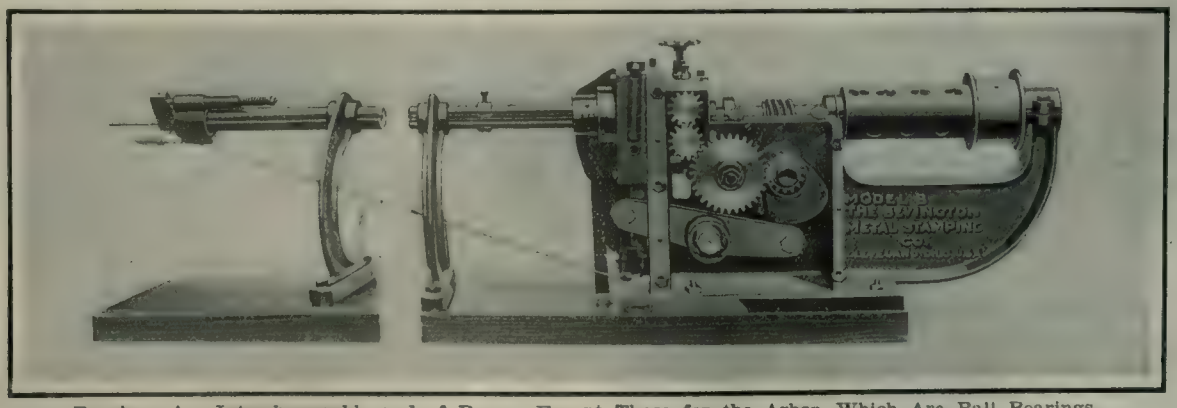
The Indexing Marker and Graduated Scale on the Upper Bar Facilitate Locating the Cylinders to Correct Position for Grinding

To operate, the workman first measures the diameter of the cylinder hole, which, let us say, is 4 in. The top bar is then set so that the zero or indexing line on each end is opposite the 4-in. graduation. The bar is then clamped and the locating brackets moved, so that the pins will be about the same distance apart as the two end holes in the cylinder block, after which the block is rested on the two pins and clamped in place. This will bring the center of the hole to be ground to the correct height for the grinding spindle to enter. The pins are then removed and the locating brackets slid out of the way of the grinding wheel.

Wire Straightening and Cutting Machine

The Bevington Metal Stamping Co., 1545 East Eighteenth Street, Cleveland, is marketing an automatic wire straightening and cutting machine having a capacity for wire ranging from 5/32 in. in diameter to No. 20 Washburn & Moen gage. Various other sizes are also furnished, to handle wire from 1/64 to ¾ in. in diameter and in various lengths to suit the length of wire to be cut.

The features claimed for this machine are its simplicity, noiseless running and freedom from vibration. All bearings are interchangeable and of bronze, except those for the arbor, which are ball bearings. It is pointed out that because of the interchangeability of bearings, repairs can be easily and cheaply made. Gears are cut from steel and the feed rolls and cutting dies are of heat-treated tool steel. The straightening dies are of gray iron, wood, babbitt or brass, depending on the wire to be handled. The machine is driven by a ¾-hp. motor.



Bearings Are Interchangeable and of Bronze Except Those for the Arbor, Which Are Ball Bearings

Industrial Activities in New England

The P. A. F. Corbin division, American Hardware Corporation, New Britain, Conn., has increased its working schedule from 32 to 40 hr. weekly, and reduced wages of employees from 18 to 28 per cent.

The Alaska Freezer Co., Winchendon, Mass., has resumed operations after being idle for two weeks. The plant is on full time.

The Gilbert & Barker Mfg. Co., Springfield, Mass., heretofore operating 46 hr. a week, has resumed a 48-hr. week schedule, but with a reduced number of employees, who have accepted a slight reduction in wages. The management states the business outlook in the company's line is good, and some additions to the working force may be necessary before long.

The Groton Iron Works, New London, Conn., has completed the last contract on hand and will immediately reduce its working force.

The New London Ship & Engine Co., Groton, Conn., has released altogether about 60 workmen because it has completed contracts on submarines S-19, S-20 and S-21.

The General Electric Co., Lynn, Mass., last week reduced wages of 12,000 employees, effective Aug. 8. The cut varies in amount, according to the different classes of workers. Of the 12,000 employees, 4671 who, prior to June 30, 1921, completed five years' service, received $171,765 last week in supplementary compensation. This sum represents 5 per cent of the company's earnings for the half year ended June 30.

The Warner & Swasey Co., Cleveland, resumed operations Aug. 1 on a three day week schedule. This company's plant was shut down July 1.

German Small Tool Prices the Lowest

Twist Drills Sold at 50 Per Cent Less Than British Product—British Compete with United States and Germany Only on High-Speed Tools

BY PAUL M. TYLER

GERMAN competition has again developed as a dominant factor in the European supply of twist drills, reamers, milling cutters and other classes of small tools, both in plain carbon and high-speed steel grades. This competition is especially serious in view of the fact that there are fairly large accumulations of stocks, particularly of American carbon tools, in England, and because of the general trade depression that restricts consumption to a minimum. Whereas in the latter part of 1920 deliveries were the leading factor, price has now become the main consideration and German manufacturers are able to quote figures considerably below the costs of manufacture in other countries. The writer's observations on a recent trip to Europe were confined mainly to England and Belgium and in these countries (up to the end of June, at least) the actual deliveries of German tools had been practically negligible, due partly to the prejudice against the purchase of articles from a former enemy country and partly to uncertainty over the operation of the reparations recovery bills pending in both these countries. German tools, however, were stocked by merchants and enjoyed a fair share of what little trade was being done.

Catering to the Buyer

In addition to the low prices they are able to quote, German manufacturers are aided in their attacks on foreign markets by the favorable credit terms they allow. A large proportion of the orders are placed subject to approval on delivery and without any advance payments. The German firms are also ready to make up samples with the merchant's name stamped on the product and with no reference to the fact that they were "made in Germany." One merchant in Brussels wrote to a German manufacturer asking bids on a variety of tools and almost by return mail received a complete set of samples each marked with his name and address, although he had never had any previous business relations with the German firm. In Cologne, also, the writer found an agent of one of the large German twist drill manufacturers who claimed that he could furnish any reasonable quantity of these tools from stock and mark and pack them in such a way as to give the impression that they were made in the United States or other countries. While German lists are made up on the basis of diameters in millimeters, English sizes can be obtained from stock at the same price as the next higher metric size. There seems to be no difficulty in obtaining export licenses and payments are ordinarily to be made in marks at current rates of exchange. New price lists were issued early in 1921 and the usual "discounts" are 200 per cent above list less 20 per cent (to dealers) on sizes above 10 mm. (say ⅜ in.) on carbon tools and 150 per cent

Comparative Table of Twist Drill Prices

Taper and Straight Shank Twist Drills (Carbon)

	Taper and Straight Shank					Taper Shank			Straight Shank		
	American		English			German			German		
Diam., Inches	List Each $	Net Each $	List Each s.	d.	Net Each s.	d.	Equivalent* Each $	List Each Marks	Net Each Marks	Equivalent* Each $	List Each Marks	Net Each Marks	Equivalent* Each $
¼	.60	.26	2	6	1	7.5	.33	3.05	7.3	.12	2.0	4.9	.08
5/16	.80	.34	3	6	2	3.3	.46	3.8	9.0	.15	3.2	7.7	.13
3/8	1.20	.51	4	0	2	3.0	.65	4.9	11.9	.19	4.5	10.8	.18
7/16	1.60	.68	4	9	3	4.6	.88	7.8	18.8	.31	6.0	14.4	.24
½	2.00	.86	8	3	5	4.1	1.07	9.9	23.8	.40	9.3	22.3	.37
9/16	2.60	1.11	11	6	7	1.8	1.23	12.6	30.2	.50	12.6	30.2	.50
1	3.50	1.50	14	9	9	7	1.92	17.4	41.8	.70	17.4	41.8	.70
1 1/16	5.50	2.35	23	0	14	11.4	2.99	27.0	64.8	1.08	27.0	64.8	1.08
1 1/8	8.50	3.63	35	6	23	.9	4.62	45.3	108.7	1.81	45.3	108.7	1.81
1 3/16	12.50	5.34	52	3	33	11.6	6.79	61.5	147.6	2.46	61.5	147.6	2.66
2	18.50	7.91	77	3	50	2.5	10.04	81.0	194.4	3.24	81.0	194.4	3.24
2 1/16	24.50	10.47	102	6	66	5.5	13.29	109.5	262.8	4.38			
2 1/8	30.50	13.04	127	0	82	9	16.55	144.0	353.6	5.89			
2 3/16	38.00	16.25	158	6	103	.3	20.61	180.0	432.0	8.53			
3	48.00	20.32	200	0	130	0	26.00	232.5	558.0	9.30			
3 1/16	65.00	27.79	271	0	176	1.8	35.23	279.0	669.6	11.16			
3 1/8	85.00	36.34	354	0	230	1.2	46.02	335.0	804.0	13.40			
3 3/16	112.00	47.88	467	0	303	6.6	60.71	408.0	979.2	16.49			
4	140.00	59.85	583	0	378	11.4	75.79	462.0	1108.8	18.48			
4 1/2	200.00	85.50											
5	260.00	111.15											
6	400.00	171.00											

Taper and Straight Shank Twist Drills (High Speed)

¼	1.10	.84	6		4	7.8	.93	14.40	28.80	.48	7.75	15.50	.26
5/16	1.50	1.14	6	6	5	.45	1.00	16.25	32.50	.54	12.90	25.80	.43
3/8	2.00	1.52	8	6	6	7	1.32	21.00	42.00	.70	20.65	41.30	.69
7/16	2.50	1.90	13		10	.9	2.02	41.00	82.00	1.37	34.25	68.50	1.14
½	3.50	2.66	16		12	4.8	2.48	56.00	112.00	1.87	55.65	111.30	1.86
9/16	4.75	3.61	20	6	15	10.64	3.18	77.50	155.0	2.58	77.50	155.0	2.58
1	6.25	4.75	26	6	20	6.45	4.11	105.65	251.3	4.19	105.65	211.3	3.52
1 1/16	10.75	8.17	44		34	1.2	6.82	177.50	355.0	5.92	177.50	355.0	5.92
1 1/8	17.25	13.11	76		58	10.8	11.78	268.75	537.50	8.96	268.75	537.5	8.96
1 3/16	25.00	19.00	104		80	7.2	16.12	391.25	782.5	13.04	391.25	782.5	13.04
2	35.00	26.60	140		118	6	23.70	544.0	1088.0	18.13	544.0	1088.0	18.13
2 1/16	45.00	34.20	185		143	4.5	28.68	734.0	1468.0	24.47			
2 1/8	65.00	49.40	240		186		37.20	989.0	1980.0	33.00			
2 3/16	85.00	64.60	315		244	1.5	48.83	1283.0	2566.0	42.77			
3	105.00	79.80	400		310		62.00	1669.0	3338.0	55.63			
3 1/16	135.00	102.60											
3 1/8	165.00	125.40											
3 3/16	195.00	148.20											
4	225.00	171.00											

*Foreign prices converted at £1 = $4, and 60 marks = $1.

above list less 20 per cent (to dealers) on all classes of high-speed steel tools.

German Prices Half the British

Representative prices will be found in the accompanying table, and it will be noted that the German prices will average less than one-half British prices, even on the basis of the exchange rate of 60 marks to the dollar prevailing in the early part of June when the quotations were made. The differences are most marked in the case of carbon drills, but are very large even in the case of high-speed steel drills, especially in the smaller sizes where the raw material is a less important item in the cost of manufacture and the advantage of cheap labor is obtained to a greater degree.

In comparing the prices as given in the table, it should be noted that the prices are all quoted at manufacturers' or merchants' warehouses in the countries named. The German prices must be increased by approximately 7½ per cent on the basis of f.o.b. Hamburg and a trifle more for delivery in Belgium, France, or England. Before reaching the consumer in any of these countries, there will be added also a middleman's profit, as few if any of the German firms have established direct agencies abroad. For this reason most of the German tools that have been exported so far have been plain carbon steel, and English manufacturers have enjoyed a practical monopoly in the sale of high-speed steel tools of all kinds. The prices of American high-speed steel tools have been so high that the only sales of this class have been a very limited range of specialties.

Straight Shank Twist Drills
Jobbers' or Short Lengths

Diameter, Inches	American List, Dozen	American Net, Dozen	American Net, Each	English List, Dozen	English Net, Each	English Equivalent U. S. Money,* Each	German List, Each	German Net, Each	German Equivalent U. S. Money,* Each
			CARBON						
	$	$	$	s d	s d	$	Marks	Marks	$
⅛	1.80	.77	.06				0.55	1.3	.02
¼	3.25	1.39	.12				1.18	2.8	.05
⅜	6.00	2.58	.21				2.42	5.8	.10
½	12.00	5.13	.43				3.9	9.4	.16
⅝							5.3	12.5	.21
¾							7.8	18.7	.31
			HIGH SPEED						
⅛	5.90	4.48	.37	1 5	1 2.9	.25	3.6	7.3	.12
¼	7.35	5.59	.47	2 5	2 1.4	.42	6.0	12.0	.20
⅜	10.50	7.98	.67	4 3	3 8.7	.74	9.5	19.0	.32
½	20.00	15.20	1.27	6 0	5 3.0	1.05	16.7	33.5	.56

*Foreign prices converted at £1 = $4, and 60 marks = $1.

Prior to the war, the European market for carbon steel cutting tools was shared mainly by American and German manufacturers, the former doing the larger share of the business in England, while German makers enjoyed the bulk of the Continental trade. There were a number of British manufacturers of carbon tools, but the output was small and most of the home requirements were imported. With the more general adoption of high-speed steel, the manufacture of small tools became a more important industry in England, but it developed mainly as a branch of the high-speed steel industry. The extraordinary demands for tools for use in the manufacture of munitions resulted in a rapid expansion in the output.

British Manufacturers' Associations

Altogether, there are now probably nearly 50 self-styled manufacturers of twist drills and perhaps an even larger number of makers of milling cutters in England. Most of the output, however, comes from about 20 fairly large firms, all of whom are members of a group of associations which govern prices. Among these are the British Twist Drill Manufacturers' Association, the Milling Cutter Association and the Screwing Tackle Manufacturers' Association (taps and dies), all having headquarters in Sheffield and operating in close conjunction, so far as prices of high-speed steel tools are concerned, with the High Speed Steel Association. The majority of the small tool makers in England do not make their own steel, although most of the larger ones use steel from only one works. The tendency toward obtaining ownership of steel works, however, has been marked and recently several firms have absorbed tool steel plants in order to assure themselves of a supply of steel and, in the case of high-speed steel, to obtain a better market for their scrap. Even when owned by the same interests, the tool steel works are rarely adjacent to the small tool factories.

Milled and Composite Drills

In England, twist drills are almost invariably milled from the solid bars, although at least two firms are licensed to manufacture them from a twisted section and produce a small quantity for use in the shipyards for non-precision work. In the largest sizes of high-speed drills, rarely under 1½ in., some makers produce a drill which has only the tip made from high-speed steel which is attached by means of a brazing compound to a carbon steel shank and flues, and inserted tips of high-speed steel are occasionally employed in lathe tools—either brazed on or fitted into a slot in a bar of carbon steel. Generally speaking, however, English tools are made of the same metal throughout. Most of the high-speed tools, both in England and on the Continent, contain only 14 per cent of tungsten, the higher grades being furnished only on special order. It is not common to specify the tungsten contents and the special steels are sold by brand names. On the basis of tungsten powder at 2s. and ferrotungsten (80 to 85 per cent) at 1s. 7d. per pound of tungsten contained, the prices of high-speed steel in England in July, 1921, were 3s. per pound for the usual 14 per cent grades and 3s. 9d. per pound for 18 per cent, with some special grades selling a few pence higher. Taking sterling exchange at $3.60, these prices correspond to 54 cents and 67.5 cents, respectively, per pound.

British Carbon Drills Not Competitive

Methods of production do not call for special comment. While a fair proportion of the equipment in the older British works is out of date, the new equipment that was put in during and since the war is almost identical with that employed in the United States; in fact, much of the machinery is actually of American manufacture and in some cases American firms have laid out the factories and installed the machinery. Production costs at some of these new plants should compare favorably with those of American manufacturers, even in the case of carbon tools. But with few exceptions, in spite of the lower wage scales, since the scale of production is much smaller than that maintained in American plants, the costs at British works are too high to allow extensive competition with American or German firms except in high-speed steel tools.

Bit Stock Drills (Carbon)

Diam., Inches	American List, Dozen	American Net, Dozen	American Net, Each	German List, Each	German Net, Each	Equiv. U. S. Money,* Each
	$	$	$	Marks	Marks	$
⅛	3.00	1.03	.09	3.60	8.64	.14
¼	5.00	1.75	.15	3.70	8.88	.15
⅜	8.50	2.91	.24	4.15	9.96	.17
½	13.00	4.45	.37	5.25	12.60	.21
⅝	18.00	6.16	.51	7.50	18.00	.30
¾	24.00	8.21	.69	9.60	23.04	.38
⅞	30.00	10.26	.86	12.25	29.40	.49
1	36.00	12.31	1.03	16.10	38.64	.62
1⅛	42.00	14.36	1.20	19.00	45.60	.72
1¼	48.00	18.24	1.52	23.50	56.40	.92

*Reckoning 60 marks = $1.

French Tools in England

There is some production of small tools in France and French tools are offered in London at prices a little lower than those quoted by American and British firms, but this is believed to be merely a result of purchases at a favorable exchange rate, as sales are

from stocks in England. There is at least one manufacturer of tools in Belgium, but Belgian production is a negligible factor even in the home consumption of that country and the development of any considerable export trade is out of the question. The Austrian firms that enjoyed some export business before the war do not appear to have resumed operations as yet and are not a factor in the post-war situation.

Germany's Low Labor Cost

The situation apparently resolves itself into a struggle between American and German manufacturers for the business in carbon tools and between British and German manufacturers in the rapidly expanding market for high-speed steel tools of all kinds. When it is realized that few German mechanics receive more than 80 marks per day and most of the operators of machines manufacturing these classes of tools are paid less than 70 marks (say $1) per day, it would seem that Germany has an overwhelming advantage in production costs. It is absolutely impossible to get figures as to the exportable surplus of German works, but for the present they are able to supply a relatively large volume of foreign business and stocks are accumulating.

GERMAN ECONOMY MOVEMENT

Combination of Engineers and Industrialists Under Government Auspices to Study Wastes

BERLIN, July 19.—Under the name of National Board for Economy in Industry and Trade, an organization has been formed at Berlin under the auspices of the Ministry of Economics and with the co-operation of leading industrialists. It is a combination of the various forces at work for the increase of production by the elimination of waste in labor and material. Its principal executive organs are the Society of German Engineers and other large technical and economic organizations. This endeavor for greater economy in industrial production originated in the standardization movement in German engineering, which has lately spread to other industries. It was found that mere standardization would not solve the problem, and in 1920 steps were taken to enlarge the operation schedule by treating such subjects as working of materials, mechanical and individual means of production (tools, machinery, and psycho-technics, time studies, etc., respectively), plant operation (works transportation, energy and heat economics), and works organization. The Government appointed a commissioner for industrial economics, who is now to be superseded by the newly-founded institution, it being recognized that such problems should be handled by self-governing bodies set up by the industries.

Active Support by All Industries

So far the center of gravity of the whole movement has been in the machine industry, while the extension of activities to other industries is in the course of development. A large number of industrial branches, as, for instance, engineering works, forging plants, foundries, metal working plants, paper mills, etc., are already in collaboration with the different suborganizations and other industries (pottery, textile, chemical) are engaged in preliminary preparations. The Government has sanctioned a grant of 1,000,000 m. and an equal amount has been contributed by industry. The trades and industry are lending active support by technical contributions, research, experiments, investigation of special subjects, and the delegating of representatives to meetings.

Wide Range of Subjects Considered

Some of the principal subjects considered, apart from scientific management, standardization and typification, are the following:

Working of aluminum; investigation of steels and lighter metal suitable for measuring instruments; possible retrenchments in the consumption of copper and alloys; cheapening of production by improving certain special machinery; improvements in the design and construction of hand tools; collecting of data for the elimination of non-productive manual operations; scientific plant layout, with special attention to mechanical transportation; agreements on technical formulæ, usages, etc. For the technical training of laborers, artisans and engineers a network of local organizations is being spread over Germany. With the co-operation of a large number of firms, touring expositions are being arranged, and the establishment at Berlin of an experimental and model institute for the training of works officials has been decided upon. Another organization just being formed and based on similar principles will devote its attention to the study of rational utilization of waste and old material.

Merger of German Locomotive Works

Another big merger has taken place in the German engineering industry, which possibly may form the nucleus of a powerful locomotive combination. At a meeting of the board of directors of the Rheinische Metallwaren-und Maschinenfabrik at Düsseldorf it was decided to establish a community of interests with the Allgemeine Elektrizitäts Gesellschaft (A. E. G.) at Berlin, the Friedrich Krupp Aktien Gesellschaft and the Cologne iron trading firm of Otto Wolff, and to increase the capital stock of the company by 95,000-000 m. to 120,000,000 m., at the same time providing for a further increase by 50,000,000 m. as a reserve for extension of the plant. This merger will place the Rheinmetall, as it is generally called, among the leading locomotive works of the world.

Wage Rates Low Abroad

Figures given on page 1692, THE IRON AGE, June 23, for wages paid labor in the iron and steel and allied industries abroad, compared with wages paid in the United States, are amplified by the full report now issued by the Committee on Ways and Means, House of Representatives, Washington, from whom a copy of the 103-page pamphlet, dealing with many industries, may be obtained on request. Some of the outstanding features gleaned from the report follow:

Wages per Day	1913–4	1919–20	*Place*
Foundry:			
Skilled labor	$1.92	$0.60	Germany
Semi-skilled	1.40	0.52	Germany
Unskilled	1.03	0.45	Germany
Skilled	...	1.53	France
Semi-skilled	...	1.15	France
Unskilled	...	1.02	France
Skilled labor	...	1.67	Austria
Iron and steel mills:			
Highly skilled	2.12 / 2.90	2.00 / 3.20	France
Skilled workers	1.55 / 1.93	1.28 / 1.52	France
Common labor	0.68 / 0.89	0.96 / 1.28	France
Rolling mills:			
Skilled	2.09	0.65	Germany
Semi-skilled	1.54	0.60	Germany
Unskilled	1.32	0.52	Germany
Wages per Week			
Blast furnace and rolling mill average	...	$43.12	U. S. A.
Steel mill workmen	...	9.96	Japan
Iron and steel common labor	...	12.52	England
Iron molders	..	15.46 / 17.40	England
Coppersmiths, ship	...	18.27	England

Rates per Ton in Bar-Iron Plants

	1895	1907	1913	1920	
Puddlers	...	$2.33	$2.74	$7.50 / 8.27	England
Puddlers	$5.50	...	...	16.00	U. S. A.

Application for a Pennsylvania charter will be made Aug. 8, for the T. E. Malone Co., Pittsburgh, which will engage in the manufacture and sale of foundry facings, equipment and supplies. Thomas E. Malone, formerly secretary of J. S. McCormick Co., Pittsburgh, George R. McAleenan and John Jackson are interested in the new company.

New Type of Induction Electric Furnace

Primary Winding Above Bath—Experience with 2-Ton Unit—For Refining Molten Metal and Serving as Holding Reservoir and Melting Ferromanganese

THE General Electric Co. has developed and placed in full commercial operation for test purposes an improved induction type of electric furnace. While the induction furnace is in principle a transformer, much more space than usually exists between the primary and secondary circuits is necessary because of required heat insulating material between the primary and the secondary. As a result the reactance is, unavoidably, comparatively large. This means that, unless the power supplied to the furnace is of low frequency, it will operate at low power factor. While a low power factor would not materially affect the energy consumption in a certain process, a low power factor furnace would be more expensive. Furnaces

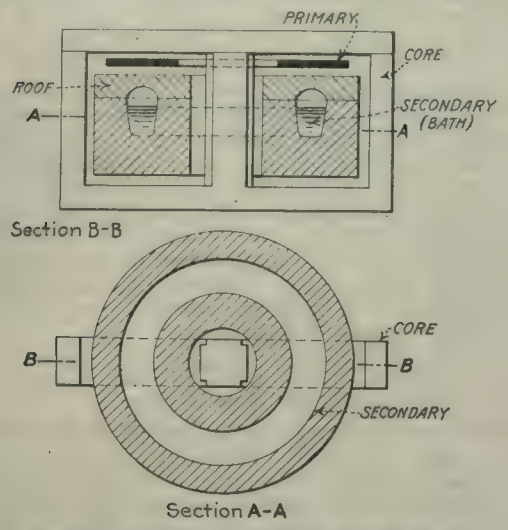


Fig. 1—Diagram of General Design Which Shows the Location of Primary Winding Above the Bath or Secondary Winding

are, therefore, generally designed for lower frequencies than what is standard among central stations.

In the new furnace the primary winding is located *above* the crucible where it is entirely out of danger in case the metal should leak out of the crucible. It is surrounded by a non-magnetic metallic easing which gives mechanical protection, and also acts as guide for the cooling air which is brought in at the bottom of the furnace so as to flow along the center leg of the core and out horizontally over the winding. The casing, being grounded, also serves to protect the operator against accidental contact with the primary circuit. The winding with its casing is attached to the upper leg or top yoke of the core so that this unit can be detached and removed from the furnace.

The crucible is of simple ring form giving substantially constant cross-section for the charge which is accessible by means of two or more lateral doors.

The roof is of unit construction, bricks of suitable shape being bridged across an outer and inner steel ring. With this construction, the roof, it is found, can be made tight and can be removed from the furnace in a short time. The furnace, it is added, can be built stationary or tilting in several well known ways.

According to a description prepared by M. Unger and C. A. Scharschu, of the General Electric Co., the metal in the induction furnace is subjected to certain electromagnetic forces, which are two-fold, an attracting force and a repelling force; that these forces are not of a small magnitude, but are, on the contrary, quite considerable.

The attracting or pinch force they describe in part as follows: The current carrying liquid conductor of the ring from crucible, they say, may be considered as a bundle of an infinite number of strands of current carrying elements and they thus are mutually attractive and pull together and the electromagnetic force tends to change the cross-section to circular. To obtain a true circular section would require an infinite force, so that in practice only the upper surface of a normally rectangular section will be curved or rounded off. This attracting force acts only on particles carrying current, and particles less conducting, as, for example, oxides, slag and gases, are therefore forced out to the circumference, i.e., a separation takes place, as in a centrifugal separator.

If the metal section should be restricted at some place, the current density becomes greater there and so also the attracting force. The result of this is that the liquid becomes agitated and if the restriction or the current is great enough, the agitation will be so great as finally to break the circuit. This phenomenon is usually referred to as the pinch force of the pinch effect.

The secondary or the "bath" forms a loop, and the current density and consequently the magnetic flux density are no longer uniform, being greater on the inner face of the loop. The attracting force is, therefore, strongest along the inner face of the loop and this causes, on the exposed surface, a slope of the metal as well as a circulatory motion in planes perpendicular to the direction of the current, as illustrated in Fig. 2. In practice the section of the bath will not be entirely uniform and this is desirable as, due to the attracting or pinch force, the metal will be caused to move in

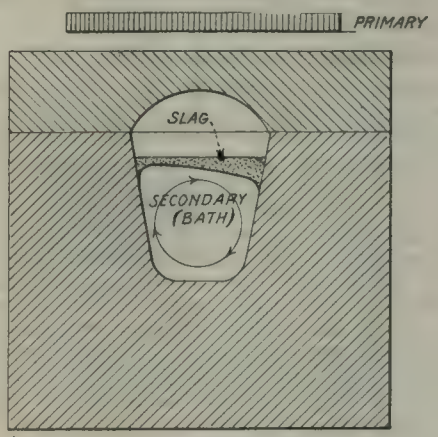


Fig. 2—Diagram to Illustrate How the Mutually Attractive Elements of the Secondary Bring About a Circulation Within the Bath and the Repellent Force Between Primary and Secondary Drives Downward the Current Carrying Bath so That the Slag Collects at the Top

direction parallel to that of the current. This motion is, however, according to Messrs. Unger and Scharschu, very gentle but sufficient to produce uniformity of the metal.

Of the repelling or centrifugal force they say: When adjacent conductors are carrying current in opposite directions and they are free to move, they will move away from each other, or, in case one of the conductors is liquid, it may be forced against the retaining wall. The primary circuit being over the secondary circuit, the current carrying elements of the bath are,

consequently, repelled toward the bottom of the crucible, thus forcing the impurities to the surface as indicated in Fig. 2.

The combined effect of the electromagnetic forces acting upon the bath of the induction furnace of such a design is consequently as follows: The metallic or current carrying parts of the bath are forced toward

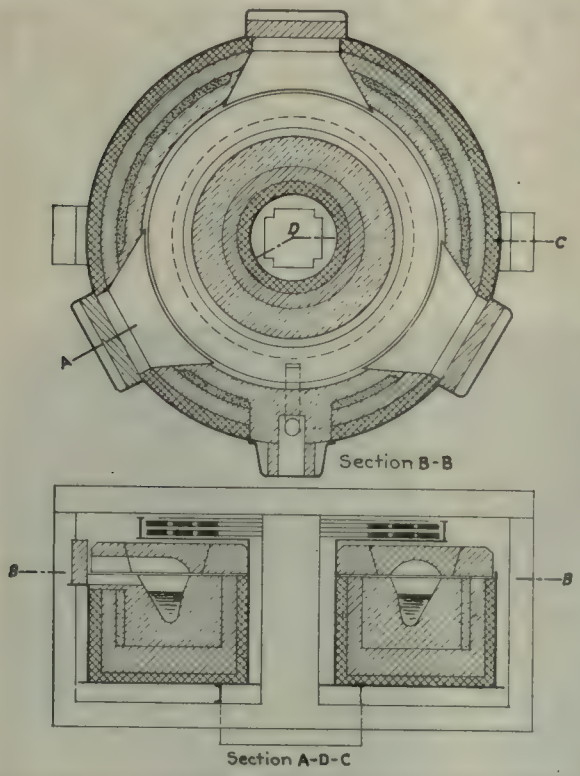


Fig. 3—The 2-ton Steel Induction Furnace Has Three Charging Doors

the center of the conductor so that impurities are squeezed out radially. The metal is also repelled toward the bottom of the crucible causing impurities to rise to the surface. The bath is, furthermore, subjected to circulation; one circulation in vertical planes, perpendicular to the direction of the current and another in horizontal planes in the direction of the current. The former circulation is generally far more pronounced than the latter which can, however, be increased by tilting the furnace, thus purposely making the cross-section of the bath uniform.

To operate the furnace, the secondary must be a closed ring or circuit, as otherwise no induced current can flow and there will, consequently, be no heating. The first charge must consist, therefore, of a metal ring of steel or of whatever metal it is desired to melt. The ring must be homogeneous and of fairly large section to avoid rupture from the pinch force at the time it commences to melt down. A positive method to avoid this trouble is to pour some molten metal over the ring shortly before it commences to melt. Another equally satisfactory method is to use two rings, one of lower melting point than the other, such as cast iron and steel. As soon as the ring is melted down, the furnace may be charged up to full capacity and metallurgical processes started. A certain amount of metal must always be left in the furnace after each pouring so as to hold the electric circuit complete. This, of course, does not apply in case liquid charges are used, as in duplexing.

It is not possible to start the furnace by using a charge of metal scrap or borings or graphite as the contact resistance becomes too great for the induced current to reach a sufficiently high value for heating.

In discussing the power supply the authors point out that it is usually necessary to install a motor-generator set for each furnace to transform the polyphase standard frequency supply into single-phase low frequency power. By regulating the field excitation of the generator of the set, the power can be varied as desired. The load required being steady the power factor of the furnace is of no interest to the central station as it does not affect the power supplied to the motor-generator set. So far as the central station is concerned, the induction furnace load is polyphase, high power factor, standard frequency and therefore an ideal one.

A 2-ton induction furnace has been in operation at the Pittsfield works of the General Electric Co. for over a year. It is rated 250 kw., 2200 volts, single-phase, 15 cycles with a hearth capacity of 4000 lb. of steel. The general design of the furnace and part of the installation is shown in Figs. 3, 4, 5 and 6. For the refractory and heat insulating material the General Electric Co. has developed for this purpose a refractory called "furnite." The roof is made from firebricks of special shapes, built up as a unit between two steel rings as shown in Fig. 4.

The furnace is provided with four doors, one of which is used exclusively for pouring. A so-called tea-pot pouring spout, as shown in Fig. 4, is used for pouring the metal entirely from below the slag line. The doors are not airtight, and, for the purpose of better control of the furnace atmosphere, the furnace is piped up for gas; one ⅜ in. gas pipe entering the crucible on each side of the three charging doors. By providing lateral doors as shown in Fig. 3, the entire bath is accessible, and slagging operations can be carried out with a minimum of effort.

The 4000 lb. charge forms a ring about 6 ft. diameter, 8 in. deep and 11 in. wide at the top. The charging doors are about 2 ft. wide and 10 in. high. The furnace occupies a floor space of about 12 x 12 ft. No water cooling is used. The available power is 2200 volt, 60 cycles, 2-phase and this is, by means of a motor-generator set, converted into 2200 volt, 15 cycle single-phase power. A 7.5 hp. blower set is provided for the furnace, and a small blower for the generator.

The furnace has, so far, been used almost exclusively for reclamation of different grades of steel scrap. The scrap is delivered either pressed in bundles or in form of small pieces and this is melted and refined in the furnace and poured into ingots.

The lining consists of two parts; the brick or permanent lining and the rammed or replaceable lining. A layer of asbestos sheet is placed around the sides and bottom of the furnace shell before the brick lining is put in. The brick lining is made up of one layer of sil-o-cel bricks around the sides and bottom of the furnace laid up as tightly as possible with a lime-silica bond. Three layers of circular fire bricks are put in the bottom of the furnace and one layer around both the inside and the outside shell. The bricks on the inside wall are laid up with fire clay as tightly as possible, whereas in the outside wall, the bricks are laid loosely so as to allow for expansion. This kind of brick lining serves the purpose of heating insulation

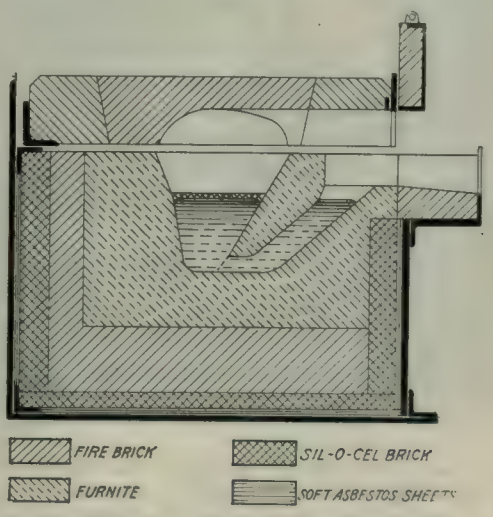


Fig. 4—The Pouring Spout Connects as Indicated with the Lower Part of the Bath and the Section Drawing Shows How the Refractory Material is Built Up

and to support the rammed lining.

The rammed lining is made up of basic material known as "furnite" with a binder of pitch. The rammed lining is put into the furnace in the following manner: A sheet metal cylinder is placed inside the outer brick wall of the furnace and is held at about 2 in. from the brick wall by means of steel spacers. Batches of furnite of approximately 1000 lb. are heated to about 70 deg. C. and mixed with warm pitch. This mixture is spread evenly around the bottom of the furnace, giving a layer between 1½ in. and 2 in. thick, and by means of air rammers the layer is rammed quickly into place. Successive layers are added and rammed before the preceding layer has had a chance to become cold, and after the lining has reached a depth of about 7½ in. it is quickly leveled by means of a straight edge and spirit level and the crucible and pouring spout forms are put in place. Both forms are made of cast iron, the crucible form being washed with kerosene to prevent the lining from sticking. The pouring spout form is allowed to remain in place and is melted down with the starting rings. A thin layer of lining material is put around the forms and tamped into place by hand rammers so as to make a perfect bond with the lining already in place. Successive layers of lining material, approximately 2 in. thick are rammed into place by air rammers until the top of the furnace is reached.

The crucible form, steel spacers and metal cylinders are then carefully removed. The space left between the outside brick wall and the rammed lining is loosely filled with granular calcined magnesite, the doors are cut down to proper level, the starting rings are put in place and the roof and top yoke with the coils placed on the furnace.

To put in the rammed lining requires about 12 hr., the labor being about 75 man-hours. With the exception of a skilled man to supervise the ramming of the lining, unskilled labor is used.

Starting rings of cast iron melt down safely in about 30 hr. The cast steel rings require somewhat longer time, whereas a combination of cast iron and cast steel rings are melted in about the same length of time as cast iron rings. The cast iron ring weighing about 400 lb. is put in the bottom of the crucible and the cast steel ring of about 1300 lb. is placed on top of the cast iron ring. The cast iron ring melts first and the cast steel ring sinks into the molten pool of metal, thus automatically repairing any break which may occur in the cast steel ring. Starting rings are of course used only when a new lining is put into operation.

The combination starting ring gives a molten charge of about 1700 lb. The bath is covered with lime to which is added sufficient fluorspar to make it pasty and sufficient mild steel scrap to bring the charge up to 3500 lb. As low carbon steel is made, iron ore is used to reduce the carbon and the oxidizing slag is withdrawn through the slagging door to remove the phosphorus. The slag is removed in 5 to 10 min. A new lime slag is added (75 lb. lime and 1 lb. spar) and the alloy additions are then made. In about ½ hr. thereafter, 2000 lb. of the charge is poured into an ingot, leaving about 1500 lb. of metal in the furnace.

One ton of metal is poured every 3½ hr. with an average energy consumption of 750 kwhr. in the furnace and 950 kwhr. at the bus bars, which includes power for the crane, lights, etc., and losses in the motor-generator set and the blowers. When melting down scrap which is in such form that the entire charge of one ton can be put in the furnace at one time, the energy consumption at the bus bars was lowered from 950 to 775 kwhr. per ton of metal poured, and the time per heat from 3½ to 2¾ hr.



Fig. 5—Above, Induction Furnace Completely Erected

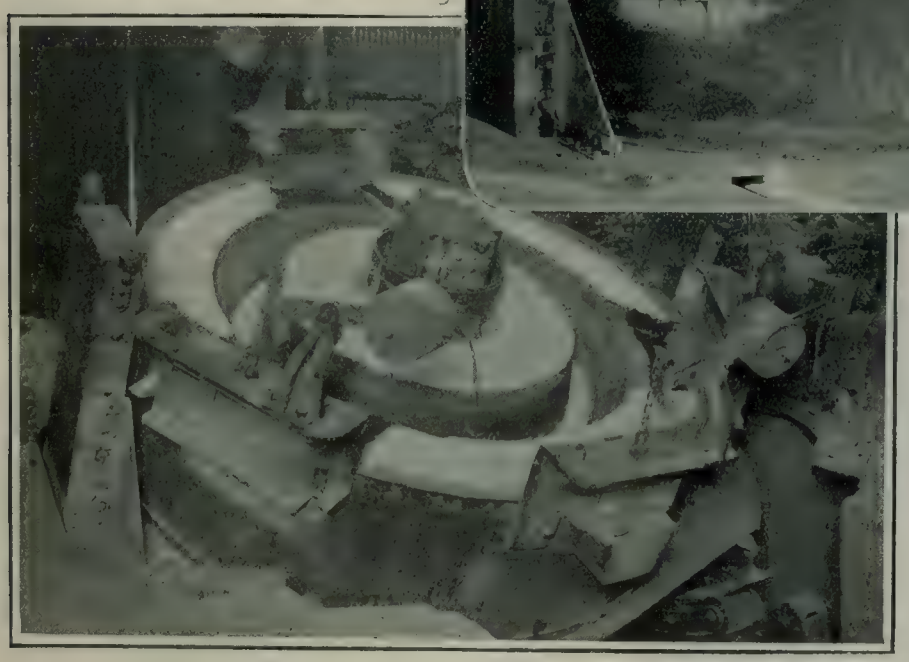


Fig. 6—At Left,—Top Removed, Rammed Lining is Shown in Place

Copper Precipitates on Iron

Extensive experiments carried out by the Chemische Fabriken Weiler-ter-Meer at Uerdingen have shown that in the electrolytic copper plating of iron by the well known process of immersing the wire in a copper sulphate bath, the adding of a small quantity of glue or gelatine had yielded very satisfactory results, an addition of as low as 0.1 per cent of glue having already proved sufficient. It is claimed that, from the viewpoint of economy and reliability, the new process is superior to the old ones.

Liquid fuel is now used on 2536 steamships listed by Lloyd's, the total gross tonnage being 12,797,000, or an average of more than 5000 tons per ship. Seven years ago only 364 steamers were listed as equipped for burning oil fuel, their gross tonnage being some 1,310,000, or an average of about 3300 tons per ship.

Sources of Waste in Building Industry

Duplication of Effort, Poor Management, Slack Production and Arbitrary Labor Regulations, All Blamed

HALF a billion dollars a year in wages is being lost in the building industry through unemployment, it is asserted in a report made public by the Committee on Elimination of Waste in Industry, of the American Engineering Council. Lack of work is declared to be the outstanding fact in this industry, whose critical condition following the war is attributed primarily to high costs of construction.

The committee's investigation covered the entire country, special attention being paid to representative cities such as New York, Boston, Philadelphia, Baltimore, Chicago, Cleveland, Atlanta and San Francisco. The inquiry into the building industry was made as a part of a national assay of waste conducted by the committee, of which J. Parke Channing of New York is chairman and L. W. Wallace of Washington vice-chairman. This assay originated with Herbert Hoover, who recently retired from the presidency of the American Engineering Council, and embraced six leading industries. The building investigation was in charge of Sanford E. Thompson of Boston, who directed a large force of field workers. An abstract of the report follows.

Waste is causing huge losses in building which, including all trades and common labor incidental to it, ranks second among the industries, and contributes to the wealth of the nation more than $3,000,000,000 yearly. Yearly averages for the past six years show that 32 per cent of the activities of the industry, which employs some 3,000,000 mechanics and laborers in a single year, is devoted to residential buildings, and 18 per cent to industrial buildings, "miscellaneous" covering the rest.

How the Waste Originates

Chief among the sources of waste in the building industry are irregular employment, inefficient management and wasteful labor regulations. Customs or conditions prevailing throughout the industry, and poorly designed equipment, are given as secondary causes. The annual economic loss due to accidents is estimated as high as $120,000,000. Application of safety methods, it is stated, would save to the industry 12,000,000 days a year.

Loss through duplication of estimates and designs, and duplication in bidding, runs into the millions. An acute national shortage of housing exists, with costs prohibitive to householder and banker. Improvement in production per man is noted as a result, in part, of weeding out war's misfits. Many union rules are condemned as absolutely wrong. Both employers and employees are blamed for restriction of output.

Haphazard management in planning and controlling work, and lack of standards, which often double the labor cost, characterize most construction undertakings. But a few builders, recognizing the waste in money and man power, are adopting methods that approach modern factory management.

The building trade workman is busy on the average about 190 days in the year, or two-thirds of his time. A few contractors, individually or associated, are attacking this problem with effective results. The public also must be educated to the need of a sensible distribution through the year of its construction requirements. Development of methods of conducting work in cold weather and arrangement of work to provide indoor operations in cold and stormy weather will help here. Idleness, however, is not due entirely to seasonal demands; strikes and lockouts are appreciable causes.

Labor Troubles Most Potent in Wastefulness

One of the great economic wastes to be found in the building industry is the strike. The waste to the men engaged, the contractor and the public is hard to estimate. The major causes of strikes are demands for increase in wages, recognition of the union, decrease in working hours, and jurisdictional disputes. Incidental to these causes and often aggravating them are working conditions, while in almost every case the prime factor is a lack of understanding and failure of the employers and the workers to get together.

From 302 in 1914, the number of strikes and lockouts in the building trades increased to 452 in 1919, an advance of 50 per cent. This increase is accounted for in part by the greater demand for labor in 1919, which inevitably makes the requirements of workmen more exacting and arbitrary. Of the 452, only 18, or 4 per cent, are listed as "lockouts," so that the waste due to lockouts is relatively small.

If the Massachusetts strike rate of 138,519 working days lost in 1920 is applied to the entire industry, a waste of some 3,000,000 days per year is found. If the greatest cause, the demand for an increase in wages, could be eliminated, strikes as a factor of waste would shrink into insignificance. The remedy that suggests itself is co-operation. Management and labor must forget the sore spots of past conflicts and, through wholehearted co-operation, fix by proper studies a minimum wage to correspond with a standard amount of production, with additional compensation for additional output. This would furnish an incentive to the men and would give recognition to deserving mechanics.

Restriction of Output Due to Union Rules

Union regulations have produced enormous losses through direct or indirect restriction of output. Workmen and contractors, however, are beginning to appreciate that reduced output reacts in tremendous fashion upon themselves. Wasteful labor regulations consist of requiring skilled men to do work that could be performed by unskilled, restricting individual incentive through requiring uniform wages, limiting the number of apprentices, excessive reduction of working hours, restricting output by prohibiting the use of labor-saving devices, and jurisdictional regulations, which distribute certain types of work to different trades, frequently without regard to expense.

It must be recognized that the unions are by no means alone in their restriction of output. Contractors and builders and supply dealers affect the situation indirectly by maintenance of high prices, collusion in bidding and unfair practices. Collusion between unions and employers also has sometimes raised prices unduly.

One great fundamental cause for low output is the fact that all members of unions in the same trade are paid the same wage. It has been found that, on construction jobs, there are usually a few men who do one-third more work than the average. These men also do better work. Is it fair that these good men receive the same wage as the others? Restriction of apprentices in many cases is extreme and unfair. Overtime and travel rules, also, tend to increase building costs unduly.

Despite the restrictive action of many of the union regulations there is growing evidence of willingness to co-operate, especially in Philadelphia and San Francisco. In Cleveland co-operation in tile setting was hindered by employers. Co-operation in the needle trade of Montreal is cited as an example for the building industry.

Heavy Losses Involved in Accidents

In some construction trades accidents involve losses up to 10 per cent of the labor cost, in addition to the human loss of lives and energy. The average loss, computed from insurance statistics, is about 2½ per cent of the labor cost. Here also certain contractors have found it possible to cut their accidents in half, through special efforts.

In Massachusetts, during one year, accidents caused

a loss of 485,486 days. In New York State, where four times as many workers are employed in the factories as are employed in building and construction work, there were more fatalities due to accidents in building than in factories during a 4-year period. Accidents are largely caused by carelessness of the workmen, or lack of ordinary safeguards. Conditions which would not be tolerated in a factory for 24 hours are found on every job.

No Lack of Demand for Buildings

The total shortage of housing in 1921 is found to be 53 per cent of the total square footage (the real measure of value) constructed in 1915. To this percentage must be added, if we consider the footage constructed in 1915 as equal to the requirements of that year, 7½ per cent, as an increment to cover the increase in population. The need for building is most evident. Costs are so high, however, that the householder cannot afford to buy, nor can the banker loan money, because of the danger of loss through the inevitable fall in prices. Income tax conditions have forced funds once available for mortgages into tax-exempt securities.

Loss Occasioned by Labor Turnover

Large fluctuations in the number of men employed by representative contractors indicate a great fluctuation in the volume of business carried on. Assuming that the figures for unemployment, due to all causes, in the building trades in Massachusetts are representative of the entire country, and if one-half of this unemployment could have been eliminated, the value to the building industry or its wealth to the country would have been increased as follows: 1915, $106,000,000; 1916, $91,000,000; 1917, $113,000,000; 1918, $85,000,000; 1919, $141,000,000; 1920, $192,000,000.

Representative average conditions in the building trades of Philadelphia and vicinity reveal lost or wasted time as high as 44 per cent among iron workers, 37 per cent among cement finishers, 36 per cent among steam fitters, plasterers' helpers and stone cutters, 40 per cent among roofers and 29 per cent among painters and paper hangers. This percentage is based on the relation of the average days worked per year to the number of effective days possible.

The days at work average 189 per year for the various trades in Philadelphia. The average of estimates reported by contractors is 210 working days a year. Over half of the lost time is laid to bad weather and the balance chiefly to waiting for or looking for work. An extreme example of labor turnover in Philadelphia is the case of a man who, in the course of 5½ years worked for 76 different contractors and was hired 108 times. This enormous turnover causes losses to both employers and men.

How the Unions Can Help the Industry

Unions must co-operate to the extent of eliminating the flat rate for all mechanics of a trade, and of modifying the restriction that forbids mechanics to accept piece work. With definite standards fixed, and with the co-operation of both parties, fair incentives can be introduced. The most encouraging sign in the elimination of the above causes is found in what is known as the "Philadelphia Plan," put forth by the labor element of that city, under which a committee, composed of an equal number of representatives from groups of employer and employed, would constitute a tribunal or council.

General failure of the building industry as a whole to develop and use a greater amount of mechanical equipment is scored. Greater strides have been made in almost every other industry in the application of mechanical means. Union objection to labor-saving devices is wrong in principle and will be relegated to the past, like the restriction of output.

Architects frequently cause expensive delays, and occasionally complete shutdowns, by failure to deliver detail plans and specifications at the proper time. Waste of time and energy and money through duplication of estimates and of designs runs into millions every year. An equal, if not greater, source of waste is said to be the duplication in figuring quantity by all bidders.

The most encouraging feature in the building industry to-day is the action of a few of the builders, and a few groups of building trade workmen, in making intensive studies of the causes and remedies for irregular employment and haphazard conditions of work. Along with this is the growing appreciation on the part of both labor and management that, to build more buildings and maintain high wages, it is necessary to attain greater and greater productive capacity per man.

Never in the history of our country was it so important that certain fundamental principles of economics—principles which are not mere theories, but are based positively on facts—should be accepted and established as a working program. These principles will throw overboard the fallacy that restricting production can make work go further, and will supplant this with the knowledge that to get, one must give; that to receive, the equivalent must be given in money or in time or in effort, and that increased returns can be attained only through increased production.

Handy Aid for Oxy-Acetylene Cutters

A handy aid for the use of metal cutters who use the oxy-acetylene blowpipe has been devised recently by K. McDermott, steam engineer and assistant mechanical engineer of the South Chicago Works of the Illinois Steel Co. It is in the form of a nickel-plated hand rule about a foot long and 1⅛ in. wide and ⅛ in. thick, graduated to indicate tip sizes and oxygen pressures best suited to cutting steel sections of any thickness.

The Illinois Steel Co. uses two different makes of blowpipes and as a common scale would not apply to both, one side of the rule is graduated for one type and the other side for the other. By a proper computation of scale a workman's rule can easily be made for any make of blowpipe. The manner of using the device is simple. Instead of reading thickness in inches and fractions, one reads tip size and pressure, thus rendering unnecessary any resort to memory or reference to a cutting table.

The new device is found to be a time saver and insurance against error and waste if the scale is read correctly. Any one can easily make his own cutting rule suited to the equipment used, as the idea is not patented.



Stockholders of Hame & Chain Company Sue Officers and Directors

Minority stockholders of the National Hame & Chain Co., operating at New Albany, Ind., a large plant, have filed suit against officers, directors and majority stockholders, charging gross mismanagement of the company, payment of large salaries and bonuses, and refusal to pay dividends to minority stockholders, although there is a surplus of $150,000 available. The suit names George D. Todd, former mayor of Louisville, Ky., president; Laura D. Todd, vice-president; J. Gault Fulton, secretary, and Arthur Loomis, treasurer. It is held that officers hold 670 of the 1000 shares of stock. The suit is brought by Joseph Burghard, owner of 300 shares of stock, and Joseph and Austine Burghard as executors of the estate of Ernest R. Burghard, deceased. It is held that officers holding majority of the stock have had control for two years, and will not even allow minority stockholders to investigate the books, and have dissipated assets in an effort to force the minority stockholders to sell.

New Automatic Starter for Motors

The Cutler-Hammer Mfg. Co., Milwaukee, Wis., has developed a new 9604 automatic starter for small squirrel cage motors to allow a large starting inrush for several seconds, but at the same time to give protection against burnout troubles. Two mercury overload relays mounted below the contact fingers, as shown in the illustration, are designed to eliminate all fuse troubles and the attendant expense, while allowing momentary overloads and overloads as high as 25 per cent for a limited period.



Two Mercury Overload Relays Eliminate Fuse Troubles

The new overload relay consists of a glass tube carrying a mercury column which forms a part of pilot circuit of the magnetic switch coil. A portion of this column is surrounded by a heating coil or thermal element. This element is in series with the motor circuit and is heated in the same proportion as the motor windings. Excessive current passing for too long a period heats the coil, causes the mercury to boil and the vapor to pass up into a chamber at the top of the tube. This action breaks the liquid mercury column and opens the circuit to the magnet coil. As this coil is de-energized, the contact fingers drop away and disconnect the motor from the line. After such an interruption, the mercury cools down, becomes liquid again, drops back into the tube so that the pilot circuit to the magnet coil is complete when the control button is depressed. In other words, the relays quickly reset themselves. The motor will not start, however, until the control button is depressed after the relays have reset.

As the functioning of these overload relays depends upon the temperature at which mercury will boil, the current required to operate the relay increases with the decrease in the temperature of the surrounding air. In other words, if the motor and the starter are installed in a cool location, the relay permits a greater starting current or a higher overload than if the temperature of the surrounding air were higher. If the motor and starter are located in an unduly hot place, the mercury relays will act in the place of a thermocouple.

The push button station which is supplied with C-H 9604 starters can be installed in any position that is most convenient for the operator. The starters may be used in connection with machinery driven by squirrel cage motors of comparatively small horsepower, 7½ hp. and less.

Court Proceedings of Walden Worcester, Inc.

In recent proceedings brought by Walden Worcester, Inc., Worcester, Mass., against the American Grinder Mfg. Co., Milwaukee, Wis., for the cancellation of the latter's trade-mark "Blackhawk," the United States patent office has rendered a decision favorable to Walden Worcester, Inc., the patent office examiner holding that Walden Worcester, Inc. (who is proprietor of the trade-mark "Tomahawk") has been injured by the registration of the trade-mark "Blackhawk."

Walden Worcester, Inc., has also recently instituted suit in equity in the Federal District Court of Wisconsin against this same company for alleged unfair competition, and trade-mark and patent infringements. C. N. and F. W. Jonas Brothers of Chicago, San Francisco and Los Angeles are made joint defendants. C. N. and F. W. Jonas Brothers at one time were selling agents in the West for Walden Worcester.

July Steel Ingot Output Very Small

The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in July of 803,376 gross tons as compared with 1,003,406 tons in June. The decrease was 200,030 tons or 19.9 per cent. Estimating the production of other companies on the basis of those reporting, the total output of ingots in July was 954,128 tons or 38.126 tons per operating day, counting 25 working days in July against an estimated total of 1,191,693 tons, or 47,667 tons per operating day, in June. This is a decrease of 237,565 tons or 9,541 tons per day. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

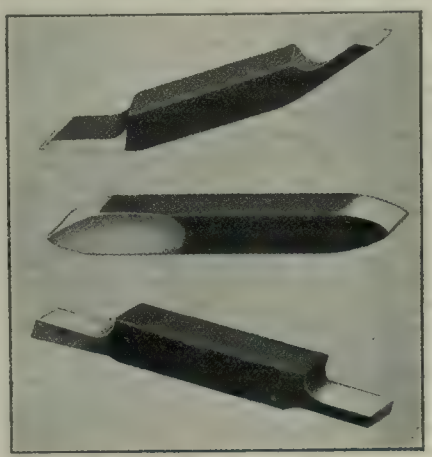
	Open Hearth	Bessemer	All Other	Total
January, 1920	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920	26,197,843	8,112,753	121,656	34,432,252
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376

The July ingot production was at the yearly rate of 11,857,186 tons, counting 311 operating days to the year. This compares with a rate in June of 14,824,437 tons, in May of 17,980,465 tons, in April of 17,242,773 tons and in March of 21,258,405 tons.

The decrease of 237,565 tons in the estimated ingot output of all companies in July from that in June compares with a decrease of 200,278 tons in the July pig iron output from that of June.

New England Tool Bits

The New England Tool & Machine Co., 51 Taylor Street, Springfield, Mass., has placed on the market tool bits, manufactured under a patented process, to fit standard tool holders taking square stock, in the following sizes: 3/16 in., ¼ in., 5/16 in., ⅜ in., 7/16 in. and ½ in. These tools are cut from annealed bars. The thread tools are ground on a special block and the flat and angles on the U. S. standard threads are ground with the same operation, proper clearance being allowed. They have a cutting edge on both ends and are offered to the machine shop trade with a view to cutting down production costs by eliminating time spent by workers in grinding tools. Their size permits checking in and out of tool cribs as are drills and other tools, thereby eliminating loss sustained in tool bits as usually handled in the shop.

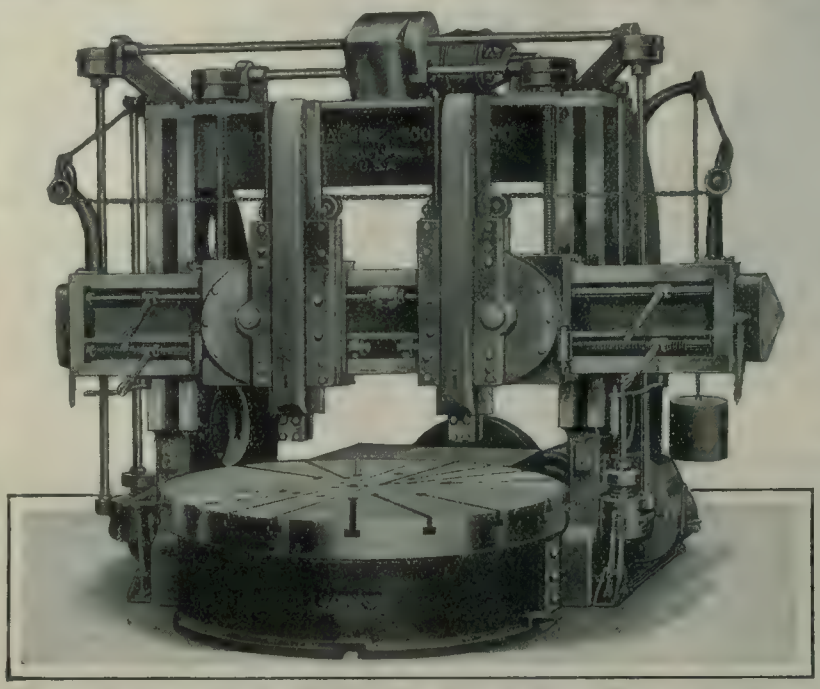


Thread Tools are Ground On a Special Block

Vertical Turning and Boring Mill

The vertical turning and boring mill shown in the accompanying illustration is being offered by the Jones Machine Tool Works, Philadelphia, in 60, 72, 84, 100, 120 and 144-in. sizes.

One of the outstanding improvements incorporated is the push button control for starting and stopping the motor. Other levers are conveniently located on each side of the machine. The drive is by a constant or variable speed motor, the constant speed motor giving 16 changes of speed through the change speed box. From the motor the drive is through heat-treated steel sliding change speed gears, miter gears and pinion to the large steel ring gear, which is bolted to the under side of the table.



Push-button Control for the Driving Motor Is a Feature. The table runs in an annular flat-shaped bearing constantly lubricated

The table runs in an annular flat-shaped bearing of large diameter constantly lubricated, and is driven by the steel spur gear. The table spindle is supported in vertical bronze bearings located in the main base. The top vertical bearing is cone shaped, adjustable for wear, and the lower bearing is straight with the lower end supporting the step bearing. This is composed of alternate layers of bronze and steel washers which run in oil and are used for raising the table off the annular bearings when machining small, light work at high speeds. The housings are of box-girder pattern, bolted to the base and tied together by the bridge, which also supports the elevating mechanism.

The crossrail is of the three-track type, the saddle screws being located between the two lower tracks, the worm shafts for operating the rams being between the two upper tracks. The crossrail is clamped to the inner and outer guides of the housings and is raised or lowered through steel screws and bronze nuts by power from a motor on the bridge. The saddles are fitted with clamps and bronze taper gibs for taking up wear, also a clamping screw for locking the saddles to the crossrail when the ram is feeding. Operation is by hand ratchet feed for fine adjustment; power feed or quick traverse through steel worm and bronze nut. The rams are scraped and fitted in saddle swivels, which are made to swivel 30 deg. either side of vertical by ratchet wrench through a steel worm and worn-gear segment, the face of the segment being graduated in degrees to indicate the angle. The rams can be operated by hand-ratchet feed, power feed or quick traverse through a steel worm and bronze worm gear, steel pinion and rack. Counterweights are located in the rear side of the housing. Clamping screws are provided for locking the rams when saddles are feeding. Tool holders are from steel forgings and have a taper shank, straight shank being furnished if desired.

Change speed gears are of 0.60 to 0.70 carbon heat-treated steel and are of the sliding type, positive, no friction clutches being employed except when the machine is belt driven. Shaft bearings are bronze bushed and all parts inside the speed box run in a bath of oil. The table is stopped in any position by throwing the power off by foot brake when the machine is belt driven, or by an electric brake of the solenoid type when motor driven. Feeds for saddles and rams are independent for each side of the machine, and safety friction clutches are provided to prevent breakage in case the saddle or bar become jammed. The rapid power traverse driving shafts receive power from the motor on the bridge, and the operating levers are at each end of the crossrail. They are independent for operating each side of the machine.

New Export Organization

The Associated Machinery Corporation, recently incorporated with capital stock of $50,000 by four manufacturers of contractors equipment, has opened an office at 50 Church Street, New York, in charge of Charles L. Langlotz. The company will act as an export selling agent to India, Burma and Ceylon for the Pawling & Harnischfeger Co., Milwaukee, Wis., electric traveling cranes, ditchers, excavators, etc.; the Chain Belt Co., Milwaukee, Wis., chain, water screens, concrete mixers, sprockets, elevators and conveyors; the Insley Mfg. Co., Indianapolis, Ind., clamps and excavators, and the Novo Engine Co., Lansing, Mich. The branch in India will be in charge of Lionel R. Vinall-Moon, who recently sailed for India to establish the first office of the company at Rangoon. Both Mr. Langlotz and Mr. Vinall-Moon were formerly associated with the Allied Machinery Co., New York, the former being in the New York office and the latter the representative in India.

Ford Motor Co.'s Furnace Breaks Its Record

Last month blast furnace A of the Ford Motor Co., Dearborn, Mich., broke its previous records for tonnage and coke consumed per ton of iron. Average tons per day, 509.8; coke per ton of iron, 1981 lb.; average silicon 2.85 per cent; average sulphur, 0.029.

The Central Pennsylvania Coal Producers' Association has addressed another letter to John Brophy, president of district No. 2, United Mine Workers of America, asking for a joint conference on or before Aug. 5, the purpose being to discuss the wage reduction question. Past invitations of the operators for a conference have been turned down by Brophy on the ground that the requests did not specify the reason for the meeting.

The Rolls-Royce Co. of America, East Springfield, Mass., plant closed July 29 for five weeks or until Sept. 6. A month ago the company employed 800, but at the time of closing the number had been cut in half. Early in July the plant was closed two weeks.

Tilley & Brown, metal heating engineers, Plainfield, N. J., have been awarded the contract for the new mold and core drying oven and fuel oil system in the plant of the Monel Metal Products Corporation, Bayonne, N. J.

CONTENTS

Electromagnets in a Plate Cooling Bed 321
Features of Plate Mill of Dorman, Long & Co., England, Notable for Its Size

Trent Process for Cleaning Powdered Coal 323
Agitation Method of Producing an Amalgam and Eliminating Ash from Low-Grade Fuels

Analysis Costs of Drop-Forging 325
Comparison of Steam and Board Drop Hammers—Rate of Production—Dividing Line Between Types

Possibilities of Fusion Welding 327
Conditions for This Type of Weld—Control of Welders—Test of Welds—Success with Alloy Steels

Electrical Cleaning of Blast Furnace Gases 329
What the Problem Is—Why Present Methods Fall Short of Desired Results—How Electrical Screen Works

Embrittling Effect of Pickling Upon Carbon Steel 334
Study of Grain Sizes Shows That Pickling Increases Width of Junction Lines Between Grains

German Small Tool Prices the Lowest 341
Twist Drills 50 Per Cent Less Than British—British Compete with United States and Germany Only on High-Speed Tools

New Type of Induction Electric Furnace 344
Primary Winding Above Bath—Experience with 2-Ton Unit—For Refining Molten Metal and Melting Ferromanganese

Sources of Waste in Building Industry 347
Duplication of Effort, Poor Management, Slack Production and Arbitrary Labor Regulations Blamed

Double Back-Geared Engine Lathe..... 324
Metal Trades Exhibition in Indianapolis. 324
Gain in Pittsburgh Industries..... 324
Standard Samples for Bearing Metals.... 324
Electric Furnace Regulator..... 328
Coal Handling Plant for Melbourne..... 335
Employment Notes 335, 339
Manganese Ore Freight Rate..... 335
Gearless Rock Crusher..... 336
Pressed Steel Tunnel Linings..... 336
Trade Association Practices..... 337
Lake Ore Movement in July..... 337
Lake Ore Analyses for 1921..... 337
Machine for Drilling and Tapping Spoke Nipples 338
Denied Hearing in Railroad Labor Case.. 339
Cylinder Block Regrinding Jig..... 340
Industrial Activities in New England.... 340
Wire Straightening and Cutting Machine. 340
German Economy Movement..... 343
Wage Rates Low Abroad..... 343
Copper Precipitates on Iron..... 346
Aid for Oxy-Acetylene Cutters..... 348

Automatic Starter for Motors..... 349
July Ingot Production..... 349
New England Tool Bits..... 349
Vertical Turning and Boring Mill..... 350
New Export Organization..... 350
Ford Motor Furnace Record..... 350
Editorials 352
Steel Prices and Costs—Sentiment and Business—Outlook in British Steel—German Steel Exports—Larger Use of Alloy Steel Castings—Copper vs. Steel for Boiler Tubes
Correspondence 355
Cold Worked Steel—Proposal to License Business Men
Census on Wire Manufactures..... 356
Canadain Iron Production 357
Foreign Trade Conditions.....357, 374
Tariff and Tax Legislation..... 375
Intervention in Pittsburgh Plus Case..... 375
Sharp Cut in Shovels..... 375
Industrial Finance 383

Iron and Steel Markets.....358
Comparison of Prices.....359
Prices Finished Iron and Steel, f.o.b. Pittsburgh.....370
Non-Ferrous Metal Markets.....371
Personal Notes.....372
Obituary Notes.....373
Machinery Markets and News of the Works.....376
New York Jobbers' Prices.....384

ESTABLISHED 1855

THE IRON AGE

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Steel Prices and Costs

Much light on the condition of the railroads has been shed by tables and charts showing the disposition of "the railroad dollar." The *Railway Age* of July 30 had a full-page colored chart on this, with another showing the total receipts and disbursements. An appraisal of the condition and prospects as to steel prices would be greatly aided by a similar presentation, but this is impossible because the figures are not reported. In the case of railroads the official reports furnish the necessary data.

Anyone at all familiar with the business of producing steel, however, can make some rough estimates that will be enlightening. The object, of course, is to gage present prices for steel and see upon what foundation they rest. THE IRON AGE composite price of finished steel products that comprise 88 per cent of the total output of the country in finished steel stands at 40 per cent above the average in the ten years ended June 30, 1914. The two largest parts of the iron and steel industry's dollar are wages and freight rates. If a 30-cent rate for common labor becomes standard, that will be 58 per cent above the 19-cent rate paid in 1914, but a still higher percentage above the average rate paid in the ten-year period on which the 40 per cent increase in steel prices is figured, for wages had been advancing more or less steadily from a 13-cent rate in 1898. As to freight rates, they are up from 75 to 100 per cent. General supplies for mills, furnaces, mines and coke works are up by large percentages. Coal at mine is up much more than 40 per cent. The Steel Corporation's taxes, outside of Federal taxes, increased about 125 per cent from 1913 to 1920, while its property account as shown on the balance sheet increased less than 10 per cent.

As to the part of the iron and steel industry's dollar that goes to "capital," the Steel Corporation's report for 1913, a year with earnings 17 per cent greater than the average in the ten-year period on which the steel price comparison is based, showed 28 cents out of each dollar received from the public as making up bond interest, sinking funds, depreciation and extraordinary replacements (some of which represented labor and freights ultimately), dividends and surplus.

While these references are not complete and precise they show increases in necessary expenditures so much greater than the increase in market prices that it is clear the steel industry is much worse off with the prices of to-day than it was during the ten years before the war. If the experience of those ten years is a criterion, steel prices to-day are considerably below a normal relation to the cost of production. That is a condition as to prices that was to be expected by reason of the lightness of demand and the strenuous character of the market competition. The point is that the condition has arrived. It is not something that is expected to be developed in future by further price declines.

Before the war steel prices went below the average and above the average. Already they are below the normal relation, and the only remaining question is how much farther below the normal they can go, until one of two things occurs, or both—an advance in prices or a decrease in costs, represented in wages, freights and other expenditures.

Sentiment and Business

As a nation we have been very prone to overwork certain words, a practice that represents loose habits of thinking or at least loose habits of speaking. The words "optimism," "sentiment" and lately "normalcy" have been used rather too much. Optimism is a trait of character, its antonym being pessimism. Given the same set of facts, the optimist views them one way, the pessimist the other way. Yet men use these words to indicate the character of facts, not the character of the man who views the facts.

Then as to "sentiment," the word is commonly used in the form that sentiment is better or sentiment is worse, the actual meaning being that men appraise business conditions as better or worse. It may be held that this diffusive way of speaking does no harm, because people understand what is meant. It does do harm, because unconsciously if not consciously men associate "sentiment" with what the word really means. One of the dictionary definitions of the word is "a judgment permeated or prompted by feeling." We do not

want that in business. When it is said that "sentiment is better" in business we want it to be that the calm and deliberate judgment of business men, not influenced by sentiment, is that the fundamental conditions of business have improved. If, for instance, the taking out of building permits has increased, the amount of debits to individual accounts at banks has grown, the freight ton-mileage of the railroads is heavier, and the volume of orders received by sellers is larger, it is much better to say that these conditions have improved than to remark lamely that men who have observed and analyzed these things are displaying "a better sentiment."

What American business needs is to study facts. It has been misled all too often by its feelings, and it has helped itself do this by overuse of such words as optimism and sentiment. Secretary Hoover recognized this at the outset in his work in the present cabinet, and purposes to give business all the concrete information that can be made available as to actual commercial movements and conditions. In this program there will be no statistics of the number of pessimists and optimists who were in business, on an average, during the ten years before the war, and the relative proportions month by month at the present time, and no graphs of the amount by which the judgment of business men is "permeated or prompted by feeling."

Another word often used harmfully is the word "waiting." We are told that there is a "waiting" market. Originally, perhaps, the word was introduced into market nomenclature to suggest, as to a dull market, that it was not permanently dull, that the condition was only temporary. If that was the motive, it was good; but with a careless habit of thought and expression we have fallen into the way of picking on the first thing that comes to mind, though preferably something that cannot occur soon, and then glibly saying that the market is waiting on that. Just now it is a reduction in freight rates. Nobody knows that men in general are waiting for that event and a canvass of individuals might fail to find a single man who was waiting to act in his own business until freight rates were reduced. Yet we say business is waiting on the rate reduction and thus close our minds to the possibility of an improvement in business before that time, which may be six months or more in the future.

A measure of the effect of the war and submarine destruction on the world's shipping industry is afforded by a comparison of British and American steel plate exports before and since the war. For 1912 and 1913 the two countries shipped out 11,450 tons and 22,550 tons of plates per month, respectively, the exports from the United States being about twice those from Great Britain. In 1919 and 1920, however, British exports rose to 18,250 tons per month while those from the United States were 70,300 tons per month. Even for the first quarter of 1921 the British exports were 24,700 tons and the American 76,200 tons per month; but both have declined drastically since. Never in the history of any country were the steel plate exports so heavy as in the last 27 months from American mills, at nearly 71,000 tons per month. Nor is it likely that this record will ever again be approached. Keen competition may be expected for the world's needs in plates and serious study must be given to finding an outlet for the increased American steel plate capacity.

The Outlook in British Steel

British steel manufacturers are staggered by the magnitude of the difficulties they now face. The coal strike has been settled, but iron and steel manufacturers cannot go ahead at the high prices they must pay for fuel. The boom of 1919 and its overhang in 1920 pushed the British steel market pounds per ton above what German, Belgian and French makers were willing to do. After the coal strike settlement British prices came off from £3 to £5 per ton, but they are still so far above those named on the Continent as to put British works out of the running as to most of the current export trade. In a recent statement issued jointly by the National Federation of Iron and Steel Manufacturers on behalf of employers and the Iron and Steel Trades Confederation for the workmen, the opinion was expressed that "in view of foreign conditions the industry will not be able to export unless fuel as well as other items of cost are reduced to a level not higher than from 75 to 100 per cent above pre-war." The statement further says that the difficulties confronting the industry "are not of its own making nor within its control; they exist largely from political causes and appear to us to require Government attention."

The London *Ironmonger*, commenting on the concluding words in the above, expresses surprise that the steel industry, "which was among the first to demand the cessation of all Government interference, should now begin to talk of Government assistance." It adds:

> There have been times of great depression in the trade before now, and the industry has always pulled through by the exercise of courage and self-reliance. It may be, however, that the present depression came at a time when the makers were less prepared to meet it than on any previous occasion. There have been changes in the administrative staffs of many works during the six years of war, and the periods of control and afterward of booming prices which followed did not provide the best experience for dealing with the depression when it came. The works that best organize themselves to meet conditions surpassing the keenest pre-war competition will be the most successful in the future; and although at the moment the cost of fuel is the main factor, enterprise and enlightened guidance are bound to make their effect felt in the end.

There is no question that high fuel and labor costs will continue for a long time to be a serious handicap to British steel manufacturers in the export trade. Production of British steel will not resume on any scale until the price of coal comes down 50 per cent or more and it will be many a day before such a drastic readjustment can take place, with the control of coal production and prices so largely in the hands of the labor unions.

It seems likely, moreover, that Continental steel will be increasingly a factor in the British market. There is scarcely a quotable market, in fact, in British material, the business done being in the smallest quantities and from accumulated stock. The nearest approach to the real steel market in Great Britain to-day would be the quotation of prices now being paid there for Continental iron and steel.

It is true, as the editorial quoted above reminds the counsellors of despair, that the British steel industry has always pulled through—just as the nation has been able to pull itself together when there seemed nothing ahead but disaster. Doubtless the way will be found at length out of the dangers that now loom up so threateningly; but it must be said that the pessimists have most of the facts on their side as the case stands to-day.

German Steel Exports

While Germany's production of pig iron and steel is not yet made public, figures as to the foreign trade in iron and steel are available, though rather old. *Stahl und Eisen* for June 30, 1921, gives details of exports and imports for the first eleven months of 1920, which indicate unmistakable recovery as far back as eight months ago. A comparison of last year's exports and imports with the pre-war movements is made in the following table:

	Exports Tons Per Month	*Imports Tons Per Month*
1912	456,600	23,700
1913	479,800	25,400
1920 (11 months)	142,600	32,500

German steel exports at the end of last year were at more than one-third the pre-war rate, the average for September, October and November having been 176,111 tons, or about 36.7 per cent of the 1913 figures. Of last year's exports about 40 per cent, or 57,351 tons per month, were steel bars, plates, sheets and structural steel.

Germany lost by the war nearly 40 per cent of her steelmaking capacity. In view of that loss and of the country's handicap in raw materials, the record in exports last year is not only surprising but points to very considerable exploits in the countries to the east, particularly Russia, when those outlets are opened, as they are bound to be in the next few years.

Larger Use of Alloy Steel Castings

The character of the steel casting output of the country is changing. A comparison of the 1920 statistics with those for 1913 shows this quite clearly. While the total steel casting production last year in relation to the total steel output was practically the same as in 1913, or about 3 per cent, the ratio by processes was quite different. There was a marked decrease in the proportion of open-hearth castings and a sharp increase in the electric furnace product last year. In 1913 open-hearth steel castings were about 89 per cent of the total, but in 1920 the percentage declined to about 78. There was an increase of 5 per cent in Tropenas or side-blow converter castings last year over 1913; but the striking gain was in electric steel castings. In 1913 electric steel castings were less than 1 per cent (0.88 per cent) of the total, but in 1920 they were 12.4 per cent, last year's output exceeding even the record of any war year, which adds to its significance.

Even more noteworthy is the showing for alloy steel castings, the use of which has developed rapidly, particularly those made in electric furnaces. It is true that in 1912 and 1913 the total of alloy castings exceeded any records before or since, but this was due mostly to the large number of locomotive engine frames made of vanadium cast steel, these being in great demand at that time. Electrically made alloy castings last year exceeded any war or pre-war record, having been 11,710 gross tons, as compared with 6057 tons in 1919 and only 926 tons in 1916 and practically none in 1913.

It is evident that in the development of the steel foundry industry, the electric process is to play a prominent part. Not only is this true of ordinary steel castings, but especially of alloy castings, which are more and more in demand as a substitute for alloy forgings. The many available alloy steels and the assurance of their almost perfect heat treatment, combined with decreased cost as compared with forgings, make this possible.

Copper vs. Steel for Boiler Tubes

While it has been the general practice in the United States for half a century to fit steel tubes in locomotive boilers, this does not appear to have been the case in Europe. Copper boiler tubes are said to have been coming into use to a large and increasing extent in England, Australia and South America, while brass tubes on the Continent of Europe are very largely used. Exigencies of the war cut down the use of copper, but efforts are now under way to force copper to the front as the material for this purpose.

In a pamphlet issued by the Brass and Copper Tube Association of Birmingham, England, the relative advantages of the two metals from the standpoint of the British manufacturer are set forth. These advantages appear to some extent clear cut, but in others require analysis. Thus it is stated that the average life of steel boiler tubes is from 80,000 to 120,000 miles, or roughly, four years. Copper tubes, on the other hand, are credited with a life of from 240,000 to 360,000 miles or some 12 years, while as much as 480,000 miles was said to have been obtained.

With a life stated to be three times that of steel tubes, the first cost of the copper tubes is put at only about twice that of the former; and it has been estimated that during a period of 12 years the cost of a ton of copper tubes, plus interest on the investment and minus the scrap value of old tubes, would figure out at £186. This contrasts with an estimate of £293 for steel.

In making the above calculation, the first set of steel tubes is figured at £70 6s. 4d., which with interest amounts to £79 at the time the second set is installed. The investment stands at £175 at the

date of installation of the third set. The net cost is found by adding interest to this item and deducting, each four years, a set of old tubes at £10 per ton, after allowing 25 per cent for loss of weight.

Similarly, the copper tubes figured at £138 per ton amount in 12 years at 5 per cent compound interest to £247. From this is deducted the scrap value of the old tubes at £72 per ton, after allowing 15 per cent for loss of weight.

Attention is called also to possible fuel economies through using the tube of greater heat conductivity than is inherent in steel, and to the savings both in expenses and in locomotive operating time from the less frequent renewing of tubes.

CORRESPONDENCE

Cold Worked Steel

To the Editor: The interesting article in THE IRON AGE of July 21 by C. E. Bregenzer, entitled "Production and Uses of Cold Drawn Steel," should have a few words of explanation and interpretation.

The title is incorrect because a great many of the parts which are listed are cold rolled and not cold drawn. A much more appropriate heading would have been "Production and Uses of Cold Worked Steel." Strip, from which many of the parts are made, such as washers, collars, go-cart trimming, alarm clock cases, brake bands, diaphragms, etc., cannot be cold worked by any other method than rolling. Axles, arbors, shafts, shafting, special shapes, etc., are drawn. Here again the qualifying statement should appear; all axles or shafting cannot be cold drawn.

In the process of drawing the flow of the metal at the surface is faster than it is in the center, resulting in a greater tension or hardness at the surface, which may be likened to a tightly drawn skin. When a keyway is made lengthwise to the bar there is a tendency for the steel to spread at the edges of the cut, increasing the diameter of the bar at that point and throwing it sometimes considerably out of round.

In relation to shapes, the author has stated that "any shape can be drawn for which a die can be made." This, however, is not really true, as there are many shapes which it is impossible to draw because of the sharpness of the angle or the length to which it is necessary to make the metal flow in order to fill out the die. There are limitations. It would have been much better to have stated that "there are few shapes which cannot be produced by cold drawing." That would more or less limit the statement.

It is to be hoped that the article will develop discussion among manufacturers who use steel in the construction of their product, because the interests of the industry, which, according to Mr. Bregenzer's figures, amounts to approximately 3 per cent of the total finished steel products, can be very materially advanced through a better understanding of the needs of manufacturers. Manufacturers should take the steel mills into their confidence and furnish full information regarding the part to be manufactured, its function and the conditions under which it operates, so that they may take advantage of the steel companies' greater knowledge of steel, gained through constant research and experiment. Most steel companies have a very complete laboratory, which is at the service of manufacturers.

The production figures which Mr. Bregenzer gives and the distribution by major industries are certainly interesting, and are the first really authentic information which has come to my notice. Personally, we appreciate very much the efforts put forth to give cold worked steel some little publicity and in this I am sure other makers of cold worked steel will concur.

C. E. MACCONNELL,
Advertising Manager,
Lancaster Steel Products Corporation.
Lancaster, Pa., Aug. 2.

Proposal to License Business Men

To the Editor: To "start something," in the slang phrase, implies the setting in motion of an extended train of thought or action. This was probably intended to be the effect of the article recently summarized by THE IRON AGE on page 86 of the issue of July 14, and justly qualified as notable. Reading the article without knowing its authorship, the suggestion put forth, that no man should be allowed to engage in important business without passing an examination and securing a license, might be supposed to be the product of some parlor radical who believes that government can take the place of individual initiative; as if "Book-taught Bilkins" could ever be able to show the experienced mechanic how to do his work well. The writer of the article is, however, Alvan T. Simonds, the successful president of the Simonds Mfg. Co., widely known as one of the strongest American manufacturing concerns, maker of saws, knives, files and steel. Evidently, Mr. Simonds put forth his interesting suggestion with the intention of "starting something." It will be of interest to take up the train of thought, and consider whether it would be possible to insure the business world against the consequence of failures of corporations or individuals through any system of examination and licensing of those about to engage in new enterprises.

What Licenses Are For

It is stated in the article that licenses are required to be obtained by men about to engage in the practice of law or medicine. Licenses are also required of steam engineers, automobile operators, and many others who engage in professions or trades which may have direct effect upon the welfare, health or morals of the public. However, the examinations or investigations required prior to the granting of such licenses are not intended to determine whether the applicant will be successful in his own affairs, but only whether he possesses sufficient knowledge to avoid conspicuous errors likely to lead to accidents or danger to himself or others.

A physician earning a scanty livelihood in a small town has passed the same State requirements as the immensely wealthy specialist in the large city. One steam engineer with a first class license earns $3 per day; another with the same grade of license may earn $5,000 per year. The licensed man is supposed to have sufficient knowledge so that he will not prescribe poison by mistake for a helpful drug, or pump cold water into an overheated boiler. But whether the licensee will become a highly valuable member of society, or make less than a bare living for himself and family, is something which no license can ever determine.

The examination required of the lawyer on entering practice is for an entirely different purpose. It is rather to insure his knowledge of ethics and general code of practice of the legal profession, than to guard against his ignorance of points of law. Something to the same end, of maintaining a somewhat definite moral code, is obtained by the membership of the stock exchanges, operating as they do as clubs or voluntary organizations, requiring certain practices of their members, and dismissing those whose methods depart too flagrantly from the accepted code of the organization.

Business Success and an Educational Test

In the proposition to license men about to engage in important business, it must be that Mr. Simonds has in mind something other than the mere certification that the candidate has a good knowledge of economic laws. Records of the great commercial agencies show that over a long period of years the average of business failures is considerably under 1 per cent, and in recent years, tends to one-half of 1 per cent. Surely Mr. Simonds does not intend to imply that 99 per cent

of business men have that thorough knowledge of fundamental economic laws which he suggests should be determined by examination and licenses, nor that the greater proportion of the 1 per cent of failure is due to ignorance of economics.

It is a fair conclusion that business success comes to a large majority of men who are by no means fitted by any test of education or knowledge of principles to obtain it. The fact, cited by Mr. Simonds, that 120,000 corporations in the United States in 1917 produced no profits, shows only that 1917 was an abnormal period, which indeed we all know; and the same is true of the month of February, 1921, in which, according to Mr. Simonds, there were 1641 commercial failures, representing an indebtedness of over sixty million dollars.

Few Know Economical Principles

It is not possible to conceive that any considerable proportion of these failures could have been avoided by an average knowledge of the principle of economics, and an average knowledge is all that could be insured by any form of examination. Since the close of the war in 1918 it was perfectly evident to the very few men who were willing to think in international terms and study world conditions, that a huge financial crisis was impending. However, a search of the printed records of the past three years shows only two names, Richard Martens and Frank A. Vanderlip, who were conspicuous for their bold telling of the truth about the economic situation. The vast majority of recognized successful leaders of trade and industry in the United States are, on the contrary, on record repeatedly up to within twelve months of this writing, as predicting unlimited prosperity, continuance of industrial activity, vast profits, and higher and higher prices for American commodities demanded by all the world; and this in spite of the fact that all of the nations engaged in the late world war were financially exhausted, and operating their governments at enormous deficits.

The Ship Captain Is a Typical Leader

The secret of success in business is not in education, nor in experience, nor in any set of qualities or attainments which can be definitely analyzed and set apart. Mr. Simonds' illustration of the ship captain, entrusted with the welfare of ship, passengers and crew, gives a clew to the secret of success in leadership. Evidently the captain's success is not due to education alone; the mates have as good a knowledge of navigation as the captain, and often indeed the captain is less experienced than they. The ship captain's supremacy is due to his ability to control men, and to think and act quickly and correctly, whatever the crisis. No mere examination can determine whether a man who has studied navigation and sailed the seas for years has in him the necessary qualities for a successful captain.

All life activity is the result of individual initiative. The successful man is he who is able to create an idea, give it shape and form, and carry it out to a useful result. The qualities of success are often found in men totally ignorant of economic laws; yesterday keeping a small news stand, to-day operating a large organization; yesterday carrying a hod, to-day building and owning a block of houses.

Business Laws Like Rules of a Game

The laws which we have made to govern the operations of business are like the rules of a game. Rules of play are not to make the players successful, but to provide a standard of practice by which the game shall proceed to the greatest satisfaction to the players. From time to time we find that the public comfort can be promoted by changes in practices, and laws are passed to insure their adoption. In this way we have gradually forbidden the employment of children, and the continuance of unhealthful conditions of work. We have spread the cost of accidents over industries as a whole, through systems of labor insurance. We have done away with the practice of lower prices for wholesale transactions in the case of transportation lines, without disturbing it in other fields of business. But all these laws are only rules in the business game, intended to provide equality between those more willing to observe the public interests and those interested only in furthering their own ends.

Business failures will always occur, no matter how well informed the leaders of industries may be. World-wide depressions, crop failures, and stock panics are no less "acts of God" than are floods and fires. The widest knowledge and the greatest foresight will not enable a man to succeed under every condition. The man who has a fundamental knowledge of economic laws has the advantage over him who has not, just as the man who knows the details of the technical side of his industry has the advantage of him who has no such knowledge.

It may be that at some time in the distant future, it will be possible to analyze and classify the subtle qualities which promote success in business and to teach these in our schools. At the present time, however, the civilized world appears thoroughly convinced that governmental interference with a man's right to practice his business in the best way he knows how is the most unfortunate experiment a nation can make.

STERLING H. BUNNELL,
Bunnell, Macy & Henriques,
Consulting Engineers.
New York.

Census Report on Wire Manufactures

WASHINGTON, Aug. 9.—The United States census report shows the value of the output of iron and steel wire manufactures in 1919 was $264,778,000, an increase of 128 per cent compared with that of 1914. The output of copper wire and wire manufactures in 1919 was $114,234,200, an increase of 166 per cent over 1914 and the output of brass wire was valued at $16,024,500, an increase of 152 per cent.

Total production of iron and steel wire in 1919 was 2,508,890 short tons, an increase of but 3 per cent over 1914. Of this 592,430 tons were for sale as plain wire. The production of coated wire for sale as such in 1919, chiefly galvanized wire, was 392,925 tons as compared with 374,480 tons in 1914. Production of wire nails and spikes amounted to 12,429,200 kegs, a quantity decrease of 3.5 per cent as compared with 1914. Production of barbed wire totaled 341,130 tons, 75 per cent less than the output in 1914. Wire rope, cable and strand, showed an increase from 52,740 tons in 1914 to 103,010 in 1919. The output of woven wire fence and poultry netting, aggregating 312,150 tons, was 24 per cent less than the output in 1914, but the higher unit prices in 1919 resulted in materially greater values for all classes of products, the values of the respective years being $419,795,800 and $30,527,000.

Total production of bare copper wire in 1919 was 193,370 tons, of which 161,660 tons were sold as such, at a value of $68,011,300. The production for sale in 1914 was 84,920 tons, valued at $26,206,000. The total production of insulated wire and cable in 1919 was valued at $129,623,100, but of this the major portion was reported by insulating establishments that purchased the wire.

The output of wire drawing mills in insulated wire and cable was valued at $45,406,200, comprising 29,470 tons of paper insulated cable. The output of these products by the wire drawing mills in 1914 was 48,390 tons, valued at $15,709,300. The output of brass wire as reported in 1919 was 50,521,000 lb., valued at $16,024,500, a quantity increase of 28 per cent. Wire of other metals represented a production of 14,596,000 lb., valued at $6,339,700, a quantity increase of 111 per cent. Included under "other metals" are copper-clad steel wire, monel metal, nickel silver and other nickel alloys, zinc, etc.

An engineering assembly is planned to be held in conjunction with the annual meeting of the American Engineering Council of the Federated American Engineering Societies. It is expected that the assembly will be spread over three days, starting between the middle and the latter part of January. The subject is to be discussed at the meeting of the American Engineering Council in Washington, Sept. 30.

AUSTRIAN MARKET DEPRESSED

German Competition Less Active—French Sellers Sound Market—Increase in Magnesite Exports

(*Special Correspondence*)

VIENNA, AUSTRIA, July 23.—Although German competition has displayed less activity in the Austrian market of late, the general situation shows little improvement. Interested circles ascribe the present inactivity of German exporters to the price recovery in Germany. Generally, offers by German works are 50 to 100 m. per ton higher than domestic quotations with terms of delivery averaging 6 to 8 weeks. There can be little doubt, however, that the slackening of German competition is but temporary and largely due to the fact that the Rhenish-Westphalian industry is being awarded most of the business which normally would go to Upper Silesia. With indications of an early solution of the Upper Silesian problem, renewed importations of German iron are anticipated.

France Threatens To Be Formidable Competitor

Herr Rothballer, Director-General of the Alpine Montan Gesellschaft, stated at the government inquiry on customs duties that the country threatening to become the most formidable iron and steel competitor to Austria was France rather than Germany. France, he declared, bids fair to become the leading iron producing country in Europe with her augmented wealth in coal and iron. The steadily proceeding price cuts in the French iron market have made domestic producers feel apprehensive and repeated attempts of French works and merchants to sound the Austrian market have lately been reported. Much will, of course, depend upon the further development of the tariff.

Market Conditions Erratic

No price reductions have appeared as yet, and works have shown no inclination to make concessions. The Alpine Montan Gesellschaft, widely connected with the manufacturing industry, has been able to dispose of its output, which is now about 50 per cent of normal, but the smaller works are finding it increasingly difficult to hold their own. In the case of bar iron for instance, they are unable to quote the price named by the Alpine works of 2900 kronen per 100 kg., as their production costs are by several hundred kronen per ton higher. Pig iron is quoted at about 2000 kr. per 100 kg., while 2300 kr. are quoted for ingots, and 2550 kr. for muck bars. Few of the foundries are working to capacity, especially the malleable iron foundries, which are operating at about 35 per cent of capacity. Nevertheless, several plants, idle for some time because of the coal shortage, have resumed operations on a limited scale. Rather erratic conditions prevail at Vienna foundries, some plants operating to capacity while others curtail production. Since April, 1921, the following prices are in force for gray iron castings:

	Kr.
Ordinary castings:	
100 to 1000 kg.	4 800
Over 1000 kg.	4.500
Less intricate castings:	
2 to 100 kg.	6.040
100 to 1000 kg.	5,200
Over 1000 kg.	4,900
Intricate castings:	
2 to 100 kg.	7,100
100 to 1000 kg.	6.100
Over 1000 kg.	5.800

Reports from Graz elaborate upon the difficult position of the Styrian iron industry through labor trouble.

Export Activity Halted

The period of activity in the export market has come to a halt, even the producers of special steel whose products have been much in demand abroad, have been forced to lay off men. It remains to be seen whether the renewed depreciation of the krone will have a stimulating effect. In manufacturing, stocks are accumulating as a result of the sluggish business and foundries, construction shops, etc., are beginning to feel the depression. Only the locomotive and rolling stock builders and manufacturers of electrical supplies report satisfactory conditions. Despite the lull, the situation is not critical and the slight revival of export business to Czecho-Slovakia, which has adopted a more liberal attitude toward Austrian imports, is generally regarded as a hopeful sign.

The principal export market for the first quarter of 1921 was Italy with 33 per cent, followed by Czecho-Slovakia with 22 per cent, Germany, Hungary, Switzerland, Jugo-Slavia and Poland. Of the total imports Germany led with 55 per cent.

Magnesite Exports Increase

There has been a notable development of the magnesite industry, several new mines, mostly in Styria, having been opened in 1920. It is noteworthy that while the United States headed the list of consumers of Austrian magnesite in pre-war years, Germany now leads. Germany is now taking larger quantities of roasted magnesite than before the war. Moreover, crude magnesite is now shipped abroad while practically none was exported before the war. The aggregate output in 1920 represented approximately 50 per cent of the 1913 production. Exports have been steadily increasing since and are given at 21,300 tons for the first quarter of 1921, compared with about 8300 tons for the corresponding quarter of 1913.

Canadian Iron Production Very Low

Pig iron and steel production in Canada showed a tendency to increase in the late spring, according to the monthly report of the Dominion Bureau of Statistics. The May production of pig iron and ferroalloys was 57,035 tons, compared with 39,693 in April, an advance of 43 per cent. Basic iron output was nearly trebled, being 44,002 tons compared with 15,971 in April. Steel ingots and castings production was 52,001 tons in May compared with 27,381 in April.

"'Dragging Bottom' is the title of an article which appeared in THE IRON AGE regarding May output of iron and steel in the United States," says the Dominion Bureau bulletin, "and the words seem to express the feelings generally held both in that country and in Canada that iron and steel production can decline no further. The increase in Canadian steel production indicates that conditions are rather more hopeful in this country and it is believed that the demand for steel products will be augmented and that the output both of iron and steel in Canada will continue to advance in the coming months."

Notwithstanding the optimistic view expressed by the Dominion Bureau of Statistics, Canadian iron and steel producers say that business for the past two months has been decidedly backward and since the May report was compiled all pig iron furnaces in Ontario have ceased the production of foundry iron, although the Algoma Steel Corporation, Sault Ste. Marie, and the Steel Co. of Canada, Hamilton, are making basic iron for their own consumption as is the Dominion Steel Corporation, Sydney, N. S.

The Iron Age and Its Readers

In addition to the steady flow of basic statistics of the iron and steel industry of the United States, presented week by week to the readers of THE IRON AGE, an occasional compilation of special interest to some large group of readers is published. An example is the list of electric steel furnaces of all types which has now become a feature of our Annual Review Number.

Last week another compilation was given, this covering the by-product coke ovens of the United States. This rapidly growing industry, with its saving of the valuable hydrocarbons formerly wasted, has now reached an output exceeding 30,000,000 tons of coke in one year. The table on page 264 (July 28) gives the location of the 12.245 by-product ovens built, together with information as to the type and capacity, as well as ownership.

Iron and Steel Markets

PIG IRON BUYING

Larger Business Brings Out New Low Prices

In Finished Material There Is a General Maintenance of Recent Levels

The moderate improvement of the past two weeks in replenishment demand for steel continues, but few successors have appeared to the larger sized orders which lately brought out such keen competition in the Central Western and Chicago districts. Any new price concessions have been in pig iron rather than in finished material.

It is recognized that large business would develop special prices, but on the general run of small orders competitive deviations of more than $1 to $2 from the schedule recently made public by the Steel Corporation are not common.

The rate of steel works operation is substantially unchanged and the same alternation of activity and shutdowns that has obtained at many plants for several months is expected to continue into the fall.

Steel, like pig iron, fell off 20 per cent in July from the output in June. The ingot statistics published this week show 803,376 tons produced by 30 companies last month, indicating 950,000 tons for the whole industry, against 1,190,000 tons in June. The July rate represents about 11,500,000 tons per year, as against a rate of 30,000,000 tons per year in January and an actual output of 40,881,000 tons in 1920.

On larger buying than in many weeks, pig iron in eastern Pennsylvania shows a fresh decline of $1 to $2 per ton. The largest lot was 5000 tons of basic bought by an Eastern steel company at $19 at furnace. Foundry iron also went to a new low level for the year, considerable sales being made at $18.50, eastern Pennsylvania furnace, for No. 2 plain and $19 for No. 2X. Lower quotations are reported also from the Buffalo district, No. 2 iron being offered considerably under $19.

On the other hand, the Chicago district shows a firmer pig iron market after the blowing out of two merchant furnaces. Sellers who have been making concessions there have now taken a stand for $20 at furnace. At Pittsburgh, due to the drastic curtailment of pig iron production, little iron is available, two sellers having withdrawn from the market this week.

The Lackawanna Steel Co., which in good times has been a buyer of pig iron, is now formally in the market as a seller, considerable bookings being reported for the past week.

An example of the wider variations in current prices on desirable business is the placing of 400,000 tie plates, or about 2000 tons, by the Burlington at $40 per net ton Chicago, the next bid being $5 per ton higher.

Cabled information respecting the Bombay water supply pipe line letting indicates that the low bid at $5,300,000, made by a British fabricator and including the laying, is less than one-half the amount of the American bid; but more than that the figures would seem to require the fabrication of the 80,000 net tons of riveted plate work at a delivered price quite a little under 2c. per lb.

Far Eastern railroad business continues to come to the United States, but with more or less complication as to shipping and financing. The General American Car Co. has an order for 700 steel box cars from a Chinese road. The same company is credited with the 14,200-ton rail contract placed by the Pekin & Suiyuan railroad after long negotiation, and is reported to have sublet it to the United States Steel Products Co. Japan has been a buyer of rails also, one order just placed in New York being for 2000 tons.

While German quotations are being made more frequently through the Stinnes office in New York, little or no German steel is coming into this market. Some cotton tie business is pending. Sixty-day deliveries on wire products are offered.

German and other European bids on steel for Japan are well below American prices. French sheet bars have been offered at $34.70 delivered in Japan, or $11 to $12 under anything domestic mills would do.

Pittsburgh

PITTSBURGH, Aug. 9.

Sentiment in the iron and steel trade here is somewhat mixed this week and the idea that the industry has rounded the corner from the depression of the past several months is not quite as uniformly held as was the case a week ago. Since price cutting has not entirely ceased, some of the trade take the position that it is decidedly premature to talk about having turned the corner and say that this condition hardly will be attained until prices have struck a point where there are no further concessions. Actual developments of the week, however, have been favorable rather than otherwise. It is noted, for instance, that in sheets the shading from what are regarded as regular quotations is a matter of cents rather than dollars, and that in the major products, there is better observance of 1.75c., Pittsburgh, for bars, and 1.85c., Pittsburgh, for plates and shapes, than has hitherto been the case. These products sold collectively are commonly quoted at 1.75c., and in some instances are said to have been priced as low as 1.70c. But sold individually the regular prices are the rule. Business in sheets shows definite improvement and orders going on the books of makers generally are more numerous than they have been. Wire products are an exception, as are also nuts, bolts and rivets.

The trade is encouraged by signs of a better demand from the railroads, which is manifested in a rather large inquiry for spikes and tie plates from the New York Central Railroad, and the promise of early

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 9, 1921	Aug. 2, 1921	July 12, 1921	Aug. 10, 1920
No. 2X, Philadelphia†	*$19.84*	$21.35	$25.50	$50.90
No. 2, Valley furnace†	19.50	19.50	20.50	46.00
No. 2 Southern, Cin'ti†	23.50	23.50	24.50	45.60
No. 2, Birmingham, Ala.†	19 00	19.00	20.00	42.00
No. 2, foundry, Chicago*	*18.25*	18 50	19.00	46.00
Basic, del'd, eastern P'a	*20.26*	21 25	23.50	44.40
Basic, Valley furnace	18.00	18.00	19.50	48.50
Bessemer, Pittsburgh	21.96	21.96	22.96	48.40
Malleable, Chicago*	18.50	18.50	19.00	46.50
Malleable, Valley	20.00	20.00	21.00	46.00
Gray forge, Pittsburgh	21.46	21.46	21.46	44.40
L. S. charcoal, Chicago	*53.50*	35.00	36.00	57.50
Ferromanganese, del'd	70.00	70.00	70.00	200.00
Rails, Billets, etc., Per Gross Ton				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	30.00	30.00	33.00	60.00
O.-h. billets, Pittsburgh	30.00	30.00	33.00	60.00
O.-h. sheet bars, P'gh	32.00	32 00	35.00	70.00
Forging billets, base, P'gh.	35.00	35.00	38.00	85.00
O.-h. billets, Phila	35.74	35.74	38.74	69.10
Wire rods, Pittsburgh	42.00	42.00	43.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	*1.75*	1.85	2.00	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philade phia	*2.05*	2.10	2.15	4.75
Iron bars, Chicago	1.75	1.75	2.00	3.75
Steel bars, Pittsburgh	1.75	1.75	1.90	3.25
Steel bars, New York	2.13	2.13	2.28	4.02
Tank plates, Pittsburgh	1.80	1.80	1.90	3.25
Tank plates, New York	2.18	2 18	2 28	3.52
Beams, etc., Pittsburgh	1.85	1.85	2.00	3.10
Beams, etc., New York	2.23	2.23	2.38	3.27
Steel hoops, Pittsburgh	*2.25*	2.40	2 50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 9, 1921 Cents	Aug. 2, 1921 Cents	July 12, 1921 Cents	Aug. 10, 1920 Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	3.50	7.50
Sheets, galv., No. 28, P'gh.	4.00	4.00	4.50	9.00
Sheets, blue an'l'd, 9 & 10.	2.40	2.40	2.65	6.00
Wire nails, Pittsburgh	2.75	2.75	2.75	4.25
Plain wire, P'gh	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh.	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.75	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$12.50	$12.50	$13.25	$38.00
Carwheels, Philadelphia	16.00	16.00	16.00	40.00
Heavy steel scrap, P'gh.	**12.50**	12.00	12.00	27.50
Heavy steel scrap, Phila.	**11.50**	11.00	11.00	23.50
Heavy steel scrap, Ch'go.	**10.25**	10.00	10.00	24.50
No. 1 cast, Pittsburgh	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia	17.00	17.00	16.00	38.00
No. 1 cast, Ch'go (net ton)	11.50	11.50	12.50	36.00
No. 1 RR. wrot, Phila	14.00	14.00	13.50	33 50
No. 1 RR. wrot, Ch'go (net)	**9.75**	9.25	9.25	24.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$18.00
Foundry coke, prompt	3.75	3.75	4.00	19.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.00	12.00	12.75	19.00
Electrolytic copper, N. Y.	11.75	11.75	12.62½	19.00
Zinc, St. Louis	4.20	4.20	4 30	7.80
Zinc, New York	4.70	4.70	4.80	8.15
Lead, St. Louis	4.20	4.20	4.35	8.75
Lead, New York	4.40	4.40	4 40	9.00
Tin, New York	**27.75**	26.50	28.50	48.00
Antimony (Asiatic), N. Y.	4.60	4.60	4.75	7.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 9, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Aug. 2, 1921,	2.364c.
July 12, 1921,	2.493c.
Aug. 10, 1920,	3.974c.
10-year pre-war average,	1.684c.

releases against orders for standard rails from railroads tributary to Pittsburgh. There is very little activity in structural material, but steel fabricators are looking forward hopefully to the letting of a bridge across the Allegheny River at Sixteenth Street, which will take 5000 tons, and bids for which will be opened Aug. 29, and for an addition to the department store of Joseph Horn Co., involving about 3500 tons.

The pig iron market is showing a stronger undertone in all grades, but especially in foundry and Bessemer, production of which has been extremely light so far this year; consumptive requirements though small have been so persistent as to have resulted in a practical exhaustion of supplies. Furnaces supplying this market have almost no iron of the latter grades left and the appearance of sizeable orders might well send up prices.

We note no material change in steel plant operations in this and nearby districts as compared with a week ago, but some of the idle capacity recently started up is likely to go down again unless there is more business shortly.

Pig Iron.—The interesting feature of the situation this week is not in sales or prices but rather in the sold up condition of the merchant producers of foundry and Bessemer grades. Of the four furnace interests which have had foundry iron for sale, two have definitely withdrawn from the market in the past week, and the others have only a very limited tonnage available for the market. Since it is highly improbable that any of the idle merchant furnaces will be relighted on the present basis of costs and selling prices, the indications point to some stiffening of the market before long. One maker, who has some iron, will not consider less than $20 for No. 2 grade. Available stocks in Cleveland are said to be fairly heavy, but to bring iron here from that district would mean a heavy freight charge and naturally would enhance the value of iron produced in the Valley or in western Pennsylvania at least to the extent of the difference in the freight rate. Some of the steel companies undoubtedly could make foundry iron, but there is considerable question that they will do so. A demand of any considerable size for Bessemer iron also would strengthen prices, because so little of this grade is available. There seems to be no shortage of basic iron, but because of high producing costs there is a disposition to ask a little more money than was acceptable recently. Two inquiries involving about 1000 tons of basic iron are before the market. The prospective buyers expect to place the business at less than $19.96, delivered, which would be the price on Valley iron at $18, furnace. The Standard Sanitary Mfg. Co. is reported to have bought a tonnage of foundry grade for its Louisville, Ky., plant, the tonnage being distributed between Alabama and southern Ohio furnaces. The A. M. Byers Co. has under consideration the relighting of its furnace at Girard, Ohio.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.00
Bessemer	20.00
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	20.00

Ferroalloys.—There has been no increase in business and the desire for orders keeps prices on the down grade. We note one sale of 100 tons of 78 to 82 per cent domestic ferromanganese to a West Virginia steel maker at $70 delivered. English ferromanganese now is being offered at $65 Atlantic seaboard, for spot delivery, equivalent to $70.32 delivery, Pittsburgh. The sale of a carload of 50 per cent ferrosilicon to a Valley steel company is noted at $60, furnace, freight al-

lowed. Makers of spiegeleisen have revised their asking prices, quoting average 20 per cent material at $27 furnace and 16 to 19 per cent manganese content at $25. Sales of the latter material are very few in this district and little inquiry is noted. Recent reductions in prices of Bessemer ferrosilicon and silveries have not stimulated the demand.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent $68; 76 to 80 per cent British ferromanganese $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 furnace; 16 to 19 per cent $25; 50 per cent ferrosilicon, domestic, $60, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent $36.50; 11 per cent $39.80; 12 per cent $43.10; 13 per cent $47.10; 14 per cent $52.10; silvery iron, 6 per cent. $25; 7 per cent. $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—No important inquiries in these forms of semi-finished steel are before makers in this district, because demands for finished products, to a large extent, are being met from existing stocks and non-integrated manufacturers, owing to the instability of prices in finished lines, seem to believe they will be able to buy billets, slabs and sheet bars at less than to-day's prices. Quotations are nominal and untested.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Besssemer and open-hearth sheet bars, $32; slabs, $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Prices are not at all well defined, because business is so limited. Makers here continue to quote $42, Pittsburgh, for No. 5 common soft rods, but it is believed they would consider at least $2 per ton less on orders which would provide a mill schedule. On export inquiries considerably less than domestic base has been quoted. Prices are given on page 370.

Structural Material.—Reports by fabricating interests here vary somewhat. Some still report inquiry to be lifeless while others note a definite increase. Awards still are of small tonnages. The McClintic-Marshall Co. has taken a bridge across the Wyandotte River at Mann, W. Va., and a building for the Detroit Motor Co. at Washington, Pa., each project requiring 100 tons, and a building for the Acme Chair Co., Reading, Mich., for which about 75 tons will be needed. There is considerable irregularity in plain material prices, but fabricating interests who have tested the market have not found producers in this district willing to go much below 1.85c. on plates and shapes. Prices are given on page 370.

Plates.—An inquiry involving more than 6000 tons is reported, but other details are withheld. Generally the demand is for small lots and not much mill capacity is engaged here. Railroads tributary to Pittsburgh are not doing much car repair work and the companies in this district which would benefit most by such orders are running at a very low rate. On the small inquiries coming out here there is not much disposition to quote less than 1.85c., but this price is being shaded on sizable inquiries.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Steel Skelp.—Prices still are on the down grade because of light demands and the desire of makers for business. As low as 1.75c., Pittsburgh, recently has been quoted and the highest asking price of any of the producers now is 1.90c.

Iron and Steel Bars.—Although there have been quotations of well below 1.75c. on steel bars when quoted in conjunction with plates and shapes, there is no important deviation from this price against individual inquiries for bars. Demand in this district is entirely for small lots for prompt shipment. The market also is dull on reinforcing bars and shows no life in iron bars.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars rolled from billets, 1.75c. base; reinforcing bars rolled from old rails, 1.60c. to 1.75c.; refined iron bars, 2.25c. to 2.40c. in carloads, f.o.b. mill, Pittsburgh.

Sheets.—Sentimentally, at least, this market is better, although price cutting still is noted. Shipments by the leading interest last week were the best of any week this year, and it also has received, in the past few days, quite a number of releases against suspended orders. Independent companies also seem to be faring better in the matter of orders and shipping instructions, and while general business still leaves much to be desired, the belief gains ground that this branch of the industry is rounding the corner from the extreme dullness of the recent past. Some makers are quoting black sheets at 3.25c. base, galvanized at 4.25c. base, and blue annealed at 2.50c. base. These prices, however, find little or no basis in sales, the more common quotations being 3c., 4c. and 2.40c., respectively. Even the latter prices are being shaded but there is some encouragement in the fact that the concessions are a matter of only 50c. to $1 per ton as against $5 a ton, or more, from regular quotations a short while ago. Prices are given on page 370.

Tin Plate.—The market continues a very limited affair, especially in regard to tin plate for perishable food containers, which, with oil containers, ordinarily account for more than 60 per cent of the country's total production. Orders for production plate readily are placed at $5.25 per base box, Pittsburgh, and it is probable that a really desirable order could be placed for less. Stock tin plate is available at $4.75 per base box, and in view of the fact that current production is in excess of orders and specifications, there is a suspicion that the material moving as stock plate is being "sweetened" with standard stock.

Nuts, Bolts and Rivets.—The market still is dull, unsettled and weak. Conditions are so bad that most makers in this district are shutting down rather than pile up stock at current costs. Present prices show heavy losses, it is claimed, but makers are meeting competition, especially where regular customers are concerned. Prices and discounts are given on page 370.

Iron and Steel Pipe.—Demand for both steel and wrought iron pipe slowly but steadily is increasing, but orders in all cases represent actual needs, and as yet there is no disposition on the part of jobbers to build up stocks. Plant operations show no appreciable increase, although the A. M. Byers Co. this week started up 22 puddling furnaces and a muck bar mill at its Girard, Ohio, plant. Operations of steel pipe furnaces do not average 30 per cent of capacity and are not even that high with the leading interest. Prices on line pipe are not very closely observed, but in other directions the July 7 card is well adhered to, and reports, which have been current in the past week, that the National Tube Co. is about to announce a reduction in prices, are vigorously denied. Discounts are given on page 370.

Wire Products.—Recent improvement in business has not been maintained, all makers in this district reporting the past week as having been an extremely quiet one. Jobbers are moving a good many nails, but are extremely cautious in the matter of replacement, chiefly because of suggestions that present prices will not hold. Prices of nails, and for that matter wire products generally, are being better maintained than most of the steel products and the basis for talk of lower prices is not easily discerned. The only plausible reason advanced is that business is far short of what it should be at this time of the year, and competition for a share of the passing orders is rather keen.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Cold Finished Steel Bars.—Prices still show a wide variation on actual business. The so-called official quotation is 2.60c. base, Pittsburgh, and while some business is being done at this figure, it may be said to be non-competitive. Where buyers scatter their inquiries, concessions of $2 to $4 per ton are known to have developed.

Steel Rails.—Light rails rolled from new billets are no longer quotable at higher than 1.85c., Pittsburgh, because demand is light and competition for orders is sharp. Rerolled old sections have been quoted as low as $32 per net ton, mill, which if applied to a Pittsburgh base, would be equivalent to about 1.50c. This price, however, refers to the lighter sections and 40-lb. rails, for which the demand is best, are not being of-

fered at all freely by mills which reroll old standard rails. Specifications against orders for standard rails still are reported to be light.

We quote 25 to 45-lb. sections, rolled from new steel, 1.85c.; rolled from old rails, 1.60c. to 1.75c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Spikes.—Inquiries for track fastenings are more numerous and include a large one for spikes and tie plates from the New York Central Railroad as well as smaller ones for spikes from the Erie Railroad and the Norfolk & Western Railroad. Inquiries for spikes are looked upon as real ones in view of the fact that railroads tributary to this center are planning to release considerable tonnages of rails before the month is out. Standard spikes are quoted at $2.75, base, per 100 lb. by all makers. The leading interest still is quoting angle bars at $3.25, Pittsburgh, and is not shading this figure on the ground that to do so would not produce business, as the order for all of the bars required accompanied the rail orders placed early in the year. Prices are given on page 370.

Coke and Coal.—The market for furnace coke seems to have entirely disappeared. Such blast furnaces as are active that are supplied from the Connellsville district are covered by contract and the great bulk of current demands is for tonnages for other than blast furnace use. The more common asking price for standard 48-hr. coke is $3, but supplies still are available as low as $2.75. There is a good steady business in foundry coke, with prices ranging anywhere from $3.75 to $4.50, per net ton oven, most of the business being right around $4.25. The coal market shows considerable strength in the slack grade, which is scarce on account of the fact that due to the light movement to the Lakes little coal is being screened. Steam slack readily commands $1.75 per net ton at mines, and gas slack $1.85. Mine run grade of steam coal is quotable at $1.50 to $2, by-product $1.50 to $1.75, and gas coal $2.25 to $2.50.

Old Material.—The slightly firmer tone recently noticed in the market has crystallized into actual advances in several of the steel works grades. Increased open hearth furnace operations have resulted in some buying by the steel companies, and this has tended to emphasize the shortage of material available for quick shipment. The railroads lately have shown a tendency to hold scrap rather than let go of it at the prices offered, and dealers who have good-sized yard stocks are not inclined to draw from them at current quotations. Up to $13 now is being paid by both dealers and melters for heavy melting steel in this district, and a recent sale in the Youngstown district of 300 tons carried a price of $13.50. Compressed sheets are valued at least 50c. per ton higher than they were a week ago, and it is noted that bids of dealers of close to $15 per gross ton delivered, failed to secure any of the rerolling rails recently offered by the Pennsylvania Railroad, eastern region. The Baltimore & Ohio Railroad will open bids Aug. 15 for 22 cars and 13,670 gross tons of old material, also for 3000 lb. high speed steel and 15,000 lb. wire cable.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.50 to $13.00
No. 1 cast cupola size	15.50 to 16.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	14.50 to 15.00
Compressed sheet steel	9.50 to 10.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.50
Railroad knuckles and couplers	13.00 to 13.50
Railroad coil and leaf springs	13.00 to 13.50
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	16.00 to 16.50
Railroad malleable	12.00 to 12.50
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	14.00 to 14.50
Cast Iron Axles	13.50 to 14.00
Rolled steel wheels	13.00 to 13.50
Machine shop turnings	7.25 to 7.50
Sheet bar crop ends at origin	11.50 to 12.00
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	11.50 to 12.00
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

Hoops and Bands.—Makers quite generally are quoting 2.40c. base on both products but it is frankly admitted that very little business is being done at this figure, and on hoops there are reports that sales recently have been made by some makers at 2.25c. and even as low as 2.15c. Desire for business is strong in some quarters, but in others there is a feeling that a cutting of the so-called regular quotation is likely to discourage rather than encourage purchases.

Hot-rolled and Cold-rolled Strips.—The tendency of the demand is toward improvement, but this is accompanied by a good deal of eagerness on the part of some mills for orders and prices favor buyers. Cold-rolled strips hardly are quotable longer at more than 4c. base and while some mills are disinclined to go below 2.60c. base on hot-rolled strips, on the basis of current costs, others will not let business slip out of their hands at 2.40c. Reports that hoops have sold as low as 2.15c. base are not without effect upon the price ideas of buyers.

British Iron and Steel Market

Some Improvement in Tone—More Blast Furnaces and Tin Mills Now in Operation

(*By Cable*)

LONDON, ENGLAND, Aug. 9.

Seven Cleveland blast furnaces are now in operation, but no further blowing-in of furnaces is anticipated until cheaper fuel becomes obtainable. Cleveland stocks of foundry iron are low. Inferior grades are plentiful but unsalable. Pig iron prices are tending upward, though sales continue of Continental foundry iron at £5 ($18.30) c.i.f. Scotland and basic iron at £4 5s. ($15.56) delivered Tees. French pig iron is quoted at £4 ($14.64) to £4 10s. ($16.47) f.o.b.

There is some slight improvement in general steel business for export, but the volume of orders is insufficent to enable the works to start up again. Home trade buying is in abeyance, very few orders being secured by British works. Prices remain unaltered, but cuts are imminent, owing to keen Continental competition. French billets are quoted at £6 ($21.96) to £6 10s. ($23.79) f.o.b.; German merchant steel bars at £8 (1.31c. per lb.) to £8 2½s. (1.33c. per lb.) f.o.b. German merchant bars sold last week at £8 10s. (1.39c. per lb.) c.i.f. Madras and £7 15s. (1.27c. per lb.) f.o.b., with delivery in 8 to 12 weeks. German plates are now quoted at £8 2½s. (1.33c. per lb.) to £8 5s. (1.35c. per lb.) f.o.b. Belgium is out of the running, and most works are closed, because of scarcity of water, this factor being much more serious than last week.

Further Welsh tin plate mills are now operating, the percentage now being 25, and the usual August holiday week having been abandoned. Stock tin plates have been reduced 2s. ($0.37) basis f.o.b. A fair line of oil plates has been placed at 25½s. ($4.67) f.o.b. There is good demand for wasters, and light weight specifications are scarce.

Norsk Valswerke of Norway has completed the first rolling of Norwegian tin plates and has orders booked ahead for several months for Norwegian packers. It is estimated that the annual output of the works will be 10,000 tons.

India has bought fair lines of galvanized sheets under £22 (3.59c. per lb.) basis f.o.b., and some 24-gage corrugated at £21 15s. (3.55c. per lb.) f.o.b., but general inquiry is slack. Germany is quoting £18 15s. (3.06c. per lb.) c.i.f. for Japanese specifications of black sheets, an advance from the price of £18 5s. (2.98c. per lb.) c.i.f., at which Germany sold black sheets to Japan

(*Continued on page* 373)

Chicago

CHICAGO, Aug. 9.

Sentiment has improved, notably in the pig iron and scrap markets, and there is a tendency among sellers to take a firmer attitude in quoting prices. With the blowing out of a blast furnace at Maysville and another at the Iroquois plant, only one stack, an Inland Steel Co. furnace, is still producing merchant iron in this district. The latter company has advanced its prices to a minimum of $20, furnace, and has announced that it will blow out the furnace rather than accept further business at prices which are far below costs.

There are also some indications of firmness among sellers of finished steel, but not enough to stabilize prices. Current business is going at a variety of prices, depending on the severity of competition and the attractiveness of the order, and sellers themselves admit that there are no ruling quotations. Reports of the abandonment of the Pittsburgh basing point in quoting finished steel are no doubt accounted for by the fact that in some instances delivered prices have figured back to approximately 1.85c. for plates and shapes minus the freight charge from Pittsburgh to Chicago. These exceptionally low prices are not regarded as demonstrating the abandonment of the Pittsburgh basing point but rather as an indication of the extreme limits to which sellers have gone to secure desirable tonnage. After all, the buyer is interested only in the delivered price, and it is immaterial whether he figures it back to Pittsburgh or Chicago.

The wide range of prices at which business is being booked is indicated by the fact that an open letting of structural material by a railroad last week did not bring out a lower figure than 1.85c., Pittsburgh. On the other hand, some orders have been booked at less than 1.75c., Pittsburgh, which is the minimum quotation on plain material published under the structural material paragraph below. The same uncertainty as to prices applies to plates and mild steel bars and to a less extent to sheets. A number of mills are refusing to deviate from the so-called official prices announced a fortnight ago, and in view of losses incurred meeting the sharp competition now prevalent, it would not be surprising if other producers would follow their example. A letting of 400,000 tie plates by the Burlington Railroad last week brought out a quotation of $40 per net ton, Chicago, by a local mill, or $5 a ton under the previously ruling price. Cast iron pipe has been moving at low prices and some observers believe that with the placing of several hundred tons at $31.85, Birmingham, the bottom was reached. Domestic railroads continue to concentrate their attention on the repair of rolling stock. An order for 700 new steel box cars, however, has been received by the General American Car Co. from a Chinese road. This company has also booked 14,200 tons of rails for the Pekin & Suiyuan Railroad, which have been sublet to the United States Steel Products Co.

Mill operations are at about the same rate as heretofore, the Illinois Steel Co. being on a 30 per cent basis and the Inland Steel Co. on a 25 per cent basis.

Pig Iron.—The blowing out of the last two active furnaces represented by the leading merchant has left only one producing stack in this district, an Inland furnace. A coincident development was the announcement by the Inland Steel Co. that it would take no further business at less than $20, base, furnace. The leading merchant interest has also advanced its prices to that level. The sharp competition which has prevailed in this market for months has forced prices down step by step, until they have reached a point where every order was taken at a larger loss. Producers have decided that idleness is preferable to a continuation of this condition. The advance in prices has resulted in closing considerablee business which was pending. Two 1000-ton lots of foundry iron were sold in Cincinnati territory at $18.50, Chicago, while 1000 tons and 200 tons were closed in this district at $18 25, Chicago. The St. Paul Railroad and the Benton Harbor Malleable Foundry Co., which were both in the market for 1000 tons of malleable iron, have bought at least part of the tonnage asked for. While it is true that considerable business was brought to a head by the advance in prices, a genuine increase in orders and inquiries is to be noted. A railroad equipment manufacturer is in the market for 2000 tons of malleable and intimated that as much as 3500 tons may be bought. Orders for 200, 300 and 400 tons are more numerous. That foundry operations are slowly but steadily increasing in this district is indicated by the fact that shipments of coke to melters by the leading interest have doubled within the last ten days. Coke is a better gage of operation than pig iron, because stocks of the former in foundry yards are not large. While it is true that pig iron stocks of some melters are still ample for several months' operation, many foundries which believed their supplies sufficient to carry them through this year are now finding it necessary to enter the market. No sales have yet been reported at the new prices and for that reason they are not yet quoted below. That there are elements of strength in the pig iron market is not denied even by buyers. The leading merchant reports that sales of pig iron thus far this month are at twice the rate of bookings in July. Another seller took orders aggregating 4000 tons within the course of a few days. Stocks on furnace yards are not heavy. The leading seller has about a month's full production on hand, but half of this tonnage is covered by old commitments. Charcoal pig iron is now available at $30, furnace. One hundred tons of 7 per cent silvery has been bought at $30, delivered Milwaukee.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago		$33 50
Northern coke, No. 1, sil. 2.25 to 2.75	18.50 to	19.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	18.25 to	19.25
Northern high phos	18.50 to	19.00
Southern foundry, sil. 1.75 to 2.25		26.67
Malleable, not over 2.25 sil	18.50 to	19.00
Basic	18.50 to	19.00
Low phos., Valley furnace, sil. 1. to 2 per cent, copper free		30.00
Silvery, sil. 8 per cent		31.82

Ferroalloys.—From 600 to 1000 tons of ferromanganese has been bought within the past week, the principal purchasers being the Griffin Wheel Co. and the American Steel Foundries. The prices paid by these two companies were $71 and $68 respectively, freight allowed. A carload of 50 per cent ferrosilicon has been bought by an Indiana Harbor foundry at $62.50, delivered.

We quote 78 to 82 per cent ferromanganese, $68 to $71 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $35.07 delivered.

Railroad Equipment.—The Chicago Great Western has let repairs on 250 box cars to the Ryan Car Co. The steel involved is negligible. The Illinois Central is asking for figures on the repair of 1250 gondola cars. The St. Paul is repairing 1000 cars in its Milwaukee shops.

Plates.—The price situation is substantially the same as a week ago. Some mills continue to quote 1.85c., Pittsburgh, on tank plates and have booked small tonnages at that price. Other producers are meeting competition, frequently naming 1.75c., Pittsburgh, and sometimes even lower. Reports persist that the business is being taken at 1.85c., Chicago, thus eliminating the much assailed Pittsburgh base, but verification is lacking. While it is true that the market lacks stability, it cannot be said that it has grown weaker since a week ago. On the contrary, a number of makers are taking a firmer attitude in the belief that there is danger of prices being stampeded to levels which would prove ruinous. There is little tonnage in sight, but some mills note a slight increase in the number of small orders. Out of the car repair orders let by the New York Central to Western car builders 1500 steel open top cars to be renovated at Detroit and Madison, Ill., plants of the American Steel Car & Foundry Co. will involve considerable steel, as yet not accurately estimated, which will probably be furnished by a local mill. The box car repairs let to Western car builders

by the same road will call for little steel and in each case the railway will attempt to supply the material from its own stocks before purchases may be made on the open market.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 2.88c. for plates out of stock

Structural Material.—Plain material in attractive tonnages is available at 1.75c., Pittsburgh, but some small lots continue to be booked at 1.85c. Structural business is diminishing in volume. Large projects which could not be gotten under roof before winter are not being undertaken, but small jobs are still numerous. Locally building has been held back by the failure of the arbitrator in the dispute between the contractors and unions to bring about an agreement. Pending a settlement, the old wages for the various crafts remain in effect. On Aug. 11 bids will be taken on the fabrication of 1700 tons for the commercial and technical high school, Omaha. This project will also involve 1000 tons of reinforcing bars. Recent fabricating awards include:

First Baptist Church and office building, Houston, Tex., 1100 tons, to Phoenix Bridge Co., Phoenixville, Pa.

Gallup-American Coal Co., Main tipple and miscellaneous steel for platforms, Gallup, N. M., 270 tops to Kansas City Structural Steel Co.

Illinois State Highway Department, bridges, 200 tons to Decatur Bridge Co.

Arcade Building, Laramie, Wyo., 142 tons to Dunbar Co., Salt Lake City.

Steel viaduct, Lawye Street, Appleton, Wis., Wausau Iron Works, Wausau, Wis., low bidder at $59,800.

Pending business includes:

Addition to Bamberger department store, Newark, N. J., 1300 tons, George A. Fuller Co., New York, general contractor; Jarvis Hunt, Chicago, architect.

Federal Reserve Bank, St. Louis, plans not completed.

The mill quotation is 1.70c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 2.88c. for materials out of warehouse.

Bolts, Nuts and Rivets.—A slow but gradual improvement in business is noted, but prices still lack firmness. The railroads are putting out some attractive inquiries for bolts, nuts and rivets, and, although it is obvious that they are buying only for immediate needs, their requirements are considerably larger than for several months previous. Jobbers continue to buy sparingly. While prices are irregular, the following discounts are rather commonly quoted and on railroad inquiries of size even better has been done:

Large structural rivets	$2.40
Large boiler rivets	2.50
Small rivets	70, 10 and 10 per cent off list
Large machine bolts	75 and 10 per cent off list
Small machine bolts	65 and 10 per cent off list
Small carriage bolts, rolled threads	70 and 5 per cent off list
Carriage bolts, cut threads, all sizes	65 and 10 per cent off list
Lag bolts	70 and 5 per cent off list
Hot pressed nuts, blank	$5.25 off list
Hot pressed nuts, tapped	$5.00 off list
Cold punched nuts, blank	$5.10 off list
Cold punched nuts, tapped	$4.75 off list
Stove bolts, in packages	80, 10 and 10 per cent off list
Stove bolts in bulk	80, 10, 10 and 2½ per cent off list

An interesting recent development is the fact that some makers are now quoting net prices instead of list as discount.

Bars.—The market on mild steel bars ranges from 1.65c. to 1.75c., Pittsburgh, and even lower quotations are occasionally reported. There continues to be a fair run of construction projects calling for reinforcing bars, the largest being on an Omaha high school, involving 1000 tons. There are some encouraging aspects to the bar iron situation, but bookings are not yet large enough to permit uninterrupted mill operation. It is notable, however, that orders, if not large, are more numerous. An Indiana mill booked more orders for bar iron in July than in any month in its history, but the aggregate tonnage was light. Railroads continue to buy cautiously, but individual orders from them are larger, not infrequently running up to 400 and 500 tons. Bar iron is commonly quoted at 1.75c., Chicago, but there has been some shading under that price. Demand for rail carbon steel bars is still sub-normal and mill operations are intermittent. Some business has been taken at 1.75c., mill, and the ruling market appears to lie between that price and 1.85c., mill.

Mill prices are: Mild steel bars, 1.65c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.75c. to 1.85c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—The price situation has not changed materially since a week ago. Demand is spasmodic, resulting in fluctuating mill operations. During the current week the local independent is running 14 out of 18 hot mills.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.53c.; No. 28 black, 4.65c.; No. 28 galvanized, 5.65c. Hoops and bands, 3.48c.

Cast-Iron Pipe.—Recent lettings have brought out low figures, but with the placing of an attractive tonnage at $31.85, Birmingham, many believe rock bottom has been reached, and some are of the opinion that prices are now firmer to the extent of $2 or $3. Manitowoc, Wis., bought a carload at $35, Birmingham, while Milwaukee let 275 tons to the National Cast Iron Pipe Co. at $34.50, Birmingham. Hammond, Ind., took bids yesterday on 3700 tons of 36-in., and Bay City, Mich., took bids on 3000 tons on the same date. The National Cast Iron Pipe Co. has taken the following business: 800 tons from Saginaw, Mich.; 200 tons from Minneapolis; 125 tons from St. Paul; and 100 tons from Detroit.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

Old Material.—Users and sellers are finding it difficult to meet on common ground. Some dealers are buying railroad material at advanced quotations and are holding their stocks in anticipation of a rise in the market. This speculative activity has pulled up the prices which consumers have paid within the past week, but some dealers refuse to sell at the quotations which users are willing to pay. Buying by users is light and the market appears to be passing entirely into the hands of the sellers. Railroad lists include: Baltimore & Ohio, 10,000 tons; Great Northern, 2500 tons; Pere Marquette, 2000 tons; Chicago & Eastern Illinois, 1000 tons; Pullman Co., 600 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	12.50 to 13.00
Steel rails, rerolling	12.25 to 12.75
Steel rails, less than 3 ft	11.50 to 12.00
Heavy melting steel	10.25 to 10.75
Frogs switches and guards cut apart	10.00 to 10.50
Shoveling steel	9.75 to 10.25
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.50 to 8.00
Per Net Ton	
Iron angles and splice bars	13.50 to 14.00
Steel angle bars	10.00 to 10.50
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.50 to 13.00
No. 1 busheling	8.50 to 9.00
No. 2 busheling	5.75 to 6.25
Cut forge	9.00 to 9.50
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	9.75 to 10.25
No. 2 railroad wrought	9.50 to 9.75
Steel knuckles and couplers	10.75 to 11.25
Coil springs	12.75 to 13.25
No. 1 machinery cast	12.00 to 12.50
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.25 to 10.75
Machine shop turnings	3.00 to 3.50
Cast borings	4.50 to 5.00
Stove plate	11.00 to 11.50
Grate bars	10.00 to 10.50
Brake shoes	10.00 to 10.50
Railroad malleable	12.00 to 12.50
Agricultural malleable	12.00 to 12.50
Country mixed	8.00 to 8.50

Wire Products.—There is a good demand for wire nails from jobbers and inquiry for barb wire is picking up. Sales to jobbers by the leading interest are now about 80 per cent of normal for this time of the year. Purchases are still small but are increasing in number, indicating that jobbers are turning their stocks fast. The harvesting of crops in Nebraska and Iowa has had

a favorable effect on business from those sections. The railroads are buying nails, barb wire and fencing more freely and an inquiry for two carloads of nails has been received from a carbuilder. The Great Northern recently bought 700 kegs of nails. Prominent among current inquiries is one from a local jobber for 1800 kegs of nails. Prices are holding. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 370.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Rails and Track Supplies.—In a public letting the Chicago, Burlington & Quincy awarded 400,000 tie plates to a local mill at $40, per net ton, Chicago. This price was $5 under the next bid. Track spikes and bolts have declined, the former being available at 2.50c. to 2.75c., Pittsburgh, and the latter at 3.50c. to 3.75c., Pittsburgh.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.85c. f.o.b. makers' mills. Standard railroad spikes, 2.50c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.50c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Buffalo

BUFFALO, Aug. 9.

Pig Iron.—The Lackawanna Steel Co. has definitely entered the pig iron market as a seller, a campaign to sell surplus iron in progress for the last two months having brought about a decision to become an active factor. A considerable quantity of iron has been sold in the past week, but figures as to the tonnage booked are not available. The price is understood to have been $19 and $19.50 for the base grade, according to the size of the order. Generally feeling is better and improvement in inquiry is noticeable. A national user who is in the market every thirty days and consumes about 1000 tons in the same period is known to have bought about 700 tons here. One interest which reported a slow movement in July finds improvement both in inquiry and sales. Their orders last week were slightly under 1000 tons at $20.50 base. Inquiry is for 5000 tons, a decided increase. A furnace now making basic iron for its own use in another department plans a month's run and conditions at the end of the period will determine the future. The policy of one furnace not to take orders for greater than 60 days' delivery has been of necessity abandoned and business is now accepted only for 30 days' delivery.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.75 to $21.75
No. 2X foundry, 2.25 to 2.75 sil.	19.75 to 20.75
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36 00

Finished Iron and Steel.—The consensus of opinion with the majority of interests, based on a more diversified inquiry and some slight increase in orders, is that the market is firmer and more stabilized. While no one is ready to say business is good, the general expression is that improvement is real and tangible. Pipe products show a better movement than plates or shapes, and orders in galvanized sheets show improvement. Orders are mostly for carload lots except in plumbing and steamfitting pipe. Generally the buyers are well satisfied with present prices, and there is only remote expectation that further reductions will come. The lowest price on bars is 1.75c., Pittsburgh. Some desirable inquiries in black sheets for 100 tons and greater quantities engage one office and the general prospect of sheet business is better. Bolts and nuts are quiet. An order for reinforcing bars for the Detroit-Belle Isle bridge has been placed with a local maker and the price is said to be 1.75c. Not all the tonnage has been awarded on this job; less than 1000 tons is involved in that portion placed with the Buffalo mill. The same interest has taken an order for 2500 tons of rails for export. Labor troubles still exist as factors in holding up structural jobs, which include desirable tonnages both of bars and shapes. An order for 800 tons of billets has been booked by one interest. One sheet maker is now operating on a 50 per cent basis. Reinforcing bars for two Rochester schools have been placed here.

Warehouse Business.—Sheet prices have been reduced again and a consequent better movement is noticed, particularly in galvanized products. Inquiry has picked up in a very appreciable way and more orders have been filed by one warehouse interest in a week than before this year. The improvement in tonnage per order is small, but the number of orders is greater. Prices now being quoted are generally admitted to be satisfactory and the tendency to buy is more marked than at any time since the depression set in.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.45c.; galvanized steel sheets, No. 28 gage, 5.30c.; black sheets, No. 28 gage, 4.30c.; cold rolled strip steel, 6.40c.

Old Material.—To indicate the lifeless condition of this market one dealer, in normal times perhaps the busiest, has not bought or sold a ton of material. The slight blast furnace and open hearth operation which developed Aug. 1 has not helped the market. The mill interests which have improved their operating schedule find themselves with old contracts unfulfilled, and whatever little material is being shipped applies on these old orders. Governmental decision withdrawing some of the steel offered at Hog Island and other places was a disappointment to one dealer who bid on the various lots.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$10.00 to $11.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13 00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

New York

NEW YORK, Aug. 9.

Pig Iron.—Strenuous competition has again forced prices lower. About 8000 tons of iron has been inquired for in this district in the past week and about half that amount has been sold. A sale of eastern Pennsylvania iron, both 2 plain and 2X, is reported as having been made at $18.75, furnace, no price distinction being made in the two grades. Another offer on the part of an eastern Pennsylvania furnace was at $18.50, furnace, for 1.75 to 2.25 silicon. An even lower offering of Buffalo iron is reported, the price being $18 at furnace for 2.25 to 2.75 silicon. Sellers who have cut what they believed to be the market price in quoting on an inquiry are surprised later to find that the business has gone elsewhere at a still lower price. The factor of sagging prices is counterbalanced by the greater number of inquiries, which indicate that there is a fairly healthy demand and that some buyers' stocks have been used up. Inquiries are beginning to be made for last quarter delivery, as instanced by the one from a Brooklyn foundry for 100 tons each month over the balance of the year. Another for last quarter calls for 400 tons.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.52 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.02 to 21.52
Buffalo, sil. 1.75 to 2.25	23.46 to 24.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom'l)	29.16 to 30.16

Ferroalloys.—Considering the inactivity which has prevailed for many weeks the market for ferromanganese shows considerably more life. In the past week sales of 400 to 500 tons are reported for early delivery, most of it stated to have been sold at around $70, delivered, although some may have gone lower. Agents of British producers are authorized to sell the British alloy at $65, seaboard, which is a reduction of about $5 per ton from previous asking prices. The spiegeleisen

market is exceedingly quiet, only two carload lots having been sold in the past week at around the prevailing quotation of $26 per ton, furnace. There has been a little more activity in 50 per cent ferrosilicon, sales of several carloads having been made between $60 and $65, delivered. The market is now regarded as a little firmer, the minimum quotation of one seller being advanced to $65, delivered. There is no demand for high-grade manganese ore and quotations are nominal.

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$65.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Ferrotungsten, per lb. of contained metal	55c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr	16c. to 16.50c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	22.00c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Finished Iron and Steel.—Despite the low bids which are being made on structural steel work, a very limited volume of work is coming into the market. A recent job, involving 400 tons for a savings bank in New York, was taken by an Eastern fabricator at less than $70 per ton fabricated and erected. This compares very favorably with pre-war prices notwithstanding higher costs of steel, freight and labor. A large downtown office building erected in 1907 was taken at $53.50 per ton fabricated and delivered. Its cost, including erection of the steel, was probably $65 a ton or more. An award will probably be made this week of 4000 tons of steel for the Bowery Savings Bank Building, New York, this being the largest project in the market. A hotel at Washington, Pa., requires 600 tons; a school building at Middletown, N. Y., 500 tons; a publishing building at Richmond, Va., 200 tons. The Pittsburgh-Des Moines Steel Co. will fabricate 400 tons for a highway bridge in North Carolina; the Paterson Bridge Co. has been awarded 1300 tons for an apartment building on Riverside Drive, New York, and the Hinkle Iron Co. has been awarded a 300-ton office building by the Broadway-John Street Corporation. The Snare & Triest Co. is general contractor for a $1,000,000 pier to be constructed in Philadelphia. There is no new railroad repair work in the market. Steel prices continue on about the same basis as last week, there being little business of importance to afford further test of the market. Bar iron is now obtainable at 1.70c., Pittsburgh. Plates for export have been quoted as low as 1.65c., Pittsburgh.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c.; plates 2.18c. to 2.23c.; structural shapes, 2.18c. to 2.23c.; bar iron, 2.08c.

Warehouse Business.—A much better tone pervades the market. Orders generally are slightly larger, specifying fair tonnages of one size instead of the wide range of sizes that has prevailed for some time. One mill producing cold drawn steel has reduced its price on bars from 2.80c. per lb. to 2.60c. per lb., a drop of about $4 per ton. Business among dealers in wrought iron and steel pipe begins to show a slight improvement. One order totaling several hundred tons of pipe for an addition to a public institution at Central Islip, Long Island, was recently placed and there are some other smaller orders pending. Prices in this field are largely nominal. There is some slight shading of prices in the brass and copper market, but business as yet shows no distinct improvement from the dullness that has prevailed for some time. We quote prices on page 384.

Lapwelded Steel Boiler Tubes

1¾ in.	+ 6
2 and 2¼ in.	—12
2½ to 3¼ in.	—26
3½ to 4½ in.	—32

Seamless steel boiler tubes, cents per ft.: 1½-in., 19c.; 1¾-in., 24c.; 2-in., 20c.; 2¼-in., 22c.; 2½-in., 26c.; 2¾-in., 30c.; 3-in., 33c.; 3¼-in., 33c.; 3½-in., 34c.; 3¾-in., 37c.; 4-in., No. 10 gage, 43c.; 4-in., No. 9 gage, 47c.

High Speed Steel.—The market is dull and prices are unchanged. Quotations continue nominal at 90c. to $1 per lb. for 18 per cent tungsten high speed steel, with some sales reported at lower prices.

Cast-Iron Pipe.—The chief inquiry of a municipal nature is that for seven miles of pipe for Scarsdale, N. Y., the business to be handled by a contractor. Buying by private companies continues in fair volume. We quote per gross ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30 with $4 additional for Class A and gas pipe.

Old Material.—Inasmuch as the chief buying of heavy melting steel is to fill an order placed by the Bethlehem Steel Co. in July at a good price and as the freight rates are favorable the f.o.b. New York quotation has been raised accordingly. Two other eastern Pennsylvania mills have bought steel, the dealers' buying prices being $11.50, delivered. Sentimentally the market is better and prices are tending upward.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.50 to $8.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.50 to 8.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Light iron	2.00 to 2.50
Cast borings (clean)	4.50 to 5.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	8.50 to 9.00
Car wheels	10.50 to 11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Cincinnati

CINCINNATI, Aug. 9.

Pig Iron.—There are evidences that melters are getting short of iron, and sellers are having less difficulty in interesting buyers for current and future needs. The past week, by comparison with many of the preceding ones, was unusually active; and it is estimated that nearly 7000 tons were disposed of in Cincinnati and adjacent districts. Among the sales made was one to a Kentucky manufacturer of 2000 tons of Southern iron, equally divided between No. 2 and No. 2 soft, at a reduced price of $19, Birmingham, for each grade. The same interest bought in the vicinity of 1000 tons of Northern iron, silicon, 2.25 to 2.75 per cent, at a price reported to be under $18.50, Chicago. Other sales reported include 900 tons to a Western manufacturer, and 700 tons to an eastern Ohio melter. An Eastern pipe manufacturer is reported to have bought 500 tons of Virginia iron, and 400 tons of Southern Iron were sold into the St. Louis district. Several 100-ton lots were also taken by melters in this territory on the basis of $18, Chicago, and $20, Ironton. Interest in silveries, following the price reductions, was evidenced by the placing of a number of carload orders. There are few inquiries current, two from the Pittsburgh district totalling 800 tons. A Chicago district producer, who has been a very active seller, has advised that prices will be advanced 50c. to $1 a ton, and requests that all quotations outstanding be closed or withdrawn by Tuesday morning. The feeling in the trade is that prices have about reached bottom, and this view is held not only by sellers but by many melters.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—The improvement noted in July dwindled somewhat in the past week. Carload orders for immediate shipment is the prevailing activity. There were no exceptional sales made and while rumors of even lower prices are being heard, there is ap-

parently no basis for these in the small sales. A plate inquiry from a Louisville manufacturer for 900 tons is still pending. A few orders for sheets, some involving 100 tons, have been placed at the current schedules. There are reports that prices on galvanized sheets are being shaded and it is said that 3.85c. has been done. In the structural field several projects are up. The Big Four Railroad has taken bids on 400 tons of bridge replacement work and is inquiring for 900 tons for track elevation work in Indianapolis. There have been no lettings of prominence during the week. Some orders have been placed for wire and wire products. It is reported that plain wire has been sold at 2.25c., Pittsburgh, and rumors are current that other reductions may be made within the next week or so. Plant operations during the week will be practically unchanged, although the Ashland Steel Co. will operate its rolling mills during the next two weeks. The American Rolling Mill Co. at Middletown, operated 15 sheet mills and three jobbing mills in the past week and it is expected that they will continue for the present week. The Andrews Steel Co. and the Newport Rolling Mill Co. will be idle.

Warehouse Business.—Local jobbers report considerable improvement. This, no doubt, was stimulated by the lower prices quoted, jobbers having reduced their prices $3 per ton. New prices in effect are as follows:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 5.75c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—There has been some activity in the coke market, one seller reporting an order for 750 tons. Another booked 500 tons. Single carloads of Connellsville foundry have brought $5 per net ton at ovens. Wise County coke is unchanged at $5 to $6, and New River $1 lower at $7.50 to $8.50.

Old Material.—The local scrap market is dull, although dealers report some activity in other districts. Prices are unchanged.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

Boston

BOSTON, Aug. 9.

Pig Iron.—Considerable eastern Pennsylvania pig iron was sold in New England in the past week, and some Buffalo iron, in instances at materially lower prices. Three eastern Pennsylvania furnaces are actively bidding for business, one on a basis of $18.50 furnace for No. 2 plain, another on a $19 basis and the third on a $20 basis, and a Buffalo producer has offered No. 2 plain iron at $18.50 furnace in several, and in one instance at $18.25 or $23.71 delivered. Direct furnace representation is noted in competition with brokers who have the same iron for sale, consequently full details regarding transactions are more often than not lacking. For instance, the Gurney Heater Co., Framingham, Mass., has again purchased, this time 1500 tons, half No. 2 plain, and the remainder No. 2X, at a price understood to be well under $20 furnace, but details are lacking. A Bridgeport, Conn., foundry bought 500 tons No. 2 plain and 100 tons malleable, and the Saco-Lowell Shops, Boston, textile machinery, 500 tons No. 1X and 200 tons No. 2 plain, it is understood from direct furnace representatives. A Providence, R. I., foundry took 400 tons No. 2X eastern Pennsylvania at about $19.50 furnace or $23.56 delivered; the Framingham Foundries, Framingham, Mass., 200 tons No. 1X at less than $24 delivered, or about $20 furnace, and a Maine melter 200 tons eastern Pennsylvania No. 2X at less than $20 furnace, while a southern Massachusetts foundry purchased 100 tons of No. 2X on a firm offer at $20, a greater Boston textile machinery maker 100 tons No. 2X at $20.50 furnace, and the Griffin Car Wheel Co., Chelsea, Mass., 250 tons Buffalo at approximately $19 furnace. Otherwise sales were in car lots and included one of malleable to a Massachusetts foundry at $19.50 furnace. The aggregate sales for the week are in the neighborhood of 4500 tons. Further inquiries are in the market, the total tonnage involved being about 2000 tons. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$23.06 to $24.56
East. Penn., silicon 1.75 to 2.25	22.56 to 24.06
Buffalo, silicon 2.25 to 2.75	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25	23.96 to 25.46
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	30.16 to 31.16
Alabama, silicon 1.75 to 2.25	29.66 to 30.66

Warehouse Business.—Local warehouse prices on soft steel and reinforcing bars, structural shapes and plates and steel bands have been reduced very slightly. Stocks are smaller than they have been in months, and in some instances broken, yet dealers appear in no hurry to cover for future requirements. Prices on bolts and nuts, due to large stocks being carried, are still in favor of the consumer. It now develops that local stocks of wire nails are larger than heretofore supposed. These were purchased at prices considerably above ruling mill prices.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Coke.—New England producers of coke are quoting spot and contract foundry fuel at $10.66 delivered where the local freight rate does not exceed $3.40 a ton. New business, however, is coming in very slowly, the number of firms having signed up on contracts still being more than 40 per cent less than it was a year ago. Those foundries not having signed contracts are in no hurry to do so, and spot shipments show a slight falling off, if anything, in view of the fact that the aggregate weekly foundry melt in New England is not much in excess of 15 per cent of normal.

Old Material.—A central Massachusetts textile machinery maker paid $19.50 delivered for 1000 tons selected No. 1 machinery cast, and a few car lots of general run were purchased at 60c. per 100 lb. by dealers the past week. Otherwise the market on machinery cast is unchanged, foundries and yards being at a deadlock on prices, the former not being willing to sell at ruling prices and the foundries only willing to purchase at concessions. Four cars of chemical borings were taken by a dealer at $4.10, f.o.b. shipping point, for Pennsylvania delivery, and a small tonnage of cotton ties at $5 shipping point for Maine delivery. A round tonnage of shafting is under negotiation, but at the moment buyer and seller are quite far apart on prices. Little, if any, interest is shown in heavy melting steel by anybody.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$16.50 to $17.00
No. 2 machinery cast	15.00 to 15.50
Stove plate	14.50 to 15.00
Railroad malleable	12.50 to 13.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Cleveland

CLEVELAND, Aug. 9.

Iron Ore.—Receipts at Lake Erie ports for the past month were only 2,793,955 tons compared with 7,076,357 tons for July, 1920, and shipments to furnaces were 1,960,565 tons compared with 4,348,496 tons in July of last year. The receipts for the season to Aug. 1 were 7,249,435 tons compared with 17,407,792 tons to Aug. 1, 1920. Shipments to furnaces for the season to Aug. 1, 1921, were 5,707,232 tons compared with 12,597,009 tons for the preceding year. Despite the light receipts, the balance on dock Aug. 1, 1921, was greater than it was a year ago, the tonnage being 8,840,824 tons compared with 7,917,109 tons on Aug. 1, 1920. The receipts for the month at other than Lake Erie ports were 1,092,598 tons compared with 2,588,846 tons for July, 1920. Sales are very light and shipments continue to be held up on contracts. It is now estimated that the entire movement by lake for the season will be about 25,000,000 tons, or about a million tons less than the movement to Aug. 1, 1920.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron $6.45; Old range non-Bessemer 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Favorable developments are not pronounced, but some encouragement is found in the larger number of releases on deferred shipments and in the increased number of small inquiries. Some important melters have not taken any iron on contract since last November. Inquiries range from a carload to 500 tons and all are for prompt shipment. The rule is for buyers to insist upon immediate delivery. As to prices, some concessions are being made when buyers agree to receive shipments of high priced iron. Except under such conditions, however, the usual selling price is $20, Cleveland, for No. 2 foundry. A sale has been made as low as $19.50 and reports are still heard of quotations of $19. Owing to the very large accumulation of stocks in Cleveland furnace yards, it does not seem probable that there will be any advance in price for many months, but sellers are entertaining the hope that prices will not be much, if any, lower.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$19.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.00 to 20.50
Southern fdy., sil. 2.25 to 2.75	26.92
Ohio silvery, sil. 8 per cent	30.67
Standard low phos., Valley furnace	36.00 to 36.25

Finished Iron and Steel.—The moderate improvement in sentiment and orders reported last week continues and is a little more pronounced. Inquiries cover a wider range and show much more interest on the part of buyers, but buying is still light. The most talked about business taken recently is still the 6900 tons contracted for by the Mt. Vernon Bridge Co. for the Ohio State University stadium and other work, consisting principally of shapes, and the eagerness displayed by the mills in this case shows what can be done when considerable tonnage appears. It is now generally believed that a large part of the material went to one company at 1.60c., Pittsburgh, and the remainder to another company at 1.65c. On plates the usual quotation is 1.75c., but it is evident that 1.70c. can be done. On steel bars some business is being placed at 1.75c., but reports of shading are persistent. On hot rolled strips 2.25c., or $5 per ton below recent Pittsburgh quotations, has been done. No large structural contracts are pending and the only business in prospect is for school buildings in several northern Ohio cities. On wire products the demand is light, but $2.75 for wire nails and $2.50 for plain wire are firmly adhered to by the leading interest, and little is heard of shading by the independents. An interesting phase of the extreme dullness in the oil market is that it is necessitating the storage of large quantities of oil and it is expected that many large tanks will be built for this purpose.

Warehouse Business.—Cleveland jobbers have reduced warehouse prices on black and galvanized sheets $5 per ton and on blue annealed from $3 to $4 per ton, following the recent reductions on steel bars, plates and shapes.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.25c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Bolts, Nuts and Rivets.—A number of orders releasing shipments on contracts have been received from the South. This is considered a very favorable indication. There is also a moderate improvement in inquiries. Regular quotations remain unchanged. The manufacturers say that fully 90 per cent is being done at these prices, although concessions are sometimes made for very desirable business. Local rivet manufacturing is at very low ebb, but no disposition is shown to meet the extremely low quotations reported in other markets.

Sheets.—The fact that the automobile manufacturers have continued to operate at a greater rate than was expected is having a favorable influence on the market for sheets, but it is generally believed that the present rate of consumption by the automobile companies will not continue and there is no prospect of other important buyers contributing to any large extent to the demand. If there is any change in quotations, it is toward firmness, the usual prices being 3c. for No. 28 black, 4c. for No. 28 galvanized and 2.25c. to 2.40c. for No. 10 blue annealed.

Coke.—The first inquiry for any tonnage on contract has been received but the amount is not large. The market continues inactive. The usual price for standard Connellsville coke is $4.50 per net ton at oven, but $4 has been named.

Old Material.—The scrap market is showing some signs of improvement. On limited sales, heavy melting is quoted $1 to $1.25 higher while advances are noted in a number of other grades. Important customers, however, still have very large accumulations, amounting in some cases to 50,000 tons.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.00 to $12.25
Steel rails, under 3 ft.	12.00 to 12.25
Steel rails, rerolling	13.50 to 14.50
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	6.75 to 7.25
Machine shop turnings	5.00 to 6.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	7.00 to 7.25
Railroad wrought	10.50 to 11.00
Railroad malleable	11.50 to 12.50
Light bundled sheet stampings	4.00 to 4.50
Steel axle turnings	8.50 to 9.00
No. 1 cast	15.50 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

Birmingham

BIRMINGHAM, Aug. 9.

Pig Iron.—From what can be gathered from various sources a business of 6000 tons was done in Birmingham pig iron in the first week of August. Heading the list was a sale of 1500 tons to a pipe interest. Others were mostly in 100-ton lots. Southern Pacific was in the market for 800 tons and all bids over $18 were not considered, whereupon several Birmingham makers withdrew bids. A 100-ton lot of 2.75 to 3.25 per cent silicon brought $19.50, reading back to base of $18.50, with 50c. for silicon additions, but the average sale was at $19 and at the end of the week that was stronger than in the beginning. Only one yard in Alabama has any No. 2 soft. Ill-assorted stocks are proving a positive handicap to melters and tend to harden prices. There seems no likelihood of lower prices. The Woodward Iron Co. blew in its second stack on merchant iron on account of bare state of yards, there being no iron on hand. Some inquiries for fourth quarter have been received. Makers will not quote for that period except at an advance of $1 and over above present levels. A high authority makes

the statement that 80 to 85 per cent of the pig iron that is being sold and moved from Birmingham is for delivery in the South and the Southwest with some to the Pacific Coast. Present freight rates to the Middle West and the East are an embargo on Birmingham iron business in those directions. All iron and steel interests admit a positive although gradual betterment, and figure something substantial within thirty days.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	32.00

Finished Material.—It is announced with authority that the finishing mills of the Tennessee company and its auxiliary, the Chickasaw Shipbuilding & Car Co., are on 50 per cent of capacity production. The rail mill is operating at normal, producing 6000 tons a week, the car works are putting on speed, the tie-plate plant is doubling capacity, all based on a monthly production of 55,000 tons of basic iron and 50 per cent of ingot production. Gulf States Steel Co. orders are larger and wire mills are on a five-day turn. Structural steel mills are active. Conners-Weymann Steel Co. continues operation of hoop and band mill at Woodlawn.

Cast-Iron Pipe.—New Birmingham base of high pressure pipe is $35 to $36 for 6 in. and upward. This marks another decline of $5 a ton. National Cast Iron Pipe Co. reports 80 to 90 per cent of capacity production. The leading interest operates two shops with two idle. Sanitary pipe is fairly active with a 50 per cent production and base of $40 with $3 for extra heavy pipe. Prices are firm.

Coal and Coke.—Steam coal production is increasing and competition has cut prices to almost one-half of last year's. Standard foundry coke is at $6. A large business in car lots for rush shipment is being done.

Old Material.—The scrap market is beginning to see a rift in the clouds with betterment in the steel market and promise of larger foundry operations, but no improvement has yet taken place. Prices are nominal.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

St. Louis

ST. LOUIS, Aug. 9.

Pig Iron.—The market continues extremely dull, trading being confined to scattered lots of one car to 100 tons, all for prompt shipment. Job foundries report the demand for castings at a low ebb, with new business so small that it can be dispatched with from one to two heats per week. Virtually all the stove plants, the largest consumers of pig iron in this district, are down. The leading blast furnace interest continues in blast and is storing a goodly part of its product. Sales in the week included 100 tons to a stove plant; two cars to a job foundry; one car to an Iowa implement interest and one car to a Quincy melter. There is an inquiry before the market for a car of Bessemer ferrosilicon from a local steel plant. The leading local blast furnace interest is quoting $21.25 for 1.75 to 2.75 per cent silicon and states that it will meet all competition.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$21.30 to $21.80
Northern malleable	21.30 to 21.80
Basic	21.30 to 21.80
Southern foundry, sil. 1.75 to 2.25	24.74 to 25.74

Finished Iron and Steel.—Warehouse interests report that the recent price reductions have failed thus far to stimulate buying. The spurt of activity which featured the closing weeks of July has spent itself, leaving the market inert and featureless. About the only buying is by the railroads, which are taking fair tonnages of materials for repairs to equipment. Shops of several Western roads have resumed activities on full time, including the chief shops of the Missouri Pacific at Sedalia, Mo. Specifications for the structural steel for the new Federal Reserve Bank's eight-story building and two buildings of the Board of Education will be made public during the next two weeks:

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.62½c.; No. 28 black sheets, cold rolled, one pass, 4.75c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and tapped, $3.00 off list.

Coke.—Outside of the sale of an occasional car of foundry coke for prompt shipment, the market is dead. Leading melters have stocks piled or under contract to carry them along for some months at the present rate of activity. Furnace coke is unsalable, the only plant in blast being that of the St. Louis Coke & Chemical Co., which manufactures its own fuel. The by-product plants have liberal accumulations in their storage yards. A small tonnage of foundry coke manufactured here has been sold to Pacific Coast melters and is being shipped regularly. Standard Connellsville foundry coke is quoted at from $4 to $4.50 ovens, with special brands as high as $5.25. The furnace product is about $1 lower. The leading by-product producer is selling its domestic sizes at $8.50 per ton delivered in St. Louis.

Old Material.—A much better tone has come into the market for scrap iron and steel, with prices taking a sharp upward slant. The industries, while mainly idle at the moment, are looking about with the view of acquiring material. The American Car & Foundry Co., which has business booked sufficient to keep all its local plants busy from Sept. 1 to the first of the year, purchased 3000 tons of rolling mill stock this week. The American Steel Foundries is seeking rerolling rails and special steel scrap. An inquiry is before the market for 2000 tons of 60-lb. relaying rails. Other plants are quietly picking up bargains wherever they appear. Railroad offerings include the following lists: Mobile & Ohio, 425 tons; Missouri, Kansas & Texas, 950 tons; Pennsylvania, Southwestern Division, 5100 tons; Union Pacific, 750 tons and Pullman Co., 350 tons. An electric railway interest is asking bids on 1200 tons of 60-lb. relaying rails.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$12.00 to $12.50
Steel rails, rerolling	11.00 to 11.50
Steel rails, less than 3 ft.	10.50 to 11.00
Relaying rails standard section	28.00 to 30.00
Cast iron car wheels	11.00 to 11.50
No. 1 railroad heavy melting steel	10.50 to 11.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	10.50 to 11.00
Ordinary bundled sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	$5.50 to $6.00
Iron angle bars	10.50 to 11.00
Steel angle bars	9.00 to 9.50
Iron car axles	16.00 to 16.50
Steel car axles	11.50 to 12.00
Wrought iron arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.50 to 9.00
Cast iron borings	5.50 to 6.00
No. 1 busheling	10.00 to 10.50
No. 1 boilers cut in sheets and rings	5.00 to 5.50
No. 1 railroad cast	12.00 to 12.50
Stove plate and light cast	10.50 to 11.00
Railroad malleable	8.50 to 9.00
Agriculture malleable	8.50 to 9.00
Pipes and flues	7.00 to 7.50
Heavy railroad sheet and tank	5.00 to 5.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	7.50 to 8.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.50 to 11.00
Railroad brake shoes	8.00 to 8.50

Philadelphia

PHILADELPHIA, Aug. 9.

For the first time in a year or more there has been a slight flurry of pig iron buying in this market. A sale of 5000 tons of basic by two furnaces to an Eastern steel company is the first transaction in steel-making iron of that size in a considerable time. Probably 10,000 tons or more of foundry iron has been sold within the week, mostly at prices which proved so attractive to consumers that some took more than their immediate requirements called for. One maker of foundry iron made prices as low as $18.50 on No. 2 plain and $19 on No. 2X to move a tonnage quickly. Other furnaces have not quite met these prices, but are within about $1 of them.

Pig Iron.—Sales of pig iron in this market within the past week have totaled upward of 15,000 tons, the best record in many months. All of this business, however, was taken at the expense of prices, which are off from $1 to $2 a ton compared with last week's quotations. The largest purchase was 5000 tons of basic by an Eastern consumer, the tonnage being divided about equally between two furnaces. The price paid was $19, furnace, which is a new low record on this grade of iron. Foundry iron also struck new low levels, $18.50, furnace, for No. 2 plain and $19, furnace, for No. 2X. Sales at this price were made by one furnace, which placed a block of 10,000 tons in the hands of a leading selling agency with which it is not regularly identified with instructions to convert it quickly into cash. The first offerings were on the basis of $19 for No. 2 plain and $19.50 for No. 2X. One sale of 1500 tons of No. 2 plain was made at $19, furnace, and other smaller sales, including one of 500 tons, were made at the same prices. Then another half dollar was lopped off to bring out more buyers. The selling agency handling the iron has offices in Boston, New York and Philadelphia, hence the offerings have been freely made throughout the whole Eastern territory. Other Eastern furnaces have not gone to such low levels but have passed up considerable tonnage which they might have had by meeting competition. One furnace which is quoting $20, furnace, on either No. 2 plain or No. 2X, is for the first time this year willing to sell for forward delivery and has taken some business running into fourth quarter. A few sales of copper bearing low phosphorus iron have been made at $35, furnace. A leading maker of standard low phosphorus now quotes $36.50, furnace, on that grade. Gray forge has been sold at about $22, delivered.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$19.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	19.84 to 21.26
Virginia No. 2 plain, 1.75 to 2.75 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	20.26
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Coke.—Considerable variation in coke prices, according to grades, is noted. Foundry coke of ordinary quality is obtainable at $3.75, Connellsville, while some of the better grades are selling for $4.50 and $5. Furnace coke of ordinary grade can be had at $2.60, Connellsville, though a better quality sells for $3.

Ferroalloys.—Eastern producers of ferromanganese now quote $70 per ton for delivery as far west as the Pittsburgh district and $75, delivered in the Chicago district. Reports of resale ferromanganese at as low as $65, delivered, are not confirmed. The lowest quotation reported on imported ferromanganese is $67.50, Atlantic seaboard. Spiegeleisen is quoted at $27, furnace, for 18 to 22 per cent, with some lower grade material available at $25.

Semi-Finished Material.—There is practically no inquiry for billets, which are nominally quoted at $30, Pittsburgh, for rerolling and $35 for forging quality. Eastern mills find it impossible to compete on sheet bars, which are reported to have been sold below $30, Youngstown.

Plates.—On the ordinary small lots which constitute the sole activity in the present market mills are quite uniformly quoting 1.85c., Pittsburgh.

Structural Material.—Reports of shading on plain material are commonly heard, but are difficult to confirm as the mills are making a determined effort to hold the price at 1.85c., Pittsburgh. Small orders are being booked at this figure; large tonnages might bring out lower quotations. Bids have gone in on an office building for Heymann & Brothers, Philadelphia, 300 tons, and for a bank building at Atlantic City, 300 tons.

Bars.—Though reports of 1.70c., Pittsburgh, on steel bars are heard, Eastern mills generally assert that their minimum is 1.75c. Very little business is being booked. Spring steel is selling on the bar base plus 15c. per 100 lb. Cold drawn steel can be had at 2.50c., Pittsburgh. Bar iron has been quoted at 1.70c., Pittsburgh, or 2.05c., Philadelphia, but buyers are taking little interest.

Railroad Supplies.—Railroad spikes are being bought by Eastern roads on the basis of 2.75c., Pittsburgh. Track bolts are quoted at 4c. to 4.25c., Pittsburgh.

Bolts, Nuts and Rivets.—Large machine bolts are being quoted by Eastern makers at 65-10-5 per cent off list, but this does not appear to be the minimum. Structural rivets are 2.50c. to 2.85c., Pittsburgh, and boiler rivets 2.60c. to 2.75c., Pittsburgh.

Sheets.—Ruling quotations on sheets are 2.25c. for blue annealed, 3c. on black and 4c. on galvanized, but these prices, particularly on black and galvanized, are being shaded at least $2 or $3 a ton.

Warehouse Prices.—Local warehouses have marked up bar iron $2 a ton in line with steel bars, but this is the only price change of the week. Business shows no expansion. We quote for local delivery as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.75c.; round edge iron, 3.05c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4.20c.; squares and hexagons, cold-rolled steel, 4.70c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 6.50c.; toe steel, 4.50c.

Old Material.—Scrap prices show an upward trend whenever the slightest demand springs up from any quarter. An Eastern mill came into the market a few days ago for cast iron borings, forcing an advance of 50c. per ton, Owing to the great curtailment in machine-shop operations borings are not being produced in sufficient volume to create a surplus. An Eastern steel mill came into the market for steel scrap at $11, but apparently has not been able to obtain any at that price. Another mill has offered $11.50 for small lots and that price appears to be the bottom at the moment. Advances of 50c. a ton are also recorded on machine-shop turnings and wrought iron and steel pipe. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.00 to 7.50
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	11.00 to 12.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80 000 lb. On the latter item the rate applies to a minimum of 50.000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46 000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65
Large boiler rivets.....$2.75
Small rivets.....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads.....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts.....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4 60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S...80, 10 and 10 per cent off list
Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70.10. 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....3.80c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9 16-in. and larger, $2.75 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $3 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.80 base per 100 lb. Tie plates, $2 to $2.05 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C. $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh follow:

Blue Annealed

	Cents per Lb		Cents per Lb.
No. 8 and heavier	2.30	Nos. 11 and 12	2.50
Nos. 9 and 10 (base)	2.40	Nos. 13 and 14	2.60
		Nos. 15 and 16	2.70

Box Annealed, One Pass Cold Rolled

	Cents per Lb		Cents per Lb.
Nos. 17 to 21	2.70	No. 28 (base)	3.00
Nos. 22 to 24	2.75	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

	Cents per Lb.		Cents per Lb.
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

	Cents per Lb.		Cents per Lb.
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Aug.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
3	12.00	11.75	25.87½	4.40	4.20	4.70	4.20
4	12.00	11.75	26.25	4.40	4.20	4.70	4.20
5	12.00	11.75	26.50	4.40	4.20	4.70	4.20
6	12.00	11.75	.....	4.40	4.20	4.70	4.20
8	12.00	11.75	27.75	4.40	4.20	4.70	4.20
9	12.00	11.75	27.75	4.40	4.20	4.70	4.20

New York

NEW YORK, Aug. 9.

A better feeling pervades all the markets and buying is in larger volume. Sellers of copper willing to do business at present levels report a fair business with the market firmer. Demand for tin continues moderate with prices higher. The lead market is slightly firmer but quiet. Inquiry for zinc is increasing and prices are steady.

Copper.—There has been more inquiry in the past week from consumers who have been bidding 11.75c., delivered, for electrolytic copper with practically no success and it is stated by one or two sellers that buyers are now willing to pay 12c., delivered, and that there is a fairly good business both for domestic and foreign accounts. It is acknowledged that over 1,000,000 lb. of copper was sold last week to a large consumer at 11.87½c., delivered, or ⅛c. below the market price, but this is considered to have been a "freak" sale, the seller being compelled to dispose of it for cash. It is declared impossible to buy electrolytic copper below 12c., delivered, and some of the large producers are out of the market at this level. While demand is better it is not large, but interest on the part of consumers is improving. Ocean freight rates have been reduced from $9 to $5.50 per ton, which, it is hoped, will stimulate foreign trade.

Tin.—The middle of last week business aggregating about 350 tons of Straits tin for shipment from the East was sold at prices ranging from 26.25c., delivered, down to 25.75c. f.o.b. New York. Aside from that the market has been inactive. Yesterday prices took a sharp advance, due to a rise in London of sterling and the advance in rates for sterling exchange. At the new level a fair business was done in this market at 27.25c. to 27.75c. for future shipment. Spot Straits tin to-day is quoted at 27.75c., New York, and the London market is about £4 per ton higher than a week ago, with spot standard at £162 10s., future at £164 10s. and spot Straits at £163 5s. Arrivals thus far this month have been 360 tons with 4010 tons reported afloat, which is regarded as unusually large under the circumstances.

Lead.—The market is steady and featureless. Some sellers report more inquiry and a tendency to firmness, but quotations are unchanged at 4.40c., New York, or 4.20c., St. Louis, in the outside market, with that of the leading interest still 4.40c., both New York and St. Louis.

Zinc.—Sellers of prime Western report inquiry on the increase and of a decidedly better character than in some weeks. Both galvanizers and brass makers, largely the former, are showing more interest and some sales have been made for August shipment at 4.20c. to 4.25c., St. Louis, or 4.70c. to 4.75c., New York, and also some for September shipment at about five points above the August price.

Antimony.—There is no change in the market with wholesale lots for early delivery quoted at 4.60c., New York, duty paid.

Aluminum.—The leading interest continues to quote virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery at 24.50c. f.o.b. plant. Importers of the same grade are asking from 21c. to 23c., New York.

Old Metals.—Business is still impossible with the market slowly declining. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6 75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.75
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Chicago

AUG. 9.—Copper has declined, while tin and lead are higher. Tin has been very low and reacted upward, as was expected in many quarters. Lead is in a better position than most other metals, because consumption has been heavier and stocks are generally low. White lead plants, for example, have been quite busy until recently, reflecting a substantial demand for paint this summer. Old metal prices are unchanged. We quote Lake copper at 12.50c. in carload lots; tin, 29c. to 29.50c.; lead, 4.37½c.; spelter, 4.30c.; antimony, 7.50c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 9.—The market for lead and slab zinc remains dormant, the usual consumers showing absolutely no interest either in futures or spot. Producers are marking time, and making no effort to press their metal for sale. Independents declare they are losing money on every pound they sell at present prices. Lead is quoted at 4.20c. and zinc at 4.20c., car lots. We quote Lake copper car lots at 12.73c. to 12.98½c.; tin, 27.36c., and antimony, 5.38½c. On old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c., and aluminum, 9c.

Belgian Blast Furnaces Operating

The following list shows the furnaces in operation in Belgium July 1, 1921:

Forges of Halanzy: 1 furnace producing 90 tons of foundry pig iron per 24-hr.

Forges of Espérance Longdoz: 2 furnaces producing 300 tons.

Forges of Angleur: 2 furnaces producing 200 tons.

Cockerill Works: 1 furnace producing 170 tons of foundry iron and 76 tons of steel-making iron.

Forges of Clabecq: 1 furnace producing 180 tons of steel-making iron.

Forges of Providence: 2 furnaces; one producing 207 tons of foundry iron; the other 155 tons of steel-making iron.

Usines du Hainaut: 1 furnace producing 120 tons of foundry iron.

Sambre et Moselle: 3 furnaces producing 450 tons of steel-making iron.

Output has still further been curtailed and two or three furnaces have been blown out in the districts of Liège and Charleroi.

The Société Franco-Belge de Matériel de Chemins de Fer in Raismes has practically finished the reconstruction of its works. It is reported that the output of the reconstructed works will reach 100 locomotives per year, compared with a pre-war capacity of 60 locomotives. Works and sheds are planned with a capacity of 200 passenger cars and 3000 trucks.

PERSONAL

Bradley Stoughton, Engineering Societies' Building, 29 West Thirty-ninth Street, New York, having resigned after more than eight years as secretary of the American Institute of Mining and Metallurgical Engineers, will resume his practice as a consulting engineer, making a specialty of financial investigations and reports to bankers, investors, directors, trustees and examining accountants on industrial plants, engineering enterprises, iron and steel plants, etc.

Joshua A. Hatfield, president American Bridge Co., sailed recently to Europe on business and pleasure.

B. D. Lockwood has resigned as chief engineer of the Pressed Steel Car Co., Pittsburgh, and J. F. Streib, formerly assistant chief engineer, has been named to succeed him.

Isaac Harter, assistant to the president Babcock & Wilcox Co., New York, boilers, stokers, etc., has been appointed general superintendent of the company.

J. A. Henry has been appointed Western district manager of the Warren Iron & Steel Co., Warren, Ohio, with offices at 1810 Continental & Commercial Bank Building, Chicago, 'phone Harrison 2541. Mr. Henry has been Cincinnati district manager for the American Rolling Mill Co. and general manager of the Indiana Rolling Mill Co.

Robert R. Carter, covering the southern Indiana territory for the Van Camp Hardware & Iron Co. for six years, has resigned to accept a position as manager for the Weber Tire & Accessory Co., Evansville, Ind., southern Indiana distributor for the Lee Tire & Rubber Co.

Joseph W. Powell, until recently vice-president of the Bethlehem Shipbuilding Corporation, has been appointed by Chairman Lasker of the United States Shipping Board to take charge of the financial, accounting and sales department of the Emergency Fleet Corporation. Mr. Powell, who will serve the Government without salary, will devote several months of his time to bringing about a complete and business-like reorganization of the department which he heads. In commenting upon the appointment Chairman Lasker said that Mr. Powell some time ago had been tendered the position of senior vice-president and general manager of the Emergency Fleet Corporation at a large salary, but found it impossible to accept. He was prevailed upon, however, to assist in the board's proposed reorganization of the Fleet Corporation and will join the organization about Sept. 1. Mr. Powell is 44 years of age, a Naval Academy graduate, and was a member of the construction corps of the navy when he resigned in 1906 to accept a position with the William Cramp & Sons Ship & Engine Building Co. In 1914 he became president of the Fore River Shipbuilding Corporation and in 1917 was put in charge of the five shipbuilding properties belonging to the Bethlehem interests. He organized and operated these properties throughout the war, and until his retirement early this year.

Arthur R. Markel has been transferred by the Columbus McKinnon Chain Co., Columbus, Ohio, from the position of secretary to that of assistant to the president. Don S. Brisbin, formerly assistant sales manager of the McKinnon Industries, Ltd., St. Catharines, Ont., goes to Columbus as director of sales.

Dr. Richard Moldenke last week was a guest at luncheon of the Worcester, Mass. members of the New England Foundrymen's Association, at the rooms of the Worcester Metal Trades Association, that city. H. P. Blumenauer, general manager Arcade Malleable Iron Co., presided. Dr. Moldenke spoke on foundry costs and on his observations of conditions in Europe, gathered during a trip from which he recently returned.

Ross C. Purdy, formerly director of research Norton Co., Worcester, Mass., and for the past two years consulting ceramist in Buffalo and elsewhere, has been made permanent general secretary of the American Ceramic Society, of which he was president in 1909 and 1910.

H. W. Thompson, 503 Mining Exchange Building, Denver, Colo., has been appointed sales representative in that territory for the M. H. Detrick Co., 155 East Superior Street, Chicago, maker of arches and steam jet ash conveyors.

I. F. Baker, general superintendent Lynn Works, General Electric Co., is convalescing following a minor operation, performed recently.

Harvey J. Mallory has been elected vice-president of the Buick Motor Car Co., Flint, Mich., succeeding C. S. Mott, who was recently made chairman of the advisory committee of the General Motors Corporation. Mr. Mallory will also continue his former duties as controller of the Buick company.

S. V. McLeod has been appointed purchasing agent for the Algoma Steel Corporation, Sault Ste. Marie, Ont.

Homer A. Pardee, general manager of the Halcomb plant of the Crucible Steel Co. of America, Syracuse, N. Y., has been appointed manager of the Park works of the company at Pittsburgh, succeeding George I. Page, who has resigned his position at the Park works. Assistant Manager James A. Scott of the Park works has also resigned.

Robert B. Woodworth, sales statistician and advertising manager of Carnegie Steel Co., will have completed 24 years affiliation with that company on Aug. 16 and on the following day retires from active participation in the steel business. He has occupied an unique position with the Carnegie company in that he directly supervised all technical publications of the company, was the author of many of them, had charge of all the advertising copy and also was the originator of the all-steel drilling rig, steel derrick, sheet steel piling driving caps and steel timbers for mines. He also worked out the details for some of the earliest examples of fireproof partitions in office buildings, built with sheet steel studding and expanded metal laths. He devised and installed for the Carnegie Steel Co. a system of trade records covering the consumption and production of all kinds of heavy rolled steel products in the United States, classified by lines of trade down to the individual requirements of separate purchasers. This system, since improved and extended, is believed to be the most complete in the industry. During the war he was in Washington, where he helped develop the American standard practice for ordering ship steel which was adopted by the Emergency Fleet Corporation and the observance of which by American shipbuilders is said to have increased the production of ship plates at least 10 per cent. Mr. Woodworth was born April 28, 1868, in Winchester, Va. He was educated in the schools at Burlington and Moorefield, W. Va., and entered Hampden-Sidney College as a junior, from which he was graduated in June, 1886. In 1893 he was awarded a master of arts degree by Princeton University, where he pursued a post-graduate course. Prior to entering the service of the Carnegie Steel Co. he had been with the West Virginia Central Railroad, now the Western Maryland Railroad, the Brown-Ketchman Iron Works, Indianapolis, the Elmira Bridge Co., Elmira. N. Y., and the Central Bridge & Engineering Co., Peterborough, Can. He entered the employ of the Carnegie company as a draftsman and was successively chief draftsman and engineer to the general sales department, having oversight of orders for fabricated structural materials. Since Oct. 1, 1917, he has been advertising manager and sales statistician.

Committee A1 on Steel of the American Society for Testing Materials is planning to extend its activities to include the study of tests and specifications for sheet steel. Inquiries received by the society have indicated a need for information concerning this product. A representative sub-committee is being organized.

Changes in Republic Sales Organization

Wilber B. Topping, general manager of sales of the Republic Iron & Steel Co., Youngstown, Ohio, announces the following changes in the sales organization of the company, effective Sept. 1. Charles S. McKinley has resigned as assistant manager of sales and will be succeeded by Walter W. Hall of the Pittsburgh office, who will become assistant to the general manager of sales, and be located in Youngstown. Frank Welsh, formerly with the Republic company, will succeed Mr. Hall as assistant manager of sales in the Pittsburgh office. Frank L. Rownd has been transferred from the operating department at the Niles, Ohio, sheet mills to the sales department, in the sheet division.

Mr. McKinley will become associated with his brother, A. E. McKinley, a professor at the University of Pennsylvania, in the management of the McKinley Publishing Co., Philadelphia, and will assume active charge of the business. The company produces school supplies, maps and other printed products. He has been associated with the Republic company since 1913, starting in the Philadelphia office where he remained for two years, when he was transferred to Pittsburgh and became manager of sales in that district. On Jan. 1, 1919, he was transferred to Youngstown as assistant manager of sales.

Except for a period of slightly more than two years when he was associated in the Columbia Steel & Shafting Co., Pittsburgh, Mr. Hall has been continuously identified with the Republic company since 1899. He was originally located in the Chicago office of the Republic company and was subsequently transferred to Pittsburgh.

Mr. Welsh previously was connected with the sales department of the Republic company for seven years, resigning Dec. 1, 1917, to engage in the export business in New York. He later became manager of the New York office of the Hickman-Williams Co. His most recent affiliation was the Detroit Graphite Co., which he represented in the Pittsburgh district.

Mr. Rownd has been with the Republic company for two years in various operating capacities in the Niles sheet mill works.

British Iron and Steel Market

(*Continued from page* 361)

last week. Welsh works have secured orders from the Far East at £21 (3.43c. per lb.) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.66 per £1 as follows:

Durham coke	£2	2		$7.69	
Cleveland basic	7	7½ &	£7 10*	26 99 &	$27.45
Cleveland No 1 foundry	7	0		25.62	
Cleveland No. 3 foundry	7	0 &	7 5*	25 62 &	26.54
Cleveland No. 4 foundry	7	0 &	7 5*	25.62 &	26.54
Cleveland No. 4 forge	5	17½		21.50	
Hematite	7	0*		25.62	
East Coast mixed	8	0 &	7 5*	29.28 &	26.54
Ferromanganese	18	0 &	14 10*	65.88 &	53.07
Rails, 60 lb. and up	10	10 to	14 0	38.43 to	51.24
Billets	9	0 to	9 10	32.94 to	34.77
Sheet and tin plate bars, Welsh	9	0 to	9 10	32.94 to	34.77
Tin plate base box	1	3 to	1 5½	4.21 to	4.67
				C. per Lb.	
Ship plates	14	0 to	15 0	2.29 to	2.45
Boiler plates	19	0 to	21 0	3.10 to	3.43
Tees	14	0 to	15 10	2.29 to	2.53
Channels	13	5 to	14 15	2.17 to	2 41
Beams	13	0 to	14 10	2.12 to	2.37
Round bars, ¾ to 3 in.	13	0 to	13 10	2 12 to	2.21
Galvanized sheets, 24 g.	22	0		3.59	
Black sheets	17	10		2.86	
Steel hoops	17	0		2.78	
Cold rolled steel strip, 20 g.	26	10		4.33	

*Export price.

Fuel Cost Retarding Resumption of Blast Furnaces—Continent Getting Most Business

LONDON, ENGLAND, July 27.—The long-looked for revival does not show yet any evidence of having arrived. There seems to be more activity in certain of the overseas markets, particularly in the East, and a good deal of miscellaneous inquiry is appearing. It is generally noticeable, however, that the business is slow to mature.

The universal cry is that fuel is too dear to enable manufacture of iron, steel or any other products to be carried on at such a price as would enable producers to compete with the continent. It looks as if, after the first rush for coal supplies is satisfied, the market for fuel will become dull and perhaps eventually prices will, by that means, come to an economic level.

A few furnaces have been started on pig iron, but as a rule, iron-masters seem determined to keep the blast furnaces idle until fuel comes to such a level that pig iron may be made at a profit. What this level is, it is difficult to say, but the general feeling seems to be that pig iron at 120s. per ton cannot be made without loss unless coke can be had at a price of 30s. per ton, delivered. As the present price of coke is about 42s. 6d., it will be seen that a considerable reduction is necessary. On the other hand, continental foundry iron is obtainable at about 100s. c.i.f. Middlesbrough, so that it looks as if fuel would need to come down even lower than the figure mentioned, as 120s. for pig iron is obviously not a competitive figure. At the moment stocks of good grades of foundry iron are scarce. There is no No. 1 to be had and for Nos. 3 and 4, 135s. has to be paid. The market has a temporary appearance of firmness therefore due to a slight demand arising from the resumption of work at the foundries.

In finished steel the general tendency of manufacturers is to go slow in resuming. There is a fair amount of business being done, but the continent is getting nearly all the orders. Although there is some inquiry, the aggregate does not look as if it would keep British works going very long.

It is reported that William Jessopp & Sons, one of the largest makers of crucible steel in Sheffield, have decided to close indefinitely during the present depression. This affects about 1500 employees. The firm's customers have been asked to place their requirements elsewhere for the present.

The shipbuilding position is far from satisfactory owing to the scarcity of new orders, but the shipping under construction in the United Kingdom at the end of June amounted to 789 vessels of 3,530,047 tons. The tonnage now under construction is less by about 268,000 tons than that being built at the end of the March quarter and about 48,000 tons less than that under construction 12 months ago. It is pointed out, however, that the figures can only be regarded as nominal, as the total includes a considerable amount of work which has been suspended owing to the decline in demand for tonnage, also a large quantity the completion of which has been postponed owing largely to the stoppage of work by the joiners' and the coal trouble. The tonnage on which work has been suspended amounts to 735,000 tons and the shipping which has been delayed in completion to 444,000 tons. These figures have to be deducted in order to enable a comparison to be made with figures for normal times. There is thus given a real total of 2,351,000 tons under construction in the United Kingdom.

OBITUARY

FRANK ERNEST WOODWARD, Wellesley Hills, Mass., died Aug. 5 at the New England Deaconess Hospital, Brookline, from the effects of an accident with which he met the previous week. Mr. Woodward was born in Damariscotta, Me., Jan. 2, 1853. At the age of 18 years he entered the employ of the Magee Furnace Co., Boston, became a member of the corporation in 1887, and in 1895 was in charge of the heating and ventilating department. In 1905 he organized the firm of Frank E. Woodward & Co., heating and ventilating engineers.

WILLIAM WILSON LIGHTHIPE, manager of the general service department of the Otis Elevator Co., died at the Long Island College Hospital, Aug. 7, aged 44. Mr. Lighthipe attended Trinity School and graduated from Columbia University in 1898. He was a member of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, Sons of the American Revolution and other organizations.

SLIGHT LULL IN EXPORTS

Far Eastern Buying Somewhat Less—Foreign Ore Imports Possible in a Few Months —Japanese Rail Inquiry

NEW YORK, Aug. 9.—There has been a slight lull in new inquiries for iron and steel from the Far Eastern markets. While South American markets are buying small tonnages of various materials, a large portion of these orders is being placed with European sellers, because of the lower prices and better credit terms. Importations of foreign pig iron, chiefly of Belgian origin, while profitable at present for Pacific coast consumers, cannot be done in competition with Eastern furnaces on the Atlantic coast. Importers in New York believe, however, that with declining European prices, in a few months it may be possible to put down foreign iron ore at Atlantic coast ports sufficiently cheap to interest American consumers. Ores considered the most favorable for such importation are those from Spain and northern Africa, which should be available at from 8c. to 10c. per unit.

Japanese Buying Light

Japanese buying continues on a slightly smaller scale. Orders for copper are still being placed in this country, one New York exporter having booked an order during the past week for 200 tons of electrolytic copper to a Japanese buyer. The South Manchurian Railroad continues to buy lightly and an inquiry is being handled by one Japanese export house for about 5 miles of 60-lb. rails and 5 miles of 75-lb. rails. An inquiry is in the hands of the American subsidiary of a French interest, calling for about 40 passenger cars for a Chinese railroad.

Mexican Situation Improves

According to the report of the representative in Mexico of a large American bank, economic and political conditions there are good and progress under the present administration rapid. Train schedules throughout Mexico are greatly improved and receipt of the locomotives and rolling stock purchased in the United States recently is expected to relieve all congestion at the ports. He adds that the administration is preparing to make payments on all foreign debts.

The Bombay water supply pipe line bids show a great divergence. It is understood that one American bid for the pipe line, fabricated and set in place, was somewhat over $11,000,000, while the bid of Braithwaite & Co., West Bromwich, England, was something over $5,000,000. This low bid was for riveted pipe, while the American bid was for the lock bar construction. Allowing in the case of the English bid some $2,000,000, which it is estimated will be less than the cost of laying the pipe, there is left over $3,000,000 for the material fabricated delivered. As there are about 80,000 net tons of material involved, it would appear that the unit cost of the fabricated steel pipe is about 2c. a lb. delivered. These figures are as yet unofficial. It may be added that the work will take 2½ to 3 years for completion.

IMPROVEMENT IN GERMANY

Price Trend Is Generally Upward—Ore Prices Decline—Jobbers Cut—Associations Formed

(*By Aerial Mail to London*)

BERLIN, GERMANY, July 25.—It is now generally admitted that a considerable betterment in the tone of the market has taken place and with prices exhibiting a strong upward tendency and a steadily increasing volume of business, the activity of the past fortnight augurs well for the future. Warehouse stocks are being rapidly cleared away and short-term deliveries are difficult to obtain, about 4 weeks being named for beams and girders and 8 to 16 weeks for bar iron and light plates. The Tube Convention has decided upon price advances for gas pipes and boiler tubes averaging 5 per cent and there are rumors of the establishment of a tube syndicate.

Ore Prices Declining

The Berg- und Hüttenmännische Verein, according to a report from Wetzlar, has reduced prices for Lahn red iron stone for the third quarter of 1921 from 238 m. to 214.30 m. per ton for 45 per cent ores and from 173 m. to 147.05 m. for 40 per cent, all f.o.b. mine head. This reduction was caused by foreign competition. Because of the precarious situation of the mining industry, representatives of labor have been urging the Government to compel smelting works to accept a certain percentage of the output of Lahn ores. Smelters have refused on the grounds that foreign ores are offered at considerably lower prices and that the poor quality of the expensive Lahn ores has resulted in losses. The Lahn red iron stone of 40 per cent iron and lower has a high silicon content which renders it, even at low prices, rather unprofitable. The Siegerland mines report improved demand. Prices for crude sparry ores and roasted ores have been reduced by 30 m. per ton as from July 1.

No important changes are noted in the pig iron market. French and Luxemburg foundry iron No. 3 are offered as low as 180 to 190 fr. per metric ton, and producers are willing to make remarkable concessions on large spot orders.

Price Cutting by Jobbers

Heavy price fluctuations in rolled material have been a feature of the market in the past week. While mill quotations continued firm, jobbers were cutting the mill prices with a view to eliminating competition. Despite fluctuations prices are on the upward trend, and for the present there is no indication of a halt. The larger works are well stocked with orders, some even operating at capacity, and new orders in some lines will not be accepted for at least 6 weeks.

Bar iron was quoted at 1850 to 1900 m. per ton, a price not reached for some time past. Concrete bars fetched 1900 to 2000 m., while offerings of jobbers were at about 1800 m. Demand for semi-finished material also shows a notable improvement, with prices recovering. We quote billets 1490 m. and sheet bars around 1480 m. Slightly higher prices ruled for open-hearth material. The sheet market is finally showing signs of an improvement. The heavy demand for rails also formed a feature of the market.

Quotations are as follows:

	Per Metric Ton, Marks
Tees and channels	1 800
Angles, rounds, flats	1.850
Hoop iron, co'd rolled	3 600
Rails, standard sections	2 350
Rails, for mines	2,300
Sheets, heavy	1.800
Sheets, medium	1,850
Plates, light	1,950

The German Iron Merchants Association at Düsseldorf has increased prices for bar iron, hoop iron and sheets for that district an average of 10 m. per 100 kg., bar iron now being quoted at 240 m. and hoops at 290 m. per 100 kg. The Bar Iron Merchants Association at Cologne has abolished the so-called guidance prices hitherto in force and fixed minimum base prices.

The Deutsch-Luxemburgische Bergwerks-und Hütten Aktien Gesellschaft in conjunction with the Bochumer Verein für Bergbau und Gusstahlfabrikation Aktien Gesellschaft and the Stahlwerke Brünninghaus Aktien Gesellschaft have established a joint sales organization under the name of Vereinigte Edelstahlwerke G.m.b.H. with the main office at Dortmund. As indicated by the name, this organization will handle the sale of refined steel produced by these works.

The two principal machine tool dealers associations are about to amalgamate. It is reported that Rhenish-Westphalian coal companies have opened negotiations with interested groups in Denmark, Sweden and Norway for the shipment of coal and coke on a large scale as soon as all reparation shipments have been concluded.

LONG WAIT ON THE TARIFF BILL

Much Senate Opposition—New Tax Legislation Likely to Come First

WASHINGTON, Aug. 9.—Among manufacturers opinion is growing in favor of the American valuation plan as the basis of ad valorem rates in the permanent tariff bill and in the membership of the Senate Committee on Finance there is a similar tendency. Importing interests are showing increasing opposition to the proposed system. It is now believed that if the plan as embodied in the bill passed by the House is not adopted in full it will be reported to the Senate in a modified form. The latter alternative appears to be the more likely outcome.

More Favor for American Valuation

The situation was summed up in substantially the above terms to-day by a prominent member of the committee, who added that he continues to have an open mind on the question. It was reiterated that in any event many rates in the House bill will have to be examined and revised downward, and it was indicated that the metal schedule will share in the changes that are to be made. It is uncertain when the hearings before the Senate committee will be completed, and consequently when the measure will be ready to be reported to the Senate. Treasury experts have prepared a modification of the American valuation plan which is said to follow the lines suggested by George C. Davis, in charge of the comparative value report bureau, customs division, Treasury Department. This would require the American producer to prove the comparability of his article with that which is imported and in competition with the domestic product. Considerable opposition to this suggestion has developed, however, and it remains to be seen what disposition will be made of it by the committee.

The Treasury experts, according to present plans, are to go into executive session to-morrow with the committee to consider the basis of fixing ad valorem rates and also to discuss the proposed dyes embargo. These matters were to have been taken up in executive session last Thursday, but owing to the great number of witnesses who desired to be heard on the embargo, hearings have been devoted to this issue.

It is hoped by the committee to act finally on both the embargo and American valuation questions by the latter part of this week and then to begin hearings as to rates in the tariff bill, with the probability that each witness will be given only a few minutes. Opportunity to submit briefs has been granted, however. It is uncertain when the metal schedule will be reached, but if the present program is followed it is expected that it will be taken up some time next week. On this basis it would seem to be the intention of the committee to report the bill to the Senate early in September, although it has been stated that no safe prophecy can be made.

Opposition to Tariff Bill

So much opposition to the bill has developed that it is thought it will be the object of vigorous attack in the Senate and that it will be held before that body for a long period. One Senator has said that the "snow will fly" before the bill is passed. The opposition apparently is not confined to Democrats, but some Republicans, it has been declared, show "less protective tendencies than heretofore."

Whether the tariff or the revised tax bill will take precedence depends upon the progress made with each. Chairman Fordney of the Ways and Means Committee now hopes to have the tax bill ready to report within 10 days and to dispose of it in the House within a week after it is taken up in that branch.

This would mean that the tax bill would reach the Senate late in August, and probably before the tariff bill is reported. Inasmuch as the Senate Committee on Finance has held hearings on internal revenue, but devoted principally to the sales tax, it is believed that it would give early attention to tax legislation and might act on it before taking up the tariff. This suggestion is strengthened by reason of the insistence from the country that tax legislation be given preference.

Wide Variance on the Tax Bill

The difficulties of framing a tax bill are as great as are those of preparing the tariff bill. While there still is a strong opinion that proposals of the Treasury Department for revised taxation will be adopted in general, they are meeting with much opposition from several sources. It is known that some members of the House Committee on Ways and Means are not favorable to the program of Secretary of the Treasury Mellon, which would eliminate the excess profits tax, increase first class postage to 3 cents, allow an exemption of $2,000 on corporation income with an increase from 10 to 15 per cent on corporation taxes, place a graduated tax on automobiles, reduce the transportation tax, repeal soft drink taxes, and fix a tax of two cents on bank checks, besides one or two other changes.

Agricultural and labor interests are opposed to eliminating the excess profits tax and many business interests favor a sales tax. The Chamber of Commerce of the United States and the National Association of Manufacturers are among organizations that have advocated a turnover tax. But indications are that the excess profits tax will be eliminated and that a turnover tax will not be considered further. It is realized that the excess profits tax has served its purpose, and in view of the deflation and liquidation in industry it would no longer produce the desired revenue.

Intervention in the Pittsburgh-Plus Case May Be Permitted

WASHINGTON, Aug. 9.—Representatives of independent steel interests who were informed that the Federal Trade Commission would not permit them to intervene in the Pittsburgh-plus proceedings are now hopeful that they may be granted this privilege. A statement has been issued by the commission that it "has not ruled against intervention in the complaint against the United States Steel Corporation, on the part of independent producers." The information previously current, that it had been decided not to allow intervention and that the proceedings would be directed solely against the Steel Corporation, was considered so authoritative that independent producers had given up the idea of making formal application to intervene. It now is understood that such application will be made. When Acting Chairman Gaskill was asked if the statement just given out by the commission implied that intervention would be permitted he replied that it could not be so interpreted and that the only way to obtain a formal ruling from the commission would be through the filing of an application.

Sharp Cut in Shovels

The Hubbard shovel manufacturing interests, Pittsburgh, have made a radical move by taking independent action in reducing the prices on all shovels, spades and scoops $3.40 per doz., making the present quotation $8.50 per doz. on the fourth grade polished goods and the same pro rata reduction on other goods. There has been no previous change in prices of shovels, spades and scoops for about a year.

Machinery Markets and News of the Works

BUYERS GET CONCESSIONS

Machine-Tool Orders Placed on Basis of Negotiated Prices

Slight Improvement Is Noted in Some Markets but Business Is Still at Low Point

Machine-tool users who are really in earnest about placing orders are finding no difficulty in obtaining attractive price concessions from many tool builders. Official prices have been changed in only a few instances, but each transaction is subject to special negotiation, with the buyer usually being able to name, within reason, his own figure.

The only business of importance is coming from vocational schools. The Alliance, Ohio, board of education has bought 14 tools—eight lathes, two drills, two grinders, a shaper and a hack saw. No action has been taken on the 25 tools required for the Canton, Ohio, schools, bids for which went in on July 29.

The Japanese Government has bought a few lathes at Cincinnati. The International Nickel Co. is in the market for some special machinery for its new plant at Huntington, W. Va. Otherwise the Cincinnati market is extremely dull.

The Phoenix Metal Stamping Co., Philadelphia, is in the market for new or used power punch presses, a rumbler and an electric welder.

New York

NEW YORK, Aug. 9.

The sale of three machines at about $20,000, made by a New York firm last week, is considered unusually good business, so dull is the machine-tool trade. Among prospective buyers are the street railroads of New York and some vocational schools in New York and Brooklyn. The Erie Railroad is asking for two lathes and the New York Central has inquired for a 42-in. lathe and a 48-in. planer. One New York seller has been asked for eight grinders by two prospective purchasers. The American Sugar Refining Co. is expected to close shortly for the machines on its list. The inquiry of the Bethlehem Steel Co. for tools for working on materials for the New York-Jersey City vehicular tunnel is still pending.

A 15 per cent reduction in sensitive drills became effective Aug. 1.

Sales of cranes are reported from other territories than the New York district, but conditions here remain quite as dull as for some time past. Decision has been made by the city of New York to exclude all but American builders in the bidding for the 34 cranes to be erected on the piers for the Pan American Terminal & Dock Co. being built at Stapleton, S. I. Openings on the two 3-ton portal cranes for Gowanus Canal will take place Aug. 18. Among recent sales are: Cleveland Crane & Engineering Co., a 5-ton, 50-ft. span overhead traveling crane to the Centre Iron Works, 608 East 137th Street, New York; Philip T. King, 30 Church Street, New York, a second-hand 20-ton, 40-ft. boom, 8-wheel Ohio locomotive crane with 1-cu. yd. clamshell bucket to the Brooklyn Eastern District Terminal Co., Brooklyn, N. Y. The 15-ton electric traveling crane for which the Equipment Corporation of America, Pittsburgh, has been in the market is reported to have been purchased from the Chesapeake Iron Works, Baltimore.

The Rèeves Domestic Utilities Co., 50 East Forty-second Street, New York, desires information on equipment for a wire goods department in a factory it expects to open in Tulsa, Okla.

The A. C. Chesley Co., Inc., 277 Rider Avenue, New York, manufacturer of fireproof doors and windows, is having plans prepared for its new two-story plant, 100 x 210 ft., on East 132nd Street, extending through to East 133rd Street. P. S. Murray, Tuckahoe, N. Y., is architect.

The Stone Mfg. Co., Brooklyn, has been incorporated with a capital of $250,000 by W. C., H. C. and A. G. Stone, Brooklyn, to manufacture loading and unloading machinery and kindred equipment. It is represented by F. V. Winters, 1133 Broadway.

The Typo Re-Inker Co., New York, has been chartered under State laws to manufacture inking machines and parts. The incorporators are J. F. Markey, A. K. Dohrmann, and G. F. Allison, 115 Bfoadway.

A new two-story power house, 52 x 68 ft., will be erected by the Artistic Dyeing Co., 100 Jewel Street, Brooklyn, at Moultrie and Meserole avenues. Plans have been completed.

The I. B. Kleinert Rubber Co., 725 Broadway, New York, manufacturer of rubber specialties, has awarded a contract to the White Construction Co., 95 Madison Avenue, for a four-story and basement plant, at Fifth Avenue and Eighteenth Street, College Point, L. I., to cost about $150,000, including machinery.

The Lake Champlain Pulp & Paper Corporation, Plattsburgh, N. Y., has been incorporated with a capital of $200,000 to manufacture pulp and paper products. The principal incororator is Thomson Douglas, 4 Elk Street, Albany, N. Y.

The Croton Development Co., New York, has been chartered under State laws to manufacture power machinery and parts. The incorporators are H. R. McKenzie, A. M. Barbe and E. M. Davidson. It is represented by Miller, Bretzfelder & Ruskay, 302 Broadway.

Special machinery, transmission equipment, electric motors and other electrical machinery will be installed in the new four-story plant, 198 x 204 ft., to be erected by the P. Lorillard Co., 119 West Fortieth Street, New York, tobacco manufacturer, at Avenue A and Seventy-first Street, estimated to cost about $500,000, with equipment. Ground will be broken at once.

The Amory Garage & Auto Repair Co., New Brunswick, N. J., has been incorporated with a capital of $125,000 by William Goodwin and Klemmer Kalteissen, 101 Albany Street, to operate a machine and repair works, parts manufacture, etc.

The Kennedy Valve Mfg. Co., 95 John Street, New York, manufacturer of valves and other steam specialties, with plant at Elmira, N. Y., has acquired the factory of the Ellis-Smith Mfg. Co., Elmira, manufacturer of automobile jacks, etc., as an extension to its plant for the production of malleable iron castings.

The Beacon Lighting Fixture Co., New York, has been chartered under State laws to manufacture electric and gas fixtures. The incorporators are L. E. McMahon and E. A. Reilly. It is represented by O'Brien, Malevinsky & Driscoll, 1482 Broadway.

The Fordham Plaza Auto Co., Inc., 1856 Bath Avenue, Brooklyn, is having plans prepared for its three-story and basement automobile service and repair works, 100 x 155 ft., on Webster Avenue, New York, estimated to cost about $150,000. Charles W. Clark, 441 Tremont Avenue, New York, is architect.

The Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, has rejected all bids recently received for electrical equipment for the electrification of a

section of its line in the anthracite district of Pennsylvania. It is expected to advertise for new bids at an early date. Gibbs & Hill, Pennsylvania Terminal, are consulting engineers.

The Blueblaze Motor Specialties Corporation, Long Island City, N. Y., manufacturer of automobile equipment, has leased the two-story building on Seventh Avenue, near Webster Avenue, for the establishment of a new plant.

The A. L. Nichols Mfg. Corporation, Poughkeepsie, N. Y., has been incorporated with an active capital of $50,000 by J. W. Allgaze and C. F. Malcolm, Poughkeepsie, to manufacture electrical products. It is represented by F. E. Hamilton, 61 Broadway, New York.

Charles F. Rattigan, superintendent of State prisons, Capitol Building, Albany, N. Y., will receive bids until 2 p. m., Aug. 16, for the erection of an addition to the power house at Sing Sing Prison, Ossining, N. Y. L. F. Pilcher, Capitol Building, Albany, is architect.

L. H. Redner, 200 West Seventy-first Street, New York, is taking bids for a two and three-story automobile service and repair works, on West Sixty-ninth Street, estimated to cost about $125,000. Charles B. Meyers, 31 Union Square, is architect.

The Radio Corporation of America, Woolworth Building, New York, will build a new wireless plant at Warsaw, Poland, to cost about $3,000,000. The station will consist of 10 steel towers, each 400 ft. high, and the transmitting aerial lines will be about two miles in length. The Polish Government is interested in the project.

The Tidal Osage Oil Co., 11 Broadway, New York, a subsidiary of the Tide Water Oil Co., same address, operating oil refineries, has arranged for a bond issue of $3,500,000, for extensions, betterments, general operations, etc.

The United Oil Producers Corporation, 347 Madison Avenue, New York, a subsidiary of the Middle States Oil Corporation and the Imperial Oil Corporation, same address, has disposed of a bond issue of $4,000,000, for extensions, improvements and general operations of oil refineries, etc.

The Kearny Foundry Co., Kearny, N. J., has been incorporated with a capital of $25,000 by Robert Douglas, William Baskerville and Colin D. Matier, Kearny, to manufacture iron and other metal castings. Clyde D. Souter, 31 Clinton Street, Newark, N. J., represents the company.

L. Cohn & Sons, 101 East Twenty-first Street, Bayonne, N. J., ship chandlers, have had plans prepared for a new one-story building, 100 x 125 ft., at Richmond Terrace and Lafayette Street, Port Richmond, S. I. Bids will be asked at an early date.

The Ferguson Co., Millville, N. J., has construction under way on a new plant at North Millville, for the manufacture of automobile springs and kindred products. It is proposed to commence production early in the fall.

The North Jersey Steel Co., Rockaway, N. J., will install equipment at once in its new mill, and proposes to have the plant ready for service early in the fall. The present small mill will be dismantled, and the machinery removed to the new works.

Reorganization plans are being arranged for the Stanwood Rubber Co., Newark Avenue, Elizabeth, N. J., manufacturer of automobile tires, now being operated under a receivership. While the plant has been placed on the market, it is said that future arrangements will be made for a resumption of manufacture. John P. Kirkpatrick is receiver. C. O. Corry is superintendent at the plant.

The Standard Underground Cable Co., Washington Street, Perth Amboy, N. J., has made application to the Board of Aldermen for permission to extend the railroad trackage at its works, as a preliminary to the enlargement of the plant. Plans are now being developed for extensions in a number of buildings, to provide about 100,000 sq. ft. of additional floor space. The main cable plant will be increased in height from two to three stories. The entire project is estimated to cost close to $250,000, including equipment. C. C. Baldwin, vice-president, is in charge.

The Magna Metal Corporation, 227 High Street, Newark, has acquired about eight acres at Port Newark for the erection of a new factory. Plans will be prepared at an early date.

The American Bit Co., 55 New Jersey Railroad Avenue, Newark, has filed notice of organization, to manufacture bits and other hardware products. Edward Scherrek, 126 South Parkway, and Harry Scherrek, 122 South Parkway, both East Orange, head the company.

The Campbell Foundry Co., Millville, N. J., has completed plans and will break ground at once for a new one-story foundry at East Millville for the manufacture of iron castings.

Freight-handling machinery, including cranes, conveying equipment, etc., will be installed on the three piers to be constructed at Port Newark, Newark, by the Bureau of Docks. The structures each will be 200 ft. wide and 1200 ft. long, and will be part of a program, costing over $5,000,000. Arthur J. Simpson is engineer.

The Universal Stamp Works, Inc., Newark, has been incorporated with a capital of $100,000 by Elmer J. Herman, and John H. Van Court, 252 Market Street, to manufacture metal specialties.

Robert J. Metzler, Inc., Newark, has been incorporated with a capital of $100,000 by Samuel Kaufman, A. MacMillan, and Robert J. Metzler, 165 Park Avenue, East Orange, to manufacture machinery and parts.

The John S. Norton Co., 70 Hudson Street, Jersey City, N. J., metal products, has completed plans for a new one-story building, 50 x 100 ft., to cost about $17,000.

New England

BOSTON, Aug. 8.

The local machine tool market, which a week ago was more active than in several previous weeks, has suffered a relapse. Sales, which have been few, included a profiling machine to the United Shoe Machinery Corporation, Boston; a 2½-ft. radial drill to the Eastern Mfg. Co., South Brewer, Me., and a 13-in. x 6-ft. lathe and 21-in. drill to a Winthrop, Mass., garage. The J. Spaulding & Sons Co., Inc., Manchester, N. H., fibre counters, is in the market for one 16-in. and one 20-in. shaper, December or January delivery, and for one 16-in. x 8-ft. and one 14-in. x 8-ft. lathe for its new Tonawanda, N. Y., plant. Several prospects considered good and included in those reported last week are still under negotiation. One Western manufacturer of drills has issued a new price list showing slight declines on some equipment, no change in others, and an advance of $15 on at least one tool, while a maker of drilling and of horizontal boring and milling machines has cut prices 10 per cent. Lower prices, however, have been named recently on prospective business.

At the auction sale of the equipment of the Industrial Research Corporation, New Haven, Conn., Aug. 4, comparatively few buyers attended. The machines went slowly and generally at new low prices for the year. Practically half the tools were as good as new, having been installed in the plant last winter and operated from then until late in April only, when operations ceased. Of the industrial interests represented at the sale, the local gas company, the Somerville Mfg. Co., Somerville, Conn., the National Woodworking Machinery Corporation, Dover, N. H., and Johnson & Bassett, Worcester, Mass., machinists, were the largest buyers. Dealers from Pawtucket and Providence, R. I., and from Bridgeport and Hartford, Conn., took considerable equipment. Some tools were purchased for a California interest, and a New York concern bought a large press.

Two Reed-Prentice high-speed ball bearing sensitive drills sold for $50 each, and two Myers 14-in. sensitive drills at the same price. Johnson & Bassett, Worcester, purchased a 20-in. Barnes camel back upright drill, built within two years, at $90. A 22-in. Barnes upright drill was bid in at $130 for the California interest, the highest price paid for any drill offered. A five-spindle Taylor & Fenn high-speed sensitive drill went to a Hartford, Conn., interest at $80. A Myers No. 1 upright bench sensitive drill sold for $17.50, and a similar machine at $20, the latter to the New Haven gas company.

The National Woodworking Machinery Co. bought a Brown & Sharpe No. 3 universal cutter and reamer grinding machine for $105, while a Hartford interest paid $200 for a No. 103 Rivett internal cylindrical grinder. Other grinding machines sold at very low prices. For instance, a Pratt & Whitney contour cutter grinder went for $65; a J. G. Blount wet tool grinder, $35; a No. 10 Builders Iron Foundry, $15; a Browne & Sharpe No. 2 type automatic surface grinder, $125; a Myers bench double grinder, $15, and two others at $20. A United States Electric Tool Co. portable electric tool post sold for $12.50 and a Universal automatic face grinder, $25.

The Somerville Mfg. Co. paid $862 for a No. 2 Cincinnati miller, which cost the Industrial Research Corporation $1,600 last January. J. E. Conant & Co., about seven months ago, sold a similar machine, not in as good condition, however, for $1,890. A No. 1½ American plain milling machine brought $300; No. 2 Brown & Sharpe plain miller $362.50 and a No. 13 Pratt & Whitney Co. Lincoln type, extra size and extra heavy miller $200, the latter going to the Pacific Coast interest. The same company took a No. 2 Brown & Sharpe universal milling machine at $500, which cost the New Haven concern $950 f.o.b. shipping point. A Pratt & Whitney full automatic thread miller went for $20 and a similar machine for $35, while a Pratt & Whitney 4-in. automatic spline miller brought $30. A No. 3½ Fox knee type plain miller sold for $55, another for $35 and two others to

one company for $30 each. A Pawtucket, R. I., dealer paid $45 for a Utility milling appliance and dividing head, which recently was quoted at better than $200 in the open market.

The highest price paid for a lathe was $412.50 by the Somerville Mfg. Co., which was a 21-in. x 11-ft. Waterville Iron Works Roulsted, costing the company $1,200. A heavy type 22-in. x 11-ft. Reed screw cutting engine lathe sold at $287.50 and a 19-in. x 9-ft. machine made by the same concern at $237.50, while two 10-in. x 4-ft. Seneca Falls Star lathes brought $135 each, a Bridgeport interest taking one and a New Haven the other. The two latter lathes cost the company $235 each. A 16-in. x 6-ft. South Bend sold for $135, and a 15-in. x 6-ft. $300; while $45 was the best bid for a 14-in. Reed stud lathe, $20 each for two 13-in. x 6-ft. Pratt & Whitney plain turning lathes, $70 for a No. 3½ Stark precision bench, and $30 for a G. Boley watchmaker's 4 x 14-in. lathe.

A Steptoe crank shaper with a 20-in. stroke was taken at $97.50; Gould & Eberhardt gear-crank shaper with a 24-in. swing, $137.50; three Pratt & Whitney shaving machines, $12.50 each; an M. A. Co. heavy-type vertical swinging straightening press, $25; two No. 2 B Cochrane-Bly cold saws, $25 and $30, and the New York manufacturer paid $950 for a 400-ton Woods hydraulic press with pump equipment, sold subject to the court's order, which cost the company $3,600 to install. The local gas company bought a Steward standard No. 0 muffle gas furnace connected with a pressure plower and bench, anvil, galvanized iron bench 80 x 28 x 34-in., a model 162 Bristol electric pyrometer, together with other hardening furnace equipment, all for $40.

A Chisholm-Moore Cyclone one-ton chain hoist sold at $20, four new Boyer pneumatic hammers at $19 for the lot, and five No. 5 Parker mechanics' vises, $4 each. Spring chucks sold at the rate of $5 per dozen and less, speed drills for a few cents each, some as low as 5c. and high-speed milling cutters 10c. each and less.

The Chapman Valve Co., Springfield, Mass., recently purchased a 60-in. sand blast barrel weighing more than 12 tons for its new foundry.

The McKinnon Vacuum Trolley Harp Co., Holyoke, Mass., has been granted a Massachusetts charter to manufacture mechanical equipment. Allan McKinnon, 279 Walnut Street, Holyoke, is president, and Henry E. McElwain, 209 Linden Street, Holyoke, treasurer.

Contract has been awarded for the erection of a two-story U-shaped plant, 60 x 200 ft., by the Ansonia Electric Co., Ansonia, Conn.

A contract has been let by the Boston & Maine Railroad Co. for the erection of a roundhouse containing 28 stalls, and other buildings, at Concord, N. H.

The Stanley Works, New Britain, Conn., has incorporated a part of its rule making plant under the name Upson Rule Co., with an authorized capital of $50,000 divided into 2000 shares, par $25. C. F. Bennett is president.

The Wallace-Barnes Co., Bristol, Conn., special screw machine products, flat and wire springs, etc., in the near future will open a Canadian manufacturing plant. Treuman B. Norton will be plant superintendent and Eric E. Waldo his assistant.

The American Grinder Co. division, Greenfield Tap and Die Corporation, Greenfield, Mass., is being moved from Worcester to the latter city. According to present plans, the grinder company will be housed in a plant in close proximity to the Greenfield company, the two divisions to be operated as separate units and not consolidated, as originally planned.

The Connecticut Rubber Co., Hartford, Conn., has bought the Slade Co. plant, Oakville, Conn., in which automobile tire tubes and tube protectors will be manufactured.

The Bell Tone Mfg. Co., Bridgeport, Conn., has been incorporated with a capital of $250,000 by Charles Gardner, T. R. Adkins, and Frank Dieli, 40 Court Street, to manufacture automotive equipment and other products.

The J. D. Crosby Co., Pawtucket, R. I., is perfecting plans for rebuilding its steel fabricating plant, recently destroyed by fire with loss in excess of $50,000. The work will include a new machine shop and annealing plant.

The Richard H. Long Co., Framingham, Mass., has filed plans for the construction of a two-story, reinforced-concrete plant on property recently acquired on Millbrook Street, Worcester, Mass., for the manufacture of automobile bodies and other automotive equipment, estimated to cost about $65,000. Plans have also been filed for a one-story power house.

The Director of Public Works, New Haven, Conn., will receive bids until 10 a.m., Aug. 15, for center bearings, track segments, bogie wheels and other mechanical equipment for the Ferry Street bridge over the Quinnipiac River, E. S. Nettleton is city engineer.

The Builders' Iron & Steel Co., Garvey Street, Everett, Mass., has filed plans for a new one-story factory to cost about $65,000. A one-story storage building will also be constructed. Contract for erection was awarded recently to the Blake & Pope Co., 15 Beacon Street, Boston.

The Chapman Valve Co., Indian Orchard, Mass., has had plans prepared for a one-story addition to cost about $15,000, supplementing the new foundry now in course of construction. The Associated Architectural & Engineering Co., 145 State Street, Springfield, Mass., is architect.

Plans are under way for a merger of the Fisk Rubber Co., Chicopee, Mass., with the Federal Rubber Co., Cudahy, Wis., and its subsidiary organization, the Ninigret Co., all devoted to the manufacture of automobile tires and tubes. The property will be taken over in the Fisk company name, and a bond issue of $10,000,000 to carry out the consolidation is being arranged.

A one-story power house and boiler plant to cost $60,000 will be erected by the Cambridge Gas Light Co., Cambridge, Mass.

Chicago

CHICAGO, Aug. 8.

While formal orders for the machine tools recently selected by the Illinois Central have not been issued from the purchasing department of that railroad, this is believed to be merely a matter of routine and orders are expected shortly. There is nothing else of importance in the market. Sales are few and confined almost wholly to single machines and few of these. Inquiries are likewise scarce. None of the business which has been pending for some weeks or months seems to show any promising signs of life.

Reports from machine-tool manufacturing centers, such as Cincinnati and Rockford, Ill., indicate an almost complete shut-down of machine tool plants. In some factories even the foremen have been discharged and there is nothing to indicate when operations may be resumed. Most machine-tool plants have fairly good stocks on hand and these will have to be absorbed before production of more tools is begun.

Prices remain unchanged, except that concessions have been made on special transactions, such as the Illinois Central purchases. The question of price is regarded with seeming indifference by most of the local dealers because of the belief that even substantial reductions would not be effective now in bringing out any business.

The Northern Boiler & Iron Works is a new industry at Houghton, Mich. The plant is being started by King Brothers, formerly of Marquette, Mich. It will make a specialty of boiler repairing and acetylene welding.

Hale Dunham has purchased the interest of his partner in the Nash garage at Fond du Lac, Wis., and intends installing machines for garage repair work.

The Ampco Metal Products Co., Springfield, Ill., has completed the erection of its initial factory and has begun the manufacture of brass and aluminum castings. The building cost about $40,000. B. F. Hayden is president. Later a complete machine shop will be erected and equipped.

The United States Lock Nut Corporation, 400 North Michigan Avenue, Chicago, has increased its capital stock from $1,000,000 to $2,000,000 for the purpose of providing funds for the erection of a new plant, probably in the Pittsburgh district. Present plans provide for starting work about Jan. 1. The plant will cost about $500,000 and will be equipped with special nut making machinery, mostly of the company's own design.

The Champion Wrench Mfg. Co., 928 West Huron Street, Chicago, has increased its capital stock from $50,000 to $200,000 to provide for the purchase of new special machinery for wrench manufacture.

The Machinery & Supply Corporation, Joplin, Mo., has completed a new plant in that city for rebuilding second-hand machinery. Some time ago it bought the United Iron Works, Inc., Joplin. D. C. Morrow, Kansas City, Mo., is president. Offices of the company are at 317½ Joplin Street, Joplin.

The Standard Safety Equipment Co., 168 North Michigan Avenue, Chicago, has recently been organized to manufacture standard safety equipment and supplies. C. A. Kingsbury is president; F. L. Huributt, treasurer, and L. E. Dickson, secretary. An Eastern office in the Clinton Building, Newark, N. J., with A. U. Barnes as manager, and a Detroit office at 414 Grand River Avenue, that city, have been opened.

The Briskin Mfg. Co., 215 South Hoyne Avenue, Chicago, manufacturer of sheet metal products, etc., has rejected bids for its two-story addition, 50 x 80 ft., and will call for new bids on revised plans. Dubin & Eisenberg, 139 North Clark Street, Chicago, are architects.

The Marquette Electric Co., 222 Austin Street, Chicago, manufacturer of electrical specialties, has filed plans for a new factory at 1401 Center Street, to cost about $40,000.

The Owens Motor Sales Co., 713 University Avenue, St. Paul, Minn., has rejected bids for the addition to its service building and repair works, estimated to cost close to $100,000. New bids will be asked at a later date. Toltz, King & Day, 1410 Pioneer Building, are architects.

The American Tar Products Co., 208 South LaSalle Street, Chicago, is having plans prepared for the construction of a new refinery at Thirty-ninth Street and Fifty-second Avenue, one and two-stories, estimated to cost in excess of $800,000, with machinery.

The H. McFarlane Co., 532 South Canal Street, Chicago, manufacturer of wagons and parts, has awarded a contract to the Adams Construction Co., 111 West Washington Street, for its new three-story and basement plant on Green Street, estimated to cost about $400,000, with machinery. J. L. McConnell, 105 West Monroe Street, is architect and engineer. H. F. McFarlane is president.

Philadelphia

PHILADELPHIA, Aug. 8.

The Hurley Motor Co., Broad and Race streets, Philadelphia, has filed plans for a new 10-story manufacturing plant at 219 North Broad Street, reinforced concrete, 80 x 100 ft., estimated to cost about $350,000.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, will use its Essington Works, near Philadelphia, for the manufacture of a large part of the electrical machinery and equipment for the Midi Railway, France, order for which, totaling $1,200,000, was recently received.

The Silencer Mfg. Co., Philadelphia, is being organized by Theodore F. Rose, Jr., John H. Moran and John J. Baker, to manufacture telephone attachments and other mechanical devices. It is represented by John Weaver, Commercial Trust Building. Application for a State charter will be made on Aug. 18.

The Perfection Auto Specialty Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 by Frederick Weirman, Charles A. Pierce, Philadelphia, and W. Hallam, Jr., Phoenixville, Pa., to manufacture automobile equipment. The company is represented by the Colonial Charter Co., Ford Building, Wilmington, Del.

The Philadelphia Automobile Lamp & Radiator Repair Co., 1304 Callowhill Street, Philadelphia, is completing plans and will soon take bids for a new three-story works, 16 x 95 ft., at 1329 Poplar Street, to cost about $30,000.

John Evans' Sons, Inc., Philadelphia, is being organized by William, John H. and Robert Evans, to manufacture iron and steel products. It is represented by Edward J. Gallagher, Jr., 405 Lincoln Building. Application for a State charter will be made on Aug. 20.

The Bush Hill Electric & Supply Co., Philadelphia, has been incorporated under Delaware laws with capital of $50,000 by Walter M. Fixter, Robert B. Yohey and Walter F. Secules, Philadelphia, to manufacture electrical fixtures and supplies. It is represented by the American Guaranty & Trust Co., Philadelphia.

The Biddle-Crane Motor Car Co., Philadelphia, has been incorporated with a capital of $600,000 under Delaware laws to manufacture automobiles. The company is represented by the Corporation Trust Co., du Pont Building, Wilmington, Del.

The Progressive Tile & Cement Works, Pottsville, Pa., is planning for the construction of a new branch plant at Hazleton, Pa.

Herman Olden, 1455 Broadway, Camden, N. J., has preliminary plans under way for a new one-story foundry, 60 x 100 ft., and estimated to cost $30,000.

The Delaware, Lackawanna & Western Railroad Co., coal mining department, Scranton, Pa., has awarded a contract to the Industrial Construction Co., 514 Union National Bank Building, for the erection of a new machine and forge shop at its Storrs Colliery, one-story, 50 x 200 ft., and estimated to cost about $60,000. It will also build a one-story addition to its coal-washing plant at this point to cost about $35,000. A new electric power station and hoisting engine house will be constructed at the Bellevue colliery.

The Board of Education, Camden, N. J., will receive bids until 2 p. m. Aug. 22 for equipment for machine and forge shops, sheet metal shop, foundry and wood-working shops. Specifications may be had upon application to the board, City Hall, Camden.

Leroy A. Goodwin, P. A. Stewart and J. L. Blandy, members of the board of directors of the Chamber of Commerce, Gloucester City, N. J., are interested in the establishment of a plant for the manufacture of news-print paper, utilizing the former buildings of the Argo Mills, manufacturer of textile products. A company capitalized at $1,000,000 is being formed by Frank J. Hummell, owner of the mill property, and associates. A list of machinery has been arranged, and it is proposed to have the plant ready for service by the end of the year.

Pittsburgh

PITTSBURGH, Aug. 8.

Machine tool inquiry generally is better, but manufacturers in their eagerness to secure orders practically are allowing buyers to name their own figures and the latter, fearing they will not buy at the bottom, are very slow to close. It is said that a salesman who recently called at a plant where some new equipment was necessary, on account of an order just booked, named a price of $18,000 on the tools wanted and following a meeting of the officers of the company was told that the price was too high. The salesman asked the prospective buyers to name what they considered a fair price and $15,000 was mentioned. The salesman then sought to get the order immediately and lopped off $1,000 from the price the buyers were willing to pay. He was instructed to call the next morning for his answer and was then told that it had been decided to postpone the purchase for a time. Some makers of machine tools who have not announced price cuts recently have offered to take 10 per cent off for cash. There is little business in cranes, the only award recently made being a 10-ton overhead by the Greenville Steel Car Co., Greenville, Pa., to the Cleveland Crane & Engineering Co., Wickliffe, Ohio. The original inquiry for this crane was put out almost a year ago. The Pittsburgh Bureau of Water is in the market for a 35-kw. direct current, turbo-generator unit.

The Resilient Safe Wheel Co., Inc., 121 Sixth Avenue, Pittsburgh, has acquired the plant of the American Axe & Tool Co., Glassport, for a new works. It consists of 21 buildings, on a 20-acre site, and was secured for a consideration said to be $850,000. A number of improvements will be made and it is planned to equip the works with machinery now in the plant at Los Angeles. It is proposed to give employment to about 500 operatives, beginning production early in the coming year. The company, a Delaware corporation, recently has increased its capital from $1,000,000 to $3,000,000. The Glassport plant has not been in operation for about two years.

The Scientific Specialty Co., Pittsburgh, is being organized by Joseph C. Keaney, C. D. Stewart and C. L. McCobb, Pittsburgh, to manufacture light hardware products, metal kitchen utensils, etc. It is represented by C. L. McCobb, 425 Wabash Building.

The North Pole Ice Co., Carson Street, Pittsburgh, is clearing the site for its new ice-manufacturing plant, and ground will be broken at an early date. It will be one-story, 60 x 100 ft., and is estimated to cost about $50,000.

The Conewango Car Co., Warren, Pa., recently organized to take over the plant and business of the Allegheny Foundry Co., has completed plans for rebuilding the former Allegheny works, recently destroyed by fire, to consist of a main car works, 50 x 150 ft.; machine shop, 50 x 140 ft.; and general building, 22 x 40 ft. Construction will begin at an early date.

Fire, Aug. 3, destroyed the press mill at the plant of the duPont Powder Co., Uniontown, Pa. It will be rebuilt.

The Regent Auto Service Co., Pittsburgh, is being organized by Ernest H., Frank W. and E. R. Heinrichs to manufacture automobile parts and equipment and operate general machine works. It is represented by J. Weinman Cratty, 1412 Berger Building. Application for a State charter will be made on Aug. 29.

George Griffith, Johnstown, Pa., has completed plans and will take bids at once for a new two-story machine shop, 50 x 100 ft. H. B. Raffensperger, News Building, is architect.

The Standard Electric & Radio Corporation, Pittsburgh, is being organized by David Rose, Torrance H. Lewis and Clarence O. Fisher, Pittsburgh, to manufacture electrical equipment and radio apparatus. Benjamin P. Brasley, Bakewell Building, represents the company. Application for a State charter will be made on Aug. 22.

Material-handling and hoisting equipment, loading and unloading machinery, etc., will be installed at the new plant to be established by the H. Miller & Sons Co., Pittsburgh, building contractor. The company has purchased property at Fifth Avenue and Robinson Street, 220 x 460 ft., and 100 x 120 ft.

The E. E. White Coal Co., Glen White, W. Va., is planning for the construction of a new tipple at its properties. A one-story power house will also be constructed, with boilers equipped with automatic stokers. E. E. White is president and general manager.

The International Harvester Co. of America, Harvester Building, Chicago, has had plans prepared for a two-story and

basement addition to its building at Parkersburg, W. Va., 43 x 75 ft.

The Maryland-New River Coal Co., Winona, W. Va., will install new loading equipment, shaker screens and other mechanical apparatus at its local plant.

Buffalo

BUFFALO, Aug. 8.

The Lamson Co., Lowell, Mass., manufacturer of pneumatic tubes, merchandise carriers and other conveying equipment, has concluded arrangements with the Chamber of Commerce, Syracuse, N. Y., for the establishment of a plant and the removal of its Lowell works to the new location. Property has been secured in the Eastwood section, and plans will be under way at an early date for the erection of a general metal-working plant, machine shops, assembling works, etc. The change in location is being made primarily for expansion purposes, and considerable new machinery will be installed. It is said that the new plant will give employment to more than 700 operatives, and is estimated to cost in excess of $1,000,000. William F. Merrill is president. The present headquarters are at Boston.

The Houde Engineering Corporation, 1392 West Avenue, Buffalo, manufacturer of shock absorbers and kindred products, has awarded contract to William Henrichs & Son, 193 Spring Street, for a new two-story factory, 37 x 100 ft., on West Avenue, to cost about $40,000. Ground will be broken at once.

The Buffalo Automotive Specialty Co., Buffalo, has been chartered under State laws to manufacture automobile equipment and parts. The incorporators are E. J. and M. H. Schork, and E. M. Allen. It is represented by T. W. Van Arsdale, attorney, Buffalo.

The Bradley Pattern Works, Inc., Buffalo, has been chartered under State laws to manufacture metal and wood patterns, and kindred products. The incorporators are J. W. Bradley, F. Leney and H. Scheibel, Buffalo. It is represented by Ferguson & Magavern, attorneys, Buffalo.

The Madison Power Co., Solsville, N. Y., has made application to the Public Service Commission for permission to build a new local electric light and power plant.

The Doman Mfg. Corporation, Elbridge, Onondaga County, N. Y., has been incorporated with a capital of $200,000 to manufacture electrical and mechanical equipment. A. E. Doman, Elbridge, is the principal incorporator.

The Georgetown Electric Lighting Co., Georgetown, N. Y., has plans under way for a new electric light and power plant.

Joseph M. Lang, 142 Dutton Street, Buffalo, has filed plans for the erection of a sheet metal shop.

The Adria Motor Car Corporation, Cleveland, has acquired the buildings in Evans Street, Batavia, formerly occupied by the Gray Tool & Machine Co., for a new plant.

Fire, Aug. 5, destroyed $50,000 worth of machinery in the ice and cold storage plants of the New York Central Railroad, Babcock and William streets, Buffalo.

George C. Riley, 714 Ellicott Square, Buffalo, represents the newly organized Memorial Highway Tire Corporation which has incorporated with a capital of $25,000. It will manufacture automobile accessories.

Cleveland

CLEVELAND, Aug. 8.

Activity in the machinery market is largely confined to purchases by schools. During the week the Board of Education, Alliance, Ohio, placed an order for equipment covered in a list of 14 machines sent out several weeks ago, which included eight lathes, two drilling machines, two grinding machines, a shaper and hack saw. One local dealer took seven machines and other local houses took the remainder. The Canton, Ohio, Board of Education has taken no action on its list of 25 machines, for which bids were received July 29. A few machines were purchased the past week for a vocational school in Marion, Ohio and it is reported that these were placed directly with manufacturers at very low prices. An order for two 24-in. lathes was placed by the Arctic Ice Machine Co., Canton, Ohio. Dealers report quite a few sales in single machines, largely second-hand. As a whole, the demand is about the same as during the past few weeks.

There is increasing evidence of price cutting and some dealers look for further reductions within the next few weeks, particularly on some of the larger types of machines. An Eastern builder has announced a reduction of 10 per cent for a 30 day period on his line of 27 to 60-in. lathes. Considerable rebuilt machinery is being offered at apparently attractive prices by machine tool builders who have surplus machinery of various types in their plants and are furnishing employment for their men in rebuilding these machines for sale. Local foundries show no change in operations, now running on an average of about 25 per cent capacity or about the same as for the past 60 days.

The Cleveland Cold Drawn Steel Co., organized some time ago to establish a plant for the manufacture of cold drawn steel, has decided to select a site in some other city and is considering the erection of its plant in Chester, W. Va., across the river from East Liverpool, Ohio. However, the final selection of this site depends upon financial assistance to be offered by Chester. Frank B. Kew of East Liverpool, formerly superintendent of the cold drawn steel department of the Crucible Steel Co.'s plant at Midland, is temporary president of the company.

The Massillon Wire Basket Co., Massillon, Ohio, has purchased the business and equipment of the Scio Wire Crate Co., Scio, Ohio, which it will remove to Massillon.

The Canton Oxygen Co., Canton, Ohio, will shortly begin the erection of a plant for the manufacture of oxygen, involving an expenditure of $50,000 or more for building and equipment. It has a capital stock of $250,000. William L. Stolzenbach and others are interested.

The Canton Metal Products Corporation, Canton, Ohio, has taken an order for steel doors, door frames and other steel building material for inside finish for the new Cleveland City Hospital. The contract amounts to about $250,000.

The Lucius Mfg. Co., Urichsville, Ohio, has been incorporated with a capital stock of $150,000 by C. W. Lucius and others to manufacture welded steel tanks.

Baltimore

BALTIMORE, Aug. 8.

The Greenmount Iron Mfg. Co., 833 Greenmount Avenue, Baltimore, has had revised plans prepared for its foundry addition to cost about $15,000, and will call for construction bids at an early date.

The Department of the Interior, Washington, F. M. Goodwin, assistant secretary, will receive bids until 2 p. m., Aug. 18, for four sets of stokers for installation at the Freedman's Hospital power plant, Washington. Plans and specifications are on file at the office of the chief clerk of the department.

The Brosvik Sales Co., Inc., 418 East Clement Street, Baltimore, has been incorporated with a capital of $100,000 by Bertel B. Brosvik, Arthur Fredericks and Leo Connor, to manufacture can openers, nippers, wrenches, and other metal products.

The Bogdan Cushion Wheel Hub Co., Wilmington, Del., has been incorporated with a capital of $1,200,000 to manufacture special wheel hubs and kindred parts for automotive service. It is represented by Arley B. Magee, 33 South State Street, Dover, Del.

The Vitalis Products Co., Wilmington, Del., has been incorporated under State laws with a capital of $13,000,000 to manufacture electric storage batteries and other electrical equipment. The company is represented by the Corporation Trust Co., du Pont Building, Wilmington.

The Hampton Roads Equipment Co., 251 Arcade Building, Norfolk, Va., has been incorporated with a capital of $150,000 to manufacture road-building machinery, contractors' equipment, etc. J. M. Sherrod is president, and W. L. Duncan, secretary, treasurer and general manager.

The Bureau of Yards and Docks, Navy Department, Washington, has had plans prepared for a new power house at Alexandria, Va.

The Williston Ice Co., Williston, S. C., is planning to rebuild its ice-manufacturing and refrigerating plant, recently destroyed by fire.

The Hampton Roads Ship Repair Corporation, Norfolk, Va., has been incorporated with a capital of $50,000 to operate a local shipbuilding and repair plant. William H. Johnson is president, and E. C. Davison, Richmond, Va., secretary.

The Common Council, Donalds, S. C., is arranging for a bond issue for the installation of a municipal electric lighting plant. B. H. Carleton, commissioner of public works, is in charge.

The Bristol Aero Co., Bristol, Va., will establish a parts manufacturing shop and repair works in connection with its new airplane hangar, to be constructed on a local site. A. E. Fuller is president, and George Furrow, secretary and general manager.

The Fitch Vending Machine Co., Buchanan, Va., has been organized with $15,000 capital stock. The officers are J. F. Fitch, president; A. B. Land, secretary, and O. E. Obenshain, treasurer.

The Floatless Carburetor Corporation, 916 Munsey Building, Baltimore, has been incorporated with $100,000 capital stock to manufacture automobile accessories and devices. The incorporators are F. Strattner Orem, Claude R. Hays and R. Contee Rose.

Cincinnati

CINCINNATI, Aug. 8.

A slight improvement was noted in the machine tool market the past week but business is still at a very low point. The Maxwell Motor Car Co. bought several tools, and it is stated that further purchases will be made, as it is the intention to replace old equipment with the latest production machinery. The International Nickel Co., is in the market for several special machines for its Huntington, W. Va., plant. Some buying is also reported for the Japanese Government, a local firm booking orders for several lathes. An Eastern manufacturer of shapers is said to have reduced prices approximately 15 per cent, which will probably be met by manufacturers in this district.

The Globe Metallic Works, Gest Street, Cincinnati, manufacturer of metal specialties, has purchased property at 917 State Avenue and has plans for a new factory, 40 x 95 ft. Kunz & Beck, Cincinnati, are architects. H. M. Schau is president of the company.

The Abel Magnesia Co., Columbus, Ohio, recently incorporated with a capitalization of $400,000, will shortly commence the erection of a plant at Cedarville, Ohio. The main structure will be 65 x 65 ft., five stories, and the dryer building 60 x 160 ft., one story. Operations are expected to begin by January. The estimated cost is $250,000.

The Bauer Brothers Co., Springfield, Ohio, operating a foundry and manufacturing farming machinery, has been authorized to increase its capitalization from $450,000 to $550,000. The company has been extending its plant and enlarging its facilities for several years and further additions are in contemplation. Charles L. Bauer is president.

The Norton-Broadway Machinery Co., general machinery dealer, Cincinnati, is in the market for a rock crusher, or pulverizer and portable cement mixer; No. 4 or 5 Gates gyratory crusher; 12-in. pipe machine; 8 x 8 and 10 x 10 belt driven air compressors; 24-in. shaper; No. 60 Heald grinder; three 12-in. and 13-in. light engine lathes; 1½-in. bolt cutter; 75 hp. fire box boiler; three 16-in. x 8-ft. or 10-ft. engine lathes; punch presses; one 12-in. sand pump with vertical shaft; one 5000 and one 10,000 gal. oil tank, and one 6 or 7-ft old style, single head vertical boring mill.

Detroit

DETROIT, Aug. 8.

A slight improvement in the demand for tools is noted in this district. The fact that most plants, however, are operating only at part capacity gives rise to the belief that no general recovery is in sight immediately. Automotive production in Detroit is better so far this month than last.

According to officials of the new Rickenbacker Motor Co., Detroit, it has contracted with the Murphy Chair Co., Detroit, for its plant site. The company has received permission to sell $4,000,000 worth of stock.

The Acason Motor Truck Co., Detroit, has purchased the property of the David Buick Carburetor Co., Wyandotte, Mich., and will remove its plant to that location.

The Detroit Automatic Scale Co., has moved its factory and general offices to Dayton, Ohio. It has been consolidated with the Computing Scale Co. of America, of which the Detroit concern has been a subsidiary.

The Kroff Mfg. Co., Lansing, Mich., will resume operations this month. The plant was recently damaged by fire but has been rebuilt and much of the machinery has been salvaged and is being repaired. It manufactures metal voting booths and other steel articles.

Headquarters have been opened at 5739 Michigan Avenue, Detroit, by the Hydraulic Hoist Mfg. Co., St. Paul, Minn., manufacturer of St. Paul hoists and Superior bodies. The local establishment is a factory branch and is in charge of Robert E. Kilgrove. It will handle Michigan and Ohio business.

The Northern Engineering Works, Detroit, recently sold a 10-ton traveling crane to the Kansas State University.

The Kuhlman Electric Co., Twenty-sixth Street, Bay City, Mich., manufacturer of electrical apparatus, is completing plans for a one-story addition, 50 x 80 ft., and will break ground at an early date. John C. Hewitt is president.

The Detroit Automatic Machine Co., Detroit, has been chartered under State laws to manufacture automatic screw machine products and other equipment. The incorporators are Henry Holland, Horace W. Peters and Jay L. Wells, 3016 Kirby Avenue, West.

The Campbell Mfg. & Foundry Co., Muskegon, Mich., has filed notice of change of name to the Muskegon Castings Co. It will operate with a capital of $100,000.

The Detroit Bumper Corporation, Detroit, has been chartered under State laws to manufacture automobile bumpers and similar metal products. The incorporators are Henry Gardner, Charles M. Phillips and Hugo Stark, 4839 McClellan Avenue.

The Rathbun Mfg. Co., Muskegon, Mich., has been incorporated with a capital of $25,000, to manufacture automobile equipment and appliances. The incorporators are Milo D. Rathbun, H. O. Bell and Harris E. Galpin, Muskegon.

Indiana

INDIANAPOLIS, Aug. 8.

C. & G. Potts & Co., 816 West Washington Street, Indianapolis, Ind., manufacturers of brick-making machinery, etc., have excavation work under way for their new one-story foundry addition at Washington and Blake streets, 60 x 130 ft., estimated to cost about $45,000. The Builders Construction Co., 540 North Meriden Street, has the contract. The company formerly was known as the C. & A. Potts Co.

Officials of the United States Automotive Co., Connersville, Ind., operating the Lexington Motor Co., for the manufacture of automobiles, have organized the Fayette Painting & Trimming Co., with capital of $500,000, for the production of automobile bodies for the parent company. It is proposed to develop a capacity of 50 bodies per day. Frank B. Ansted is president, and Frank M. Crawford, vice-president and general manager.

The Elwood Pattern & Castings Co., Elwood, Ind., has leased buildings heretofore used by the Union Traction Co., and will remodel and improve the structures for a new foundry and pattern works. Charles P. Rush and John P. Ritchie head the company.

The Martin Parry Corporation, Indianapolis, manufacturer of commercial automobile bodies, is arranging for the establishment of new assembling plants, at Philadelphia, Pittsburgh, Cleveland, Detroit, St. Louis, Kansas City, Mo., and Newark, N. J.

The Horace F. Woods Transfer Co., 216 North Meriden Street, Indianapolis, has rejected bids for its proposed automobile service and repair works, and will call for new bids at an early date. The structure will be three-stories and basement, 61 x 100 ft., and is estimated to cost about $80,000.

The Resistant Alloy Casting Co., Gary, Ind., has been incorporated under Delaware laws with capital of $300,000. to manufacture iron and other metal castings. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Central South

ST. LOUIS, Aug. 8.

The St. Charles Garage Co., St. Louis, has plans under way for a four-story service and repair building, 130 x 160 ft., at St. Charles and Eleventh streets, to cost about $300,000, including equipment. N. B. Howard, Arcade Building, is architect. T. S. Kirkpatrick, 5510 Cates Avenue, is one of the heads of the company.

Fire, July 28, destroyed a portion of the works of the Joplin Iron & Metal Co., Joplin, Mo., with loss estimated at about $25,000. It will be rebuilt.

The Louisiana & Arkansas Railroad Co., Stamps, Ark., is having plans prepared for a new one-story locomotive repair and machine works, estimated to cost about $150,000, with equipment. Harrington, Howard & Ash, Orear-Leslie Building, Kansas City, Mo., are architects and engineers.

The Arkansas Hydroelectric Co., Boyle Building, Little Rock, Ark., will commence the immediate construction of its new hydroelectric generating plant on the Red River, to have an initial capacity of 22,000-hp. J. E. Sirrine, Greenville, S. C., is consulting engineer. E. T. Stanfield is vice-president and general manager.

The Enterprise Foundry & Machine Co., Bristol, Tenn., has acquired a local building for the establishment of a new foundry for the production of iron and steel castings. The structure will be remodeled and equipment installed at a cost of about $45,000.

The Prest Machine Works Co., Oklahoma City, Okla., has been incorporated with a capital of $40,000 to manufacture machinery and parts, and operate a repair works. Barr S. Prest is president.

The Henry Vogt Machine Co., Tenth Street and West Ormsby Avenue, Louisville, manufacturer of ice-making and refrigerating machinery, has awarded a contract to the Struck Construction Co., Garden Street, for a three-story addition, 50 x 162 ft., to cost about $60,000. Construction will begin this month.

The Common Council, Claremore, Okla., is planning for the installation of a municipal electric-lighting plant. J. M. Davis, mayor, is in charge.

Milwaukee

MILWAUKEE, Aug. 8.

The machine-tool market continues quiet, and while developments the past week or two have been more encouraging than for at least 60 days, volume is lacking. A few orders come from scattering sources and usually specify immediate shipment. The automotive industries are the best source of new business. Inquiry is slack but gives promise of some fair buying shortly. Locomotive and car building and repair shops which have been closed are now resuming work, while those which have been running at very small capacity are enlarging forces.

The Oshkosh Tractor Co., Oshkosh, Wis., incorporated recently with a capital stock of $2,000,000, has purchased eight acres for its proposed new works on Harrison Street. Ground will be broken Aug. 15 for a machine shop and assembling floor, 150 x 375 ft., one story, of brick and steel, to cost about $175,000. Contracts for the substructure have been let. The architects are Auler & Jensen, Oshkosh. The new corporation takes over the entire assets, equipment and stock of the LaCrosse Tractor Co., LaCrosse, Wis., for $850,000. A. D. Paine, 276 Main Street, Oshkosh, is president and general manager of the new corporation.

The Highway Trailer Co., Edgerton, Wis., sustained a loss of about $30,000 by fire in its main machine shop on July 29, which was the second fire believed to be of incendiary origin within the month. On July 4 the main warehouse and storage building, 190 x 960 ft., was totally destroyed, the loss being estimated at $260,000. The works of the Continental Axle Co., an affiliated concern, was located in the burned structure. Repairs and replacements of tools will be made immediately. James W. Menhall is president and general manager.

The Badger Excavator Co., Milwaukee, is a new corporation organized with a capital stock of $150,000 to manufacture excavating machinery and contractors' equipment. The incorporators are Lloyd H. Draeger, 780 Fourth Street; J. Jaeckle, and Hugo J. Trost, attorney, 425 East Water Street. Plans of the company will be announced fully within a short time.

The Tomahawk, Wis., Steel & Iron Works broke ground Aug. 3 for a new foundry and machine shop, on a new site, to supplant the works which was totally destroyed by fire in April. The investment will be about $75,000. Practically all foundry and machine shop equipment will be new and orders are now being placed.

The Board of Education, Clear Lake, Wis., has engaged Edwins & Edwins, architects, 911 Northwestern Building, Minneapolis, to design a new union high school, with vocational training departments, to cost $100,000. Bids will be taken about Sept 1. F. E. Enderholm is secretary of the board.

The Mid-West Industrial Supply Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture shop and factory equipment, supplies and accessories. The incorporators are Joseph W. Hoffmann, R. J. Haszucla and Lewis J. Brabant, attorney, 221 Grand Avenue.

The Oliver Mfg. Co., Chicago, and the Barth Mfg. Co., Milwaukee, both manufacturing lifting jacks and other automotive accessories and malleable parts, have been consolidated under the name of the Oliver-Barth Jack Co., with factory and offices at 348-352 Milwaukee Street, Milwaukee. Interests identified with the Northwestern Malleable Iron Co., Milwaukee, acquired the Oliver company last November and now have taken over the Barth company. The officers are: President and general manager, Helmus B. Wells, secretary Northwestern Malleable Iron Co.; vice-president, William H. Oliver, Chicago; secretary and treasurer, Mackey Wells; directors, Pearson Wells, Detroit, and Frederick L. Sivyer, president Northwestern Malleable Iron Co.

The Automotive Machine & Tool Co., Janesville, Wis., has installed a new cylinder grinding machine and other metal-working equipment. Further purchases will be made from time to time, according to Delbert Harder, general manager.

The Star Mfg. Co., Lomira, Wis., will start work soon on the erection of a factory for the manufacture of milking machines and other farm equipment and devices. It has recently been reorganized and is marketing $50,000 of capital stock to finance construction, equipment and manufacturing. The officers are: President, Peter Wolf; vice-president, Otto Krueger; secretary, Alois Schmidt; treasurer, L. H. Zaun; director, Thomas Purtell.

Langlade County, Wis., is erecting a building, 56 x 80 ft., on the county fair grounds at Antigo for the highway department for the repair and storage of equipment. It will be equipped with a 5-ton traveling overhead crane and miscellaneous tools. C. J. Nash is commissioner.

The Drop Head Projector Co., Fond du Lac., Wis., manufacturer of portable motion picture and stereopticon machines, has reorganized with larger capital and absorbed the Cinematic Service Co., its foreign connection. H. R. Thompson has resigned as president and is succeeded by T. B. Earle, Edgerton, Wis. A. T. Earle has been made general manager. The plant, which was erected some time ago, is now in production. A large order for die castings has been placed with the Doehler Die Casting Co.

California

LOS ANGELES, Aug. 2.

The American Aluminum Metal Products Co., Los Angeles, has plans under way for the construction of its new plant on property recently acquired at Burbank. It will comprise several one-story buildings and is estimated to cost in excess of $50,000. Richard D. King, 519 Van Nuys Building, is architect.

The Pacific Shovel Co., Long Beach, Cal., has been incorporated with a capital of $100,000 by E. J. Williams, H. E. Comstock and E. B. Yost, Long Beach, to manufacture shovels and kindred products. The company is represented by Denco & Hart, 309 Long Beach Bank Building, Long Beach.

The Angelus Sanitary Can Machine Co., Los Angeles, has awarded a contract to the Austin Co., Pacific Electric Building, for its new one and two-story, brick, steel and concrete plant, at Forty-eighth Street and Pacific Boulevard, Huntington Park, near Los Angeles.

The W. B. Bastian Mfg. Co., Los Angeles, has filed notice of organization to manufacture ranges, heaters, etc. W. B. Bastian, 2983 Leeward Avenue, heads the company.

The Southern California Edison Co., Los Angeles, has arranged for a bond issue of $6,000,000, the proceeds to be used in connection with its proposed hydroelectric generating plants. The company has had plans prepared for a new power house at 7125 South Western Avenue, two-stories, 49 x 55 ft.

The Oil Well Equipment Co., Los Angeles, has plans under way for a new one-story plant, 50 x 80 ft., at Fiftieth Street and Santa Fe Avenue. Construction will commence at an early date. Gordon LaBarr and F. A. Noyes, 524 West Ninth Street, are architects.

The Gulf States

BIRMINGHAM, Aug. 8.

The Panther Machine Co., Fort Worth, Tex., is planning for the erection of new works for the manufacture of castings and machined products, to include foundry for brass, bronze and aluminum castings, machine shop, welding works, and grinding department. S. Johnson, F. & M. Bank Building, is president and general manager.

The Brady Compress Co., Brady, Tex., is planning to rebuild the portion of its cotton compress plant, destroyed by fire, July 28, with loss estimated at about $100,000, including machinery.

The Golden Star Refining Co., Mexia, Tex., is planning for the construction of a new local oil refinery, with initial output of about 5000 bbl. per day.

The Home Ice & Cold Storage Co., Austin, Tex., has preliminary plans under way for the erection of a new cold storage plant. The company has increased its capital from $125,000 to $175,000.

The Nu-Tex Brick & Tile Co., Tampa, Fla., has been incorporated with a capital of $200,000 to manufacture brick, tile and kindred products. Plans are under way for the erection of new works with equipment to provide for a daily output of about 30,000 brick. W. B. Coarsey is president and general manager.

The Hardee County Power & Ice Co., Wauchula, Fla., recently organized with a capital of $200,000, has plans under way for the erection of an electric power plant, and ice-manufacturing and cold storage plant. J. G. Fancy, Fort Meade, Fla., is president.

P. P. Vail, Jackson, Miss., and associates, are planning the erection of a new ice-manufacturing and cold storage plant to cost $150,000.

The Hartselle Machine Co., Hartselle, Ala., is planning to rebuild the portion of its plant recently destroyed by fire with loss of about $25,000.

Electrical equipment, transmission and operating machinery and other mechanical apparatus will be installed in the new plant to be erected by the Birmingham Flour Mills, Birmingham, Ala., to be 140 x 150 ft., and estimated to cost about $150,000.

The Texas Dressed Beef Co., Fort Worth, will build a meat-packing plant to cost $40,000. A. H. Boswell, H. B. Kahn and R. C. Brauer are the principal stockholders.

The Corpus Christi Light & Power Co., Corpus Christi,

Tex., plans to install a new unit and rehabilitate its electric light and power plant at a cost of about $200,000.

According to W. J. Doyle, industrial commissioner for the Gulf Coast Lines and the Houston Belt & Terminal Co., Houston, W. M. Bancroft, sugar mill machinery manufacturer, and associates plan to build a refinery at Houston to cost $1,250,000. A site of 20 acres has been purchased.

Canada

TORONTO, Aug. 8.

Inquiries for various lines of equipment continue the main feature of this market. Machine-tool buying, however, is at a standstill, with only a limited number of sales in woodworking equipment. Many users are in need of tools for replacement purposes, but are not buying on account of the uncertainty of industrial conditions. Dealers, however, look for more activity in the fall as it is likely that many inquiries now in the market will ultimately turn into sales. Small tools are moving quietly. The Westinghouse Electric & Mfg. Co., Hamilton, Ont., announces a 10 per cent reduction on prices of practically all industrial motors and motor control apparatus, including all direct current generators and motor generators.

The Adanac Motor Syndicate, Lachine, Que., has been incorporated to manufacture motor trucks, etc. The head office is at 163 St. Joseph Street. The directors include Gordon A. Elmslie, H. Milton Purnell and B. H. T. McKenzie.

The general contract for the construction of a $5,500,000 power plant at Point Du Bois, Man., for the Winnipeg Electric Railway, Winnipeg, Man., has been let to the Northern Construction Co., Union Bank Building, Winnipeg.

London, Ont., will have plans prepared for erection of pump house to cost $50,000. H. A. Brazier is engineer.

The F. Bowden Lumber Co., Greenwood Avenue, Toronto, is preparing to build a planing mill to cost about $60,000.

Molsons Brewery, 906 Notre Dame Street East, Montreal, has awarded the general contract for a boiler house to cost $80,000 to E. G. M. Cape & Co., Ltd., 10 Cathcart Street, Montreal.

Belleville Motors, Ltd., Belleville, Ont., have been incorporated with a capital stock of $40,000 by Charles E. Wilmot, Earl F. Chapman, and others to manufacture automobiles, bicycles, trucks, parts, etc.

The Canadian Automatic Boiler Cleaner Co., Ltd., Kingston, Ont., has been incorporated with a capital stock of $50,000 by Knud Lund, Gananoque, Ont.; Francis J. Lachance, Howe Island, Ont.; John E. Kane and others of Kingston, Ont., to manufacture boilers, engines, tools, etc.

H. G. MacDonald, 612 Tegler Building, Edmonton, Alta., has the general contract for the erection of power house to cost $40,000 for the Department of Public Works, Provincial Government, Calgary, Alta.

Plans of New Companies

The Oilgear Co., Milwaukee, which was incorporated a short time ago to manufacture transmission devices and specialties, has increased its capital stock from $100,000 to $300,000 preferred stock and 25,000 shares of common stock without par value.

The McCabe Co., Inc., 119 West Freemason Street, Norfolk, Va., authorized to manufacture and sell the McCabe automatic water heater, wishes to contract with some company to manufacture for it. Its officers are: Allen E. McCabe, president and treasurer; W. L. Ewing, vice-president and general manager, and W. J. Fielder, secretary. This is a stamping job, requiring automatic stamping machinery, as the device is made of either sheet copper or brass with a small collar stamped from black iron. The company is in the market for range boilers and hot water tanks of various sizes, and wants quotations on copper and brass tubing of 4 in. and 5 in. diameter and on sheet copper or brass of 18 and 20 gage. It is also looking for a location for an assemblying and shipping plant in Eastern or Central States.

The Lane Signal Accessories Co., Sayre, Pa., recently incorporated, will manufacture relays, indicators, switch boxes, lightning arrestors and other accessories to an automatic system of signals and will sell principally to the railroads. The company proposes to have its own plant to manufacture all the articles it will sell. It will equip the plant with machinery for this purpose and will be in the market for equipment, comprising automatic and hand screw machines, drill presses, milling machines, etc.

The S. P. Brick Co., recently incorporated, has been in operation for the past 10 years. The only change is that the firm has been incorporated.

IRON AND INDUSTRIAL STOCKS

Net Changes in Prices for the Week Are Not Significant

General sentiment in most sections of the country is more cheerful than it has been, yet this fact is not reflected in the movement of prices quoted for iron and industrial stocks the past week. Early in the week the price tendency was upward, but when call money at New York rose from 3½ to 6 per cent a damper was put on investment buying and prices sank back to about their level of a week ago. Thus the net change in the market value of the average security does not amount to much.

Some investors maintain securities have not discounted good business this or early next year. A comparison of securities values, however, shows that on the average they are higher than they were two, three and four months ago. The recovery has been slow, however, and not noticeable to many.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	30½- 32	Int. Har. com...	72¼- 75
Am. Can com....	26⅜- 28½	Int. Har. pf.....	99¼-100⅝
Am. Can pf.....	- 82	Lackawanna Stl.	39½- 40
Am. C. & F. com.	124 -125½	Midvale Stl.....	23¾- 25¼
Am. C. & F. pf..	108 -109⅛	Nat.-Acme	14½- 14⅞
Am. Loco. com..	82 - 85½	Nat. E. & S. com.	48 - 48½
Am. Loco. pf....	100 -102¼	Pressed Stl. com.	58 - 61⅛
Am. Stl. F. com..	25¼- 26	Ry Stl. Spg. com.	76 - 80
Bald. Loco. com.	76⅜- 80⅛	Replogle Stl.	20¾- 23
Beth. Stl. com...	48½- 50⅛	Republic com....	46¾- 49¼
Beth. Stl. Cl. B..	50 - 52¾	Republic pf.....	.. - 85
Beth. Stl. 8% pf.	98¾- 99	Sloss com.....	34¼- 35⅞
Chi. Pneu. Tool..	49 - 50	Un. Alloy Stl....	.. - 25
Colo. Fuel	22¾- 23⅝	U. S. Pipe com..	15 - 15⅜
Cru. Stl. com....	54⅛- 57¾	U. S. Stl. com...	74⅜- 76
Gen. Electric....	117½-120	U. S. Stl. pf.....	107¾-109
Gt. No. Ore Cert.	27¼- 28	Vanadium Stl....	29 - 30
Gulf States Stl..	33 - 36½	Westingh'se Elec.	43 - 48½

Industrial Finances

Involuntary bankruptcy proceedings have been filed against the Shuler Axle Mfg. Co., Louisville, Ky., the petition setting forth that assets are $250,000, with liabilities of $385,000. The Steel Products Co., Cleveland, and two other creditors brought the action, alleging that the company had preferred other creditors, among which was the First National Bank of Louisville. Officers of the company claim that assets are tied up in material and securities which can't be liquidated at this time.

The United States Tack Co., New Bedford, Mass., has converted the 1000 outstanding shares of common stock, par $100., into 1000 shares of no par value, and has issued 11,000 additional common shares, no par value, as well as 1000 shares 8 per cent preferred stock, par $100. All of the preferred stock and part of the common will be offered for subscription and part of the common distributed to holders of original shares.

The Bridgeport Hydraulic Co., Bridgeport, Conn., has sold to banking interests $1,750,000 5 per cent gold notes, dated June 1 and maturing in 1925. These notes are a part of a $5,000,000 authorized issue.

It was announced in New York in the past week that the issue of $5,000,000 of Otis Steel Co. first mortgage, 20-year, 8 per cent sinking fund gold bonds, put out through Blair & Co., had been taken up promptly. The purpose of these bonds is to pay off approximately $3,500,000 current indebtedness and to provide additional working capital. It was stated that after giving effect to the proposed bond issue, current assets as of June 30, 1921, were $8,366,189 and current liabilities $981,845. The company's plants at Cleveland have an approximate annual capacity of 360,000 tons of pig iron, 275,000 tons of plates, 140,000 to 150,000 tons of light plates and sheets, 30,000 tons of steel castings, 10,000,000 lb. sulphate of ammonia, 3,500,000 gal. tar, 1,250,000 gal. crude benzol and toluol and 600,000 lb. sodium ferrocyanide.

The Virginia Iron, Coal & Coke Co., Roanoke, Va., reports gross earnings for the three months, ended June 30 last, amounting to $212,094. Interest, taxes, etc., amounted to $111,020, thereby making the net earnings for the second quarter $100,073, as contrasted with $471,356 for the three months, ended March 31. Net earnings for the six months, ended June 30, were $571,430.

The Two-In-One Signal Lamp Corporation, 152 Temple Street, New Haven, Conn., recently incorporated with a capital of $50,000 to manufacture electrical lamps and signal devices, is having its work done by C. Cowles & Co., New Haven, Conn. The lamp takes the place of the ordinary tail light and in addition it is a signal device, operated automatically from the brake, cable reaching from the break-rod to the lamp, and the cover slides up when the brake is brought into action. The lamp is made of brass with a high lustre nickel finish.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅝ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.05c. to 4.30c.	.....
Nos. 22 and 24	4.10c. to 4.35c.	4.70c.
No. 26	4.15c. to 4.40c.	4.75c.
No. 28	4.25c. to 4.50c.	4.85c.
No. 30	4.50c. to 4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.25c.
No. 16	4.50c.
Nos. 18 and 20	4.65c.
Nos. 22 and 24	4.80c.
No. 26	4.95c.
No. 27	5.10c.
No. 28	5.25c.
No. 30	5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¼ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	5.00c. to 5.25c.
Coppered basic	4.75c. to 5.00c.
Tinned soft Bessemer	6.25c. to 6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20
IC	$10.60	$9.50
IX	11.80	10.75
IXX	13.60	12.25
IXXX	15.60	14.25
IXXXX	17.20	16.00

Coke—14x20	Primes	Wasters
80 lb.	$6.80	$6.55
90 lb.	6.90	6.65
100 lb.	7.00	6.75
IC	7.20	6.95
IX	8.10	7.85
IXX	9.10	8.85
IXXX	10.50	10.25
IXXXX	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	37c. to 38c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	30c. to 32c.

Old Metals

The market is easy. Business is at a standstill. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.75
Copper, heavy and wire	9.00
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.75
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

THE IRON AGE

New York, August 18, 1921

ESTABLISHED 1855 VOL. 108: No. 7

Cutting Costs in a Drop Forge Shop

Trolley System Used for Handling Work Between Hammers and Furnaces—Features Include Water Reclaiming Plant

BY F. L. PRENTISS*

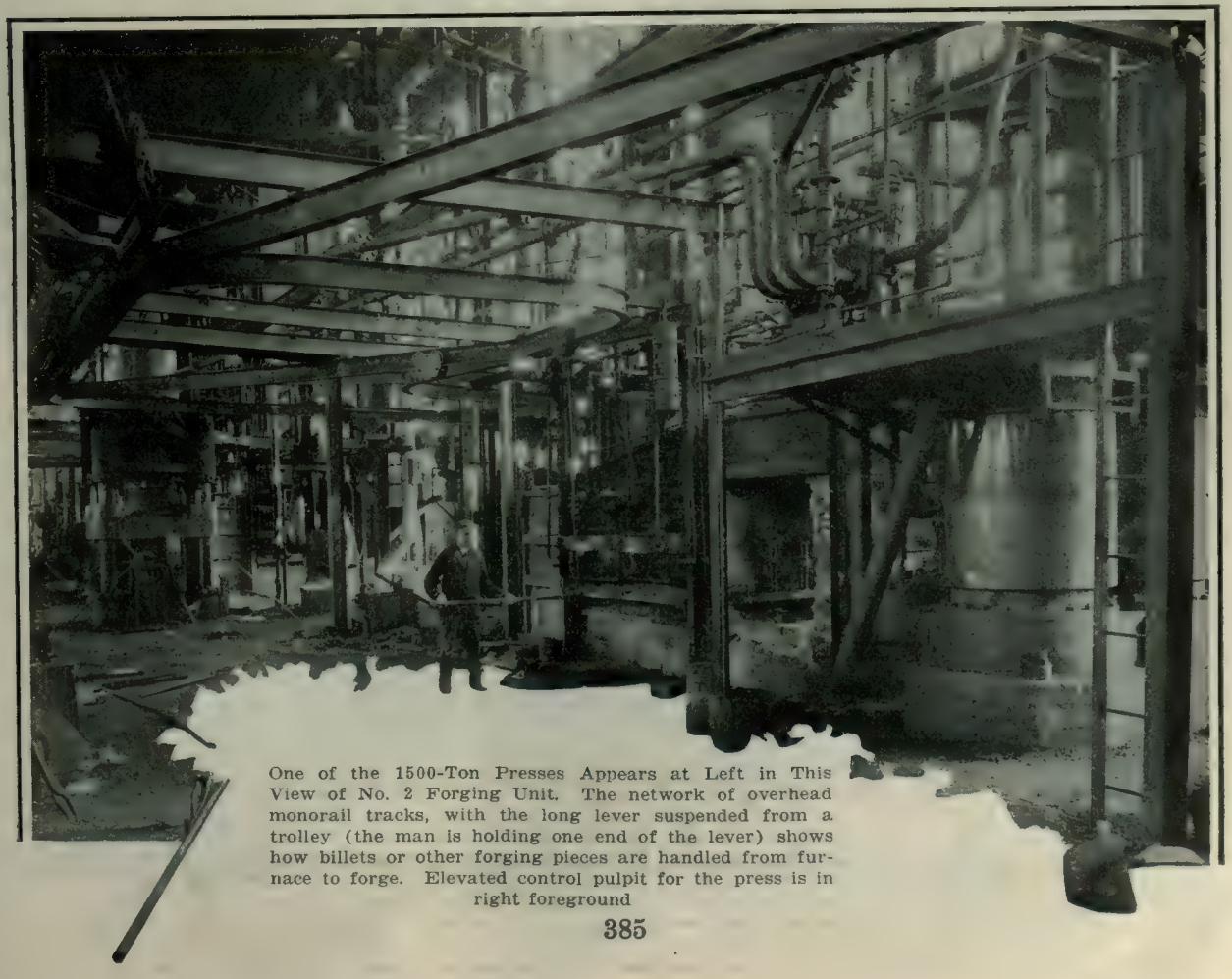
THREE separate adjoining forging units, each unit having two heating furnaces connected to waste-heat boilers, and the units arranged with monorail tracks located in front of the hammers, presses and furnaces for handling work in process of manufacture, form the predominating features of the new drop forge plant of the Champion Machine & Forging Co., Cleveland. While the three units were designed particularly for forging large crank shafts, they can be used for any commercial work in the larger forgings. They were laid out and provided with the monorail system to conserve labor, permit quicker handling of work from furnace to hammer, and to secure the maximum production from a given amount of forging equipment.

The units are so arranged with the monorail tracks reaching from one to another that, should the operations require moving the work from one unit to another, this can be done readily by transferring it to the monorail in the adjoining unit. In forging crank shafts, successive operations are performed in the three units.

Each monorail unit has a number of hand-operated trolleys from which a carrier is suspended, this being a long lever attached to the trolley by a chain. The work is moved between furnace and hammer on the lever, being guided by a pair of tongs. Only two men are required to handle the piece, the heater and the hammer man, one to push the trolley and the other to handle the tongs. The use of the trolley permits the hammer man to swing the work around in place under the hammer without doing much walking. The trolley rests on an 8-in. 18-lb. trolley I-beam, the top of which is 12 ft. above the floor. The monorail and carriers were supplied by the Richard Wilcox Co.

Waste heat from the heating furnaces is utilized

*Resident editor of THE IRON AGE, at Cleveland.



One of the 1500-Ton Presses Appears at Left in This View of No. 2 Forging Unit. The network of overhead monorail tracks, with the long lever suspended from a trolley (the man is holding one end of the lever) shows how billets or other forging pieces are handled from furnace to forge. Elevated control pulpit for the press is in right foreground



Raw Material Is Handled on These Rollers, Either into the Shears in Center or into the Small Heating Furnace at Right of Shears. The traveling crane places stock on the rack in left foreground, and the air hoist shown on monorail deposits it on the rollers

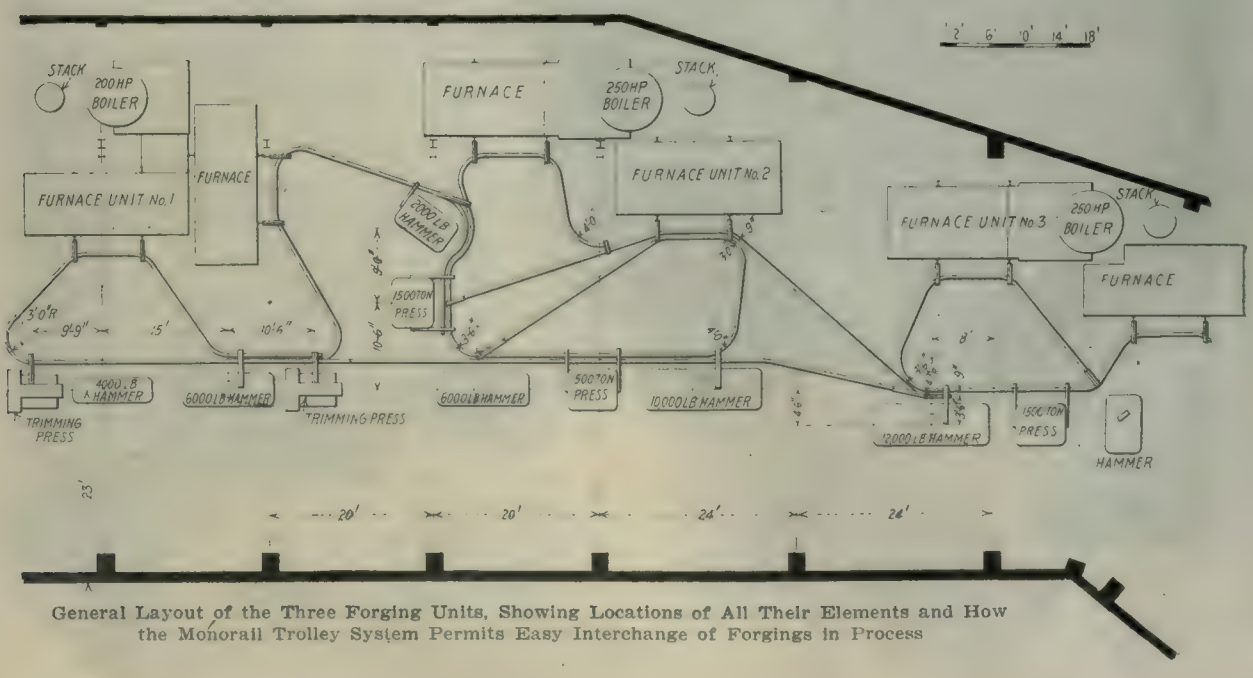
to supply steam for the plant through the waste-heat boilers. Each unit has two furnaces connected to a Wickes standard waste-heat water tube boiler. One is a 200-hp. boiler and the others are 250-hp. each. The forging equipment for the most part is located in a straight line, but an irregularity in the building line required somewhat of an irregular arrangement of the furnaces. The two furnaces are located on opposite sides of each boiler.

Limited space made it impossible to connect all the furnaces directly to the boiler setting. Three are direct connected, but for the other three it was necessary to use underground connecting flues. The flues are carried in a straight line and discharged directly into the boilers. Each boiler has a self-supporting steel stack extending up through the roof of the building and held in a saddle trussed to the building columns, eliminating the use of guys. Two stacks are 120 ft. high and 46 in. in diameter, and the third is 110 ft. high and 42 in. in diameter.

Though the heating furnaces, which were designed by the company, are normally oil fired, they are also arranged for coal firing. They have water-cooled welded steel plate doors, and the arch supports and jambs are also water cooled, the latter being provided to protect the buckstays. The use of a water-cooling system is a departure from the usual practice in a forge shop heating furnace.

All furnaces have wide openings, only 1 ft. in height, and split doors. The two furnaces of No. 1 unit have hearths 5 ft. 3 in. wide and 7 ft. 6 in. long, and the other four furnaces have hearths 6 ft. 6 in. wide and 8 ft. long. The water-cooled doors were designed by the Blaw Knox Co. to fit the type of furnace used.

After the furnaces had been placed in operation and it was found that the water cost was excessive, water reclaiming equipment was installed which, it is stated, has resulted in a net saving of $10 per day, after deducting the cost of maintenance. The water



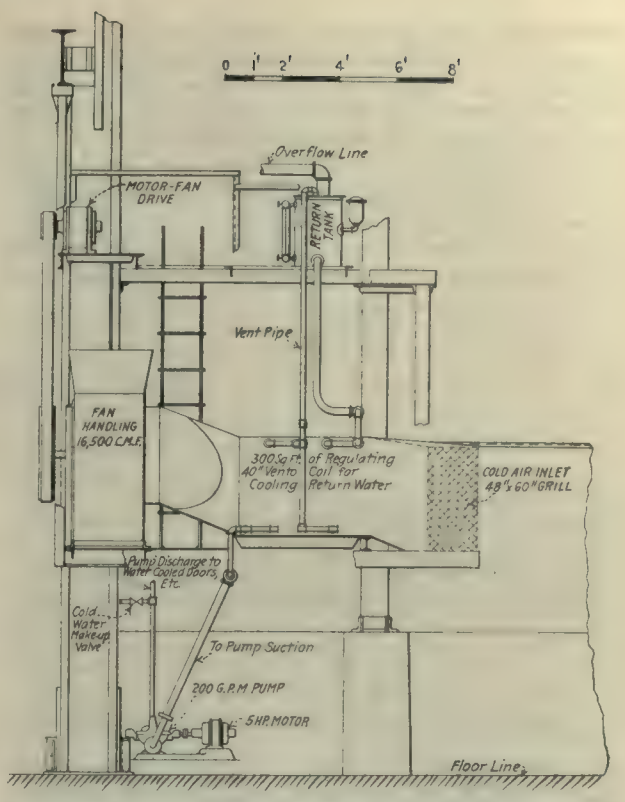
General Layout of the Three Forging Units, Showing Locations of All Their Elements and How the Monorail Trolley System Permits Easy Interchange of Forgings in Process

is carried in five individual discharge lines, ranging from ¾ in. to 1¼ in. in diameter, from the water cooled parts of each furnace, there being two lines from the doors, two from the jambs and one from the arch. These lines discharge through a gooseneck into a sheet metal funnel and from the funnel into a 6-in. open line located 18 ft. above the floor and running the length of the waste-heat plant. Discharge into the main line through the funnel is provided, so that it can be readily seen by glancing into the funnel whether the water is circulating properly through the water-cooled units.

The 6-in. line connects through an automatic feed to a Cochrane feed water heater of 2000-hp. capacity located near the waste-heat boilers, and approximately 200 ft. from the main power plant. The feed water heater was placed in the new forge shop because the company contemplates the erection of a new power plant on a site across the street from the new forge shop.

Surplus hot water, not utilized through the feed water heater, is delivered to the water reclaiming plant, and if the supply is beyond the capacity of the reclaiming plant it passes into the sewer. The discharge from the 6-in. line is into a small tank provided with a water level regulator. From this tank the hot water is circulated through 450 sq. ft. of cooling coils, and from the coils a motor-driven re-circulating pump delivers it into a 3-in. line which carries it back to the water-cooled parts. The coils have a capacity for cooling 200-gal. of water per min., by passing over 16,000 cu. ft. of air per min.

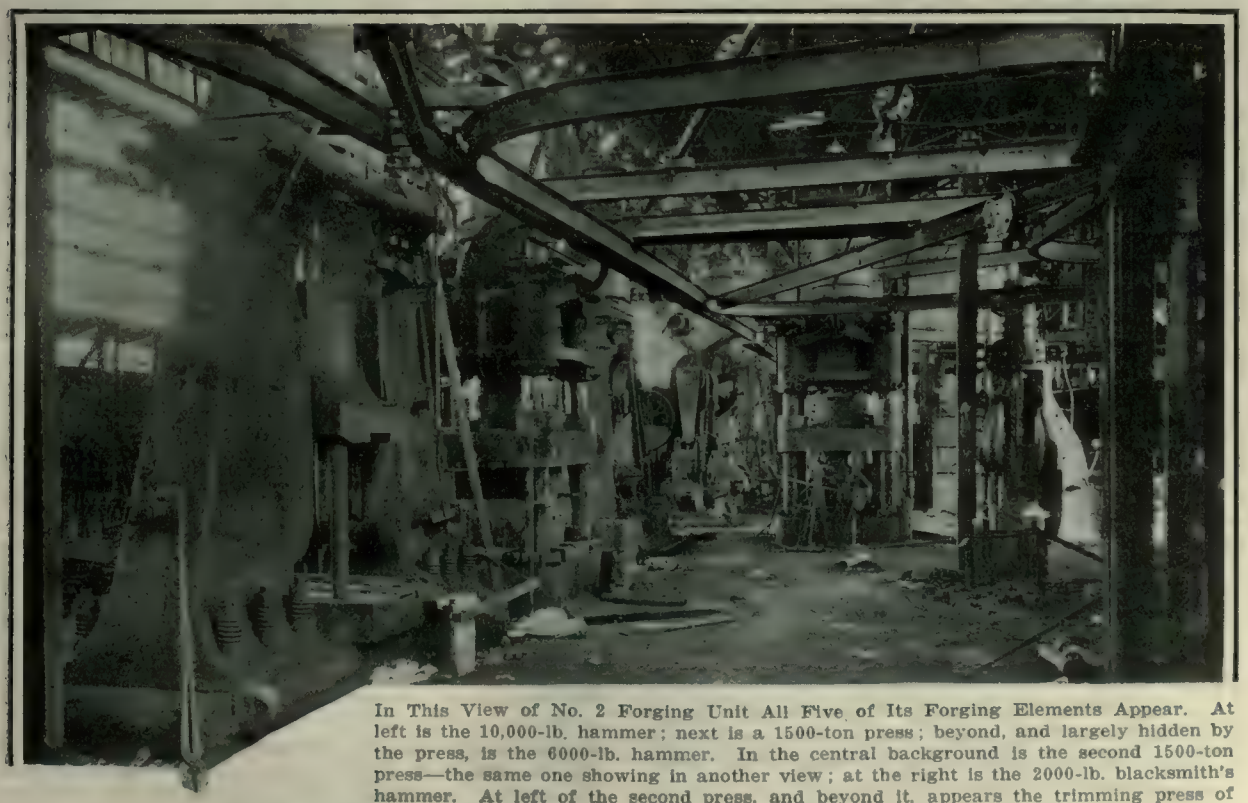
With the elimination of a feed water heater in the power house, an economizer will be installed in each boiler setting to boost the temperature of the entering feed water from the feed water heater. The waste-heat boilers discharge into the main steam lines, there being an automatic cutout on each boiler to shut off the boiler from the steam line when not in use. The connection between the boilers and the main steam lines is through a 10-in. overhead main connecting to the three boilers, and two 10-in. drop lines that extend down to the steam lines located in tunnels under the forge shop floor. The main steam line and exhaust



Arrangement of the Water Reclaiming Equipment, Showing Method of Handling the Water

lines are looped together in the tunnels, so that any part of the forge shop can be shut down without affecting the other parts.

No. 1 forge shop unit has a 4000-lb. and a 6000-lb. steam hammer and two electrically driven mechanically operated Toledo trimming presses. Unit No. 2 has two 1500-ton Southwark hydraulic presses and a 6000-lb. Chambersburg and a 10,000-lb. Niles hammer. The third unit is equipped with a 12,000-lb. Niles hammer and a 1500-ton Southwark press, space being provided for a second press. Between No. 1 and No. 2 units is a 2000-lb. blacksmith hammer and a smaller hammer



In This View of No. 2 Forging Unit All Five of Its Forging Elements Appear. At left is the 10,000-lb. hammer; next is a 1500-ton press; beyond, and largely hidden by the press, is the 6000-lb. hammer. In the central background is the second 1500-ton press—the same one showing in another view; at the right is the 2000-lb. blacksmith's hammer. At left of the second press, and beyond it, appears the trimming press of No. 1 unit

is located in the No. 3 unit. In addition to the regular carriers for handling material between the furnaces and press and hammer equipment, the monorail is provided with two chain hoists for handling billets during the operations at the blacksmith hammers .

All the hydraulic presses are operated by two Southwark steam hydraulic intensifiers connected together. One is a high-pressure intensifier that operates the presses at 3800 lb. per sq. in. water pressure, giving 1500 tons pressure on each press for forging work. The low-pressure intensifier provides 850 lb. per sq. in. water pressure, giving 300 tons pressure for trimming and bending operations. The intensifiers, which take the place of a pump and accumulator, also do away with the necessity of high-pressure water operating valves at the presses, the valves being located at the intensifier and operated only at low pressure. One man in a pulpit at the intensifier operates all the presses.

Built in 1918 and adjoining the company's old plant, the first unit of this plant was 160 ft. long and 54 ft. wide. Later this was extended 160 ft. with a 15-ft. leanto in the extension for the waste-heat boilers. The steel frame-work of the building is carried 152 ft. further to cover the steel yard, which is served by a railroad switch track. This steel yard extension provides a runway for a 10-ton Niles alternating current electric traveling crane, equipped with a direct current lifting magnet which serves the steel yard and the lower part of the forge shop. A motor generator set mounted on the crane supplies current for the magnet.

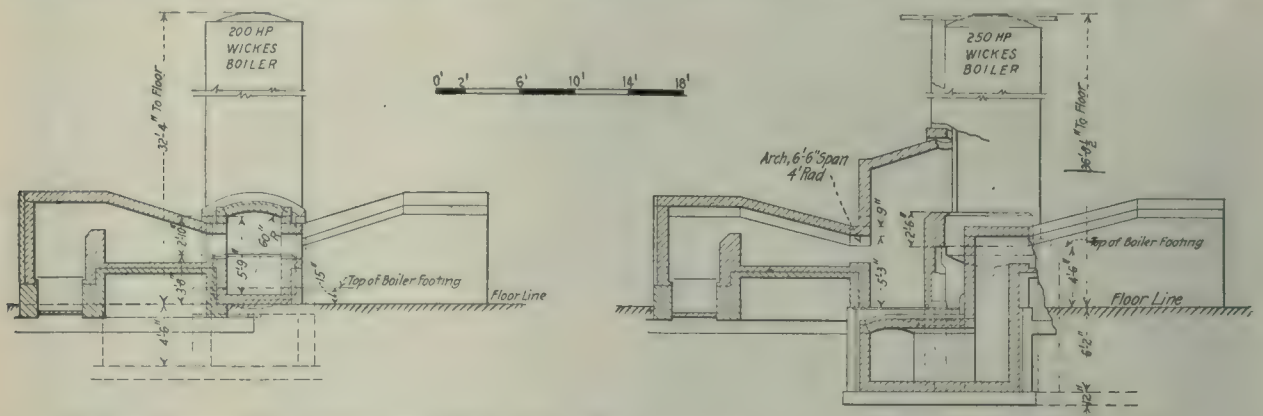
The plant is conveniently arranged for the handling of material. Heavy stock is unloaded from cars with the traveling crane and stored out in the steel yard, or on shear racks built of 8-in. I-beams embedded in a concrete base and raised far enough to permit the placing of a crane hook under the stock. From the racks it is picked up with an air hoist with a capacity of 1000 lb. and placed on a set of four steel pipe rollers 33 in. wide, 4 in. in diameter and on 30-in. centers. These rollers are located in front of a Cleveland shear, having a capacity for cutting stock up to 5½ in. square.

Other racks are provided for alloy steel, and near these racks is an oil-fired heating furnace for heating alloy steel bars. A similar set of rollers is provided in front of the furnace for handling bars.

Owing to an angle in the building, two overhead cranes are required, a jib crane serving to transfer between the two sections. One of the traveling cranes serves an inside shipping platform at the end of the plant farthest from the stock yard. This is a motor truck platform used for handling both stock and outgoing forgings. In addition to the use of overhead cranes, electric trucks operating on concrete runways 8 ft. wide throughout the building are provided for distributing and collecting stock and finished forgings.

Blast for the furnaces is provided by three Sturtevant blowers that deliver air at a pressure of 12 oz. per sq. in., and a General Electric high-pressure blower providing a pressure of 2 lb. per sq. in. The Sturtevant blowers are connected to a header, from which blast lines are gated so that the system can be operated on any one of the blowers. The blowers are located in the basement in the center of the building, the blast lines being carried in tunnels under the forge shop and in the leanto that houses the waste-heat boilers.

The forge shop, of steel and glass construction, is unusually high, being 52 ft. to the peak of the roof, which is of the Pond truss type. The windows are of ribbed wire glass. Nearly all the window sections are set in chain-operated swinging sash, that can be set at any desired angle, depending on weather conditions, thus providing good natural ventilation.



Sections Through the Furnaces and Waste Heat Boiler Connections of No. 1 Unit (at Left) and No. 2 Unit

Steel Corporation's Orders Decrease

Unfilled orders on the books of the United States Steel Corporation July 31 were 4,830,324 tons, compared with 5,117,868 tons on June 30. This is a decrease of 287,544 tons and compares with one of 364,619 tons in June, 362,737 tons in May, 439,541 tons in April, 649,102 tons in March, 639,297 tons in February and 574,958 tons in January, and represents the twelfth consecutive monthly decrease reported. The unfilled tonnage a year ago was 11,118,468 tons, or 6,288,144 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28	6,933,867	9,502,081	6,010,787	9,288,443
Mar. 31	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30	5,845,224	10,359,747	4,800,685	8,741,882
May 31	5,482,487	10,940,465	4,282,310	8,337,623
June 30	5,117,868	10,978,817	4,892,855	8,918,866
July 31	4,830,324	11,118,468	5,578,661	8,883,801
Aug. 31	.....	10,805,038	6,109,103	8,759,042
Sept. 30	.....	10,374,804	6,284,638	8,297,905
Oct. 31	.....	9,836,852	6,472,668	8,353,293
Nov. 30	.....	9,021,481	7,128,330	8,124,663
Dec. 31	.....	8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Fire Brick Production Increases

Figures of the United States Geological Survey show that the 1920 production of fire brick amounted to 1,131,000 thousands, as compared with 943,942 thousands in 1919. The 1920 production was valued at $52,750,000, or an average of $46.64 per thousand; the 1919 production was valued at $36,170,000, or an average of $38.32 per thousand. The quantity shows an increase of 20 per cent during the year; the value an increase of 46 per cent and the unit value an increase of 22 per cent. In each year the total value of the product was approximately 20 per cent of the total value of all brick and tile manufactured in the United States.

Beginning Aug. 15 the open-hearth department of the National Malleable Castings Co.'s plant at Sharon, Pa., started on a five-day-a-week basis, instead of three days a week. Other departments will continue to run three days each week.

VANADIUM PRODUCTION IN PERU

Extent of the American-Owned Deposits and Plans for Future Operations

The recently published *Boletin del Cuerpo de Ingenieros de Minas del Peru* gives some interesting data* concerning the important vanadium deposits of Peru, which are American controlled and operated and constitute the chief source of supply of vanadium for the world. The principal deposit, which is at Minasragra and is the only one in active exploitation, has yielded since the beginning of operations in 1907 a total of 27,998 metric tons of ore, having a content of 10,413.6 metric tons of vanadic acid, equivalent to 5850.4 metric tons of metallic vanadium.

Concerning the deposits, the report says: "The great interest awakened in vanadium has resulted in the thorough search for a new deposit in all parts of the world, and there have been developed effective processes for the extraction of vanadium from certain ores in which it is contained in minute percentages. Very little has resulted from these efforts, since there have been discovered no new deposits of importance and the amount of vanadium which has been recovered from other ores by the metallurgical processes referred to does not appear to be important because the processes, while technically successful, necessarily involve a large cost of production. In view of these facts we believe that the vanadium reserves of greatest importance in the world and in Peru are the numerous and extensive deposits of asphaltic material, which exist in the departments of Junin and Lima. These contain from 1 to 2 per cent of V_2O_5. These deposits were the object of interest on various occasions, and in 1908 and 1910 there were exports of ash obtained by burning the asphalt, with a resulting content in the ash of from 20 to 25 per cent of V_2O_5. Later, the depression in vanadium as a consequence of the remarkable developments at Minasragra has caused the suspension of these exploitations except in some few localities near the railroad, which still utilize the vanadium from the ash to a limited extent."

Referring to the Vanadium Corporation of America, the *Boletin* says: "For some time this company has given special attention to the exploration of its mine to determine as definitely as possible the extent of the ore, so that it could plan its work and determine the future of the business. The result of these explorations, which were done mainly by diamond drilling, has been satisfactory and in consequence the company decided to undertake the expensive improvements which are now being made. It was reported that the ore in sight represented about 16,500 tons of metallic vanadium, and it was claimed that the total ore in the mine, based on probable estimate, would exceed 45,000 tons.

"The president of the company at a recent meeting denied certain rumors that had been circulated about the exhaustion of the ore reserves, claiming that on the contrary the engineers had discovered a new vein of ore which increased the reserve very much. In addition to this it was announced that the company was planning an installation for the treatment of the mine waters which carry an appreciable quantity of vanadium, heretofore lost in Lake Punrun, and that the recovery from this source would be equivalent to $500,000 yearly.

"From these facts and reports it appears evident that the reserve at Minasragra are sufficiently large to insure an ample production during many years, especially with the provision of methods and facilities to permit of realizing on the leaner parts of the deposit. As is to be expected, the grade of the ore is not so high as at first when the rich zone of patronite (vanadium sulphide) was being worked. Now the oxide ores preponderate and are extensive in quantity but of lower grade. The sulphide of vanadium ore which was formerly extracted had from 20 to 25 per cent of V_2O_5 and by elimination of the sulphur by calcination it was possible to export a product of from 40 to 45 per cent of V_2O_5. However, in 1919 the average of the exports was only 30.4 per cent, and in 1920 some shipments as low as 16 to 20 per cent were made. Because of these conditions, the company decided to construct at Jumasha, on the shores of Lake Punrun, a beneficiating plant and a furnace, by which it can obtain a product 85 to 90 per cent of V_2O_5, which can be exported to the United States for refining. At first it was planned to treat the ore by lixiviation but, considering the good results obtained by the electrical furnaces at Bridgeville, Pa., it was decided to use instead electrical smelting, and a contract has been made for a 20,000-kw. hydroelectric installation at a place about 40 kilometers from Jumasha.

"In addition to the reserves in the deposit, the company has a large amount of ore already mined which it has not been possible to export before because of the transportation conditions. Formerly the ore was transported on the llamas from the mine to Jumasha, and then across Lake Punrun on barges, and then conveyed again by llamas to the station of Ricran, on the Cerro de Pasco Railroad to La Oroya. The employment of llamas furnished uncertain transportation, and to remedy this a broad gage railroad has been constructed from the mine to the lake, a distance of 12 kilometers. This was finished in 1920. Likewise, an excellent road for automobile trucks was built from the lake to the railroad, a distance of 25 kilometers. Over this road the ore is transported by caterpillar tractors, drawing special trucks which are loaded at Jumasha and transported across the lake on motor barges. This transportation system is adequate for the handling of a thousand tons monthly."

*Translated by Kirby Thomas, New York.

To Replace Chateaugay Furnace at Standish, N.Y.

Contract has been awarded the William B. Pollock Co., fabricating interest of Youngstown, Ohio, for the replacing of a blast furnace, supplying the ladle equipment and making necessary improvements to the stoves and piping by the Chateaugay Ore & Iron Co., Standish, N. Y. The award represents one of the most important blast furnace contracts entered into this year. The blast furnace to be replaced was built and erected 17 years ago by the Pollock company.

The Pollock company will erect the new furnace as well as build it. The ladle cars to be supplied are a new built-up, short-pour type of the Pollock company's own design. Freyn, Brassert & Co., Chicago, designed the new stack for the Chateaugay company, while E. P. Ross, vice-president of the Wharton Steel Co., is in direct charge of the improvements.

Chicago Hearings on Basing Point in September

CHICAGO, Aug. 13.—Hearings on the Pittsburgh basing point for steel prices will be opened here in September, according to K. E. Steinhauer, attorney for the Federal Trade Commission, who is in the city investigating the complaint of the Western Association of Rolled Steel Consumers. At these hearings attorneys for the respondents and the complainants, respectively, will introduce evidence. The examiner, after the hearings, will present tentative findings to the commission. The attorneys may then present their objections to such findings and the commission may allow counsel to argue the matter before it both orally and by brief.

Contract is being negotiated for construction of the Youngstown & Austintown Railroad, a four-mile branch of the Erie extending from the Ohio Works of the Carnegie Steel Co. at Youngstown. The purpose is to afford plant sites with rail connections for small and diversified industries. The project is being financed by the New Industries Co. of Youngstown, of which George E. Rose is president. The Erie, it is stated, has agreed to reimburse the builders for the cost of construction by allowing them a certain charge for each car of freight moved over the road.

New Time Study Watch

The duration time study watch shown in the accompanying illustration is a new instrument developed by the Mortimer J. Silberberg Co., 122 South Michigan Ave., Chicago, for use in time and motion study. It is designed to handle the timing, analysis and observation of from one to ten operations, up to and including 5 min. duration.

There are three circles on the dial, the outer one being red; the center, black; and the inner blue. The large hand makes a revolution in 100 sec., the small hand in the center moving over a red, a black and a blue sector to indicate by color the circle in which the large hand is operating. All of the figures on the dial denote production per hour, based on the time of ten operations. For example: If ten operations were observed in 20 sec., the figure under the large hand in the red circle would show 1800 operations per hour. If one operation were observed in 20 sec., then instead of 1800 it would show on the dial 1800 ÷ 10, or 180 operations per hour.



Figures on the Dial Denote Production per Hour. Based on the Time of Ten Operations

If an operation is timed and its duration is 130 sec., it will be noted that the large hand will have made one total revolution and 30 sec. additional. The small hand in the center of the dial will then pass the first sector and show in the second sector, which is the black and which denotes that the operation must be read in the black circle. Then reading under the 30-sec. mark in the black circle the figure 277 will be noted. However, this figure being based on the observation of 10 operations, and only one operation having been timed in that period, it is necessary to point off one figure, and the result is then 27.7 operations per hour, based on one operation timed in 130 sec. The same applies to operations of longer periods; the small hand moves in the colored sector, showing in which circle the large hand is operating, simplifying the calculation of elapsed time.

The instrument has the take-out time feature allowing the operator to start and stop the watch without returning the large hand to zero. When an operation is entirely completed pressing the crown down returns all hands to the starting point. The dial is divided in seconds and half-seconds.

Increasing the Output of Castings in Steel Works

A method of lay-out for steel works whereby castings can be produced practically continuously is described at length by a writer in *Stahl und Eisen*, July 29, 1920, an abstract of which is furnished by *Technical Review*, London, which cites the following advantages:

By subdividing the total casting operations into casting work proper and secondary operations, and transferring these two branches of the work to two separate sets of machines, losses of time, which are otherwise unavoidable, are eliminated, and thus the highest attainable output of castings is obtained. By adopting these measures it is possible to cast 60 heats of 22 tons each, or 1320 tons of steel, in 12 hr.

By making the casting operations as far as possible automatic, the number of hands required on this work can be reduced to seven, and a saving in wages effected which varies according to the circumstances governing each particular case.

Traversing platforms and other equipment details for the transverse motion of the foundry cars, with their ladles, are dispensed with, thus effecting a saving not only in plant charges and space, but also eliminating a source of danger.

The foundry can be made considerably smaller in dimensions, and the floor space thus set free can be used for other purposes in existing steel works. The plant charges can also be considerably reduced in new installations.

Stagnation in Italy

MILAN, ITALY, July 27.—There has been practically no changes in the month. Business is absolutely dead and it is therefore hard to give correct prices. Italy is going through a very hard spell on account of the continual fighting between the Socialists and Fascisti.

Thousands of people are out of work as all firms are laying off help and some have even closed completely. The hotels and summer resorts are begging for guests; this time last year one could scarcely find a room in a summer resort.

Here are this week's prices, largely nominal, in lire, f.o.b. Milan, per 100 kg.:

	May 22	June 30	July 27	Cents Per Lb., July 27
Copper, electrolytic	575	600	630	11.65
Copper sheets	1020	1020	1040	19.24
Brass sheets	900	900	900	16.65
Brass wire	875	875	880	16.28
Brass rods	550	550	560	10.36
Brass tubes	1070	1070	1100	20.35
Black sheets, base, 4 mm.	160	150	160	2.96
Galvanized sheets, No. 20	250	240	235	4.35
Tin plate, standard, per case	180	165	175	$7.14

Stereoscopic Eyepiece for Microscopes

A new eyepiece for use on microscopes is being offered by the Bausch & Lomb Optical Co., Rochester, N. Y. With this eyepiece a stereoscopic effect equal to that given by a binocular can be obtained with a monocular microscope. Among the advantages of binocular vision absence of eye fatigue and the well-defined relief of details which might escape one eye may be mentioned.



The Tops of the Eyepiece Caps Are Adjustable for the Eyepoint of the Eyepiece

The attachment is designed so that the axes of the eyepiece tubes are parallel, permitting the eyes to be used with relaxation of convergence, and hence accommodation, as if they were directed at a far distant object. A prism system mounted in the body holding the two parallel eyepiece tubes divides the pencil of light from the objective into two full aperture pencils, and turning them through 90 deg., reflects one and transmits the other. Since placing the new eyepiece upon the monocular microscope raises the tube length to 230 mm., its extension tube has a negative correction lens to compensate for this increase. The two eyepieces are regularly 6.4 x specially matched for this use, and specially matched 7.5 x eyepieces can also be supplied. The steroscopic eyepiece can be used with almost any monocular microscope.

The Inland Steel Co., Chicago, reduced wage rates, effective Aug. 1. Wages for day and tonnage employees are now the same as those which were in effect May 1 to Oct. 1, 1917. Salaries of employees paid by the month were to be adjusted on an equitable basis, according to the announcement by the company. On July 1, the Inland Steel Co. discontinued the basic 8-hr. day, eliminating time and one-half pay and placing production departments on a straight 10 and 12-hr. basis.

Necessity of Proper Cost Accounting

Machine Rate or Production Center Method Stressed—Distribution of Overhead in Bulk or by Department—Why Some Methods Fail

BY J. B. SEHL*

THE primary purposes of cost accounting may be summarized as follows. 1st. To ascertain actual costs. 2nd. To forecast with reasonable accuracy in order to fix future selling prices. 3rd. To reduce costs. 4th. To increase efficiency. From this we begin to appreciate its importance to the manufacturing, selling and administrative departments of the business.

Elements of Cost Considered

Manufacturing costs are made up of three elements: materials, labor, and manufacturing overhead, or burden as it is often termed. In manufacturing there is another overhead burden which consists of selling and administrative expense, and this also has to be considered in addition to the manufacturing cost, before the final cost can be determined, profits calculated and selling prices established.

In manufacturing there can be no production for marketing without combining material, labor and overhead in some proportion to each other. That is to say, in some industries material may be the important element, its fabrication involving little labor; in other lines of industry, this condition may be reversed, the material being unimportant in value but its conversion into finished product involving a large amount of high-priced labor. But, whatever the conditions may be as regards material and labor, the manufacturing overhead expense or burden is as inevitable as taxes and death, its weight very frequently spells success or failure for the enterprise, and its distribution over the product necessitates the employment of accounting principles which are absolutely dangerous unless properly applied.

Direct or Productive Material

The cost of the material of which the product is composed is usually easy to follow, requiring merely an entry for the amount involved. By arranging suitable facilities for the storage of material and its issuance by requisition for consumption, much can be done not only to facilitate the cost accounting work, but to aid those who have the immediate responsibility for the preparation, planning and execution of factory production.

Stock records, so called perpetual inventories, and stock control of material, whether it be finished or unfinished, is good business conduct for the very good reason that it represents money and should be safeguarded as such. Theft is not the only reason why materials mysteriously disappear; waste, spoilage of work are among other reasons. But, whatever the cause, losses of material increase manufacturing costs accordingly.

Expense of Materials in Overhead

Materials which do not form part of the manufactured product, but are incidental in the manufacturing operations, should also be under stock room control. Frequently, materials of this class are expensive and make up a large proportion of the manufacturing overhead, and their consumption is more difficult to account for than the material which goes into the product.

Direct or Productive Labor

Among the several methods of recording and paying for the performance of labor may be mentioned the premium system, or some modification thereof, the contract method, piece work and day work. Whatever the method, the importance of speed and accuracy cannot be overestimated, because this is where direct contact with the workman is involved, and his time card is his bookkeeping system. It is the score card of his performance and, for this reason, the job time card must be planned to give all the necessary information with the highest possible speed, first to the operator and his foreman and without bookkeeping by them, before the time record is incorporated in the cost records.

What the foreman wishes to know, among other matters in connection with time keeping on job order costs, is the success or failure to accomplish desired production, the earnings made, the quantity of good work produced, how much defective work and the reason therefor. It is evident that this information must be given to him quickly, and also to the workmen. They should have this information day by day and not week by week. The foreman is primarily the executive to whom the workmen look for instruction and the settlement of matters affecting their daily work, time, earnings, etc., and he must be in a position to answer questions quickly and also accurately; therefore, neither his nor their co-operation can be expected with any timekeeping arrangement that is an irritant instead of an assistance.

Operatives who are assigned to what is termed "productive labor" are not always producing. For reasons sometimes beyond their control they are subject to "lost time," due to waiting for work, repairs to tools or machines, waiting for material, etc., and this lost time, unlike materials, cannot be replaced. The time keeping arrangement must account for such losses, and it is possible for the accounting system to incorporate the loss in the schedule of accounts, and indicate the amount.

Non-Productive or Indirect Labor

This class of labor, such as foremen and clerks, inspectors, truckmen, repairmen, has practically the same relation to manufacturing operations as expense material, and must be carefully accounted for and accurately distributed, because it frequently is a large item in the factory burden.

Manufacturing Overhead or Burden

A manufacturing business must provide, among other things, miscellaneous materials, machinery to work with and buildings in which to work. There must be power, light, heat, depreciation and various other items of similar nature, and a factory supervisory organization. The cost of maintaining the above represents what it *costs the company to keep workmen at work;* this is over and above the wages paid them and the material used by them for conversion into the finished product.

An examination of the general factory burden of a typical company would reveal expenses of three general classes: First—Expenditures that do not vary with increase or decrease of production, and known as "Fixed Charges," such as taxes, fire insurance, depreciation and interest on investments. Second—Expenditures that vary to some extent with increase or decrease of production and known as "Semi-Fixed Items," such as factory supervision, cost of operating the purchasing and receiving departments, clerical hire in the factory offices, emergency hospital expense, washrooms. Third—Expenditures the volume of which is in direct relation to volume of production and which

*Billings & Spencer Co., Hartford, Conn. Abstract of paper read before American Drop Forge Association at Chicago, June 24.

are usually termed "Variable Charges," such as yard expense, internal transport, inspection, liability insurance, general equipment, repairs and supplies of various kinds.

After the proper determination and classification of the general burden charges, the next step (and most important) is properly to apportion and distribute it over the producing departments or operations. In a large business, which manufactures and markets a varied product, extreme care must be used so to apportion the general overhead charges as to place each kind of product on a basis which is competitive with another producing these goods exclusively.

As an illustration, a business may comprehend the manufacture of iron castings and the machining and assembling of these pieces into machinery for its own use and also for sale; it may also produce forgings to be sold without further processes and it may also machine and heat treat them. To make the forgings it must provide the proper machine tools and fixtures. With such a variety of activities, those directing the policies ought to know if it is cheaper to purchase the castings than to manufacture. The same applies to the forgings, and the provisions for dies, tools and fixtures must have the same consideration. In determining matters of such vital importance, how is an intelligent decision to be made without proper distribution of expense?

Departmental Burden Assigned Where Possible

It is usual to place machinery performing similar operations in defined groups, as separate from operations of different character. Often an arrangement of this kind is called a department and occasionally referred to as a production center. Irrespective of phraseology, it is apparent that machinery and the work performed by it necessitates operating expenditures that are different from expenditures carried by the operation of machinery on some other class of work. Other classes of work may be what is known as bench work, requiring little or no machinery.

For factory accounting purposes, the procedure then is to "tie up" certain expenditures directly to the operations causing the expenditures, as for example: The replacement cost of drop boards is contingent on the operation of drop board hammers and not on steam hammers, repairs to machinery are not to be expected in connection with bench work operations, fuel oil for the forge department would not be a proper charge to the die-sinking department.

Certain work may necessitate certain immediate inspection before other operations ensue, thereby treating this more directly than the inspection which is of general character. Trucking costs may be more excessive in some departments than in others, and the same with lubricating and cutting oils, supply tools, belting renewals, expense materials, power, etc., and it will be noted that most of these charges which can be applied directly do vary, and are closely related to the volume of activity.

Spreading Expense Items Over Product

Assuming the expenditures representing production burden to have been properly classified and distributed over the producing departments or operations, the next procedure is to "cost" the articles manufactured with an amount truly representative of their share of the burden incident to their manufacture. There are commonly used five methods of diffusing expense over product: 1. The percentage method; 2. Man-hour method; 3. Sold-hour rate; 4. List percentage method; and 5, Machine rate or production center method.

The last named method has as its objective the distribution of manufacturing burden "through the machine" rather than "through the man," as do the percentage and man-hour methods. It is becoming recognized as the most accurate of all the methods of expense distribution, because it is a clearer expression of the charges incidental to a particular process or operation. It comprehends more definitely the outlay to which the business subjects itself in providing the means of performing the particular process, and it reflects this expenditure in an hourly or daily rate that is a service charge to the product for the time it consumes in such service.

For the purpose of establishing machine rates it is practical to classify into groups the machinery performing similar operations and call these groups "Production Centers." Processes which are similar and not performed by machinery can be grouped in like manner and given the same terminology; consequently a "Production Center" can be a classification of any similar productive activity, performed with or without machinery, and should include the auxiliary machinery or equipment immediately essential to its operation.

One principal requirement for the fixing of Production Center rates is the more direct application of indirect expense, and considerable "detective work" is necessary to effect this. Visualizing the activities of a manufacturing plant as a whole, we have discussed the expenditures that are fixed, semi-fixed and those that rise and fall sharply with the volume of production.

In review, it is seen that to determine a machine or production center rate, it is necessary:

1. To classify machines or processes into groups of similar operation.

2. To determine the operating costs of groups for a given period.

3. To determine the operating hours of the groups for the same period.

Operating costs, divided by the operating hours, gives the actual cost per hour.

Predetermined Machine Rates Based on Budget

The basis for predetermined rates is the budget, a means by which income and expenditure are related and regulated. The first essential to the operation of rates, based on budget forecast, is to provide means of constant comparison of actual with estimated figures, for without this constant scrutiny the arrangement becomes haphazardous.

The usual method is to provide a detailed statement for each production center or unit, showing the number of machines in the group, the possible hours and estimated hours of activity and any other facts which will make the statement convenient for reference. On this statement are listed the charges incidental to operation and, if the statement is in columnar form, in the first column is entered their estimated costs for the period and, in the second column, the actual costs for the same period. In the third column can be entered the variance between the estimated and actual expenditures. The credit element to the statement is the burden earned, which comprises the amount that is charged to the product, and we now can compare the earned burden to the estimated and actual expense.

If, on analysis of the statement, there exists an excess of actual over estimated cost, this is caused by higher prices for materials, labor, etc., inefficiency or a decrease in activity. If the estimates are higher than the actual costs, this is caused by lower prices for material and labor, higher efficiency or an increase in activity. Recalling the statement that the production center activity has been fixed at a standard which past experience indicates as attainable under normal conditions, and which, if operated at such a standard, would indicate normal costs of product, then any difference between the estimate and the actual activity indicates increased or decreased production.

Present day conditions are marked by a more than usual effort to discount the future, and it is sound business to fix our prices on the basis of what we believe will be the prevailing costs under near future conditions. We are to do this by analyzing and forecasting manufacturing and other costs, and also by recognizing the fact that present day inventories are worth no more than their replacement value.

If this is an economic truth, then the efficacy of the budget for costing purposes is proved, and the accounting arrangement that fails to provide the facilities for such forecast is inadequate and out of harmony with present day requirements.

Some cost finding arrangements have been unsuccessful because they adhere too closely to the prevail-

ing idea among accountants that the principal use of cost finding is to fix selling prices. Most important of all, its uses as an aid to executive control is the opportunity for comparison of costs, order by order, or of actual processes with standard process. The absence of this has caused many cost systems to break down in times like the present, and just when the information is needed most.

If a good planning and production follow-up arrangement is already in operation, the cost work is greatly simplified; on the other hand, intelligent cost work can be made a factor in developing a good planning and production system. Unquestionably there is a very close relation between the two which must not be overlooked, and there has been lack of harmony in this respect. Executives are interested in cost work which produces the desired results without interfering with factory activities; so, therefore, the closer the cost finding and the planning and following up of production are co-ordinated, the less will be the impression among shop executives that their duties consist principally of supplying information to the Cost Department.

Split-Head Rail Failure Shows Rupture*

Differs from a Piped Rail and Is Often More Easily Discovered by Outcropping at Side

ON January 3, 1920, the derailment of a passenger train on the Chicago Great Western Railroad, near Wyeth, Mo., resulted in the death of 1 passenger, and the injury of 79 passengers and 3 Pullman employees. The derailment was due to the failure of a rail, the leaving end of which was broken into a number of small fragments. The receiving end, for a length of



End View of Rail, Polished and Etched with Tincture of Iodine, Showing Relations of Markings in Upper Part of Head, and Origin of Split Head Fracture

23 ft. 6 in., remained intact. The type of rupture displayed was a split-head fracture. A vertical plane of rupture was developed which nearly separated the head into halves, which extended along the length of the rail for a distance of 13 ft. Of this section, 9 ft. 6 in. was broken into small fragments, 32 being recovered.

The rail was 85 lb. weight, A. S. C. E. section, rolled in September, 1904, and laid in the track in October of that year. Its age was therefore 15 years 3 months. It was made of Bessemer steel.

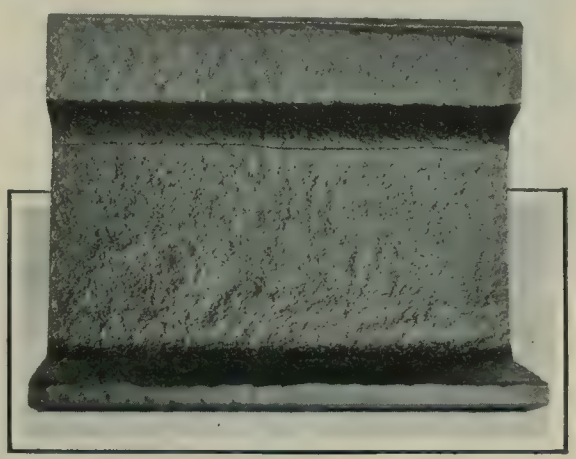
This rail presented a common type of rupture, the characteristics of which are illustrated in the several cuts herewith. In rails with split heads a longitudinal, vertical plane of rupture is developed, located along the middle of the width of the head. The origin of the plane of rupture is an interior one, located about ¼ in., more or less, below the running surface of the head. The shallow zone above the origin of the rupture remains unbroken until the last stages of failure are reached.

In the development of the split head the plane of rupture extends downward until abreast the junction of the head and the web. Here it commonly bifurcates, the branches extending right and left toward the fillets under the head. Final rupture occurs by the complete separation of the halves of the head and their detachment from the web. At the upper initial edge of the plane of rupture a small V-shaped ridge of metal, attached to the upper zone of metal, is frequently found. This acts as a wedge to separate the walls of the fracture.

The incipient point of rupture, in respect to the length of the rail, was somewhere in the 9 ft. 6 in. section, which was broken into small fragments. The characteristics of the metal of the rail were similar along this portion of its length and in the unbroken part adjacent thereto.

One figure shows the appearance of the rail, in cross section, near the fractured portion, after polishing and etching with tincture of iodine. The upper edge of the plane of rupture is characterized by the presence of markings on the end surface revealed by the tincture of iodine. These markings, here viewed on end, represent longitudinal streaks in the steel. They are lines of structural weakness, affecting the metal under crosswise strains.

The split in the head, shown at this stage of development, is much wider at its upper edge than elsewhere. The wedge-shaped rib of metal at its upper edge is forced by the successive wheel pressures between the faces of rupture, thereby increasing the width of the head. The plane of rupture separated below into two branches. One branch extended and reached the periphery of the section at the fillet under the head on the outside of the rail. The other branch extended toward the gage side of the rail, and appears in a partially developed stage.



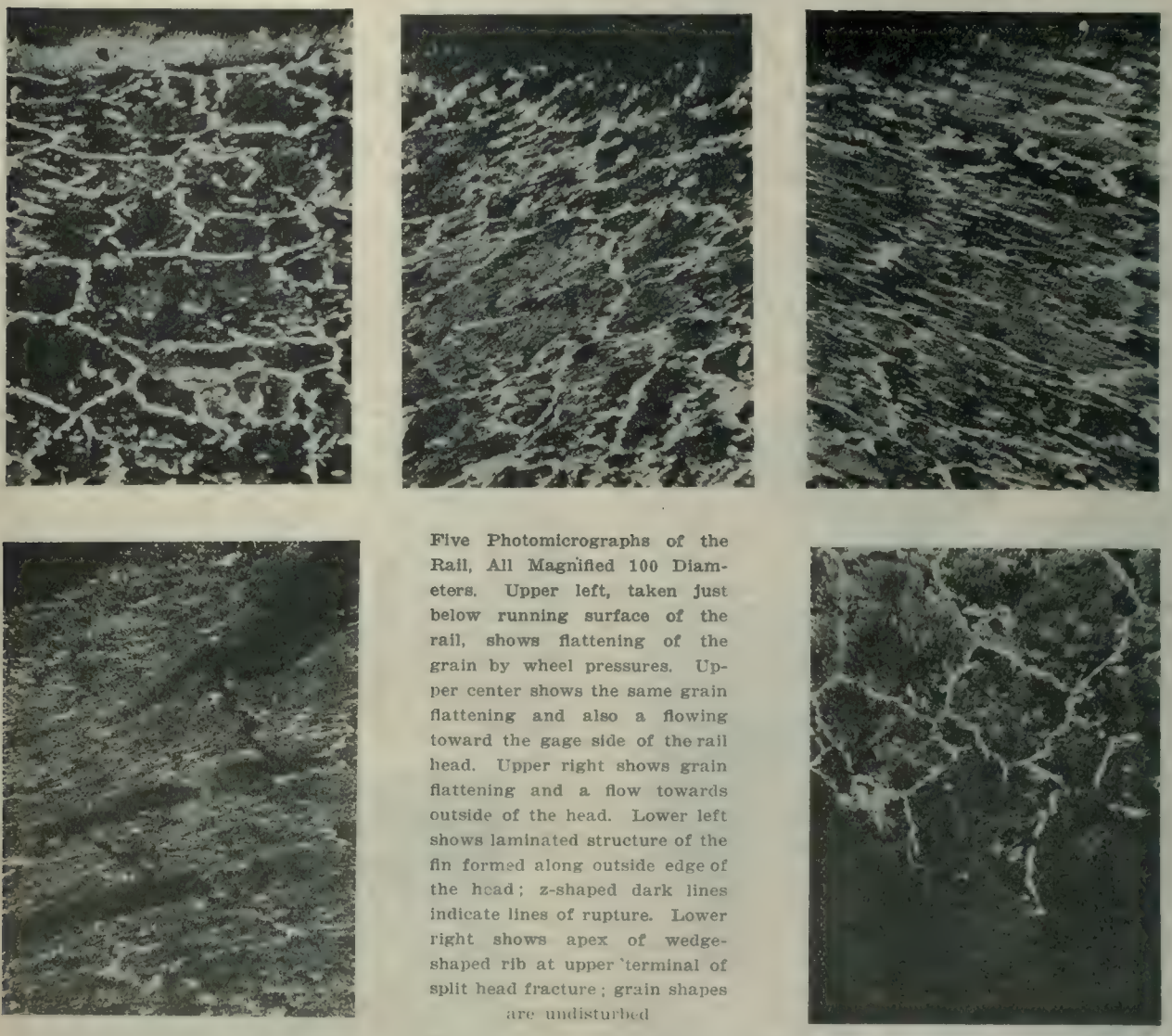
Side View of Rail, Showing Longitudinal Crack at the Fillet Under the Head, Where Split Head Fracture Had Reached the Peripheral Surface of the Rail

In the side view of the rail is shown the line of rupture under the head, which had reached the peripheral surface. Fractures of this kind do not always continue in an unbroken course, but deviate under the influence of contiguous streaks in the metal.

In the study of the failure of steel, attention cen-

*Abstract of report of Dr. James E. Howard, engineer physicist, Interstate Commerce Commission, Washington.

ters upon one principal feature and the relations of subordinate features to the principal one. The principal feature relates to the stress or strain, mutually related factors, which the metal is capable of enduring, and the manner in which limiting values in terms of stress or strain are reached. In plainer language, it is desired to know what loads the steel will carry; what relations the properties of the metal shown under test bear to the endurance of service conditions; whether any part of the elongation displayed in the tensile test or the contraction of area then displayed will be realized in service; whether the ultimate tensile strength of the steel represents a particular value to the rail when in service; whether the ductility clause of the drop test has any real significance; whether the drop test itself has any definite relation to the serviceability of the rail. These and other queries suggest themselves. Chemical composition and finishing temperatures are factors which influence and control physical properties in rolled shapes—established by the laws of nature and not by specifications.



Five Photomicrographs of the Rail, All Magnified 100 Diameters. Upper left, taken just below running surface of the rail, shows flattening of the grain by wheel pressures. Upper center shows the same grain flattening and also a flowing toward the gage side of the rail head. Upper right shows grain flattening and a flow towards outside of the head. Lower left shows laminated structure of the fin formed along outside edge of the head; z-shaped dark lines indicate lines of rupture. Lower right shows apex of wedge-shaped rib at upper terminal of split head fracture; grain shapes are undisturbed

Opportunity occasionally offers to acquire data touching upon some of the above queries. On the present occasion microscopic observations were made upon the structural appearance of the metal of the rail adjacent to the running surface of the head, at the upper terminal of the split-head fracture, and at the lower terminals of the bifurcated fracture. The observations were directed to the distortion of the grain of the steel adjacent to the running surface, where flattening and flow occur immediately, due to the wheel pressures, and noting the undistorted shape of the grains at the split-head fracture.

The metal of this rail was capable of displaying ductile flow. The distorted shape of the grain next the running surface and the formation of a fin along each edge of the head is evidence thereof. At the terminals of the split-head fracture and the apex of the wedge-shaped rib at the upper edge of the split-head fracture there was, however, no appreciable distortion of the grain. At these places, microscopically, evidence was absent of any appreciable permanent set of the steel having taken place. Ductile flow and brittleness in the same rail are here shown, the result of the manner in which the stresses were received. The same is true of other carbon steel rails. Whether any part of the elongation or contraction of area of the tensile test is displayed in service depends upon the manner in which those features are developed.

The depth of the zone of distorted grain was about 0.05 in. Below this depth normal shape of grain prevailed. A feature of interest is raised in this connection—namely, that microscopic evidence is not presented showing a disturbance of the structural state of the metal so far down as the origins of split-head fractures are located. Evidence of a state of internal compression in the upper part of the head does not rest upon microscopic indications, but upon the results of strain gage measurements. In comparing the results of strain gage measurements with the indications of the microscope it has not been made clear that the presence of internal strains of either tension or compression may be recognized with the aid of the microscope. If such were the case the most far-reaching results would come from the use of the microscope in ascertaining the existing states of strain in all kinds of engineering structures.

A plane of rupture may pass into or through a steel member without change in shape of the grain, and therefore without display of appreciable ductility. This has been found true in different grades of steel. The behavior of rails in service furnishes the basis for the

query concerning the value in itself of the ductility clause of specifications. A greater or less display of elongation will take place in steels, depending upon their composition, when tested in such a manner as to permit of the display of ductility; that is, certain steels inherently possess such ability by reason of their chemical composition.

Specifications can enumerate these numerical values, but without changing the results. These remarks are made because the failures of materials are often attributed to lack of meeting specifications, when as a matter of fact the relation between the specified properties and the ability of the material to endure service stresses has not been given consideration. This is a plea for a better understanding of the specific causes which lead to failures, in which those of rails present notable opportunities.

In summation, the failure of the rail which caused the present derailment was due to the presence of a split-head fracture. Wheel loads cause distortion of the grain of the steel and induce lateral flow of the metal at the running surface of the rail, the tendency of such loads being to spread the railheads. The successful resistance to such lateral forces depends upon the structural soundness of the metal in the railhead. Longitudinal streaks are lines of weakness which influence the formation of split-head fractures and locate their incipient points of origin. Longitudinal streaks are due to casting and mill conditions. Their elimination, or reduction in numbers and gravity of development, are matters for the steel makers to consider. The ages at which split-head rails manifest themselves indicate such fractures are of slow and progressive development.

It is a matter of conjecture, although having the appearance of probability, that split-head rails would be unknown if strictly seamless steel were available for rails. The rail problem is intensified by reason of the employment of high wheel pressures. Soft rails display mashed heads; hard rails furnish a large number of transverse fissures.

There is a popular fallacy that split-head rails do not constitute a dangerous type of fracture, since at certain stages in their progress of rupture they may be detected in the track. This detection, however, comes after the necessary margin in strength in the rail has been practically exhausted, and not prior thereto. An element of danger has arisen when split-head rails are detectable in the track. An economic question is involved in the elimination of the causes of split-head failures, since many rails are removed for this cause which are not otherwise unserviceable. Finally, split-head failures should not be reported as piped rails, for they form quite a different problem.

TRADE ASSOCIATIONS

Government to Announce Affirmative Policy Respecting Open-Price Organizations

WASHINGTON, Aug. 16.—Following discussions during the past week between Secretary of Commerce Herbert Hoover and Attorney General Harry M. Daugherty, announcement has been made by both officials that an outline of policy to be pursued regarding open price and trade associations is soon to be published. Secretary Hoover especially has emphasized the need of letting business interests of the country know as nearly as possible what they may do within the law. It is his view that an affirmative rather than a negative policy should be laid down and used as a chart for the guidance of business. Until this is clearly established, it is pointed out that close co-operation between the Government and business interests of the country cannot be expected, because of the uncertainty on the part of the latter as to whether or not they are violating the law in supplying the Government with statistics.

So-called open price and trade associations particularly are interested because they are being asked to aid the Department of Commerce in providing it with data concerning industrial activities. Unless assurance is given to them that they may do this freely, without fear of legal interference, doubt has been expressed that they can be of any great and continuous aid in helping the department. For instance, it has been explained, the Department of Commerce through the initiative of Secretary Hoover, has begun the monthly compilation of commodity tables, giving an outline of business conditions in what is known as "A Survey of Current Business." It has been observed that there were only two trade associations that supplied data for the first number of this document, issued under date of July 1. The inference has been that associations generally have refrained from a more active participation in the work in the absence of assurance that they are committing no breach of the law.

Both Secretary Hoover and Attorney General Daugherty have on several occasions expressed the view that the vast majority of these trade associations are entirely legitimate and do constructive work that is of great importance to the national welfare. They, of course, have recognized that there are exceptions. Investigation by the Department of Justice of these associations which are alleged to exist in violation of the law, however, will in no way be an attempt to disturb commercial or industrial activity unnecessarily, according to a statement made by Attorney General Daugherty last Thursday.

"The Department of Commerce," said Mr. Daugherty, "is much concerned about the welfare of business. Mr. Hoover and myself have discussed the situation and we both are anxious to give business reasonable assurance that it will not be disturbed by Government action or legal interference. There are a great number of trade associations and organizations of business that are of much benefit to business in general. The majority of these organizations are desirous of doing the right thing. There are, however, some which, under guise of trade associations, go beyond the point permitted by law.

"Prices are fixed in an illegitimate way and illegal things are done and camouflaged," Mr. Daugherty continued. "Representatives of several organizations have come into the department and agreed to work in harmony and quit what might seem to be questionable practices. I want to say, of course," added the Attorney General, "that in taking this matter up and discussing it directly with representatives of the organizations should not lead to the conclusion that the Department of Justice will close its eyes to violations of the law. The administration wants to start right in dealing with business and believes that the present is the time to make the start."

The New York, New Haven & Hartford Railroad has placed an order with the Osgood Bradley Car Co., Worcester, Mass., for eight motor equipped electric zone cars costing $70,000 each, and 14 trailers costing $35,000 each, a total of 22 cars involving an investment of more than $1,000,000. The new rolling stock will be used on the railroad's main line between New York and New Haven, Conn.

In the table of by-product coke plants in operation May 1, 1921, published in THE IRON AGE, Aug. 4, it is shown that 885 Semet-Solvay ovens were under construction at Rosedale works, Cambria Steel Co. This is an error. The correct number is 88. The total number of ovens built or building as of May 1, 1921, therefore, is 11,628 instead of 12,425 as originally published.

Officials of Smith & Wesson, Springfield, Mass., firearms, have announced that the plant, which closed July 15 for a month, will not reopen before Sept. 6. Incoming business does not warrant an earlier opening.

Principles of Modern Rolling Practice*

Discussion of the Great Power Required for Finishing Passes — Phenomenon of Speed-Gain in Rolling

BY E. COTEL†

TO the strong ascendancy of rolling mill practice is due the commanding importance of the iron and steel industry. Beams and railroad rails, those most essential materials in modern life, can no longer be produced in sufficient quantity and quality by forging. The fact that rolling is merely an improved form of forging undoubtedly springs from the complete identity of all the phenomena of the two methods.

Like the spreading in forging, the work of rolling is evidenced by a considerable elongation of the bar, owing in both cases to its contracted section, and by a slight increase of its width. The difference of these two working methods in point of continuity touches neither their substance nor their nature. The difference in fact is only that the constantly repeated hammer blows in forge work coalesce in rolling to a single pressure, so that the periodic advance of the bar is replaced by a continuous automatic feed. By the rolling method merely the periodic interruptions are avoided, and hence we can say that rolling is forging become stationary. Indeed, by a mathematical analogy, we may say that rolling is integrated forging.

In spite of the fact of no theoretical difference between the two processes, the integral character of rolling gives it a huge advantage over forging. Because of the rotary motion and the avoidance of idle periods, that is, for the up and down strokes of the hammer and the free shifting of the bar, rolling has all the advantages of a mass-production method. The past century has well recognized these advantages and so utilized them that the development of the rolling process has been extraordinarily great and important.

*Translated from *Montanistische Rundschau.*
†Chief engineer, Krompach, Czecho-Slovakia.

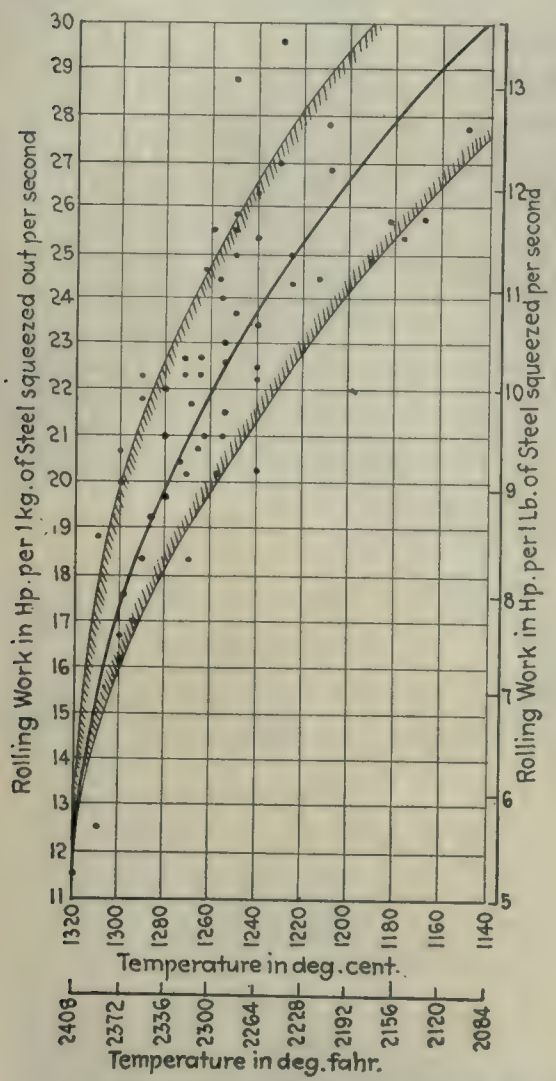


Fig. 2. Recorded Power Characteristics from Experiments of Dr. Puppe:—Rolling in the Gothic Pass

The Power Required for Rolling

In designing a roll train a most important question, not only financially but in point of reliable operation, is the power required—that is, a determination of the

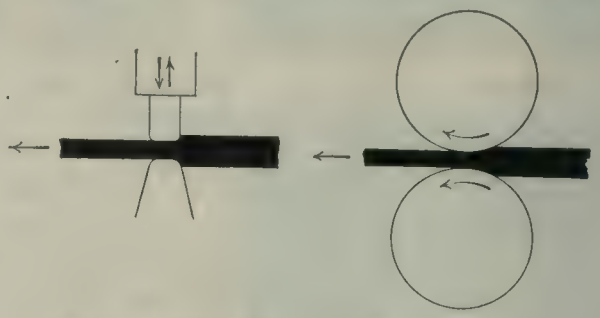


Fig. 1. Analogy Between Forging and Rolling

power for the drive. This question of power consumption was until recently unsolved. Theorists have indeed often tried to determine the rolling work by calculation, but always without practical result, since the power consumption varies too greatly for different roll-groove sections. Even the distinguished work of Dr. Puppe[1] could not solve the problem. The valuable collection of his test results deserves, however, the greatest recognition, because it furnishes a definite starting point to subsequent investigators.

My particular acknowledgment to Dr. Puppe is all the greater because the following simple and certain solution of the problem is based on his experimental data. After the appearance of his work I was of the opinion that a regular interdependence must certainly exist among his data, in spite of the fact that he had not himself discovered it. The graphical expressions of his power-consumption values unfortunately show neither regularity nor logical coherence. Nevertheless I discovered the desired regularity, upon choosing an entirely new way of studying the interdependence.

Rolling-mill work, due to the nature of rolling, can be nothing other than the work of squeezing out a certain mass of metal. Consequently, in passes of similar section and at the same temperature, the rolling work in ratio to a given weight of metal squeezed out per second must always be practically equal. The correctness of this assumption has been completely verified by the results.

Conformably with the foregoing, I have in my investigation[2] converted Dr. Puppe's dubious experimental results so as to support a conclusion that the power-consumption values for grooves of similar section show a substantially perfect equality. Details are given in

[1]Experiments to Determine the Power Required for Rolling Mills, 1919.

[2]For Determination of Rolling Work, *Stahl und Eisen*, 1918, No. 16, page 336.

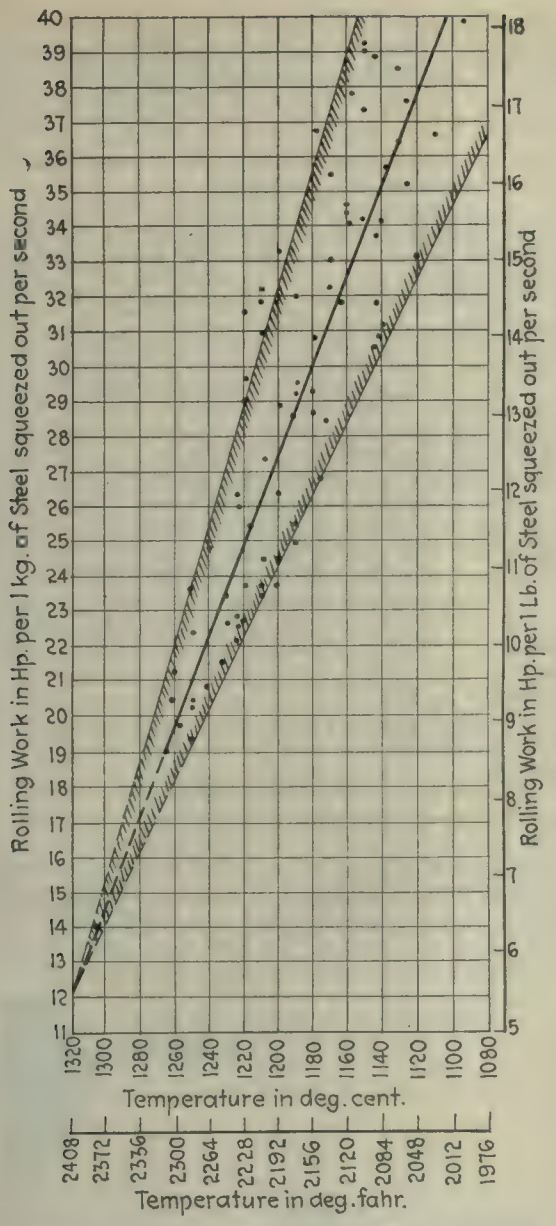


Fig. 3. Power Consumption for Rolling in the Box Pass, from Experiments of Dr. Puppe

the article just cited. Here are brought together in an accompanying table only the values of work determined for the various groove sections.

It is noted that at the commencement of the rolling all the groove shapes consume relatively little power, and that the greatest absolute difference between the power-consumption values for the first passes through the rolls amounts altogether to only 20 hp. In contrast, the power-consumption values for the last passes are decidedly high, and the absolute difference between the power values of the finishing passes is very great.

This phenomenon may very plainly be seen in the graphical representations of the power consumption. It is self evident that for the purpose of determining the driving power needed, only the highest values are actually important. If we take for a unit the power consumption of the Gothic pass, since it is the lowest, we find the other maximum power-consumption values exceed it by the following multiples:

The box pass.....	1.3 times	The rail pass.....	3.7 times
The round finishing pass	1.3 "	The railroad-tie pass	4.1 "
The diamond pass.	2 "	The channel pass..	4.3 "
The flat-oval pass.	2 "	The tee pass.....	6.5 "
The flat-bar pass..	2.2 "	The I-beam pass...	7.6 "
The polishing-roll pass	3.7 "		

Publication of these power-consumption values for the various groove sections, which before that time had been wholly unknown, both absolutely and relatively, soon brought out a letter from the prominent specialist, A. Schöpf,[3] in which he fully confirmed my data and conclusions on the ground of his own experiments.

If we chart these values from experiment or calculation, we get a more perfect picture of the rolling work, and are in a position to draw interesting deductions from the curves. Figs. 2, 3 and 4 show graphically the same data from Dr. Puppe's experiments that were contained in the tables.

An interesting fact shown by the curves in the graphical figures is that the lower limit of the rolling work is practically the same for all groove sections and amounts to about 12 or 15 hp. (metric) for each kilogram per second of metal squeezed out (5.38 to 6.72 hp. per lb. per sec.). That is to say, the curves, extended below the range of the experiments, intersect the line of maximum roll temperatures always at a height of about 6 hp.

Table I

Rolling Work per Pound of Metal Squeezed Out per Second

Shape of Grooves	Lowest Hp.	Corresponding Temperature Deg. Fahr.	Highest Hp.	Corresponding Temperature Deg. Fahr.
Gothic	4.9	2408	13.4	2102
Box-pass	8.9	2307	17.9	1958
Round finishing	...	....	17.9	1940
Diamond	13.4	2161	26.8	1886
Flat oval	...	....	26.8	1958
Flat bar	14.7	2093	29	1814
Polishing roll..	22.3	2113	49.1	1958
Rail	14.3	2210	50	1803
Railroad tie...	18.3	2161	55.4	1719
Channel	24.6	2082	58	1666
Tee-bar	17.9	2071	87	1899
I-beam	13.4	2082	102.7	1744

Naturally, the work consumption increases with falling temperature. While, however, this increase for the Gothic and box passes is moderate, and even the

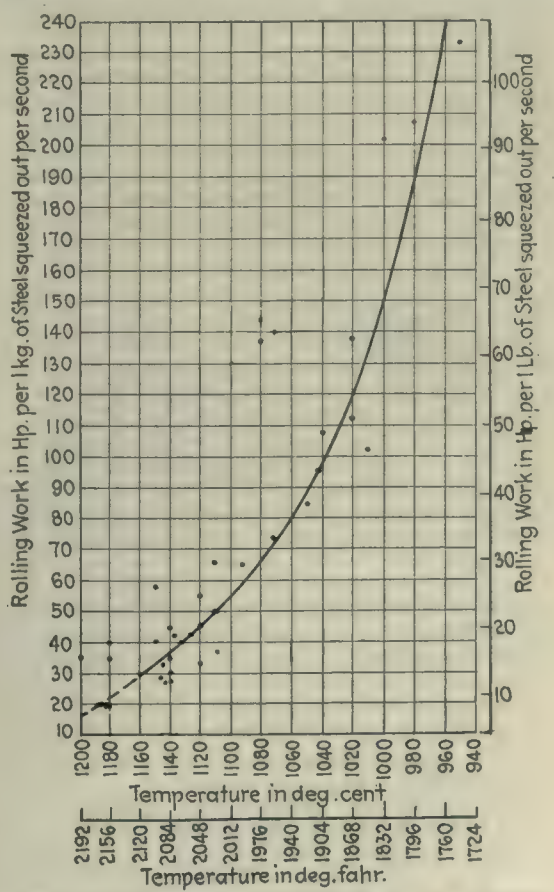


Fig. 4. Characteristic Power Curve for Rolling I-Beams, as Shown by Dr. Puppe's Experiments

[3] *Stahl und Eisen*, 1918, No. 27, page 613.

maximum values for these sections are not very high, the corresponding power consumption for the special sections rises rapidly, and the maximum power values for these grooves are several times greater than for the Gothic and box passes. For the Gothic passes a temperature drop of 40 deg. Fahr. corresponds to an increase of about ⅝ to 1¼ hp.; for the box passes, to about 1¼ hp.; whereas for the special sections it is 4 to 5 hp., even for the first passes, and 15 to 22 hp. for the finishing passes.

This indeed is characteristic of the special sections, as a result of the violent squeezing out in a lateral direction, or in consequence of extending the thin web and flanges, which rapidly cool and hence offer great resistance. Rolling-mill men are daily paying increased attention to the conditions of economical groove design, so that the rolling work, especially in the profiling passes, may be much reduced. But until this is brought about there can at least be no doubt that a driving engine chosen to perform present rolling work must be



Fig. 5. Illustrates the Podhradsky Method of Laying Out Pass Profiles

more powerful than should really be necessary for reliable service; and at all events there is an advantage in having reserve power for a possible extension of the rolling-mill program.

On the Principles of Roll-Pass Design

Successful rolling, exactitude of profile, economical use of power and wear of rolls are dependent upon the form of the grooves, whence it is evident that high importance attaches to the methods of designing them. The very clever and practical method of Chief Engineer L. Podhradszky, of Krompach, for laying out the profile shape, avoids the use of awkward paper templets and substitutes for them a transparent oiled tracing paper so used that it is unnecessary to cut out the shape.

If we draw the outline of a groove with a hard pencil on a tracing paper, and the outline of the proposed roughing (or previous) groove on another sheet, we can superimpose them and thus can precisely observe and judge the working and filling out of the metal which it is intended to produce. The two sheets, laid one over the other on white paper, Fig. 5, lie stretched perfectly flat, do not stick together, do not tear, and they allow both profile outlines to be seen at once. But the chief advantage is the possibility of changing the form with a few strokes. This method is so perfect and simple that everyone who has tried it will use it.

Even the design of the grooving has had no pronounced, recognized rules. For laying out round, box and Gothic passes there are indeed very well-tried and generally familiar methods, but these are almost entirely lacking for the special shapes. Even the best well-known treatises on grooving design mostly handle this subject on the basis of good, well-tested examples, and only to a slight extent on the basis of definite, general rules.

The first rational and correct principle of a theoretical grooving method for the special sections (irregular profiles) has been offered in the notable study of W. Tafel, entitled "New Methods for Calculating Grooves."[*] A further development of Tafel's methods will lead to important progress in the field of grooving. Since, however, the present applications of his idea are quite complicated and tedious, grooving still remains ever a matter of experience and judgment.

The chief rule of all groove design is as follows: The change of shape in the cross-section shall be as simple, as easy, as possible. The more violent the change of shape in a pass,

1. the greater will be the power consumption,
2. the greater will be the wear of the groove,
3. the less will be the chance of correctly filling out in the groove.

Since this fact is established by experience, personal ingenuity will always play a leading rôle in grooving, even should the methods of grooving by calculation be fully adopted in practice. Mathematics is the science of absolutely inflexible figures, and yet there are many mathematical problems which have more than one answer. One solution may be long and complicated, another short, simple and clear.

In proof of this assertion the possibilities in rolling Phoenix rails offer a good example. The Phoenix (grooved) rails are, as generally known, manufactured in such a way that the grooves are channeled in the metal when going through the last two roll passes, by means of small horizontal auxiliary rolls. But this method is very inconvenient for the rolling work, on the one hand because the necessary attachments can generally be inserted in existing roll housings only with great difficulty, and on the other hand because the old driving engines are usually too weak for this rolling work.

The problem of rolling 60-kilogram (121 lb. per yard) Phoenix rails in a comparatively weak reversing mill was solved by forming the horn of the groove like the flange of a beam or rail, and bending it in during the last pass without special appliances. As shown in Fig. 6, *a* is the old and *b* the new shape of the next to the last roll groove. The trial rolling gave a good result and, despite the fact that the matter was never



Fig. 6. For Rolling "Phoenix" Rails, *a* Shows the Section Formerly Used, and *b* the Section Now Used, Immediately Previous to the Last Pass, Which Gives the Final Section Shown at Left

carried out commercially, some years later an English book gave the same solution, this having been employed in practice.

This is evidence that even methods very generally used can be simplified and improved, or that problems in rolling practice almost always have more than one correct solution. The correctness here relates solely to the right shape of the last cross section, since the economy of the various solutions may widely differ.

Confirmation comes also from A. Schöpf, in his discussion of my work, where he remarks: "Cotel says that the rolling work, at least in the profiling passes,

[*] *Stahl und Eisen*, 1909, No. 18, page 651.

must in the future be lessened. Of late I have concerned myself with design of passes for wire and have found that even in this subject, which seemed unqualifiedly a closed one, considerable progress is still possible."

Stretching and Speed Gain [Bar Acceleration] in Rolling

The fact that the stretching or spreading of the metal between the rolls takes place in one direction, opposite to that of the bar's movement, or that the roll cannot perform the stretching forward, but only backward, is of no special significance, and interesting merely because it is a fact first determined a few years ago. These observations and determinations had in the meanwhile been confirmed by Haedicke.[5]

The speed gain [acceleration of the bar to a speed greater than that of the roll circumference] is a very interesting phenomenon accompanying the rolling, the properties of which have not until recently been fundamentally investigated. Following my article, "The Stretching in Rolling,"[6] Dr. Puppe published, in his study of the speed gain, a rich collection of his experimental data relating to it. A single fault in his notable work is that he takes the phenomenon of the speed gain to be altogether a regular one.

There is no doubt that, besides the factors which Dr. Puppe observed, there are several others which have an influence upon the degree of speed gain. To prove this and disclose such factors, I made various experiments in the year 1909, and in my article[7] showed that:

(1) Besides the factors observed by Dr. Puppe, both the amount of lateral pressure and the rotary speed of the rolls exert a considerable influence upon the amount of the speed gain;

(2) The amount of speed gain may vary for a single bar by about 100 per cent;

(3) The speed gain cannot therefore be considered a regular phenomenon determinable with formulae.

Consequently the claim of Dr. Puppe that the phenomenon of speed gain can be utilized in designing the roll grooves is unsound. This, however, is also stated by W. Tafel in his article on the latest methods of designing grooves, already mentioned, although he had made no experiments concerning it.

[5] *Stahl und Eisen*, 1908, No. 24.
[6] *Stahl und Eisen*, 1908, No. 5.
[7] *Bányászati és Kohászati lopak*, Budapest, 1910, No. 7.

Causes of Cracks in Case-Hardened Objects

Grinding Found to Be the Predominating Factor—High Speed of Rotation a Means of Avoiding Cracks and Softening

REVUE DE METALLURGIE for April has a most interesting paper on the reason for the surface cracks so frequently seen in case-hardened objects after grinding. It is by Messrs. Guillet, Galibourg and Beuret. First a description is given of the cracks, well illustrated by photographs, and a review of the literature, in particular the recent paper by Hanson and Hurst before the Iron and Steel Institute. Their conclusion was that if the network of cementite could be suppressed the pieces rejected for cracks would be greatly reduced.

Grinding a Main Cause of Cracks

In order to study the question the French experimenters treated the specimens to prolonged attack in 10 per cent sulphuric acid. This develops cracks which are only latent in the specimens. At least fifteen main factors entering into this question of formation of cracks are given in detail in the paper; but by means of careful observations it was found possible to simplify the matter and not investigate the influence of all of them. It was soon found that the grinding used to dress the pieces to the desired size after treatment was the predominating factor. For instance, in the case of shafts the cracks always form a closer network at the ends where there is most grinding, than in any other part. Plane surfaces, where the wheel works on the flat, crack more easily than cylindrical surfaces. Further, it is a striking fact that the cracked pieces, which are very hard before dressing, may be readily filed after the cracks are produced. This seems to indicate that they have suffered a superficial tempering or reheating which could only come from heating while being ground. These views are supported by the case of a shaft the details of which are given.

Next is a short review of the subject of the cracks formed in the liners of guns, and the theories explaining the cracks produced during erosion as outlined in 1915 by the eminent Russian metallurgist, Tchernoff. These theories the authors believe to be applicable to the present case.

Methods of Prevention

Careful experiments were carried out to determine methods of avoiding the cracks. It was decided to consider only those pieces sound which did not develop cracks after 24 hours in the 10 per cent sulphuric acid. All the experiments were concentrated towards the aim of obtaining the minimum of heating and tempering while grinding to the desired finished size. In a tentative way it was found, other things being equal, that this result was obtained when the piece was turned as rapidly as the arrangement of the machines allowed. It must be understood that the wheel also turns as usual. The theoretical reasons for this are given in detail. Two typical cases taken from the results obtained may be given. Fifty-two cylindrical bars, 14 mm. diameter, of ordinary carbon case-hardening steel were treated, Nos. 1 to 28 to have 0.5 mm. depth of case, and Nos. 29 to 52 to have 1.0 mm. Each of the two lots was divided in two parts, one being reheated at 150 deg. C for 30 min., and the other ground without reheating. Each of these lots was in turn divided and these subdivisions ground to size, one with the piece turning at 120 turns per minute and the other at 500. The striking results of this test are shown below:

Bar Nos.	Depth of Case	With or Without Reheating After Quenching 800—8250 deg. C. in Water	Bar No:.	Conditions of Grinding Speed of Piece, r. p. m.	Results of Grinding After Etching in 10% Acid
1	0.5 mm	Without	1 to 7	120	All cracked
to	0.5 mm	Without	8 to 15	500	No cracks
28	0.5 mm	Reheated	17 to 22	120	All cracked
	0.5 mm	Reheated	23 to 28	500	No cracks
29	1.0 mm	Without	29 to 34	120	All cracked
to	1.0 mm	Without	35 to 40	500	No cracks
52	1.0 mm	Reheated	41 to 46	120	All cracked
	1.0 mm	Reheated	47 to 52	500	No cracks

As may be seen, whatever the conditions of treatment, the pieces are cracked or not depending upon whether the speed of rotation of the piece was sufficient or not.

Results With Case-Hardened Pinions

A second test was made on case-hardened pinions, quenched and ground on the plane surfaces normal to the axis of rotation and on a part of the shaft. These pieces were considered as giving an enormous loss because of the cracks found on the cylindrical surfaces, and more particularly on the faces of the pinion. Photographs are given in the original paper

showing these conditions. The results given in the table below confirm fully the previous results obtained. In this case, also, notwithstanding very different working conditions, the speed of rotation of the piece dominates the question.

Results of Grinding Pinions—All Case-Hardened for 0.8 mm Depth and Quenched in Water at 800 to 825 Deg. C.

Machine	Pinion No.	With or Without Reheating	Conditions of Grinding Speed of Piece	Results
A	1 to 4	With	500 r.p.m.	No cracks
A	5 to 8	With	120 r.p.m.	Badly cracked on the two faces and 15 mm. on the two ends of shaft.
A	9 to 12	Without	500 r.p.m.	No cracks
A	13 to 16	Without	120 r.p.m.	Same as 5 to 8
B	17	Without	One face with new wheel, 120 r.p.m.	Badly cracked
		Without	One face with dirty wheel, 120 r.p.m.	Like 5 to 8
B	18	Without	Both faces with dirty wheel, 120 r.p.m.	Like 5 to 8
B	19 to 20	Without	Both faces with dirty wheel, 440 r.p.m.	No cracks

The tests carried out leave no doubt that neither the depth of the case, nor cold work, nor the presence of cementite in excess is a principal factor in the production of the cracks. It was interesting to see whether heating alone would make pieces crack without the intervention of grinding. For heating the piece very rapidly and on the surface only, the most active of all the methods tried consisted of pouring on the case-hardened and quenched surface molten copper, raised to 1200 deg. C, then cooling the whole with a jet of water, as when grinding. Under these conditions cracks are produced on the surface and are visible even without etching. A photograph is given in the paper showing the cracks brought out more clearly by etching.

The experiments, therefore, lead to the following conclusions:

1. The cracks are due more than anything else to a heating of the metal while grinding.
2. It is possible to obtain considerable cooling with plenty of water and to avoid all cracks by giving the piece to be dressed a circumferential speed high enough (about 400 r.p.m. for pieces 15 mm. (0.591 in.) diameter).

Also the same heating that produces the cracks is the cause of pronounced softening of the surface. In this case also, and for the same reasons, with sufficient speed of rotation of the piece practically all softening is avoided.

G. B. W.

Universal Machine Shop Rule

To aid in solving many machine shop calculations without the necessity for using pencil and paper, R. Poliakoff, 709 Sixth Avenue, New York, has designed and placed on the market a 12-in. rule which contains on its two sides various scales by which calculations can be made by the aid of a pair of dividers. These scales, which are laid out to logarithmic measure, permit the user to solve a number of machine shop problems of which the following are perhaps typical:

Given diameter of bar and cutting or grinding speed, to find the r.p.m. Given diameter of bar and r.p.m. of grinder or lathe, to find the grinding or cutting speed. Given length of bar, number of r.p.m. and feed in inches per revolution, to find the time required to turn or grind the bar. Given depth of cut and feed of machine, to find the volume of metal removed. Given speed and feed of machine, to find the area machined.

As the rule contains both English and metric scales, its use is not confined to calculations. It has a high, white celluloid finish, so that dirt accumulated in the shop may readily be removed.

Rogers, Brown & Co. have been appointed sole agent in the United States for the sale of virgin aluminum, of various grades, produced by the Norsk Aluminum Co., Christiania, Norway. Stocks of aluminum will be carried at New York and Cleveland.

Safety Hooks for Handling Plates

Safety and speed in operation and simplicity of design are features claimed for the Comrie safety hook, designed by Alexander Comrie, Standard Shipbuilding Corporation, Shooters Island, N. Y. It is intended primarily for handling plates, though it is adaptable for piling, railing, piping; it can be made large enough to handle armor plate. The pull or lift can be exerted from any direction. Teeth at the gripping end of the tongue become engaged with the plate, so that if the strain is prematurely released the load will not be dropped.

It is made of a forged steel jaw, a tool steel tongue and BB chain, its weight being about 80 lb. It takes 20 sec. of two men's time, one man at the crane and the other at the hook to lift a 4-ton plate from the racks and place it upon a flat car. Two or more plates can be lifted at a time.



With Teeth at the Gripping End of the Tongue, This Hook Lifts Plates Safely

The standard clamp for plates, as used in shipyards, will lift plates from 1/16 to 1⅞ in. in thickness. So great is the grip that the tongue often has to be tapped slightly to disengage the clamp. It is claimed that the teeth do not mar the plates. The designer states that not an accident nor delay has been traceable to its use.

The Pennsylvania Tank Car Co., Sharon, Pa., has started work on an addition 100 x 400 ft. to its plant at Masury, Ohio, a short distance from Sharon. The additional facilities will afford employment for 400 workmen. The company will hereafter do both repairing and fabricated work at its Masury plant, and tank car parts will be manufactured, as well as assembled. Three miles of railroad tracks will be laid to provide storage for tank cars. The company is likewise installing a similar additional unit at its plant at Argentine, Kan., the structure to be 183 x 300 ft. The expenditure there will be about $150,000.

RAILROAD BILL HELD UP

Improvement in Many Industries Delayed—
—$500,000,000 Issue Is Maximum

WASHINGTON, Aug. 16.—With stimulation of the iron and steel and other industries largely dependent upon passage by Congress of the $500,000,000 funding bill for the railroads, concern has been expressed over the obstacles this legislation is facing. The point has been reached where it seems unlikely that it will be enacted before Congress takes a recess and there is no indication how much time will be required after Congress reassembles. The strongest opponent to the measure is Senator LaFollette of Wisconsin and the tactics he has adopted are largely responsible for the slow progress being made. He has asked that former Directors General McAdoo and Hines of the Railroad Administration appear before the Senate Committee on Interstate Commerce, which, with the House Committee on Interstate and Foreign Commerce, last week began hearings on the bill. The witnesses were Director General Davis and Chairman Meyer of the War Finance Corporation. Mr. Hines is abroad and it will be a considerable time before he can be in Washington.

Meanwhile industrial and financial interests still hope that the measure can be enacted without the delays its opponents plan. As is known, the President is urging its passage, recognizing the importance of such action to relieve the unemployment situation. Mr. Meyer has told the Senate committee that if Congress does not pass the funding bill it will be necessary to make a direct appropriation of $250,000,000 in order to enable the Government to pay the railroads the net balance due them. Members of both the House and Senate committees have received communications from business interests urging quick passage of the bill. Among them is one addressed to Chairman Cummins of the Senate committee by Charles A. Livingston representing the Illinois Manufacturers' Association, urging prompt enactment of the bill "in order that the railroads, industries and all shippers may immediately be relieved, that transportation troubles may be averted and unemployment be lessened."

For General Business Betterment

Both Mr. Meyer and Mr. Davis have vigorously urged quick passage of the bill. The former has spoken of it as a measure for country-wide as well as railroad rehabilitation and vigorously denied that it was a "hand-out" as it has been characterized by some opponents. If it is passed equipment trust certificates running up to $310,000,000 in value which were deposited with the Railroad Administration during its control for the purchase by the Government of engines, cars, rails, etc., would be sold to the War Finance Corporation. The latter would dispose of them in the market gradually. At present these certificates, which bear interest at 6 per cent, are not marketable securities.

Assurance has been given by Mr. Davis that the maximum of funding under the bill would be $500,000,000 and the amount would probably be less. This statement was made in answer to claims by Senator LaFollette that the bill really would authorize the War Finance Corporation to fund or sell over $1,000,000,000. Making a detailed analysis of the railroad debts to the Government for additions and betterments, mostly equipment, furnished the carriers during the war, Mr. Davis said a total of $1,144,000,000 had been advanced for that purpose. For this, it was said, the railroads had given $310,000,000 in equipment trust notes and $70,000,000 had been paid in cash, leaving a balance of $764,000,000, of which $61,000,000 already has been funded privately. Approximately $700,000,000 of the Government advances consequently have not been funded, it was stated, but for various reasons the bill would require funding of less than $500,000,000. Mr. Meyer said that not all of the railroad securities held by the Government would be accepted and marketed by the War Finance Corporation. Only good securities, it was pointed out, will be funded.

Strike Settled on Open-Shop Basis

MILWAUKEE, Aug. 15.—Striking employees of the Hamilton-Beach Mfg. Co., Racine, Wis., manufacturer of domestic and industrial appliances with electric motor power, called off a strike instituted more than a year ago to enforce a demand for recognition of the union. Following a conference between Fred J. Osius, president of the company, and R. G. Knudson, representing the Industrial Commission of Wisconsin, striking employees held a meeting and decided to declare the strike off.

On Aug. 1, 1920, between 750 and 800 employees walked out when the company enunciated the "open shop" policy. Since that time more than $2,000,000 in wages has been lost to strikers, according to conservative estimates. Suits involving $1,200,000 in damage claims resulted. The company brought suit against union labor organizations for damages, while the unions retaliated with counter suits demanding damages for alleged false arrest and personal injuries. There were numerous riots and at one time when an appeal was sent to the Governor for State troops for protection of the plant, the sheriff was ordered to appoint 100 deputies to preserve order.

An official statement signed by "The Former Employees of the Hamilton-Beach Mfg. Co." says: "The men and women who were former employees of this company, after carefully considering the sacrifices that had been made financially fighting for their cause and also that it would be for the best interest of the community to have this affair settled, are willing to accept the proposition of Mr. Osius."

A statement by the company said in part: "This company believes that its interest, as well as the interest of every employee, are best and most honestly served by maintaining an open shop. We stand for the principle of the open shop in which union and non-union men may work without molestation or being forced to join any organization. We pay wages and maintain shop conditions which compare very favorably with any other manufacturers in our industries. This company is glad to discuss matters appertaining to proper working conditions and fair, clean treatment, and expects in return just what every good workman knows is due the company. No employee or class of employees needs the help of any outside agitator to correct conditions in this shop. The employment office of this company is now open. Applications will be received by mail or at the office. The company will open its factory just as soon as sufficient employees apply for work so that it can operate."

DETROIT, Aug. 13.—During the week ended Aug. 2 the 79 plants of the Detroit Employers' Association had 118,803 men on their payrolls. This was an increase of 1231 over the preceding week. There were 11,083 men working on part time, with an average week of 36 hr. This compares with 12,728 and 35 hr. for the week ended July 26. The number of men employed for the week was about 64.5 per cent of the number employed by the same plants at about the same time last year. Production, according to all reports, in these plants has mounted considerably about 80 per cent of production last year at this time.

July wage disbursement of $3,323,982 by Youngstown, Ohio, industries is the lowest in three years, reflecting manufacturing stagnation, irregular employment and unemployment. It represents a decline of $440,234 from the June payroll and compares with $6,402,521 paid in July, 1920, a loss of $3,078,539. The exceeding low rate of steel mill operations during the period represented accounts for the small distribution.

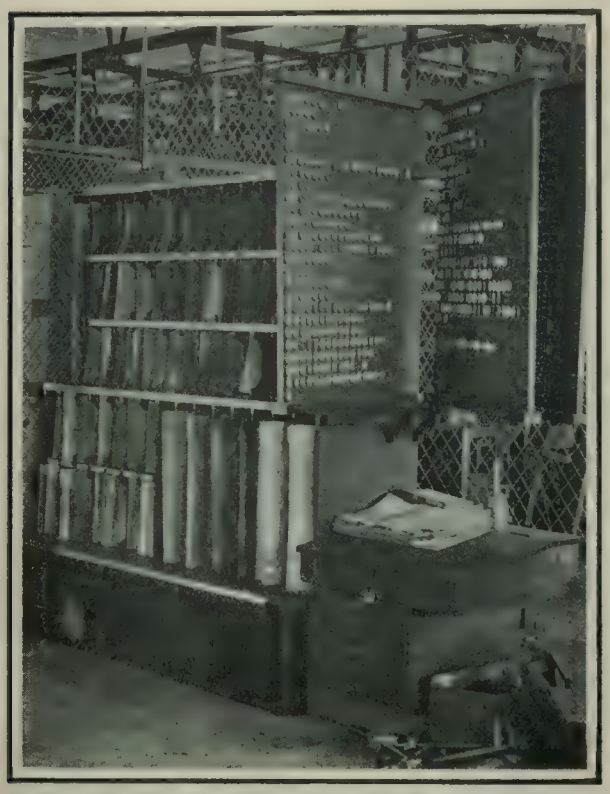
Among the speakers at the annual convention of the National Implement & Vehicle Association at Chicago, Oct. 12 to 14, will be Herbert Hoover, W. P. G. Harding, governor of the Federal Reserve Board, and Henry C. Wallace, Secretary of Agriculture.

CONTROLLING BLUEPRINTS

How Engineering Department Maintained Correct Drawings and Money Was Saved

BY H. M. FITZ*

Blueprints have been mounted in one form or other for shop use for many years, but in a large shop where hundreds of blueprints are made and issued daily, costs are watched closely and any suggestion that is made to improve conditions with a possible increase in cost is questioned. The management of a motor truck company went to the trouble to find out what mounting the prints costs, and what is saved by so doing.



Cabinet Provides for Three Sizes of Blueprints, Which Are Mounted on Cards, and Checks Are Used for Keeping Track of Withdrawals

In a shop that is not entirely a one-product shop but doing different kinds of work, it is necessary that the blueprints be placed in the shop in the most substantial way possible. Sometimes the engineering department loses control of the drawings and blueprints the minute they leave the drawing room by not properly listing and checking the number of each that goes to the shop. The fact that blueprints are still engineering property and are merely loaned to the shop to use is overlooked. Any corrections or changes should be recorded by the engineering department.

For example, an experience is recalled of finding four blueprints (spoiled work caused the search) that were issued at four different times with certain dimensions changed each time, but the unchanged prints were not taken care of either by correction or collection. Others were found with changes in dimensions made by some one in the shop. The engineering department had no record of changes being made. Suggestions from the shop are practical and necessary, but with proper control the responsibility should rest on the engineering department.

Checking out blueprints in the shop helps to decrease the loss. For instance, if a print drops behind a tool box or a bench, it is not likely to stay there if there is a check on it. The system helps to locate prints in case of changes during process and reminds the user of returning it to the proper place.

The average blueprint costs about 21 cents to produce. A shop that receives a daily average of 195 blueprints has an expense on this account of $40.74. In this case, it was found that 50 per cent of the blueprint work was replacement of shop-worn prints rendered unreadable from handling and misuse. Spoilages occur from oil-stained and creased blueprints, adding to the manufacturing costs, so the management stopped this replacement work—not only by mounting them on cardboard and shellacing—but placed an eyelet to hang up a print, providing in addition a hook at each machine and bench for that purpose. A cabinet was built to take care of three different size prints that have been standardized, also boards placed book fashion with the drawing numbers in numerical order and hooks for checks.

The additional cost amounted to 7 cents per blueprint, making a total cost of 28 cents. By reducing the 50 per cent replacement, or 97 blueprints, the possible saving is $97 \times 21 = \$20.37$ per day, and seems worth while from a cost standpoint alone. In addition the general appearance of the shop was improved and the saving gave the blueprint boy more time for making records.

*McVicker Engineering Co., Minneapolis.

Foundries Agree to Report Pig Iron Stocks

Out of 1050 members of the American Foundrymen's Association using pig iron, 450 have thus far agreed to co-operate with Secretary of Commerce Hoover by supplying monthly a report of pig iron on hand at the end of the month and pig iron used during the month. Only three firms have expressed themselves as averse to giving out such information. The poll of the membership of the association was decided upon by the board of directors following a conference on iron and steel statistics held in the office of the Secretary of Commerce on May 18, at which W. R. Bean, president, represented the association. The sentiment of members was sounded not with the idea that such statistics would be collected by the American Foundrymen's Association, but rather to ascertain for Secretary Hoover what firms would be willing to supply his department with the desired information. The results thus far are regarded as highly satisfactory and further replies from members are looked for.

The Tank Car

Under the above title, the Pennsylvania Tank Line, Sharon, Pa., has issued a paper bound book of about 150 pages, with comprehensive index, which gives an immense amount of information regarding the use of tank cars, the rules of railroads with regard to tank cars on their lines, regulations for the transportation of inflammables, mileage allowances, safety appliance standards, specifications for tank cars of both the American Railroad Association and the Master Car Builders' Association, car accounting records and specifications of cars made by the company. The work is so complete in all the details under the headings listed above that it must be of great benefit to both shippers and other users of tank cars, as well as the railroad systems over which they operate. In the rear of the book are given a number of general tables and drawings showing such items as capacities of cars for varying depths of contents, details of safety valves, heating coils, sill construction and other matters connected with the construction and equipment of the cars.

Foundrymen's Association to Publish Monthly Bulletin

The first issue of a monthly bulletin to be published by the American Foundrymen's Association has gone to press. The bulletin will be 6 x 9 in. and will contain eight pages. Its purpose is to keep members advised of the progress of committee work between conventions, to record any other association news of importance, and to call attention to important articles in the technical journals, by publishing abstracts from those papers. C. E. Hoyt, secretary-treasurer, Marquette Building, Chicago, is the editor.

Use of Cupolas in Open-Hearth Practice

Melting High Silicon and Other Pig Iron Continuously and Supplying Hot Metal to Four 60-Ton Basic Furnaces

BY V. W. AUBEL*

IN Bessemer steel making before the days of direct metal and mixers, continuous cupola operation was the dominant factor in production. The prevailing practice was to have several of these cupolas in reserve to allow for repairs, relining, etc., so that the supply of hot metal would always be sufficient for the converters. But even in Bessemer practice the run of a cupola was seldom more than six days, the mill as a general rule being shut down from midnight Saturday to midnight on Sunday of each week. Some large foundries operate heavy-duty cupolas, but as a rule they are in operation continuously for only 10 hours of each day, the bottom being dropped each night.

The use of cupolas for supplying hot metal to basic open-hearth furnaces is probably not a practice in steel plants of any size, and certainly it cannot compete with the use of mixers and direct metal where a blast furnace is a unit of the plant. Nevertheless, for basic open-hearth plants which use cold pig charges, not having a blast furnace as a unit of its plant, it might be of advantage to premelt in the cupola. A great many factors necessarily enter into the desirability of using such a process but, as an example of what may be done in an emergency, this article may be of some interest.

The following letter from the author accompanied this article:

"I was very much interested in an editorial paragraph in the July 14 issue of THE IRON AGE, *in which you quote from an article in "Foundry." It is recommended that the lime charge in the cupola be regulated more after the practice followed in burdening the blast furnace, and in this way eliminate considerable of the sulphur in cast iron scrap. I wish to add my testimony to this recommendation, as I know from actual experience that it is possible not only to desulphurize to a considerable extent in the cupola, especially when the sulphur content is abnormally high, say 0.100 per cent or over, but also to desiliconize to a very great extent by using larger quantities of limestone than is usual in cupola practice. Although not a cupola or foundry expert, having followed blast furnace work all my life, yet I had at one time several years ago to melt some 20,000 tons of miscellaneous pig iron in the cupola. My experience gained over several months of very heavy-duty cupola operation led me to think that a great many cupola operators are not obtaining the purifying effect from their cupolas which it is possible to get simply by adding the proper amount of limestone and maintaining a proper slag.*

"My interest in this matter has influenced me to inclose a small article which covers my experience in this line. It was written just previous to the war and may contain some portions which are of interest."

The steel plant in which the following run was made consisted at the time of only one blast furnace and four 60-ton basic open-hearth furnaces with the necessary coke ovens and mills, but with no hot metal mixer. During a forced temporary shutdown of the blast furnace for repairs the management was faced with the necessity of using cold pig charges for the open-hearth furnaces. Something like 20,000 tons of pig were available, which had mostly all been stocked by a magnet crane in one large pile, no effort having been made to sort the different grades. This iron ranged in silicon from 0.50 to 6.00 per cent. Previous practice with cold pig heats had not been very successful from the standpoint of time. They invariably ran from 18 to 20 hr. against 10 to 12 hr. for the hot metal heats. A great deal of the loss of time with cold iron was due to the difficulty of regulating the ore and lime in the open-hearth charge when the silicon content of the cold pig was not known. The heats invariably either melted "soft" or high carbon and time was lost in recarburizing or oreing down as the case might be. The variable silicon content of the pig also caused a great deal of delay due to erosion and eating away of furnace banks and bottoms. When a patch of high silicon was struck for the charge, the result was that the furnace not only melted "high" and the heat was a long one, but very often the banks and bottoms would require repairs and more loss of time resulted. The yield from hot metal heats was also found to be from 2 to 5 per cent higher than with cold stock.

Two large spiegel cupolas had just been completed and it occurred to the management that under the circumstances it might pay to use these for supplying the open-hearth with hot metal. Aside from the increased yield and gain in time of heats it was thought that the uniform grade of metal resulting from the remelt would save much of the delay on banks and bottoms. In other words the cupolas were to perform all the functions of a mixer.

The cupolas are very strongly built on four columns imbedded in brickwork. The base is a cast steel circular plate with heavy double drop doors. They are 30 ft. high from base to charging floor, with a shell diameter of 9 ft., and working diameter of 6 ft. The slag notch is 3 ft. from top of drop door, with the wind box 7 in. above this. The wind box contains 40 tuyeres each 3½ in. in diameter, placed in four rows. There are eight manholes in the bottom of the wind box and all of the tuyeres except eight, where the blast pipe enters the box, are accessible through small plate covered handholes with eyesights. Two manholes are provided for access to the hearth. Blast is furnished through a common blast main 24 in. in dia. by a No. 8 Green rotary blower, belt driven by a triple expansion high-speed steam engine. Butterfly valves control the wind for each cupola.

Adapting the Cupolas for Heavy Duty

As the capacity of the blower or the efficiency of the charging arrangement were not known, a trial run was made with one cupola. The situation of the cupolas gave only a very limited stockyard. The charging was by hand with small unweildy 2-wheeled hand buggies similar to what is used for hand filling blast furnaces. These buggies would only hold 1000 lb. of pig or about 250 lb. of coke and only one buggy could be raised to the charging floor on each trip of the elevator. A very small tonnage only could be handled in this way so the buggies were discarded and a system of narrow-gage tracks installed. Two different gages and two sizes of 4-wheeled side tipping trucks were made use of. The small 18 in. gage trucks would hold

*Blast furnace superintendent, Midvale Steel & Ordnance Co., Coatesville, Pa.

2000 lb. of pig, and the large 2 ft. gage trucks used for coke would hold 600 lb. A large flat sheet was fixed at the foot and in front of the elevator and both gages of tracks let onto this sheet which, kept always well oiled, allowed either size of truck to use both elevators. A steel plate charging floor and large openings into the stack made these trucks very suitable for handling on top. The pig and coke were filled directly from the cars into the small charging trucks.

The original arrangement shows how each cupola tapped from its own spout into a common ladle, which was spotted on a recording scale underneath the tapping platform. The slag notches were on the rear 120 deg. away from the tap hole and the slag was allowed to run through holes in the floor onto the ground. As a considerable quantity of slag was anticipated, this arrangement was reversed to allow the use of a steam dumping blast furnace slag ladle. New tap holes were cut almost underneath the old slag notches and a large Y runner built with brick. The leg of the runner was a brick-lined steel spout. New slag holes were cut directly over the old tap holes and the slag run through the floor into the ladle.

Operation

After the alterations, as mentioned, were made, both cupolas were prepared for blowing in. After the drop doors were put up, all cracks were well luted with fire clay; then a 6-in. bottom of dry ground fire brick was well rammed with a slope to the tap hole. The tap hole and breast were made up of tar and burnt dolomite well rammed into place. A hole, 2 in. in diameter, was left for slagging. The second and fourth rows of tuyeres were bricked up, as the capacity of the blower was hardly sufficient for maximum production. A wood fire was started in each cupola by inserting wood through the manholes and the addition of some kerosene oil from the charging platform. More wood was thrown in from above and then a couple trucks of coke were added until the bed was about a foot above the tuyeres. When the coke was glowing on top, the manholes were bricked up and the cupolas charged full. The bed was of 5000 lb. weight and on account of the high ash content of the coke, it was necessary to charge some lime with this bed, otherwise the first slag would be so viscous that it would adhere to the hearth. It was found to be of vital importance to get a good hot free running slag from the very first and in our practice we used burnt lime for the bed and the initial charges. The blowing-in charge was as follows:

6 Trucks coke (600 lb. each).
15 Shovels burnt lime (20 lb. each).
2 Trucks coke.
8 Shovels burnt lime.
4 Trucks pig iron (2000 lb. each).
2 Trucks coke.
8 Shovels burnt lime.
4 Trucks pig iron.
} 2 charges made cupola half full.
3 Charges { 2 Trucks coke. 14 Shovels limestone. 5 Trucks pig iron.

Charging commenced on hot coke bed at 7 a. m.; blast was put on at 10.30 a. m. and first tap was at 1.00 p. m. Both cupolas were filled and blown in together. About 140 r.p.m. was the capacity of the engine giving the blower 90 revs. and 16 oz. blast pressure at the cupola. The cupolas were tapped every 20 min. into a 30-ton blast furnace iron ladle. It took about one hour to fill a clean ladle. Coke breeze was used liberally on the surface of the metal to prevent skulling. When the ladle was filled, it was taken by the engine, weighed and delivered to the open-hearth department, and another ladle placed for filling. Three ladles were kept in service. It was necessary for the cupola foreman to keep in very close touch with the steel melter so as to supply the hot metal at the right time. Three 8-hr. shifts were worked and an engine was in attendance at all times to handle the hot metal and bring up stock to the cupola yard. The pig was loaded by magnet in the open-hearth stockyard and the coke used from trucks just as it came into the plant yard. The slag ladle was dumped once each day.

Considerable trouble was experienced keeping the small tuyeres open. It was necessary for one man almost to spend his entire time punching them open with an iron bar. By using tin cylinders instead of steel pipes for tuyeres we were able to increase the diameter from 3½ to 5 in.

One of our first troubles to overcome was the tendency of the slag notch to become greatly enlarged due to the cutting action of the slag. We were unable to keep the hole built up with anything, so we finally hit on the idea of using a blast furnace cinder notch cooler or "monkey," as it is called. These are cylindrical copper water jackets with a 2-in. center hole for the flow of the slag. When inserted into the hearth jacket of the cupola flush with the outside and held firmly with braces they gave first-class service and eliminated all of our slag notch troubles.

We next found that our tap hole and breast would only last about 24 hr. and we were losing a lot of time each day draining the cupolas and putting in a new breast, besides making the work extremely difficult for the tapper. We overcame this difficulty by using a steel ladle teeming nozzle. These nozzles are about 8 in. in diameter, about 10 in. long and have a 1.50-in. hole, and are made of first-class fire brick. These were placed so as to be flush with the inside of the hearth and rammed tightly around with dolomite and tar. They had an average life of about 5 days when they had to be changed, the hole becoming too large due to the cutting action of the metal. The life of a lining averaged about 10 days. In all 5 different runs were made over a period of about 2 months. The operation was very irregular, a great deal of time being lost waiting on the open-hearth furnaces.

It was doubted at first whether the two cupolas would be able to supply sufficient metal for the four furnaces and it was expected that a large proportion of scrap would be used in the charges, but after the first day the original hot metal charge of 50 tons was adhered to. Even then the cupolas were on blast only on an average of 18 hr. out of each 24 hr. of possible operation. A delay report was accurately kept. An electric signal bell in the engine room was controlled from the tapping floor and both the tapper and the engine driver were required to keep a report of the number of revolutions ordered and the time blast was off. A report of the filling was kept by both the cupola foreman and the top fillers. This report was checked each day against the yard reports of material delivered to the cupola yard. The gross and tare weights of the hot metal ladles were kept by the weigh master and also entered by him on the open-hearth furnace charging sheets. All coke, limestone and pig iron were weighed before being taken to the cupola yard.

The fact that our coke was very high in ash and the importance of having a good liquid slag for successful continuous operation was mentioned before. The analysis of the coke and ash follow:

	Ash	Sulphur	SiO_2	Al_2O_3	CaO	MgO
Per cent	18.2	0.40	49.00	32.70	3.00	0.50

The limestone analyzed:

	SiO_2	Al_2O_3	CaO
Per cent	4.2	0.70	53.1

The regular cupola charge after 8 or 10 hr. was: 1200 lb. coke, 320 to 400 lb. limestone and 14,000 lb. pig. The slag analysis was fairly uniform at: SiO_2, 48.0; FeO, 2.0; Al_2O_3, 16.5; MnO, 5.0, and CaO, 28.2 per cent. With this analysis and figuring for a slag of approximately 50 per cent SiO_2 and 30 per cent CaO, we found it necessary only to add 1121 lb. limestone. As our charge was always between 320 and 400 lb. we were evidently desiliconizing to the extent that 250 lb. limestone would unite with SiO_2 in the above ratio or 208 lb. SiO_2 or 100 lb. silicon, equivalent to approximately 0.80 per cent Si in the pig iron. The analysis of the melted iron was remarkably uniform, always below 1 per cent silicon with the sulphur ranging from 0.50 to 1.00 per cent. Only two or three times did we run into a streak of high silicon pig iron, and then we were always careful to add more limestone. On one occasion at night two 40-ton trucks of 6 per cent silicon iron were charged by mistake. Only prompt addition of considerable fine fluorspar saved the cupolas

from being hopelessly bunged up with slag, due to it becoming extremely silicious and at the same time very viscous.

Summary of Delays for Total Campaign

Total number of hours	1,575
1st repairs to lining	68 hr.
2nd repairs to lining	51 hr.
3rd repairs to lining	89 hr.
4th repairs to lining	43 hr.
5th repairs to lining	75 hr.
Total delay for lining repairs	326 hr.
Total time blast off waiting on open-hearth	376 hr.
Total delays	702 hr.
Total operating time, or total time blast on	873 hr.

Production Summary

Total iron melted (pig to cupola yard)	13,210 tons	
Metal to open-hearth furnaces (net)	12,191.70 tons	
Metal to foundry	26.60 tons	
Recovery	12,218.40 tons	92.42 per cent
Scrap recovered as ladle skulls	661.53 tons	5.08 per cent
Losses in slag, etc	330.20 tons	2.50 per cent

Summary of One Blast—10 days

Total production, net weight of hot metal	2,601.6 tons
Total coke into cupola yard, actual yard weight	305.8 tons
Melting ratio	8.5 lb. iron to 1 lb. coke
Weight cold pig to cupola yard	2,713 tons
Ladle skulls, actual weights	80 tons
Losses	32 tons

Example of One 24-Hr. Run

Time lost, each cupola	6 hr. 30 min.
Net production hot metal	368.25 tons
Charges:	
No. 1, 29	Charge, 1,200 lb. coke
No. 2, 33	360 lb. limestone
	1,400 lb. pig iron
Melting ratio	About 10 to 1
Rate of melting	21 tons per hour for two cupolas

Considerably better results would have been obtained were it possible to dispose of all the metal the cupolas could melt. Nearly every 24 hr. the blast was off from 6 to 12 hr., sometimes for periods of 5 to 6 hr. each. Under these circumstances it was not safe to burden the cupolas too heavily. These delays were responsible for chilling and building up of the hearth, which was evidenced by the decreased amount of metal in the succeeding taps. The hearths were seldom ever clean after the doors were dropped, the accretions seemingly consisting of both metal and slag. Our greatest difficulty in the operation of the cupolas was in keeping the tuyeres open and preventing irregular melting. Although we were only using 20 out of the 40, and had increased their size to the limit of the shell hole, it was practically impossible to keep the melting evenly distributed. If several adjacent tuyeres were left unattended for a few hours, accretions and shelves would build up on that section of the tuyere zone which often as not would stay there until the end of the campaign, gradually as a rule getting worse instead of better. A blank of coke and several bags of fluorspar would sometimes clean out the melting zone but not always. These obstructions, which were formed, were always preliminary to slower driving and were usually responsible for a considerable loss of iron in the slag.

The writer is strongly of opinion that for heavy-duty work especially, a single row of large rectangular tuyeres with a slightly downward slope is the best type of construction. For this kind of work, also, the wind box should not be built onto the shell, as is the custom in so many foundry cupolas. A form of construction similar to the blast furnace bustle pipe should be followed, with each tuyere having a separate feed from the wind pipe. This allows the use of water to cool any hot spot that might show up on the melting zone. In heavy slagging cupolas, the water-cooled slag notch is no doubt a great help. A cooler with a 2½- or 3-in. hole is preferable. This hole may be reduced with clay to any size desired, the clay also neutralizing the chilling effect of the cooler on the slag. For a tapping breast which must withstand the cutting action of such large tonnages of metal, the fireclay nozzle will probably give the most satisfaction.

Cost of Operation

Going partially into the question of cost and the advantages of the hot metal over the cold stock charges, the cupolas operated on three shifts of 17 men each, comprising:

1 Foreman	$2.50	1 Electric lift operator	$2.00
1 Tapper	3.00	8 Stock men in yard	2.25
1 Assistant tapper	2.50	1 Locomotive driver	3.00
2 Chargemen	2.50	1 Switchman	2.50
1 Engine driver	3.00		

Total about $30 per shift or $90 per day.

As this crew was not engaged during the lining period or a total of 326 hr. for the entire campaign, this leaves 1249 hr. as time actually working or 52 days at $90 per day, or $4,680. This is the labor cost for melting 12,218 tons or 38c. a ton. This compares favorably with the practice at one large foundry with which the writer is familiar where they melt 72 tons per day of 10 hr. Here the charging and handling of the stock is all by hand and the cost per ton is approximately 45c. Adding to this cost of 38c. that of relining, cost of coke, limestone and incidental repairs, etc., brought our total melting cost up to about $1.00 per ton. Without going further into figures, it suffices to say that from the standpoint of the open-hearth department, after careful investigation it was decided that hot metal at any cost of remelting under $2.50 per ton was cheaper than using cold pig charges. To summarize some of the advantages:

The increased yield of steel would more than balance the cupola losses.

The increased production due to quicker heats was such that for one month the production was greater than any previous production when receiving hot metal from the blast furnace in full operation. This was due to hot metal being always available from the cupola, whereas the blast furnace only tapped every four hours and very often an open-hearth furnace would have to wait several hours between casts for metal. The more uniform grade of metal from the cupola was also an advantage.

The saving in limestone in the open-hearth charges due to the lower silicon content of the cupola metal, more than paid for that used as flux in the cupola itself.

The advisability of using cupolas to premelt the pig in basic open-hearth steel plants having no blast furnaces depends so much on local conditions that it could not be advocated as a general rule. Most plants using cold pig and scrap stock are very particular to secure a uniform grade of material, but even then the writer believes that, with a modern mechanically charged cupola, the increased production of the open-hearth furnace from the use of hot metal will considerably more than pay for the cost of operating such a cupola plant.

In 1914 about 89 per cent of the ocean-going tonnage of the world was propelled by engines deriving their energy from the combustion of coal. In 1921 Lloyd's reports that only 72.3 per cent of the (larger) tonnage depends upon coal for propulsion. Steam vessels using oil for fuel have increased from 2.62 per cent of the total to 20.65 per cent. Internal combustion engines now propel 2 per cent of the tonnage—more than four times the proportion prevailing in 1914.

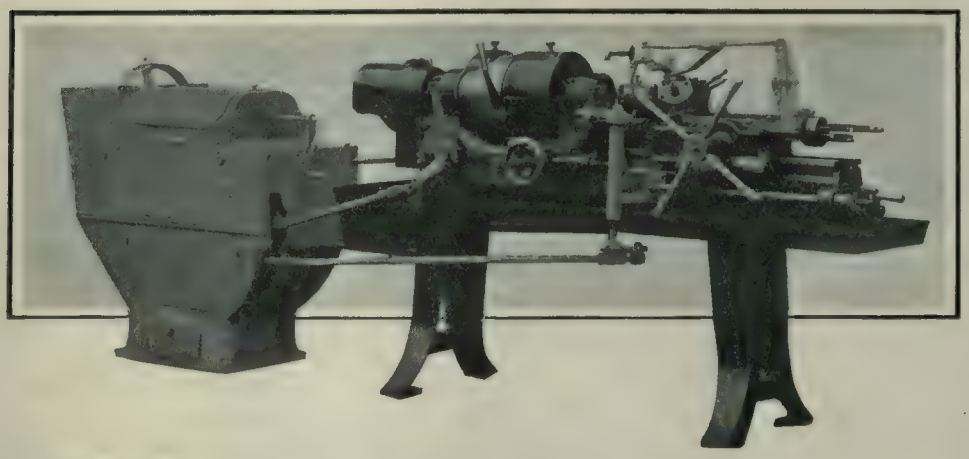
The Wheeling Steel Products Co., sales subsidiary of the Wheeling Steel Corporation, announces that the vacancy created by the retirement of John Duncan as vice-president in charge of pipe and tin plate sales will not be immediately filled. Mr. Duncan's duties with the Wheeling Steel Products Co. have been assumed by other officials of the company.

That pig iron is cheap is no wonder, according to the Pittsburgh *Press*. "THE IRON AGE and the rest of the iron and steel trade journals," it says, "are all right as far as they go, but not one of them has hit on the real reason why pig iron is at the lowest price since 1903, the reason being that it is the only thing not used in home brewing."

Hand Screw Machine Attachment

An attachment called the iron man, for use with hand screw machines and turret lathes, making them fully automatic in operation, has been placed on the market by the Pearson-Scott Co., Indianapolis.

The device is shown in the accompanying illustrations and consists essentially of a disk mounted on a frame and upon which there are flat cams. The cams make contact with rollers on the crossheads that are connected to the ends of reach rods the opposite ends of which are connected to different units on the machine. The attachment is driven through the worm shaft to periphery of the disk as shown. The speed is controlled by buttons placed on the ring gear and a countershaft of special design takes care of speed changes necessary for the various materials worked upon. In case of clogging of the parts or slipping of the belts on the machine a safety pin is provided to prevent injury to the mechanism. The cams are so placed on the disk that operations are performed in the proper sequence, one part being completed at each revolution of the disk. Locating the cams on the disk is a simple matter, as the shapes of the cams are stencilled on the sides of the disk as shown, and holes drilled so that a cam will not fit in any other than its proper place. Twenty cams are supplied with each attachment. The indexing cams are never changed and the reacting cam is intended to take care of coasting in the turret slide.



Cams Are So Placed on the Disk That Operations Are Performed in Proper Sequence. The attachment may be located at either end of the machine. Hand operation is not interfered with and attachment may be quickly disconnected

The iron man may be located at either end of the hand screw machine and may be used for driving simultaneously two machines doing the same kind of work. A stock feed unit is included which is adaptable to any screw machine, making a continuous feed and giving a stroke of 12 in. if desired. This unit is separate and distinct from the attachment as is also the turret lock and die setting unit which automatically locks and unlocks the indexing turret and sets the dies for chasing threads.



The Aluminum Bronzes

R. Guérin, reporter to the French Aluminum Commission, gives a résumé in *La Nature*, Oct. 16, 1920, of the properties, as far as they have been determined up to the present, of aluminum bronzes, or, as the French Standards Committee has decided to term them, the copper-aluminum alloys.

According to an abstract in *Technical Review*, London, reference is made to the pioneer work of Henry Sainte-Claire Deville, and the recent researches of Guillet, Le Chatelier, de Fleury, and others, as well as to the researches on quenching and annealing that were carried out at the French Aeronautics Laboratory during the war by M. Breuil. The photomicrographic examination of forgeable bronzes cast by the Durville process (which gives perfectly sound ingots) reveals the presence of a hard constituent consisting of fine grains, embedded in a plastic mass. Tests made also showed that the fineness of grain of these metals contributed to a reduction in friction, while offering a resistance to wear superior to that of phosphor-bronzes. Under loads which would have cracked or destroyed all ordinary anti-friction metals, aluminum bronze rollers were subjected to protracted running tests without exhibiting appreciable wear. These alloys are also excellent conductors of heat, while retaining their mechanical properties at high temperatures. At 350 deg. C. a 90:100 bronze gave a tensile strength of 50 kg. per sq. mm., an elongation of 15 per cent, and an elastic limit of 31 kg. per sq. mm., the latter having slightly increased with the temperature. These alloys are non-magnetic, which makes them suitable for use in certain parts of rotors, where a high elastic limit is required.

The resistivity of a 10 per cent aluminum bronze has been found by M. Pécheux to be eight times greater than that of copper, and increases with temperature; at 630 deg. C. the figure for resistivity is doubled, and it approaches that of German silver.

It has been decided in France to mint coins of small denominations of aluminum bronze for issue by the Chambers of Commerce in place of the small notes now in use.

How the United States Steel Corporation organizes for safety and some of the concrete things done by it to attain it is outlined in an article entitled, "Safety Where the Bessemer Blows," by Louis Resnick, which occupies first position in the August issue of *National Safety News*. It is illustrated by 16 photographs and charts. The expenditures of the corporation for safety have increased from $595,649 in 1912 to $1,420,456 in 1920, the record year. As an illustration of how far the corporation will go to make safe conditions, mention is made of the window cleaner's track and cars, and other runways, built near the roof of a building in the National Tube Co.'s plant at McKeesport at a cost of $50,000.

Characteristics of Foundry Cokes and Slags

Analyses, Units of Value and Tests — Analyses and Value of Fluxes—Slagging— Nature of Slags and Value of Melting Process

BY Y. A. DYER*

COMMERCIAL coke is manufactured in the old-type "bee hive" oven and in the new-type "by-product" oven. The coking principles involved apply to both forms of manufacture—expulsion of gases from bituminous coals and "fixing" of the carbon residuum. That is, driving off by heat the rich hydrocarbons in an atmosphere from which air is practically excluded, and concentrating the amorphous carbon of the coal. The two forms of coking materially differ by reason of the methods employed as to gas disposal.

In the manufacture of beehive coke the rich volatile gases are permitted to escape from the oven into the open air, while the by-product or retort process reclaims these gases and condenses them into a tar and liquor form. By subsequent series of fractional distillation and concentration, valuable by-products are obtained from the tar and liquor in the form of creosote, sulphate of ammonia, benzol and other organic compounds and combustible gas.

A coal which contains less than 20 per cent volatile matter does not, under present coking methods in use, "cake" or fuse properly—hence is classed as non-coking coal. Should it contain more than 30 per cent volatile matter the porous structure of resultant coke will likely be so great that its wall structure will be too weak effectively to sustain or carry metal charges; or will at least permit a too free burning away of coke bed at the zone of fusion.

The presence of free (uncombined) or inherent (combined) sulphur in coals vitally determines their suitableness for the manufacture of coke—especially for foundry use; that is, whether the sulphur is largely mechanically free and volatile—in the form of iron pyrites (FeS)—or whether mixed in the ash in the form of calcium sulphate ($CaSO_4$). If the former condition prevails, much of the sulphur may be mechanically washed out of the coal at the mines, or volatilized in the oven and burned to SO_2 gas. Some sulphur may remain in the coke from this reaction as iron sulphide, but usually the major portion of the sulphur present will be disseminated in the coke ash as calcium sulphide (CaS), as a residue from the heat reaction on the gypsum ($CaSO_4$).

Typical Coke Analyses

Following analyses represent (in percentages) a fair average of chemically satisfactory foundry coke—(BH) representing beehive coke and (BP) by-product coke:

	Fixed Carbon	Volatile Hydro-carbons	Moisture	Ash	S	P
Eastern:						
(BH)	87.25	1.48	0.77	10.50	0.80	0.017
(BH)	88.00	1.00	0.50	10.50	0.80	0.018
(BH)	89.00	1.50	0.74	8.76	0.75	0.016
Western:						
(BP)	89.51	1.03	0.75	8.71	0.67	
(BH)	83.00	0.95	0.25	15.80	0.65	
Virginia:						
(BH)	91.54	1.70	0.25	6.51	0.70	0.002
(BH)	87.56	1.36	0.56	10.52	0.62	0.007
Southern:						
(BH)	89.15	1.32	0.35	9.18	0.65	
(BH)	88.00	1.07	0.60	10.35	0.75	0.030
(BP)	87.87	1.14	0.39	9.56	1.00	0.030

Both the quality and the effectiveness of coke may be expected to reflect the chemical and physical factors of the coal from which produced and the mode of its manufacture. It is particularly true in the South that the generally satisfactory foundry cokes are produced in the beehive oven. There seem to be exceptions to the rule in some sections. Mixtures of certain West Virginia and Pennsylvania coals produce a high-grade by-product coke. However, it would seem that there are certain superior physical and chemically combined constituents (as yet inexplicable) present in beehive coke for foundry use.

Possibly one of the basic causes of these virtues may be due to the fact that the coke is permitted to "ripen" or mature under cumulative moderate conditions which prevail during the coking period in the beehive oven, rather than being forced to yield to drastic influences in the superheated and rapid coking retort oven. In other words, it would seem that the carbonization and cementation processes are more uniform and complete under moderate conditions prevailing in the beehive oven.

Peculiar Characteristics of Coke

Some foundrymen are prone to condemn coke from outward appearances. Carbon deposits, in the form of "soot" or dark, "stringy hairs" are often classed as "jamb" coke or black ends. The writer has had numerous analyses made of such substances and in each instance the carbon content of the coke was 92 to 93 per cent. "Rusty" spots on coke are often classed as an indication of high sulphur. Their presence is traceable to iron oxide in the coke ash. Some cokes "clinker" freely and have a tendency to "gum" and interfere with the circulation of gases. This condition is controlled by the constituency of the coke ash. An ash low in alumina, and high in silica and iron oxide (iron silicate), will have a low melting point by reason of the basic effect of the iron oxide.

According to Richards, a typical iron silicate (Fe_2SiO_4) has a melting point of 1904 deg. Fahr. An ash high in alumina, high in silica and low in iron will have a high melting point. Any material increase in iron oxide and lowering of silica and alumina will lower the melting temperature. According to Richards, again, a typical iron-aluminum-silicate ($Fe_3Al_2Si_3O_{12}$) has a melting point of 2093 deg. Fahr.

Following analyses of coke ash are typical and illustrative of the varying composition of ash as related to fusibility. It will be noted that the nearer the ash approaches the composition of a typical aluminum silicate—54.2 per cent silica and 45.8 per cent alumina—the more infusible it will become. The nearer it approaches a typical iron-aluminum silicate—53.6 per cent iron and alumina and 46.4 per cent silica—the less infusible it will become. No. 1 ash is non-clinkering, No. 2 ash is fair and No. 3 ash is clinkering:

	No. 1	No. 2	No. 3
SiO_2	54.67	46.23	46.40
Al_2O_3	41.95	31.93	16.45
Fe_2O_3	Trace	14.54	18.15
CaO	1.82	5.04	11.80
MgO	1.46	2.26	4.63

Units of Value for Foundry Coke

Presence of high carbon and low ash in coke is not necessarily a guarantee that it will prove to be high grade for foundry purposes. These qualities are highly

*Birmingham, Ala.

desirable, but not to the exclusion of due consideration to structure and to undesirable elements. In addition to fixed carbon and low ash, other units of value are wall and cell structure, low sulphur and phosphorus. First grade cupola coke may be expected to possess adequate burden carrying qualities. That is, its wall structure should approximate, by volume, 52 to 54 per cent, and cell structure 48 to 46 per cent.

Charging and melting conditions should vary with the porosity of coke. If the coke should be too porous and weak, relatively smaller charges of metal should be used; if heavier and denser in structure, normal charges should be used. This is reflected in fuel costs per ton of iron melted. The fixed carbon may vary from 87 to 90 per cent; sulphur is not objectionable between 0.65 and 1 per cent; ash may be from 8.5 to 11 per cent. Shatter test should approximate 75 to 80 per cent; compressive, or crushing, test 300 to 400 lb. per cu. in. The constituency of the coal ash, carbonizing and cementation processes will determine the wall structure of the coke; the volatile hydrocarbon content of the coal will influence the cell structure, or porosity, of the coke.

Tests to Determine Coke Characteristics

The apparent specific gravity of coke is the ratio of the whole coke, inclusive of pores, to that of an equal volume of water; real or true specific gravity is based on coke substance exclusive of pores—the carboniferous elements, together with the ash and other constituents. Apparent specific gravity is of most importance, and ranges from 0.80 to 1.25; true specific gravity from 1.25 to 1.90. Hardness test ordinarily ranges from 2.50 to 3, and is a very important test for coke. The kindling temperature of coke is about 1292 deg. Fahr.

A simple method to ascertain shatter test is to place 100 lb. of coke in a metal container, hoist it 6 ft. and drop four times on a firm metal or concrete surface. Put the shattered coke over a 2-in. screen. That portion which does not pass through the meshes of the screen represents the percentage of "shatter."

Compressive or crushing strength is obtained by placing a 1-in. cube of coke in a specially constructed machine and crushing it until it breaks. Pounds pressure to cu. in. is registered by the machine.

The cell and wall structure are obtained as follows: cut 1-in. or 2-in. cubes of coke from a fair average sample, and dry thoroughly by heating. When cooled, carefully weigh and note; then immerse the cube or cubes in distilled water and place under air receiver. Exhaust the air to force the water into cells; remove cube or cubes, weigh again and note. Difference in weight between dry coke and water filled coke, equated to apparent specific gravity of the coke, represents the aggregate cell space; the remaining percentage will represent the wall space.

Fluxes for Foundry Use

Most fluxing materials occur in carbonate form. That is, their elements are in combination with carbon and oxygen. Once heated to their critical temperatures, the carbon and oxygen are expelled, or pass off as carbon dioxide gas, leaving as a residuum an oxide and small percentages of impurities. The oxides form an active base for fluxing and holding in solution, or neutralizing, the harmful effects of impurities which may be present in gangue or slag.

Calcium.—The most abundant form of calcium is the carbonate $CaCO_3$, or lime rock. When pure it is white or gray in color, though impurities of iron compounds and organic matter may alter the shading to red, yellow, blue or black. Calcite is crystalized limestone, and is a pure form of calcium carbonate. Marble is a hard crystaline limestone, and the crushed "marble spalls" are often used to good advantage as a flux. Oyster shells are also very pure calcium carbonate and constitute a good flux. By weight, 56 per cent of calcium carbonate forms the oxide, or effective flux, and 44 per cent is driven off as carbon dioxide gas—decomposition being effected at a temperature between 1500 and 1600 deg. Fahr. It requires 818.7 B.t.u. to decompose 1 lb. of limestone.

Magnesium.—One of the most abundant forms of magnesium is magnesium calcium carbonate ($CaMg(CO_3)_2$), or dolomitic limestone, closely resembling lime rock and marble. By weight, 47.6 per cent of the carbonate ($MgCO_3$) forms the oxide; or effective flux, and 52.4 per cent is driven off as carbon dioxide gas. Decomposition of dolomite is effected at a temperature between 1100 and 1200 deg. Fahr. As a flux, magnesium oxide is 1.4 times more effective than calcium oxide.

Fluorine.—This is the most active of all known fluxing elements; it forms an extremely fluid slag and will dissolve anything. Fluorine enters widely into combination with other elements—especially calcium. In this form it is known as calcium fluoride (CaF_2), or fluorspar. No oxide of fluorine is known. On account of its high expense, compared with limestone and dolomite, its use is very much restricted in the foundry.

Satisfactory Flux Analyses

Following analyses are given as information in checking percentages of desirable and undesirable elements in fluxing materials. Each specimen submitted approximates first-grade in respect to percentage constituency of fluxing elements. The active bases—calcium oxide, magnesium oxide and calcium fluoride—are desirable; the impurities—silica and alumina—are undesirable in large percentages:

	CaF_2	CaO	MgO	SiO_2	FeO and Al_2O_3
Fluorspar	92 to 98	....	...	8 to 2.00	...
Limestone (Eastern)	.....	53.00	3.86	0.82	0.80
Limestone (Eastern)	.....	54.34	0.72	0.70	0.58
Limestone (Alabama)	.....	49.00	8.73	2.00	0.70
Limestone (Alabama)	.....	53.00	1.15	2.10	0.79
Dolomite (Alabama)	.....	31.00	20.50	5.00	3.74
Limestone (Texas)	.....	54.74	0.38	0.28	0.40
Oyster shells	.....	55.00	0.10	0.50	0.15
Marble spalls	.....	54.00	0.20	0.60	0.20

Slagging

Strictly speaking, slag is a fluid or semi-fluid mass of matter which forms at a high temperature, and separates from other matter present according to relative density or specific gravity. Commonly referred to, slag is the dross, scoria or cinder created in the smelting and refining processes incident to the production of metals. By reason of the presence of large quantities of infusible acid matter in the formation of certain slags, it is necessary to supply a basic material to create fluidity, neutralize the acids and hold in solution certain oxides and sulphides, thereby rendering them harmless to the molten metal. Such process is termed fluxing and slagging, and the flux material used is basic in nature; the base and acid neutralize each other. That is, by a series of changes they mutually destroy each other's characteristic properties, and produce a compound known as a salt.

Many foundrymen prefer to ignore the necessity of fluxing the cupola gangue. Inasmuch as all materials charged in the cupola pass into either metallic, slag or gaseous form, it is evident that all the non-volatile matter of the charges, including any rust (iron oxide) from corroded scrap metal, will pass to the slag. It would, therefore, appear very important to form a slag which will have a greater attraction for harmful impurities than the metal possesses. The heat of formation of a cupola slag (calcium-aluminum-silicate) is very high, and for that reason the high heat retained in it serves as a protection to the metal bath in the cupola and keeps the metal hot. It is well to retain a

good portion of the slag in the cupola during the melting process.

Nature of Slags

A cupola slag is essentially a calcium-aluminum-silicate—largely composed of lime, silica and alumina, with small percentages of iron oxide, manganous oxide, alkalies and calcium sulphide. Acid slags are viscous in nature and basic slags are fluid. The presence of a comparatively small amount of iron oxide and iron sulphide in a slag creates a greenish tinge; large amounts create a black viscous slag. Such latter condition is a fair guide to indicate that heavy oxidation of metal has occurred. An effective method of checking oxidation is to have slag analysis determined—especially for ferrous oxide.

In normal working cupolas, iron oxide in the slag should not exceed 7 to 8 per cent; it will vary between 4 and 8 per cent. Iron oxidizes in the cupola chiefly as ferrous oxide and passes to the slag; silicon oxidizes as silicon dioxide; sulphur combines chiefly as calcium sulphide and manganese sulphide; manganese oxidizes as manganous oxide and combines with sulphur as manganous sulphide. Iron oxide and manganous oxide are active bases—hence readily combine at high temperatures with acids present; therefore, if they are not satisfied by acids present in charges, they are likely to attack the silica (acid) bricks, or cupola lining.

Two slags produced under specific conditions have been analyzed. Metal charges for each heat consisted of like material—1500 lb. iron and scrap, 12 lb. of 80-per cent ferromanganese and 150 lb. intermediate coke. For heat No. 1, 30 lb. of limestone was used as flux; for No. 2, 50 lb. of stone. Slag from No. 1 heat was of dark brownish color and viscous in nature; from No. 2 heat it was more fluid and of greenish tinge. For No. 1 heat the coke bed was found to be too low; for No. 2 heat it was normal. Following slag analyses were reported for the two heats:

	No. 1 Per Cent	No. 2 Per Cent
SiO_2	48.10	47.60
Al_2O_3	12.10	16.12
CaO	21.50	22.90
MgO	1.68	1.71
FeO	11.63	7.46
MnO	4.94	5.48
S	0.05	0.15

Metal analyses from these two heats were reported as follows:

	No. 1 Per Cent	No. 2 Per Cent
Graphitic carbon	2.80	...
Combined carbon	0.60	...
Total carbon	3.40	...
Silicon	1.65	1.41
Sulphur	0.072	0.04
Phosphorus	0.74	0.69
Manganese	1.13	1.05

Slag from a highly oxidized heat of metal on the same test was also analyzed, showing ferrous oxide 33.18 per cent (metallic iron 25.80 per cent). Castings from this heat contained prolific blow holes, segregation and cold-shuts. The slag was black and very viscous in nature.

The acid to base ratio in each of the two slags reported above is entirely too high for satisfactory fluxing of sulphur by the "lime route." Fortunately, a low sulphur coke (0.60 per cent) was used and a good percentage of ferromanganese, otherwise the iron would likely have been excessively high in sulphur. An acid to base ratio of 0.90 or 0.92, or base to acid of 1.1 or 1.08, is recommended for effective desulphurization. The following theoretical slag composition will serve as a goal to approach:

SiO_2	32.00 per cent
Al_2O_3	15.00 per cent
CaS	3.00 per cent
CaO	38.00 per cent
FeO	8.00 per cent
MnO	2.50 per cent
Alkalies	1.50 per cent

STRUCTURAL STEEL FAILURES

Unusual Ones Not Due to Fatigue—Krupp Repeating Impact Testing Machine

Peculiar failures in structural steel parts, as well as the results of a special impact testing machine, are discussed in the monthly organ of Krupp's, Essen, Germany, *Krupp'sche Monatshefte*, June, 1920, by two writers, an abstract of which is published by *Technical Review*, London, as follows:

Structural steel parts often do many years' service in the machine or structure, and then suddenly fracture, though there is no evidence of overstressing. Fracture takes place without appreciable deformation, or elongation or reduction of area at the fractured portion. As an example of parts subjected to the stresses associated with this type of fracture, the writers mention the recurring impact or shock stresses of railroad vehicle axles due to the rail joints, the alternating direction of the forces of crankshafts and similar changes in parts of high-speed machines caused by the oscillating masses, or by rotating portions that are not properly balanced. These stresses are generally additional to the tensile (or compressive), bending and torsional stresses which occur simultaneously.

The writers contend that these fractures must not, as is generally done, be regarded as fatigue fractures, because modifications in the structure of the steel, and, consequently, changes in the strength, are caused by these "permanent" or "secular" stresses. The fractures are probably often due to imperfect elasticity of the steel. Thus, taking a bar under bending stress, small permanent deformations may be set up in the outermost fibres, these deformations eluding detection with all present methods of accurate measurement. Where the number of loads involved is small, these deformations are unimportant; but if the loads change very often in magnitude or direction, the result is that fine and scarcely perceptible cracks occur, and gradually progress into the material as the result of further secular stressing. The cracks produced give to the material a certain slight mobility, and the cracked surfaces rub on each other until they are smooth, and, finally, the portion of the section still adhering breaks. Illustrations are given of fractures of this kind taken from crankshafts, railroad and tramway axles, locomotive cranks, etc., showing the smooth portions and the last adhering part. Most of the fractures proceed from notches or acute angles acting as notches, reentering angles, or sudden changes of cross-section.

After referring to the work of Wöhler and others in regard to alternating stresses, which they state only gives qualitative information, the writers describe the repeating impact testing machine used by Krupp's, and the results obtained. The machine has 4.185 metric ton tup, with a normal drop of 30 mm., and is capable of delivering about 85 blows per min. After each blow the specimen is turned through either 180 deg. or through 1/25 of the total revolution, special gear being fitted to the machine for the purpose. A wide range of tests were made with specimens having different forms of notches (round, acute, and obtuse angled), and of different composition; full details of these are given in the paper. The tests made show the relations between the resistance of steels to permanent or repeated stresses, and their yield point. Many of the fractured test-pieces showed the same peculiar structure as the broken part from which they were taken.

Finally, it is stated that machine parts which have been case-hardened, and which are subjected to continuous stresses, show a long life—this result according with the results of the repeated impact test.

The paper contains valuable information for all who have to deal with the suitable designing of parts to overcome the stresses described.

The Kissel Motor Car Co., Hartford, Wis., has added 100 men to its working force under a plan of enlarging production of both passenger and commercial cars. The woodworking shop, which has been closed for several months, also has been reopened.

ERIE LEASES ITS REPAIR SHOPS

Railroad Expects Lowered Costs and Avoids National Agreements

What promises to prove a most interesting experiment is the reported leasing by the Erie Railroad to the Railway Service Corporation of the Erie repair shops at Marion, Ohio. The men back of the Service Corporation are in the main well known manufacturers of Marion, and are members of the Marion Employers' Association, which is an open-shop organization.

It is reported that, upon appearing for work at 7 o'clock Monday morning, the erstwhile employees of the Erie shops were offered their old jobs by the new management, at their old rates of pay. Inasmuch, however, as the Railway Service Corporation is not in any sense a common carrier, its operations will be entirely outside the jurisdiction of the Railway Labor Board, and hence such matters as the long-disputed national agreements, the eight-hour day and various other features which have attended the operation of railroads in the United States for some time, will not necessarily apply under the new regime.

There has already been trouble at Marion, although this antedates the new arrangement, and was caused by the announcement on the part of the Erie Railroad that the ten-hour day would be resumed, overtime would not be paid for Sunday work and each employee should submit to physical examination. Resulting upon this announcement, the force of 400 to 500 men had dropped off nearly half. Consequently it was a much reduced force which came on the new job.

It is said that a plan somewhat similar to that which has been put into effect at Marion has been in vogue for several months in the Erie repair shops at Hornell, N. Y., where approximately 1000 men are reported engaged in locomotive repairing. It is also reported that negotiations are under way which, if successful, will turn over the Silvia, Ill., shops of the Rock Island Railroad to a similar outside corporation for operation.

But it is stated that, if a general tendency along this direction is noticed, the Railway Labor Board may take the view that an effort is being made to sidestep or violate the Esch-Cummins act, under which the railroads are now operating. The new company at Marion has been incorporated, the papers being filed with the Secretary of State at Columbus last Saturday, but nothing was made known of the plan until the men reported for work Monday morning.

To Hold Hearings on Patent Bill

WASHINGTON, Aug. 16.—The compulsory work and patent bill, after coming up in the Senate for consideration, has been referred back to the Committee on Patents, with instructions that hearings will be held on the measure. It is known as the Stanley bill and was introduced at the request of the Secretary of War because foreigners were obtaining inventions relating to American ordnance and selling them to German interests. The patent committee of the American Engineering Council has reported that the bill introduced a dangerous innovation into the law, which was not intended by those who drafted it, and furthermore, it would not obtain the result desired. Members of the patent committee will present their case before the Senate committee.

A 90 Per Cent Duty on Imported Army Supplies

WASHINGTON, Aug. 16.—The iron and steel trade is interested to a certain degree in the resolution passed last week by the House providing a duty of 90 per cent of the original value in the United States on reimportation of army supplies shipped abroad during the war to the American Expeditionary Forces. Most of the material is in France, where much of it, it is stated, after being bought by the French Government, was sold and fell into the hands of speculators, who have been dumping it in this country. While there is considerable steel included in these supplies it is high carbon tonnage, for which there is practically no market here at present and with no prospects that there will be soon, if at all. However, it has been stated by steel men that some of it, such as shell billets, could be used for making axles, reinforcing bars, etc., although perhaps 80 per cent of it, it is estimated, would have to be remelted as scrap. The measure now is before the Senate committee on finance, which will begin hearings on it in a day or so, according to present plans.

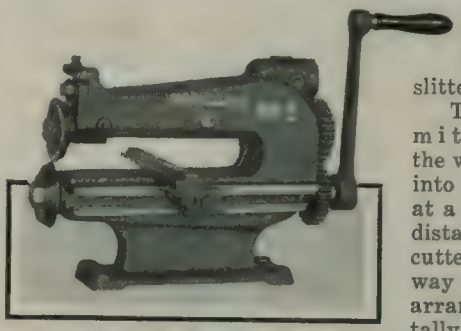
Consolidation of Tractor Plants

The Post-Whitney Co., a consolidation of the Post Tractor Co., Cleveland, the Whitney Tractor Co., Upper Sandusky, and the Chief Motor Co., Port Huron, Mich., has perfected production and distribution plans calling for the manufacture and sale of 30,000 tractors within the next 16 mo. The Post plant at Cleveland will be used to build transmissions. The Chief Motor plant at Port Huron will be devoted to the manufacture of motors for the Whitney tractor. The other parts and general assembly will be done at the Whitney plant at Upper Sandusky.

The officers of the company are: A. B. Whitney, president and treasurer; Harry S. Erd, vice-president and general manager; Ralph Blue, secretary. Maurice F. McCarthy has charge of production and C. E. Grove is manager of distribution, which includes sales, service and advertising.

Splitting Gage for Rotary Shear

A new slitting gage for a rotary sheet metal shear is being placed on the market by the Niagara Machine & Tool Works, Buffalo. The accompanying illustration shows the application of the gage to a No. 2 Niagara slitter.



The Gage Is Set by Turning a Nut on the Gage Block

The gage permits of keeping the work being fed into the machine at a predetermined distance from the cutters. The guideway of the gage is arranged horizontally on the front face of the machine and is integral with the frame. A guide block is movable longitudinally in the guideway and may be clamped thereto at any point. Detachably secured to the upper part of the block there is an angle-iron wear strip arranged transversely of the machine and this fits into an abutment that is made integral with the guide block. When circle and ring cutting the guide block and its wear strip may be quickly removed by sliding them forward until the head of the clamping bolt is disengaged from the guide. Ordinarily, however, it is sufficient to merely slide the gage rearwardly out of the way. There is but one adjustment to make in setting the gage, namely, turning the nut on the gage block. The gage cannot be thrown out of adjustment when accidently moved along the guide and the large area of contact between the block and the guide eliminate the tendency of the block to slip longitudinally after the adjusting nut has been tightened.

The No. 2 Niagara slitter has been recently redesigned and is now ready for the market equipped with the patented slitting gage as shown.

Wage changes in June, in the British metal, "engineering" and shipbuilding industries, affected 350,500 workers, according to *Commerce Reports*, and showed a decrease in weekly wages of £90,850 ($340,700, at $3.75 per £). Thirty-five hundred workers received advances, amounting to £1,350 weekly; 347,000 sustained decreases, amounting to £92,200 weekly.

First Reductions in Iron and Steel Rates

Bearing of Rock Island Action on the General Movement—Carriers Agree to 25 Per Cent Differential on Steel for Export

WASHINGTON, Aug. 16.—Much interest has been shown in efforts being made by the Chicago, Rock Island & Pacific Railroad to reduce freight rates on iron and steel products from the Chicago district to the important implement manufacturing towns of Rock Island and Moline, Ill. The situation is apparently local, but there is the possibility of the movement expanding and bringing down the iron and steel rate structure throughout the country. It is a matter of history that a break in rates in one section often is followed by a widespread reduction. Moreover, there is an increasing disposition on the part of carriers to lower rates voluntarily, recent instances being the decision reached at New York last week in favor of a 25 per cent differential on steel for export and the cut in rates on grain for export from points on Lake Erie. The iron and steel trade is becoming more active in urging rate reductions as necessary to lower costs of production and to stimulate demand. This attitude of producers has been particularly noticeable in and around the Pittsburgh district. Thus the move made by the Rock Island may be an additional influence toward a general reduction in iron and steel rates.

First Reduction Disallowed

The Rock Island has made two attempts in the direction of lower freights. Its first move was checked by the action of the Interstate Commerce Commission last Wednesday in suspending the tariff which would cut rates by approximately 15 per cent on a general list of semi-finished and finished steel products from Chicago to Rock Island and Moline, the tariff having been filed to become effective Aug. 10. The suspension was made on the strength of a complaint of the Illinois Steel Co., made in view of the fact that the reductions first proposed would not apply to Gary, Ind., where the steel company has plants. The reduction was forbidden the Rock Island in connection with the Elgin, Joliet & Eastern Railroad, because of a technical error, the carrier having published rates from Chicago and South Chicago to Rock Island and Moline which were lower than rates from intermediate points, including Gary, Hammond and Indiana Harbor, Ind. This was in conflict with the fourth section of the act to regulate commerce, which does not permit lower rates for a longer than a shorter haul over the same lines in the same direction. Upon notice from the commission that the tariff had been suspended from Aug. 10 to Dec. 8 pending investigation and hearing, because of this violation, the Rock Island made application last Friday to be permitted to apply the lowered rates from Gary and other Indiana points as well as from Chicago and South Chicago so as to correct the error made and to come within the provisions of the fourth section. The present rate on shipments of finished steel from Chicago to Rock Island and Moline, towns which adjoin each other, is 17c. per 100 lb., and the proposed tariff would reduce the rate to 14.5c. per 100 lb., a cut of 14.7 per cent.

The reason for the action of the Rock Island is said to have been that it has been losing business to the Chicago, Burlington & Quincy Railroad, and attempted to place rates on the same levels as those maintained by the latter. In making its proposal, the Rock Island called attention to the fact that the rates over the Burlington are lower than on any other line in Illinois. The Burlington has made one or two efforts to bring its rates up to the level of those on other lines, but for one reason or another the orders of the commission have made that impossible.

Attitude of Commerce Commission

The policy of the commission toward rate reductions has not been as favorable as shippers had hoped. Chairman Clark has written a number of letters pointing out that the necessities of the carriers are so great, by reason of high operating expenses, that even a temporary loss of revenue would be serious. The commission has suspended various tariffs carrying reductions, but at present is not following this policy so closely. After holding the matter up a few days, it permitted Henry Ford to make a reduction of 20 per cent in rates on the Detroit, Toledo & Ironton Railroad, which some traffic men have felt may tend to bring down rates throughout the Central Freight Association territory, even though the D., T. & I. line is not important from the standpoint of mileage.

The need of cutting costs of production and of stimulating business as quickly as possible is back of the movement for lower freights on steel. While recognition is given to the financial needs of the railroads, it also is pointed out that the increased traffic that will be developed by lower rates will result in a greater net return to the carriers. Reductions that have been made bear out this contention and encouragement has been found in the improvement in the railroad situation. Net operating income was $51,778,000 for June, 1921, or $14,697,346 more than in May. The earnings for June, on the basis of the tentative valuation fixed by the Interstate Commerce Commission for rate making purposes, would mean an annual return of 3.1 per cent compared with 2.4 per cent the previous month. Tabulations show, however, that the railroads fell short $47,295,000 or 47.7 per cent of earning the 6 per cent contemplated by the act. June showed the largest earnings for any one month since November, when the net operating income was $54,343,793. Increased efficiencies, together with better control of expenditures, have been an important factor in the improved showing. At the same time significance is given to the fact that the volume of traffic has become greater where rates have been reduced, while traffic carrying rates held to be excessive or rates which it has been proposed to increase further has shown a further slump in movement. Iron ore from the Lake Superior ranges is an example.

Reduced Freight Rates for Export

American steel exporters have probably succeeded in obtaining reduction of 25 per cent in railroad freight rates on export shipments. Efforts toward this end have been made for several months and culminated in a final hearing in New York on Friday, Aug. 12, at which the United States Steel Products Co., the Consolidated Steel Co. and other steel exporters made pleas to representatives of the Trunk Line Association for a 33 1/3 per cent preferential export differential, this being the differential that prevailed before the war. The Trunk Line Association agreed to a 25 per cent differential and its recommendations have gone to the Interstate Commerce Commission, which is expected to give its consent, so that the new rates may go into effect some time between Sept. 1 and 15.

YOUNGSTOWN, Aug. 15.—Iron and steel exports from the Youngstown district will be benefited by a 25 per cent freight reduction agreed upon last week at conferences between manufacturers and the railroads in Chicago and New York. The reductions will affect export business only and the new rate to tidewater ports will be three-fourths of the domestic charge. Details, such as differentials, are to be worked out, after which tariffs will be filed with the Interstate Commerce Commission at Washington for approval. Trade competition in foreign field, chiefly England and Belgium, forced the

reduction, said representatives of the producers attending the conferences.

The Trunk Line Association called the meetings to discuss a "proposal to establish rates on articles of iron and steel manufacture, structural iron and steel, billets, blooms and related articles, pig iron, new iron, steel rails and cross ties, from Trunk Line and Central Freight association territories to Atlantic ports, for export on a basis of 25 per cent less than present domestic rates."

Current freight rate from Youngstown to seaboard is 42c. per 100 lb. on bars, plates and sheets, or 40 per cent above the 30c. rate effective prior to Aug. 25, 1920. Under the proposed 25 per cent cut on export tonnage, the rate will be 31.5c. On billets the present charge is $7, the proposed rate $5.25 and the original rate $5.

Shippers originally urged a 33 1/3 per cent reduction in rates on export steel, a differential which in times past existed between domestic and export tonnage. The proposed reduction will place Valley steel makers on a more favorable competitive basis with foreign makers.

Railroads Need Not Do Interchange Switching Within Plants

WASHINGTON, Aug. 11.—The Interstate Commerce Commission has handed down a decision that the railroad line operated by the Whitaker-Glessner Co. at its steel plant at New Boston, near Portsmouth, Ohio, is a plant facility over which the Baltimore & Ohio and Norfolk & Western cannot be required to perform interchange switching within the plants. The commission also held that placing of cars on interchange tracks within the plant constituted delivery at the industry at the line haul rate. A further holding was that the refusal of the trunk lines to perform interchange switching within the plant or to make in the absence of this service an allowance in money was not unreasonable, unduly discriminatory, or in violation of the fourth section of the act to regulate commerce. In consequence the commission dismissed both the complaint and the accompanying supplement.

Unreasonable Rates on Brass Products

WASHINGTON, Aug. 16.—Making a tentative report in the case of the West Virginia Metal Products Co. vs. the Baltimore & Ohio Railroad, et al, Examiner Henry C. Keane has recommended to the Interstate Commerce Commission a holding that rates on brass sheets, rods, wire and tubes from Fairmont, W. Va., to Flint, Mich., Cincinnati, Detroit, St. Louis and Toledo are unreasonable to the extent that they exceed the rates on like commodities from Pittsburgh. A similar recommendation is suggested as to the same points of origin and destination on less than car lot shipments of copper and brass sheets, rods, wire and tubes. The report also takes the view that the rate on the commodities named are unusually prejudicial in favor of the Pittsburgh competitors of the complainant. Points to which the rates were held to be unreasonable are those in which the complainant hopes to do the most business. Adoption of the report would cut off the third and fourth class differentials of 4c. and 3c. per 100 lb. now imposed against traffic from Fairmont to the destinations mentioned.

The New England Foundrymen's Association held its annual summer outing Wednesday, Aug. 10, at the Pomham Club, East Providence, R. I., approximately 125 attending. Charles T. Colvin, Colvin Foundry Co., Providence, R. I., chairman, and Charles E. Andrews, Whitehead Brothers, Providence, members of the Providence reception committee, met the association members at the New Haven station, where automobiles were taken to the club. A luncheon was served and a Rhode Island clambake at 2 o'clock, C. S. Lovell, Walker & Pratt Mfg. Co., Watertown, Mass., president of the association, presiding.

Foundrymen's Association Prepares Index of All Transactions

The American Foundrymen's Association, C. E. Hoyt, secretary-treasurer, Marquette Building, Chicago, has issued a complete index of the transactions of the organization. As stated in the preface of the index, a vast amount of valuable information has been contributed to the literature of the foundry industry, but its usefulness is seriously impaired by its inaccessibility to the majority of readers. The annual index of the transactions of the American Foundrymen's Association, as well as the volume of indices of the trade papers, afford a means of finding articles appearing in a limited period of time, but are of little assistance to the reader who requires an extensive list of references on a particular subject. Unless a person has unusual facilities at his command the great library of foundry facts is closed to him. For this reason the members of the board of directors in session at Pittsburgh, Dec. 9, 1919, authorized the secretary to engage an experienced librarian to prepare a page to page index of all available volumes of the transaction. The index recently published is the outcome of this action of the board.

In cross-indexing the text matter of technical articles, an effort has been made to include all headings under which the reader might reasonably expect to find the desired information. For instance, reference to a discussion on modern methods of cleaning gray iron castings will be under "Cleaning," "Gray Iron," and "Castings." The tendency was to err on the side of "over-indexing" rather than to cross-index too sparingly. For the convenience of those who identify papers by the names of the writers, the authors' index has been separated from the subject index and appears near the end of the book. The book is 6 x 9 in., contains 190 pages, and is bound in the same style as the annual transactions of the organization.

Revised Federal Tax Bill

WASHINGTON, Aug. 16.—Decided departures from the existing law are carried in the revised tax bill, introduced in the House yesterday, and proposed for passage during the present week, after which Congress hopes to recess till Sept. 19. According to Treasury experts and Republican leaders in the House the measure will yield approximately $1,500,000,000, or about $350,000,000 less for the current fiscal year than would be obtained from the law as it now stands. Supporters of the measure are of the opinion that the amendments drafted will simplify the task of collecting taxes and have made readjustments that are intended to provide a more equitable distribution of the assessments and give relief to the public and to business generally. Underlying the decision to cut the levies are the plans to reduce Government expenditures and by refunding the $170,000,000 of war savings securities and Pittman act certificates coming due, so that it will be possible to lower the Government's fiscal requirements from $4,550,000,000 to $4,034,000,000. Secretary of the Treasury Mellon has estimated that receipts amounting to $857,643,000 may be expected from customs, salvage and other miscellaneous sources, and that $176,357,000 or more will be obtained by reason of the overlapping of receipts collected under the law as now drawn and partly by recovery of back taxes. With this calculation in mind, $3,000,000,000 has been left for collection from the normal income tax, income surtaxes, back collections of income and profits taxes and from miscellaneous internal revenue.

The revised bill authorizes the Secretary of the Treasury to settle disputes over back taxes without resort to the courts. It is proposed to establish a tribunal to pass upon claims and the time for their settlement would be reduced from five to three years, unless extension is ordered by the Secretary. It is the belief of officials of the Treasury that this will make much easier the collection of taxes now in dispute, estimated to total approximately $1,500,000,000.

Advantages of American Valuation Plan

Puts Foreign Sellers on One Footing and Prevents Undervaluation, While Neutralizing Depreciation in Currencies Abroad

WASHINGTON, Aug. 16.—One of the statements submitted to the Senate Finance Committee in connection with the tariff bill is by J. F. Zoller, General Electric Co., Schenectady, N. Y., and relates to the American valuation plan. Mr. Zoller is a member of the executive committee of the American Valuation Association, 304 Madison Avenue, New York, and associated with him on that committee are D. W. Jayne, the Barrett Co.; John A. Matthews, Crucible Steel Co. of America; Charles F. Rockwell, Miller Brothers Cutlery Co.; H. J. Strugnell, Remington Arms Co.; Stanley Williamson, Linde Air Products Co., and others. Mr. Zoller's argument is in large part as follows:

Depreciation of Foreign Currency

"In studying this matter we have prepared some figures showing the value of currency of Great Britain, France, Germany and Japan both before the World War and at present. The table comprising these figures is herewith submitted:

Country	Money Unit	Value in U. S. Money July 1, 1914	July 1, 1921
Great Britain	pound sterling	$4.8665	$3.73
France	franc	$0.193	$0.08
Germany	mark	$0.238	$0.013
Japan	yen	$0.501	$0.481

"It shows among other things that on July 1, 1914, the German mark was worth in United States money $0.238, but on July 1, 1921, the same German mark was worth in United States money only $0.013; that in 1914 an ad valorem duty of 33⅓ per cent imposed upon the foreign value of a German article costing 150 marks would amount to $11.90, but to-day, due to depreciation of the German mark, the duty at the same rate would amount to much less than that.

German Wages One-Third Pre-War

"In 1914 skilled laborers in Germany received about 8.7 marks per day, equivalent at that time to about $2.09. In January, 1920, (I have not the figures for 1921) such skilled laborers received the equivalent of 73 cents per day, which amount if converted into marks at the rate of exchange prevailing on July 1, 1921, would mean about 56 marks per day. Other things being equal, it follows that an article costing 150 marks in 1914 would cost about 7 times that amount, or 1050 marks, in 1921; 1050 marks in 1921 would be equivalent to about $13.65. An ad valorem duty on this amount at 33⅓ per cent would amount to only $4.55, as against $11.90, the duty that would be collected at the same rate in 1914.

"But there is another important factor in the situation. Wages in Germany, measured in terms of United States money, have gone down materially since 1914. In 1914 skilled laborers in Germany received the equivalent of $2.09 per day. In January, 1920, they received the equivalent of only about 73 cents per day, notwithstanding the fact that they received a much greater number of marks per day. In the United States, on the other hand, wages have materially advanced during the same period. This is shown by the following table:

Employment	1914	1920
Bricklayers	$5.59 per day	$9.60 per day
Laborers	2.50 per day	5.58 per day
Carpenters	4.33 per day	8.27 per day
Painters	4.16 per day	8.33 per day
Plasterers	5.44 per day	9.22 per day

Note.—The figures used herein as regards wages here and in Germany are taken from pages 9, 22 and 74 of bulletin entitled "Wages," prepared for the Ways and Means Committee of the House, dated 1921.

"The ad valorem duty, therefore, instead of being made less than it was in 1914, as it certainly would be if imposed upon the foreign value to-day at any reasonable rate, should be made more because of the difference in labor costs between this country and Germany to-day as compared with 1914.

"From the foregoing it seems obvious that an ad valorem duty imposed in 1914 upon foreign value at a rate entirely adequate at that time would constitute practically no protection at all to-day against German importations.

"If we continue the levying of ad valorem duties upon foreign value, me must, in order to get adequate protection against German importations, make the rate so high as to constitute practically an embargo against those countries whose currency has not been much depreciated. In any event protection against Germany to-day under our present system probably means a prohibitive duty against many of the other foreign countries.

Fluctuations in Duty Avoided

"If we cannot impose ad valorem duties to-day as a practical matter upon foreign value and must impose ad valorem duties, then it would seem that the only alternative is to impose such duties upon the American value instead of the foreign value. The American valuation plan has the following advantages:

"1. If our ad valorem rates are applied upon the American value the duty will not fluctuate because of the fluctuation of foreign currency. This is very important, because if we should impose to-day an adequate ad valorem duty based upon foreign value, such duty automatically might become inadequate, due to further depreciation in the foreign currency, or it automatically might become prohibitive should the foreign currency recover.

Advantages to Consumer

"2. The American valuation plan would result in two distinct advantages to the American consumer, which advantages could not be attained if our ad valorem duties were imposed upon foreign value.

"(a) It is a means of securing more revenue from those countries whose costs of production are low than would be secured if the duty were imposed upon foreign value. Under the American valuation plan an article imported from China, for example, would be subjected to the same duty as a similar article coming from England, whose costs of production are much higher. This additional revenue from China and other countries whose production costs are low is secured without imposing a corresponding burden upon the American consumer. The sale of the article from England in this case establishes the price to the American consumer. Imposing more duty upon a similar article from China does not increase that price, but it does reduce the profit of the Chinese merchant and makes it more comparable with the profit of the English merchant. Any tax law that equitably produces more revenue without imposing a corresponding burden upon the consumer is almost an ideal tax law. The American valuation plan, therefore, is of material benefit to the consumer from this standpoint.

"(b) The American valuation plan tends to lower retail prices. At this time I think we will all agree that retail prices are high compared with wholesale prices, the prices of manufacturers and prices of raw materials. By imposing our ad valorem duties upon the American wholesale value we educate the American people as to wholesale values. If the people know the wholesale value they will have some conception of what the retail price ought to be. This will have a tendency to adjust retail prices to the benefit of the American consumer.

Countries Treated Alike and Inquisition Abroad Made Unnecessary

"3. This plan will make it possible to treat all foreign countries alike by imposing the same duty upon

the same article regardless of the country from which it comes. As it is now we discriminate against those countries having the higher production costs in favor of those countries having the lower production costs, so that to-day we discourage the establishment or maintenance of better living conditions abroad.

"4. American valuation will prevent, to a very great extent, undervaluation and make it possible for the Government to collect substantially all the duty prescribed by law. [The statement here quotes from a British authority as to the great prevalence of undervaluation. Some firms have junior partners who are kept ignorant of values, so that they can testify on invoices to the best of their knowledge and belief. The consular check on invoices is merely nominal.]

"5. Lastly, the American valuation plan would make it unnecessary for this Government to carry on foreign inquisitions in an attempt to secure foreign values, inquiring abroad into the private affairs of citizens of foreign countries, much to their disgust and displeasure. Foreign countries resent these inquisitions and they have resulted in the past in no small amount of irritation upon the part of countries otherwise friendly toward us.

Objections Answered

"The foregoing are some of the advantages of the American valuation plan over the foreign valuation plan. We now desire to consider with you some of the objections that have been urged against American valuation.

"1. It has been contended, or at least intimated, by many people in the press and elsewhere that the American valuation plan necessarily results in imposing more duty upon imported articles than would be the case if the duty were imposed upon foreign value. Some of the critics of the schedules in the pending bill have stated that the duty has been increased merely on account of the substitution of American value for foreign value. This reasoning is fallacious and misleading so far as the unsophisticated are concerned. These critics should address themselves to the rates and not to the base upon which these rates are applied and be made to understand that the same duty could be imposed upon the foreign value provided that could be ascertained with any degree of certainty under present conditions. And in order that the public may not be misled, it should be clearly stated that American valuation in itself does not mean more duty or less duty than we had before.

"2. It has been suggested that the American value would be difficult to determine. It is our view that this value would not be so difficult to determine as the true foreign value if we actually got the true foreign value in all cases. If it costs more to administer our tariff law under the American valuation plan than it does under the present makeshift plan which does not secure the true foreign value, it is our opinion that the proposed substitute will be worth much more to this country than it can possibly cost to administer it.

"One Government expert, if we understand his testimony correctly, after emphasizing the difficulties in putting this plan in force, suggested as a substitute for it, a fictitious foreign value. This fictitious foreign value was to be determined by making certain deductions, some arbitrary and some not, from this identical American value. This suggestion would seem to be an admission upon the part of this Government expert that the American value could be obtained at least for the purpose of determining his suggested fictitious foreign value. If it could be obtained for that purpose, it certainly could be obtained for the purposes of the pending bill. Therefore, we do not look upon this witness as one who believes it impracticable to attempt to ascertain the American value. It is our view that if this bill be enacted into law our Government officials without great difficulty will be able to adjust themselves to the changed conditions and will soon become much more familiar with American values than they have ever been with true foreign values.

"3. It has been urged that if the ad valorem rates be applied upon the American value, the importer will be unable to determine with certainty in advance of payment of the duty the amount thereof. Is it not a fact that any experienced business man, be he a manufacturer or a wholesaler, knows at least two things to almost a certainty; namely: (a) the cost of his product, and (b) the selling price? He would not remain in business long if he did not know these things. If we impose this duty upon foreign value to-day there is bound to be grave uncertainty as to the amount of protection afforded American industry. So if we admit that there might be some uncertainty as to the exact amount of duty collectible in isolated cases, we submit that that uncertainty is negligible, as compared with the uncertainty that would result if these duties are not imposed upon a permanent and substantial base.

"4. Lastly, it has been urged that the American valuation plan would result in permitting the American producer to increase the duty against his foreign competitor by increasing the wholesale selling price here. This proposition has been stated another way by saying that this plan would permit the American producer instead of Congress to write the tariff rates. This we think a novel objection. No one ever suggested to our knowledge as an objection that under our present law the foreigner might reduce the duty against his American competitor by reducing the price upon which the duty was assessed, and therefore the foreigner instead of Congress actually write the rates in the tariff bill. And yet, the foreigner is in a much better position to write the rates (if that is what it amounts to), under the present law, than the American producer would ever be under the American valuation plan. If the foreigner can in any way, under our present law, justify a lower valuation, or if he can get the duty imposed upon a lower valuation without justification, the result is directly beneficial to the foreign importer, because it reduces his duty and increases his profit. If the American producer, on the other hand, attempts to raise the duty by increasing the selling price, thereby writing the rates of duty in the law (if that is what it amounts to) under the American valuation plan, the result is directly disadvantageous to the American producer, because the rate of duty being always less than 100 per cent, he, by his own act, puts himself in a position to be at once undersold by his foreign competitor.

"We have endeavored to weigh before you the advantages and disadvantages of the American valuation plan. We believe that there must be disadvantages, because there always are, but it is our sincere belief that the advantages far outweigh the disadvantages. If we are to have adequate protection for our industries and are to be put in a position in this country to maintain the usual standards of living for our American workers, without the imposition of prohibitive duties against some countries other than Germany, it seems to us, as it does to the honorable Secretary of Commerce, that the American valuation plan is the only alternative."

To Survey Asiatic Markets

WASHINGTON, Aug. 16.—A field survey of Asiatic markets for American goods is to be made by Frank R. Eldridge, Jr., chief of the Far East Division of the Bureau of Foreign and Domestic Commerce. Assignment of a chief of division to such a field survey in the geographical area of the world in the economics of which he specializes is a new departure in federal promotion of American foreign trade.

Sailing from San Francisco about Sept. 22, Mr. Eldridge will accompany the representation from the San Francisco Chamber of Commerce that is planning a tour of Eastern markets for the advancement of trans-Pacific commerce. This trade delegation, with Mr. Eldridge, will visit Yokohama and Kobe in Japan, Shanghai and Hongkong in China, Manila in the Philippines, and Batavia in the Netherlands East Indies. Mr. Eldridge will part company with the San Francisco delegation in Batavia. From the Netherlands East Indies he will proceed to India, where a new field office of the Bureau of Foreign and Domestic Commerce is to be established.

Much of Mr. Eldridge's time in the Far East is to be applied to inspection of the work of men in the field for the Department of Commerce with a view to improving their services to American business.

CONTENTS

Cutting Costs in a Drop Forge Shop 385
Trolley System for Handling Work Between Hammers and Furnaces—Features Include Water Reclaiming Plant

Necessity of Proper Cost Accounting 391
Machine Rate or Production Center Method Stressed—Distribution of Overhead in Bulk or by Department

Split-Head Rail Failure Shows Rupture 393
Differs from a Piped Rail and Is Often More Easily Discovered by Outcropping at Side

Principles of Modern Rolling Practice 396
Discussion of Great Power Required for Finishing Passes—Phenomenon of Speed-Gain in Rolling

Causes of Cracks in Case-Hardened Objects 399
Grinding Found to Be Predominating Factor—High-Speed of Rotation a Means of Avoiding Cracks and Softening

Use of Cupolas in Open-Hearth Practice 403
Melting High Silicon and Other Pig Iron Continuously and Supplying Hot Metal to Four 60-Ton Basic Furnaces

Characteristics of Foundry Cokes and Slags 407
Analyses, Units of Value and Tests—Analyses and Value of Fluxes—Slagging—Nature of Slags and Value of Melting Process

First Reductions in Iron and Steel Rates 411
Bearing of Rock Island Action on General Movement—Carriers Agree to 25 Per Cent Differential on Steel for Export

Advantages of American Valuation Plan 413
Puts Foreign Sellers on One Footing and Prevents Undervaluation, While Neutralizing Depreciation in Currencies Abroad

Steel Corporation's Orders Decrease 388
Fire Brick Production 388
Vanadium Production in Peru 389
Pittsburgh Basing Point 389
New Time Study Watch 390
Output of Castings in Steel Works 390
Foreign Market Conditions ..390, 433, 434, 438
Stereoscopic Eyepiece for Microscopes 390
Trade Associations 395
Universal Machine Shop Rule 400
Safety Hooks for Handling Plates 400
Railroad Bill Held Up 401
Labor Notes 401
Controlling Blueprints 402
Foundries Agree to Report Pig Iron Stocks 402
The Tank Car 402
Foundrymen's Association to Publish Bulletin 402
Hand Screw Machine Attachment 406
Aluminum Bronzes 406
Structural Steel Failures 409
Erie Leases Its Repair Shops 410
To Hold Hearings on Patent Bill 410
A 90 Per Cent Duty on Imported Army Supplies 410
Splitting Gage for Rotary Shear 410
Foundrymen's Index of Transactions 412
Revised Federal Tax Bill 412
To Survey Asiatic Markets 414
Editorials 416
Competition and the Open Shop—Future Demand for Metals—Beehive and By-Product Coke—Refining with the Cupola—The Induction Furnace
Refractories Market 433
Industrial Cost Association Meeting 436
Tinplate Exports from Liverpool 436
Metal Schedule Next Week 437
Graphitization in Cast Iron 437
Pig Iron Production in First Half 439
Industrial Finance 442

Iron and Steel Markets 420
Comparison of Prices 421
Prices Finished Iron and Steel, f.o.b. Pittsburgh 435
Non-Ferrous Metal Markets 436
Personal Notes 440
Obituary Notes 441
Machinery Markets and News of the Works 443
New York Jobbers' Prices 450

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Competition and the Open Shop

If there had been an agreement among the steel makers not to furnish steel with more than 0.15 per cent carbon, or among the blast furnaces not to supply pig iron except with a silicon content between 1.75 and 2.25 per cent, or had there been other agreements reducing all steel and pig iron to common levels, the agreements would now break down, for we are in a period of strenuous competition. The blast furnace and the steel mill would seek to furnish the material best suited to the buyer's requirements, would strive to give the customer the best service possible. If there had been an agreement not to sell given classes of material at less than certain prices that agreement also would fail.

The competitive conditions among the sellers of material should and will exist also among the sellers of personal service. The average man, working for a wage, will seek to give his employer the best service possible, to do all the work of which he is capable, and the best work, in the time for which the terms of employment pay him. Nominally he will be working for so much an hour or so much a week, but practically he will endeavor to furnish the best service possible in the time. The open shop furnishes the opportunity. The union shop does not.

If there is insufficient employment for all, the better workmen in a union have employment, but the best are not permitted to do their best and if they were they could not expect to be paid proportionately, hence they may well prefer to work under open conditions. The poorer union workmen get no employment at all, and naturally prefer to sell their services for what they are worth under open conditions.

In 1920 the expression became common, "The higher the price, the poorer the quality." It was not the price that made the quality poor. The condition that caused prices to advance permitted quality to deteriorate. In the new condition, the same influence that reduces the price improves the quality. It must be so with labor or personal service. One cannot conceive of an economic condition that would produce price and quality competition in the sale of goods and not corresponding competition in the sale of personal service.

Can the lines of effort in which unionism has been conspicuous withstand this economic pressure? The lines are three—rail transportation, coal mining and the building trades. Already they are under great pressure, from quite different angles. The men connected with these lines comprise less than 10 per cent of the total number of workers, and the smallness of the proportion makes the cases all the more conspicuous.

As to railroad labor, the Transportation Act lays down seven considerations which shall guide the Railroad Labor Board. Not merely one of these seven, but the first of the seven, is: "The scales of wages paid for similar kinds of work in other industries." As to coal mining, scarcely a commodity is in more general use than coal; and seeing that coal is bought by very different kinds of buyers—by the householder, by the public service corporation and by the large private corporation—each class is able to exert a different kind of pressure if coal is not available at a price commensurate with the cost of other things that are bought. A condition of high prices for coal and low prices for everything else could not be expected to last long.

As to the building trades, if the workers cause building costs to be high and thus bring about a great accumulation of deferred building projects, that will not help them as they vainly imagine. Rather it will cause men to seek and find the way out. Experiences of that sort have been common. Time and again a new device has been put on the market and has sold well. One inquires why the thing was not invented a quarter century ago and the answer is it would not have sold well then. When the demand arises the thing is provided, and if an actual demand of sufficient proportions accumulates for dwelling houses or other forms of construction the way will be found to do the work efficiently and cheaply, without the consent of the bricklayers', carpenters' and other unions, if they have survived to that time.

One of the surprises of the post-war export trade of Great Britain and the United States has been the small demand for galvanized sheets. This is in striking contrast with the course of other products. In 1913 Great Britain's exports

of galvanized sheets were 63,500 tons per month and those of the United States 9500 tons per month. In 1919 and 1920 British exports were 15,500 tons and 34,200 tons per month respectively, or much less than the pre-war rate. In the same two years exports from American mills were 8500 tons and 9000 tons per month respectively, or nearly on a par with the pre-war rate. Thus, while the world demand in 1913 as represented by the exports of the two countries was 73,000 tons per month, it has been only 33,600 tons per month in the last two years, a decrease of about 54 per cent. This marked falling off accounts in part for the existing depression in the zinc markets of the world. There is the other side, however, in the backed-up demand that must have accumulated and that will come out later, for galvanized sheets are almost as staple a commodity as tin plate or steel rails.

Future Demand for Metals

That human demands for metals are bound to increase, as present backward countries advance further and further toward the standards of civilization existing in the United States, was pointed out forcibly by H. Foster Bain in a commencement address before the School of Mines and Metallurgy of the University of Missouri, from which institution the address comes as a publication. Mr. Bain pointed out that the pre-war consumption of copper in the United States was from 6 to 7 pounds per capita; in a country as well developed as France, it was only ¼ pound.

China uses about 100 pounds of coal per capita per annum. "Americans use approximately 6 tons, and other peoples use various amounts between. Generally speaking, the world is learning to use more and more coal, and to substitute the mechanical energy of heat for human labor. The United States is by no means the only country where modern plumbing is appreciated, and as the cult of the bathtub spreads around the world, the consumption of metals will grow. This demand can be supplied only by re-use of old metal or by making addition to the world's stock. Mineral wealth, fortunately, is not necessarily consumed in use. There is wastage, but there is also salvage, and large amounts of old metal are continually returning to use, so much so that important metallurgical processes, such as making open-hearth steel and cement copper are based upon supplies of scrap metal."

It would be idle to attempt to forecast the demands of any now backward country at any time when, in the future, its requirements may approach those now prevalent here. Yet it is impressive to note that a consumption of 6 tons of coal per capita for China's 400,000,000 people would represent nearly double the world's total production in 1920, which is estimated at about 1,300,000,000 tons, of which the United States produced 586,000,000 tons, all of Europe 597,000,000 tons, and the rest of the world 117,000.000 tons. Six pounds of copper per head in China would call for approximately the entire world's 1920 production of copper.

If India were to use, for each inhabitant, the equivalent of the 780 pounds of pig iron per capita produced in the United States last year, India's demand for one year alone would absorb all of the 1920 world's production of pig iron, plus the greater part of the 1921 output. The coming of such a time would cause a drain upon the world's iron ore reserves as now known, that would mean impending famine, despite the ever-increasing re-use of old material as scrap.

Beehive and By-Product Coke

The Geological Survey this week reports the output of coke by the by-product process in July. Shortly after the armistice the weekly reports of by-product coke output were discontinued, although beehive production has been reported to date. Beginning with last June a system of monthly reports was instituted for by-product coke. Production is reported for the two months, in net tons, as follows:

	By-Product	Beehive	Total
June	1,410,000	232,000	1,642,000
July	1,285,000	181,000	1,466,000

The most striking feature of the showing is the large proportion of by-product coke—85.9 per cent in June and 87.6 per cent in July. This is a remarkable proportion, for the two branches of the industry are not far from being balanced in potential capacity. With an average operating rate of 85 per cent, which seems to be the acceptable estimate against nominal rated capacity, the by-product ovens have a capacity of about 36,000,000 net tons a year. Whatever may be the capacity of beehive ovens now in existence, it is a fact that in 1916, the record year for beehive coke, 35,464,224 tons was produced by the process. Instead of there being an equal division in July, however, the proportion was about seven-eighths by-product and one-eighth beehive.

Were it not already well known that the production of pig iron recently dropped to a very low level the smallness of coke production, whatever the process used, would be surprising. The July output, shown above, was at the rate of 17,500,000 tons a year, this contrasting with 56,478,185 tons made in 1916, the record year, and about 51,888,000 tons made last year. The rate of production last month was 31 per cent of the average rate in 1916. The rate of pig iron production with coke as fuel, as shown by THE IRON AGE report, was 26 per cent as large last month as in 1916. The comparison suggests that the miscellaneous consumption of coke has held up better than its consumption in the iron blast furnace, though it is a fact that some by-product coke has piled up.

In 1918, the year of maximum production of bituminous coal and of coke, 14.7 per cent of the bituminous coal produced was coked, while the Geological Survey puts the normal proportion at 15 per cent. In July the proportion of bituminous coal produced that was coked was about 6.9 per cent. The comparison suggests what can be seen by other statistical comparisons, that the iron industry has been more depressed than industry in general.

It was to be expected that in a period of gen-

eral depression the by-product coking process should suffer less inactivity than the beehive process, and the experience of last month, with seven tons of by-product coke made to one ton of beehive, fully confirms the expectation. A part of the by-product production, but only a small part, was forced by the existence of contracts for supplying municipalities with gas from by-product operations. The Steel Corporation, without such obligations, discontinued the manufacture of coke in the Connellsville region some three months ago, while it has shipped large quantities of Connellsville coal to its by-product plants. The market in the Connellsville region has exhibited of late the curious spectacle of the price of by-product coal being higher than the amount that could be realized by putting the coal into beehive coke without charging any fixed expense to the ovens.

While the by-product process seems to make a good showing at the moment, from the long range viewpoint very little has been done. It would be only one step in the efficient use of coal simply to make all the metallurgical coke needed. Eventually the major part of the coal produced should be coked, the coke being used as ordinary fuel.

Refining with the Cupola

The cupola has been generally regarded in the iron industry as simply the cheapest and most efficient melting medium for pig iron or scrap. Recent experience, however, points to its possible use as a refining agent of considerable importance.

Besides the experience referred to in THE IRON AGE of July 14, in the lowering of sulphur by an increased lime charge in the cupola, there has been more recently the use of cupolas by a large steel company for furnishing hot metal to basic open-hearth furnaces, as detailed elsewhere in this issue. In this case the cupolas played the role of the modern mixer or took the place of the blast furnace as a source of liquid metal. The point of chief interest is that it was demonstrated to be possible to take heterogeneous pig iron, some quite high in silicon, and measurably eliminate the silicon, making the iron suitable for basic practice. This was accomplished by the proper use of lime in the charges. There was also a decided increase in the steel output of the furnaces and a saving in the limestone necessary in the open-hearth practice.

The author, in summarizing the advantages, claims that the increased yield of steel more than balanced any cupola losses; that the steel production, due to quicker heats, was greater than when using blast-furnace metal, because hot metal was always available from the cupola. While admitting that the advisability of using cupolas for such purposes depends largely on local conditions, he believes, that "with a modern mechanically charged cupola the increased production of the open-hearth furnace from the use of hot metal will considerably more than pay for the cost of operating such a cupola plant."

This testimony places the cupola in a new light. There are doubtless many plants having no blast furnaces or mixers, but in the habit of making quantities of steel, where pre-melting in cupolas would be of value and where advantage could be taken of the refining possibilities. As the quality of pig iron deteriorates or the contamination of scrap increases, the cupola may be found to have advantages which until now have not been thoroughly appreciated. There is at least the assurance that in its usual role in the iron foundry the cupola may be made to refine as well as melt.

The Induction Furnace

Induction electric steel furnaces have played a small role in the remarkable expansion of the American electric steel industry. Only one furnace of this type may be said to have operated successfully for any considerable time, and this is the furnace developed by the General Electric Co. and described in THE IRON AGE last week. There were over 350 arc furnaces in American plants at the opening of this year. It appears that in the General Electric furnace two radical changes have been adopted which overcome the obstacles to previous attempts with this type in the United States. The placing of the entire primary coil on top is one departure and a vital one, because any breaking through of hot metal cannot harm an expensive part of the equipment. The development of a special refractory is another step in advance. Much depends on the lasting qualities of the lining of induction furnaces and it was the fact that Austrian magnesite could not be obtained during the war which in large measure prevented the use of the two or three induction furnaces in American steel works.

Germany has been and still is the country in which induction furnaces have a prominent place in steel making. This is explained partly by the fact that in the early days an arc furnace was as expensive to install as an induction furnace. It is probable, however, that in the United States the induction type can never compete seriously for general purposes, in view of its first cost, but its field will be in the making of unusual and special high grade steels or possibly in special duplexing operations.

Wheeling Steel Corporation Labor Controversy

PITTSBURGH, Aug. 16.—The executive committee of the Amalgamated Association of Iron, Steel and Tin Workers has declared a strike in all the plants of the Wheeling Steel Corporation. Officials of the labor organization say that this is merely a formal step based upon the rules of the association and was forced, it is claimed, by the fact that the company locked the union men out some weeks ago, following the expiration of the agreement on June 30 between the Amalgamated association and the Whitaker-Glessner Co. and the Wheeling Steel & Iron Works.

The Wheeling Steel Corporation officials, it seems, declared some time ago for the open-shop principle and at the Atlantic City and Columbus, Ohio, conferences between the sheet manufacturers and the Amalgamated association, to fix the wage scale for the year ending June 30, 1922, the Wheeling Steel Corporation's subsidiaries were not represented. It has been said that the Amalgamated association made the demand that the Wheeling Steel Corporation sign the scale as a unit, thus covering all subsidiaries, among which is the Labelle Iron Works, which has been operated as an open shop. The Amalgamated officials deny this, claiming that they merely asked for a renewal of the agreement covering the plants of the Wheeling Steel & Iron Co. and the Whitaker-Glessner Co., which previously had been operated as union mills.

CORRESPONDENCE

Proposal to License Business Men

To the Editor.—The suggestion put forward in your issue of July 14 by Mr. Alvan T. Simonds, president of the Simonds Mfg. Co., which urges that no man shall be allowed to engage in business, at least in business involving a capital larger than a certain fixed amount, without passing an examination and securing a license (as the doctor and the lawyer are now required to do), and that no one should be allowed to participate in making laws unless he has proved in some way his fitness to grasp conditions to meet which the laws are being made—the suggestion strikes me as impractical. What we need is not more regulation but less interference with business on the part of the State.

Let us analyze for a moment the very thing that Mr. Simonds puts forward. "The State," he writes, "does not allow men to practise law or medicine without a license, but it allows any man who can secure the proper amount of capital or credit to enter upon a business venture involving not only himself and his future but also the future welfare of thousands of others. When a company employing 30,000 men and women fails because of poor management, due to an ignorance of fundamental economic laws, something has happened that society should not allow."

Doctors and lawyers and certain of the highly trained professions require, for their proper training, a certain amount of knowledge which can be obtained only from the study of books, and then rarely in any other way than by attendance at a proper institution of learning. In the case of doctors, and in a less degree in the case of lawyers, the life of the individual is at stake, and the State, very properly, requires that there shall be at least a minimum of knowledge.

In the case of a business man, however, does anyone suppose that any Tom, Dick or Harry can secure "the proper amount of capital or credit to enter upon a business venture" of any size without having his experience, character and references carefully investigated? Furthermore, the companies employing 30,000 men are few and far between, and such companies, and even much smaller companies, are almost universally managed by boards of directors who have definite obligations imposed upon them by law. The executives of such companies, moreover, are selected by the directors because of their supposed fitness for the task. In other words, while we have to-day no guarantee of fitness granted by any State licensing board, there is a constant weighing and examining going on by judges who are far more competent than any that the State could hire, namely the banks and credit departments from whom accommodation is asked, the various directors of the company, and, further, the stockholders themselves, beyond whom, in the case of the larger corporations, is the court of public opinion. All of these things act as checks on mismanagement. It is freely granted that notwithstanding all of these checks, cases of mismanagement are frequently and constantly arising, but to think that these cases can be cured by any State licensing device is absurd. Let us take a few concrete cases:

Some years ago the Westinghouse Electric & Mfg. Co. failed. Could this failure have been averted by asking Mr. George Westinghouse to pass an examination and take out a license from some State board? Or is it conceivable that Mr. Westinghouse could not have passed such an examination?

Within the memory of all of us, the New York, New Haven & Hartford Railroad was considered one of the prime investments, and we all remember the various disasters which overtook it, and which certainly were due to bad judgment and bad management. Is it conceivable that this situation could have been averted by asking the various gentlemen connected with the New Haven Railroad to pass an examination as to their fitness as business men?

Let us take the reverse of this picture. Mr. Henry Ford's replies on the witness stand to questionings in his famous libel suit a few years ago would not indicate his ability to pass an examination of the type that would be conducted by any State examining board authorized to issue licenses to business men. Yet it will be conceded that Mr. Ford has managed to build up a fairly tidy business.

Let us now pass to Mr. Simonds' next point in regard to licensing lawmakers. He states, "Is it not a rather curious attitude on the part of the public to require all those who are to practise law to go through a long term of study and to pass difficult examinations before they are admitted to the bar, and at the same time to send to our legislature and to Congress, to make laws, men who have little or no knowledge of the great fundamental principles that underlie the prosperity of the country?"

Unfortunately for Mr. Simonds' argument, the very men who he states have to go through this long term of study and pass difficult examinations before they are admitted to the bar are the very ones whom we send to our legislatures and to Congress. The percentage of lawyers in Congress and in the various State legislatures is overwhelming.

We all agree with Mr. Simonds that the more education we can have in business, and the more education we can have in our halls of legislature, the better it will be, but there is no panacea in any licensing device and no royal road to success possible by legislation. Certainly no additional paternalism on the part of the State will bring us to Utopia.

JOHN C. JAY, JR.

New York.

Compression Strength of Metals and Alloys

With a view to arriving at a satisfactory measure of the compressive strength of certain metals and alloys, A. Pomp, in an article in *Zeitschrift des Vereines Deutscher Ingenieure*, Sept. 11, 1920, has recently tested a number of specimens 10 mm. diameter and 20 mm. height in a 15-ton Amsler machine, and has given the results in diagram and tabular form from which the following table, showing the correspondence between the relative tensile strength and the relative pressure required to produce a compression of 10 mm., is extracted by *Technical Review*, London:

Material	Tensile Strength, Kg., Per Sq. Mm.	Compression Pressure, Kg.	Relative Strength, Per Cent	Relative Pressure, Per Cent
Steel (0.5% C), annealed	54.0	13,050	100.0	100.0
Brass (62% Cu), annealed	46.0	11,480	85.0	88.0
Mild steel (0.06% C), annealed	38.5	9,800	71.5	75.0
Copper, annealed	22.0	5,200	40.8	40.0
Aluminum, annealed	10.0	2,910	18.6	22.3
Lead-tin alloy (3%), pressed	2.4	630	4.5	4.8
Lead, pressed	2.2	405	4.1	3.1

The Iron Age and Its Readers

It has been one of the aims of THE IRON AGE to keep its readers posted on each new development in the notable expansion of the electric steel industry since its beginnings in this country a few years before the war. Besides data of a statistical nature, there has been presented complete information concerning the new types of furnaces as they have appeared from time to time. It is believed that THE IRON AGE has featured, by full descriptions and illustrations, every furnace that has secured its place by active commercial operation in the industry, and only such furnaces. The latest appeared in last week's issue when the new induction furnace of the General Electric Co. was described. The claim made is also true of the non-ferrous industry, which is fast showing a great dependence on the electric furnace for melting.

Iron and Steel Markets

PIG IRON ADVANCES

Buying on Larger Scale Than in Months

In Finished Steel Evidence Increases That Stocks Are Being Exhausted

The recent low dip in pig iron prices led to buying on a scale probably not equaled in a year, and producers of foundry iron in all districts shared in the business. A good many consumers whose stocks had run down sensed the possibilities of the low rate to which output had fallen and decided to buy.

In the past week furnaces at Chicago, St. Louis, Buffalo, and in Ohio and Pennsylvania districts have advanced their prices by 50 cents to $2 per ton in an effort to limit the losses they have been making on raw materials bought last year. While the extent of the actual rebound in the market is uncertain, the firmer stand of producers is marked and its effect will be closely watched.

The situation in finished steel differs from that in pig iron. Steel works are being run and none are dropping out of the race. Buyers do not believe that low point has been touched and are working close on stocks. The Ford Motor Co., in keeping as far as one month ahead of the mills, is an exception.

The past week has shown continued irregularities in prices, on some products rather more resistance to declines, but generally a willingness of producers to meet competition. The expectation of some increase in operations in the fall is general and is based on evidence that many consumers have used up their stocks and must buy on a larger scale. Producers report a moderate increase in buying in the past week, but the testimony is not pronounced or uniform.

In the effort to get business various mills are crossing usual lines. Makers of strip steel have sought orders in hoops and bands by low offers. Plate mills have gone in the field of the strip steel mills and rollers of light plates have made attractive offers on blue annealed sheets.

Some new-comers into the automobile sheet field have made concessions of several dollars a ton to get trial orders.

Wire products are as firmly held as any finished line—more firmly than the leading heavy products. New business is coming to some important producers at up to about 30 per cent of capacity, with indications that stocks are small all along the line.

New car work and car repairs are bringing further orders to the mills, but not to the extent producers have been led to expect. The railroad repair shops have plenty of steel in stock and are using it. Cars for the Kansas, Oklahoma & Gulf will require 5000 tons of plates, shapes and bars. A Chicago district car repair shop is in the market for 2500 tons of plates. About 10,000 tons of steel will be needed for the repair of 4950 cars and inquiries for 450 new cars have appeared.

Chicago still leads in concessions on plates which are the partial absorption of Pittsburgh freight. While business there has gone at 1.65c. and less, mills farther East have stopped at 1.75c., and 1.80c. has been secured on considerable business.

While the cotton tie season opened some weeks ago on the basis of $1.35 per bundle, the price has now settled to $1.30, Pittsburgh, in part in view of the decline in other mill products and in part because of German competition.

New structural work in excess of 30,000 tons has come on the market, including 18,350 tons for two Federal Reserve banks. Awards probably totaled about 4000 tons.

Some fair orders have been taken for tin plate recently, chiefly from oil companies, one large interest in this line buying over 3000 tons.

The slow progress in the plans for railroad relief at Washington is a matter of concern in the steel trade.

Basic pig iron figured in the increased activity in the eastern Pennsylvania market, one steel company taking 2000 tons and another 5000 tons, the prices ranging from $19 to $19.50 delivered. In the Central West the steel companies which for some time have made the market by sales of basic pig iron have advanced to $20 at furnace, or $1.50 to $2 above recent prices. In foundry iron radiator companies have figured in late buying, but specific reports of heavy tonnages taken by one such interest have not been confirmed, apart from a Buffalo transaction.

Scrap iron and heavy melting steel have shared in the strengthening of primary materials that has marked the past week, the advance in some forms of old material being not far from $1 per ton.

The action of Eastern railroads in agreeing to a 25 per cent differential on steel shipments for export recognizes the low state of that trade.

Pittsburgh

PITTSBURGH, Aug. 16.

The outstanding development of the past week in the situation here is a stronger market in the basic materials. An advance, amounting in some cases to $2 per ton, has been announced in basic pig iron by several of the steel companies, which hitherto have been supplying the demand, while the virtual exhaustion of furnace yard stocks of the foundry grade, coupled with the disinclination of makers of the latter to start up idle furnaces on to-day's costs and selling prices, has encouraged the asking of higher prices than have prevailed recently. In scrap iron and steel further advances amounting in a number of instances to $1 a ton have been established in the past week. This effort toward strengthening the foundation of the market structure naturally is looked upon as a constructive move. It may be said, however, that in the case of basic pig iron the attempt to obtain higher prices is based less upon a better demand or lack of supplies than a desire on the part of the steel company to reduce the losses which the recent base of $18 at furnace entailed.

The quite general report about the steel business is that orders are considerably more numerous in almost all lines than they were recently, but no claim is made that the individual orders are any larger than they have been in the past few weeks, nor do they reflect any abandonment on the part of buyers of a policy to take on supplies only as they are needed. Since practically everything bought is for immediate

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 16, 1921	Aug. 9, 1921	July 19, 1921	Aug. 17, 1920
No. 2X, Philadelphia‡	**$20.34**	$19.84	$21.85	$52.90
No. 2, Valley furnace†	19.50	19.50	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	24.50	45.60
No. 2, Birmingham, Ala.†	19.00	19.00	20.00	42.00
No. 2, foundry, Chicago*	**20.00**	18.25	18.50	46.00
Basic, del'd, eastern Pa.	20.26	20.26	21.25	48.30
Basic, Valley furnace	18.00	18.00	19.00	48.50
Bessemer, Pittsburgh	21.96	21.96	22.46	48.40
Malleable, Chicago*	**20.00**	18.50	18.50	46.50
Malleable, Valley	20.00	20.00	20.50	50.00
Gray forge, Pittsburgh	21.46	21.46	21.46	50.40
L. S. charcoal, Chicago	33.50	33.50	36.00	57.50
Ferromanganese, del'd	70.00	70.00	70.00	200.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	30.00	30.00	33.00	60.00
O.-h. billets, Pittsburgh	30.00	30.00	33.00	60.00
O.-h. sheet bars, P'gh.	32.00	32.00	35.00	68.00
Forging billets, base, P'gh.	35.00	35.00	38.00	80.00
O.-h. billets, Phila.	35.74	35.74	38.74	69.10
Wire rods, Pittsburgh	42.00	42.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.75	1.75	2.00	3.25
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.05	2.05	2.10	4.75
Iron bars, Chicago	1.75	1.75	1.90	3.75
Steel bars, Pittsburgh	1.75	1.75	1.80	3.25
Steel bars, New York	2.13	2.13	2.18	4.02
Tank plates, Pittsburgh	1.80	1.80	1.80	3.25
Tank plates, New York	2.18	2.18	2.18	3.52
Beams, etc., Pittsburgh	1.85	1.85	1.85	3.10
Beams, etc., New York	2.23	2.23	2.23	3.27
Steel hoops, Pittsburgh	2.25	2.25	2.50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 16, 1921 Cents	Aug. 9, 1921 Cents	July 19, 1921 Cents	Aug. 17, 1920 Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	3.25	7.50
Sheets, galv., No. 28, P'gh.	4.00	4.00	4.25	9.00
Sheets, blue an'l'd, 9 & 10.	2.25	2.40	2.50	6.00
Wire nails, Pittsburgh	2.75	2.75	2.75	4.25
Plain wire, P'gh	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh.	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.75	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$13.00**	$12.50	$12.50	$38.00
Carwheels, Philadelphia	16.00	16.00	16.00	40.00
Heavy steel scrap, P'gh.	**13.00**	12.50	12.00	29.00
Heavy steel scrap, Phila.	11.50	11.50	11.00	26.00
Heavy steel scrap, Ch'go.	**10.75**	10.25	10.00	25.00
No. 1 cast, Pittsburgh	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	39.00
No. 1 cast, Ch'go (net ton)	**13.00**	11.50	12.50	36.00
No. 1 RR. wrot, Phila.	14.00	14.00	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	**11.00**	9.75	9.00	24.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$17.50
Foundry coke, prompt	3.75	3.75	4.00	18.50
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.00	12.00	12.75	19.00
Electrolytic copper, N. Y.	11.75	11.75	12.62½	19.00
Zinc, St Louis	4.20	4.20	4.25	8.00
Zinc, New York	4.70	4.70	4.75	8.35
Lead, St. Louis	**4.25**	4.20	4.35	8.87½
Lead, New York	4.40	4.40	4.40	9.12½
Tin, New York	*26.12½*	27.75	27.00	48.00
Antimony (Asiatic); N. Y.	*4.50*	4.60	4.65	7.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 16, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Aug. 9, 1921,	2.364c.
July 19, 1921,	2.407c.
Aug. 17, 1920,	3.974c.
10-year pre-war average,	1.684c.

delivery, not a little of the demand is being met from the mill stocks and the effect upon steel works and rolling mills operations is not pronounced. Building up of a backlog is almost out of the question so long as buyers generally are purchasing so close to their needs.

The Ford Motor Co. is scheduling about one month ahead and making a strong effort to keep its raw material inventory down to about three weeks' requirements. But this company is the only important consumer of steel that is buying even that far ahead. The natural inference from this policy is that buyers do not yet believe that the lowest prices have been touched.

Considerable irregularity still exists in prices, although in general there is slightly more resistance to efforts to force further declines than there was a few weeks ago. There are still a few manufacturers who want business so badly that they are naming very attractive prices, and since the greatest concessions are offered to the regular customers of other companies rather than their own, it is necessary for the other companies to either meet competitive prices or suffer the loss of regular patrons. The tendency to "poach in the other fellow's preserves" is one of the evils of the present situation. Some of the makers of strip steel are charged with having similarly sought business at very low prices in hoops and bands, and makers of plates similarly are credited with having tried, by naming low prices, to take business away from strip steel mills, while very low prices have been done on blue annealed sheets because of competition between plate makers and sheet manufacturers. Most plate mills can roll sheets up to No. 12 gage and when based upon the plate card can name a lower price than the regular makers.

Pig Iron.—Practically all of the steel companies which hitherto have been supplying the demand for, and making the open market in, basic pig iron, have in the past week gone to a minimum of $20, furnace, for this grade. This price represents an advance of at least $1.50 a ton, and in a few instances $2 a ton from what these interests previously were willing to accept. Merchant producers having any stocks of this grade, also, now are asking $20, furnace, minimum, but since this price has not yet found a basis in sales, it must be regarded merely as a quotation. The most recent transaction in basic iron was one of 2000 tons taken by a Pittsburgh district sheet maker, who claims to have secured the tonnage at a delivered price of about $20. This would be equivalent to about $18.04, if the iron came from Valley furnaces, and slightly more from furnaces having a lower freight rate into the Pittsburgh district. The same interest bought 500 tons of Bessemer iron at about 50c. per ton below the Valley furnace price on this grade. This iron was bought at $21.44, delivered, as against $21.96, the delivered price on Bessemer from Valley furnace. Foundry iron is quite firmly held, not because of the size of the demand but rather because so little of this grade now is available. On No. 2 plain, $20 is the minimum asking price and one producer is unwilling to go below $20.50, while still another, with furnaces in western Pennsylvania and Cleveland, has announced a price of $20, Cleveland, which would mean $22.94 delivered into this district. The Iron City Sanitary Mfg. Co. recently closed for 500 tons of No. 2 plain and No. 2X at an average price of $20, western Pennsylvania furnace. The recent pur-

chases of the Standard Sanitary Mfg. Co. for its Louisville, Ky., plant were made at $18.25, Birmingham, for No. 2 plain, and at an even lower base price for some high silicon iron purchased in that district. It also bought some iron in Chicago at $18.50, the purchase including No. 2 plain and iron of higher silicon content. The Union Radiator Co., Johnstown, Pa., is in the market for 250 tons of No. 2 plain, while Phillips Mill & Supply Co. is seeking 200 tons of low silicon iron for prompt delivery and the Danville Iron & Steel Corporation, Danville, Pa., wants 200 tons at 2.25 to 2.75 per cent silicon iron for last quarter delivery. Altogether about 1000 tons of foundry iron are wanted.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.00 to $20.00
Bessemer	20.00
Gray forge	18.50 to 19.50
No. 2 foundry	19.50 to 20.00
No. 3 foundry	19.00 to 19.50
Malleable	20.00

Ferroalloys.—Inquiries for ferromanganese are somewhat more numerous than they have been, but with the exception of one from a Valley steel maker calling for 200 to 300 tons, for September and October shipments, they rarely exceed a carload. Among the latter is one from a Detroit steel casting company against which a price of $75 delivered on domestic 80 per cent material has been quoted. The most recent business done in domestic ferromanganese was at $70 delivered, for 80 per cent alloy, and with British ferromanganese available at $65 c.i.f., Atlantic seaboard, of $70.32, delivered Pittsburgh, it is doubtful if much more than $70 delivered to-day could be obtained for the domestic product. Very little interest is noted in other ferroalloys. Makers of 50 per cent ferrosilicon are not publicly quoting less than $65 furnace, freight allowed, but there has been no business recently to support this quotation. Spiegeleisen is offered at $26 for average 20 per cent material, but does not find much demand.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent $68; 76 to 80 per cent British ferromanganese, $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $26 furnace; 16 to 19 per cent, $25; 50 per cent ferrosilicon, domestic, $60, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Small lot inquiries for sheet bars are fairly numerous, in keeping with the better demand for sheets. The bulk of recent business has been done at $30, f.o.b. maker's mill, and this means f.o.b. Youngstown, in view of the fact that makers in that district have taken a part of the business. It is not possible to quote this price, f.o.b. Pittsburgh, because makers here will not go that low to secure business. Too little is going on in billets and slabs definitely to determine prices. It is said that a really desirable tonnage would develop a price of less than $30 for 4-in. rerolling billets, but, on the other hand, a recent bid of $28 Pittsburgh, against a substantial tonnage was turned down without consideration. Demand for slabs has rarely been as limited as it is at present. The claim is made that with plates selling at 1.80c. base and bars at 1.75c., there is not much profit in billets at $30 or slabs at $31, the present quotations.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Bessemer and open-hearth sheet bars, $30 to $32; slabs, $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The price of $42 Pittsburgh for No. 5 common soft rods still is the public quotation of all makers, but there is not enough business to provide a real test of this figure. We note a fair sized sale of some screw stock rods at $47, Pittsburgh, which on the basis of the differentials would support a price of $42 for ordinary soft rods. At the same time, the opinion is pretty common that an inquiry for 2500 to 5000 tons would bring concessions. Rods for export are said to have been offered at $38, Pittsburgh, for soft rods, and around $45 for carbon rods. Prices are given on page 435.

Structural Material.—Fabricating interests here generally report a fairly good inquiry but that they are getting no important awards. Bids were opened yesterday against the 8-story addition to the store of Joseph Horne Co., which will take about 3000 tons of steel, but no information yet is available as to who is the low bidder. Bids will be opened by the County Commissioners next Monday for a new bridge over the Allegheny River at Sixteenth Street, for which 5000 tons of steel will be wanted. There is little real activity in plain material but most makers report orders for small tonnages to be somewhat more numerous than they were recently. The going price on such lots is 1.85c., but the belief still is prevalent that considerably less could be done on sizable tonnages. Prices are given on page 435.

Steel Skelp.—A Pittsburgh district maker of lap-welded boiler tubes recently closed for a fair sized tonnage of skelp at 1.90c., Pittsburgh. Material for this use is of lighter gage than that employed in making standard pipe, and consequently commands a premium over pipe skelp because of the heavier labor charge. Pipe skelp is available at 1.75c.

Iron and Steel Pipe.—As is the case with almost all finished steel products, there is a fairly good run of small orders in standard steel pipe, but all makers note a tendency on the part of distributers merely to order supplies as they are needed, and no especially large individual orders are coming in. Since a good many of the current demands can be met from stock, mill operations do not increase much. There is good observance of the July 7 card on standard pipe, but on line pipe, prices vary considerably with the different makers, just as they have for some time past. Demand for oil well tubular goods remain extremely slow. Makers of wrought iron pipe are getting more business, but as is the case with steel pipe, the orders are more numerous than large. Discounts are given on page 435.

Iron and Steel Bars.—Rumors are common that less than 1.75c. is being done in mild steel bars, but they find no verification, as far as the general run of current orders are concerned, by makers in this district. While buyers seem to have fixed upon 1.50c. as the ultimate price, there are no makers willing to entertain within several dollars a ton of that figure and in support of the assertion that 1.75c. is being done more generally, it is pointed out that the Ford Motor Co., which is one of the largest buyers of the moment, is paying the latter price. Reinforcing bars occasionally sell down to 1.70c., base, although the more common quotation still is 1.75c. Makers of iron bars still are endeavoring to hold to 2.25c., Pittsburgh, for refined iron in carload lots. Chicago advices are that common iron bars recently sold there at 1.62½c.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets 1.70c. to 1.75c. base; reinforcing bars rolled from old rails, 1.60c. to 1.75c.; refined iron bars, 2.25c. to 2.40c. in carloads, f.o.b. mill, Pittsburgh.

Nuts, Bolts and Rivets.—It is impossible to record even the slightest betterment in business and prices are extremely indefinite as far as Pittsburgh makers are concerned, most of them having shut down rather than pile up stocks at current costs and possibly carry them for a long time. Most makers actually are out of the market for the time being and are not making quotations. Prices and discounts are given on page 435.

Steel Rails.—The market for light rails still is dull and unsettled. Steel companies who are regular producers of these sections are quoting 1.85c. Pittsburgh for 25-lb. to 45-lb. rails. Against this, however, is an offering by one of the smaller makers of rails rolled from guaranteed soft steel at 1.60c., mill, or about 1.75c., Pittsburgh. Mills rerolling old rails also are on a basis of 1.60c., but since the railroads are not pulling up many heavy rails, the rerolling mills only occasionally can offer light sections of more than 30-lb. to the yard. Specifications against orders for standard rails are slightly larger than they have been.

We quote 25 to 45-lb. sections, rolled from new steel, 1.85c.; rolled from old rails, 1.60c. to 1.75c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—Orders are more numerous, but they leave much to be desired both individually and in the aggre-

gate. While 1.85c. is the common asking price few buyers are forced to go that high even on small tonnages. We note a sale of a couple of carloads to a tank and stack builder at 1.80c. and there is still a common belief among buyers that they could obtain a lower price if they had sizable tonnages to place.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Wire Products.—Orders with all makers in this district are more numerous than they were recently, but they run entirely to small lots for immediate shipment, and since manufacturers can supply them in most instances from stock, they do not mean any material increase in mill operations. Nail orders are comparatively good, but there is a fair sprinkling of plain, galvanized and barbed wire business. Talk of price cutting still persists, but does not find confirmation.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Sheets.—Although further expansion is noted in the number of orders and they are coming alike from jobbers and consumers, there continues to be more or less cutting of the regular market bases of 3c., 4c. and 2.40c. respectively, for black, galvanized and blue annealed. Concessions from these prices are slight in black and galvanized sheets but in blue annealed the competition from plate makers is rather sharp and to hold regular customers sheet makers have gone as low as 2.25c. base. Orders in all cases are for quick shipment and to a large extent are made from stock. Mill operations, consequently, are not much heavier than they were recently. Prices are given on page 435.

Tin Plate.—Orders for small lots for prompt shipment are coming along fairly well but there is no gain in business for future shipments. Makers report no difficulty in obtaining $5.25 per base box, Pittsburgh, on standard cokes. Not much export business is developing as Welsh makers are quoting more attractive prices.

Hot Rolled and Cold Rolled Strips.—Regular makers of hot rolled strips regard the market as 2.40c. base, Pittsburgh, and are not disposed to cut this price. However, there are some companies with equipment for rolling hoops and bands and plates which are actively soliciting business in strips and going as low as 2.25c. to secure orders, and occasionally regular makers meet competition to hold regular customers. Competition is not so keen in cold rolled strips, and the market is fairly steady at 4c. base, Pittsburgh.

Cotton Ties.—It develops that shortly after the opening of the season on the basis of $1.35 per bundle of 45 lb., Pittsburgh, the market settled to $1.30, partly in keeping with other merchant mill products, and also because of German competition. The August delivery price, therefore, is $1.31, the carrying charge being 1c. per bundle per month.

Spikes.—The New York Central Railroad recently closed with a Pittsburgh maker for 21,500 kegs of standard spikes, at 2.75c. base. No other important sales recently have been made and such inquiries as are coming out are for small lots, and are not very numerous. Inquiry for small spikes is reported to be somewhat better than it has been. Track bolts recently went to 3.25c. on a sale of 2000 to 3000 kegs, but this is below the price ideas of most makers in this district, some of whom are not willing to go below 3.75c. base on carloads of a size. Prices are given on page 435.

Boiler Tubes.—Business still is of rather limited proportions, although in the past week or so orders have increased in number if not in size. On lap-welded steel tubes prices still favor buyers, and on seamless tubes conditions are very similar. Discounts are given on page 435.

Cold Finished Steel Bars.—A strong effort is being made by makers to maintain a base of 2.60c., Pittsburgh, and on small tonnages this price is the rule. However, there have been concessions of $2 to $4 per ton from this price on desirable business, and it is probable that the lower prices would be repeated on inquiries of an attractive character.

Hoops and Bands.—The general quotation of makers still is 2.40c. base Pittsburgh on both products, but a quotation of 2.25c. recently made to large cooperage interests by some makers failed to bring the orders, the word being that the business was placed for less money. Apparently some mills are taking business based upon the bar card instead of the hoop and band card. On the other hand, the Carnegie Steel Co. claims to be getting business at 2.40c. base.

Coke and Coal.—The American Rolling Mill Co., Middletown, Ohio, is considering blowing in one of its furnaces at Columbus, Ohio, and has put out an inquiry for 10,000 tons of coke for September shipment. The Thomas Iron Co. also is reported to be in the market for a round tonnage. Outside of these inquiries the market presents no new features. One inquiry is regarded here as nothing more than a "feeler" and that quotations made by Connellsville operators will be used as a lever to pry down prices from a more convenient source of supply. It is doubtful if the operators will name a very low price since few would be inclined to light up idle ovens for merely a month's run. The spot furnace market still is quotable at $2.75 to $3, some being able to obtain the latter price, while others find that disposal of surplus tonnages is not possible at much above $2.75. There is a steady business in foundry coke with small lot buyers paying $4.25 to $4.50 and those able to provide fairly large tonnages cover them from $3.75 to $4. The coal market does not change much except that there are rather more inquiries for future shipments, some consumers being inclined to build up reserve stocks. Mine-run steam coal is quotable from $1.50 to $2, by-products within the same range, and gas coal from $2 to $2.50. Slack grade is quotable at $1.75 for steam and $1.85 for gas.

Old Material.—The stronger tendency in pig iron prices due to the reduction in available supplies is finding reflection in a more active and a stronger market for old material. Advances of at least 50c., and in most cases $1 per ton, from last week's levels, are noted as the larger demand has disclosed only limited tonnages of scrap available for early delivery. A number of dealers here are trying to buy heavy melting steel at $13, f.o.b. the plant of a large Pittsburgh independent steel company, but are finding it rather difficult to uncover supplies at that price. Several dealers with yards in this district have rather sizable stocks of open hearth grades, but as it cost well above current levels, the market would have to move up to a basis of at least $17 Pittsburgh for heavy melting steel before any of these stocks would become available. A West Virginia steel maker recently paid $10.50 delivered for compressed sheets, $8 delivered for machine shop turnings, and $8.75 for short shoveling turnings, but it is doubtful if those prices could be repeated today, the average price idea of most dealers being well above these figures. The general market is aided by the fact that current offerings run small, rarely reaching a total as large as 2000 tons.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13.00 to $13.50
No. 1 cast cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	15.50 to 16.00
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	14.00 to 14.50
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	19.00 to 20.00
Locomotive axles, steel	18.50 to 19.00
Steel car axles	14.50 to 15.00
Cast iron axles	14.00 to 14.50
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.00 to 8.25
Sheet bar crop ends at origin	12.50 to 13.00
Heavy steel axle turnings	9.50 to 10.00
Short shoveling turnings	8.75 to 9.25
Heavy breakable cast	14.50 to 15.00
Stove plate	12.00 to 12.50
Cast iron borings	8.50 to 9.00
No. 1 railroad wrought	12.00 to 13.00

Chicago

CHICAGO, Aug. 16.

It develops that producers of merchant pig iron booked a substantial tonnage just prior to the advance a week ago, one order from a steel company calling for 10,000 tons of basic and another from a Wisconsin melter amounting to 5000 tons of foundry. There continues to be active inquiry for pig iron and some orders involving several hundred tons have been closed at $20 base, Chicago furnace. Producers are holding firm at the new price and it is intimated that a further advance to $21 may be made.

Demand for finished steel has not shown a change similar to that which has taken place in the pig iron market. Except for railroad car construction and repair work, which is gradually increasing in importance, there is little in sight which will call for any considerable tonnage of plates, structural material or merchant bars. Reinforcing bars are in fair demand, however, but in the absence of purchases of merchant bars by manufacturers, there is by no means enough bar business to go around and competition among mills is keen. Evidently reflecting an increase in dwelling house construction, sheet metal shops are busy and are buying fair tonnages of sheets. There is also better demand for light plates.

The price situation has undergone little material change. Sheets are firmer but the same cannot be said of plates, structural material and bars. Wire products, the demand for which has been maintained, are holding more steadily than any other finished commodity. Structural lettings are still too light to give stability to the market. The successful bid on 971 tons for the Ruggles & Radmaker salt plant, Manistee, Mich., was $70 erected. The American Bridge Co. took the business.

Reduced freight rates on steel and pig iron to the Pacific Coast have been brought one step nearer by the transcontinental freight committee's approval of a proposed cut averaging 33 1/3 per cent. The rate on plates, structural shapes and bars is brought down to $1 per 100 lb. and on pig iron to 90c.

Mill and blast furnace operations in this district are substantially unchanged.

Pig Iron.—As noted a week ago the advance in local iron brought considerable business to a head. Probably the largest individual order taken was 10,000 tons of basic bought by a local steel plant. A Wisconsin maker of sanitary goods closed for 5000 tons of foundry. While buying has not been so brisk during the past week as it was just before the advance, inquiries are numerous and some fair-sized lots have been purchased, including one of 800 tons of foundry iron. Outside of the agricultural implement manufacturers, there are few melters with heavy stocks of iron in their yards or on order. Some of these have already entered the market for their needs and others are expected to do likewise. That foundry operations are slowly improving is evidenced by a sustained betterment in the demand for coke. During the first fifteen days of this month, the local by-product maker shipped over twice the tonnage of coke shipped to melters during the first half of July. The change that has taken place in the pig iron market may be best appreciated by recalling conditions 90 days ago. Then the only purchases of any size were by radiator and boiler manufacturers. Since that time, however, buying has slowly increased, at first being confined largely to carload orders and later developing to the point where orders of from 100 to 1000 tons became more numerous. There are still many foundries that are idle but the progess that has been made up to date is impressive. Local furnaces are holding firmly at the new price of $20 and it is intimated in some quarters that prices may be again advanced to $21, base. With a sale of a carload of low phosphorus at $30, furnace, about two weeks ago, one Ohio producer disposed of the last of its yard stocks and, not being in blast, is now out of the market. Other makers are quoting $36 to $37, furnace. Some resale low phosphorus has been offered at $34, Chicago, but the tonnage is not large.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos	20.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	20.00
Basic	20.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	$36.00 to 37.00
Silvery, sil. 8 per cent	31.82

Ferroalloys.—There has been no further activity in any of the ferroalloys. The Griffin Wheel Co. bought ferromanganese at $68, delivered, instead of $71, as reported last week. Spiegeleisen 18 to 22 per cent is quoted at $26 to $28, furnace, varying freight from different producing points bringing the delivered price to $36 to $37.

We quote 78 to 82 per cent ferromanganese, $68 to $71 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Rails and Track Supplies.—The Missouri Pacific has bought 2500 tons of tie plates at a price reported not to exceed 2c., mill. The order was divided between a Chicago and a Birmingham Mill. The New York Central has placed 22,000 kegs of track spikes with a Pittsburgh mill at 2.50c., f.o.b., Pittsburgh. Demand for track supplies is light and competition on business offered is sharp.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.85c. f.o.b. makers' mills. Standard railroad spikes, 2.50c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.50c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.t. makers' mills.

Plates.—Railroad car repair programs continue to bring tonnage into the market. A car repair shop in this vicinity is inquiring for 2500 tons of plates. Orders for new cars to be let by the Kansas, Oklahoma & Gulf, will involve 5000 tons of plates, shapes and bars. The Chicago, Rock Island & Pacific is asking for figures on the construction of 200 hopper bottom coal cars of 50 tons capacity and on the repair of 250 50-ton general service cars. The Burlington is inquiring for material and miscellaneous parts for 100 Gondola cars which will be repaired in the railroad's own shops. Prices on tank plates still lack stability. Between 1.60c. and 1.65c., Pittsburgh, has not been uncommon, but some business has been closed at even lower figures, while other orders have been placed at the full official price of 1.85c., Pittsburgh.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—Bids were taken on the commercial and technical high school, Omaha, last week, a project involving 1700 tons of fabricated steel and 1000 tons of reinforcing bars. No award has been made and it is intimated that it has been decided to go ahead with only three out of the five units comprising the project. The demand for fabricated steel shows no change for the better and shops continue to name rock bottom prices to secure business. On plain material 1.60c. to 1.65c., Pittsburgh, is not unusual, but some business still brings the full official price of 1.85c. Recent fabricating awards include:

Utah Oil Refining Co., three tanks, Salt Lake City, 656 tons, to American Bridge Co.

St. Louis County, Minn., Congdon Boulevard and Babcock Highway bridges, 377 tons, to Illinois Steel Bridge Co.

Highway truss span for Leonia Bridge in Idaho, 148 tons, to Illinois Steel Bridge Co.

Music Hall, University of Minnesota, Minneapolis, 108 tons, to Crown Iron Works.

Building for new Rosary College, Oak Park, Ill., 200 tons, to Worden Allen Co.

Sixth Street bridge, Racine, Wis., 200 tons, to Worden Allen Co.

Addition, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., 80 tons, to Worden Allen Co.

Pending business includes:

Frost National Bank, San Antonio, Tex., 382 tons.

Auditorium and Music Hall, College of Industrial Arts, Denton, Tex., 225 tons.

George Washington Hotel, Washington, Pa., 1000 tons.

Western Maryland Railroad, grain elevator, Baltimore, 265 tons.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 2.88c. for materials out of warehouse.

Bolts, Nuts and Rivets.—Railroad inquiries are increasing but in most cases they call for prompt shipment to apply against immediate requirements. Business from the automobile industry is of a similar character. Some buyers, however, regard present prices as low and have asked for fourth quarter contracts to protect them against possible advances. Current quotations continue to vary widely, but with slight modifications the discounts and prices published last week are representative. Rivets have firmed up slightly since a week ago and are quoted at $2.50 for structural and $2.60 for boiler rivets. The ruling quotation on large machine bolts appears to be 70 and 10 per cent off list. Attractive inquiries are bringing out exceptionally low prices, which, however, can hardly be considered as ruling quotations. Thus a Western railroad got a price of $6.10 off list on a desirable order for blank hot pressed nuts.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Keen competition has brought out wide variations in prices on mild steel bars. Quotations of 1.55c. to 1.65c., Pittsburgh, are not uncommon, but some orders have been booked at both higher and lower quotations. Railroad car repair work is resulting in the closing of some bar business and there is an encouraging number of reinforcing projects in the market. Bids will soon be taken on a sewage disposal station at Milwaukee, which calls for 1000 tons of reinforcing bars. Railroads continue to buy bar iron rather cautiously with the result that mill operations are still of an intermittent character. Prices are about the same as a week ago, possibly slightly weaker. There has been no change in the demand for rail carbon steel bars and 1.75c., mill, apears to be the top of the market.

Mill prices are: Mild steel bars, 1.55c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—There is more activity in sheets than in plates, shapes or bars and prices are holding more steadily.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.53c.; No. 28 black, 4.65c.; No. 28 galvanized, 5.65c. Hoops and bands, 3.48c.

Wire Products.—Mills are maintaining the improved rate of bookings noted last week and prices are steady. Chicago, Minneapolis, St. Louis and Eastern railroads have all been buying a little more freely of late. Their purchases are confined principally to nails, barbed wire and fencing. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 435.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Cast-Iron Pipe.—The Lynchburg Foundry Co., which, as was announced 2 weeks ago, was low bidder on 1500 tons for Detroit, has been awarded that tonnage. Milwaukee has let 3510 tons of pipe and fittings to the United States Cast Iron Pipe & Foundry Co. Most of the tonnage is made up of 54-in. Class C pipe, on which the accepted bid was $44.85, or approximately $35, Birmingham. The fact that so large a size brought out so high a price is regarded as evidence that the market has passed its low point and is now on a higher level. Ruling prices appear to lie between $33.50 and $36.50, Birmingham, for 6-in. and larger.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

O'd Material.—Steel foundries and mills are feeling out the market for material, but are reluctant to pay the prices at which dealers are now holding. As a result trading is confined largely to the sellers, who are laying in stocks at advanced quotations in the belief that the market is on an upward swing. Thus far there has been no increase in mill operations to justify this belief and improvement in foundry operation has been slight. With the market in the hands of the dealers, prices of most grades have advanced from 50c. to $1 a ton. Railroad lists include Rock Island, 3000 tons; Northern Pacific, 2000 tons; Santa Fe, 1500 tons; Chicago Great Western, 600 tons; Soo Line, 400 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.50
Steel rails, less than 3 ft	12.00 to 13.00
Heavy melting steel	10.75 to 11.25
Frogs, switches and guards cut apart	10.75 to 11.25
Shoveling steel	10.00 to 10.50
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.00 to 7.50
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6 75
Cut forge	9.50 to 10.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.00 to 11.50
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	11.00 to 11.50
Railroad malleable	12.00 to 12.50
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

Federal Judge Westenhaver yesterday disapproved the application of a number of creditors of the Standard Parts Co. for the immediate sale of the property. The court granted the application of F. A. Scott, receiver, to pay creditors 10 per cent of the amount due them. The creditors will receive about $1,000,000 at this time.

British coal raised during the 13 weeks of the miners' strike is reported at 179,100 tons, or an average of 13,800 tons per week. This compares with previous and subsequent weeks as follows:

March 12	4,277,200 tons	During strike	13,800 tons
March 19	4,240,400 tons	July 9	2,355,000 tons
March 26	3,660,000 tons	July 16	2,928,000 tons
April 2	1,950,100 tons	Dec. 18, 1920	*5,307,000 tons

*The largest weekly figure of the past year.

Opposition to the proposed pontoon bridge across the Hudson at Yonkers is based on the narrowness of the channel through the draw span. Based on a floating structure—one of the wooden ships built by the Shipping Board—such a draw could not be given so long a span as if it were supported on the rigid foundation of a permanent structure.

George J. Hagan Co., Pittsburgh, recently secured a contract from the Coonley Mfg. Co., Cicero, Ill., for a 225-kw. electric vitreous enameling furnace.

New York

NEW YORK, Aug. 16.

Pig Iron.—Some fairly good-sized orders for foundry iron have been placed within the week, a few of them running from 500 to 1000 tons. A part of the week's business went at $18, Buffalo, and $18.50, eastern Pennsylvania furnace, for No. 2 plain and about 50c. advance for No. 2 X, but these prices are now said to have been withdrawn and a few orders have been taken at 50c. and $1 a ton higher. One sale of 1000 tons for delivery in Connecticut figured back slightly under $18, Buffalo. A Buffalo steel company, which had offered iron at $18, furnace, now quotes $20 as its minimum, while an eastern Pennsylvania furnace, which sold No. 2 plain at $18.50 and No. 2 X at $19, has disposed of the block of iron which it intended to sell at these prices and has raised its quotations $1 a ton. While the demand for iron is scarcely large enough to support an advancing market, the action of producers in withdrawing their low prices has had a favorable effect upon sentiment in the trade. Some buying has been done by consumers who recognized that such low quotations could not be expected to prevail for long in view of the high producing costs; in a few instances consumers have availed themselves of the opportunity to cover their requirements for the next few months, this being the first forward buying that has been done in a considerable period, probably a year, at least. In line with a firmer tendency in pig iron prices, producers of coke have also stiffened in their quotations. Foundry coke is now quoted at $4 to $4.50, Connellsville, the former minimum of $3.75 seeming to have disappeared. At any rate it probably would require a fairly good tonnage to bring out that price again. Furnace coke is still obtainable at $2.75 to $3, Connellsville.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom'l)	28.16 to 29.16

Ferroalloys.—New inquiries for ferromanganese continue to be reported, two of which call for 200 and 150 tons, respectively. Sales of carload lots are reported at the prevailing quotations. Demand for spiegeleisen is light and the manganese ore market is stagnant, it being impossible to sell any offerings that are available at prevailing quotations, and it is believed that 20c. per unit, seaboard, could easily be done. The 50 per cent ferrosilicon market is confined to small lot inquiries and sales at the prevailing quotations. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$65.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Ferrotungsten, per lb. of contained metal	50c. to 55c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—A fairly good demand for pipe from gas and water companies exists, but municipal work is unimportant. Yonkers, N. Y., will let an order this week for 230 tons. The prices quoted apply usually to carload lots; on open bids for municipal work lower quotations have been made. We quote per gross ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30 with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—Mark Eidlitz & Co., general contractors for the new Federal Reserve Bank in New York, have asked for bids for the steel work, which will total about 15,000 tons, of which about 12,000 tons will be for the building and 3000 tons for the vaults. An addition to the Bamberger store, Newark, which originally called for 7000 tons of steel, is again in the market, the steel requirements having been pared to about 1800 tons. Three schoolhouses in Brooklyn, totaling about 1000 tons, and a building at Cornell University, Ithaca, N. Y., about 500 tons, are up for bids. No important jobs have been let within the week. More railroad car repair work is coming out, the Lehigh Valley Railroad having distributed 3200 cars among several companies as follows: American Car & Foundry Co., 1000 steel underframe box cars and 500 steel hopper cars; Magor Car Co., 1000 all wood box cars; Buffalo Steel Car Co., 500 steel hopper cars, and Lehigh Structural Steel Co., 200 steel hopper cars. About 6000 tons of steel will be required for the work. The Delaware, Lackawanna & Western has divided orders for 1500 cars for repair among the Buffalo Steel Car Co., Magor Car Co. and American Car & Foundry Co., 500 to each. The Pittsburgh & West Virginia has awarded an order for the repair of 250 steel hopper cars to the Pressed Steel Car Co. The Chicago, Rock Island & Pacific is in the market for 200 new composite gondola cars and the Kansas, Oklahoma & Gulf is inquiring for 250 gondolas. The inquiry of the Western Maryland Railroad for 5000 new car bodies is still active, and the order may be placed shortly. The demand for finished steel continues very light. Though some in the trade believe that prices are firmer than they have been for some months, there is not sufficient business in the market to indicate any definite trend one way or another. Some of the mills appear to be holding firmly at 1.75c. for steel bars and 1.85c. for plates and shapes, but there are intimations that these prices have been shaded from $1 to $3 a ton, particularly on plates, for which there is almost no demand worth mentioning. Some of the car repair work recently let and noted in this paragraph may bring out a few inquiries. Bar iron is available at 1.70c., Pittsburgh, but demand is limited to very small lots.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c.; plates, 2.18c. to 2.23c.; structural shapes, 2.18c. to 2.23c.; bar iron, 2.08c.

Old Material.—A distinctly better tone is evident in the market, according to most dealers, despite the fact that order books show little change for the better. A tonnage of 1500 to 2000 tons of relaying rails was offered last week by the New York Central Railroad and is said to have been placed. A railroad recently sold a tonnage of scrap at $1.25 per ton higher price than was obtained for the same kind of material on Aug. 2. There is practically no buying by local foundries and prices of dealers for this purpose are largely nominal.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.50 to $8.75
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.50 to 8.75
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Light iron	2.00 to 2.50
Cast borings (clean)	5.00 to 5.50
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	8.50 to 9.50
Locomotive grate bars	8.50 to 9.25
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Warehouse Business.—Although there is a more optimistic tone to the market, inquiries continue in about the same volume. Prices are unchanged, all warehouses meeting competition where necessary. Galvanized sheets have registered another slight decline, No. 28 gage being obtainable as low as 5c. per lb.,

although the majority of warehouses continue to quote 5.25c. per lb. Brass and copper warehouses report no change, except for copper sheets, which in some cases are quoted as low as 20c. per lb. Sales of wrought iron and steel pipe show no increase, but some dealers expect August to show better results than July, which was extremely dull. We quote prices on page 450.

High Speed Steel.—The market is entirely nominal, 18 per cent tungsten high speed steel continuing at 90c. to $1 per lb., New York, with sales reported under special conditions at slightly lower prices. Inquiries show a slight increase.

St. Louis

ST. LOUIS, Aug. 16.

Pig Iron.—An improvement in the pig iron market is indicated by some heavy buying during the week at increased prices. The St. Louis Coke & Chemical Co. reported on Wednesday the sale of 6250 tons of foundry iron at the market levels of $22.88 to $23.38, f.o.b. St. Louis. Most of this was of 1.75 to 2.25 per cent silicon. The sales were made in lots ranging from 1250 to 2000 tons. This company also sold a number of smaller lots of up to 100 tons. Local brokers purchased from another concern 3500 tons of foundry iron at $18.50, f.o.b. Chicago. Foundries catering to railroad work are increasing activities. The Southern Wheel Co., St. Louis, which has been running as low as 10 per cent of normal, is now operating at a 50 per cent rate. The Mt. Vernon (Ill.) Car Works are now operating at full capacity; the Hannibal (Mo.) Car Wheel Co. has resumed operations after having been shut down for some time, and the Barry Iron & Steel Co., St. Joseph, Mo., is now operating. A survey made of the Davenport, Ia., Tri-cities district indicates some improvement in the agricultural implement district. Their stocks are low and they are buying a few cars of foundry iron. Other inquiries are out, and there is generally a better feeling in the pig iron market. The sale is reported of one car of Bessemer ferrosilicon at about $40 and one car of ferromanganese at about $75. There is an inquiry out for another car load of ferromanganese.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$22.88 to $23.38
Northern malleable	22 88 to 23.38
Basic	22.88 to 23.38
Southern foundry, sil. 1.75 to 2.25	24.74 to 25.74

Finished Iron and Steel.—The market has not shown the activity manifested in the pig iron trade. Local fabricators are figuring on several large-sized jobs and are hopeful. The most important development of the week was the placing of an order for 3000 tons of tie plates by the Missouri Pacific with the Illinois Steel Co. The Missouri Pacific also purchased 2000 kegs of track spikes at a reported price of $2.50, f.o.b. Pittsburgh. The requirements for the new Federal Reserve Bank Building will be approximately 3000 tons of structural steel and 350 tons of reinforcing bars. A very slight improvement is noted in the demand for warehouse steel.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.62½c.; No. 28 black sheets, cold rolled, one pass, 4.75c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—An increase in the number of inquiries for coke is reported not only from local consumers but from outlying territory. There is an inquiry out for 2500 tons from a Western smelter and one for 5000 tons from an Illinois operator, with various other requests of from 300 to 400 tons. Consumers in some instances are asking now for shipment of orders that had been temporarily held up. Prices are unchanged, Standard Connellsville foundry coke is being quoted at $4 to $4.50 ovens, with special brands up to $5.25, and the furnace product $1 lower.

Old Material.—There has been a decidedly better tone, due to the fact that some dealers have been buying railroad material at advanced quotations with the expectation of a rise in the market. However, all of the large consumers still decline to pay any advance for material, contending that the small amount of business on their books does not justify any advance in old material prices. It will be necessary for dealers either to lay this material down in their yards or sell at a loss to consumers. The following railroad lists are before the market this week: Baltimore & Ohio, 9000 tons; Great Northern, 2000 tons; Northern Pacific, 2500 tons; C. I. & L. Railway, 800 tons; Kansas City Southern, 150 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$12.50 to $13.00
Steel rails, rerolling	11.50 to 12.00
Steel rails, less than 3 ft.	10.00 to 10.50
Relaying rails, standard section	28.00 to 30.00
Cast iron wheels	11.00 to 11.50
No. 1 heavy railroad melting steel	9.50 to 10.00
No. 1 heavy shoveling steel	9.00 to 9.50
Ordinary shoveling steel	8.50 to 9.00
Frogs, switches and guards, cut apart	9.50 to 10.00
Ordinary bundle sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	$5.50 to $6.00
Iron angle bars	10.50 to 11.00
Steel angle bars	8.00 to 8.50
Iron car axles	16.00 to 16.50
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	9.50 to 10.00
Steel couplers and knuckles	9.50 to 10.00
Locomotive tires, 42 in. and over, smooth inside	8.50 to 9.00
No. 1 dealers' forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers cut in sheets and rings	5.50 to 6.00
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	7.50 to 8.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	7.00 to 7.50
Uncut railroad mixed	7.50 to 8.00
Horseshoes	9.50 to 10.00
Railroad brake shoes	8.00 to 8.50

Buffalo

BUFFALO, Aug. 16.

Pig Iron.—Announcement by a steel interest last week of intention to enter the selling field in foundry iron was followed by considerable business; approximately 18,000 tons of various grades were sold within the week at a base price ranging from $18.50 to $19.50. One of these sales was a lot of 5000 tons to an Eastern buyer. Other producers though encouraged have not found a great deal of buying. A sale of 200 tons of low silicon iron at $20 represents the sole transaction with one furnace but it received a number of inquiries from buyers who have been out of the market for some months. Inquiry and sales have fallen off; the total tonnage involved in inquiries is 20 per cent less than for the previous week. While the tendency of local producers is to refrain from future commitments, there is rumor of a sale of 1500 tons for delivery in April, 1922, at a price of $18.50. A furnace blown in Aug. 1 and producing basic iron may turn out foundry iron after its basic needs are filled.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.75 to $21.75
No. 2X foundry, 2.25 to 2.75 sil.	19.75 to 20.75
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic (nominal)	20.00 to 21'00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—There is little question that there is a greater volume of business with a

majority of sellers. In pipe and tubular products, structural shapes, sheet piling and wire, the improvement is manifest and there has been some increased demand for cold rolled material calling for immediate delivery. An interest sold 800 tons of billets, its first sale of this material this year. Several good-sized structural jobs, including one requiring more than 1000 tons of reinforcing bars for a terminal elevator in Baltimore, are noted. One inquiry is for 500 tons of bars for a Rochester apartment house. Tin plate inquiry is quiet and the same apathy in bolts and nuts is still shown. In black, galvanized and blue annealed sheets an increase is perceptible. A number of pipe inquiries in Canada for export are receiving attention. With one mill there is little moving in bars, plates or shapes, but up to date the current month shows improvement over its predecessor. Each mill of the largest local interest will run for a time in August.

Warehouse Business.—Increases in orders and inquiry continues with especially good business in sheets and structural shapes. Prices seem to be in favor and the tonnage per order shows improvement. Speculation is about evenly divided as to the possibility of any further price reductions. The better movement out of warehouses is regarded as more definite than any previous flurries this year.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets No. 10 gage 3.45c.; galvanized steel sheets, No. 28 gage, 5.30c.; black sheets, No. 28 gage, 4.30c.; cold rolled strip steel, 6.40c.

Old Material.—There is a more optimistic feeling and general belief that a more lively market is within sight. Inquiry has been received from points in the Pittsburgh and Valley districts for steel, borings and turnings. However, they are regarded as of much value to Buffalo dealers as the freight rate is prohibitive; they would have to sell steel at a figure near $8 to compete for the business. The general tendency is not to sell below the present quotation, about $10.50.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$10.00 to $11.00
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9 00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Birmingham

BIRMINGHAM, Aug. 16.

Pig Iron.—Sales of the past week did not total large, but the $19 base was maintained consistently and efforts to obtain concessions were futile. One maker sold 1000 tons in the first three days of the week, one order being for 300 tons for export out of New Orleans, two for 100 tons and the remainder for carload lots. Melters who wished a certain analysis and could not get that accepted the nearest substitute. Nearby consumers, who declared they would not buy at $19, wired orders at that base shortly after declining to place orders at that figure. The ill-assortment of stocks has produced its effect among the buyers. The disposition to get into the market for more than immediate requirements is beginning to manifest itself. Southern foundries are melting more iron. The market can the better afford to be stiff because it is confined to the South at this time owing to freight rates. The cast iron pipe makers seem on the eve of purchasing heavily following an increase in bookings that seems imminent. The melt of radiator plants and stove works is also larger than it has been. American sugar refineries have placed orders for considerable machinery in this district and that requires much iron. Southern iron makers will be slow in resuming, preferring to lose a little business in the hope of a market somewhat above the present level. The Woodward Iron Co. is understood to have the business in sight for the operation of its two merchant stacks. Several export inquiries have been received, but destination is not known. The Pacific Coast continues to take small amounts of iron on vessels taking cargoes of pipe and steel out of Mobile for that destination.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	32 00

Cast-Iron Pipe.—Phoenix, Ariz., has sent in specifications for 3000 tons of pipe to the United States Cast Iron Pipe & Foundry Co., and the National Cast Iron Pipe & Foundry Co. has taken numerous Middle West orders and is operating at around capacity. The Pacific Coast is taking about 4000 tons of high pressure pipe from the United States, the American, and the National companies. The base remains at $35 for 6 in. and upward, following acceptance of some business under that. The market seems to be hardening.

Finished Material.—The Tennessee company will operate its Bessemer plate mill in full this week in addition to continuing a rate of 50 per cent of capacity in other finishing mills. It has a rush order for 13,000 tons of heavy rails for the Huan Shan railroad in China. The order for 12,000 tons for Manchurian railroads has been delivered. The delivery of 12,000 tons of rails to Alaska will be completed out of Mobile this week. Ingalls Iron Works, steel fabricators, are at capacity on office and industrial buildings. The Gulf States Company's blooming mill resumed this week. Demand for wire mill products and for sheets has improved. Jobbers in the Southeast are placing larger orders.

Old Material.—Inquiries for stove plate and cast are fairly good, but steel remains inactive. Dealers have small stocks owing to heavy freight rates, which discourage country sellers from sending in supplies. Offers of 1000 cars of scrap from sawmills were not accepted on this account. Except as to stove plate and cast scrap the price list is nominal.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10 00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16 00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Cincinnati

CINCINNATI, Aug. 16.

Pig Iron.—The stiffening of prices in the Chicago market, while it undoubtedly had the effect of bringing out some tonnage for immediate shipment, has not stimulated buying to any great extent. There is some evidence, however, that the situation is improving, as there is more demand for malleable iron and alloys. Stove foundries are now increasing their melt, and it is expected that inquiries from this source will soon be received. During the early part of the week some fair tonnages were disposed of. An Indiana melter took 1000 tons of malleable iron, and a northern Ohio melter 400 tons of foundry. An eastern Ohio interest was a purchaser of 300 tons of Buffalo iron and a West Virginia melter bought 200 tons of southern Ohio iron. Several sales of from 100 to 200 tons were made in this territory, several of them being made on the basis of $20, Chicago furnace. There is very little interest in Southern iron, and while reports are current that $18 has been quoted, there is apparently no foundation for them, as most furnaces are holding firm at $19. In the southern Ohio district the market remains firm at $20 to $20.50 with no disposition to quote these prices for extended delivery. One interest in the last few days turned down offers to buy 1000 tons for delivery during the rest of the year at today's prices.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24 00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—An inquiry for approximately 1000 tons of plates and 500 tons of structural shapes has been received from a manufacturer in this district. A Kentucky oil company is understood to have placed a number of oil tanks with an Eastern manufacturer. The tonnage of plates involved was about 900 tons. Some small inquiries for bars and shapes are also being figured on. There is no indication of lower quoted prices than those published recently, although on an attractive tonnage it is said that 1.65c. for bars and from 1.70c. to 1.75c. on plates can be done. Some sheet inquiries have been received and while they are mostly for carload lots for immediate shipment, several 100-ton inquiries are before the trade. While there are reports that prices on sheets are being shaded, most of the orders being placed are at 2.40c. for blue annealed, 3c. for black and 4c. for galvanized. A jobber in this district is reported to have placed an order for 10,000 kegs of nails on the basis of $2.50 per keg, Pittsburgh. Some low prices are being made on light rails and bolts and nuts. It is said that 1.55c. can be done on light rails from some of the smaller mills. Some small orders are being placed and in some instances the full price of 1.85c. was secured. The Big Four Railroad is taking bids on 16,300 angle bars. It is understood that this road has purchased 2500 tons of tie plates from Pittsburgh and Chicago manufacturers. There are no structural inquiries of any size, and no awards have been made. A school building at Dayton, Ohio, which was to have been up shortly, has been postponed indefinitely. The First National Bank of Ashland, Ky., is having plans prepared by Dayton, Ohio, architects for an 11-story office building. Plant operations will not materially change during the week. The American Rolling Mill Co. at Middletown, will have 10 sheet mills on. The sheet mill of the Ashland Iron & Mining Co., Ashland, Ky., is running at approximately 50 per cent of capacity and the plant of the Ashland Steel Co. will run full for this week.

Warehouse Business.—Local warehouses report business as spotty. One day there will be a flurry but the next day business will fall off to practically nothing. Only small orders are being received. No price changes have been made since the ones quoted last week.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 5.75c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—The coke market is dull. A sale of 600 tons of foundry coke was made at $4.50 per net ton Connelsville ovens, and another of 200 tons at $4.15. Producers are less anxious to quote for forward delivery than has been the case recently. Prices are unchanged from last week.

Old Material.—Speculative buying by dealers has given the scrap market some show of activity, but while the price situation may have a firmer tendency, prices are unchanged. Some inquiries for heavy melting steel are being figured on, but the tonnages are not large. There is practically nothing moving in foundry scrap.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

Strikers in Pennsylvania lost $25,413,305 in wages alone, during the first six months of 1921, according to figures compiled by the State Department of Labor and Industry. This loss, resulting from 323 strikes, is said to be greater than the amount for any previous full year, since the figures began to be compiled, in 1916.

Cleveland

CLEVELAND, Aug. 16.

Iron Ore.—All of the older ore selling companies are vigorously opposed to any reduction in prices of ore, and buyers, as a rule, are not urging such action. It is true that one company, which within a few years established offices in Duluth and Cleveland, has offered to sell at a large reduction from the prevailing rates, but no sales are reported and it is not believed that a general reduction would stimulate the market; it is feared that it would cause some banks to ask for additional security on ore on which money has been loaned. The movement continues light and one important shipper which owns 28 vessels and has had six in commission, has now tied up two of the six.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Looking at the market from week to week, it is not so easy to see much change, but taking into consideration a period of several months and all of the territory covered by Cleveland agencies, it is clear that a noteworthy change for the better has taken place. In some cases, sales have increased in three months from 50 to 75 per cent and shipments from 50 to 100 per cent. This week in the immediate Cleveland district, sales are light and shipments fair, but numerous inquiries have been received from, and a considerable number of sales made to, customers outside of the immediate district. A sanitary company has purchased 1000 tons of foundry iron on the basis of $20.50, Valley. Numerous sales have been made from $20.50 to $21, Valley. Some buyers are expressing a willingness to take contracts for round tonnages to be delivered during the next six months at present quotations, but furnaces are slow in making contracts so far in advance.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$19.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.00 to 20.50
Southern fdy., sil. 2.25 to 2.75	26.92
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	36.00 to 36.25

Finished Iron and Steel.—The decision rendered by the Interstate Commerce Commission at Washington yesterday, refusing to authorize the issuing of $60,000,000 in bonds for the construction of the terminal on the Public Square, Cleveland, has removed from the market the largest pending structural contract. The original estimate was for 60,000 tons of shapes, plates and bars. If this project should ever be carried out it will be in the distant future. The 15,000 tons of steel for the Union Trust Co. building is being fabricated, delivered and stored by the American Bridge Co., but unlike the terminal project this one may go forward next year. Reports as to what, if any, progress has been made in the market the past week are conflicting. Most of the mills report a very moderate increase in buying. The car repair work recently awarded, some being taken in this district, has proved disappointing as far as new steel business is concerned, as most of the shops have plenty of steel in stock and they are using it. Prices are perhaps a little bit steadier, but reports of 1.75c. on plates continue to be heard. On hot rolled strips 2.25c. is still quoted. On a power plant at Ashtabula calling for 250 tons of structural steel, the McClintic-Marshall Co. is low bidder. Bids will soon be called for a number of school buildings in Cleveland and vicinity.

Bolts, Nuts and Rivets.—Cleveland manufacturers report a moderate improvement in business, especially in bolts and nuts, and are declining to meet concessions reported in other markets. Rivet manufacturers say that even if it is necessary to continue the present low rate of production, they will not meet the very low prices reported elsewhere.

Sheets.—The Canton Sheet Steel Co., Canton, Ohio, will resume operations in a few days and is buying sheet bars, which the mills have promised to deliver very quickly to meet early requirements. Quotations on sheets remain unchanged at 3c. for No. 28 black, 4c. for No. 28 galvanized and 2.25c. to 2.40c. for No. 10 blue annealed.

Warehouse Business.—Recent reductions in prices have brought out little if any new business and jobbers report the market extremely dull.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.25c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Old Material.—Activity among dealers indicates that they at least believe that conditions are improving and there also has been a fair amount of buying by consumers. The result is that nearly all prices have advanced and $12.25 seems to be the minimum on heavy melting steel. Other grades show advances of from 25 to 75 cents.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails, under 3 ft	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	7.00 to 8.00
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Youngstown

YOUNGSTOWN, OHIO, Aug. 16.

Steel market in this district is still hesitant, though it is much improved over a month ago. The Brier Hill Steel Co. has followed the action of Inland Steel in advancing the price of standard basic pig iron to $20, though the $18 base is still being quoted by other steel works interests.

Through inability to meet delivery requirements, a district sheet maker was compelled to turn down an order for 10 carloads of galvanized sheets offered at 4c. Recent improved buying of steel products has strengthened the scrap market and prices are up from $1 to $1.50 per ton. In finished products sheets are most active.

The Youngstown Sheet & Tube Co., which is supplying the by-product coke for Mary blast furnace at Lowellville of the Sharon Steel Hoop Co., has added a third battery of by-product coke ovens to the active list, making three of six batteries in commission. The gas is being consumed in the pipe furnaces. Previous to its suspension, the Mary stack was run on beehive coke.

An encouraging feature of the black sheet market is the volume of inquiry from consumers in widely separated sections, who have been out of the market indefinitely in many cases. One maker is now rolling an order for 480 tons of black and has another for 350 tons. Several orders involving in excess of 200 tons are now going through the mills. Most of the transactions involve business up to 500 tons.

While jobbers have entered the market more freely, they are still buying largely against requirements and no general buying movement is as yet under way to replenish depleted stocks. Stocks in many cases are unbalanced, while in others they are exhausted.

More activity is being displayed in the strip market, though the Ford Motor Co. continues to take the bulk of the output of the leading district maker. Other interests, however, are entering the market in a quiet way. The price range in hot strip is from 2.25c. to 2.40c., with the spread on cold-rolled from 4c. to 4.25c.

Due to recent revival in buying, manufacturers have made substantial reductions in stocks, especially in sheet accumulations, the price reductions constituting a controlling factor in such movement. One independent interest, for instance, in this territory, recently sold several thousand tons of sheets from warehouse stocks, leaving it only about 3000 tons of such material. This applies to other finished commodities as well, especially where the orders are for small tonnages. Such business is usually transmitted directly from the order departments to the shipping department, and frequently the tonnage is shipped the same day the order is telegraphed. But for this fact, revival in buying the past three weeks would have produced a much larger operating rate.

One maker is rolling No. 9 gage sheet material for frame stock for the Ford Motor Co., this being a small preliminary order to be followed by others if the material is satisfactory. Existing schedules are being largely supported by demand from the automobile trade and any drop in that demand is certain to be immediately reflected in the Valley steel situation.

In the pipe market, lap weld continues to feel the effect of competition from the resale market in the oil fields. Comparatively large tonnages of lap weld pipe have recently been rolled for export to Mexico, while some European pipe has been produced. Butt weld pipe, however, continues to support production in large measure.

Price uncertainties still prevail in plates, the minimum in the Valley being apparently 1.70c., though other makers farther west are quoting lower prices. It is certain that Valley producers would have to make further concessions on attractive tonnage. The plate market is still spotty.

Consumers of tin plate are specifying against contracts but doing little new buying. The price of $5.25 per base box is generally being observed for production plate, though stock plate has sold down to $4.75.

Most of the business in steel bars at this time is coming from the automobile industry for rim sections calling for light material. Some railroad bar business is coming through. The 1.75c. base is being sustained.

Though $32 has been the basis for most of the transactions in sheet bars, the market is definitely trending to a $30 level. Non-integrated sheet makers are taking heavier tonnages.

Activity in the scrap market follows general improvement in steel buying. One company has purchased 2000 tons of hydraulically compressed scrap at prices ranging from $9 to $10.50. Another interest has taken 1000 tons of heavy melting. The market is $10.50 to $11 for hydraulic scrap and $12.75 to $14 for heavy melting.

Boston

BOSTON, Aug. 16.

Pig Iron.—The Whitin Machine Works, Whitingsville, Mass., textile machinery, this week was in the market for 3000 tons of iron, silicon 2.00 to 2.50 per cent, but as far as known has not covered. One 400-ton lot of Buffalo No. 1X sold at $18.50, furnace, and a like lot of eastern Pennsylvania at a low figure to Massachusetts consumers. Inquiries and actual sales otherwise appear to have dwindled to car lots. Buffalo $18.50 iron has disappeared from this market, the company heretofore quoting on that basis now asking $20, furnace for No. 2 plain and No. 2X. Eastern Pennsylvania $18.50 iron also has practically disappeared, and No. 2 plain and No. 2X are now obtainable at $19 and No. 1X for $21, where round tonnages are involved. It is generally conceded by sellers that with the Whitin Machine Works business out of the way, $18.50 eastern Pennsylvania iron will have passed from the New England field. Car lots of eastern Pennsylvania No. 1X sold this week as high as $24.50 furnace and No. 2X at $23.50. One carload of malleable iron was taken by a Massachusetts melter at $19.50, furnace. Those furnaces heretofore offering iron at $18.50 are understood to have secured a sufficient backlog to insure

operations for some time. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$23.06 to $25.56
East. Penn., silicon 1.75 to 2.25	23.06 to 25.06
Buffalo, silicon 2.25 to 2.75	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25	24.46 to 25.46
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	30.16 to 31.16
Alabama, silicon 1.75 to 2.25	29.66 to 30.66

Finished Material.—A slump is noted in structural prospects and 2000 to 3000 tons figured on the past month remains uncovered. McClinitic-Marshall Co. has been awarded 190 tons for an Ansonia, Conn. electric plant. The Boston Structural Steel Co., Inc., Cambridge, Mass., is low bidder on 100 tons for a Great Northern Paper Co. machine shop. It recently was awarded 150 tons for a Northampton, Mass., college building, 100 tons for a Watertown, Mass., school, and about 100 tons for the Atlantic Dye Co., Millington, N. H. Stone & Webster have asked bids on 200 tons for the Ford, Green Island, N. Y., plant. The Lancaster Iron Works, Inc., Lancaster, Pa., is awarded 100 tons sheared plates for water pipes, Searsburg, Vt. Most mills quote plates at 1.85c., Pittsburgh, but 1.75c., was recently named. A Japanese consumer is inquiring on 350 tons, 3 x 6 ft., heavy gage blue annealed sheets. Domestic sheet business is confined to an occasional car-lot. Local July bar bookings were larger than those for June, and August will go well above July.

Warehouse Business.—While consumption of warehouse products in general throughout New England has not increased noticeably this month, better business is hoped for after Labor Day. Stocks of iron and steel bars and hoops and bands are gradually working downward and in certain cases are broken. Those of structural, plates and sheets show little shrinkage from week to week. Large stocks, coupled with keen competition for trade, have forced reductions of 5 to 10 per cent in machine and common carriage bolts and cap and set screws. The market appears amply supplied with wire and cut nails.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—The market for machinery cast is stronger, based on larger inquiries and purchases. Prices for cotton machinery cast are $1.50 to $2 under those for straight metal working machinery cast, the latter being in light supply. Little stove plate is available and prices are higher. Railroad malleable, although inactive, has strengthened with machinery cast and stove plate. Both New England and Pennsylvania consumers are buying borings more freely, one broker alone reporting sales of nine cars this week. On the other hand, machine shop turnings, forged scrap, bundled skeleton, street car axles and shafting have little, if any, call and quotations are largely nominal. One house sold a small tonnage of heavy street railway rails at 1c. per lb. at shipping point, otherwise the market for this old material is quiet. Pennsylvania mills will buy any tonnage of heavy melting steel available at $6.50, but yards, as a rule, are not willing to let go at any such figure.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.50 to $20.00
No. 2 machinery cast	15.50 to 17.50
Stove plate	16.00 to 17.00
Railroad malleable	15.50 to 16.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.50 to 4.50
Cast iron borings, chemical	3.50 to 4.50
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.00 to 11.50
Rerolling rails	9.00 to 10.00

Philadelphia

PHILADELPHIA, Aug. 16.

A decidedly better tone is in evidence, particularly in the local pig iron trade, which has been encouraged by the marked betterment of demand within the past few weeks. Another week in which sales have exceeded 15,000 tons, including 7000 tons of steel-making iron, has placed the few Eastern furnaces which are in blast in a fairly comfortable position for the next few weeks. The extremely low prices on foundry iron have disappeared and foundry grades are at least 50c. a ton higher than last week with the possibility that the low-priced sellers may put up their prices another half dollar within the week.

Pig Iron.—Another week of fairly good pig iron sales has served to create a better sentiment among sellers, and this is reflected in slightly higher prices on foundry grades. Apparently all of the 10,000 tons of iron which was thrown upon the market by an eastern Pennsylvania furnace at prices based on $18.50, furnace, for No. 2 plain has been disposed of and this maker has advanced its prices 50c. per ton, now quoting $19, furnace, for No. 2 plain and $19.50, furnace, for No. 2X, with the possibility that another 50c. advance may be made before the end of the week. Two other Eastern makers of foundry iron are quoting $20, furnace, for No. 2X, and some business has been closed on this basis. Two factors stand out prominently in the present market situation. One is the apparent determination of producers to go no lower and the other is the increasing interest taken by those consumers who believe that pig iron is a "good buy" at present prices. The few furnaces in blast in eastern Pennsylvania were unable to sell all they were making a few weeks ago, but now they are comfortably fixed for the next three or four weeks and are booking new orders at a rate equal to or in excess of their output. The largest purchase of the past week was 5000 tons of basic iron by a Harrisburg consumer, the price being about $19.50, delivered. A later sale of 2000 tons of basic to a Delaware plate manufacturer established a lower delivered price, namely $19. Sales of foundry iron have been in lots ranging from a carload to 1000 tons. A Lansdale, Pa., foundry is reported to have purchased about 1500 tons. There have been several sales of 500 tons or more. Pig iron producers and selling agents are firmly of the opinion that the turn has come in the pig iron situation, and they are considerably cheered by reports of higher prices at Buffalo, Chicago and elsewhere.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$19.84 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.34 to 21.26
Virginia No. 2 plain, 1.75 to 2.75 sil.	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	29.74
Basic deliv. eastern Pa.	19.00
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—A slightly better inquiry for ferromanganese is reported. A sale is reported at about $68, delivered, for a single carload. American producers continue to quote $70, delivered as far west as the Pittsburgh district, and $75, delivered in the Chicago district. Spiegeleisen, 18 to 22 per cent, is quoted at $27, furnace.

Semi-Finished Steel.—A few sales of billets at $30, Pittsburgh, constitute the first real activity in semi-finished in some weeks. Forging billets are quoted at $35, Pittsburgh.

Plates.—No steel product is quite so inactive as plates, the demand for which is next to nothing. Prices are weak but are not well determined because of the small volume of business. On the ordinary run of small inquiries Eastern mills are disposed to quote 1.85c., Pittsburgh, but on anything attractive 1.75c. can quite easily be done and quotations of 1.70c. have been reported. The market may be quoted at 1.75c. to 1.85c., Pittsburgh.

Structural Material.—Shapes are somewhat firmer than plates, but shading of prices is occasionally reported. Two local jobs that are up for bids are a moving picture theater for the Stanley Co., 1000 tons, and an addition to the Wesley Building, 400 tons. The general contract for the Chelsea National Bank at Atlantic City has been awarded to Warren Moore & Co., who will buy the steel, about 300 tons. We quote plain material at 1.85c., Pittsbrugh.

Rivets.—Further price cutting on rivets has brought structural quality down to 2.40c. per lb., Pittsburgh, and boiler quality to 2.50c. per lb. Railroads are more active buyers for car repair work.

Bars.—Soft steel bars are quite firmly held at 1.75c., Pittsburgh. A fair amount of buying of carload lots is reported. Bar iron is available at 1.70c., Pittsbrugh.

Sheets.—On small lots of blue annealed 2.40c., Pittsburgh, is the usual quotation, but on larger lots 2.25c. can be done. Black sheets are quoted at 2.90c. to 3. and galvanized sheets at 3.85c. to 4c., Pittsburgh.

Wire Products.—The price of wire nails is being firmly held at $2.75 per 100 lb. keg, Pittsburgh, and other wire products are also firm. A fair business in nails is being done.

Warehouse Business.—A slightly improved demand for steel out of stock has been noted in the past week. A feature of the demand is that sizes which have not been called for in months are now on the order sheets. Prices for Philadelphia delivery are unchanged as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.75c.; round edge iron, 3.05c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black sheets, No. 28 gage 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in.; 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4.20c.; squares and hexagons, cold-rolled steel, 4.70c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 6.50c.; toe steel, 4.50c.

Coke.—Foundry coke is slightly firmer at $4 to $4.50, Connellsville. Apparently it is not so easy to buy at $3.75, the minimum which has been ruling. Furnace coke of good quality is obtainable at $2.75 to $3, while even as low as $2.60 has been quoted.

Old Material.—With very few transactions, the undertone of the scrap market is fairly strong. This is due principally to the belief of dealers that any important demand will send prices upward; hence they are not willing to sell anything but very small lots at the current prices. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.50 to 8.00
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

San Francisco

SAN FRANCISCO, Aug. 10.

Pig Iron.—Rather more business was reported for the past week or ten days on the Coast, but the general situation remains quiet. The most prominent inquiry was from the Southern Pacific Co., involving 300 tons of No. 1 foundry and 500 tons of No. 2. It is understood that 500 tons of Belgian material was sold at around $30, c.i.f. San Francisco. The Southern California Iron & Steel Co., Los Angeles, has placed an order for 150 tons of basic pig iron at around $31, c.i.f. San Pedro. The Puget Sound Navy Yard is asking for bids on 150 tons of foundry pig on Aug. 12. Late offerings of Belgian basic pig iron are reported at about $25 a gross ton, delivered consumers' works, which is an unusually low price. With the general curtailment of foundry operations, however, interest has not been pronounced. Business in coke has been small and principally of a routine nature.

Old Material.—This market remains almost completely dormant, and real trading is sporadic and on a small scale. Prices are nominal at around $9 a gross ton delivered for heavy melting steel and at about $20 a net ton delivered on cast iron scrap.

Cast Iron Pipe.—During the past fortnight, there is to be reported a limited business from municipal sources, and a little revival of private business, involving several hundred tons. The market has displayed another softening tendency, and the price is now ruling around $40 and even below. Douglas, Ariz., is calling bids on Aug. 12 for 30 tons of 4-in. pipe, and Sacramento is inquiring for 35 tons of 6-in. pipe. The Central Foundry Co. announces, effective here a reduction of $5 a ton on sanitary cast iron pipe.

Finished Iron and Steel.—Business is rather light the market restricted by labor troubles as well as by the prevailing depression. Steel interests can see little hope for a revival until the building trade contention is settled. Market prices continue unsettled. Considerable foreign material, largely in the form of Belgian billets and standard rails, is reported coming in and underselling domestic products by a good margin. The Southern Pacific Co. has again entered the market for materials, particularly sheets, plates and bars. From the South the Llewellyn Iron Works is inquiring for 300 tons of shapes, and another Los Angeles interest has contracted for 400 tons of bands.

Building Increases in Chicago

Building permits issued in Chicago in July showed an increase of 110 per cent in frontage covered over the same month a year ago. Permits were taken out for 754 buildings, fronting 21,403 ft. and involving a cost of $14,400,650, as against 253 permits, 9718 ft. of frontage, and $6,669,300 for July of last year. There was also a material gain over June, 1921, the permits for that month having numbered 675, covering 18,510 ft. of frontage, and involving $7,484,200. Figures for July covering the past ten years show that the frontage covered by permits issued in that month this year exceed those of all years back to 1916, and do not fall very far short of July, 1916, 1915, and 1913, and are exceeded by July, 1914, and 1912, by 10,000 and 13,000 ft. respectively. Small residences costing from $4,000 to $15,000 lead all other types of structures in the number of permits issued. The construction of a large number of apartments is also being undertaken. Permits for large office buildings and other structures involving fabricated steel are exceedingly few.

While fabricated steel tonnage bears a more or less definite ratio to the production of structural steel, the yearly percentages vary with exigencies of the time. In 1920, with the highest structural output on record, only 35 per cent of the tonnage reappeared in the fabricated reports. The usual percentage is about 45. In 1915, when structural tonnage reached an apex, the percentage reached the high figure of 61.

MEXICO BUYS LOCOMOTIVES

Places 110 with Two American Builders—Japanese Market Depressed—Venezuela Plans New Railraods

NEW YORK, Aug. 16.—Although there has come a distinctly quieter tone to the export market during the past fortnight, numerous and continued reports from various foreign markets of projects under consideration, which will involve large uses of iron and steel, pipe and machinery, give the near future an optimistic aspect. Mexico as a neighboring market is apparently becoming a safer customer for American sellers, evidenced by the recent credit of $2,000,000 for a period of three years and $500,000 in cash advanced for roadbed repairs and locomotive purchases by the Baldwin Locomotive Works. The National Railways of Mexico have placed in the United States with the two leading locomotive interests a total of 110 locomotives of various types, of which 83 are being constructed by the Baldwin Locomotive Works under the $2,000,000 credit arrangement and 27 by the American Locomotive Co. on a ten months extension of credit.

Japanese Market Dull

While buying from Japan is light and Japanese buyers are facing a declining rice and silk market as well as lower prices on iron and steel, the latter caused by the depressed situation in the United States, numerous large projects are planned throughout the Far East. German and Belgian low prices obviously are partly the underlying cause of the present cessation of purchases from Japan, as in a majority of cases, the Continental quotations are as much as 50 per cent below the American makers' price. In evidence of this, a quotation submitted recently by a Japanese branch in New York on No. 2 gage zinc sheets, used in the boxing of matches, was about $300 per ton, c.i.f. Japanese port, compared with a German price of $140 per ton, c.i.f. Japan.

The recent activity in purchases of electrolytic and casting copper, most of which was either for direct shipment to China or for trans-shipment from Japan, has dropped off considerably, through the action of the Chinese Government in temporarily prohibiting shipments of copper to the Chinese mints, because of difficulties between the political factions of the North and South of China. Japan, however, is expected by some to enter the market at a later date for copper to be used for drawing into wire for the various hydro-electric projects, now planned or under construction in Japan and throughout other Far Eastern countries.

Recent Japanese orders have been confined largely to light gage black sheets and small quantities of corrugated galvanized sheets. One exporter has booked an order for 7500 packages of oil size tin plate (slightly less than 10,000 base boxes) and a total of 200 tons of No. 30 gage black sheets. An inquiry now in the hands of exporters to the Far East is from the South Manchurian Railroad and calls for a 20-ton locomotive crane. An inquiry that recently appeared in the American market from Japan, but in which but little faith is placed, calls for about 500 tons of soft steel bars, ½-in. and ¾-in. An exporter with a tonnage of about 11,000 ft. of canceled locomotive boiler tubes at Kobe, Japan, has disposed of the entire lot for 3000 yen ($1,455).

Railroads Planned in Venezuela

Among the South American nations, either planning railroads, or attempting to interest foreign capital in the construction of additional railroad lines, is Venezuela. The present rail facilities of the country consist of about 600 miles and a total investment of $40,000,000. Four new roads are being considered; one connecting a cacao region with the coast; a second through the cattle, coffee and tobacco districts; a third running from the oil country to the coast and a fourth connecting the Yuruari gold mines directly with a port and opening rich iron ore deposits.

The United Engineering & Foundry Co., Pittsburgh, has completed shipment of 9500 tons of rolling mill and steel works equipment from its Youngstown plant to England, France, India and Australia. The Youngstown units of the company have been almost exclusively engaged on this work for several months. J. J. Choorin Co., Inc., general exporters of Harbin, Manchuria and Vladivostok, has opened an office for the United States and Canada at 149 Broadway, New York. This office has been opened for the purpose of buying for the general trade in Harbin and Vladivostok and supplying the four large department stores of the company.

R. G. Dun & Co. are in receipt of an inquiry from A. Galland, 125 bis Avenue Parmentier, Paris, mine and factory supplies, requesting price lists, etc., on a pipe threading machine, motor operated, for right and left hand American threading of pipe from 4 to 10 in. A 2-kg. capacity gasoline or kerosene air compressor is also wanted. Fn. Marechal & Co., Malines, Belgium, request catalogs and prices from manufacturers of pin and rivet making machinery and stamping machines. Ateliers Armand & Deoune, 56-64 Boulevard Oddo, Marseilles, France, is interested in lathes for roughing cast iron, tempered cylinders 0.425 meter in diameter and 1.10 meters long.

REFRACTORIES MARKET

Magnesite and Chrome Brick Reduced $5 Per Net Ton—Few Changes in Other Brick

PITTSBURGH, Aug. 15.—Inquiry for refractories has improved appreciably in the past week or 10 days; and while actual business still is of rather moderate proportions, the belief is gaining ground that a turn from the extreme dullness of the past several months is at hand. Since the first of the month all manufacturers have been able to make some inroads upon their stocks, and it is confidently expected that the monthly statement of stocks on hand as of Aug. 31 will be the most favorable of any so far this year. The increase in shipments has not been accompanied by any material increase in production, and the suggestion is made in some quarters that if much steel works capacity is started up during the latter part of this year, some difficulty might attend the getting of sufficient supplies of brick. The largest sale recently reported involved 300,000 ladle brick to the Republic Iron & Steel Co. The more general policy of the steel companies is to buy as supplies are required.

Effective, Aug. 10, makers of magnesite and chrome brick have announced a reduction in prices of $5 per net ton. Demand for these brick is exceedingly light, and the decline in prices also may be ascribed to the desire of makers to reduce their stocks. Magnesite brick in standard sizes now are quoted at $65, which compares with $110, the peak price of last year, and $135 the high point reached during the war period. We note no special change in prices of fire clay and silica brick, but if there is a definite tendency it is down. As matters stand, there is not especially close adherence to quotations, and it is frankly admitted that there would be considerable sharpening of pencils on the appearance of a really sizable inquiry.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $40.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33 00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 42.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		65.00
Chrome Brick:		
Standard size, per net ton		52.00

British Iron and Steel Market

Improved Activity All Along the Line—Cut in Coke Prices Stimulates Business

(By Cable)

LONDON, ENGLAND, Aug. 16.

Coke prices are falling in all districts. Nine Cleveland furnaces are now blowing and two more are to be started immediately. Others are expected to commence operations as early as possible, for there are prospects of a resumption of steel making. Number 3 G.M.B. is still officially quoted at £6 ($21.84) for home consumption, though prices were forced up during the stoppage of iron making operations, and sellers now quote £6 15s. ($24.57) for home buyers. The export premium has been dropped.

Luxemburg basic iron is arriving, priced at £4 10s. ($16.38) delivered Tees. Belgian foundry iron is being sold here at £5 ($18.20) c.i.f. Tees. Hematite makers are well booked up ahead, and are not anxious to cut export quotations.

Steel works generally are awaiting orders, and some are reducing export prices. Home quotations are unchanged, but consumers are showing little disposition to purchase. The ship joiners' strike still continues. The Yarrow shipbuilding and engineering works are to close Nov. 30, owing to labor troubles and other causes.

There is a fair demand for Continental steel, but little business is being placed. German merchant bars are quoted at £8 5s. (1.34c. per lb.) to £8 10s. (1.38c. per lb.) f.o.b., for November shipment, which is the earliest date for which sales arrangements are now entertained. Prices made to India were £8 17½s. (1.44c. per lb.) c.i.f. German billets are held at £6 10s. ($23.66) f.o.b., for November delivery; plates at £7 15s. (1.26c. per lb.) f.o.b., for October.

Luxemburg has sold to the United Kingdom good lines of sheet bars at £6 10c. ($23.66) f.o.b. Supplies are now becoming scarce, up to £6 15s. ($24.57) f.o.b. asked. Belgium is quoting on untested plates £8 (1.30c. per lb.) f.o.b.; on tested plates, £8 10s. (1.38c. per lb.) f.o.b. French billets are held at £6 10s. ($23.66) to £6 15s. ($24.57) f.o.b.

As Welsh coal has been reduced 8s. ($1.46) and tin plate bars £1 ($3.64), tin plate prices are consequently easier. Prompt delivery is quoted at 24s. ($4.37) basis f.o.b. and November at 23s. ($4.19) basis f.o.b. There is some revival of demand from India, the Far East, South Africa and South America, and small orders are being booked. Welsh tin plate workers are becoming alarmed at the fall in prices of their product, and the prospect of further reduction of their wages, owing to the drop in the steel on which the wages are based.

India has bought a fair line of 24-gage galvanized sheets at £21 10s. (3.49c. per lb.) f.o.b. Small sales have been made to South America, particularly to the Argentine, at £22 (3.575c. per lb.) f.o.b. in cases. Straits specifications are being sold at £29 10s. (4.79c. per lb.) f.o.b. Wales is offering to Japanese specifications black sheets at £22 10s. (3.66c. per lb.) to £23 (3.74c. per lb.) f.o.b., for October shipment. Belgium is quoting £20 (3.25c. per lb.) f.o.b., for October and November shipment, on the same specifications.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.64 per £1 as follows:

Durham coke, at ovens	£1	15							$6.37			
Cleveland basic	7	7½	&	£7	10*				26.85	&	$27.30	
Cleveland No. 1 foundry	7	0							25.48			
Cleveland No. 3 foundry	6	15							24.57			
Cleveland No. 4 foundry	6	10							23.66			
Cleveland No. 4 forge	5	17½							21.39			
Hematite	7	0*							25.48			
East Coast mixed	8	0	&	7	5*				29.12	&	26.39	
Ferromanganese	18	0	&	14	10*				65.52	&	52.78	
Rails, 60 lb. and up	10	10	to	14	0				38.22	to	50.96	
Billets	9	0	to	9	10				32.76	to	34.58	
Sheet and tin plate bars, Welsh	8	0	to	8	10				29.12	to	30.94	
Tin plate base box	1	3	to	1	4½				4.19	to	4.46	
									C. per Lb.			
Ship plates	14	0	to	15	0				2.75	to	2.44	
Boiler plates	19	0	to	21	0				3.09	to	3.41	
Tees	14	0	to	15	10				2.75	to	2.52	
Channels	13	5	to	14	15				2.15	to	2.39	
Beams	13	0	to	14	10				2.11	to	2.36	
Round bars, ¾ to 3 in.	13	0	to	13	10				2.11	to	2.19	
Galvanized sheets, 24 g.	21	0	to	22	0				3.41	to	3.575	
Black sheets	17	10							2.84			
Steel hoops	17	0							2.76			
Cold rolled steel strip, 20 g.	26	10							4.31			

*Export price.

CZECHO-SLOVAKIAN MARKET

General Curtailment of Production—Further Combinations of Companies Planned

(Special Correspondence)

PRAGUE, CZECHO-SLOVAKIA, July 28.—The situation seems to be going from bad to worse in Czecho-Slovakian industry and conditions in the coal and coke industry are causing grave apprehension. The recent miners' strike in the United Kingdom and the political unrest in Upper Silesia brought but a short and almost imperceptible relief. Export channels are blocked by the high price of Czecho-Slovakian coke and Austria, hitherto the principal customer, has arranged to depend upon German supplies, shown by the recent Stinnes-Alpine Montan Gesellschaft transaction.

Steel Works Lay Off Thousands

Activity in the iron market has practically ceased and there is no evidence that the bottom of the slump has been reached. The Trzynietz iron works has blown out the third of its four blast furnaces and the rolling mills are operating four days a week. The works at Branka laid off 400 hands a fortnight ago and the Hahn tube rolling mills at Oderfurt, which have been operating part time, have announced a further curtailment of production. Tube mills and steel works are operating about four days per week. The Witkowitz steel works has shut down its open-hearth plant and approximately 8000 of its 20,000 workers will probably apply for unemployment benefit this month. The Prague Iron Industry Co. is closing down one plant after another and some 18,000 carloads of ore are stored at the Nucitz mines. Iron and steel works are operating at about 40 per cent of normal capacity.

Combinations in Steel Industry Continue

The tendency to establish communities of interests and working agreements in the iron and engineering industries has steadily gained ground during the past months and the present slump only serves to stimulate these activities. Following the recently announced formation of a community of interest among the three largest works, Prague Iron Industry Co., Witkowitz Steel Works and Mining & Smelting Co., plans are maturing for the establishment of close connections with the steel industry and negotiations with the Poldi steel works with plants at Komotau and Kladno are said to be pending.

In an effort to revive the export market, particular attention is being devoted to Russia and Poland, the two primary markets of the future. There are also indications that the iron industry combination is seeking to extend its influence to the metal-working industry and the name of the Ruston works is frequently mentioned in this connection.

The Towmotor Co., Cleveland, has received from one of the governments of South America an inquiry for 50 of its gasoline tractors with hoist attachment. Inquiries have also come in from British Columbia, Montreal, Seattle, New Orleans and Atlanta, indicating a considerable revival of interest.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0 415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.80c. to 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roonng nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	$2.50
Large boiler rivets	2.60
Small rivets	70, 10 and 10 per cent off list
Small machine bolts, rolled threads	65 and 10 per cent off list
Small sizes in cut threads	75 and 10 per cent off list
Longer and larger sizes of machine bolts,	75 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:	
Smaller and shorter, rolled threads	70 and 5 per cent off list
Cut threads	65 and 10 per cent off list
Longer and larger sizes	65 and 10 per cent off list
Lag bolts	70 and 5 per cent off list
Hot pressed sq. or hex. blank nuts	$5.25 off list
Hot pressed nuts, tapped	5.00 off list
C.p.c. and t. sq. or hex. nuts, blank	5.10 off list
C.p.c. and t. sq. or hex. nuts, tapped	4.75 off list
Stove bolts in packages	80, 10 and 10 per cent off list
Stove bolts in bulk	80, 10 and 2½ per cent off list
Track bolts	3.25c. to 3.75c. base

Square and Hex. Head Cap Screws

½ in. and under	70 per cent off list
9/16 in. to ¾ in.	70 per cent off list

Set Screws

½ in. and under	70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.	70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.75 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $3 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.80 base per 100 lb. Tie plates, $2 to $2.05 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.ob. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.15	Nos. 11 and 12	2.35
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.45
		Nos. 15 and 16	2.55

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.70	No. 28 (base)	3.00
Nos. 22 to 24	2.75	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

Aug.	Copper, New York: Lake	Copper, New York: Electrolytic	Tin: New York	Lead: New York	Lead: St. Louis	Zinc: New York	Zinc: St. Louis
10	12.00	11.75	26.87½	4.40	4.25	4.75	4.25
11	12.00	11.75	26.50	4.40	4.25	4.75	4.25
12	12.00	11.75	26.32½	4.40	4.25	4.70	4.20
13	12.00	11.75	.....	4.40	4.25	4.70	4.20
15	12.00	11.75	26.25	4.40	4.25	4.70	4.20
16	12.00	11.75	26.12½	4.40	4.25	4.70	4.20

New York

NEW YORK, Aug. 16.

The better feeling which has been manifest for the last two or three weeks continues but buying has not increased. The copper market is quiet but firm. Buying of tin has been fair at lower prices. The lead market is a little more active with the tendency higher. The zinc market shows scarcely any improvement but prices are steady.

Copper.—While buying is limited both for domestic and foreign account, it is impossible to buy electrolytic copper below 11.75c., New York, or 12c., delivered, for early delivery. At these levels some business is reported by several sellers, but most of the large producers are still out of the market except under unusual circumstances. Future delivery is not freely quoted by all sellers, but can be obtained at about 12.12½c. for September and 12.25c. for October.

Tin.—On two days last week a fair business was done in future shipment, the total sales amounting to about 350 tons. On the first day dealers were the principal buyers, but on the second consumers were fairly liberal purchasers. Thus far this week the market has been stagnant. The buying last week was due to a recession in prices, the metal being regarded as cheap at the levels reached. Spot Straits tin to-day is quoted at 26.12½c., New York. The London quotations to-day were about £8 per ton lower than a week ago, with spot standard at £154 15s., future standard at £156 and spot Straits at £155 10s. Arrivals thus far this month have been 2710 tons with 2810 tons reported afloat.

Lead.—Some sellers report the market quiet, but others state that a good business has been done in the past week, which has resulted in a firmer market. The leading interest continues its quotation unchanged at 4.40c., New York and St. Louis, but independents are asking 4.45c., New York, and 4.25c., St. Louis, at which levels they are getting some business.

Zinc.—The livelier inquiry and the better business which were reported in the first two weeks of this month seem to have disappeared and the market has turned decidedly quiet, but not necessarily weaker. Prime Western is unobtainable apparently below 4.20c., St. Louis, or 4.70c., New York, at which the current small business reported is being done.

Old Metals.—While business is not active, there is a little better tone to the market. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.75
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Antimony.—In a quiet market prices have sagged until wholesale lots for early delivery are now obtainable at 4.50c., New York, duty paid.

Aluminum.—There is no change in the price of the leading interest for virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery which still stands at 24.50c., f.o.b. plant, but the same grade from foreign sources is available from American importers as low as 19c., New York, duty paid.

Chicago

AUG. 16.—Tin has declined in sympathy with the London market. Purchases of this metal are largely by dealers who consider it a good investment at the present price. Lead has declined slightly, while copper and spelter are unchanged. Users are buying lead and tin cautiously and in some instances are trying to buy for future delivery at lower prices. Producers are disinclined to quote on futures because every concession, no matter how slight, brings out still lower bids by users. Buyers of copper are offering less than producers will accept. The old metals are unchanged. We quote Lake copper at 12.50c. in carload lots; tin, 28.50c.; lead, 4.35c.; spelter, 4.30c.; antimony, 7.50c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 16.—Demand for lead and zinc amounts to virtually nothing. The markets were never so dull as now. There is no demand for copper. The old metal markets are without interest. Lead is quoted at 4.20c. and spelter 4.20c., car lots. We quote Lake copper, car lots, at 12.73½c. to 12.98½c.; tin, 27.11c.; antimony, 5.33½c. On old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c., and aluminum, 9c.

Pittsburgh Meeting of Industrial Cost Association

At the regular monthly meeting of the Pittsburgh section of the Industrial Cost Association, held at Seventh Avenue Hotel, Pittsburgh, Aug. 10, A. A. Alles, Jr., secretary and treasurer of the national association described cost systems used by the Fawcus Machine Co., Pittsburgh. James P. McLean, Pittsburgh Forge & Iron Co., chairman of the Pittsburgh section, discussed the industrial cost lexicon or handbook, which is to be published by the national organization and will standardize industrial cost termonology. At the next meeting of the Pittsburgh section, to be held at the Seventh Avenue Hotel, Pittsburgh, Sept. 14, Jay Chapin, assistant secretary of James H. Matthews Co., Pittsburgh, will describe the cost system of the Matthews company.

Tinplate Exports from Liverpool

Consular reports show in the following table the quantity in gross tons, and countries of destination, of the tinplates and tinned sheets exported from Liverpool in 1919 and 1920:

Countries of Destination	1919 Tons	1920 Tons	Countries of Destination	1919 Tons	1920 Tons
France	34 357	60 526	Germany	309	1.874
B. East Indies	33 760	51 579	Russia	1.303	1.504
Australia	36.033	47 336	Argentina	5.701	1.148
Netherlands	16,032	21,598	Rumania	2,574	1.004
Portugal	17,452	18,585	Canada	500	957
China	7,535	17,118	United States	254	625
Belgium	8.761	17,032	All other countries	85,449	73 359
Italy	6,056	16,073			
Norway	20,164	12,761			
Japan	13,222	9 958	Total	289,462	353.017

The total value of the tinplate and tinned-sheet exports in 1919 was $53,914,317 and $92,240,682 in 1920.

METAL SCHEDULE NEXT WEEK

Steel Interests Oppose Ferro Alloy Duties—Agreement Reached on American Valuation

WASHINGTON, Aug. 16.—Hearings before the Senate Committee on Finance on the metal schedule of the permanent tariff bill probably will not begin until next week. It had been hoped to reach them this week, but so many witnesses asked to be heard on the chemical and the earths, earthenware and glassware schedules, the two which precede the metal schedule, that this idea had to be abandoned. Efforts to expedite the hearings in order to prepare the bill for reporting have not been as successful as could be wished. Under a rule adopted by the committee each witness is allowed 15 minutes except where the subject under discussion is considered to be important enough to justify more time. The latter situation already has developed in a number of cases on the chemical schedule, hearings on which began yesterday.

The first witness to be heard on the metal schedule will be Chairman John A. Topping of the Republic Iron & Steel Co., who was in Washington yesterday. He will act as spokesman for the indepedent iron and steel interests of the country, covering the entire schedule. It is known that part of his testimony will be directed against the rates of duties carried in the ferroalloy section, which has been the object of attack from many consumers. Vigorous efforts will be made to induce the committee to revise the section sharply downward, and in the case of some items, such as manganese ore, the request will be made for restoration to the free list. Mr. Topping, in addition to speaking on the metal schedule as it was passed by the House, will ask that raw materials used by the iron and steel trade be incorporated in the metal schedule, where duties are to apply, instead of being included in other schedules, as some of them are in the House bill. Among such items are magnesite, which was placed in the chemical schedule, and fluorspar, included in the earths, earthenware and glassware schedule. Refractory brick, limestone and graphite, used by steel works and foundry interests, are also carried in the earths schedule. It is pointed out that items of this character are so closely related to the iron, steel and foundry trades that logically they should be placed, when on the dutiable list, in the metal schedule. Names of witnesses other than Mr. Topping who are to appear before the committee in connection with the metal schedule hearings have not been given out, but it is understood that there will be a full presentation of views on the subject and that some of those to be heard will require more than 15 minutes to give their testimony. Plans have been made so that men of the trade specializing in certain products will speak on these lines.

There will be both opposing and supporting views with regard to rates in the metal schedule, and it is stated that domestic producers of manganese and other ores and ferroalloys will contend for the House bill rates as strongly as they are combatted. There will be a contest also, it is stated, over crucible steel products, some opposition having developed to the rates in the pending bill.

American Valuation Agreed Upon

Over and above the rates carried in the tariff bill, the steel trade is showing interest in the administrative features, which as adopted by the House have been quite acceptable to manufacturers. The American valuation plan has been favored by iron and steel interests, and they are satisfied with the compromise made on it last week between majority members of the Senate Committee on Finance and the House Committee on Ways and Means, which gives a rather definite promise that it will be enacted into law as agreed upon by the Senate and members of the two committees. This being the basis on which ad valorem rates are to be assessed, it was considered necessary by the majority members of the Finance Committee to arrive at an understanding regarding it before proceeding with hearings on the schedules. The subject brought out spirited contentions from witnesses before both committees.

Methods of Assessment

Chairman Fordney of the Committee on Ways and Means said that even with the changes made in the American valuation plan, which are relatively mild, a distinct victory had been won for the proposal. The changes were decided upon after conference between members of the Finance Committee and Treasury experts. It is claimed by the Senators that the changes will make the valuation plan more workable and less likely to result in litigation. Under the revised provision, ad valorem rates will be assessed on the basis of the American wholesale selling price on all imports, where comparable and competitive articles of domestic manufacture are found. Where no comparable and competitive articles exist, the duty will be assessed on the American wholesale selling price of a comparable and competitive imported commodity. In the event no such basis prevails, then the duty will be levied on the value of the articles in the country of origin at the time of export, plus necessary transportation and other expenses to an American port and a reasonable profit, totaling not less than 16 per cent of the value of the articles. If no basis is found in the first three alternatives, the plan of assessment will be to revert to the production cost, plus the expense of laying the shipments down in America. It has been stated that the provision as finally agreed upon would apply to about 75 per cent of all imports. In the case of iron and steel there will be few if any instances where the ad valorem duties cannot be based on comparable and competitive products. One of the important advantages the plan gives to domestic iron and steel makers, it has been stated, is on products carrying extras. Importations when coming under the classification of extras will be made dutiable, not on the base prices, but on the latter plus the extras.

With the American valuation plan adopted and with the anti-dumping act in effect, some American makers of steel believe there need be no cause for alarm over competition with German steel. Mr. Topping is among those who share this view.

Graphitization in Cast Iron

Microscopic study of graphitization in cast iron has been further studied by the Bureau of Standards, Washington. The investigation supplements that reported in technologic paper No. 129. After prolonged annealing considerable graphitization, that is, change in the combined carbon, occurs in the material below the thermal critical range (approximately 700 deg. C.). Below 500 deg. C., however, no change was detected even after a very prolonged heating period. In the low-temperature graphitization, only the pearlite is affected; the free carbide does not appear to be changed until the thermal critical point has been passed and solution of this constituent has begun. The form in which the graphite exists after annealing depends upon initial structural state of the iron. If any flakes of graphite exist, they act as nuclei for the deposition of the graphite formed during annealing; if no such flakes are present, the new graphite takes the form ol small globules rather than flakes.

The experimental work of this investigation, furnace work, chemical analyses, microscopic examination, has now been completed and the data are being put in shape for publication.

GERMAN PRICES HARDENING

Industrial Problems as Affected by Taxation at Home and Tariff Walls Abroad

(By Air Mail Express to London)

BERLIN, GERMANY, Aug. 1.

The past month has witnessed a hardening of most commodity prices and indications are not lacking that the increase in living costs—which will become more pronounced as autumn approaches and the proposed new taxes will come into force—will start a fresh period of wage claims. The recent price advance for certain grades of coal by the Rhenish-Westphalian Coal Syndicate has automatically brought about an increase in cement prices, which in turn are reacting upon the building trades, and the planned increase in potash prices will doubtlessly result in dearer agricultural product. One gains the impression that official circles are by no means wholly averse to the idea of sanctioning higher prices to agriculture, industry and trade, with a view to increasing public revenues by increasing the taxability of the three groups to the possible maximum. Whether the taxation dilemma can be solved without further inflation remains to be seen. Inflation and watering of capital stock are going hand in hand.

More Amalgamations

Plant extensions and formation of new combines or mergers are being announced almost daily. The Ottensener Eisenwerk Aktien Gesellschaft at Ottensen-Altona (near Hamburg) is negotiating with the Hamburg authorities for a site measuring 71,800 sq. yd. and located in the old petroleum harbor in Hamburg, where a ship's boiler plant is to be erected. One of the larger mining concerns, the Ilseder Hütte, is conducting iron ore mining operations in the Goslar district (Central Germany), where a new shaft is being sunk near Haverlahwiese. The Gelsenkirchner Bergwerks Aktien Gesellschaft is likewise showing activity in pushing mining operations. It is also announced that the idle pits at Wettin and Löbejün, owned by the State, will shortly be reopened and operated by the company.

Under the name of "Gesellschaft Aluminium Thermie—Professor Dr. H. Goldschmidt," a new company has been established by the inventor of the thermit patent, Dr. Hans Goldschmidt, in co-operation with the Mark steel works at Wengern-on-the-Ruhr. The company will primarily engage in welding operations, particularly rail welding on the road, as well as in the production of metals and alloys, both by the aluminum-thermit process and other new patented processes.

The tendency of merging of interests has been forming a feature in the metal working fields. The Deutsche Maschinenfabrik (Demag) at Duisburg has expanded. Interest is focussed on the Maschinenbauanstalt Humboldt at Cologne. There has lately been some heavy buying in Humboldt shares by a group believed to be connected with the Klöckner concern, while a foreign group is likewise reported to evince a strong interest in the shares of that company. The same parties are also stated to have their eyes on the Flander machine works.

Obstacles to Export Business

In the iron industry, the activity at wire mills, construction shops and rail mills deserves mention. Less satisfactory conditions appear to obtain in the Remscheid and Solingen tool and cutlery industry, where the lag in sales is largely accounted for by the severe customs restrictions by Spain, Italy, Norway and Canada. The Bergische Chamber of Commerce has petitioned the Government to intervene at the Spanish and Italian Governments with a view to having the customs rates on small iron ware reduced in order to avoid hardships to the industry.

The overseas market seems to be somewhat slow in developing but your correspondent learns from an authentic source that trade in hardware and small iron and steel ware with China has been gaining in volume at a marked rate since the conclusion of the commercial treaty between China and Germany. Inquiries for fairly large shipments are being received and substantial orders have already been closed. Most of the business is being done by firms who were catering to the Chinese market before the war. The enamel ware industry is showing activity in working the South American market, where, according to a prominent Saxon firm, kitchen ware is meeting with a good demand.

A leading Hanover works has just entered an order by the Dutch State Railroads for 2000 cars and 100 coaches. Krupp's are known to have sent a representative to Riga, who was received by the ministers of traffic and finances and apparently is testing the market for rolling stock, motors, agricultural machinery, etc. Bulgaria is in the market for railroad material and mining equipment. The purchasing commission of the Bulgarian State Railroads has established an office at Berlin and so has a mission representing the State mines at Pernik.

Quotations are as follows, per metric ton with the mark at 1.24c.:

	Marks	
Billets	1550–1580	$19.22 to $19.59
Sheet bars	1530–1580	18.97 to 19.59
Blooms	1400	17.36
Ingots	1300	16.12
Bar iron	1900–2000	23.56 to 24.80
Structural shapes	1800–2100	22.32 to 26.04
Squares	2100–2200	26.04 to 27.28
Concrete bars	1850–1950	22.94 to 24 18
Rounds, drawn	2600	32.24
Hoop iron, cold rolled, annealed.	3400	42.16
Rails, standard sections	2350–2400	29.14 to 29.76
Wire rods	2000	24.80
Sheets, heavy	1750–1850	21.70 to 22.94
Sheets, medium	1850–1950	22.94 to 24.18
Plates, light	2200–2300	27.28 to 28.52
Sheets for stamping, double plan	3900–4200	48.36 to 52.08
Steel pipe, welded, per meter	3.50	.04

Increased Activity in Mahoning Valley

YOUNGSTOWN, OHIO, Aug. 16.—Maintenance of finished steel production around 50 per cent of capacity, a substantial increase over a month ago when it averaged 25 per cent or less, is one of the encouraging features of the industry in the Mahoning Valley.

Of the 105 sheet mills in the Valley, 54 are under power. Following a long suspension, the Mahoning Valley Steel Co. started five of its eight mills on Monday. The Falcon Steel Co., which has been idle for two months, is also preparing to resume.

Independent steel making units are operating at fully 50 per cent, while similar units of the Carnegie Steel Co. are engaged to the extent of 40 per cent. At Girard, the A. M. Byers Co. is operating 22 puddle furnaces in No. 1 puddle mill, and one bar mill. The full strip capacity of the Trumbull Steel Co. is active, largely on orders from the Ford Motor Co. Nine of the 17 tube mills in this district are in commission, while only one plate mill is rolling, the 84-in. mill of the Brier Hill Steel Co. Sharon Steel Hoop Co. reports considerable enlargement in production of sheet steel, operating seven mills.

Comparative figures for July and August on railroads serving the Youngstown district show an increase in the movement of freight during the first 12 days of this month. The New York Central, Erie, Pennsylvania and Baltimore & Ohio report increased movements of loaded cars since the beginning of August. The Ohio region of the Erie reports an increase in the daily movement of loaded cars of 349 since Aug. 1, as compared with July. The increase in short-haul movements averages nearly 150 cars a day. Railroad officials say there has been a sharp increase in the movement of semi-finished steel.

Mattie blast furnace, at Girard, Ohio, of the A. M. Byers Co., Pittsburgh, is being overhauled and repaired preparatory to having the blast turned on.

Ore piles are rapidly being built up at the new furnace at Warren, Ohio, built by the Trumbull-Cliffs Furnace Co. for the Trumbull Steel Co., and it is expected this 600-ton stack will be started for the first time in the fall.

Because of its abundant ore stocks, the Brier Hill Steel Co., Youngstown, is preparing to dock its lake steamer, the H. H. Porter, at the end of August, much earlier than usual.

United States Pig Iron Production in the First Half of 1921

The American Iron and Steel Institute in its special statistical bulletin No. 4 gives the production of all kinds of pig iron in this country for the first six months of the present year. Aside from the showing that output was barely one-half of the production of either half of 1920, outstanding features are the small amount of iron made with the use of anthracite coal or anthracite mixed with coke, and the drop in the amount of charcoal pig iron made.

Anthracite iron is less than 1/7 per cent of the total production, lower by a wider margin than ever before, though the tendency has of course been downward. Charcoal iron for this year is less than ¾ per cent of the total.

HALF-YEARLY OUTPUT OF PIG IRON BY STATES.

HALF-YEARLY PRODUCTION OF ALL KINDS OF PIG IRON.

States.	Blast furnaces. In blast Dec. 31 1920.	June 30, 1921. In.	Out.	Total	Production—Gross tons. (Includes spiegeleisen, ferro-mang., ferro-silicon, ferro-phosphorus, etc.) First half of 1920.	Second half of 1920.	First half of 1921.
Maine	0	0	0	0			
Massachusetts	1	0	1	1	6,180	4,101	1,537
Connecticut	0	0	2	2			
New York	16	3	24	27	1,207,475	1,393 659	506,113
New Jersey	1	1	3	4			
Pennsylvania	73	27	134	161	7 241,726	6,741,408	3,577,570
Maryland	2	1	6	7	254,420	269,313	75,130
Virginia	4	2	15	17	223,522	205,780	53,519
Alabama	15	8	35	43	1,225,236	1,167,726	659,225
Georgia	0	0	4	4			
Texas	0	0	1	1			
West Virginia	3	1	4	5	374,906	397,473	117,215
Kentucky	0	0	7	7			
Mississippi	0	0	1	1			
Tennessee	3	0	17	17	159,041	124,166	12,369
Ohio	49	14	66	80	4,130,811	4,402,659	2,081,847
Illinois	16	6	20	26	1,634,164	1,646,711	1,030,801
Indiana	12	7	9	16	1,426,045	1,513 476	1,019 010
Michigan	10	2	11	13			
Wisconsin	3	1	6	7	345,091	366,314	211,574
Minnesota	2	0	1	1			
Missouri	3	1	3	4			
Iowa	0	1	0	0			
Montana	0	0	0	0			
Colorado	3	2	3	5	206,985	257,599	185,071
Oregon	0	0	1	1			
Washington	0	0	0	0			
Total	216	76	376	452	18,435.602	18,490,385	9,530,981

HALF-YEARLY PRODUCTION OF COKE PIG IRON.*

Maine	0	0	0	0			
New York	16	3	23	26	1,211,475	1,393 659	507,108
New Jersey	1	1	3	4			
Pennsylvania	71	27	120	147	7,094,917	6,585,086	3,564,406
Maryland	2	1	5	6	254,420	269,313	75,130
Virginia	4	2	15	17			
Georgia	0	0	2	2	223,522	205,780	53,519
Texas	0	0	1	1			
Alabama	14	8	32	40	1,212,718	1,154,404	655,693
West Virginia	3	1	4	5	374,906	397,473	117,215
Kentucky	0	0	7	7			
Tennessee	3	0	14	14	155,897	115,104	12,369
Ohio	49	14	66	80	4,130,811	4,402,659	2,081,847
Illinois	16	6	20	26	1,634,164	1,646,711	1,030,801
Indiana	12	7	9	16			
Michigan	2	1	3	4	1.502,165	1,558,526	1,060,523
Wisconsin	2	1	1	1			
Minnesota	2	0	3	3			
Missouri	1	0	1	1			
Iowa	0	0	0	0			
Montana	0	0	0	0	338,616	437,698	289,612
Colorado	3	2	3	5			
Washington	0	0	0	0			
Oregon	0	0	1	1			
Total	201	74	337	411	18,133,611	18,166,413	9,448,223

*Includes ferro-alloys made with electricity, electricity and coke, etc.

HALF-YEARLY PRODUCTION OF ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

Pennsylvania	2	0	10	10	146,379	156,188	12,823
Total	2	0	10	10	146,379	156,188	12,823

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON.

Massachusetts	1	0	1	1			
Connecticut	0	0	2	2	2,610	4,235	883
New York	0	0	1	1			
Pennsylvania	0	0	4	4			
Maryland	0	0	1	1			
Alabama	1	0	3	3			
Georgia	0	0	2	2	15,662	22,384	3,532
Tennessee	0	0	3	3			
Mississippi	0	0	1	1			
Michigan	8	1	8	9	92,382	113,141	41,346
Wisconsin	1	0	1	1			
Missouri	2	1	2	3	44,958	28,024	24,174
Total	13	2	29	31	155,612	167,784	69,935

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Coke*	201	74	337	411	18,133,611	18,166,413	9,448,223
Anthracite†	2	0	10	10	146,379	156,188	12,823
Charcoal	13	2	29	31	155,612	167,784	69,935
Total	216	76	376	452	18,435,602	18,490,385	9,530,981

* Includes ferro-alloys made with electricity, electricity and coke, etc.
† Includes mixed anthracite and coke pig iron.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1920.	Second half of 1920.	First half of 1921.
New York, New Jersey	513,327	623,977	199,568
Pennsylvania—Allegheny County	1,646,540	1,498,938	1,024,302
Other counties	2,180,007	1,970,770	736,305
West Virginia, Alabama, Kentucky	691,574	707,124	438,730
Ohio	1,442,867	1,505,444	685,788
Indiana, Illinois	1,754,977	1,699,669	1,149,432
Michigan, Minnesota, Missouri, Colorado	221,402	281,106	270,306
Total	8,450,694	8,287,028	4,504,431

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	193,096	181,992	61,225
Pennsylvania	2,523,457	2,432,309	1,381,591
Maryland	247,070	274,663	74,[illegible]
West Virginia, Kentucky, Tennessee, Alabama	193,426	218,097	73,816
Ohio	1,899,250	2,079,537	1,081,868
Illinois, Colorado	[illegible]	956,962	606,912
Total	5,918,524	6,143,560	*3,280,072

* Includes 62,908 tons of low-phosphorus pig iron.

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON AND FERRO-SILICON.

Maine, Massachusetts, Connecticut	6,173	4,062	1,537
New York, New Jersey	398,765	456,003	215,512
Pennsylvania	539,707	531,667	285,798
Maryland, Virginia, West Virginia	236,597	200,405	
Kentucky	42,601	29,378	67,138
Tennessee	136,692	103,942	
Alabama	644,494	582,360	241,091
Ohio	488,448	528,463	219,004
Indiana, Illinois	107,572	83,876	104,944
Michigan	170,099	249,587	118,110
Wisconsin	171,416	162,736	85,800
Missouri, Iowa, Colorado, Washington	37,637	44,102	36,465
Total	2,980,201	2,977,581	*1,375,399

* Includes 55,180 tons of ferro-silicon.

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York	90,320	114,168	22,533
Pennsylvania	68,880	40,820	14,099
Kentucky, Ohio	245,221	210,993	62,267
Indiana, Illinois, Michigan, Wisconsin, Minn	261,744	278,805	66,623
Total	666,165	644,786	165,522

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New Jersey, Pennsylvania	104,818	70,985	13,280
Virginia, Tennessee	2,366	710	
Alabama	9,441	8,258	5,276
Ohio	52,244	69,226	30,381
Total	168,869	149,179	48,937

HALF-YEARLY PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

New York, Pennsylvania	170,706	191,670	122,093
Virginia, Alabama, Tennessee	4,287	12,602	9,646
Illinois, Colorado, Montana, Washington	11,968	15,663	4,530
Total	186,961	219,935	*136,269

* Includes 83,861 tons of ferro-manganese and 52,408 tons of spiegeleisen.

HALF-YEARLY PRODUCTION OF OTHER GRADES.

Connecticut, New York, New Jersey	7,984	8,478	4,482
Pennsylvania	11,601	13,329	2,895
Maryland, Va., West Va., Ky., Tenn., Alabama	21,587	26,923	7,101
Ohio	9,771	8,992	2,539
Indiana, Illinois, Michigan, Wisconsin, Missouri, Colorado	13,245	10,594	3,334
Total	64,188	68,316	20,351

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1921.

Grades.	For sale.	For maker's [illegible]	Total. Gross tons.
Basic	361,884	4,142,547	4,504,431
Bessemer and low-phosphorus	263,964	3,016,108	3,280,072
Foundry, including ferro-silicon	1,211,014	164,385	1,375,399
Malleable	132,673	32,849	165,522
Forge or mill	20,291	28,646	48,937
Ferro-manganese	22,797	61,064	83,861
Spiegeleisen	5,745	46,663	52,408
All other grades	10,314	10,037	20,351
Total	2,028,682	7,502,299	9,530,981

PERSONAL

E. Dana Durand has been appointed chief of the newly created eastern European division of the Bureau of Foreign and Domestic Commerce. Mr. Durand was director of the Bureau of the Census from 1909 to 1913 and from 1903 to 1909 was connected with the Bureau of Corporations of the Department of Commerce and Labor, first as economic expert and later as deputy commissioner. As an instructor in economics he has served at Harvard, Stanford and Minnesota universities. He is author of "The Finances of New York City," "The Trust Problem," and numerous magazine articles and Government reports.

G. St. J. Perrott, associate physical chemist of the Bureau of Mines experiment station, Pittsburgh, will go to Birmingham, Ala., to study the physical properties of coke in relation to its production and use in the blast furnace. Conditions are favorable for conducting these investigations at the Tuscaloosa experiment station of the Bureau of Mines, with the co-operation of a number of companies operating blast furnaces and by-product plants in Alabama.

R. A. Lundquist, Minneapolis, has been appointed head of the newly created electrical machinery division in the Bureau of Foreign and Domestic Commerce, Department of Commerce. He is a graduate of the University of Minnesota. He has made extensive studies of the possibilities for the sale of American electrical goods and machinery in Australia, New Zealand, China, Japan and South Africa, the results of which have been published by the Bureau. He is author of "Transmission Line Construction-Methods and Cost" (McGraw-Hill Publishing Co.) and various articles for engineering and other technical journals. Like heads of other divisions already set up in the Bureau, including iron and steel, lumber and heavy machinery, Mr. Lundquist will specialize on work looking to the expansion of foreign markets for American interests.

C. R. White, for many years connected with the New York office of Alfred Herbert, Ltd., British machine-tool manufacturer, as assistant manager, is no longer associated with that company.

Fred C. Severin, for the past few years manager of the New York office of the Betts Machine Co. of Rochester, N. Y., and before that with the Niles-Bement-Pond Co., has resigned. The Betts Machine Co. has not yet appointed his successor.

Walter G. Bunzel, formerly chief engineer of the Richmond Radiator Co., is now associated with the Pittsburgh Electric Furnace Co. at its New York office, 149 Broadway.

T. A. O'Leary Co., Keenan Building, Pittsburgh, effective Aug. 6, relinquished the representation in the Pittsburgh district of the Farber Fire Brick Co., St. Louis, and hereafter will devote its attention to Pennsylvania fire clay brick as sales agent for the Climax Fire Brick Co., Climax, Pa.

Carl A. Johnson, president Gisholt Machine Co., Madison, Wis., was elected a director at the formal organization meeting of stockholders in the Northwestern Casualty & Surety Co., Milwaukee, which was incorporated some time ago with a capital stock of $1,000,000 and a surplus of $750,000. Other directors elected include: K. K. Knapp, general counsel Illinois Steel Co., Chicago; Norval A. Hawkins, sales director General Motors Corporation, Detroit.

H. M. Schwartze, for 15 years electrical engineer for the Cadillac Motor Car Co., Detroit, has resigned to join the engineering staff of the new Collins Motor Car Co.

E. W. Seaholm, for several years assistant, has been appointed chief engineer of the Cadillac Motor Car Co. Detroit.

J. C. Ward, director Edgar Allen & Co., Ltd., Sheffield, England, left on Aug. 13 on the Aquitania for a visit to the New York and Chicago offices of the Edgar Allen Steel Co., Inc., manufacturer of high speed, carbon and alloy tool steels.

J. Leonard Replogle, chairman Replogle Steel Co., and president Vanadium Corporation of America, recently returned from a trip to Europe, where he has been studying business conditions.

Ralph C. Schwarz has taken over the Northwestern New York territory for the distribution and sale of Stewart industrial furnaces and appliances. His address will be 921 Granite Building, Rochester, N. Y.

James H. Nutt, 306 Mahoning Bank Building, Youngstown, Ohio, secretary of the Western Bar Iron Association and the Western Sheet & Tinplate Manufacturers' Association, has recently added to the records of the office three bound volumes containing copies of the annual wage agreements with the Amalgamated Association of Iron, Steel and Tin Workers since 1881. The sole purpose of the two manufacturers' organizations is to deal with employees at the annual conferences and at the bi-monthly settlements. Mr. Nutt has been secretary since 1892, when the association embraced but a few members. The Amalgamated Association was formed in 1876. For many years Mr. Nutt served as a puddler in the mills.

Samuel M. Vauclain, president Baldwin Locomotive Works, Philadelphia, inspected the plant of the St. Louis Coke & Chemical Co. at Granite City, Ill., on Aug. 13, stopping on his return to Philadelphia from a trip to Mexico. He was met in St. Louis by Clarence H. Howard, president Commonwealth Steel Co., St. Louis, and William B. Dickson, vice-president Midvale Steel & Ordnance Co., New York.

Lyman M. Waite, formerly with the National Acme Co. and recently with the Springfield Automatic Screw Machine Corporation, Fitchburg, Mass., has been appointed sales manager of the Garvin Machine Co., New York, succeeding Frank A. Power, who has resigned.

Mason B. McLaughlin, manager of the central sales department, Cleveland, of the White Co., has been elected a vice-president, as has also Robert W. Woodruff, manager of the southeastern sales department with headquarters at Atlanta Ga.

Horton Penrose, for a number of years Pittsburgh and Philadelphia representative of Shimer & Co., has become connected with the Cleveland-Cliffs Iron Co., Cleveland, as a salesman in the pig iron department.

C. T. Stewart, Harbison-Walker Refractories Co., Pittsburgh, and R. T. Blair, Pittsburgh Gage & Supply Co., Pittsburgh, have been chosen delegates of the Purchasing Agents' Association of Pittsburgh to the national convention of the Purchasing Agents' Association of the United States, to be held in Indianapolis, Oct. 13 to 15, inclusive.

W. S. Pilling of the pig iron firm of Pilling & Co., Philadelphia, sailed on Saturday, Aug. 13, for England. He will be gone several weeks.

The recent reduction in prices of shovels, spades and scoops of $3.40 per dozen by Hubbard & Co., Pittsburgh, has been followed, in part, by other large manufacturers who have announced a cut of $3 per dozen, effective Aug. 15. The new quotations now quoted by the Ames Shovel & Tool Co., Boston, the Baldwin Tool Co., Parkersburg, W. Va., the Pittsburgh Shovel Co., Pittsburgh, the Wood Shovel & Tool Co., Piqua, Ohio, follow: Black, first grade, $10.14; per doz., second grade, $9.40; third grade, $8.75; fourth grade, $7.90, to which must be added $1 per doz. for polishing.

Working forces in factories in New York State have fallen approximately 30 per cent since March, 1920, according to a report of the State Industrial Commission. This represents a reduction of about 450,000 workers. The metal industries are reported to have sustained the largest recent losses. Lack of orders is the main reason for curtailment.

OBITUARY

AUGUST A. FRAUENHEIM, president of the Iron City Sanitary Mfg. Co., Pittsburgh, died at his country home, Kittanning pike, O'Hara Township, Pa., Aug. 10. He was prominently connected with the business and industrial life of Pittsburgh. For a number of years he was president of the Epping-Carpenter Pump Co., serving in that capacity until the concern merged with the Worthington Pump & Machinery Corporation. He was a director of the Pennsylvania National Bank, the East Williston Land Co., New York and the Pittsburgh Hospital. He was a member of the Duquesne Club, the Pittsburgh Country Club and the Pittsburgh Athletic Association in Pittsburgh.

JOHN A. HANLON, vice-president and general manager of the Hanlon-Gregory Galvanizing Co., Pittsburgh, died suddenly in his home in that city, Aug. 11. Mr. Hanlon, who was 41 years old, was born in Pittsburgh, and had been active in the galvanizing industry for the past 15 years. Prior to 1913 when the Hanlon-Gregory company was organized, he had been affiliated with the Pittsburgh Galvanizing Co. He was a member of the National Galvanizers Association, serving several terms as president of that organization.

WILLIAM H. GRIFFITHS, 67 years old, president of the Griffiths Charcoal Iron Mills, Washington, Pa., died at his home there Aug. 12. He was born in Boston, England, coming to this country when a boy of 17 years, and locating in Pittsburgh. He went to Washington, Pa., in 1895 and established the first tin plate plant in that district.

THOMAS W. HOLMES, 27 years old, superintendent of the Twenty-fifth Street plant, Pittsburgh, Railway Steel Spring Co., died in Erie, Pa., Aug. 11, following a brief illness. He was born in Pittsburgh and had been affiliated with the Railway Steel Spring Co. for the past 12 years.

JULIAN BURDICK, president of the West Penn Steel Co., Pittsburgh, has the sympathy of his friends in the sudden death of his son, Julian Burdick, Jr., aged 13 years, who was killed Aug. 9, as the result of a fall from a cliff at Eaton's Ranch, Wyo., where the family of Mr. Burdick had been summering.

FREDERICK ERDLE, founder of the Erdle Perforating Co., perforated metals, Rochester, N. Y., died at his home in that city on Aug. 2 at the age of 81 years. He retired 12 years ago from active participation in the business.

CHARLES HAINES WILLIAMS, first vice-president Chicago Railway Equipment Co., Chicago, died at his home in that city on Aug. 8, aged 46.

The production of by-product coke in the United States in July showed a decrease of 8.9 per cent, when compared with that for June. The total output was 1,285,000 tons as against 1,410,000 tons, the revised figure for June. These statistics, issued by the Geological Survey, show that the July production was 35 per cent of the maximum capacity of the ovens. Fifty-five plants were in operation and 15 were idle. The output of beehive coke during July was only 181,000 tons.

A. M. Castle & Co., jobbers in iron and steel, Chicago, have commenced the construction of a new warehouse at the northwest corner of Blackhawk and North Branch streets. It will be 211 x 232 ft. and will cost $350,000. The west 75 ft. is to be two stories in height and the second floor will be used for the general offices of the company, giving a floor area for that purpose of 72 x 211 ft.

Railroad track abandoned in the United States during 1917, 1918, 1919 and 1920 exceeded the new mileage built by more than 1000 miles. Abandonment has averaged more than 1000 miles annually for some years.

Office and Trade Changes

Altemus & Prindle, room 5726, Grand Central Terminal, New York, have been appointed exclusive selling agents in the United States for the Compagnie Belge des Mines, Minerais et Metaux, Antwerp, Belgium, a mining and smelting concern. They are now in position to offer in this market phosphoric and non-phosphoric Swedish iron ores, Barreiro iron ore, Douaria, Rif and Rubios iron ore, Indian manganese and chrome ores, and alloys such as standard 80 per cent ferromanganese, silicomanganese, ferrosilicon, ferrochrome and pyrites. C. L. Altemus and H. B. Prindle, who established themselves in the iron and steel business some time ago, with quarters at 101 Park Avenue, New York, recently moved to the Grand Central Terminal.

O. J. Abell & Co., 29 South La Salle Street, Chicago, has added to its existing lines in the machinery and machine products field representation of the Jefferson Forge Products Co., Detroit, maker of automotive forgings and the Jefferson one-piece drop-forged steel wheel; and the Pittsburgh Electric Furnace Corporation, Pittsburgh, builder of the Moore 'Lectromelt furnace for the manufacture of electric steel, malleable and gray iron.

The Metals Coating Co. of America, manufacturer and distributor of the Schoop metal spraying process, by which metallic coatings may be sprayed upon any surface, is now in full operation at its new plant, 495-497 North Third Street, Philadelphia, having removed from its former Boston, Mass. and Woonsocket, R. I. locations.

The New York office of the Matthew-Addy Co., has been moved to 90 West Street.

The name of the Kendall Hardware Co., 421 Main Street, Cambridge, Mass., has been changed to the Kendall Nail & Hardware Co. Peter C. Welch is president and John B. Welch, treasurer.

The Eastern Steel Co. announces the discontinuance of its Boston office. Harry O. Russ will continue to represent the company in that territory with headquarters in the New York office, 50 East Forty-second Street.

The Boston office of the Eastern Steel Co. has been discontinued, effective Aug. 10. Harry O. Russ, who has been New England sales agent since 1907, will continue to represent the company in that territory, with headquarters in the New York office, 50 East Forty-second Street.

T. J. Rafferty & Co., iron and steel scrap and steel, Worcester, Mass., have removed their offices from the Park Building, to their new warehouse at 21-23 Ellsworth Street. With the erection of three new buildings, a full line of hot and cold rolled strip steel, cold rolled shafting and screw stock, tool steel, machine steel, etc. will be stocked.

Medley Scovil Co., New York advertising firm, have moved to new and larger offices in the new Cunard Building, 25 Broadway.

The Schaffer Engineering & Equipment Co., Pittsburgh, has combined its administrative, sales and manufacturing departments in its new general offices at 2828 Smallman Street, Pittsburgh.

Earle S. Barber, who recently resigned as director and sales advertising manager of Alfred Decker & Cohn, Chicago, has engaged in business as Earle S. Barber & Co., commercial councillors, with offices in the new Wrigley Building. They will cover the various branches of business and will maintain a sales organization for obtaining distribution and maintaining efficient representation in five states—Illinois, Indiana, Iowa, Michigan and Wisconsin.

The Cincinnati office of the Cutler-Hammer Mfg. Co., Milwaukee, has been removed from the Gwynne Building, to the Dixie Terminal Building. A. R. Maujer, formerly of the sales-engineering force of the Pittsburgh office, is now in charge of the Cincinnati office.

The Eastern Agencies Co., manufacturers' representative, 79 Main Street, Yokohama, Japan, opened an office on July 15 in Tokio in charge of Edwin Russell, at 3 Uchisaiwai-cho, Itchome Kojimachi-ku. The company represents the Steel Producers Export Corporation, New York, and the Western Clock Co., La Salle, Ill., among others.

The Societe Anonyme des Usines Giulini, Basel, Switzerland, manufacturer of virgin aluminum ingots, notched bars, bars, plates and sheets, have appointed C. W. Leavitt & Co., New York, sole selling agents for the United States and Canada.

Record of many months of decreasing index figures for the cost of living has been broken by July, which recorded a slight advance. Metals, foods and farm products are the lowest of all groups studied, while furniture and building materials are highest. The average is now about 50 per cent above 1913.

IRON AND INDUSTRIAL STOCKS

Lower Prices Have Ruled Much of the Time the Past Week

Prices for securities in general have been under pressure much of the time recently, but whenever it has relaxed they have snapped back quickly. Selling, in a large measure, is believed to have been based on the fear that some national disaster is imminent, either as a result of the foreign credit situation, or a nation-wide tie-up in transportation. The frequency with which new foreign issues are offered in and absorbed by this country (something more than $1,000,000,000, it is estimated, having been sold in this country since the signing of the armistice) is held to demonstrate faith in the ability of Europe and South America at large to weather in time their financial problems.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	29¾ - 31	Nat.-Acme	14⅛ - 14¼
Allis-Chalm. pf..	71¼ - 73¾	Nat. E. & S. com.	47⅝ - 48¼
Am. Can com....	25½ - 26¾	Nat. E. & S. pf..	.. - 45
Am. Can pf.....	81⅛ - 82	N. Y. Air Brake.	54½ - 55
Am. C. & F. com.	122½ -124	Nova Scotia Stl..	22¼ - 22½
Am. C. & F. pf..	.. -109½	Pressed Stl. com.	57⅞ - 60½
Am. Loco. com..	82⅛ - 86¼	Ry. Stl. Sp. com.	72⅝ - 76½
Am. Stl. Fd. com.	25⅜ - 25½	Replogle Steel...	21 - 21¼
Bald. Loco. com.	72⅛ - 77⅜	Republic com....	45¼ - 47½
Beth. Stl. com...	48 - 50	Republic pf.....	.. - 84
Beth. Stl. Cl. B..	48⅛ - 51	Sloss com.....	33 - 34
Beth. Stl. 8% pf.	97½ - 99	Sup. Stl.	.. - 33⅛
Chi. Pneu. Tool..	.. - 48	Sup. Stl. 1st pf..	.. - 94
Colo. Fuel.....	22½ - 24	Un. Alloy Stl....	23½ - 25
Cru. Stl. com....	52½ - 55	U. S. Pipe com..	13 - 14⅞
Gen. Electric....	112½ -118¼	U. S. Steel com..	73⅜ - 74½
Gt. No. Ore Cert.	28¼ - 29¾	U. S. Steel pf....	108⅞ -109¼
Gulf States Stl..	30½ - 31¼	Vanadium Steel.	27¾ - 29½
Int. Har. com...	71½ - 74¾	Va. I. C. & Coke.	68 - 69
Lackawanna Stl.	38 - 39¼	Westingh'se Elec.	42½ - 44⅜
Midvale Steel....	23¼ - 24⅝		

Half-Year Report of American Locomotive Co.

Gross earnings of the American Locomotive Co. for the six months, ended June 30, were $25,989,781, compared with $45,114,934 for the previous six months, ended Dec. 31, 1920. The net profit for the last six months amounted to $4,556,043, compared with $5,660,494 for the previous period. An amount equal to $12.10 per share was earned on the common stock in this last period after paying the dividend on the preferred stock. There was a surplus of $2,276,043 for the period.

According to President Andrew Fletcher, "There has been no money spent on the proposed new plant in the St. Louis district other than the cost of the land, and it is the present intention of the company to withhold active development of that property until general business requirements of the company warrant it. The total unfilled orders for new locomotives, reconditioning of old locomotives and miscellaneous work on June 30 was $4,595,958, of which domestic business was 16.5 per cent and foreign business 83.5 per cent, the foreign business being mostly for Japan, China and South Africa. At present there are but few inquiries for new locomotives either for foreign or domestic use."

Industrial Finance

Stockholders of the Baush Machine Tool Co., Springfield, Mass., have voted to exchange the 12,500 outstanding shares of common stock, par value $100, for an equal number of shares having no par value, and to issue 37,500 additional shares of common stock, no par value, to be sold from time to time. The capital now is 50,000 shares common stock, no par, and 6100 shares preferred, par $100. Willoughby H. Stuart, Jr., is president, and George D. Haskell, treasurer.

Shipments by the Westinghouse Electric & Mfg. Co. are at the rate of slightly less than $10,000,000 a month. Those for April and May were above $20,000,000, and those for June and July approximately that much, while so far this month they average less than $10,000,000. Unfilled orders on the books of the corporation are in the neighborhood of $50,000,000, whereas on April 1 they were $65,621,000.

The American Bosch Magneto Corporation, Springfield, Mass., in the six months ended June 30, operated at a loss of $40,000 to $50,000. The financial condition of the concern, however, shows its current debts amount to but $400,000, whereas its quick assets total $5,700,000. The company recently sold $2,500,000 8 per cent 15-year notes. After making allowance for these notes, there are net tangible assets of $75 a share on the 100,000 share capital, of which $28 represent net quick assets.

The earnings statement of the National Acme Co. for the three months ended June 30 shows an operating deficit of $834,362, contrasted with a deficit of $354,074 for the previous quarter, and a net profit amounting to $1,385,925 for the corresponding period last year. Sales for the second quarter were $1,435,722, as against $1,041,840 for the preceding period. The increased deficit was due, in a large measure, to the marking down of inventories, which showed a shrinkage of $523,835. Total sales for the first six months this year were $3,047,566, as compared with $9,582,369 last year, or about one-third.

The Allis-Chalmers Mfg. Co. in the quarter ended June 30 billed out $7,014,373 goods, and showed net profits after taxes of $635,879, as compared with $7,369,106 goods billed out and $832,750 net profits for the corresponding three months last year. The net profits equal, after all charges and preferred dividends, $1.34 a share earned on the $26,000,000 common stock, contrasted with $1.87 a share for the quarter ended March 31 and $2.13 for the quarter ended June 30, 1920. The total unfilled orders on the books as of June 30 last were $9,472,772, against $12,943,633 at the close of the preceding quarter.

The consolidated income account of the Steel & Tube Co. of America for the six months ended June 30 last shows gross profits of $1,555,849 and miscellaneous income of $694,377, making a total income of $2,250,226, contrasted with $6,732,006, $231,733 and $6,963,739, respectively, for the corresponding period last year. Miscellaneous charges, including taxes, amounting to $906,037, left a balance of $1,344,178, as against a balance of $6,158,912 for the six months ended June 30, 1920. Interest charges, depreciation and depletion cut down the net earnings to $25,969. Last year nothing was allowed for depreciation and depletion, consequently the net earnings before dividends were $5,325,877.

The American Heater Corporation, St. Louis, has been reorganized following the death of its president, Walter Hennig. The reorganized corporation has a capital stock of $250,000, of which $160,000 is paid. C. Norman Jones, chairman of the board, Title Guaranty Trust Co., St. Louis, is president of the new corporation, and his associates are a number of St. Louis business men. The company manufactures automatic gas-fired water heaters. Extensions are said to be planned.

During the first half of 1921, the Newton Steel Co., Youngstown, Ohio, producer of full finished sheets, earned all charges before dividends, its preferred dividend for the period and made some addition to surplus. The company started six mills in March, following a suspension, and subsequently increased the number of active units to eight. At the end of May the full complement of 10 mills was placed on the active list and the company has been operating to capacity since July 1. Orders in hand insure production at the current rate well into September. An official of the company anticipates a better showing during the second half. From 85 to 90 per cent of its output has consisted of automobile body stock.

The Franklin Tractor Co., Greenville, Ohio, on the application of a number of its stockholders, has been placed in the hands of a temporary receiver. Fred D. Koppock has been named receiver and it is likely that the plant will be operating under his management.

A suit for the appointment of a receiver for the Lane & Bodley Co., Cincinnati, has been filed in the Common Pleas Court by the administrator of the estate of H. T. Lane, who was a stockholder in the company. The company recently sold a part of its Bond Hill plant and its equipment to the American Blower Co.

The New-Way Motor Co., Lansing, Mich., manufacturer of air-cooled engines and parts, has arranged for a stock issue of $500,000.

The Midvale Steel & Ordnance Co. reports a deficit of $1,289,393 for the quarter, ended June 30, after charges, taxes, depreciation and depletion, compared with a deficit of $1,395,202 in the preceding quarter and a surplus of $4,349,498, equal to $2.17 a share on the $100,000,000 capital stock, in the corresponding quarter of 1920.

The Electro Sherardizing Co., 1743 North Randolph Street, Philadelphia, has been incorporated with a capital of $25,000, primarily to coat metals by either plating or sherardizing. At the present time the company is devoting its entire energy to the sherardizing end of the business. The company is not in the market for any equipment as it took over the equipment which was being used by the General Electric Co., Seventh and Willow streets works, as a jobbing sherardizing proposition. The company is ready to take care of custom sherardizing work, rust proofing such material as bolts, nuts, stampings, castings, nails, chains, etc. The operation of the plant is in charge of T. Liggett, Jr., who has had about 15 years experience in the sherardizing business, first being with the United States Sherardizing Co., New Castle, Pa., and then having charge of the General Electric Co.'s, Philadelphia sherardizing plant.

Machinery Markets and News of the Works

SOME PRICE REDUCTIONS

Announcements Made on Milling Machines, Turret Lathes and Sensitive Drills

No Marked Improvement in Machine-Tool Business but Inquiries Are More Numerous and Sentiment Is Better

Since the first of the month some leading manufacturers of milling machines and sensitive drills have reduced their list prices about 15 per cent, while an Ohio maker of turret lathes has reduced prices about 16 per cent. A general reduction on some types of grinders is expected, a leading manufacturer having led the way a few weeks ago. Machine-tool prices on the average are now fully 25 per cent below the peak prices of 1920.

No important business is being closed, buying in all markets being confined to single tools. A slow improvement is noted, however, in some centers and the tone is more cheerful, due doubtless to a little gain in the number of inquiries.

At Cincinnati it is expected that the Big Four Railroad will soon buy tools for which it inquired some time ago, and the list of the Missouri, Kansas & Texas, issued a few months ago, may be revived shortly. The American Sugar Refining Co., New York, is expected to close soon on about 15 tools. An Eastern car equipment manufacturer is in the market for several punches and shears. The Huckabee Tractor & Mfg. Co., Little Rock, Ark., has issued a list of about 12 machines.

It is reported from Chicago that machine-tool trade during the first half of 1921 was about 25 or 30 per cent of the volume in the first half of 1920. A slow but steady improvement over the remainder of the year is expected. July was the poorest month and August sales at Chicago have shown a slight gain.

New York

NEW YORK, Aug. 16.

A little business in machine tools has been closed within the past week and there is a slight improvement in the number of inquiries, but on the whole trade is very dull. The Dexter Folder Co., New York, bought about 12 drills, mostly single spindle, and the Durant Motor Co. bought four drills for its assembling plant at Long Island City.

Several important price reductions have been made affecting leading makes of tools. A large maker of turret lathes announced a 16 per cent cut; the principal makers of milling machines have reduced about 15 per cent; sensitive drills have been cut 15 per cent and some makes of lathes have been reduced. A general reduction on grinding machines is expected, a leading maker having reduced its prices last month. A certain low-priced lathe was cut fully 50 per cent on at least one quotation in an effort to secure the order. Machine-tool prices on the average are now from 25 to 40 per cent below the peak prices in 1920.

A better tone is evident in the crane market, but new inquiries are still rare. The greatest activity at present seems to be in the hand power crane and hoist field. Bidding on the 25-ton, 50-ft. span hand power crane with alternate quotations on the same crane electrically operated, which was inquired for by the United States Machinery Export Co., 136 Liberty Street, New York, for export to Mexico, has been closed and the order will be placed shortly. Another inquiry in the market from a Mexican source is from E. T. Bailey, Mexico City, and calls for a 2-ton hand power crane. Bidding has also closed on the 10-ton, 27-ft. span hand power crane for the New York & Pennsylvania Co., 200 Fifth Avenue, New York. The Centre Iron Works, 608 East 137th Street, New York, which recently purchased a 5-ton electric traveling crane is receiving bids on two 3-ton hand power cranes, either single I beam or underslung type.

Among recent sales are: B. M. Weiss, Philadelphia, a second-hand 15-ton Brown hoist locomotive crane to the Carrol Contracting Co., 103 Park Avenue, New York; Thomas Elevator Co., four 3-ton concrete tower hoists and the American Hoist & Derrick Co., 11 8000-lb. derrick hoists, to Dwight P. Robinson, Inc., New York, for export to Brazil. The 60-ton overhead traveling crane inquired for by the Amoskeag Mfg. Co., Boston, Mass., is reported to have been placed with the Northern Engineering Works. W. J. Rainey, Inc., 52 Vanderbilt Concourse, New York, has purchased a 10-ton hand power crane from Alfred Box & Co. The Third Avenue Railroad Co., New York, has purchased a 3-ton pillar crane from the Chesapeake Iron Works.

Blue prints and specifications covering the contract for the supply and erection at Vereeniging, Transvaal Province, of two horizontal-spindle centrifugal pumps and motors with all accessories, and one 10-ton traveling crane have been forwarded to the Bureau of Foreign and Domestic Commerce by Consul Fred D. Fisher, Johannesburg, South Africa. This material is for use in connection with the Vaal River scheme. The specifications may be examined at the bureau's district office, 734 Custom House, New York, or they will be made available at any other district or co-operative office upon request. Those interested should refer to file No. 33,592.

The Multiple Storage Battery Co., Van Wyck Avenue, Jamaica, L. I., manufacturer of storage batteries, has filed plans for a one-story addition, 60 x 120 ft., to cost about $55,000, including improvements to be made in the present plant.

The United Lamp Manufacturers' Corporation, New York, has been incorporated with a capital of $75,000 by H. Wolff, R. Press and S. Math, to manufacture electric lamps and kindred products. It is represented by E. Hollander, 8 Bline Avenue, Union, N. J.

The Pure Aluminum Co. of America, New York, has been incorporated with a capital of $100,000 by B. L. Shaw, E. E. Grabo and H. P. Armstrong, to manufacture aluminum and other metal products. It is represented by J. M. Coleman, 29 Broadway.

E. L. Westervelt, Inc., Lawrence, N. Y., has been incorporated with a capital of $50,000 by E. L. Westervelt, L. H. Hall and W. Schneider, to manufacture electric motors and kindred equipment. It is represented by Putney, Twombly & Putney, 2 Rector Street, New York.

M. T. Kelly, 249 Green Street, Brooklyn, has filed plans for a one-story foundry, 50 x 60 ft., on Provost Street, to cost about $20,000.

The Seabring Machine & Repair Co., Brooklyn, has been chartered under State laws to manufacture machinery and parts, and operate a general repair works. The incorporators are J. M. Larson, T. Carlsen and J. Johansen. The company is represented by Crowell & Rouse, 24 Broad Street, New York.

The New York Central Railroad Co., Grand Central Terminal, New York, will take bids at once for shop requirements until Oct. 1 of flexible staybolts and parts, steel wheels for locomotive and passenger car repairs, and one portable electric arc welding machine and accessories, all as per standard drawings and specifications on file at the office of W. C. Bower, general purchasing agent, Grand Central Terminal.

Frank B. Rown has leased the building at 527-33 West Fifty-fifth Street, New York, extending through to West Fifty-sixth Street, for the establishment of an automobile service and repair works.

The Bottle Guard Cap Corporation, New York, has been chartered under State laws to manufacture metal caps and kindred specialties for bottle sealing. The incorporators are E. R. Hooper, R. O. Glasser and A. Westlake. It is represented by Edwards & Bryan, 31 Nassau Street.

The Pignolet Instrument Co., 78 Cortlandt Street, New York, manufacturer of electrical instruments, has leased space in the building at 76 Greenwich Street for new works.

The Fenlind Corporation, New York, has been chartered under State laws to manufacture machinery and tools. The incorporators are C. U. Ackerlind, L. Fendrich and C. E. Lage. It is represented by V. Yardum, 110 East Fifty-ninth Street.

The Phoenix Battery Co., Inc., Brooklyn, has been incorporated under Delaware laws with capital of $1,250,000 to manufacture storage batteries and other electrical products. The incorporators are Gustav J. Frickmann, Edward Sokal, and William M. Hawkins, Brooklyn. It is represented by Arley B. Magee, 33 South State Street, Dover, Del.

The Thatcher Propeller & Machine Co., Learned Street, Albany, N. Y., is arranging a list of equipment for installation in its two one-story buildings, 120 x 270 ft., to be used as a foundry and machine works. Pember & Campaigne, 24 James Street, are architects. George Thatcher is president.

The Denby Motor Truck Co., 49 West Sixty-third Street, New York, manufacturer of motor trucks and parts, is arranging for a bond issue to total $600,000. It will also double its capital from $750,000 to $1,400,000 for proposed expansion. The main plant is located at Detroit.

The Southern Dutchess Gas & Electric Co., 89 Main Street, Beacon, N. Y., is planning for the erection of an addition to its electric power plant at East Fishkill.

The Oakfield Gypsum Products Corporation, Alabama, Genesee County, N. Y., has been incorporated with a capital of $150,000 by J. L. Hughes, J. R. Swan and H. F. Weaver, Alabama, to manufacture building blocks and other machine-pressed building products. It is represented by Hart & Senior, attorneys, Utica, N. Y.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, will build two one-story coaling towers at its power plant on Walnut Avenue, 133rd to 134th Street, 17 x 67 x 187 ft. high, to cost about $200,000, including machinery. Thomas E. Murray, Inc., 65 Duane Street, is engineer.

The Curtiss Aeroplane Export Corporation, New York, has been incorporated with a capital of $650,000 to manufacture aircraft and parts for export distribution. The incorporators are L. B. Case, W. W. Webster and P. M. Crichton, 41 East Forty-second Street.

The plant of the Sonora Co., Degraw Street and Tiffany Place, Brooklyn, manufacturer of talking machine cabinets, etc., has been purchased by David Kramer, 76-84 Ninth Street, manufacturer of woodwork products, for occupancy. The sale includes the machinery and equipment, the property being held at $400,000. Mr. Kramer has disposed of his former works to Herman Schwartz, 99 Richardson Street, Greenpoint section, cabinet manufacturer, who will establish works at this location.

The Corinth Electric Light & Power Co., Corinth, N. Y., is planning for the erection of a new electric power house.

The Excel All Puncture Proof Tube Co., Inc., Jersey City, N. J., has been incorporated with a capital of $125,000 by David A. Farrington, E. L. Williams and Frank G. Schafer, 673 Summit Avenue, to manufacture tubes for automobile tires and other rubber products.

The Joseph Foy Co., 353 Bank Street, Bridgeton, N. J., has had plans prepared for the erection of a new one-story foundry to cost about $12,000. The W. P. Cameron Engineering Co., Witherspoon Building, Philadelphia, is engineer.

The Sterling Watch Co., West Orange, N. J., has been incorporated with a capital of $200,000 by Benjamin Webster, C. B. Lee and G. H. Barbour, 100 Northfield Avenue, to manufacture watch mechanisms, precision parts, etc.

George W. Smith, Hackettstown, N. J., is planning for the erection of a one-story machine shop on North Main Street.

The General Steel Casting & Machine Co., Jersey City, N. J., has been incorporated with a capital of $125,000, to manufacture steel and other metal castings, etc. It is represented by Alfred F. McCabe, 15 Exchange Place.

The Bureau of Yards and Docks, Navy Department, Washington, is completing plans for the erection of a new power house at Lake Denmark, N. J.

The Caloric Furnace Co., 36 New Street, Newark, has been incorporated with a capital of $100,000 by Oscar H. Cushwa, W. Howard Demarest and L. M. Mullany, to manufacture pipeless furnaces and parts.

The Clinton Electric Co., 266 Springfield Avenue, Newark, has been organized to manufacture parts for electric motors and operate a general motor construction and repair works. Edward Snyder heads the company.

The Westinghouse Electric & Mfg. Co., 95 Orange Street, Newark, has discontinued the manufacture of arc lamps, arc lamp repair parts, fixtures, etc., at its local works, and in the future this line of production will be carried on at its plant at South Bend, Ind. Machinery and equipment will be transferred from Newark.

The Essex Electric Supply Co., Newark, has been incorporated with a capital of $100,000 by Harry J. and Morris Levy, and Emanuel D. Lasher, to manufacture electrical appliances. Harry J. Levy, 277 Market Street, represents the company.

New England

BOSTON, Aug. 15.

A new low record business in machine tools was made the past week in this market. Sales were confined to less than a half dozen tools, the highest price being $750, and about as many used machines were moved. In addition, several dealers have abandoned what they previously considered live prospects involving several thousand dollars' worth of equipment. School business has been disappointing also. Only one local dealer reported any increase in prospective business. Inquiries in this instance, however, are confined to single machines and all are either low or medium-priced tools.

Sentiment regarding business this fall nevertheless is cheerful, although no great expansion is anticipated. The United Shoe Machinery Corporation, Boston, in July had the best month since March and the cotton and woolen industries are more active. Many metal-working plants now closed are expected to resume operations after Labor Day, and more activity among foundries is anticipated, especially in the textile machinery and heating appliance lines. In contrast, the electrical appliance business gives little evidence of improving in the near future and machine-tool houses have given up hope of purchases by New England railroads this year.

Stone & Webster are asking bids on one 50 and one 10-ton crane for the Ford plant at Green Island, N. Y.; the Power Construction Co., Worcester, Mass., on a 15 or 20-ton motor-driven or hand-operated crane, and the Government on one 50-ton crane for South Boston, bids for which will close Sept. 7.

The Chisholm-Moore Mfg. Co., Cleveland, has reduced prices 10 points on chain hoists. The Stanley Rule & Level Co., New Britain, Conn., has reduced prices on gages approximately 10 per cent.

The Great Northern Paper Co., Millinocket, Me., has awarded contract for a one-story repair shop, 102 x 218 ft., at Greenville, Me.

C. G. Garrigus, Bristol, Conn., has purchased 50 acres in Tylerville, Conn., and is perfecting plans for the erection of a plant to manufacture machinery.

The State of Maine has awarded contract for the erection of a State training school at Fort Kent. Augustus O. Thomas, superintendent of public schools, Augusta, Me., is supervising the work.

The metal and wooden toy business conducted by Rene P. Provencal, West Brookfield, Mass., has been acquired by Dubois Brothers, Inc., that town, capitalized for $25,000, recently granted a Massachusetts charter.

Plans are being prepared by Westcott & Mapes, Inc., engineers, New Haven, Conn., for a one-story, 80 x 100 ft. power plant in the rear of 170 Temple Street, for the Edward Malley estate, to cost about $150,000.

A charter has been granted the Arrow Light Co., Inc., Springfield, Mass., to manufacture an automobile traffic signal indicator. It is capitalized for $30,000. Gordon W. Gordon, Springfield, is president, and T. M. Marczal, Chicopee, treasurer.

Anton J. Haug, Taylor Road, Nashua, N. H., is president, and Joseph Simon, 11 Orvis Road, Arlington, Mass., treasurer of the Haug Paper Machine Co., 135 Essex Street, Boston, capitalized for $100,000, recently granted a Massachusetts charter to manufacture paper machinery.

The Baum Dairy Appliance Co., Natick, capitalized for $175,000, has been granted a Massachusetts charter to manufacture dairy, surgical and hospital supplies, machines, dies, tools, etc. Ewald C. Baum, 19½ West Central Street, is president, and Hallett E. Jones, 66 Walnut Street, treasurer.

The New Haven Sherardizing Co., Hartford, Conn., will move its subsidiary, the Middlesex Machine Co., Bridge Street, Middletown, Conn., to Hartford, where it will be operated in connection with the plant at 868 Windsor Street. The Middlesex company manufactures the Connecticut universal grinding machine and special machinery.

The Williams & Anderson Co., 33 Broad Street, Providence, R. I., manufacturer of emblems and other metal specialties, has acquired property, comprising about 70,700 sq. ft., as a site for a new plant.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until Aug. 24 for equipment for in-

stallation at the power house at the naval plant, Boston; also, until Sept. 7, for one 50-ton steam crane for use at the Government drydocks, South Boston.

The H. L. Judd Co., Wallingford, Conn., manufacturer of iron and brass beds, brass hardware specialties, etc., has plans under way for an addition to cost about $100,000, including equipment.

C. F. Luce, 36 Pearl Street, Hartford, Conn., architect, is preparing plans for a new six-story machine and repair works, and automobile service building, 150 x 150 ft., on Hicks Street, estimated to cost in excess of $300,000. The owner's name will be announced at an early date.

The Waterbury Metal Mfg. Co., Waterbury, Conn., recently incorporated to manufacture metal products, has been organized with Hans Rasmussen, Bradley Avenue, as president and treasurer; and A. R. Rasmussen, same address, as vice-president.

Otto W. Siebert, Gardner, Mass., formerly treasurer and general manager of the Bay State Metal Wheel Co. and the Children's Vehicle Co., both of East Templeton, Mass., has leased buildings on Main and Logan streets, Gardner, for the establishment of a new plant to manufacture fiber products. The two factories total about 50,000 sq. ft. of floor space. Later it is proposed to construct a new plant.

The Malden Electric Co., Malden, Mass., has filed plans for an addition to its power house at Broadway and Oakland Avenue, to cost about $75,000.

The Osgood-Bradley Car Co., Worcester, Mass., has taken an order from the New York, New Haven & Hartford Railroad Co., New Haven, Conn., for the construction of 22 electric cars for its electrified zone, to cost about $1,400,000. The electric equipment will be furnished by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

James F. Cleary, Jr., 112 Maple Street, Holyoke, Mass., has filed plans for a one-story machine shop on Maple Street, to cost about $15,000.

A one-story power house will be erected by the Gardner Reed & Rattan Co., 323 Pleasant Street, Gardner. Mass., in connection with the construction of a new factory on West Broadway.

The Yankee Carbon Monoxide Burner Co., Providence, R. I., recently organized, has been chartered under State laws with capital of $50,000 to manufacture oil-burning heating devices and equipment. The incorporators are R. A. Morse and Roy J. Oberemeyer, 59 Park Street.

Chicago

CHICAGO, Aug. 15.

It is believed that machine tool sales in this district reached the low water mark in July. One representative dealer reports that he has closed twice as much business thus far in August as was booked in the entire previous month. While orders are still light, the situation is slowly improving. Store trade has picked up and small miscellaneous orders, particularly from automobile accessory makers and repair shops, are more numerous. A fair-sized automobile accessory plant in this vicinity is reported to be running full. There has been no further business from the railroads. The formal letting of the Illinois Central machine tool orders has not yet been made, but is expected at any time. The Santa Fe is again taking figures on a number of large cranes for its Albuquerque, N. M., shops and is expected to place orders in the near future. It is also considering the revival of inquiries for the tools which were not bought when the first purchases were made for Albuquerque some months ago. The Marvel Machinery Co., Minneapolis, manufacturer of automobile axles and other accessories, has issued a list of about 75 tools, part of which are understood to have been placed. Buying is being handled in Chicago by Mr. Bouthinon at the offices of the F. C. West Corporation.

The Huckabee Tractor & Mfg. Co., 704 South Valmar Street, Little Rock, Ark., recently organized, has issued the following list:

One No. 2 universal milling machine with vertical head.
One 26-in. x 14-ft. engine lathe.
One 16-in. x 8-ft. heavy duty precision lathe.
One ½-ton electric crucible.
One power hack saw.
One emery stand.
One 15-hp. high-speed electric motor.
One No. 2 universal grinding machine.
One automatic or semi-automatic gear machine with capacity to cut gears up to 24 in.
One 20-in. crank shaper.
One 24-in. drill press.
One molding machine with 24-in. x 48-in. table.

The city of Chicago, Department of Supplies, is in the market for a 20-in. upright drill, and the Board of Education is inquiring for a three-spindle drill for the Senn High School and three bench lathes for the Harrison Technical High School.

A review of the first half of this year indicates that sales by dealers did not average more than 25 or 30 per cent of those for the first six months of 1920. A slow but steady increase in buying is looked for in the next six months.

A number of important price changes have been made recently. Two Western manufacturers of milling machines have reduced prices 15 and 12½ to 15 per cent respectively, and an Ohio maker of turret lathes has cut quotations 16 per cent.

The Kaestner & Hecht Co., manufacturer of elevators, now at Throop and Harrison streets, Chicago, has bought from A. M. Castle & Co., 102,000 sq. ft. at the northeast corner of Blackhawk and North Branch streets, improved with two seven-story buildings. It will spend $100,000 on improvements and alterations before occupying.

The Campbell Mfg. & Foundry Co., Lake front and Lake Street, Muskegon, Mich., has changed its name to the Muskegon Castings Co.

The Sapihl Electric Tool Co., Galesburg, Ill., has been incorporated with $36,000 capital stock to manufacture machinery and electrical appliances. The incorporators include G. A. Swenson, Fred Peterson, Henry M. Hawkinson, Karl Pihl and G. H. Lorberg.

The Illinois Steel Co., South Chicago, Ill., has a permit to construct a three-story electric power station, 93 x 375 ft., between Eighty-sixth and Eighty-seventh streets, to cost $250,000.

The Advance-Rumely Co., La Porte, Ind., manufacturer of farm implements, has preliminary plans under way for a one-story brick and concrete addition. J. C. Llewellyn, 38 South Dearborn Street, Chicago, is architect.

The North American Car Co., 328 South La Salle Street, Chicago, has preliminary plans under way for a one-story shop, 80 x 120 ft., at 135th Street and California Avenue, Blue Island, Ill., to cost $40,000. Bids are expected to be asked for some time this month.

The Niagara Radiator & Boiler Co., North Tonawanda, N. Y., has purchased from Briggs & Turivas 10 acres at the southwest corner of Eighty-third Street and Woodlawn Avenue, Chicago, and plans to improve the property with a foundry, 140 x 175 ft. Ultimately a four-story warehouse will also be built, the total contemplated improvements involving about $250,000.

The Equipment Corporation of America, represented by H. M. Capron, 11 South La Salle Street, Chicago, has postponed for two years the erection of a large plant at Maywood, Ill., for rebuilding contractors' equipment.

The Sheridan-Wilson Garage Co., 64 West Randolph Street, Chicago, will receive bids through W. G. Uffendell, 39 South State Street, on a three-story reinforced concrete garage, 75 x 200 ft., at 4616-32 Winthrop Avenue, to cost $150,000.

John E. Decker has leased to the Yellow Cab Co., Chicago, a tract, 140 x 260 ft., at the northeast corner of Flournoy Street and La Vergne Avenue, and will erect a one-story plant to cover the area at a cost of $100,000. The lease is for a 20-year term.

The Middle West Utilities Co., 72 West Adams Street, Chicago, has arranged for a note issue of $1,500,000, the proceeds to be used for extensions, improvements and general operation of power plants and system.

The Producers & Refiners Corporation, Waterloo, Iowa, operating the plant of the Hawkeye Oil Co., recently acquired, has plans under way for its new refinery at Casper, Wyo., with initial unit of about 3000 bbl. per day capacity. Later the plant will be extended with output of close to 10,000 barrels daily, with lubricating oil manufacturing works. The complete project is estimated to cost close to $5,000,000, including machinery.

The G. A. Ball Bearing Co., 3051 West Lake Street, Chicago, will call for bids at once for its one-story addition, 205 x 230 ft., at West Lake Street and Albany Avenue, estimated to cost about $65,000. Burrett H. Stephens, 37 West Van Buren Street, is architect.

The Great Western Automobile Co., 22 East Michigan Street, Duluth, Minn., is completing plans for a new two-story and basement automobile service and repair works, 100 x 400 ft., at 2533 West Superior Street, estimated to cost about $200,000 with equipment. Gustave Berquist is president.

The Board of Education, Dubuque, Iowa, is arranging a list of equipment for installation in the manual training de-

partment at the proposed new high school. N. Palen, Bank and Insurance Building, Dubuque, is secretary of the board.

The American Wire Fabric Co., 208 South La Salle Street, Chicago, has filed plans for a new one-story building, 47 x 145 ft., at Blue Island, Ill., to be equipped as a galvanizing works. A warehouse will also be erected. The structures are estimated to cost $100,000.

Buffalo

BUFFALO, Aug. 15.

The Positive Traction Motors Corporation, Buffalo, has been incorporated with a capital of $500,000 by F. X. Irr, R. E. and M. G. Dussau, to manufacture automotive machinery, motors, etc. It is represented by W. J. Bullion, Ellicott Square.

The Milling & Lighting Co., Brasher Falls, N. Y., is planning for the construction of a new electric power plant at St. Lawrence.

The Crostholz-Treiber Co., Rochester, N. Y., has been incorporated with a capital of $24,000 by C. C. and J. N. Crostholz, and W. C. Treiber, Rochester, to manufacture tools, piston rings and kindred products. It is represented by Melvin & Melvin, White Memorial Building, Syracuse, N. Y.

The Buffalo Aeroplane Corporation, 1059 Main Street, Buffalo, has filed notice of dissolution under State laws.

The Rochester Automatic Tool Corporation, Rochester, N. Y., has been incorporated with a capital of $100,000 by J. J. Appel, H. F. Stablerodt and M. J. Landau, to manufacture machinery, tools and dies. It is represented by Bryan & Bryan, Powers Building.

The Reznoir Corporation, Alden, N. Y., has been incorporated with a capital of $30,000 by H. M. Dent, C. E. Leffel and F. J. Moore, Alden, to manufacture molded mechanical products, etc. It is represented by A. W. Plumley, Mutual Life Building, Buffalo.

The Hogle Motor Sales Co., East Main Street, Malone, N. Y., is completing plans for a new three-story automobile service and repair works on East Main Street, to cost about $150,000. W. Hogle is head of the company.

Generators and transformers were damaged beyond repair when fire destroyed the power house of the Wickwire Limestone Co., Gasport, N. Y., Aug. 7. The loss is estimated at $30,000.

Philadelphia

PHILADELPHIA, Aug. 15.

The Richter Machine Co., Van Kirk and Erdrick streets, Philadelphia, manufacturer of textile machinery and parts, has filed plans for a one-story addition, estimated to cost about $10,000. Wolfang Richter is head.

The American Steel Equipment Co., Philadelphia, has been incorporated with a capital of $25,000 to manufacture steel specialties. H. C. Ramsberger, 18 South Eleventh Street, is treasurer.

The United States Heating Appliance Co., Philadelphia, has been chartered under Delaware laws to manufacture heating equipment and appliances. The incorporators are Harold C. Lansinger, Frank A. Cabeen, Jr., Philadelphia; and Edward L. Reeves, Paulsboro, N. J. The company is represented by the United States Corporation Co., Commonwealth Building.

Thomas McGinnis, 1752 North American Street, Philadelphia, has filed plans for a one-story addition to his machine shop at 1716-18 North American Street.

The Philadelphia Rapid Transit Co., 1520 Spruce Street, Philadelphia, has awarded contract to Henry E. Baton, 1713 Sansom Street, for a new one-story car repair works at Thirty-first and Dauphin streets, to cost about $50,000.

The Electro Self-Winding Phonograph Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 to manufacture talking machines with self-winding spring motors and parts. It is represented by F. R. Hansell, Land Title Building.

Plans for a new power house for the Logan Baking Co., Philadelphia, are being prepared by T. F. Miller, 1012 Walnut Street, Philadelphia, architect, in connection with a new three-story plant.

The Motor Theft Protector Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 by Ralph C. Stewart, Lansdowne, Pa.; William B. Lex and Harry S. Mangin, Philadelphia, to manufacture safety devices and appliances. It is represented by the Corporation Trust Co., Land Title Building.

The Victor Lens Mfg. Co., Camden, N. J., has been incorporated with a capital of $125,000 by Clifford A. Baldwin, George D. Rothermel and Albert E. Burling, 520 Market Street, to manufacture lenses and kindred products.

The Witte Sales Co., Camden, N. J., has been incorporated with a capital of $100,000 by Stephen M. Paschall, John E. Fennell and Edmund A. Witte, 214 Broadway, to manufacture electrical appliances and equipment.

The Universal Coal Machine Co., Little Building, Boston, manufacturer of coal-working machinery, is planning for the establishment of new works in the vicinity of Trenton, N. J., and is in communication with the Chamber of Commerce for the purchase of an existing plant.

The State Purchasing Department, Capitol Building, Trenton, N. J., is considering the installation of a refrigerating plant in the building on Perrine Avenue, recently acquired for $58,800, and heretofore owned by F. A. Poth & Sons. Edward E. Grosscup is State purchasing agent.

The Daniels Motor Co., Reading, Pa., manufacturer of automobiles, has tentative plans under way for new works at Philadelphia for complete car manufacture, including motors and chassis, estimated to cost close to $500,000 with machinery. George E. Daniels is president.

The Harrisburg Corporation, Harrisburg, Pa., operating the Harrisburg Foundry & Machine Co., Seventh and Curtin streets, has acquired a substantial interest in the plant and business of the Henry, Millard & Henry Co., Inc., 1059-65 West Market Street, York, Pa., manufacturer of gasoline engines and tractors, and operating general machine repair works. Plans are under way for enlargements.

The Keystone Supply & Mfg. Co., Bethlehem, Pa., manufacturer of pipe, steam supplies, plumbing equipment, etc., has plans under way for a new two-story factory to cost about $200,000, with equipment.

F. A. Seiberling, formerly president of the Goodyear Tire & Rubber Co., and now head of the Lehigh Tire & Rubber Co., New Castle, Pa., comprising the plant and business of the New Castle Tire & Rubber Co., recently acquired, is said to have merger plans in preparation for a consolidation of the local works with the Republic Rubber Co., Akron and Canton, Ohio, now operating under a receivership, and the Portage Rubber Co., Akron, in which a substantial interest has been secured. The Republic Rubber plants will be made the principal units in the merger.

The Bessemer Truck Co., Grove City, Pa., has been incorporated under Delaware laws, with capital of $100,000 by L. M. Monroe, I. M. Lewis and C. G. Keller, Grove City, to manufacture automobile trucks. The company is represented by the Capital Trust Co., Dover, Del.

The International Mfg. Co., Weatherly, Pa., recently organized, has arranged for the immediate operation of a plant for the manufacture of metal screens and kindred specialties.

The Fayetteville Electric Light & Power Co., Fayetteville, Pa., is being organized by I. S. and C. W. Sollenberger, Greene Township, Franklin County, for the operation of an electric power plant. Application for a State charter will be made on Aug. 22.

Samuel L. and Harry H. Light, and Thomas S. Quinn, all of Lebanon, Pa., and interested in local iron and steel companies, have acquired the plant of the Rivetless Chain & Engineering Co., Avon, Pa., specializing in the manufacture of chains, iron and steel forgings, etc. The new owners will continue the operation of the works.

Pittsburgh

PITTSBURGH, Aug. 15.

A more cheerful tone is observed in the machine tool market, due to inquiries being more numerous. While many of these are merely for the purpose of getting quotations for appropriation purposes, hopes run strong that the last quarter of the year will see a definite increase in orders. The Wheeling Steel Corporation is going ahead with its program of improvements at the LaBelle Iron Works, Steubenville, and has placed an order for a 19-in. 6-stand, continuous bar mill with the Morgan Constructions Co., Worcester, Mass. In the next few days it is expected to put out a formal request for bids on a 35-in. blooming mill and a blooming mill engine. Informal inquiries on this equipment were issued recently. Through the John F. Casey Co., Pittsburgh, the Toledo Crane Co. has secured an order for a 20-ton, 67-ft. overhead crane for installation at the municipal pumping station of Nashville, Tenn. In machine tools is noted the sale of three Fay & Egan motor-driven wood-working machines to a West Virginia lumber company. Machine tool business, as far as actual orders are concerned, still is limited, but dealers are working on several promising inquiries which they hope to close in the near future. The question of price is the dominant factor in sales at present. The Westcott

Chuck Co., Oneida, N. Y., has issued a new list cutting prices from 16⅔ to 25 per cent.

The Ephrata Metal Products Corporation, Ephrata, Pa., has issued an inquiry for a 12-in. or 14-in. x 6-ft. engine lathe, a No. 3 V & O 30-ton inclinable power press, No. 1½ Brown & Sharpe or Rockford universal milling machine, Norton or Greenfield tool grinder, and a small portable filing machine.

The Pennsylvania Tank Car Co., Sharon, Pa., will build an addition costing about $100,000 to its plant at Petroleum, to be used as a repair shop. Machinery for the fabrication of steel parts entering into the manufacture of cars will also be installed. An appropriation of $100,000 for the erection of a similar plant at Argentine, Mo., has also been made. Construction will start immediately and is to be completed in 90 days.

The American Steel & Wire Co., Fifteenth Street and Pennsylvania Avenue, Pittsburgh, has acquired property at Braddock, 76 x 100 ft., for $35,000, to be used for extensions.

The West Penn Power Co., Pittsburgh, has arranged for a bond issue of $3,000,000 for extensions, improvements, general operations, etc.

The Wire Products Corporation, Oakmont, Pa., has been chartered under State laws to manufacture wire goods and other steel products. James W. MacFarlane, Woodland Road, Pittsburgh, is treasurer.

The Du Roth Steel Truck & Car Wheel Co., Pittsburgh, has been incorporated under Delaware laws with capital of $500,000 to manufacture steel trucks, car wheels and other iron and steel products. It is represented by Wilber A. McCoy, 237 Fourth Avenue.

The Union Ice Co., Pittsburgh, has filed plans for the erection of a two-story plant, 75 x 100 ft., at 817 Beaver Avenue, to cost about $100,000 with equipment.

The United States Engineer Office, Pittsburgh, will receive bids until 12 noon, Sept. 2, for the construction of 3 steel deck barges. Plans and specifications are on file at the local office.

The Seyler Mfg. Co., Pittsburgh, has been incorporated with a capital of $100,000, to manufacture hardware products. J. T. Seyler, 525 Aspen Street, is treasurer.

The Brownsville Window Glass Co., Brownsville, Pa., is planning to rebuild its plant destroyed by fire Aug. 6, with loss estimated at about $300,000, including machinery. W. S. Phillips is general manager.

The Leevale Coal Co., Leevale, W. Va., is planning for the construction of a new steel tipple at its local properties. Headquarters of the company are at Charleston, W. Va. D. H. Morton is general manager.

The Holdred Collieries Co., Blair, W. Va., will build a new tipple, install shaker screens and make other extensions and improvements at its local properties. R. S. Wing is manager.

The Ohio & Pennsylvania Coal Co., Wheeling, W. Va., has completed plans for the construction of a new tipple at its Yorkville mine, near Wheeling.

Detroit

DETROIT, Aug. 15.

The local machine-tool market is improving slightly. Inquiries are on the increase and a larger number of single orders are coming through. No great betterment is expected, however, in the immediate future.

The plant of the American Car & Foundry Co. in Detroit will reopen the middle of September with an order for 500 new steel hoppper cars from the New York Central Railroad. This will give employment to about 1000 men, although the normal force is 2000. Two months ago the plant was closed after finishing the overhauling of 5000 freight cars.

The Hart Quick Change Rim Co., Hart, Mich., has been organized with a capitalization of $100,000 by L. P. Hyde, George W. Powers and Frank Demmon, Hart, to manufacture a new collapsible rim attachment for motor cars.

The Cameron Motors Corporation, New York, has purchased the implement plant of Cass T. Wright, Greenville, Mich., for the production of parts for the Cameron air-cooled car and Sandusky tractor. About 400 men will be employed.

M. Brownell, Battle Creek, Mich., who recently purchased the business and patents of the True Mfg. Co. of that city, states that the business will be located in Eaton Rapids, Mich. Construction on a new factory will be started soon.

King Brothers, Marquette, Mich., will establish a boiler and iron works at Houghton, Mich., to be known as the Northern Boiler & Iron Works. It will specialize in boiler repairing and acetylene welding.

Everett Winters, contractor, Detroit, has begun work on the construction of a $250,000 hydroelectric plant on the Boardman River for Traverse City, Mich.

The Howell Washing Machine Co., Howell, Mich., has been incorporated with a capital of $60,000 by William M. and Chester L. Schwartz, Howell, and Julius Englander, 59 Forty-second Boulevard, Detroit, to manufacture electrically operated washing machines and parts.

The American Forging & Socket Co., Branch and Air Line streets, Pontiac, Mich., is completing plans for a new one-story foundry, estimated to cost about $30,000.

The Morton Mfg. Co., Muskegon Heights, Mich., has been incorporated with a capital of $150,000 by Henry E. Morton, Mason B. Morton and William Rowan, Jr., Muskegon Heights, to manufacture agricultural machinery and implements.

The Reynolds Roofing Co., Grand Rapids, Mich., is planning to rebuild its main plant, destroyed by fire, Aug. 3, with loss reported in excess of $200,000, including equipment.

The Forth Resilience Mfg. Co., Detroit, has been incorporated with a capital of $100,000 by William Edelstein, W. J. Spearman and Charles Forth, 66 Lawrence Avenue, Royal Oak, Detroit, to manufacture automobile parts and other automotive equipment.

The Ravena-Conklin Electric Light & Power Co., Ravena, Mich., will soon take bids for the construction of a new hydroelectric power plant, to cost about $85,000. Holland, Akerman & Holland, 106 East Liberty Avenue, Ann Arbor, Mich., are engineers.

The Kess-Line Motors, Inc., Detroit, has been incorporated with a capital of $500,000 by Peter De Vries, William L. Kraetke and Charles A. Greenwood, 626 Orange Street, Wyandotte, Mich., to manufacture automobile tractors, engines and similar products.

The Ford Motor Co., Detroit, has construction under way on a new building at Northville to be equipped as a welding works, and used primarily in connection with the manufacture of valves and valve stems

Baltimore

BALTIMORE, Aug. 15.

Lyon, Conklin & Co., 13 Balderstone Street, Baltimore, manufacturers of sheet metal products, have arranged with the city for the closing of a portion of Race Street, the property to be used in connection with the erection of an addition.

The Bull Dog Lock Washer Co., Baltimore, care of the Industrial Bureau, Board of Trade, Munsey Building, is arranging for the establishment of a local plant to manufacture special lock washers and kindred products.

The National Differential Mfg. Co., Takoma Park, Washington, has been incorporated under Delaware laws, with capital of $250,000, by Anthony J. Casel, and George E. Gaylord, Takoma Park, and Joseph B. Simpson, Brightwood, D. C., to manufacture axles and similar equipment for automobiles. It is represented by the Capital Trust Co., Dover, Del.

Considerable electrical and mechanical equipment, including loaders, conveyors, transmission machinery, etc., will be installed at the new grain elevator of the Western Maryland Railroad Co., Continental Building, Baltimore, to be located at Port Covington. It will duplicate the company's present plant here and is estimated to cost in excess of $1,000,000. Plans have been completed.

The Phillips Steam Car Co., Wilmington, Del., has been incorporated with a capital of $5,000,000 to manufacture steam-driven automobiles. It is represented by the Colonial Charter Co., Ford Building.

The Board of Harbor Commissioners, Wilmington, Del., has awarded a contract to the du Pont Engineering Co., du Pont Building, for the construction of its proposed new marine terminal at a cost of $1,372,570. It will be equipped with loading and unloading machinery, hoisting and conveying apparatus, etc.

Plans are nearing completion for the proposed new paper mill to be erected by the Gwynns Falls Paper Co., 517 Calvert Building, Baltimore, on property recently acquired at Gwynns Falls, and bids will soon be asked. The main mill will be one, two and three-stories, 75 x 400 ft., estimated to cost about $250,000 with machinery. Joseph H. Wallace, 5 Beekman Street, New York, is engineer. George W. Davis is head.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until Aug. 31, for the construction of an addition to the power house at the naval grounds, Annapolis, Md., including ash bunker, coal bunker and other work. On the same date, the department will receive bids for a new gun shed at the Marine Barracks Reservation, Navy Yard, Norfolk, Va. Until Sept. 21, the department will receive bids for a one-story machine shop, 181 x 520 ft., at

the Naval Station, Pearl Harbor, H. T. C. W. Parks is chief of the bureau.

The Norfolk & Western Railway Co., Norfolk, Va., Room 351, J. H. Clemmitt, purchasing agent, will receive bids until 12 o'clock noon, Aug. 24, for about 75,000 lb. of soft steel bars, 120 rods of wire fencing, electrical material, parts for electrical apparatus, and parts for pumping machinery.

The Atlantic Ice & Coal Corporation, Atlanta, Ga., is planning for extensions and improvements in its ice-manufacturing and cold storage plants at Atlanta, Decatur and Fort Valley, Ga. The work is estimated to cost about $700,000, of which about $500,000 will be used for doubling the capacity of the Atlanta plant, and $100,000, each, for work and equipment at the two other points.

The Earley Process Materials Co., Washington, has been incorporated with a capital of $25,000 by John B. Earley, B. B. Taylor and Henry W. Heine, Washington, to manufacture concrete products and other materials. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Carolina Shipyards, Wilmington, N. C., have been purchased by the Maryland Wrecking Co., Baltimore, which plans for the early dismantling of the plant. John E. Smith is president of the purchasing company.

Milwaukee

MILWAUKEE, Aug. 15.

Conditions in the machine tool market appear somewhat brighter, inquiries as well as actual orders placed having shown at least slight improvement in the last two weeks. Volume is lacking, however, and transactions almost invariably involve a single machine. Orders originate in a scattering way, with the automotive industries predominating as the source. A few orders from railroads have been booked. Production remains at a low ebb and it is not believed that any material increase in output will be necessary until after Sept. 1.

The Chicago, Milwaukee & St. Paul Railway Co., 80 East Jackson Boulevard, Chicago, is reported to have instructed its engineering department to prepare tentative plans and secure estimates of the cost of erecting a new grain elevator and storehouse at Lake and Greenbush streets, in Milwaukee, to replace the plant known as Elevator A, which was destroyed by fire Jan. 16. It is to be of reinforced concrete, 85 x 285 ft., 85 ft. high, and cost about $1,500,000, including a full complement of new elevator, electric motor and power equipment, boilers, etc. Work probably will be undertaken early next spring, but the substructure may be built during the fall and winter. C. F. Loweth is chief engineer, and C. P. Rawson, chief architect, with offices at Chicago. The company is also making preliminary plans to rebuild the main car repair department of the West Milwaukee car and locomotive shops, destroyed by fire a year ago. The investment in buildings and equipment will be about $350,000. C. F. Loweth, 80 East Jackson Boulevard, Chicago, is chief engineer.

The Capital City Pattern Co., Madison, Wis., will build an addition at 613 Williamson Street, to cost about $15,000, including equipment. W. J. Gregerson is president.

The Andrew Mfg. Co., 533-545 Thirtieth Street, Milwaukee, has changed its corporate title to the Wehr Co. It was originally founded as the Andrew Motor Mfg. Co., at 736 Windlake Avenue, to manufacture rowboat and canoe motors. Later it was converted into a commercial machine shop. About a year ago the business was acquired by members of the Wehr Steel Co., Milwaukee, a manufacturer of electric steel castings for the automotive and agricultural machinery industries, and moved to its present location. E. R. Wehr is president, and William K. Andrew, vice-president and general manager.

The Service Auto Spring Co., 426 Sycamore Street, Milwaukee, manufacturer of motor vehicle springs and accessories, has changed its name to the Widmeyer Auto Spring Co., E. F. Widmeyer, secretary-treasurer and general manager.

The Lincoln Light Corporation, Milwaukee, organized several months ago with a capital stock of $150,000, has started operations in its new factory erected as an addition to the plant of the Jungers Stove & Range Co., at Grafton, Wis. The offices also have been moved from Milwaukee to Grafton. The Lincoln company will manufacture a self-contained electro-generating unit designed for lighting farms and other isolated places.

The Silent Washer Mfg. Co., Clintonville, Wis., which erected a new factory the past year, has completed all experimental work and is starting quality production of domestic washing machines with manual, belt power and direct electric motor power. For the present it is buying its castings from outside foundries, but it is planned to erect an addition to house a casting shop within the coming year. O. R. Schwantes is president.

Cincinnati

CINCINNATI, Aug. 15.

No material improvement is noted in the machinery market. While undoubtedly a better feeling prevails, it has not yet been demonstrated in the number of orders placed. Local manufacturers report scattered orders for one or two machines, but business continues light. A number of lists, however, are expected to close during the week, including those of the American Sugar Refining Co. and the Big Four Railroad. A list issued some months ago by the Missouri, Kansas & Texas Railroad, and on which no action has been taken, will likely be revived shortly. An Eastern car equipment company is inquiring for several punches and shears and the Ford Motor Co. is reported to be in the market for at least one planer. Several machine-tool manufacturers in this district have completed contracts on which they had been working for some months for duplication of rolling mill equipment for India.

Local jobbing foundries are running at approximately 15 per cent of capacity. Stove shops in the district, however, are showing some improvement and some estimates place their rate of operation at approximately 60 per cent.

No price changes on machine tools are reported. In this connection an item in last week's issue stating that an Eastern manufacturer of shapers had reduced prices approximately 15 per cent has been denied.

The Merkel Brothers Co., Cincinnati, jobber in plumbing supplies, is having plans prepared for a warehouse containing 200,000 sq. ft. of floor space in the Walnut Hills section. The building will be 100 x 400 ft., five stories. Bert Baldwin, Second National Bank Building, Cincinnati, is the architect.

The Dayton Paper Products Machine Co., Dayton, Ohio, has been incorporated with a capitalization of $10,000 to manufacture machines for assembling paper milk bottles. The machine is the invention of William Brown, Dayton, who, with Otto C. Crisp and W. J. Seifried, is one of the incorporators.

The Central South

ST. LOUIS, Aug. 15.

The first large order to be placed by the railroads for some time is reported this week. Manning, Maxwell & Moore, Inc., sold the Missouri Pacific a 42-in. motor-driven drill press for its shops, at Sedalia, Mo., and a 23B Greenlee Brothers mortiser for the Dupo, Ill., shops.

The Yard-O-Meter Corporation, St. Louis, manufacturer of measuring and computing machines for textiles, has leased larger quarters, in the Lucas Building, at Fourth and Locust streets.

The Standard Machine Works, Memphis, Tenn., is planning for enlargements in its plant for the manufacture of locomotive equipment. W. W. Jones is head.

The United Light & Power Co., Abilene, Kan., and the Pawnee Power & Water Co., Larned, Kan., have been merged under the name of the United Light & Power Systems, Inc. The consolidated company is planning for extensions and improvements in its different power plants and systems.

The Kentucky Block Fuel Co., Pikeville, Ky., has completed plans for the construction of a new tipple at its plant, estimated to cost about $25,000. Charles K. Wagner is vice-president in charge.

The Mississippi River Commission, Customhouse, Memphis, Tenn., will receive bids until 11 a. m., Sept. 5, for the construction of 13 steel barges, as per plans and specifications on file.

The Board of Directors, State Hospital, Fulton, Mo., is considering plans for a new power house to cost about $45,000. M. O. Biggs is superintendent.

The Missouri, Kansas & Texas Railroad Co., St. Louis, is planning for the conversion of its steam locomotives to oil burning operation, and will begin work at an early date. The improvements, including equipment for storing and handling oil, etc., is estimated to cost about $1,000,000.

C. W. Squires, Galena, Kan., is planning for the construction of a new rock crushing plant, with initial capacity of about 225 tons per day.

The Lock Joint Pipe Co., Kansas City, Mo., will commence the erection at once of its new plant at Webb City, Mo., for the manufacture of reinforced cement pipe and kindred products. The initial plant will cost about $125,000.

The Arkansas Royalty Co., Little Rock, Ark., has plans under way for a new refinery at El Dorado, Ark., with initial output of about 5000 gal. per day. Lee Miles is president.

The Board of Directors, Federal Penitentiary, Leavenworth, Kan., W. I. Biddle, warden, has approved plans for the construction of a new power plant at the institution to cost about $145,000, including boilers, engines and auxiliary machinery.

The Board of City Commissioners, Pawhuska, Okla., has plans under way for an addition to the municipal electric power plant. A list of equipment will be prepared at an early date.

The Kansas City Power & Light Co., Kansas City, Mo., has completed plans for the construction of a new one-story power house at Sixty-first and Forest streets 60 x 90 ft. A. E. Beltis is chief engineer.

Indiana

INDIANAPOLIS, Aug. 15.

The Active Coal Co., 607 Board of Trade Building, Indianapolis, Ind., has plans under way for a new coal-handling plant at Fourteenth and Senate streets, to cost about $50,000. Bacon & Teislow, 30 West Ohio Street, are engineers. P. M. Gale is president.

The Arctic Corporation, Michigan City, Ind., has been incorporated with a capital of $200,000, by E. E. Mikesell, H. L. Henry and S. W. Wilhelm, Michigan City, to manufacture refrigerating machinery and parts.

The Interstate Car Co., Massachusetts Avenue and Sherman Drive, Indianapolis, manufacturer of automobiles, has filed plans for a one-story addition to cost about $25,000.

The Standard Electric Co., Hammond, Ind., has been incorporated with a capital of $25,000 by W. R. Wermine, Ernest Freeman and Oliver W. Hershman, Hammond, to manufacture electrical equipment.

The Spurgeon Brothers Mfg. Co., Muncie, Ind., has been chartered under State laws to manufacture automobile equipment and parts. The incorporators are K. A., W. W. and W. C. Spurgeon, Muncie.

The United States Radiator Corporation, Indianapolis, has leased a building, 50 x 150 ft., on Senate Avenue, now being constructed by Marks Brothers, for the establishment of a new assembling plant. A portion of the structure will be used for storage. Harry L. Repp is local manager.

The New Castle-O'Brien Woven Lath Co., New Castle, Ind., has been chartered under State laws to manufacture wire lath and kindred products. The incorporators are W. F. Wilkinson, Claude Byers and B. F. Netz, New Castle.

The Gulf States

BIRMINGHAM, Aug. 15.

The Peninsular Tire & Rubber Co., Tampa, Fla., recently incorporated with a capital of $1,000,000, has plans under way for a new two-story plant, 100 x 300 ft., for the manufacture of automobile tires. The initial works will have an output of about 300 tires per day, and will cost about $200,000, including equipment. A. H. Van Auken is general manager.

The Oldsmar Tractor Co., Oldsmar, Fla., is planning for an addition to its plant for the manufacture of oil heaters and heating equipment. It will be operated as a branch of the tractor works. H. J. Keller is vice-president and general manager.

The Humble Oil & Refining Co., Corpus Christi, Tex., is considering the erection of a new refinery in the vicinity of Benavides, Tex.

The Southern Railway Co., Charlotte, N. C., is planning to rebuild its coal tipple at Chamett, La. L. S. Lemond is chief engineer.

The Peninsula Ice & Cold Storage Co., Daytona Beach, Fla., recently organized, has plans under way for a new ice-manufacturing plant with initial output of about 30 tons per day. A new cold storage plant will also be constructed. Guy G. Bailey is president, and E. B. Parker, secretary and treasurer.

The Panhandle Brick & Tile Co., Amarillo, Tex., has been incorporated with a capital of $80,000, by W. C. Pope, H. B. Boyle and A. S. Stinnett, Amarillo, to manufacture brick, tile and kindred products.

The Chapman Carriage Works, Jacksonville, Fla., is having plans prepared for the construction of a three-story addition for the manufacture of automobile bodies and tops, estimated to cost about $100,000, with machinery. Marks & Shettall, Jacksonville, are architects. W. E. Sweney, 332 West Forsythe Street, is president.

Ernest Lynn, Hartsells, Ala., and associates, are planning the construction of a hydroelectric power plant in the vicinity of the Big Four Ranch, to cost about $100,000, including equipment.

The Kelsite Stone Products Co., 210 Seward Building, West Palm Beach, Fla., has had plans prepared for a factory to manufacture concrete building blocks, tile and kindred products. A list of machinery is being arranged, estimated to cost close to $15,000. H. G. Mitchell is president.

R. L. Spann, Dallas, Tex., has had plans prepared for a three-story machine and automobile service work, including department for equipment manufacture, estimated to cost about $85,000.

California

SAN FRANCISCO, Aug. 10.

The local market for machine tools is narrow and uninteresting. Business in new materials has been very small and is handicapped by the surplus of second-hand tools, to which most buyers are turning. Shop activities have also been curtailed, thereby reducing the demand for equipment.

The Tunison Motor Co., Thayer Building, Oakland, has plans under way for a new one-story, reinforced concrete factory, 150 x 450 ft., for the manufacture of automobiles and parts, estimated to cost about $250,000. It is proposed to begin construction early in the fall.

Reed Brothers, Inc., 91 Drumm Street, San Francisco, manufacturer of surgical instruments, rubber goods and similar products, has preliminary plans under way for a new branch factory at Irvington, Cal., estimated to cost about $100,000, with equipment. The first unit will be supplemented later by additions.

The California Gypsum Corporation, 731 Pacific Finance Building, Los Angeles, has preliminary plans under way for a new works at Coyote Wells, Imperial County, estimated to cost about $350,000 with equipment. A crushing plant with steam shovel and other machinery is estimated to cost approximately $100,000. A 16-mile narrow-gage railroad will also be constructed at an estimated cost of $200,000, including locomotive and rolling stock. R. W. Waterman is construction engineer.

The Pruden-Burr Unitsteel Construction Co., Douglas Building, Los Angeles, a subsidiary of the Metal Shelter Co., St. Paul, Minn., has preliminary plans under way for the establishment of a local plant for the manufacture of unit steel products for building construction.

The Severin Motor Co., Oakland, Cal., formerly located at Kansas City, Mo., is having plans prepared for a one-story, reinforced-concrete factory, 60 x 450 ft., for the manufacture of automobiles and parts. It is estimated to cost about $100,000. Maury I. Diggs, Easton Building, Oakland, is architect.

R. F. Angulo, Santa Barbara, Cal., manufacturer of building tile and kindred products, is considering plans for a new branch factory at Monterey, Cal.

The Los Angeles Street Railway Co., Pacific Electric Building, Los Angeles, will make extensions and improvements in its electric power plants and lines, to cost about $500,000.

The California Car Co., 496 Twelfth Street, Oakland, Cal., has leased the plant of the Enterprise Foundry Co., Richmond, Cal., for temporary works, pending the erection of its new plant at Oakland, plans for which are being prepared. The company manufactures automobile equipment and parts.

The T. H. Symington Co. has established a northwestern district with headquarters in St. Paul, Minn. J. F. Schurch, vice-president of the company and president of the Railway Supply Manufacturers' Association, who has been head of the company's Chicago office for several years, will have charge of the new district. In the Chicago office he will be succeeded by Le Roy Kramer, who has been elected a vice-president and director of the company. Mr. Kramer was for years identified with the operating department of the Frisco and Rock Island railroads and for six years was vice-president in charge of manufacturing for the Pullman Co. During the war he was Federal manager of the Frisco and the Missouri, Kansas & Texas railroads at St. Louis under the United States Railroad Administration. In the spring of 1919 he became vice-president in charge of production of the Willys-Overland plant at Toledo, and for a short time was vice-president of the Pierce-Arrow motor car plant at Buffalo.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.05c. to 4.30c.	.....
Nos. 22 and 24	4.10c. to 4.35c.	4.70c.
No. 26	4.15c. to 4.40c.	4.75c.
No. 28	4.25c. to 4.50c.	4.85c.
No. 30	4.50c. to 4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¼ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	5.00c. to 5.25c.
Coppered basic	4.75c. to 5.00c.
Tinned soft Bessemer	6.25c. to 6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	18½c. to 20 c.
Copper tube, seamless	20 c. to 22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$6.80	$6.55
		90 lb....	6.90	6.65
		100 lb....	7.00	6.75
IC.. $10.60	$9.50	IC...	7.20	6.95
IX.. 11.80	10.75	IX...	8.10	7.85
IXX.. 13.60	12.25	IXX...	9.10	8.85
IXXX.. 15.60	14.25	IXXX...	10.50	10.25
IXXXX.. 17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	37c. to 38c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6½c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 30c. to 32c.

Old Metals

The market is quiet but there is a little better feeling regarding the future. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.75
Copper, heavy and wire	9.00
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.75
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

THE IRON AGE

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Primitive Iron Smelting in China

Tubal Cains of Today—How Natives Make Cast Iron and Put Phosphorus Into It Without Knowing It

BY THOMAS T. READ*

TUBAL CAIN, according to Biblical tradition, was the first ancestor of every worker in brass and iron. It seems a far cry from that legendary gentleman and his methods to the modern iron blast furnace, with an output of 500 tons of pig iron per day, and the open-hearth furnace with its correspondingly great yield of steel, but a more surprising thing is that, in the far corners of the earth, methods essentially the same as those primitive beginnings are still being practiced.

One of the most famous centers of iron smelting by primitive methods is the Ping-ting-chou region of Shansi province, China. How long ago the art of iron smelting was developed there we have no certain knowledge, for iron yields so readily to corrosion and cast iron is so difficult to engrave and lends itself so readily to being broken up and remelted that it does not yield the ancient records that make bronzes so valuable to the student of history. The cast iron cooking kettles and other objects collected from this region by Berthold Laufer are quite certainly ascribed to the Han dynasty, but whether the industry in Shansi had its beginning in this dynasty, which was so active in bringing to China the arts and products of distant lands, we do not know.

Since iron is mentioned in Chinese records nearly 20 centuries before the Christian era, it is not at all improbable that the art was practiced much earlier than 200 B. C., and at any rate we have before us the picture of the metallurgists' art practiced in essentially the same way for over 20 centuries. It seems probable that the method used was devised in this region, because it differs markedly from the

*Bureau of Mines, Washington.



The Hoisting Engine Used to Raise the Ore Wears a Cheerful Expression. The small shafts are shallow and the workings very narrow. The small brick structure at the right is the shrine of the local deity

usual method of iron smelting followed by primitive peoples. Usually a small rude furnace is constructed by digging a shallow hole in the earth, such as the Japanese used to use for copper smelting, and through improvements the artisans gradually arrive at such furnaces as can be found in Szu-chuan and the Philippines today. Those about to be described are quite unusual and therefore it is probable that they originated at the place where they are now found.

It was my privilege, a few years ago, to traverse this region on foot, thus affording ample opportunity to make observations and secure photographs. F. A. Foster has kindly given permission for the use of some of his own photographs, secured subsequently, that supplement my own.

The Chinese have until the introduction of modern civilization exhibited little need for iron; cast iron pans for cooking, chilled cast iron points for ploughs, axles for carts and a few more objects of a simple nature being the principal forms in which cast iron was used. To provide saws, axes, knives, razors, etc., for so primitive a civilization, even a smaller quantity of steel was necessary. It so happened that in this region, lying near the center of the ancient civilization of the "Sons of Han," coal and iron ore are found in close proximity and thus formed the basis of essential enterprise.

The iron ore is not of especially good quality, according to modern standards, and the deposits are small, seldom being over 3 ft. in thickness. They are worked in the most primitive way, one of the illustrations showing how simple is the hoisting equipment and how small the shafts, which are also relatively shallow. The ore, after being brought to the surface, is sorted by hand into several grades and sold to the smelters. The grading seems to be purely empirical, for I could not learn that any method of ascertaining the iron content was ever practised.

At the smelter the ore is mixed with half its weight of coal (not coke) and packed into cylindrically formed clay crucibles, 5 in. in diameter and a little less than 4 ft. long. From 250 to 275 of these crucibles are set upright inside an inclosure 12 by 6 by 4 ft. Spaces for the entrance of air beneath the crucibles are provided by the interstices between the loosely laid butts of old crucibles which form the floor of the inclosure. Over these is spread a layer of coal; the crucibles are set in place, with coal between them, until the inclosure is full, when the front is closed up, the furnace lighted at the bottom and allowed to burn by natural draft for three days. Then the front is taken down and the crucibles removed, a row at a time.

In the meantime, the coal in the crucible has robbed the iron ore of its oxygen and reduced it to metallic iron. Near the bottom of the crucible the heat has been sufficiently intense so the particles of iron have fused together into an irregular "bloom," but near the top the iron is in separate particles, from the size of a nut down to fine shot. The native hunters used the finer particles as shot and one evening I dined off a fine roast partridge which had been slain with this very material. Being pure iron it is relatively soft and therefore does not wear away the barrel, as cast iron particles would, and the smooth-bore matchlock which the hunter used was probably not dependent on fine adjustments.

The coal which was inside the crucible is not all consumed in the process but is partly converted into coke. This is carefully saved and used to mix with clay in making the crucibles. Rigid economy is characteristic of all the operations and the tops of the crucibles, which usually come through unharmed, are carefully saved. Thus the tops of the crucibles of one operation become the bottoms of the next set. The thick portion at the bottom fuses very hard and is used to make the porous bottom



Iron Ore Mixed with Half Its Weight of Coal Is Packed into These Crucibles. After the front is closed it is lighted and burned for three days; then the iron is taken out



Labor Is So Cheap and Economy Is So Necessary That the Used Crucibles Are Repaired and Used a Second Time. These are patched crucibles drying in the sun

for the furnace, as building material in constructing the sides and also in building house and courtyard walls. Even these manifold uses do not absorb all the supply available.

These primitive artisans are economical of labor as well as of materials. The clay from which the crucibles are made is spread in the roadway and the hoofs of the passing pack trains pulverize it, work organic matter into it and develop its plasticity. The crucible maker screens out the fine clay and throws the coarser portions back under the feet of the passing mules for further pulverizing.

The bloom of iron at the bottom of the crucible is worked up into wrought iron objects of every conceivable description. It is heated in a wood fire (so that it will not absorb carbon and become hard) and hammered until it is free of slag and earthy matter and gradually becomes welded into a solid ingot. These ingots are sold to iron-workers who work them up into the finished product, at the ex-



The Furnace for Melting Down the Cast Iron Has a Blower at the Back to Give a More Intense Heat. The crucibles are corrugated to give greater strength



This Tilting Furnace Is a Modern Improvement. A stream of molten iron is running into the casting ladle. The blowing engine is inside the box-line structure at the right

penditure of almost infinite labor. Mostly this is done by heating and hammering but the final finishing of thin tools, such as knives and razors, is done by scraping. The tool is finally converted into steel by the cementation process, which seems to be the common practice of all peoples. The finished tool is packed in charcoal and heated until it absorbs enough carbon to be converted into steel of the requisite hardness.

Wrought iron made in this way was at one time the sole source of supply of the Chinese artificer of wrought iron and steel, but for many years now scrap steel from foreign countries, especially old horseshoes, have become increasingly popular with the ironworkers as the source of raw materials for their trade. This competition of foreign materials in the principal centers of population has led to the modern decline of the industry, which Von Richthofen says was much more extensive at the time of his visit, 40 years ago, than it is now.

The small, loose particles of iron in the crucibles are used for making cast iron objects. They must be made to take up carbon so they will melt at a workable temperature and this is done in the following ingenious way. The smaller pieces of iron are mixed with coal and put into crucibles about 7 by 14 in. in size, and 70 to 80 of these crucibles are put into a furnace for which the draft is furnished by a hand blower. The original material is fairly pure iron but during the melting it takes up both carbon and phosphorus from the coal. The smelterman adds some impure coal, which they call "hei-tu" and which probably serves to introduce more phosphorus, making the melted cast iron very fluid, so that it runs well in the molds in casting. These primitive metallurgists do not know there is phosphorus and carbon in their cast iron and are quite unaware of the effect of these elements on iron and yet through experience they have worked out an elaborate technology that produces the desired result.

In preparing the molds for casting, these native artisans display extraordinary skill. The smaller objects are cast very thin and are yet quite perfect. In some cases wrought iron parts are placed in the molds and the cast iron poured around them,



A Fairly Extensive Operation Is the Casting of Small Objects

thus making a composite object, which is better for some purposes than one made wholly of cast iron.



It Is a Practice to Dump the Contents of Several Crucibles into One Before Pouring

Copper and Brass Research Association

The formation of the Copper and Brass Research Association, an unincorporated, voluntary organization of the copper, brass and copper-alloy interests, has been announced by its president, R. L. Agassiz, president Calumet & Hecla Mining Co. The purpose of the association as stated in its by-laws is to stimulate by co-operative effort the use of copper, brass and copper-alloy products. Membership is open to producers of copper sold here or selling agents of copper in the United States, to fabricators of copper, brass and copper products generally in the United States and Canada, and to others directly engaged in or connected with the copper and brass industries.

Eligibility for membership in the association is determined by the Board of Directors, which is composed of the following:

Walter Douglas, Phelps Dodge Corporation; C. F. Kelley, Anaconda Copper Mining Co.; H. C. Bellinger, Chile Exploration Co.; Stephen Birch, Braden Copper Co. and Kennecott Copper Corporation; F. H. Brownell, American Smelting & Refining Co.; R. L. Agassiz, Calumet & Hecla Mining Co.; Charles Hayden, Utah Copper Co. and Chino Copper Co.; C. V. Jenkins, Ray Consolidated Copper Co. and Nevada Consolidated Copper Co.; H. B. Paull, Calumet & Arizona Mining Co. and New Cornelia Copper Co.; W. Parsons Tod, Copper Range Co. and Quincy Mining Co.; Robert H. Gross, East Butte Copper Mining Co.; J. Parke Channing, Miami Copper Co.; Fred S. Chase, Chase Rolling Mills Co. and Chase Metal Works; Henry F. Bassett, Taunton-New Bedford Copper Co.; Edward H. Binns, C. G. Hussey & Co.; H. J. Rowland, Rome Brass & Copper Co., and U. T. Hungerford, U. T. Hungerford Brass & Copper Co.



Making Molds for Cart Axles. A mold for a bell is seen at the left

The officers of the association are: R. L. Agassiz, president; Fred S. Chase and C. F. Kelley, vice-presidents; Stephen Birch, treasurer; W. S. Eckert, secretary. William A. Willis has been appointed manager of the association, which has offices at 25 Broadway.



A Small Cast-Iron Cook Stove and the Mold

Membership in the association now includes the following:

American Smelting & Refining Co., Anaconda Copper Mining Co., Braden Copper Co., Calumet & Hecla Mining Co., Calumet-Arizona Mining Co., Chile Exploration Co., Chino Copper Co., Chase Metal Works, Chase Rolling Mills Co., Copper Range Co., East Butte Copper Mining Co., U. T. Hungerford Brass & Copper Co., C. G. Hussey & Co., Kennecott Copper Corporation, Lake Copper Co., Michigan Copper & Brass Co., Miami Copper Co., Mother Lode Coalition Mines Co., National Brass & Copper Co., Nevada Consolidated Copper Co., North Butte Mining Co., New Cornelia Copper Co., Phelps Dodge Corporation, Quincy Mining Co., Ray Consolidated Copper Co., Rome Brass & Copper Co., Scoville Mfg. Co., Shattuck Arizona Copper Co., Taunton-New Bedford Copper Co. and Utah Copper Co.

Last year, the Pennsylvania is reported to have laid 82,500 tons of 130-lb. rails, enough for 404 miles of single track.

Automobile Race for the Steel Treaters Convention

George Desautels, chairman of the entertainment committee for the convention and exhibition of the American Society for Steel Treating in Indianapolis, Sept. 19 to 24, has issued an announcement of a match race between Frontenac and Duesenberg automobiles. This 50-mile race will be staged on the speedway, Wednesday, Sept. 21, at 10.00 a. m. This is the first time in the history of the speedway that the authorities have ever consented to let anyone stage a race of any kind on this track other than the annual race meet on Decoration Day. There will be three or four Frontenac cars and three Duesenberg machines. The manufacturers of these machines are located in Indianapolis and are great rivals. Other races are possible.

While the race will probably be the largest event and probably of the greatest interest to the visitors, Chairman Desautels has, nevertheless, arranged for golf and tennis tournaments and ball games between the Eastern and Western delegates. Dances, smokers, vaudeville and a continual round of enjoyment are promised for the visitors. The steel treaters are looking forward to having the largest convention and most enjoyable occasion in their history. Prospects for technical papers are up to expectations. The hotels are already reporting heavy reservations for the week of Sept. 19.

The importing of agricultural implements into Cuba is under consideration by Gil & Co., E. En. C., Compostela, Num. 135, Havana, Cuba, who are importers. They desire to deal directly with manufacturers. Samuel A. Jenkins, of the company, should be addressed on the subject.



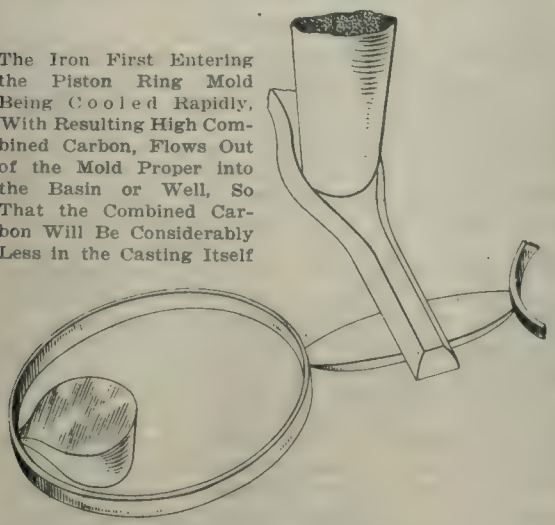
Casting Grate Bars for the Ordinary Clay Stove on Which the Cast-Iron Pans Are Set for Cooking

Mechanical Control in Foundry Problems

Several Cases Discussed Showing How the Application of Simple Mechanics Produced Results Which Chemistry Alone Did Not

BY J. H. HOPP*

FOUNDRIES generally accept patterns and equipment with approval or criticism based upon a superficial examination rather than a close study. At times designers are at fault in endeavoring to carry out certain theories; again, the pattern maker views the product of his art—he would call it—from a standpoint of simplicity of construction or beauty of finish, rather than from the practical utility of the pattern to that joint end of simplifying and foolproofing the molding and producing quality product. To indicate the need of a close co-operation between—not only the foundry superintendent and the pattern department—but the engineering department and machine shop superintendent also, certain simple examples have been selected to convey the value of an application of mechanical control of the product. Both mechanical and chemical control are essential; results, whether good or otherwise, are attributed to but one of these factors, which, it is hoped, will be clearly shown as erroneous.



The Iron First Entering the Piston Ring Mold Being Cooled Rapidly, With Resulting High Combined Carbon, Flows Out of the Mold Proper into the Basin or Well, So That the Combined Carbon Will Be Considerably Less in the Casting Itself

The first example is that of individual piston ring castings, commonly used by automobile and tractor engine builders. Individual piston ring castings, to meet the exacting requirements of present day machining operations, must be soft and particularly free from hard spots. It must be evident that first of all the proportions of the various elements must be suited to light castings requiring soft metal and having sufficient spring to meet the conditions imposed in a gas engine cylinder under heat.

Assume the conditions are piston ring castings of extremely light metal section, naturally subject to rapid cooling, and a complaint of hard spots, resulting in too much time required for machining and a high machine shop loss. It is an entirely conservative statement that 98 per cent of the foundrymen of the United States or Canada would attack that problem first, if not for all time to come, from a chemical and metallurgical standpoint.

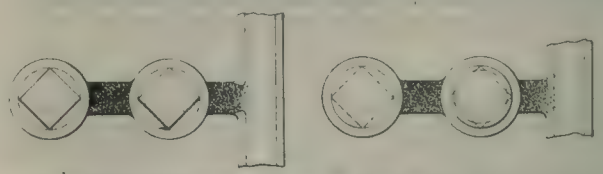
In a majority of castings, when the chemical proportions of the elements are correct, or shop conditions preclude the practicability of altering the mixture, it is possible mechanically to eliminate the difficulties encountered, or reduce them at least very materially, as will be shown. My recommendation would be, first, study the metal content of the castings. An accurate analysis, coupled with a simple knowledge of the action of the various elements, in combination, will generally show whether or not the metal mixture is satisfactory.

Referring to the accompanying drawing of a single ring, one will note at a point diametrically opposite to the point of entrance of the metal into the mold, but on the inside of the ring casting—to conserve flask space—a basin or well of a size dependent upon the size of the casting in question. The temper of the sand forming this mold, acting upon the fine stream of molten metal entering it, tends to increase the rate of cooling to an extent depending upon the amount of moisture present, and as a result we have higher combined carbon.

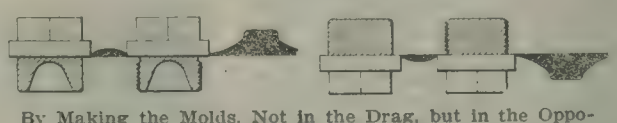
The addition of this basin or well permits the first iron entering the mold, which cooled rather rapidly, with a resulting high combined carbon, to flow out of the mold proper. In the interval the sand has become heated, and following this a more normal rate of cooling results. As a consequence of this drawing off of the original metal poured into the mold, the combined carbon will be considerably less in the casting itself. This practice has been universally adopted and eliminates "hard spots."

The method of controlling the piston ring castings in reality makes the molding operation foolproof against the tendency of using sand too wet or of uneven ramming or squeezing. The principle underlying the control can be applied with variations in many ways and will be found practicable and profitable. With a very desirable mixture, 50 per cent, say, of all the castings produced cannot be machined or at least only at a very considerable expense over and above that required to machine the other 50 per cent of castings.

Another example is shown in the molding of plugs for steel barrels, threaded as indicated and provided with square head for application of wrench. One hundred per cent appear acceptable, but 50 per cent, to repeat, are machinable and 50 per cent are not considered to have satisfactory metal for machining, though all metal came from the same ladle and through the same gate.



In Molding Threaded Plugs As Indicated, Half of the Castings Were Found Not Satisfactory for Machining, Although All the Metal Came from the Same Ladle and Through the Same Gate

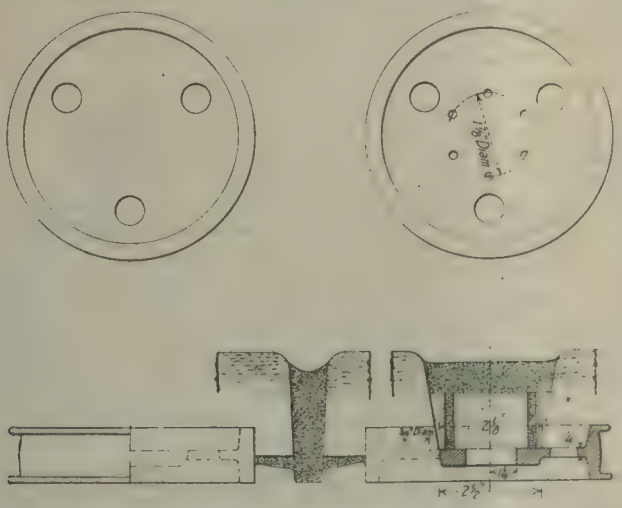


By Making the Molds, Not in the Drag, but in the Opposite Manner, and Filling Up the Section of the Casting Originally Cupped to Save Weight and to Eliminate Hanging Sand in the Cope, the Trouble Was Overcome

The flask used was a 10 x 24-in. snap type and the match-plate actually contained 60 patterns, four rows of 15 each, and a single gate with a single main runner lengthwise, from which at various points the metal was conducted to the central rows of patterns on either side of main runner and by small gates from these castings to the two outer rows of patterns.

*From an address delivered before the Southern Metal Trades Association. Mr. Hopp is secretary and chief engineer of the Charles C. Kawin Co., Chicago.

The importance of the case may be apprehended by suggesting a contract's being involved stipulating the furnishing and machining at a fixed price of 250,000 pieces and yet half of the foundry production proved too hard to machine. One could stop off the outer rows of molds, which are the ones containing hard castings,



By Rearranging the Method, Shown in the Upper Part, of Molding Gas Stove Hose Connection Fittings, Castings Resulted When Molded as in the Lower Arrangement, Which Could Be Threaded in the Interior

but this would be very costly because production would be reduced. One could make new pattern equipment with less patterns in a smaller size of flask, but proportionately one would not get as many patterns in the same equivalent area. On an order of 250,000 pieces the pattern expense could be considered negligible, but as all of these are items of cost they must be considered.

The castings under consideration were in the drag of the mold, and the molding was done in the opposite manner from that originally planned. The sketch shows this change together with one other, that of filling up the section of the casting which originally was cupped out to save weight. This last change being made necessary to eliminate the hanging sand in the cope. Production as a result was not decreased.

Each casting weighed slightly more than under the previous arrangement. Rejections due to hardness were entirely eliminated. There were, of course, the usual rejections due to various molding causes. The added weight of metal, however, was an item in the total order, but insomuch as the contract was taken at a fixed price, and under the conditions of pattern equipment offered, the foundry had no recourse, whereas a careful diagnosis of the problems at hand before bidding upon the work or accepting the contract would undoubtedly have placed the foundryman in a position to quote a price including the additional metal.

An example of chemical control that should prove interesting is one of a product mechanically correct and upon which fact the manufacturer fought until bankrupt. The castings failed in service principally from leakage. The class of castings is best described as seamless steam jacketed kettles and evaporating pans, tested to 150 lb. hydrostatic pressure, and in daily use for rendering, refining, soap making, cooling fluids and semi-fluid substances, preparing food specialties, candies, medicines, tooth paste, drilling compounds, paints, etc.

In explanation the kettle, exterior jacket, stay-bolts and outlet are cast complete in one piece. The inner shell of kettle is very thin, resulting in quick heating; and casting the stay-bolts between inner shell and steam jacket outer shell as an integral part of the casting results in unusual strength and reinforcement of the thin shell.

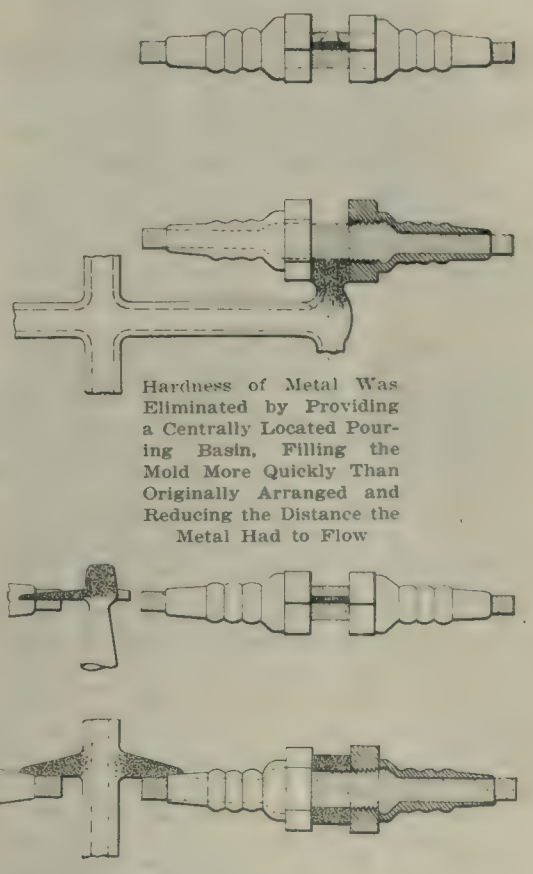
The original company produced kettles of 175 gal. capacity, maximum, but the metal problem was not solved and the losses were of such moment as to bring on bankruptcy. The parties who purchased the rights, etc., at the bankrupt sale, and who have made these seamless kettles satisfactorily, now manufacture kettles up to 1200 gal. capacity.

To appreciate fully the complexity of these castings conceive a kettle of 800 gal. capacity. That means about 6 ft. diameter by 6 ft. high, with 90 sq. ft. of heating surface. This 90 sq. ft. of surface has 480 stay-bolts connecting it to the heavier outer steam jacket shell. This means 960 points of metal junction and that many possibilities of a leak.

The metal mixture was perfected and then a "guarantee without limit" was given. I believe it is the only guarantee of its kind in connection with pressure apparatus or, in fact, any kind of machinery. The guarantee is as follows: "To at *any time* replace any kettle or parts found defective in workmanship or material upon return of part claimed defective, transportation charges prepaid." The pig iron is not judged by fracture nor charged into the cupola by rule of thumb. Coke and pig iron are not bought without certainty of high quality.

Another sketch covers the molding of a pulley 6 in. in diameter, the rim of which is machined on both sides and the face machined to form a double shrouded idler pulley. These castings are machined in an automatic machine performing the several operations simultaneously. Should any tool become dulled its replacement requires complete shutdown of machine.

A study of this casting revealed on the drag side of the rim—and after eliminating such factors as cold



Hardness of Metal Was Eliminated by Providing a Centrally Located Pouring Basin, Filling the Mold More Quickly Than Originally Arranged and Reducing the Distance the Metal Had to Flow

iron, too wet a sand and unnecessarily hard ramming—that the time of pouring the casting was too great and the distance that the metal had to travel was too long. A casting of 6 in. in diameter having a circumference of approximately 19 in., resulting in the metal having to travel 9½ in. in each direction from the gate.

The sketch will show that a centrally located pouring basin was recommended, which permitted filling of the mold much more quickly than before. Of course, the total area of the pencil gates—as we term them—was greater than that of the single gate, but the metal in no case was required to travel more than one-sixth of the circumference and therefore would not give up its heat as rapidly and as a consequence the combined carbon would be more nearly uniform throughout the casting. In the practice as found, the combined carbon

was from 10 to 20 points higher on the drag side. This change in pouring, without any alterations in the metal mixture, will eliminate we believe the difficulties causing rejection.

Innumerable examples of this general sort of thing could be given, but the cases cited, it is believed, will suffice to show that one cannot afford to pour castings too slowly. On the other hand, it can also be said that castings should not be poured too fast. In substantiation of this, consider a six-cylinder automobile casting weighing approximately 240 lb. The production in this particular case was 38 to 40 per day for a given number of core fitters and assemblers and the scrap generally equalled the production. The entire mold in every particular was made of dry sand and it was the contention of the manufacturer that he followed good accepted foundry practice and in so doing could see no reason why he should not expect a practically perfect production of these castings.

As stated before, the casting weighed 240 lb. A cubic inch of cast iron weighs approximately ¼ lb. Roughly speaking, the contents of this mold was 960 cu. in. The manufacturer's contention was that the iron entered the mold so fast that the gases did not have time to form and, therefore, he could not account for the gas pockets in the bore of these cylinders, which caused their rejection.

It was pointed out that irrespective of any gas formed by contact of the molten iron in the cores, there had to be removed from this mold 960 cu. in. of air. It was proved quite conclusively that the practice followed was in reality preventing the escape of a portion of this air—and by placing four small risers in various parts of the cope side of the mold and pouring the mold in 12 sec. instead of 8, giving the air a chance to be liberated, there was produced virtually 100 per cent perfect castings, that is, free from the defects causing their rejection prior to this change.

It can be stated safely that but a small proportion of all castings finding their way to the scrap heap are produced by pouring too fast, but the illustration mentioned is convincing of one thing and that is that we cannot carry the speed of pouring to the extreme and secure quality any more than we can increase production indefinitely and still maintain quality.

As a further illustration of the principle governing the rejection of the castings discussed previously, attention is called to the gas stove hose connection fittings shown in another sketch. This shows the improper method of making these and one which has resulted in a casting too hard to be threaded in the interior, and it also shows the proper way of pouring to assure ease of machining.

My conclusion must be plain. The co-partners contributing jointly to foundry results are chemistry and simple mechanics.

SILICON ADDITIONS TO STEEL

Effect of Early and Late Introduction on Gas Content and Rolling Discard

The effect of the time of adding silicon in the physical properties and the gas content of open-hearth steel is exhaustively discussed by E. Piwowarsky in *Stahl und Eisen* for June 10, 1920. An abstract of this important article has been published by *Technical Review*, London, as follows:

A number of opinions are held regarding the deterioration of steel by the small quantities of silicon present in the ordinary commercial steels, principal among these being the view that the silicic acid formed by the action of the ferrous oxide is retained by the steel in the form of a finely divided emulsified product, and that this weakens the cohesion of the steel, while the excess of silicon impairs the weldability of the material. The writer carried out a number of experiments and observations in steel works, with a view to clearing up this question, and determining whether and how it would be possible to enhance the good effects of silicon and to suppress the deleterious effects. A number of test heats were made, and the silicon added (in the form of ferrosilicon) at different stages of the pouring. It was found that when the ferrosilicon was added too early, the silicon losses were considerable and the quantity of silicon left in the final product was smaller than when the addition was made as late as possible.

A further series of heats was carried out to determine the effect of the gases, incorporated in the steel, on its qualities. For this purpose, the melts were made, as far as possible, using the same material and the same furnace. The ferromanganese required for deoxidizing the bath was added when the charge was completed, and time had been allowed for a state of equilibrium to set in between the bath and the slag. The ferrosilicon in half the heats was added by placing it in the bottom of the ladle at the usual time and in the other half it was added as late as possible by means of a special box arranged over the ladle and fitted with a flap-door at the bottom. The quantities of silicon were so selected as to give a final percentage of 0.20 to 0.22 per cent in the steel, as it was found that only with these percentages was the difference between the methods of adding the silicon to the bath sufficiently marked to be observed.

The charges were cast in round chill molds of 540 kg. in sets of 34 ingots, except in the case of the heats containing over 0.5 per cent carbon, which were cast in 750 kg. square ingots. The ingots were always cast from the bottom. Before the steel was cast, the ladle was left standing for 10 minutes or so, this measure being necessary especially in the case of cold charges, as otherwise the rolling discard of the steel is increased, due to the presence of the "emulsified" silicic-acid in the steel. Gas samples were then drawn off by a special arrangement. The results show that the gases given off by the liquid steel, where the silicon is added prematurely, contain a very large proportion of CO, which is the most harmful gas as regards the formation of blowholes. Further, when the silicon is added late, the hydrogen content falls with decreasing temperature, and finally ceases, whereas it increases when the silicon is added too early.

Rolling tests were also carried out to show the amount of discard resulting (from the presence of occluded gases) when the silicon was added early and late. The following table shows the results:

Test No.	C.	Mn.	P.	S.	Si.	Results of Rolling—Good Material, Kg.	Results of Rolling—Discard, Kg.	Discard, Per Cent
			(*a*) *Ferrosilicon Added at Usual Time*					
1.	0.30	0.69	0.051	0.028	0.18	24,200	14,000	36.50
2.	0.39	0.63	0.060	0.036	0.20	27,200	12,800	32.00
3.	0.37	0.51	0.053	0.044	0.20	34,400	12,100	26.00
4.	0.32	0.47	0.014	0.037	0.19	9,300	21,740	70.00
			(*b*) *Ferrosilicon Added Late*					
5.	0.36	0.54	0.027	0.038	0.22	30,250	6,800	18.00
6.	0.35	0.57	0.043	0.032	0.24	32,700	3,700	10.00
7.	0.31	0.52	0.057	0.038	0.25	28,600	4,900	14.60
8.	0.40	0.54	0.027	0.040	0.26	36,200	4,100	10.00
9.	0.37	0.58	0.064	0.040	0.25	34,900	3,800	9.80

The author concludes from his investigations that a high temperature favors the separation of the silicate present in the form of a product of deoxidation on the tapping of basic silicized open-hearth heats; and that when the ferrosilicon addition is made at as late a stage as possible, this reduces the percentage of gas in the final product, in the liquid, solid and rolled states.

The American Red Cross is making a drive to get the smaller industrial companies interested in first aid work. To that end classes are being organized by the Pittsburgh chapter for the instruction of those employees of companies which do not feel they can afford the expense of holding classes in their own plants. Any company in Allegheny county which wishes to start its own class, the Red Cross will assist upon application to the Pittsburgh chapter. Classes are to be held in room 1003 Chamber of Commerce building, once a week beginning Sept. 15, at 8 p. m. The fee is $5 per member and the course comprises 10 lessons.

Steel Labor Less than Half Employed

Figures of Labor Bureau Show Extent of Falling Off and Trace Curve of Employment—Curves Show Also Unfilled Orders and Pig Iron Produced

WASHINGTON, Aug. 23.—It is estimated that the number of persons employed in the iron and steel industry in July, 1921, was 283,648 less than at the peak of employment in June, 1918, when 532,798 were engaged. The falling off therefore was 53.2 per cent. The second peak in the number of persons employed in the industry, by which is meant the blast furnace, steel works and rolling mill departments, was in March, 1920, with a total of 502,133, so that the decrease in July of this year was 50.4 per cent. The figures, prepared by the Bureau of Statistics, Department of Labor, are based upon reports showing the number of persons employed by the United States Steel Corporation, and reports of the Bureau of Census.

Reports of the Steel Corporation show that the average number of persons employed by it in the manufacturing properties in 1914 was 131,616. The average number of persons employed in the iron and steel industry in 1914, according to the Bureau of Census, was 307,356. Thus the employees of the corporation constituted 42.82 per cent of all persons in the industry in that year.

Index Figure and Estimated Number of Persons Employed in the Iron and Steel Industry

100 = Base, January, 1916 = 383,308

1915		1917		1920	
Jan.	74 = 283,648	July	130 = 498,300	Jan.	127 = 486,801
Feb.	71 = 272,149	Aug.	134 = 513,633	Feb.	129 = 494,467
Mar.	77 = 295,147	Sept.	133 = 509,800	Mar.	131 = 502,133
Apr.	80 = 306,646	Oct.	135 = 517,466	Apr.	130 = 498,300
May	82 = 314,313	Nov.	136 = 521,299	May	121 = 463,803
June	85 = 325,812	Dec.	136 = 521,299	June	128 = 490,634
July	87 = 333,478			July	126 = 482,968
Aug.	90 = 344,977	1918		Aug.	125 = 479,135
Sept.	93 = 356,476	Jan.	134 = 513,633	Sept.	128 = 490,634
Oct.	97 = 371,809	Feb.	135 = 517,466	Oct.	128 = 490,634
Nov.	97 = 371,809	Mar.	137 = 525,132	Nov.	124 = 475,302
Dec.	97 = 371,809	Apr.	136 = 521,299	Dec.	113 = 433,138
		May	138 = 528,965		
1916		June	139 = 532,798		
Jan.	100 = 383,308	July	137 = 525,132	1921	
Feb.	102 = 390,974	Aug.	138 = 528,965	Jan.	93 = 356,476
Mar.	105 = 402,473	Sept.	137 = 525,132	Feb.	93 = 356,476
Apr.	104 = 398,640	Oct.	138 = 528,965	Mar.	89 = 341,144
May	108 = 413,973	Nov.	135 = 517,466	Apr.	81 = 310,479
June	109 = 417,806	Dec.	138 = 528,965	May	79 = 302,813
July	110 = 421,639			June	75 = 287,481
Aug.	113 = 433,138	1919		July	65 = 249,150
Sept.	115 = 440,804	Jan.	136 = 521,299		
Oct.	115 = 440,804	Feb.	128 = 490,634		
Nov.	117 = 448,470	Mar.	125 = 479,135	*Averages:*	
Dec.	118 = 452,303	Apr.	119 = 456,137	1915	86 = 329,006
		May	114 = 436,971	1916	110 = 420,361
1917		June	114 = 436,971	1917	129 = 496,062
Jan.	122 = 467,636	July	117 = 448,470	1918	137 = 524,493
Feb.	123 = 471,469	Aug.	121 = 463,803	1919	115 = 442,401
Mar.	124 = 475,302	Sept.	122 = 467,636	1920	126 = 482,329
Apr.	124 = 475,302	Oct.	81 = 310,479	1921*	82 = 314,860
May	127 = 486,801	Nov.	95 = 364,143		
June	129 = 494,467	Dec.	113 = 433,138		

*Seven months.

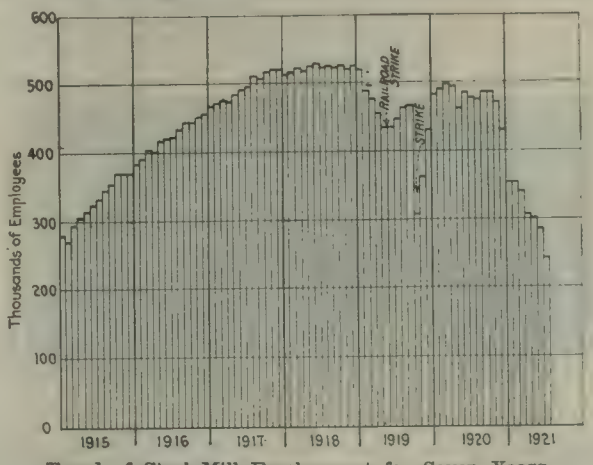
A table prepared by the Bureau gives an index number of persons employed in the industry by months from January, 1915, to July, 1921. The average for the index numbers for 1915 was 85.83, with the base of 100 applying to January, 1916, when 383,308 persons were employed in the industry. This period is used as the base because it marked the first complete and satisfactory reports the Bureau had received regarding employment in all of the industries reporting employment figures.

The Steel Corporation in 1915 had 140,875 persons employed. Using this as 42.82 per cent of all persons employed in the industry in 1915, then the total number employed was 328,993. With this number engaged in 1915, and an average index of the number employed fixed at 85.83, then 1 in the index number would be equivalent to 3,833.08 persons.

Upon this basis of estimate, the computation shows the following number of persons employed at the dates specified as:

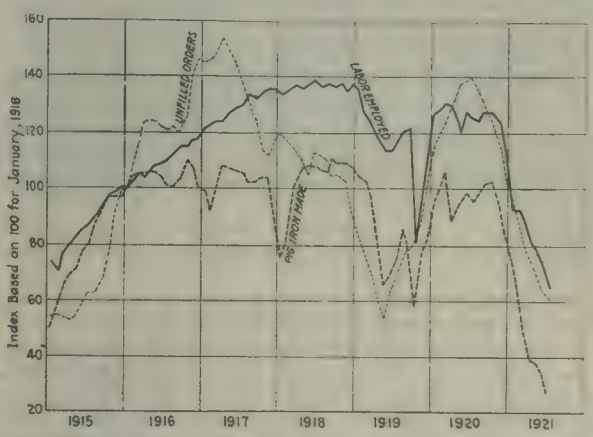
January, 1916	383,308
June, 1918	532,798
March, 1920	502,133
July, 1921	249,150

An accompanying table presents the index numbers referred to, together with the estimated number of persons employed from January, 1915, to July, 1921.



Trend of Steel Mill Employment for Seven Years

According to these figures the peak of employment in June, 1918, was 39 per cent greater than in January, 1916, and no month in 1918 showed an excess lower than 34 per cent. In the next high point, March, 1920, employment was 31 per cent greater than in January, 1916. In July, 1921, only 65 per cent as many were employed as in January, 1916.



Concurrent Fluctuations of Steel Mill Employment, Pig Iron Production and Corporation's Unfilled Orders

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Portland cement production of the United States in July amounted to 9,568,000 bbl., the heaviest month of the year; 52,036,000 bbl. have been produced to date in 1921 and 50,376,000 bbl. shipped. Production in seven months is about 52 per cent of the corresponding figures for 1920.

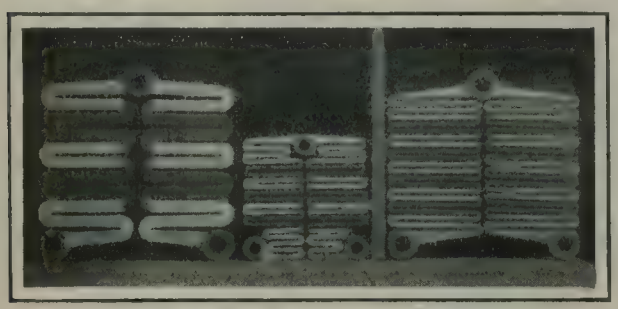
A new rate of $1.12 per ton on limestone from Fairport Harbor on Lake Erie to Youngstown furnaces is announced by the Baltimore & Ohio Railroad.

NICKEL IN IRON CASTINGS*

Alloy Resistance Grids Having Unusual Properties—Effect of the Nickel

One of the special uses to which the electric furnace has been put recently is the melting of an alloy of nickel and cast iron for the production of electrical resistance grids. The metal sections of these grids, as shown by the illustration, are quite uniform for each pattern, but there is, among the various patterns, a variety of thicknesses. The cross sections vary from ½ by 3/16 in. to as small as ⅛ by ⅛ in. The electrical resistance of a perfect casting lies within 10 per cent above or below the fixed listed resistance for each pattern. Good molding is essential to success in the making of these grids, for with absolutely correct metal a variation of 0.01 in. in width and thickness of section on some of the patterns may mean as much as 12 or 14 per cent variation in resistance.

The service for which these castings are intended demands that the metal, even in the smallest castings, be very soft, showing an open, gray, highly graphitic structure in order that they may be resistant to shock,



Electrical Resistance Grids

and stand up well under rough usage. The metal used for this purpose is a gray iron alloyed with 4 to 5 per cent of nickel, which element, when the composition of the alloy is correct, imparts toughness and pliability to the metal and helps to overcome the tendency of metal to run white and become brittle because of the rapid cooling action of the sand mold. When cold, these castings can be twisted into various shapes, taking a permanent set without breaking. The alloy has approximately double the electrical resistance of ordinary cast iron.

Following are the specifications and the analyses of three heats showing a normal resistance:

	Specifications, Per Cent	Analysis of Three Heats Per Cent	Per Cent	Per Cent
Silicon	2.40 to 2.60	2.40	2.48	2.47
Sulphur	Under 0.05	0.010	0.013	0.018
Phosphorus	Under 0.08	0.055	0.055	0.074
Manganese	Under 0.40	0.13	0.08	0.10
Total carbon	3.60 to 4.00	3.92	3.92	3.82
Nickel	4.00 to 5.00	4.47	4.24	4.55
Copper	0.50 to 0.70	0.67	0.67	0.67

On account of the nickel content of the metal, which raises the setting point of the alloy considerably above that for cast iron, causing the alloy to be sluggish at a temperature at which cast iron would have great fluidity, it is necessary to cast at a much higher temperature than would be required for cast iron. The temperature of the metal in the ladle, as determined by a Leeds & Northrup optical pyrometer, runs between 2800 and 2900 deg. Fahr. (1537 to 1592 deg. C.).

The urgency of the situation made necessary the use, largely, of such materials as happened to be in stock in our works, consequently much of the equipment is crude. The furnace is three-phase, combined open-arc resistance type, without bottom electrode; is stationary, and of 1000 lb. capacity. The hearth is built of magnesite brick and grain magnesite while the roof is made of special fireclay brick. Alternating current is delivered by the power company at 22,000 volts. It is stepped down to 220 volts in three 150-kv.-a. single-phase, Westinghouse, lighting transformers, and further reduced to 90 or 110 volts in three autotransformers. These transformers, while not intended for electric-furnace use, have stood up remarkably well, having at times carried an overload of more than 100 per cent for an hour. Four-inch Atcheson graphite electrodes are used, and the regulation is by hand. A switchboard, located in a convenient place for the furnace operator, contains a voltmeter, three ammeters, and the power switch.

The required amounts of pig iron, scrap and nickel ingot, together with some retort carbon, are charged into the furnace, the power turned on, and the melting done as quickly as possible. The melting down is carried on at the higher of the two possible voltages, viz., 110-volt, and the input of current fluctuations from 0 to 3000 amp. per phase; the melting requires about 1 hr. to 1 hr. and 10 min.

As there is not enough time to allow for chemical determinations, the necessary adjustments are made from observations of test pieces so shaped as to indicate the character of the metal as cast in all sections from a feather edge up to ½ in. Several of these test pieces are cast in sand during the adjusting and heating period, and additions of silicon and carbon are made until the fracture of the test piece shows the metal to be normal. As stated before, the temperature, to be high enough to run the smallest grids, should be from 2800 to 2900 deg. Fahr. in the ladle. The adjusting and superheating of the metal requires from 30 to 40 min., thus making the time of the heat from 1½ to 2 hr.

One of the peculiarities of this alloy of cast iron and nickel is a rejection of graphite from the metal when it is just melted, but when the metal is superheated, it again takes up the carbon thrown out at a lower temperature. It is this property of nickel, throwing out graphite on cooling, which helps to make the grids soft and gray in the smaller sections and incidentally keeps the electrical resistance high.

The average power consumption, covering a 9-mo. period of operation, was 1100 kw.-hr. per ton, while the electrode consumption for the same period averaged 28 lb. per ton. These figures are rather high, even for such a small furnace, but considering that the operation was, in a sense, experimental, and the installation more or less a makeshift, it is probably not as bad as the figures would seem to indicate. With an ideal installation, consisting of a tilting furnace, suitable furnace transformers, and automatic regulation, it would be possible to reduce the current consumption by reason of having a smoother operation, greatly lessen electrode consumption by having less breakage, shorten the time of the heat considerably, reduce the amount of labor necessary to operate the furnace, and thereby decrease the cost of metal in the ladle.

The advantages of this method of melting may be stated briefly as follows:

There is no picking up of sulphur in the melting process, therefore all of the scrap alloy, such as gates, sprues, defective grids, and over iron can be charged back into the furnace and nothing wasted. In fact, it is quite possible and just as easy to run a heat of 100 per cent scrap as it is to run one made up of pig iron, scrap, and nickel.

The possibility of adjusting the metal to the proper composition while it is in the furnace.

The attaining of the high temperature necessary to cast the metal into very small section castings so that it will run clean, and remain gray and tough.

*From a paper to be presented at the fall meeting of the American Institute of Mining and Metallurgical Engineers at Wilkes-Barre, Pa., by D. N. Witman, metallurgist, Westinghouse Electric & Mfg. Co., Trafford, Pa.

The Fischer Scrap Iron Co., Stevens Point, Wis., has changed its corporate title to F. & G. Auto Parts Co. It will continue to deal in waste metals and other materials but will specialize in marketing useful parts of passenger vehicles and motor trucks purchased and scrapped in the last two years in the conduct of the business. Hyman D. Fischer and Joseph Goldstein are the proprietors of the business.

Car repair contracts received by the Youngstown Steel Car Co., Niles, Ohio, will keep its plant operating to capacity into the first quarter of 1922 and afford employment to 350 men.

Methods of Preparing Blast Furnace Slag

Divided into Four Classes by Carnegie Steel Co. According to the Specific Use to Which It Is to Be Put

METHODS of preparation of blast furnace slag are described in a comprehensive way in a book compiled by the Carnegie Steel Co., Pittsburgh, to emphasize the properties and commercial uses of the material. From advance pages of the book, the subjoined descriptive matter has been obtained and the accompanying illustrations have been reproduced.

There are four general classes of slag mentioned: air cooled bank slag, fork slag, pancake slag and honeycomb slag. Study of blast furnace slag has been carried on for 16 years, and the forthcoming book of some 38 pages discusses, among other things, the commercial sizes of concrete and the mixtures used for various purposes, and it incorporates tests to prove the reliability of the slag and general physical characteristics necessary in the construction of buildings, roads and other places where the slag may be utilized.

To make air cooled bank slag the white hot molten liquid is run from the slag notch of the furnace into the slag ladles, which hold 200 to 260 cu. ft. or some 7½ to 9½ tons of slag, and which can carry the slag in liquid form as far as eight to ten miles. On the edge of a spoil bank they are dumped and from the slag deposited in this method the greater amount of the principal commercial slag is produced.



The Principal Commercial Slag, Used for Ballast, Road Construction and Mass Concrete Work, Is Obtained from Banks Like That Here Shown at the Lorain Plant of the National Tube Co.

On the bank the slag gives up its heat to the air and to previous deposits with which it coalesces to form a hard stone-like substance. Here it weathers from two weeks to one year or more, dependent upon magnesia content and demand. During this period of seasoning any free lime is removed by natural agencies and thus disintegration of the slag, when in practical use, is eliminated. Meantime, no refuse or waste material is dumped on the bank from which slag is to be taken for sale or use.

The properly seasoned slag is excavated from the bank by blasting or by steam shovel or by both, loaded on cars and hauled to the crusher and the larger pieces broken up. It is then passed over a magnetic separator to extract the iron and from thence is elevated by belt conveyor to revolving screens where it is graded into commercial sizes and is ready for the market.

Fork slag corresponds in size and general characteristics to rough bank slag. It is made at the Columbus steel works of the Carnegie Steel Co., where there is no crusher and where, therefore, earlier methods of disposal are still in use. The slag as it issues molten from the blast furnace is led in long, narrow trenches formed in sand where it is allowed to cool. When sufficiently cool to handle, the long strips or molded pigs of slag are broken up with sledges. The larger pieces are loaded by hand and the smaller by forks into cars to be hauled away to the dump for final disposition after seasoning. Fork slag of necessity carries some sand with it from the trenches and it is offered for mass concrete, road work, etc.

Pancake slag is made at the Isabella furnaces of the Carnegie company. The slag is cast on a machine like a pig casting machine into large flat molds about 20 x 45 in. and 2 in. deep. The pans of slag travel along an endless chain conveyor and, when within a short distance of the dumping point, the cooling of the slag is accelerated by sprinkling with water. This process cracks the thin sheets of slag and the drop into the car breaks them into small pieces. Much of this form of slag has been used as a concrete aggregate in fireproof construction but the production is limited and cost of maintenance of machine high. In consequence this method was for a time discontinued as a mode of preparation of slag for regular uses.

There has beeen a demand recently for a heavy dense blast furnace slag for use as an abrasive, also for the manufacture of ornamental brick. The Isabella furnaces make ferromanganese and the beautiful green slags from them can be manipulated as pancake slag for special uses.

Honeycomb slag, its name derived from its appearance, is the result of numerous experiments to lessen weight without decrease in strength. By the method finally perfected, a slag has been produced that weighs but 30¼ lb. per cu. ft. and will make up into concrete with a weight as low as 105 lb. per cu. ft., compared with the usual 165 lb.

A large rectangular tank, 40 x 120 ft. and 6 ft. deep, built of brick is located near the furnace. The bottom is cooled, cleaned and dried, and then the molten slag is run from the furnace directly into the tank to a depth of about 6 in. When this layer has cooled suf-



Pancake Slag, Cast on a Machine Like a Pig Casting Machine, Has Been Used as an Abrasive and in Making Ornamental Brick

ficiently, it is sprayed with water, cleaned and dried; then another 6 in. layer is poured, and so on until the tank is filled. It is then broken up, excavated by steam shovel, loaded into cars, sent to the crusher and crushed and graded to the various commercial sizes.

Granulated slag is cooled by water immediately on its passage from the blast furnace. It is used in the manufacture of Universal portland cement, and as a substitute for river sand and also as satisfactory filling material. Two methods of granulation are at present in use:—

1. The open tank method.—Common granulated slag is made by running the molten slag directly into a tank or pit partly filled with water by simple contact with which disintegration is accomplished. This product contains many light, fluffy particles in addition to those that are finer and denser. Much of it is as coarse as popped corn which, when the color is light enough, it rather resembles. Owing to its great porosity much of it floats until it becomes cold and saturated with water; only the denser particles settle at once to the bottom of the tank.

2. Improved water jet method.—The molten slag is delivered from the furnace through a trough to a concrete pit at the edge of which the trough takes the form of a large nozzle fitted with an annular tube from which water issues in the form of a spray delivered through a 4 in. pipe under 30 to 40 lb. per sq. in. pressure. This causes disintegration and partial cooling, which operations are completed by contact with the water in the pit. By the force of the impact with the water the slag is driven against the opposite side of the pit. Slag thus granulated resembles that made by the open tank method except that the largest particles are much smaller and the entire product is somewhat more dense.

Granulated slag is removed from the pits and loaded into cars by grab bucket and crane. It will weigh



Slag Tank at the Isabella Furnaces of the Carnegie Steel Co., Where the Jet Method Is Used in Granulating the Slag



The Trough at the Concrete Pit Takes the Form of a Nozzle Fitted with an Annular Tube from Which Water Issues Under Pressure

from 50 to 60 lb. per cu. ft., dependent upon the kind of ores smelted, moisture, condition, etc.

International Resolutions on Emigration Supervision

WASHINGTON, Aug. 22.—The International Emigration Commission, composed of representatives of fifteen nations, which has been in session in Geneva, Switzerland, has adjourned after adopting a number of resolutions, according to a cable received by Ernest Greenwood, American representative of the international labor office.

Among the resolutions adopted were (1) supervision over all kinds of agents interested in promoting emigration and the abolition of all emigration propaganda based on false information; (2) supervision and control, by competent authorities, of the recruiting of workmen in foreign countries, confining such recruiting to agencies authorized by the State; (3) safeguarding the state of the labor market of countries of emigration and immigration; (4) contracts containing clauses for the deduction of traveling expenses from the wages of the immigrant shall be declared null and void by competent authorities of countries of emigration, where such clauses are not in accord with existing legislation.

Tinplate Manufacture in Norway

In 1916, when the difficulty of procuring tin plates (which were not made in Norway) was severely felt by the Norwegian canning industry, a company was formed, with a capital of 3,000,000 kr., to establish rolling mills for the production of steel plates, and a tinning plant for their conversion into tin plates, at Simonsvik, near Bergen. The capacity of the works, which were to be known as the Norsk Valseverk, was to be 18,000 tons a year. It is now announced, says the London *Ironmonger*, that the plant has just completed its first important order, and that another tin mill is about to be erected. In 1914 Norway took 29,000 tons of tin plates from Great Britain.

Germany's Low Bids on Structural Steel for South America

WASHINGTON, Aug. 23.—German steel mills will be unable to make deliveries of a great part of the business they have taken recently in South America in competition with American and British firms, according to importers in that country. A report received by the Bureau of Foreign and Domestic Commerce from Edward F. Feely, commercial attaché at Buenos Aires, says that the view of the importers, who represent American and British manufacturers, was expressed in connection with the award given in June to Pedro Goedhart, representing a German firm, for 750 tons of fabricated bridge steel for the Argentine government. The German bids were much lower than the American and British tenders, one of the latter carrying the highest figure. The bid of Goedhart was 309,570 pesos Argentine paper currency, c.i.f. Buenos Aires, or less than one-half of the lowest American bid, 648,868 pesos, even if the latter currency is figured at the normal rate of exchange. The highest British bid was 670,000 pesos, made by Percy Grant. Another importer of British steel, Cia. Britannica de Construcciones de Acero, bid 496,264 pesos. The two lowest bids were both made by importers representing German mills. In addition to the one mentioned, there was the bid of Staudt y Cia (Krupp), 312,264 pesos.

The State of Pennsylvania suffered a loss of $25,413,305.73 in wages alone from strikes during the first six months of 1921, according to a report submitted to State Commissioner of Labor and Industry Clifford B. Connelley by William J. Tracy, chief of the bureau of mediation and arbitration. A total of 4,186,031 working days were lost in 323 strikes in the six months' period. In the metal industries, alone, the loss is estimated at 669,015 days, with a wage loss of $4,673,736.

Strike benefits amounting to $391,985 have been paid from Oct. 1, 1920, to June 30, 1921, by the International Union of Boilermakers and Iron Shipbuilders, it was announced in St. Louis by Joseph P. Ryan, international vice-president, who is there directing the strike of local No. 27. There are 400 men in St. Louis that are out on strike. Ryan said that boilermakers are on strike in about forty cities in this country.

The open hearth department of the National Malleable Castings Co., Sharon, Pa., is working five days a week, starting Aug. 15, instead of three days as before. No additional men will be employed, but those who were retained when the three-day-a-week schedule was started will be given an increase in working hours. The company expects to increase production in other departments within a short time.

Special Diehead for Fine Threads

The diehead shown in the accompanying illustrations has been developed recently by Alfred Herbert, Ltd., 50 Church Street, New York, and is being offered as an addition to the line of Coventry dieheads handled by that company.

It is for fine threads of comparatively large diameter but of no great length. The company's standard diehead is of a size and weight in excess of what is required for cutting a fine thread, being made strong enough to cut Whitworth threads of the full nominal diameter of the diehead, which threads are comparatively coarse in pitch. To meet the demand for a smaller and less costly diehead the 2½ in. fine thread diehead under consideration was developed. The range of sizes cut is from 1¾ in. to 2½ in.

The diameter of the body of the diehead is 5⅝ in.; the total length, 7¼ in., and the weight, with one set



The Shank Is Attached to the Diehead by a Large Flange. For threads longer than 2½ in., the shank is removed and an adaptor fitted



The Holder Consists of a Base Bolted to the Capstan Face and a Sliding Portion, Which Carries the Diehead. The slide is elevated by a handle

of dies, is approximately 25 lb. The diameter of the shank is 1¾ in. The weight of a set of dies would be about 8 oz. against 5½ lb. for the dies of a 3 in. diehead. Being smaller and lighter and having a smaller shank than the 3-in. diehead it can be used in the turrets of the smaller lathes which would be used for cutting the fine threads.

The shank is attached to the back of the diehead by a large flange. In cases where threads longer than 2½ in. are required, the shank can be removed and an adaptor fitted to suit the particular turret face on which the diehead is to be used, the adaptor having a hole large enough to accommodate the maximum screw to be cut. The length of the thread is then not limited by the diehead but only by the holes in the turret of the lathe. The shank is 1¾ in. x 3 in. long and, being solid, permits of a reduction in diameter to suit holes less than 1¾ in. The holder consists of a base which is bolted to the capstan face and a sliding portion which carries the diehead. The slide is elevated by a handle with an eccentric at the end of the shaft which engages the slot in a hardened steel bush driven into the base. The reverse movement of the handle lowers the diehead into the cutting position. An external deadstop locates the diehead in line with the spindle. Taper threading and rotating attachments can be supplied. The coarsest pitch which can be cut is 11 per in., or 2.25 min. pitch.

The diehead is said to have met with a ready reception in the brass industry where fine threads are to be met on an extended scale.

The Associated Building Employers of Jackson, Mich., which has declared for the American or open shop plan of employment, has perfected an organization and opened offices at 111 East Main Street, Jackson: A. N. Case, Case Mfg. Co., sheet metal contractors and metal stamping, is president; Clyde Elwood, Watts-Morehouse Co., builders' supplies, is treasurer, and Lewis Atherton is executive secretary. The association is a unit of the Associated Building Employers of Michigan.

Present World Stocks of Zinc

World stocks of virgin zinc, according to the well-informed European correspondent of the American Zinc Institute, are at present about as follows by countries in tons:

United States	80,000
United Kingdom	20,000
Belgium	11,000
Germany	16,000
France	5,500
Scandinavia	4,500
Other countries	8,000
Total	145,000

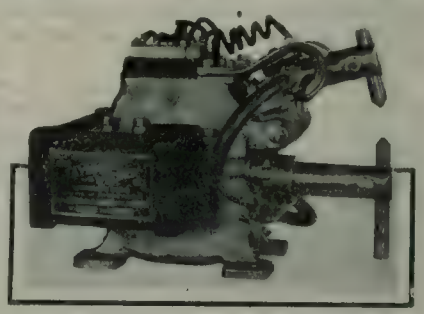
Bearing in mind that the world's consumption was almost 1,000,000 tons per year before the war, these stocks as unsold are low and would be quickly absorbed by a sudden trade revival.

Improved Condition of Standard Parts Co. Affairs

What is mentioned as a sign of recovery for the automotive and allied industries was contained in the decision rendered by Federal Judge D. C. Westenhaver of the Northern Ohio District Court in Cleveland, Aug. 15, answering the petition of Frank A. Scott, receiver for the Standard Parts Co. The court granted permission for a payment of a 10 per cent dividend to creditors and stated that he was satisfied the company was being operated by the receiver in a sound and economical manner. The petition set forth that the company held a cash balance in excess of $1,500,000. A consolidated balance sheet, submitted with the petition, showed the condition of the Standard Parts Co. to be improved.

New Bench Type Spot Welder

A new spot welder of the bench type, designated as the S-4-B, has been placed on the market by the Taylor Welder Co., Warren, Ohio. It is designed for light work such as spot welding light gages of sheet metal; cross-wire welding; contact points of platinum or tungsten to steel; brazing and soldering small parts of electrical instruments, watch cases, optical goods and the welding of gold to German silver or steel; and also



The Cast Copper Frame Acts as a Secondary. The lower horn can be adjusted to three different positions, three sets of holes being drilled in the base of the frame and the horn set to suit the work

small laboratory work. In capacity the range is two pieces of No. 30 to No. 16 gage sheet steel.

The floor space occupied is 10 in. x 17 in., the extreme height from the bench being 12 in. and the distance from bench to the welding dies, 6¾ in. The overhang is 4 in. and greatest movement of the upper electrode, 1 in. the distance between the horns when closed being 3 in. in the upper position and 5 in. in the lower position. The weight is approximately 150 lb.

The machine has a cast copper frame which acts as secondary, tending also to make it more efficient. The horns are of cold drawn copper 1¾ in. in diameter. The lower horn can be adjusted to three different positions, being made adjustable by drilling three sets of holes in the base of the frame and setting the horn to suit the work, a long electrode being furnished below to suit this condition. The electrical features include a 3 kw. transformer with a 4-step regulator for adjusting the current and an automatic single-pole switch. Water circulates in the upper and the lower horn. The machine is foot operated.

The Moline Plow Co., Moline, Ill., announces a new price of $990 on Model D tractors, this being a reduction of $320 under the price of Jan. 1. The new price is the lowest at which the tractor has ever been sold.

Secure Place of the Iron Blast Furnace

Features of Superiority Not Met by Processes Aiming at Producing Steel Direct from Ore — Several Possibilities of Improvements

BY JOSEPH F. SHADGEN*

OF late the reduction process on which the blast furnace is based has been by inference subject to doubt, and various efforts have been made in different countries to discredit, at least indirectly, the functions of this venerable apparatus as well as its commercial usefulness. Direct methods of producing steel immediately from the ore are invented every year. They stir up a froth of opinions and controversies that generate sometimes extensive trial installations, but they have, up to the present time, upset very little of the universally recognized strong position of the blast furnace in its yielding an intermediate product termed pig iron, so impure that another operation is required to transform it into steel, the most useful commercial form of iron. That the blast furnace offers only a roundabout solution of the ore reducing problem is obvious and the following study purposes to present in a concise way the whys and hows of the process involved. It is neither an attack nor a refutation, but is merely intended as an objective exposition of the writer's personal point of view, the result of theoretical studies and practical observations.

In reviewing the problems involved, it must not be forgotten that the direct process of reducing iron ore to steel existed before the blast furnace, because the Catalan ovens and fires producing steel from ore antedate even historic records. The blast furnace is the result of a slow evolution and was born over a century ago through the efforts of the artisan to increase the production. After a century of a haphazard slow development, it came into prominence about 75 years ago through the invention and application of the steam blowing engine to replace the old style bellows or hydraulic devices. Refinements of the process never ceased. Hot blast was adopted after 1860 and Cowper stoves in their numerous forms have been standard fixtures since 1880. After 1900 the utilization of the waste gases set in vigorously and to-day is in the last stages of its development. Hence it appears that the blast furnace is not an invention but the growing child of the practical operator, who never ceased to have faith in its superior commercial value.

Very little of theoretical consideration was responsible for its conception. Bessemer and Thomas, as well as Siemens and the Martin brothers, accepted the correct principle and efficiency of the blast furnace process philosophically and concentrated their minds on the methods of refining economically the pig iron into the final steel by means of either the converter or the open-hearth furnace. Theoretical investigations of the very complex process were undertaken only after the universal adoption of the process by industry, as the classical work of Professor Gruner of Paris attests, and only since 1900 have scientific tests been made on a large scale to secure real data for heat-balance sheets and to study the detail factors.

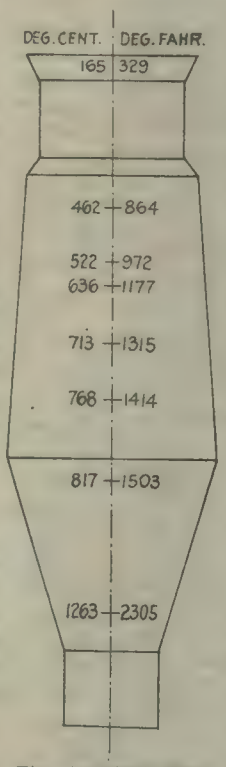


Fig. 1—Blast Furnace Temperature Records as Published by N. Metz

Early records show that the small blast furnaces used charcoal, and this fuel has survived in this country and also in Sweden, where its price is reasonably low. Economic reasons, cost and supply considerations, forced a switch to the mineral fuels available in larger quantities and anthracite proved to be the best suited natural coal giving good results in the blast furnaces. High volatile coals proved unsatisfactory on account of the complication of the coking phenomena introduced within the shaft of the furnace. The scarcity of anthracite coal led to previous carbonization of the ordinary bituminous coals to transform them into coke by distilling the gases that had proved objectionable in the blast furnace. Coke became the standard fuel not only because practically all its carbon is uncombined and its sulphur content is less than that of the original coal, but because its qualities could easily be controllable beforehand. Coke furthermore is hard and of a very porous texture, properties that are of the greatest value in the process of the blast furnace. Free carbon proved to be the best reducing agent in the blast furnace for reasons unknown for quite some time, but the results of the practical experience more than convinced the operator of this vital condition.

Features of the process are: The so-called impure carbon-iron alloy called pig iron melts at a relatively low temperature, and melts without getting pasty or without any intermediate transformations. The melting points of the various grades of pig iron lie between 1100 and 1300 deg. C. (2000-2350 deg. Fahr.), which permit operating with bosh and hearth temperatures of 1200 to 1400 deg. C. (2200-2550 deg. Fahr.), as slightly superheated conditions have to prevail to guarantee permanent fluidity and continuity of running. The relative ease of producing slags (aluminosilicates of calcium and magnesium) melting at those temperatures, the possibility of shading the composition of those slags to conform with the analysis of the various qualities of pig iron wanted by the trade are outstanding reasons for the success of the blast furnace process. As all temperatures below 1400 deg. C. (2550 deg. Fahr.) assure a reasonably long life of the refractories, it will be clear why the blast furnace is the accepted medium for reducing iron ores. The last but not least advantage of the blast furnace is that "all" the iron content of the ores is reduced to metallic iron and that the loss of metal through incomplete reduction (in other words, the iron content of the slag) is very low. In spite of the large volumes of the slags produced, four to ten times greater than the volume of pig iron, this loss seldom exceeds 3 per cent of the iron produced and should never be greater than 5 per cent. The iron loss through the dust contained in the blast furnace gases can be recovered practically in its totality in a modern plant.

All direct methods reducing ores immediately to steel must not only create slags fluid at temperatures

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around 1500 to 1600 deg. C. (2700 to 2900 deg. Fahr.), and consequently provide refractories to withstand those temperatures and the mechanical actions and chemical reactions at those extreme heats, but they must also avoid that the iron oxides enter the slag, unreduced, because this loss is unrecoverable, and hence may compromise the economic results of the whole operation. All operators of open-hearth furnaces are well aware of the difficulties of keeping the iron content of their high temperature slags very low. In spite of the small volume of slag in comparison with the volume of the metal inherent to the refining process, all means are used to cut down this loss to a minimum.

Another factor not to be lost sight of is the enormous capacities made possible by the blast furnace within a very limited space without handicapping the natural balance of its reactions or reducing the economical run of operations. The recognition of these facts led to enormous daily production (500 tons, sometimes more), unknown in any other industrial process involving chemical changes. This concentration of operations in large units helped considerably the economic developments, because it permitted the reduction of conversion costs through large well equipped mechanical installations that are the earmarks of the modern blast furnace plant.

Influence of Solid Carbon of Fuel as Reducing Agent

The blast furnace mixes fuel and flux intimately and creates by the counterflow of the rising gases an equilibrium of reactions as well as temperatures at each level that is difficult to excel by any other apparatus. The movement of the materials downward is vertical, producing least friction and a minimum of abrasion on the walls of the furnace and thus assuring long life of the brick linings. The vertical upward movement of the gases tends to make use of the whole section offered and does not favor any part against another part. This counterflow utilizes the heat to a remarkable degree and stratifies the various reactions that require different temperature levels, such as dehydration, calcination of limestone, reduction of oxides, melting of flux. The remarkable way the temperatures vary is reflected by the results of tests of N. Metz, made in 1910 in Dudelange (Luxemburg) on a minette furnace. See Fig. 1.

The latest research seems to attribute the surprising reduction qualities of the blast furnace process to the action of the solid carbon. The theory confirmed what had been recognized by practical experience as reflected by the constant endeavors to provide a fuel with a maximum amount of free, uncombined carbon. Without going into lengthy theoretical calculations, this point can be made clear by pointing out that the reducing influence of the gases (CO in particular) is practically negligible. First, because their time of contact in the high temperature zone is very small—a fraction of a second—as the gases pass through any blast furnace from tuyere to top in less than 3 to 5 sec. Second, because this high velocity does not permit intimacy of mixture and contact necessary for the reducing action. And, third, because the reaction velocities of CO acting as the reducing agent are relatively small.

Most of the reduction of iron oxide or the ores to the uncombined metal of the pig iron is the work of the downgoing carbon of the coke. The porous texture permits intimate mixtures and offers large contact surfaces. The periods of contact are very long, several hours at least. The coexistence of these conditions explains the superiority of the blast furnace process. Part of this solid carbon that pervades the whole pasty mass in the lower bosh is absorbed by the freshly reduced iron particles to form the alloy called pig iron that absorbs additional impurities of the flux (Si, P, S and Mn).

This analysis and these considerations bear out, first, that all new processes based on the reducing activities of gases have to be taken with a grain of salt and, second, that laboratory tests are in no way conclusive, as the time factor is completely ignored in small installations producing several tons a day, whereas in large plants with hundreds of tons of daily capacity the time of contact is much shorter, a detail feature that has to be discounted correctly. The fact of the paramount influence and value of the solid carbon as a reducing agent is also borne out by the evolution of the electric blast furnaces, wherein electricity generates only the heat required to attain the temperatures necessary for the reactions and the melting phenomena, while mixtures of coke with charcoal, or charcoal alone, provide the reducing agents for the iron oxides of the flux.

Heat Balance of Blast Furnace

Fig. 2 represents the rough diagram of the heat balance of a blast furnace. The calculations and assumptions conform to a practical case, and for general discussion, the data of Table 1 may be accepted. It must be said in parenthesis that real balance sheets are much more complicated and require very elaborate preliminary explanations and real information data, but for the purpose of this study the tabulated approximations will prove sufficient.

The hot blast contributes more than heat and the savings are proportionately greater than the immediate addition of a number of British thermal units. The increase in temperatures around the hearth level caused by the hot air creates more appreciable results than merely adding heat. This plus the flywheel effect and easy control explains why stove efficiency and blast temperatures are or should be in the foreground of the attention of the practical furnace man to-day.

The heat loss through the slag varies with the flux, which is a function of the ore. The heat lost by the molten slag is proportionate to the amount of slag and is practically unrecoverable. No practical means of reclaiming that waste exists to-day in spite of efforts toward a solution in England.

The melting of the pig iron accounts for about 4 per cent of the heat supplied by the coke. In steel plants adjoining blast furnaces this sensible heat is utilized to a large extent, as the pig iron is refined into steel immediately.

Table I—Items Entering into the Heat Balance of a Blast Furnace

Providing B.t.u.		Absorbing B.t.u.	
(*a*) Heat content of coke, %	100	(*a*) Liquid iron, %	3.5 to 5
(*b*) Heat added by hot blast, %	8 to 15	(*b*) Liquid slags, %	4 to 10
		(*c*) Radiation and cooling	8 to 12
		(*d*) Reactions, %	25 to 32
		(*e*) Blast furnace gas, %	55 to 65

Radiation and cooling losses are mainly dependent on the rate of operation; their value is considerably less in large furnaces blowing large tonnages than with the small units pushed to less degree.

The heat required for the complex reactions is made up of the heat required for evaporating the water of the flux and the coke, the calcining of the limestone and the reduction of the ores and varies considerably. Numerous detail data have to be guessed at or, to put it politely, have to be carefully estimated.

The most remarkable characteristic of the blast furnace process is the fact that, speaking roughly, 55 to 65 per cent of the theoretical heat content of the coke escapes from the top of the apparatus in gaseous form. In the early days of the art, with the open top, these gases were considered a great nuisance, but soon their value as a by-product was recognized, especially for

heating the brick work of the stoves that raise the temperature of the blast. Crude attempts were made to separate the dust that soiled them. The advent of the gas engine and the continuous upward movement of coke prices changed the old point of view, and to-day the gases are no longer a by-product but one of the main products.

The correct utilization of their energy permits of reducing the conversion cost of ore to pig iron to a remarkable extent. Speaking generally, for each ton of pig iron the blast furnace yields an average of 155,000 cu. ft. of gas, representing at 130 B.t.u. per cu. ft. some 20,000,000 B.t.u., equivalent to the heat value of 1400 lb. of real coal of about 14,000 B.t.u. per lb. This simple calculation visualizes the asset those furnace gases represent and makes all further comment of their value superfluous.

To make an efficient use of the calorific value of the blast furnace gases a thorough cleaning is necessary. The last twenty years of furnace experience are a proof of that statement and yet not all operators accept its obvious logic. It is not only cheaper to clean all the gases, but it is cheaper to cleanse them thoroughly before releasing their heat energy. The costs of purification will be more than regained by subsequent advantages. Efficient solutions of the cleaning problem are on the market, based either on the dry filter principle or on water injection with centrifugal separation or scrubbers, or the electrical precipitation phenomena.

That no gas should escape and all joints be tight to prevent every wanton loss is a precaution so evident that it hardly needs any repetition. A loss of over 3 to 5 per cent during work days may be accepted as inevitable, but figures in excess of that are to be considered as representing wasteful operation.

The first use of the gas is the heating of the Cowper stoves. With clean gas and modern burners, 25 per cent of the total gases, or some 5,000,000 B.t.u. per ton of pig iron, should suffice for this purpose, although 30 to 33 per cent (7,000,000 B.t.u.) are more common in every day experience to-day. Here is room for considerable saving, and it is astonishing to note the absence of interest in this problem and to record the indifference toward improvements in this detail by the majority of operators.

The second immediate utilization of the blast furnace gases is the generation of power to operate the furnace itself. The principal auxiliaries are the blowing engines, the hoist, the pumps and the gas cleaning plant, all of which operate practically continuously; of secondary importance is current for intermittent uses, such as lighting and shop work. The total power requirements per ton of pig iron will probably average some 130 to 150 kw., of which the blowing station takes the lion's part of 90 to 110 kw. The generation of this power leads broadcast into the controversy of gas versus steam prime movers, a question which cannot be dealt with squarely in a summary like this one. The surprising popularity of the gas engine in Europe is nevertheless worth mentioning, and for general information it may be added that 15,500 to 16,500 B.t.u. are generally figured as necessary to generate a kilowatt on the bus-bars of the powerhouse, an average confirmed by practical experience, over years of operation, with due allowance for the low load factor of the central power plant in the iron and steel industry in not operating on Sundays. For gas blowing engines here in America a minimum of 100,000 B.t.u. per 1000 cu. ft. of blast air may be accepted (although lower figures have been reached with lower pressures in Europe) and used as a comparison to check up the actual efficiency of an existing equipment.

About 40 to 55 per cent of the blast furnace gases are surplus available for other purposes and represent a value that no practical operator should miss taking advantage of. The statement, heard so often: "We have no use for the surplus," cannot be taken seriously, as no industry can afford to disregard an asset and to throw dollars away.

This essay will have proved that there is nothing basically wrong with the process of the blast furnace. The historical evolution has found a theoretical confirmation that explains the superiority of the method of reducing iron ores into pig iron over any other method. The efficient utilization of the blast furnace gases is emphasized and several possibilities of improvement are hinted at; these will not fail to be drawn into the limelight in the coming years of competition and low margin profits.

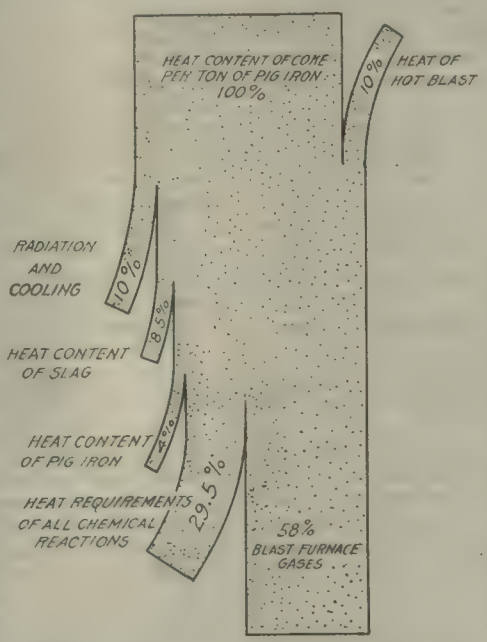


Fig. 2—Approximate Diagram of Heat Balance of Blast Furnace

Coal and Coke Labor Reductions

UNIONTOWN, PA., Aug. 20.—Preceding by 24 hours the announcement of the United States Steel Corporation of a further reduction in wages, W. J. Rainey, Inc., published reductions of 3 to 15 per cent in mine and coke plant labor, carrying the Rainey scale back to the old Frick scale of May 1, 1917. Employees of the Mt. Braddock and Allison plants of the Rainey company declined to accept the reduction and quit work, closing down two of the largest plants of the company in the region. No disorder marked the suspension of operations. Men say they will not accept the new scale; officials say the plants cannot be operated at a higher scale.

The Rainey reduction, effective on Aug. 19, is the fourth this year and cuts total approximately 50 per cent. Other reductions were put into effect without question and were followed by all other independents in the region. So far as can be learned to-day, no other independent operations contemplate further reductions. The present scale of the independents is 10 per cent lower than the present Frick scale. No information is available as to the new scale of the Frick company which is to become effective on Aug. 29, in line with the Steel Corporation's announcement on Aug. 19 in New York.

Rainey operations, until the Mt. Braddock and Allison were suspended, was approximately 85 per cent coal and 30 per cent coke. All Frick ovens continue out of blast. Coal production of the company in the region is now approximately 35 per cent. Most observers believe that the new wage scale will be the signal for resumption on a large scale, many predicting that the region will be operating generally at 60 per cent by the middle of September and at near normal by early spring, "near normal" being approximately 90 per cent of regional production. It is wise to emphasize, however, that coke production probably never will reach the "war basis" of operations, due to the growth of the by-product ovens in place of the beehive type.

Steel Industry Heard on Tariff Schedules

Ferroalloy Paragraph Chiefly the Issue —Magnesite and Graphite Duties Opposed and Defended in Late Hearings

WASHINGTON, Aug. 23.—The interest of the iron and steel and allied industries in the metal schedule of the permanent tariff bill is evident from the number of important witnesses who are scheduled to appear this week before the Senate Committee on Finance. The hearings on this schedule were begun to-day with discussion relating to aluminum, anvils, files, cutlery, surgical instruments and other products but it is a question how far the committee can carry out its program, because it has been delayed in closing hearings on the chemical and earthenware schedules.

The committee plans to complete the metal schedule this week, after which it expects temporarily to discontinue hearings in order to take up the tax bill. On Thursday the major items in the metal schedule are to be taken up, according to the present program, and some of the leaders in the industry are listed to appear. They include Chairman John A. Topping, Republic Iron & Steel Co., who will speak on the ferroalloy section, an object of much discussion, also on tin; E. G. Grace, president Bethlehem Steel Co., ferroalloys; A. C. Dinkey, president Midvale Steel & Ordnance Co., ferroalloys; J. A. Campbell, president Youngstown Sheet & Tube Co., welded pipe and barbed wire; Willis L. King, vice-president Jones & Laughlin Steel Co., ingots, slabs and billets and structural steel; Severn P. Ker, president Sharon Steel Hoop Co., hoops, bands and cotton ties; I. M. Scott, Wheeling Steel Corporation, sheets and tin plate; Alan Wood Iron & Steel Co., pig iron and scrap; W. M. Slater, Washington, American Rutile Co., ferroalloys; Henry L. Smith, Indianapolis, manganese ore; De Courey Brown, New York, ferroalloys; Dan Sutherland, Washington, American Brass & Copper Statistical Exchange, chrome ore; Clifton Taylor, Pittsburgh, Molybdenum Corporation of America, ferroalloys; Radcliffe Romeyn, Philadelphia, ferroalloys; W. H. Abbott, Wheeling Steel Corporation, metal schedule; Thomas E. Monks, Cleveland, ferrosilicon.

Hearings last week on the chemical and earthenware schedule included testimony regarding magnesite, graphite and fluorspar. On the first two witnesses appeared both to oppose and support duties, while on fluorspar one witness appeared and asked that the duty of $5 proposed in the Fordney bill be increased to $10 net ton. The steel industry itself did not have any representative before the committee, but its position is that fluorspar should be continued on the free list.

Treasury experts have begun the work of studying the American valuation plan, which the Senate Finance Committee, in joint conference with the House Committee on Ways and Means, has concluded to adopt. The experts will endeavor to learn as nearly as possible how the new plan of assessing ad valorem duties will operate as applied to American products and report to the Senate committee. The latter will use the information in determining rates in the permanent bill and it has been indicated strongly that this will result in a general lowering of the duties carried in the measure as it passed the House.

Argument Against Proposed Duty on Magnesite

Claiming that the four Pennsylvania plants engaged in the manufacture of magnesite brick and the plant of the American Refractories Co. at Baltimore, representing an investment of approximately $2,500,000, would have to be abandoned within one year after the levying of the proposed duty of ¾c. per lb. on dead burned magnesite carried in the Fordney tariff bill, P. B. Mossman of the American Refractories Co., Pittsburgh, urged the committee to continue crude and dead burned magnesite on the free list. Mr. Mossman, after approving the present duty of 10 per cent ad valorem on manufactured magnesite brick, made a vigorous attack on the Fordney rates on magnesite. He recited the growth of production in the United States, saying that domestic output was less than 10,000 tons prior to 1914; that large quantities were imported into the United States from Austria and Greece, 90 per cent coming from the former country because of the superior character of the material.

Domestic Production and Prices

Stimulation of domestic production following the outbreak of the European war, when importations from Austria were cut off, was noticeable, references being made to operations in California and Washington. It was contended by Mr. Mossman that there is not one magnesite deposit in California that has sufficient tonnage of quality to justify the erection of a plant at the deposits for the production of synthetic and dead burned magnesite. It was also asserted that at the rate of production for the year 1920, magnesite deposits in Stevens County, Washington, would be exhausted within 10 years and that meanwhile users of magnesite in this country would be carrying a heavy tax burden, and millions of dollars invested by rivals of the Northwest company would be in idle plants.

Before the war dead burned magnesite sold at $15.75 per ton at American Atlantic seaboard and consequently the tax proposed, equivalent to $15 per ton, is practically 100 per cent. Asserting that the United States Tariff Commission estimates the total consumption of magnesite in this country at about 300,000 tons crude, which would equal about 150,000 tons of calcined or dead burned, Mr. Mossman said that the total annual tax upon the producers of steel, copper and other materials in the production of which magnesite is used would amount to $2,250,000, a sum to be annually increased with the normal increase of production in the United States.

He combatted what he said was the assumption of domestic producers that the chief point of destination of magnesite grain was the Atlantic seaboard, freight rates being figured accordingly. It was explained that about 50 per cent of the magnesite grain is shipped to the brick plants to be manufactured into magnesite brick and the remaining 50 per cent is shipped in grain form directly to the steel or copper plants, where it is used in making bottoms for the furnaces in which the metals are treated. The brick plants are at present located, he said, in Pennsylvania and Baltimore.

The Center of Magnesite Consumption

With the development of the industry in Washington, under free and competitive conditions, it was maintained by Mr. Mossman that it is inevitable that similar plants will be erected either by the producing company or by others, in such close proximity to the deposits of raw material as to have the benefit of the resulting low freight rates. He maintained that it is a well-known fact that the center of steel production in the United States is in the neighborhood of the Indiana and Ohio State line and that in view of the fact that there is very large consumption of magnesite used in the copper smelting industry in the Rocky Mountain States, it is fair to assume that the center of consumption of magnesite grain is west of the center of steel production.

It was asserted that 30½ per cent of the total ship-

ments of the American Refractories Co., during the years 1916-17-18, went to destinations north, west and south of the Mississippi River, 26 per cent going to points in the United States west of the Mississippi. It was argued, therefore, in determining the comparative cost of the foreign and domestic material, that the Atlantic seaboard cannot be taken, in estimating freight tariffs, as the average point of destination. He gave figures to show that the actual cost of all the magnesite marketed by the American Refractories Co. from its Austrian plant during the year 1920, amounting to 17,217 metric tons, delivered at Baltimore, was $33.05, while the total cost per net ton of 2000 lb. on vessel at United States Atlantic seaboard ports was given as $30.05. He also submitted a statement making a comparison between domestic and imported magnesite delivered at various destinations. It emphasized again the fact that the average destination is not the Atlantic seaboard but some point west of the Indiana-Ohio State line, it being claimed that the Austrian cost did not include any profit to the Austrian operation.

Competitive Prices East and West

The cost of magnesite produced at Chewelah, delivered in the Pittsburgh-Cleveland district, was given as $40.04, while the import cost was given as $36.05, the latter having the advantage of $3.99. The cost of the Chewelah product delivered in the Chicago-St. Louis district was given as $38.29, while the import cost was estimated at $40.05, the domestic advantage in this instance being $1.76. In the Montana copper district the domestic advantage was put at $20.17.

Mr. Mossman opposed the idea that domestic deposits should be developed as a matter of national preparedness, contending that the best thing that could happen to further the cause of preparedness would be to close down the domestic magnesite industry completely in order to conserve the supply for emergency needs.

"The American Refractories Co.," it was stated, "has a far greater investment of capital than exists in the entire magnesite producing industry in the United States. This investment was made at a time when the copper and steel producers of the United States were wholly dependent for their supplies of magnesite upon European sources.

"The property of the American Refractories Co. acquired in Austria now represents a cash investment of over $2,000,000, and it has produced and sold to American manufacturers magnesite which is recognized to be of the highest known quality."

Request was made by Attorney Reeves T. Strickland, Washington, representing the Magnesite Mining & Mfg. Co., that magnesite be placed on the free list. The company he represents has mines on the coast of Venezuela and it was stated that importations would be seriously interfered with by the duties proposed in the Fordney bill. It was asserted that imports at the Atlantic seaboard would not interfere with the magnesite industry on the western coast of the United States.

For and Against the Graphite Tariff

In his argument before the committee for the continuation of graphite on the free list, H. M. Riddle of the Asbury Graphite Mills, Asbury, N. J., stated that a serious condition confronts not only the manufacturer and refiner of foreign crystalline graphite, but all users of this material, including nearly 4000 foundries in the United States and large crucible interests. There never has been a duty on crystalline graphite because it is impossible to get along without this product. It was explained that there is something about the texture of Ceylon graphite that the American graphite does not contain. Aside from that, it was pointed out that there is only about 2 per cent of graphite in the American rock, while the Ceylon product is from 60 to 98 per cent pure. Mr. Riddle told of the difficulty of using American and Canadian graphite during the war, when shipments from Ceylon were cut off. Their use was made possible by mixing these grades with the Ceylon product which was on hand. Not only did Mr. Riddle complain of the high prices of the domestic product, but he claimed that there is nothing that will satisfactorily take the place of Ceylon graphite.

Restoration to Free List Urged

Speaking for graphite dealers and manufacturers, Attorney Charles E. Kern of Washington urged the committee to restore this product to the free list. He said that no matter how high the tariff may be it cannot force crucible makers to use an unfit raw material. He added: "Increased cost of crucibles will work to the disadvantage of manufacturers who have small capital. The electric furnace and the crucible have been going nip and tuck in matters of cost efficiency but if expense is added to the crucible by a tariff tax which does not apply to electric furnaces there will be a positive advantage for manufacturers of large capital because they can change to the electric furnace. Men operating on a small scale will continue of necessity to use the crucible if they remain in the business.

"Our graphite trade with Ceylon is now giving return cargoes to American ships that carry our products to the Orient. It has been suggested that we should develop our graphite deposits as a preparation for war, but until someone can make a satisfactory crucible of this graphite it cannot serve in war time. Necessity caused the most thorough tests of this material in crucible making during the recent war and proved that it was unfit for that purpose, beyond a small mixture along with the binding clay.

"We trust the crucible industry will be permitted to continue with the conditions under which it was built up."

George H. Pettinos of Philadelphia manufacturer of crude graphite, using domestic and foreign material, and owner of deposits in Chester County, Pennsylvania, asked that graphite be kept on the free list. He said there is no substitute for Ceylon graphite, except up to 10 per cent, and that the crucible industry, now on a par with the electric furnace as to cost and quality, will be wiped out if it is handicapped by the proposed duty on graphite. He gave it as his opinion that eventually the electric furnace will entirely replace the crucible industry but protested against hastening such a condition. Replying to a question by Senator Simmons, the witness said he did not seek or desire protection on his manufactured products.

Lower Melting Cost with American Crucibles

The other side of the story on graphite was told by George A. Sharpe of Birmingham, Ala., representing the Alabama graphite producers, who asked for protection ranging from 1c. per lb. on crude graphite to 6c. per lb. on the finished product. He asserted that domestic graphite will make a good crucible of itself and even a better crucible than that made from Ceylon graphite and pointed out that the Electro Refractories Corporation of Buffalo is getting 85 heats from domestic flake graphite. He argued that a duty of 6c. per lb. on American flake graphite would reduce instead of increase the cost to consumers by more than one-half. With this in mind he said that a No. 70 crucible contains approximately 17 lb. of graphite, which at a duty of 6c. would be $1.02. Made of Ceylon graphite, it was stated, this crucible will take not more than 30 heats. The crucibles from American flake (each charge weighing about 90 lb.), it was stated, will melt 7650 lb. of metal. Melted in a Ceylon crucible, the total would be 2700 lb.

"A No. 70 crucible, we will say," added Mr. Sharpe, "sells for 7c. a number, and this means a No. 70 crucible would be sold for $4.90. Add to this the full 6c. per lb. which we are asking on flake, or $1.02, and you have a cost of $5.92 for the American crucible. The Ceylon crucible, melting 2700 lb. of metal, at a cost of $4.90, means a cost of 0.18c. per lb. of metal melted. The American flake crucible, melting 7650 lb. of metal at a cost of $5.92, represents a cost of 0.08c.

per lb. of metal melted, or less than one-half the cost of melting in the Ceylon crucible."

Asks $10 Per Ton on Fluorspar

A duty of $10 a ton on fluorspar was asked by A. A. Northern, Hopkinsville, Ky., representing the Potters' Union. The duty carried in the Fordney bill is $5 a net ton, with a provision that after the expiration of one year beginning on the day following the passage of the act, the duty shall be $4 a net ton. Mr. Northern contended that production costs in England are much lower than they are in the United States and said this open-hearth flux was coming in from England and selling at $10 a ton, while the average domestic price is $20 a net ton f.o.b. mines. It was brought out, however, that imports have been extremely small during the past few years when compared with domestic production and consumption.

Transfer of zinc oxide from the metal to the chemical schedule was suggested by Stephen S. Tuthill of the American Zinc Institute. He also asked that products of lead and zinc ores be placed at higher duties than the ores themselves, pointing out that zinc oxide and white lead are competitive.

Fall Meeting of Mining Engineers

Plans are rapidly maturing for the fall meeting of the American Institute of Mining and Metallurgical Engineers at Wilkes-Barre, Pa., Sept. 12 to 16. Besides the usual sessions on coal and general mining problems, there will be a meeting of the metal section at 8 p. m. on Monday, Sept. 12, for which the following papers are scheduled:

"Application in Rolling of Effects of Carbon, Phosphorus and Manganese on Mechanical Properties of Steel," by W. R. Webster.

"Thacher Process for Molding and Casting Propeller Blades and Wheels," by E. Touceda.

"Making a 5 Per Cent Nickel Cast Iron Alloy in an Electric Furnace," by D. N. Witman.

A paper on the "Application of Pulverized Coal to Boilers" will be presented Tuesday evening, Sept. 13, by J. M. Fuller.

Fall Meeting of Electrochemists

Present indications point to a high-grade program for the technical sessions of the fall meeting of the American Electrochemical Society at Lake Placid, N. Y., Sept. 29, 30 and Oct. 1. The features are to be symposiums on non-ferrous metallurgy and on electrodeposition. On Thursday evening, Sept. 29, Prof. Harlow Shapley of Harvard University will lecture on "Chemistry and the Stars." An elaborate program of sports is being arranged.

For the spring meeting in 1922 three symposiums are announced: Electric furnace cast iron, gases of the electrochemical industries and electromotive chemistry.

The Gibson, Ind., repair shops of the Indiana Harbor Belt R. R. have been leased by the United Boiler Heating & Foundry Co., Hammond, Ind., which opened the shops on Aug. 15, with a force of 150 men. Charles Nau, president of the company, was formerly general foreman of the Gibson shops and hopes to be able to handle the repair work not only of the Indiana Harbor Belt but of other roads.

A merger has been effected between the Stowell Co., South Milwaukee, and the Pelton Steel Co., Milwaukee, whereby the Stowell Co. secures the business of the Pelton company. It is the intention to continue operating the Pelton plant under the old name and to maintain the same organization. The Stowell Co. has had steel casting facilities for some time, but now counts on added capacity and scope of quality.

Industrial Plant Activities

The tinners tool department, Peck, Stow & Wilcox Co., Southington, Conn., is on a 5½-day schedule, as against a 5-day heretofore.

The Remington-Arms Union Metallic Cartridge Co., Bridgeport, Conn., employing 2700, last week began operations under a new wage scale involving a reduction of 10 per cent.

The Warren Steam Pump Co., Warren, Mass., heretofore operating its plant with reduced help on a 40-hr. week schedule, has closed.

The Sessions Clock Co., Forestville, Conn., last week somewhat reduced working forces and lowered wages 10 per cent. The automatic machine and casting departments closed for two weeks.

The screw products department, New Britain Machine Co., New Britain, Conn., is working a small number of men on a night shift. Other departments are busier than they have been in months.

The Gilbert & Barker Mfg. Co., West Springfield, Mass., maker of tanks, is employing 800, contrasted with approximately 2000, the normal working force. The company in the past week laid off an additional 100 men.

The employees of the Stanley Rule & Level Co., a subsidiary of the Stanley Works, New Britain, Conn., have returned to work under a wage reduction of about 12½ per cent. The plant was closed for a 10-day period, reopening Aug. 22.

The New York, New Haven & Hartford Railroad Co. is steadily increasing the working force at its East Hartford, Conn., car shops and this week expects to have 400 on the payroll. Most of the men are working for 72c. per hour or about $3.92 per week less than they formerly received.

Effective Aug. 26, the plant of the Collins Co., Collinsville, Conn., maker of agricultural tools, etc., will be closed Mondays and Saturdays.

Following a shutdown of some time, the Aetna Nut Co., Southington, Conn., will resume operations within the immediate future. The full number of 100 employees will be engaged.

The plant of the Royal Typewriter Co., Hartford, Conn., was closed Aug. 17 until Sept. 6, throwing approximately 1200 out of employment. Between 300 and 400 have been retained on the payroll. The plant was operating two days a week, following a two weeks' shutdown.

Business of the Cadillac Motor Car Co. is so favorable, says a statement issued by the general office of the corporation, that the new Clark Avenue plant has been opened. The company, says the statement, has reached 70 per cent of normal production and is employing 70 per cent of the normal working force. More than 1000 men have been added in the last few days, bringing the number up to more than 4000. Almost every department is operating full time.

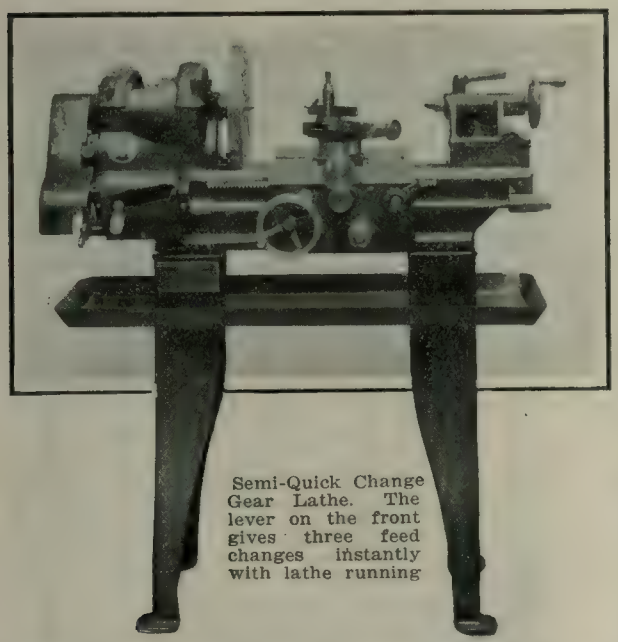
The Nash Motors Co., Kenosha, Wis., in a public statement, says that although it attained a production of 2470 passenger cars at the Kenosha and Milwaukee works for July, orders exceeded production by more than 50 per cent following the price cut effective July 1. It is also stated that a similar condition confronts the company for the monthly period ending Aug. 31, and will carry over well into September.

As part of a program of expansion, the Warren Iron & Steel Co., Warren, Ohio, producer of steels used chiefly in ploughs and tools, has purchased coal lands in Kentucky. Hitherto, the company has purchased its coal requirements on the market. Stockholders are asked, in a letter by President C. B. Loveless, to sanction a $400,000 bond issue, proceeds to be applied to purchase of the coal properties.

Adds to Line of Engine Lathes

The Monarch Machine Tool Co., Sidney, Ohio, has added two new machines to its present line of engine lathes. The sizes are 9 in., and 11 in., respectively and are being offered under the name of Monarch Junior.

Among the features of construction may be mentioned the quick change gear box which is of simple design, one tumbler lever operating on a cone of nine gears, compounded on the end with a 32- and 64-tooth gear and with three other gears on the end gearing, giving 54 changes of threads and feeds. The back gears are locked in and out of position by a ball and spring plunger. The tailstock base is graduated for accurate set-over for taper turning and can be considerably over-hung on the bed. The feed reverse and lead screw reverse are instantly secured and with the lathe



Semi-Quick Change Gear Lathe. The lever on the front gives three feed changes instantly with lathe running

running by a reverse lever on the headstock. The compound rest is gibbed throughout and has large bearing surfaces. Cross feed dial, swivel and compound rest dial are graduated and numbered. The tool post is steel, milled from the bar and tool post screw is the Mac-It non-breakable screw. The steel rack is in one section.

The lead screw is from special screw stock, is chased on a special lathe and tested on a Hartness screw thread comparator, recording 0.0001 in. for accuracy of lead and form of thread. The carriage is 11¾ in. long and is drilled and tapped to receive taper attachment, chasing dial and chasing stop. The apron is said to be foolproof and exceptionally rigid and strong. The upper knurled hand wheel has three distinct marked positions of engagement. When thrown to the left, the longitudinal feed is engaged; to the right the cross feed is engaged; and when in neutral, and only in this position, the half-nut is engaged. The lower knurled hand wheel controls the large friction, which is used to operate both power cross feed and longitudinal feed. It is impossible to engage either feed and the half-nut at the same time and thereby eliminates breakage from that source. Ample oiling facilities are provided.

The countershaft consists of Edgemont friction clutches and cast iron hangers having ring oiling bearings. The lathe can be furnished with floor or bench legs; with oil pan, pump and tank; and in bed lengths of 2½, 3, 4 and 5 ft. For motor drive the countershaft and control clutches are mounted above the headstock on a special bracket. Full quick or semi-quick change gear box can be supplied as desired. Other attachments include: draw-in, taper, turret, chasing dial, chasing stop and metric thread transposing gears. A ½ to ¾ hp. motor is required.

The Graton & Knight Mfg. Co., Worcester, Mass., manufacturer of leather belting, has abolished the titles of general manager and sales manager. Production will be supervised by the administrative board.

German Export Success Exaggerated

Ever since the reparations question was settled between the allied nations and Germany in May there has been a great deal of superficial discussion to the effect that German workmen are working long hours at very low pay; and that all the people of Germany—60,000,000 souls with a single thought—are buckling down to capture the markets of the world, crush foreign competition, and pay off their indemnities with manufactured products, enjoying all the while the advantage of greatly depreciated currency, low cost of living, and low cost of materials as compared with other manufacturing nations.

But L. R. Morris, in an article in this week's *American Exporter Bulletin*, states that: "Germany, instead of being in a better position to compete with the United States than before the war, is in a much worse position. That this is the case is recognized even in Germany; it is a subject of comment in the trade press, and is emphasized in official documents relating to German export trade and reports of prominent banking houses.

Germany an Exporter of Cheap Goods

"It is a fundamental of world trade that each manufacturing country will excel in certain lines of products and certain industries. Germany may be expected to show special qualification in her specialties now, as she did before the war, just as this country excels in certain lines, Great Britain in others, and France in still others. But this is not to say that Germany will be able to compete in any and all lines. Germany will have much the same place now as before the war, in that she will be known chiefly as an exporter of cheap goods.

"American goods have never competed on a price basis except in staple lines—grains, steels, etc. Manufactured goods, which in the fiscal year 1913 formed 48.80 per cent of our total exports, and in June, 1921, formed 52.15 per cent, have never been sold so much on a price basis as on quality and service. In hardware, shoes, machine tools, and many other lines, the United States has always sold large quantities of its goods, even in Germany, although German products in the same lines were sold at cheaper prices.

Labor Costs in Germany

"The most important factor in the cost of production is labor. Now any impression that German labor is working on a less self-centered basis than labor in other countries, or is working at a less rate of increase per hour over pre-war years, in proportion to the increased cost of living, is not true to facts.

"The efficiency of the German workman has deteriorated in the last few years, just as it will always deteriorate in a period of inflation. The Manufacturers' Union of South Germany recently reported workmen turning out only 60 per cent per capita of their pre-war production. During the first four months of this year the coal mines of all Germany, excluding lost territories, employed 92,000 more men than before the war, and produced 22 per cent less coal.

"Belief abroad that German workmen are to-day working long hours is likewise not supported by facts. The normal work day in Germany is 8 hr.; in coal mines, only 7 hr.; a bill has been submitted in the Reichstag to make the day in all mines 7 hr. Last year in the Ruhr mines a general strike was at one time threatened, to enforce the demand for a 6-hr. day.

German Wages Compared with American

"The belief that German workmen are working for extremely low wages, as compared with pre-war conditions, is also a misconception. German real wages are actually 30 per cent higher than before the war, for since 1914 the cost of living has increased 770 per cent, and wages have gone up 1032 per cent.

"In the same period the cost of living in the United States rose 66 per cent, and wages rose 107 per cent, making the rise in United States real wages 25 per cent, or less than that of Germany.

"Between February, 1920, and May, 1921, the cost of living in Germany rose 41 per cent, whereas wages rose 120 per cent, or three times as fast. Between

February, 1920, and May, 1921, the cost of living in the United States declined 15 per cent, and wages declined 8 per cent."

Data presented show how Germany is slipping in her erstwhile control of markets once largely dominated from Berlin. As a single example:

"During the first three months of 1921 imports from the United States into Japan constituted 35 per cent of the total imports, as compared with 18 per cent in the corresponding period of 1914. During the same period, imports from Germany constituted 1.3 per cent of the total as compared with 7 per cent in 1914. Whereas the value of imports from the United States was 254 per cent greater than in 1914, the imports from Germany showed a decrease of 65 per cent from the 1914 figure."

Melting Steel in a Non-Ferrous Electric Furnace

Successful Production of Crucible Quality Steel in Small Baily Resistance Units

NOT all tool steel, whether carbon or high-speed, is made in electric furnaces. There is still a considerable quantity made by the crucible process. One reason why crucibles are still used is because of the convenience of such small pots for special mixtures and the ability to pour without sculling, thus doing without a ladle.

In the belief that the small type of electric resistance furnace might be used in place of the crucible, the Electric Furnace Co., Alliance, Ohio, recently carried out experiments at its laboratory at Salem, Ohio, in melting steel in such a furnace. Attempts were made to adapt it to producing the portion of crucible quality steel now handled in pots.

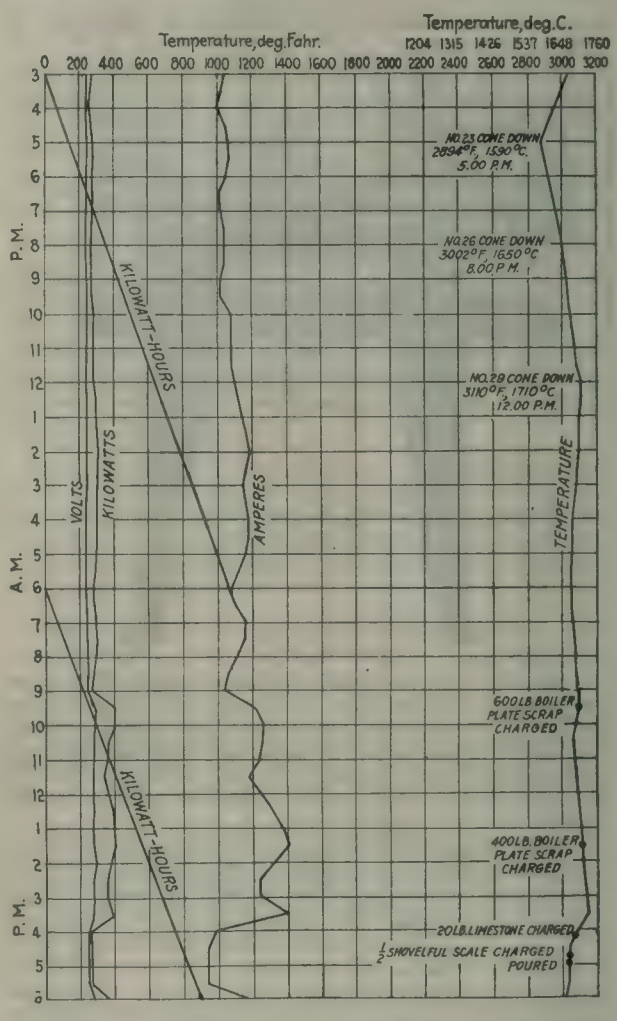
These furnaces have been developed into smaller sizes, holding 200 lb., 750 lb. and 2000 lb., respectively, the largest size also being built in the nose tilting type in connection with a casting table on which molds are mounted; so that the metal can be poured directly to the molds without any ladle at all, as in brass melting practice. This gives uniform temperature throughout the pour, eliminates the ladle entirely and makes the pouring condition analogous to that of crucible practice. The following is taken from the report of the company's results and claims.

This test was also used as a means of determining the maximum temperature that could be obtained and maintained in a furnace of the resistance type, and it was found that there was no difficulty in keeping steel of as low carbon content as 0.05 per cent at a good pouring temperature. The maximum temperature obtained on the hearth in this test was 1850 deg. C., at which the magnesite lining commenced to volatilize.

The furnace used for this steel test was a standard 7-ft. diameter brass melting furnace, having a hearth capacity of 2000 lb.; and, in addition to the 4½-in. brick lining used in brass melting, a 9-in. magnesite brick lining was placed directly inside the ordinary fire brick lining. The roof was made of 9-in. silica soap shapes, and was not insulated. The accompanying test sheet shows not only the temperatures obtained, but the melting rate as well.

These tests, and subsequent tests, indicated that crucible quality steel can be made and poured in small furnaces of this type with a current consumption of not to exceed 1200 kw.hr. per ton which, while much higher than the figures obtained in arc practice, nevertheless will produce steel much more economically than by crucible practice.

There seems every reason to believe that furnaces of this type can be advantageously used to replace a large part of the crucible steel making capacity that is still handled in pots. A particularly advantageous feature of the resistance type of furnaces for this work is that the furnace atmosphere is under better control than in a furnace of any other type, whether of the electric arc type or in a crucible pit furnace. This particular feature has been one of the advantages in handling non-ferrous metals, particularly of rolling mill quality, since the furnace can be kept much more tightly closed than other types and, therefore, the amount of oxides and blow holes in the metal reduced; the bath of metal in this type furnace, not being agitated as in the case of the arc furnace, almost directly duplicates conditions in crucible practice, in allowing not only the gases to rise to the top of the bath but also any slag inclusions or other foreign substances.



Steel Melting Test in a Baily Electric Resistance Furnace at the Salem Laboratory of the Electric Furnace Co.

Time	Amperes	Kw.	Voltage	Bath Temp., Deg. Fahr.	Meter Reading, Kw. Hr.	Remarks
8:00 P.M.	1040	68	60	3002	200,454	[1]
9:00	1020	67	60	3030	.....	
10:00	1080	70	60	3050	.....	
11:00	1080	70	60	3080	.....	
12:00	1100	70	60	3110	.....	[2]
1:00 A.M.	1140	74	60	3100	.....	
2:00	1180	76	60	3100	.....	
3:00	1140	75	60	3090	.....	
4:00	1180	75	60	3070	.....	
5:00	1160	75	60	3060	.....	
6:00	1080	71	60	3050	201,185	
7:00	1160	75	61	3060	.....	
8:00	1120	73	61	3080	201,333	
9:00	1040	67	60	3090	201,391	
9:30	1000	65	61	3100	201,421	[3]
10:00	1260	100	75	3080	201,462	
11:00	1240	90	70	3070	201,553	
12:00	1240	92	69	3090	201,647	
1:00 P.M.	1380	98	70	3110	201,733	
1:30	1400	100	69	3120	201,792	[4]
2:00	1320	95	74	3120	201,840	
3:00	1240	90	70	3140	201,924	
4:00	980	65	64	3090	202,009	[5]

Remarks:
[1] No. 26 cone down at 3002 deg. Fahr.
[2] No. 29 cone down.
[3] 600 lb. boiler plate scrap charged.
[4] 400 lb. boiler plate scrap charged.
[5] 20 lb. limestone charged, 4:10 p.m.; 5 lb. roll scale charged, 4:40 p.m.; poured at 4:52 p.m.

WHEELING DISTRICT

The Strike Against Wheeling Steel Corporation —Sheet Market Conditions

WHEELING, W. Va., Aug. 24.—The answer of the Wheeling Steel Corporation to the strike called against it a week ago to-day by the Amalgamated Association of Iron, Steel and Tin Workers is point to the fact that it has in operation the Belmont mill of the Wheeling Steel & Iron Co., the Benwood plant, where it is running at a 50 per cent gait in the skelp mills and pipe furnaces and has its steel works there going after a shutdown of a week, and that the LaBelle Iron Works is running 40 per cent of capacity both in Wheeling and Steubenville. The company is making no attempt at present to start up the Wheeling Steel & Iron Co. tin mills at Yorkville, Ohio, nor any of the Whitaker-Glessner Co. plants, but since the company is carrying good sized stocks of sheets and tin plate, built up earlier in the year, and current orders largely can be supplied from stocks, the necessity of starting up idle capacity is not pressing. On sheets the company can supply sizes and gages not in stock from the Steubenville, Ohio, plant of LaBelle Iron Works, which is in operation. If orders continue to grow in number as they have in the past few weeks, it is possible that the Portsmouth, Ohio, works of the Whitaker-Glessner Co. will be started up.

There is little or no outward sign that a strike exists and none is likely to appear until the company attempts to start up some of the sheet and tin plate mills hitherto operated under an agreement with the Amalgamated association. The Wheeling Steel Corporation officials view the situation calmly. They believe firmly in the principle of the open shop and having decided that the interests of the workmen and the stockholders are better served by such a policy, they are not disposed to go back to dealing with the unions. There has been no lockout, as claimed by union leaders, company officials declare; there has been simply the substitution of direct dealing with the men for indirect dealing with them through union officials. Men can work in the plants whether they are members of the union or not. In announcing the change it was stated that the same wages as are paid in the union mills would be paid in the plants of the company, and as indicating the wage ideas of the company, one official, who is active and conspicuous in its affairs, declares that 30c. an hour, the ruling rate for common labor, is low enough with rents and the necessaries of life as high as they are to-day. The belief exists among Wheeling Steel Corporation officials that the company has been singled out for special attack by the Amalgamated association, pointing out that in no other steel-making center is the latter organization as active as it is in the Wheeling district.

Business Volume and Prices

In common with other districts steel manufacturers here are enjoying a somewhat better business. No big orders are being received, but the number is greater and they are so well distributed among the various products of local plants that manufacturers are encouraged to believe that consumers' and jobbers' stocks are pretty low and that buying will be constant during the remainder of the year. The feeling prevails here, as elsewhere, that prices have gone about as low as they can unless there is a reduction in railroad freight rates, which would permit some lowering of producing costs, and some will not admit that this development will bring material recessions from present prices, claiming that such rate reduction as is likely to be made would no more than absorb the present difference between present costs and selling prices.

On the basis of recent business done by mills in this district, black sheets are quotable at 2.75c. to 3c. base, Pittsburgh; galvanized at 3.75c. to 4c. and blue annealed at 2.25c. to 2.40c. Sheet bars have been sold in this district at $30 f.o.b. makers' mill and 4-in. rerolling billets at $29 to $30, mostly at $29.50. So little demand is developing in slabs that the price is indefinite, but they probably could be placed at $30. Both LaBelle Iron Works and Weirton Steel Co. have supplies of basic pig iron that are available for market. The latter company is quoting $20 furnace, but $21 is as low as LaBelle Iron Works would consider. The latter is not actually seeking pig iron business and prefers to carry the iron rather than sell at less than $21, which it claims is below replacing costs, and these, it is asserted, have been figured upon a basis of the lowest probable fuel, ore and labor costs that can be reasonably expected over the next six months and also make allowance for a possible freight rate reduction.

Operation in Wheeling District

Operations in the district, aside from those of the Wheeling Steel Corporation plants, still are low. National Tube Co. has its plant at Benwood down. Laughlin Works, American Sheet & Tin Plate Co., Martins Ferry, Ohio, last week started up about half of the tin mills there, but this is only for a brief run and the resumption is merely part of the plan of the company to give some work to the men of all plants so long as orders are not sufficient to keep all plants running. Carnegie Steel Co. plants at Bellaire, Steubenville and Mingo are all idle. Weirton Steel Co., Weirton, W. Va., is running rather well. In addition to its blast furnace, it has five of its seven open hearth furnaces running and by concentrating its tin plate business at Weirton it is able to keep the 26 mills there running 16 turns a week. Operation of its strip mills are averaging about 35 per cent full.

After several postponements due to labor conditions, which delayed alterations in the old Schmulback building, now the Wheeling Steel Corporation building, Market Street, Wheeling, all of the executive offices of the Wheeling Steel Corporation are located in that building. It is expected in the near future to have the offices of all of the subsidiaries quartered in this building. This means the eventual abandonment of all offices elsewhere, leaving only plant operating offices outside of Wheeling. The company expects to sell the old Wheeling Steel & Iron Co. building, Main and South Streets, Wheeling.

Employment in New York State Factories

Figures for June from the State Department of Labor show a falling off during the month, both in the number of employees at work and in the total wages received. The former loss is 1.9 per cent; the latter, 2.4 per cent. Under the headings of Metals, Machinery and Conveyances, which heading included 30.1 per cent of all employees reported in June, the falling off during the month was much more marked, having been 7.2 per cent in number of employees and 8.5 per cent in total wages. The heaviest decreases in this group were under the headings of Pig Iron and Rolling Mill products, Structural and Architectural Iron Works, and Cars, Locomotives and Railroad Repair Shops. Under these headings the number of employees, compared with June, 1914, is now 52, 42, and 64 per cent, respectively, showing a falling off of approximately half.

A statement recently made on behalf of union molders, concerning labor conditions in Indianapolis foundries, is contradicted by the employing companies. The situation at Indianapolis is that only two out of 33 foundries reporting have any agreement with the molders' union for a definite time and these two are stove foundries. The six other union shops have no present agreement with the union. Since the reduction in wages from 90 cents per hour to 75 cents, made in April, their molders have been working from day to day, without an agreement, at the reduced rate. There are 19 open-shop and five non-union foundries. The one other foundry of the 33 has not begun operations, its machinery having just been installed.

The Sharon Pressed Steel Co., Sharon, Pa., manufacturer of automobile frames, has increased the operating rate of its plant at Wheatland, Pa., to 40 per cent. Officials state the outlook for business continues bright. A number of substantial orders have been placed.

BRITISH PROTECTIVE BILL

Protective Duties for Certain Key Industries and a Five-Year Anti-Dumping Provision

WASHINGTON, Aug. 23.—The bureau of foreign and domestic commerce has received a cablegram from Commercial Attache Alfred P. Dennis, London, stating that the House of Commons has passed the British Safeguarding-of-Industries bill carrying protective duties on certain special lines in key industries and also an anti-dumping clause, which is to remain in force for five years. The measure is certified as a money bill and is therefore incapable of amendment by the House of Lords and becomes statutory in the present form on receiving Royal assent.

Among products embraced within the measure, which imposes a duty of one-third of the value of the goods, are metallic tungsten, ferrotungsten and manufactured products of metallic tungsten, crucibles, gages and measuring instruments of precision of the types used in metal working shops, various chemicals, optical glass, etc.

The anti-dumping feature is applicable under conditions of collapsed exchanges or in the ordinary acceptance of the term. Dumping is defined as the sale or offer of goods in the United Kingdom below the cost of production in the country of origin.

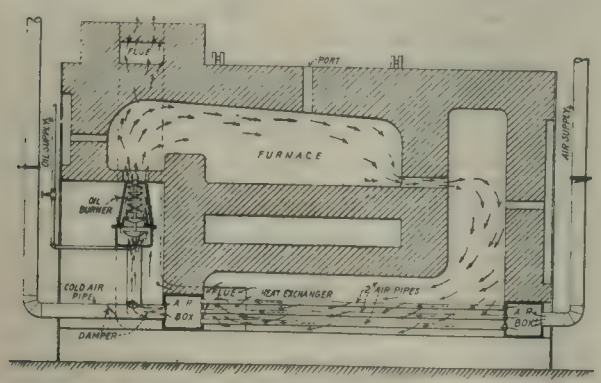
Controversial points have to do, first, with the confusion between the cost of production and selling prices abroad, cost of production being defined in the bill itself as the current sterling equivalent of 95 per cent of either the wholesale price at the works less internal duties leviable in the country of origin, or, if the wholesale price cannot be established through actual sales, a reasonable price computed on wholesale prices charged for similar goods; and, secondly, with conflicts between the bill and existing treaties with other nations. The part having to do with depreciated exchanges appears to contravene commercial treaties with 26 foreign powers, it is stated. The government gives assurance that it does not intend to denounce any existing commercial treaties and, as a consequence, the only countries of commercial and competitive importance to which the exchange provisions could be made to apply are France, Germany and whatever remains of the old Austrian-Hungarian Empire.

The original bill clothed the Board of Trade with final competence as to the issue of anti-dumping orders. This was regarded as an assumption of taking authority and was amended so that all Board of Trade orders against dumped goods are subject to confirmation by the House of Commons.

The amended measure also provides that trades demanding protection against dumped goods must show that the British manufacture of similar goods is being carried on with reasonable efficiency and economy.

Oil Burner Uses Preheated Air

It is a universal practice in Pittsburgh, Cleveland, Buffalo, Wheeling, Cincinnati and Columbus to cut off industrial consumers of natural gas so that domestic consumers may have sufficient gas for cooking and heating purposes, when the supply is short. Two causes have contributed to the shortage of natural gas supplies: wide-spread use of the fuel, and gradual depletion of the Appalachian field after thirty years' constant drain. The natural gas companies have, for several years past, advised industrial users to provide other appliances and fuel for emergency purposes.



Setting of Burner and Furnace, Showing Path of Heated Air from Burner Through Furnace, Back Around Air Inlet Pipes and Up Flue

To meet this condition, the Anderson-Garner-Shaner oil-burning apparatus has been designed and patented, and is being marketed by the Pittsburgh Saw & Manufacturing Co. During the development stages of this apparatus tests were made of its efficiency and utility in commercial ovens, refineries, glass plants and forge furnaces. The cost of operation with oil at 8c. per gal. is about equal to that of natural gas at 45c. per 1000 cu. ft.

This oil-burning apparatus is of the gasification variety. Air, under a pressure of from ½ to 2 oz., delivered by a small fan or blower, is adequate for the heat requirements of metal, heat-treating, forging or glass plants.

The forging furnace shown is 4 ft. wide, 8 ft. long and 5 ft. high. Arrangement is made for the exchange of heat between outgoing, hot flue gases and the fresh incoming air. All of the heat imparted to the incoming air contributes materially to efficiency of use of the fuel, and makes it possible to attain high temperatures in the heating chamber. This forging furnace has been in practically continuous operation for some weeks, and it is said that at no time has the temperature of the flue gases at a point 6 in. above the furnace exceeded 650 deg. Fahr.

Temperatures of 2600 to 2800 deg. Fahr. are obtained and maintained in the heating chamber. It is possible by means of thermostatic connections to maintain and control temperature between 500 and 2800 deg. Fahr. The consumption of oil in heating up the forging furnace is placed at 5 to 6 gal. per hr. The time required, depending upon the oil consumption, is 1 to 1½ hr. When once the furnace has been raised to the desired temperature of 2000 to 2800 deg. Fahr. the oil consumption, to maintain this temperature, is said to average 2½ to 3 gal. per hr.

Cost of Living Stationary

Figures of the Bureau of Labor Statistics show no change in the index number of the cost of living in July as compared with June. Wholesale prices in both months were 48 per cent above the average of 1913. Metals and metal products continue to hold the lowest price position, with the exception of farm products, being now only 25 per cent above the 1913 figure, or well below the average run of prices. House furnishing goods and building materials still maintain their positions at the top of the list, being respectively 135 and 100 per cent above 1913 figures.

In the following table all the figures given represent wholesale prices, except the last line—retail prices of food. The figures are based on 1913 at 100.

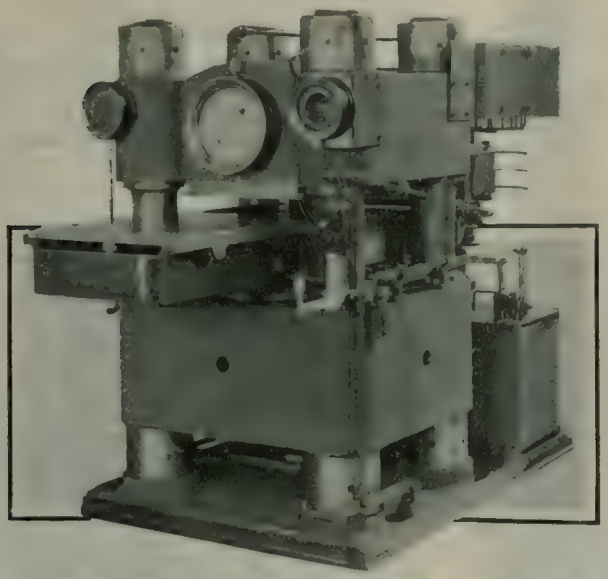
	1920	1921		Percentage Reduction	
	July	June	July	A*	B†
Farm products	236	113	115	51.3	89.6
Food, etc.	268	132	134	50.0	81.8
Cloths and clothing	317	180	179	43.5	68.0
Fuel and lighting	252	187	184	27.0	37.8
Metals and metal prod.	191	132	125	34.6	73.1
Building materials	333	202	200	39.9	58.5
Chemicals and drugs	217	166	163	24.9	45.2
House-furnishing goods.	362	250	235	35.1	43.5
Miscellaneous	243	150	149	38.7	66.4
All commodities	262	148	148	43.5	72.1
RETAIL COST OF FOOD	219	144	148	32.4	58.3

*Reduction in one year. †Percentage cut from the excess of May, 1920 (the "peak" month) over the average for 1913.

Lead Molding Hydraulic Press

The hydraulic press shown in the accompanying illustration is a recent product of the Hydraulic Press Mfg. Co., Mount Gilead, Ohio. It was designed and built for the Menasha Machinery Co., Menasha, Wis., and although intended primarily for use in the Claybourn process of solidifying electroplates, it is regarded as equally serviceable as a lead molding press.

The press, motor, pump, reservoir, valve and motor controls are contained in a steel cabinet 5 ft. 4 in. x 5 ft. 2 in. x 3 ft. 7⅛ in. The machine complete weighs



The Platen Travels In and Out, Stopping Automatically When Reaching the Extreme Position

about 6 tons and is capable of exerting 1000 tons pressure. Lightness is secured without sacrificing strength and rigidity by using heat-treated nickel steel castings for the cylinder and press heads and forged nickel steel strain rods. Among the special features may be mentioned the cylinder which is of the differential type having one small cylinder of 3¾ in. bore set inside and at the bottom of the 18-in. cylinder. A single pressure pump is furnished. Pressure is applied first in the small cylinder which raises the main ram until the daylight space is closed, the large cylinder at the same time filling through a surge check valve by suction. When the pressure builds up in the small cylinder, which occurs as soon as the daylight is closed, a valve automatically opens and admits pressure into the large cylinder. In this manner a pump having a relatively small discharge may be used and rapid operation secured. To prevent air from sucking into the large cylinder while it is being filled by suction, two U leather packings are used with the open sides of the U adjacent to each other. A small pipe connection in the side of the cylinder admits the same pressure between the two packings as is applied to the small ram. The packings are thus expanded before the main ram starts to ascend and remain expanded during the operation.

A special operating valve and pump are placed inside the reservoir and operate under oil, the pump being belt driven by a motor on the back of the press head. The valve is operated by two levers, one of which is worked by hand, applying and releasing pressure; the other being operated by the foot pedal and used to raise the stem of a safety valve in order to release the pressure from the pump. A check valve is placed between the safety and the operating valves, so that pressure may be held on the press at any point and for as long as may be desired. The press is also equipped with a pressure gage, electrical control gage and travel indicator.

A price reduction of 10 per cent is announced by the Link-Belt Co., from its Chicago office, on malleable iron and steel chains, sprockets, buckets and other products, to take effect Aug. 22.

Fewer Steel Men at Lower Wages

Unemployment is still increasing in iron and steel works, according to the Bureau of Labor Statistics report for July, which shows a loss of 14,633 men from June, representing 12.7 per cent. The loss from July, 1920, is 89,000 men, or 46.9 per cent. Payrolls showed an even greater decrease, the drop from June to July being 24.4 per cent, while that for the year was 71.4 per cent. As a result, the individual pay envelope has fallen from $72.11 in July, 1920, to $38.17 last month—a cut of 47.1 per cent. This decrease in earnings is greater than the 43.5 per cent drop in the cost of living, from July, 1920, to July, 1921.

Comparative figures for June and July, 1921, and July, 1920, in iron and steel mills, automobile factories and car building and repairing shops follow:

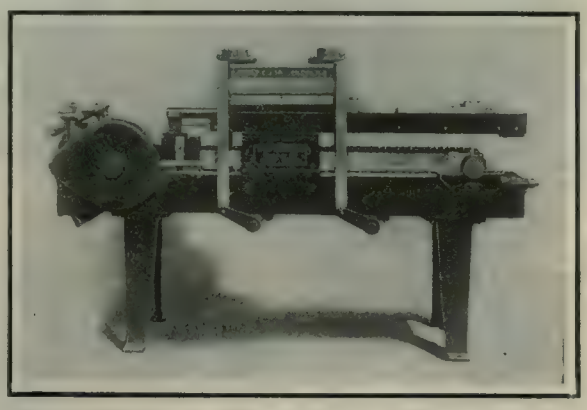
Month	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
June, 1921.....	118	115,411	$5,088,831	$44.10
July, 1921.....	118	100,778	3,846,541	38.17
July, 1920.....	118	189,770	13,683,927	72.11
Automobiles				
June, 1921.....	45	76,734	2,620,084*	34.15
July, 1921.....	45	79,064	2,622,596*	33.17
July, 1920.....	49	126,997	4,335,639*	34.14
Car Building and Repairing				
June, 1921.....	59	39,335	2,670,021	67.88
July, 1921.....	59	38,378	2,272,954	59.22
July, 1920.....	62	65,386	4,082,301	62.43

*Weekly.

Automatic Lockseaming Machine

An automatic machine which produces a lock-seamed article direct from the blank without an extra operation is being marketed by the Stolp Co., Inc., Geneva, N. Y. The machine is also equipped with a self-feeding attachment by which lock-seamed tubes can be produced directly from a coil of metal. It is said to handle taper tubes within certain limits and lockseam tubes of any thickness of metal.

The machine is shown in the accompanying illustration. The blank on being inserted is pressed into a U



A Mandrel Pushes the Blank Endwise Through the Lockseaming Dies

shape after which the round mandrel enters the blank and pushes it through the lockseaming dies endwise. The mandrel is fastened to a crosshead which straddles a chain. The chain carries the cross head back and forth the whole length of the frame. As the mandrel reaches the back position a U-shaped punch descends, pressing the blank into a position in line with the mandrel. The punch then leaves the blank and the mandrel enters, carrying it forward through the lockseaming dies which are shaped to close the blank and put the lockseam in it. The dies have no moving parts. The finished product comes out at the end of the machine, the mandrel withdrawing to its starting position to repeat the operation.

Sales representation of the Farber Fire Brick Co., St. Louis, in the Pittsburgh district has been taken over by the Dover Fire Clay Brick Co. of Cleveland.

New Crawling Tractor Crane

To meet the need for a full revolving tractor crane which can be operated independently of rails, the Industrial Works, Bay City, Mich., have developed the crane shown in the accompanying illustration. It is built in two types, the type BC having a capacity of 20,000 lb. at 12 ft. radius and equipped with continuous crawling tractor belts; and the type BT with a capacity of 18,000 lb. at 10 ft. radius, equipped with four broad-gage tractor wheels.

Operation is by means of an internal combustion engine. The boom is 30 ft. long and made up of two channels strongly latticed with angles and tie plates. The steering, while propelling, is controlled by the operator from his position in the revolving upperworks, by manipulation of the friction clutches and brakes controlling the motion of each tractor belt. Through these clutches and brakes either tractor belt may be readily and instantly disconnected from the motor while the other belt continues traveling at the normal rate of speed. The disconnected belt can be held stationary by applying the brake, can be allowed to coast with the brake and clutch both disengaged or the clutch can be allowed to slip, thus allowing the operator to turn as sharp or as wide a corner as he may select. For simplicity and accessibility the clutches, brakes and lever mechanism for steering are located in the revolving upper works.



The Capacity Is 20,000 Lb. at a 12-Ft. Radius. Steering is by means of friction clutches and brakes controlling the motion of each tractor belt

The makers emphasize the propelling and steering arrangement as a new and exclusive feature, stating that it enables the operator to propel and steer the crane independently of all other motions and as easily as a wheel or "caterpillar" tractor. The capacity and speed of these cranes make them adaptable to the needs of road contractors, coal dealers, gravel, sand and stone producers, foundries, and moderate-size manufacturing plants. They can be equipped to handle hook and block; grab bucket; drag scraper bucket; wood grapple; electric lifting magnet; shovel dipper and pile driver loads with drop hammer.

Luria Bros. & Co., iron and steel scrap, has in operation its new yard located on South Avenue and Baltimore & Ohio Railroad tracks, on the north side, Pittsburgh. The yard covers an area of about six acres, has three tracks and a capacity for handling 68 carloads of material at one time, and is equipped with three shears and a 25-ton locomotive.

July Fabricated Steel Business

The amount of fabricated steel business that was contracted for in July, according to the records of the Bridge Builders and Structural Society, George E. Gifford, secretary, 50 Church Street, New York, was 60,200 tons. This corresponds to 33⅓ per cent of the capacity of the bridge and structural shops of the country and compares with 66,900 tons, or 37 per cent, for June. The amount of business taken in the first half of 1921 averaged about 47,250 tons per month.

Efforts to Relieve Unemployment

WASHINGTON, Aug. 23.—The report of the Bureau of Labor Statistics sent to the Senate by Secretary of Labor Davis, reporting 5,735,000 persons out of employment in the United States, has stirred the administration and Congress to increased efforts designed to relieve the situation. Speedier action for the purpose of bringing about economic readjustment is being urged, and is one reason why it has been desired to enact quickly the railroad funding bill, and other measures that would mean more employment. Unemployment is the result of poor national economic management, according to Eugene Meyer, Jr., director of the War Finance Corporation, who stated that unless the Government acts there will be a most serious situation for it to confront next winter.

Of the total reported unemployed by the Bureau of Labor Statistics, 3,900,000 (more than two-thirds) are classified under manufacturing and mechanical industries.

British Steel and Iron Output and the Coal Strike

The serious effect of the coal strike on the pig iron and steel output of Great Britain is reflected by the following table in gross tons:

1921	Pig Iron	Steel Ingots and Castings
January	642,100	493,400
February	463,600	483,500
March	386,000	359,100
April	60,300	70,600
May	13,600	5,600
June	800	1,900
Aver. per month, 1920	667,320	754,730

Only two blast furnaces were operated in June and the 1900 tons of steel, credited in that month, was steel castings.

July Exports Under One-Sixth of January

Falling Off General—Lowest Figure in Nearly Seven Years—Many Items Less Than 10 Per Cent of July, 1920—Imports Also Low, but Slightly Better Than June

WASHINGTON, Aug. 23.—Exports of iron and steel in July totaled only 86,523 tons, and were but 925 tons above the low point in August, 1914, when the outbreak of the European war temporarily demoralized the industry and reduced exports to 85,598 tons. The value of July exports was $27,639,787. For the seven months ending with July exports totaled 1,676,348 tons, valued at $465,374,692. The July exports showed a drop of 32,558 tons under those of June, 119,081 tons. The striking reversal of the export movement is shown when comparison is made with that of one year ago, the total for July, 1920, having been 489,223 tons and for the seven months ending then it was 2,701,400 tons.

Exports, January, 1919, to July, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Calendar year 1919.	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920...	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920.	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921...	4,168,619	129,541	82,549
July	86,523	2,744	363
Seven months	1,676,348	15,493	4,326

Exports for January, 1921, were reported at 547,394 tons.

Machinery exports for July amounted to $14,758,741, as compared with $37,303,748 in July, 1920, and for the seven months of the present year they aggregated $214,832,576, as against $258,813,489 for the same period of last year. In June, 1921, machinery exports amounted to $22,044,833.

Imports of iron and steel in July totaled 10,286 tons, valued at $2,253,110, exclusive of those relating to sheets and plates, which are omitted in view of an error made by the Bureau in its compilation on these products. The incoming tonnage for this month was greater than in June, when importations totaled 8929 tons. For the seven months ending with July imports amounted to 62,438 tons, valued at $18,279,024. Those of July, 1920, totaled 31,863 tons and for the seven months ending with that month they were 257,782 tons.

Steel rails were exported in greater volume than any other product in July, shipments amounted to 20,074 tons. Next in importance came welded pipe, with an outward movement of 14,485 tons. Structural steel took third rank, with 11,320 tons exported. Other lines generally showed a drop and some of them almost reached the vanishing point, among these being ferromanganese, ferrosilicon, horseshoes and railroad spikes.

Steel rails also were imported in July in greater quantity than any other product, the amount being

Exports of Iron and Steel

	Gross Tons			
	July		Seven Months Ended July 31	
	1920	1921	1920	1921
Ferromanganese	417	15	934	413
Ferrosilicon	97	64	306	218
Pig iron	29,133	2,744	128,995	15,493
Scrap	24,906	1,524	84,021	24,198
Bar iron	33,729	149	22,388	11,290
Wire rods	12,258	854	77,588	10,964
Steel bars	55,933	5,385	363,288	152,700
Billets, ingots, blooms	17,243	363	155,530	4,326
Bolts and nuts	2,639	1,028	22,290	19,449
Hoops and bands	4,733	1,263	31,906	13,393
Horseshoes	198	12	1,141	364
Cut nails	354	42	1,296	588
Wire nails	8,184	992	43,959	17,296
All other nails, including tacks	878	445	6,534	3,243
Cast pipe and fittings	3,851	2,634	30,942	37,814
Welded pipe and fittings	28,075	14,485	147,675	288,678
Radiators and cast house boilers	486	238	4,285	1,644
Railroad spikes	1,270	16	9,794	6,558
Steel rails	51,869	20,074	333,834	256,938
Galvanized sheets and plates	10,642	2,634	63,834	40,578
All other sheets and plates	1,802	652	17,659	9,756
Steel plates	58,360	6,205	494,505	282,414
Steel sheets	15,220	6,819	92,261	70,459
Ship plates, punched and shaped	5,522	294	25,369	9,401
Structural steel	36,054	11,320	236,695	244,810
Tin and terne plates	17,553	3,024	139,995	77,302
Barb wire	10,439	1,432	72,151	20,372
All other wire	17,358	1,860	92,256	55,689
Total	489,223	86,523	2,701,400	1,676,348

2597 tons. Pig iron came next, with 2567 tons; while billets, without alloys, were third, with 2469 tons. These three items represented much more than one-half of the entire importations of blast furnace, semi-

Imports of Iron and Steel

	Gross Tons			
	July		Seven Mos. Ended July 31	
	1920	1921	1920	1921
Ferromanganese	2,448	275	23,711	5,481
Ferrosilicon	1,265	309	9,436	1,922
Pig iron	7,335	2,567	85,387	15,595
Scrap	7,953	1,650	85,672	21,381
Bar iron	564	274	2,468	1,006
Structural steel	192	46	841	405
Billets, without alloys	1,313	2,469	17,416	2,916
All other billets	481	22	2,803	1,020
Steel rails	9,550	2,597	26,952	11,898
Sheets and Plates	79	....	903	....
Tin and terne plates	17	....	222	308
Wire rods	666	77	1,971	506
Total	31,863	*10,286	257,782	*62,438
Manganese ore and oxide	18,447	5,028	234,989	297,403

*Omitting tonnage of sheets and plates, which the Bureau is having rechecked.

finished and finished lines. Imports of manganese ore in July totaled 5028 tons, compared with 18,447 tons last year.

A 12-story building to serve as the New York warehouse of the Dodge Sales & Engineering Co., Mishawaka, Ind., is being erected on West Broadway, from Murray Street to Park Place. The structure has been provisionally named "Power and Transmission Building," for it is hoped to make of it a new center for factory and mill supplies of this character. The eight upper stories are to be leased, in whole or in part, to concerns in the power field.

NEW SCRAP CLASSIFICATION

Schedule Prepared by Division of Purchases and Supplies of American Railway Association

The American Railway Association, division 4, purchases and supplies, has prepared a new scrap iron and steel classification which will come up for adoption at that body's next meeting, which will take place in the spring of 1922. The classification is of especial interest to old material dealers because, if adopted, it will be used by all of the railroads and will eliminate the special classifications now in use. Although most railroads are now following the classification adopted by the United States Railroad Administration, which superseded the old Railway Storekeepers' Association classification, there are still some roads using the latter and others which use private classifications. The adoption of a uniform classification will do away with much of the confusion resulting from the present system.

The proposed classification follows the old storekeepers' classification more closely than any of the other various classifications. Thus far the only criticism of it reported by the dealers is that it does not stipulate that No. 1 steel rails is intended to cover rails used for rerolling purposes. There has always been controversy between the railroads and the rerolling mills as to what is and what is not a rerolling rail; and without a definite stipulation in the classification, further disagreement of this kind is bound to occur. This situation was recognized when the Railroad Administration classification was prepared and it is urged that a like stipulation should be added to the proposed classification.

American Railway Association Classification of Scrap Iron and Steel

Item No.	Description
1	Arch bars and transoms, iron.
2	Arch bars and transoms, steel.
3	Axles, steel—Car and locomotive, 6 in. diameter and over at center.
4	Axles, steel—Car and locomotive, under 6 in. diameter at center.
5	Axles, steel, hollow bored.
6	Axles, iron—Car and locomotive, all sizes.
7	Angle and splice bars—Steel angle bars and splice bars.
8	Angle and splice bars—Patented joints only.
9	Angle bars, splices and fish plates, iron.
10	Boilers, fireboxes and tanks, uncut—All kinds, attached or separate. Specify whether with or without flues.
11	Boilers, fireboxes and tanks, cut up—Iron or steel boiler or tank plate, cut into sheets and rings (with or without stay bolts).
12	Brake beams, uncut.
13	Built up bolsters.
14	No. 1 busheling—Iron and soft steel pipes and flues (free from scales); tank and bands No. 12 and heavier, boiler plate punchings and clippings, and soft steel and iron drop forgings and trimmings, nothing to be over 8 in. long or wide, free from galvanized or tinned stock.
15	Cast, Railroad No. 1—Pieces weighing 150 lb. or less, includes new grates, new stove plate and clean cast-iron culvert, soil and water pipe, to be free from brake shoes and burnt grates, burnt grate frames, burnt stove plate and all other burnt castings.
16	Cast, Railroad No. 2—Pieces weighing over 150 lb. but not more than 500 lb.; otherwise same specifications as Class No. 15.
17	Cast, Railroad No. 3—Pieces weighing over 500 lb.; includes cylinders and driving wheel centers and all other castings; otherwise same specification as classification No. 15.
18	Cast, Railroad No. 4—All kinds of burnt castings, including grate bars, grate frames and stove plate.
19	Cast-iron brake shoes—All shoes with steel back or with steel or wrought iron inserts, both driving and car. Excludes composition filled shoes.
20	Cast-iron borings—Clean and free from other metals, dirt and lumps.
21	Cast steel No. 1—Charging box size, 5 ft. and under, under 18 in. wide; no piece weighing less than 10 lb. to be included.
22	Cast steel No. 2—Steel castings over 18 in. wide and over 5 ft. long; may include cast steel truck or body bolsters and cast steel locomotive frames.
23	Cast steel truck and body bolsters.
24	Couplers and knuckles, steel and steel knuckle locks.
25	Tools and tool steel—Worn out steel tools, tool steel, files, including old claw bars, pinch bars, spike mauls, track wrenches, picks, axes, adzes, chisels, drills, hammers, knuckle pins, punches, finger pins, bits, draft keys, bar steel weighing under 10 lb. per piece.
26	Frogs and switches, uncut—Steel and iron frogs and switches that have not been cut apart, exclusive of manganese material.
27	Flues, tubes and pipes, wrought iron and steel No. 1—1 in. diameter and over, 2 ft. long and over, free from fittings, paint, galvanized or enameled, coiled or bent material.
28	Flues, tubes and pipes, wrought iron and steel No. 2—Ungraded wrought iron and steel flues, tubes and pipe, including fittings attached.
29	Limed iron and steel—All kinds of material from interior of boilers (except flues which are incrusted with lime or corroded by the action of water) such as crown bars, crown bar bolts, stay bolts, etc.
30	Malleable—All malleable castings.
31	Melting steel, heavy, No. 1—Charging box size, ¼ in. thick and over and not over 18 in. wide, or over 5 ft. long, free from all attachments, may include chain, carbon tool steel, files, punchings and all other steel scrap that will come within the above dimensions, unless otherwise specified.
32	Melting steel, heavy, No. 2—All steel over 5 ft. long or over 18 in. wide.
33	Rail, iron, No. 1—Iron tee rail, 3 ft. long and over, toe section 40 lb. per yard and over, free from frog, switch, guard or crooked rail.
34	Rail, iron, miscellaneous—All iron rail, not otherwise specified, including guard rails, switch points and frogs, when cut apart. Does not include frog fillers or plates.
35	Rail, steel, No. 1—Standard section steel tee rails, 50 lb. per yard and over, 5 ft. long and over, free from badly bent and twisted rails, frog, switch and guard rails and rails with split heads and broken flanges. Note: All rail suitable for relaying must be classified as relaying rail separate from all scrap rail.
36	Rail, steel, No. 2—Cropped rail ends under 3 ft. long, 50 lb. and over, standard section.
37	Rail, steel, No. 3—3 ft. long and over, 50 lb. and over, standard section having split heads or ball of rail worn with wheel flanges, curved and bent rails, free from frog, switch and guard rails.
38	Rail, steel, No. 4—All sections of rail not coming under specifications of No. 1, 2 or 3 rail, including frogs cut apart, guard rails and switch points. Does not include frog fillers or plates.
39	Structural wrought iron, cut apart—Wrought iron structural shapes from bridges, buildings and equipment, cut apart and free from riveted material.
40	Structural wrought iron uncut—Wrought iron from bridges, structures and equipment which has not been cut apart.
41	Structural steel, uncut—All steel or steel mixed with iron from bridges, structures and equipment that has not been cut apart; may include uncut bolsters, brake beams, steel trucks, under frames, channel bars, steel bridge plates, frog and crossing plates and other steel of similar character not included in No. 2 heavy melting steel, Class 32.
42	Sheet scrap No. 1—Under ¼ in. thick, consisting of cut stacks and stack netting, hoops, band iron and steel, pressed steel hand car wheels, scoops and shovels (free of wood) and wire rope; must be free from galvanized iron or tin, cushion and other similar springs and lime encrusted pipe and flues from boilers.
43	Sheet scrap No. 2 and miscellaneous—Includes netting, other than stack wire, all galvanized or tinned material, composition brake shoes and gas retorts, and any other iron or steel material not otherwise classified.
44	Spring steel No. 1—Flat spring steel, including elliptic springs from which bands have been removed.
45	Spring steel No. 2—All coil springs, made from steel 3/16 in. and over.
46	Manganese steel—To include all kinds of manganese rail, frogs and switch points, cut or uncut.
47	Steel, high speed—High speed steel turnings (butts and ends report separately).
48	Tires No. 1—All locomotive or car tires 36 in. and over inside diameter, smooth inside, not grooved for retaining rings or lipped.
49	Tires No. 2—All tires not included in tires No. 1.
50	Turnings and drillings No. 1—Wrought iron and soft steel, clean, free from cast borings, brass, hard steel or other foreign metals, dirt and lumps.
51	Turnings and drillings No. 2—From tires and other similar steel, including hard steel; clean, free from other metals, dirt and lumps.
52	Turnings and drillings, mixed, No. 1—Wrought, cast and steel mixed, free from other metals, dirt and lumps.
53	Turnings and drillings, mixed, No. 2—Wrought, cast and steel, mixed with brass and other metals, free from dirt and lumps.
54	Wheels, No. 1—Includes all solid cast iron car and locomotive wheels; no allowance for grease and dirt.
55	Wheels, No. 2—Includes all kinds of built-up or steel-tired wheels (specify kind in offering).
56	Wheels, No. 3—Includes all solid rolled, forged or cast steel car and locomotive wheels (specify kind in offering).
57	Wrought, railroad No. 1—Clean wrought, pieces 6 in. long and over, flats to be ¼ in. thick and over; rounds or squares ⅝ in. thick and over; to include bars, rods, chain; all to be free from riveted material.
58	Wrought, railroad No. 2—All wrought under 6 in. long, not specified under No. 1 railroad wrought; to include track spikes, bolts, nuts, rivets and lag screws.
59	Wrought iron locomotive frames or mud rings—Includes all other large wrought iron forgings.
60	Destroyed steel cars and locomotive tenders—Includes underframes and bodies of steel cars cut apart sufficiently to load—excluded trucks and cast steel underframes.
	Miscellaneous
61	Aluminum.
62	White metal No. 1—Including various mixtures of clean bearing or lining metals, such as babbitt, metallic packing, etc.
63	White metal No. 2—All non-bearing white metals, exclusive of aluminum.
66	No. 1 brass—Locomotive bearing metal, such as driving, crown and rod brass, free from white metals, excluding car and tender bearings.
67	No. 2 brass—Steam metal brass, including valves and fittings, injector and lubricating bodies and parts and check valves.
68	No. 3 brass—Journal bearings free from babbitt.
69	No. 4 brass—Brass or bronze borings, drillings and turnings.
70	No. 5 brass—Yellow brass castings, to include coach trimmings, light brass, hose couplings, pipe, tubes, etc.
71	Copper cable, insulated—Specify kind.
72	Copper, No. 1—Wire free from insulation, flue ferrules, pipe and tubes.
73	Copper, No. 2—Sheet copper, sheathing and roofing, free from paint and nails.
74	Copper, No. 3—Sheathing and roofing copper, with paint and nails.
75	Copper, No. 4—Battery copper.
76	Copper, No. 5—Dross and oxide (report separately).
79	Lead—Sheet, pipe, etc.
80	Lead—Battery.
81	Lead—Battery mud or sediment (specify wet or dry).
91	Zinc—Battery or sheet (specify kind).

CONTENTS

Primitive Iron Smelting in China 451
Tubal Cains of To-day—How Natives Make Cast Iron and Put Phosphorus Into It Without Knowing It

Mechanical Control in Foundry Problems 456
Cases Showing How the Application of Simple Mechanics Produced Results Which Chemistry Alone Did Not

Methods of Preparing Blast Furnace Slag 461
Divided Into Four Classes by Carnegie Steel Co. According to Specific Use to Which It Is to Be Put

Secure Place of Iron Blast Furnace 465
Features of Superiority Not Met by Processes Aiming at Producing Steel Direct from Ore—Possibilities of Improvements

Steel Industry Heard on Tariff Schedules 468
Ferroalloy Paragraph Chiefly the Issue—Magnesite and Graphite Duties Opposed and Defended

Melting Steel in a Non-Ferrous Electric Furnace 472
Production of Crucible Quality Steel in Small Baily Resistance Units

July Exports Under One-Sixth January Figures 477
Lowest Figure in Nearly Seven Years—Many Items Less Than 10 Per Cent of July, 1920—Imports Also Low

Copper and Brass Research Association.. 454
Silicon Additions to Steel..... 458
Steel Labor Employment 459
Nickel in Iron Castings..... 460
International Resolutions on Emigration Supervision 463
Tinplate Manufacture in Norway..... 463
Germany's Low Bids on Structural Steel 463
Special Diehead for Fine Threads..... 464
Present World Stocks of Zinc..... 464
Condition of Standard Parts Co. Affairs.. 464
Bench Type Spot Welder..... 464
Fall Meeting of Mining Engineers..... 470
Fall Meeting of Electrochemists..... 470
Industrial Plant Activities..... 470
Monarch Engine Lathes 471
German Export Success Exaggerated.... 471
Labor Conditions.....467, 473, 475, 476
British Protective Bill 474
Oil Burner Uses Preheated Air..... 474
Cost of Living Stationary..... 474
Lead Molding Hydraulic Press..... 475
Automatic Lockseaming Machine..... 475
Crawling Tractor Crane 476
July Fabricated Steel Business..... 476
British Iron and Steel Output..... 476
New Scrap Classification..... 478
Editorials 480
Kicking Against the Goads—The Traffic Problem—Steel Makers as Coke Sellers —Adding Silicon to Basic Steel
Correspondence 482
New Car Wheel Specifications and Southern Charcoal Pig Iron—Proposal to License Business Men
Revised Federal Tax Bill..... 487
Foreign Market Conditions.....496, 497
Production of Refractory Brick..... 499
Steel Corporation Wage Reduction..... 501
Pre-War and Present Prices..... 502
Industrial Finance 509

Iron and Steel Markets.....484
Comparison of Prices.....485
Prices Finished Iron and Steel, f.o.b. Pittsburgh.....498
Non-Ferrous Metal Markets.....499
Personal Notes.....500
Obituary Notes.....501
Machinery Markets and News of the Works.....503
New York Jobbers' Prices.....510

ESTABLISHED 1855

THE IRON AGE

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Kicking Against the Goads

Mr. Gompers, in his favorite impersonation of Ajax defying the lightning, spoke with some violence this week on present industrial conditions, at the Atlantic City meeting of the American Federation of Labor. "We are going to fight to our utmost the reduction of wages," he said. He denied that the cost of living had come down, though official statistics have shown a substantial reduction in the past year. "Instead, it is going up, especially rents." It is true that in many cases rents are being advanced even now. It must be said, however, that the main cause of higher rents is that the supply of houses, generally speaking, falls short of meeting the demand, and that condition in turn is due largely to the fact that some scores of thousands of union workers in the building trades prefer idleness to accepting such a reduction in wages as would encourage the building of more houses. Attention has been called repeatedly to this phase of the unemployment situation which is brought home daily to millions of workers, either in the high rents they pay or in the entire cutting off of income because the union has decided that no pay envelope at all is preferable to a pay envelope of less than war-time proportions.

"In all this talk about readjustment and reconstruction," says Mr. Gompers, "why is it that the pressure is always brought to bear upon those whose standards of life and everyday existence would be demoralized by a reduction in wages, and why this drive to reduce wages first? Would it not be more humane to start with 'them as have' and whose profits or incomes derived from their surplus savings would be the only factor affected? The question is between profits in dollars and the demoralization and deterioration of the American wage earners' standards."

The record of dividends reduced or passed by industrial companies in the past nine months has suggested that the order has been just what Mr. Gompers would have it—the cutting down of profits and then reductions in wages. That has been the order throughout the steel industry. Profits have disappeared and scores of important producers are writing a loss on every day's operations. And if the list of sufferers from the suspension or cutting down of dividends were analyzed it would be found that in ninety cases out of a hundred the losses are falling upon investors with small or moderate incomes, whose hardship in kind, and in many cases also in degree, is like that of the worker whose wage has been reduced.

It may be recalled that in November, 1918, when the country faced the maze of problems resulting from the armistice, Mr. Gompers announced in an address at Laredo, Tex., that "the advantages which the workers of America and the allied countries have gained are not going to be taken away from us, and we will resist the attempt to the uttermost." He referred to the eight-hour unit in figuring overtime, also to the high rates of wages that were the gift of the war. At that time it was said in these columns that war commodity prices and war wages must be deflated and that Mr. Gompers could no more successfully resist the forces that would bring about these changes than he could control the rise and fall of the tides or the precession of the equinoxes. The record of his success has been written in the months that have elapsed. He has been no more able in the past year to hold wages at the war level than he could hold wheat at $2.30, or ship plates at $95.20 per gross ton.

The forces at work have been economic forces and not decrees of any labor union or manufacturer or government. Moreover, forces beyond any such control are still at work. They are world-wide in their operation. "The economic crime," as Mr. Gompers calls the "forcing into idleness" of several million workers, is not the conspiracy he conceives it to be. Rather the economic crime was the forcing of the labor cost of production, which was also the cost of living, beyond the power of consumers to endure it. To the reparation every member of the community is contributing.

One of the surprises of the abnormal course of steel production the world over this year is the performance of the electric furnace in Canada. Out of a total output of steel castings of 12,639 gross tons for the first half, 75.8 per cent or 9585 tons was made in electric furnaces. On Jan. 1 Canada had only 43 electric steel furnaces as compared with 356 in the United States. The best

record ever made by American electric furnaces producing steel castings was in 1920 when almost 12.5 per cent of the total was electric. The best previous Canadian record was in 1919, when about 18 per cent of the total steel casting output was from electric furnaces. Of interest also is the fact that in June the Canadian electric steel ingot production of 1353 tons was over twice that of the United States in July—575 tons. Even the American output for June, 1476 tons, was but slightly in excess of the same month's output in Canada. Seeing that Canada has only about one-eighth as many electric furnaces as the United States, this performance is noteworthy.

The Traffic Problem

While there is a great deal of talk about what the public needs in freight service and what the railroad companies need in earnings, it does not appear that the full extent of the traffic problem is appreciated. A little analysis on the quantitative basis may be illuminating. Demand for various commodities rises and falls quite irregularly, though the general trend in nearly all commodities is upward. Representing in a sense the sum total of all demand for commodities, the demand for transportation service moves with relative smoothness. Almost any comparison that can be selected shows that from almost the earliest time in American railroading the freight ton-mileage on the railroads has tended to double every 12 years. Not going into details, it is sufficient here to point out that the revenue ton-mileage in the fiscal year ended June 30, 1913, was 301,398,752,-108, also that the movement in 1901 had been a trifle less than one-half and the movement in 1902 a trifle more than one-half of this amount, so that there was a doubling in a shade less than 12 years.

The rate represents an annual increment of 5.95 per cent. Such an increase, from 1913, would involve in the twelvemonth to end June 30, 1922, on which period we have already entered, a movement of 507 billion ton-miles, or 68.2 per cent more than that of 1913. The railroads cannot closely approach such a rate now or in the near future, and they cannot come at all near it with any degree of comfort or convenience to shippers. In 1918, under forced conditions, and with some long movements to use certain lines, thus piling up ton-miles, they did about 400 billion, while in 1920, with consignees very greatly incommoded, they did only a shade better.

Last May the quality of service rendered by the railroads was comparatively good, and the rate of movement was just equal to the movement in 1913. Two conclusions can readily be drawn: (1) That with anything like normal business conditions the demand upon the railroads would be much greater, perhaps closely approaching the 507 billion ton-miles computed according to the old rule; (2) That the railroads could not possibly perform anything like the quantity of service demanded by active industrial conditions, even by moving the freight irrespective of the convenience of shippers and consignees.

To a great many the conclusion to be reached from the facts here referred to is that by this means or that means sufficient improvement in railroad capacity must be forced to meet the indicated conditions. That dictum, however, cannot be granted in full. As a people we cannot accept the burden of doubling every 12 years the quantity of freight movement on our railroads, for obviously we should eventually break under the strain. After liberal allowance for improvements and economies that may be introduced the supply of capital and man power would not increase rapidly enough to carry the pace.

As a part of the transportation problem, whether we accept it intelligently or have it forced upon us, is the necessity of curtailing our requirements or diverting some of the demands from the railroads. Of course this will have to come about through the force of self-interest, but there are some means available for influencing self-interest. When water transportation is available as an alternative, there can be some recession from the principle so often preached that the railroads must make rates that will compete. We have reached a point where much more is requisite than a mere increase in railroad facilities. Should we depend alone on that our trouble would be endless.

Steel Makers as Coke Sellers

Not only are the steel companies making the market in pig iron, but they threaten to become the dominating influence in the coke market, at least temporarily. This possibility is suggested by the fact that a Youngstown district steel company, which recently blew in a blast furnace, contracted for its fuel requirements from a nearby steel company having by-product ovens. This company formerly bought beehive coke for its furnaces, as it probably would be doing now if business were normal and the steel companies having by-product plants were using all the coke they produce. The lowest price quoted by the Connellsville operators against the inquiry, which was for about 12,000 tons a month over the remainder of the year, was $3 per net ton at ovens. The buyer was able to get by-product coke at $2.50 per net ton, Connellsville base, a saving of 50 cents per ton, or $6000 per month. It is necessary to keep by-product plants in partial operation at all times to prevent heavy repair charges, and there are also in some cases gas contracts, and the steel companies in the Youngstown district, and probably in all other districts, which have by-product plants, are producing more coke than they need, since they have only one blast furnace in five on an average making iron.

It was the marketing of surplus pig iron by the steel companies that established market prices in steel-making grades of iron, and now that the steel companies have surplus by-product coke for sale and the capacity for commercial production, the beehive coke producers have a condition to meet that may have to be reckoned with for a considerable time. The fact that many merchant blast furnaces stopped making iron did not prevent prices from slipping, and likewise the curtailment of beehive coke making has its limitations as a price corrective, seeing that the steel

companies must keep their by-product plants going and will take low prices for coke to prevent burdensome accumulations.

Adding Silicon to Basic Steel

Deterioration of steel due to mistaken judgment as to the proper time and method of adding silicon has been the subject of experiments by a German investigator, as summarized elsewhere in this issue. His work was on basic open-hearth steel. He concludes that by adding the ferrosilicon at as late a stage as possible, not only are the silicon losses and silica inclusions less, but also the carbon monoxide in the steel is greatly reduced, as well as the hydrogen content. Still more important is his conclusion that the amount of discard in rolling the steel, due to the presence of occluded gases, is reduced over 50 per cent by late additions of the silicon alloy. The results show a discard as high as 70 per cent when silicon is added at the usual time, whereas by a late introduction of the silicon discards ranged from 9.80 per cent to 18 per cent.

It is true that the steel under consideration contained from 0.20 to 0.22 per cent final silicon, which is not usual in American practice; but if the author's conclusions are true regarding such steel, they must have some weight in the production of steel containing less silicon. At any rate the points the author raises merit close consideration from producers of basic open-hearth steel castings, where the final silicon content is usually at a minimum of 0.25 per cent and where gas content and consequent blow holes are some of the chief defects to be avoided. And the matter is equally vital if rolling discard losses can be cut in two by proper additions.

These experiments emphasized the growing necessity of giving more attention to the time and method of making additions of all alloys. In many plants ferrosilicon is not added to the steel under the conditions laid down by the German investigator. There is also a wide divergence of opinion as to when and how ferromanganese should be added. Time of addition, temperature and other considerations in adding all alloys deserve careful research, which will no doubt reveal some facts not now known.

CORRESPONDENCE

New Car Wheel Specifications and Southern Charcoal Pig Iron

To the Editor: The tentative specifications for cast iron car wheels adopted by the American Society for Testing Materials at its 24th annual meeting, as reviewed by THE IRON AGE of June 30, work a severe hardship to the Southern pig iron manufacturer, in that they eliminate Southern pig iron almost entirely by lowering the phosphorus maximum. Time was, when the large as well as the small producer of wheels, was content with a maximum phosphorus specification of 0.55 per cent, sulphur, 0.035 per cent and under, with silicon all the way from 0.75 to 2.75 per cent, depending on the other ingredients of the individual mixture.

Dr. Moldenke saw the injustice these new specifications would work to the Southern product, when he raised the point that Southern melters could not meet these figures, since their product contains phosphorus around 0.50 per cent.

Let us go back to 1913, the year in which Mr. Force states that the total loss sustained by the railroads, due to accidents of all kinds, amounted to approximately $33,000,000, as compared with $106,000,000 for the year 1919, which increase, it is admitted, is due in a large measure to defective wheels. In 1913 one Southern charcoal iron manufacturer shipped 53 per cent of his output to the railroads and car wheel manufacturers, while in 1919 only 16 per cent went to this same trade.

Recent investigation developed that some of the wheel manufacturers, in order to meet the views of the railroads as to price, were resorting to the use of higher phosphorus iron of the ordinary No. 4 foundry grade, increasing the percentage of steel scrap and adding ferromanganese. It is small wonder that the scrap wheel of to-day, which constitutes a goodly percentage of the manufacturer's mixture, has accumulated phosphorus, sulphur and combined carbon in such quantities as to lower materially the former high standard of efficiency of the wheel.

A close inspection of the tables submitted by Mr. Force reveals the fact that in practically every case where failure appears to be attributable to high phosphorus content, either the combined carbon or sulphur content or both were excessive. Then why should the Southern pig iron manufacturer, the Southern and Pacific Coast wheel maker be eliminated until it can be established that phosphorus is responsible for wheel failures?

If wheels could be made in 1913, that would give the maximum service without the aid of the electric furnace or the addition of nickel and chromium, they can be made in 1921 without these agencies. Meanwhile railroads have been hammering the shipper to load freight equipment heavier, insisting that cars be loaded 10 per cent over their marked capacity in order to make the supply take care of the demand during a prosperous period, thus increasing the strain on the most vital part of the equipment, the wheel. They have resorted to the cheaper wheel; and thus it is we have a condition that cuts both ways—reduced wheel efficiency combined with increased maximum loads.

Let's agree with the author of "Some Failures of Chilled Cast Iron Wheels" in the statement, "By no means are the car wheels as a whole satisfactory," and get at the root of the trouble before we reach a conclusion that operates against the best interests of any special section of the United States.

J. G. HENDRICK,
Shelby Iron Co.

Shelby, Ala., Aug. 19, 1921.

Training in Economics as Preparation for a Business Career

To the Editor: THE IRON AGE for Aug. 11 contains a letter by Sterling H. Bunnell commenting upon an article by Alvan T. Simonds, president of the Simonds Saw Mfg. Co., Fitchburg, Mass., in which he raises the question "Should Business Men Be Licensed?"

Mr. Simonds prepared his article because he recognized a condition among American business men that I have seen nowhere better stated than in Mr. Bunnell's letter as follows:

> Since the close of the war in 1918 it was perfectly evident to the very few men who were willing to think in international terms and study world conditions, that a huge financial crisis was impending. However, a search of the printed records of the past three years shows only two names, Richard Martens and Frank A. Vanderlip, who were conspicuous for their bold telling of the truth about the economic situation. The vast majority of recognized successful leaders of trade and industry in the United States are, on the contrary, on record repeatedly up to within twelve months of this writing, as predicting unlimited prosperity, continuance of industrial activity, vast profits, and higher and higher prices for American commodities demanded by all the world; and this in spite of the fact that all of the nations engaged in the late World War were financially exhausted, and operating their governments at enormous deficits.

Mr. Simonds believed from his own experience and study that what was "perfectly evident to very few" might be made evident to the many by proper educa-

tion; or at least that the many might be taught to respect and follow the opinions of the few who had taken the time and trouble to get the proper education. Most men respect and take the advice of skilled physicians because they believe that there is a science of medicine back of them. Most business men neglect or ridicule the advice of skilled economists (and I mean by this skilled both by study and experience) because they have failed to recognize that there is such a thing as a science of economics. Mr. Simonds believed that with such education many business failures, with the consequent loss of money and the bringing of great hardship upon many families of employees, might be avoided to a much greater extent than it is to-day.

During the first six months of 1921 there were over 9000 business failures in the United States, involving an indebtedness of over $300,000,000. In the light of these facts the failures for February, 1921, do not stand out as so unusual. It should be remembered in this connection that the failures show only a small part of the losses occasioned by ignorance of the fundamental laws of economics—and the word is used here to mean the study of material means to satisfy human desires. Greater losses than those represented by the failures occurred in connection with businesses that did not fail because of their financial condition or because of being bolstered up by friends or banks.

Mr. Simonds is not a believer in Government regulation. He is an individualist and few business men would go further than he does in giving freedom for individual initiative. Realizing, however, how far the Government has interfered to protect property, he raised the question that if this principle is good, why should not business men be licensed, who direct the use of other people's money and who determine by their success or failure the happiness or misery of many families of laborers, before such men are allowed to undertake such a trust. He did not mean the small man running a fruit stand, but only those who work with large capital and direct large numbers of employees.

Mr. Simonds did not want "to start something." He wanted to create public sentiment in favor of education in economics, so that the condition described above by Mr. Bunnell would gradually cease to exist.

He believes "world wide depressions" and "stock panics" are caused by the ignorance, weakness and foolishness of human beings and are not "acts of God" save as every act of human beings may be called an act of God. Depressions and stock panics differ from earthquakes and the floods that usually follow them, because human beings can prevent the former by proper education and experience rightly understood. Education here does not mean only book education; scarcely anyone so understands education to-day. Mr. Simonds believes that most of the business men (as Mr. Bunnell says, "this includes the vast majority of recognized successful leaders of trade and industry in the United States,") who did not foresee the condition that followed the armistice would foresee such a condition twenty years from now, if they were living and in business and we had just passed through another world war. A study of the years following our Civil War and the Napoleonic wars should have made American business men understand these conditions in 1919 and 1920. A very few did "see perfectly," as Mr. Bunnell says. Mr. Simonds was one of these. In the house organ of the Simonds Saw Mfg. Co. in March, 1920, he called the attention of the employees of the company to his belief that October of 1920 would see many of them out of employment and that a similar condition would exist in most businesses in the United States.

Mr. Simonds says: "Let us have such education in our schools and colleges that the many may be better able to see as the very few saw in the last two or three years."

JOHN G. THOMPSON,
Assistant to the President
Simonds Mfg. Co.

Fitchburg, Mass., Aug. 15, 1921.

[In a note accompanying the above, Mr. Thompson says that he is writing in Mr. Simonds's absence on his vacation.—EDITOR.]

Proposal to License Business Men

To the Editor: The proposal of Alvan T. Simonds in your issue of July 14 is very interesting, particularly as I myself have raised that very question among our own members in my discussion of business conditions at our regional meetings. There is no doubt in my mind but that society as a whole cannot afford the waste of capital caused by incompetent management of business.

I myself have used the same illustration as Mr. Simonds, that inasmuch as navigation insists on licensing its ships' officers, so business should insist on licensing its managers. Just as ships' officers must demonstrate their ability in service, and must have a certain education as well before they can secure their license, so business captains using other people's money in their ventures, or managing business ventures for other people, should be licensed.

The competitive capitalistic system is greatly criticised for its deficiencies. Those of us who believe that there is no other system possible would do well to make every necessary improvement in the present system. Unless the deficiencies of the system are removed, we may find enough sentiment aroused among the unthinking and ill-informed to try something entirely different. I believe it would be a calamity, but if it should come about it will be due to the inertia of men who ought to be improving the present system.

Profound ignorance of fundamental economic laws and their operations has recently put a number of large concerns on the rocks. Some of them have not yet reached the bankruptcy court, but some of them surely will; and perhaps more are headed the same way than the public may suspect. The loss to stockholders is the same whether it is caused by ignorance or by criminal looting. The ordinary stockholder cannot know that the management of his property is in incompetent hands until the final crash demonstrates that fact, and perhaps his property is picked up by financial beach combers.

The corporation is a creature of the law. Those using the corporate form of organization use a power conferred upon them by the State. Is it too much to ask of all those operating as corporations created by law first to demonstrate their qualifications, and their character, before they are allowed to use this public power? Under the corporate form they secure many advantages, not the least of which is the size that a venture can grow to. This being possible only by special action, that permits the managers to gather large sums together from the public, certainly the public could well demand that the management of public money gathered into corporations shall be in the hands of men who presumably are able to guard properly the funds intrusted in their care.

Many a man will rise up and say that this is unwarranted interference, but let him just look around and see the wreckage that even now is strewing financial shores. Let him look back over the days of the Rock Island, the New Haven, C. H. & D. deals, and see whether something more than honesty is not necessary. A well-intentioned fool should not be allowed to control business craft any more than he should be allowed to navigate a ship on the high seas.

E. F. DUBRUL,
General Manager, National Machine Tool Builders' Association.
Cincinnati.

Improved Industrial Outlook in Milwaukee

MILWAUKEE, Aug. 22.—Reviewing the important local industries manufacturing motor vehicles and parts, the current review of the First Wisconsin National Bank says: "Most firms in automobiles and allied lines, except trucks, report improvement both in current sales and forward business. Capacity of operations averages around 60 per cent, with one firm making automobile specialties (drop forgings) operating at full capacity, 24 hr. a day. Automobile bodies are in fair demand. Prospects for motorcycle business in August and September are good. Prices in automobile lines are believed to be close to the bottom.

Iron and Steel Markets

USING UP STEEL STOCKS

Consumers in the Market in Larger Numbers

Improvement in Pig Iron Maintained—Increase in Output Expected

The hope of the steel trade that the fall will bring a noticeable increase in buying amounts to something less than confidence as yet, but there are indications of slowly expanding demand for some forms of finished steel. The best basis for better expectations is an increase in the number of orders coupled with a more urgent call for early delivery.

Producers of steel see more signs of the using up of stocks that have long stood between them and anything more than a hand-to-mouth operation, and are encouraged to look for a gradual decrease in the scale of their losses.

That the Steel Corporation followed more promptly the last wage reduction of the independent companies than those coming earlier in the year is an indication of the effect of recent competition. It will take a considerable increase in operations to give any approach to economical production.

The rate of steel ingot production is slightly larger this week at several important plants. In the Chicago district the Wisconsin Steel Co. shows the most marked improvement, running at 40 per cent of capacity.

Central Western mills find more activity in automobile steel than in any other direction. Several Detroit plants will operate at the present rate through September. The Ford Motor Co. placed 2500 tons of light plates at Youngstown and a like amount went to another mill.

There are signs of increased activity at some implement works, but one farm tractor company has reduced production.

The sheet market is more active, some buyers making their first purchases in months. Base prices on blue annealed range from 2.25c. to 2.40c. and on black sheets from 2.75c. to 3c. Offerings of stock tin plate have been made at $4.50 per box, or 75c. below the price for production plate.

The week has been an outstanding one in fabricated steel. Upward of 12,000 tons was placed and nearly 20,000 has been added to active pending projects, not including 14,000 tons for the Federal Reserve Bank in New York. Railroad bridge and building work is conspicuous for its absence.

Railroads continue to place car repair work. An Illinois Central contract is for the repair of 1400 box and gondola cars. Western roads are in the market for locomotive forgings and car axles. For repair work in its own shops the Burlington will buy 2200 tons of plates and shapes.

Bar iron is about $1 per ton lower in the Eastern market, being now quoted at 1.65c., Pittsburgh.

Light rails, 25 to 45 lb., have declined about $2 per ton under recent competition.

The pig iron market has held the improvement of last week, considerable sales being reported at 50c. or more above recent low prices in some districts, while in other cases business was closed at prices quoted a fortnight ago. In the Central West foundry iron shipments in August have been from a third to 50 per cent larger than in July.

The appearance of an inquiry at Chicago for 40,000 tons of pig iron for India naturally caused comment, but there is no expectation that any part of it will be bought in this country.

Further Chicago sales of 50 per cent ferrosilicon have been made at concessions, the low prices having been made by Canadian producers in view of their advantage in the exchange situation.

Tentative inquiries for coke have been made by several blast furnace companies in the Central West which have considered blowing in. The Carnegie Steel Co. will start another furnace at Youngstown, but will blow out one in the Pittsburgh district. A Cleveland furnace and one at Columbus are to go in early in September and there are other indications of slightly increased pig iron production in the fall.

Prices of old material grow firmer on any appearance of consuming demand; but the market is still largely in the hands of dealers.

Recent concessions by one producer of Lake Superior iron ore have not changed the prices of other sellers. A Canadian steel company that thus far has received no 1921 ore on its contracts will now begin to ship and may take a total of 250,000 tons.

Pittsburgh

PITTSBURGH, Aug. 23.

Demand for steel continues to reflect a lack of confidence on the part of consumers that prices now current will hold any considerable length of time. While orders in a general way still are gaining in number they do not increase in size, and in all cases prompt shipment is demanded. Buyers merely are taking on such supplies as will meet their immediate requirements, and about the only encouraging feature to the demand is the fact that it comes from widely scattered sources and also that there is insistence on early deliveries. This indicates plainly that the consumers' stocks are pretty low, but only here and there are plant operations discernibly greater than they have been and if anything the question of prices is more prominent now than it was last week and the week before.

The action of the Steel Corporation in receding to the independent company wage scales encourages the hand-to-mouth purchasing policies of buyers because they feel that further reductions on the part of the independent steel companies are likely. Such an idea does not find much support among steel manufacturers in general because it is held that 30c. an hour carries common labor to a point that cannot fail to put it into debt on current living costs and a great many workmen on present operations are not getting in more than three or four days a week. It is estimated that unemployment in the Pittsburgh district now is a matter of 60,000 workmen. Buyers, however, seem interested only in getting prices down and are not greatly concerned as to how such a condition is brought about. Present prices are badly out of alignment with costs and it is declared that even with common labor at 25c. an hour, as it is in some mill towns where living costs

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 23, 1921	Aug. 16, 1921	July 26, 1921	Aug. 24, 1920
No. 2X, Philadelphia‡	**$20.84**	$20.34	$21.35	$53.35
No. 2, Valley furnace†	**20.00**	19.50	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	24.50	45.60
No. 2, Birmingham, Ala.†	19.00	19.00	20.00	42.00
No. 2, foundry, Chicago*	20.00	20.00	18.50	46.00
Basic, del'd, eastern Pa.	19.00	19.00	21.25	48.30
Basic, Valley furnace	18.00	18.00	19.00	48.50
Bessemer, Pittsburgh	21.96	21.96	22.46	49.90
Malleable, Chicago*	20.00	20.00	18.50	46.50
Malleable, Valley	20.00	20.00	20.50	50.00
Gray forge, Pittsburgh	21.46	21.46	21.46	50.40
L. S. charcoal, Chicago	33.50	33.50	36.00	57.50
Ferromanganese, del'd	70.00	70.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	*29.00*	30.00	30.00	60.00
O.-h. billets, Pittsburgh	*29.00*	30.00	30.00	60.00
O.-h. sheet bars, P'gh.	*30.00*	32.00	32.00	68.00
Forging billets, base, P'gh.	*34.00*	35.00	35.00	80.00
O.-h. billets, Phila.	35.74	35.74	35.74	64.10
Wire rods, Pittsburgh	42.00	42.00	42.00	75.00
Skelp, gr. steel, P'gh., lb.	Cents 1.75	Cents 1.75	Cents 1.90	Cents 3.25
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.00*	2.05	2.10	4.75
Iron bars, Chicago	1.75	1.75	1.85	3.75
Steel bars, Pittsburgh	1.75	1.75	1.75	3.25
Steel bars, New York	2.13	2.13	2.13	4.02
Tank plates, Pittsburgh	1.80	1.80	1.80	3.25
Tank plates, New York	2.18	2.18	2.18	3.62
Beams, etc., Pittsburgh	*1.80*	1.85	1.85	3.10
Beams, etc., New York	*2.18*	2.23	2.23	3.37
Steel hoops, Pittsburgh	2.25	2.25	2.50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 23, 1921 Cents	Aug. 16, 1921 Cents	July 26, 1921 Cents	Aug. 24, 1920 Cents
Sheets, black, No. 28, P'gh.	*2.75*	3.00	3.00	7.50
Sheets, galv., No. 28, P'gh.	*3.75*	4.00	4.00	9.00
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.40	6.00
Wire nails, Pittsburgh	2.75	2.75	2.75	4.25
Plain wire, P'gh.	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh.	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.50	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$13.00	$13.00	$12.50	$39.00
Carwheels, Philadelphia	**17.00**	16.00	16.00	41.00
Heavy steel scrap, P'gh.	13.00	13.00	12.00	29.00
Heavy steel scrap, Phila.	11.50	11.50	11.00	26.00
Heavy steel scrap, Ch'go.	**11.00**	10.75	10.00	25.50
No. 1 cast, Pittsburgh	**16.50**	16.00	16.00	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.00	13.00	11.50	36.00
No. 1 RR. wrot, Phila.	14.00	14.00	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	9.00	24.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$17.50
Foundry coke, prompt	3.75	3.75	4.00	19.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.00	12.00	12.50	19.00
Electrolytic copper, N. Y.	11.75	11.75	12.25	19.00
Zinc, St. Louis	4.17½	4.20	4.25	8.10
Zinc, New York	4.67½	4.70	4.75	8.45
Lead, St. Louis	4.25	4.25	4.35	8.75
Lead, New York	4.40	4.40	4.40	9.00
Tin, New York	26.12½	26.12½	26.00	45.50
Antimony (Asiatic), N. Y.	4.50	4.50	4.65	7.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 23, 1921, Finished Steel, 2.321c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel.

Aug. 16, 1921,	2.364c.
July 26, 1921,	2.364c.
Aug. 24, 1920,	3.974c.
10-year pre-war average,	1.684c.

are low and freight rates substantially lower, not much excuse exists for lower prices than now prevail.

However, all manufacturers are not giving close attention to costs, or at least are not letting them influence their price ideas, and the past week has seen recessions in a number of finished products, notably in sheets. The week also has developed lower prices in semi-finished material, while the effect of the recent advances in asking prices of pig iron has been to halt new buying. Releases against unshipped tonnages of foundry iron are more numerous, but some difficulty is experienced in getting buyers to advance their bids to the ideas of producers.

Pig Iron.—A Pittsburgh district steel maker has just closed for 2000 tons of basic iron on a basis of $19, Valley furnace. This iron is to be shipped from a furnace outside the Valley district and the sale cannot be considered as having established the Valley furnace price. Last business done from any of the Valley furnaces was at $18 and while all makers in that district now are asking $20 for this grade, this price has not yet been established by a clear-cut sale. There are no important inquiries for basic now before makers. The market on Valley Bessemer iron still is quotable at $20, at which price a few moderate sized lots have changed hands. New business in foundry iron has been altogether in small lots, but there no longer is much iron of this grade available and $20, Valley furnace, is as low as any can be bought for, while one maker is unwilling to consider less than $20.50 for No. 2 grade. It is reported that the matter of blowing in several furnaces, now idle, is under consideration. Among the furnaces mentioned as likely to be put on the active list before long are those of the A. M. Byers Co., Girard, Ohio; the Trumbull-Cliff furnace, a new stack jointly owned by the Cleveland-Cliff Co. and the Trumbull Steel Co., Warren, Ohio; one of the Shenango Furnace Co. stacks and the Cherry Valley furnace, Leetonia, Ohio. While coke inquiries have been put out against the probable relighting of some of these furnaces, the matter at present is merely in the tentative stage in all the cases. The only change in the line-up of active furnaces is that the Carnegie Steel Co. has put on one furnace at its Ohio works, Youngstown, and has withdrawn the blast from one of its Carrie furnaces, Rankin, Pa. It seems that more iron was being melted than made at the Ohio works and since the extra iron was coming from Pittsburgh, a considerable saving in freight was affected by turning the blast on in one of the idle Ohio furnaces.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.00 to $20.00
Bessemer	20.00
Gray forge	19.00 to 19.50
No. 2 foundry	20.00 to 20.50
No. 3 foundry	19.50 to 20.00
Malleable	20.00

Ferroalloys.—A rather determined effort is being made by domestic producers of ferromanganese to boost the price of 78 to 82 per cent material to $75, delivered, but such business as has been done has been at $70, at which price we note one sale of 100 tons. Some makers are asking $73 delivered for 76 to 80 per cent alloy but consumers claim to have been offered this grade as low as $65. The Valley steel maker who recently asked for 200 to 300 tons of 80 per cent material for September and October shipment has not yet covered. British ferromanganese is quoted at $60 to $65 c.i.f. Atlantic seaboard, but is not being pressed for sale. British makers evidently are waiting definite action on the

tariff before aggressively going after business. Little interest is apparent on the part of consumers in spiegeleisen, which is quoted by an Eastern maker at $26 furnace, for 19 to 21 per cent material, and by another with furnaces in western Pennsylvania at $29 for 18 to 22 per cent manganese content. Despite efforts by some makers of 50 per cent ferrosilicon to get at least $65 furnace, freight allowed, the market is not quotable above $60 on sales. Demand is limited and competition for passing orders is sharp.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent $68; 76 to 80 per cent British ferromanganese, $60 to $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $26 furnace; 16 to 19 per cent, $25; 50 per cent ferrosilicon, domestic, $60, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—There is some inquiry for sheet bars but actual sales are of rather moderate tonnages, and buyers seldom find it necessary to go as high as $32 Pittsburgh. The common basis is $30, f.o.b. makers' mill. Four-inch re-rolling billets are reported at $29 and on sales cannot be quoted above $29.50, though $30 still is asked. Hardly enough demand is coming out for slabs to establish prices. The quotation is $31, but it is doubtful if more than $30 could be obtained except for retail lots.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30 to $31; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demand still is extremely limited but apparently production is being gaged by consumption and there are no surplus tonnages to weigh down prices. Occasionally small lots are sold from makers' yards at around $40 for common soft steel, but on new rollings nobody is disposed to go below $42 Pittsburgh. However, an inquiry of a size that would provide a real test of the price is lacking. Prices are given on page 498.

Structural Material.—Actual orders in fabricated steel are still of small proportions, both individually and in the aggregate. Some projects, the original inquiries against which went out as far back as a year ago, are coming to life, but these are merely providing work for the estimating departments rather than the shops of the fabricators. The McClintic-Marshall Co. recently entered 250 tons for the municipal electric light plant in Ashtabula, Ohio, and 800 tons for school No. 54, Brooklyn, N. Y. On the small lots of plain material that are being placed there is not much cutting from 1.75c. for bars and 1.80c. on plates and shapes, but it is reported that protection has been given against round tonnages on pending projects, down to 1.65c., and quotations of 1.70c. to 1.75c. have been fairly common on prospective business. Prices are given on page 498.

Iron and Steel Pipe.—Orders for standard pipe in both steel and wrought iron still are gaining but there is no perceptible increase in the demand for oil country goods, nor in line pipe, and in a general way there is so much room for improvement that few are inclined to believe that business is definitely on the upgrade. August is proving a better month than July, but the improvement is found in shipments rather than in plant operations. Prices are pretty well maintained on standard pipe but there is not quite so good observance of quotations on oil country and line pipe. Discounts are given on page 498.

Iron and Steel Bars.—Considerable talk continues that less than 1.75c. is being done on soft steel bars and it is indeed possible that if a sizable inquiry were before makers, less than this price could be done, but there is a dearth of other than small lot inquiries and on such tonnages as are wanted there is no important deviation from the regular market base. Orders for iron bars are more numerous but they run entirely to small lots.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets 1.70c. to 1.75c. base; reinforcing bars rolled from old rails, 1.60c. to 1.75c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Nuts, Bolts and Rivets.—The market still is dull and settled, with no very definite basis of prices. Quotations made by makers in Cleveland and Chicago are not being followed by makers here, except occasionally, where the account of a regular customer is involved. On machine bolts, rolled thread, makers here are not inclined to quote more than 70 per cent off list and on cut threads and on the larger and longer sizes are holding fairly well to 65 and 10 per cent off list. Pittsburgh district makers are trying to hold at $4.60 off list for blank nuts either in hot-pressed or c.p.c. and t. and $4.25 off list for tapped. Prices and discounts are given on page 498.

Steel Rails.—As a selling price, 1.85c., Pittsburgh, for 25- to 45-lb. rails has disappeared. Larger makers are quoting and glad to get orders at 1.75c., base, and even at this price are finding competition from rerolling mills rather stiff.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—Very little demand is developing in this district except for small tonnages for early shipment. A number of makers still are observing the quotation of 1.85c., but on actual sales 1.80c. about measures the top, and there is an inquiry from one of the railroad equipment manufacturers for about 600 tons carrying a price of 1.70c. As far as can be learned, the latter inquiry has not been placed.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Wire Products.—While orders, especially in nails, continue to increase in number, they do not gain much in size and the general character of the demand is such as to suggest a lack of confidence on the part of buyers in the maintenance of present prices. Neither jobbers nor manufacturers are buying more than a few weeks ahead, apparently because they do not want to be too heavily stocked in the event of a price cut. There are rumors that less than $2.75 base, per keg, Pittsburgh, has been done but verification is lacking and one maker here reports a customer who claimed he had a price of $2.65 and subsequently placed the order at $2.75. If there is any shading of prices, it is in wire rather than in nails, but the concessions are neither numerous nor large.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Spikes.—On standard railroad spikes, the recent purchase by the New York Central Railroad of 21,500 kegs at $2.50 per 100 lb. appears to have fixed that figure as the minimum and the old base of $2.75 has disappeared. Makers now are quoting $2.75 base on the smaller sizes and also on boat and barge spikes. The railroads are not buying or specifying at all freely and demand from the jobbers though fairly numerous, are only for small lots for prompt shipment. Prices are given on page 498.

Hot Rolled and Cold Rolled Strips.—Orders show a fair increase in number but do not gain much in size. There are more sellers than buyers and prices consequently favor the former. Some makers who are not aggressively seeking business are trying to maintain the old basis of 2.50c. to 2.60c. for hot rolled strips and 4.25c. for cold rolled strips. On competitive business, however, as low as 2.25c. has been done on the former and 4c. on the latter.

Boiler Tubes.—Small orders for early shipment are more numerous than they were recently, but capacity is far from being taxed and buyers are experiencing no difficulty in covering their requirements and usually at favorable terms. Discounts are given on page 498.

Cold-Finished Steel Bars.—Efforts to stabilize the market at 2.60c. base, Pittsburgh, have been unsuccessful due to the fact that some makers in their anxiety to secure orders have not observed this quotation and a recent reduction in the base to 2.50c. by a large maker has been quite generally followed by others. Even this price, however, does not rule very often on new business, which has been taken as low as 2.40c. base, the higher figure referring chiefly to shipments against old orders.

Hoops and Bands.—The base of 2.40c. has practically disappeared. Large cooperage interests have had no difficulty in developing a base of 2.25c. on hoops and even less has been quoted by companies which ordi-

narily are not regular factors in the hoop and band business. On small lot inquiries, however, the common quotations are 2.30c. to 2.35c. It is claimed that a price of $1.30 per bundle of 45 lb. for cotton ties is much more remunerative than 2.25c. for hoops and some mills which have done well with ties this year are not inclined to shade 2.25c. on hoops.

Sheets.—The past two weeks have been exceptionally good ones for the American Sheet & Tin Plate Co., its orders and shipments having averaged about 50 per cent of normal production. Sheet mills of this company are not running in excess of 40 per cent, but it is able to meet larger demands because of the existence of fair sized stocks. Independents are getting a fair amount of business but it is not quite as heavy as it was recently. Fresh irregularity and weakness is observed in prices, some four or five mills having lately taken business in black sheets at 2.75c. and galvanized sheets at 3.75c. base. Mills adhering to the regular bases of 3c. and 4c. frequently find it necessary to meet the low prices named by others to hold regular customers. The quotable market now is 2.75c. to 3c. base for black, 3.75c. to 4c. base for galvanized and 2.25c. to 2.40c. base on blue annealed sheets. It is said that some newcomers in the field of full-finished sheets are offering to take business at $5 to $7 per ton below the base of 4.70c. for No. 22 gage, as quoted by makers who have been in this business for some time. Prices are given on page 498.

Coke and Coal.—Outside of some inquiries made chiefly for the purpose of finding out probable prices by some furnace interests considering blowing in idle stacks, the market for beehive oven coke has been dull and featureless. Several Valley furnaces are mentioned as likely to go into blast before long, but definite action in this direction still is to be taken. The more common price idea of Connellsville operators on furnace coke for the remainder of the year is $3 per net ton, oven. This is considerably above what iron makers feel they can afford to pay on the present selling price of iron, and it is more than probable that some of the producers, who are figuring on starting up, will buy by-product coke, as did the Sharon Steel Hoop Co., a few weeks ago. It is impossible to make any change in prices on spot coke, standard 48-hr. fuel taking a range of $2.75 to $3 per net ton at oven, and foundry coke $3.75 to $4.50. The coal market does not show much life nor strength. Activity in slack to-day has dwindled and recent quotations of $1.70 for steam and $1.85 for gas slack have lately been shaded as much as 10c. to 15c. per ton. Mine run steam coal is quotable at $1.50 for Sewickley seam up to $2 for higher quality, while by-product coal ranges from $1.50 to $2 (generally at $1.60 to $1.85), and gas coal from $2 to $2.25.

Tin Plate.—Makers whose plants are in operation report a generous volume of rush shipment orders and in some instances have been obliged to put on additional capacity to accommodate these demands. As stock items have been pretty thoroughly liquidated, consumers are obliged to take new production and the market consequently is slightly firmer than it was recently. Stock items which recently sold down as low as $4.50 per base box now are not available at less than $4.75 and there is much closer adherence to the base of $5.25 for production plate than was true a short time ago. Considerable tin plate capacity still is idle in this and nearby disricts. All of the 24 mills of the Wheeling Steel Corporation are down, while neither the Standard Tin Plate Co., Canonsburg, Pa., nor the Washington Tin Plate Co., Washington, Pa., which have been down for several months, has yet resumed. On the other hand, the Weirton Steel Co. has all of its 26 mills at Weirton, W. Va., running 16 turns a week, the McKeesport Tin Plate Co., McKeesport, Pa., is running about 80 per cent full and the Jones & Laughlin Co., 62½ per cent.

Old Material.—The market maintains a strong tone, though demand is lighter than it was recently. Actual increase in open-hearth furnace operations is slight but in anticipation of improvement in this direction almost all of the independent steel companies would take on tonnages. They are not buying heavily, however, because asking prices generally are above what they consider they can afford to pay. On heavy melting steel $13.50 per gross ton, delivered, is about the maximum bid that can be secured, and material thrown down on the storage yards at that price, it is claimed, would mean about $15 in the charging box because of handling charges. A few companies have a real need of supplies, but generally the condition is that the companies which are buying are in the market chiefly because they regard old material as cheap at current quotations. It takes only moderate buying to send prices up at present, because offerings are so meager. Producers are not forcing supplies on the market at current levels and dealers' stocks are off the market until prices are much higher. Foundry grades are in better demand than they were a short time ago, partly because of the scarcity and strength of pig iron. Rerolling rails are not plentiful and not available at less than $16 delivered, consuming points. We note one good sized sale at that price. The Westinghouse Electric & Mfg. Co. scrap list for September offers 3 to 5 cars of hydraulic compressed steel a week, 1 to 2 cars a week of turnings, and 1 to 2 cars for the month each of cast iron borings and shoveling steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13.00 to $13.50
No. 1 cast cupola size	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	16.00 to 16.50
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	14.00 to 14.50
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	19.00 to 20.00
Locomotive axles, steel	18.50 to 19.00
Steel car axles	14.50 to 15.00
Cast iron wheels	14.00 to 14.50
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.50 to 9.00
Sheet bar crop ends at origin	12.50 to 13.00
Heavy steel axle turnings	10.00 to 10.50
Short shoveling turnings	9.50 to 10.00
Heavy breakable cast	15.00 to 15.50
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.50
No. 1 railroad wrought	12.00 to 13.00

Revised Federal Tax Bill

WASHINGTON, Aug. 23.—The revised tax bill passed by the House last Saturday, which is estimated to cut $818,000,000 from the tax levies of the nation by 1923, will be taken up by the Senate at the end of the recess, Sept. 21. Meanwhile, the Senate Committee on finance will hold additional public hearings on the measure and it is assumed will make a number of revisions as to details, if not as to fundamentals. The bill as passed by the House is supposed to produce a total of $3,347,000,000 revenue during the present fiscal year, or $221,000,000 less than the estimate under the existing law. The repeal of the excess profits tax and higher income tax rates will not become effective until Jan. 1, 1922, a disappointment to business interests of the country, which had hoped that this provision would be made retroactive as of Jan. 1, 1921.

Representative Fordney, chairman of the House committee on ways and means, stated that the bill is predicated on a policy of strictest economy, and added that the effect of the repeal of the transportation act cannot be other than beneficial. He pointed out that the objectionable taxes from the business standpoint, the standpoint of the cost of living, and the standpoint of the revival of the railroads is the existing tax on transportation, which produces a yearly revenue approximating $262,000,000.

"With a view to simplifying tax forms the bill provides for the creation of a tax board on which the taxpayers will be represented," he said. "Several changes have been made in the law to clear up administrative difficulties, and to simplify the tax forms, a conspicuous one being the amendment regarding Liberty Bond exemptions.

"In administering the existing law many loopholes have been discovered by the Treasury Department, and corrective recommendations by the department are incorporated in the bill passed by the House."

Chicago

CHICAGO, Aug. 23.

An unusual feature in the current demand for finished steel is the fact that immediate delivery is invariably asked on all orders placed with the mills. This indicates that many consumers have allowed their stocks to run very low. While it is apparent that most purchases are for replacement purposes, it is notable that orders are steadily increasing in number, and aggregate bookings of mills are growing larger. One important local producer reports that specifications received thus far this month are twice those of July. As July was an exceedingly poor month, the comparison is not so impressive as it might otherwise be, but it can nevertheless be truthfully said that business is slowly expanding.

Prices are no more clearly defined than heretofore, nor are they any weaker. In an effort to keep their plants running, producers continue to take business at a loss, evidently on the theory that if operations could be sufficiently increased the red figures on their books would be wiped out. If a slow cumulative increase in business in the next month or two should bring their operations to a 45 or 50 per cent basis, they will be able to gage more accurately what can be done with costs and will no doubt find that there is an inflexible limit under which high transportation and raw material costs will not permit them to go. Some observers in fact believe that present going prices will be found to be under that level and that a reaction upward, such as has taken place in pig iron prices, may also occur in steel.

The Chicago, Burlington & Quincy took public bids to-day on a small tonnage of steel. The low bid on 123 tons of structural steel and 49 tons of plates was 2c., Chicago, this price having been named by two local interests. The low figure on a small lot of sheets was equivalent to 3.90c., Pittsburgh, for No. 28 gage, galvanized.

Considerable interest has been aroused in the pig iron market by the appearance of an inquiry from India for 40,000 tons. The railroads continue to place repair work. The Illinois Central has awarded contracts for the repair of 1400 box and gondola cars.

Mill operations are approximately the same as heretofore, the only changes being for the better. The most marked improvement is by the Wisconsin Steel Co., which is now operating on a 40 per cent basis.

Pig Iron.—Local sellers have received an inquiry from India for 40,000 tons of 2½ to 3 per cent silicon foundry iron, for delivery over the rest of the year. It is not regarded likely, however, that the business will be placed here. There continues to be a fair rate of buying in this territory and the new prices are holding. A local melter has purchased 2000 tons of malleable, and a large radiator manufacturer has bought 1500 tons of foundry iron for delivery at Litchfield, Ill., and Kansas City. Other sales made recently range from several hundred tons to carload lots. Even at the advanced quotations, some business is still being placed for local producers in outside territories, such as southern Ohio, southern Indiana and the St. Louis district. The St. Louis Coke & Chemical Co. expects to bank its furnace at Granite City the latter part of this week. It has about 9000 tons of iron on yards, of which the larger part is less than 2¼ per cent in silicon. The Tennessee producer of silvery has sold most of its stocks with the result that Jackson County prices now rule in this market. A current inquiry calls for about 500 tons of silvery. A Milwaukee melter has purchased 1000 tons of low phosphorus at $40, delivered, part of the tonnage being resale and the remainder copper bearing material from furnace. A number of carload sales of copper free material have been made recently at $35.50, Valley furnace. Inquiries for charcoal iron include one for 120 tons for delivery over the remainder of the year and two others for a single carload each. Thus far one inquiry for first half delivery has been received by the local trade. It covers 1000 tons of foundry and one producer has submitted a quotation on the basis of present prices. Most of the other current inquiries range from carloads to several hundred tons. A Michigan printing press manufacturer wants 400 tons of foundry grade. A feature of the past week's business was the sale of 1000 tons of gravel fluorspar to a local user at $15, at mine.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos.	20.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil.	20.00
Basic	20.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32.82

Ferroalloys.—Several hundred tons of approximately 15 per cent ferrosilicon has been bought by a local melter at $33 delivered, and a number of inquiries for carload lots have brought out quotations of $34, Chicago. Further sales of 50 per cent ferrosilicon have been made at $62.50, freight allowed. It is reported that the low prices on ferrosilicon are being named by Canadian producers, who are favored by the exchange situation. Ferromanganese has stiffened evidently because producers are discounting the passage of the tariff bill.

We quote 78 to 82 per cent ferromanganese, $72 to $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Rails and Track Supplies.—New business in track supplies is light and the price situation is substantially unchanged. Specifications against rail contracts are disappointingly small.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.85c. f.o.b. makers' mills. Standard railroad spikes, 2.50c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.50c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Railroad Equipment.—The Illinois Central has divided the repairs on 1400 box and gondola cars between the American Car & Foundry Co., the Haskell & Barker Car Co., the Pullman Co. and the Ryan Car Co. The Rock Island is in the market for 10 Mikado type engines and the Seaboard Air Line is inquiring for 5 mountain-type, 13 Mikado type and 10 six-wheel switch engines. Western roads are in the market for locomotive forgings and car axles. The Northern Pacific and the Great Northern have each purchased 100 tons of locomotive forgings, including locomotive axles, and a number of 100-ton inquiries for car axles are current.

Plates.—The Chicago, Burlington & Quincy Railroad takes open bids to-day on 200 tons of plates and shapes and on Sept. 2 will receive tenders on 2000 tons, to be used for car repair work in its own shops. There has been no material change in the plate market, aggregate demand being light and prices being indefinite. The attitude of sellers appears to be to quote what is necessary to get the business, with the result that varying concessions under the official price of 1.85c., Pittsburgh, are reported. So far as can be determined, the market is neither weaker nor stronger than heretofore.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—Structural inquiries and lettings are falling off, and competition among mills for plain material business is keen. There is no definite market level for plain material in this district. Mills are considering each inquiry individually and are naming quotations according to the desirability of the business. As a result variations in going prices are wide. Recent fabricating awards include:

Fifth Street Department Store, Los Angeles, Cal., 3271 tons, to American Bridge Co.

Northern Pacific Terminal Co. of Oregon, trainshed and umbrella shed, Union Depot, Portland, Ore., 136 tons, to an Oakland, Cal., fabricator.

Group of buildings, Saint Elizabeth's Hospital, Lafayette, Ind., 210 tons, to Indiana Bridge Co.

Vault, Lake Shore Trust & Savings Bank, Chicago, 80 tons, to Union Foundry Co.

Meat market building, Louisville, Ky., 150 tons, to Louisville Bridge & Iron Co.

Pending business includes:

San Jacinto Life Insurance Building, Beaumont, Tex., 950 tons.

Bryn Mawr School, Chicago, 230 tons, Gage Structural Steel Co. low bidder.

Frost National Bank Building, San Antonio, Tex., 382 tons, general contract awarded to J. P. Haynes, San Antonio.

New shop for F. Rosenberg Elevator Co., Milwaukee, 100 tons.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 2.88c. for materials out of warehouse.

Bolts and Nuts.—Purchases by railroads and jobbers are small and for immediate needs only. The same thing may be said of the automobile manufacturers with the possible exception of the leading maker of low priced cars, whose monthly purchases are fairly large. While prices are still weak, some bolt makers are turning away orders rather than take more business at a loss. As a result, the market is somewhat steadier and the appended quotations appear to be representative.

Small machine bolts, rolled threads, 70, 10 and 10 to 70 and 7½ per cent off list
Small machine bolts, cut threads. 70 and 10 to 70 per cent off list
Large machine bolts. . . . . 70 and 10 to 70 per cent off list
Small carriage bolts, rolled threads, 65, 10 and 10 to 65 and 5 per cent off list
Small carriage bolts, cut threads, 65 and 10 to 65 and 5 per cent off list
Large carriage bolts. . . . . 65 and 10 to 65 and 5 per cent off list
Lag bolts . . . . . 70, 10 and 7½ to 70 and 5 per cent off list
Stove bolts, in packages. . . . . 80, 10 and 10 per cent off list
Stove bolts, in bulk. . . . . 80, 10, 10 and 2½ per cent off list

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅝ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅝ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Sheets.—The demand for this commodity is appreciably better than for plates, structural shapes or bars. Both mills and warehouses report that users have little material in stock and invariably ask for the immediate shipment when they buy. Individual orders are generally small, indicating that buyers are still timid. While keen competition is bringing out some shading in mill prices, the ruling market is substantially the same as a week ago. Blue annealed is weaker than either black or galvanized, owing to the fact that there is less demand for that product. The local independent continues to operate 14 out of 18 hot mills.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.53c.; No. 28 black, 4.65c.; No. 28 galvanized, 5.65c. Hoops and bands, 3.48c.

Bars.—Orders for mild steel bars are still small but gradually increasing in number. There is an increasing insistence on the part of the purchaser for immediate delivery, indicating that stocks have been depleted. In fact, sellers declare that it is surprising how many consumers have little or no remaining material in stock. As yet, however, buyers are cautious and are placing orders for replacement purposes only. There continues to be a fair run of small reinforcing jobs. Among the largest is a factory addition for the Cuneo-Hennebery Co., Chicago, requiring 450 tons, which is reported to have been let. Considerable road building is also under way, resulting in the purchase of a moderate quantity of reinforcing steel. The amount of concrete work being done may be judged by the fact that the leading cement producer is unable to keep up with its orders. Prices of both merchant and reinforcing bars are neither weaker nor stronger than a week ago. Jobbers, however, appear to be asking a full warehouse differential on reinforcing bars, bringing the quotation up to 2.53c., f.o.b., local store. The demand for bar iron is light and the ruling price for this commodity remains 1.75c., mill. There has been no material change either in the demand or price of rail carbon steel bars. Hard steel bar mill operations are somewhat steadier than they were a month or two ago.

Mill prices are: Mild steel bars, 1.55c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Wire Products.—Mills have received at least two offers of 500-ton orders of soft wire rods at $35, Pittsburgh, but the business has gone begging. While as low as $35 might have been done a few weeks ago, $40, Pittsburgh, is now the bottom, and most makers are insisting on the official price of $42. Railroad inquiries for nails are increasing. Several lots of 500 to 1000 kegs are in the market and a number have already been closed. The Rock Island is inquiring for 1100 kegs Railroad inquiries and orders for wire are principally in carload lots. Fall trade in barb wire is commencing to come in, and bookings of wire products in general are on an improved scale. Nevertheless it is to be noted that jobbers are buying cautiously and run the risk of being unable to supply their customers if a healthy autumn demand materializes. In such a case they would ask for immediate shipment and the mills, having no accumulated stocks to draw from, would be unable to meet the situation. For mill prices, see finished iron and steel f.o.b., Pittsburgh, page 498.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.;; cement coated nails, $2.90 per keg.

Cast Iron Pipe.—Bay City, Mich., which took bids on 3000 tons, has awarded the business to W. J. Magher, a general contractor of that city, who will sublet. For the 36-in. pipe to be bought, steel has been specified, but cast iron has been decided upon for the remaining sizes, which will call for about 2000 tons. The Detroit Water Board awarded 1500 tons to the Lynchburg Foundry Co., as announced last week, but the letting was later cancelled by the City Purchasing Board, and new bids were ordered taken on Aug. 23. Other pending business includes:

Youngstown, Ohio, 1500 tons, bids to be received Aug. 31.
Bloomington, Ind., two carloads, Aug. 22.
Sidney, Ohio, 400 tons, Sept. 2.
Table Rock, Neb., 125 tons, Sept. 9.
St. Paul, Minn., 200 tons, Sept. 5.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; ;6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

Old Material.—The market has grown quieter, even the buying by dealers having abated. Consumers still refuse to pay the advanced quotations, the only noticeable exception being a local melter who bought 1000 tons of brake shoes at $11.25, delivered. With the market largely in the hands of the dealers, prices are about the same as a week ago. The only important railroad offerings are 3000 tons advertised by the Burlington and a blind list circulated by the New York Central.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.50
Steel rails, less than 3 ft	12.00 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.25 to 10.75
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.00 to 7.50
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	9.50 to 10.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.00 to 11.50
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	11.00 to 11.50
Railroad malleable	12.00 to 12.50
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

New York

NEW YORK, Aug. 23.

Pig Iron.—The stronger prices on foundry iron reported last week are still in evidence and some business running into fairly large figures has been closed at the higher levels. Nevertheless some prices close at $18 are reported by consumers, though it is difficult to trace these quotations to any furnace. The inference of the trade is that some more re-sale iron is being thrown on the market. Furnace quotations range from $19 to $20 for No. 2 plain and from $19.50 to $20.50 for No. 2 X. Most, if not all, of the Buffalo furnaces are quoting on the basis of $20, furnace, for No. 2 plain, but some eastern Pennsylvania iron figures back to $19, base, at the furnace. A heating furnace company has placed 1500 tons of foundry iron, the order having gone, it is reported, to an eastern Pennsylvania furnace at $19.50, furnace, for No. 2 X. Another furnace company, which came into the market last week for 2000 tons for delivery over the remainder of the year, closed on Monday for at least 1000 tons and paid $20, furnace, for No. 2 X. Judged by these transactions, the market has strengthened from $1 to $1.50 a ton within two weeks. A significant feature of present demand is the willingness of consumers to cover for the last quarter of the year, indicating a confidence in prices which has not existed before this year. It is also to be noted that the furnaces are willing to accept business for forward delivery, whereas a month ago or so they would take nothing but prompt-shipment orders. Pending inquiries do not total very large, perhaps a few thousand tons. A car builder has not closed, so far as reported, on 1000 to 1500 tons for a Western plant and a machinery manufacturer is believed to be still interested in 500 tons of foundry iron, on which quotations were made a week or so ago.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom'l)	28.16 to 29.16

Ferroalloys.—The report is current that a Central Western consumer has been offered 200 to 300 tons of British ferromanganese at $57 to $60, seaboard, as against a prevailing quotation of $65. However, the $65 price is the general minimum so far as British producers themselves are willing to sell. It is reported that some dealers in Great Britain have been offering ferromanganese to merchandising representatives in this country at somewhat below the regular market price. With these possible exceptions, there are no offerings of ferromanganese below $65, seaboard, for the British product and $70, delivered, for the American. Imports from Great Britain have dwindled, having been only 275 tons in July, bringing the total for the first seven months to 5481 tons as against 23,711 tons for the first seven months last year. The spiegeleisen market is exceedingly quiet, with quotations unchanged. There is no activity in high grade manganese ore for which the quotations are nominally the same as a week ago. Imports of ore are also declining, having been only 5028 tons in July as against a rate of nearly 60,000 tons per month early in the year. Sales of carload lots of 50 per cent ferrosilicon are reported at $65 per ton, delivered, though $60 has been named as the basis of one transaction. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$65.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Ferrotungsten, per lb. of contained metal	50c. to 55c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast Iron Pipe.—A further reduction of $5 a ton in cast iron pipe has been made by leading producers, who believe that this will be the last. On 230 tons of 12-in. pipe for Yonkers, N. Y., the United States Cast Iron Pipe & Foundry Co. was low bidder, its price being $41.90 per ton, delivered. The general contract for waterworks extensions at Scarsdale, N. Y., requiring 800 tons of pipe has been let.. We quote per gross ton f.o.b. New York, carload lots, as follows: 6-in. and larger, $42.30; 4-in. and 5-in., $47.30; 3-in., $57.30, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—A noteworthy increase in fabricated steel projects is the outstanding feature of the local finished steel market. The largest letting covers 3700 tons for the Bowery Savings Bank building, awarded to the Hedden Iron Construction Co. Other awards include the following taken by the American Bridge Co.: A high school at Jeannette, Pa., 250 tons; an office building at Trenton, N. J., 200 tons; a bridge over the Mystic River at Mystic, Conn., 450 tons, and a factory building for the Onondaga Pottery Co., Syracuse, N. Y., 300 tons; and Eidlitz & Ross have been awarded 500 for the Bushwick telephone exchange in Brooklyn. Among the new steel structures, railroad work is conspicuous by its absence. Included in the new work are the following:

National Surety Co., Washington Street between Albany and Carlisle, 1000 tons.

An apartment house, Thirty-eighth Street and Park Avenue, 500 tons.

Five schoolhouses, three in New York totaling 2500 tons, and the others, totaling 350 tons, one at Syracuse, N. Y., and the other at Meadville, Pa.

A high school, Mercer County, Trenton, 500 tons, letting postponed to Sept. 6.

Wharf, Chestnut Street, Philadelphia, 1000 tons, bids to be taken Sept. 9.

Theater and office building, Philadelphia, 1500 tons.

Highway bridge for New York State at Aqueduct, 300 tons, bids Aug. 25.

Federal Reserve Bank, New York, 14,000 tons, including vault work, bids Sept. 3.

Boiler house, Cherry River Paper Co., West Virginia, 200 tons.

Representatives of some mills report a slight improvement here and there in demand, but in the main the situation continues unchanged. The improvement is chiefly in small orders. Without large projects, with the exception of a few pending structural jobs, present steel prices are not being thoroughly tested. On the ordinary small business prices are not being cut much except on plates, which are now quotable at 1.70c. to 1.75c., Pittsburgh, though some mills still adhere to the "regular" quotation of 1.85c. No new domestic car work has come out, but American car builders, who quoted on 1000 tank cars for the Russian Soviet Government, have learned that this order was placed in England, credits in gold having been arranged through a Stockholm bank. It now appears that the 1000 all-wood box car repairs for the Lehigh Valley will be obtained in a Hamilton, Ont., car plant. The Long Island Railroad Co. will receive bids, Aug. 29, for 550 kegs of spikes and bolts besides frog and switch work, covering estimated shop requirements from September to December.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c.; plates, 2.18c. to 2.23c.; structural shapes, 2.18c. to 2.23c.; bar iron, 2.08c.

Coke.—A copper company which inquired for 1000 tons of furnace coke is reported to have received several quotations below $3 per net ton, Connellsville basis. Foundry coke is slightly firmer, sales having been made within the week at $4.25 to $4.50.

Warehouse Business.—The market continues to move along sluggishly with no changes in prices reported. Present quotations are in most cases nominal, a good sized order bringing out some shading. Buying is sporadic, one week bringing in a fairly large number of small orders, and the following week reverting to the dull condition. Some warehouses expect that there may be a slight price change in September, but this assumption is evidently based on the belief that the leading mill interest may make a downward revision at this time. The brass and copper market is unchanged. Wrought iron and steel pipe warehouses report no change. We quote prices on page 510.

High Speed Steel.—Although orders are still ex-

ceedingly small, most producers report them more numerous. Quotations continue nominally at about 90c. per lb. for 18 per cent tungsten high speed steel, with sales reported at slightly lower prices.

Old Material.—The trade continues hopeful, although transactions show little or no change for the better. There is a slight tendency of some dealers to hold stocks in yards in anticipation of a recovery early in the fall. There is some activity in cast iron pipe. The American Bridge Co. is considering offers for Pencoyd of No. 1 heavy melting steel and cast iron borings, both of extremely high grade, the former not over 4 ft. long. Prices show practically no change, although there is evidently a rather wide range in quotations on heavy melting steel which spreads from $7.50 per ton with some dealers to as high as $9 per ton with others. The latter quotation is for extremely high quality.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.50 to $8.75
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.50 to 8.75
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Light iron	2.00 to 2.50
Cast borings (clean)	5.00 to 5.50
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	9.00 to 9.50
Locomotive grate bars	8.50 to 9.25
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Boston

BOSTON, Aug. 23.

Pig Iron.—Business the past week was confined to 3000 tons eastern Pennsylvania iron, silicon 2.00 to 2.50 per cent, nearby shipment, to the Whitin Machine Works, Whitingsville, Mass., at an indicated price of less than $19.50 furnace; 200 tons No. 2X to a Massachusetts foundry at $20 furnace; 100 tons No. 2X to a Holyoke, Mass., melter at $19.50 furnace and about a dozen car lots of No. 2 plain, No. 2X and No. 1X on a basis of $19.50 to $20.50 furnace for No. 2 plain, the aggregate business falling short of 3700 tons. No Buffalo, Southern or Virginia sales are reported. Prospective business has dwindled to small proportions. Furnaces quoting show a strong tendency to maintain silicon differentials. One eastern Pennsylvania furnace, for instance, is now quoting $19.50 for No. 2 plain, $20 for No. 2X and $21 for No. 1X. Another quotes $19 for No. 2 plain, $19.50 for No. 2X and $20.50 for No. 1X. Other interests, however, quote No. 2 plain and No. 2X at $20. Buffalo usually is quoted at $20 furnace base. The average large New England foundry appears better off for business than the small one. The Sessions Foundry Co., Bristol, Conn., has reduced wages 10 per cent. Other melters, due to keen competition, are endeavoring to reduce operating charges. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$23.56 to $24.56
East. Penn., silicon 1.75 to 2.25	23.06 to 24.06
Buffalo, silicon 2.25 to 2.75	25.96 to 26.46
Buffalo, silicon 1.75 to 2.25	25.46 to 25.96
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	30.16 to 31.16
Alabama, silicon 1.75 to 2.25	29.66 to 30.66

Coke.—The general foundry coke situation shows no improvement. Consumption continues below normal, forward bookings have not increased nor have New England oven outputs, and both the New England Coal & Coke Co. and the Providence Gas Co. quote spot and contract fuel at $10.66 delivered, where the local freight does not exceed $3.40.

Finished Material.—Within six weeks Boston will be in the market for a round tonnage of steel for the Allston bridge over the Boston & Albany Railroad tracks. Later, bids will be asked on structural steel for a Beacon Street bridge, specifications for which will include trusses weighing 67 tons each; also on 435 tons of structural steel for approaches on the Chelsea bridge, as well as 15 to 20-in. steel columns and a tonnage of sheet steel piling. The Strauss Bascule Bridge Co., Chicago, will supply double-leaf underneath counterweight type of bascule for the last named bridge, taking approximately 300 tons of steel. Steel mill representatives continue to report bookings for bars, plates and sheets as comparing favorably with those for July.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—Among the more important old material houses, business the past week was confined very largely to scattered car lot sales of No. 1 machinery cast to foundries at $16.50 to $17.50 delivered, and borings at $3.50 to $4.50 f.o.b. shipping point, for chemical and Pennsylvania mill consumption. The situation in New England is unusual. Dealers maintaining large yards are heavily stocked, cannot take in additional stock and cannot afford to sell at going prices. Small yard owners are well stocked and are offering material to local and nearby foundries at prices quoted to large dealers, usually around 65c. per cwt. for No. 1 machinery cast. The average foundry melt is only sufficient to absorb such offerings and there is little incentive to anticipate wants. Bids made by Pennsylvania mills on heavy melting steel and other material usually do not allow yard interests more than to break even, consequently there is a deadlock between buyer and seller. Although business is dull, prices are generally reported as very firm, but unchanged.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.50 to $20.00
No. 2 machinery cast	15.50 to 17.50
Stove plate	16.00 to 17.00
Railroad malleable	15.50 to 16.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.50 to 4.50
Cast iron borings, chemical	3.50 to 4.50
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.00 to 11.50
Rerolling rails	9.00 to 10.00

Birmingham

BIRMINGHAM, Aug. 22.

Pig Iron.—Birmingham pig iron is firm at a minimum of $19 and seems headed to a higher level on slight provocation. One maker, who began the week with 1800 tons to sell, was almost cleaned out at its close and is about to retire from market, not being a producer at this time. Ill-assorted stocks and growing depletion of yard accumulations is gradually leading up to a point of acuteness. Melters wishing 2.25 to 2.75 per cent silicon analysis took 1.75 to 2.25 per cent. Inquiries coming by mail have been anticipated before arrival by the same inquiry and acceptance by wire. The off-grades have disappeared and leave no ground for false reports of a lower base than really exists. The Southern melt is increasing each week, stove plants and small foundries adding to production, while pipe founders seem scheduled for continuous appearance in the market unless they buy for forward delivery. Some inquiries for fourth quarter have been received. Makers do not care to quote, but, when they do, ask from $1.50 to $2 above the present base. The entire South is beginning to respond to the better feeling in the agricultural sections, which has led to increased activities in all lines. Business of the week includes about 6000 tons of merchant iron placed by four makers. It is agreed that the corner has been turned.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	32.00

Cast Iron Pipe.—High pressure pipe has hardened

and the nominal base of $35 for 6 in. is the minimum. Quotations for Southern delivery on small lots were $2 higher last week than in the one before. Total business of 6000 tons was done in the first three weeks of the month with the Pacific Coast and more is reported in sight. An influx of new business is expected shortly on a conviction that the corner has been turned. It is not stated which shop will make the 3500 tons for Milwaukee recently awarded to the United States Cast Iron Pipe & Foundry Co. Sanitary pipe melt is increasing, but price cutting is reported as still affecting the nominal base of $40.

Finishing Mills.—The Tennessee company went beyond 50 per cent of capacity operations in finishing mills this week, when, in addition to another week on full turn at the Bessemer plate, bar and guide mill, it also put in operation the structural mill at Fairfield. The rail mill, car works and tie-plate departments were also continued at work. Conners-Weymann began the fourth week of continuous operation of the cotton tie, band and hoop mill at Woodlawn. The Gulf States Steel Co. continued operation of blooming mill on better showing of order books.

Coal and Coke.—Coal production has increased and movement is larger. Standard foundry coke is active at $6 to $6.25 with Pacific Coast and Texas again in market.

Old Material.—Cast scrap is quite active and prices are firm. Steel shows slight tendency to harden, but transactions are few.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Buffalo

BUFFALO, Aug. 23.

Pig Iron.—Increased foundry operation at points east of Buffalo is reflected in the volume of business placed here. With the exception of one producer, who has maintained a $21 base price throughout the period of price cutting and did but little business, other producers in general report improvement. With a stronger price the extraordinary tonnages reported last week have eased off—and while the sales have not been up to the point, the improvement is manifest, nevertheless. The base price now touches the $21 mark. One furnace has sold 6000 tons through its various branches and is working on inquiries for considerably more than this figure. Another furnace has inquiries in hand for 10,000 tons including one for one-third of this amount from a national buyer who is in the market about every 30 days. Its sales were 5000 tons and consisted of an unusually large number of small lots. The low limit in prices demanded by the newest factor in pig iron sales is now $20 and prices range from that level to $22. About 1000 tons have been booked on the basis of the new prices. Small lots of malleable have been moved at $21. Shipments of basic iron by a furnace still working on old contracts continues without unusual change. Like the others this furnace quotes $21 on No. 2 plain.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.75 to $21.75
No. 2X foundry, 2.25 to 2.75 sil.	19.75 to 20.75
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—Flurries in buying which had their inception with the announcement of the most recent price reductions have been maintained in a steady way. This is particularly the case in structural business, although no large orders have been placed. But one mill finds it impossible to join in a general expression of improvement. This interest started several open hearth furnaces and a blooming mill recently but orders have not kept apace with necessary mill schedules and unless some business not in prospect at this time develops a curtailment may be expected. Pipe business continues brisk and orders and inquiries show a marked increase. Much of this business is in carload lots. Nails and some wire products are quiet. Plate and shape business has shown marked improvement this month with one mill but bar business is slow. Operation will be increased with a large steel interest and all mills will be in operation before the end of the month with the exception of a rail mill. Proposed erection of a new power line from Niagara Falls to Buffalo at an estimated cost of $11,000,000 interests structural mills with reference to steel requirements for towers and foundations. A Masonic building at Jamestown involving 100 tons of shapes is engaging a few of the structural interests. Fifty per cent operation recently put into effect by a sheet interest which was down for several weeks, will likely be continued indefinitely.

Warehouse Business.—Improvement growing out of most recent price reductions is sustained and demand seems more stabilized than heretofore. An interesting and encouraging sidelight is the fact that a greater demand for machine tools is coming in—indicative of improved operation in shops. Customers out of the market for ten months have manifested growing interest within a week. Movement of all warehouse materials is more balanced, a change over the previous condition of the market when last week the best movement was in sheets. The general impression is that business is better with respect to both the number of orders as well as quantities asked for.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.45c.; galvanized steel sheets, No. 28 gage, 5.30c.; black sheets, No. 28 gage, 4.30c.; cold rolled strip steel, 6.40c.

Old Material.—Little can be said of the demand for old material except that transactions are on the same level from week to week. Prices are generally accepted as the lowest likely to be reached. Some strengthening of the market for heavy melting steel is noticed with reports of $13 and $13.50 delivered Pittsburgh. This would bring about $11 f.o.b. Buffalo.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$10.00 to $11.00
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.06 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Cincinnati

CINCINNATI, Aug. 23.

Pig Iron.—The market has slipped back into its customary dullness as far as sales are concerned. The stimulating influence of the recent price advances has apparently subsided, and only occasional sales are reported. With the foundry industry in this district running approximately 25 per cent of capacity, buyers are only disposed to cover for one or two months ahead, and at the rate of melting small tonnages will suffice for their needs. There are some melters who are willing to contract for first quarter of next year at to-day's prices, but furnaces are not inclined to quote that far ahead. Reports are heard that stocks of iron have found their way into brokers hands, but these cannot be confirmed. On Northern iron $20 is still the minimum, with some furnaces asking $20.50. Most of the sales are being made at $20, and included in these are several 100-ton lots. The largest sale reported was 300 tons to an Indiana melter. Carload sales are again taking their place as the market activity, but in the opinion of the trade the general situation is much improved. Stocks on furnace yards are perceptibly dwindling, and it is reported that at least two furnaces will be lighted in the Ironton district shortly after Sept. 1. The only inquiry of any size is one for 500

tons to a melter in nearby territory.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—While buying has not been very heavy, it is on a little larger scale than has been the case during recent months. The sheet market is the most active and a few orders for 100-ton lots have been placed in the week. Prices are inclined to hold firm although a couple of mills are reported to be shading the regular schedule. On an inquiry during the week, 2.90c. was quoted on black sheets and 3.75c. on galvanized. The majority of the sales, however, are being made on the basis of 3c. for black and 4c. for galvanized. It is reported that a considerable tonnage of reinforcing bars for the Columbus stadium have been placed with a Central, Ohio, re-rolling mill. Bar prices are holding firmly at 1.75c. There is very little plate or structural tonnage moving. In wire products it is said that plain wire has been sold at 2.25c., an order for 100 tons having been placed with an Ohio mill at this figure. The market on nails is steady at $2.75 per keg, Pittsburgh, and while reports are heard of $2.50, these are not confirmed. In the structural field the Mt. Vernon Bridge Co. has been awarded a contract for a bridge on the Evansville, Terre Haute & Eastern Railroad involving approximately 600 tons. The Indiana Bridge Co. has taken 200 tons for a hospital at Lafayette, Ind. The King Bridge Co. is reported to be low bidder on 800 tons of track elevation work for the Big Four at Indianapolis. The tonnage involved in the Kellogg Avenue bridge at Cincinnati is approximately 1000 tons instead of 400 as previously reported. A bridge over the Warrior River in Alabama, 600 tons, will shortly be up for figures. A telephone exchange building and a market building at Covington, Ky., are prospects which will develop in the near future.

Warehouse Business.—Small orders for immediate shipment continue as the prevailing activity. Some jobbers report an increased tonnage during the week. There have been no price changes since the ones recently announced. We quote:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1¼ in. and larger, 4.25c.; under 1¼ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 5.75c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—The American Rolling Mill Co. is understood to have closed for 10,000 tons of Connellsville furnace coke at a price said to be $2.90 per net ton at ovens. The company will blow in one of its furnaces at Columbus shortly. Several other inquiries are before the trade, but the tonnages are small and immediate shipment is requested. Local houses profess to see a firmer tone to the coke market, but prices have not advanced.

Old Material.—Cleveland and Wheeling district consumers were purchasers in the local scrap market in the week. Heavy melting steel was sold in the Cleveland district at around $13, delivered, and some mixed borings and turnings to Wheeling at $9, delivered. The local market is quiet, the larger consumers still being closed down. Foundry scrap is exceptionally quiet. Prices, while having a firmer tendency, are quotably unchanged.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

St. Louis

ST. LOUIS, Aug. 23.

Pig Iron.—The market is firm. Buyers are showing more interest by far than for some time past. More inquiries are being received, and more orders, and there is generally a better feeling among consumers except in the stove trade, whose business has not yet recovered from the effects of the buyers' strike of the farmers. Inquiries were out for about 3000 tons in various lots for prompt shipment. A Quincy, Ill., stove plant bought 300 tons for last quarter shipment and a local stove plant which had an inquiry out for 100 tons bought 400 tons. There is an inquiry out for a car of 49 to 51 per cent ferrosilicon.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$22.88
Northern malleable	22.88
Basic	22.88
Southern foundry, sil. 1.75 to 2.25	24.74

Coke.—There are more inquiries and more business is being placed, although there are no large orders. Interest is being shown in an inquiry for 2000 tons from Mexico for August and September delivery. Prices are unchanged. Standard Connellsville foundry coke is being quoted at $4 to $4.50 per net ton at ovens, with special brands up to $5.25. The furnace product is $1 lower.

Old Material.—The slight flurry among dealers last week has about subsided, although advances of about 50c. per ton are noted in most grades. Steel foundries and rolling mills are on a still hunt for bargains, but are declining to pay the prices at which dealers are holding material. Thus far there has been no increase in mill operations, and only slight improvement in foundry operations. The American Steel Foundries announced that it would light up one furnace at its East St. Louis plant on Sept. 6, employing about 450 men, but the resumption has been postponed indefinitely. No railroad lists are before the market this week.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton		
Iron rails	$13.00 to	$13.50
Steel rails, rerolling	12.00 to	12.50
Steel rails, less than 3 ft.	10.50 to	11.00
Relaying rails, standard section	29.00 to	31.00
Cast-iron wheels	11.50 to	12.00
No. 1 heavy railroad melting steel	10.00 to	10.50
No. 1 heavy shoveling steel	9.50 to	10.00
Ordinary shoveling steel	9.00 to	9.50
Frogs, switches and guards, cut apart	10.00 to	10.50
Ordinary bundled sheet	4.00 to	4.50
Per Net Ton		
Heavy axle and tire turnings	5.50 to	6.00
Iron angle bars	11.00 to	11.50
Steel angle bars	8.50 to	9.00
Iron car axles	16.50 to	17.00
Steel car axles	12.50 to	13.00
Wrought iron arch bars and transoms	13.00 to	13.50
No. 1 railroad wrought	9.50 to	10.00
No. 2 railroad wrought	9.00 to	9.50
Railroad springs	10.00 to	10.50
Steel couplers and knuckles	10.00 to	10.50
Locomotive tires, 42 in. and over, smooth inside	9.00 to	9.50
No. 1 dealers' forge	6.00 to	6.50
Cast-iron borings	5.50 to	6.00
No. 1 busheling	9.50 to	10.00
No. 1 boilers cut in sheets and rings	5.50 to	6.00
No. 1 railroad casts	12.00 to	12.50
Stove plate and light cast	11.00 to	11.50
Railroad malleable	9.50 to	10.00
Agricultural malleable	9.00 to	9.50
Pipes and flues	7.00 to	7.50
Heavy railroad sheet and tank	6.00 to	6.50
Light railroad sheet	3.00 to	3.50
Railroad grate bars	7.50 to	8.00
Machine shop turnings	4.00 to	4.50
Country mixed iron	7.00 to	7.50
Uncut railroad mixed	7.50 to	8.00
Horseshoes	10.00 to	10.50
Railroad brake shoes	8.50 to	9.00

Finished Iron and Steel—An improvement is noted. No big tonnage is being placed, but there is a fair amount of carload business. The Missouri Pacific Railroad, which is showing more activity than other lines, will place an order in October for tie plates, in addition to the 3000 tons mentioned last week as having been ordered. This railroad also has out an inquiry for building 20 bodies and fire boxes. An inquiry has been received by the Rock Island for 200 50-ton composite coal cars. Orders are being received from some of the lines for carloads of wheels and axles. Chief interest in structural steel lies in the steel airship hangar at Scott Field, Belleville, Ill., which will be placed through

the chief of construction service at Washington on Sept. 15; 3000 tons are involved. Local fabricators are working through contractors here. The inquiry for 450 tons of reinforcing bars for the Frost National Bank Building, San Antonio, Tex., is still pending. The American Car & Foundry Co. announces that its plant at Madison will be reopened within two weeks to repair 1500 cars for the Big Four lines.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.62½c.; No. 28 black sheets, cold rolled, one pass, 4.75c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Cleveland

CLEVELAND, Aug. 23.

Iron Ore.—The Algoma Steel Co., which so far this year has taken no ore has advised shippers that it will at once begin to take shipments and, while the amount has not been definitely announced, it is expected that it will be close to 250,000 tons. This company has long time contracts and consequently will buy no ore in the open market. Price concessions by one seller apparently are not disturbing the market. Other ore firms claim that the interest naming the lower prices has not maintained regular quotations during previous years. August shipments are expected to show some improvement over July.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Probably the most interesting feature of the pig iron market is the increase in the demand as shown by improvement in shipments. Comparing the first three weeks of August with the corresponding period of July, one producer has shipped almost twice as much iron this month as last, two others have increased shipments 50 per cent and another 33 per cent. Inquiries and sales also showed some improvement the past week, although most orders are for carlots. Prices on foundry iron are firm and range from $20 to $21, with a large proportion of orders taken at $20.50. Some sellers are not going below that level and one is trying to work its price up to $21. With the recent stiffening of the market, iron for Cleveland delivery is about 50c. per ton higher. The American Radiator Co. was in the market during the week for 1000 tons of foundry iron for its Springfield and Titusville plants and is reported to have made purchases. It also bought 250 tons additional low silicon iron for its Detroit plant. An Erie consumer purchased 300 tons of foundry iron. An Ohio foundry is inquiring for 1000 tons of foundry iron and the American Car & Foundry Co. is in the market for 1000 tons of malleable iron for its Detroit plant. On an inquiry for 500 tons of basic iron from a western Pennsylvania consumer, a Cleveland interest having a freight advantage over the Valley has quoted $19.25, Valley furnace, but the consumer is reported to have secured a quotation of $18.50, Valley furnace.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$19.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.92
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	36.00 to 36.25

Semi-Finished Steel.—There is a fair demand for sheet bars on which $30, Youngstown, is generally regarded as the market price. One inquiry for a 5000-ton lot from a Valley district consumer is reported.

Finished Iron and Steel.—Demand has improved somewhat and August orders will show a moderate gain over July. Orders usually are for small lots for immediate shipment, indicating that consumers' stocks are low. The heaviest demand is still from the automobile industry. Several of the leading Detroit motor car builders now expect to keep operating at about the present capacity during September, and are buying steel to cover their requirements. The Ford Motor Co. has placed 2500 tons of light plates with a Youngstown district mill, and is understood to have bought the same tonnages from another mill. There are signs of increasing activity on the part of some agricultural implement manufacturers, but one farm tractor manufacturer has curtailed production somewhat. The demand for plates has improved and the Otis Steel Co. is operating its Lakeside plant at full capacity this week. There is considerable irregularity in plate prices but price cutting is less pronounced on structural shapes, although a desirable order would probably bring out a 1.75c. quotation. The 1.75c. price on soft steel bars is being quite generally maintained. On plates 1.75c. has become the fairly well established price, but there are apparently authentic reports of quotations as low as 1.65c. for desirable orders. A Cleveland manufacturer has placed 600 tons of plates, shapes and structural material for a coal handling plant for Duluth. This inquiry brought out a 1.75c. quotation for all the material, but was placed at a slightly higher price before the lower price appeared. An inquiry is pending on 675 tons of plates for stills for the Standard Oil Co. This company has placed 133 tons of shapes and plates. Whitehead & Kales, Detroit, has taken the contract for the municipal car barns in that city, and an office building and shops for this railroad system, requiring 1500 tons, will be placed shortly. An Indiana interest is inquiring for 500 tons of structural material and 1200 tons of plates, presumably for Ohio River boats.

Sheets.—Demand shows an improvement and manufacturers report a broadening in the market in that they are getting orders from some consumers who have not been buyers for months. Orders are mostly for small lots for early requirements. On blue annealed sheets quotations range from 2.25c. to 2.40c. Black sheets are generally quoted at 3c., although a 2.85c. price is being named. Automobile body sheets are being quoted at 4.70c. for No. 28 gage.

Warehouse Business.—Local jobbers report some improvement in warehouse business and August sales will show a fair gain over July.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.25c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Bolts, Nuts and Rivets.—Bolt, nut and rivet makers believe that a turn for the better has come. Prices are still somewhat irregular. The demand for rivets for car repair and oil country work has improved and the leading local producer increased operations this week to nearly full capacity. The Navy Department has reinstated an order for 1500 tons of rivets taken by this plant but held up several months ago. Most sales are being made at 2.50c. for structural and 2.60c. for boiler rivets, but these prices are being shaded $1 a ton for large orders.

Old Material.—The market is firm at the recent advance and there is a fair volume of inquiry from dealers who either have orders to fill or want to make speculative purchases. Several Valley mills have been buying scrap recently and one Youngstown consumer is reported to have made an additional purchase of cast borings and compressed steel the past week. These grades and heavy melting steel and turnings are the most active.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails, under 3 ft.	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.00 to 8.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Philadelphia

PHILADELPHIA, Aug. 23.

With the closing of a few tonnages of foundry iron on the basis of $19, Eastern furnace, the foundry iron market is on a firmer basis, the minimum for No. 2 plain iron now being $19.50, furnace, while No. 2X is quoted at $20. One or two furnaces are naming $20 and $20.50 on these grades. Eastern Pennsylvania furnace operators are apparently determined to take no more business below these prices, but are willing to sell for delivery over the remainder of the year, a factor which has caused a number of buyers to close for practically their entire requirements for the last four months.

Few inquiries of importance for steel are being received by the mills, with the result that prices remain untested and virtually unchanged. Plates are available at 1.70c. to 1.75c., Pittsburgh; shapes are fairly firm at 1.85c., though sizable projects might bring concessions; steel bars are firm at 1.75c.; bar iron is off $1 a ton at 1.65c., Pittsburgh; sheets are weak, the minimum prices now appearing to be 2.25c. for blue annealed, 2.90c. for black and 3.75c. for galvanized, Pittsburgh; stock tin plate is offered at $4.50; bolts, nuts and rivets continue irregular and weak, though one leading Eastern producer has virtually withdrawn from the market by advancing prices.

Buyers with definite projects in hand for which steel must eventually be purchased are withholding inquiries, making the explanation to mill representatives that they expect lower prices. The attitude of the mills seems to indicate that the initiative must come from the buyer; in other words, if lower prices are quoted it will be when definite tonnages invite more spirited competition.

Ferroalloys.—A British agent is reported to have received authorization to quote $60, seaboard, on imported ferromanganese. Domestic producers continue to quote $70, delivered, but will probably meet competition.

Pig Iron.—Several thousand tons of foundry iron has been sold within the past week, but these transactions were at prices quoted more than a week ago. Following the price advance of Eastern furnaces, a smaller volume of business has been done at the higher quotations and there is comparatively little business pending. Notable among the week's sales were two lots of about 3000 tons each to the Whitin Machine Works, Whitinsville, Mass., and to the Florence Iron Works, Philadelphia. Both of these transactions were on the basis of $19, furnace, for No. 2 plain iron. Other smaller lots, including one of 800 tons bought by the Thatcher Furnace Co., New York, and one of 1500 tons bought by the Richardson & Boynton Co., New York, make up a fairly good week for this market. The bulk of this business was booked by one furnace company, whose prices are now $19.50, furnace, for No. 2 plain and $20, furnace, for No. 2X. One or two eastern Pennsylvania furnaces are quoting $20 for No. 2 plain and $20.50 for No. 2X. Apparently it would now be difficult to buy foundry iron below $19.50, base. Reports of lower prices emanate usually from buyers and upon being traced are found to relate to quotations which were made a week or ten days ago. Whatever the future may bring forth, it is quite certain that the local pig iron market is now on the firmest basis it has experienced this year. With the larger business of the past few weeks the few furnaces now in blast in this district find themselves in a fairly comfortable position and it is the expectation of their operators that consumption will continue to exceed the output, which is exceedingly small. There is a considerable tonnage of iron on furnace banks, but the owner of the largest quantity shows no disposition to throw this upon the market at lower than the prevailing market prices, but on the contrary is seemingly anxious to obtain all that the market will afford. There seems no likelihood that additional merchant furnaces will go into blast until market prices have ascended above the cost line and until business has expanded sufficiently to assure them of a backlog upon which to start operations. Our quotations for foundry iron show an advance of 50c. per ton over the prices of last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.84 to 21.76
Virginia No. 2 plain, 1.75 to 2.75 sil.	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	29.24 to 29.74
Basic deliv. eastern Pa.	19.00
Gray forge	20.00 to 21.00
Malleable	20.00 to 21.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Plates.—The demand continues light and prices are stationary. While some mills continue to quote 1.85c., Pittsburgh, plates are available at 1.70c. to 1.75c., Pittsburgh, and these prices may be more nearly regarded as the market on sizable lots than the higher figure. On small lots 1.85c. has been obtained.

Structural Material.—Current low prices on fabricated work have led to the presumption that prices on plain material have been made below 1.85c., Pittsburgh, but there is so little open competition owing to the scarcity of projects that definite information to this effect is lacking. One Eastern mill is credited with quotations on a mill basis which figure back $2 or $3 a ton below the 1.85c. Pittsburgh basis, but generally the price situation on shapes appears to be firmer than on plates. Some mill representatives declare their willingness to make slight concessions on sizable tonnages. A municipal pier at the foot of Chestnut Street, now being figured upon, involves about 500 tons of shapes.

Bars.—Steel bars continue firm at 1.75c., Pittsburgh. Apparently buyers have not found it easy to shade this price except, perhaps, on rerolled material for concrete work. Bar iron is weaker and can be had at 1.65c. to 1.75c., Pittsburgh, according to the specification.

Sheets and Tin Plates.—While the nominal quotations on sheets are 2.40c. for blue annealed, 3c. for black and 4c. for galvanized, Pittsburgh, these prices are being quite freely cut on desirable lots. The minimum prices appear to be 2.25c. on blue annealed, 2.90c. on black and 3.75c. on galvanized. Production tin plate continues to be quoted at $5.25 per base box, but stock tin plate is being sold at $4.50.

Bolts, Nuts and Rivets.—Prices continue weak, some of the current prices, it is stated, being below cost. One of the principal Eastern makers has advanced bolts to the basis of 60 and 10 per cent off list, which is equivalent to a withdrawal from the market as lower prices are being made by competitors.

Old Material.—The belief of scrap brokers and dealers that prices of old material are at the bottom is borne out by the rise in price which occurs with any demand however slight. Within the past week buying of blast furnace borings and turnings forced the price up 50c. a ton. Rerolling rails and carwheels have sold at slightly higher prices than quoted a week ago. Heavy melting steel is still to be had at $11.50, though some brokers say they would not sell below $12 or $12.50. In the past few weeks there have been more advances than declines despite the dullness of business. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.00 to 9.50
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

INTEREST IN GERMAN MATERIAL

Nails, Wire and Spiegeleisen Quoted at Competitive Prices New York—Japan Continues Active

NEW YORK, Aug. 23.—Transactions at present are still confined to Far Eastern markets. There is evident a rapidly increasing interest in German iron and steel by consumers in the United States, who are obtaining from German mill representatives in New York quotations and terms of delivery on such materials as blue annealed sheets, structural and ship rivets, machine bolts, wire nails, plain and barbed wire, bars and similar products. In one case negotiations are in progress for the purchase of about 28,000 kegs (133-lb. kegs) of wire nails, which it is said may be put down in New York at about $2.75 per keg or better. Galvanized wire can be delivered, c.i.f. New York, at 2.75c. per lb. Sheets, however, are not a profitable importation at present. The best possible price on galvanized sheets of Belgian origin at present is about 4.80c. per lb., c.i.f. New York, which cannot compete with the domestic quotations.

German foundry iron has shown another decrease and can now be obtained for export at $15 per ton, f.o.b. Hamburg, which price, however, is not sufficiently low to import it profitably for American consumption. German spiegeleisen, 45 to 50 per cent, may prove marketable here, as it can now be put down in New York or other Atlantic ports at about $60 per ton, against the domestic price of $65 to $70 per ton. Even better than $60 could probably be done on a large tonnage.

German Prices in the Orient

To Oriental markets German prices prevent anything like American competition on a price basis. The galvanized wire offered at 2.75c. per lb., New York, is quoted to the Far East as low as 2.72c. per lb., c.i.f. Dairen, Manchuria, and wire nails, 133 lb. to the keg, are offered to the Orient at about $3.80 per keg. A recent sale of 535 tons of soft steel bars to Japan, which was handled by a New York exporter, resulted in the bars being delivered, c.i.f. Japanese port from Germany, at a price better than $45 per ton.

A lot of 500 tons of reinforcing bars for a building project in Osaka, Japan, has been placed with an American mill through the New York office of a large Japanese export house. Sheet buying continues to lead in exports to Japan. There is some interest also in tin plate, one inquiry being in the market for about 1500 base boxes. Copper buying is also beginning to show signs of revival despite the recent cessation of purchases caused by the temporary ban on imports for minting purposes, issued by the Chinese Government for political reasons. The new buying is largely of cathode copper, which will be used in wire drawing, the wire to be used in the various hydro-electric projects in the Far East. One exporter has closed on a total of about 2000 tons of cathode copper in the past fortnight.

Oriental Railroad Orders to Belgium

Keen competition is not entirely confined to German sellers in the Oriental markets. On the recent inquiry issued by the Association of Chinese Bankers, calling for 41 locomotives of various types, 200 covered freight cars and 40 open cars, only five of the locomotives (2 prairie type and 3 Pacific type) were placed with American locomotive builders. The remainder of the locomotives and cars went to Belgium. As an evidence of Belgian bidding on rails, a recent inquiry for 300 tons of 40-lb. basic Bessemer rails brought out a price of £10 12s. ($38.70), f.o.b. Antwerp, bid by the Ougree-Mayihaye works, Belgium, while Wendel & Co., Lorraine, submitted a bid of £8 4s. 10d. ($30.10) per ton, f.o.b. Antwerp, on a tonnage of 85-lb. Bessemer rails.

Some small orders of light rails for Japan have recently been placed with American mills and there is an inquiry still in the market for about 700 tons of 20-lb., 25-lb. and 35-lb. rails for Japan. Evidently a fairly large volume of inquiries is being withheld by Japanese buyers in anticipation of still lower prices here. With a clarification of the price situation, some exporters look for renewed buying from the Far East. A large Japanese export house in Japan recently obtained from its European branch a bid of £12 per ton, c.i.f. Chinese port, on the 15,000 tons of 85-lb. rails inquired for by the Pekin-Mukden railroad, but did not submit this quotation because of unsatisfactory financial conditions that would have been involved in the contract with the railroad.

Although China is generally considered as potentially an American market, the recent report of the British customs service shows that in 1920, 44 per cent of the imports and 39 per cent of the exports were British, while the American exports and imports were 18 per cent and 12 per cent and the Japanese 29 per cent and 26 per cent. This shows an increase of British imports of 35 per cent over 1913.

The Imperial Japanese Government recently purchased two 62-ton electric freight locomotives, totaling about $150,000. The locomotives, which are of a box cab, narrow gage type, will operate on the main lines of the Government railroads. They are equipped with four 250-hp. motors each, and are being built by the Westinghouse Electric & Mfg. Co., East Pittsburgh.

The Argentine Minister of Public Works has requested new tenders on 70 freight cars, broad gage, 40 tons capacity, for use on the port railroads, according to a cable to the Bureau of Foreign and Domestic Commerce. Bidding will close Sept. 2. Either the minister of public works or the director general of railroads (Direccion General de Ferrocarriles) may be addressed for specifications at Casa Gobierno, Buenos Aires, Argentine.

Adolfo Vazquez, Andres Mellado 19, Malaga, Spain, wishes communication with a reliable firm to represent him in the United States in the sale of various minerals, oxide of iron, etc.

The contract for the erection of a 112-mile high tension electric line between Victoria Falls and Melbourne, Australia, has been awarded to Milliken Brothers Mfg. Co., New York. The contract, which involves about £75,000 ($273,750), calls for the erection of 634 steel towers, over which a current of 132,000 volts will be carried. The contract was obtained in competition with British, German and Australian companies. This company reports contracts under way in Burma, South Africa and Norway.

British Iron and Steel Market

More Iron Being Made—Steel Prices Cut to Meet Continent—Wages Going Down

(*By Cable*)

LONDON, ENGLAND, Aug. 23.

Eleven Cleveland blast furnaces are now in blast. Producers are asking purchasers of No. 3 G. M. B. to take equal quantities of No. 4 foundry iron at a combined price of £6 12½s. ($24.25). There is practically no demand, however, owing to the cheapness of Continental offerings. Luxemburg basic pig iron is being sold at £4 5s. ($15.56) c.i.f. Tees. Hematite makers are moderately sold and less disposed to cut export quotations.

There is a small reduction in British home trade steel prices, but these are still far above Continental figures. German billets are being sold at £6 12½s. ($24.25) f.o.b., on the basis of shipments in five weeks. German wire rods are being sold at £8 10s. ($31.11) f.o.b. for October and November shipment. German plates are being sold at £7 15s. (1.27c. per lb.) f.o.b. for October shipment. German steel strip is quoted at £11 10s. (1.88c. per lb.) f.o.b., for shipment in 18 weeks.

French 2-in. billets are being sold at £6 8½s. ($23.52) f.o.b., and Luxemburg billets at £6 10s. ($23.79) c.i.f. Newport. Australia is buying fair supplies of Belgian and Luxemburg steel, owing to the prohibition against the importation of German material.

Settlement of the ship joiners' strike has been made,

with an immediate wage reduction of 3s. (55c.), and with further reductions to go into effect in October and December. Sheffield steel furnacemen's wages have been reduced 17½ per cent.

Tin plates are quiet after the revival of demand from the Far East. Business is being done at 23s. ($4.21) f.o.b. for September and October. Some business is reported in oil sizes. Quarter wasters are being sold at 17s. ($3.11) f.o.b. Some mills are starting up again, while others are closing after completing their rolling programs. The Welsh output is about 30 per cent of normal. Small sales are reported of galvanized sheets to India, at around £21 (3.43c. per lb.) f.o.b., but there is little demand in other markets. Belgium is quoting £11 10s. (1.88c. per lb.) f.o.b. for 18-gage black sheets.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.66 per £1 as follows:

Durham coke, at ovens	£1 15	$6.40	
Cleveland basic	7 7½ & £7 10*	26.99	& $27.45
Cleveland No. 1 foundry	7 0	25.62	
Cleveland No. 3 foundry	6 15	24.70	
Cleveland No. 4 foundry	6 10	23.79	
Cleveland No. 4 forge	5 17½	21.50	
Hematite	7 0*	25.62	
East Coast mixed	8 0 & 7 15*	29.28	& 28.36
Ferromanganese	18 0 & 14 0*	65.88	& 51.24
Rails, 60 lb. and up	10 10 to 14 0	38.43 to	51.24
Billets	8 0 to 8 10	29.28 to	31.11
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.28 to	31.11
Tin plate base box	1 2½ to 1 4½	4.12 to	4.48
		C. per lb.	
Ship plates	14 0	2.29	
Boiler plates	19 0 to 20 0	3.10 to	3.27
Tees	14 0 to 14 10	2.29 to	2.37
Channels	13 5 to 13 15	2.16 to	2.25
Beams	13 0 to 13 10	2.12 to	2.21
Round bars, ¾ to 3 in.	13 0 to 13 10	2.12 to	2.21
Galvanized sheets, 24 g.	21 0 to 21 10	3.43 to	3.51
Black sheets	17 0	2.78	
Steel hoops	17 0	2.78	
Cold rolled steel strip, 20 g.	26 10	4.33	

*Export price.

Keen Competition in Pig Iron from the Continent—Resumption of Plants Slow

LONDON, ENGLAND, Aug. 11.—There is no marked improvement in general trade conditions. Prices are gradually getting down to a more reasonable basis on which this country will be in a better position to compete for overseas trade. Labor is settling down and accepting the inevitable in reduced wages, and the necessity for work, production and reasonable prices are apparently being realized.

The signs apparent recently of an awakening of business in the East are further confirmed, and inquiries and orders for various material are appearing. Orders have been coming in for galvanized sheets, for example, from both India and South America. At the same time it is realized that it will probably be a long time before trade really recovers to anything like normal conditions here.

Up to the present the pig iron markets have been extremely dull. Demand was not particularly good; continental competition was keen, and in view of the high price of fuel, ironmasters here saw little object in starting their works when they could not possibly produce iron at a competitive price. This is illustrated by the fact that the large plant of the Staveley Coal & Iron Co. is out of commission, and there is no output of coke, by-products or pig iron. Some of the foundries, it is understood, have been kept going, but only because Belgian pig iron could be bought, and a managing director stated that to-day labor alone on a ton of pig iron costs £4 15s., while it is possible to buy iron from Belgium at £5 17s. delivered. In addition, the Belgians are working longer hours. He further stated that if the company started its furnaces they would lose 15s. per ton on all coke produced, and between £2 to £3 per ton on pig iron.

A step has now been taken, however, toward getting the cost of production of both pig iron and steel down, a reduction of 15s. per ton having been made in Midland furnace coke. This makes the new quotation 30s. per ton at the ovens. At the same time a decrease of 8s. per ton in the price of Welsh coal is reported.

While export prices here are being shaded, there is no doubt that the bulk of the business is going to the continent. Indeed, German bar makers seem to have booked themselves up so well that they are now less keen sellers, and 10 to 12 weeks are required for delivery. Belgian prices meanwhile are high and, owing to the scarcity of orders, works are in some cases only working part time. The bulk of the business in finished continental material is for export, home buying in this country still being dull.

There is nothing new in the shipbuilding situation. There is still a fair amount of work on hand, but new orders are few. It is interesting to note that the firm of Sir W. G. Armstrong Whitworth & Co. state that on March 22, this year, their output had reached 3,000,000 tons of shipping. The company has now completed 1000 vessels, of which 800 are passenger and merchant ships.

GERMAN PRICES STRONG

Export Business Continues to Increase Particularly with Holland and Scandinavia—Upper Silesia Buys

(By Aerial Mail to London)

BERLIN, GERMANY, Aug. 10.—With the extraordinary rise in prices during the past fortnight consumers have adopted a more reticent attitude and jobbers, on the contrary, are buying up large stocks in anticipation of further advances. Consumers complain that while prices during the past months have been on a rather low level, the recent feverish advances are not justified by prevailing conditions.

Prices continued strong throughout the past week, and in some instances further advances were registered. In the pig iron market the reduced prices for French and Luxemburg iron could not keep pace with the depreciation of the mark. Export business is increasing, rolled material, especially bars, being particularly in demand from Holland and Scandinavian countries. Semi-finished material has improved, but the pipe market is weaker with the exception of boiler tubes. The wire market reports increasing demand with prices tending upward.

Rather encouraging reports are coming in from the Upper Silesian market, where comparative order has been restored and customers are beginning to place orders. Although regular railroad service has been interrupted for two months, production has continued on a small scale and enormous stocks have accumulated which are being cleared off with prices rapidly recovering and few concessions.

Quotations are as follows, per metric ton:

	Marks	(At 1.14c.)
Bar iron	2050	$23.37
Structural shapes	2000	22.80
Tees and channels	2200	25.08
Squares	2250	25.65
Flats and angles	2200	25.08
Concrete bars	1950	22.23
Hoop iron, non-punched material	3500	39.90
Rails, heavy	2400	27.36
Mine rails, including fishplates	2000	22.80
Sheets, heavy	1900	21.66
Sheets, medium	1960	22.34
Sheets, black, according to gage	3100-3400	$35.34 to 38.76
Sheets, double, planished for stamping	4000-4200	45.60 to 47.88
Sheets, galvanized, according to gage	3000-6000	34.20 to 68.40
Plates, light	2300	26.22
Sheet bars	1500-1700	17.10 to 19.38
Billets, open-hearth	1680	19.15
Billets, basic	1550	17.67
Wire rods	2050	23.37

	Marks	Cents per Lb.
Wire nails, per 100 kg	270	1.4
Wire, galvanized, per 100 kg	290	1.5
Rivet and bolt stock, per 100 kg	250	1.26
Barbed wire, closely spaced, per 100 kg	320	1.66

Pipe and Boiler Tubes

	Marks per Metre	Cents per Ft.
Boiler tubes, 2⅝ in., per metre	25	8.7
Boiler tubes, 4 in., per metre	75	26.1
Cast iron pipe and sockets, 1-ft. dia.	240	83.5
Gas pipes, ¾ in., per metre	7.30	2.5
Gas pipes, 1¼ in., per metre	13.25	4.6
Gas pipes, ⅜ in., galvanized, per metre	6.90	2.4
Gas pipes, 1 in., galvanized, per metre	15.50	5.4

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.80c. to 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.35 to $2.50
Large boiler rivets..... 2.45 to 2.60
Small rivets ....65, 10, 10 and 5 to 70, 10 and 10 per cent off list
Machine bolts, small, rolled threads,
70 and 7½ to 70 and 10 per cent off list
Machine bolts, small, cut threads,
65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer,
65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads..65 and 10 per cent off list
Cut threads .....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts .....70 and 5 to 70 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....60 and 5 per cent off list
Larger and longer sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped..... 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts..... 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.50 to $2.60 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.15–2.30	Nos. 11 and 12	2.35–2.50
Nos. 9 and 10 (base)	2.25–2.40	Nos. 13 and 14	2.45–2.60
		Nos. 15 and 16	2.55–2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.45–2.70	No. 28 (base)	2.75–3.00
Nos. 22 to 24	2.50–2.75	No. 29	2.85–3.10
Nos. 25 and 26	2.65–2.90	No. 30	2.95–3.20
No. 27	2.70–2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75–3.00	Nos. 25 and 26	3.45–3.70
Nos. 12 to 14	2.85–3.10	No. 27	3.60–3.85
Nos. 15 and 16	3.00–3.25	No. 28 (base)	3.75–4.00
Nos. 17 to 21	3.15–3.40	No. 29	4.00–4.25
Nos. 22 to 24	3.30–3.55	No. 30	4.25–4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 17 to 21	2.60–2.85	No. 29	2.80–3.05
Nos. 22 to 24	2.65–2.90	No. 30	2.80–3.05
Nos. 25 to 27	2.70–2.95	Nos. 30½ and 31	2.85–3.10

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Aug.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
17	12.00	11.75	25.62½	4.40	4.25	4.70	4.20
18	12.00	11.75	25.75	4.40	4.25	4.70	4.20
19	12.00	11.75	26.00	4.40	4.25	4.70	4.20
20	12.00	11.75	....	4.40	4.25	4.70	4.20
22	12.00	11.75	26.00	4.40	4.25	4.67½	4.17½
23	12.00	11.75	26.12½	4.40	4.25	4.67½	4.17½

New York

NEW YORK, Aug. 23.

The markets are prcatically all marking time with demand light and prices unchanged. Buying of copper does not improve. Transactions in tin have been of good proportions. The lead market is very quiet but exceedingly firm. There is no improvement in the demand for zinc and prices have eased slightly.

Copper.—There is practically no change in the general situation, some of the large producers still remaining out of the market, while two or three others are taking such business as is offered at 11.75c., New York, or 12c., delivered, for early delivery. While there have been a few small sales, made slightly below this level, the foregoing quotations are regarded as the minimum for any substantial business. Domestic demand is light and foreign demand is not much better, although Japan has been a consistent buyer to the extent of several thousand tons in the last two or three weeks. Demand for Lake copper is light and prices are nominal.

Tin.—Importers of tin state that sales last week were exceedingly good, amounting to close to 500 tons future shipment Straits tin at advancing prices. On Wednesday, Aug. 17, 300 to 400 tons was sold, mostly to consumers, part of them located in the interior, but on the two following days the market was dull and nominal. On Saturday, however, about 100 tons is reported to have been sold, also future shipment metal. Spot Straits tin has been firm but neglected, with the quotation to-day at 26.12½c., New York. The market as a whole yesterday and to-day has been inactive and nominal. Prices in London to-day are about on a level with those reported a week ago. Arrivals thus far this month have been 1785 tons, with 3055 tons reported afloat.

Lead.—A fairly steady demand from consumers is reported by most sellers with prices firm. Exactly two months ago to-day the leading interest established its New York and St. Louis price at 4.40c., at which level it has continued until the present time. The outside market is on the same level in this market, but the metal can be purchased from independents at St. Louis at 4.25c.

Zinc.—The market continues extremely quiet and reports that some business has been done under the quotation which has prevailed for several weeks are confirmed. It develops that prime Western for early delivery is obtainable at as low as 4.17½c., St. Louis, or 4.67½c., New York, which we quote as the market.

Old Metals.—The market has quieted down again and business is practically impossible. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.50
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Antimony.—Wholesale lots for early delivery are still obtainable at 4.50c., New York, duty paid.

Aluminum.—The leading producer continues to quote 24.50c., f.o.b. plant, for wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery and the same grade from importers can be purchased as low at 19c. to 20c., New York, duty paid.

Chicago

AUG. 23.—The metals are very dull and copper and tin have weakened slightly. Old metal prices are unchanged. We quote Lake copper at 12.25c. to 12.50c. in carload lots; tin, 28.25c.; lead, 4.35c.; spelter, 4.30c.; antimony, 7.50c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 23.—In none of the non-ferrous metals is there any demand. Lead is quoted at 4.25c., car lots and zinc at 4.20c. We quote Lake copper, car lots, at 12.73½c. to 12.98½c.; tin, 26.86c.; antimony, 5.23½c. On old metals, we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Production and Shipments of Refractory Brick

PITTSBURGH, Aug. 22.—Figures of production and shipments of fire clay and silica brick for the month of July, and stocks on hand and unfilled orders as of July 31, have just been released by the Refractories Manufacturers' Association. The figures are compiled from reports of all manufacturers regardless of whether they are members of that association or not, and cover, as nearly as it is possible to do so, the entire industry. It is interesting to note that shipments and production of fire clay brick were identical during July, indicating that manufacturers finally have been able to make output conform to demand. Shipments of silica brick in July exceeded production by 1,825,000, this resulting in a reduction in the stocks on hand. The figures follow:

	Fire Clay Brick	Silica Brick
Production	31,893,750	2,555,000
Shipments	31,893,750	4,380,000
Stock on hand	207,900,000	57,870,000
Unfilled orders	38,981,250	16,060,000

Bureau of Standards Tests Canadian Meter Bar

One of Canada's official standards of length, a meter bar that had been calibrated at the International Bureau of Weights and Measures in Paris, has been in Washington at the Bureau of Standards where it was compared with the official length standards of this country.

The Canadian meter bar is made of invar, an alloy of nickel and steel that changes only slightly in length with variation in temperature. This bar has made the trip to Washington in previous years for comparison with the American standards, and the Topographic Survey Laboratory of Ottawa is now obtaining several other standard bars from the International Bureau so that they may be used in checking the accuracy of the rules, yardsticks, tapes, and other length-measuring instruments of that dominion.

Comparisons were made between the four platinum-iridium meter bars that are official standards of this country and the Canadian bar.

While only 43.3c. of each $1 of railroad gross revenue went for railroad wages in 1917, 59.9c. was labor's toll in 1920.

PERSONAL

Allen G. Goldsmith, Milwaukee, who during the period of 1911-1917 was associated with the American Rolling Mill Co., Middletown, Ohio, in various capacities up to department manager, has been appointed to take charge of the western European division of the Bureau of Foreign and Domestic Commerce. He was educated in the public schools of Chicago and at Kenyon College. He has also studied in Berlin. From 1917-1919 he served in the army as second lieutenant, and finally as secretary of the general staff of the 83d division. On April 1, 1919, he was detailed to the American Relief Administration as executive officer, and later was appointed chief of the Roumanian mission with headquarters in Bucharest.

Chester Lloyd Jones, of Orange, N. J., has been appointed acting American Commercial Attache to Cuba, and will make his headquarters with General Crowder in Havana. This is the first time the Department of Commerce has been represented in Cuba, which is described as the best market for American goods in all of the Latin-American countries. Mr. Jones represented the Department of Commerce in Spain, as commercial attache, in 1919. He will devote his time in Cuba to the development of American trade. He has given considerable study to commercial conditions in Latin-American countries, and in 1920-21 was employed as trade advisor and director of C. Tennant Sons & Co., New York. His educational and training experience was obtained at the University of Wisconsin, the University of Pennsylvania, the University of Berlin and University of Madrid.

C. A. Ducharme, formerly with Republic Iron & Steel Co., is now associated with the iron and steel firm of J. Edward Grinfield-Coxwell, 40 Central Street, Boston, as sales agent.

William C. Reilly, general superintendent of the Youngstown Sheet & Tube Co., Youngstown, Ohio, has been selected by the provincial Government of Nova Scotia as its representative in arbitration proceedings with the Dominion Steel Co., involving settlement for steel used during the war aggregating $9,000,000. During the war, the Dominion Steel Co. erected a large plate mill at the request of the government and entered into a contract for plates for military purposes. When the armistice was signed the contract was half completed and the government having no further use for the plates, cancelled its contract. In the interim efforts have been made between the company and the Government of Nova Scotia to agree upon an amicable settlement, but without avail. Mr. Reilly has gone to Sydney, N. S., where the plate mill is located, to meet with representatives of the company.

M. L. Filley has joined with Barnard Eberlin, under the firm name of Filley & Eberlin, to act as district sales agents at 50 Church Street, New York, for the Superior Sheet Steel Co., Canton, Ohio. The firm will occupy the same offices Mr. Filley is now using as manager of the New York office of the American Zinc Products Co., maker of slab zinc and sheet zinc, Greencastle, Ind. Mr. Filley was for years Eastern sales representative of the Deforest Sheet & Tin Plate Co., Niles, Ohio, until it was sold to the Republic Iron & Steel Co. Mr. Eberlin was connected with the Merchant & Evans Co., New York, from 1910 to 1917, when he joined the United States Army, participating in the campaigns in France as a captain of infantry. On his return he rejoined the Merchant & Evans Co. as sales representative in Cleveland and vicinity. Mr. Eberlin will be associated with Mr. Filley in the New York office of the American Zinc Products Co., where Willard Fisher will continue to act as Eastern sales manager.

B. G. Dann, for the past four years connected with the engineering department of the Truscon Steel Co. in Youngstown, Ohio, and New York, has resigned to become manager of the New York office, 30 Church Street, of the Hendrick Manufacturing Co., maker of perforated metal screens, elevator buckets, general sheet and light structural work, and also light and heavy steel plate construction. He is a graduate of the engineering department of Lafayette College. B. G. Shotton is the manager of the Pittsburgh office of the Hendrick company, located in the Union Bank Building.

E. A. Woodworth, formerly railroad representative, Imperial Belting Co., Chicago, has resigned to take charge of southwestern territory for the United States Metallic Packing Co., Philadelphia, with headquarters at Chicago.

W. M. Dambach, designing and consulting engineer, formerly associated with Hazel-Atlas Glass Co., Wheeling, W. Va., has become affiliated with the Carlem Engineering Co., Keystone Bank, Pittsburgh, as vice-president. For a number of years he was assistant superintendent of construction of the Pittsburgh board of education.

J. W. Hocking, secretary Wheeling Steel Corporation, Wheeling, W. Va., who resigned recently, was secretary of the Whitaker-Glessner Co. prior to the combination of that company with the Wheeling Steel & Iron Co. and LaBelle Iron Works, into the Wheeling Steel Corporation.

Clarence T. Warner, general manager of the Michigan State Investment Co., Benton Harbor, Mich., has resigned to become president of the new Warner Auto Equipment Co., Benton Harbor, which will manufacture a new shock absorber. This article is now being manufactured in the plant of the National Axle Co., Benton Harbor, but the company plans soon to obtain its own factory.

J. T. Kane has been appointed warehouse superintendent for the Sheet Metal Mfg. Co., Youngstown, Ohio, which recently completed a new warehouse at the westerly city limits of Youngstown, near the plate mills of the Brier Hill Steel Co. He was formerly superintendent in charge of shipping for the Trumbull Steel Co., Warren, Ohio.

John C. Robinson, after 30 years' continuous service as manager of New England sales for William Wharton, Jr., & Co., Inc., has resigned and will devote himself to his interests in the firm of Harrington, Robinson & Co. of Boston. The office of the Taylor-Wharton Iron & Steel Co. and of William Wharton, Jr., & Co., Inc., in the future will be located at room 235, Boston Safe Deposit Building, 201 Devonshire Street, in charge of Walter H. Allen.

Fall Meeting of Iron and Steel Institute in Paris

The fall meeting of the Iron and Steel Institute will be held at the headquarters of the Comité des Forges de France, 7, Rue de Madrid, Paris (in close proximity with the Gare St. Lazare), on Monday and Tuesday, Sept. 5 and 6. At the conclusion of the meeting alternative visits have been arranged to works in Lorraine, in Burgundy and in Normandy. The following is the list of papers which it is expected will be submitted:

"Damascene Steel," by N. T. Belaiew, C. B.

"An Experimental Investigation of the Mechanical Properties of Steels at High Temperatures," by E. L. Dupuy.

"The Situation of the French Metallurgical Industry in the North and in the East of France; Its Destruction and Reconstruction," by L. Guillet.

"Does the Critical Point Depend on the Strength of the Magnetizing Field?" by K. Honda.

"On Constituents Found in Tungsten and Molybdenum Steels," by A. Portevin.

"A Contribution to the Study of Coalescence," by A. Portevin and V. Bernard.

"On the Characteristic Curves of the Heat Treatment of Steels," by A. Portevin and P. Chevenard.

"Iron Ore Deposits of Eastern and Western France," by P. Nicou.

"An Investigation of Various Forging Operations Carried Out Under Hydraulic Presses," Part II, by E. Schneider.

"Manufacture of Shells in Canada During the War, 1914-1918," by Capt. H. W. B. Swabey, C.B., and R. Genders, M.B.E.

OBITUARY

ROBERT TEN EYCK LOZIER, aged 53, consulting engineer, died of pneumonia on Aug. 21 at the Post Graduate Hospital, New York. He was a pioneer in the development of electrical power, entering the employ of Thomas A. Edison at the age of 14. He had taken out many electrical patents and for the last fifteen years had been a consulting engineer. During the war he was in charge of hydroplane construction at the League Island Navy Yard, Philadelphia. He was a member of the Engineers Club of New York, a Fellow of the American Institute of Electrical Engineers and a life member and past president of the New York Electrical Society.

ALFRED D. BAUER, president Technical Advertising Service, Inc., New York, died from injuries received in an automobile accident at Stamford, Conn., on Aug. 13. For 19 years he had been connected with the advertising profession and before organizing the Technical Advertising Service he was advertising manager of *Chemical and Metallurgical Engineering*. He was born in Bremen, Germany, 42 years ago and was a graduate of the University of Baden. Mr. Bauer was among the first to recognize the possibilities of an advertising service devoted entirely to engineering products and carried on by engineers and merchandising experts.

JAMES HENRY TOWER, president and director James H. Tower Iron Works, Providence, R. I., fabricators, died Aug. 13 at his home in Wakefield, R. I., after a long illness. He was born in Providence, May 23, 1846, and was graduated from Brown University of that city. Early in his life he was active in city politics. He is survived by a daughter, Mrs. Benjamin P. Harris, and two sons, Louis P. and James Henry Tower.

WALTER N. LOWELL, superintendent Waterbury Brass Co., Waterbury, Conn., who died at his home, 166 Bunker Hill Street, following a long illness, was superintendent of the Waterbury Brass Co. for thirty years. He was born at New Bedford, Mass, July 22, 1852, and previously was associated with the Pratt & Whitney Co., Hartford, Conn.

CHANDLER ROBBINS, formerly president Robbins & Myers Co., Springfield, Ohio, died in a hospital at Baltimore, Md., on Aug. 18, of pulmonary embolism. He was 77 years old and had been ill only 10 days.

WALLACE D. GLIDDEN, assistant treasurer the Kewanee Boiler Co., Kewanee, Ill., died suddenly at Boulder Junction, Wis., on Aug. 13.

WILLIAM HENRY WARRINGTON, president the Vulcan Iron Works, Chicago, died in that city on Aug. 11, at the age of 75.

JOHN KRYL, president Pilsen Foundry & Machine Works, Chicago, died in that city on Aug. 15, at the age of 53.

Merger of Massillon Companies

The merger of the Massillon Rolling Mill Co. and National Pressed Steel Co., Massillon, Ohio, with the Central Steel Co., Massillon, was approved at a meeting of the stockholders of the three companies Aug. 18. The combination will be effected in accordance with the terms recently agreed upon by the boards of directors of the three companies. The merger involves about $18,000,000, as represented by the combined capital stock of the three companies. R. E. Bebb, president of the Central Steel Co., will be at the head of the combined organization.

The last issue of the *Commonwealther*, the plant publication of the Commonwealth Steel Co., reports an address of President Clarence H. Howard to the company's employees describing his European trip of the early summer. Mr. Howard was a delegate to the International Chamber of Commerce.

Reduction in Steel Corporation Wages

Chairman Elbert H. Gary of the United States Steel Corporation announced on Friday, Aug. 19, a reduction in day labor rates from 37 cents to 30 cents an hour, effective Monday, Aug. 29.

This wage cut is equivalent to a reduction of nearly 20 per cent from the rate established July 16 when time and one-half for work over 8 hr. per day was abolished although no change in the 37 cents an hour rate was made at that time. Other wages and salaries will be equitably adjusted to the new rate for day labor. Judge Gary's statement follows:

"In view of the prevailing low selling prices of steel as compared to costs of production, it is necessary to make reductions in wage rates, and therefore we will recommend to subsidiary companies that the general rates of day labor be decreased to 30 cents per hour, to become effective on Monday, Aug. 29, and that other wages and salaries be equitably adjusted."

Following table shows the wages of common labor after each advance or decrease in wages by the United States Steel Corporation, the percentage of each advance or decease, and the cumulative percentage of each advance or decrease over the 1915 rate:

Date	Wages 10 Hr.	Date	Wages 10 Hr.
1915	$2.00	Aug. 1, 1918	4.20
Feb. 1, 1916	2.20	Oct. 1, 1918	*4.62
May 1, 1916	2.50	Feb. 1, 1920	5.08
Dec. 15, 1916	2.75	May 16, 1921	†4.05
May 1, 1917	3.00	July 16, 1921	†3.70
Oct. 1, 1917	3.30	Aug. 29, 1921	3.00
Apr. 16, 1918	3.80		

*Eight-hour basic day established and time and one-half paid for overtime.
†Approximated.

Pittsburgh View of Wage Cut

PITTSBURGH, Aug. 22.—Announcement by the Steel Corporation of its intention to reduce the wages and salaries came as no great surprise to the trade here, as it had been figured that eventually the corporation must come down to the independent company schedules. Although higher efficiency is claimed for corporation plants than for a number of the independents, it was quite generally believed that this condition hardly would overcome the difference between Steel Corporation and independent scales, with the corporation meeting the independent selling prices. The belief is pretty general that present steel prices are as low as they can consistently go, barring a cut in cost in the shape of lower freight rates, and because of that feeling few are inclined to believe that the wage reduction will be productive of a formal downward revision of prices. The more common expression is that the corporation merely is matching wages to the selling prices it is obliged to accept in competition with independent companies.

No Wage Cuts Contemplated by Independents

YOUNGSTOWN, Aug. 23.—In normal times, about 6000 employees of the Carnegie Steel Co. in the Youngstown district would be affected by the wage reduction effective Aug. 29. The new common labor rate of 30c. an hour is the same as that paid by the independents since July 16.

Owing to the scarcity of employment, independents experienced no difficulty in getting workmen even at the lower rate. While a number of Eastern independents have reduced the day labor wage to 27c. an hour, no further cut is contemplated at present by independent interests in this district. In Canton, Ohio, a number of steel plants are paying 27c. per hr. Valley steel makers look for closer competition in prices from the leading interest as a result of the wage adjustment.

The Reeves Pulley Co., Columbus, Ind., has arranged with Manning, Maxwell & Moore, Inc., 119 West Fortieth Street, New York, whereby the latter assumes the exclusive agency for the Reeves variable speed transmission in the New York territory. Repair parts will be carried and transmissions of various sizes and classes as well as the Reeves wood split pulley will be kept in stock.

YOUNGSTOWN MARKET

August Bookings Exceed Those of Any of Four Preceding Months

Inasmuch as it was generally expected that improvement in the steel industry would be mixed with periods of recession, little surprise is expressed at indications of letting down in buying. James A. Campbell, president Youngstown Sheet & Tube Co., warns against over-optimism, although he believes September will prove a satisfactory month. Tonnage booked by Valley interests in August has exceeded that placed in any of the four previous months, and in some lines has exceeded purchases of any month this year. Severn P. Ker, president Sharon Steel Hoop Co., anticipates a bigger volume of business in September than in August and looks for general improvement.

While jobbing interests have been placing some tonnage, it has been largely against current requirements and there has been little effort to build up depleted or unbalanced stocks. Sheet buying is in smaller volume than has prevailed. Recent business placed with Valley producers involved upward of 1800 tons of black sheets, accepted at 2.90c. base, or 10c. per 100 lb. below the current market. The buyer is regarded as a careful student of the market and declares that sheets at 2.90c. are cheaper than they were at 1.75c. before the war. Other lots ranging from 50 to 200 tons have been placed with district interests, including tonnages for shipment to Japan. On the whole, the market is active, though buying is chiefly for small tonnages.

Inasmuch as shipments are being currently made from stock accumulations, not only in sheets, but in other finished commodities, prompt consignments are possible. Frequently a telegraphic order is filled the same day it is received. Because certain gages of sheets have been exhausted, some makers have been compelled to turn down business recently, especially in galvanized sheets, through inability to meet delivery requirements.

More inquiries are circulating through the trade for by-product coke, presaging more active blast furnace production. One such inquiry put out by the American Rolling Mill Co. calls for 14,000 tons of coke. A Cleveland interest is also in the market for coke for one of its furnaces, which has been idle all summer. A Valley interest reports the purchase of first-grade coking coal at $1.60.

Strengthening of the basic pig iron and the old materials markets has been one of the constructive developments of the past two weeks, say Valley steel makers. Scrap grades have generally firmed up an average of $1 per ton. An average quotation on basic iron is now $20, which compares with a recent low of $18, at which a number of 1000-ton lot purchases were made by the Sharon Steel Hoop Co. before it started its own furnace at Lowellville. Steelworks interests operating blast furnaces state there is firmer demand from the foundry trade than heretofore, and that foundry iron stocks have generally been reduced to low levels.

Plate buying is in sufficient volume to keep one of four mills in this district partially engaged. The price range is from 1.70c. to 1.80c. in the Valley, though makers in nearby districts are reported to have accepted tonnage at 1.60c. Most of the current business is from car repair concerns. Recent inquiries included one for 250 tons of plates for railroad car repair work, and 1500 tons of ½-in. plates for fabrication.

Sheet prices are still uncertain, the market ranging from 2.75c. to 3c. for black and 3.75c. to 4c. for galized, while blue annealed has dipped to 2.25c. and ranges up to 2.40c. Some makers contend that the 2.75c. price for black sheets is more attractive than the 3.75c. quotation for galvanized owing to the fact that galvanizing cost is more than 1c. per lb. Full finished sheets are firm with the principal maker in this territory at 4.70c. for 22-gage auto body stock, which is a differential over black of from 1.70c. to 1.90c., though 1.35c. is the recognized spread.

Sustained demand for strip steel is one of the bright features of the market in the Mahoning Valley, being sufficient to support production at an average rate of 50 to 60 per cent. Concessions from recent levels are more frequent, cold-rolled ranging from 3.85c. to 4c. and hot-rolled selling down to 2.25c., from 2.40c., base sizes. An inquiry before the trade this week called for four carloads. Most of the production is going to the automobile trade, though hardware manufacturers and makers of electrical appliances have likewise been seeking tonnage.

Pipe business has been accelerated due to activity of jobbers in filling up pipe stocks. Five of six buttweld furnaces of one interest have been fired, while the tube department of another maker has been operating at 60 per cent. Demand is usually in carload lots. There is little buying of oil country goods or line pipe and the usual discounts are being closely observed.

New business in tinplate is largely lacking with exception of scattered inquiries from oil companies. Regular customers are specifying slowly against existing contracts. Stock plate continues to be quoted at $4.75 per base box and production plate at $5.25.

PRE-WAR AND PRESENT PRICES

Steel as Low Today as in 1910-14, Considering Freight and Wage Advances

YOUNGSTOWN, OHIO, Aug. 23.—Prices of steel commodities, both finished and semi-finished, are as low as, or lower than, actual average prices during the five-year period 1910 to 1914 inclusive, considering the difference in production costs due to the higher freight charges and higher wages of to-day. The sales executive of an important independent producer in this city makes this statement as the result of a recent study. Transportation rates are from 100 to 115 per cent higher than they averaged during the five-year period.

Freight charges on iron ore from mines on the Mesabi range to Youngstown averaged $1.81 from 1910 to 1914, whereas the current freight rate is $2.93 for the same haul, plus war tax of $.0879 per ton, or a total of $3.01. Similarly, the freight rate on coke from the Connellsville district to the Mahoning Valley averaged $1.20 per ton in the five-year period, whereas the present charge is $2.60, including tax of 8c.

The present freight rate (with tax) of $1.55 per ton on coal from the Pittsburgh district to the Valleys compares with 70c. in 1910 to 1914. On limestone the freight rate from Hillsville to Youngstown, plus tax, amounts to 86.5c., as compared with 34.5c. The current carrying charge on coal per ton from the Connellsville district to Youngstown is $1.627, compared with 85c.; freight charges on ferromanganese from Philadelphia or Baltimore aggregate $6.44 per ton, which compares with $2.28 from Philadelphia to Youngstown during 1910-1914, and $2.08 from Baltimore.

Market prices also yield some interesting comparisons. The current quotation of $5.55 per ton for non-Bessemer Mesabi ore compares with an average price of $3.32 between 1910 and 1914. Connellsville coke at $2.75 to $3.25 compares with $2.01. Ferromanganese at $57.60 compares with an average for the five-year period of $48.36, while spiegeleisen at $27, the current market, compares with an average of $23.86.

The differences in semi-finished and finished steel complete the comparison. Black sheets, for instance, now quoted at 3c., Valley, averaged from 1.86c. to 2.23c. per lb. between 1910 and 1914; plates at 1.75c. to 1.80c., this month, compare with 1.32c., the five-year average; basic pig iron at $19 to $20, compares with $13.88 during 1910-1914; open-hearth billets at $30 compare with $23.18. Sheet bars, now ranging from $30 to $32, compare with an average price between 1910 and 1914 of $23.17.

During the five years in which the averages were taken, the common labor rate changed from 16c. per hr., which prevailed prior to May 1, 1910, to 19½c., or an average of 18.39c., calculated by months. This compares with the going rate of 30c. in the Valleys.

Considering the differences in freight rates and wages between the period 1910-1914 and the present, prices of steel products are to-day as low proportionately, it is contended, as in 1910-1914.

Machinery Markets and News of the Works

BETTER TONE

Some Markets Report More Inquiries for Machine Tools

Actual Orders Have Not Shown Much Improvement, but Sentiment Appears to Be More Cheerful

Without much actual change in the machine-tool situation so far as orders are concerned, a better tone and more cheerfulness is reported from some market centers, notably Chicago, Cincinnati and Boston.

In Chicago, where the bulk of the trade is handled by dealers with showrooms, there has been a noticeable increase in the number of callers. Mail inquiries have also been in greater number.

Cincinnati reports that inquiries appear to be more genuine; in fact, seem to indicate that the business will be closed in the immediate future. One inquiry that is looked for at Cincinnati is for the General Motors Co. plant at Dayton, Ohio. The Big Four Railroad list is still pending, but it is expected that it will be closed shortly.

A fair degree of interest in machine tools is shown by the automobile industry. Purchases consist mainly of single tools, but there is some evidence that motor car manufacturers are planning for continued and steady production.

The F. C. West Corporation has practically completed purchases of factory equipment, including machine tools, for a Minneapolis plant, the outlay being about $250,000. Many used machines and some re-sale tools still in their original crates were purchased. The corporation has issued another inquiry calling for 19 tools and 10 trucks.

There is a little activity in New England. Action on two school lists are expected soon. A textile machinery manufacturer is inquiring for three or four tools. A Fitchburg, Mass., company is asking for prices on miscellaneous used tools.

New York

NEW YORK, Aug. 23.

If business in machine tools is no better it can at least be said that it is no worse. There continues to be a small demand for single tools from scattered sources, but large inquiries are unknown. The Board of Education of the city of New York is understood to have selected a part of its list of about 20 tools for vocational training. The local trade is simply waiting and hoping and there is no indication as to when an improvement in demand may be expected.

The crane market, as far as overhead traveling cranes are concerned, is about as dull as it has been at any time. In locomotive crane inquiries, however, there is evidently some slightly increased activity, numerous inquiries being in the market particularly from contractors and construction companies. The total sales of nine crane builders during July amounted to only about $70,000, representing about 3 per cent of the capacity of their plants. George P. Coulter, 1713 Sansom Street, Philadelphia, is inquiring for a 5-ton and 10-ton, 35-ft. span, overhead traveling crane. Frazar & Co., 30 Church Street, New York, and Okura & Co., 30 Church Street, New York, are handling an inquiry from Japan for a 70-ton, short span, overhead traveling crane. W. R. Grace & Co., New York, have been receiving bids on a 5-ton hand-power crane for export to South America. The Erie Railroad purchasing agent at 50 Church Street, New York, is accepting quotations on an 8-ton hand-power crane for the Forest City Colliery, Forest City, Pa. Hodgson-Freck, Ltd., Montreal, has inquired for a 15-ton, crawl-tread locomotive crane.

Among recent sales are: Shepard Electric Crane & Hoist Co., two 7½-ton, 38-ft. 3½-in. span overhead traveling cranes to Davies & Thomas Co., Catasauqua, Pa. (another 7½-ton crane will probably be purchased later); Chisholm-Moore Mfg. Co., a 5-ton, 18-ft. span hand-power crane to the San Francisco Mines of Mexico, Parral, Mexico. The Chesapeake Iron Works recently sold three 3-ton pillar cranes to the Third Avenue Railroad, New York, instead of one as reported.

The Electro Thermo Co., 206 Broadway, New York, recently incorporated to make electrically operated household appliances, such as washing machines, will shortly be interested in obtaining prices and catalogs, according to Leo H. Strauss of the company, relative to sheet metal working machines, bending machines, punch presses, etc.

The Willart Instrument Co., 13 Rose Street, New Rochelle, N. Y., has plans under way for the erection of a new two-story factory at the foot of Hugenot Street, 70 x 250 ft., estimated to cost about $60,000. Construction will commence at an early date. George Ferrischild, 220 North Avenue, is architect; William Nelson is president.

The Cylent Flush Meter Mfg. Co., Brooklyn, has been incorporated with a capital of $100,000 by J. Harris, C. Rice and B. Weissman, Brooklyn, to manufacture water meters, parts, etc. The company is represented by M. Eichner, 1545-47 Broadway, New York.

The American Bar Lock Co., Brooklyn, has been incorporated with a capital of $75,000 by D. E. and L. B. Mulford, and C. H. Law, Brooklyn, to manufacture skylights and other metal products. The company is represented by Caldwell & Polhemus, 50 Church Street, New York.

The Board of Directors, Utica State Hospital, Utica, N. Y., will take bids at an early date for a new cold storage plant, 70 x 100 ft., estimated to cost about $65,000.

The Fibre Tire & Rubber Co., New York, has been incorporated with a capital of $100,000 by E. F. Stoeckle, M. N. Salmon and E. F. File, New York, to manufacture tires and other rubber products. It is represented by C. Foley, 38 Park Row.

Topping Brothers, 122 Chambers Street, New York, heavy and marine hardware products, have awarded contract to the White Construction Co., 95 Madison Avenue, for a four-story and basement, reinforced-concrete building at Varick and Vandam streets, to total about 67,000 sq. ft. of floor space. Foundation work will provide for the addition of three more stories at a later date.

Fire, Aug. 17, destroyed a number of industrial plants on the block bounded by Greenpoint Avenue, Diamond, Calyer and Newell streets, Brooklyn, including the Greenpoint Motor Co.; Alexander Koby, forge and machine shop; Davis Wood Turning Co.; Manhattan Show Case Co.; Lelberine Stone Co.; and the Universal Reed & Willow Co., with total loss, including equipment, estimated at $1,000,000.

The Bangert Electric Co., Jamaica, L. I., has been incorporated with a capital of $40,000 by W. A. and A. M. Vangert, and T. Breiling, to manufacture electrical specialties. John Adikes, 285 Fulton Street, Jamaica, represents the company.

The Oil Burning Installation Co., New York, has been incorporated with a capital of $125,000 by B. Alexander, E. A. Pierce and A. W. Levy, 60 Wall Street, to manufacture oil burning equipment.

The A. L. Nichols Mfg. Co., Poughkeepsie, N. Y., has filed notice of change of name to the Algonquin Electric Mfg. Corporation.

The William A. Zeidler Co., Locust Avenue and 136th Street, New York, manufacturer of machinery and parts, has leased a building at 135th Street and Third Avenue for a branch plant.

The Corinth Electric Light & Power Co., Corinth, N. Y., has been granted permission to build a new electric power plant.

The Summit Brass & Bronze Works, Inc., Hoboken, N. J., has been incorporated with a capital of $100,000 by Fred

Hausmann, N. J. Shapiro and Henry P. Mertel, 700 Madison Street, to manufacture electric fixtures, and other brass and bronze products.

The Board of Fire Commissioners, East Orange, N. J., William H. Wilson, president, will take bids up to 8 p. m., Sept. 6, for 5 miles of underground fire alarm cable.

Reorganization plans are under way by the Eastern Foundry Co., Jamesburg, N. J., specializing in the production of piano plates. New interests will assume active control, and additional capital will be placed in the business for general expansion.

The National Metal Products Co., Passaic, N. J., has been incorporated with a capital of $50,000 by C. S. and Myron L. Wells, and Albert S. Bray, 12 Lexington Avenue, to manufacture metal goods.

The T. B. Lewis Co., Newark, N. J., has been incorporated with a capital of $100,000 by Theodore B. and F. E. Lewis, and J. J. Maloney, Newark, to manufacture locks and safety locking devices. It is represented by Frederick N. Esher, 586 Newark Avenue, Jersey City, N. J.

The Tousek Engineering Corporation, Newark, N. J., has been incorporated with a capital of $100,000 by Emil A. Kern, Paul Bernath and Edward B. Tousek, 228 Jelliff Avenue, to manufacture electrical devices and equipment.

E. E. Steiner & Co., 20 Orange Street, Newark, have leased the one-story building at 2-16 Avenue C, at Harper Street, 60 x 130 ft., for the establishment of a new plant to manufacture portable ovens and other metal products.

The Detonating Toy Mfg. Co., Newark, N. J., has been chartered under State laws to manufacture mechanical and other toys. The incorporators are Christian and Joseph Mayer, and Charles A. Scheihing. The company is represented by Russel H. Scheihing, 261 Walnut Street.

The Van Dorn Steel Products Co., 324 William Street, Long Island City, N. Y., has acquired two one-story buildings, at 310 Coit Street, Irvington, N. J., for a branch plant. It is proposed to construct several additional floors.

The First International Mfg. Corporation, Newark, N. J., has been chartered under State laws to manufacture cans, containers and other metal products. The incorporators are Harry A. Knauss and Frank A. Rizollo. The registered office is at 277 Livingston Street.

New England

BOSTON, Aug. 22.

Sentiment among a majority of local machine-tool houses appears more cheerful, due to several inquiries for one or more new and used machines. These are largely from small metal-working concerns enjoying increased business or planning to place on the market products not heretofore made in the hope of keeping plants in operation. A few of the better known companies are also inquiring. A large textile machinery maker is asking quotations on three or four tools, including a six spindle heavy duty radial drill. The Cambridge Plumbing Supply Co. and the Corcoran Supply Co., Cambridge, Mass., and similar companies elsewhere contemplate purchases of pipe threading and cutting machinery. One local dealer reports an inquiry from Montreal covering a considerable quantity of small equipment.

It is intimated that the Manchester, N. H., school lists will be acted upon in the near future. The Lynn, Mass., school list has been materially cut and other municipalities are not showing any more action on their lists than heretofore. Quite a slump is noted in garage inquiries for metal-working equipment.

The Leighton Machine Co., Manchester, has bought a 30-in. lathe. The Vaughn Foundry Corporation, Norwich, Conn., is considering the manufacture of pipe fittings and is inquiring for equipment.

William A. Hardy & Sons, Fitchburg, Mass., brass screen plates for paper mills, are asking quotations on miscellaneous used machine tools. A Philadelphia dealer the past week has purchased considerable used equipment from a local dealer. A number of companies purchasing Government tools the past year or more are adapting these for work other than the machines were originally intended and inquiring on used parts. Otherwise the market for used equipment is without special feature.

A reduction of 20 per cent on South Bend lathes is announced. Prices on the leading makes of files have been reduced 10 per cent. Two leading New England manufacturers of machinists' small tools have issued new discount sheets showing a reduction of 10 per cent, which leaves a net result of only 10 per cent as contrasted with the 1915 cost to the consumer. That is, prices to the consumer to-day are but 10 per cent higher than in 1915, allowing for the list price advances made by manufacturers in July, 1919.

Instead of one 50-ton and one 10-ton crane for the Green Island, N. Y., Ford plant, Stone & Webster, Boston, are inquiring for one 40-ton and one 10-ton crane.

The Machinery Clearing House Corporation, dealer in new and used machinery, 718 East Pratt Street, Baltimore, is in the market for the following lathes: One 24-in. to take 6 ft. 6 in. between centers; one 18-in. or 20-in. with 8-ft. or 10-ft. bed, Lodge & Shipley, LeBlond or American, motor driven; also one screw machine to take 2¼-in. stock.

Contract has been awarded by the Albert Russell & Sons Co., Newburyport, Mass., for rebuilding its foundry destroyed by fire several weeks ago.

The Heppenstahl Forge Co., Harvard Avenue, Bridgeport, Conn., has been granted permits to erect oil tanks and a one-story pumping station.

Bids are asked by C. W. Parks, chief of the Bureau of Yards and Docks, Washington, for mechanical equipment and piping for and alterations to a Government owned boiler plant at Boston.

The Rowe Calk & Chain Co., Plantsville, Conn., is perfecting plans for the manufacture of an automatic device for carrying spare tires on automobiles, a patent on which recently was granted.

Lockwood, Green & Co., Boston, are preparing plans for an addition to the factory of the H. L. Judd Co., Cherry Street, Wallingford, Conn., brass andirons, etc., to cost about $100,000.

The F. T. Ley Co., Springfield, Mass., has been awarded a contract for the construction of a power house, dam and penstock for the South Berkshire Power & Electric Co., Williamsville, Mass.

William S. Thompson is president, Benjamin W. Woodward, vice-president, and Charles M. Cornins, treasurer, of the Woodward Wrench Co., Springfield, Mass., recently incorporated under Massachusetts laws. It is capitalized for $500,000.

Robert W. Merrick, 32 Greenleaf Street, Quincy, is president and Charles B. Putnam, 32 Queensbery Street, Boston, treasurer of the Electric Highway Signal Co., Boston, which has taken out a charter to manufacture highway safeguarding and regulating devices.

George M. Wright, formerly president and general manager Wright Wire Co., Worcester, and his son, George F. Wright, until recently vice-president Wickwire-Spencer Steel Corporation, which took over the Wright Wire Co., this fall plan to engage in the manufacture of wire drawing machinery and equipment in Worcester. Offices have been secured in the Park Building, that city.

The Hunt-Lasher Co., Inc., has been granted a charter to manufacture blow pipe alcohol torches, automobile accessories, household and electrical appliances, machinery and tools. Lester L. Lasher, 53 Lawton Avenue, Lynn, is president, and Joseph M. Hunt, 319 Temple Street, West Roxbury, Boston, treasurer.

J. E. Conant & Co., Lowell, Mass., will sell at auction Sept. 1 the equipment and stock of the No. 1 plant of Burgess Co. & Curtis, Marblehead, Mass., aeroplanes.

New interests, headed by Garrett M. Ross, have acquired the plant and business of the Cushman Electric Co., Concord, N. H., manufacturer of motors, motor-generator sets, etc. The present name will be retained and the plant continued in operation for the same products. Mr. Ross is president of the new company; A. L. Cushman, vice-president, and Alexander P. Achimore, manager.

The Wallace Barnes Co., Wallace Street, Bristol, Conn., manufacturer of steel springs, etc., is arranging for the early opening of a branch plant at Hamilton, Ont., to be operated under the name of the Wallace Barnes Co., Ltd., recently organized as a subsidiary, with capital of $300,000.

The Forestdale Mfg. Co., Forestdale, R. I., has completed plans for the construction of a new power house at its cotton mills.

The F. A. Whitney Carriage Co., Leominster, Mass., has filed plans for a three-story addition, 45 x 70 ft.

The L. & H. Motors Co., Hartford, Conn., manufacturer of automobile equipment, has awarded contract to the Lawrence & Coe Construction Co., 372 Trumbull Street, for an addition to its plant on High Street.

The National Folding Box & Paper Co., New Haven, Conn., is taking bids for an addition to its plant on James Street, 62 x 140 ft., estimated to cost about $150,000, including machinery. Westcott & Mapes, Inc., 207 Orange Street, are architects and engineers.

Chicago

CHICAGO, Aug. 22.

There has been a noticeable increase in the number of callers at local machine tool houses and inquiries coming through the mail are also more numerous. Prospective buyers who visited the local market the past week were from such distant points as Nebraska and Ohio. Dealers are encouraged by the increased interest, and while buying is still relatively light, it is felt that business has turned the corner and is now on the upswing.

The F. C. West Corporation, referred to last week, has practically completed purchases of equipment for a new Minneapolis plant. The total outlay for all equipment, including machine tools, will amount to about $250,000. Thus far most of the machines have been bought second-hand and in many cases practically new tools which have never been put to use have been acquired at favorable prices. Many of the machines were bought in the East and several carloads have been shipped to Minneapolis. The new plant, the name of which has not been disclosed, is in the new industrial section of Minneapolis and has 44,000 sq. ft. of floor space. It will manufacture automotive replacement parts. Edward M. Heller & Co., 144 West Kinzie Street, Chicago, now in direct charge of machine tool purchases, have issued the following inquiry for equipment not yet bought:

One 60-in. wheel lathe for trimming treads on locomotive drivers and car wheels.
One 20-in. x 14 or 16-ft. motor driven engine lathe.
One lathe to cut threads on bolts up to 2 in. in diameter with universal head.
One Baker elevating type electric factory tractor.
Two piston boring machines.
Two 10 x 50-in. plain Norton grinding machines.
One 75-ton back-geared punch press.
Ten to 15 3½ x 60-in. Fitchburg Lo Swing lathes.
Ten Steubing hand-operated elevating trucks.

The Huenengarth Co., Lincoln, Neb., recently organized to manufacture washing machines, has been sounding the local market for a hand screw machine, turret lathe, disk grinder and a hack saw. The Arctic Corporation, Michigan City, Ind., recently incorporated, has gone into the manufacture of ice machines, and has closed for some metal-working equipment. The formal letting of the Illinois Central machine tool orders was made last week.

As previously intimated, there has been an encouraging movement of second-hand equipment of late. One dealer reports a single transaction involving two gear generators and two upright drills. Many users particularly the smaller buyers, evince an interest in second-hand offerings and if they do not find what they want in new equipment frequently purchase used tools.

Two manufacturers of milling machines in addition to those mentioned a week ago have reduced prices. One, a Western maker, has cut quotations 10 to 15 per cent, and another, an Eastern builder, has marked off 15 per cent. A Western manufacturer of hand screw machines has made a reduction of 10 per cent. South Bend engine lathes have been marked down 20 per cent. In connection with this reduction it is announced that the prices of Jan. 1, 1914, were only 37 per cent lower than present quotations. This comparison does not take into consideration the fact that the present machines are not the same as those sold in 1914. In fact, practically all machine tool builders have redesigned their equipment since that time with the result that their machines are more rugged and have a greater output. One large manufacturer of radial drills spent $250,000 on redesigning. The column was increased in diameter, the saddle was lengthened, tapping frictions were increased 40 per cent and now run in oil instead of in the open, the gears are now of chrome nickel steel whereas they were formerly of cast iron, the weight of the machine was increased 33⅓ per cent, and the range of feeds and speeds was expanded.

E. J. Gaddis, 1548 East Sixty-seventh Street, Chicago, has let contract for a one-story battery repair station, 50 x 127 ft., 1540-42 East Sixty-seventh Street, to cost $20,000.

The Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, has postponed until next spring the construction of a two-story factory, 90 x 150 ft., at the northeast corner of Knox and Wellington avenues. The structure will cost $200,000.

The Wickey Battery Co., East Chicago, Ind., has been incorporated with $75,000 capital stock to manufacture electric batteries. The directors include E. W. and W. G. Wickey, J. E. Francis, D. L. White and H. E. Zoeger.

The Saperston Mfg. Co., 28 North Clinton Street, Chicago, has been incorporated with $8,000 capital stock to manufacture arch supports and foot appliances. The incorporators include Perry Saperston, Charles D. Saperston, and Frederick L. Wallace.

H. A. Zimmer, formerly of Moline, Ill., will open a general machine shop at 127 South Prairie Street, Galesburg, Ill. It will be equipped to do die, gear and grinding work.

The Malleable Iron Co., Kokomo, Ind., which recently completed a new foundry, will commence operations within a few weeks. It will supply material for the Haynes Automobile Co., Kokomo, and the Service Motor Co., Wabash, being a subsidiary of these two companies. G. A. Wagner will be general manager.

Washington, Ind., has sold $100,000 worth of stock in the Union Steel Mfg. Co. as an inducement to that company to move its factories and offices to that city. The company controls two plants, one at Brazil, Ind., and the other at Chicago. The Chicago plant is largely given over to the manufacture of die castings.

The construction of a new plant for the Otsego Angle Steel Co., Plainwell, Mich., will start soon, according to an announcement by one of the officers.

S. Buchsbaum & Co., 159 North State Street, Chicago, jewelers, plan to build a six-story office and factory building, 100 x 175 ft., East Huron and Fairbanks streets, to cost $300,000.

The Grand Avenue Building Co., E. H. Gill, engineer, Interstate Building, Kansas City, Mo., has let a contract for a two-story garage, 80 x 122 ft., at 714 Grand Avenue, to cost $100,000.

The board of directors, St. Lucas Hospital, Faribault, Minn., is arranging plans for the erection of a new one and two-story power house at the institution.

The Mattson Wire Mfg. Co., Market and Lucas streets, Joliet, Ill., has been chartered under State laws to manufacture wire goods, and other metal products. The incorporators are J. A. Tune, C. N. and Elmer L. Crouch.

Chalmers-Williams, Inc., 208 South La Salle Street, Chicago, manufacturer of mining machinery, has awarded contract to the Arnold Co., 207 South La Salle Street, for a one-story addition to its plant in the Chicago Heights section, estimated to cost about $50,000.

Philadelphia

PHILADELPHIA, Aug. 22.

The Electric Storage Battery Co., Nineteenth and Allegheny streets, Philadelphia, has acquired a building at New Orleans for a new branch works.

The Metropolitan Body Co., Philadelphia, is being organized to manufacture motor-truck and automobile bodies. Application for a State charter will be made on Sept. 12. It is represented by Nathaniel I. S. Goldman, 812 Lincoln Building.

The Department of City Transit, Philadelphia, is considering the erection of two new power plants for the municipal electric railroad system to cost in excess of $500,000.

Fire, Aug. 15, destroyed a portion of the plant of the Atlantic Refining Co., Philadelphia, with main offices at 3144 Passyunk Avenue, with loss estimated at close to $1,000,000. The equipment destroyed included four pumping plants with machinery, five steam stills, oil tanks, agitator tanks, separator equipment and other apparatus.

The Tioga Engineering & Pattern Co., Philadelphia, Pa., has been incorporated with a capital of $65,000 to manufacture machine parts, castings, patterns, etc. William S. Cox, Fifth Street and City Line, is treasurer.

Charles Wacker, Philadelphia, operating a wagon and wagon parts plant at 1345 West Cumberland Street, has filed plans for a new factory at 1304-1308 West Cumberland Street.

The Multilite Mfg. Co., Philadelphia, is being organized to manufacture lighting fixtures and other metal products. Application for a State charter will be made on Sept. 6. The company is represented by Rose & Fischer, 803-6 Victory Building, 1011 Chestnut Street.

D. P. Brown & Co., 264 North Fourth Street, Philadelphia, manufacturers of belting, etc., have acquired the two four-story factory buildings at 405-7 Wood Street, to be used in connection with general operations.

The King-O-Tone Phonograph Co., Philadelphia, has been incorporated under Delaware laws with capital of $500,000 to manufacture talking machines and parts. It is represented by F. R. Hansell, Land Title Building.

The Mercer Motors Corporation, Trenton, N. J., is arranging for the sale of a bond issue of $500,000, following which notes amounting to $2,000,000 will be issued, the proceeds to provide working capital for resumption of production and expansion. The company is being reorganized to operate independently of Hares Motors, Inc., heretofore holding supervision.

The Franklin Air Compressor Works, Inc., Norristown, Pa., has been incorporated with a capital of $50,000 to manufacture air compressors and other machinery. George C. Yates, 27 West Pomona Street, Philadelphia, is treasurer.

The Wilson Motor Co., 1721 Haddon Avenue, Camden, N. J., has completed plans for the erection of a new one-story plant on Haddon Avenue, to cost about $45,000. Construction will commence at once.

The Anthracite Refractories Co., Blakely, Pa., has been incorporated with a capital of $150,000 to manufacture fire brick and other refractory products. D. J. Beardslee, Peckville, Pa., is treasurer.

The Deca-Disc Co., Hanover, Pa., has been incorporated under Delaware laws with capital of $500,000 to manufacture a newly patented talking machine. Paul D. Bodwell is president, and George L. Creager, secretary.

Buffalo

BUFFALO, Aug. 22.

The L. G. Schoepflin Co., 80 West Mohawk Street, Buffalo, has plans under way for a two-story automobile service and repair works, 60 x 175 ft., at 306 Franklin Street, to cost about $55,000.

The Lightning Change Auto Wheel Corporation, Rochester, N. Y., has ben incorporated with a capital of $250,000 by J. M. Sebring, B. R. Robin and F. Hesse, Rochester, to manufacture metal automobile wheels. It is represented by H. H. Cohen, Trust Building.

The Genesee Light & Power Co., Batavia, N. Y., is planning for extensions and improvements in its local electric plant and system.

The E. Bartheimes Mfg. Co., Rochester, has been incorporated with a capital of $300,000 by E. Bartheimes, A. C. Wischmeyer and W. Haefele, Rochester, to manufacture stamped metal products. It is represented by McLean, Duffy & Kaelber, Insurance Building.

Th W. J. Hall Co., 54 South Fitzhugh Street, Rochester, is taking bids for a two-story machine shop and automobile service building on Lake Street, 61 x 70 ft. Leander & McCord, Powers Building, are architects.

The Wickwire Limestone Co., River Road, Buffalo, is planning to rebuild the power plant at its properties at Lockport, N. Y., recently destroyed by fire with loss estimated at about $30,000.

Frostholm Brothers, manufacturers of special machinery and tools, Syracuse, N. Y., have opened a tool and cylinder regrinding shop in Rochester under the name of Frostholm-Treiber, Inc. The incorporators are C. C. and J. H. Frostholm. Melvin & Melvin, First Trust and Deposit Building, Syracuse, represent the company. The name was incorrectly given last week as the Crostholz-Trieber Co.

Baltimore

BALTIMORE, Aug. 22

The Board of City Commissioners, Oxford, Md., has made application for permission to construct a local electric power plant for municipal service. Bonds for the project will be issued at an early date.

The Maryland Motor Machine Co., Frederick, Md., recently reorganized with Charles H. Kehne as president, is planning for the erection of an addition to its factory.

The Smoot Specialties Corporation, 614 West North Avenue, Baltimore, has been incorporated with a capital of $50,000 by William B. Smoot, John G. Chapman and Gerard W. C. Smoot, to manufacture automobile equipment.

The Freedom District Electric Light Co., Sykesville, Carroll County, Md., has been chartered under State laws to equip and operate an electric light and power plant and system. The incorporators are John T. Scott, Charles C. Williams and Charles W. Melville, Sykesville.

Fire, Aug. 13, destroyed a portion of the plant of the American Manganese Steel Co., New Castle, Del., including a four-story pattern shop, with loss estimated at about $100,000.

The Aircraft Construction & Transportation Corporation, Wilmington, Del., has been incorporated under State laws with capital of $100,000,000 to manufacture airplanes and parts. It is represented by the Delaware Charter Co., 904 Market Street.

William Shinn & Co., Inc., 407 Orange Street, Wilmington, Del., has been incorporated with a capital of $100,000 by William I. and John A. Shinn and M. N. Parry to manufacture cornices, skylights, metal window frames and other sheet metal products.

The Ringless Piston Replacement Co., Wilmington, Del., has been incorporated under State laws with capital of $3,000,000 to manufacture pistons, piston rings and kindred products for automobile engine service. The company is represented by the Corporation Trust Co. of America, duPont Building.

The Neill-Buick Co., Inc., 111 West Mount Royal Avenue, Baltimore, has been incorporated with a capital of $100,000 by Daniel S. Neill, John Kimmell and Benjamin B. Nyce, to manufacture automobile trucks, tractors and parts.

The Paragon Motor Car Co., Cumberland, Md., manufacturer of automobiles, will break ground at once for the first unit of its new plant on Mount Savage Road. It will be 165 x 480 ft., and will be supplemented by a number of smaller buildings. A power plant will also be erected.

Fire, Aug. 9, destroyed a portion of the plant of the Armour Fertilizer Co., Bull Creek, Columbus, Ga., with loss estimated at about $300,000. Headquarters of the company are at 209 West Jackson Boulevard, Chicago.

The Columbia Railway & Navigation Co., Columbia, S. C., is planning for the construction of a new hydroelectric generating plant on a canal to be constructed, connecting the Santee and Cooper rivers, with initial capacity of about 30,000-hp. The work, including canal construction, is estimated to cost close to $5,000,000. G. A. Guignard is president.

The Lullwater Co., Atlanta, Ga., recently organized with a capital of $2,000,000, has acquired a six-story and basement building, totaling about 110,000 sq. ft., for the establishment of a plant to manufacture automobile equipment and accessories. The different departments will include parts manufacture, nickel plating works, machine and repair department, grinding room, welding department, etc. A portion of the works will also be given over to battery repair operations. Lionel J. Kahn is manager.

The Caldwell Power Co., Lenoir, N. C., recently organized with a capital of $300,000, has preliminary plans under way for a hydroelectric generating plant. J. H. Beall and J. L. Nelson head the company.

The Southern Electro Steel Co., Scott Building, Lynchburg, Va., has increased its capital stock to $100,000 and will install additional machinery. Joseph Keyser is president.

Detroit

DETROIT, Aug. 22.

The Hercules Steel Post Co., Niles, Mich., care of G. J. Pammel, secretary local Chamber of Commerce, representative, has plans nearing completion for a new one-story factory, 50 x 250 ft., estimated to cost about $30,000.

The Perry Mfg. Co., Inc., Argentine, Genesee County, Ind., has been incorporated with a capital of $100,000 by D. F. Hopkins, W. L. Coop and George E. Taylor, Argentine, to manufacture barn and dairy equipment, farming implements and kindred products.

Ralph J. Handy, Inc., Detroit, has been incorporated with a capital of $100,000 by Mark A. Bertaire, Karl O. Hawley and Ralph J. Handy, 2074 Seward Avenue, to manufacture motor trucks and parts.

The City Council, Lansing, Mich., has plans under way for a new municipal electric power plant estimated to cost about $1,600,000. Woodwell & Resler, 501 Fifth Avenue, Lansing, are architects and engineers.

The Algonac Boat & Machine Co., Algonac, Mich., has acquired property adjoining its plant for extensions. It recently completed an addition, and greater capacity is again required. Jan Smits is president.

The Greater Hart Association, Hart, Mich., a community betterment organization, is arranging for a site for a new plant for the Hart Quick Change Rim Co., recently organized to manufacture a collapsible metal rim for automobile wheels and attachments. It is said that the initial plan will cost about $50,000. The company is headed by George W. Powers and L. P. Hyde, Hart.

The plant of the H. M. Reynolds Asphalt Shingle Co., Grand Rapids, Mich., was recently destroyed by fire with a loss of $250,000 to $400,000. Plans are under way for new works of steel and concrete.

The True Mfg. Co., Eaton Rapids, Mich., which will manufacture several lines of automotive accessories, expects to begin construction of a new plant within 30 days.

The LaBelle Washing Machine Co., Ecorse, Mich., has been organized by Alfred Robinson, Ecorse; William H. Rouston, Detroit, and Hugh McLain, Oakwood, Mich. The product will be handled at the Robinson plant in Ecorse and the business headquarters will be in Detroit.

The Columbia Body Corporation, Detroit, has acquired the plant of the American Chemical Co. in Ford, Mich., and is removing to that town.

Pittsburgh

PITTSBURGH, Aug. 22.

As far as actual business is concerned, the local machinery market is exceedingly quiet. Representatives of crane manufacturers have had a fair number of requests for prices for estimating purposes, some of which may later develop into definite inquiries, but the only order placed in the past week was for a 10-ton, 40-ft. span, 3-motor overhead, by the Ladel Mfg. Co., New Philadelphia, Ohio, which is building a new foundry, the order going to the Northern Engineering Works, Detroit. Inquiry put out by the Wheeling Steel Corporation several weeks ago for a 5-ton, 7½-ton, and a revolving jib crane is dormant. Machine-tool activities are confined largely to individual pieces which are absolutely required to replace old or worn-out equipment. One dealer reports the sale of a heavy duty Diamond grinder with 40-hp. motor and attachments. Such tools ordinarily form part of the equipment of railroad shops, but this grinder is said to have been taken by a company engaged on different work. There is an absence of railroad inquiry and the manual training school lists, issued by the cities of Johnstown and Butler, Pa., and Wheeling, W. Va., do not appear to be near the closing stage. The school board of Johnstown, Pa., has decided upon a new high school and this is expected to delay the placing of tools for the manual training department until the completion of the building. Considerable difficulty is being experienced in securing appropriations for school purposes in these cities. The Westcott Chuck Co. has increased the discount to jobbers from 16⅔ per cent to 25 per cent, and has not reduced prices 16⅔ to 25 per cent as was stated in THE IRON AGE of last week.

The Oberndorf Mfg. Co., 7509 Thomas Boulevard, Pittsburgh, manufacturer of pipe, steamfitters' supplies, etc., will take new bids on revised plans at an early date for its one-story addition, 160 x 200 ft., estimated to cost about $150,000. Edward Oberndorf is president.

The Standard Specialty Co., Pittsburgh, is being organized by E. W. Gibson, F. G. Leslie and F. J. Semasko, Pittsburgh, to manufacture metal products. Application for a State charter will be made Sept. 6. It is represented by Owen S. Cecil, 1016 Berger Building.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, is reported to be planning for a new foundry at Trafford, Pa., to give employment to more than 300 men.

The Ingram-Richardson Mfg. Co., Beaver Falls, Pa., manufacturer of enameled iron signs, and other metal products, has completed plans for a one-story addition, 95 x 130 ft., estimated to cost about $60,000, including equipment.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, has plans under way for extensions and improvements in its hydroelectric generating plant on Little Island, near Logan, W. Va., to cost in excess of $500,000. The work will include the installation of two new 15,000 turbo-generators with auxiliary machinery. Francis R. Weller, Hibbs Building, Washington, is consulting engineer.

The Puritan Coal Co., Williamson, W. Va., will build a new steel tipple at its properties, with daily capacity of about 4000 tons, estimated to cost $60,000.

The Rosedale Coal Co., Monongalia County, W. Va., with offices at Morgantown, W. Va., will build a new steel tipple at its properties, estimated to cost about $50,000.

The Central South

ST. LOUIS, Aug. 22.

The St. Louis Pump. & Equipment Co. has leased the two-story brick building at the corner of Forest Park Boulevard and Spring Avenue, and will make alterations and improvements. John C. Roberts, Jr., is president.

The Standard Stamping Co., 2000 North Broadway, St. Louis, manufacturer of stamped metal products, has taken bids for a one-story plant, 107 x 132 ft., for the manufacture of enameled metal ware products. It is estimated to cost about $50,000. Klipstein & Rathman, Chemical Building, are architects.

The Nichols Wire & Sheet Metal Co., Tenth and Missouri streets, Joplin, Mo., is having plans prepared for a one-story building, 50 x 200 ft., at 513 East Fifth Street.

Fire, Aug. 7, destroyed a portion of the works of the Rhinock-Flexner Co., Hancock Street, Louisville, steel and metal specialties, with loss estimated at about $32,000.

The Beggs Machinery & Supply Co., Beggs, Okla., has been incorporated with a capital of $25,000 by William H. Donohue and H. T. Purnell, Beggs; and E. J. Little, Tulsa, Okla., to manufacture machine products, etc.

The Huckabee Tractor & Mfg. Co., 704 South Valmar Street, Little Rock, Ark., is planning for the installation of new machinery at its works. N. F. Wilson is general manager.

The Board of Directors, University of Missouri, Columbia, Mo., is completing plans and will soon call for bids for a new one-story and basement power plant estimated to cost about $150,000. Prof. Guy D. Newton is engineer.

The Chattanooga Warehouse & Cold Storage Co., 212 King Street, Chattanooga, Tenn., has plans under way for the erection of a two and four-story addition to its cold storage plant. Bouchard & Co., Nashville, Tenn., are engineers.

The Little Rock Auto Tow Service Co., 115 West Twentieth Street, Little Rock, Ark., recently organized, has plans under way for a two-story automobile service works, with machine and repair departments, 50 x 100 ft. William Rinke is president and general manager.

The Mercury Motor Corporation, Quapaw, Okla., has been incorporated with a capital of $250,000 by W. I. Bingham, Quapaw, and W. E. Douthat, Commerce, Okla., to manufacture automobiles and parts.

The Ohio-Kentucky Fluorspar & Lead Co., City National Bank Building, Paducah, Ky., recently organized with a capital of $1,000,000, is planning for the construction of new works in the vicinity of Smithfield, Ky., with daily output of 100 tons. It will include crushing plant, refinery, etc., and is estimated to cost in excess of $200,000. The company has acquired the property of the North American Fluorspar & Lead Corporation in this section. T. J. Clay is president, and F. B. Moodie, vice-president and manager.

Indiana

INDIANAPOLIS, Aug. 22.

The Indiana Electric Corporation, Indianapolis, Ind., recently organized, has plans under way for a merger of a number of light and power companies, following which a large hydroelectric generating plant will be constructed on the Wabash River, near Terre Haute, Ind. The plant will have a capacity of 30,000-kw., and with transmission system is estimated to cost more than $2,000,000. The company is planning for a bond issue of about $5,000,000 to carry out the project. It is headed by Joseph H. Brewer, president American Public Utilities, Inc., Grand Rapids, Mich.; Charles O'Brien Murphy and Paul D. Birdsall, both of the Merchants' Heat & Light Co., Indianapolis.

The Berry Oil Gas Burner Co., Schnellville, Ind., has been chartered under State laws to manufacture oil and gas burners. The incorporators are J. A. Berry, F. A. Haas and J. W. Haas, all of Schnellville.

The Public Service Commission, Indianapolis, will receive bids at the office of the secretary up to 1 p. m., Aug. 29, for a quantity of galvanized posts to be used for carrying metal disk warning signs at railroad crossings. The disks will be manufactured at the State prison.

The Haynes Tractor Co., Kokomo, Ind., affiliated with the Haynes Automobile Co., has tentative plans in preparation for a new one and two-story plant to manufacture automobile tractors. Elwood Haynes is head of the company.

The City Council, Kendallville, Ind., has completed arrangements for the erection of a one-story addition to the municipal electric power plant, 50 x 100 ft.

Cincinnati

CINCINNATI, Aug. 22.

The Ford Motor Co. was a purchaser of machines the past 10 days, taking a number of tools. Manufacturers and dealers report a better tone to inquiries and expect that in the near future some buying will develop. An inquiry for a number of machines is looked for shortly from the General Motors Co. for plants in Dayton, Ohio. The Big Four list is still pending, but is likely to be closed at any time. An Eastern list involving a number of lathes will probably close this week. The automotive industry is showing some activity and local manufacturers received several orders from this source.

The Criterion Automotive Products Co., Dayton, Ohio, has been incorporated with a capitalization of $75,000 to manufacture automobile accessories. Frank Moeschel, H. A. Rietdy and Carl Brough are incorporators.

It is understood that the Burton-Townsend Co., Zanesville, Ohio, is contemplating the erection of a brick plant at Darlington, Ohio. Plans have not yet been completed.

The Cincinnati Sash & Door Co., whose plant at Sixth Street and Freeman Avenue was recently damaged by fire, has secured a new location in the adjoining neighborhood. The damage to the equipment amounted to approximately $30,000. New machinery has been installed and the plant is again in operation.

The Gulf States

BIRMINGHAM, Aug. 22.

The Texas-Mexia Co., Mexia, Tex., is completing plans for a new oil refinery to cost about $400,000, including machinery. The company recently acquired about 40 acres of land.

Edward Boehm and F. T. Fehrenkamp, Moulton, Tex., are organizing a company to construct a new electric power plant. An ice-manufacturing plant will also be erected.

The Jahnacke Ship Repair Co., New Orleans, is negotiating for the purchase of the river front property occupied by the Jackson Barracks, for proposed extensions in its plant.

The Efficiency Engineering Co., Orlando, Fla., has been incorporated with a capital of $30,000 to manufacture special driving mechanisms and other mechanical equipment. M. O. Overstreet is president and treasurer; P. L. Billingsley is secretary.

The Golden State Refining Co., Mexia, Tex., is planning for the erection of a new refinery with initial daily output of 6000 bbl. It recently acquired a site for the plant.

The Bastrop Pulp & Paper Co., Bastrop, La., is planning for installation of machinery at its new plant, to be ready for operation in October and estimated to cost close to $1,000,000. It is a subsidiary of the Kansas City Packing Box Co. and the Kansas City Fibre Box Co., both of Kansas City, Mo. L. H. Fox is head of the companies.

The Freeport Gas Co., Freeport, Tex., has completed plans for the construction of a new plant to manufacture steel drums. It is proposed to develop a daily capacity of about 500. C. A. Jones is manager.

J. Schlecht, Bradentown, Fla., is organizing a company to establish a plant for the manufacture of spark plugs and kindred products.

O. H. Foster, Breckenridge, Tex., and associates, have acquired property at Mexia, Tex., for the erection of a new oil refinery, estimated to cost about $350,000.

The Merritt Island Light & Power Co., Merritt, Fla., has plans under way for a new electric light and power plant. O. R. Grosse is president.

The Chapman Carriage Factory, Jacksonville, Fla., will build a plant at a cost of about $200,000 for the manufacture of carriages, automobile tops and parts. W. E. Sweney is president.

Milwaukee

MILWAUKEE, Aug. 22.

In the past week more indications of the beginning of an actual recovery from the depresion in the metal-working industries have come to the surface. While the machine tool market has not yet felt an appreciable effect, the nature and scope of inquiry portends improvement and new business is developing with greater frequency. Individual orders though small and limited principally to single tools, are becoming more numerous, and it is believed that some good business may be expected in the coming three months. A general view of the local metal-working industry shows that manufacturers are more disposed to make capital investments and some projects intermitted three and six months ago are being resumed.

The F. Rosenberg Elevator Co., 174 Reed Street, Milwaukee, manufacturer of freight and electric passenger elevators, is taking bids for a new plant at Franklin and Becker streets and the Chicago, Milwaukee & St. Paul tracks. It will be of brick and steel, 120 x 223 ft., and cost about $100,000 complete. Considerable new equipment, including a 5-ton electric traveling crane, will be installed. Bids are being taken on the equipment. The architects are Martin Tullgren & Sons, 425 East Water Street, Milwaukee.

The Wrought Washer Mfg. Co., Milwaukee, manufacturer of wrought iron washers and similar bolt, nut and screw specialties, is starting work on the construction of two additions to its plant at Wilcox and South Bay streets. One will be 179 x 135 ft., for manufacturing, storage, warehouse and shipping, and the other, 15 x 89 ft., for offices, stock storage, etc. The cost of the improvements is estimated at $50,000. The general contractors are Klug & Smith, Mack Block, local.

The Marsh Refrigerator Service Co., Milwaukee, manufacturer and repairer of refrigerator cars, is liquidating its business and has sold its plant on the Port Washington Road and the Milwaukee Road tracks to the Matthews Brothers' Mfg. Co., 61-75 Fourth Street, manufacturer of fine interior woodwork, office fixtures, aircraft propellers, etc. The Matthews company in turn has disposed of its present plant to the Rundle-Spence Mfg. Co., 63-67 Second Street, manufacturer of plumbers, and steamfitters' supplies, etc. Both plants will undergo considerable alteration, improvement and retooling by the new owners. The Matthews company will take possession of the Marsh plant about Sept. 1, and give occupancy of its plant to the Rundle-Spence company on Nov. 1. The latter company will operate its newly acquired plant as a branch of the works on Second Street, which will be kept intact. The two transactions involve in excess of $500,000.

The Peter Pirsch & Sons Co., Kenosha, Wis., has engaged Charles O. Augustine, local architect and engineer, to design a one-story brick and steel addition, 100 ft. sq., for the production of fire apparatus for mounting on horse-drawn and motor chassis, and complete vehicles. The investment in building and equipment now being purchased is estimated at $50,000.

The Maribel Straw Cutter Co., Maribel, Manitowoc County, Wis., has been organized with $50,000 capital to manufacture a patented straw cutter and a self-feeding device attachable to all feed cutting machines. Work is under way on a factory, 40 x 100 ft., and equipment is now being purchased. Operations will begin about Oct. 1. Officers of the company are: President and general manager, Henry Elmer; vice-president, Patrick Carberry; secretary, Martin Kvitek; treasurer, Dr. V. V. Kellner.

The Valley Paper Mills, Inc., Neenah, Wis., recently organized with $800,000 capital stock, has acquired a water power site of 17 acres at Blair Springs on the Fox River and is having plans prepared for a paper and pulp mill and auxiliary buildings, to cost with equipment about $600,000. The architect is Edward A. Wettengel, Appleton, Wis., and the engineer for equipment, etc., is Albert C. Ehlman, 835 Caswell Block, Milwaukee. The main building will be 80 x 550 ft., part two stories; the boiler house and engine room, 60 x 165 ft.; machine room, 80 x 170 ft.; beater room, 80 x 100 ft., and finishing room, 80 x 150 ft., all of brick and steel on concrete substructures. G. W. Burnside, Neenah, is general manager.

The Allis-Chalmers Mfg. Co., Milwaukee, has taken the contract for furnishing and installing four electric generating units with a combined capacity of 8000 kw. in the new tractor plant to be established at Troy, N. Y., by the Ford Motor Co. The contract amounts to approximately $200,000. It also recently completed the equipment of a $500,000 saw and planing mill and general wood-working plant at Iron Mountain, Mich., for the Ford interests, which operate this division as the Michigan Lumber, Land & Iron Co.

The Elto Outboard Motor Co., Milwaukee, is the name adopted by Ole Evinrude for a new corporation which he is organizing to take over his business, established about a year ago at 62 Mason Street, of manufacturing gas engines for application to rowboats, canoes and other light water craft. The company is now in quantity production and early next spring intends to build a new plant, although details have not yet been worked out. Mr. Evinrude was the founder of the Evinrude Motor Co., Milwaukee. He retired in 1913 and since then has developed a new light twin-cylinder engine producing 3-hp. and weighing complete 46 lb. Officers of the new company are: President and general manager, Ole Evinrude; vice-president and advertising manager, Mrs. B. Evinrude; secretary-treasurer and sales manager, George B. Treviranus.

The Wisconsin State Board of Control, Capitol Building, Madison, has let the general contract to the American Contracting Co., 198 Milwaukee Street, Milwaukee, at $34,800 for the construction of a power house at the State Home for Feeble-Minded in Union Grove, Racine County.

The Milwaukee-Western Fuel Co., 120 Wisconsin Street, closed bids Aug. 22 for a reinforced concrete, brick and steel garage, machine shop and mechanical service building, 136 x 138 ft., part two stories and basement, at Clinton and South Pierce streets. The equipment will include two 5-ton electric traveling cranes, which probably will be purchased locally. The architects and engineers are Klug & Smith, 30 Mack Block, Milwaukee. William F. Ardern is vice-president and general superintendent.

The Clark Cylinder Regrinding Co., Racine, Wis., has filed articles of incorporation with a capital stock of $25,000 to build a machine shop specializing in automotive engine repairs. The principals are John Clark, Joseph Keidel and Leonard P. Baumblatt, all of Racine.

The Board of Education, Prairie du Sac, Wis., has engaged J. R. & H. J. Law, architects, Madison, Wis., to design a new high school with vocational training departments, to cost about $100,000.

The Northern Wisconsin Hydro-Electric Power Co., Port Wing, Wis., has been organized by T. N. Okerstrom, Port Wing, to develop a waterpower site with a potentiality of 3385-hp. at Orienta Falls on the Iron River. The initial work, which will be undertaken early next spring, will involve an investment of about $375,000.

The Clarkson Coal & Dock Co., Ashland, Wis., which is investing about $500,000 in a new coal dock, handling equipment, etc., has reincorporated under the laws of Delaware with an authorized capital stock of $3,700,000. The incorporators are M. P. Clarkson, J. A. Vaughn, H. R. Johnson and H. P. Porter.

The Continental Axle Co., Edgerton, Wis., advises that it did not sustain a fire loss on July 4. Its building and equipment are intact and the company is under production.

California

LOS ANGELES, Aug. 22.

Buttress & McLean, 205 North Los Angeles Street, Los Angeles, has filed plans for three one- and two-story buildings at Fifty-first Street and Santa Fe Avenue, for the manufacture of mining machinery and parts. The structures will aggregate 60 x 280 ft., and are estimated to cost about $100,000 with machinery.

The Reliable Enameling & Plating Co., 2221 South Main Street, Los Angeles, has filed notice of organization to manufacture enameled and plated metal products. B. H. Brown, 5307 South Main Street, heads the company.

Loading and unloading machinery, hoisting equipment, etc., will be installed on the new dock to be constructed by the Board of City Commissioners, Oakland, Cal., at the foot of Clay Street, estimated to cost about $100,000. City Commissioner Albert E. Carter is in charge.

The Great Western Power Co., 14 Sansom Street, San Francisco, has arranged for a bond issue of $500,000, the proceeds to be used for extensions and improvements to plants and system.

The California Metal Products Co., 8613 Moneta Avenue, Los Angeles, has filed a notice of organization to manufacture metal goods. Thomas D. McHale, 634 West Ninety-second Street, heads the company.

The San Joaquin Light & Power Corporation, Fresno, Cal., has plans under way for the erection of a one-story works building, 130 x 150 ft., to cost $25,000.

The Pomona Sheet Metal Works, Pomona, Cal., has removed to a new building at 174 North Gordon Street, where increased facilities will be provided for the manufacture of gas furnaces, ventilating equipment, etc.

The Crystal Ice & Cold Storage Co., Sacramento, Cal., has plans under way for the erection of a new three-story cold storage plant at Sixteenth and R streets, estimated to cost about $100,000 with machinery. Rasmus Carstensen is president.

Canada

TORONTO, Aug. 22.

The Canadian Automobile Corporation has taken over the building formerly occupied by the Rapid Tool & Machine Co., at Lachine, Que., and has commenced the manufacture of motor cars. The present plant is only temporary, the company having secured a site of 163,000 sq. ft. at Longueuil, Que., and proposes to start work in the near future on the erection of a plant. The directors include F. W. Stewart, H. W. Austin, J. D. Henderson and others.

The International Harvester Works, Chatham, Ont., will build an addition to its plant and proposes to go into the manufacture of motor trucks, etc.

The Hollinger Consolidated Mines, Ltd., Timmins, Ont., proposes to spend $2,000,000 on hydroelectric development there. Sutcliffe & Neelands, New Liskeard, Ont., are the engineers.

The East Kootenay Lumber Co., Jaffray, B. C., is having plans prepared for repairs to a planing mill to cost $40,000. Some new equipment will be required.

The contract for foundations for the paper mill to cost $2,000,000 for the Provincial Paper Mills, Ltd., 54 University Avenue, Toronto, to be erected at Port Arthur, Ont., has been awarded to Chambers, McQuigge & McCaffrey, Port Arthur, Ont.

The Smithville Metals, Ltd., Smithville, Ont., will erect a new factory to cost $11,000. The steel contract has been let to the Standard Steel Construction Co., Welland, Ont.

The Wire Co. of Canada, Ltd., Hamilton, Ont., recently incorporated to manufacture wire and stamping specialties, has taken over the plant and equipment of the MacPherson Wire Co., Ltd., Hamilton.

The Canadian Austin Machinery, Ltd., Woodstock, Ont., has been incorporated with a capital stock of $50,000 by Henry A. Little, Arthur S. Robertson, Stanley A. Ross and others to manufacture concrete mixing machines, steam shovels, contractors' equipment, etc.

The British American Fuel & Metals, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by Thomas Gibson, 67 Yonge Street; Henry C. Draper, 100 Binscarth Road; Edward M. Stoer and others to manufacture iron and steel products, etc.

The National Slag Products, Ltd., Hamilton, Ont., recently incorporated with a capital stock of $300,000 will start work in the near future on the erection of a plant for the production of tile, brick, roofing material, posts, etc. The officers and directors are William H. Yates, Hamilton, president; David Dick, Welland, vice-president; J. P. Anglin, Montreal; Hon. G. D. Robertson, Ottawa, Ont.; H. J. Daly and W. R. Fleming, Toronto; Gordon Hutton and E. J. Robertson, Hamilton.

IRON AND INDUSTRIAL STOCKS

Constructive Forces Have Failed to Stimulate Investment Buying

Steel mill operations are improving and there has been greater activity in the pig iron market and in various manufacturing lines. National finances, as represented in Federal Reserve and private bank reports, are daily strengthening. These constructive forces have failed to stimulate investment buying of iron and industrial stocks to a point in excess of liquidating sales. Average quotations for securities consequently are lower than they were a week ago and in quite a few instances lower than they have been before this year.

Six months' earnings statements, issued recently by important industrial concerns, almost uniformly revealed the necessity of absorbing inventory losses, thus postponing the time when normal earnings power will have been restored. Fear that forthcoming earnings statements will show such internal conditions is said to be the basis for at least a part of the present liquidation in securities.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	29½ - 30⅝	Midvale Steel.....	23¼ - 24
Allis-Chalm. pf...	72¾ - 73	Nat.-Acme	14 - 14⅛
Am. Can com.....	24¼ - 25½	Nat. E. & S. com.	39 - 43¾
Am. Can. pf.....	78½ - 80	Nat. E. & S. pf...	— - 89½
Am. C. & F. com.	120½-123½	N. Y. Air Brake..	47½ - 53
Am. C. & F. pf...	— -109½	Nova Scotia Steel.	— - 23½
Am. Loco. com....	83 - 84	Press. Steel com..	53⅝ - 57
Am. Radiator com.	— - 68½	Ry. Stl. Spg. com.	69 - 74½
Am. Steel F. com.	22½ - 25½	Ry. Stl. Spg. pf...	— -100
Am. Steel F. pf...	— - 80½	Replogle Steel....	— - 20
Bald. Loco. com..	71¾ - 75	Republic, com.....	45 - 46¾
Beth. Steel com..	— - 45⅝	Republic pf.....	82½ - 84
Beth. Stl., Cl. B..	47¾ - 49	Sloss com.....	— - 33½
Beth. Stl., 8% pf..	97 - 97¼	Un. Alloy Steel...	— - 23
Chic. Pneu. Tool..	— - 48	U. S. Pipe com...	12 - 12½
Colorado Fuel.....	22½ - 23¼	U. S. Pipe pf.....	40 - 42
Cruc. Steel com...	51½ - 54¼	U. S. Steel com...	73⅜ - 74¾
General Electric..	109⅞-114½	U. S. Steel pf.....	109 -110
Gt. No. Ore Cert..	— - 28⅝	Vanadium Steel...	26¼ - 27½
Gulf States Steel.	— - 31	Va. I. C. & Coke..	59 - 62
Int. Har. com.....	69½ - 73	Westingh'se Elec.	39½ - 43⅛
Lackawanna Steel.	37½ - 38		

Industrial Finance

All outstanding 5 per cent first mortgage bonds dated Oct. 1, 1914, of the Quigley Furnace & Foundry Co., Brightwood, Mass., due in 1924, have been called for payment Oct. 1 at the office of the State Street Trust Co., Boston. This company was taken over by the Huron Metals Co. some time ago, and eventually the plant was run by the General Electric Co. and other interests.

Frank E. Malone, New York, and Thomas B. Coughlin, Springdale, R. I., have been appointed receivers for the British-American Mfg. Co., Springdale, R. I., to succeed three original receivers, Edward J. Maurer, Frederick Stern and Louis C. Hasell.

The General Motors Corporation, in the six months ended June 30, last, showed a surplus after all charges, federal taxes, preferred stock and debenture dividends of $6,468,550, which is equal to 31c. a share on the 20,528,790 outstanding common shares of no par value. In the corresponding period last year the company earned $1.66 a share on 19,518,895 shares of common stock.

Peter Gray & Sons, Inc., Cambridge, Mass., maker of railroad lanterns, etc., has increased its capitalization $30,000 or 300 shares of preferred stock and making the total capitalization $140,000. George M. Gray is president, and Mason H. Gray, treasurer.

The Nelson Rivet Co., Taunton, Mass., has increased its capitalization from $10,000 to $25,000 by an issue of 50 shares of common and 100 shares of preferred stock issued against real estate, merchandise and machinery. A. E. Nelson is president and Walter H. Nelson, treasurer.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅝ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.05c. to 4.30c.	.....
Nos. 22 and 24	4.10c. to 4.35c.	4.70c.
No. 26	4.15c. to 4.40c.	4.75c.
No. 28	4.25c. to 4.50c.	4.85c.
No. 30	4.50c. to 4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c. to 4.25c.
Annealed soft	4.00c. to 4.25c.
Galvanized annealed	4.75c. to 5.00c.
Coppered basic	4.50c. to 4.75c.
Tinned soft Bessemer	6.00c. to 6.25c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	18½c. to 20 c.
Copper tube, seamless	20 c. to 22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20	
		Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		
IC.. $10.60	$9.50	IC... 7.20	6.95
IX.. 11.80	10.75	IX... 8.10	7.85
IXX.. 13.60	12.25	IXX... 9.10	8.85
IXXX.. 15.60	14.25	IXXX... 10.50	10.25
IXXXX.. 17.20	16.00	IXXXX... 11.50	11.25
		80 lb.... $6.80	$6.55
		90 lb.... 6.90	6.65
		100 lb.... 7.00	6.75

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	37c. to 38c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 30c. to 32c.

Old Metals

The market has settled back into a quiet, sluggish condition. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.50
Copper, heavy and wire	8.75
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

THE IRON AGE

New York, September 1, 1921

ESTABLISHED 1855 VOL. 108: No. 9

Features of a Non-ferrous Metal Foundry

Cost of Handling Reduced to Minimum—Melting Equipment Located at Center—Fumes and Smoke Satisfactorily Removed

BY F. L. PRENTISS*

THE outstanding features of the new jobbing brass and aluminum foundry of the National Bronze & Aluminum Foundry Co., Cleveland, are the arrangements for the reduction of the cost of handling material to a minimum, the location of the melting equipment in the center of the foundry and the method of providing ventilation for carrying away the fumes from the furnaces.

The plant includes a main building 150 x 250 ft., a cleaning and shipping room on one side 80 x 100 ft., and a sand mixing room 20 x 100 ft. adjoining the core room, part of which is used for core room purposes.

The plant is designed for mass production work and has sufficient flexibility to permit its use for making either heavy or light castings with equal facility. It is so laid out that all of the production departments are virtually in one room, and the superintendent, from points near the center of the foundry, has a good view of all departments. The casting goes in turn from the



The Melting Equipment Is Located at the Center of the Foundry to Reduce the Distance the Metal Has to Be Carried to the Molds. The crucibles are arranged in a double row in the pit and the fumes from the furnaces are carried out through a hood and ventilating stack in the roof above the crucible furnaces. Other melting equipment is located at the right of the crucibles, only one group of these appearing in the picture

*Resident editor of THE IRON AGE at Cleveland.

molders' floor to the shake-out room, finishing department, sand blast and shipment room, all on one floor. With continuous glass sections in the side walls the lighting facilities are unusually good. The plant has a daily capacity of 16 tons of aluminum and 50 tons of brass castings.

The advantage of locating the melting department in the center of the main building is in the reduction of the distance the metal has to be carried to the molding floors which surround the melting furnaces. The average distance that crucibles of metal are carried from the furnaces to the molds is 75 ft., and 100 molding floors can be reached in that distance. Two jib cranes attached to the building columns handle the crucibles. With the convenient arrangement of the foundry and the short distances that the metal is carried, the management states that the cost of non-productive labor, which includes all labor except molders and core makers, has been reduced 50 per cent from that in its former plant.



The Arrangements for Lighting and Convenient Handling of Machines and Materials Are Apparent in the General View of the Foundry Floor

The Smaller View Covers a Part of the Cleaning Department. The rough castings are placed in a bin back of each grinding machine. When the operator finishes a piece he places it on a cleaning table at the side of the machine, where any filing necessary is done

For melting brass there are 30 oil-fired, pit type, crucible furnaces with No. 80 crucibles. About 300 lb. of brass is melted in each crucible. The crucibles are arranged in a double row in a pit, instead of in the usual one row. The pit, of concrete construction, is 45 ft. long, 10 ft. 6 in. wide and 18 in. deep. Between the two rows of furnaces is a concrete covered manifold that supplies the furnaces with air. The oil lines are carried above the manifold. The control of both air and oil is at each end of the pit. A special feature of the furnace arrangement is the provision of a pit, 6 ft. deep, that extends under the furnace pit. Under each crucible is a hole 4½ in. in diameter. Through this the metal passes in case a crucible breaks, and is deposited in a compartment in the pit beneath, from which it is later recovered. With this arrangement interference with operations of other furnaces should a crucible break is avoided, and the escaped metal does not spread out in the bottom of the pit and become mixed with the dirt under the furnace.

Fumes from the furnaces are carried from the foundry through a ventilating stack 10 x 16 ft. that extends up to the roof and is connected at the bottom to a hood 50 ft. long and 20 ft. wide extending down in the trusses directly over the furnace pit. Sufficient air comes in from the sides of the building to provide circulation and the products of combustion are carried straight up the furnace and out through the ventilating stack. As a result the foundry is remarkably free from fumes and smoke.

The melting equipment includes two large specially designed oil-fired furnaces of the reverberatory type, one of 2000 lb. capacity for melting aluminum and the other with melting capacity of about 2 tons for brass, these being used for production work, three roll-over brass melting furnaces and a Booth electric furnace of 500-lb. capacity for melting brass. A feature of the two large reverberatory furnaces is that the dirt and slag cannot be poured out with the metal but stays in the furnace. The furnaces are cleaned every night by pouring out the refuse from the bottom of the furnace. The melting furnaces are located near the center of the foundry at the side of the pit furnaces and the fumes from the former are also carried up through the ventilating stack. They are so placed that all handling of metal from the furnaces to the molders' floors is done by hand. Practically all the molds are machine made, various types and sizes of jar ram roll-

over pattern drawing machines being used. Jar ram squeezers are provided for making smaller molds. Air hoists are used for handling the molds and shaking out castings.

The core room is equipped with eight Swartwout core type oil-fired double core ovens, 7 ft. 6 in. wide and 8 ft. 10 in. deep. Elevating trucks, both hand and electric, are used for charging these ovens. There are also three shelf type ovens, 5 ft. wide and 30 in. deep, for small cores.

The ovens are at the sides of the core room adjoining the foundry floor. The large ovens have doors on both sides so that cores, after being baked, are taken out the opposite side into the core storage room. Cores baked in the small shelf type ovens are also removed from the opposite side of the ovens, thus reducing the distance in handling. Foundry sand is unloaded from a siding only 30 ft. from the sand mixing machine.

The cleaning room is reached from the foundry floor by two aisles, one for heavy brass and aluminum castings and the other for light brass castings. On the foundry side of the cleaning room is a row of sprue cutters and band saws, the former for cutting the sprues from brass castings and the latter mostly for work on light aluminum castings. Back of the sprue cutters and band saws is a double row of grinders for grinding small brass castings. The rough castings are placed in a bin back of each grinder, and when the grinding machine operator finishes a piece he places it on a cleaning table at the side of the machine, where the filing is done. With this arrangement of the cleaning room the superintendent can see at a glance if any employee is lagging. Air hammers are provided on the side of the cleaning room where the heavy work is handled, for chipping the heavy brass and aluminum castings.

From the cleaning-up tables the brass castings go to the sand blast machine back of the grinders for the final cleaning operation. This machine has two combined cleaning units consisting of a rotary table for small work and a sand blast room for large work. The machine is furnished by the MacLeod Co.

NICKEL AND COBALT IN IRON

German Experiments on Iron Castings—Nickel Improves Physical Properties

Two authors, Prof. O. Bauer and Dr. E. Piwowarsky, in an article in *Stahl und Eisen*, Sept. 30, 1920, discuss the effect of nickel and cobalt on cast iron based on experiments which they conducted. It was attempted to ascertain whether the addition of these metals to cast iron had a similar effect to their addition to steel. An abstract of the original article, made by *Technical Review*, London, follows:

"The raw material used in the tests was pure Swedish charcoal pig iron containing 3.90 per cent total carbon, 2.80 per cent graphite, 0.048 per cent phosphorus, 0.18 per cent manganese, and 0.69 per cent silicon. The nickel was used in the form of electrolytic nickel. Small melts were first of all made for obtaining the cooling curves, and it was found that the nickel easily alloyed with the pig iron at a temperature that was only 50 deg. C. above the temperature of the iron. Larger melts were then made, in conical graphite crucibles of 200 mm. height and 100 mm. diam. at the top. These crucibles each contained 2250 grams of pig iron, which was then melted in a Helberger furnace with a liberal addition of graphite. They were heated 100 deg. C. above the melting point, the nickel, carefully weighed, being added in small pieces. After the mixture was thoroughly stirred with a carbon rod, the metal was poured into dry sand molds, and gave castings 20 mm. diam. and 650 mm. long. Four melts were made in this way, the first without any metallic addition, and the other three with various added percentages of nickel.

"Suitable samples were taken for purposes of analysis, tensile tests, notch-impact tests, compression tests, and Brinell hardness tests, the dimensions of the test pieces being given. The results of all the tests are given in a table. They show the best figures for about 1 per cent of nickel. The increase in bending strength as compared with the original cast iron is approximately 30 per cent; the compressive strength is increased 30 per cent, and the tensile strength by only 18 per cent. The freedom from acid decreases slightly, but not to the extent anticipated. Probably the catalytic effect of the graphite is too considerable. The following mean figures are given for a nickel addition of about 1 per cent: Per cent nickel added: 0.87; total carbon, 3.89 per cent; graphite, 2.85 per cent; graphite expressed as percentage of total carbon, 74.1; bending strength, 31.3 kg. per sq. mm.; extent of bending or deflection, 6.8 mm.; tensile strength, 12.5 kg. per sq. mm.; compressive strength, 74.75 kg. per sq. mm.; Brinell hardness, 171; specific work of impact (resilience [Charpy]), 0.43 kg. per sq. cm; per cent loss of weight of a 10 gram cube when subject to a 1 per cent solution of sulphuric acid, 14.6. On metallographic examination, all melts exhibited the normal structure of a good gray cast iron, that is, very uniformly distributed graphite needles in a ground mass of ferrite, and pearlite in the form of laminæ.

"For the manufacture of high quality castings for machine parts, gear-wheels, etc., the writers recommend a percentage of added nickel of up to 1.20 per cent.

"Two test melts with added cobalt were prepared, the percentages of cobalt being 1 per cent and 2 per cent respectively. The results show the effect of cobalt to be opposite to that of nickel. The bending strength drops considerably, and the tensile and compressive strengths exhibit a gradual decrease, while the hardness increases slightly. There is therefore no possibility of using cobalt for improving the properties of cast iron."

Steel Mill Electrical Engineers' Meeting

What is called "fuel economy day" will be a feature of the annual convention of the Association of Iron and Steel Electrical Engineers at the La Salle Hotel, Chicago, in the week of Sept. 19. On Wednesday, Sept. 21, papers are announced on fuel problems as follows:

"Waste Heat Utilization for Steam Generation," by G. R. McDermott, assistant engineer, Illinois Steel Co., South Chicago, Ill.

"Combustion Control," by W. N. Flanagan, steam engineer Ohio works, Carnegie Steel Co., Youngstown, Ohio.

"Fuel Requirements of Steel Mills," by F. E. Leahy, fuel and experiment engineer, Carnegie Steel Co., Duquesne, Pa.

After the discussion of these papers, it is proposed to take up the advantages that may be derived from the use of such appliances as CO_2 recorders, flow meters, indicating combustion pressure meters, pyrometers and regulators.

New Sales Plan of Thos. Firth & Sons

The agency arrangement for the sale of sheet steel heretofore existing between Thos. Firth & Sons, Ltd., Sheffield, Eng., and Wheelock, Lovejoy & Co., New York and Cambridge, has been terminated, and Thos. Firth & Sons have appointed as their general sales manager for the United States Horace G. Hides, Hartford, Conn., who for the past 20 years has represented Wm. Jessop & Sons.

The stock of Firth-Sheffield sheets will be carried in the warehouse of the Firth-Sterling Steel Co., 312 Hudson Street, New York, an associate company.

Thos. Firth & Sons and the Firth-Sterling Steel Co. are also opening a joint office in Hartford, Conn., where Mr. Hides will have his headquarters, and where Henry I. Moore will represent the Firth-Sterling Steel Co.

DOLLAR CONTROL

Executive Management Should Watch Purchases No Less Carefully Than Income

BY JOHN J. RALPH*

There has been a great advance in the use of past records of business in judging the effect of past measures and present happenings. Years ago it was general practice to balance books once a year. This balancing was merely a bookkeeper's proceeding. To-day in some concerns balances are drawn as often as every month, and there is a thorough examination of what may be called fixed items, to see that there has really been no change and to allow for the effects of time. It is realized that plant investment, good will, machine equipment, design and patent properties are not fixed capital, but only relatively so.

The movement of the point of exact information is toward the exact time of the happening. Occasionally the cost-keeping system is so perfect that the results of to-day are available to-morrow morning. This makes it possible to keep an exact control on the dollar that is being spent on goods going through the works.

Specialty Development

Of late years business and professional literature has been full of a developing series of specialties, which in turn have exploited the possibilities of the different departments of a business, and each in turn has insisted that it was the major and essential element of success. In many cases these widely heralded discoveries are not really new, but are popularization of principles which have been known for many years, having reached considerable perfection in certain industries and trades.

Intense study of mass production was developed to a high degree in the agricultural implement and sewing machine industries. Perhaps the pioneer of machine mass production was the fire-arms manufacturer.

Cost accounting is to-day recognized universally as absolutely essential. There have been few new principles evolved. Costs and their elements have been known by progressive men since the foundation of industry. But the practice has now been codified, the elements laid bare, and the knowledge has been made general.

Similarly, there have arisen efficiency engineering, industrial management, statistical analysis, so-called scientific salesmanship and other "isms." There has been progress, both in actual accomplishment and in dissemination of knowledge of engineering, chemistry, agriculture and other basic sciences.

The Master Faculty

Proud as is each exponent of the specialties, yet there is one faculty upon which they all depend, to which they all yield obedience, of which they all pretend knowledge, but which belongs to none of them alone and includes all of them. This is plain business judgment and initiative.

Perhaps because of the universal knowledge of the truth of this, perhaps because of its empirical nature, its exceedingly personal nature; because of the general slavery to it and the dislike for making a display of bonds, scant justice has been done to it by the various specialties. Not that he who exercises it cares, for he handles the cash and cracks the whip for the rest of the "isms."

As business increases in size it becomes necessary to develop the various specialties. The general adoption of modern methods of accounting and cost finding is a special instance of this. Their purpose is to furnish to the executive an accurate small-scale reproduction of the entire institution, so that he may follow all that is being done, and thus control it.

He it is who is responsible for the dollar, its growth and its protection. The bookkeeper tells him of what has been done. The cost-keeper brings the record up to yesterday. The efficiency engineer cares for the securing of the maximum returns on it to-day. His is the problem of the dollar control. The height of its perfection is shown in the accuracy of the forecasts of the future and the aptness of the steps that have been made to take advantage of it. Just as the increasing size and complexity of modern business have forced the evolution of modern record keeping, so that the executive might keep track of developments, so the same cause has taken out of his hands many of the control functions which, whether he realizes it or not, are now exercised by his subordinates. His power is more and more that of mere control, of approval or of veto.

Executive Reluctant to Give Up Power

Still the old feeling of the power of the executive persists. He is reluctant to give it up, reluctant to see how he has been compelled to delegate to others. And throughout the organization there is the reluctance of the individual to see responsibility and to assume it.

Where, in the old days, judgments were made and initiative exercised by the executive, to-day he chooses between two or more alternatives offered by his subordinates. He is free, if he wishes to do so, to judge which of two different kinds of machines he will buy, but the design and manufacturing departments, by their prior decisions, have forced the type of machine he must choose.

Similarly, the sales department dictates what shall be the output of the coming years. Theirs is the responsibility of gaging the market, and of getting from the design department what they will want. Here again the executive must act, but this action is that of approval or veto. It is not an independent action. If John Fritz were alive to-day he would not design his own blowing engines, master steel maker that he was. There would be too much else for him to do, and others exist who could design as well as he.

Large decisions are made up of an infinity of smaller ones. Unless the entire organization is forward looking, and so closely knit together that the best collective judgment is used, the executive has poor alternatives from which to choose.

Bookkeeping or cost records can be a record only of what has already been done. It is necessary that the lessons contained in them be thoroughly learned, for they form the basis of future judgments. There are always hidden elements not revealed by these records. Part of these lie within the institution, part of them without. The intangible things of to-day—the happenings of to-morrow—are not to be found on a paper record. Here lies the element of speculation in business, for the business man must act and determine in advance of the actuality.

If the executive has lost much of his power to make decisions, to plan, to execute; if this has passed to his organization, it is a most important part of his duty to see that they develop the faculty of foresight, and realize the part they are actually playing in the life of the organization.

The Control Line

The cost record, the production chart, furnish the basis of control of what is going on now. The bookkeepers' record, the yearly balance sheet, tells the story of what has occurred in the past, and either justifies or condemns the errors of the past.

Where does the control of the future lie? The capable executive keeps in close touch with all parts of his organization, but there must be some particular point where all must recognize a formal control line.

The tendency is to watch carefully the point where the dollars come in. This is desirable, but they are the result of work done. The real point to watch is where the dollars go out. The incoming dollar is the fruit, the outgoing dollar is the seed, on which the institution depends for its life.

This is what makes buying so important.

Here is the logical point to control that which will happen in the future. If insistence is placed on the perfection of the methods of determining on purchases, the forethought involved, the co-operation in planning for the future, then the alternatives offered for decision will be worth while. This is the logical point from which to enforce realization of the part each one in the organization has in determining its future—the necessity of thorough work and of co-operation.

*40 Flushing Avenue, Jamaica, N. Y.

Universal Steel Classification Code

Proposed New Code to Supplant Present S. A. E. System—Claimed to Be Simpler, More Elastic and Easily Expanded

—BY HORACE C. KNERR* AND ARTHUR L. COLLINS*—

THE present system of classifying steels, known as the S. A. E. system, was inaugurated by the iron and steel division of the Society of Automotive Engineers in 1912. The idea behind this movement was to afford a code by which any steel could be designated and to indicate concisely the important elements present in the steel with the approximate amounts of each. Those behind this movement decided on numerical symbols, believing that such a system would be sufficiently comprehensive. To quote from the S. A. E. handbook:

The numeral index system adopted in the numbering of the metal specifications renders it possible to employ specification numerals on shop drawings and blueprints that are partially descriptive of the quality of material covered by such numbers. The first figure indicates the class to which the steel belongs; thus, 1 indicates a carbon steel; 2, nickel, and 3, nickel-chromium. In the case of the alloy steels, the second figure generally indicates the approximate percentage of the predominant alloying element. The last two or three figures indicate the average carbon content in "points," or hundredths of 1 per cent. Thus 2340 indicates a nickel steel with approximately 3 per cent nickel (3.25 to 3.75) and 0.40 per cent carbon (0.35 to 0.45); and 52100 indicates a chromium steel with about 2 per cent chromium (1.20 to 1.50) and 1.00 per cent carbon (0.95 to 1.10).

The basic numerals for the various qualities of steels specified follow:

Carbon steels 1	Chromium-vanadium steels..6
Nickel steels 2	Tungsten steels 7
Nickel-chromium steels 3	Silico-manganese steels....9
Chromium steels 5	

It is claimed for this system that it is "capable of unlimited expansion and that no other system could be as simple."

Nevertheless consideration was recently given by the society to revising this system to take care of the rapidly increasing number of alloy steels. It was soon found that in expanding the old code to meet the enlarged requirements, it was necessary to depart from the original plan and to arbitrarily assign symbols to new types of steels without regard to consistency. In other words, it was impossible to adhere to the original method.

The following elements were regarded as being of sufficient metallurgical importance to be considered as possible constituents of alloy steels:

Aluminum	Nickel
Carbon	Silicon
Cobalt	Titanium
Copper	Tungsten
Chromium	Uranium
Manganese	Vanadium
Molybdenum	Zirconium

The method of expansion proposed by the society to take care of the new alloys may be illustrated by the following cases:

*Metallurgical engineer, Philadelphia.

AUTHORS' SYNOPSIS

The present system of steel classification is believed to be limited in scope, arbitrary rather than scientific and not inherently capable of consistent expansion.

The original simple plan is already outgrown; the proposed further expansion tends to complication. Examples of inconsistencies are shown.

A scientific system capable of unlimited expansion is needed. Symbols should be consistent and should suggest material represented, aiding the memory.

A straight number system is necessarily limited.

A combined letter and number system is suggested, which is mnemonic, simple and truly elastic, and which indicates both materials and their approximate quantities, if desired, without complication.

Illustrations of the proposed system are given.

Group 1—Carbon steels.

10--Carbon steel as now specified.
10--(plus three figures for carbon contents above 1.00 per cent.)
11--Carbon steel, screw stock.
12--Carbon steel, castings.
13--Carbon steel, with manganese content from 1.00 to 1.50 per cent.
113--12-14 per cent manganese steel.

The figures 14 to 19 are reserved for additional carbon steels.

Group 2—Nickel Steels.

The first figure indicates the nickel group while the second figure represents the per cent of nickel, thus:

21--Nickel steel with 1.00 per cent nickel.
23--Nickel steel with 3.00 per cent nickel.
25--Nickel steel with 5.00 per cent nickel and so on.

The remaining numbers, 26 to 29 inclusive, are reserved for other nickel steels, such as NiV, NiMo, NiMn, NiSi.

Group 3—Nickel-Chrome Steels.

31--Nickel-chrome with 1.00 to 1.50 per cent nickel.
32--Nickel-chrome with 1.50 to 2.00 per cent nickel.
33--Nickel-chrome with 3.00 per cent Ni and 1.50 per cent chrome.
34--Nickel-chrome with 4.00 per cent Ni and 1.50 per cent chrome.

The remaining numbers, 35-39, inclusive, are reserved for other nickel-chrome steels such as NiCrV, NiCrMo, NiCrSi, etc.

Group 4—Unassigned.

Group 5—Chrome Steels.

51--Chrome steel as now.
52--Chrome steel with 1.00 to 1.50 per cent Cr.
52--Chrome steel with 3.00 per cent Cr.
54--Chrome-steel with 4.00 per cent Cr.
512--Chrome steel with 12.00 per cent Cr.

The remaining numbers are for other chrome steels such as CrMnSi, CrMo, CrSi.

Group 6—Vanadium and Chrome-Vanadium Steels.

60--Vanadium.
61--Chrome-vanadium as now.
62--Chrome-vanadium with 2.00 per cent Cr.
63--Chrome-vanadium with 3.00 per cent Cr.

The remaining numbers are reserved for other combinations such as CrMoV, CrSiV.

Group 7—Tungsten and Tungsten-Chrome.

70--Tungsten 5.00 per cent W.
71--Tungsten-chrome with 1.00 per cent W.
72--Tungsten-chrome with 2.00 per cent W.
73--Tungsten-chrome with 3.00 per cent W.
74--Tungsten-chrome with 4.00 per cent W.
75--Tungsten-chrome with 5.00 per cent W (Magnet).
713--Tungsten-chrome with 13.00 per cent W.
716--Tungsten-Chrome with 16.00 per cent W.

It was undecided whether to designate the straight 5.00 per cent W. steel as 70 or 75, and whether there would be occasion to classify any other tungsten steel in this group.

No provision has been made to take care of tool steels.

Group 8—Not Assigned.

Group 9—Silicon and Silicon-Manganese Steels.

90--
91--Silicon steel with 1.00 per cent Si.
92--Silicon steel with 2.00 per cent Si.
93--Silicon steel with 3.00 per cent Si.
94--Silicon steel with 4.00 per cent Si.
95--Silicon steel with 5.00 per cent Si.

The remaining numbers are reserved for the other silicon combinations such as SiCr, SiNi, etc.

In all the above symbols, the dashes represent carbon content.

Limitations of Present S. A. E. System

It is believed that a careful analysis, entirely unprejudiced by the familiarity of usage and custom, would show that the present system of designation of steels by numbers, although it has perhaps been simple, convenient and workable up to the present time, is in reality unscientific, arbitrary and not inherently capable of wide expansion.

The original plan of using the first figure of the designating number to indicate the alloy, the second figure the approximate amount of the alloy and the final two figures the approximate carbon content of the steel was excellent so far as it went, but it has quite evidently been outgrown by the multiplicity of alloying elements and combinations which have come into use.

It is true that an arbitrary assignment of unused numbers may be made to cover the diverse alloys now immediately in view, with some margin for further expansion, but such numbers will necessarily be inconsistent with the fundamental plan of the system and must therefore lead to confusion.

Inconsistencies Illustrated

For example, under Group 2, nickel steels, the first figure, 2, indicates nickel, the second, from 1 to 5, the approximate percentage of nickel, and the third and fourth figures, the carbon content. It is now proposed to use the remaining numbers, 26--, 27--, 28--, and 29--, for nickel steels containing another alloy, excepting chromium, such as vanadium, molybdenum, manganese, silicon. The original plan is thereby abandoned and confusion is inevitable.

Moreover, is there any reason to feel sure that numbers at present unused will take care of all new or unlisted alloys and combinations of alloys? For instance, 26--, 27--, 28-- and 29-- are proposed to take care of four different alloys of nickel. When these are assigned, what about further alloys? And how will varying *quantities* of the alloys be indicated? Are there not several possible proportions of, say, nickel-molybdenum to be distinguished? How will a number such as, say 27-- for the nickel-molybdenum group do this?

To illustrate the inconsistencies which will result from further expansion of the present system, take several steels having an 0.30 per cent carbon content:

2330 = 3.50 per cent nickel.
2630 = say (?) per cent nickel, (?) per cent vanadium.
2730 = say (?) per cent nickel, (?) per cent molybdenum.
3130 = 1 per cent nickel, 0.60 per cent chromium.

Why should the second figure in the first case represent the amount of nickel? In the next two cases the presence, but not the amount of some other element, say vanadium or molybdenum, the amount of nickel being ignored; while in the last case the first figure indicates two elements, nickel and chromium, the second figure the amount of nickel, while the amount of chromium is ignored.

Furthermore, nickel-chrome-vanadium shall be, say, 36--, which does not indicate the quantity of any alloy, whereas, without the nickel the same steel would be 61-- (chrome-vanadium), or if the chromium were omitted, it might be 26-- (nickel-vanadium). For chrome steels, we have the Group 5, which does not appear in any of the above combinations containing chromium. For tungsten-chrome steel we use 71--, 72--, etc., the first figure indicating the presence of tungsten and the second figure the amount, there being nothing to indicate either the presence or amount of chromium.

Many illustrations of such inconsistencies and departures from the original plan could be quoted. It would seem as if the matter might become almost as arbitrary and involved as the Chinese alphabet, if much expanded.

Need of a Universal System

Ten years ago, when the system was adopted, alloys were few. At the present time, the number of alloys and combinations has already outgrown the original simple plan. Is there not reason to believe that new discoveries and experiments may result in even greater expansion in the next 10 years? May it not, therefore, be time to develop a system founded upon a scientific basis, which can be expanded indefinitely to meet present and future needs without becoming arbitrary and complex or introducing exceptions?

Any straight numerical system is necessarily limited. For example, in the present system, the first figure (on the left) is sometimes used to designate one material and sometimes two (as 2--- for nickel and 3--- for chrome-nickel), while the second figure sometimes designates the amount of the first material (as 23-- for 3½ per cent nickel), sometimes the amount of the second material (as 32-- for chrome-nickel with 2 per cent nickel), sometimes the amount and presence of the second of two materials (as 63-- for chrome-vanadium, with 3 per cent Cr.), and it is now proposed to have the second figure sometimes designate the presence but not the amount of a third material (as 36-- for nickel-chrome-*vanadium*). Further complications are introduced by using two numbers to designate the amount of certain materials (as 113-- for 12 to 14 per cent manganese steel).

It seems clear, therefore, that by using numerals alone, a system permitting unlimited expansion without inconsistencies is impossible (unless, perhaps, a complicated decimal system running into high numbers were used, analogous to the Dewey decimal system, which is undesirable). One reason for this limitation is that the number of available units, 9, is less than the number of alloying elements, already more than 12.

Characteristics Desired

It is, therefore, worth considering whether a system involving letters may not indeed be developed to meet the requirements. A perfect system should be:

Brief, easy to say, write or print.
Universal, capable of unlimited expansion.
Comprehensive, capable of indicating approximate quantity of each alloy as well as its presence.
Mnemonic, easy to remember.

A letter system has the advantage that there are 24 available units (omitting O and I), as compared to 9 with numbers. A letter is as simple as a number for designating a material, and within certain limitations, the letters can be chosen so as to represent, or at least suggest, the name of the material in question, which a number cannot do. Numerals may then be used solely to indicate the quantities, which is their true function. This comes down to a simplified chemical system. Can such a system be made sufficiently simple to meet the requirements?

Proposed System

As indicated above, there are 14 elements at present recognized as likely to enter into alloy steels. Discovery may result in the use of a number of others. Let us consider the present ones listed in the following table, with a proposed designation for each:

Element	Chemical Symbol	Proposed Alloy Symbol
Aluminum	Al	A
Carbon	C	C
Chromium	Cr	K
Cobalt	Co	B
Copper	Cu	Q
Manganese	Mn	M
Molybdenum	Mo	L
Nickel	Ni	N
Silicon	Si	S
Titanium	Ti	T
Tungsten	W	W
Uranium	Ur	U
Vanadium	Vd	V
Zirconium	Zr	Z

Each of these elements is symbolized by a single and distinctive letter which suggests, in some degree, its name or chemical symbol, so that the system is so far mnemonic.

This leaves 10 letters of the alphabet to take care of other elements whose usefulness is still to be learned. The letters I and O should be omitted

on account of their resemblance to numerals.

This permits of nearly doubling the number of alloying elements now used, before combinations of two letters will be necessary. It is apparent that even should two letters be employed to designate any new element there would be no resulting confusion. This, of course, contemplates the use of capital and small letters for a symbol. The symbol for carbon would not necessarily appear, as will be seen below.

In order to indicate, approximately, the quantity of any alloying element, numbers would be used, as in the present system. The number would be placed after the symbol of the element referred to. When unnecessary to designate the amount of the element, this number could be omitted. The carbon content would be indicated by the figures at the extreme left, the prefix C being implied but not written, except in the case of straight carbon steels.

The letter X may be used to designate special steels, differing slightly from the standard, as in the present S. A. E. system. This would be placed at the end of the symbol, so as not to interfere with the carbon content.

Some illustrative examples of groupings and designations under this proposed system follow:

Carbon Steels

Proposed Symbol	Present Symbol
C10	1010
C20	1020
C95	1095
C125	10125
Etc.	

Nickel Steels ("N" Steels)

Proposed	Present	
20N1	2120	(1% nickel, 0.20% carbon)
20N2	2220	(2% nickel, 0.20% carbon)
35N3	2335	(3.50% nickel, 0.35% carbon)

Nickel-Chrome Steels ("NK" Steels)

Proposed	Present	
20N1K	3120	(1.25% Ni, 0.60% Cr)
30N2K1	3230	(1.75% Ni, 1.10% Cr)
40N3K2	3340	(3.50% Ni, 1.50% Cr)
35N3KX	X3335	(3.00% Ni, 0.80% Cr)

Chrome Steels ("K" Steels)

Proposed	Present	
20K1	5120	(1% Cr, 0.20% C)
30K2	5230	(2% Cr, 0.30% C)
60K12	51260	(12% Cr, 0.60% C)

Vanadium and Chrome-Vanadium Steels ("V" and "KV" Steels)

Proposed	Present	
20V	6020	(Vanadium)
20VK1	6120	(1% chrome)
35VK2	6235	(2% chrome)

Other Combinations

It may be seen that the symbol for any steel may be built up logically from the constituents present, thus:

First figures—carbon content.

Then the letter indicating predominating alloy, followed by a numeral showing its approximate percentage.

Next a letter representing second alloy followed by a numeral indicating its approximate amount, etc.

As in the present S. A. E. system, it is not necessary to indicate the less important elements, such as phosphorus, sulphur, etc. It quite often happens that manufacturers produce valuable steels that do not conform to the analyses set down, more or less arbitrarily, by the S. A. E. An undue multiplicity of alloy steels is to be avoided in the interest of standardization; nevertheless, a truly elastic code system should be such that any new alloy steel which has proved its usefulness may be symbolized easily and without confusion.

For example, take a steel of the following composition belonging to the chrome-nickel-molybdenum group:

Carbon—0.25–0.35 per cent
Chrome—0.70–1.00 per cent
Nickel—2.75–3.25 per cent
Molybdenum—0.30–0.50 per cent

In the proposed system, this would be symbolized as follows:

3ON3K1L4

In the present system, there is no way of indicating the quantities of alloying elements, and should a number be assigned it would be purely arbitrary. This is but one example of how difficult it will be, by the S. A. E. system, to classify many of the new alloy steels which have demonstrated their value during the last few years.

A few more illustrations of the application of the proposed system to some new steels follow:

Nickel-vanadium ("NV") steel, - - N - V -.
Nickel-manganese ("NM") steel, - - N - M -.
Nickel-molybdenum ("NL") steel, - - N - L -.
Nickel-chrome-vanadium ("NKV") steel, - - N - K - V -.
Nickel-chrome-molybdenum ("NKL") steel, - - N - K - L -.
Chrome-manganese-silicon ("KMS") steel, - - K - M - S -.

In the above, the dashes would be replaced by the numerals representing the approximate amounts of the elements, the first two numerals indicating carbon content. In case it were desired to show fractional percentages of any element, this could be done by introducing decimal points, thus 3.50 per cent nickel steel of 0.35 carbon would be written: 35N3.5.

It is evident that this system is perfectly elastic, any combination of alloys can be indicated, the quantities of each element can be signified without confusion, if desired, and the symbols are easy to remember.

The authors do not consider that this plan is by any means perfect and feel that the subject should receive very careful consideration from many angles before a new system of symbols is adopted. It seems that a combination of letters and numerals will provide the simplest form of symbol in the end and that, in fact, such a combination is essential in order to make the system truly expansible and at the same time give the information desired in the briefest form.

It is entirely possible that this system could be adapted to the important field of non-ferrous alloys, but this is beyond the scope of the present paper.

The fundamental principles of the plan may be recapitulated as follows:

Letters represent alloying element.

Numbers represent quantity of alloying element.

The number shall immediately follow the letter indicating the element to which it refers.

Single letters shall be used to represent all the most important alloying elements. (24 different letters are available for this purpose, omitting I and O, because of their similarity to numerals.) For the less important elements, a capital and small letter may be used.

The letters to be chosen to suggest the name or the chemical symbol as consistently as possible, at least for the most important metals.

Numbers, indicating quantity, may be approximate, or may be accurately expressed in several figures, if desired, without confusion.

Carbon content to be placed at the beginning of the symbol, rather than at the end as in the present system.

The number of figures (letters and numerals) in any symbol will depend upon the number of alloys present in sufficient quantities to warrant attention and upon the degree of accuracy to which it is desired to indicate the quantity of each element. It would be impractical to have the same number of figures in each symbol. The letter representing alloying elements should be arranged in order of the importance of the alloy.

It is not claimed that this plan is a final solution of the problem. It is offered in the way of constructive effort, in the hope that it will stimulate interest and discussion which, we trust, will lead to the development of a truly scientific, comprehensive and practical method of classification.

Hot metal will be transferred direct from the new blast furnace of the Trumbull-Cliffs Furnace Co. at Warren, Ohio, to the open-hearth furnaces of the Trumbull Steel Co., located on the opposite side of the Mahoning river. A bridge has been erected for conveyance of the metal direct. Officials state that no date has yet been set for starting the furnace, though ore piles are being built up. Construction of by-product coke ovens is the next step in the development at the Trumbull company's property.

The Link-Belt Co., Chicago, announces a reduction of 10 per cent in the selling prices of malleable iron and steel chains, sprockets, buckets and other products.

WAGE PROBLEMS

Some Steel Companies May Make Further Reductions Plants Losing Money

YOUNGSTOWN, OHIO, Aug. 30.—While advices are to the effect that a number of Eastern independent steel interests are preparing to reduce wages, following action by the Steel Corporation effective Aug. 29, independents in the Mahoning and Shenango Valleys are planning no further curtailments in this respect at present.

"We are losing money at present steel prices and will probably lose more money if we enlarge production," states the president of an important Valley producer. "The actual cost of manufacturing the steel which is sold to-day is higher than the selling price.

"We dislike to reduce wages and will not do so unless compelled to, but the situation is such that labor cost is the only element in current production costs which we control. We cannot expect a further reduction in the price of coal as long as miners are paid high wages. The miners refuse to talk about wages until their contract expires next spring.

"We cannot expect reduction in assembling charges of raw materials, because wages of railroad workers have not been reduced in proportion to the wage rates paid in the steel industry, and railroads as a consequence cannot sell transportation at reduced prices. Our stockholders are taking a loss now. We cannot expect them to take even larger losses, if we keep on operating.

"On the other hand, we cannot afford to shut down our plants entirely. We have a regular list of customers who gave us their business in good times, when we made a profit in dealing with them. We cannot now disregard them, but must fill their orders even at a loss to our company. We cannot disrupt our sales and operating organizations, though we have cut them to the bone and have simply skeleton organizations left.

"We thought that conditions would turn for the better in the fall, but readjustment is slower than we expected. While steel prices have tumbled next to farm products, other industries have not kept pace and we will have to mark time until conditions become equalized."

For the Real Open Shop

At a meeting of the Locomotive Crane Manufacturers' Association, held recently in Cleveland, resolutions were adopted opposing anything that interferes with freedom of contracts of employment and favoring "the real open shop, in which every worker's chance is as good as every other worker's chance, and from which no worker is shut out because he holds a union card and from which no worker is shut out because he has no union card."

Rainey Employees Strike

UNIONTOWN, PA., Aug. 29.—Dissatisfaction over wage reductions at W. J. Rainey, Inc., plants, reported in THE IRON AGE last week, spread during the week just closed with the result that five of the leading plants of the company were forced to suspend operations. Mt. Braddock, Allison, Royal, Revere and Elm Grove plants are closed to-day. Paull plant was closed Aug. 26, when men refused to go to work. A few, however, reported back, and there are some indications that the plants may all resume work next week.

After closing of Mt. Braddock and Allison, employees there prevailed upon the employees at the other plants to walk out. Large groups of the workers marched to the plants yet in operation during the early hours of the mornings and called the workers out of beds for meetings, resulting in their walking out in sympathy. In one instance, when a large group were marching to Paull, sheriff's deputies dispersed the men. Aside from this incident there has been no disorder of moment.

The men, in presenting their claims to their superintendents, demand retention of the Frick scale, lower commodity prices in company stores and a few changes in working conditions. In all 2500 men have been affected as a result of the walkout.

Inquiries for furnace coke are stronger this week than at any other time during the depression. Prices below $3 have been eliminated.

Cable Company Awaits Wage Reduction

ST. LOUIS, Aug. 30.—The Standard Underground Cable Co., Pittsburgh, will not start construction of its plant in St. Louis until the building mechanics recede from the present high scale of labor effective here of $1.25 an hour, which was practically the highest peak reached during the war period. The company, however, will go ahead with the grading of the site, which occupies approximately 600,000 ft. of ground, and the installation of spur tracks. The building will be approximately 320 x 520 ft., and the investment for grounds and buildings will represent $1,000,000.

This announcement was made by R. D. Sangster, industrial commissioner for the St. Louis Chamber of Commerce.

In the Field of Labor

Announcement has been made at the Lynn and Pittsfield plants of the General Electric Co. that, effective Nov. 1, the pay of all salaried employees will be reduced 10 per cent. The cut will apply to salaried officers as well.

Effective Aug. 29, wages of approximately 5000 employees of the American Steel & Wire Co., Worcester, Mass., were reduced 20 per cent, making a total reduction of 36 per cent within a few months. In addition, overtime pay has been abolished.

An application for an injunction against members of the Amalgamated Association of Iron, Steel and Tin Workers to restrain them from picketing the Belmont mill and interfering with the men working at the company's plant recently was filed by the Wheeling Steel & Iron Co., in the circuit court of Wheeling. The application will be heard on Monday morning, Sept. 5. The petitioners charge that the members of the Amalgamated Association are out on strike and are interfering with men employed at the mills.

Owing to irregularity of employment and unemployment in the steel mills at Youngstown, Ohio, the Spanish colony there has dwindled from 3000 to 700 men. Many of the Spaniards have migrated to other sections of the country.

The receiver for the United (Street) Railways, St. Louis, has announced a cut of more than 15 per cent in the wages of between 400 and 500 employees of their general repair shops. The reduction is due to general business depression and closing down of manufacturing establishments, which caused a heavy falling off in street railway travel. The cut is effective Sept. 1. The men entered a protest and negotiations have been started.

Railroad Conditions Improving

For the first time this year, total shipments of freight exceeded 800,000 carloads, when in the week ended Aug. 13 the number reached 808,000, says the *Railway Age*. This was substantially less than the railroad freight movement for the same weeks in 1920 and 1919, but reflected the slow but steady improvement in the railroad situation which is taking place. Railroad net earnings are increasing as business improves and expenses are brought under better control, and the July reports, when available, undoubtedly will make much the best showing this year.

The American Bosch Magneto Corporation, Springfield, Mass., has received a contract for starting, lighting and ignition systems from the Hudson and Essex automobile makers involving better than $1,250,000, deliveries to extend over a period of months. A large percentage of the work will be done at the Gray & Davis, Cambridge, Mass., plant subsidiary.

Continuous Foundry for Pipe Fittings

Designed for Minimum Handling of Sand, Castings, Cores, Hot Metal and Flasks —Novel Layout and Modern Details

BY HENRY M. LANE*

ORIGINALLY the castings for the General Fire Extinguisher Co. were made by the Carpenter Foundry Co. in Providence, R. I. When, later, the Carpenter interests were taken over, a new foundry plant built at Auburn, a suburb of Providence, was a pioneer in many features in the production of this type of castings. The Auburn foundry is a two-story structure, with three stories over part of the ground, the castings being made on the upper floor and passed to the lower floor for transportation to the cleaning room.

Recently the company has built, at Warren, Ohio, a large new plant in which advantage was taken of experience gained in the old plant, and information resulting from careful studies of the general foundry field. At Warren had been maintained for many years a pipe-cutting and assembly plant; the machine shop has now been extended to include pipe tapping, and a complete foundry has been built for producing all sizes of pipe fittings up to approximately 8 in. Heavy pipe fittings are practically all produced in the company's Southern plant, at Atlanta, Ga.



Incoming Coke and Metal Are Unloaded in the Yard at Left. All melting stock passes up the elevator tower in foreground, then across the bridge, and so reaches the cupolas, the stacks of which show above the roof. Sand bins are in the corner of the building, back of the blank walls

Like the Auburn plant, the new Warren plant is a two-story structure, but it has a number of new features in storage and handling. The incoming freight track runs alongside the building, and pig iron is unloaded from the cars into piles away from the building. Coke is unloaded into a big pit depressed below the general yard level, but at the time our picture was taken an additional supply had been piled above the yard level.

Incoming sand, dumped into a hopper under the track, is taken up by mechanical means and stored in sand bins. The material for melting stock is handled from the pig iron and stock yard onto a transfer car, electrically operated, which runs the length of the yard. Cars going to the charging floor are brought by this transfer track to the elevator shaft, taken up the elevator and across the bridge onto the charging floor. Under this bridge is the refuse bin, into which all such refuse as material from the cupola drop, burned sand and ashes are dumped. From this they can be dumped directly into outgoing cars.

The charging platform is on a level which would be really the fourth floor of the foundry building. Under the platform is a compact concrete structure, shown at the right of the bin, which consists of a series of sand bins nearly 40 ft. deep.

Above these bins is a belt system; the sand comes up an elevator and is transported over the bins by means of the belting, and scraped off into any given bin by plows, one of which is shown near the head of the belt. These plows can be lifted out of the way so that only one is in operation at a time. The bins are like grain elevators or silos and give a considerable depth of sand in storage, so that the number of tons on a given floor area is rather surprising. Sand is taken out from the bottom of these bins and transported by the monorail, for blending with the old sand in the molding sand equipment, or wheeled to the core sand mixer.

Only a few feet from these bins is the core sand mixer. Any sand which requires riddling before mixing is put through a gyratory riddle, which swings on the small crane shown. The mix is then bedded down so as to get the various ingredients thoroughly blended before they are shoveled into the mixer.

At this point the fact may be noted that the company is a pioneer in a good many things in the core line. At the Providence plant many years ago a core mixture was worked out which contains no oil, and this type of mixture has been used successfully ever since. The secret of its success, however, is largely due to the fact that in a continuous foundry a water soluble binder may be used, for the cores do not remain in the mold long enough to draw dampness.

*President H. M. Lane Co., Detroit.



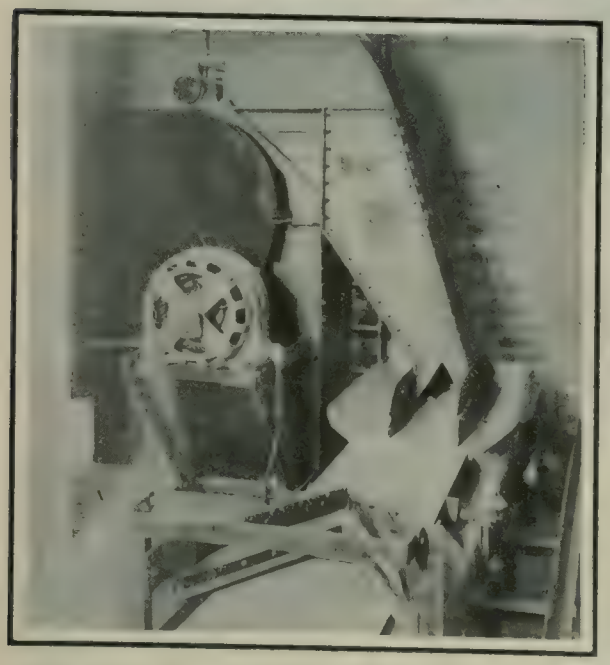
Core Sand Mixing Equipment Includes a Gyratory Sand Sifter for Riddling Sand and a Batch Mixer. At rear is the casing of the elevator which conveys the mixed core sand to the core room

In the Warren plant essentially the same mixture has been adopted, composed of a sharp or lake sand like Michigan City sand, a certain amount of molding sand and a binder made from waste liquor refuse from the sulphite paper process. After a mixture is made it is dropped directly from the bottom of the mixer through a chute into the elevator and passes up to the sand storage bins over the coreroom.

One view shows the Holcroft & Co. core ovens on the left, with some of the core racks on the right. The three rack-type ovens and three drawer-type ovens are all fired from one firebox on the first floor. Doors in a partition in the background lead to the coreroom proper. The core sand, discharged from the elevator into any one of several bins by a swinging spout, is then distributed by means of an overhead gallery and dumped directly into bins back of the coremakers' benches, or into bins for the Demmler core machines.

Behind the core racks at the right is a partition which immediately adjoins the molding floor; through windows in this partition boxes of cores are passed directly from the coreroom to the molders. The work is so arranged that practically all dry sand core work is located on this side of the foundry. These windows are shown in the view of the foundry floor.

Another view shows the end of the series of coremakers' benches, with the sand spouts leading from the platform above, and also the Demmler machines used in making a very large proportion of the cores. The Demmlers were located at the end of the room next to the core ovens so that there would be a minimum amount of handling of the unbaked cores.



Sand Comes Up the Elevator, of Which the Head Is Shown, and Is Distributed by the Conveying Belt Running Over the Sand Bins. The plow in foreground can be located where desired



Sand Is Delivered to the Sand-Mixing System by a Monorail Grab Bucket, Which Removes the Sand from the Long Bin at Left, Where It Is Deposited After Being Shaken Out of the Used Molds

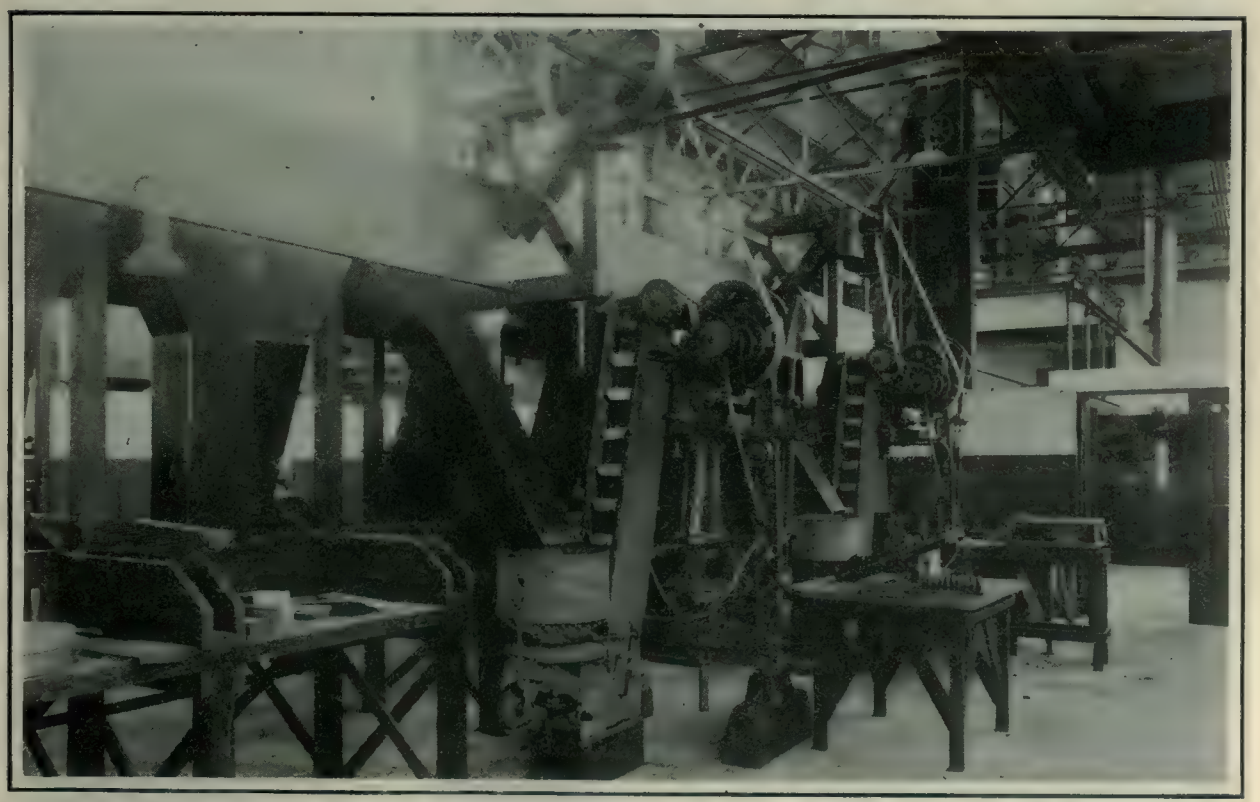


Core Ovens at Left and Racks at Right. Windows in the wall behind the racks permit passing of baked cores to the molding floor beyond. Core room is behind the double doors

Both sides of the molding floor are served by sand bins, but of slightly different type. In the general view of the molding floor are shown the undercut-gate bins which drop the sand directly into the molds. On this side of the shop is a continuous line of Nicholls molding machines. These are all jar ramming machines, and they are arranged with a cushion foundation, so that the vibration on the molding floor is reduced to a minimum. This illustration also clearly shows the windows back of each machine, through which cores are passed from the coreroom to the molding floor.

Tempered molding sand is taken in a car down the gallery over the molding machines and dumped directly into the bins. In front of the molding machines is an almost continuous dump-out grating, through which molding sand is dumped to the floor below, and at intervals are located casting chutes, through which the castings are sent down.

In practice, the molders set out a group of molds at one side of the floor, and the pouring gang then comes along and pours these while a group of molds is being put up on the opposite side of the floor. The first group is poured and shaken out and the flasks stacked back before the second group is completed. At the Auburn plant they have been able to utilize the floor



Demmler Core Machines Fitted Up for Making a Large Variety of General Fittings Cores. At left is beginning of a series of core-making benches for hand work. Sand from the elevated platform supplies both benches and machines



This Molding Bay Running Down the Center of the Building Is Supplemented by Another at the Left. Sand is distributed from the gallery at right. Core room is beyond the wall at right. Pouring cranes span each molding bay

from four to seven times, depending upon the type of work, and this in turn minimizes the distance that a molder must carry his molds to set them out. It also conserves floor space, and consequently investment in the plant.

Over the molding floor are a series of underslung cranes with Brillion pouring devices, so that the pouring gang can pour off without the use of hand ladles. The metal is distributed down the gangway in the center by means of a monorail.

On the opposite side of the foundry, part of the distance is taken up by a group of Nicholls machines and part by a group of larger Osborn machines. At the end of the plant next to the molding unit are located several large Osborn machines for making fairly heavy fittings.

Both castings and sand pass through the floor to the lower level, the sand landing in two long bins back of the casting chutes. Over these bins runs a monorail with a Sprague Electric Co. carrier and Blaw-Knox grab bucket, which carries the sand from the sand chutes to a bin at the end of the plant, under which a pan feeder feeds it through suitable mixing machinery in the basement under this part of the plant, where any core butts or scrap are riddled out. Sand from here passes up through an elevator to the top of the



Tumbling Barrels and Chutes for Delivering Castings. After being run through the tumblers, the castings are sorted into boxes and taken to the grinding room, behind the partition at right



Castings Are Brought from the Tumbling Department into the Grinding Room in Wooden Boxes Mounted on Stands Provided with Wheels. After grinding, they go into the barrels and are taken to the tapping room

sand towers, where it is tempered on a moving belt by adding sufficient water as it passes through a series of rakes and plows. It is then dropped through a Sellers centrifugal mixer and lands in a big bin over the sand galleries, from which it is fed by a pan feeder into cars for delivery back to the molders. The sand storage bins below and above are of sufficient capacity to hold sand equal to about six hours of molding, so that it is not necessary to have the grab bucket in constant operation.

One feature of this plant is the reduction of the handling distance to a minimum, by placing the tumbling barrels adjacent to the ends of the casting chutes. The series of casting chutes and the Sly tumbling barrels on the first floor are interspersed. Behind these tumbling barrels is located the long sand bin above referred to, and in front of them a monorail system for carrying castings to the grinding room.

The grinding room is located under the coreroom, the general view showing a series of Norton grinding wheels and sorting benches. More barrels are in view than would ordinarily be the case. In practice, the castings ready for grinding are brought in in the boxes, a few of which can be seen. These boxes are on wheels



Metal and Coke Brought to the Charging Platform in Cars Which Serve as Stock Bins Are Loaded in Charges onto the Small Cars Shown, Which Are Then Wheeled Over to the Cupolas for Use. All charges pass over the scale platform and are recorded

and are shoved up next to the grinding stand. As the grinding is done the finished castings are thrown into the barrels for transportation to the tapping shop.

Ingersoll-Rand Co. air-compressor and motor-generator sets necessary for the plant are located in a room on the first floor adjacent to the core sand mixing unit.

In the general view of the charging floor, the Kron scale at the left is located at the end of the bridge from the elevator in the yard. At the time this picture was taken the final charging system was not fully worked out. In practice, various grades of pig iron are brought from the yard on cars, in bulk, each car carrying from one to two tons of a given grade. On reaching the charging platform, the cars are used as stock piles from which the several charges are made up. The scrap likewise comes in cars. The charges are made up on small flat-wheeled cars on the scale, the material for each mixture being taken from the cars carrying the material in bulk, which are located around the scale. As soon as the charge is made up, the small car is shoved over near the cupola, and as several charges are made up ahead, the cupola never has to wait.

There is sufficient space on the charging platform for the storage of metal sufficient for two or more days' run, so that in case of bad weather it will not be necessary to bring in material from the yard. As the metal is kept in the cars, there is no labor used in unloading onto the charging platform. Attention is called to the fact that this charging platform is open to the main foundry structure, so that the heat from the stacks ascends directly into the monitor of the Pond roof and gives immediate ventilation to the charging floor.

Three Otis platform elevators of the micro-drive type are used in connection with this plant. One is in the tower of the yard, for bringing up pig iron and foreign scrap, and this runs below the general yard level, to the bottom of the depressed coke storage yard, to get coke. Adjacent to the charging platform is an elevator used for bringing up returned scrap to the charging floor level and also to handle rubbish into the rubbish bins. At the opposite end of the plant is an elevator for handling patterns, arbors, flasks, etc., from storage to the pattern-shop or to the foundry, and for handling general supplies to the stockroom, and serving the various floor levels at the end of the building.

Up to the foundry level the structure is of solid concrete of the beam type, and so designed as to reduce vibration from the molding machines to a minimum. Above the foundry floor level is a steel structure, with a Pond type roof over the foundry, and a flat roof over the service building, which houses the offices, pattern storage, a completely equipped pattern-shop, washrooms, shipping room and various other necessary adjuncts to a continuous foundry.

Two Whiting No. 7 cupolas are installed with 72-in. shells, provided with double linings to reduce the diameters. These cupolas are planned to melt about 30 tons per day. At present they are used on alternate days. Continuous pouring is to be the rule, either using one cupola in the morning and the other in the afternoon, or, after using one throughout the morning, blanking it with coke and blocking the tuyeres until time to start it up again in the afternoon. So far they have not started continuous melting, but are making a rather long heat each afternoon.

As screen type charging doors are found to last longer than the brick-lined type, the former are fitted. The cupola legs are on the level of the molding floor, and the drop falls through that floor into a room below, where it is quenched and then put through a Sly water-barrel to recover any iron or coke it may contain. The Roots blowers are mounted on a mezzanine floor immediately over the charging floor.

It will not be necessary to install a third cupola, for which the plant was designed, until the daily melt reaches 60 tons. That figure is the limit of the present cupolas, and is beyond the demand of the molding plant as now installed, but gradual extension will, it is anticipated, bring the capacity to that figure at no distant date.

The general contractors were the Foundation Co., the plumbing contractors the Stamberger Co. and the electrical contractors the Livingston Co. The sand handling equipment was designed by the engineers, the H. M. Lane Co., Detroit, who designed and laid out the entire plant. The sand handling machinery was furnished by the Lamson Co. Sash was furnished by David Lupton's Sons Co. The heating and sprinkling systems were installed by the owner.

LOWER EXPORT RATES

Interstate Commerce Commission Grants Petition of Eastern Railroads

WASHINGTON, Aug. 30.—In an effort to place the iron and steel industry of the country in a position to compete for business in foreign markets, the Interstate Commerce Commission last Thursday authorized the railroads east of the Mississippi river to re-establish export rates on iron and steel on five days' notice. These rates are slightly more than 20 per cent less than the rates now in effect. Applications for authority to re-establish export rates lower than the domestic rates were filed for the Central Freight Association lines by one agent. The Eastern lines acted individually. The applications were received and acted upon the same day. They are to become effective Thursday of the present week.

The railroads acted upon the representations made to them by the iron and steel industry about 15 days ago. They repeated to the commission the arguments made to them by the iron and steel makers, chief of which was that the industry is faced now by the conditions that confronted it in pre-war days. That is to say, the European nations that were devoting all their energies to the making of war have taken up their peace time efforts in commercial lines and Americans, to meet them in the common foreign markets, must have the benefit of rates to the ports lower than those given upon domestic business.

At the time of the conference in New York, the railroad traffic executives said that, in their opinion, iron and steel was not being held up by the freight rates to the ports but rather by the inability of foreign purchasers to finance orders they might be inclined to give to American producers. The railroad interests said they were inclined, however, to try the experiment of restoring export rates from 20 to 25 per cent less than the domestic rates, which now, almost without exception, are the full fifth class basis.

Under the tariffs, the rate on manufactured iron and steel from Chicago to New York will be 47.5c. instead of 63c., and the rate from Pittsburgh to New York will be 28.5c. The rate applicable on both export and domestic at present is 38c.

Export rates on iron and steel were abolished before the United States entered the war because Europe was clamoring so persistently for iron and steel from American mills that there was no commercial necessity for the railroads making any concession to the sellers. The latter were without competition. All iron and steel was under control of the governments at war and the neutrals were given only such as the warring nations had to give up in exchange for foodstuffs.

The disappearance of that control and the fact that the nations that were at war have devoted the output of their steel mills to purposes other than war, constituted the chief reasons for the restoration of export rates.

These tariffs, according to their terms, will expire Sept. 1, 1922. The filing agents made their preparations for the restoration of export rates with a view to having them become effective Sept. 1, so that the export rates, when filed will be intended to apply for one year at least. The chances are that they will remain indefinitely and tend to go lower.

Bids will be opened Oct. 19 at the office of the Obras Sanitarias de la Nacion, Buenos Aires, Argentine Republic, for 7000 tons of cast-iron pipe.

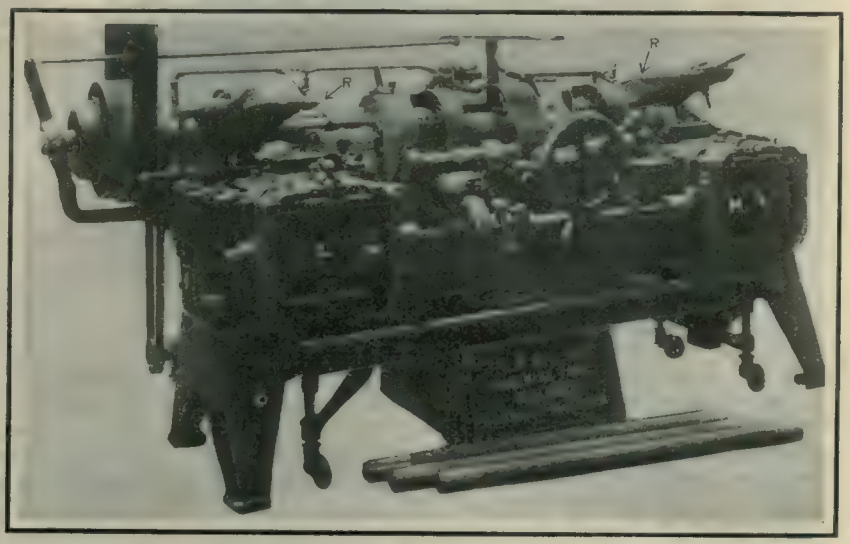
Axle Shaft Turning Machine

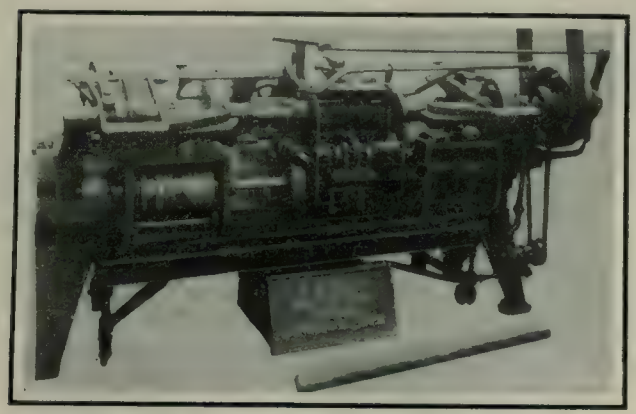
An interesting development in special purpose machinery is represented by the semi-automatic turning machine recently designed and built by the T. M. C. Mfg. Co., Harrison, N. J., for the Timken-Detroit Axle Co. The machine is shown in the accompanying illustrations and is used for machining automobile and truck axles of the "full floating" type.

The shafts machined are of nickel or chrome nickel steel, the forgings being formed either by upsetting the ends of rolled bars in a bulldozer, or by the Baehr continuous die rolling process, operated by the Witherow Steel Co., Pittsburgh. The forgings are heat treated before machining. The machine takes the forgings, as shown on the line drawing, and squares the ends to length; turns down each end to the correct diameter; forms the bevel at one end and the check at the other. Each end is centered true before the shaft is removed from the machine, the centering being necessary for the further operations of finish grinding the diameter of the ends and hobbing of the splines required on the large diameters.

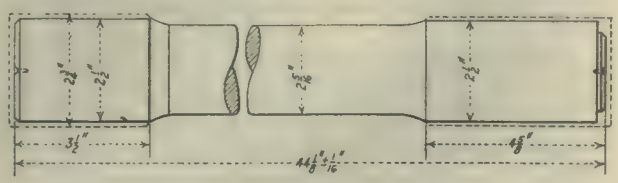
The forging to be machined is placed in the hollow spindle of the machine, leaving both ends projecting. It is held by two scroll chucks close to the portions to be turned and is located by a positioning stop which is brought up to place by a lever. The stop when not in use folds down out of the way. The chucks are operated together by the hand wheel acting through a differential which allows of the chucks being brought down equally tight on each end of the shaft irrespective of any variation in diameter of the bar under the two sets of jaws. There are four slides, the first pair carrying the tools which turn the diameters; the second pair face the ends to length and put in the check and bevel edges. Slides G and H (indicated in the illustration) make two and three movements across the work respectively during each cycle of the machine, the tools being advanced the amount of the cut to be taken before each passage of the tool is begun. The slides G are moved along the bed by cams L, which engage with cam rollers in the bed, each slide carrying a cross slide, K, controlled by cams M. Variations of diameter are taken care of by screw adjustments on each cross slide.

When the forging is clamped in position a trip lever starts the cam-operating shafts and the four tools move simultaneously over the work. When the cycle is completed the tools come to rest clear of the shaft. The operator then swings down the center drilling spindles, R, and sinks the centers, the shaft revolving meanwhile. The finished shaft is then ejected by an extension of the positioning bar which pushes the shaft far enough out of the chucks to be lifted out. A gear box provides three spindle speeds and three feed speeds to take care of various diameter shafts. The hollow main spindle is made telescopic and the slides at one end of the machine are adjustable to accommodate shafts of from 36 to 48 in. and diameters from 1¾ to 2¾ in. The drive is by a single belt and clutch pulley. The cutting tools are either circular formed tools or may be solid rectangular tools as desired. The time per shaft varies from 4 to 10 min. according to the diameter and cutting quality of the heat treated forgings.





Axle Forgings of the Dimensions Shown in the Line Cut Below Are Placed in the Machine Which Squares the Ends to Length; Turns Down Each End to Correct Diameter; Forms the Bevel at One End and the Check at the Other. The slides and cams and the center drilling spindles are indicated by letters in the view above. The rear view, at the left, shows further details of the slides and the arrangement of the gear box



Ore, Coke and Plate Rate Declared Unjust

WASHINGTON, Aug. 30.—A finding of undue prejudice, with an order to remove it before Dec. 1, has been made by the Interstate Commerce Commission in the case of the United Iron Works, Inc., against the Atchison, Topeka & Santa Fe and other railroads. The holding of the commission was that the railroads unduly prejudiced Iola and Independence, Kan., as to rate on iron ore, coke and steel plates. Specifically the finding was that none of the rates under attack by the complainant, which has plants at Iola, Independence and Pittsburg, Kan., and Joplin, Springfield and Aurora, Mo., for the manufacture of machinery of various kinds was unreasonable but unduly prejudicial to Iola and Independence to the extent that the rates to Iola on pig iron, coke and iron and steel plates from Chicago, and pig iron from Duluth, exceeded or may exceed the rates to Girard, Kan., a more distant point; and to Independence to the extent that they exceeded or may exceed by more than 30c. on coke from Chicago and by the same amount per gross ton on pig iron from Chicago and Duluth the rates contemporaneously maintained to Girard.

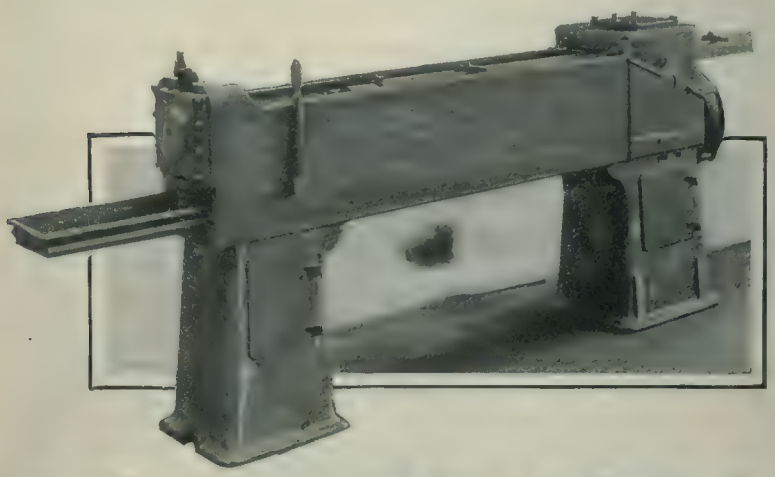
In a fourth section order, the commission denied relief on shipments of pig iron and coke from Chicago and Duluth to Girard, Kan., and directed the carriers to line up their rates, in conformity with the decision on the formal complaint, not later than Dec. 1.

The Macdonald Wire Goods Co., Drummondville, Quebec, Canada, is in the market for over 1,000,000 ft. of No. 12 and No. 6 galvanized wire cloth.

New Heavy-Duty Broaching Machine

A heavy-duty broaching machine having a cutting stroke of 15 ft. per min., and a return stroke of 55 ft. per min., is being placed on the market by the Velco Mfg. Co., Greenfield, Mass.

In this machine the broach holder is attached to a solid steel head which is supported throughout its travel by bronze-gibbed bearings sliding on steel ways. Power is applied to a rack which meshes with a pinion mounted on a heavy shaft having long bearings on either side of the pinion. The rack is of special steel, and the pinion of hardened steel and cut from the solid. The rack and pinion are designed to mesh exactly on the pitch line and the broach is attached so that the pull is directly on the pitch line of the rack. Vertical adjustments are made at the face plate. A gear stub tooth designed by the Fellows Gear Shaper Co., is used in the rack and driving pinion.



Rack and Pinion Are Designed to Mesh Exactly on the Pitch Line. The broach is attached so that the pull is directly on the pitch line of the rack

The teeth of the rack are on the under side and the rack supported in proper mesh with the driving pinion by means of rollers on the sides of the pinion and guide bars fastened on the side of the rack. In this way rolling contact on the pitch line is secured. The radial thrust of the driving pinion against the rack is taken by three hardened rollers, adjustable for wear. The pinion shaft is driven by a phosphor-bronze worm wheel and a hardened steel worm, running in oil, the worm shaft having ball-thrust and radial bearings. All other important bearings are bronze-bushed and ring-oiled.

Rapid return is accomplished by an internal gear cut on the worm wheel and driving the return gear shaft, the return motion being applied through the driving pinion. There are no high-speed gears, the fastest gear speed used having a surface speed of 60 ft. per min. The clutch is not operated during the cutting stroke, acting only as a positive coupling. No friction clutches are employed and all parts are protected from shock due to a positive clutch under load. In operating, the belt is first shifted to the loose pulley, thus relieving the load from the clutches. Further movement of the shifting lever applies a friction brake to the driving pulley and withdraws the positive clutch, still further movement of the lever engaging the reverse clutch, shifting the driving belt to the tight pulley and reversing the machine.

Automatic adjustable stops are provided and also non-removable emergency stops. A single lever conveniently placed controls every motion of the machine, control being further simplified by having the direction in which the operating lever is moved the same as that in which the rack will travel. The machine has but one speed and no countershaft is necessary. Cooling fluid is supplied by a gear-driven pump of adequate capacity. Three point suspension is a feature and all adjustments have been simplified and the entire mechanism made easily accessible.

The maximum pulling effort requires 15 hp., although all ordinary broaching operations may be handled with a 10 hp. motor. The machine is furnished in belt and motor drive, there being no change in construction necessary for either style. It is placed on the market as the Velco No. 4 production type broaching machine.

To Discuss Uniform Cost Methods

At the second international cost conference under the auspices of the National Association of Cost Accountants, to be held in Cleveland on Sept. 14, 15 and 16, one session—on Thursday morning, Sept. 15—is to be devoted to a discussion of uniform cost methods as used by the trade associations.

This subject has received a great deal of attention during the past few months as a result of the various investigations which have been made of the activities of the trade associations. There is a great deal of popular misapprehension as to the purposes and methods of uniform costing. It will be the object of this session to discuss all phases of the subject. Trade associations which have had actual experience with uniform methods will be officially represented. The Federal Trade Commission, it is expected, will also have an official representative present. It is hoped that as a result of this discussion some of the uncertainty as to how far it is legally possible to go in the matter of uniform accounting methods will be removed.

It appears that more than one hundred trade associations have made some progress along the line of uniform cost methods. No previous attempt has been made on such a large scale actually to get at the results which may be obtained from these systems.

Among other subjects of the cost conference are the following:

Executive Uses of a Cost System.

The Distribution of Overhead Under Abnormal Conditions.

Cost Systems as a Means of Preventing Waste.

Uniform Methods and Standardized Costs.

Interest as an Element of Cost.

The national headquarters of the association are located in the Bush Terminal Sales Building, 130 West Forty-second Street, New York.

Improvement in Demand for Refractories

PITTSBURGH, Aug. 29.—Business in refractories in the Pittsburgh district is somewhat quieter than it was recently, but in practically all other districts, especially those in which are located sheet and tin plate mills, the report about business is one of improvement. There is no tendency on the part of the blast furnace and steel plant interests to anticipate their requirements, even in Ohio, where business is comparatively good. Only actual requirements are being bought, but buyers are so insistent on early delivery as to indicate that their stocks are getting pretty low.

Prices are holding fairly steady at the levels established a few weeks ago. Suggestions are heard of price concessions here and there, but as a rule the reduction offered from regular quotations is extremely slight. The claim is common that there is no money in either fire clay or silica brick at to-day's prices. It is pointed out that freight rates are up 100 per cent as compared with 1914, and that there has been practically the same increase in labor costs. When it is considered that four tons of clay are required to make 1000 brick, it can be readily understood how present freight rates are affecting manufacturing costs.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $40.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 42.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		65.00
Chrome Brick:		
Standard size, per net ton		52.00

Steel Makers Heard on Metal Tariff

FERROALLOY DUTIES DISCUSSED AT LENGTH

Ferromanganese Manufacturers Ask Protection for a Newly Established Industry —Some New Classifications Asked and Changes in Wire, Pipe and Wide Strip Duties—Sheffield Tool Steel Companies Make a Statement

BY L. W. MOFFETT

WASHINGTON, Aug. 30.—In direct terms, the position of the independent steel manufacturers of the country relative to the metal schedule of the Fordney tariff bill was made known last week to the Senate Committee on Finance. Representing a prime industry with an enormous capital investment, with much at stake in the enactment of the proper duties on imports, those who appeared spoke forcefully and with knowledge. A strong impression was made upon the committee, even upon those members who were not in sympathy with the claims of the industry. The force of the arguments was not alone in the supporting evidence contained in written statements, but also in the information freely given extemporaneously in answer to the questioning of Senators. So interesting was the recital that the hearing was not completed in the three days originally allotted to the metal schedule. The hearing was not closed until to-day, making seven days in all, though during this period some time was devoted to other schedules. Most of the steel producers, including a number of well-known leaders in the industry, appeared on Thursday.

Except for their vigorous objection to what they consider high duties on raw materials—including manganese ore, ferroalloys, magnesite and graphite—the steel producers had little complaint to make of the rates proposed on their products as a whole. A number of suggestions were made for reclassification, with here and there a slight increase in duties, and a request to transfer barbed wire from the free to the dutiable list, giving it the same duty as plain wire. There was also a suggestion to lower rates, as in some sizes of welded pipe and in certain wire. The moderation of the steel interests elicited from Chairman Penrose the statement that not only had they made modest requests but that the schedule on steel products carried lower rates than any other in the bill. The attitude of the steel men was that the industry has reached a new point of expansion in the development of export business. And with this in mind the steel men showed that they do not want to erect any undue barriers, their idea of protection being such as would cover the difference in labor cost.

The producers of manganese, ferroalloys, magnesite and graphite were fully alive to the fact that the rates proposed on these products were the storm center. The committee was made fully cognizant of this fact and is apparently giving much study to the issue. Senator Smoot perhaps showed more interest than any other member of the committee on this point. In commenting on proposed duties on manganese ore, he said there would be "no legislation on the 5 to 30 per cent grades." Whether accurate or not, the interpretation placed on this remark was that ore of a lower manganese content than 30 per cent would not be made dutiable.

Sheffield Steel Men Heard

To-day the committee heard a delegation from the Chamber of Commerce of Sheffield, England, with regard to high-speed steel rates. Arrangement for hearing these interests was made with the committee by the State Department at the request of the British embassy in Washington, to which the Sheffield men transmitted a request that the hearing be arranged. While it is said to be unprecedented for a foreign delegation to appear as interested individuals at a hearing concerning tariff legislation in this country, the committee has pointed out that the Sheffield men came as private citizens and not as representatives of the British government, and also that it is not unusual for foreign delegations to appear before committees of Congress regarding other matters. The Sheffield delegation consists of Arthur Balfour, of Arthur Balfour & Co.; S. J. Robinson, of William Jessop & Sons; Peter Macgregor, of Sanderson Bros. & Newbould, and J. C. Ward, of Edgar Allen & Co.

The committee will suspend tariff hearings to-morrow and go to work in executive session on the tax bill, which is to have precedence over the tariff bill and will be reported to the Senate on Sept. 21, when Congress reconvenes.

Steel Makers Oppose Duties on Raw Materials

Making observations on the entire metal schedule as well as on the whole tariff bill, Chairman John A. Topping of the Republic Iron & Steel Co. spoke for the independent steel companies and was kept before the committee for more than an hour. He was questioned closely and proved his ability to meet sharp examination, being able to give offhand a wide range of figures and facts. On several occasions he had mild tilts with Senator LaFollette of Wisconsin, who put questions that it was either impossible to answer or that related to matters not to be divulged.

Senator LaFollette had prepared a set of questions which he said he would mail to the steel trade witnesses as well as to others, adding that of course it remained with them whether they gave answers. Like others who testified on the metal schedule, Mr. Topping said he would answer those questions that could be properly answered, but would reserve the right not to answer those he considered were not proper. Senator Penrose interposed to say that response to some of Senator La Follette's questions would be equivalent to making an income tax return, information which the Treasury Department is bound not to make public. Senator LaFollette said he would state on the floor of the Senate when the tariff bill is up for debate what questions witnesses had declined to answer and would make use of replies given but would not reveal the names of those making response to such questions as deal with capital investments, costs of production, dividends paid, profits made on given products, salaries paid officers, etc. The greater part of the information no doubt will be supplied to him, and much of it was given by Mr. Topping as to the Republic company by submitting its regular public reports.

Taking up the outstanding features of the metal schedule, as suggested by Chairman Penrose, Mr. Topping said that rates it carried are quite low and steel

producers, consider it a bill to obtain revenue rather than to afford protection, but that manufacturers, are inclined to accept the schedule, because tied in with it are such features as American valuation, anti-dumping, bounty and reciprocity.

His attitude toward duties on raw products was soon made clear. The duties proposed on such products as manganese ore, ferromanganese, zinc, magnesite and fluorspar, would result he said in an annual increase of $23,805,000 to independent producers in the cost of making soft steel. This, he stated, cannot be paid if the industry is to meet foreign competition and expand.

(Mr. Topping's statement appears on a later page.)

"Your idea is that rates on ferroalloys are too high if steel rates are not increased?" suggested Senator Smoot.

"Yes," replied Mr. Topping, "this schedule is lower than that in the Payne-Aldrich bill, even with the American valuation plan applying." He said steel makers were, however, sustaining the Fordney bill and the American valuation plan, generally, but objected to the duties proposed on raw materials.

Steel Companies' Losses To-day

Current prices of steel were said by Mr. Topping to be $5 a ton lower than the cost of production.

When asked by Senator LaFollette as to the finances of the Republic company, Mr. Topping said it had accumulated a surplus of $38,000,000 in a period of more than 20 years but that this is being dissipated rapidly. Senator LaFollette seemed to be irritated because Mr. Topping could not tell him the amount of the original capital invested in the units which were taken over and consolidated. Answering further questions by Senator LaFollette, Mr. Topping said that he doubted that any steel company would show an earning power comparable with bank and trust companies. He added that he did not believe it would be over 8 per cent.

"Steel duties in the Payne-Aldrich act," said Mr. Topping, "averaged about one-half of those in the Dingley law, while those in the Fordney bill are less than those in the Payne-Aldrich measure."

"Rates in the steel schedule," said Senator Penrose, "are more moderate than in any other schedule and the requests of steel men have been modest."

Mr. Topping said the average ad valorem rate in the Fordney bill is 15 per cent.

Senator McLean inquired as to the number of men engaged in the alloy industry to which Mr. Topping stated he could not say specifically but that "it is a mere bagatelle, lost in the crowd and forgotten when compared with the steel industry," and that comparatively its capital investment is small.

Independents Will Make Alloys

"We think domestic producers of alloys will live on much less," said Mr. Topping. "We are asking for duties of 15 to 20 per cent. They are asking for duties of 35 to 215 per cent. If it is necessary we will put in electric furnaces and produce our own alloys. We shall do this if the duties are too high."

He estimated that proposed duties on ferrosilicon would cost $3,000,000 and on manganese $8,000,000 annually in producing soft steel. "We could form a co-operative company and put on blast furnace capacity to make ferromanganese and will do it before we pay exorbitant prices. We could import the manganese ore and still be ahead $17 a ton after paying the ore duty."

Asked by Senator Penrose about employment and operating conditions in the steel industry, Mr. Topping said nominally it engages about 1,500,000 men from the mines to the finished products but today the number is about 300,000 and operations range from 25 to 30 per cent. Mr. Topping stated that at no time since he became connected with the steel industry in 1878 was there a depression comparable with that now existing. He said that the Republic company is feeding men out of its commissary in Alabama to keep them from starvation. The company at full operation employs 15,000 men, and is now employing 3000.

Senator Simmons asked as to the cause of the depression. Mr. Topping said that it is due to the cost of fabricating, transportation, and labor and of building materials such as brick, cement, etc. These costs are so high that a builder could not afford to put up a building in Washington, for instance, even if the steel needed were given away and whose cost was said to be only 12 per cent of the total. The steel trade, he said, is paying labor today 53 per cent more than in 1913 while steel prices have declined greatly since January, 1921. The steel maker, it was pointed out, buys far less labor and transportation with a dollar than in 1913, but when increased costs are considered is selling at practically pre-war prices.

Some Reductions Suggested

President James A. Campbell of the Youngstown Sheet & Tube Co., appearing as a representative of his company and several other independents, especially makers of steel pipe, tubing and wire products, recommended reductions in some duties and increases in others, as shown in his brief printed below. The distinction made in the wire paragraphs as proposed were declared by Mr. Campbell to penalize one class of users for the benefit of others and this was called "class legislation." He said he was sure that the committee could be justly criticized if it permitted the paragraphs to stand as they now are.

Mr. Campbell agreed with Mr. Topping in protesting against duties on raw materials, including fluorspar, manganese ore, ferromanganese, magnesite, pig tin, zinc and alloys. He stated that American producers do not require this abnormal protection and if there are any cases where they do, the interests are so small and can produce such a small percentage of the material required that their needs should not be permitted to impose this tax on all steel consumers. He said he hoped the duties would be greatly reduced.

"Profits" on Barbed Wire

"What are your profits per ton on barbed wire?" inquired Senator LaFollette.

"Oh, I think we lose about $5 per ton," responded Mr. Campbell dryly, whereon quiet laughter swept over the room.

"What would be the consequence if we built rates so high as to shut out imports?" asked Senator Walsh of Massachusetts.

"That would build a tariff wall and ruin the country, creating industrial depression and fictitious values, and the depression would continue until there would be a breaking down of industry." Mr. Campbell said, however, he favored protection on finished products sufficient to maintain the American standard of living for workmen. He vigorously assailed the transportation and Adamson acts and said both had broken down and should be wiped off the books. Both acts were declared to be holding business by the throat. It was added that buying power, especially that of the farmer, has shrunk, and that high transportation and labor costs are at the bottom of it. Not until purchasing power has been restored to a normal basis, can there be an adequate revival of business, but if the farmer and manufacturer were brought to the same level, it was added, the sprag would be removed from the wheels of industry and in 90 days it would start up in good shape.

Midvale and Bethlehem Protest

President A. C. Dinkey, of the Midvale Steel & Ordnance Co., said the proposed duty on ferromanga-

nese would add 30c. to the cost per ton of soft steel ingots. The effect, he pointed out, would be to increase costs at a time when the industry is expecting foreign countries to absorb from 15 to 20 per cent of the production. He asked that manganese ore be made duty free with a compensating duty on ferromanganese, $2.50 per ton being suggested, to cover the difference in the labor cost in England and the United States. The Midvale company, he said, normally employs 40,000 men but to-day is employing only 11,000.

The free list for manganese ore and a nominal duty on alloys to protect the domestic industry were suggested by C. A. Buck, vice-president Bethlehem Steel Co. He strongly opposed the duties proposed on chrome, manganese, ferromanganese, tungsten and ferrosilicon. The proposed duty on ferromanganese, he said, would amount to $39 a ton, while before the war it was bought at $35 to $40 a ton. He said he would like to see a nominal duty on ferromanganese and to have magnesite made free of duty.

Separate Classification for Bars

A separate classification for common merchant bars and a slight increase in duties, also an advance from 7/20c. per lb. to 4/10c. per lb. on structural steel were suggested by Vice-President Willis L. King, of the Jones & Laughlin Steel Co. The chief cost to-day is transportation. The cost at present of assembling raw materials for finished products and shipping from Pittsburgh to New York was $10 a ton more, he said, than before the war. Mr. King said proposed rates on raw materials are beyond reason and, besides adding to the cost to the consumers, would seriously affect foreign trade. The Jones & Laughlin Steel Co. normally employs 25,000 to 26,000 men, Mr. King said, but at present is not operating at more than 25 per cent of capacity and employing 5,000 to 6,000 men.

President Severn P. Ker of the Sharon Steel Hoop Co., speaking for independent makers, suggested reclassification and increase in rates in hoops, bands, strips and cotton ties, as stated more fully below.

Dr. J. A. Mathews, president Crucible Steel Co. of America, suggested a number of changes in the bill, suggesting free manganese, or not over 10 per cent duty, reduction of the tungsten duties, which would increase the cost of high-speed steel by 20 to 25c. per lb., also proper distinctions between products in paragraph 304, covering ingots, billets, bars, forgings, etc.

Tin Plates and Sheets

Speaking for the Association of Tin Plate Manufacturers, President E. R. Crawford of the McKeesport Tin Plate Co. said that while tin plate makers can get along with the proposed rate of 1 1/10c. per lb. on tin plate, taggers tin and terne plate, after conditions have become normal, they would like to have a duty of 1 2/10c. fixed. Mention was made of the fact that tin plate manufacturers are open to competition on account of low ocean freight rates. He said that while these manufacturers had not complained of the proposed duty of 2c. per lb. on pig tin, they thought it was not justified and would be better stricken out, though perhaps the Government favors the duty as a source of revenue. Mr. Crawford protested against the duties proposed on raw materials, including fluorspar, magnesite and ferromanganese.

W. H. Abbott, of the Wheeling Steel Corporation, representing independent sheet makers, said that while the duties on sheets in the Fordney bill are adequate generally, they are not entirely so for mills located along the Atlantic seaboard. Labor costs of domestic production were said to constitute 80 per cent of the total cost, direct and indirect, and to have increased 72 per cent from 1912 to 1921. He pointed out also the low wages paid in Europe as well as the ocean freight rates, which make mills along the Atlantic seaboard open to sharp competition.

Pig Iron and Scrap

John W. Logan, secretary Alan Wood Iron & Steel Co., Philadelphia, asked for a duty on pig iron of $2.50 (instead of $1.25), the same as in the Payne-Aldrich act, and that a differential of $1.50 less be fixed on scrap. In the Fordney bill both products take a duty of $1.25 per ton. Mr. Logan pointed out the importance of transportation as a factor in pig iron cost. He said that today pig iron is selling at $19 to $20 a ton and of the cost 70 per cent is represented by transportation of raw products, amounting to six tons required to make a ton of pig iron. He added: "Our costs are higher, due to the longer hauls and higher transportation charges on our raw materials. Low water transportation rates facilitate delivery of European iron and steel to Eastern seaboard markets; the ocean freight being frequently less than the cost of hauling from even Pittsburgh to the same position. On account of its character and adaptability as ship ballast, pig iron is often carried across the Atlantic for comparatively trivial rates."

Protest was made by Mr. Logan against the rates carried on calcined magnesite, fluorspar and ferromanganese:

> Leaving to other steel companies who have appeared, or expect to appear, before your committee with respect to duties on calcined magnesite, fluorspar and ferromanganese, the presentation of specific arguments and recommendations, we desire to record our protest against the rates proposed as being very much too high. We are not opposed to any reasonable protective duties on our raw material, but the suggested duties on the three materials above referred to are so unprecedented that we feel we must protest. They are entirely out of line with the duties on various forms of finished steel contained in this bill, which duties we believe to be just and reasonable.

William Dette of Crocker Bros., New York, importers of ferromanganese, recommended a duty of not more than $1 per ton on ores containing 45 per cent manganese or over, and $2.50 per ton on ferromanganese. The latter, it also was said, being a blast furnace product, should be classified with pig iron and spiegeleisen. In speaking of manganese ore, Mr. Dette said:

> Manganese ores have always been admitted free. The domestic supplies are limited, inferior in quality and far from consuming points. Even under the stimulus of war necessity and high prices domestic production furnished only a small part of our total needs and that only by a sacrifice in quality of the smelted product. It is safe to say that the steel trade must depend for all time on foreign ores or foreign ferromanganese for at least 90 per cent of its requirements.

In urging that ferromanganese be classified with pig iron, Mr. Dette stated that the former is not a ferroalloy in the sense of other alloys in paragraph 302, which are made either by the electric furnace or the Thermit process, and which are added to special steels for properties conferred by the metal, such as tungsten, chrome, etc. Ferromanganese is a product of the blast furnace and is made the same as pig iron and merely requires more fuel and more limestone for fluxing and is cast in a bed and broken into lumps instead of being cast in pigs. The price of ferromanganese at present, it was said, is about $65, and on that basis the proposed duty of 2-1/5c. per lb. is equivalent to $39 or $40 per gross ton, or 80 per cent of the pre-war price and 60 per cent of the existing price. He argued that interests of the independent steel makers require the restraining influence of foreign competition "to prevent a repetition of the unreasonable prices which pre-

vailed when this competition was temporarily reduced. The rates in the present bill are not only high but are not proportionate. At the rate of $11.20 per ton on ore the tax on ore to make one ton of ferromanganese is $24.64, while the finished product [ferromanganese] is taxed $39.42."

President Campbell on Wire and Pipe

J. A. Campbell, president the Youngstown Sheet & Tube Co., Youngstown, Ohio, filed a brief in behalf of his company and also as the representative of other independent steel companies; especially those making steel pipe, tubing and wire products. He said:

"With reference to schedule 3, paragraph 328, pertaining to butt welded and lap welded pipe, I beg to say that the duty proposed of ¾c. per lb. is greater than is necessary to protect this interest; and, therefore, I would recommend that the duty on butt welded and lap welded iron and steel tubes, in sizes from 1 in. to 6 in. inclusive, be made 6/10c. per lb. instead of ¾c.; and that sizes of butt welded pipe, from ⅜ in. to ¾ in. inclusive, and also lap welded pipe larger than 6 in. carry a duty of ¾c. per lb. as proposed. I suggest this change to your committee, for the reason that the smaller sizes of butt welded pipe and the larger sizes of lap welded pipe carry a greater labor cost than what we call the 'base sizes,' from 1 in. to 6 in. inclusive. These sizes on which I propose a lower duty are the common sizes of pipe, and the tonnage is considerably greater than the smaller sizes and larger sizes mentioned. I think the proposed duty on sizes smaller than ⅜ in. is justified, on account of the small production per man and high labor cost.

"With reference to coated conduit for electrical conductors, referred to in this paragraph, I would say that we are large manufacturers of this product, and that 25 per cent ad valorem is ample protection.

Duty on Wire Rods

"With reference to paragraph 315, pertaining to wire rods, the duty proposed in the bill of 3/10c. per lb., or $6.72 per gross ton, is sufficient, and I do not think it should be increased or decreased.

"In discussing paragraph 316, pertaining to black and galvanized iron and steel wire, I am also obliged to discuss paragraph 317, pertaining to galvanized wire used for fence, galvanized wire fencing, and wire for baling purposes.

"In paragraph 317, you propose a duty of ½c. per lb. on galvanized wire used for fencing purposes and for making into wire fencing and wire used for baling purposes; while in paragraph 316 you propose a duty on this same wire when used for other purposes of ¾c. per lb. It seems to me that the committee in framing this paragraph has overlooked the fact that it penalizes one class of users of this material for the benefit of others who use it for fencing and baling purposes only, and that this is 'class legislation'; and I am quite sure you could be justly criticized for making this distinction. Therefore, I recommend that you reduce the duty proposed in paragraph 316 from ¾c. per lb. to 6/10c. per lb., with the addition you now propose of 2/10c. per lb. for coated wire for all purposes; and that paragraph 317 be stricken out. There certainly can be no good reason offered by anybody why any class of users should be given preference over any other class; and while the duty I propose is smaller, perhaps, than it should be, it will safeguard to a certain extent the users of wire covered in paragraph 317 against unduly high prices, and will still afford sufficient protection to the interests affected by paragraph 316.

Labor Cost to Be Considered

"Referring to paragraph 331, pertaining to nails and spikes made from iron and steel wire, I beg to call your attention to the fact that this proposes 4/10c. per lb. on nails, which carry a labor cost $12 per ton higher than wire; and as it is my understanding that you wish to protect the labor employed in producing these nails to the same extent that you would protect labor producing the wire from which they are made, it naturally occurs to me that the committee framing this bill did not have sufficient information on this subject, and, therefore, has not provided sufficient duty to protect the labor engaged in the manufacture of nails. If this is the principle by which your committee is to be guided, then wire nails should carry a higher duty than plain wire, for the simple reason that the labor cost in producing this product is considerably greater, as above stated. With this fact in mind I would, therefore, recommend and strongly urge that paragraph 331 should be changed so as to provide a duty of ¾c. per lb. instead of 4/10c. per lb. on the common sizes of nails and spikes, and other sizes in proportion.

"I wish to call your attention to another wire product, viz.: barbed wire, both plain and galvanized, which is on the free list, schedule 15, paragraph 1679. I cannot understand the purpose of the ways and means committee in proposing that barbed wire be put on the free list. The cost of wire that enters into the manufacture of barbed wire is fully as great as that of wire for fencing or other purposes. Labor in making this wire and in manufacturing it into the finished product, barbed wire, is certainly entitled to the same protection as the labor employed in making wire for other purposes; and it would be rank discrimination to treat it other than on the same basis. If the manufacturer of barbed wire is compelled to meet foreign competition without any protection, he will be forced to reduce labor that enters into the manufacture of this wire to the very minimum, and may be put out of business entirely. I do not believe that this is the idea of the ways and means committee or the Senate Finance Committee, and if it is, I certainly hope that it is not the idea of Congress as a whole; and that this item of barbed wire will be put on the dutiable list and treated the same as other wire products.

Protect All Interests

"It is my impression that in framing this tariff bill it was the intention of the House Ways and Means Committee to protect all American interests—the farmer, invested capital, and especially the laboring people. I appreciate the difficulty that confronted the ways and means committee in framing a bill that will do exact justice to all the interests concerned. All interests are selfish; especially those that ask you to do things that would be an injustice to others. For that reason you should secure the facts and do what is best for the people as a whole, rather than to give undue protection to any one interest at the expense of many.

"Many producers in different lines may have high costs, due to antiquated factories or methods, or to disadvantage in their geographical location; but if there are such, their interests should not be considered to the detriment of the country generally.

High Duties on Raw Materials

"While I am not supposed to discuss duties other than those on pipe and wire, I desire to emphasize, if possible, what Mr. Topping has said with reference to duties on raw materials.

"The proposed duties on fluorspar, manganese ore, ferromanganese, magnesite, pig tin, zinc, and alloys will put considerable tax on the steel industry, which the consumer must pay. Mr. Topping has explained that American producers do not require this abnormal protection, and if there are any cases where they do, the interests are so small and can produce such a small percentage of the material required that their needs should not be permitted to impose this tax on all steel consumers. The duties proposed on these articles are all too great in my opinion, especially those on fluorspar, manganese ore, ferromanganese and magnesite, and I trust they will be greatly reduced by your committee.

"It should be understood that in recommending lower duties on some tubular and wire products than those proposed in this bill, I do so believing that the entire bill will finally provide for a moderate duty on all

classes of merchandise. If this bill, as a whole, is so framed that the result of its passage would be to increase the cost of living and labor, in that event we need higher duties than those I have suggested.

"As Mr. Topping states, we will be obliged to export 20 per cent of our steel if we are to keep our mines and mills in operation and give continuous employment to our workmen, and anything that adds to our costs will make this more difficult and also increase the selling price to our domestic consumers.

General Observations

"In this connection I would like to make a few observations on the tariff generally in the hope that practical ideas and experiences may be of service to your committee.

"Conditions are abnormal throughout the world and the quicker readjustments are effected, the better for everybody; so it seems to me that your tariff bill, when completed, should be based on what we may think are normal conditions and values, rather than on conditions that obtain at present. If it has the effect of speeding readjustments to lower values on a more stable basis, it will be of great benefit. Wages and materials in other countries must increase or wages and materials in the United States must decrease before values are stabilized. Both will happen; wages and materials will be lower in the United States and higher abroad. A reasonable tariff bill will bring this about quickly; a tariff too high will prolong this readjustment and in the meantime the country will suffer.

"I believe in the American standard of living and desire to see it maintained, but I am not so much concerned about the rate of wages paid as about what the wage earner has left after paying the cost of living by this standard. Duties that are too high will raise values, increase the cost of living, stop exports, cause unemployment, and finally cause industrial depression. You are expected to frame a tariff bill that will maintain the American standard of living and yet permit us to export our products to the markets of the world. This cannot be accomplished by a bill that will materially increase the cost of production."

Various Changes in Metal Schedule Urged

John H. Brewster, New York, filed a brief asking for the maintenance of differentials on crucible and electric steel on one hand and bessemer and open hearth steel on the other in the paragraphs dealing with ingots and semi-finished products and the one dealing with wire rods.

Nelson Franklin, Denver, representing the Rare Metals Ore Co., appeared before the committee to sustain the proposed rate of 45c. per pound on the metallic tungsten content provided for tungsten ore or concentrates, but claimed a higher duty would be justified.

Wallace L. Pond, Nicholson File Co., Providence, R. I., manufacturer of files and rasps, asked for an increase of duties over the Fordney bill rates, ranging from 25c. to 77½c. per dozen. He referred to the skilled and high priced labor required to make these products. Certain classes of files, largely the smaller and more finely cut, are being imported from various European countries in considerable quantities. He recommended rates of 40c. per dozen on sizes 2½ in. and under, 75c. per dozen on 2½ in. and not over 4½ in.; $1 per dozen on sizes over 4½ in. and under 7 in., and $1.20 per dozen on 7 in. and over.

Attorney Harold H. Burton, of Cleveland, representing the inventor, Dr. Aladar Pacz, and the producers of alpax and new silicon-aluminum alloys, urged that paragraph 302 be amended to continue free of duty silicon with 5 per cent or less of iron. He pointed out that this grade of silicon is separate from ferrosilicon used in commercial quantities in the general practice, but is used in the manufacture of alpax, which is being developed by the General Aluminum & Brass Mfg. Co., Detroit, owner of the alpax sand casting license. This new alloy substitutes silicon for copper and aluminum in the manufacture of castings. It was stated further that the manufacture of the new product is an infant industry undertaking to compete with commercial aluminum, and in some cases with products of copper, brass, cast iron or even steel. It requires for its manufacture silicon metal containing 5 or less per cent of iron and it affords the only known commercial use for that grade of silicon. It is hoped that the required grade of silicon can be produced in this country at less than 22c. per lb. and if this comes about it was argued that the tariff should be less than 8c. per lb., which is proposed on 90 per cent or more ferrosilicon. Mr. Burton stated that the new alloy is being used in the United States, particularly in the casting of automobile parts.

A Plea for Chrome Ore

Dan Sutherland, representing mining interests in the West and in Alaska, asked that chrome ore be made dutiable at 60c. per unit of metallic content, or $30 per ton when 50 per cent oxide and $25 per ton on the ore when 40 per cent oxide. He expressed the opinion that there are ample chrome ore deposits to supply the requirements of American steel interests. He made the point that domestic chrome ore is produced by American labor, while that mined in Caledonia is produced by convict labor and that of Africa by Kaffir labor; also that manganese ore is in the same class with chrome in that manganese ore has never been sought extensively but would be, if sufficient value were placed on it.

J. W. Hoffman, for the American Brass and Copper Statistical Exchange, New York, asked for a reclassification of the brass, copper and bronze paragraph, 378, and filed a brief carrying the proposed changes, the plan of which is to grade the duties more in accordance with the cost of production and the value of the semi-finished and finished articles. The rates asked for are not easily comparable with those existing because they are based on a rearranged classification. He said that wages in the industry in the United States are from 90 to 120 per cent higher than in England. Wages in Germany were said to be from 60 to 80 marks per day.

Egbert Moxham, the Conley Foil Co., New York, speaking for tin foil manufacturers of the United States, opposed the Fordney schedules on tin and lead. He said the latter carries approximately 50 per cent protection under American valuation and that the duty of 2c. per lb. on tin, an imported metal, is too high, asking that tin be left on the free list. If the above suggestions are not adopted, he said, the rates on tin foil should be increased.

Changes Sought on Aluminum

Laurence M. Brile, president of Brile & Ratner, New York, urged that aluminum coils be included in paragraph 374 of the Fordney bill, carrying a duty of 5c. on aluminum scrap and 7c. on aluminum plates, etc., but protested against the duties themselves. The concern represented by Mr. Brile is an importer of crude and finished aluminum from Switzerland and contends that the rates in the bill are prohibitive.

Senator Penrose said that three foreign corporations, English, French and Norwegian, control a large part of the aluminum output of Europe, according to a report made to the committee, and if protection is not given domestic producers the consumers in this country would be at the mercy of foreign manufacturers.

Harris E. Galpin, Muskegon, Mich., speaking for the National Aluminum Foundries Association, protested against increases over the Underwood-Simmons rates on crude and finished aluminum. The respective duties in the present law are 2c. and 3½c. per lb., which the Fordney bill raises to 5c. and 9c. respectively.

Protection for Zinc

Eugene Wolff, representing the American Zinc Institute, said the condition of the zinc industry in the United States has grown worse due to importations. He said the zinc ore duty in the Fordney bill is made

permanent, while the products are given two years' protection at the specified rates, which are to be lowered after that time. He asked for rates as follows: Ore up to 10 per cent, free; 10 to 20 per cent, 1½c.; 20 to 25 per cent, 2c.; zinc dust, 3¾c.; slab zinc, 2¾c.; sheets, 3¾c.; coated sheets, 3¾c.; old and worn out, 2¾c.

Arguments on the same paragraph and of similar nature were made by Otto Ruhl, Joplin, Mo., who said that during the war large quantities of zinc ore came into the United States from Mexico and have come in later and that the domestic industry has been seriously affected, although it was conceded that this is partly due to the general industrial depression.

F. C. Wallower, also from the Joplin district, made arguments similar to those of Messrs. Wolff and Ruhl.

A. C. Dinkey Opposes Manganese Duties

A. C. Dinkey, president Midvale Steel & Ordnance Co., submitted the following statement relative to manganese:

With respect to manganese ore and ferromanganese, the outstanding facts are:

(1) That the use of manganese is absolutely necessary in the production of steel.

(2) That in only three districts in the world are there deposits of sufficient size to support the production of ore on anything like a scale commensurate with the needs of the steel industry; viz., India, Russia and Brazil.

(3) That within the borders of the United States no prospect has been found, even under the spur of war necessity, which it is reasonable to suppose will support a mining operation on an economic basis, either as to quantity, quality or cost.

(4) That ore from India, Russia and Brazil can be laid down at Atlantic ports for about $12 per ton. Approximately this sum must be paid for railroad freight alone from such small manganese ore mines as there are in the United States to the chief domestic consuming point of such ore.

(5) That the foreign steel industry (England, Germany, France and Belgium) draws its supply of manganese ore from these same far-off fields, costs to them being about the same as to steel producers in the United States. The present House bill would add about 30c. per ton to the cost of all steel ingots produced in the United States. The folly of doing this while expecting the neutral markets of the world to absorb from 15 to 20 per cent of the finished steel output of this country, on a competitive basis, is apparent.

(6) That the United States Steel Corporation would be less disadvantaged than all other steel producers in this country. The Steel Corporation makes its own ferromanganese almost entirely out of imported manganese ore; all other domestic steel producers generally buy their ferromanganese, either because they do not use ferromanganese in sufficient quantities to justify a blast furnace operation or because they do not have the necessary facilities.

The much higher duty proposed for ferromanganese than for manganese ore would have this effect: Every ton of ferromanganese used by the Steel Corporation would cost it, in duties, $23.65 per ton (i.e., the duties on ore). All other domestic steel producers would pay $39.42 per ton in duties (i.e., the duty on ferromanganese). We ask for free ore and a small tariff on ferromanganese—not more than $2.50 per ton, the same as in the Payne-Aldrich bill.

To-day the steel manufacturers of foreign countries and all manufacturers of this country are on substantially the same footing with respect to their supplies of manganese ore. Why, then, handicap manufacturers of the United States in favor of their competitors in England and Germany?

A compilation of supporting data prepared by the Midvale Steel & Ordnance Co. is filed herewith. [Extracts from this statement appeared in THE IRON AGE of Aug. 4, page 288.]

Vice-President King Proposes New Bar Classification

Willis L. King, vice-president Jones & Laughlin Steel Co., Pittsburgh, said that the company is a large manufacturer of steel products in many forms, the more important of which are steel bars, structural shapes, plates, wire products, pipe, tubes, and tin plate, and is, therefore, vitally interested in securing adequate protection in the proposed new tariff, not only for the steel industry and its workmen, but for all other American products which can be produced in Europe and elsewhere more cheaply.

"In the main," said Mr. King, "we agree with the general statement of John A. Topping on both finished and raw materials. On a comparative basis of labor and other costs here and abroad, the duties on common steel products fixed in the House Bill 7456, are inadequate, but we appreciate that changes must occur as the world progresses toward normalcy, and that the tariff should anticipate these changes. Knowing the difficulty in securing accurate information as to foreign labor costs, efficiency, and other conditions, and the uncertainty of the future, we are not able, even if disposed, to dispute your prognosis of the future as it may appear in this bill.

Increased Cost of Transportation

"The chief element of cost to the American manufacturer is the increased charge for transportation. Generally speaking, it has more than doubled since the tariff of 1909; but you will, perhaps, better understand the effect on our costs by the specific statement that the cost of assembling the raw material per ton of steel in Pittsburgh, and shipping the steel to New York, where we must meet foreign competition, is $10 per ton more than before the war. This is a cost which we can not control, but are, of course, hopeful of relief, and it can not come too soon for the general good.

"Our appearance here is not to criticise but to call attention to the classification of two, or perhaps three of the finished steel products which has been handed down from previous tariffs, and which we believe can be greatly improved with but slight increase in the duties.

Bars Classed with Other Products

"In fixing the duty on steel bars in the House bill under discussion, paragraph 304, their importance and probability of importation have not been recognized, largely, I think, because they are classed with about 17 other articles or products having no relation in cost or importance, ranging from steel ingots, die blocks, and gun barrel molds to certain alloys. This same classification appears in previous tariff bills, but it covers too much to cover it well. The lower priced brackets are too low for bars, but possibly entirely adequate for the other articles, and the higher priced brackets entirely unnecessary for bars. As to the importance of steel bars, the tonnage is greater than any other single steel product, and the selling price is lower than any other steel product. They are likely to be imported, not only because of their general use, but because they are not usually subject to chemical or physical specifications, can be easily transported in vessels, and more readily sold because of their wide market. Certainly they are important enough to have a separate paragraph in the tariff bill and I hope this suggestion will appeal to you.

"If the American valuation plan is retained, it is not likely that any steel bars will be imported under the first or lowest bracket in paragraph 304, namely, when valued not over 1c. per lb., 2/10c. per lb. duty; but in the second bracket, reading, valued over 1c. per lb. and not over 1½c. per lb., 3/10c. per lb., imports

are entirely possible, and would result in the reduction of American labor to a point below the accepted standard living conditions and comfort, which we earnestly hope will never become necessary. I would, therefore, recommend for your consideration a change in the classification, and slight increase in the duty on common merchant steel bars to read as follows:

Valued not over 1c. per lb.....3/10c. per lb. duty
Valued over 1c. and not over 1½c. per lb...4/10c. per lb. duty
Valued over 1½c. per lb. to 2½c. per lb....5/10c. per lb. duty

Structural Material

"Beams, channels, angles, etc., commonly known as structural material, in paragraph 312 of House Bill 7456, are made dutiable at a flat rate of 7/20c. per lb. Structural material is a large and important tonnage but not as likely to be imported as bars, because of the rigid specifications as to quality, length, etc., necessary for large buildings, but based on competitive costs here and abroad, both present and prospective, the duty of 7/20c. per lb. flat is not adequate. In some previous tariffs, structural materials carried a sliding scale based on the price and there is no logical reason now why they should not carry a sliding scale such as I have suggested for steel bars, but if your committee decides in favor of a flat duty I suggest that it be increased 1/20c. per lb. over paragraph 312, making the duty 4/10c. per lb.

"I do not know whether anyone has been designated to speak to you on steel plates, but the duties specified in paragraph 307 is, in our opinion, fairly adequate. The sliding scale protects manufacturers from foreign competition on a low market but gives the Government higher revenue on a strong market, and would seem to be a principle fair alike to the American industries and the Government. Any increases I have asked or suggested are based on the adoption of the American valuation plan in the new tariff bill.

Duties on Raw Materials Too High

"In closing, I beg your indulgence for a few words regarding raw materials as specified in the House bill under discussion. The rates on these materials are beyond reason, and beside adding materially to the cost of domestic consumers, will have a most serious effect on our foreign trade. The framers of provisions on raw materials doubtless had in mind the desirability of increased revenue for the Government; but in my opinion, it would be poor business policy for the Government to exact a few hundred thousand dollars at the Customs in exchange for many millions of dollars of foreign trade, on which the Government would receive taxes on its manufacture and transportation. The encouragement of steel exports is hardly less important than home protection under present and prospective conditions. The excess war made tonnage cannot be disposed of at home, and the duties fixed in the House bill will undoubtedly prevent the free flow of exports. We are informed that foreign governments, especially Germany, are fully alive to the importance of their export trade, and are making concessions in freight and taxes to their manufacturers, and it is our hope that, in the tariff under discussion, no handicap will be placed upon us."

President Crawford Speaks for Tin Plate Companies

E. R. Crawford, president McKeesport Tin Plate Co., for himself and E. T. Weir, president Weirton Steel Co., representing all the independent tin plate manufacturers of the United States, presented a brief on tin plate, terne plate and taggers tin. He named the independent tin plate manufacturers in the United States as follows:

Weirton Steel Co., Weirton, W. Va.
McKeesport Tin Plate Co., McKeesport, Pa.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
American Steel Co., Pittsburgh, Pa.
Washington Tin Plate Co., Washington, Pa.
Standard Tin Plate Co., Canonsburg, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
N. & G. Taylor Co., Philadelphia, Pa.
Trumbull Steel Co., Warren, Ohio.
Carnahan Sheet & Tin Plate Co., Canton, Ohio.
National Stamping & Enameling Co., Granite City, Ill.

"On Aug. 8, 1921," said Mr. Crawford, "we addressed a letter to Hon. Boise Penrose, chairman, Finance Committee, U. S. Senate, briefly stating our views in relation to the situation with the tin plate manufacturers of the United States and their attitude towards the revision of the tariff and the proposed rate of duty on tin plate, as well as certain rates of duty proposed on raw materials, which are used in the manufacture of tin plate.

Payne-Aldrich Duty Favored

"When the tariff bill was under consideration in the House, we requested the ways and means committee to fix the rate of duty on tin plate at 1.2c. per lb., which was the rate provided in the Payne-Aldrich bill, and which was a substantial reduction on the rate provided in the Dingley bill.

"The Underwood tariff bill now in force provides a duty of 15 per cent ad valorem, which is entirely inadequate, under the present unsettled conditions, taking into consideration the abnormal low rates of wages prevailing in Germany, Belgium and England, as well as the unsettled exchange situation, and exposes this important industry to ruinous competition in all of our seaboard markets where the great bulk of the tin plate manufactured in this country is consumed; the Atlantic and Pacific seaboards are easily accessible to foreign manufacturers, at low ocean freight rates.

"Tin plates are all manufactured in the interior of this country and bear a very heavy freight rate from point of manufacture to seaboard markets. Under the circumstances, we feel that we are entitled to restoration of the Payne-Aldrich rate of 1.2c. per lb. on tin plate, terne plate and taggers plate. The Fordney bill, however, provides a rate of 1.1c. per lb. in paragraph 310.

The Duty on Pig Tin

"After due and careful consideration, the tin plate manufacturers have reached the conclusion that with economies in manufacture which they hope to accomplish as conditions approach a more normal level, they will be able to get along with the proposed rate of 1.1c. per lb. and maintain their position in the home market against foreign competition, despite the fact that the Fordney bill has placed a duty of 2c. per lb. on pig tin, as provided in paragraph 386. There is very considerable opposition to this proposed duty for the reason that there are no commercial tin-bearing ore deposits in this country, and the two tin smelters situated on the Atlantic seaboard produce pig tin from imported tin ores. They sell their product on a parity with the landed cost of imported tin, and there is no prospect of compensating advantage by reason of expected competition from domestic sources, which would eventually reduce price of this commodity to a basis which would be competitive with imported tin.

Revenue Measure Only

"The tin plate industry is the largest consumer of pig tin in this country, but the tin plate manufacturers realize that the proposed duty may be considered a revenue measure, and for this reason they are not disposed to enter strenuous objection to the proposed duty of 2c. per lb. on pig tin, but leave it to the committee to satisfy itself that the smelting companies in this country are entitled to this protection, or that your committee is justified in leaving this duty as a purely revenue measure only.

"The tin plate industry in this country consumes 2,500,000 tons of steel per annum, and employs in direct labor in its own plants, approximately 40,000 workmen, who obtain the highest rate of wages of any workmen employed in the steel industry in this country.

"As large consumers of steel, which we purchase from the steel manufacturers, we are indirectly, but very deeply, interested in the schedule of duty proposed on steel products, which constitute our raw material. The rates proposed in the general metal sched-

ule are extremely moderate, and in our opinion, may be considered to be drawn on a revenue basis, rather than on a basis of protection. The rates on practically all items in the steel schedule are lower than those of the Payne-Aldrich bill, and are on an average of about 50 per cent of the rates in the Dingley bill. We have noted, however, that the Fordney bill proposes extremely high rates of duty on raw materials such as magnesite, fluorspar, manganese ore, ferromanganese and ferroalloys, which are essential and necessary in the manufacture of steel. These proposed rates of duty will unnecessarily increase the cost of our raw materials and will be an increased burden to manufacturers of tin plate and other similar commodities who are using large quantities of semi-finished steel.

"We wish to call the attention of the committee to this situation, particularly because we feel that the proposed rates of duty on these raw materials should be stricken out or modified to a strictly revenue basis, as in most cases they are not competitive, and hence the tariff becomes a tax, without any compensating advantages.

Valuation Plan Indorsed

"We wish also to go on record with your committee that the independent tin plate manufacturers of the United States are unanimously in favor of the proposed American valuation plan, and we would deplore any modification of that plan which would fix the assessment of duty on valuation prevailing in foreign countries, whose depreciated currencies are subject to violent fluctuation in exchange value, as compared with the standard value of the United States gold dollar."

Special Alloy Steels and the Tariff

Dr. J. A. Mathews, president Crucible Steel Co. of America, addressed the committee as a member of the tariff committee of the crucible steel manufacturers of the country and made a number of suggestions for changes in the proposed bill. He said in part:

"It is a pleasure to know that in the pending tariff legislation the return to the sound principle of American valuations is contemplated, thus getting back to a feature of the original tariff bill signed by George Washington in 1789. Under this principle, manufacturers are assured of whatever rates are finally adopted, and not left in uncertainty as to the proportion of those rates actually applying, due to under-valuation and uncertain values, as has been the case under previous bills. The Government will be able to collect more revenue, and imports will be made on the basis of equal or superior quality and not upon the basis of unequal valuations. It is my belief that the Tariff Commission can now function in a more truly scientific fashion than has been possible in the past, and that Congress can arrive with a greater degree of certainty at equitable rates. After a short experience with the American valuation plan it is my judgment that the administrative features will be easier than under the present system."

Doctor Mathews at this point compared the crucible steel industry with other departments on much the same lines as when he appeared before the Ways and Means Committee in January, as reported in THE IRON AGE, January 20, 1921, pp. 197 and 198.

Manganese and Tungsten

Taking up paragraph 302 of the new bill, Dr. Mathews said in part: "In this paragraph very heavy duties are imposed upon the ores and raw materials which are an essential part in the manufacture of tool and alloy steels. This is a radical departure from the traditional policy of cheap raw materials for manufacturers, coupled with suitable protection on finished articles the manufacture of which involves much labor.

"It is difficult to understand why manganese ore and tungsten ore should suddenly require protection in an amount of something over 100 per cent of their pre-war values. No great deposits of these ores have been discovered. We shall have to go abroad for our principal sources to the great deposits in foreign lands.

"Manganese may be considered as a steel-making necessity, and compared with it all other alloying materials mentioned in this paragraph may be termed luxuries. The proposed duty of 1 cent per pound on metallic manganese in ores "containing in excess of 30 per cent" is in itself an admission of the low quality of our domestic ores. This material should be restored to the free list, or possibly protected to the extent of 10 per cent as a revenue measure.

"The proposed rate of duty on tungsten ores and concentrates is about 250 per cent of the present selling price, or 125 per cent of the average pre-war selling price. Our company is a very large buyer of tungsten ores. In the years before the war over one-half of this material was of domestic origin. During the war period, when the prices were so high and the difficulties of obtaining foreign shipments were so great, we had to rely more and more upon foreign sources, and for the past three years we have bought no domestic ores. The demand for tungsten during the war was so great that many were induced to work tungsten properties which were of little value, and it is poor economics to continue the operation of such properties by reason of an exorbitant rate of duty, particularly since they cannot under any circumstances take care of the country's normal needs. The rates for both tungsten and manganese seem to be predicated upon the extremely high costs during the war period rather than upon the basis of operation in normal times.

"In the case of molybdenum ore we have a little different situation. Of all the alloying materials used in the steel industry molybdenum seems to be the only one of which we possess an adequate domestic supply. The use of this metal is a new development in steel metallurgy and the production of molybdenum is an infant industry which, we believe, is entitled to some protection. We feel that the rate proposed of 75c. per unit is too high and should be changed to not over $10 per ton.

"The rates proposed on the ferroalloys made from these three ores are in the nature of compensatory duties made necessary by the extremely high rates imposed upon the ores themselves. If the rates on the ores are reduced, as they certainly should be, then these rates on the ferroalloys should be correspondingly reduced. The rates on the other ferroalloys are needlessly high, and seem to be based upon wartime conditions, and not on any normal basis of costs. If the present rate of duty is retained on tungsten ore and ferrotungsten, it will raise the cost of high speed tool steel from 20 to 25c. per lb. and the selling price by somewhat greater amount.

Need of Classification

"The fundamental defect in paragraph 304, and in several others, is the lack of orderly classification of steel products. The need for more scientific classification has been pointed out by the United States Tariff Commission, and in a brief which the writer submitted to the Ways and Means Committee Jan. 10, 1921 [THE IRON AGE, Jan. 20] he proposed a classification which Doctor Page, of the Tariff Commission, stated was the best attempt in this line that he had seen. Paragraph 304 includes ingots, billets, bars, and forgings, These represent great differences with respect to the ratio of raw material to labor. In the fine steel industry it is possible by the application of labor to convert five cents worth of raw steel in the ingot into 75c. worth of needle wire, or $1.50 worth of safety razor blades, or $10 worth of hair spring wire. It is the highly finished forms of steel representing the expenditure of much labor on a small amount of raw material that are seriously affected by importations from abroad, where labor is so much lower than it is here. About 70 per cent of the duties collected on iron and steel products are on products which are imported in competition with the tool steel industry.

"Instead of adopting an ascending rate of duties on products representing an increased amount of labor, this paragraph contains specific duties, the highest

rate of protection being given to the tonnage products, which have almost no competition from abroad, and the lowest duty is given to the highest priced steels which represent in some cases 85 to 90 per cent labor. If you will examine this schedule you will see that a steel valued at 1½c. is protected to the extent of 33-1/3 per cent, while a steel valued at just under 40c. is given 15 per cent protection, and all steels over 40c. are allowed 20 per cent.

An Important Amendment Suggested

"The defect in the rates in paragraph 304 as applied to high grade steels can be in large measure corrected without complete revision if in line 7 of paragraph 305 you will insert the words "carbon, or" before the word "nickel." Line 7 would then read "containing more than six-tenths of 1 per centum of carbon, or nickel," etc. It so happens that nearly all of the crucible or fine steels are high carbon products running well above six-tenths of one per cent, while the large tonnage industry is in very large part made up of steels running much below six-tenths of one per cent; therefore, if the carbon should be included along with the alloying metals the industry based largely upon the production of high carbon steels would secure the additional protection which it deserves and needs.

"The last portion of this paragraph, beginning at the end of line 13, should be amended so that the additional cumulative duty should apply to the entire molybdenum or tungsten content. Having defined in the earlier portions of this paragraph the lower limit of alloy which shall constitute an alloy steel for duty purposes, there is no reason for setting a different rate at which the assessment of additional cumulative duty shall begin in the case of molybdenum and tungsten. The provision as it now stands will permit the entry of a great many steels containing, in fact, less than 1½ per cent of these elements.

"The additional cumulative duties proposed are of course based upon the exorbitant rates of duty proposed on molybdenum and tungsten ores and metals. If these rates are reduced, as they certainly should be, then of course the additional cumulative duties should also be reduced, and if not reduced it will very seriously injure all the manufacturers of high-speed steel and all of the manufacturers of small tools, such as twist drills, cutters, etc., made from high-speed steel.

"It should further be pointed out that this additional cumulative duty is the same in amount as the cumulative duties placed upon molybdenum metal and ferromolybdenum, tungsten metal and ferrotungsten. It does not take into consideration at all the fact that there is a loss of some 20 to 25 per cent in the use of these metals and ferroalloys in the process of conversion into finished steel. The amount of this loss has been confirmed by the investigations of the Tariff Commission. Therefore, we are not only deprived of the additional cumulative duty on the first 1½ per cent of molybdenum or tungsten contained, but also upon the entire conversion loss in the use of these metals. If the rates are to be retained as they now appear on the ores and alloys, the additional cumulative duty should be increased by 25 per cent, and it should apply to the entire tungsten or molybdeunm content.

"The same applies to paragraphs 307 and 308 as in paragraph 304, namely, that the higher the value of the steel, the lower is its rate of duty. This defect would be in large measure corrected in so far as it applies to the manufacture of tool steel if the amendment proposed in paragraph 305, line 7, is adopted.

"Paragraphs 315 and 316 cover satisfactorily ordinary commercial rods, wire, and cold rolled strip. They do not adequately protect the manufacturer of highly finished specialties in this line, as, for instance, polished drill rods, watch part steel, safety razor steel, either tempered or untempered, tape line steel, pen steel, needle wire and similar products which are turned out by specialty mills and involve a great deal of skilled hand labor. If the amendment proposed in paragraph 305, line 7, is adopted, this would in a measure take care of these highly specialized products."

Wide Strips and Cotton Ties Not Adequately Protected

Severn P. Ker, president Sharon Steel Hoop Co., presented the following on behalf of the independent steel manufacturers:

I would call your attention to the inconsistency of paragraph 313 and its inadequacy as a protective measure. Hoops, bands and strips are rolled from billets and slabs and are commonly rolled in this country up to 16 in. in width as a result of developments in the last few years of wide strip mills. There are several mills that roll up to 18 in. in width. I think, therefore, that hoops, bands and strips should be described to be steel in coils, scrolls, or cut to lengths, 16 in. in width and narrower. Before the advent of these wide strip mills 8 in. probably covered fairly well the production of this class of steel in this country, but with the development of the automotive industry a much wider strip was required and the industry has met that requirement by the expenditure of large sums of money in permanent investments in highly specialized mills capable of rolling, as above stated, up to 18 in. in width. Our own company rolls regularly up to 15 in. in width and down to ⅜ in. wide. We roll in the narrower widths as thin as 23 gage or 0.025 in. thick. In the wide widths we roll:

Up to 8 in.	down to 16 gage, or 0.065 in. thick
Over 8 in. to 12 in.	down to 14 gage, or 0.083 in. thick
Over 12 in. to 15 in.	down to 12 gage, or 0.109 in. thick

The rates of duty on this class of material, as written in the bill, are less than are accorded other products not nearly so far advanced in the process of manufacture, and in which the labor cost is not so high. (See paragraph 304 covering, among other things, ingots, blooms, slabs and billets out of which hoops, bands and strips are rolled.)

Duties Not in Proper Relation

The whole of schedule 3, as it relates to iron and steel in its various forms, names rates of duty that are not only very low but the classification is very broad in some paragraphs and not fully descriptive of the product in other paragraphs, notably paragraph 313. The commodities under this paragraph should have a rate of duty at least equal to the extremely low rates provided for commodities not so far advanced in process of manufacture and in which the labor cost is not so great. I think that no one who believes in the theory of protection will argue that the rates in paragraph 304, or indeed any of the other paragraphs covering iron and steel, are high. The protection afforded by tariff acts, on iron and steel commodities, in all bills since the McKinley bill have been subject to material reductions until the act of 1913. The latter practically affords no protection against foreign competition to this great industry, which was saved from a continuation of the depression which set in during the latter part of 1913 and early part of 1914, only because of the world war. During the first half of 1914 mill order books shrank to a point which necessitated the curtailment of operations and resulted in decreased employment, and only began to fill up during the latter part of 1914 to a point that justified full employment, as a result of the European War, and full employment in this country was only continued until the effects of that conflict had passed. It has been, in recent months, at the lowest rate as to percentage of operation and employment, I think, in the history of this country, and we can only look for improvement as the general conditions of business improve and then, in my judgment, only if our home market is protected for the benefit of our home labor and investments.

New Paragraph Suggested

I think it is necessary to rewrite the description of hoops, bands and strips of iron or steel to meet the actual facts of to-day's production by dropping the limit of 8 in. and by extending the limit to 16 in. in

width and then to give this branch of the industry a rate that will be consistent with the rest of the schedule which, as already stated, is extremely moderate and will result in only reasonable protection against foreign competition. I would respectfully suggest, therefore, that paragraph 313 be corrected to read as follows:

Hoop, strip, band and scroll iron or steel, hot rolled, not especially provided for, 16 in. or less in width, ⅝ in. or less in thickness, valued at 1c. and not over 1½c. per lb., 25/100c. per lb.; valued at over 1½c. and not over 2c. per lb., 41/100c. per lb.; valued at over 2c. and not over 3c. per lb., 55/100c. per lb.; valued at over 3c. per lb., 20 per cent ad valorem; provided that all strip, band and scroll iron or steel wider than 16 in. shall be considered sheet iron or steel, and provided further that barrel hoops of iron or steel, and hoop or band iron or hoop or band steel flared, splayed or punched, with or without buckles or fasteners, shall pay no more duty than imposed on the hoop or band iron or steel from which they are made. Bands and strips of iron or steel, whether in long or short lengths, not especially provided for, 20 per cent ad valorem.

Cotton Tie Duty Out of Line

Paragraph 314 covering cotton ties and baling ties is entirely inadequate as a protective measure. Why hoops of iron or steel 15/16 in. wide x 0.035 in. thick, cut to specified lengths of 11 ft. 6 in., put up in counted bundles, enclosing a buckle for each strip in the bundle, and coated or painted, should take a duty less than that imposed upon similar strips or hoops of iron or steel not so put up, I cannot understand. These bundles are put up in standard weight of 45 lb. each and to-day are selling at $1.30 per bundle at maker's mills, Pittsburgh. The rate provided in paragraph 314 of ¼c. per pound is, therefore, less than 10 per cent ad valorem. The per ton value of cotton ties at to-day's market at maker's mill, Pittsburgh, is $57.77 per net ton, which makes the ¼c. protection $5 per net ton. I think that paragraph should have the rate of duty changed from ¼c. per lb. to 25 per cent ad valorem, if it is to protect the American producer of this commodity. In years past, before the rail rates of freight were as high as they are to-day, cotton ties could be delivered from English or German ports to any South Atlantic or Gulf port for a very much less rate of freight than from the mill of any American producer (except as to the mills located at Atlanta, Ga., and Helena, Ala., within the radius of a very short rail haul). There would be no adequate protection to the industry in the rate as written. Cotton ties in the past have frequently been carried from German or English ports to South Atlantic and Gulf ports practically as ballast or at exceedingly low rates of freight, by ships coming to those ports for cotton or other products for the return cargoes, and this practice will undoubtedly prevail again as the business of the world begins to assume normal relations. With our present excessive rail rates the cost of delivery from American mills to consumers would be so high that it is doubtful if the rate as written in the bill will afford any protection to the American producers of this commodity; and while rail rates must be materially reduced, if business is to go forward, it is not easy to believe that for a long time they will be reduced to a rate equivalent to that in effect prior to 1914.

The above rates are suggested as a very modest protection, provided the American valuation clause is retained in the bill, which clause the industry heartily approves and supports. Without the American valuation clause I am of the opinion that in order to afford any adequate protection to the American industry these rates would have to be raised materially. Indeed, I do not see how without the American valuation clause dumping and improper valuations can be avoided.

Cost of Making and Transporting Sheets

N. H. Abbott appeared before the committee as vice-president of the Wheeling Steel Corporation, and also as a designated representative of the following independent manufacturers of sheet steel:

Alan Wood Iron & Steel Co., Philadelphia.
Allegheny Steel Co., Pittsburgh.
American Rolling Mill Co., Middletown, Ohio.
Apollo Steel Co., Apollo, Pa.
Ashland Iron & Mining Co., Ashland, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Brier Hill Steel Co., Youngstown, Ohio.
Canonsburg Steel & Iron Co., Canonsburg, Pa.
Canton Sheet Steel Co., Canton, Ohio.
Carnahan Tin Plate & Sheet Co., Canton, Ohio.
Chapman Price Steel Co., Indianapolis, Ind.
Eastern Rolling Mill Co., Baltimore.
Falcon Steel Co., Niles, Ohio.
Follansbee Bros. Co., Follansbee, W. Va.
Labelle Iron Works, Steubenville, Ohio.
Mahoning Valley Steel Works, Niles, Ohio.
Mansfield Sheet & Tin Plate Co., Mansfield, Ohio.
Massillon Rolling Mill Co., Massillon, Ohio.
National Enameling & Stamping Co., Granite, City, Ill.
Newport Rolling Mill Co., Newport, Ky.
Newton Steel Co., Newton Falls, Ohio.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Reeves Mfg. Co., Dover, Ohio.
Republic Iron & Steel Co., Youngstown, Ohio.
Seneca Iron & Steel Co., Buffalo.
Sharon Steel Hoop Co., Sharon, Pa.
Superior Sheet Steel Co., Canton, Ohio.
Trumbull Steel Co., Warren, Ohio.
United Alloy Co., Stark Division, Canton, Ohio.
Youngstown Sheet & Tube Co., Youngstown, Ohio.
West Penn Steel Co., Brackenridge, Pa.
Whitaker-Glessner Co., Wheeling, W. Va.
Wheeling Steel Corporation, Wheeling, W. Va.

"My brief," said Mr. Abbott, "is restricted to those steel products which are made on jobbing mills or sheet mills only, and to a proposed tariff on imports of similar materials covered by House Bill 7456, schedule 3, paragraphs 307, 308, and 309.

"The sheet steel industry consists of 598 sheet mills and 43 jobbing mills, scattered from the Atlantic seaboard to Wisconsin; the principal production, however, being in the Pittsburgh-Wheeling, Youngstown-Mahoning Valley and Cincinnati-southern Ohio districts. Other large districts of production are Chicago-Milwaukee, St. Louis, Baltimore-Philadelphia-Bethlehem and Buffalo districts.

The combined production of jobbing and sheet mill products was 2,335,000 net tons in 1919 and 3,300,000 net tons in 1920, of which production approximately one-third was galvanized, using approximately 88,000 tons of spelter for that purpose.

"The industry represents a large investment and in 1920 produced 3,300,000 net tons of sheets, employing approximately 42,000 people in the conversion of sheet bars into finished black and galvanized sheets. The wages paid for this conversion—mill labor only—amounted to $80,260,000.

"Comparative tables of statistics of the growth of the industry in recent years are omitted from this brief, because of the abnormal conditions prevailing from 1915 to 1920, inclusive, during which period an unusually large percentage of the capacity of the industry was engaged in making sheets for foreign consumption; as, during that period, the principal foreign competitors were not in position to supply their accustomed percentage of world's consumption.

"Any consideration of a protective tariff as an efficient, practical measure must, at this time, take into consideration the general sub-normal conditions that exist and that, presumably, may be expected to exist for several years in foreign countries; also the effect of low ocean rates from foreign countries against all rail or rail and water rates in this country, from our principal producing districts, to our seaports.

Labor Cost

"Directly and indirectly, not less than 80 per cent of the total cost of producing steel sheets in this country, is the item of labor; but analyzing from the conversion of the sheet bar into the finished common black sheet—not galvanized nor specially finished—the direct labor cost of producing and of repair labor, ranges from 27 per cent to 31 per cent of the total cost of the product. The increase in cost per ton between 1912

and the first quarter of 1921 is shown by the following schedule:

	Actual Average Cost of Labor Producing Common Black and Blue Annealed Steel Sheets, Per Net Ton Year 1912	Actual Average Cost of Labor Producing Common Black and Blue Annealed Steel Sheets, Per Net Ton, First Quarter 1921
Producing labor	$13.28	$22.86
Labor repairs and maintenance	0.43	1.20
Total	$13.71	$24.06

"This is a difference of $10.35, equaling an increase in labor cost over 1912 of 72 per cent. No comparative figures as to similar labor producing costs per ton of product produced, as paid in mills of foreign countries, are available at this time, but a general contrast can be made with Germany, the figures being reduced to United States currency at the now existing rate of exchange, and both figures being as of July 1, 1921, per day.

	Unskilled Workers	Skilled Workers
Germany	$0.88	$1.25
United States	3.00	9.95

(Skilled sheet mill workers in the United States work 5⅓ days and unskilled 6 days per week.)

"Both English and Belgian rates for similar work are higher than the rates paid in Germany but are very substantially less than the rates paid in the United States.

NOTE.—In connection with the comparison of the wages paid in the United States, as of July 1, it is pointed out that the rates effective at that time were materially less than the average of those existing in 1920. The rate in 1920 for unskilled labor was $5.06½ for a 10-hr. day. The skilled labor rates show a corresponding reduction.

Transportation Costs

"The following comparison is made between the rates from Pittsburgh and comparative ocean rates from the principal shipping ports in England, Germany and Belgium, all per net ton of 2000 lb. Foreign currency rates are reduced to United States currency at now existing rates of exchange.

	From Pittsburgh				
To	All Rail	Rail and Water	From England	From Belgium	From Germany
New York	$7.60	....	$5.40	$4.50	$4.50
New Orleans	10.20	$11.20	5.80	4.60	4.80
San Francisco	33.30	20.17	5.80	5.00	5.40
Seattle	33 30	20.17	10.80	6.60	6.60

"The following is a comparison of difference between the lowest foreign and lowest Pittsburgh rate, per net ton in favor of foreign manufacturers:

To	Pittsburgh Rate	Foreign Rate	Difference
New York	$7.60	$4.50	$3.10
New Orleans	10.20	4.60	5.60
San Francisco	20.17	5.00	15.17
Seattle	20.17	6.60	13.57

"The following comparison shows increase in foreign and domestic transportation rates between 1912 and 1921:

	1912	1921	Increase Per Net Ton
Liverpool to New York	$2.00	$5.40	$3.40
to New Orleans	2.20	5.80	3.60
to San Francisco	5.00	8.80	3.80
to Seattle	7.00	10.80	3.80
(All Rail)			
Pittsburgh to New York	3.20	7.60	4.40
to New Orleans	5.14	10.20	5.06
to San Francisco	19.90	33.30	13.40
to Seattle	19.90	33.30	13.40

"Pittsburgh rail and water combination rates existing in 1912 were not available at the time this brief was written.

"It is apparent that the difference in transportation costs alone would prohibit a buyer on the southern seaboard, and particularly in the Pacific Coast markets, from purchasing at home even though the advantage of quicker service or lowered investments in merchandise stocks would otherwise govern his preference. This difference in transportation costs has existed in the past, but not to the marked extent of today.

"The tariff rates on iron and steel sheets as proposed in House bill 7456, schedule 3, paragraphs 307, 308, 309 provide adequate protection to the industry except to the seaboard territory where transportation costs are so decidedly favorable to foreign manufacturers. This condition may be remedied to a substantial extent by the American valuation plan which is strongly endorsed by the industry.

"The capacity of the sheet steel industry of this country is sufficient to supply the requirements of the United States, as evidenced by any previous year's consumption; and, in addition, to produce a surplus equal to at least 25 per cent of its capacity; also that in the period from 1912 to 1921 the number of mills increased 38 per cent and producing capacity 45 per cent."

Manganese and Magnesite Duties Defended

Speaking for the Lavino Furnace Co., E. W. Marshall, and his own company, Vice-President Radcliffe Romeyn of the American Manganese Mfg. Co., with furnaces at Dunbar, Pa., made a plea for a protective duty on ferromanganese. He said that unless this is granted, the merchant ferromanganese industry will be wiped out of business within six months. The domestic makers, he stated, are satisfied with duties carried in the Fordney bill, or an alternative that would be acceptable would be free manganese ore with either an ad valorem duty of 25 per cent or a specific duty of $15 per gross ton on ferromanganese. This latter figure was arrived at by taking from the duty of $39.42 that would be levied on 80 per cent ferromanganese at the proposed rate of 2-1/5c. per lb., the sum of $24.64 that would be levied on 45 per cent manganese ore at 1c. per pound as proposed, the difference being $14.78. With a $15 duty the domestic maker would escape payment of the $24.64, if the ore duty is eliminated and be granted the same protection as now proposed. At the same time the $15 ferromanganese duty would represent a cost of only $2,250,000 annually to independent steel manufacturers, or 29.9c. per ton increase in the cost of soft steel production. The depressed condition of the industry was cited and the attention of the committee was called to the fact that workmen at Dunbar had voluntarily taken a cut of 22c. per hour in wages in order to continue employment and maintain operations. British competition was assigned as the chief reason for asking protection.

John J. Howard, general manager of the Lavino Furnace Co., after concurring in the arguments of Mr. Romeyn, submitted a brief and made some supplementary remarks. He expressed satisfaction at the action of the House Committee on Ways and Means in giving ferromanganese a classification separate from pig iron and spiegeleisen. Senator Smoot said that it is difficult to make the classification and that he could not understand why ferromanganese manufacture should be given a duty of $15 and spiegeleisen a duty of only $1.25, when both products are made in the blast furnace and contain manganese, though he said he recognized one was much higher than the other in manganese. It was explained to him by Mr. Romeyn, who interposed to clear the point, that standard spiegeleisen runs from 18 to 22 per cent in manganese only, although Senator Smoot insisted it runs as high as 30 per cent, while standard ferromanganese runs to 80 per cent or higher. Spiegeleisen, Mr. Romeyn said, needs no higher protection because there are ample supplies of domestic ore for spiegel manufacture, while foreign ores are necessary for the production of standard ferromanganese.

Mr. Howard said that the domestic makers, if allowed to develop, can produce cheaply enough so that steel makers will not have to buy foreign ferromanganese.

Without making any specific recommendation, George H. Crosby, Duluth, Minn., explorer of minerals,

urged the committee to provide protection for domestic manganese ore. Sharp refutation was made of claims that deposits in the United States are small and isolated and that there is a lack of high grade materials. Stimulation of manganese mining during the war was explained and it was stated that it could be proved that there are 43,000,000 tons of manganiferous ore and over 30,000,000 tons running higher in manganese. To show that the actual tonnage of reserves is greater than has been reported, it was asserted that there are 36,000,000 tons on the Cuyuna range, of 5 to 35 per cent manganese content. The witness said that more than $7,0000,000 has been spent since 1914 in trying to develop manganese mines and that of 39 on the Cuyuna range only two are operating. The belief was expressed that if the industry is protected this country would be capable of producing 75 per cent of the manganese required and would be for many years. The area explored in Minnesota was said to be only one-eighth of the proved merchantable deposits. The ore in reserve inland could be increased to 50,000,000 tons on the Cuyuna range alone, Mr. Crosby said.

Charles W. Potts, of Dearwood, Minn., prospector and miner of manganese ore, made a plea similar to that of Mr. Crosby. He said domestic shipments in 1918 totaled 305,000 tons. Official reports by the Government and States were declared to be out-of-date and reserves to be greater than have been estimated. Mention was made of manganese ore deposits, some as high as 49 per cent, in the Batesville, Ark., district, while others of 31 per cent were called to the attention of the committee. Mr. Potts said he thought there were reserves amounting to 10,000,000 tons, ranging from 40 to 42 per cent in manganese, 20,000,000 tons of ferruginous ore, and 36,000,000 tons of manganiferous ore, and that they will last as long as the iron ore deposits.

American Mining Congress for High Duties on Minerals

That the Finance Committee may give ferromanganese a different classification from that provided in the Fordney bill was indicated by inquiries with this in mind directed to witnesses by Senator Smoot, and the interest he manifested in a recommendation by Herbert Wilson Smith of the American Mining Congress. Mr. Smith pointed out that as the ferro-alloy section is framed it is difficult to make a division between spiegeleisen and ferromanganese and suggested that ferromanganese instead of being classified as "such iron manganese alloys as contain 45 per centum or more of manganese," the content be lowered to the top line of spiegeleisen, or, as Mr. Smith said, 23 per cent of manganese. Mr. Smoot, as he had done previously, insisted that standard spiegeleisen runs up to 30 per cent in manganese, despite the fact that the trade recognizes it as ranging from 18 to 22 per cent. Mr. Smith said at present there is a gap between spiegeleisen and ferromanganese which should be taken up by means of the suggested reclassification. Spiegeleisen, however, in the Fordney bill is described as "an iron manganese alloy containing less than 45 per cent of manganese," or, in other words, is graded up to the point where ferromanganese begins.

Mr. Smith's testimony dealt with 27 minerals and he submitted extensive statistical data on which he based his arguments, some of which were to support suggested revisions and reclassifications. He supported the duty carried on manganese ore, the duties suggested by graphite and zinc producers, also the restoration of the Payne-Aldrich rates of 7c. and 11c. respectively on block and pig aluminum and aluminum sheets and strips. He did not insist on the latter, however, but said the Fordney rates of 5c. and 9c. are as low as the domestic industry can stand. He also recommended that the duty on block tin be increased from 2c. per lb., proposed in the Fordney bill, to 4c. per lb.

Statement of the Northwestern Magnesite Co.

An argument for the proposed duties on magnesite was made by Roy N. Bishop, president and general manager of the Northwestern Magnesite Co., with mines in Stevens County, Washington. He said that while the proposed duty on dead burned magnesite does not now represent the difference between costs of production in the United States and Austria, it is felt that economic conditions in the United States will adjust themselves so that it will be possible to produce more cheaply than has been possible heretofore. He cited the following delivered prices per ton to show the costs in the United States compared with those of Austria:

	Austria	United States	Difference
Chester, Pa. (seaboard)	$20.00	$46.35	$26.35.
Pittsburgh	24.50	43.95	19.45
Harrisburg, Pa.	22.80	46.35	23.55
Johnstown, Pa.	24.30	46.35	22.05
Buffalo, N. Y.	24.50	43.95	19.45
Youngstown, Ohio	24.60	43.95	19.35
Chicago*	27.20	43.95	19.35
Cleveland	25.60	43.95	18.35

*Magnesite from Austria takes rate by New Orleans of $7.20 to Chicago.

Mr. Bishop said that not a pound of magnesite had been produced by the Northwestern mines in 1921 so that the percentage of domestic supplies is probably back to the pre-war basis of 5 per cent of the total. This was attributed partly to the depression in the steel industry but also to imports from Austria.

The following table was submitted to show the total crude magnesite produced in the United States for the past four years, according to the United States Geological Survey, and also to show the tons of crude magnesite produced by the Northwest Magnesite Co., and the percentage of the total for the United States contributed by that company. It was given to refute claims that this company had a monopoly.

	Total U. S., Tons	Northwest Magnesite Co. Tons	Per Cent
1917	316,838	62,737	19.8
1918	231,605	81,111	35.0
1919	156,226	89,163	57.1
1920	303,767	141,817	46.7
Total	1,008,436	374,828	37.2

A schedule was submitted to show that the center of consumption is in the Pittsburgh district and surrounding territory, including Youngstown, Ohio, and Johnstown, Pa., with a yearly consumption of 66,000 tons by 415 open-hearth furnaces having a daily capacity of 26,935 tons of steel. The freight rate on magnesite from Chewelah, Wash., is $20.80 per net ton to Johnstown and $18.40 to Youngstown and Pittsburgh. The rates from the Atlantic seaboard were said to be $4.10 to Johnstown, $4.50 to Pittsburgh, and $5 to Youngstown. The statement was also designed to show that there is not enough business west of the Mississippi to justify operating magnesite mines.

The annual consumption in the latter territory was given as 13,550 tons, or 8.5 per cent of the total consumption of dead burned magnesite in the United States. Domestic production, according to government figures, ranged from 12,443 tons in 1910, or 3.7 per cent of the total consumption, to 316,838 tons in 1917, the peak year, or 89.2 per cent of consumption. Some of the conclusions of Mr. Bishop, who strongly upheld the quality of domestic magnesite, were:

The proposed tariff will only add 3c. to 5c. to the cost of a ton of steel, which may be considered negligible.

Five hundred pounds of steel tools for a mechanic would only have its original cost increased 2c., which may be considered negligible.

Magnesite mines only ask a tariff which will place American mines in competition with Austrian mines. It is therefore fair to assume that the importations will equal 50 per cent of the consumption. The steel manufacturers are asking a tariff so that they may accomplish the same end.

With a competitive tariff, assuming 50 per cent of the magnesite enters from Austria, the United States would furnish about 75,000 tons of dead burned magnesite.

The cost of Austrian magnesite versus American magnesite is based upon the following differences

which justify granting a tariff that will place these two countries upon a competitive basis:

	United States	Austria	Difference
Labor, per day.....	$5.30	$0.30	$5.00
Coal, per ton.....	9.00	5.75	3.25
Freight to Chester....	20.80	4.60	16.20
Freight to Pittsburgh.	18.40	9.10	9.30

Competition must exist at the center of the steel industry (Pittsburgh and vicinity) in order to protect American industry, as only 2.6 per cent of the open-hearth steel capacity in the United States is west of the Mississippi. West of the Mississippi there are 129 copper converters which would require only 2.8 per cent of the dead burned magnesite consumed in the United States.

H. F. Wierum, Valley, Wash., general manager American Mineral Production Co., supported arguments in behalf of the proposed duty of ¾c. per lb. on grain magnesite. He stated that his company has 4,000,000 tons in sight, with a probable reserve of 10,000,000 tons more of mineral for the making of this grade of magnesite and said he thought the Northwestern Magnesite Co. has the same quantity of reserves, while California has in reserve at least 1,000,000 tons of material for making plastic magnesite.

While upholding the proposed duty of 10 per cent on graphite, preference was expressed for a rate of 6c. per pound on flake and 2c. per pound on lump by Floyd Weed, of Birmingham, Ala. His contentions in behalf of the domestic graphite producers were similar to those made by George Sharpe, also of Birmingham, representing producers in Alabama, as published in THE IRON AGE of last week.

Vice-President Buck Presents Views of Bethlehem Steel Co.

A brief was submitted by Vice-President C. A. Buck, Bethlehem Steel Co. regarding certain schedules in the tariff bill. His principal points were made as follows:

"We believe the proposed duties on finished steel products in the metal schedule to be fair and equitable to the steel industry in general provided the American valuation plan is accepted. It is only certain raw materials and certain alloys that are practically raw materials that we wish to call to your attention.

Ferroalloys

"We would recommend that only nominal duties be put on ferroalloys and that the ores from which they are made, be put on the free list. Our reason for these requests are:

"1. Ferroalloys are essentially raw materials, being the first product resulting from the smelting of the various ores, this generally being done in the electric furnace.

"2. The ores of most of the metals in this group do not exist in the United States in commercial quantities. As to this feature reference may be made to some of these elements in detail.

Chromium

"Only low grade chromium ores exist in the United States. These occur in California and their use in the steel industry is practically prohibitive on account of their leanness and their cost when the freight on waste matter in the ores is considered. No rich chrome ores were developed during the exceedingly high war prices. The deposits in California are too low grade to be of importance in peace times but would form a valuable emergency reserve in time of war.

Tungsten

"The case of tungsten is much like that of chromium. In using up our tungsten reserves we are consuming a relatively low grade reserve of very moderate tonnage in competition with rich ores of very large tonnage that occur in Peru, China, the Malay States, etc.

Nickel

"No nickel deposits exist in the United States and a high duty on the crude forms of nickel (metallic nickel and nickel alloys) is a hardship on the steel industry.

Manganese Ore and Ferromanganese

"Manganese is absolutely essential in the steel industry and about 17 lb. of ferromanganese are used for every ton of steel produced. This importance makes the subject worthy of special mention. We are not in favor of a duty on manganese ores, but do object to more than a nominal duty on ferro-manganese.

"Inducements should be made in this tariff for the manufacture of ferro-manganese in this country. This can be done by admitting the ores free of duty and by putting a nominal duty on ferro-manganese. In this way we will offset the advantage Europe now has in the matter of ocean transport on ores from India, Turkey and Brazil to European points. England in normal times enjoys a distinct advantage in ferro-manganese production over the United States. Any tariff on manganese ore will increase this advantage.

Fluorspar

"Fluorspar is an essential material in the steel industry being the only satisfactory flux for open-hearth furnaces. For many years a considerable part of our requirements has been imported, mostly from England.

"The tariff on fluorspar will be a distinct hardship on Eastern steel manufacturers on account of the high freight rates applying from Kentucky and Illinois. We believe the reserves in those states to be ample, but also believe that steel plants located in the east will be a distinct disadvantage as compared with Chicago and Pittsburgh. The freight rates at present are as follows: From Ky.-Ill. field to Chicago, $3.60; to Pittsburgh, $5.60; to Bethlehem, $8.00.

"It is to be noted that the American fluorspar industry will apparently flourish without tariff protection. So many new uses are being developed for high grade spar that the industry has greatly expanded in recent years. Thus while the price of spar in 1920 was four times that of 1890, production was about 18 times the production for 1890. This development occurred while fluorspar was on the free list or while it had only a nominal duty of $1.50 per ton.

Magnesite and Magnesite Brick

"Magnesite is an important refractory used extensively in the steel industry for lining open hearth and other furnaces. It is subjected to a dead burning process before use and is then called dead burned grain magnesite. A large amount is used in this form and a large amount is also used in the form of brick made from this material. The only substitute is a very pure dolomite which while cheaper is not as satisfactory as magnesite. The best magnesite for refractory purposes occurs in Austria and the magnesite industry of the United States has practically been built up on importations from that country. As indicating this development the imports of dead burned magnesite were 30,000 tons in 1904 and increased to 150,000 tons in 1914. Development of domestic magnesite has been recent and only one property located in Washington is known that can supply an important tonnage. California also is a producer, but the quality of the product is such that it is not well adapted to refractory use. In 1920 California produced 82,000 tons and Washington 222,000 tons.

"We are not in favor of the imposition of a duty on magnesite for the following reasons:

"1. An important magnesite brick industry has been built up in the East, depending entirely on Austrian magnesite. This industry comprises many brick plants located in Pennsylvania and Maryland and well adapted to serve the steel industry.

"2. Geographically the Washington deposit is such that it will always furnish a product delivered to

(*Continued on page* 564)

Program for Technical Sessions of Convention of American Steel Treaters

The schedule of papers which are to be presented for discussion at the technical sessions of the American Society for Steel Treating at its third annual convention and exhibition at Indianapolis, Ind., Sept. 19 to 24, follows:

Tool Steel

C. M. Brown, vice-president Colonial Steel Co., Pittsburgh: "Tool Steel Specifications."

W. G. Calkins, metallurgist Detroit Twist Drill Co., Detroit: "Notes on Forged High-Speed Milling Cutters."

A. H. d'Arcambal, metallurgist Pratt & Whitney Co., Hartford, Conn.: "Physical Tests on High-Speed Steel."

A. W. F. Green, metallurgist John Illingworth Steel Co., Philadelphia: "Providing Properly Rolled Tool Steel for the Steel Treater."

L. K. Marshall, metallurgist North East Electric Co., Rochester, N. Y.: "Tool Steel Manipulation."

M. H. Medwedeff, metallurgist, 5014 Weseley Avenue, Howard Park, Baltimore, Md.; "Heat Treatment and Uses of High-Speed Steel."

T. Holland Nelson, steel works manager H. Disston & Sons, Philadelphia: "A Comparison of American and English Methods of Producing High Grade Crucible Steels."

L. R. Seidell, managing director New York Testing Laboratories, New York: "Tool Steel."

A. S. Townsend, chief chemist Cleveland Twist Drill Co., Cleveland: "The Effect of Tungsten Content on the Specific Gravity of High-Speed Steel."

Metallographic Research

R. L. Dowdell, instructor of metallography, University of Minnesota, St. Paul, Minn.: "Reclaiming High Carbon Gears."

J. P. Gill and L. D. Bowman, metallurgist and assistant metallurgist Vanadium Alloy Steel Co., Latrobe, Pa.: "Metallography of High-Speed Steel."

N. B. Hoffman, metallurgist, Colonial Steel Co., Pittsburgh: "Ghost Lines and Grain Elongation in Hot Rolled and Cold Drawn Iron Wire."

F. C. Lau, consulting engineer, 1437 W. Jackson Boulevard, Chicago: "The Effect of Phosphorus in Tool Steel."

Heat Treatment of Steel

D. N. A. Blacet, metallurgist Central Steel Co., Massillon, Ohio: "Modern Methods of Heat Treating."

I. H. Cowdrey, professor of mechanical engineering, Massachusetts Inst. Tech., Cambridge, Mass.: "The Efficiency of Annealing Overstrained Steel."

L. S. Cope, consulting metallurgist, 920 Mary Street, Ann Arbor, Mich.: "Coarse Grained Forgings; Their Detection and Correction."

E. J. Janitzky, metallurgist Illinois Steel Co., South Chicago, Ill.: "A Contribution to the Problem of the Influence of Mass on Heat Treatment."

J. F. Keller, department of forging and heat treating, Lewis Institute, Chicago: "The Whys of Warping."

C. B. Langstroth, metallurgist A. O. Smith, Milwaukee, Wis.: "Heat Treatment of Steel."

H. E. Hayward, metallurgist Link Belt Co., Indianapolis, Ind.: "Malleable Iron."

S. L. Hoyt and G. H. Bierman, metallurgical engineers National Lamp Works, Nela Park, Cleveland: "On the Theory of Hardening Steel."

T. D. Lynch and W. J. Merton, metallurgical engineers material and process engineering department, Westinghouse Electric & Mfg. Co., Pittsburgh: "Tests Showing the Effect of High Temperatures on Malleable Iron."

W. J. Merton, metallurgical engineer, Westinghouse Electric & Mfg. Co.: "A Coiling and Heat Treating Plant for Helical Springs."

W. J. Priestley, superintendent of hot metal division U. S. N. ordnance plant, Charleston, W. Va.: "Fracture Test on Steel to Determine Its Quality."

W. R. Ward, metallurgical engineer, Lyells, Va.: "Miscellaneous Heat Treating."

W. H. White, superintendent of melting shops U. S. N. ordnance plant, Charleston, W. Va.: "Heat Treatment of Steel Castings."

J. A. Gann, metallurgist Dow Chemical Co., Midland, Mich.: "Dowmetal and Its Application."

Carburizing

C. M. Campbell, superintendent Pioneer Alloy Products Co., Cleveland: "Do Alloy Carbonizing Boxes Pay?"

H. H. Harris, president General Alloys Co., Chicago: "Design of Heat Treating Containers."

V. E. Hillman, metallurgist Crompton & Knowles Loom Works, Worcester, Mass.: "The Efficiency of Various Mixtures for Cyanide Hardening and the Rôle of Nitrogen in the Process."

W. I. McInerny, foreman heat treatment armor plate, U. S. N. ordnance plant, Charleston, W. Va.: "Carburizing Heavy Sections."

H. Schagrin, chief chemist, U. S. N. ordnance plant, Charleston, W. Va.: "Carburization with Wood Charcoal."

T. G. Selleck, vice-president Gurney & Selleck, 513 Peoples Gas Building, Chicago: "Carburizing."

P. W. and E. B. Shimer, metallurgical engineers, Easton, Pa.: "Cyanamide in Liquid Case Hardening."

S. C. Spalding, metallurgist Halcomb Steel Co., Syracuse, N. Y.: "Comparison of the Rate of Penetration of Carbon into Various Commercial Steels Used for Case Carburizing."

Management

A. E. Bellis, president Bellis Heat Treating Co., New Haven, Conn.: "Shop Management."

A. A. Blue, metallurgist Duff Mfg. Co., Pittsburgh: "A Successful Bonus System Applied to Heat Treating."

J. Walter Bressler, Philadelphia: "System of Records for Metallurgical Departments."

F. C. Langenburg, metallurgist Watertown Arsenal, Watertown, Mass.: (Title to be supplied later.)

E. W. Pierce, metallurgist Maxwell Motor Car Co., New Castle, Ind.: "Buying Steel on Closer Carbon Limits."

C. F. Smart, assistant chief metallurgist, Ingalls-Shepard division Wyman-Gordon Co., Harvey, Ill.: "Steel Is Steel."

W. P. Woodside, superintendent of materials Studebaker Corporation, Detroit: "Organizing Research to Pay Dividends."

W. P. Wood, professor of chemical engineering, University of Michigan, Ann Arbor: "A University Course in Metallurgical Engineering."

H. F. Wood and F. G. Millard, chief metallurgist and superintendent of finishing department Ingalls-Shepard division, Wyman-Gordon Co., Harvey, Ill.: "Production Efficiency in the Heat Treatment of Drop Forgings."

M. H. Medwedeff, metallurgist, 5014 Weseley Avenue, Howard Park, Baltimore, Md.: "Metallurgy in the Modern Shop."

Alloy Steel

H. J. French, physicist Bureau of Standards, Washington, D. C.: "Tensile Properties of Some Structural Steels at High Temperatures."

M. A. Grossman, metallurgist Electric Alloy Steel Co., Youngstown, Ohio: "The Toughness of Alloy Steels as Affected by Their Heat Treatment."

C. M. Johnson, director of research Park Works Crucible Steel Co. of America, Pittsburgh: "Some Alloy Steels of High Elastic Limit, Their Microstructure and Heat Treatment."

G. C. McCormick, assistant metallurgist Crompton & Knowles Loom Works, Worcester, Mass.: "A Discussion of Uranium and Allied Elements."

H. Styri, chief S. K. F. Research Laboratories, Philadelphia: "Heat Treatment of Chrome Steel for Ball Bearings."

J. S. Vannick, metallurgist research laboratory, Department of Agriculture, Washington, D. C.: "Mechanical Properties of Chrome Vanadium Steels."

Properties of Carbon and Alloy Steels

R. M. Bird, metallurgist Bethlehem Steel Co., Bethlehem, Pa.: "Standardization of Methods Leading to Comparative Properties of Alloy Steels."

A. M. Cox, assistant metallurgist R. D. Nutthall Co., Pittsburgh: "Abrasive Qualities of Plain Carbon and Alloy Steel."

H. J. French and W. G. Johnson, physicist and assistant physicist Bureau of Standards, Washington, D. C.: "Effect of Heat Treatment on Mechanical Properties of 1 Per Cent Carbon Steel."

H. A. Holz, president Holz & Co., New York: "Recent Researches on the Elastic Limit."

L. W. Wild, president Wild Barfield Co., London, England: "Influence of Heat Treatment on the Magnetic Properties of Steel."

H. J. French, physicist Bureau of Standards, Washington, D. C.: "Effect of Heat Treatment on Mechanical Properties of Carbon Molybdenum and Chrome Molybdenum Steels."

Heat Treating Equipment

W. H. Bristol, president Bristol Co., Waterbury, Conn.: "Automatic Compensation for Variation of Cold Ends of Thermo-Electric Pyrometers."

E. D. Campbell, professor of chemistry University of Michigan, Ann Arbor: "Some Brinell Hardness Measurements on Small Specimens."

George Keller, sales manager Brown Instrument Co., Philadelphia: (Title to be supplied later.)

R. W. Newcomb, manager Charles Englehard, Inc., New York: "A New Type Automatic Temperature Regulator; Its Application to Heat Treating Furnaces."

T. Y. Olsen, vice-president Tinius Olsen Testing Machine Co., Philadelphia: "Determination of Stiffness of Wire on Sheet Metal."

S. P. Rockwell, metallurgist Whitney Mfg. Co., Hartford, Conn.: "Testing of Metals for Hardness."

C. Upthegrove, professor of chemical engineering University of Michigan, Ann Arbor, Mich.: "Note on the Small Brinell Machine."

Furnaces

T. F. Bailey, vice-president Electric Furnace Co., Alliance, Ohio: "Electric Furnaces for Heat Treating with Automatic Control."

G. R. Brophy, metallurgical engineer industrial furnace Department General Electric Co., Schenectady, N. Y.: "Calite; A New Heat Resisting Alloy."

E. F. Davis, sales manager Celite Products Co., New York: "Construction of Furnace Doors, Lining and Bases."

F. J. Evans, sales engineer Surface Combustion Co., Springfield, Mass.: "High Pressure Gas and Its Application to Industrial Furnaces."

J. T. Gower, Armstrong Cork & Insulation Co., Pittsburgh: "Reducing Conduction and Radiation Heat Loss."

C. L. Ipsen, designing engineer, General Electric Co., Schenectady, N. Y.: "The Electric Furnace as It Affects Overall Costs of Heat Treated Parts."

P. J. Lafore, industrial engineer Boston Consolidated Gas Co., Boston: "The Use of Gas Fired Furnaces for Heat Treating."

G. M. Little, resident engineering division, Westinghouse Electric & Mfg. Co., Pittsburgh: "An Electrically Heated Forging and Heat Treating Furnace."

W. E. McGahey, foreman heat treating large guns, U. S. N. ordnance plant, Charleston, W. Va.: "Heat Treatment of Large Forgings by Oil, Gas, and Electricity."

A. F. Mitchell, superintendent heat treating U. S. N. ordnance plant, Charleston, W. Va.: "A Comparison of Conditions Entering into the Operation of Oil and Natural Gas Fired Furnaces."

J. Weaver Smith, industrial engineer Citizens Gas Co., Indianapolis, Ind.: "Gas Accessories for the Heat Treating Room."

R. E. Talley, chief engineer Geo. J. Hagen Co., Pittsburgh: "Operating Data on Electric Furnaces."

Miscellaneous Topics

A. E. White, University of Michigan, and J. S. Vannick, Bureau of Standards: "Note on Occurrence of Oxides and Nitrides in Boiler Tube Steel."

F. H. Helrigel, metallurgist Motor Products Co., Detroit: "The Heat Treatment of Copper and Brass."

American Pig Iron Association

BUFFALO, Aug. 25.—At the meeting of the American Pig Iron Association held at the Hotel Statler this morning, representatives of more than 20 producers reported a better buying movement. Unanimous reports of increased shipping and larger inquiry in August than any month this year, were heard. The railroad situation was discussed. Likelihood of a strike did not appear to alarm the representatives. President Friend of the association presided. Generally the producers felt that the worst of the depression has passed. None of the interests represented claimed to be selling on any other basis than immediate delivery. The session was brief and in the afternoon the majority of the visitors went to the Orchard Park Golf Club.

Some Increase in Foundry Operation

In their review of the pig iron market, Rogers, Brown & Co., Cincinnati, discuss the situation in the various divisions of the foundry industry:

"The revival in buying during the past two or three weeks east of the Rockies has caused much discussion as to the increase in melt. The steel plants are doing better. For the most part, there is very little improvement in the general gray iron foundry melt. Here and there a foundry reports a real revival and many are taking off a few more heats per week. The accumulation of these increases is not impressive, but is moving in the right direction. There is more demand for malleable castings, with a corresponding increase in malleable pig iron consumption. In the West this is largely due to railroad repair and some little automobile work. The radiator companies and sanitary ware manufacturers are running well. Agricultural implements builders are not showing any improvement. Piano plate foundries are doing better, preparing for the holiday trade. Mine car, mining and oil well machinery manufacturers have been growing quieter during the past 60 days, although now a few who cater to the oil drillers are picking up some business. Undoubtedly the greatest increase in melt during the past few weeks has been noted in the stove industry. Reports from all sections of the country are unanimous on this. A large part of the stoves are being shipped out as completed, while some are stocked for the cold weather demand. From this synopsis it is apparent that pig iron melt is growing heavier."

COMING MEETINGS

September

Iron and Steel Institute (Great Britain). Sept. 5 to 10. Autumn meeting, Paris, France.

National Exposition of Chemical Industries. Sept. 12. Eighth Coast Artillery Armory, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 12 to 19. Fall convention, Wilkes-Barre, Pa. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

National Association of Brass Manufacturers. Sept. 14 and 15. Fall convention, Cleveland. Secretary, W. M. Webster, 139 North Clark Street, Chicago.

National Association of Cost Accountants. Sept. 14 to 16. Fall convention, Cleveland Hotel, Cleveland. Session on morning of Sept. 15 on cost methods of trade associations. Offices of association at 130 West Forty-second Street, New York.

American Society for Steel Treating. Sept. 19 to 24. Annual convention and exhibition, Manufacturers Building, State Fair Grounds, Indianapolis. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention, Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

American Electrochemical Society, Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Indianapolis.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

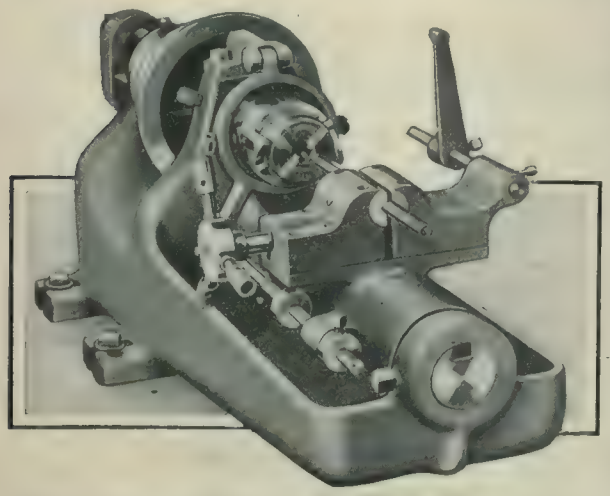
The suit of Capt. Alexander McDougall, shipbuilder, against the Oliver Iron Mining Co., to recover a large amount of royalties alleged to be due on account of infringement on patents on an ore washer, has been decided in favor of the defendant. Captain McDougall may appeal the case to the higher courts.

Building permits issued in Chicago during the first 23 days of August exceeded the number issued for any similar period since 1914. The permits issued numbered 747 and the value involved was nearly $8,700,000.

New Bench Threading Machine

A new bench threading machine for material 1/16, 3/32, 3/16 and 5/16 in. in diameter and cutting 3¼ in. maximum length with one setting, 18 in. with re-settings, has been recently added to the line of the Geometric Tool Co., New Haven, Conn.

The bed is a single casting carrying a spindle mounted on bronze bearings of liberal size. The spindle has three speeds, 653, 333 and 180 r.p.m. and is provided with a Geometric self-opening rotary diehead with



The Carriage Is Guided by a Bronze Key Engaging a Keyway on the Shaft

a yoke lever and trip rod, the operation of which is governed by adjustable stops. The carriage travels on a round shaft and is guided by a bronze key engaging a keyway on the shaft, adjustment being provided for maintaining the proper fit of the carriage on the shaft. This construction of the carriage allows maximum space for removal of chips from the bed. As shown in the illustration, a two jawed chuck is mounted on the carriage which is operated by the handwheel. The adjustable swinging stop on the opposite side of the chuck provides for accurate setting of the work for a pre-determined length of thread. Collets, expanding arbors and special holders can be furnished if desired.

Different sets of chasers are required to cover the threading range of the machine. As in other threading machines made by this company the chasers are removed by tripping the diehead and pulling out the stop plunger, permitting removal from the slots. In replacing, the numbers on the chasers and those on the slots are intended to correspond.

A geared pump driven from the spindle forces oil from the reservoir in the bed through the spindle and against the work. The machine weighs 90 lb. and the bench space occupied is 9½ x 29 in. Mounted on a pedestal the floor space occupied is 16 x 19 in. A 1½ in. driving belt is used, the countershaft pulleys being 3⅞ x 1¾ in., and speed of countershaft 245 r.p.m.

Belgium as a Machine-Tool Market

There are at present only four important plants in Belgium manufacturing machine tools, according to the *Ironmonger* (London), which publishes the following:

Two of these are in Brussels, one in Liège, and one in Bruges. One of the Brussels plants specializes on lathes of 14 to 40-in. dimensions, while the other, which is now increasing its installations to a capacity of 1000 to 1200 a year, builds lathes, milling machines and pneumatic hammers. The Bruges plant, apart from refrigerating machinery, turns out several models of boring mills, which are considered equal to any similar makes produced outside the United States.

The principal export markets for Belgian machine tools are France, Great Britain and Italy. Machine-tool dealers state that before the war 70 per cent of all machine tools imported into Belgium were of German origin. For reconstruction purposes after the armistice, however, American machine tools of all classes were sold in Belgium in large numbers.

While there are in Belgium numerous small shops producing brass valves, the native product is not able to compete with the standardized American article. German competition is particularly active in measuring tools and on small carbon steel articles. In the latter branch German manufacturers undersell American products in the local market by over 80 per cent. It is the local practice to use carbon steel up to ½ in. diameters, and above that dimension to employ high-speed steel. German supremacy in micrometers is almost as exclusive as in drills. A German product, not of extremely high finish, but of entirely accurate construction, is sold in Brussels for 31.20 fr., while the price asked for the corresponding American micrometer is 96 fr.

For Officers of Purchasing Agents' Association

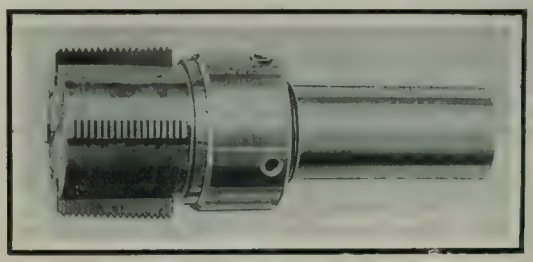
The nominating committee of the National Association of Purchasing Agents has named for re-election the entire board as it now stands. The officers thus renominated include: W. L. Chandler, Dodge Sales & Engineering Co., Mishawaka, Ind., president; S. F. Woodbury, Willamette Iron & Steel Works, Portland, Ore., fourth vice-president; D. E. Ferguson, H. K. Porter Co., Pittsburgh, fifth vice-president; W. J. Gamble, Vulcan Steam Forging Co., Buffalo, treasurer, and L. F. Boffey, 19 Park Place, New York, secretary.

The annual meeting of the association will be held in the Claypool Hotel at Indianapolis, Oct. 10 to 13.

The executive committee of the association at a two-day executive session at Denver passed a resolution advocating centralization of city, county, state and federal purchasing. The resolution states that a saving ranging from 10 to 25 per cent would be effected.

Solid Adjustment Tap

A new threading tool, a solid adjustment tap, has been placed on the market by the Geometric Tool Co., New Haven, Conn. It is intended as an intermediary between an adjustable collapsing and a solid tap, for



Each Size Takes Chasers for a Range of Diameters

use where a machine has no means of closing a collapsible tap or for some other reason does not permit the use of a tap of that type.

While not equipped with the collapsing device the tap is said to have all the advantages of a collapsing tap, and being adjustable, the correct size is always maintained. Each size of tap accommodates chasers for a range of diameters, which are readily removed for grinding. When it is finally necessary to renew the chasers, the new ones can be inserted without renewing the entire tap.

As a memorial to the late Col. Raynal C. Bolling, general solicitor United States Steel Corporation, who was killed in the World War, in March, 1918, his brother-in-law, Dr. J. C. Phillips, Wenham, Mass., has established the Bolling Memorial Redwood Grove on the south fork of the Eel River, in Humboldt County, Cal. A memorial tablet to Colonel Bolling has been placed near the highway at the entrance of the grove. A bronze statue of Colonel Bolling, recently completed by E. C. Potter, the sculptor, is soon to be placed on the Havemeyer School grounds, Greenwich, Conn., as a memorial gift to the town by a number of the colonel's friends.

FEWER ACTIVE MILLS

Sheet and Tube Plants in Mahoning Valley Show Decreased Operations

YOUNGSTOWN, OHIO, Aug. 30.—Indicating slower buying is the reduced finishing mill operating rate in the Mahoning Valley, particularly in sheet and tube mills. Of the 105 sheet mills in the Valley, 45 started on Monday, six less than the previous week, while seven pipe furnaces were fired, as compared with 11 the week before. Of the 66 open-hearth furnaces, 32 are charged this week, as compared with 38 the previous week. But one of the three Bessemer departments in this district, that of the Youngstown Sheet & Tube Co., is active.

Following a three weeks' run, during which accumulated orders were worked off, the Mahoning Valley Steel Co. suspended its sheet plant at Niles this week.

Sheet mills are being operated as follows: Youngstown Sheet & Tube Co., nine; Newton Steel Co., 10; Republic Iron & Steel Co., seven; Brier Hill Steel Co., 10; Sharon Steel Hoop Co., five, and Trumbull Steel Co., four.

The Sheet & Tube Co. is operating four tube mills and the Republic company three.

The Trumbull company is operating 13 tin mills.

Finishing capacity of the Carnegie Steel Co. in this district is engaged to the extent of 35 to 40 per cent.

In the Shenango Valley, the most conspicuous change is in the action of the American Sheet & Tin Plate Co. in operating, for the first time in several months, 20 of its 30 hot mills at the Shenango Works in New Castle on a regular schedule of 16 turns a week.

The volume of new orders combined with releases against former purchases is such as to insure maintenance of production at 60 per cent by the Truscon Steel Co., fabricating interest of Youngstown, Ohio. Road builders and construction interests are absorbing the bulk of the tonnage produced by the company. Current buying is featured by absence of large orders.

Improvement at Milwaukee

MILWAUKEE, WIS., Aug. 29.—The resumption of production by numerous large and small plants in the metalworking industries of Milwaukee and Wisconsin during the past week to ten days has given the general business of this district an aspect which is more favorable than at any time since early spring.

Plant Operations

The New England motor industry outlook is brighter than it has been before in some time. The Stevens-Duryea Co.'s Chicopee, Mass., plant last week resumed full time operations with 500 on the payroll. The company at that time announced a material reduction in prices for its product. The Rolls-Royce of America, Inc., Springfield plant, according to present plans, will reopen Sept. 6. Whether all employees will be taken back at once or a start be made with reduced forces and then gradually increased depends to a large degree on the ability of automobile body builders to furnish the company with finished products. The plant was obliged to close due to the inability of the body builders to furnish bodies built to Rolls-Royce specifications. Announcement is made that the Driggs Ordnance & Mfg. Corporation, New Haven, Conn., will soon begin the manufacture of light automobiles and automobile parts. Progress is being made by the Waltham Motors Co., Waltham, Mass., toward the resumption of automobile production at the former Metz plant. The Hendee Mfg. Co., Springfield, Mass., motorcycles, is operating its tool department full time in preparation for production of spring models.

The Illinois Steel Co., on Tuesday, Aug. 23, reemployed about 800 men out of the total who were laid off April 1 when operations of the Bay View mills at Milwaukee were suspended because of the decline of demand. The blast furnaces so far are not affected by the reinstatement of working forces. Four rolling units are now in operation. The number of men back at work represents about 65 per cent of the normal force.

The Malleable Iron Range Co., Beaver Dam, Wis., on Aug. 26 resumed production in its gray iron foundry department and the malleable foundry may be reopened within a short time in view of the steady improvement in business. Both foundries have been idle since the early part of the year.

The Gurney Refrigerator Co., Fond du Lac, Wis., which closed down July 1, recalled its entire force of 200 employees for resumption of work on Aug. 22.

Manufacturers of farm implements, farm equipment, dairy machinery and supplies, and other agricultural tools, in many sections of Wisconsin, are either broadening the scope of their operations, or reinstating forces in the case of shops which have been idle for from one to four months.

The Union Pacific Railroad shops at North Platte, Neb., have resumed operations, returning about 45 per cent of the old employees to work. The shops had been idle for seven months.

The Powell Pressed Steel Co., Hubbard, Ohio, has resumed operations on a small scale, following a protracted suspension.

British Steel Exports Very Low in July —Imports Increasing

British steel exports in July, this year, excluding iron ore and including scrap, were only 64,001 gross tons as compared with 183,373 tons per month for the first quarter and 368,481 tons in July, 1920, or the heaviest in that year. The average per month in 1913 was 420,757 tons. The July outgo is much less than even the 1919 monthly average and smaller than any month in the war years. Imports in July were 103,561 tons, which contrast with 88,083 tons in June, and with 186,040 tons per month in the first quarter. The 1913 imports were 195,264 tons per month and in 1920 they were 128,685 tons per month. The following table shows comparative data:

British Steel Exports and Imports

Gross Tons	Exports	Imports
Aver. per mo. first quarter 1921	183,373	186,040
April, 1921	161,508	111,536
May, 1921	101,202	89,348
June, 1921	66,301	88,083
July, 1921	64,001	103,561
Aver. per mo. second quarter 1921	109,670	96,320
Aver. per mo. 1919	188,519	50,801
Aver. per mo. 1920	274,881	128,685
Aver. per mo. 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data in gross tons:

Principal British Exports

	Average per Month 1913	1920	July, 1920	July, 1921
Pig iron	78,771	38,505	49,205	7,777
Steel rails	41,676	11,213	23,963	1,581
Steel plates	11,162	16,571	22,787	2,680
Galvanized sheets	63,506	34,244	51,214	2,691
Steel bars	20,921	30,322	48,818	2,702
Tin plates	41,208	29,418	32,616	8,827
Black plates	5,679	3,026	2,225	500
Steel sheets	....	....	12,607	779

Iron ore imports in July were only 14,857 tons as compared with 541,742 tons per month in 1920. In July, 1920, they were 641,975 tons. The total for the first seven months was 1,299,023 tons, as compared with 4,101,483 tons in the first seven months in 1920.

Manganese ore imports were only 4789 tons in July against 37,717 tons per month in 1920 and 50,098 tons per month in 1913. The total to Aug. 1, this year, was 146,827 tons against 225,589 tons for the same seven months last year.

Oil well supplies, accessories and tools, including drilling outfits, are wanted in the Argentine Republic, according to the United States commercial attaché in Buenos Aires. Manufacturers are asked to send two copies of their catalogs to the Bureau of Foreign and Domestic Commerce, Washington, for transmission to the Direccion General de Petroleo. One inquiry covers 12 pipe-cutting machines of various sizes.

HOPES NOT REALIZED

Little New Business in the Valleys—Controversy as to Price of Basic Pig Iron

YOUNGSTOWN, OHIO, Aug. 30.—Relatively small unfilled tonnage of district iron and steel makers is being rapidly worked off, with some additions to stock material, while incoming business is hesitant and insufficient in volume to maintain operations at the rate which prevailed the first three weeks in August. The hoped for revival in buying this fall will likely fall short of expectations and there is considerable pessimism in the trade, especially in view of low current prices as compared with costs.

A controversy has arisen with respect to the actual price of basic pig iron, which some steel works interests maintain they have advanced to $20, from $18. Several large consumers, on the contrary, insist that the $18 price is still current and that iron is purchasable at the lower figure. One substantial buyer states that iron has been bought at $18 since the reported advance by certain Valley makers. This interest points out the inconsistency of a higher iron market in view of recessions in prices of important finished products, such as sheets.

The Reduction in Sheets

Reductions in prices of sheets met by the leading interest have established the market at 2.25c. for blue annealed, 2.75c for No. 28 gage black and 3.75c for No. 28 galvanized. Some galvanized tonnage has been offered at 3.70c., it is understood. The relatively low price of galvanized is partially due to the fact that spelter has sagged to 4.15c per lb., a level that it has not reached in a number of years.

All sheet business, for the present, is confined to small tonnages, though business is coming from more diversified groups than formerly. In both sheets and pipe, jobbers are active factors in the market. Interest in galvanized sheets shows more life, owing to seasonal requirements from Southern buyers. Full finished sheet buying is still holding up, virtually all of the demand coming from the automobile trade. Weakening in the price of No. 22 gage auto body stock is noted, following declines in other grades, and some interests are now quoting 4.45c on the material mentioned, as compared with 4.70c, the quotation which prevailed for a considerable period.

Plates Still Weak

Plates continue to be the weak spot of the market in this territory, with one mill of the leading independent working off light gages. Other plate mills in this territory operate spasmodically on skelp, while the Youngstown Sheet & Tube Co. has been out of the plate market for an indefinite period. The price range is from 1.70c. to 1.75c. The only recent order of consequence involved in excess of 600 tons was placed in a nearby district.

Demand for wire products has been more sustained than for some other finished commodities, and prices have been firm at $2.50 for wire and $2.75 for nails. Some wire rod tonnage has been moving at $42.

Hot strip demand continues one of the brightest spots on the market, maintaining production of the leading maker at 60 per cent. Cold strip is also being rolled, all of the output going to automobile builders, and chiefly to the Ford Motor Co. The price is fairly established at 2.25c. for hot strip and 4c. for cold rolled.

Standard pipe is in fair demand from jobbing quarters. Increased uses of pipe in the smaller sizes are being reflected in the diversity of inquiry. Lap weld is largely listless, though some tonnage is being rolled for export to oil interests in Mexico.

The sheet bar market is more firmly established at $30, since the cut in sheet prices. About the only tonnage moving is against contracts, and going to non-integrated makers of sheets.

Whether it is a sustained movement or not, old material is still firm. A recent sale of heavy melting involving 1000 to 1500 tons was closed at $14. A sheet maker operating open-hearth furnaces has taken a small tonnage of hydraulically compressed scrap at $11, though dealers maintain that $12 more fully represents the market. While consumers' stocks are generally lower due to recent enlarged operating activity, they are still far from depletion. Scrap is generally being offered less freely, as it is being made in smaller quantities.

BUSINESS IN PITTSBURGH

Replies to Questionnaire Indicate That a Hopeful Feeling Prevails

The Trade and Industrial Bureau of the Chamber of Commerce of Pittsburgh, with an idea of determining the state of business in the Pittsburgh district, recently distributed 1000 questionnaires into various trade channels containing the following questions:

How does present volume compare with April? (A questionnaire was sent out last spring.)
Are inquiries more numerous?
Do you receive a larger percentage of orders from inquiries than you did during the last quarter?
How are collections?
What in your opinion are the prospects for increased business in the next six months?
How does the present number of employees compare with April?
Do you believe we have made the turn?

In a summary of the replies, *Pittsburgh First*, organ of the Chamber of Commerce, says:

"According to answers business is not very good. That is the net summary of what business has been during July and August. As to what is in store, that is a different question. Many are frankly convinced that we have made the turn and that business will grow better during the autumn. A minority report that they do not expect anything like a real resumption of business until spring. Analyzed, the answers show the effect on different industries and lines of merchandising. Some industries are faring better than others. A few even have as many employees as they had several months ago—and this in spite of the wave of unemployment. Several show such wide variance in their outlook on future business conditions that there is no way to strike a happy medium. It all depends on whose ox is gored, apparently. Wholesale lumber may react the same as retail lumber, in the main, but the two are far different from wholesale groceries, from chemical manufacturing, from the making of iron and steel, or from the sale of automobiles. The coal industry, which has long been dormant, shows renewed activity as September approaches, but coal men deny anything more than the usual fall spurt.

"One of the most outstanding points made by the answers is that on the whole collections are satisfactory. In a number of lines they are reported slow, but the majority report them either 'fair' or 'good.' Coming at a time when many business firms are or have been refusing to take advantage of discount for cash, this seems to indicate that money is loosening up.

"A report by one industry or one concern might not indicate much as to general conditions, but when 1000 answers are grouped, the composite report is important. As an indication of what Pittsburgh business thinks of business to-day and to-morrow, the result is eminently satisfactory. There is no reason for premature optimism; so many concerns are marking time. But there is real cause for optimism in the attitude of the majority of concerns toward the immediate future. With scarcely an exception the belief is expressed that 'we have made the turn,' that the bottom has been reached and that an upward trend may be expected. A few profess to believe that only in finance has the turn been made; that the labor situation still is to be solved. But others, basing their statements on wage cuts in many lines of industry during the last few

months, ignore the fact that thousands are still out of work, declaring that the readjustment is now possible and will not much longer be delayed."

New Cylindrical Plug and Thread Gages

The cylindrical plug reversible end gages and the reversible end thread gages shown in the accompanying illustrations are recent additions to the line of the Pratt & Whitney Co., Hartford.

The cylindrical plugs are machine lapped by a modification of the Hoke process which is said to produce a finely finished surface entirely free from circular grooves. It is further claimed that the gages are round and of uniform size from end to end; the measuring machine, fluid gage or amplifying machine showing no errors in these respects. The use of carefully selected alloy steel together with exceptional finish seems to justify the belief that the gages will maintain their accuracy for an unusual length of time. The "go" ends are held to a very small *plus* tolerance from the marked size, to allow for wear. The "no go" ends are held to a still smaller *minus* tolerance, as they are subject to little wear and must accept work which is exactly up to the allowable limit. Blanks are well seasoned before lapping and sizes are marked on the gage end instead of on the handle.



Plugs Are Machine Lapped by Modification of the Hoke Process. View to left shows the two forms of chip groove used in thread gages shown above



The handles are of hexagon stock, giving ample space for marking tool and operation numbers. The method of fastening the ends to the handle is unique. Three prongs on the handle, of 90 deg. included angle, engage three grooves of 75 deg. included angle in the gage ends. By means of a single screw through the gage the wedge-like prongs are forced into the grooves, providing a self-centering tripod support which, it is said, can neither rock nor shake to destroy the sensitiveness of the feel. No locking screws, keys or pins are necessary, the rigidity being practically that of a solid gage. The sizes available are 5/16 to 2 in. Cylindrical gages smaller than ⅜ in., lapped by the same method are in preparation and also sizes larger than 2 in., made hollow for lightness, with the same reversible features.

The reversible thread gages are from the same alloy steel blanks as the cylindrical plugs in all sizes above ½ in. "No go" and "go" ends are interchangeable with the cylindrical plugs and either length can be used according to the preference for long or short threads. For fine pitches the short gages are recommended. Rigidity between gage and handle, insuring sensitiveness of touch, is said to be fully accomplished by the tripod support, previously described.

In the accompanying illustration, beginning at the left the first two gages are the standard type, single and double end. The third gage is a "protected master," which cannot be screwed into a hole, thus impairing its accuracy, being used as a standard for checking thread plug gages, transferring by wires in the measuring machine or micrometer, etc. The fourth is a setting plug which is used for setting thread gage templets. The threaded end is made to duplicate the thread in the templet, while the plain end is used for checking the root diameter. The remaining gage is a non-reversible type, being used for sizes ½ in. and smaller and for larger sizes where the reversible feature is not desired. The handle is of cold-rolled hexagon steel and the gage end of alloy steel. The two parts are driven together on a slight taper and cannot work loose nor shake. A feature of the reversible thread gages is the chip groove provided for carrying dirt and chips ahead of the gage when entering the hole. Two forms are used, as shown in the separate illustration, the one at the right having the first thread removed to form a pilot of root diameter. This is intended to assist in entering the gage when applied to running work or when the gage is held in a reversing speed lathe and the work fed on it, while running.

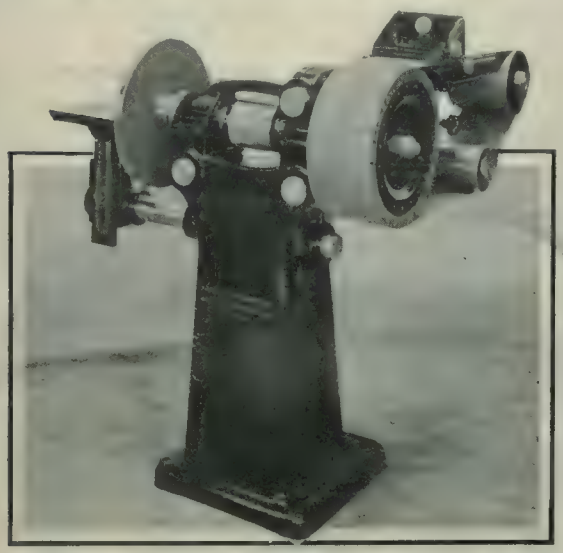
Bids on Hangar to Be Received Sept. 15

WASHINGTON, Aug. 30.—Steel producers and fabricators are greatly interested in bids to be opened Sept. 15 and being asked by the construction division of the War Department for a hangar, gas holder, power house and roadway at Belleville, Ill., as stated briefly in the St. Louis market report in THE IRON AGE, Aug. 25. The hangar will involve 4000 to 5000 tons of steel, mostly shapes, with a good sized tonnage of corrugated sheets and a small quantity plates and bars. The exact number of bays is to be determined upon the price asked for the work, which construction division contemplates letting to a general contractor, who will erect the complete plant. The gas holder will require a fair tonnage of plates. The general contractor is to sublet awards to steel producers, fabricators, etc. The hangar will be next to the largest in the United States, the latter being owned by the Navy at Lakehurst, N. J. It is proposed that the Army hangar, if the price is within the appropriation of $1,000,000, will be 810 ft. long with a 150-ft. arch.

Utility Grinding and Polishing Machine

A utility machine, designated as type R, combining several types of grinding and polishing machines has been recently brought out by the Production Machine Co., Greenfield, Mass. It is principally for disk grinding, polishing and belt surfacing but can also be converted into a buffing machine with double spindle and a single or double wheel tool or a light snagging grinder. It is arranged so that three operators can work simultaneously without interfering with one another.

As shown in the accompanying illustration, one end of the spindle is equipped with a double-faced disk for disk grinding, the other end carrying a patented leather cushion wheel, which is 14 x 6 in. and carries a 6 in. x 7 ft. endless abrasive belt having a surface speed of



The Wheel with Belt Is Used for a Variety of Polishing

4764 ft. per min. The wheel with belt can be used for a variety of polishing. The belt is kept under proper tension by a swinging idler and a quick adjustment for tracking the belt is provided. The spindle is mounted in Timken roller bearings that are packed in grease and sealed from dust and runs at 1300 r.p.m. Adjustment for wear is provided by a simple threaded sleeve and nut.

A table, 6½ x 14 in., is also furnished for surfacing, as well as an adjustable gage to handle articles with straight and beveled edges on the surfacing table, so hinged that it may quickly be swung over to the back of the machine when it is necessary to change the abrasive belt. The idler arm is arranged with a latch so that it may be lifted off the belt and held in place while changing the belt. The disk grinder is 15 in. diameter, and is double faced and reversible. A plain table, 9¾ x 8 in., is supplied, which has a rocking seat to provide for bevel work also adjustment vertically and a circular adjustment on the holding post. Four posts are provided, two in the front and one on each side of the machine, adapting it for the application of a variety of fixtures.

The floor space occupied is 37½ x 36 in. and the height, 46 in. The machine is belt driven, requiring 3 hp. and the driving pulley is 4½ x 4½ in. The base and head are one casting, providing rigid support for the spindle and bearings.

Employment in St. Louis District

ST. LOUIS, Aug. 30.—The Eighth Federal Reserve Bank has received replies from questionnaires addressed to 173 leading employers of labor in 21 of the largest cities of that district, with a normal complement of 90,047 workers, asking for employment data developed that the number of employees of the reporting interests decreased 23,649 or 26.6 per cent between the dates July 1, 1920, and July 1, 1921. On July 1, 1920, the number was 954, or 1.05 per cent under normal, and on July 1, 1921, the total was 24,603 or 27.4 per cent under normal. Wages, figured on a semi-monthly basis, decreased $1,016,592, or 23.5 per cent between July 1, 1920, and the same date this year. The district comprises Indiana, Kentucky, Tennessee, Mississippi, Arkansas, eastern Missouri and southern Illinois.

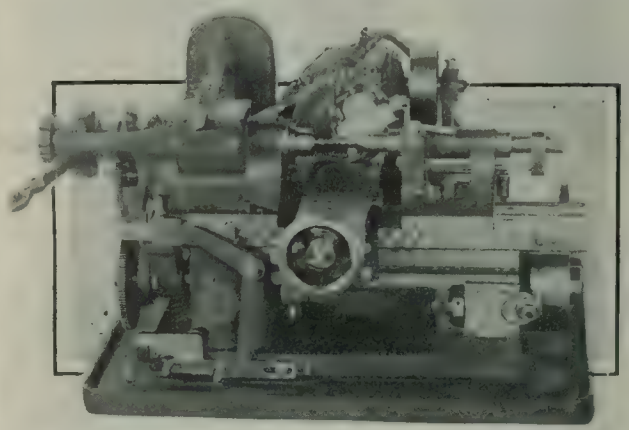
Automatic Thread Milling Machine

An automatic thread milling machine intended for manufacturing purposes and designed to be equipped for a variety of work has been placed on the market by the Waltham Machine Works, Waltham, Mass. Its automatic features not only increase production per machine, but for some kinds of work permit one operator to handle two or more machines.

In operating, the work is first placed in position, either on centers or in the chucking device. The machine is then started by a lever at the left. Further operations, which include the movements of feeding the cutter to the work, the milling of the thread, the withdrawal of the cutter after the required length has been milled, the returning to the starting point, and the stopping of the machine, are automatic. For multiple threads the operations are continuous until all threads have been milled.

The length of the thread is the same as the amount of rise of the cam controlling the workslide, while its pitch is determined by the relation between the gearing from the workhead to the cam shaft and the lead of the work slide cam. Indexing for multiple threads is obtained by a fractional proportion in the gearing, possibility of error being eliminated inasmuch as the workhead continuously revolves in the same direction and there is no backlash to produce inaccurate spacing. The extreme travel of the workslide is 2 in. Threads of this length or shorter may be milled but adjustments are provided so that this milling can be done either close to the work spindle or in any position not more than 6 in. distant.

The approximate location of the cutter slide in relation to the workhead is obtained by moving the cutter



For Multiple Threads the Operations Are Continuous Until All Threads Have Been Milled. By a slight change of design helical gears can be cut

slide support along the tongued ways, while the exact location is obtained by adjusting the work slide cam attached to a slide on the front of the machine. With the exception of the oil pump the whole mechanism is driven by a single belt. The machine can be installed either on a bench or a cabinet base. The cutter spindle and its drive are of the same design and size as used on the company's thread milling machines. The cutter head is provided with an angular adjustment of 45 deg. each side of the horizontal. The workhead is driven by means of a geared connection and universal joint. It is of hardened steel, has a spring collet and is provided with a lever closing attachment.

The machine can be stopped automatically at the end of one revolution of the cam shaft or after any predetermined number of revolutions. The machine shown in the illustration is particularly adapted for cutting multiple threaded worms such as used in phonographs, electric fans, vacuum sweepers, etc. By a slight change in design it can be made to cut helical gears. For brass work the all-gear drive is omitted and a special high-speed belt-driven cutter head provided.

CONTENTS

Features of a Non-Ferrous Metal Foundry 511

Cost of Handling Reduced—Melting Equipment Located at Center—Fumes and Smoke Satisfactorily Removed

Universal Steel Classification Code 515

Proposed New Code to Supplant S. A. E. System—Claimed to Be Simpler and Easily Expanded

Continuous Foundry for Pipe Fittings 519

Designed for Minimum Handling of Sand, Castings, Cores, Hot Metal and Flasks—Modern Details of Layout

Steel Makers Heard on Metal Tariff 527

Ferroalloy Duties Discussed—Ferromanganese Manufacturers Ask Protection—Sheffield Companies Make Statement—New Classifications Asked and Changes in Wire, Pipe and Wide Strip Duties

Nickel and Cobalt in Iron 513
Steel Mill Electrical Engineers' Meeting.. 513
Dollar Control in Executive Management.. 514
Wage Problems 518, 550
Labor Notes 518, 546, 551
Railroad Conditions Improving 518
Lower Export Rates 524
Axle Shaft Turning Machine 525
Heavy-Duty Broaching Machine 526
To Discuss Uniform Cost Methods 526
Refractories Market 526
Machine Tool Builders' Convention 526
Convention of American Steel Treaters ... 540
American Pig Iron Association 541
Foundry Operations 541
Coming Meetings 541
Bench Threading Machine 542
Belgium as Machine-Tool Market 542
Purchasing Agents' Association 542
Solid Adjustment Tap 542
British Steel Exports and Imports 543
Business in Pittsburgh 544
Cylindrical Plug and Thread Gages..... 545
Grinding and Polishing Machine 546
Employment in St. Louis District 546
Automatic Thread Milling Machine 546
Editorials 548
Progress in Steel Making—Prices and Pig Iron Output—Alloy Iron Castings—Scrap Prices and Supplies—Wage Reductions a Buying Factor.
Amalgamated Association Enjoined 551
Foreign Market Conditions 551
British High Speed Steel Protest..... 568
Iron and Industrial Stocks 569
Office and Trade Changes 569
Book Reviews 579

Iron and Steel Markets 552
Comparison of Prices 553
Prices Finished Iron and Steel, f.o.b. Pittsburgh 567
Non-Ferrous Metal Markets 568
Personal Notes 570
Obituary Notes 571
Machinery Markets and News of the Works 572
New York Jobbers' Prices 580

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Progress in Steel Making

As the steel industry has no occasion to add new capacity at this time and is unlikely to have occasion for several years, it is interesting to speculate what it will do by way of making progress. It is inconceivable that it should stand still, for it has capital, brains, energy, a future and a sanguine temperament.

While there have been great improvements in processes and equipment throughout the history of the steel industry, the most impressive progress has been in the ability to get out tonnage. The capacity in ingots doubled approximately from 1900 to 1910 and again from 1910 to 1920. Prior to about 1900 the steel industry grew, partly through replacement of wrought iron, and the doublings were more rapid, approximately from 1881 to 1886, five years, from 1886 to 1892, six years and from 1892 to 1900, eight years. From 1880 to 1910 pig iron production increased almost precisely by the rate of a doubling every ten years, on an average. From 1910 to 1920 the rule of doubling did not operate, partly because the requirements of iron foundries did not maintain the necessary pace.

For some years it has been a common saying that the steel industry would now have to "go in" for quality, and as often the requirements in common ordinary steel have grown so rapidly as to prevent the finer grades from making an important percentage showing. Perhaps, however, the application of engineering to the filling of man's requirements has now reached a point where the big things, simply on account of their bigness, will require special steels as the little things have often done hitherto. The proportion of weight of structure to load to be carried has been increasing, making it more and more important to minimize the weight of structure.

There is nothing like comprehensive information as to the proportion of steel made in the past few years that was really "special" in character, but the tonnage reported as "alloy steel" is somewhat suggestive. Of the total reported production of steel ingots and castings, "alloy steel" was 2.54 per cent in 1912 and 3.94 per cent in 1920. Such proportions are certainly low. The competition between heat treating and alloying is already rather keen.

It is interesting to speculate whether the steel producers will be disposed in the next few years to try to improve their position by carrying their products to a greater degree of finish. In the past this tendency has appeared to an extent, and there has also been a tendency to "diversify" products by adding to the number of ordinary rolling mill products made. The one may be referred to as "vertical" expansion and the other as "horizontal" expansion, just as in financial mergers there has been "vertical integration" and "horizontal integration."

One large steel producer or another makes bolts and nuts, turn buckles, spikes, cold-finished steel bars, freight cars, ships, rivets, guns and steel derricks and drilling rigs. Other steel makers have been disposed to avoid such vertical expansion, partly because they feared they would be getting into a sort of retail business and partly because they regarded such expansion as in the nature of competition with their natural customers. However, we have passed into a period in which competition by efficiency will be the rule and in which even small orders will be desirable.

Prices and Pig Iron Output

The recent moderate improvement in demand for pig iron and the checking of the downward tendency in prices have caused some furnace operators to consider carefully what prices it will be necessary to obtain to justify the blowing in of merchant stacks. Certainly the country cannot continue indefinitely at the extremely low rate of pig iron production which has been recorded for several months. A daily output of less than 5000 tons by merchant stacks is pitifully small for this great country. It is, of course, a fact that steel companies have been an important factor in the pig iron market, not only in disposing of stocks of steel-making irons, but also in manufacturing foundry grades; but with the gradual reduction of stocks at steel works and with pig iron production at these plants down to 23,000 tons per

day, there is a limit to their control of the pig iron market.

In January, 1913, basic iron was selling at about $16, Mahoning or Shenango Valley. According to the estimate of one important company, producers would now need to ask $26 in order to have the price bear the same relation to cost as $16 had to cost in 1913. It is agreed that the $18 price for basic, which has recently prevailed, will not justify the blowing in of any furnaces, nor will somewhat higher prices, say $19 or $20, on foundry irons. Manufacturers of basic iron estimate that if freight rates on their raw materials were reduced 20 per cent, if Connellsville coke could be obtained at $2.75 and if the price of iron ore could be reduced about 75 cents, basic pig iron could be produced in the Valleys at about $20. It is not likely, however, that freight rates will be reduced in the near future, or that ore prices will be marked down. Hence it will hardly be possible this year to manufacture pig iron, and come out even, at a price at all attractive to melters.

Idle furnaces are not likely to be blown in unless their owners can see a prospect of making a fair profit. Finishing mills often find it desirable to maintain their organizations and keep their customers satisfied, even when, by so doing, losses are constantly recorded. Operators of blast furnaces do not feel the same necessity of maintaining organizations or catering to their customers, and when furnaces are once out they seldom resume unless business justifies. The prospect of materially increasing the production of merchant pig iron this year, therefore, is not encouraging.

Alloy Iron Castings

Recent metallurgical developments point to the growing importance of alloy iron castings for industrial use. The unusual properties which a nickel content of 5 per cent bestows on iron castings was discussed in THE IRON AGE one week ago. Electrical resistance castings containing 4 to 5 per cent nickel, have not only marked electrical properties, but the castings can be "twisted into various shapes, taking a permanent set without breaking." On other pages of this issue the results of German experiments on iron castings containing nickel and cobalt are given, showing that a nickel content of about 1 per cent bestows valuable properties, the cobalt however playing no rôle as an alloy.

Attention has been called recently to the influence of a small percentage of nickel and chromium in chilled cast iron wheels, and this may take on more importance. A large motor corporation is now making iron castings in the cupola, having a nickel content of 1 to 1.5 per cent. The nickel is introduced into the charge as shot nickel in the cavity of rejected pistons. The castings so obtained are harder and wear better than the ordinary gray iron castings.

The use of Mayari pig iron in the making of certain grades of castings is not new. Such nickel-chrome iron castings have proved satisfactory for rolls and for conditions where wearing quality is a factor. It appears that the mixture of this native alloy pig iron with other iron for certain motor castings has proved satisfactory because of sounder metal and a comparatively longer life. Extensive experiments are now being made in order to learn all the possible uses to which this particular class of alloy iron castings can be put. Valuable information should result.

These facts point to the place which alloy iron castings are likely to take in the future. While some of these castings can be produced in the cupola, the electric furnace is necessary in cases where the alloy content is high or a high temperature is required for pouring. It is safe to expect that, with the aid of the electric melting furnace and possibly the application of heat treatment, other metals besides nickel and chromium may be added to cast iron with good results and that alloy iron castings may establish themselves alongside alloy steel castings.

Scrap Prices and Supplies

Were it not that dirt is an expensive thing to have when it is necessary to pay a railroad to haul it away, it might be said that some grades of iron and steel scrap are now "as cheap as dirt." Steel turnings have been sold in Detroit at as low as 50 cents per ton, the seller being required to load on cars, but if the producer had found no purchaser he would have had to pay a railroad to dispose of the material. In either case, however, the scrap would not be paying for its disposal.

Such scrap is at a double discount, a time discount and a place discount. With the great increase in freight rates on scrap the place discount on all scrap is much greater than formerly. The time discount is much greater on turnings than on heavy melting steel, since the turnings rust very rapidly. The average dealer will not stock turnings, while he will stock heavy melting steel. Indeed, most dealers began stocking the latter when it cost $5 a ton more than it has cost recently.

There used to be interested discussion as to whether the supply of scrap would continue to be sufficient for an economical operation of the open-hearth steel industry. Without scrap, or with a small proportion of scrap, there would be a double increase in the cost of making steel, from the higher average cost of the material used and from a lengthening in the time necessary to finish a heat. Year after year, however, the steel industry seemed to get along nicely. Prior to 1904 the production of basic pig iron was about 45 per cent of the production of basic open-hearth steel ingots and castings, pointing to a scrap use of about 55 per cent. Then pig iron rose steadily, to a maximum of about 60 per cent in 1909 and 1910, indicating about 40 per cent for scrap. The trend has since been upward for scrap, since 1920 showed 53.3 per cent as much basic pig iron made as basic steel. The showing is not altogether conclusive, for there was an extra supply of scrap on account of the war, but on the other hand stocks of basic pig iron undoubtedly accumulated, to at least a small extent, toward the close of the year. Still, it seems fair to conclude that without these influences the basic steel of 1920 would have been made with a larger percentage of scrap and a

smaller percentage of pig iron than was the case ten years earlier, although the tonnage output had more than doubled.

What of the future? We are coming into new conditions. For the nearby future there is likely to be a shortage of scrap at the time when production of steel increases sharply. That is generally the case at such a time. An increase in industrial activity brings a demand for steel before it dumps much scrap into the situation, while little scrap accumulates in a period of low industrial activity, because the consumption of steel is confined largely to channels that are not good scrap producers. The steel works individually may feel that they have insurance against a shortage, in the piles of scrap the dealers have been accumulating, but too many steel works may have their eyes on the same pile.

In the long run, two factors are likely to operate to help maintain the supply of scrap relative to requirements. There is always, of course, the works scrap and the industrial scrap, a practically fixed percentage of the steel that is being made. As to old material, its outcome depends on two factors—the length of time steel stays in service and the production at the time it went into service. As industry develops, the time in service is likely to shorten rather than lengthen, while as the steel industry will increase in tonnage less rapidly in future than it has in the past there is aid in that respect. Assuming convenient figures merely to make the argument simple, if the steel constituting the bulk of the returns in scrap form stays in service 20 years and production of steel doubles in ten years, thus making a quadrupling in 20 years, the outcome of old material would be in relation to one-fourth current steel production; but if the doubling of steel requires 20 years the relation is one-half instead of one-fourth. Both the influences named are subject to change and their relation in the future is a matter of no little interest.

An impressive exhibit of the low level to which world demand for iron and steel has fallen is furnished by the July export statistics for Great Britain and the United States. Details of the former appear elsewhere, while facts regarding the latter were analyzed in last week's issue. British July exports totaled only 64,000 gross tons, a smaller movement than at any time of which there is definite record. American exports fell to 86,500 tons in July, which is also smaller than in many years and is in sharp contrast with the record of over 400,000 tons per month only last year. In 1913 the combined iron and steel exports of the two countries were about 655,000 tons per month; in July, this year, they were 150,500 tons, or less than one-fourth as much. Even the combined exports of France and Belgium in 1913, 177,000 tons per month, exceeded the record last July of the American and British industries. If July marked the low record in steel and pig iron output, as now seems likely, it is probable that August will show a slight improvement in the steel exports of both countries.

Wage Reductions a Buying Factor

Manufacturers in some industries are making inquiries for new equipment, looking to the time when their products will be again in active demand. Especially is this so of equipment requiring a considerable time to build, which is often the case with machinery the design of which departs from standard lines. Inquiries for metal-working machinery, excepting of very special character, are not being made to the same extent as for textile machinery, for example, and equipment for producing the thousand and one things entering into the daily life of the people.

The would-be purchaser is keenly alive to the matter of price, and not least in his investigations of the market comes the question whether the machinery builder has cut adequately the wages of his workers. Not all plants have reduced wages. Some firms which have only a few men on their payrolls have taken no action in the matter, putting it off until they shall begin to hire men again. In other cases, quite exceptional however, shops are busy and managers have considered it their best policy to let the payroll remain without change. On the other hand, the managements of some relatively busy shops have made the same reductions as their less busy neighbors, beginning with company officers and going down the line, realizing that prices must come down if new business is to be booked now or later, and that cost of production must fall correspondingly.

In any case, the prospective customer is watching the price lists of the equipment manufacturers, and taking into account, before placing orders, whether the manufacturer has done what he should in reducing costs. Consequently pointed inquiry is common enough, a familiar question being: "What have you done in the reduction of your labor cost?"

Wages of Iron Workers Reduced

YOUNGSTOWN, O., Aug. 30.—Average sales price on shipments of bar iron from mid-Western mills in July and August was 1.85c. per lb., as disclosed at the bi-monthly examination of sales sheets Aug. 29 between representatives of the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers. The average price two months ago was 2.30c.

For the September-October period, the boiling rate will be $9.12 per ton, as compared with $11.38 the previous two months. Wages of bar iron finishers will be reduced 19 per cent by the settlement.

Under the new annual wage agreement, the puddling rate is $1.14 per ton lower at the 1.50c. card, which accounts for part of the reduction. The current boiling rate compares with $18.76 paid the first two months of this year.

Examination of sales sheets to determine the tonnage rates to be paid sheet and tin plate workers in September and October will take place about Sept. 10. Inasmuch as the last settlement was made on the basis of 3.85c. per lb. for No. 28 gage black sheets and $5.75 per base box for tin-plate, a considerable reduction in the tonnage rates will take place. Common sheets are now generally quoted at 2.75c., while tin plate is being sold by the principal district maker on a basis of $5.25.

The Standard Steel Car Co., New Castle, Pa., will resume operations at once, officials report, on a basis of 50 to 60 per cent.

CONSTRUCTIVE AIMS

President Harding's Conference Will Avoid Discussion of Irrelevant Topics

WASHINGTON, Aug. 30.—No contentious questions as to open or closed shop or conditions of work are to be permitted to enter into discussions at the national conference on unemployment to be held in Washington soon at the call of President Harding. This statement was made yesterday by Secretary of Commerce Hoover who expects to submit detailed plans for the meeting within a week or 10 days to the President. The conference is not to be the battleground of organizations of either employers or employees, it was declared, but will relate to the need of the assurance of a definite program as to business and workingmen and it is hoped to develop constructive plans through unity of action. Secretary Hoover is now at work selecting the personnel, which it is contemplated to hold down to 15 or 25 men representative of groups of employers geographically and by industries and employees. Secretary of Labor Davis is co-operating in the selection of the labor delegates. It is hoped to begin the conference by the middle of September or a little later. The iron and steel trade, being the largest industry in the country, has the greatest number of unemployed, and it is understood will be given due representation at the conference.

Many good suggestions as to relieving the labor situation have been made to Secretary Hoover, but all of the actual plans to revive industry and reinstate employment will not be developed until the conference is held. Some suggestions made relate to the matter of intermittent and irregular employment in certain industries and also to a plan for road improvement and building operations where these are seasonal and are to be permanent in character, the idea being to avoid any artificial undertakings. It is believed that the question of transportation costs will share prominently in the discussion, many industrial interests considering that the high freight rates are one of the underlying causes of unemployment, and that associated with it are high wages still being paid in some lines of work. Secretary Hoover, however, resents the terms "liquidation of labor," whatever may be done regarding wages, holding that labor is a human equation and not a matter of values in dollars and cents.

The results of the conference are likely to be used by the Administration as a part of its legislative program looking to economic readjustment, which Congress has been criticized by the business world for delaying. An instance is its failure before recessing to act upon the railroad funding bill whose enactment has been looked to as a means of restoring 500,000 men to work. But it is not, of course, intended to wait for legislation to improve employment conditions. A quicker improvement than that is hoped for, although legislation probably will be necessary to develop the complete program that is in prospect.

Weirton Operations Increased

WEIRTON, W. VA., Aug. 29.—The Weirton Steel Co., with plants here and in Clarksburg, W. Va., and Steubenville, Ohio, has reached the highest rate of operation in several months. In addition to the 26 tin plate mills at the plant here, the company has seven of the 12 mills at the Steubenville works under power, making a total of 33 of the 50 mills at the three plants in operation, or 66 2/3 per cent. To provide the sheet bars for the Steubenville tin plate mills, it was necessary to put on an additional open-hearth furnace at Weirton, making a total of six of the seven there now in operation. The company is operating its strip mills here at about 35 per cent of capacity. The company, which hitherto has been a seller of pig iron, has temporarily withdrawn for that market, as current production of about 600 tons daily is all needed at present and the management is anxious to accumulate a reserve stock against later requirements. Moreover, it is considerably more remunerative for the company to charge hot metal than to sell cold iron at current prices.

Amalgamated Enjoined

WHEELING, W. VA., Aug. 27.—Temporary injunction against the Amalgamated Association of Iron, Steel and Tin Workers, was granted the Wheeling Steel & Iron Co. by Judge R. M. Addlemen in Circuit court today. The injunction restrains the union men from picketing in the vicinity of the plants now closed because of a strike. The steel workers, however, are allowed to further their strike against the petitioner's mills. The order restrains the defendants against unlawful interference with the plaintiff's employees, picketing, force, intimidation, or unlawful persuasion, directed against the plaintiff or its employees with a view toward interfering with the operation of the plaintiff's mills, and against blockading, congregating at or near the entrance to the mills.

Industrial Chemistry Meeting at Paris

The Society of Industrial Chemistry of France will hold a meeting Oct. 9 to 12, inclusive, at the Conservatoire des Arts et Metiers, Paris, and in the same building will be held a chemical exposition under the patronage of the Minister of Commerce of France. Among the subjects to be considered at the chemical congress are: Coking industry, oils, distillation of wood and the by-products, metallurgy and electrometallurgy, electrochemistry, etc.

Swedish Prices Lower

STOCKHOLM, SWEDEN, Aug. 7.—The Swedish Iron Federation has revised prices for August. All prices are in Swedish kronen per metric ton, f.o.b. maker's yard. The dollar quotations are per gross ton, f.o.b. Swedish port:

	Kr.	
Export pig iron, 0.015 per cent sulphur, max.	145-150	$34.75-$ 35.77
Billets, annealed, over 0.45 per cent C.	400-500	86.88- 107.32
Wire rods, over 0.45 per cent C.	450-550	97.10- 117.55
Rolled open-hearth steel bars, base price	260-280	58.26- 62.35
Rolled Lancashire iron, base price	350	70.53

The hot mills and all intermediate departments at the Farrell, Pa., works of the American Sheet & Tin Plate Co. were placed in operation Aug. 29. About 700 men will be afforded employment.

The Iron Age and Its Readers

A good example of the use of THE IRON AGE as a medium through which one reader may help other readers and advance the "state of the art" in their common field was afforded Aug. 18 by the article by V. W. Aubel on what amounts to a new use of the cupola in metallurgy. The author was prompted to submit to THE IRON AGE an article he wrote some time ago after reading a brief editorial in our issue of July 11 on sulphur removal in the cupola. In this way attention has been called to the value of the cupola as a refining agent, in addition to its role as a melting medium, and to the place it can have in steel works practice.

This mention of Mr. Aubel's article is made particularly as a suggestion that other readers have experiences that might well be discussed in our columns for the common good.

Iron and Steel Markets

MEETING COMPETITION

No New Price Policy, But Some Fresh Declines

Sheet Reduction General, but Tin Plate Market Not Unsettled—New Plate Inquiry

In the varying reports from different branches of the steel industry the balance is still on the side of betterment in demand, but with no clear indication of progressive improvement ahead. Exhaustion of inventories is more marked as the occasion of buying.

Steel Corporation activities still average a fraction under 30 per cent, with the Carnegie Steel Co. running at a lower rate than in recent weeks, while the Tennessee company, owing to export and other contracts and to the improvement in the South, is at nearly half a full operation.

The competitive aspect of the market has not changed, despite widespread reports attributing a more aggressive policy to the leading producer. Actual transactions show that both the Steel Corporation and the leading independent producers are following their practice of many weeks, making such concessions as are required by new developments.

The one formal price change of the week was the general dropping to 2.75c. instead of 3c. on No. 28 black sheets and to 3.75c. from 4c. on galvanized sheets. Smaller mills first made these prices two or three weeks ago; the larger independents followed and then the Steel Corporation. The unfounded report of a $10 per ton reduction in tin plate, or to $4.75 per box, did not unsettle that market.

The reduction in sheets may have made more general the low quotations appearing from time to time in other products. Bars show less resistance to pressure, and 1.70c. is a common price, with some business in the Central West going as low as 1.60c. In plates and structural shapes also, the exceptional prices of a month ago are now more commonly made.

A measure of the decline in bar iron is the bimonthly wage settlement at Youngstown this week, by which the puddling rate falls from $11.38 per ton to $9.12.

Rail buying for this year is practically over and no interest has developed in rails for next year to call for the naming of a price for 1922. Meanwhile railroads are showing reductions in maintenance costs at the expense of their properties. But they are making a better record in paying what they owe the steel companies.

The volume of fabricated steel work which has been a continuing feature in demand has been large enough to afford tests of price strength. Tonnage contracts have been written at less than the quoted market. Besides additional car repair orders, about 7500 tons of structural work has been closed and 11,000 tons added to what is pending. Mexican oil interests are in the market for 17,000 tons of plates and an Eastern locomotive builder for 3000 tons.

Sales of pig iron in the Cleveland and Philadelphia districts amount to a very fair tonnage, but for the most part there is a subsidence from the active buying of two or three weeks in August. Following the recent activity, furnaces have made an effort to establish higher prices and have succeeded to some extent, as basic has been sold at $19, Valley, or $1 above what has prevailed for some weeks, while small sales of various grades have been made in Chicago at an advance of $1. In Buffalo and eastern Pennsylvania also the market seems somewhat firmer. Reductions in freight rates on ore and limestone within the State of Alabama will enable furnaces most favorably situated to make pig iron at a reduction of about 40c. per ton in costs.

Export trade has been better in some directions. Japan is still a steady buyer of black sheets, which are galvanized there. Japan also has bought considerable amounts of sulphate of ammonia from coke by-product plants.

China is in the market for 20,000 tons of rails after buying 35,000 tons in the past six months. Japan is about to close for 4000 tons. Germany is low bidder on 12,000 tons for Chile. The 10,000 tons lately taken by German rail mills in Java indicate that their price is $35 to $36 at shipping port. The 500 tons of 40-lb. rails they took in Cuba went at $38, delivered.

The extent of the decline in steel prices is indicated by THE IRON AGE composite, which at 2.293c. per lb. for finished steel products is now 36 per cent above the ten-year pre-war average, though it was nearly 55 per cent above this pre-war average only two months ago.

Pittsburgh

PITTSBURGH, Aug. 30.

Reports about business covering the past week are of a slightly less cheerful tenor, but there is nothing to suggest that the lull is anything more than temporary and a natural development in view of the fact that there has been a comparatively steady demand for more than a month. The recent announcement by Judge Gary that the Steel Corporation hereafter would meet competitive market prices was received with keen interest. His words were as follows:

"When the subsidiaries of the Steel Corporation ascertain to a certainty that large and important independents, so-called, are selling at prices materially lower than those which have been heretofore announced, our subsidiaries meet the new prices. They do not precipitate or lead in establishing lower prices, for they are aware that the prices which have prevailed for some time past are lower than the actual cost of production by most if not all of the producers."

The prevailing opinion is that the pronouncement has clarified the situation and that the fact the Steel Corporation now will sell as low as anyone else is likely to exert a restraining influence on promiscuous cutting of prices. This will probably mean less selling to recognized regular customers of the Steel Corporation by independents, because such buyers now will be able to match the lowest prices named by independents with those of the Steel Corporation subsidiaries.

The week has developed more clearly than was apparent recently the real selling prices. Although makers of steel bars here and in the Valley district are making a pretty strong effort to obtain 1.75c., base, Pittsburgh, there are authentic reports as low as 1.60c. has been done, and since the Steel Corporation now is

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 30, 1921	Aug. 23, 1921	Aug. 2, 1921	Aug. 31, 1920
No. 2X, Philadelphia‡	$20.84	$20.84	$21.35	$53.51
No. 2, Valley furnace†	**21.00**	20.00	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2 foundry, Chicago*	**21.00**	20.00	18.50	46.00
Basic, del'd, eastern Pa.	19.00	19.00	21.25	50.67
Basic, Valley furnace	**19.00**	18.00	18.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	**21.00**	20.00	18.50	46.50
Malleable, Valley	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh	**21.96**	21.46	21.46	50.96
L. S. charcoal, Chicago	33.50	33.50	35.00	58.50
Ferromanganese, del'd	70.00	70.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. sheet bars, P'gh	30.00	30.00	32.00	68.00
Forging billets, base, P'gh.	34.00	34.00	35.00	75.00
O.-h. billets, Phila	35.74	35.74	35.74	65.74
Wire rods, Pittsburgh	*40.00*	42.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh	1.75	1.75	1.85	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.00	2.00	2.10	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	*1.70*	1.75	1.75	3.25
Steel bars, New York	*2.08*	2.13	2.13	4.13
Tank plates, Pittsburgh	*1.70*	1.80	1.80	3.25
Tank plates, New York	*2.08*	2.18	2.18	3.63
Beams, etc., Pittsburgh	*1.75*	1.80	1.85	3.10
Beams, etc., New York	*2.13*	2.18	2.23	3.48
Steel hoops, Pittsburgh	2.25	2.25	2.40	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 30, 1921 Cents	Aug. 23, 1921 Cents	Aug. 2, 1921 Cents	Aug. 31, 1920 Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	3.00	7.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	4.00	9.00
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.40	6.00
Wire nails, Pittsburgh	2.75	2.75	2.75	4.25
Plain wire, P'gh	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh.	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$13.75**	$13.00	$12.50	$38.00
Carwheels, Philadelphia	17.00	17.00	16.00	42.00
Heavy steel scrap, P'gh.	13.00	13.00	12.00	30.00
Heavy steel scrap, Phila.	11.50	11.50	11.00	26.50
Heavy steel scrap, Ch'go.	11.00	11.00	10.00	26.00
No. 1 cast, Pittsburgh	16.50	16.50	16.00	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.00	13.00	11.50	35.00
No. 1 RR. wrot, Phila.	14.00	14.00	14.00	33.00
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	9.25	24.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$3.00**	$2.75	$2.75	$17.00
Foundry coke, prompt	**4.00**	3.75	3.75	18.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.00	12.00	12.00	19.00
Electrolytic copper, N. Y.	*11.62½*	11.75	11.75	19.00
Zinc, St. Louis	*4.12½*	4.17½	4.20	8.10
Zinc, New York	*4.62½*	4.67½	4.70	8.45
Lead, St. Louis	4.20	4.25	4.20	8.75
Lead, New York	4.40	4.40	4.40	8.75
Tin, New York	**26.75**	26.12½	26.50	45.75
Antimony (Asiatic), N. Y.	4.50	4.50	4.80	7.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 30, 1921, Finished Steel, 2.293c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel.

Aug. 23, 1921,	2.321c.
July 26, 1921,	2.364c.
Aug. 31, 1920,	3.974c.
10-year pre-war average,	1.684c.

meeting competition the preponderating weight is on the lower figure, because of productive capacity. On plates 1.70c., Pittsburgh, has been done and the going price on structural beams is 1.75c. These tonnage products, in other words, have declined from $1 to $3 per ton from what have been regarded as the market prices. Some very low prices have come to the surface on hot-rolled strips in the past week, sales having been made down to 2c. base, Pittsburgh, and on a large tonnage as low as 1.90c. is reported to have been made.

Single quotations again rule in sheets, all makers now being willing to take business at the low levels named by one or two makers a short time ago.

Reports with regard to plant operations are very irregular. There has been a definite gain in the activities of tin plate mills and the operations of strip mills are on a larger scale than they were recently. Sheet mill operations, on the other hand, taking the industry as a whole, have receded, while wire and pipe plants have been practically stationary. We note no gain in activities of bar, plate or structural mills and open-hearth operations do not exceed 25 per cent capacity. In the latter respect, the past two weeks have been the poorest since the depression set in as far as Carnegie Steel Co. is concerned. The Cambria Steel Co. has put on a blast furnace and in the next week or 10 days the Shenango Furnace Co. and the Hanna Furnace Co. each will put on a furnace. The pig iron market reflects a strong undertone, although a demand of sufficient proportions to carry prices up to producers' ideas still is lacking.

There is no easing in the prices of old material and the prospect of early blowing in of several idle furnaces is having its effect upon fuel prices.

Pig Iron.—All makers of basic iron in this and nearby districts are holding firmly to $20, furnace, but as yet that price has not found basis in actual sales. The same interest which recently bought 2000 tons at $19, Valley Furnace basis, has bought another 1000 tons at the same price at a Western Pennsylvania furnace. Another sale of 1000 tons is noted to a West Virginia melter, but beyond the fact that the iron was bought for less than $20, there are no details. The claim is made than this kind of iron still can be bought at $18, Valley furnaces, but no sales lately have been done as low as that and since Valley makers all are asking $20, and the Valley basis was recognized in the recent sale of 2000 tons, the fairer appraisal of to-day's market on Valley basic iron is $19. The market on foundry iron has definitely reached $21, furnace. The one Valley furnace interest which is offering this grade has turned over at least 600 tons at $21 for No. 2 grade, and that also is the price obtained from a Western Pennsylvania furnace on recent transactions. There is no change in Bessemer iron, which is moving in a small way at $20, Valley furnace. The additional furnace in blast at Cambria Steel Co. brings the total number now active in the territory from Johnstown to Wheeling, to Pittsburgh and the Valleys, to 30 out of a total of 139. Soon after Labor Day the Cherry Valley furnace, Leetonia, Ohio, and No. 3 furnace, Shenango Furnace Co., Sharpsville, Pa., will be blown in.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys.—Both inquiries and sales are few and small. Prices do not change much but the drift is toward lower levels. The Valley steel maker who a few weeks ago put out an inquiry for 200 to 300 tons of 80 per cent ferromanganese for September and October delivery has been quoted as low as $58 c.i.f. Atlantic seaboard on the English material, this being equivalent to slightly more than $64 delivered. This price is $2 per ton below the recent minimum quotation, and would seem to put American manufacturers out of the running, since the lowest price of any of them is $70 delivered. We note a sale of a fair sized tonnage of 20 per cent spiegeleisen within the range quoted below. Hardly enough inquiries are out for 50 per cent ferrosilicon to determine the actual price. Most makers are publicly quoting $65, furnace, freight allowed, as a minimum, but the most recent business done was at $60 and it is probable that this price could be done again.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent, $68; 78 to 82 per cent British ferromanganese, $58 to $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Very little is going on and prices to a large degree are untested. There are reports that there was an inquiry recently for 400 to 500 tons of 4-in. billets a month, over the remainder of the year, but it does not seem to have been given to more than two companies and one of them was not interested in the business. Sheet makers generally are getting fewer orders than recently and this has been accompanied by a lighter demand for sheet bars. Almost no interest is being shown in slabs. Price given below are as fair an appraisal as can be made on the limited demand.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30 to $31; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Although most makers are not interested in business at less than $42 Pittsburgh, for the base size of soft rods, some business has been placed at $40 and since the appearance of a sizable order undoubtedly would develop this price, we are forced to recognize it as a quotation. No big demands are coming out at present because of the rather limited movement of the products of rods. Prices are given on page 567.

Structural Material.—Bids were opened yesterday by the Allegheny County commissioners for a new bridge over the Allegheny River at Sixteenth Street, Pittsburgh. The Fort Pitt Bridge Co., Pittsburgh, was low bidder for furnishing the steel and placing it, with a bid of $541,822. Other bids ranged up to $822,400, this being by the Independent Bridge Co., Pittsburgh. About 5000 tons of steel will be required for this bridge. The general contract for the eight-story addition to the department store of the Joseph Horne Co. has yet to be let. It is said that a price of $50 fabricated and delivered has been made on the steel for the building. Actual awards with fabricating shops here remain few and small. The McClintic-Marshall Co. has taken a highway bridge for the Pattengill Transportation Co., Cuba, an umbrella shed for the Chesapeake & Ohio Railroad, Wilmington, Ky., and the steel for the castings for dam No. 38 on the Ohio River at Aurora, Ind., all three jobs taking about 175 tons. The American Bridge Co. has taken 300 tons in addition to the original award of 1000 tons for a saw plant at Manistee, Mich. Occasional sales of plain material in small lots are being made at 1.80c., but 1.75c. is the more common quotation. Prices are given on page 567.

Iron and Steel Pipe.—Jobbers are fairly persistent though moderate buyers of standard pipe, but they are not buying very far ahead and while business has been better in August than it was in July or June, it still leaves much to be desired. No important demands are coming out for oil country goods, because so few of the oil companies are doing any drilling and those that are, seem to be well supplied with casing and drill and drive pipe. Inquiries for line pipe also are few and small. There continues to be good observance of the July 7 card on standard pipe, but on oil country and line pipe competition is sharp and prices favor buyers. Discounts are given on page 567.

Iron and Steel Bars.—While an attempt is still being made to hold merchant steel bars at 1.75c., base, only retail quantities have been moved at that figure and competitive conditions have resulted in prices of anywhere from 1.70c. down to 1.60c. Lower prices also are indicated for iron bars in view of the bi-monthly settlement of the bar iron scale at Youngstown, Ohio, yesterday, which resulted in a drop in the puddling rate from $11.38 per ton to $9.12.

We quote steel bars rolled from billets at 1.60c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c. base; reinforcing bars rolled from old rails, 1.60c.; renned iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Nuts, Bolts and Rivets.—There is practically no market as far as the makers here are concerned as the prices reached in other important manufacturing centers are so far below costs that makers here refuse to follow. One plant here is closed indefinitely because it had been figured out that to meet competitive prices on nuts and bolts would necessitate buying bars at 1.47c., Pittsburgh. This company made a bid of 1.50c. for bars without uncovering any supplies. The leading maker of small rivets in this district is holding to 65, 10 and 10 per cent off list on the bulk of its business, occasionally giving an additional 2½ and 5 per cent on lots involving more than a carload. It is claimed here that a Chicago district maker quoting a lower price does not make a full line of small rivets. Prices and discounts are given on page 567.

Spikes.—The market on standard spikes leans in the buyers' favor, due to the fact that competition for orders is extremely sharp. Locally $2.50 per 100-lb. base, is minimum, but it is admitted that business has been lost at this figure because of the absorption of freight by makers outside this district. It is reported that there is some deviation from the established price of $2.75 per 100-lb. on splice bars. Prices are given on page 567.

Steel Rails.—Demands for light sections still are few and small and buyers are having no trouble in placing orders for new steel rails at 1.75c. Pittsburgh, for the base sizes. Rerolled rails are holding around 1.60c. mill. Specifications for the standard rails still are rather disappointing, but there are hopes that September will develop some improvement in this respect. Reports that the prices of standard rails were to be cut at an early date find no verification here.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—The market no longer is quotable at above 1.75c., as that quotation not only is maximum, but somewhat extreme. A quotation of 1.70c. has become common lately, and it is reported that a recent inquiry brought a quotation of 1.67½c. The principal inquiry is from tank builders. The railroad equipment manufacturers are not doing much, although the Pressed Steel Car Co. recently secured an order for 53 steel passenger cars for the Tientsin Puko Railroad, China. The Baltimore & Ohio Railroad has put out an inquiry for 1000 box and 1000 hopper bodies.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.70c. to 1.75c. f.o.b. Pittsburgh.

Sheets.—Announcement by the Steel Corporation of its intention to meet competitive prices means the passing of higher prices than 2.75c. base for black, both sheet and tin mill sizes, 3.75c. base for galvanized and 2.25c. base for blue annealed. These prices were made by one independent about two weeks ago and since have been followed by several other independents. Distribution of business is rather uneven among the different companies, and between the American Sheet & Tin Plate Co. and the independent companies. While the American Sheet & Tin Plate Co. reports that last week was the best in orders and specifications in more than four months, and it now is running about 44 per cent of its sheet mills, the experience of the independents has been that orders are lighter and they

have been forced to put down some capacity. It seems to be a case that with prices the same, the Steel Corporation gets the preference. Prices are given on page 567.

Wire Products.—Makers in this and near by districts are having a fair run of small orders for quick shipment. The movement of nails continues to be very much better than that of other products, but buyers in general are slow to abandon the policy of coming into the market only for such tonnages as will meet their immediate requirements. There continues to be talk of price cutting, but it is largely talk in the case of nails and does not amount to more than $1 per ton in wire. Case is cited of a buyer wanting 2000 kegs of nails, who though willing to pay the regular base of $2.75, found it necessary to do considerable shopping to find a mill that could make the shipment as promptly as desired. It is asserted that if makers would guarantee prices against a decline they could fill up their order books, at least over the remainder of the year. The American Steel & Wire Co. now is giving a dating of Nov. 1, against woven wire fence business, thus meeting terms offered by the independents for some little time. The announcement by the Steel Corporation that it would meet competitive market prices is considered likely to be a stabilizing influence in prices of wire products, for the reason that concessions which might be made by independents now will not be a successful means of getting business, as it would be with the corporation quoting a higher price.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Tin Plate.—Newspaper reports that the price of production tin plate had been cut to $4.75 per base box are absolutely without foundation. The price is and has been $5.25 per base box for production plate, with stock items available at $4.75. In announcing the intention of the Steel Corporation to meet competitive prices, Judge Gary made no reference whatever to prices of any product. The real situation in tin plate is that manufacturers whose plants are in operation have had a really good business in tonnages for quick shipment and the needs of container manufacturers are so urgent that they have not questioned the price.

Hoops and Bands.—The market has definitely settled to a base of 2.25c. for these products, for that price has been the base of independent makers for the past few weeks and now is the Steel Corporation price in view of Judge Gary's recent announcement that the corporation hereafter would meet competitive prices. It is not believed that less than 2.25c. has been quoted, although the demand still is of small proportions.

Cotton Ties.—Specifications are coming in satisfactorily and it begins to look as though requirements would be heavier than was indicated a few weeks ago. German competition seems to have been successfully fought off by the reduction of 5c. per bundle made by domestic makers, following the opening of the season. September shipments carry a price of $1.32 per bundle of 45 lb., Pittsburgh, this including the carrying charge of 1c. per bundle per month on the revised opening price.

Hot-Rolled and Cold-Rolled Strips.—The full range of prices on hot-rolled strips is from 1.90c. to 2.40c., base, Pittsburgh. It is reported that the Ford Motor Co. has placed 4000 tons at the lower figure. There is a disposition to question the accuracy of this report in view of the fact that Detroit advices are that this company is figuring on a reduction in its production schedule for September to 50 per cent of that for August, and such a tonnage would considerably exceed its requirements for the coming month. It also is said that material sold at such a price would not be strictly within the specifications of strip steel, and that it probably was rolled on a skelp mill. However, some regular makers of hot-rolled strips recently have been going down to 2.10c. and even 2c. to secure tonnage orders, and others, though nominally quoting a high price, have met these figures where the loss of a customer was involved. On a strictly strip steel basis, the market is quotable from 2.20c. to 2.40c. Where a large tonnage is involved or where strips are competing with plates or sheets, prices range from 1.90c. to 2.10c. Cold-rolled strips are quotable on sales from 3.85c. to 4c., base, Pittsburgh. Business has improved but seemingly at the expense of prices.

Cold-Finished Steel Bars and Shafting.—The market on rolled or drawn steel still is quotable from 2.40c. to 2.50c., base, Pittsburgh. The general asking price is 2.50c. and some business has been done at that figure, but usually on tonnages involving less than a carload. Competitive business usually results in a price of 2.40c. The Cumberland Steel Co. quotes ground shafting at $3 per 100-lb. base, f. o. b. its mill, for carloads, and $3.25 for less carloads.

Coke and Coal.—The appearance of two or three good-sized inquiries for furnace coke, coupled with a stronger market in coal, has developed an advance of about 25c. per ton in this grade of fuel. The American Rolling Mill Co., which is blowing in one of its blast furnaces at Columbus, Ohio, has contracted for 27,000 tons for delivery over the next three months, at $3.10 per net ton, oven, and other inquiries which have been out have developed no prices of less than $3 per net ton, oven. It is probable that within the next few days a contract for 10,000 tons a month over the next three months will be closed at $3. Another inquiry for a round tonnage for last quarter shipment is on the market, against which a price of $3.25 has been named. There seems to be no furnace coke either for spot or future shipment at less than $3.

Old Material.—The market maintains a strong undertone although in some instances buyers have reduced their bids and generally the dealers are having some difficulty in obtaining the prices they ask. But as an offset to this condition, there are some dealers who are short of the market and who are trying to cover in the fear of not being able to do so later, except at a loss. Pittsburgh district steel companies using machine shop turnings are bidding $8 to $8.50 per gross ton, delivered, but the lowest price noted on any actual business has been $8.50 and we regard that as minimum, in view of the fact that one large user stands ready to take on additional tonnages at that price. The lower bids have failed to secure any material of this grade in this district and the indications point to even higher prices in view of the fact that the automotve industry, the principal source of supplies, is beginning to slow up and naturally will have smaller tonnages to offer during the next few weeks. Based on actual sales, we quote turnings at $8.50 to $8.75 per gross ton, delivered Pittsburgh, common freight points. There were several bids by Pittsburgh district interests of $8.50 per ton, or more, delivered, against the turnings offered by Dodge Bros. last Friday. Heavy melting steel has brought $13.50 on one lot of 2000 tons and it is doubtful whether any now could be bought as low as $13. The Baltimore & Ohio will receive bids until noon Sept. 6, for 19 cars and 10,530 gross tons of old material; also for 3000 lb. of high speed steel. The Pennsylvania Railroad, Eastern Region, will open bids, Sept. 1, for 28,500 net tons of old material.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13.00 to $13.50
No. 1 cast cupola size	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	16.00 to 16.50
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	14.00 to 14.50
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	19.00 to 20.00
Locomotive axles, steel	18.50 to 19.00
Steel car axles	14.50 to 15.00
Cast iron wheels	14.00 to 14.50
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.50 to 8.75
Sheet bar crop ends at origin	12.50 to 13.00
Heavy steel axle turnings	10.00 to 10.50
Short shoveling turnings	9.50 to 10.00
Heavy breakable cast	15.00 to 15.25
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.25
No. 1 railroad wrought	12.00 to 13.00

Chicago

CHICAGO, Aug. 30.

Local producers of merchant pig iron have again advanced their prices, this time to $21, base furnace, for foundry, basic and malleable. Although buying has not been heavy at the new quotation, the market is firm.

Demand for steel continues to increase slowly, but most purchases are of small tonnages on which prompt delivery is asked. Sheet prices have definitely receded to a lower level, but the market on bars, plates and structural shapes is still in a state of confusion. It is apparent, however, that the prices announced in July, namely, 1.75c., Pittsburgh, on soft steel bars, and 1.85c., Pittsburgh, on plates and structurals, are now purely nominal in this district, and an early announcement of lower quotations corresponding more closely to actual going prices would not be surprising. On all three products, 1.50c. to 1.60c., Pittsburgh, has been done rather frequently recently and exceptionally attractive business has brought out heavier concessions. A railroad car builder, for example, closed for 2200 tons of plates at a reported price of 1.80c., Chicago. Mill and furnace operations are substantially unchanged.

Pig Iron.—Local producers have again advanced their prices this time to $21, base furnace, for foundry, malleable and basic. Purchases ranging from carload lots to several hundred tons have been made at the new prices, but on the whole buying is not so active as a week or two ago. Some contracts have been closed, however, covering requirements ranging from two months to the rest of the year, and an Illinois melter is inquiring for 1300 tons of foundry for first quarter delivery, as well as for 300 tons for fourth quarter. The furnace of the St. Louis Coke & Chemical Co. at Granite City was banked last week, as forecast in this column, thus further reducing the number of active stacks in the country. A Wisconsin melter has purchased 500 tons of 10 per cent silvery at the ruling Jackson County prices. An inquiry for 500 tons of charcoal iron has been received from an Eastern melter. Buying of foundry coke has expanded measurably and some melters who had been ordering only one carload at a time have placed contracts for from one to two months ahead. A stiffening in beehive prices would not be surprising in view of the fact that operations are at a low ebb and producers declare they will not relight ovens at the present market. Current ruling prices on beehive foundry coke range from $4.25 to $4.50, Connellsville.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00
Northern high phos.	21.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil.	21.00
Basic	21.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32.82

Ferroalloys.—Ferromanganese is stronger, as is evidenced by a sale of 100 tons at $75, delivered. There has been no activity in spiegeleisen or 50 per cent ferrosilicon.

We quote 78 to 82 per cent ferromanganese, $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment.—The Pere Marquette has awarded repairs on 350 wooden box cars to the International Car Co., Chicago. The Rock Island has deferred action on its inquiries for new cars and car repairs. The award of repairs by the Illinois Central, noted last week, totaled 1950 cars instead of 1400, and the distribution was as follows: Five hundred box and 250 Roger ballast cars to the Pullman company, 400 box cars to the Ryan Car Co., 300 gondola cars to the Haskell & Barker Car Co., and 500 box cars to the American Car & Foundry Co.

Rails and Track Supplies.—Outside of a number of carload orders for track bolts and standard railroad spikes, there has been little new business in track supplies. There have also been some releases against contracts for the same commodities, but on the whole bookings are disappointing. In fact, it is reported that the railroads are borrowing from each other rather than to enter the market for their needs. Light rails are weaker and are now bringing a maximum of 1.75c., mill.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.50c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.50c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Plates.—A Chicago district car builder has bought 2200 tons of plates from a local mill. The steel for the car repairs let by the Illinois Central last week has not yet been placed and the tonnage will probably not run very heavy, as all of the cars have wooden superstructures. The Chicago, Burlington & Quincy takes public bids on Sept. 2 on 1500 tons of plates and 350 tons of structural shapes. The same road is inquiring for 500 tons of car parts. In the aggregate, inquiry for plates shows little improvement and competition for business has been keen. The so-called official price of 1.85c., Pittsburgh, is now little more than nominal and orders are going at concessions ranging all the way from $4.50 to $7.50 a ton. Owing to the present propensity of buyers to limit their purchases to small tonnages for prompt delivery, the exceptional inquiries of size and desirable specifications are bringing out extraordinary inducements from the mills. Hence on most current orders the ruling market appears to be 2c., Chicago.

The ruling mill quotation is 2c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—With fabricating work diminishing rather than increasing and demand from other sources light, business in plain material is at a low ebb. The mill price of 1.85c., Pittsburgh, which is still adhered to by some makers, is no longer getting any business of consequence in this section. Actual going prices range all the way from 2c. to 1.85c., Chicago, the extreme concessions being named on attractive tonnages. Current fabricating jobs are small with the exception of a 3000-ton airship hangar to be erected at Belleville, Ill., noted in the St. Louis column last week. Recent fabricating awards include:

Logan Square Masonic Temple, Chicago, 320 tons, to A. Bolter's Sons Co.

Hutchinson Lumber Co., one 120-ft. single track through girder span, Oroville, Cal., 120 tons, to American Bridge Co.

South Dakota State Highway Commission, two 198-ft. spans, 163 tons, to Standard Bridge Co., Omaha.

Pennsylvania Tank Line Co., two buildings, Kansas City, Mo., 225 tons, to Kansas City Structural Steel Co.

Pending business includes:

Southside High School, Fort Wayne, Ind., 300 tons.

Courthouse, Rapid City, S. D., 250 tons.

Powerhouse, Gallup American Coal Co., Gallup, N. M., 275 tons.

The mill quotation is 1.85c. to 2c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Bolts and Nuts.—The Ford Motor Co. bought its monthly requirements of bolts and nuts last week. Business in general remains light. Jobbers, railroads and manufacturing consumers still adhere to the cautious policy of buying only for their immediate needs. The price situation is still unsettled, but the discounts named in this paragraph last week appear to be representative.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Sheets.—Mill prices on black and galvanized sheets have been reduced to 2.75c. and 3.75c., base Pittsburgh, respectively. The ruling price on blue annealed continues to be 2.25c., Pittsburgh, for No. 10 gage. Warehouse quotations have been marked down to conform with the new mill prices and are appended below. The demand for sheets is of fair proportions, as indicated by the fact that the local independent continues to operate 14 out of 18 hot mills.

Mill quotations are 2.75c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Bars.—There has been no material improvement in the demand for mild steel bars and 1.75c., Pittsburgh, is merely a nominal quotation in this district. On most orders 1.50c. to 1.60c., Pittsburgh, is being done, and in some cases as low as 1.42c. has been named. That buyers have permitted their stocks to dwindle almost to the vanishing point is indicated by the increasing number of requests for immediate shipments. In a number of instances, they have failed to find mills which could furnish the material and have been forced to buy out of stocks. Current reinforcing jobs are mostly under 100 tons each, an exception being a factory addition for the Cuneo-Henneberry Co., Chicago, involving 450 tons, which will be furnished by the Inland Steel Co. There is little demand for bar iron and while as low as 1.65c., mill, has been done, the ruling price remains 1.75c., mill. Although some concessions have been made in this market of late, the ruling market on rail carbon steel bars remains 1.75c., mill. The operations of bar iron and hard steel bar mills are still of an intermittent character.

Mill prices are: Mild steel bars, 1.50c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Old Material.—The market is quiet and consuming demand is principally from small gray iron and malleable foundries. A second advance in pig iron has tended to strengthen the foundry grades, car wheels having advanced and the other items being on a firmer footing. Generally speaking, consumers are still reluctant to pay the advanced prices and continue to offer to buy at quotations current two or three weeks ago. One iron mill, however, has purchased in excess of 500 tons of No. 1 wrought at $11.50 per net ton. Dealers are not buying so actively as they were, although some short interests are in the market for brake shoes and No. 1 wrought. The largest railroad offering is 10,000 tons advertised by the Baltimore & Ohio. Blind lists have been received from the Erie and the Michigan Central.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	13.75 to 14.25
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.25 to 10.75
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.00 to 7.50
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	9.50 to 10.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.50 to 12.00
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.00 to 12.50
Grate bars	10.00 to 10.50
Brake shoes	11.00 to 11.50
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

Wire Products.—Orders are numerous but lacking in size. Jobbers are buying rather generally, but as yet are not laying in stocks for fall trade. Railroad buying is less in evidence than a week or two ago. Trade from the manufacturing consumers is small. Prices are holding firmly except on cement coated nails, on which there has been some shading of late. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 567.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Cast Iron Pipe.—Detroit has again rejected bids on 1500 tons and will readvertise. Milwaukee will take bids Sept. 9 on 1928 tons of straight pipe, largely 54-in. with a few pieces of 36-in.; 241 tons of lugged pipe and 376 tons of special castings. Cedarburg, Wis., receives tenders to-day on 600 tons of four, six, eight and 10-in.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

New York

NEW YORK, Aug. 30.

Pig Iron.—The buying of the middle August period has subsided, although there is still fair inquiry, including 1500 tons for delivery after Jan. 1. The furnace company referred to last week as having purchased at least 1000 tons has contracted for about double that amount for No. 2X and No. 2 plain for the last quarter. Furnace quotations show little, if any, change. Furnace operators who were selling below cost find it difficult to advance quotations and at least one furnace is expecting to go out about Oct. 1, by which time it is estimated all the iron it has sold will be delivered. The usual furnace quotations for No. 2 plain, eastern Pennsylvania, are $19 to $19.50, while Buffalo furnaces seem to have established the $20 furnace price. Virginia iron is selling at from $22 to $23, furnace, in very limited quantities.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom'l)	28.16 to 29.16

Ferroalloys.—Reports persist of claims by buyers that ferromanganese has been offered lower than the prevailing quotation, but sellers deny that any sales have been made at less than $65, seaboard, for the British alloy and $70, delivered, for the American product. Sales of carload lots are reported and there is an inquiry for 100 tons from a Western New York consumer. The chief item of interest in the spiegeleisen market is an inquiry for 350 tons for early delivery. There is no demand for high grade manganese ore and quotations are unchanged. The 50 per cent ferrosilicon market is exceedingly quiet and prices are firm. Quotations are as follows:

Ferroalloys	
Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$65.00
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $27.00
Ferrosilicon, 50 per cent, delivered, per ton.	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00
Ores	
Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast Iron Pipe.—Considering the period of the year, business holds up fairly well. There is no new municipal business before the trade. Next month the usual seasonal slump is looked for. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $42.30; 4-in. and 5-in., $47.30; 3-in., $57.30, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—On the whole, a larger volume of inquiries has marked the week over those of the recent past, but prices do not seem to have stiffened. One instance was found of a seller who booked more business in the last week than in any other week this year, and the month bids fair to be the best of

the year. Demand is of rather a broad nature except in cold finished steel and cold rolled strip steel, which seem still to be in fairly heavy stocks in consumers' hands. As to prices, 1.70c., Pittsburgh, is easily obtainable on large lots of plates, and while bars have been done at 1.65c. in some special cases, there is evidence that 1.70c. is also the going price for bars, although business is still done at 1.75c. Structural shapes are dropping to a parity with plates, and on large structural operations it is probable that 1.75c. is a top figure. At least one buyer of national operations has disregarded Pittsburgh in Chicago purchases, using round figures for that delivery in estimating. Fabricated steel awards of the week include 600 tons for the Sinclair Valentine Co., New York, to the Hinkle Iron Co.; 250 tons for the Methodist Publishing Co., Richmond, Va., to the Richmond Structural Steel Co.; 300 tons for apartments at Elmhurst to Kues Brothers; 1000 tons for the Allerton Housing Corporation, Lexington Avenue and Fifty-seventh Street, to the Paterson Structural Steel Co., which also took 1500 tons for the Henry Schiff apartment, Riverside Drive; 3100 tons for the Bamberger store, Newark, to the Hay Foundry & Iron Works. The Fort Pitt Bridge Co. was low bidder on the 5000-ton Sixteenth Street bridge, Pittsburgh. For the bridge at Aqueduct, N. Y., taking 350 tons, Lathrop, Shea & Henwood Co., Buffalo, is general contractor. Among new projects are a laboratory building for Yale University, 1000 tons, and 700 tons for a hospital at Hackensack, N. J. In car building lines the Baltimore & Ohio is in the market for 1000 hopper car bodies and 1000 box car bodies. The Illinois Central car repair contracts cover 1422 cars and were divided among four companies. The Pressed Steel Car Co. will build 53 passenger cars for the Chinese Government railroads.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.08c.; plates, 2.08c. to 2.13c.; structural shapes, 2.13c. to 2.23c.; bar iron, 2.08c.

Old Material.—When the so-called better tone is analyzed, it appears to be due to conditions between brokers and dealers rather than because of a demand on the part of mills. An example of this was the raising of the buying price of pipe to the extent of 25 cents by a leading New York broker to facilitate his covering on an old contract. One broker has been trying to dispose of 3000 tons of one grade at an attractive figure which would undoubtedly interest mills in normal times. However, no mills have shown interest. The New York Central decided not to sell its 1500 tons of relaying rails, since it holds out for $30 and has not secured bids that high. Heavy melting steel is before the market in two grades, yard steel and rails or equivalent.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to $7.50
Heavy melting steel, rails or equivalent	8.25 to 8.75
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.50 to 8.75
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Light iron	2.00 to 2.50
Cast borings (clean)	5.00 to 5.50
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	9.50 to 10.00
Locomotive grate bars	8.50 to 9.25
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Warehouse Business.—With most warehouses in this district, the past month resulted in a slightly larger volume of business than July, which, however, was the poorest month of the year. Prices on practically all items are nominal. Particularly in the wrought iron and steel pipe field is there a tendency to quote competitive prices regardless of the established warehouse schedule. About the only decrease in prices during the past week is noted in black sheets, which are now being sold as low as 4c. per lb. for No. 28 gage. Brass and copper warehouses report business dull and prices unchanged. We quote prices on page 580.

High Speed Steel.—Dullness continues, although some producers report a continuation of the slight increase in activity during the past few weeks. Quotations continue at about 90c. to $1 per lb. for 18 per cent tungsten high speed steel.

Birmingham

BIRMINGHAM, ALA., Aug. 30.

Reductions on ore and limestone to Alabama furnaces effective on or before Oct. 1, as declared by the Alabama Public Service Commission, make a maximum saving of about 40c. to 42c. a ton in the manufacture of pig iron, compared with present cost for the most favorably situated furnaces. In the 25-mile zone, the ore rate is reduced from 50c. to 37c. This makes 39c. on three tons of ore. The reduction on limestone is from 40c. to 37c. This is about 1c. on the amount of stone used to make a ton of iron. Coal and coke rates were not changed. Reduced rates on greater distances are not so great, that on ore in a zone from 25 to 50 miles being reduced from 60c. to 47c. and that on stone from 50c. to 47c. The Sloss-Sheffield and Republic companies benefit most by the reductions.

Pig Iron.—While business was mainly confined to small lots for prompt movement last week, it was marked by a solid front both as to $19 base and the 50c. differentials. The last known deal made under this was for 1700 tons of pipe iron, in which the average base was $18.50 with the usual charge for differentials. This was about Aug. 19. After that, all makers charged $19 flat. Toward end of the week a pipe interest tried several makers on 1500 tons of 2.25 to 3.25 silicon at $19, but the proffer was not accepted. About that time brokers are known to have placed orders for lots at $19 base, one lot of 100 tons of 3.25 to 3.75 silicon bringing $20.50. The inquiry for 40,000 tons for India was received, but little interest was shown in it. Stocks are in bad shape from grade standpoint. One maker has no high silicons and another has no silicon under 3.25. This causes a continuous refusal of orders or changes as to grades. The week was marked by the re-entrance of Cincinnati and St. Louis territory buyers for small lots. St. Louis took 100 tons and Cincinnati took several small lots at uniform base of $19. Apparently the melters were glad to get in at the price paid. Melt of stove foundries and others in the South is increasing and their inclination to cover is more pronounced. Stocks are going down. Preparations to have furnaces ready to go in are under way, but none forecast additional furnace activity before lower rates on ore and limestone go in effect Oct. 1. The reductions in these rates was only 25 per cent in shortest zones, much less in longer hauls. The general tendency of the market is to harden to a higher base.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Finishing Mills.—Finishing steel works are on greater production schedule, the Tennessee company having progressed to one of 65 per cent. The rail mill for two weeks has been on night and day turn, producing 9000 tons compared with the prior production of 6000. New car works has begun turning out 10 standard steel freight cars per diem. Wire drawing mills appear to have attained 35 per cent capacity with wire fencing again on the order books following better feeling in the country. Hoop and tie mills continue operations at normal.

Cast Iron Pipe.—It was a quiet week in high pressure pipe, but the price base remained firm around $35 with numbers of small orders and one shop at 100 per cent capacity. Sanitary pipe is running about the same as for several weeks with a fair demand and

sharp competition on a $40 base for standard and $35 for extra heavy.

Coal and Coke.—Foundry coke is more firm at $6.50, the $6 base seeming to have disappeared owing to the strengthening of the demand. Bunker coal at New Orleans and Mobile is quite active. General trade is much improved.

Old Material.—Cast scrap is moving out of yards in considerable volume owing to increase in shop operations. Heavy melting steel is still weak, but the outlook is improving.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Aug. 30.

Pig Iron.—Eastern Pennsylvania $19.50 iron has disappeared from this market, those furnaces quoting adhering to $20 furnace or $24.06 delivered for No. 2 plain and No. 2X. On No. IX iron, prices spread from $20.50 to $21.50. Both Buffalo No. 2 plain and No. 2X are obtainable at $20 furnace or $25.46 delivered common points, but $20.50 furnace or $25.96 delivered on No. 2X was done on car lots this week. Sufficient inquiry to establish a market for Virginia iron is lacking. Alabama iron is offered on a flat basis of $19 furnace for No. 2 plain. One producer is asking foundries to take definite action on iron contracted for, held at furnace. Aside from 100 tons eastern Pennsylvania No. 2X, sold to a Maine foundry at $20 furnace, business reported this week was in car lots of eastern Pennsylvania and Buffalo at prices noted above. New inquiries include 1000 tons, silicon 1.25 to 1.80, 750 tons, silicon 2.75 to 3.25, and 200 tons No. 1X, all from Connecticut consumers; 300 tons charcoal iron from a nearby melter; and numerous car lots, mostly No. 2X and No. 1X. Foundries are bidding low for business. A Massachusetts foundry recently took city water department work at 2½c. per lb. On small castings requiring a fine finish, prices quoted to-day are more than 50 per cent under those named a year ago. A Massachusetts manufacturer is paying 4.6c. per lb. for gray iron castings that cost 15.5c. a year ago. Delivered pig iron prices follow:

East. Penn. sil. 2.25 to 2.75	$24.06 to $25.06
East. Penn. sil. 1.75 to 2.25	24.06 to 24.56
Buffalo sil. 2.25 to 2.75	25.46 to 26.46
Buffalo sil. 1.75 to 2.25	25.46 to 25.96
Virginia sil. 2.25 to 2.75	31.08 to 33.08
Virginia sil. 1.75 to 2.25	30.58 to 32.58
Alabama sil. 2.25 to 2.75	30.16
Alabama sil. 1.75 to 2.25	29.66

Warehouse Business.—Consumption of iron and steel continues to increase, although slowly. Two local warehouses are well supplied, but a majority are pushing mills for deliveries on material ordered earlier in August because stocks are broken. Receipts of nails have materially increased this week and prompt warehouse deliveries are now guaranteed. Most firms quote wire nails at $3.85 base. One, however, quotes $3.65 per keg base. Stove bolts have been cut 10 per cent, and two important manufacturers of vises have reduced prices about as much.

Finished Material.—An order for 900 tons girder and 200 tons standard T rails and 1250 pairs of joints placed by the Boston Elevated Railway Co. with an eastern Pennsylvania mill constitutes the outstanding feature of the finished material market this week. The Copley Square Trust Building, Boston, is taking bids on 250 tons of structural steel and Stone & Webster on 123 tons for a Far Rockaway, L. I., power house project. Local fabricators also are bidding on 480 tons for a Cornell University building. Actual structural tonnages placed since last reports were confined to small individual lots. Such jobs are plentiful and large as well as small fabricators are bidding for work. Structural prices are inclined toward weakness. On one round tonnage offered this week, as low as $61.50 was bid for steel, fabricated and erected. The plate market is soft, 1.75c., Pittsburgh, having been done on sheared. Sheet quotations have been revised to correspond with those made at other centers. Otherwise iron and steel prices hold steady with incoming business as good or slightly better than previously reported.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Coke.—New England producers of foundry coke continue to quote $10.66 delivered for spot and contract fuel where the local freight rate does not exceed $3.40, and nothing indicates a change within the near future. New business and shipments on contracts are no more than holding their own, consequently oven operations do not increase. Although there is little forward buying, a slight increase in foundry activities is expected following Labor Day. Connellsville foundry cokes are not much of a factor in this market.

Old Material.—A Pennsylvania structural rolling mill this week secured a small tonnage of steel at $11.50 delivered and Bethlehem, Pa., interests bought a little. Generally speaking, however, prices offered by the mills are not sufficiently high to bring out material. One melter raised his bid on pipe from $7.50 to $8.50 without success. Otherwise activity in the old material market centers in No. 1 machinery cast, car lots of which are reported sold this week at $17.50 delivered. Holders want more money, but few foundries are interested, consequently prices do not fluctuate much when an actual sale is made. One dealer sold a small tonnage of No. 2 machinery cast at $12.50 delivered, but this cannot be considered a criterion of the market.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.50 to $20.00
No. 2 machinery cast	15.50 to 17.50
Stove plate	16.00 to 17.00
Railroad malleable	15.50 to 16.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.50
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.50 to 4.50
Cast iron borings, chemical	3.50 to 4.50
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.00 to 11.50
Rerolling rails	9.00 to 10.00

Cincinnati

CINCINNATI, Aug. 30.

Pig Iron.—Several good-sized sales were reported during the week, the interest chiefly centering in malleables. A West Virginia car company closed on 1000 tons, and a central Ohio melter took a similar amount. A local melter brought 450 tons of foundry iron and another 100 tons. A Hamilton foundry bought 100 tons of Southern iron and melters outside of this immediate district were responsible for several sales running up to 300 tons. A northern Ohio melter is inquiring for 600 tons of malleable, 100 tons of which is for prompt shipment, and the remaining 500 for the rest of the year. The Louisville & Nashville Railroad will close Tuesday for 400 tons. The American Radiator Co. is inquiring for 400 tons for its north Birmingham plant, and the National Cash Register Co. 100 tons for Dayton. A northern Indiana melter is also in the market for 500 tons of foundry. Prices have not changed with the exception of Chicago district iron, in the past week, those furnaces having advanced to $21 on Thursday. In the South $19 is being firmly held. And in southern Ohio the quotations range from $20 to $20.50. All the sales recorded above were made at the current market, but it is reported that furnaces in districts other than Chicago are considering advancing from $1 to $2 a ton. The Mating Iron & Steel Co. will blow in a furnace at

Ironton on Sept. 15 and one stack of the American Rolling Mill Co. at Columbus will likely be in this week.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—Some fair sized orders for finished material were placed during the week. These included an order for 300 tons of structural shapes taken on the basis of 1.80c. Pittsburgh. An order for 300 tons of reinforcing bars is reported to have gone to an Ohio mill at 1.50c, Pittsburgh. These bars, it is said, will be rolled from new billets. There has been some inquiry for galvanized sheets, but the market for black sheets is slow and weaker. On blue annealed, 2.25c. is the general asking price, and on galvanized 3.75c. is holding fairly well. Quotations of 2.55c. on black sheets, or $4 per ton below the regular market, are reported. On new bars, 1.75c. Pittsburgh is the general asking price and this figure was secured on a lot of 100 tons taken by an independent mill during the week. Some orders for nails and wire products were placed at the regular schedules, and there is apparently no confirmation for the report that nails can be had from mills in Southern Ohio at 2.50c. Pittsburgh. In the structural field, there is very little activity. A municipal powerhouse at Frankfort, Ind., involving 130 tons is up for bids. An umbrella shed for the new Covington, Ky., station, taking 80 tons, has been awarded to the McClintic-Marshall Co. E. M. Sculley, Columbus, Ohio, is low bidder on the Kellogg Avenue, Cincinnati, bridge. This award will likely be made within the next week. Plant operations will not materially change during the week. The American Rolling Mill Co., Middletown, will have 10 mills in operation. The Whitaker-Glessner Co., at Portsmouth, Ohio, will be idle as well as the Andrews Steel Co. and Newport Rolling Mill Co., Newport, Ky. The two latter plants have broken off negotiations with the Amalgamated Association and will hereafter be operated without any agreement.

Warehouse Business.—Some jobbers report a greater number of small orders. The tonnage involved is also showing some increase, but as a rule, manufacturers are buying only for their immediate needs. There have been no further price reductions and jobbers quote:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 5.75c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—There is some activity in the coke market, foundry cokes in carload lots being sought. Occasionally, however, larger tonnages are purchased. Two inquiries for 400 tons each are pending. Prices are practically unchanged, Connellsville furnace being quoted at $2.75 to $3 and foundry at $3.75 to $4.50. Wise County is quoted at $5 to $6 and New River at $7 to $8.50. By-product coke is quoted at $6.50, Connellsville basis.

Old Material.—A central Ohio steel company is reported to have purchased a tonnage of borings and turnings at around $8.50 delivered. There is very little activity, however, the market practically being in the hands of dealers. The B. & O. is offering 11,000 tons. Prices, while firmer, are not quotably changed.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

Buffalo

BUFFALO, Aug. 30.

Pig Iron.—About 12,000 tons of various grades has been sold here at an average price of $20.50 base grade. Some inquiry from Valley points is engaging one seller and the understanding is that foundry iron is scarce at these places, while it is a known fact that the Buffalo market is weak. There is no change in the situation with reference to future business; contracts are made on 30- and 60-day delivery basis. A number of small foundries have reopened and better operation is noticed in foundries which have been barely active. One producer sold 7000 tons and the lot included one 1000-ton order and several 500-ton lots. Sales of 2500 tons made by a furnace were on a base price of $20 for No. 2 plain. Offerings of desirable tonnages at lower prices were refused. Furnace operation is unchanged and there is no likelihood of any change in the near future. Inquiry of 4500 tons with one furnace is scattered and consists of 25 items.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$21.75
No. 2X foundry, 2.25 to 2.75 sil	20.75
No. 2 plain, 1.75 to 2.25 sil	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—With the exception of bar business, improvement is general and demand is improving. Sheet and pipe orders have improved in a satisfactory manner and in the latter case some carload business appeared; mostly for small sizes as used by steamfitters. The lack of interest by bar buyers is accounted for by the excessive stocks held by jobbers and consumers when drastic price cuts were announced and in consequence these stocks have moved slowly. Sheet business is better, due to growing interest on the part of motor car builders. A desirable local inquiry for an unusual tonnage in bolts and nuts is in the market and the competition for this business consisting of two carloads is more than ordinarily keen. Some belief is expressed that still lower prices will be forthcoming Sept. 1, but the number of small orders shows an increase from week to week. The prevailing bar price is 1.75c. and is steady. A local agency lost a desirable tonnage through its refusal to meet a 1.70c. price, but despite this rumors are current of bar prices as low as 1.60c. An inquiry is out for 150 tons of reinforcing bars for an interest at Carthage, N. Y., and about 350 tons of the same material will be bought by contractors erecting an addition to the plant of the American Hardwall Plaster Co., Utica, N. Y. Wire orders show steady and consistent gain and the mill concentrating on this business reports a normal demand. Tin plate is quiet and price cutting is reported occasionally. The Lackawanna Bridge Co. will fabricate 400 tons for a Niagara Falls high school. In structural mills orders ranging from one to 15 tons are eagerly sought—a contrast to the situation a year ago when business of that character was disregarded.

Warehouse Business.—Sheet prices have been reduced on three grades; on galvanized and black sheets the reductions are $5 a ton and on blue annealed $3 per ton. The volume of business has been steady and while no large tonnages have moved, orders are more frequent and for slightly larger quantities.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.30c.; galvanized steel sheets, No. 28 gage, 5.05c.; black sheets, No. 28 gage, 4.05c.; cold rolled strip steel, 6.40c.

Coke.—Several sizable inquiries not confined to blast furnace interests but commercial users are noted. There is a tendency to cover future needs, but this business is not particularly acceptable to the sellers. All sales are spot.

Old Material.—Three local mills are buying heavy melting steel and paying $13. Dealers look for an advance based on the fact that other points will pay more. A fair demand for hydraulic compressed has

appeared in several offices and feeling generally has taken on a more optimistic turn.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $13.50
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

St. Louis

ST. LOUIS, Aug. 30.

Pig Iron.—A further improvement is noted in the demand for pig iron. This has been followed by an advance of $1 a ton, and a firm stand by producers to sell only at the market price. Some orders at the old prices have been declined. Inquiries this week include one for 1500 tons for immediate shipment, another for 1300 tons for delivery during the remainder of the year, and another for 300 tons. In addition, one concern has scattering inquiries involving about 2500 tons. Most orders that are being placed are for immediate shipment and buyers are demanding car numbers at once, so that shipments can be traced. The gray iron foundries are nearly all operating, a conservative estimate being 40 to 50 per cent of normal. The St. Louis Coke & Chemical Co., Granite City, banked its furnace on Thursday, with about 9000 tons on yard, most of which is less than 2.25 per cent in silicon.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago, and $5.74 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$23.88
Northern malleable, sil. 1.75 to 2.25	23.88
Basic	23.88
Southern foundry, sil. 1.75 to 2.25	24.74

Coke.—There is more buying of coke, and the market is stronger. Standard Connellsville foundry coke is 50c. higher at $4.50 to $5 per net ton at ovens and Wise county at $6. Local and nearby melters are operating on a larger scale, and such purchases as they make are for immediate shipment with eager calls for delivery at once. There is an improvement in the demand for domestic coke.

Finished Iron and Steel.—There seems to be lessening of interest this week in finished iron and steel. There were no sales to speak of, and the only inquiry of note was for 3000 kegs of track spikes from the Missouri Pacific Railroad for St. Louis delivery. A slight improvement in warehouse business during August as compared to July is reported, the business being mostly in sheets. Warehouse prices of sheets are lower, being the only change in prices.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, $4.50c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Old Material.—Activity in old material is near the vanishing point, but the market is in many respects stronger than a week ago, and nearly all grades have advanced 50c. per ton, despite lack of demand displayed by consumers. Rolling mill grades are quiet, and relaying rails have fallen off to a considerable extent. Heavy melting steel is not in demand, although some consumers are willing to take on tonnages at about $1 per ton under the present market. The following railroad lists are before the market this week: Wabash, 150 tons; Minneapolis, St. Paul & Sault Ste. Marie, 200 tons; open lists issued by the Cleveland, Chicago, Cincinnati & St. Louis, closing on Aug. 30, and New York Central, closing Sept. 8.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$13.00 to $13.50
Steel rails, re-rolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.00 to 11.50
Relaying rails, standard section	29.00 to 30.00
Cast iron car wheels	12.00 to 12.50
No. 1 heavy railroad melting steel	10.50 to 11.00
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	10.50 to 11.00
Ordinary bundle sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	5.50 to 6.00
Iron angle bars	11.00 to 11.50
Steel angle bars	9.00 to 9.50
Iron car axles	16.50 to 17.00
Steel car axles	12.50 to 13.00
Wrought iron arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	9.50 to 10.00
Railroad springs	10.50 to 11.00
Steel couplers and knuckles	10.50 to 11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to 9.50
No. 1 dealer's forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad casts	12.50 to 13.00
Stove plate and light cast	11.50 to 12.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.00 to 7.50
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	8.50 to 9.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	7.00 to 7.50
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.50 to 11.00
Railroad brake shoes	8.50 to 9.00

Cleveland

CLEVELAND, Aug. 30.

Iron Ore.—There is no activity in the ore market. A few consumers will probably have to buy some small lots before the close of the season of navigation but are not expected to come in the market before October. In view of the expected reduction in prices next year and probable lower freight rates, these consumers will buy only enough ore to carry them over until the opening of navigation next year. Lake Superior ore on hand at furnaces and Lake Erie docks Aug. 1 was approximately 32,600,000 gross tons as compared with 27,900,000 tons on the same day a year ago. Furnace stocks on Aug. 1 amounted to approximately 23,800,000. The consumption of Lake Superior ore during July was about 1,200,000 tons as compared with 1,470,000 tons during June.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market was more active during the past week than for some time. One lake furnace interest sold 7000 to 8000 tons of foundry and malleable iron, mostly the former, in lots of from a carload up to 1000 tons. Another Cleveland interest sold 5000 to 6000 tons during the week, including 2000 tons of No. 2 foundry iron for prompt shipment at $20 to an Ohio pipe foundry and 700 tons of gray forge iron at the same price. One Valley furnace which has stiffened up somewhat on prices reports the sale of two lots aggregating 200 tons at $21. Sales reported include 1000 tons of malleable iron taken by a Detroit consumer. The spurt in buying is attributed to the fact that some foundries have run out of iron. There is no indication that the increased activity will keep up, as few inquiries are now pending. The only inquiries of any size reported is one for 250 tons of foundry iron from the Union Radiator Co. and one for 500 tons of malleable iron. The basic iron market is quiet and the price has not yet been established at $20, which is being quoted by several producers. Basic iron held by brokers can be purchased at $19 and probably at $18.50 or lower. Some of the Southern producers are a little firmer on foundry iron and small lot sales were

reported at $19, Birmingham, for 1.75 to 2.25 for silvery iron. The usual differential now named by Southern producers for 2.25 to 2.75 silicon iron is 50 cents. The Hanna Furnace Co. will blow in its Cherry Valley furnace at Leetonia, Ohio, Sept. 7, on basic iron.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.46 to $20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.37
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	36.00 to 36.25

Semi-Finished Steel.—Sheet bars are commonly quoted at $30, Youngstown. Sheet mills are buying only in small lots to take care of orders on their books. While slab prices are not as clearly established as sheet bars, it is understood that a Youngstown mill will quote $29 on slabs, making the usual $1 differential below sheet bars.

Finished Iron and Steel.—Following an improvement in orders noted a week ago, the demand for finished iron and steel fell off during the past week, but the total volume of business during August will show a fair gain over July. Buying is almost wholly in small lots for immediate delivery to replenish stocks. Keen competition has resulted in further price concessions. Steel bars, which for some time resisted efforts of buyers to force prices down, have finally weakened and can now be bought at 1.65c., although some mills are still quoting 1.70c. to 1.75c. Plates, on which competition is sharpest, have further declined, 1.70c. now being the common quotation as compared with 1.75c. a week ago, but a buyer can secure a 1.65c. price on a round lot order. On structural shapes, minimum quotations range from 1.70c. to 1.75c. Hard-steel reinforcing bars are quoted at 1.65c. to 1.70c. Building work shows some improvement. The American Bridge Co. has taken a warehouse at Manistee, Mich., requiring 1000 tons. Cleveland has taken bids for four school buildings requiring 900 tons of structural material and Elyria has taken bids for two school houses requiring 400 tons. The Cuyahoga County Commissioners, Cleveland, have taken bids for a bridge requiring 180 tons, and bids have been taken for the Eagles' office building, Alliance, requiring 300 tons. Inquiry is out for a stadium for the Detroit baseball park requiring 500 tons of structural material and 200 tons of reinforcing bars. Some price shading is reported on plain wire, but nail prices are reported firm.

Sheets.—The demand for sheets has quieted down and prices have weakened. Common quotations low are 2.75c. for black sheets, 2.25c. for blue annealed and 3.75c. for galvanized sheets, these apparently being minimum quotations.

Warehouse Business.—Jobbers have again reduced prices $3 a ton on blue annealed sheets and $5 a ton on galvanized sheets. Other warehouse prices are unchanged.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Coke.—Sales of foundry coke are still limited to car lots. Quotations on standard brands of Connellsville foundry coke range from $4.25 to $4.75 at oven, with most producers asking $4.50.

Bolts, Nuts and Rivets.—Manufacturers report an improvement in small lot orders for bolts and nuts. Consumers, however, are apparently buying only enough to take care of their regular requirements and orders from jobbers are for small lots to round out their stocks. Prices appear to be holding somewhat better than they have been recently. Prices on semi-finished hexagon nuts show some irregularity. The leading local producer is still adhering to 2.50c. for structural rivets and 2.60c. for boiler rivets and reports some carlot sales at these prices. Rivet quotations have appeared as low as 2.25c. for structural and 2.35c. for boiler for desirable orders.

Old Material.—Mills are buying small lots of scrap that they can secure at their prices and in the aggregate consumers have purchased during the past week or two considerable material in heavy melting steel, compressed steel, borings and turnings. Present prices are regarded as low as compared with pig iron prices and some consumers are evidently using more than the usual amount of scrap in their open-hearth furnaces. Dealers also are in the market for scrap for yard stocks. However, the supply is light and the market has a firm undertone. Some dealers believe that should a mill come into the market for a round tonnage of heavy melting steel, the price would jump to $15. Quotations are unchanged.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails, under 3 ft	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.00 to 8.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Philadelphia

PHILADELPHIA, Aug. 30.

The price tendency seems to be as follows: Raw materials, such as pig iron and old material, upward, and finished steel, downward. Some furnaces have raised pig iron prices 50c. during the week and another similar advance is contemplated by some after Labor Day. The market is settled at present at either $19.50 or $20 for No. 2 plain, the latter being the more general figure. No sales have been noted at less than $19.50 during the past week. A sizable inquiry for next year delivery has come into the market, though skepticism is expressed as to whether any furnace will quote so far in the future.

Very little business has come forth in finished steel and all who quote nominal prices admit that an attractive tonnage would bring out some vigorous cutting by the mills. Bids will be opened next month for 1000 tons of steel for a theater in Philadelphia. One inquiry calls for 2000 tons of plates to be made into storage tanks for an oil company. The railroads are among the chief buyers for car repair work, but only for small tonnages.

Pig Iron.—Price tendency is still upward, as more furnaces quote $20 for No. 2 plain and less name the $19.50 figure. One furnace which has been an active seller, parting with considerable iron at $18.50 two weeks ago, is now asking $19.50 and seriously contemplates a raise to $20 after Labor Day. Two reasons are advanced for the stiffening of the market: One, because the recent flurry of business has satisfied furnaces for the time being; the second, because sellers are convinced that as much iron will be sold under higher prices as under lower at this time. It is expected that the next two weeks will see less business, as is natural after a flurry like that of the past two weeks. One merchant disposed of 6000 tons of foundry iron last week, one being a sale of a 2000-ton lot, another of a 1000-ton lot, the rest in smaller amounts. There are two current inquiries for 400 tons of No. 1X, each, one from Reading and the other from New Jersey. One inquiry for 1000 to 1500 tons of foundry iron comes from a consumer in northern New Jersey, who recently bought iron for the remainder of the year delivery, this additional inquiry specifying delivery the first quarter of next year. It is not believed that furnaces will quote for so long in the future. No recent sales have been made of basic, though sellers claim that $19, furnace, would be insisted upon. A car of gray forge was sold at $19.50, furnace, the seller admitting that $1 lower might be named on a larger tonnage. Sellers find some relief in the fact that the market has become so stabilized

that there are practically only two market prices: $19.50 and $20 for No. 2 plain and $20 and $20.50 for No. 2X. An Eastern merchant furnace which has been continuously in blast all this year has received since June 15 about twice as many orders as were taken during the entire period from Jan. 1 to June 15, and the tonnage sold since June 15 is three or four times that sold from Jan. 1 to June 15. This furnace has shipped about 4500 tons of iron within the past week and during the past four weeks its shipments have averaged close to 1900 tons a week. In the preceding month, the shipments from the same furnace averaged slightly over 1000 tons a week. These figures illustrate the gain in pig iron buying in the East within the past few weeks.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.84 to 21.76
Virginia No. 2 plain, 1.75 to 2.75 sil.	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	29.24 to 29.74
Basic deliv. eastern Pa.	19.00
Gray forge	20.00 to 21.00
Malleable	20.00 to 21.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—A sale of 60 tons of British ferromanganese was made Tuesday at $65, Baltimore, which price represents the market for imported material. Domestic producers strive to get $65, furnace, for this material, which means $70 or $75, delivered, depending on the destination. Spiegeleisen is generally quoted at $27. Inquiries and orders are increasing.

Semi-Finished Steel.—Recent sales in small quantities have established the prices of $30 for rerolling billets and $35 for forging quality, Pittsburgh. Sellers state these prices would be shaded in case of attractive tonnages.

Plates.—Though 1.85c., Pittsburgh, is nominally quoted universally, all admit that attractive business would bring out considerably lower figures. One maker names 1.75c. for sales in carloads and 1.85c. for less tonnages. Plates were bought by a railroad at 1.75c., eastern Pennsylvania mill, the practice of disregarding the Pittsburgh base becoming more popular as a means of shading prices. The Philadelphia & Reading bought 200 tons of plates recently and is now inquiring for 135 tons of tank plates. The Petroleum Iron Works is asking for 2000 tons of plates to be made into tanks for the Sinclair Oil Co. Some Southern railroads, including the Chesapeake & Ohio, the Norfolk & Western, the Western Maryland and the Seaboard Air Line, have been asking for car repair material, including plates, the last-named road to open bids on 400 tons of steel during the first week of September. It is estimated that the Stanley Theater in Philadelphia will take 150 tons of plates and that a bridge in Trenton, N. J., will need a fair tonnage.

Structural Material.—There is considerable future business in sight, judging by the data being gathered by architects and builders. The Stanley Theater, Philadelphia, will need about 1000 tons of steel, bids to be opened Sept. 15. The Southard Street bridge at Trenton, N. J., will require 540 tons of steel, bids to be opened Sept. 6. Those who have quoted 1.85c. for shapes have lost the business to competitors willing to make concessions. The practice of quoting f.o.b. eastern Pennsylvania mill is prevalent.

Warehouse Business.—Small price cuts have been made in four items, including iron bars. Inquiries and orders are fairly satisfactory, considering the depressed state of the steel industry.

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4.20c.; squares and hexagons, cold-rolled steel, 4.70c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Bars.—There is not so much softness as in the case of plates and shapes. The openly quoted price is 1.75c., Pittsburgh, though worth-while business would be transacted at 1.70c. There is better demand for reinforcing bars than for plain. The marine terminal at Wilmington, Del., will need 2000 tons of reinforcing bars, it is reported, an inquiry for 210 tons being now in the market. Railroads are the chief buyers for repair puposes.

Sheets.—Actual sales have established 2.25c., Pittsburgh, as a price for blue annealed sheets, with black quoted at 2.75c. A consumer who claimed he could buy the former at 2.15c. was glad to cover at 2.25c. Galvanized sheets are quoted at 3.75c.

Bolts, Nuts and Rivets.—The volume of inquiries is improving, the chief business being from railroads, particularly the Philadelphia & Reading. An attractive tonnage is expected to be asked for the marine terminal at Wilmington, Del.

Old Material.—The present is a restricted market—there are few buyers but rising prices. Though some heavy melting steel was purchased by a steel mill for $11.50, this comparatively low price was the result of the close proximity of the material to the plant. Otherwise higher prices would have been paid. The higher prices being paid by a prominent New York broker have had the effect of making the price tendency upward. The price of bundled sheets was raised 50c. when a company paid $9, delivered. Four hundred and fifty tons of relaying rails was purchased for the marine terminal at Wilmington, Del., for $38.

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.00 to 9.50
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Fabricating in Transit Privilege Approved

BIRMINGHAM, ALA., Aug. 30.—The Southeastern Freight Rate Committee to-day approved the fabricating in transit privilege on steel fabricated in Birmingham and other Southeastern points and recommended that all Southeastern carriers at once publish the same. Users of Pittsburgh and Youngstown steel will save $4 to $8 a ton. Chattanooga, Atlanta and other cities also get the privilege. The Louisville & Nashville and Southern railroads recommended this action to the freight rate committee.

Large Plate Tonnages Pending

YOUNGSTOWN, OHIO, Aug. 30.—District makers are figuring on two inquiries for plates aggregating 20,000 tons. Mexican oil interests are seeking 17,000 tons and the Baldwin Locomotive Co. the remainder. It is expected the larger tonnage will test the plate market and establish substantially lower prices than current quotations in case the business is placed.

The Cambria Steel Co. last Friday night turned on the blast at one of its idle blast furnaces at the Franklin works, Johnstown, Pa. This gives the company three active furnaces out of 11. It is stated that the putting on of this furnace was necessary because it was desired to build up the stocks of Bessemer steel. The Bessemer plant and a 48-in. blooming mill went on this week.

Steel Makers Heard in Metal Tariff

(*Continued from page* 539)

eastern steel plants at prohibitive prices. This is due to the high freight costs which will necessarily be charged.

"3. The Washington producer does not need protection to insure prosperity. The fact that the Washington production increased from 715 tons in 1916 to 222,000 tons in 1920 with magnesite on the free list is sufficient proof of the above statement.

"4. A heavy duty on magnesite will certainly tend to force steel makers to use dolomite as a refractory and the use of magnesite will tend to decrease.

"Ferrosilicon is mentioned especially as showing the very high duties proposed on some of the ferroalloys. At present the price of a domestic 50 per cent ferrosilicon is $60 per gross ton at Ohio points. A 50 per cent ferrosilicon means that it contains 50 per cent of silicon, therefore, a gross ton contains 1,120 lb. The duty proposed in the bill is 2½c. per lb. of silicon or for this grade, a duty of $28 per ton is proposed. This is nearly 50 per cent of the present selling price.

Iron and Silica Abundant Everywhere

"The materials entering into ferrosilicon are iron and silica, which are both abundant in all parts of the world. While a moderate duty might be advisable, we believe one that approximates 50 per cent of the selling price is excessive."

General Statement by John A. Topping

CHAIRMAN John A. Topping of the Republic Iron & Steel Co., spoke for the following independent manufacturers of steel:

Republic Iron & Steel Co.
Bethlehem Steel Co.
Midvale Steel & Ordnance Co.
Youngstown Sheet & Tube Co.
Jones & Laughlin Steel Co.
Brier Hill Steel Co.
Pittsburgh Steel Co.
Sharon Steel Hoop Co.
Interstate Iron & Steel Co.
Lackawanna Steel Co.
Gulf States Steel Co.
Inland Steel Co.
Lukens Steel Co.
Wheeling Steel Corporation.
Steel & Tube Co. of America.

Below is given Mr. Topping's statement nearly in full. Accompanying data as to foreign and domestic wages in iron and steel works, and rail and water freights on finished products will be published later.

As to the importance of the interests I represent, it is common knowledge, that the Iron and Steel business is the largest single industry in the world. The census report of the United States for 1914 credits the Steel Industry with a capital investment of nearly $4,300,000,000, with an annual payroll of over $723,000,000, and a total value of products of $3,223,000,000. Since 1914, under the stimulus of war demand the steel ingot capacity of this country was increased from about 40,000,000 tons to 55,000,000 tons, or an increase of about 37 per cent. Calculated on this increase, the present total number of steel employees, under full operations, would closely approximate 1,500,000 people, with an annual payroll of close to $1,000,000,000, based on the 1914 wage rates. This total payroll however, calculated on present wage rates, would bring the total annual wage disbursements to approximately $1,500,000,000, and the total value of products to approximately $3,500,000,000. As a result of this rapid growth in production, which was over-stimulated by war requirements, it is commonly agreed that the present productive capacity of the United States is in excess of its normal requirements. Therefore, if labor is to receive full employment hereafter, it will not only be important for us to maintain home demand at 100 per cent, but to seek an outlet for part of our surplus production in foreign markets. To make such a program possible, it will be necessary to minimize our cost of production in every possible manner, and to do this it will require the fullest co-operation, not only of capital and labor, but of the Government, the railroads and the shipping interests, if we are to hope for any success in foreign fields.

Must Export 20 Per Cent of Steel

During recent years the average export tonnage sold of iron and steel represented about 10 per cent of our total output. I think under conditions at home, it will now be necessary for us to export 20 per cent of our present capacity. These figures, I believe, are conservative, and seem to me to emphasize the importance of making every possible effort, Governmental and otherwise, for the protection of domestic trade, and for the promotion of foreign trade.

The steel manufacturers, when they discussed informally schedule 3 with the sub-committee of the Ways and Means Committee of the House of Representatives, indicated our willingness to accept both a classification and rates of duty under schedule 3 which averaged somewhat below the Payne-Aldrich schedule, but clearly stated that in so doing we must have the Payne-Aldrich free list unimpaired in the new tariff schedule, and must have as a further measure of protection some reasonable provision against dumping and other unfair practice, and also that provision should be made for reciprocity agreements for the encouragement of foreign trade.

We are strongly opposed to a number of paragraphs under several schedules of H. R. 7456, but we are in full accord with many of its general provisions. We are opposed to paragraph 1680 of schedule 15, and ask that this item be stricken out, and that barbed wire be placed where we think it properly belongs under schedule 3 and made dutiable, for the reason that there is no more justification for placing barbed wire on the free list than there would be to put any other finished iron and steel products on the free list.

We are strongly opposed to the provision of schedule 1, paragraph 47, and schedule 2, paragraph 207, also paragraphs 302, 386, 389 and 390 of schedule 3.

Our principal objection to these paragraphs is, that increased taxation is proposed on imports of these raw materials, which will materially increase our cost of production. While the cost per ton of steel, as influenced by the various items required for steel manufacture referred to in the paragraphs mentioned, might appear to be insignificant, yet they bulk large when the cumulative influence of these cost additions is considered as a total. In fact, the total increased cost, if imposed, will seriously weaken our competitive position.

We estimate, in other words, that iron and steel costs, by reason of the proposed tax on our raw materials, will be increased by the sum of approximately $24,000,000 per annum, estimated as follows:

	Annual Requirements	Proposed Tax	Tax Per Annum
Ferrosilicon 57% ad valorem.....	80,000 tons @	$37.05 per ton	$2,964,000
Fluorspar	300,000 tons @	5.00 per ton	1,500,000
Manganese ore 48%	750,000 tons @	10.75 per ton	8,062,500
Magnesite	150,000 tons @	10.00 per ton	1,500,000
Pig tin	61,949,922 lb. @	.02 per lb.	1,238,998
Zinc (first two yrs.)	426,986,416 lb. @	.02 per lb.	8,539,728
Total tax			$23,805,226

In addition to these items, further cost additions will be made on account of the proposed tax on lead. Considering the amount of lead used for roofing plate in the steel industry, the increase will add substantially to our total cost.

Aside from all questions of cost, these proposed taxes are inequitable, and cannot be supported or justified for the following reasons:

Fluorspar

Schedule 2, paragraph 207, is a mine or quarry product, the domestic supply of which principally comes from southern Illinois and northern Kentucky. This product is likewise an item of substantial importation, being imported largely by the Central Western and

Eastern steel manufacturers. The Illinois and Kentucky product, however, finds a market principally in the Central West, and other points distant from the seaboard. On account of the distance of these mines from the seaboard, and the protection which they enjoy by way of inland rates of freight, they are in no danger of foreign competition; in fact, the fluorspar interests have prospered heretofore under free trade, and there can be no possible reason for taxing the steel producers of the East at the rate of $5 per ton, or as an alternative force Eastern manufacturers to go West to obtain their fluorspar supplies, at an increased freight cost, which in many cases would exceed the amount of the duty proposed.

Magnesite

Magnesite is also a mine product, and is prepared for use by calcining or burning, the process of treatment being similar to that in the preparation of cement rock for use. Magnesite is also largely used in the manufacture of magnesite brick, paragraph 201, schedule 2. As to the fabricated magnesite or brick, the rate on this product should be relative to the duty allowed on other grades of fire brick. There can be no justification, however, for a duty on magnesite of $15 per ton, with a compensatory duty on the brick of $15 per ton, plus 10 per cent ad valorem.

The magnesite industry, like fluorspar, has prospered under free trade. The only known deposits of carbonate of magnesia, which is the rock required for calcining, and which after treatment, is called magnesite, are found in the States of Washington and California. A large business during the war was developed by the quarries in these States, and there can be no question of their ability to meet foreign competition in their natural markets, which would be St. Louis, Chicago, Pueblo and other western points where steel works are located. It would be practically impossible for imported magnesite to successfully compete with the Western producers, on account of the excessive cost for rail carriage from the Atlantic seaboard inland. This freight rate from seaboard to Chicago and St. Louis averages approximately $10 per ton, and to that extent serves as a protective tariff. But all questions aside, why should quarried burnt rock, which carries a minimum of labor cost, require more protection than mined coal, when coked, which carries a much higher labor cost in its treatment, or why should the output of a magnesite mine be entitled to any more protection than is accorded the output of an iron mine? In fact, with the general products of all of our mines and quarries on the free list, and consistently free of duty heretofore, under Republican tariff legislation, we fail to see any reason why these products should now be made dutiable.

We further claim that a duty on magnesite would be an unfair discrimination against the smaller producers of steel, in favor of the United States Steel Corporation and other manufacturers at Chicago, because these Western steel works would obtain their supplies from Western domestic mines, whereas the Eastern makers of steel would be compelled to import foreign magnesite or pay the equivalent increased cost, in the long haul from the Pacific coast to Atlantic seaboard.

The United States Geographical Survey published, under date of July 27, 1921, a statement of our domestic reserves of magnesite, the aggregate of which was 3,500,000 tons. At the present rate of consumption, this reserve will be exhausted in ten years. As one of the principal owners of this reserve is the Northwest Magnesite Co., the proposed duty will practically give it a monopoly of domestic supply of this important refractory.

Manganese

Manganese, heretofore on the free list, is even more difficult to justify now as a dutiable product. The only explanation given for the change in the schedule on manganese was recently stated on the floor of the House of Representatives, viz., that the proposed duty was for the protection of the miners in Arkansas, Montana, Georgia and Florida, but it was not stated on the floor of the House, why the miners of manganese in these States went out of business when the war ended. The reason was, not because of free trade in manganese, but because there was no market for domestic lean and high-silicon manganese ores, when the richer foreign products of Brazil, India and Russia were again available.

As a war measure, the steel manufacturers used everything and anything which would make steel suitable for Governmental purposes for the prosecution of the war. Our main idea was tonnage and service for war purposes. Cost of production was forgotten in the interest of output, but with the advent of peace economic reason quickly reasserted itself and forced the abandonment of domestic manganese ores, except for such uses as had always been our practice, of using these leaner ores for the production of spiegel. We maintain, that if the ferromanganese producer in this country is to prosper he also must have free manganese ores, or in other words have the same opportunity for obtaining and smelting the richer and cheaper ores found in foreign fields, as are available to his foreign competitor. The American producer of ferromanganese, in our opinion, is at no disadvantage with his English, Belgian and German competitors, because all these manufacturers of ferromanganese depend upon imported ores, principally obtained from India, Russia and Brazil, and the producers of ferromanganese in this country are at no more disadvantage in meeting competition than is the manufacturer of pig iron, whose industry rests largely upon domestic supplies of ore, and largely so at other points of manufacture in other parts of the world.

Ferromanganese, the product of manganese ore, is a blast furnace product, it is manganese in the pig form; in other words, it is only entitled to a relative duty to pig iron, and there can be no justification in placing a duty on ferromanganese, the finished product, relatively greater than that accorded pig iron. If this is done, based on a fair difference in cost above the metallic charge, which is about three and a half times that of pig iron which is rated for duty at $1.25 per ton, the maximum duty justified for ferromanganese would be $4.25 per ton, whereas it is proposed to tax this essential product for steel production at the rate of 2.2c. per lb. for the manganese content. or at the rate of $39.42 per ton.

The burden of this extreme tax on ferromanganese would be borne largely by the smaller steel producers of the United States, because our principal competitor, the United States Steel Corporation, owns its own manganese mines in Brazil, and also owns transportation facilities by water, and partially by land, and it manufactures its own ferromanganese from its own imported ores, because owing to its large consumption, it can afford not only to operate one but several blast furnaces for its requirements, whereas the smaller producer of steel would not consume enough ferromanganese to absorb the output of even one blast furnace; consequently the entire tax burden placed on ferromanganese would fall on him, because he must buy, rather than produce, his supplies.

Furthermore, the proposed tax on manganese ores, to any steel works importing the ores, would mean a tax on about 2.2 tons of manganese ores, the amount required to produce one ton of ferromanganese, or a total duty of approximately $23.65, whereas the smaller steel works buying the ferromanganese or finished material would pay a tax of $39.42, which in effect suggests a tax discrimination of $15.77 per ton in favor of the U. S. Steel Corporation and others who produce their own ferromanganese, which discrimination places the smaller steel works at a serious disadvantage.

Aside from all these questions of equity respecting taxes on manganese ore, it is generally conceded that our supplies of manganese ores are of exceedingly meager proportions, and lean in character, and if you place a prohibitive duty on manganese, you may force the consumer to use the domestic product, which will more quickly exhaust our reserves, and therefore, as a matter of conservation or broad Governmental policy, all of these minerals, such as man-

ganese ores, fluorspar and magnesite, should be kept on the free list, for the protection of our country in times of war, when outside sources of supply of these very essential materials required for steel production might be shut off.

Other Metals and Alloys

I particularly desire to emphasize my opposition to the ferrosilicon rate, because this item is one of large importance to the manufacturers of soft steel. The other alloys however, not specially mentioned by me, are of no less importance to the manufacturers of special steels. I do not believe it will be contended by the manufacturers of these alloys, that they employ relatively speaking either as much capital or labor as is employed by the manufacturers of steel, whose operations are more widely diversified and integrated; therefore, it is difficult for us to understand why these manufacturers of alloys need the protection they ask, or why they need even the ad valorem equivalent asked by the manufacturers of steel, which averages about 15 per cent, whereas the proposed alloy duties range from 45 per cent to 215 per cent.

As to pig tin, paragraph 386; zinc, paragraph 390, and lead, paragraph 389 of schedule 3, there can be no justification for increasing our import taxes on these products, from a protective standpoint at least. The smelting of tin ores in this country is an industry which was established on a free trade basis, and the only plants operating are located on the Atlantic coast and use imported ores. Inasmuch as tin smelters everywhere operate under equal conditions as to raw material supplies, there can be no justification for showing preferential treatment to this domestic industry, which has demonstrated its ability to live and prosper without protection.

What is true of pig tin is likewise true of zinc, lead or other raw materials, and any added cost for these materials, through increased taxation, will be directly reflected in the cost of galvanized fencing, wire, pipe, and sheet metal products generally, which are largely used on the farms, in housing construction and for household wares. Therefore, increased taxes mean increased cost of living to the great mass of our people.

Aside from these reasons, any increase in cost would be an added burden difficult to overcome, in maintaining competition for our exportable surplus, and will bear most heavily on the small steel manufacturers, because here, too, the United States Steel Corporation produces in part its own zinc supplies and imports both its pig tin and zinc in its own bottoms.

Labor Conditions

Briefly, referring to our labor and general cost conditions, I would state that owing to the upset conditions now existent throughout the world, it is rather difficult to obtain full data. I shall submit later some general information on this subject as a supplemental statement.

As a broad, general statement, however, it can be said that a day's labor in America will buy more than double the necessaries of life which can be obtained with a day's labor anywhere else in the world, and that notwithstanding recent reduction in labor costs which have taken place in the steel trade, our present wage scales in the steel industry are about 52 per cent higher than during the year 1913, while our average selling prices are only 33 1/3 per cent higher; although our cost for assembling raw materials, due to freight rate advances, are up over 100 per cent, so that to-day the selling price of pig iron at $20 per ton carries with it freight charges to the amount of $10.50 per ton. In fact, to-day, with pig iron selling at $20, the maker does not realize enough cash to return him the cost of his raw materials and freight bills, he being out of pocket as to labor cost and overhead. What is true of pig iron is likewise true of finished products made from pig iron under the iron and steel schedule.

Worst Depression in History

In other words, the iron and steel business to-day is suffering from the greatest depression it has ever experienced, and we must have cost relief in every conceivable direction. Not only must our raw materials be cheapened, but our transportation costs must be reduced, if we are to get back to normal business conditions. If our raw materials are taxed on the present schedule under H. R. 7456, we will not, owing to high costs, have adequate protection, and schedule 3 rates will have to be raised, as an alternative for taxed steel raw materials. In other words, you must give us free raw materials or increase our iron and steel schedule and revise generally the iron and steel classification.

It may be stated in this connection that the present world tendency is toward protective tariff measures, with strong preferential features. This is notably true of the British possessions, whose colonial tariffs give England a distinct advantage through imperial preferences in such important markets as Canada, Australia and South Africa.

In view of this situation we strongly indorse the bargaining clause of H. R. 7456, which empowers the President to negotiate reciprocal treaties for the promotion of foreign trade, where sufficient trade advantages can be obtained to justify tariff concessions by us.

We also heartily approve of the bounty clause in H. R. 7456 as a reasonable measure of protection to home industry against the unfair competition caused by foreign Governmental bounties in favor of foreign products.

American Valuation Favored

We strongly approve of the American valuation plan, as a prevention against fraud and under-valuation, and also because the American valuation plan provides for protection against the unfair competition brought about through a dislocation of rates of exchange, which rates are now from 25 per cent to 94 per cent discount below pre-war normal.

I would further state that without the protection of the American valuation plan, the rates of duty for iron and steel under schedule 3 of H. R. 7456 are not protective. We do not agree with the opponents of the American valuation plan, who have condemned this feature of H. R. 7456, and who claim the administrative features of the plan are not practical. We, on the other hand, believe the administrative features of this plan can be easily made operative without confusion, because we believe that it will be easier to obtain the necessary data for appraising market prices at home than it now is to obtain market prices in foreign countries.

Another feature of the American valuation clause to which I would call your attention is that under the present law of 1913 paragraph K requires that all appraisements shall be based on the actual market value and wholesale price of merchandise, at time of exportation, in the principal markets of the country from whence products have been imported, and when values cannot be satisfactorily ascertained, paragraph L of the law of 1913 provides that our appraising officers after having failed to obtain cost of production at place of exportation, may appraise such or similar imported merchandise at not less than such or similar products are actually sold or freely offered for sale in the usual wholesale quantities, in the United States in the open markets, less cost of transportation and insurance, subject to a deduction for commissions or profits not to exceed 6 to 8 per cent.

It would therefore appear that as a practical measure the present law recognizes American valuation when other methods of valuation fail, thus emphasizing our claim that American values are more easily ascertained than are values and costs in foreign countries. Therefore, why not apply the American valuation as a primary method of determining values, rather than as a last resort method, as the law of 1913 provides.

The iron and steel industry, both on account of its size and importance, as related to many other industries dependent upon it, has always been regarded as the key industry, and therefore, struggling as we are in our efforts to get back to normal, would it not be fatal to future prosperity to reverse our past tariff policy, which has given us free raw materials and prosperity, by a change so fraught with danger to business success as is now proposed?

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.75c. to 1.80c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.35 to $2.50
Large boiler rivets..... 2.45 to 2.60
Small rivets.....65, 10 and 10 to 65, 10, 10 and 5 per cent off list
Machine bolts, small, rolled threads.
70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer,
65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads..70 and 5 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts .....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....60 and 5 per cent off list
Larger and longer sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped..... 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts..... 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.
All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $40 to $42; chain rods, $40 to $42; screw stock rods, $45 to $47; rivet and bolt rods and other rods of that character, $40 to $42; high carbon rods, $48 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.50 to $2.60 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.60c. to 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	⅛ to ⅜	+ 1½	+ 27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+ 42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1¼ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.15	Nos. 11 and 12	2.35
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.45
		Nos. 15 and 16	2.55

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.45	No. 28 (base)	2.75
Nos. 22 to 24	2.50	No. 29	2.85
Nos. 25 and 26	2.65	No. 30	2.95
No. 27	2.70		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75	Nos. 25 and 26	3.45
Nos. 12 to 14	2.85	No. 27	3.60
Nos. 15 and 16	3.00	No. 28 (base)	3.75
Nos. 17 to 21	3.15	No. 29	4.00
Nos. 22 to 24	3.30	No. 30	4.25

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55	No. 28 (base)	2.75
Nos. 17 to 21	2.60	No. 29	2.80
Nos. 22 to 24	2.65	No. 30	2.80
Nos. 25 to 27	2.70	Nos. 30½ and 31	2.85

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Aug.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
24	.....12.00	11.62½	25.62½	4.40	4.20	4.65	4.15
25	.....12.00	11.50	25.50	4.40	4.20	4.65	4.15
26	.....12.00	11.37½	26.00	4.40	4.20	4.65	4.15
27	.....12.00	11.50	....	4.40	4.20	4.65	4.15
29	.....12.00	11.62½	26.25	4.40	4.20	4.62½	4.12½
30	.....12.00	11.62½	26.75	4.40	4.20	4.62½	4.12½

New York

NEW YORK, Aug. 30.

There is very little change in any of the markets. Buying of copper is light and prices are lower. The movement in tin has been of fair proportions. The lead market continues steady and firm. Demand for zinc is still very light and prices have again eased off.

Copper.—Copper has touched new low levels in the past week, electrolytic having sold for early delivery as low as 11.37½c., New York, or 11.62½c., delivered, but only from one or two sellers. Whether this is due to the recent tendency of some holders to convert metal into cash at the end of the month is not known, but it is probably the explanation. At any rate, very little metal is now available at lower than 11.75c., delivered, with the prevailing quotation for early delivery ruling at 11.87½c., delivered, or 11.62½c., New York. Inquiry is fairly large from various sources and it is probable that if buyers could obtain the metal at their ideas of prices a fair buying movement would result, but most producers will not sell below 12c., delivered. The market for Lake copper is entirely nominal.

Tin.—Steady sales of Straits tin are reported to have been made each day in the past week in a quiet way, so that the aggregate has amounted to a fair total. Most of these sales have been made by two importers with dealers and consumers the buyers. At certain times there was a firm desire on the part of some sellers to get rid of their tin in spite of an advancing market in London. Yesterday and to-day the market has been very quiet, buying being absent because of the higher prices. Spot Straits tin is quoted to-day at 26.75c., New York. The quotations in the London market were £156 10s. for spot standard, £158 15s. for future standard and £157 5s. for spot Straits, total sales amounting to 800 tons and the market reported strong. Arrivals thus far this month have been 2500 tons, with 3340 tons reported afloat. It is stated that one American consumer bought 1000 tons direct from the Far East.

Lead.—The market is quiet and firm. A steady business is reported both by the leading interest and by outside sellers. Quotations are unchanged, that of the leading interest being 4.40c., both New York and St. Louis, and that of the outside market 4.40c., New York, and 4.20c., St. Louis.

Zinc.—Demand for zinc is extremely light and, as the result of offerings by one or two interests, prices are lower and prime Western for early delivery is quoted and has been sold as low as 4.12½c., St. Louis, and 4.62½c., New York.

Old Metals.—The market is dull and very little business is being transacted. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.50
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Antimony.—The market is unchanged with wholesale lots for early delivery quoted at 4.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by the leading producer at 24.50c., f.o.b. plant, while the same grade from importers is held at 19c. to 20c., New York, duty paid.

Chicago

AUG. 30.—While there has been some buying of all of the metals except tin, it has been of a spasmodic character. Tin, lead and antimony have declined and spelter and copper are weak. No changes are to be noted in old metal prices. We quote in carload lots, tin, 27.50c.; lead, 4.30c.; in less than carload lots, antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 30.—There is almost no business reported. Lead is steady at 4.25c., carlots, and zinc is steady at 4.15c. We quote Lake copper at 12.48½c., to 12.73½c., carlots; tin, 26.86c.; antimony, 5.23½c. On old metals, we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

British Makers of High Speed Steel Protest

WASHINGTON, Aug. 30.—Representing a delegation of producers of high speed steel in Sheffield, England, Arthur Balfour of Arthur Balfour & Co. appeared before the Senate Finance Committee this morning and suggested a reduction in the rates proposed in the Fordney tariff bill. In paragraph 304, Mr. Balfour said he thought the rate of duty of 20 per cent proposed on steel valued above 40c. per lb. should be reduced to 10 per cent and in paragraph 305 suggested that a compensating duty of 72c. per lb. on tungsten content should be reduced to 35c. per lb. He claimed that if the proposed rates become operative, Sheffield high speed steel makers will have the American market, with which they have long been associated, entirely cut off. He also expressed opposition to American valuation. In mentioning the depressed condition of industry and increased costs in England, the reply made by Senator Smoot was that the same condition prevails here. Senator Smoot asked if English makers would be satisfied with a tariff representing the difference in labor cost and equalizing exchange. Mr. Balfour replied they would be, provided it is not made permanent and the high tariff did not remain in effect. He said the cost of making high speed steel in England is greater than in the United States and that he earnestly hoped trading with this country would be allowed to continue so as to aid industry as well as stabilize the exchange situation.

Nickel Plant Will Close

TORONTO, ONT., Aug. 29.—The huge smelter, mines, and works of the International Nickel of Canada will close down Sept. 1, for an indefinite period, according to official announcement made at the Coppercluff, Ont., office. Operations have been curtailed to a minimum for months past and the closing down announcement was not unexpected. Business depression and the resultant piling up of heavy metallic stock, due to lack of market, is given as the reason. Six hundred employees, nearly all old hands are affected. During the war, however, upwards of 2500 men were employed.

British Iron and Steel Market

Activity Increasing—Three More Furnaces Blowing—Continental Steel Competition Hurts

(By Cable)

LONDON, ENGLAND, Aug. 30.

Fourteen Cleveland blast furnaces are now blowing, a gain of three since last week, but the general pig iron position is unchanged. Hematite is more active and supplies are scarce, but makers are not anxious to re-light their furnaces until production costs are reduced. Continental basic iron is arriving in fair quantities at £4 5s. ($15.72) ex-ship Tees.

Improvement in the British steel position is evidenced by the starting up of several works. Orders have been placed here for 50 tank steamers; also, a large contract for passenger ships is pending. Baldwin's secured a rail order for China. Home trade quotations are unchanged, but export figures are easier.

Continental semi-finished steel prices are hardening, good tonnages of sheet bars having been sold at £7 to £7 5s. ($25.90 to $26.82) c.i.f. German merchant bars are quoted by the works up to £8 10s. (1.40c. per lb.) f.o.b. German galvanized wire is being sold at £15 15s. (2.60c. per lb.) basis, for No. 8 gage, cost and freight to Japan. German wire nails can be done at 22¼s. ($4.12) cost and freight to Japan per pikul keg for December shipment. French plates are held at £8 2½s. (1.34c. per lb.) f.o.b. Merchants have sold Belgian or German merchant bars, at seller's option, at £7 15s. (1.28c. per lb.) f.o.b., for October or November shipment. Belgian wire and sheet mill output is affected by strikes.

Tin plates are easier with cheaper fuel. Eastern buying continues in fair quantities, and is the main support of the market. Sellers are asking 23½s. ($4.35) prompt and 22½s. ($4.16) f.o.b. for forward shipment. War stocks of canned foods are now liquidated, except in meats, which Russia will probably absorb. Galvanized sheets are weak, small sales having been made at £20 10s. (3.39c. per lb.) f.o.b. Wales sold to Japan specifications black sheets at £19 10s. (3.22c. per lb.) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.70 per £1 as follows:

Durham coke, delivered	£1 15	$6.47
Cleveland basic	7 7½ & 7 10*	27.29 & $27.75
Cleveland No. 1 foundry	7 0	25.90
Cleveland No. 3 foundry	6 15	24.97
Cleveland No. 4 foundry	6 10	24.05
Cleveland No. 4 forge	5 17½	21.74
Hematite	7 0*	25.90
East Coast mixed	8 0 & 7 15*	29.60 & 28.67
Ferromanganese	18 0 & 14 10*	66.60 & 53.65
Rails, 60 lb. and up	10 10 to 14 0	38.85 to 51.80
Billets	8 0 to 8 10	29.60 to 31.45
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.60 to 31.45
Tin plate base box	1 2½ to 1 3½	4.16 to 4.35
		C. per Lb.
Ship plates	13 10 to 14 0	2.23 to 2.31
Boiler plates	18 0 to 19 0	2.97 to 3.14
Tees	13 10 to 14 10	2.23 to 2.39
Channels	12 15 to 13 15	2.21 to 2.27
Beams	12 10 to 13 10	2.06 to 2.23
Round bars, ¾ to 3 in.	12 10 to 13 10	2.06 to 2.23
Galvanized sheets, 24 g.	20 10 to 21 0	3.39 to 3.47
Black sheets	17 0	2.81
Steel hoops	17 0	2.81
Cold rolled steel strip, 20 g.	26 10	4.38

*Export price.

GERMAN COMPETITION

No Effort to Be Made to Sell in United States—Japanese Buying Largely in Europe

NEW YORK, Aug. 30.—Representatives of German interests in New York consider that competition in iron and steel with American manufacturers, except in a few special materials, is remote. The attitude of German mill interests since the armistice and at present is explained as one of "hands off" as far as competition in the United States is concerned. They believe that any success in such trade would be only temporary, as they would be stopped by cutting of prices by American mills and special tariff barriers enacted against German materials. Added to this, according to the men in close touch with German mills, manufacturers will soon be well filled with orders for several months. Within the past week a representative of a large German interest cabled a plate inquiry of about 1000 tons to Germany and was informed that no delivery could be promised under one year on plates, as the plate mill was booked solid.

With low-priced coal and the depreciated condition of the mark in international exchange, German production costs appear at a minimum. But as coal shipments to France and Belgium in accordance with the terms of the reparations agreement are based upon the internal price of coal in Germany, an effort is being made by the Government to bring this price up by taxation. The mark is also considered by Germany to be too low in value, and an effort is being made to bring the value up to about 10 per cent of the pre-war or par value, which would be about 2.40c. per mark instead of the current rate of about 1.30c. With the value of the mark increased and coal increased in price, German prices will be considerably higher, and as the mills are rapidly filling up with orders, poor deliveries, it is held, will tend to lessen German competition in foreign markets.

While German interests at present have no intention of attempting anything resembling aggressive selling in the American market, representatives of foreign interests believe that some effort may soon be made to sell ore and other raw materials in this market when there is some recovery from the present depressed condition. At present German prices and under the prevailing exchange rates, it is stated that 60 per cent low phosphorus iron ore from German-owned Swedish fields can be put down on the Atlantic seaboard at about $6.50 per ton, and an effort may be made to sell to furnaces that are not too far inland. It is also stated that German ferromanganese can be imported to sell at $64 per ton, Pittsburgh. With a recent reduction of about 20 per cent on Swedish bar iron, high speed steel, etc., it may be possible to import some Swedish material profitably.

The Japanese market is dull, with prices of iron and steel at a low level. Much of the buying of iron and steel in Japan is being done in Germany, Belgium and other Continental markets, according to reports received by Japanese branch export houses in the United States. It is estimated by some Japanese exporters that as much as 80 per cent of the current purchases of iron and steel items are being made in Europe, with the remaining 20 per cent coming to the United States.

Among recent export sales may be mentioned about 2000 boxes of tin plate, several hundred tons of wire nails to South America, and a round lot of skelp to Europe.

For supplying information on the Peruvian import market, a Peruvian General Information Office, Calle de San Pedro 370 (Altos), Lima, Peru, has been opened by Profs. J. B. and J. A. de Lavalle, the former a lawyer and the latter an engineer. Charges will be made for information supplied, depending on the importance and the technical work required and covering such matters as the examination of industries and the handling of buying and selling. Luis Ibarra, Cinco de Mayo No. 10, Mexico, D. F., is interested in tractors, agricultural implements and road-making machinery, and wishes to receive catalogs and prices on this type of machinery, quoted f.o.b. New York.

Machine Tool Builders' Convention in October

The annual convention of the National Machine Tool Builders' Association will be held Oct. 18, 19 and 20 at the Hotel Astor, New York.

PERSONAL

Carl F. Dietz, vice-president and sales manager of the Norton Co., Worcester, Mass., has resigned to become president and general manager of the Bridgeport Brass Co., Bridgeport, Conn. He will finally sever his connection with the Norton Co., Oct. 1, when he will assume his new duties at Bridgeport. He succeeds as president Fred J. Kingsbury, of New Haven, who wishes to be relieved of some of his responsibilities and becomes chairman of the board of directors. Mr. Dietz will also be general manager. He has been connected with the Norton Co. for 10 years, first as plant engineer, then as assistant sales manager, and afterward as sales manager of the wheel division of the business, and two years ago when the Norton Co. and the Norton Grinding Co. were consolidated he was made vice-president and sales manager. He was born in New York, Feb. 12, 1880, and was graduated from Stevens Institute of Technology in 1901, and subsequently took post graduate courses in the Royal Technical College, Berlin, in sciences, metallurgy and mining. Early in his career he was employed for three years at plants of the United States Steel Corporation, largely in blast furnace operation and large gas engine installations. In 1905 he engaged in development of zinc-smelting processes, and later operated a mining lease in Utah, installing a dry method for concentrating lead-silver ores. He designed and built modern ore-milling plants for the American Glue Co., as a part of its sandpaper factory at East Walpole, Mass.; Grunelli Chemical Co., Park City, Utah, where the separation of iron and zinc sulphides was the problem; and the Ozark Smelting & Mining Co., Magdalena, N. M., where zinc ore required concentration for paint making. In 1908 he joined the Minerals Separation, Ltd., London, as consulting engineer and in the interest of this company developed treatment methods at the Dunderland iron ore deposits in Norway, north of the Arctic Circle, and studied ore treatment methods for properties in Russia, Bolivia, Australia and Africa. He put into operation the San Francisco del Oro mines in Mexico, yielding complex lead and silver ores. He is a member of the American Society of Mechanical Engineers and the American Institute of Mining and Metallurgical Engineers.

Vice-President William Le Coste Neilson, foreign sales manager of the Norton Co., with headquarters in London, who is now on his way to the United States, will succeed Carl F. Dietz as sales manager of the Norton Co.

Robert B. Moir has been appointed manager of the New York branch of the W. A. Jones Foundry & Machine Co., Chicago. He will assume his new duties immediately, making his headquarters at the present sales office and transmission warehouse of this company at 20 Murray Street. Mr. Moir has been actively connected with the home office and factory for several years.

F. C. Wiese is organizing the sales department of Amplex, Inc., importer of S&N beam shears, solid steel frame combination punches and shears and Hercules angle bending machines. R. Bauer, formerly with Joseph T. Ryerson & Son, has been placed in charge of the metropolitan district.

H. E. Mandel has severed his connection with the Lindsay Chaplet & Mfg. Co., and is now general manager of the Pennsylvania Foundry Supply Co., Philadelphia.

The Columbia Steel & Shafting Co., Pittsburgh, announces that effective Sept. 1, Harwell C. Booth, has been appointed district manager of sales for New York, succeeding Edward T. Corbus, who will assume important duties elsewhere for the organization. Mr. Booth has been associated with the cold finished steel industry for a considerable period and during the last few years has been identified with this company as sales representative in Connecticut and eastern New York.

L. Norris Hall, vice-president Pennsylvania Steel Export Co., and W. W. Baker & Co., has resigned from both companies to take effect Sept. 1, and has leased a concrete warehouse at 940 North Front Street, Philadelphia, where he expects to engage in the steel jobbing business. Prior to joining the export company he served about 16 years in the Philadelphia sales office of the Carnegie Steel Co.

Frank Johnson, automotive engineer, has joined the engineering staff of the Cadillac Motor Car Co., Detroit.

At a recent meeting of the board of directors of the Hurley Machine Co., Chicago, the number of vice-presidents was increased from three to five, Edward N. Hurley, Jr., and James A. McCoy being elected to the two vacancies created. John Proudfoot, formerly assistant treasurer of the company, was elected treasurer to succeed Mr. McCoy.

F. Baackes, vice-president and general sales agent American Steel & Wire Co., Chicago, announces the appointment of H. S. Durant as sales agent and M. W. Floto assistant sales agent at the Detroit office of the company, to succeed M. Whaling and T. J. Usher, Jr., resigned.

Arthur Balfour, of Arthur Balfour & Co., and Peter Macgregor, of Sanderson & Newbould, both well-known steel manufacturers of Sheffield, England, are now in this country on a business trip.

Howard A. Coffin, formerly secretary of the Detroit Pressed Steel Co. and manager of that company's Disteel wheel division, has been elected vice-president of the White Star Refining Co., manufacturer of lubricants, with a plant in Detroit and a fuel storage warehouse in Ecorse, Mich.

J. J. Dale, president Dale Machinery Co., New York and Chicago, has removed his place of residence to the latter city. He will continue to divide his time between his Chicago and New York stores, and the latter, as heretofore, will remain the head office of the company.

Prof. A. A. Aagaard has been appointed assistant professor of steam and gas engineering in the College of Engineering, University of Wisconsin.

K. E. Steinhauer, attorney for the Federal Trade Commission, and H. G. Pickering, attorney for the Western Association of Rolled Steel Consumers, spent two days in St. Louis last week, collecting evidence for the commission's hearings in September on the Pittsburgh plus plan. Local manufacturers and fabricators were interviewed.

Ira N. Hollis, president Worcester Polytechnic Institute, Worcester, Mass., has returned to that city following a trip abroad. Dr. Hollis went to London as one of the delegation from the engineering societies of the United States chosen to present the John Fritz medal to Sir Robert A. Hadfield.

R. W. Andrews who has been with the Fairbanks Co. for the last seventeen years, the past year and half as manager of the branch at Rochester, N. Y., has resigned and is contemplating going into business.

D. D. Lewis has been appointed general manager of the Carroll Foundry & Machine Co., Bucyrus, Ohio. Mr. Lewis was formerly general manager of the Southward Foundry & Machine Co., Philadelphia, and also served as general manager of the Buckeye Engine Co., Salem, Ohio. He had also been identified at times with the Cambria Steel Co., the Jones & Laughlin Steel Co. and the Algoma Steel Co. He was associated with the late Tom L. Johnson when the latter built the Johnson steel plant at Lorain, Ohio. W. E. Matthew, who has been general secretary and manager of the Carroll company for the past year, will devote his time exclusively to the Lambert boring mill branch of the company's business and will continue to act as secretary of the company and as a member of the executive committee.

J. C. Ward, Sheffield, England, president Edgar Allen Steel Co., Inc., Chicago, and a managing director of Edgar Allen & Co., operating the Imperial Steel Works at Sheffield, is now in the United States.

Samuel Mather and W. G. Mather, Cleveland, sailed for Europe Aug. 24.

Chas. H. Kittenering, president Defiance Machine Works, Defiance, Ohio, has been appointed special representative in the United States to act for the Chinese Government in the purchase of machinery to be used in various development projects in China, including railroads, water power, canals, telegraph, etc. The Kettenering interests had previously been selected to supply motor trucks and transportation equipment for China. It is stated that a large part of the equipment required will be supplied by the Defiance Machine Works, Defiance Motor Truck Co. and the Highway Engine Co. of Defiance.

Sydney Jessop Robinson, of William Jessop & Sons, Sheffield, probably the most frequent visitor to the United States among British steel makers in the past 25 years, arrived in New York last week for a stay of three or four weeks.

OBITUARY

BENJAMIN H. JONES, president Smith & Davis Mfg. Co., St. Louis, metal beds, died in that city on Aug. 22 of a complication of blood poisoning and pneumonia after an illness of three weeks. He was 64 years old. He had been with the Smith & Davis company since he was 12 years old.

FRED ABBOTT DEXTER, founder of the Leavitt Machine Co., Orange, Mass., valve reseating machines, etc., died Aug. 26 at his home, aged 58 years.

PERCY M. FOWL, 37 years old, president Cadillac Tool Co., Detroit, died on Aug. 24, at Harper Hospital, that city. He was born in Elyria, Ohio, and went to Detroit in 1907. He was employed at various times by the Ford Motor Co., the Burroughs Adding Machine Co., and later was Detroit manager for Strong, Carlisle & Hammond. He became president of the Cadillac Tool Co. in 1917.

FRANK J. SMITH, district engineer, American Can Co., Chicago, died Aug. 21, at his home in Oak Park, Ill., aged 44. The first oil pipe line across the Panama Canal was constructed under Mr. Smith's supervision. He later had charge of the establishment of pipe lines and storage tanks in Venezuela and Cuba.

DANIEL SOLLINGER, aged 63 years, died at his home in Chicago on Aug. 24. His entire life had been spent in the iron and steel business. He was early employed at the Wyandotte Rolling Mill Co. and later at the old Bridgeport rail mill of the Illinois Steel Co. For more than 20 years he was in the employ of Robert W. Hunt & Co., engineers, Chicago, for most of which time he was in charge of inspecting rails at the South works of the Illinois Steel Co.

MICHAEL KENNEDY, secretary and treasurer Shenango Machine Co., Sharon, Pa., died at his home in that city Aug. 23. He was 53 years old and a native of Stoneboro, Pa. He took an active interest in politics and was a member of the Pennsylvania legislature during the 1909-10 term.

PETER COOPER HEWITT, scientist and inventor, died in Paris Aug. 25. He was born in New York Mar. 5, 1861, and educated at Stevens Institute and at the Columbia School of Mines. His inventions covered many fields, including evaporators, centrifugal machines, automotive details, the Cooper-Hewitt mercury vapor lamp, the static converter or rectifier, the electrical interrupter or circuit breaker, a wireless receiver, helicopter, etc. He was for a number of years vice-president of the Pequest Co., which operated the Pequest furnace at Buttzville, N. J. This furnace was built in 1874, and was dismantled a few years ago. Mr. Hewitt was a director or trustee of many enterprises, and a member of many societies and clubs, including the Engineers' Club of New York. He was a son of Abram S. Hewitt, formerly mayor of New York, member of Congress and well-known iron master of Civil War and later days, who, in an address made when the members of the Iron and Steel Institute came from England to visit the United States in 1890, predicted the doubling of the output of American pig iron every ten years.

FRANK D. MOFFAT of Frank D. Moffat & Co., New York, and New England agent for the Atlas Steel Casting Co., and the Bay City Forge Co., died at the Hotel Vanderbilt, New York, Aug. 20. His death followed a brief illness upon his return from abroad recently. He was 61 years of age and had been identified with the pig iron and coke business for many years.

ALBERT H. CHILDS, retired iron broker, died Aug. 26, at his summer home near Port Hope, Ontario. Mr. Childs was 82 years old. He was born in Pittsburgh and received his early education there, afterward going to Yale. Returning to Pittsburgh, he engaged in the iron brokerage business, from which he retired several years ago.

EDWARD A. CRAIG, manager of the export department, Westinghouse Air Brake Co., died Aug. 28, at his home in Edgewood, Pa., after a brief illness. He was born in Allegheny, Pa., 48 years ago and as a boy entered the employ of the Westinghouse Air Brake Co. as a messenger. He later became secretary to the general superintendent of the plant then located at Allegheny, then became assistant auditor, then auditor, and later manager of the southeastern district. About two years ago, when the company organized its export department, he was appointed its manager. Recently he had been appointed president of the Westinghouse Pacific Coast Brake Co., and Pacific Coast district manager of the company. It was while preparing to assume that position that the illness which resulted in his death overtook him.

JAMES SWEENEY, until 1919 treasurer of the W. H. Sweeney Mfg. Co., nickel-plate ware, Brooklyn, N. Y., died at his home in that city Aug. 23. He was born at Napanee, Ont., Canada, March 3, 1847. He retired two years ago, taking up the treasurership of the Sweeny Realty Co.

LOUIS J. GOLDMAN, president of the Cincinnati Electrical Tool Co., Cincinnati, died at his home in that city Aug. 22, aged 71. He was a national figure in Jewish activities. A son, J. Albert Goldman, is treasurer of the Cincinnati Electrical Tool Co.

ALBERT H. WINSLOW, manager of the appropriations department of the National Lamp Works plant, Nela Park, Cleveland, of the General Electric Co., was killed in an automobile accident Aug. 26. He was 56 years of age and had been connected with the National Lamp Works about 20 years.

BAYARD PHILLIPS, treasurer Phillips-McLaren Co., Pittsburgh, died at the St. Joseph Hospital, Pittsburgh, Aug. 30, following a surgical operation. Mr. Phillips was well known in Pittsburgh iron and steel and business circles, as he was secretary of the Pittsburgh Foundrymen's Association and a number of other business organizations. He was born in Glenfield, Pa., June 30, 1879. He was graduated from Washington & Jefferson College in the class of 1898 and from the medical school of the University of Pittsburgh in 1901. He practised medicine for about four years, having been company physician for the Pressed Steel Car Co. from 1902 to 1906. In the latter year he became identified with the Phillips-McLaren Co., in which his family had been interested since its organization many years ago.

The Valley Mould & Iron Corporation, Sharpsville, Pa., will resume within the next 10 days on a 50 per cent basis, after a prolonged suspension. The Shenango Furnace Co., a merchant interest, will start its No. 2 blast furnace at Sharpsville on Sept. 10.

Machinery Markets and News of the Works

HOPES FOR SEPTEMBER

Prospects Developing in August Indicate Better Business Coming

Santa Fe Has Out New List—Three Price Reductions Announced

The trade has sanguine hopes that September will be one of the best months of the year. The increased inquiries and prospective business which developed in August are responsible for that more optimistic feeling. Actual business in August was generally no better than that of July, New England reporting it the quietest month of the year, Cincinnati suggesting that with many dealers, at least, it has considerably surpassed the preceding month.

The Santa Fe is now asking for eight machine tools for its shops at Argentine, Kan., and will possibly seek more equipment for Albuquerque, N. M., and for its coast lines. The H. A. Smith Machinery Co., Syracuse, N. Y., is asking for about a dozen machines for its own prospective customers.

The Board of Education, Canton, Ohio, rejected all bids when some manufacturers wired reductions from 10 to 20 per cent, and will receive new bids Sept. 16 on a revised list of 21 machines.

Recent price reductions include the following: 20 per cent by the South Bend Lathe Works, South Bend, Ind.; 12½ per cent by an Eastern manufacturer of milling machines, drill presses, hand screw machines and profiling machines; 15 per cent by a Wisconsin maker of tool grinders.

A central Massachusetts forging company has purchased 10 used Waterbury-Farrel Foundry & Machine Co. presses and hardening and tempering equipment from Bridgeport, Conn., interests. The Hartford-Springfield Street Railway Co., Warehouse Point, Conn., bought six machines from a Springfield, Mass., concern. The International Nickel Co., New York, has bought seven gate shears for its new plant at Huntington, W. Va.

Most of the foreign inquiries come from the Far East, there being one inquiry for seven lathes for Manchuria. Belgian agents inform American tool builders that it is practically impossible to sell high grade American tools in the face of German competition.

New York

NEW YORK, Aug. 30.

While machine-tool sellers are not expecting much railroad buying this year, there is a good deal of interest in tentative preparations which the roads are making for next year. The New York Central, for example, has included about $300,000 worth of machine tools in its 1922 budget. Purchases of these machines will, of course, be contingent on the financial situation.

One of the largest transactions of the week was the purchase of seven gate shears by the International Nickel Co., New York, for its new plant at Huntington, W. Va. The order went to a Pittsburgh company. The American Sugar Refining Co. is placing orders against its recent list, now pared down to about a dozen machines, and the Durant Motor Co. continues to buy a few tools for its assembling plant at Long Island City. A few orders have been placed by Stone & Webster, Boston, for the new Fordson tractor assembling plant at Green Island, Troy, N. Y.

Foreign inquiries come almost entirely from the Far East. Such inquiries, however, are frequently duplicated, as for example, one for seven lathes for Manchuria, which has been sent out for quotations by at least four New York export houses. American tool builders are advised by their Belgian agents that it is almost impossible to sell high-class American tools in competition with the low-priced German tools.

The dull condition of the crane market in this district continues. Sales of electric overhead cranes are particularly inactive, but there is a fair volume of inquiries in the locomotive crane field, and sales of hand power cranes, although small, are considerably more numerous than the sales of electric cranes. Some business has evidently been stimulated by the lower prices now prevailing among builders of hand power cranes. An inquiry is in the market from the William Steele & Sons Co., Philadelphia, for a 6-ton, 70-ft. span bucket crane and two 3-ton overhead traveling cranes. The American Locomotive Co. has asked for quotations on a 2-ton, 40-ft. span overhead traveling crane for its Dunkirk plant. A request for bids on specification 4509 has been issued by the Bureau of Yards and Docks, Navy Department, Washington, calling for a 10-ton hand power crane for the Bureau of Mines depot, Yorktown, Va.

On the two 3-ton portal cranes for the Gowanus Canal, purchased by New York State, the lowest bid was submitted by the Lambert Hoisting Engine Co., Newark, N. J., quoting $25,590 for the two cranes; Pawling & Harnischfeger Co. quoted $25,950; Heyl & Patterson, $29,720; Manning, Maxwell & Moore, $29,900, and the Wellman-Seaver-Morgan Co., $32,800. The rumored purchase of cranes by the American Dock & Terminal Co. at Tompkinsville, Staten Island, consisted of two 2000-lb. capacity electric hoists, for warehouses, purchased from the Lidgerwood Mfg. Co. Further purchases of electric hoists may be made. Tenders on the 34 3-ton cranes for the Stapleton, Staten Island, piers being built by the city of New York for the Pan-American Terminal & Dock Co. will probably be issued in about one week by the Commissioner of Docks. The Kentucky & West Virginia Power Co. has purchased a 15-ton hand power crane from the Reading Chain & Block Corporation. The Lancaster Wrecking Co., Lancaster, Pa., desires catalogs and prices from manufacturers of crawl tread locomotive cranes.

The Wheeler Co., care of the Graham Beach Realty Co., Brooklyn, has acquired 17 lots on Coney Island Creek, Flatbush section, for the establishment of a new shipbuilding works, to specialize in the construction and repair of small vessels.

The Bernard Mailing Machine Co., New York, has been incorporated with a capital of $50,000 by J. Wile, F. McCarthy and T. Donohue, to manufacture mailing and addressing machines and parts. It is represented by Henry Hoelljes, 95 Madison Avenue.

The Fordham Plaza Auto Co., Inc., 1856 Bath Avenue, Brooklyn, is completing plans for a new three-story automobile service and repair works, 100 x 150 ft. on Webster Avenue, New York, estimated to cost about $150,000. Charles S. Clark, 443 East Tremont Avenue, New York, is architect.

The Driggs Ordnance & Mfg. Co., 19 West Forty-fourth Street, New York, is arranging equipment and facilities at its plant at New Haven, Conn., for the manufacture of lightweight automobiles and parts. Production will commence at an early date.

The Instantaneous Electric Water Heater Corporation, Brooklyn, has been chartered under State laws to manufacture electric water heaters and parts. The incorporators are L. Feinman, M. Holland and Samuel Rubinton, 32 Court Street.

The Power Driven Machine Gun Corporation, New York, has been incorporated with a capital of $100,000 by J. F. Mathias, W. D. O'Gorman and P. M. Kelly to manufacture machine guns and parts. It is represented by Hardy, Stanoliffe & Whitaker, 165 Broadway.

The International Cement Corporation, 342 Madison Avenue, New York, has arranged for a note issue of $1,500,000,

the proceeds to be used for plant improvements, operations, etc.

A. Schrader's Sons, Inc., New York, has been incorporated under Delaware laws with capital of $100,000 by M. Charles Schweinert and Phillip G. Cole, Forest Hills, N. Y., to manufacture valves, couplings and kindred products. It is represented by the Corporation Trust Co. of America, duPont Building, Wilmington, Del.

The Cowles Heater Co., New York, has been incorporated with a capital of $100,000 by H. L. Cowles, J. J. Young and J. A. Trimble, to manufacture heaters and heating equipment. The company is represented by F. A. Hutson, 41 Park Row.

Arrangements are being perfected for a merger of the General Asbestos & Rubber Co., 58 Warren Street, New York, and the Raybestos Co., Bridgeport, Conn., under the first noted name. The consolidated company will have aggregate assets of $9,615,000. The General Asbestos company operates a large plant at North Charleston, S. C., for the manufacture of brake lining and kindred products, and the Raybestos Co., in addition to the Bridgeport works, has plants at Stratford, Conn., and Peterboro, Ont. The different plants will be continued in operation. C. Bissell Jenkins is chairman of the board, and Sumner Simpson, president of the new organization.

The Havana Electric Railway, Light & Power Co., Havana, Cuba, has disposed of a note issue of $1,500,000, the proceeds to be used in part for extensions, improvements, etc., in electric power plants and system.

The Vulcano Mfg. Co., New York, has been incorporated with a capital of $50,000 by H. J. Friedman, J. M. Nimhauser and A. G. Solomon, 200 Fifth Avenue, to manufacture tools, hardware products and other metal goods.

The Manhattan Roofing Co., 133 East 118th Street, New York, has acquired a three-story building at 121 East 120th Street, on site 25 x 100 ft., and will remodel the structure for a new plant. Max Pischler is president.

The Bunnell-Stevens Co., recently organized under Delaware laws with capital of $400,000, will operate a plant at New York for the manufacture of engines and machinery. It is represented by R. D. Bunnell, 2 Rector Street.

Fire, Aug. 22, destroyed three high-pressure boilers and other auxiliary power equipment at the plant of the West Virginia Pulp & Paper Co., Mechanicsville, N. Y. The department will be rebuilt.

Schulz & Co., Inc., New York, has been chartered under State laws to manufacture machinery and parts. The incorporators are H. Schulz, I. Spencer and Charles Marks, 302 Broadway.

The New Jersey Power & Light Co., Dover, N. J., has been granted permission to acquire the Lambertville Public Service Co., Lambertville; Flemington Light, Heat & Power Co., Flemington, and the Newton Gas & Electric Co., Newton, and to issue securities in an amount of $446,300 to effect the purchases, and for plant and system extensions and improvements.

The Radio Service Laboratories, Inc., Asbury Park, N. J., has been incorporated with a capital of $50,000 by Harold M. Lewis, Hobart A. Simpson and Melvin S. Moore, to manufacture wireless and other electrical equipment. It is represented by Joseph M. Turner, 701 Mattison Avenue.

Fire, Aug. 22, destroyed the machine shop, forge shop, pattern shop, sawmill and power house at the plant of the Vulcan Iron Works, Hudson and Essex streets, Jersey City, N. J., with loss estimated at about $250,000. The company specializes in marine iron and steel construction, and is operated by the Grymes Engineering & Vulcan Iron Works Co. A. J. Grymes is president.

Matthew Walsh, Brooklyn, manufacturer of belting, has leased a three-story building, aggregating about 6000 sq. ft., at the rear of 28 Orange Street, Newark, N. J., for the establishment of a new plant.

The Kelsey Motor Co., 25 Branford Place, Newark, will break ground at once for its new plant at Belleville, N. J., on a seven-acre tract recently acquired. It will be used for the manufacture of parts and assembling.

The Kolb Sheet Metal Works, 30 Orange Street, Newark, has filed notice of organization to manufacture fans and blowers and other metal products. Norman L. Kolb, 56 Crawford Street, heads the company.

The Amalgamated Iron & Steel Co., Newark, has filed notice of organization to manufacture iron, steel and other metal products. Elwood B. Hendricks, 645 Springvale Avenue, East Orange, N. J., heads the company. The same interests have also organized the Bolt, Nut & Rivet Co. and the Brass, Bronze & Copper Co., both of Newark.

The Newark Die Co., 17 Frelinghuysen Avenue, Newark, has filed notice of dissolution under State laws.

The M. L. Copper Welding Works, Newark, N. J., has filed notice of organization to operate a plant at 207 Sixteenth Avenue. Meyer L. Levy, 125 Somerset Street, heads the company.

John L. Reid, Newark, N. J., former police commissioner of the city, and associates have organized the Proctor Typewriter Co., to manufacture a new typewriting machine and parts. Initial production will be carried out at Baltimore and arrangements are being perfected for a plant. Later it is planned to establish works at Newark.

The Trethanay Mfg. Co., 154 Wright Street, Newark, N. J., has filed notice of organization to manufacture toys, metal novelties, etc. Charles and Joseph Trethanay, 31 Lincoln Park, head the company.

New England

BOSTON, Aug. 29.

Local machine-tool houses report comparatively little business the past week. One firm sold a used six-spindle drill and a 16-in. lathe to a New Hampshire repair shop, and another two new 16-in. lathes, while here and there a new and used tool has changed hands. Indications are that August will be the smallest month this year in the amount of business booked by local selling interests. Sufficient new inquiries and prospective business, however, are at hand to warrant expectations of better market conditions next month. Since our last report a local representative of a low-priced lathe has received 10 inquiries on small equipment.

Elsewhere in New England encouragement is found in business reported. A central Massachusetts forging company has purchased 10 used Waterbury Farrel presses as well as hardening and tempering equipment from Bridgeport interests. The Hannon-Finton Co., Springfield, Mass., reports recent sales as follows: One No. 5B Becker vertical milling machine to the Schuykill Forge Co., Philadelphia; one No. 4B to the W. H. Stearns Stamping Co., Worcester, Mass.; one 36-in. x 10-ft. planer to a Chicago dealer; two No. 2 Hendee universal milling machines with vertical attachments to a New York dealer; No. 4 Landis universal grinder to a Springfield concern for regrinding automobile cylinders, the buyer purchasing an attachment for grinding crank shafts direct from the Landis company; No. 1 Norton universal grinding machine and a 14-in. grinder stand to a Northampton garage; small universal milling machine to the Rue Mfg. Co., Philadelphia, and one band saw, combination wood-working machine, bolt cutter, power hack saw, car wheel boring machine and one 20-in. drill press to the Hartford-Springfield Street Railway Co., Warehouse Point, Conn. The company is negotiating with a local metal-working concern for two vertical milling machines. The Metal Saw & Machine Co., Inc., Springfield, reports the sale of two 10 x 10-in. saws for Australia and considerable band saw business for British accounts.

Although the Bangor & Aroostook Railroad Co. has laid off for six weeks 280 men at its Derby machine shop, the New England railroad shop situation is brighter. The Bangor & Aroostook car repair shop crew is busy getting cars ready for fall traffic. All employees laid off some time ago at the East Hartford, Conn., shops of the New York, New Haven & Hartford have been taken back and the company will take on additional men at New Haven and elsewhere in the immediate future. Work at the locomotive repair shops of the Boston & Albany at West Springfield, Mass., has been resumed, approximately 200 machinists having been recalled. This railroad is in the market for a 2500-lb. single frame steam hammer and a 28-in. motor-driven shaper. The Maine Central is expected to take some action in the near future on equipment, inquiries for which were sent out several weeks ago.

The Whitin Machine Works, Whitingsville, Mass., has purchased a 2000-kw. General Electric steam turbine generator and an Alberger condenser for its power plant which is being rearranged.

The affairs of the Boston District Ordnance Salvage Board practically have been wound up. All machine tools have been taken out of the market so far as this particular branch of the Government is concerned.

The A. Burlingame Co., 149 Commercial Street, Worcester, machinist, is asking bids for the erection of two additional stories, 78 x 500 ft.

Bids are being asked on the construction of a four-story and basement printing plant, 80 x 180 ft., contemplated by the Rumford Press, Concord, N. H.

Charles E. Wilson, 198 Franklin Street, Springfield, Mass., machinist, is building a one-story shop, 40 x 100 ft., on Riverside Drive.

The Connery Machine & Tool Co., 56 Harrison Avenue, Springfield, Mass., small tools, is negotiating for property on which the erection of a small plant is contemplated.

Plans are being prepared for a one-story factory, 60 x 160 ft., with ell, 60 x 100 ft., contemplated by the Williams & Anderson Co., Providence, R. I., emblems.

The Utilities Mfg. Co., New Haven, Conn., has been formed with an authorized capital of $50,000 by T. A. Cooney, Cheshire, and J. D. Beecher and William B. Turley, New Haven. Among the products to be manufactured are can and bottle openers.

A Massachusetts charter has been granted the Saving Spring Co., Boston, to manufacture automobile springs. It is capitalized for $100,000. Thomas W. Morris is president and William P. Everts, treasurer, both at 709 Pemberton Building, Boston.

Mack Klein, 146 Shirley Avenue, Revere, Mass., is president and David Adelson, 150 Campbell Avenue, treasurer of the Century Mfg. Co., Boston, capitalized for $25,000, which has been granted a charter to manufacture automobile accessories.

The Hampton Tool Co., 238 Dwight Street, Springfield, Mass., tool maker, within the immediate future will build a one-story plant, 40 x 100 ft., at 562 St. James Avenue. Provision will be made for additional floor space when business conditions warrant. At present the company is engaged in the manufacture of a patented ice cream freezer and kindred machinery for outside interests. G. T. and P. P. Murphy are proprietors.

The Metal Saw & Machine Co., Inc., Springfield, Mass., saws and cutting-off machinery, has installed considerable heavy production tools and otherwise equipped the part of its plant formerly given over to the manufacture of hack saws, for the manufacture of high production and other special machinery for outside interests. New equipment includes monorail system on which a Franklin-Moore 1-ton electric hoist operates. Additional machine tool equipment will be installed within the next few months. The company maintains an engineering department for developing special machinery. Howard L. Washburn will supervise production.

The K. B. Noble Co., 249 Pearl Street, Hartford, Conn., manufacturer of contractors' machinery and parts, has completed plans for extensions and improvements in its plant to cost about $30,000. Buck & Sheldon, Inc., 60 Prospect Street, is architect.

The Grant Motor Radiator Works, 8 Calender Street, Providence, R. I., has filed notice of organization to manufacture automobile radiators and other metal products. Leonard W. Forest and Chester M. Grant, 718 North Broadway, East Providence, head the company.

Plans for a new one-story power plant for mill service are being prepared by Benedict Schwanda & Sons, Staffordville, Conn. It will be of hydroelectric type.

F. A. Ryer, purchasing agent Boston & Albany Railroad, Boston, will receive bids until Sept. 6 for engine truck swing frame, steam pipe flanges, trailer truck box, cylinders, valves and other equipment for locomotive rapair work.

The Worcester Electric Light Co., 11 Foster Street, Worcester, Mass., has completed plans for a two-story machine shop estimated to cost about $35,000.

The Spindle City Brass Foundry, South River Road, Lewiston, Me., is planning to rebuild the portion of its foundry destroyed by fire, Aug. 17, with loss estimated at about $10,000.

The Union Rubber Co., Inc., Calais, Me., has been incorporated with a capital of $400,000 by C. L. Lello and Harold H. Murchte, Calais, to manufacture tires, etc.

The Porcupine Co., Bridgeport, Conn., manufacturer of boilers, has awarded a contract to the T. J. Pardy Construction Co., Bridgeport, for a one-story, brick and steel addition, 148 x 240 ft., estimated to cost about $30,000.

Fire, Aug. 23, destroyed the power plant of the Lincoln County Power Co., Damariscotta Mills, Me., and the plant of the Damariscotta Leather Co., manufacturer of leather board products, with loss, including equipment, estimated at $100,000. Both properties are operated by Burgess & Lang, Boston.

The Bigelow Co., 92 River Street, New Haven, Conn., manufacturer of steam boilers, has completed plans for a one-story boiler shop addition, 53 x 105 ft. Henry R. Kent & Co., 5 Erie Avenue, Rutherford, N. J., are architects and engineers.

The Mechanical & Electrical Mfg. Co., Bethel, Me., has been incorporated with a capital of $100,000 to manufacture electrical equipment and machine products. Theodore Morin, Bethel, is president and treasurer; Ellery C. Park is secretary.

The power house and compressor plant at the works of the Wetmore & Morse Granite Co., Websterville, near Montpelier, Vt., were destroyed by fire, Aug. 17, with loss estimated at $100,000. They will be rebuilt.

Chicago

CHICAGO, Aug. 29.

The Atchison, Topeka & Santa Fe has issued an inquiry for equipment for its Argentine, Kan., shops. It is also expected to enter the market soon for additional machinery for its Albuquerque, N. M., shops, as well as for equipment for its coast lines. The Argentine list is as follows:

One heavy duty double-end 52-in. car wheel axle lathe with slip ring induction motor.

One car wheel journal truing machine with slip ring induction motor.

One 5-ft. radial drill.

One 36-in. x 16 ft. engine lathe.

One 28-in. crank shaper.

One 24-in. x 10-ft. engine lathe.

One heavy upright drill of sensitive type with capacity to drill 1½-in. steel.

One motor-driven 76-in. boring and turning mill.

All of the machines with the exception of the axle lathe, the journal truing machine and the boring mill are to be arranged for belt drive. The Santa Fe is expected to close on a number of overhead traveling cranes for Albuquerque some time this week.

The general situation in the trade has undergone little change. Inquiries, principally for single machines, are more numerous than in July, but actual buying is still light. Local dealers have received from the H. A. Smith Machinery Co., a machinery house in Syracuse, N. Y., a list including four 2¼-in. turret lathes, two 6-in. spiral bevel gear generators, two 12-in. spiral bevel gear generators, one No. 12 Barber-Colman gear hobbing machine, and two No. 70 Heald grinding machines. The company states that it has live inquiries for all the tools mentioned and that slightly used machines, or new machines, at attractive prices, will be considered.

An Eastern manufacturer of milling machines, drill presses, hand screw machines, and profiling machines has reduced prices 12½ per cent. A Wisconsin maker of tool grinders announces a reduction of 15 per cent.

The Reliable Sheet Metal Works, 1325 Belmont Avenue, Chicago has let contracts for a factory addition, 25 x 65 ft., to cost $8,000.

The J. G. Pressler Co., 326 West Madison Street, Chicago, has been incorporated with $10,000 capital stock to manufacture rubber hose, other rubber products and automobile accessories. The officers are J. G. Pressler, president; D. C. Pressler, treasurer, and R. H. Inman, secretary.

The Sterling Trap Co., 105 West Monroe Street, Chicago, has been incorporated with $5,000 capital stock to manufacture fly traps. For the present the company will merely supply the dies to be used in punching out the traps, but later expects to do its own manufacturing. The officers include Frank C. Powers, president; J. H. Clark, vice-president, and Edward J. Hess, secretary and treasurer.

The Ludlow Typograph Co., manufacturer of type setting and type casting machines, 2032 Clybourn Avenue, Chicago, has let contract for a one-story office and factory, 47 x 52 ft.

The Standard Electric Co., Hammond, Ind., has been incorporated with $25,000 capital stock to manufacture electrical equipment. The incorporators include W. R. Wermine, Ernest Freeman and Oliver W. Hershman.

The Improved Power & Machinery Co., Pueblo, Colo., is building an addition to cost $4,000.

The Pence Auto Co., Eighth Street and Hennepin Avenue, Minneapolis, Minn., has let contract for a one-story plant, 100 x 220 ft., at 2401 Broadway, to cost $65,000.

Joseph Spingola & Sons, 750 Taylor Street, Chicago, are receiving bids through A. V. Capraro, 105 North Clark Street, on a two-story garage, 75 x 120 ft., 1918 South Morgan Street, to cost $50,000.

The City Council, Carrollton, Ill., has preliminary plans under way for a new municipal electric power plant to cost about $90,000.

The Pendergast Fence Co., Fort Madison, Iowa, is having revised plans prepared for its new one-story and basement factory, 60 x 120 ft., to manufacture wire fencing.

The Coal Products Mfg. Co., Lockport Township, Joliet, Ill., will break ground at once for a two-story and basement addition, 48 x 65 ft.

The Chicago, Rock Island & Pacific Railroad Co., LaSalle Street Station, Chicago, has taken bids for its new one-story car repair shop at Trenton, Mo., 85 x 400 ft., estimated to cost about $65,000.

The Shelbyville Ice Co., Shelbyville, Ill., is planning the erection of a new ice-manufacturing plant, with initial daily capacity of about 65 tons. D. B. Isenberg is president.

The Western Metal Products Co., Joliet, Ill., has been incorporated with a capital of $50,000 by Walter B. Stewart, A. D. MacIntyre and Frederick A. Hill, 314 Barber Building, to manufacture metal goods.

Philadelphia

PHILADELPHIA, Aug. 29.

The Reid-Avery Co., 1434 Brandywine Street, Philadelphia, operating an electric welding and repair works, has leased the two-story building at Twenty-first Street and Washington Avenue, owned by the Merchant & Evans Co., for a new plant.

The Acme Iron & Metal Co., Twenty-third and Arch streets, Philadelphia, has acquired property at Twenty-fifth and Dickinson streets, 85 x 169 ft., to be used in connection with plant extension.

The Columbia Steel Equipment Co., Third and Annsburg streets, Philadelphia, manufacturer of steel filing cabinets, etc., will build a one-story addition.

John P. Smith, Inc., Philadelphia, is being organized by John P. Smith, Franklin S. Morehouse and Joseph S. Shusted to manufacture heating equipment, piping, boilers, etc. The company is represented by Leighton P. Stradley, Land Title Building. Application for a State charter will be made Sept. 19.

The John Best Lock Nut Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 to manufacture nuts, bolts and kindred products. It is represented by F. R. Hansell, Land Title Building.

The Lutz Co., Thirty-first Street and Grays Ferry Avenue, Philadelphia, manufacturer of machinery and parts, has filed plans for a one-story foundry addition, 80 x 120 ft., at its works on Hayes Avenue, Camden, N. J. William Lutz is president.

The Superior Radiator Co., Hanover, Pa., has been incorporated with a capital of $25,000 to manufacture automobile radiators and kindred equipment. Edgar P. Wentz, Hanover, is treasurer.

The Philadelphia Rapid Transit Co., Land Title Building, Philadelphia, will soon break ground for the erection of a one-story addition to its car repair shops on Dauphin Street, estimated to cost about $50,000. Henry E. Baton, 1713 Sansom Street, has the contract.

The Harrisburg Corporation, Harrisburg, Pa., has taken over the control of the Harrisburg Foundry & Machine Works, Harrisburg, and in the future the plant will be operated under the purchaser's direction. It manufactures engines and kindred mechanical equipment. Alfred Sohland is president, and C. H. Israel, general sales manager.

The Hendrick Mfg. Co., Dundaff Street, Carbondale, Pa., manufacturer of perforated metals, screens, etc., has awarded contract to the Austin Co., Bulletin Building, Philadelphia, for a one-story addition, 100 x 220 ft., to cost about $100,000.

The Lehigh Structural Steel Co., Allentown, Pa., is considering the erection of a number of additions. It recently secured a contract for the reconstruction and repair of 200 steel hopper cars for the Lehigh Valley Railroad Co.

The Wenz Granite Quarries Co., 1141 Hamilton Street, Allentown, Pa., is installing new equipment at its plant, including polishing machinery, lathes and power plant apparatus.

Pittsburgh

PITTSBURGH, Aug. 29.

While actual business in machine tools in this district still is of very limited proportions, the tendency being to purchase only such tools as needed, the trade is encouraged by the inquiries that are coming out from time to time. A railroad list involving seven tools has just been issued, but the inquiry does not seem to have been very widely scattered and those who have it are inclined to withhold details, both as regards the name of the company and the tools wanted. This is the first railroad inquiry in several months and is looked upon as a favorable development. The movement on the part of some railroads to close their own shops and transfer repair work to private establishments, to put such work outside of the scope of the Railroad Labor Board, seems to be gaining ground and it is thought this may be productive of some business for tool builders. No price changes have come out in this district the past week. The crane market shows very little life. Several requests for prices for estimating purposes have reached local offices, but as yet nothing has been done regarding the cranes for the galvanizing plant of the Wheeling Steel Corporation, Beech Bottom, W. Va., nor for the crane which the Bessemer Gas Engine Co., Grove City, Pa., recently inquired for with one or two makers. These have been regarded as the livest inquiries before makers and awards had been expected by this time.

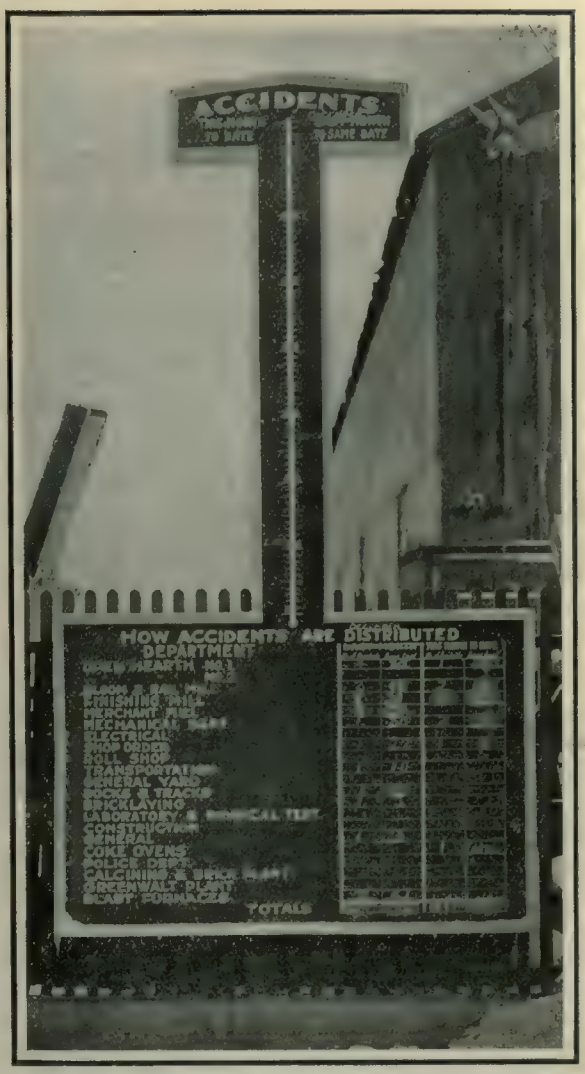
The Scientific Specialty Co., Pittsburgh, has been incorporated with a capital of $25,000 to manufacture hardware specialties, metal kitchen utensils, etc. C. D. Stewart, Crafton, Pa., is treasurer. The company is represented by C. L. McCobb, 425 Wabash Building.

The Pittsburgh Radio & Appliance Co., Pittsburgh, is being organized by Frank Feldman, Max Hirsch and Martin W. Kunkel to manufacture wireless apparatus, electric fixtures and equipment, etc. It is represented by Frank R. S. Kaplan, 922 Frick Building.

The McCrey Sanitary Collapsible Barrel Co., Apollo, Pa., has completed plans for the erection of a one-story factory, 50 x 160 ft., to cost about $42,000. It recently arranged for a change of name to the Sanitary Collapsible Barrel Co., and will maintain headquarters at Pittsburgh.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, has awarded contract to the J. W. Cowper Co., Oliver Building, for a one-story addition to its plant on Sixteenth Street, estimated to cost about $17,000.

Plans are being completed for a new four-story power plant at the McKeesport Hospital, McKeesport, Pa., and bids



The photograph here reproduced represents an accident indicator used at the works of the Algoma Steel Corporation, Sault Ste. Marie, Canada. The accident prevention campaign has been in progress there for the past ten months. Frank J. McGue, director of safety, says that the result has been a diminution of over 50 per cent in accidents, 70 per cent in lost time and some 70 per cent in compensation.

The indicators were designed to keep every man in the plant informed every day of exactly what progress is being made in fighting accidents. The belief is that if everybody at all times be made to think of safety, greater care would always be taken and there would be fewer accidents. One of these boards is placed at every gate or clockhouse, where every man passing in or out must of necessity see it. The photograph was taken in February, and instead of the comparison being made with January, when operations were curtailed to some extent, the figures were compared with those for December, so that there would be a fair basis of camparison.

will be asked at once. It is estimated to cost in excess of $60,000. Sidney F. Heckert, Pittsburgh, is architect.

The P. Wall Mfg. Supply Co., Pittsburgh, is being organized by Frank T. Page, J. M. Irwin and H. E. Letty to manufacture galvanized iron and steel products. Application for a State charter will be made on Sept. 12. The company is represented by Calvert, Thompson & Wilson, 1737 Oliver Building.

M. B. Kelly, care of the American Steel Co., 1300 Park Building, Pittsburgh, and associates are planning for the purchase of a factory for manufacturing mechanical products, utilizing tin plate, wire, etc. It is proposed to re-establish the plant at Pittsburgh or Ellwood City, Pa. The project will represent an investment of close to $1,000,000.

The Hess Coal & Coke Co., Morgantown, W. Va., will install new electrical and mechanical equipment at its local properties to cost about $35,000. A number of plant improvements will be made.

Louis Adams and J. P. Hetherington, Huntington, W. Va., are planning the establishment of a new machine repair and electric welding works.

C. H. Craig, Charleston, W. Va., is planning for the erection of a new ice-manufacturing and refrigerating plant at Richwood, W. Va.

Ohio

Sentiment has improved somewhat in the Cleveland machine-tool market and inquiries are more plentiful. This is regarded as encouraging, although it is doubtful whether some of these inquiries will result in the early placing of orders. Local dealers report the volume of sales in August practically the same as in July. However, some improvement is expected during September. The South Bend Lathe Works, South Bend, Ind., has made a further price reduction of 20 per cent. This company states that the average pre-war prices on its entire line of lathes were only 37 per cent below the quotations it has just adopted.

In Cincinnati, while no large purchases of machine tools are being made, the month of August with some makers will run far ahead of July as to the number of orders booked. While this does not mean that business is at all brisk, local manufacturers are confident that a turn for the better has come. A number of inquiries for one and two tools are before the trade which are expected to close within the next few weeks. Several Eastern railroads are inquiring for tools, but no large lists are being issued. It appears to be the policy to buy only as machines are urgently required, but manufacturers in close touch with the situation feel that with the better showing of the railroads and the prospects for increased business which now look brighter than for many months, it is only a question of a short time when new tools will be bought. In this connection it is persistently reported that a local manufacturer has secured an order for approximately 60 machines which are destined for several railroad shops.

The Board of Education, Canton, Ohio, has rejected all bids for the machine-tool equipment for the McKinley School in that city and will receive new bids Sept. 16. It is stated that before the bids were opened a number of manufacturers wired new prices, reducing their formal quotations from 10 to 20 per cent, and that the board decided to re-advertise in order to get the benefit of any lower prices that may be named. The original list has been changed and now consists of 21 machines and considerable small tool equipment. The list includes 11 heavy duty and engine lathes, 2 shaping machines, 1 radial drill, 2 universal grinding machines, 2 milling machines, 1 upright drill, 1 hack saw and 1 wet tool grinder.

An interest in the United Machine & Mfg. Co., Canton, has been acquired by Cleveland men and two new directors representing Cleveland interests have been elected. These are P. R. Mather, of Pickands-Mather & Co., and H. B. Bole, vice-president Hydraulic Steel Co. The United company will shortly add to its present line of products the manufacture of underfeed stokers.

The Mansfield Wire Spoke Co., Mansfield, Ohio, has been incorporated with a capital stock of $250,000 and has secured equipment for a plant. Negotiations are pending for acquiring the present plant of the Ideal Electric Co., Mansfield, which will shortly move into new quarters. The officers of the new company are C. E. McElroy, president; A. M. Hall, vice-president, and B. E. Frasher, secretary and treasurer.

The Dillon Brothers Machine Co., Bridgeport, Ohio, has been incorporated with a capital stock of $150,000. It operates a machine shop and it is stated that later a new plant will probably be erected.

Reports from Elyria, Ohio, state that the American Radiator Co. is negotiating for the purchase of the Fox Furnace Co. of that city and that plans for acquiring the works will probably be completed shortly.

The International Steel Tie Co., Waterloo Road, Cleveland, is planning the erection of a one-story factory, 40 x 120 ft.

The Spangler Trap Shoot Mfg. Co., Chillicothe, Ohio, has been organized to manufacture a contrivance for throwing clay pigeons, used by trapshooters. The company has purchased machinery and operations will begin about Oct. 1.

The Shartle Machine Co., Columbus, Ohio, has purchased all of the power house equipment of the smokeless powder plant erected by the Government during the war at Nitro, W. Va. The purchase price was said to be in the neighborhood of $1,000,000.

Baltimore

BALTIMORE, Aug. 29.

The Adamantex Brick Co., Arbutus, near Baltimore, recently organized with a capital of $1,000,000 to manufacture sand-cement bricks, has awarded contract to the L. V. Thayer Construction Co., 25 West Forty-third Street, New York, for its plant, estimated to cost $150,000. The main building will be two stories, 160 x 268 ft., and will be supplemented with a number of smaller structures. Louis F. Ducker is president. The company is represented by Blum & Makover, Equitable Building, Baltimore.

The Continental Engineering & Equipment Co., Baltimore, manufacturer of water sprinklers, etc., has filed notice of change in name to the Central Automatic Sprinkler Co.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has sold a preferred stock issue totaling $2,500,000, the proceeds to be used in part for power extensions, improvements, etc. Herbert A. Wagner is president.

The Marlin Firearms Corporation, Wilmington, Del., has been incorporated under Delaware laws with capital of $3,450,000 to manufacture rifles, shotguns and other firearms. It is represented by the Corporation Trust Co. of America, duPont Building, Wilmington.

The Kelly Mfg. & Sales Co., 2503 West Lexington Street, Baltimore, has been chartered under State laws to manufacture mechanical toys and kindred products. The incorporators are John I. and Andrew J. Kelly and Harry F. Kimberley.

The Potomac Electric Power Co., 231 Fourteenth Street, N. W., Washington, has been granted permission by the District Public Utilities Commission to issue bonds for $2,600,000 for extensions, improvements, general operations, etc.

Robertson, Strader & Co., Greensboro, N. C., are planning to rebuild their machine shop, recently destroyed by fire with loss of about $30,000.

The Dalford Oil Refining Co., Wilmington, Del., has been incorporated under State laws with capital of $100,000,000 to construct and operate a series of oil refineries. The company is represented by the Corporation Trust Co. of America, duPont Building, Wilmington.

The Pitt Tractor Co., Wilmington, Del., has been incorporated with a capital of $400,000 to manufacture automobile tractors and parts. It is represented by the Colonial Charter Co., Ford Building, Wilmington.

The City Council, Springfield, Ga., is planning for the construction of a municipal electric light and power plant. The machinery installation is estimated to cost about $25,000. L. B. Ackerman, Jr., mayor, is in charge.

The Hampton Roads Equipment Co., 251 Arcade Building, Norfolk, Va., recently incorporated, will operate a local plant for the manufacture of road-building and conveying machinery, electrical equipment, etc. J. M. Sherrod is president and L. P. Beard, vice-president.

The Teal Light & Power Co., Chesterfield, S. C., is planning for the construction of a new power plant.

The Bristol Granite & Marble Works, Bristol, Va., is planning for the installation of new pneumatic and other machinery at its plant. John Shirreff is manager.

The Georgia Marble Co., Tate, Ga., is planning to rebuild its works recently destroyed by fire. New stone-handling and stone-working machinery will be purchased. The plant will be 85 x 300 ft.

The L. Rosenfeld Mfg. Co., 105 South Hanover Street, Baltimore, manufacturer of bakers' utensils, dairy utensils and other metal containers, is planning for the erection of a one-story addition, 40 x 125 ft. The machinery installation will cost about $25,000. The company recently increased its capital to $65,000. Louis Rosenfeld is president.

The Granite Falls Mfg. Co., Hickory, N. C., is arranging for the erection of a new hydroelectric generating plant on

Wilson Creek, near Lenoir, N. C. It will have an initial capacity of 5000-hp.

The American Box Co., Lynchburg, Va., is planning to rebuild its machine shop, recently destroyed by fire with loss of about $50,000.

Buffalo

BUFFALO, Aug. 29.

The Niagara Radiator & Boiler Co., Oliver Street, North Tonawanda, N. Y., has plans under way for a new one-story foundry, 140 x 175 ft., at Sixty-third Street and Woodland Avenue, Chicago, estimated to cost about $100,000. E. C. Andrews is president.

The Thomas Coupling Corporation, Dunkirk, N. Y., has been incorporated under Delaware laws with capital of $1,000,000 to manufacture couplings, clamps and other heavy mechanical products. R. W. Snow, Dunkirk, is representative.

The Buffalo Steel Car Co., Buffalo, has taken a contract for the reconstruction and repair of 500 hopper cars and 2000 box cars for the Buffalo, Rochester & Pittsburgh Railroad Co.

Fire, Aug. 19, destroyed the engine house and repair shop at the yards of the Pennsylvania Railroad Co., Eighteenth and Wayne streets, Erie, Pa., with loss estimated at about $125,000.

The Schloezer-Ash Mfg. Co., Buffalo, has been chartered under State laws to manufacture electric motors and kindred equipment. The incorporators are M. J. and L. F. Schloezer and J. H. Ash. The company is represented by William J. Volker, Mutual Life Building.

The Niagara Falls Power Co., Niagara Falls, N. Y., is planning for extensions in its electric transmission system, with new line from Niagara Falls to Buffalo, to cost in excess of $6,000,000, including steel towers, etc.

The Meldrum-Gabrielson Corporation, Industrial Building, Syracuse, N. Y., manufacturer of milling machines and parts, has awarded contract to Dawson Brothers, Union Building, for a one- and two-story plant on West Fayette Street, 60 x 160 ft., to cost about $75,000. A large portion of the structure will be equipped as a machine shop.

Detroit

DETROIT, Aug. 29.

Despite a steady increase in automotive and other machine production in this district and a larger number of inquiries noted, these encouraging features have not yet been reflected in the trade by any sales of importance. This is due in a large degree to the fact that prior to last December purchases of machine tools in the Detroit district were made in quantities which will largely take care of the demand for some time to come.

A steel wheel division has been formed by the Motor Wheel Corporation, Lansing, Mich., which is expected to get into production before the end of the year.

Construction is well under way on the new plant of the Stokes Mfg. Co., Owosso, Mich. It will manufacture a new manifold for motor vehicles.

The Steere Engineering Co., Owosso, Mich., and Detroit, has received an order for the installation of a condensation and gas cooling system at Havana, Cuba, to cost $50,000.

The Reynolds Spring Co., Jackson, Mich., will start immediately on the construction of an addition to care for increased business.

The Oliver Machinery Co., Grand Rapids, Mich., has added to its line of products a new type of belt sander, particularly adapted for the use of automobile body makers and for metal and wood-working plants.

The Standard Auto Co., Bridge Street and Gold Avenue, Grand Rapids, Mich., has completed plans for a new two-story and basement service and repair works and will commence erection at an early date.

The Wilton Tool & Mfg. Co., Grand River Avenue, Detroit, has arranged a list of new equipment to be installed at its plant for the manufacture of steel parts for automobiles.

The Detroit Tap, Die & Machine Co., Detroit, has filed notice of change of name to the Hawken Nut & Screw Co.

The Detroit Machine Products Co., Detroit, has been incorporated with a capital of $200,000 under Delaware laws by Edwin A. Leichfield and Walter A. Foster, Detroit, to manufacture machinery, tools, etc. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The City Council, Traverse City, Mich., will commence the immediate construction of its new hydroelectric generating plant on the Boardman River, estimated to cost about $250,000.

The Warner Auto Equipment Co., Benton Harbor, Mich., recently organized to manufacture shock absorbers and other automotive equipment, will carry out initial production at the plant of the National Axle Co., Benton Harbor. Later it is proposed to build a plant. Clarence T. Warner is president.

Indiana

INDIANAPOLIS, Aug. 29.

The Durant Motors of Indiana, Muncie, Ind., recently organized with a capital of $3,000,000, has taken over the local plant of the Sheridan Motor Car Co., to manufacture a six-cylinder automobile. Extensions and improvements will be made and new equipment installed. Plans are being perfected to commence production in October. Dennis A. Burke is president and general manager of the company, which is affiliated with the Durant Motors, Inc., 1819 Broadway, New York.

The Automatic Sliding Trolley Co., Frankfort, Ind., has been chartered under State laws to manufacture industrial trolley systems and kindred devices. The incorporators are William Robinson, J. A. Lucas and E. A. Spray.

The Interstate Car Co., Massachusetts Avenue, Indianapolis, manufacturer of automobiles, has awarded a contract to the Central State Bridge Co., Beecher Avenue, for a one-story foundry addition, estimated to cost about $25,000. E. H. Darrach is president.

The Concord Foundry Co., Elkhart, Ind., has filed notice of dissolution under State laws.

The Triangle Steel Products Co., Michigan City, Ind., will hold in abeyance the erection of its new plant, estimated to cost close to $75,000, until early next spring. The company is headed by T. C. Casse of the Josam Mfg. Co., 163 Washington Street, Chicago.

The Board of School Trustees, Angola, Ind., will make extensions and improvements in the electric power plant used for local schools.

The Central South

ST. LOUIS, Aug. 29.

The Missouri, Kansas & Texas Railroad Co., St. Louis, is having plans prepared and will soon take bids for a one-story addition to its machine shop at Parsons, Kan., 50 x 50 ft. A. L. Sparks, company address, is architect.

The Federal Penitentiary, Leavenworth, Kan., is planning for extensions and improvements in the power plant at the institution to cost about $115,000. New engines, boilers and auxiliary equipment will be installed. W. I. Biddle is warden in charge.

The Lexington Utilities Co., Lexington, Ky., has disposed of a bond issue of $560,000, the proceeds to be used in part for extensions and improvements in power plant and system.

The Commercial Coal Mining Co., Lexington, Ky., is planning for the installation of new electrical and other operating equipment on property recently acquired.

The Hygienic Heating & Ventilating Co., care of the Chamber of Commerce, Chillicothe, Mo., manufacturer of heating equipment, has acquired local property for the establishment of a new works.

The May Hosiery Mills, Nashville, Tenn., are planning for the establishment of a subsidiary plant for the manufacture of knitting machinery and parts. Julius Martin is secretary and treasurer.

Tabler Brothers, Pittsburg, Kan., will soon commence the erection of a new ice and cold storage plant, estimated to cost about $150,000 with machinery.

J. H. Mitchell, Kankakee, Ill., is planning for the establishment of a new plant at Joplin, Mo., to manufacture automobile trucks and parts. Negotiations are under way with the Joplin Chamber of Commerce for the purchase of a suitable site.

The City Council, Tulsa, Okla., is considering the construction of a municipal electric light and power plant. C. E. Griggs, city engineer, is in charge.

The Midwest Piping Co., 1452 South Second Street, St. Louis, has awarded contract to H. O. Hirsch & Co., Wainwright Building, for a one-story addition, 40 x 150 ft. A. G. Stoughton is president.

Swift & Co., Union Stock Yards, Chicago, are planning the erection of a new packing plant at Sedalia, Mo., to replace the words recently destroyed by fire.

The Chicago, Rock Island & Pacific Railroad Co., La Salle Street Station, Chicago, will take bids at once for the erec-

tion of a new engine house with locomotive repair works at Eldon, Mo. C. A. Morse is chief engineer.

The Peerless Wire Fence Mfg. Co., Adrian, Mich., has acquired property, 310 x 350 ft., at Memphis, Tenn., for a branch plant to manufacture wire fencing, staples and kindred products.

The Topeka Steam Boiler Works, Topeka, Kan., has filed plans for a four-story and basement works at Second and Jefferson streets, 50 x 85 ft.

Electric motors, automatic machinery for wood-working and other equipment estimated to cost about $20,000 will be installed at the plant of the Murphy Chair Co., Owensboro, Ky.

Milwaukee

MILWAUKEE, Aug. 29.

While the volume of new tool transactions remains restricted and sales are few and far between, the revival of the metal-working industry is progressing so well that machine-tool builders and dealers are encouraged over the prospect of an early resumption of buying. A general survey of the metal-working trade of Milwaukee and Wisconsin reveals greater activity probably than at any time within the last seven to eight months. Production of machine tools remains at a minimum pending the appearance of a healthier demand. Manufacturers of cranes are encouraged by increasing inquiry and better sales. The Pawling & Harnischfeger Co. sold a 5-ton electric traveling crane to the Consolidated Water Power & Paper Co., and several other fair-sized sales in this territory are pending.

The Perfection Hoist & Engine Co., Milwaukee, manufacturer of electrogenerating systems for farms and horizontal hoists for motor dump trucks, has purchased the former plant of the Two Rivers Plating & Mfg. Co., Two Rivers, Wis., and will move its factory and offices to that city on Sept. 1. The plant is undergoing some alterations and a small list of equipment will be purchased. Walter F. Mayer, 221 Grand Avenue, Milwaukee, is secretary.

The J. F. Davis & Sons Co., Chicago, which recently acquired the plant, equipment and business of the DePere Mfg. Co. at DePere, Wis., has completed alterations and placed the shop in operation. It will be conducted mainly as a boiler works, but will also fabricate structural steel. J. H. Allison is general manager at DePere.

The Victor Krefi Mfg. Co., Two Rivers, Wis., manufacturer of shock absorbers and other automotive accessories, has taken over the building formerly used as a machine shop by the Two Rivers Wooden Ware Co. and is installing some additional equipment. It has been occupying under lease the former plant of the Two Rivers Plating & Mfg. Co., which has recently been acquired by the Perfection Hoist & Engine Co., Milwaukee, as its permanent works.

The Marshfield Casket Co., Marshfield, Wis., has been incorporated with a capital stock of $25,000 to take over the plant and business of the Elgentone Mfg. Co., which is liquidating. The plant has been used for the manufacture of talking machine and music cabinets and will be partly retooled for manufacturing wooden and metallic caskets, etc.

The Northern Sash & Door Co., Hawkins, Wis., has awarded contracts for a new plant to cost about $65,000. It will consist of a main factory, 70 x 170 ft., a power plant, 30 x 42 ft., and a dry kiln, 36 x 45 ft., to be equipped with new machinery throughout and be ready for operations Jan. 1. Jens Jensdahl is president and general manager.

The Perron Signal Co., Sparta, Wis., has been organized to manufacture a vacuum type of traffic signal for motor vehicles, operated from engine exhaust. The new concern is a companion corporation of the Perron Spark Plug Co., established in Sparta two years ago. A. J. Perron is president of both concerns, which will be housed in the same plant. An addition will be erected later in the fall and some additional equipment is now being purchased.

The Milwaukee Board of Industrial Education will purchase shop equipment for the second unit of the new Central Continuation School in December or January. Much of the equipment for the first unit was acquired from Government tool stocks. Fred H. French is secretary of the board.

The Acme Grey Iron Foundry Co., Milwaukee, has been chartered with a capital stock of $25,000 to engage in the foundry and machine shop business. The incorporators are Warren J. Wheeler, Charles W. Brown and Arthur Breslauer, attorney, 740 Wells Building. A statement concerning the plans will be made shortly.

The Litman Bronze Co., Menomonie, Wis., producer of special bronze alloy castings, is seeking a location for its plant in Appleton, Wis. It is desired to come into close proximity to the paper mill industry of the Fox River valley.

The Gulf States

BIRMINGHAM, Aug. 29.

The Tidewater Glass Mfg. Co., Jacksonville, Fla., is planning for extensions in its plant to include a new metal-working department for the manufacture of caps for glass jars. It will build new works to cost $300,000.

Harry Whittier and William W. Shepard, Jacksonville, Fla., are organizing a company with capital of $3,000,000 to construct a new oil refinery with an initial daily capacity of 2000 bbl.

S. Pearson & Son, Ltd., Orizaba, Tex., operating oil properties, is planning the erection of an addition to its hydroelectric generating plant, with machinery to increase the capacity by about 50,000 hp.

The Maryland Refining Co., New Orleans, has commenced the construction of a new refinery to cost about $2,000,000.

The Safety Guard Rail Lock Co., Orlando, Fla., has been incorporated with a capital of $150,000 to manufacture rail locks, locking devices and other railroad equipment. W. L. Daughtry is president and R. B. Jarvis, secretary, both of Orlando.

The Dallas Railway Co., Dallas, Tex., is completing plans for the construction of an addition to its interurban railroad system from Dallas to Terrell, Tex., about 30 miles, estimated to cost $1,800,000, including rails, line equipment, electric stations, electrical and mechanical apparatus. C. W. Hobson is vice-president.

The Texas Oil Products Co., Waxahachie, Tex., has broken ground for a new oil refinery, estimated to cost about $500,000 including machinery.

The Key West Electric Co., Key West, Fla., is planning for extensions and improvements in its electric power plant to cost about $135,000, including the installation of new engine, generator and auxiliary operating machinery. B. L. Grooms is general manager.

The Jensen Ice Works, Jensen, Fla., is arranging for the erection of a new ice-manufacturing and refrigerating plant, estimated to cost $50,000. H. H. Schultz is general manager.

The Hercules Brick Co., Dallas, Tex., is perfecting plans for new works to cost about $75,000. A. B. Saling is general manager.

The Industrial Mfg. Co., Indianapolis, Ind., George A. Weaver, president, is planning the erection of a new pulp and paper mill in the vicinity of Orlando, Fla., to cost about $2,000,000. A site will be selected at an early date.

The Sawyer Specialty Scales Co., Jacksonville, Fla., has been incorporated with a capital of $500,000 to manufacture scales and similar products. W. H. Sawyer is president and W. E. Sawyer, secretary and treasurer.

California

LOS ANGELES, Aug. 23.

The Central California Ice Co., Fresno, Cal., has plans under way for enlargements in its ice-manufacturing plant. Considerable new machinery will be installed.

Rogers Aircraft, Inc., Los Angeles, has been incorporated with a capital of $150,000 by Emery H. Rogers, W. P. Holliday and M. M. Fogel, to manufacture airplanes and parts. It is represented by Fogel & Beman, Merchants' National Bank Building.

The American Auto Radiator Works, 1909 South Main Street, Los Angeles, has filed notice of organization to manufacture automobile radiators and other metal products. Louis Jacobs, 1170 East Twenty-fifth Street, heads the company.

The Wilgus Mfg. Co., Boyd and Wall streets, Los Angeles, manufacturer of oil burners, pump governors and other steam specialties, has plans under way for a new one-story plant, 50 x 120 ft., on property recently acquired.

The Los Angeles Gas & Electric Corporation, Los Angeles, is outlining an expansion and improvement program in electric generating plants and system over a term of years, with estimated cost placed at $5,850,000, including new machinery.

The McLaren Automobile Signal Co., Whittier, Cal., has been incorporated with a capital of $50,000 by Peter McLaren, George L. Hazzard and Rex B. Kennedy, Whittier, to manufacture automobile signal devices and other automotive equipment. It is represented by James S. Bennett, Van Nuys Building, Los Angeles.

The Asphaltum & Refining Co., Los Angeles, has preliminary plans under way for the erection of a new refinery near Long Beach. George Zeeman is president and general manager.

Swift & Co., Chicago, have plans under way for a one-story addition to their meat plant at 922 East First Street, Los Angeles, with installation to include refrigerating machinery and other equipment.

BOOK REVIEWS

The Human Motor. By Jules Amar, D.Sc. Pages, xvi + 470; 5½ x 8½ in.; illustrations and numerous tables, 309. Published by George Routledge & Sons, Ltd., London, and E. P. Dutton & Co., New York.

This unusual work, whose author is the director of the research laboratory of industrial labor at the Conservatoire National des Arts et Métiers, Paris, France, has been translated from the French by Elsie P. Butterworth and George E. Wright. It has for an optional title "The Scientific Foundations of Labor and Industry," and, according to the preface, the author hopes his work may stimulate further research into fields first brought forcibly to the attention of the public by Chauvean and Taylor. According to the publisher's note this work was published in France in 1914, but on account of war conditions an English edition was not heretofore available. It is the publisher's expressed belief, however, that this delay has not affected the value of the book, owing to the general suspension of such experimental research (except as applied to re-education of the disabled) during the war.

As the title suggests, the human body (or motor) is considered in terms analogous to an inanimate body (motor) capable of transforming energy into work. For the benefit of the lay mind the first 84 pages are devoted to a concise summary of the general principles of mechanics.

A discussion of the "Human Machine" follows, taking up the structure of the matter constituting the organs of living machines, and describing the organs of movement and locomotion, or the bones, muscles and tendons. Since the motor in the human body is the muscle, and the muscle functions like a heat engine, a description of its functioning and its fuel (alimentation) follows. After this is treated human energy under the divisions of the laws of energetic expenditure, the yield of the human machine and the physiological effects of fatigue.

Man and his environment are then discussed. The "internal environment" or the blood and the influence of aliments upon it, and the external environment or the atmosphere, temperature, clothing, at various altitudes and under varying conditions, are all taken into consideration and treated in detail.

Thus about two-thirds of the work are given over to establishing the analogy between inanimate and animate motors. Some 70 pages are then given over to a description of the experimental methods, including measurements and instruments, the dynamic elements of the human machine and the measurement of energy. The remainder of the work under the general head of "industrial labor" discusses the human body in equilibrium and movement, industrial labor and locomotion, the tools of industrial labor; and finally the general conclusions of the author. The work is replete with experimental data of all kinds and as the author suggests, should stimulate leaders of scientific thought to attempt even more complete treatment of the subject.

E. C. R.

Employee Training. By John Van Liew Morris, Ph.D. Pages, xxiii + 311, 5½ x 8 in. Published by McGraw-Hill Book Co., Inc., New York.

Since the title might be used for books very different in character, it is advisable to note that in this instance the book consists merely of a very comprehensive compilation of the methods used in the training and educational departments of various corporations throughout the country. The compilation evidently was carefully planned for, since it is confined to metal working industries, electrical equipment manufacturers, shipbuilding and railroads, with one example in the printing industry.

The subject matter of the compilation is based on information gathered in personal visits and supplied by educational and training executives. This is grouped under four main heads of programs for apprenticeship and special training; programs emphasizing apprenticeship; programs emphasizing special training; and programs of primarily technical instruction. After setting forth the findings in this matter, an academic discussion of them at some length follows, and then a brief chapter on conclusions. There is included a selected bibliography and complete index.

The data for this book seem to have been obtained carefully and accurately, and are reproduced in sufficient detail to make the book of considerable value for reference purposes.

Labor's Crisis. By Sigmund Mendelsonn. Pages, xii + 171, 4½ x 7¼ in. Published by the Macmillan Co., New York.

An employer's views and analysis of labor problems, based upon the practical experience of an employer, are given in this very interesting and readable little book. Taking as his basis the fact that a labor problem exists, the author tries to show wherein it differs in this twentieth century from that of the nineteenth. In other words, insufficiency of labor, the inflated wage and the striving for economic dominance by labor constitute for the employer a very different one to-day.

To the author this whole problem seems to revolve about the matter of the number of working hours per day. Arguing that "acute labor shortage cannot be materially relieved by new inventions nor by the more intensive application of labor-saving machinery and devices," and that from a 12 and 14-hr. day we have come to an 8-hr. day, with efforts toward a still shorter work day gaining ground, he discusses both the economic effect and the moral effect of this curtailment of labor.

The nature and effect of poverty as related to labor, labor welfare as related to material and social welfare and labor as it affects the wife and the home are other phases of the problem touched upon.

The Automobile Industry and Its Future. By Leonard P. Ayres, vice-president Cleveland Trust Co., Cleveland, Ohio. This pamphlet of 32 pages is the second of the economic series of the Cleveland Trust Co., the first, also by Mr. Ayres, being on "Price Changes and Business Prospects." A feature of the discussion of the automobile industry is a table presenting in outline the statistical history of the industry from its beginning more than 25 years ago. There is also a description of a new method for computing the elimination of cars year by year. The prognosis of automobile use and production is particularly interesting. The number of cars manufactured up to the beginning of 1921 is put at 11,775,000, of which more than 700,000 have been exported. About 9,000,000 are in use and 2,000,000 have been worn out, destroyed or abandoned. The average term of service has been about six seasons. At the end of 1920 one car was in use for each 12 people in the population. Since 1916 the increases in the annual output have been largely for the increasing demand for Ford and other relatively inexpensive cars, and for some time to come the new users will be people of limited means who will buy inexpensive cars. It is believed the country will shortly need about 1,500,000 cars annually if the use of automobiles remains about at its present status. The production capacity is more than 2,500,000 cars per year. Extensive price readjustments may be expected in the next few years, the author believes, as the industry with its great capacity competes for purchasers among people and countries whose buying power has been sharply curtailed.

South African Engineers' Directory.—Electrical and allied trades, including a complete mining directory. Pages X + 481, 6½ x 9½ in. Compiled and published by the South African Mining and Engineering Journal, Johannesburg, Union of South Africa.

This directory covers South Africa and has been planned to embrace every branch of engineering (electrical, iron, steel, machinery, constructional and automobile) and also the hardware business throughout the Union, Rhodesia and Mozambique. It classifies the personnel of the various trades alphabetically and geographically.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ⅛ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅝ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¼ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c. to 4.25c.
Annealed soft	4.00c. to 4.25c.
Galvanized annealed	4.75c. to 5.00c.
Coppered basic	4.50c. to 4.75c.
Tinned soft Bessemer	6.00c. to 6.25c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	18½c. to 20 c.
Copper tube, seamless	20 c. to 22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14x20	Primes	Wasters
		80 lb....	$6.80	$6.55
		90 lb....	6.90	6.65
		100 lb....	7.00	6.75
IC.. $10.60	$9.50	IC...	7.20	6.95
IX.. 11.80	10.75	IX...	8.10	7.85
IXX.. 13.60	12.25	IXX...	9.10	8.85
IXXX.. 15.60	14.25	IXXX...	10.50	10.25
IXXXX.. 17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	29c.
Bar	36c. to 37c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c.to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6c. to 6½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	29c. to 31c.

Old Metals

The market is very quiet with no business. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.50
Copper, heavy and wire	8.75
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

THE IRON AGE

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Electric Furnace Operating Experiences

Experiments with Three Forms of Furnace Bottom—Methods of Building Bottoms—Experiments with Roof and Sidewalls—Metallurgical Features

BY LARRY J. BARTON*

DURING the last five years the electric furnace has shown the greatest increase of its career. Under the conditions of war specifications there was great need for a melting medium which would furnish the required steel. Many orders carried such rigid specifications that they could only be met by steel made either in the electric furnace or the crucible. Eliminating the crucible due to its small tonnage and high cost, there remained only the electric furnace. The tests of this steel, the tonnage possible in a given period, and its commercial costs, opened the eyes of manufacturers to its peace time possibilities. Its scope or adaptability in the making of alloy steels, steel castings, iron castings, etc., have come to be thoroughly recognized, and it has become one of the accepted factors in the steel industry.

Many new furnaces have come into existence and many executives have adopted the idea that all they need to produce steel of exceptional quality is an electric furnace. The personal equation is either ignored or passed over as a minor point. The following paper is an attempt to show what highly varying results can be obtained on the same furnace under different conditions of operation. The points shown are not brought forward as anything new, but merely to bring before the eyes of the electric furnace industry some points usually regarded as minor, yet points which may mean commercial success to a new undertaking.

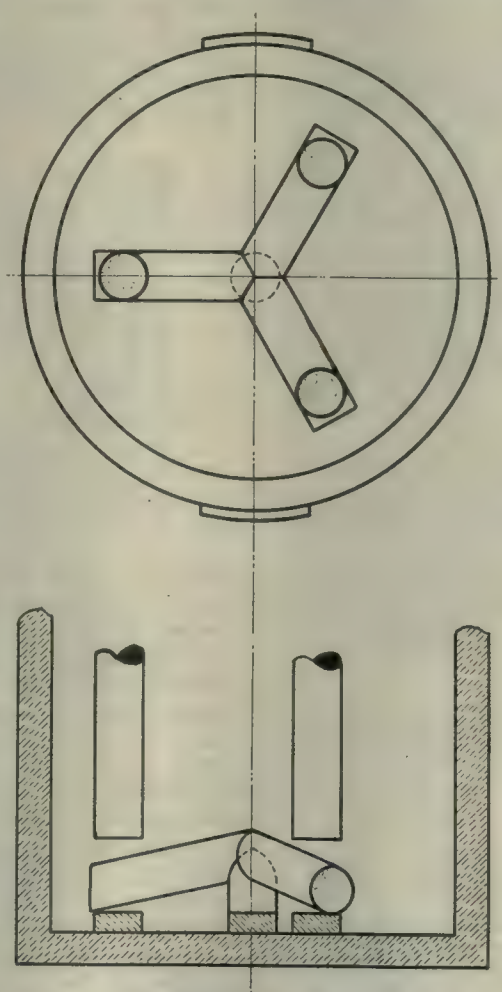


Fig. 1—Arrangement of Electrodes for Burning the Bottom of the Furnace by Sintering Bit by Bit

Furnace and Equipment

The furnace discussed in the following article is a standard 6-ton Heroult, basic lined. The electrical equipment used throughout is of General Electric make. This furnace is working on steel castings and high-grade rolling and forging ingots for general railroad work. The scrap used is not selected, but is taken as it comes from the road, consisting of such material as old track bolts, spikes, tie-plates, old castings, forge flashings and butts, borings and turnings, etc.

When the furnace was about to be put into operation great consideration was given as to whether an acid or a basic process was to be used. The advantages for the acid process were hotter and cheaper steel and greater tonnage in a given period. Against this were the disadvantages: selected scrap must be used to meet specifications, due to the inability to do any refining of note on an acid bottom; specifications and analyses are harder to meet with constant exactitude; alloy steels cannot be very satisfactorily made, and can never be remelted to save alloys; no iron refining can ever be done; power surges and even control give more trouble than on a basic bottom.

As the scrap to be used was high in phosphorus and sulphur, due to large quantities of wrought iron, it became imperative to use the basic process. Against the disadvantage of higher cost for this process were the ability to make any analysis with ease; great refining possibilities; easier power control; elimination of power surges with high peak loads; reclamation of alloy steel scrap; and most important of all, complete de-gasification.

Basic Furnace Bottoms

There are three methods in use for the making up of a basic bottom.

1. The bottom is sintered in bit by bit, being always under the heat of the arc.

2. The whole bottom is rammed into place, the furnace filled with coke and heated white hot for from

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8 to 24 hr., burning in the complete bottom at one operation.

3. The bottom is rammed in an inch or two at a time, and then burned as in method 2.

Believing that the better the bottom at first, the less trouble in the future, we used the first method. This method is one which, if properly done, will give

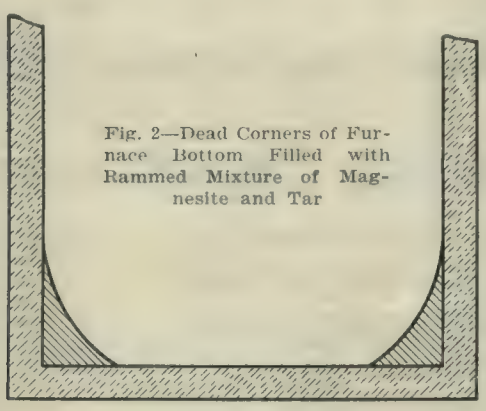


Fig. 2—Dead Corners of Furnace Bottom Filled with Rammed Mixture of Magnesite and Tar

a bottom of solid material all the way through, without any foreign material such as coke from tar, as would be obtained in a rammed bottom. Then there is no danger of the bottom rising in layers as is possible when put in by ramming a layer at a time.

The following is a log of the bottom burning:

Electrodes set on bottom as shown in Fig. 1:
Dead corners of bottom filled with rammed mixture of magnesite and tar, as shown in Fig. 2.

4:30 p. m.	Current on at 2000 amp.; 500 kw.
5:30 p. m.	Current 3000 amp.; 700 kw.
6:30 p. m.	Current 4000 amp.; 900 kw.
7:30 p. m.	Opened doors for first time after start, raised electrodes and inspected walls. On lowering electrodes the plug in bottom connection slipped.
8:05 p. m.	Current on again at 900 kw.
9:45 p. m.	First addition of magnesite-basic open-hearth slag, 4:1, made around corners; 1200 kw. Walls glistening.
9:45 p. m. and 1:00 a. m.	Additions made regularly as long as previous layer had become thoroughly sticky and pasty.
1:00 a. m.	Bottom as high as possible on this set up. Shut off current and pulled electrode stubs. Bottom looking fine, walls have run slightly.
Second Set Up.	
5:10 p. m.	Current on, 500 kw.
6:10 p. m.	Increased to 600 kw.
7:10 p. m.	Increased to 750 kw.
8:10 p. m.	Increased to 900 kw. Furnace getting very hot.
8:30 p. m.	First addition of 6:1 immediately to rear of No. 2 electrode, where arc is directly striking. Walls glistening. Additions now being regularly made of 6:1.
9:40 p. m.	Cut power to 700 kw.
10:50 p. m.	Cut power to 600 kw.
11:40 p. m.	Cut to 500 kw. From this point used all mixture in a moist condition and used spoon for all wall touching. All additions being made with current on.
3:40 p. m.	Current off and stubs removed. Bottom looks fine and hard as rock.

Bottom 8 in. thick at center.
Total time 19 hr.

This bottom has been in use for a year and a half on 24-hr. operation, and has not given a bit of trouble.

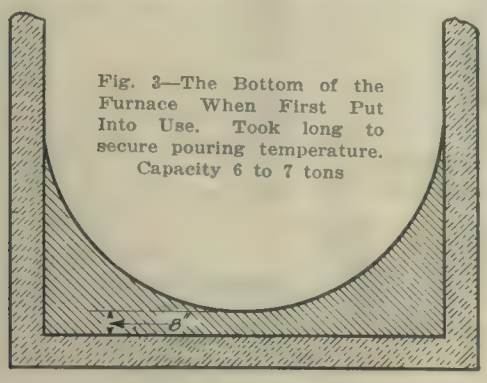


Fig. 3—The Bottom of the Furnace When First Put Into Use. Took long to secure pouring temperature. Capacity 6 to 7 tons

While on the subject of bottom making, it might be a good thing to mention the use of the cement gun. While not particularly applicable on such a small installation as ours, in the case of a 75 to 100-ton open hearth furnace, it has proved to be a wonderful aid in bottom making and patching between heats. The best open-hearth bottoms are those put in the same way as indicated by the preceding log. The old way was to have a gang of men throw the patching material across the furnace with shovels. For this purpose the cement gun is now coming into large use. Some of its advantages are: The bottom can be made up while the gas is on and the doors down; there is practically no wasted material; the material is shot precisely to the points where wanted; the men can stand away from the heat, and only two men are needed to handle the apparatus; the time between heats can be materially lowered.

Experiments on Bottom

The bottom when first put in was as shown in Fig. 3. After following results very carefully on this shape of bottom, we allowed the bottom to "build up" to shape shown in Fig. 4. When our figures from this method were enough to prove the results, we changed to the shape as shown in Fig. 5. During this period we ran heats of 5 to 8 tons, keeping careful figures on all such points as time of melting down, refining, etc. From this mass of data we obtained the following points:

1. Bottom No. 1 melts down fastest. It takes longest to heat to the pouring temperature. Refining is not as good as No. 3. Trouble is experienced with side walls digging opposite the arcs. Due to its increased depth, there is a greater length of electrode necessary between the roof and the bath during melting down. In other words, due to the electrode's digging deeper, the holders must be fastened to the electrode

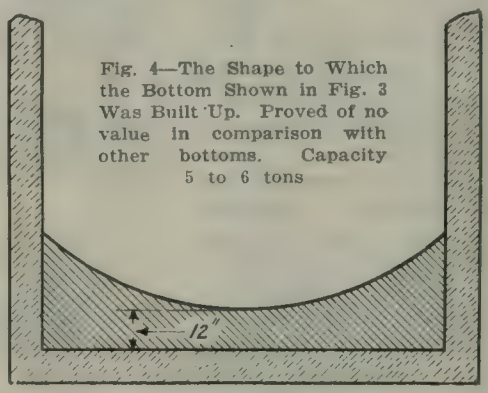


Fig. 4—The Shape to Which the Bottom Shown in Fig. 3 Was Built Up. Proved of no value in comparison with other bottoms. Capacity 5 to 6 tons

higher up. This results in a greater amount of electrode becoming heated and results in greater electrode consumption.

2. Bottom No. 2 proved to be of no value at all, in view of the working of the other two. It took greater power, more time, more electrode consumption in proportion, to turn out the smaller heats than with the larger heats on the other shape bottoms.

3. Bottom No. 3 proved to be the best all around bottom. While it did not melt as fast as No. 1, the total time per ton was less, due to shorter time of refining and superheating. Absolutely no trouble was experienced with side walls, and refining was possible without extra trouble, down to 0.005 per cent sulphur. The main point found was that with a bottom shaped as No. 3 it was possible to melt and pour 8 tons of metal, in the same time as would take for 6.5 tons on bottom No. 1, or 5.5 tons on bottom No. 2. On this bottom we have made 8-ton heats, for steel castings, in as short a time as 3 hr. 5 min. from the time current was put on until pouring.

Furnace Walls

Having determined the shape bottom which gave us the best results, our next step was made on the side walls. These were of 18-in. silica brick, two courses, laid flat. The bricks were made by the American Refractory Co., analyzing about 90 to 95 per cent silica,

and have proved very reliable. These bricks were laid perfectly dry and completely up to the roof ring. After running several linings we changed as follows: The lining next to the shell was run all the way to the roof, while the inside lining was run only as high as the arches. This made an 18-in. lining up about half way, and a 9-in. lining from that point to the roof. After obtaining our figures on this style of wall, we substituted magnesite brick for the silica brick, in the

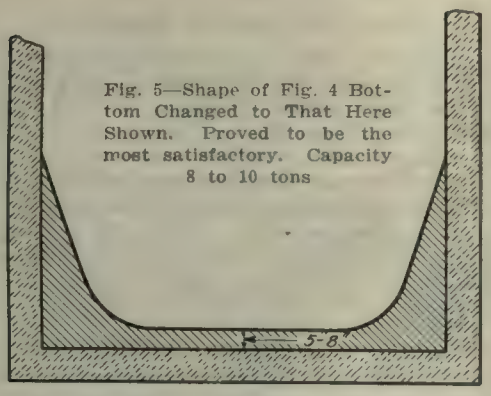


Fig. 5—Shape of Fig. 4 Bottom Changed to That Here Shown. Proved to be the most satisfactory. Capacity 8 to 10 tons

inside lining for a space of about 2 ft. directly opposite each electrode. Then we did the same thing, using carborundum brick opposite the electrodes. Our next step was to use only 9 in. of brick in the walls, trying both silica and magnesite. In the near future we expect to try this with carborundum brick.

From our trials we found that:

1. Both with full 18-in. walls, and with 18-in. walls only half way up we experienced the trouble of having the brick burn through opposite the arcs. This is shown in Fig. 6. This weakened the wall and we had great difficulty with the upper part of the wall falling in when pouring. To overcome this we moved the electrodes 2 in. in toward the center of the furnace, but still had the same difficulty.

2. Magnesite brick opposite the arcs hold up much longer than the silica brick, but tend to spall severely, coming off in pieces 2 in. thick.

3. Carborundum brick burned off 2 in., while magnesite brick under them burned 9 in., and silica brick above burned through 18 in. These bricks gave excellent service, but at a price of $1.75 per brick, the cost is prohibitive. We expect to put in a full wall of these bricks to determine exact costs of same.

4. Best results were obtained with only a 9-in. wall. While the loss of heat was greater, by lining a little oftener this was entirely overcome, and the extra cost of brick was saved by the ability of repairing in shorter time than when a full 18 in. was used.

While there are many other combinations of brick which could have been used, we feel that we have tried out enough to be able with certainty to foretell the condition of our furnace weeks ahead. We believe that as good results are obtained with only 9 in. of brick as with 18, figuring on a yearly basis.

Furnace Roof

Our roofs are made up in the standard way, using the common shapes of silica brick. The only experimentation done on the roof was trying out different heights from the bath. We have tried with the roof resting on the roof ring of furnace; with it 2½ in. higher; and with it 5 in. higher. We find that by raising the roof we save enough to obtain a few heats more from each roof, but it takes longer to get out the heats. Our present practice is to rest the roof directly on the ring. We are now collecting figures on the operation of a Griffin patent roof, which was put into operation a few weeks ago.

Carbon electrodes of 17 in. diameter and graphites of 10 in. diameter have both been tried with the balance in favor of the carbon. Our main objection to the graphites is the fact that they are too fragile and do not stand up under tonnage work. In addition they require too much lowering in the holders, causing a large amount of delays. With the carbons we found that they would melt quicker, did not break so much, required less lowering, gave better power figures, and in general under our conditions proved much better.

Slags

The slags are the heart of the electric furnace process. Under an oxidizing condition phosphorus is removed, while under a reducing condition sulphur is eliminated. As these impurities are removed by the slag it follows that the greater the amount of slag, the larger the amount of impurities that will be removed. It also follows that the greater the amount of slag, the greater the power necessary to melt and keep this in a molten condition. It normally takes about 530 calories to melt low carbon steel, while it takes about 650 calories for the same amount of basic slag. Therefore the slag requires more heat for the same amount than the steel, and all heat or power wasted in heating unnecessary amounts of slag is money wasted.

What Is Correct Amount of Slag?

The problem therefore is to ascertain the correct amount of slag to use to eliminate the impurities. As the base of the slag is lime, and this is practically infusible, there must be something else added to form a slag with the calculated weight of lime. There are two main materials, silica sand and fluorspar. Of these silica sand is much the cheaper, and if possible should be used in greater quantity than the fluorspar. Now the question comes up, "How much of these shall I use?" One naturally wishes to add enough to make the slag thoroughly fluid and yet not make it watery or tend to go acid, nor does one want to have a thick viscous slag.

After a large number of trials and experiments on this subject, we have adopted the following: Lime, 2 per cent of the charge; sand, 20 per cent of the lime; spar, 10 per cent of the lime; ground coke, two large scoops to each side, or four large scoops to the total. For our first slag we use 2 per cent of the charge lime only, the lime having enough dirt and sand from the scrap to flux it thoroughly. The second slag material is added half at a time, being thoroughly mixed on the

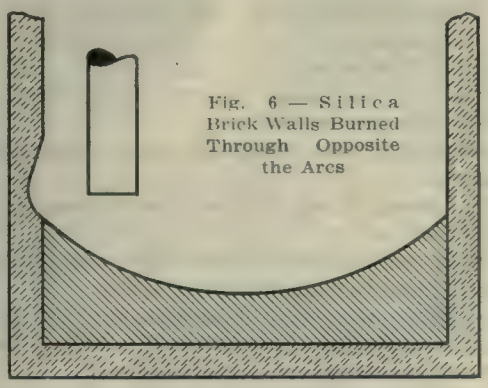


Fig. 6 — Silica Brick Walls Burned Through Opposite the Arcs

floor. In a large majority of cases this mixture will give a finished slag in 20 min. to half an hour. If anything this slag tends to come up a little thick, requiring one scoop of about 25 lb. of spar to finish it. The amount of ground coke will not affect the carbon in the metal and is the principal cause for a quick clearing of the slag. We have run hundreds of heats call-

ing for under 0.10 per cent carbon with this mixture and have seldom had an off analysis.

Alloys

All our alloys are added to the furnace. Our ferromanganese is added immediately after slagging off. Then when the slag has cleared and powders on exposure to the air we add the silicon. If alloy steels are being made, then is the time to add the alloys. This applies to chrome, chrome-vanadium, high silicon, manganese steel, and any others in which the alloy itself is likely to become oxidized. Copper and nickel can be added in the charge with no appreciable loss. Immediately the final alloys are added, the slag must be given a heavy dusting of ground coke to prevent any possible reoxidization. On heats under 0.10 per cent carbon, we add ¼ lb. of aluminum per ton of metal, in the ladle, to prevent any rising in the molds.

Pouring

We do not use any skimming gate when pouring. We do not claim that this is the best of practice, but find that the class of steels we make do not require such precautions. In a case for very high grade forging ingots, for instance, just a few minutes before pouring we throw a scoop of lime on the edge of the slag just inside the tapping door. This thickens the slag enough to act as a skimmer, the slag following into the ladle after the greater part of the metal. On heats of this kind we tap at a much higher temperature than required, add a few pounds of fluorspar in the ladle, and hold the metal in the ladle 10 or 15 min. before pouring any ingots. The fluorspar tends to bring any foreign matter to the top during the period when holding.

We have made numerous tests to determine segregation but have never found any to amount to anything. We lay this to the fact that the steel is completely finished before it ever touches the ladle, the pouring operation serving merely further to mix it.

Conclusion

After an intensive series of experiments we have adopted the following conditions as being more economical and efficient in every manner, under our conditions of working:

1. The bottom shall be nearer the shape of a saucer than a cup.
2. The thickness of the bottom shall be ⅝ in., and shall be made of double dead burned magnesite, sintered in bit by bit.
3. The walls shall be of silica brick, 9 in. thick.
4. The walls shall be laid either dry, or with a thin coating of silica cement.
5. The roof shall rest not over 2½ in. higher than the roof ring, preferably on it.
6. Electrodes shall be of amorphous carbon, 17 in. in diameter.
7. Dephosphorizing slag shall be 2 per cent of the charge lime.
8. First slag shall be added during melting down, never added on the hearth.
9. Deoxidizing or final slag shall consist of 2 per cent of charge lime; 20 per cent of lime sand; 10 per cent of lime fluorspar; 4 scoops ground coke.
10. This final slag charge shall be added a few minutes after slagging off, one-half at a time.
11. All alloys shall be added in the furnace, and steel shall be in a finished condition before the ladle is called for.

In closing, the writer again wishes to reiterate that the ideas expressed in the foregoing are not offered as a text on electric steel, but merely as a few suggestions of the great amounts of varying results which can be obtained with the same apparatus, showing the great importance of the human equation. Our conditions as we found them may be a great deal different in another shop under different conditions, but the record of the experience may serve as a guide to meeting difficulties as they come. In the face of the present competition it is the shop with the best and most efficient "system" which will win out.

Causes and Cures of Depression

In discussing the current business situation, President F. C. Biggert, Jr., United Engineering & Foundry Co., Pittsburgh, states—"Always it is the arousing of the national consciousness to the fact that something is out of joint, or likely to go out of joint, that causes depressions. This time it is the foreign situation which looms largest as a disturbing factor. This situation is the inevitable consequence of our war commerce; its correction will be by the inevitable operation of the law of compensation, and a very long time, a great many years, will be required to re-establish the balance.

"To be sure we can recover our breath and go ahead within our own country and be prosperous for a long time, without any considerable commerce with other nations; but we must recognize and obey the natural conditions to be successful in this.

"We must buy from outside nations more than we sell to them, and to offset this purchase of foreign labor, we must occupy ourselves in the development of our own country to the highest possible state of economy. We need railroads and railroad equipment, improved highways, development of waterways, houses and farm machinery. We should develop our water powers to the end that less coal be consumed and should burn our coal more efficiently where we must burn it. We should study the economical use of all our labor and materials.

"Under our present conditions it will be difficult to do these things. Wise counsel and judicious government will be necessary to their proper consummation, but they are the key to our success in the future."

Improvements of American Roll & Foundry Co.

A program of improvements at the American Roll & Foundry Co. department at Canton, Ohio, of the United Engineering & Foundry Co., Pittsburgh, started in 1920, is now nearing completion. It includes an extension of 120 ft. to the roll and machine shops, 200 ft. to the foundry, new pattern shop, new blacksmith shop, modern office building together with various additions to equipment, including a number of cranes, roll lathes, new type air furnace, with waste heat boiler, and Fuller coal pulverizing equipment.

The plant produces gray iron castings, sand and chilled rolls, and is equipped for and makes a great many rolls for rolling iron, steel, spelter, brass, copper and alloyed metals, and also makes a specialty of rolls for rubber and paper mills.

"Peds" to Attach Trim to Concrete

The General Fireproofing Co., Youngstown, Ohio, is introducing to the building trade a "ped" or spot ground for attaching wood and metal trim to walls, and screeds to concrete floors. A ped consists of a nailing block of wood forced into a circular metal plate. The wood block, 2 in. in diameter, is treated to prevent rotting or swelling from moisture. The metal plate, 3⅝ in. in diameter, is painted to prevent rust and perforated with ⅜-in. holes. The ped is bonded to the wall with plaster or to the floor with cement, and the plaster or cement comes through these holes and keeps the ped firmly attached to the basic surface.

When the plaster or cement has set, the walls are plastered flush with the top of the wood nailing block, and the floor screeds are nailed down. The peds form solid, permanent spot grounds in the walls for the secure fastening of wall trim, and a firm foundation for the wood floor.

Foundry Irons for Particular Uses

Differentiating Characteristics of Gray Iron, Mottled, Chilled or White—Skill of Manufacture—Analyses for Certain Castings

BY Y. A. DYER*

GRAY iron may be designated as a stable system (Fe—Fe_3C—C) when compared with white iron. That is: at different prolonged cooling temperatures and concentrations, sufficient time elapses for its constituent parts—more particularly carbon—to reach a state of comparative equilibrium with reference to molecular adjustment. Therefore, when gray iron is permitted to cool gradually, its molecular structure follows more closely the curve lines of stability. During the cooling periods the iron carbide has sufficient time to decompose naturally into iron and carbon—part of the carbon separating out as particles of graphite. The presence of this graphitic carbon in cast iron controls its eutectic, or melting point, and largely determines its fluidity and freezing point. That is: the melting point of graphite has not been determined, and the specific heat of carbon is high (at 23650 deg. Fahr. it is 0.505) and varying with rise in temperature; therefore, the melting point of the iron will be high and the latent heat of carbon in solution high.

If an equal quantity of heat be given out (and it is) by the graphite when the reverse change takes place—in cooling—then the carbon, as it separates out of solution with the iron, must give up equally as high heat—hence the giving up of this latent heat by the carbon as it separates out through the different stages of cooling prolongs fluidity of the metal and controls its freezing point. Each time the metal temperature is lowered, its power to hold carbon in solution decreases; therefore, as more carbon separates out, additional heat is added by its dissociation.

It would seem that, in a measure, this is a rational explanation as to why the melting point of gray iron is higher than that of white iron; also why its fluidity is prolonged over that of white iron by reason of the high percentage of graphite present; and also why its freezing point is lower than its melting point. The iron carbide in iron is a very unstable compound, and when formed at a high temperature decomposes into graphite and iron according to the formula: $Fe_3C = 3Fe + C$. Later on, in discussing white iron, another phenomenon of the performance of iron carbide will be noted. A typical gray iron melts at about 2260 to 2280 deg. Fahr.

Mottled Iron

The classification of mottled iron, with reference to structural composition, may be described as partly gray and partly white iron; or the "hybrid" of cast iron—it is neither white nor gray iron. Its matrix contains particles of small size graphite and particles free from graphite; or cementite and pearlite. In the classification of pig iron it is graded as low silicon, 0.75 to 1.25 per cent, and contains high sulphur, usually 0.08 to 0.12 per cent. It is generally the product of an irregularly working furnace.

That portion of metal which lies between the chilled tread and hub of a carwheel, or between the chilled surface and core of a chilled roll, is typical mottled iron. The blending from white to gray is gradual, hence the nearer the approach to the gray portion of the metal the larger the graphitic flakes will occur. It contains much free cementite, hence is inclined to be hard and brittle. A typical mottled iron melts at about 2200 to 2230 deg. Fahr.

White Iron

White iron is a supercooled solution of iron and carbon; and, compared with gray iron, may be considered an unstable system between Fe_3C and Fe. That is, its carbon is in an unstable condition, due to the iron carbide not having had an opportunity, during the rapid cooling process, to carry forward the reaction: $Fe_3C = 3Fe + C$. Thus, an iron suddenly cooled presents the spectacle of having its constituent molecules frozen before there has been sufficient lapse of time for proper "molecular adjustment"—hence the molecules are tense and subject to crack by sudden impact or rapid heating and cooling. By annealing such an iron a sufficient length of time, there will be created a "molecular readjustment," and high tension will thus be relieved.

Molecular readjustment may be illustrated by reference to the treatment of "fatigued" iron or steel. Thus, a chain or wire rope which has undergone severe strain of molecular structure may be materially strengthened by the application of heat to readjust its molecules and thereby relieve the tenseness. In the production of chilled carwheels it is very necessary that the wheels be placed in "soaking" or annealing pits, after having been removed from the molds at red heat, in order that there may be created a readjustment of the differentiating molecular structure of the three combined types of metal—white, mottled and gray—thus relieving the tension and preventing cracks and weakness.

During the quick-setting period of white iron the iron carbide has not had sufficient time to decompose into iron and carbon; therefore, after the solution of iron and carbon has set or frozen, this condition renders the carbon very susceptible to subsequent heat reactions. That carbon atoms are migratory, or move and are transferred, is fully demonstrated by the change of structure from white iron to malleable under intense heat; and by the fact that solid iron or steel will absorb carbon, upon being placed in contact with incandescent carbon.

It is possible to produce a white iron in the presence of 2.00 to 3.00 per cent silicon, and in the absence of much manganese and sulphur, if the mixture be melted hot and cooled quickly before the iron carbide has had time to break up. This fact is demonstrated by casting iron in chilled molds, or cooling it quickly by a spray of water. It is also possible for an iron containing a small amount of silicon and large amounts of manganese and sulphur to cool slowly and yet be white in nature. This is illustrated by casting grinding slugs and stars in green sand molds. A typical white iron melts at about 2000 to 2070 deg. Fahr.

Lack of reactions created by graphite separating out of solution, to prolong the fluidity of the metal, explains why the freezing and melting points of white iron may be considered practically the same. Hence white and mottled iron will melt at a lower tempera-

*Birmingham, Ala.

ture than gray iron, and freeze at practically the same temperature.

Skill of Manufacture—Gray Iron

Compared with the high skill and art necessary in the production of chilled or hardened castings, there is usually as fine art and skill needed in the production of certain types of gray iron castings. The founder's wit and skill should be at "par" when he decides to enter the field of brake shoe manufacture, engine and automobile cylinders, piston heads and rings, projectiles, shells, propeller blades, ingot molds, welding rods, acid and alkali resisting castings, glass molds, stills, eggs, retorts, valves, fittings, etc. The relative importance of standardizing certain of these castings is briefly touched in the following paragraphs:

Brake shoes: A casting which will resist sudden and variable frictional wear, yet not be so hard as to break down in an irregular way the wearing tread of the wheel, should be the aim of the manufacturer of brake shoes. The silicon should be fairly low, sulphur low, phosphorus medium and manganese fairly high. The braking power of the shoe will be commensurate with its softness; but soft shoes wear more rapidly. One street railway system manufactures its own brake shoes; they are chilled throughout. This company is noted for the number of flat wheels on its cars; also for the "bell chimes" created by the shoes idling against the wheels while the car is in motion. The following analyses are recommended for brake shoes:

Percentage Contents

	Si	S	P	Mn	Total Carbon
Hard	1.50	0.08	0.60	0.70	3.25
Soft	2.00	0.07	0.70	0.50	3.40

These castings are sold under a guarantee, hence the percentage of good foundry iron should be used as the base metal, with major percentages of steel and low silicon cast scrap.

Automobile castings: The manufacture of automobile cylinders requires a standard of high art. The cylinder specifications not only require minimum thickness, but maximum strength and density, to insure safety from impact of explosion and effective compression; also to care for contraction and expansion due to fluctuating temperatures. Minimum frictional wear is also essential. These are a combination of factors for solution by the most renowned construction engineers. The ingenuity of the molder is also put to a severe test, for much depends on the construction of the mold, and on the gating and pouring. Following are suggested analyses for cylinders:

	Si	S	P	Mn	Total Carbon
Medium	1.75-1.85	0.07-0.08	0.25-0.35	0.75-0.80	3.30
Light	2.00-2.15	0.06-0.07	0.25-0.35	0.60-0.70	3.40

Piston heads and rings should be of softer material, in order not to scorify or wear away the cylinder. The rings should be of a springy nature. Following compositions are suggested:

	Si	S	P	Mn	Total Carbon
Rings:					
Medium	2.00	0.07	0.40	0.75	3.40
Light	2.25	0.06	0.50	0.65	3.45
Pistons:					
Medium	1.85	0.07	0.25	0.60	3.40
Light	2.15	0.06	0.35	0.50	3.45

Projectiles; shells: Cast projectiles, ordinarily used by the Government for target practice, require for their production strict attention to melting practice; also gating and molding. A dried mold, whirl gate and bottom pour are features which will tend to soundness and homogeneity of casting. Shells should be cast vertically, and may number four to the flask for smaller sizes. Twenty-five per cent of steel scrap may be used to good advantage in large size shells, and from 18 to 20 per cent in smaller sizes. Steel will lower the phosphorus and total carbon.

As compressive strength, or resistance to expansion, is an important requisite of shell metal, density is a controlling factor. Specifications usually call for 28,000 to 30,000 lb. per sq. in. tensile strength, and 18-in. impact. Inasmuch as the smallest pin-hole may cause the rejection of shells, it is necessary to minimize oxidation of the metal and guard against segregation, by the use of low phosphorus metal superheated and poured hot. Charges should be well fluxed; good substantial risers used, and metal be allowed to cool in the mold 4 to 6 hr.

Following analyses are suggested:

	Si	S	P	Mn	Total Carbon
Light, 3 to 5 in.	1.40	0.06	0.30	0.60	3.35
Medium, 6 to 8 in.	1.20	0.07	0.30	0.70	3.20
Heavy, 10 to 12 in.	1.10	0.09	0.30	0.80	3.10

Propeller blades: Because propeller blades are for use in both fresh and salt water, corrosion at once suggests itself. Low total carbon, with comparatively high graphite, resists corrosion from salt water. The silicon should not be too high, manganese medium, phosphorus and sulphur reasonably low. As much as 20 per cent steel will assist in lowering total carbon. If propeller blades are heated, and then coated with tar, the treatment will assist in resisting corrosion for a long period of time. Following analyses are suggested:

	Si	S	P	Mn	Total Carbon
Light	1.80	0.06	0.40	0.50	3.40
Medium	1.40	0.08	0.40	0.60	3.25
Heavy	1.15	0.10	0.40	0.70	3.15

Ingot molds: Service and economy are the prime requisites of ingot mold metal. The molds are bulky castings, but continued service depends on their composition; more especially the economy question, as old and worn-out molds are put through the open-hearth furnace for entrance into a new steel mixture. Therefore sulphur and phosphorus should be low. One steel plant produces periodically, for this purpose, in one of its small blast furnaces, a metal of the following analysis: silicon 1.80 per cent, sulphur 0.04 per cent, phosphorus 0.08 per cent and manganese 0.80 per cent. This metal is produced from steel scrap, manganous slag and silica rock. It is then put through the cupola, and poured as ingot molds of following analysis:

Si	S	P	Mn	Total Carbon
1.65	0.06	0.10	0.65	3.40

This analysis constitutes an excellent ingot mold metal, and its duplication in a cupola is suggested.

Welding rods: Clean and flawless metal with reasonably high melting and freezing qualities are desired in welding rods. High silicon, with its fluxing qualities, is a desirable element. Sulphur and phosphorus should be reasonably low and manganese medium. Following composition is suggested:

Si	S	P	Mn	Total Carbon
3.50	0.06	0.50	0.50	3.50

Snap graphite board flasks, inclined vertically, make desirable molds for casting rods. The product will be clean and symmetrically shaped. However, the rods may be successfully cast in dry or green sand. Because the metal section is small and the iron poured hot the grain will be close and even.

Acid-resisting Castings.—Of course, the ideal metal to resist corrosive effects of hot and cold acids would be one which approaches iron silicide; that is: an alloy metal which contains 12 to 15 per cent silicon, or following approximate analysis:

Si	S	P	Mn	Total Carbon
14.00-15.00	0.05	0.05-0.20	0.35-2.50	0.60-1.25

Such a metal, however, could not be classed as cast iron. This metal may be produced in an air furnace or electric furnace by the use of ferroalloys. The nearest approach to an acid-resisting metal, poured from cupola iron, would be of following suggested composition:

	Si	S	P	Mn	Total Carbon
Light	2.00	0.05 max.	0.30 max.	0.75	3.25
Medium	1.50	0.05 max.	0.30 max.	1.00	3.20
Heavy	1.25	0.05 max.	0.30 max.	1.25	3.10

Alkali and heat resistant castings come under the above analyses, with slight rise in silicon and lowering of manganese for heat resistant castings; and still further reduction of manganese for alkali resistant castings.

Gun Iron.—As the name implies, this metal once found its most practical use in ordnance work, mortar guns, cast iron cannon, etc. It has since gained quite a reputation for use in chilled rolls, gas and steam engine cylinders, piston rings, liners and various engine castings which require a smooth, dense and tough structure—"Hunt-Spiller" metal being a fair specimen.

This metal is also essentially a product of the air or electric furnace, in which the elements may be regulated to suit the specific casting required. Carbon control is ideal under such melting conditions, as well as silicon, sulphur, phosphorus and manganese, according to the lining used. While large percentages of steel may be used in cupola mixtures, yet the total carbon in resultant casting may vary considerably, due to the metal's contact with incandescent carbon. Additions of steel scrap will materially assist in accomplishing the desired results. The nearest approach to the analysis of gun iron metal in cupola mixtures would be the following:

	Si	S	P	Mn	Total Carbon
Light	1.80	0.05	0.35	0.60	3.35
Medium	1.40	0.06	0.35	0.70	3.20
Heavy	1.15	0.08	0.35	0.80	3.00

Skill of Manufacture—White Iron

There is no branch of foundry work where skill of operation and metallurgical knowledge are put to a more thorough test than in the manufacture of chilled or hardened castings. The real fine point to be observed in the production of hardened castings is the manner in which the transition of the white section is made to interlock or merge into the mottled section. It should be the endeavor of the producer to have the white fibers interlock or "dove-tail" into the matrix of the mottled section. This conditions decreases straight line cleavage areas and minimizes cracks. Manganese promotes a fibrous, tough chill, whereas sulphur is more conducive to cleavages and brittleness. High phosphorus also has a tendency to produce cleavages, as well as segregation.

For many years foundrymen clung tenaciously to the idea that it was absolutely essential to use charcoal iron in mixtures requiring a hardened or chill process. While modern foundry practice has to a great extent removed the barrier, the fact remains that dependable low silicon iron of high grade is yet peculiarly a product of the charcoal furnace.

As low silicon irons, 1.25 per cent and under, produced in a coke furnace, are likely to be "off grade" by reason of excessive sulphur or other causes incident to an irregularly working furnace, they may prove to be an inferior product. In many instances, however, it is possible to use the higher silicon coke irons, 2.25 to 2.75 per cent silicon, in chilled or hardened mixtures, by having available sufficient low silicon cast scrap, 0.50 to 0.70 per cent silicon, and steel scrap. The following comparative results reported by Evans are interesting:

Mixture A	Per Cent	Analysis	Per Cent
Pig iron	11.6	Silicon	0.607
Steel scrap	8.3	Sulphur	0.148
Old wheels	80.1	Phosphorus	0.430
Ferromanganese	0.2	Manganese	0.563
		Graphite carbon	2.587
		Combined carbon	0.729
		Total carbon	3.316

	Tests Crack	Break	Chill
Average drop blow	27.6	66.2	0.51-0.60 in.
		Chilled Tread	Test Ingot
Hardness		477	482
		Load	Deflection
Transverse 1¼-in. round-gray		2 948 lb.	0.123 in.
Transverse 1⅛ in. square-chilled		2,611 lb.	0.043 in.

Mixture B	Per Cent	Analysis:	Per Cent
Charcoal pig	13.30	Si	0.634
Steel scrap	8.30	S	0.160
Old wheels	78.30	P	0.350
Ferro-manganese	0.05	Mn	0.425
		Graphitic carbon	3.191
		Combined carbon	0.344
		Total carbon	3.535

	Tests Crack	Break	Chill
Average drop blow	15.4	49.6	0.46-0.56 in.
		Chilled Tread	Test Ingot
Hardness		457	478
		Load	Deflection
Transverse 1¼ in. round-gray		2,975 lb.	0.111 in.
Transverse 1⅛ in. square-chilled		2,617 lb.	0.043 in.

Car Wheels.—An economical mixture, as well as one which will produce a wheel to stand all the requirements of the Master Car Builders' Association, may be made with the following materials:

	Si	S	P	Mn	Total Carbon
12.0 per cent pig	2.30	0.04	0.55	1.15	....
10.0 per cent steel	0.10	0.03	0.06	0.50	....
78.0 per cent wheels	0.65	0.12	0.35	0.58	....
0.3 per cent ferro-manganese	....	....	....	80.00	....
Wheel analysis	0.65	0.12	0.35	0.60	3.35

The depth of chill on tread of railroad carwheel ranges from ¾ to ⅞ in.; street carwheels require considerably lower depth of chill. The safer policy would be to aim for a lower silicon content in a wheel, rather than a high one, for high-silicon iron or ferrosilicon may be quickly added to raise the silicon, whereas if the silicon should be too high, more drastic steps have to be taken to "pig down." Therefore, in mixtures for chilled castings, the silicon content in the metal mix should be low.

Chilled Castings.—Where only a hard, smooth chill is wanted, the manganese may range from 0.25 to 0.35 per cent; sulphur 0.07 to 0.10 per cent. This especially applies to chilled rolls. Following approximate analyses have proved good mixtures for rolls:

	Si	S	P	Mn	Total Carbon
Light	0.85	0.07	0.50	0.35	3.00
Heavy	0.60	0.08	0.35	0.35	2.85

Following analyses for other chilled or hardened castings have proved satisfactory:

	Si	S	P	Mn	Total Carbon
Plow points	1.25	0.07	0.50	0.85	3.10
Dies	0.85	0.08	0.40	0.50	3.00
Anvil blocks	0.85	0.10	0.35	0.60	3.00
Armor	0.70	0.08	0.40	1.00	3.00
Grinding balls	0.75	0.15	0.40	0.80	3.00

Rate of cooling also has its effect on the chill and texture composition of metal mixtures desired for hardened castings. The process is accomplished by the sudden cooling of the molten metal coming in contact with a metal chiller, the depth of chill depending on the chemical composition of the metal and the temperature at which it is poured. Chill test blocks are made 6 x 4 x 1½ in., and are usually cast in the mold with the casting, and from the same ladle of metal, as a check or indication of chilling qualities.

Low silicon, high combined carbon and medium manganese are ideal chemical components, and hot unoxidized metal, poured at a temperature between 2400 and 2500 deg. Fahr., favors satisfactory chilling conditions. If melting conditions should be right, and careful attention given to the matter of pouring tem-

perature, higher silicon mixtures may be made to produce a deep chill. However, the metal must not be oxidized, or the resultant casting will be irregular and weak.

Iron properly chilled should show a structural mixture of cementite and pearlite, with quite an excess of free cementite; the mottled portion, in addition to cementite and pearlite, will reveal small patches of graphite; the gray portion will show relatively large plates of graphite in pearlite, with a comparatively small amount of free ferrite in pearlite. The chemical composition of white, mottled and gray sections of hardened iron would be expected to approximate the following percentages:

	Si	S	P	Mn	Graphitic Carbon	Combined Carbon	Total Carbon
White....	0.65	0.11	0.40	0.50	0.05	3.25	3.30
Mottled...	0.65	0.12	0.39	0.52	1.50	1.60	3.10
Gray.....	0.60	0.13	0.38	0.55	2.40	0.80	3.20

CHINA BUYS LOCOMOTIVES

American Builders Secure Part of Large Order for Rolling Stock

WASHINGTON, Sept. 5.—Forty-one locomotives were required for three Chinese Government railroads, for which bids were received from 28 manufacturers, including British, German, French, Belgian, Japanese and American factories. The business was divided into four items and awarded as follows:

Item 1.—30 Prairie type locomotives for Pekin-Hankow Railway. Awarded to Forges Usines et Fonderies de Haine-St. Pierre Ateliers Metallurgiques Tubize Société Franco-Belge à la Croyere, Belgium.

Item 2.—6 English type locomotives for Shanghai-Hangchow-Ningpu Railway. Awarded to Forges Usines et Fonderies de Haine-St. Pierre Ateliers Metallurgiques Tubize Société Franco-Belge à la Croyere, Belgium.

Item 3.—2 Mikado type locomotives for Pekin-Suiyuan Railway. Awarded to American Locomotive Co.

Item 4.—3 Pacific type locomotives for Pekin-Suiyuan Railway. Awarded to American Locomotive Co.

Two hundred and forty all-steel cars were required, 100 of which were open and the others covered. Although three items were represented, all were awarded to Compagnie Centrale de Construction à Haine-St. Pierre, a Belgian company.

Bids were submitted in seven different currencies, and certain bids were rejected because the delivery offered was not as specified. The following table gives the lowest bid of each of the several nationalities:

Items and Nationalities	Bid—Currency	Bid—Amount	Equivalent in Taels
Thirty Prairie type locomotives:			
Belgium	Belgian francs.	452,550	55,210
Japan	Yen	85,000	62,475
United States	Dollars	42,200	68,510
Germany	Dollars	49,215	76,280
Great Britain	Pounds sterling	13,647	78,880
Six British type locomotives:			
Belgium	Belgian francs.	434,660	53,025
United States	Dollars	43,230	67,000
Great Britain	Pounds sterling	11,750	67,915
Germany	Dollars	49,540	76,790
Three Pacific type locomotives:			
Japan	Yen	94,000	61,740
Belgium	Belgian francs.	515,000	62,830
United States	Dollars	50,880	78,860
Great Britain	Pounds sterling	14,310	82,710
Germany	Dollars	53,910	83,560
Two Mikado type locomotives:			
Belgium	Belgian francs.	548,600	66,930
Japan	Yen	100,000	73,500
United States	Dollars	52,000	80,600
Great Britain	Pounds sterling	14,904	86,150
Germany	Dollars	57,000	88,350
One hundred all-steel "open wagons":			
Germany	Pounds sterling	612	3,540
Belgium	Belgian francs.	31,325	3,820
United States	Dollars	2,550	3,950
Japan	Yen	6,000	4,410
Great Britain	Pounds sterling	1,016	5,870

It will be noted that the relative positions of the various countries change very little and that the American product is competitive. Belgium and Japan were consistently lower, and Great Britain and Germany consistently higher, in prices for locomotives, than was the United States. It is necessary to make certain allowances in interpreting the above data. Specifications for the 30 Prairie type locomotives conformed almost exactly with the Belgian locomotive already operating, and the 6 British type locomotives are to conform strictly with existing locomotives of British manufacture. Certain bids were disqualified, even though nominally lowest, because they did not include all items as required for delivery as specified. The two Mikado and three Pacific type locomotives were awarded to the lowest bidder that conformed to the specifications for a cast-steel bar frame.

These figures indicate what is to be anticipated in the present disturbed condition of international exchange. In spite of the fact that the American dollar is at a premium over all the other currencies, it is still possible to submit competitive prices. As the indications are that the amount of this premium will gradually decrease during the next few years, it should have the effect of placing American manufacturers in an increasingly favorable position.

If the Belgian franc stood at 10c. instead of 8c. it would have raised all of the Belgian bids 25 per cent. Also it is understood that a great deal of the steel now being made in Belgium is produced largely from scrap, rather than being worked up from ore, and is correspondingly cheap. As time exhausts these stocks it will probably be found that Belgian prices increase. It is noteworthy that the German bids on locomotives were in dollars; on cars, in pounds sterling.

Steel Corporation Analysis Methods

The various committees of chemists of the United States Steel Corporation have prepared up-to-date pamphlets covering the following subjects: "Sampling and Analysis of Iron Ores," "Sampling and Analysis of Pig Iron," "Sampling and Analysis of Fluxes, Cinders and Refractories," "Sampling and Analysis of Plain Steels," "Sampling and Analysis of Ferroalloys and Bearing Metals," "Sampling and Analysis of Gases," and "Sampling and Analysis of Coal, Coke and By-products." These pamphlets, it is announced, are prepared solely for the use of the chemists of the Steel Corporation and are of interest only to chemists. To limit the requests from outside sources, which the committee does not feel it can wholly deny, a charge on them of $1 each has been imposed, payable to the Carnegie Steel Co., payment to accompany the request. The matter is in charge of J. M. Camp, chairman Chemists' Committee, U. S. Steel Corporation, Carnegie Building, Pittsburgh.

The evening courses of Pratt Institute, Brooklyn, N. Y., begin Sept. 22 for the trade classes and Sept. 26 for the technical classes. The technical courses include industrial electricity, practical electricity, technical chemistry, mechanical drawing and machine design, elements of power plant operation, stationary steam plant operation and automotive engine maintenance and repair. The trade courses include machine work, pattern making, foundry practice, forging and heat treatment and machine shop foremanship.

The President of the Argentine Republic has sanctioned a decree authorizing a further increase of 4,500,000 pesos in the budget for sanitary works for the city of Buenos Aires during the current year. The money will be used in extending the radius of the water and sewer systems and will call for the purchase of pipe and fittings. The work is under the direction of Director de Obras Sanitarias de la Nacion, Buenos Aires.

Following an announcement by the Aetna Nut Co., Southington, Conn., last week of a reduction in wages of 15 to 25 per cent, about 10 per cent of the employees, mostly roughers on heavy and light rolls, walked out, and the plant was obliged to suspend operations. The plant had resumed last week following a long period of inactivity.

British View of American Steel Making

Blast Furnace and Open-Hearth Practice Compared—Coke-Oven Gas as a Fuel—Rolling Mills Here and in England

THE *Journal* of the West of Scotland Iron and Steel Institute publishes an article, "Snapshots of an American Pilgrimage" by R. Percival Smith, which was read at the June meeting of the society. The author is connected with the Lanarkshire Steel Co., Ltd., Motherwell, Scotland. His impressions were received on a "somewhat hurried visit to several important centers of the American steel industry" in 1920, and are of such interest as to warrant the reproduction of liberal extracts below:

Works Organization

What impressed me, and what would, I believe, be bound to impress every stranger going to America for the first time, is the splendid organization of the works. When you introduce yourself you see the general superintendent, who immediately refers you to his departmental chiefs, and the departmental chiefs approach you and talk to you about the plant as if the plant were their own property. It is a pleasure to see what personal pride they take in the mills and shops under their charge. They look upon their departmental chiefs as fellow-workers and accept suggestions from them readily. Men are not discouraged by being turned down again and again. The American never hesitates to give an idea a fair trial if he thinks there is anything in it. If a venture proves successful, the author is given full and due credit; if, on the other hand, failure attends an honest effort at improvement, the man responsible for the suggestion is not unduly discouraged.

American steel makers show no hesitation in exchanging views and experiences, and in holding out a helping hand to the competitor in difficulties. To whatever works I went in America I found they were in intimate touch with the others and could tell me what was happening elsewhere and direct me where to go to see things of interest.

Organization also has its outward and visible signs. Its impress is upon all American works; you cannot escape it. You go to America knowing you are going to a country where they worship hustle, and you may have a suspicion that this must go on with a reckless disregard of outward appearances. If so, there is a surprise in store for you. American works are kept in beautiful order, and put ours to absolute shame.

It is probably true that the American has in the past paid attention to speed production to the exclusion of every other consideration, but he is certainly beginning to realize that quality must not be sacrificed; and there is every indication that he is going to find means of producing good iron and steel without losing time about it.

The free interchange of views and experience has led to standardization of plant and method, and it is only in certain instances that difficulty seems to be experienced in coming to a complete understanding as to which is really the best. There appears to be no unanimity about the best type of gas producer, for instance; the Hughes and the Morgan gas machines seem to be struggling for mastery. Upon the question as to which is the best type of open-hearth furnace reversing gear there are sharp differences of opinion, and there is a bewildering variety of checker-work formations in use.

But though repetition in plant is very marked wherever you go, this does not imply that Americans are content to follow on in a well-defined groove. Changes take place rapidly. When it becomes known that alterations in one plant have been attended by success, others are not long in following suit. That changes are not looked upon with disfavor was unconsciously expressed by superintendents, who, upon hearing that I had visited certain plants, wanted information concerning them, as they had not been there for two or three years, and showed evident disgust when it transpired that there had been no or only trifling development.

Far-reaching standardization has the obvious advantages of quick delivery and reduction of initial costs.

America has its difficulties—difficulties unknown to us. They have long hauls, and severe winter weather causes very serious disturbances. Works have to be fitted with large storage accommodation to tide them over the closed season, when sea and land is in the grip of winter. The American has faced these difficulties courageously. By wide application of machinery, handling costs have been greatly reduced, and plant equipment has been provided to meet every emergency. If errors have been made, they have been made on the side of over-equipment.

Ore Handling

A very good instance of ore handling is to be found at South Bethlehem. The yard there has a storage capacity of 1,000,000 net tons of ore. It is served by two ore bridges with 15-ton grabs. The ore in 75 trucks with side hoppers empties itself into concrete trenches running the length of the yard on both sides, and is lifted from there to the pile by the grabs. Special provision is made for dealing with solid bottom trucks, which are used extensively in the transport of ore. The loaded truck is run into a lattice-work drum, so placed that when it rolls on its pinion racks, thereby inverting the truck, the ore is emptied into hopper wagons on the road at the side of the trench. The method is simple and effective. As 75 tons are thus dealt with in 10 min., which corresponds to an hourly capacity of 400 to 500 tons, less than 1 cent per ton will pay for the service of the eight men in attendance.

From the yard the ore is transported in hopper wagons to the daily supply bins, whence it flows into the trucks that weigh it and dump it into the blast furnace skips. All operations are performed rapidly and with the minimum expenditure of time and effort. Though South Bethlehem has been quoted here, it is not singular. Many instances could be mentioned of plant for handling ore and coal and other raw materials.

To make direct comparison between Scottish and American blast furnace practice would serve no purpose, for the conditions in the two countries vary so widely. Some facts about American blast furnace practice are nevertheless bound to be of interest to us.

Mesabi ore, which is used largely, is a gravelly ore, very rich in iron and easily fluxed. The reducing agent is in every case coke, produced from the finest quality of coking coal, and very carefully prepared. It is screened to secure uniformity in size. The large coke goes to the blast furnaces, the smaller coke is sold for household purposes, and the coke breeze is, in certain cases at any rate, used by the works themselves for steam raising under boilers with mechanical grates specially devised for the purpose. American blast furnaces are generally about 100 ft. in height, the blast pressure varies from 16 in. to 21 in., and the output for 24 hr. from 400 to 700 tons. The average is probably anything from 500 to 600 tons.

From the steel makers' point of view, the quality of iron produced is highly interesting. So-called American standard iron has the following composition:

Silicon	0.75 per cent
Manganese	0.75 per cent
Phosphorus	0.70 per cent
Sulphur	0.04 per cent

Hot Metal Steel Practice

Cold metal practice is practically non-existent. Hot

metal practice may be said to be universal. That in July of last year duplexing, the more elaborate adaptation of hot metal practice, was not much in evidence is perhaps no matter for surprise, when the relation between the prices of pig iron and scrap at that time is taken into account. It is of great interest to note, however, that in some quarters doubts are entertained as to the economic advantages of duplexing, not on general grounds, but as the result of careful and exhaustive inquiry. In 1912 or 1913 an influential American corporation drew up comparative costs between the duplexing process of one of its plants and the ordinary hot metal practice of another, and came to the conclusion that, considered purely from the point of view of economy, the former has no advantage, or so very little that when you throw its disadvantages into the balance it is not worth consideration.

Hot metal practice in America is conducted on similar lines to what it is in this country, as much scrap entering into the composition of a charge as can be conveniently handled. The percentage of scrap used there on an average appears to be somewhat lower than is the case in the best-conducted plants in this country. Taking the composition of American standard iron into account, this is only to be expected. The analysis shows that it has a lower silicon content and a very much lower phosphorus content than the grades of iron in general use with us.

It follows from the foregoing that a strict comparison between British and American open-hearth practice is impossible, but there is no reason why we should not equal their very best practice, or even surpass it. Our latest plants do not differ widely in essentials from the latest American open-hearth plants. There is this to be said, however, that in America there does not appear to be the same tendency to underpower shops in certain essentials to the everlasting detriment of free unhindered production. The American believes in a margin of safety, and if mistakes are made it is usually on the side of liberality.

Gas Producers

To give an instance, the two 80-ton open-hearth furnaces at the Brier Hill Steel Works, have four producers for each furnace; each of the four has an hourly capacity of 3000 lb. This may seem over-generous, may be regarded as unwarranted extravagance, yet there is no gainsaying the fact that the average fuel consumption calculated over a year's operations is very creditable. We are bound to look upon a fuel consumption of 700 lb. per ton of ingots produced as a fairly satisfactory performance. Wherever producer gas is used in America, the figure quoted was approximately the same.

Mechanical producers of one form or another are universally installed. It cannot be said that producer practice is very carefully controlled. Generally speaking, we keep a more rigid check on the operations of the gas bench. But here again the American is amply blessed. Consider the following analysis of West Virginian gas coal:

Ash	7.0 per cent
Volatile matter	37.0 per cent
Moisture	2.0 per cent
Sulphur	1.0 per cent
B.t.u.	13,800

We might well envy him. The attitude of the American open-hearth manager is perhaps after all not to be wondered at. He is quite satisfied that all is well with the producers as long as the paces of his furnaces are satisfactory. He may, however, some day recognize that with systematic control of producer practice results would be even more satisfactory and, when fuel of less excellent quality has to be accepted, the consequences less serious. How serious they may be under existing conditions was exemplified in one plant where the usual supplies failed, and Indiana gas coal of the following composition had to be used instead:

Ash	8.5 per cent
Volatile matter	41.7 per cent
Moisture	10.4 per cent
B.t.u.	10,940

We would consider ourselves very fortunate if we were assured of a constant supply of such fuel, yet the melting shop outputs in this instance fell off in alarming fashion.

Coke Oven Gas for the Open-Hearth

As you all know, producer gas is not used exclusively in America, nor yet to a preponderating degree, in open-hearth furnaces. They have a variety of fuels. At the top of the list stands natural gas. It is considered the best fuel of all, but its uses are now restricted. In having supplies of this gas America was richly blessed. Having come into such wealth without a struggle, the American failed, however, to appreciate it fully and squandered it. It is now available for melting purposes in a few places only, and in these cases provision is made for its immediate discontinuance. The American regrets its passing. Coke oven gas is employed largely. Its constitution and heating value is exemplified by the following analysis from the coke oven plant at Clairton, the most modern of its kind in the United States:

Carbon dioxide	1.65 per cent
Carbon monoxide	3.93 per cent
Illuminants	3.32 per cent
Carbohydrates	33.53 per cent
Hydrogen	54.11 per cent
Nitrogen	3.46 per cent
B.t.u.	578
Sulphur, per 100 cu. ft. of gas	0.0606 lb.

Coke oven gas is very light, and consequently difficult to control. As far as my experience goes, only one firm in America uses it alone successfully; in all other cases that came under my notice tar was used with it, the tar being introduced above the gas by means of a small nozzle after passing through a special form of carbureter. Tar by itself is highly favored, in spite of certain drawbacks. Carburetion does not yet appear to have reached perfection, a black heart being very noticeable in the flame. The checkers soon become very dirty, and have to be cleaned out after a run which never seems to exceed 200 charges. The heating value of tar as fuel for open-hearth furnaces is, however, undoubted as long as the system is in good condition, and the speed with which a furnace thus heated melts and works a charge must be considered quite satisfactory. The amount of tar used per ton varies between 30 and 40 gal. Each gallon contains about 155,000 B.t.u., of which, therefore, 4,650,000 to 6,200,000 are expended in the manufacture of one ingot ton. If you express the results obtained with producer gas in the same terms, you will find that tar compares very favorably indeed with it.

Powdered Coal As a Fuel

The use of powdered fuel for open-hearth and mill heating furnaces has not hitherto been attended by success. The heat of the flame is intense, but its control presents great difficulties. Powdered fuel plant was installed in the melting shop at Clairton; the furnaces were, however, unable to stand it, and the men demanded their time. An experiment was then made with it in the mills, but abandoned when a hole was burnt through the bridge in an unguarded moment. Apart from this, powdered ash very soon chokes up the checker chambers, putting the plant out of commission. In connection with this question, the following figures supplied by Clairton of the heating values of the various fuels in use might be of some interest:

Blast furnace gas	90 to 110 B.t.u. per cu. ft.
Producer gas	140 B.t.u. per cu. ft.
Coke oven gas	578 B.t.u. per cu. ft.
Natural gas	1,000 B.t.u. per cu. ft.
Tar	155,000 B.t.u. per gal.

As has already been mentioned, the American open-hearth plant does not differ largely from ours. In keeping with a very liberal policy ample yard room is always provided, and generally adequate means for forwarding materials to the furnaces. In this respect America shows a superiority, but I do not think it can be said that its practice is in every respect superior to ours. The American is occasionally inclined to be coarse in his methods. Water cooling is a feature of melting shops both in the United States and Canada. Water-cooled doors and door frames are universally employed. Water-cooled ports are very common, and some form of bulkhead cooling is frequently installed.

In some instances the application of water cooling goes still further, as, for instance, at South Chicago, where the furnaces, as well as having all the equipment already mentioned, are fitted with devices for cooling skew-backs and slag lines.

The following details of the cooling arrangements in No. 4 shop at Homestead may be found interesting. It is very complete; the end walls are cooled by means of pipe lines, which are looped back and forth, the water being admitted at one side of the furnace and drawn off at the other. There are 10 loops in all—six of them below the charging floor level and four above. An 8-in. pipe cools the blocks and the bridges of the air wells, the air uptakes entering the furnace as in the case of the Maerz block. Doors and door frames are water cooled, and an 8-in. water pipe runs the length of the furnace both at the front and at the back, immediately under the bottom flange of the channel carrying the crown; 5,800,000 gal. of water are required for cooling purposes in 24 hr., when 14 furnaces are in operation.

Car casting has found general adoption in America, the ingot being stripped in a separate bay. This arrangement leaves more room in the casting bay.

An interesting feature of American open-hearth plant is the skull breaker. The tripod has been discarded, and in its place you find a gantry and crane, with magnet equipment for lifting the round balls that are in general use. It is obvious that the running costs must be low, as two men are quite sufficient for all purposes.

Figures dealing with the time occupied with furnace repairs are instructive. At Brier Hill, a plant near Youngstown, they put up a full back wall in 15 min., a front wall in 40 min., remove a Blair port pan and put another in its place in 20 min. without the aid of a crane, and perform a general repair in somewhat less than six days.

American Blooming Mills

The blooming mill is an interesting feature of American steel works plant. The soakers of a 40-in. cogging mill in this country have a capacity of, say, 200 tons; the soakers of the 38-in. blooming mill at Duquesne, to take one instance, are capable of holding 500 tons in 3-ton ingots. Also a blooming mill in America is a specialist. It is generally called upon to break down ingots to blooms of a definite size.

If further reduction is called for before the finishing stage, another specialist, the roughing mill, undertakes the work, and to the finishing mills restricted tasks are apportioned. Mill work is characterized by far-reaching specialization.

You find elaborate blooming mills in America. That they porform an amazing amount of work is not astonishing. Take, for instance, the three-high blooming mill at the Ohio Works, or the continuous blooming mill at Gary, with its nine stands. In their way they are very interesting. But I do not think they could ever impress the stranger in the same way as the ordinary reversing blooming mill, in most respects so like our own. The days of the steam engine are said to be numbered, but at present the motive power is, as a general rule, supplied by twin compound condensing engines, though atmospheric exhaust is not unknown even in otherwise up-to-date plant. The work of these mills would call forth nothing but pleasure in the mind of the visitor. The following table shows the roll design and the procedure in the 44-in. mill at the works of the Youngstown Steel & Tube Co.:

First pass	12¾ in. groove
Second pass	55 in. slabbing
Third pass	3⅞ in. groove
Fourth pass	8¼ in. groove
Fifth pass	5¾ in. groove

Breaking Down

Ingot, 20 in. x 22 in.; bloom, 7¾ in. x 3¼ in.

	Total
Slabbing—2 passes–t.o.*; 4 passes–t.o.	6
12¾ in. groove—2 passes–t.o.; 2 passes–t.o.	4
8 in. groove—2 passes–t.o.; 1 pass	3
Slabbing—1 pass–t.o.	1
3⅞ in. groove—2 passes	2
Slabbing—1 pass	1
	17

*t.o. = turnover.

You will observe that if the amount of work performed at each pass is greater than is the case with us, it is not strikingly so, yet 17 passes are given to the piece in 85 sec. by the stopwatch. The performance was even better at Duquesne, where, in the 38-in. blooming mill, 60 sec. only were required for 15 passes and 7 turnovers. It is inspiring to watch these mills at work. The crews give a fine display of team work; the engineman is not afraid to reverse his engine. All auxiliary gear is electrically driven, including the tilts, which work in slots in one of the side guides, and are raised and lowered by a bell crank on the motor shaft.

Finishing Mills

In finishing mills you find a bewildering variety, but they are all either continuous or semi-continuous. For sections the cross-country mill, a most attractive form of semi-continuous mill, appears to be highly favored, whereas for billets, sheet bars, and skelp, shapes for which there is a constant demand, the continuous mill seems to be almost universally employed. A fine example of this type of layout for the rolling of billets and sheet bars is to be found at the Trumbull Steel Works, Warren, Ohio. Here one 3-ton ingot is broken down to 8-in. sheet bars in one minute. When adequate supplies of steel are available, there is only one brief interruption in the amazing flow after every third ingot. The stoppage takes place to allow the cooling bank crane to lift the sheet bars out of the cradle. A red light flashes on as a warning for a short arrest of 15 to 20 sec.; the light goes out and work proceeds. To pass from one side of this mill to the other you go through tunnels beneath the rack. No undue precaution this.

The subject is a fascinating one, but also very wide. We can touch upon it only briefly. To conclude, it seems evident that the Americans are far ahead of us in mill practice, but for no very obvious reason. It may not be possible to introduce into this country the highly specialized mill, but apart from it we have leeway to make up. There is surely no reason why we should not be equal to the task. It is certainly not that we lack the men. We supply America with man material of the very best kind, with which they are obviously perfectly satisfied.

In my experience, Americans were seldom supercilious. I did, however, come across an exception. He was general superintendent, and was inclined to underestimate our powers. To his credit be it said, however, that he admitted the point frankly when it was suggested to him that Britishers were serving America very well. Scotsmen and Englishmen are to be found everywhere in highly responsible positions, carrying on the work of the great Republic, and, as it is no doubt still true that "there are as good fish in the sea as ever came out of it," there is surely no reason to despair. It is certain, however, that we would find it both useful and profitable to review our own position with a critical eye, and then, if we find that all is not well, to face unpalatable facts undauntedly, and to correct them in a courageous and enterprising spirit.

The Pittsburgh chapter of the American Society for Steel Treating has practically completed its program for its regular monthly meetings, which are held on the first Tuesday evening of each month. Included among the speakers are professors from the University of Pittburgh, Harvard University, the University of Illinois and a number of men identified with various corporations and societies. At the first meeting of the new season, to be held at Hotel Chatham, Sept. 6, Prof. F. F. MacIntosh, Carnegie Institute of Technology, Pittsburgh, will speak on "The Metallurgy of Iron and Steel."

Repairs costing $60,000 now are nearing completion at the New Castle, Pa., works of the American Sheet & Tin Plate Co., which has been closed down for some time. The plant will be ready to start in the near future.

SECRETARY HOOVER'S VIEWS

Germany Not the Dangerous Competitor Generally Described

WASHINGTON, Sept. 5.—Germany is not proving to be the post-war competitor in the commercial world that has been credited to her, said Secretary of Commerce Hoover. After stating that an investigation disclosed that Germany was not making inroads in the commercial field in Mexico to the extent reports have indicated, the Secretary alluded to the fact that Germany has been compelled to abandon orders taken for steel in Argentina. Specific reference was made to sales of structural material at low prices, against which, it is said, it has been found German mills cannot make delivery. This situation has been explained in THE IRON AGE. Mr. Hoover said also that not only does Germany lack the supplies and the ability to sell at prices quoted on steel and other products, but that the quality of material being produced was inferior and consequently has lost much of its marketable value.

The Secretary is entirely optimistic with regard to American trade prospects in South America and declared that the bugbear of ruinous competition in that market has gained credence in some trade quarters that is entirely unjustified by facts. Mr. Hoover said that Germany cannot undersell the American exporter in South America for any appreciable length of time because she cannot square the existing low cost of production in some lines with the economic problems she faces in keeping her industry going and in meeting the condition imposed with regard to war reparations.

Credit Facilities

"Insofar as German inroads upon American trade in South America are dependent upon alleged superior credit facilities, it is entirely improbable that any such advantage can be maintained. Credit terms in Latin America have been materially changed during the war, all exporting nations offering less favorable terms than previously. The depletion of German financial resources makes it improbable that the long and favorable credit terms freely offered in some cases before the war can be continued, even though temporarily renewed. With the present financial difficulties of the German Government, which must inevitably be reflected in German finance and ultimately in German industry, there will be no opportunity for adopting credit policies which nations much stronger financially cannot duplicate.

"American manufacturers are in a more favorable position than previously as regards both banking and distribution facilities in South America. While an extensive American distribution mechanism has been built up throughout Latin America since 1914, the German system of banks and trading companies has been seriously damaged. Important German interests in public utilities companies and others have been liquidated and the whole basis for sales of German goods in South America has been materially weakened. Another factor of prime importance to American trade extension is the increased tendency toward American investments in Latin America. There will be no exportable capital available in Germany, as there was before the war, and South American countries will more and more look to the United States.

Reparation Payments

"The reparations payments will also handicap German exporters. The taxes necessary to raise them, however they may be apportioned among German export industries, must increase export prices to a point much nearer the world level. It is primarily by means of exports that the German Government must meet the reparations payment and the natural tendency will be to charge all that the tariff will bear.

"Altogether, it appears that the prospect of ruinous German competition in South America has been exaggerated. Even admitting the present advantages of German exporters, they are apt to be of a temporary nature, in view of the artificial basis upon which German industries rest at this time."

FRENCH COKE REDUCED

Now Quoted at 75 Fr. per Ton—Only 25 Furnaces Out of 312 in Blast—Railroads Busy

(*Special Correspondence*)

LONGWY, Aug. 16.—French ironmasters have lodged numerous protests against prevailing high freight rates from the interior to seaports and also against the high price of coke. As a result the price of coke has been lowered by nearly 35 fr. per ton at one cut. In fact, with the price of coke in France officially fixed at 75 fr. per metric ton, it is expected to have an important effect on surrounding countries. Manufacturers, however, are not satisfied with this improvement in the situation and are pressing the government to remove many of the present taxes imposed upon them.

It is reported that Poland contemplates an order for trucks and railroad material, the Government of Warsaw having recently communicated with the French Government on this subject. Speculating on the heavy decline in coke, Lorraine metal works are already quoting reduced prices. In fact, No. 3 pig iron (smooth skin quality) is quoted at 170 to 175 fr. per 1000 kg. for substantial orders. There are only 25 furnaces in operation out of the total of 312 in France. There is no doubt that such a large number of idle works is responsible for the drastic decline in the price of coke. Ironmasters in Nancy are persuaded that this new price of coke will enable producers to come nearer the German prices.

The railroads are becoming more active with orders. When the effect of the coke decline will have affected prices generally the railroads will no longer have reason to hold back. General optimism is also inspired by the situation in Russia. It is believed here that Russia will be progressively restored to business and that French investments in that country, totaling many billions of francs, will, at last, become active.

Locomotive works are booking orders for repair and for new construction, and the decline in British and American exports will surely be a strong bid for fresh business, probably involving further declines in prices. Malleable castings and steel castings in general are suffering from the present depression, and the only alternative to save these works from difficulties is the booking of railroad orders. War material is in course of completion for Rumania and other Balkan countries.

English and Continental Prices

The following schedule, prepared by the Bureau of Foreign and Domestic Commerce, Washington, presents a comparative statement of (British) domestic and Continental prices during the first six months of 1921:

	No. 3 Foundry Pig Iron		Billets (Soft)	
	Home Price	Approximate Continental c.i.f. Price	Home Price	Approximate Continental c.i.f. Price
Months	£ s.	£ s.	£ s.	£ s.
January	10 17½	8 10	15 12½	11 0
February	9 15	8 0	14 0	10 0
March	7 10	7 10	13 10	9 10
April	6 0	6 10	13 0	8 10
May	6 0	7 0	12 0	8 10
June	*6 10	6 10	10 10	7 10

	Wrought Iron Bars		Steel Bars†	
	Home Price	Approximate Continental c.i.f. Price	Home Price	Approximate Continental c.i.f. Price
Months	£ s.	£ s.	£ s.	£ s.
January	26 13	16 0	22 0	11 0
February	25 0	14 10	20 0	11 0
March	23 0	12 10	17 0	10 0
April	21 0	12 0	15 2	10 0
May	19 0	13 0	13 7	10 5
June	16 0	12 0	13 10	10 0

*Premium of approximately 10s. on basis price.
†No specified test.



Fig. 1



Fig. 2

HOBBING LARGE WORM WHEEL

Hurried Requirement Met by Using Horizontal Boring Mill—Arrangement Described

Confronted with the hurried requirement of cutting a worm wheel too large to be put on a milling machine in the regular way, the Erie works of the General Electric Co. met the situation in a unique manner. The hobbing was done on a horizontal boring mill, as shown in the illustrations, with satisfactory results. The method, as described by E. J. Edwards, superintendent of foundry maintenance, was as follows:

The blank was 46⅛ in. in diameter and the finished worm gear 45⅝ in. in pitch diameter, 190 teeth, with ¾-in. pitch, 14½ deg. angle of pressure. The method of handling was as follows: On a plate 5 ft. in diameter and 2¼ in. thick a 43-in. diameter ball race was cut for 1⅛-in. steel balls. The plate was leveled by being supported partly on the rear side of the mill bed and the overhang jacked up on a horse. Fig. 1 illustrates the arrangement.

A 4-in. pin at the center, surrounded by short pieces of ¼-in. drill rod, served as an axis with roller bearings. A second plate placed carefully on the first could now revolve on the ball bearings with very slight friction. The blank was placed centrally on the second plate and bolted securely to it. To get the required angle for the first or gashing cut, for which a fly cutter was used, both plates and the blank were elevated on one side by blocking and jacking, as shown in Fig. 2.

A mark was made on the lower plate and the upper plate divided as accurately as possible into 190 equal divisions. A roughing cut was taken with the forming tool, the table then being moved around to the next mark and another cut taken, this process being repeated until all the teeth were roughed. The overhang of the plates was supported, as shown in Fig. 3, and moved easily on the balls provided. This allowed the feed for depth of cut to be easily taken care of by the cross-feed screw with which the boring mill was already equipped. The finishing cut as illustrated in Fig. 4 was taken with a home-made hob cutter. Any lateral play of the boring bar was prevented by a thrust collar on each side of the upright supporting the free end of the bar. The finished job set in plate gave satisfactory results.

Census Returns from Mineral Industries

WASHINGTON, Sept. 6.—A preliminary statement of the census of mines, quarries and wells, has been issued by the Bureau of the Census, furnishing comparative statistics covering the years 1919 and 1909 for the mineral industries. These statistics show by industries the number of enterprises reported and the amount received for the materials produced. Figures of interest to the iron and steel and allied industries follow:

Industry	1919 Enterprises	1919 Value of Products	1909 Enterprises	1909 Value of Products
Iron	292	$219,539,000	176	$106,947,000
Copper[1]	195	181,258,000	161	134,617,000
Lead and zinc[1]	432	75,579,000	977	31,363,000
Limestone[2]	895	52,943,000	1,665	29,833,000
Abrasive materials[3]	34	721,000	49	498,000
Fluorspar	54	3,334,000	13	289,000
Graphite	21	869,000	19	344,000
Magnesite	11	2,169,000	6	68,000

[1]Includes reduction mills operated independently of mines and operations on old dumps and tailings.

[2]Excludes enterprises producing limestone for their own use in the manufacture of lime and cement.

[3]Includes enterprises producing emery, garnet, pumice, tripoli, diatomaceous earth, stone for hones, scythestones, whetstones, etc., and tube mill pebbles and liners.

Reflecting industrial stagnation in the Mahoning Valley is the decline in bank deposits. Two affiliated institutions report a loss in deposits of $6,243,857 during the first six months of 1921, of which $1,238,839 was through their foreign department. This was caused mainly by the fact that many depositors sent part of their earnings to relatives in Europe, or were out of work and, therefore returned to their European homes, or went to some other part of the country seeking employment.



Fig. 3

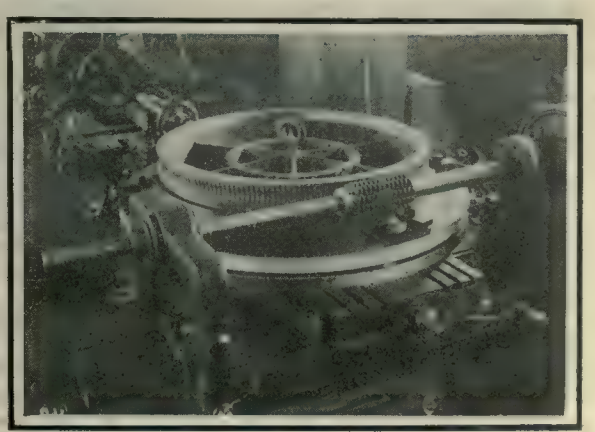


Fig. 4

Three Types of Alloy Sheet Steel—I

Proper High Tensile Material for Aircraft Parts—Specifications, Analyses and Manufacture of the Three Electric Steels

BY HORACE C. KNEER*

THE following report deals with an investigation of three commercial types of high strength alloy steel in sheet form, carried out at the Naval Aircraft Factory, Philadelphia, to determine which was the most suitable for the manufacture of fittings for large aircraft, such as the NC's of transatlantic fame. The word "fittings" is used to describe the many structural parts, made of sheet metal, which are used to connect, support and reinforce diverse members of an aeroplane. They are often of complex shape. Examples of such fittings are shown in the illustration.

Until the development of very large types of aircraft, such as the NC flying boats, low carbon sheet steel, having about 55,000 lb. per sq. in. tensile strength, or a mild grade of alloy steel, was satisfactory for fittings, as their thickness rarely exceeded ⅛ in. But with the advent of planes weighing from 20,000 to 60,000 lb., the use of high strength steel became absolutely essential in order to avoid excessive thickness and weight in the fittings.

Steel was required having a tensile strength of 150,000 lb. per sq. in., combined with a suitable ductility to insure against brittleness. Deep drawing in manufacture was not called for but it was necessary that the steel be capable of severe cold bending in any direction, independent of the direction of rolling, of successful welding by both the acetylene and electric spot methods and of brazing, heat treatment being applied after these operations. Sheets were wanted in thickness of from .035 in. up to ¼ in. and about 18 in. wide by 6 ft. long.

Alloy steel bar stock of the tensile strength indicated has been in fairly common use for years in the aircraft and automobile industries, especially in motor parts. It is not difficult to obtain on the market and the properties of the various types are fairly well known. It was found, however, that very few steel mills had any experience in the rolling of such alloy steel into sheets.

Comparatively little was known as to the rolling properties of the diverse commercial alloys and which, if any of them, would fulfill the required conditions in sheet form. After a canvass of the situation, it was decided to have samples rolled of the three most promising commercial types of alloy steel and to make a careful comparison of their characteristics.

It is believed that the results of this investigation will be of value to users of high grade sheet steel in industry, especially to automobile and aircraft manufacturers. The report, which follows, may also be of interest as illustrating the form in which a research investigation of this nature may be drawn up:

Specifications, Manufacture and Analyses

THE object was to investigate the comparative merits of three commercial types of high strength alloy sheet steel—chromium-vanadium, nickel-chromium (or "chrome-nickel") and 3.50 per cent nickel, for the manufacture of structural parts of aircraft.

The results in general were: chromium-vanadium steel was satisfactory in every respect. The other types, 3.50 per cent nickel steel and nickel-chromium steel, failed in the bend test, the nickel-chromium being the most brittle.

All three steels meet the required static tensile tests (except in thin gauges). They can be acetylene or electric spot welded. They can be brazed and heat treated after brazing. Any of the three steels can be machined in the annealed state without special difficulty, and can be drilled, cut and sheared in the heat treated state.

Aside from the bend test, the three steels did not differ greatly in any of the properties investigated, except that nickel-chromium steel was somewhat inferior to the other two types in electric spot welding and acetylene welding.

Thick specimens showed a better combination of tensile strength and elongation than thin specimens in all cases. The ⅛ in. specimens failed to meet tensile test requirements. Their low strength was probably due to surface decarbonization, and their low elongation to smaller section area which permitted less necking down. Consideration should be given to this matter in specifications and design, especially with light gages.

Cross rolling slightly improves the tensile properties of the three steels, but has no noticeable effect on their bending qualities, at least, in so far as was shown by this test.

Since beginning this investigation, chromium-vanadium sheet steel has been used in the manufacture of aircraft fittings for more than a year with satisfactory results.

Requirements and Specifications

Specifications, N.A.F.* S-35, were prepared to cover the purchase of alloy sheet steel suitable for the manufacture of fittings for the NC flying boats and other aircraft parts requiring high strength and reliability. The physical properties called for were:

Ultimate tensile strength	150,000 lb. per sq. in.
Yield strength	125,000 lb. per sq. in.
Elongation in 2 in.	10 per cent*

*Later revised to 8 per cent.

It was desired to cold bend these fittings in manufacture, although deep drawing was not necessary. It was, therefore, required that the sheets be furnished annealed and the following bend test was specified:

> Test pieces cut in any direction from sheets as received must stand cold bending, without cracking, through an angle of 180 deg. on a diameter equal to the thickness of the sheet.
>
> The minimum *radius* of bend allowed in design was equal to the thickness of the sheet, so that this bend test allowed a fair margin of safety.

Some difference of opinion existed among manufacturers and others as to the most suitable type of alloy for this purpose. A certain latitude of choice for the steel manufacture was therefore believed advisable, and three recognized commercial types of alloy were accordingly included in the specifications, as follows:

> 3.50 per cent nickel steel (No. 2330).
> Nickel-chromium steel (No. 3130).
> Chromium-vanadium steel (No. 6130).

The bidder was permitted to select the type of steel which, in his opinion, was best suited to the require-

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*Naval Aircraft Factory.

ments, both in regard to facility of manufacture and physical properties, and was required to state in his bid the type of alloy which he proposed to furnish. In order to obtain high quality, freedom from impurities and a low sulphpr and phosphorous content, it was specified that the steel be made, or at least finished, by the crucible or electric furnace process.

The chemical analyses of the three types of steel were specified to be within the following limits:

Type	Nickel. 3.50 Per Cent	Nickel-Chromium	Chromium-Vanadium
Steel No.	2330	3130	6130
Carbon	0.25 to 0.35	0.25 to 0.35	0.25 to 0.35
Manganese	0.50 to 0.80	0.50 to 0.80	0.50 to 0.80
Phos. (max.)	0.030	0.030	0.030
Sulphur (max.)	0.030	0.030	0.030
Nickel	3.25 to 3.75	1.00 to 1.50	....
Chromium	....	0.45 to 0.75	0.80 to 1.10
Vanadium	....	....	0.15 (Min.)

Certain objections were raised against these specifications. It was claimed by manufacturers that steels within the required analyses would not meet the physical requirements and that if the carbon content were sufficiently high to insure the tensile strength called for, the steels would not meet the bend test nor possess the required ductility or elongation after heat treatment.

It was also claimed that one or another of these steels would not roll properly to thin sheets or would scale excessively in rolling and that certain of the alloys would segregate and the strength therefore vary and be unreliable. Doubt was also expressed whether these steels could be readily machined and whether they would weld properly.

Manufacture and Analyses of Samples

In order to determine the relative merits in manufacture, fabrication and physical properties of these three types of alloy steel, and to determine whether any modification of the specifications was desirable, the Halcomb Steel Co., of Syracuse, N. Y., through the courtesy of Dr. John A. Mathews, undertook to roll an experimental heat of each type and to submit samples for investigation and test.

This company prepared three heats of electric furnace steel, having the following heat analyses, respectively:

Type	Nickel. 3.50 Per Cent	Nickel-Chromium	Chromium-Vanadium
Steel No.	2330	*	6130
Heat No.	49-H-19	X-1819	155-H-19
Carbon	0.29	0.29	0.29
Silicon	0.28	0.19	0.27
Manganese	0.69	0.40	0.77
Phosphorus	0.011	0.016	0.007
Sulphur	0.007	0.008	0.023
Nickel	3.51	3.45	..
Chromium	..	0.88	0.97
Vanadium	..	..	0.16

*The nickel-chromium steel differed in analysis from No. 3130, called for.

Check analyses made on test specimens at the Naval Aircraft Factory confirmed the above data reasonably well. A carbon content of 0.25 per cent was obtained.

It is noteworthy that the carbon content of these three experimental heats was the same, and that in the 3.50 per cent nickel steel and the chromium-vanadium steel, the carbon, manganese, nickel, chromium and vanadium contents closely conformed to the desired or mean values of the specifications. The nickel-chromium steel was taken from a heat made up prior to having received these specifications, and the nickel and chromium contents differed from those called for. The composition was believed by the manufacturer to be one that would certainly yield the physical properties desired.

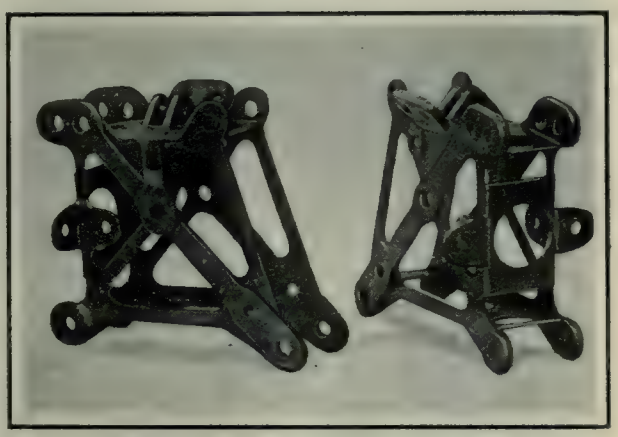
Rolling and Annealing

Sheets ¼ in thick and ⅛ in. thick were rolled from each type of steel. In order to determine whether cross rolling would improve the physical properties or cold bending qualities, some sheets of each heat and thickness were cross rolled, the others being straight rolled.



Some of the Many Structural Parts of Thin Sheet Steel Used to Construct and Support the Members of Large Aircraft Such as the NC Flying Boats

In the upper row: Successive stages of wing beam hinge; after welding, fitting is dip brazed and then heat treated. In the lower is a box fitting made of seven pieces which carries a load of ten members



(Cross rolling means rolling transversely to the axis of the ingot or billet. Straight rolling means rolling along the axis.) All sheets were hot rolled to finished size.

The manufacturer annealed all the sheets together, packed in boxes. They were brought to a temperature of 1500 deg. Fahr. (815 deg. C.) after which the temperature of the furnace was lowered to about 1300 to 1350 deg. Fahr. (705 to 735 deg. C.) and held for several hours, followed by slow cooling. This method of annealing was determined upon by the manufacturer as representing good commercial practice but it was not claimed that some other combination of time and temperature might not give better results.

Twelve samples of sheets, each 3 sq. ft. in area, were received from the manufacturer for test, as follows:

Type of Steel	Mark No.	Thickness	Rolled
Chromium-Vanadium ..	5	⅛ in.	Straight
" " ..	6	⅛ in.	Cross
" " ..	7	¼ in.	Straight
" " ..	8	¼ in.	Cross
Nickel-Chromium	9	⅛ in.	Straight
" "	10	⅛ in.	Cross
" "	11	¼ in.	Straight
" "	12	¼ in.	Cross
3.50 per cent Nickel....	13	⅛ in.	Straight
" " "	14	⅛ in.	Cross
" " "	15	¼ in.	Straight
" " "	16	¼ in.	Cross

It was difficult to tell which was the true longitudinal or transverse direction of the sample; speci-

mens were marked L and T to indicate these directions according to the surface appearance of the sheet, but these marks do not indicate with certainty that the specimens were longitudinal or transverse, respectively, in all sheets. They merely serve to distinguish between specimens cut in different directions from the same sample.

Tensile specimens were machined to a 4-in. gage length, ½ in. wide. The elongation was measured in 2 in. and in 4 in. Bend specimens were made 1 in. wide and about 4 in. long. The edges were rounded.

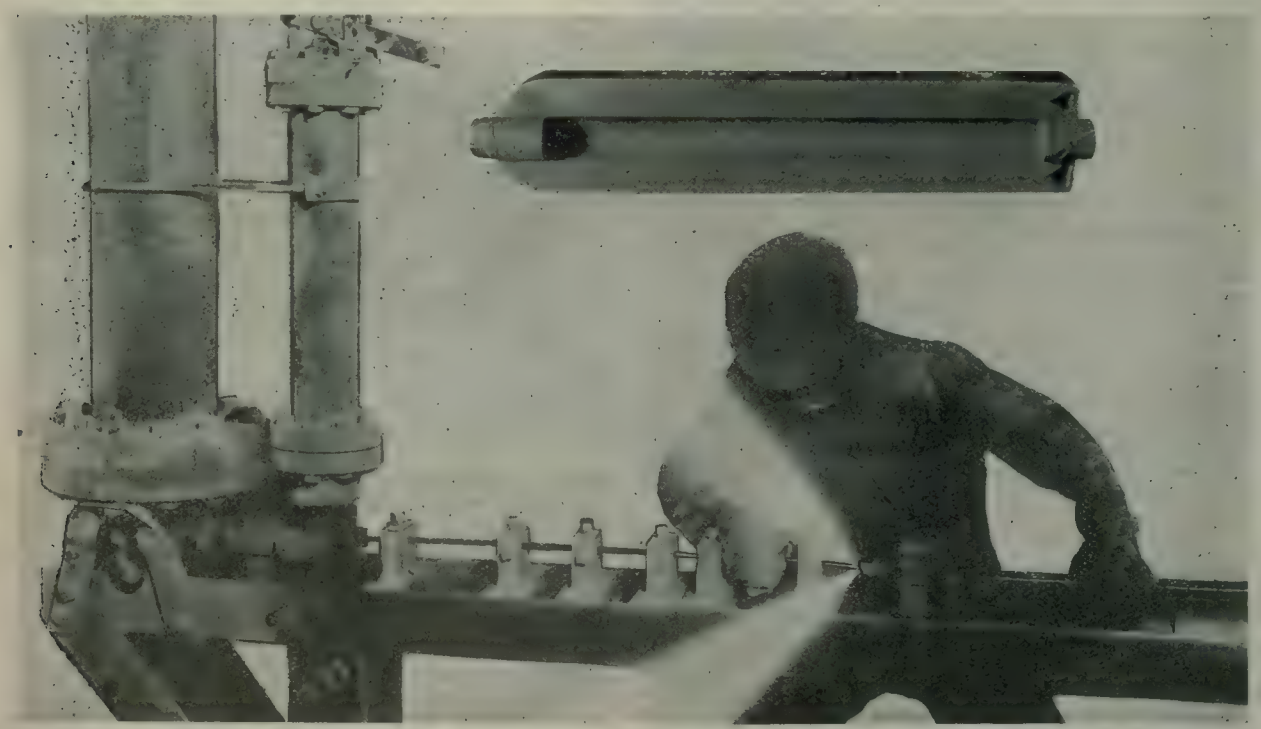
(*To be continued*)

Manufacture of Drill Steel from Hollow Ingots

Process Used by the Ludlum Steel Co. and Its Advantages—Influence of Decarbonized Layers

AT the symposium on drill steel which was a feature of the February meeting in New York of the American Institute of Mining and Metallurgical Engineers, P. A. E. Armstrong, vice-president Ludlum Steel Co., Watervliet, N. Y., read a paper entitled "Drill Steel from Hollow Ingots," which described fully the method of manufacture used by his company. Since the reading of this paper and its subsequent publication in June, some additional details and illustrations have been furnished THE IRON AGE. These have been incorporated in a brief abstract of the original paper which follows:

Hollow drill steel is made by various methods: (1) The drilled billet with a sand-filled core, the general method used in this country, or (2) The drilled, pierced, or the drilled and pierced billet, not sand-filled, is rolled down over a projectile or ball much the same as in ordinary pipe manufacture. The second method is employed largely in Sweden. In Sheffield, England, the general scheme is sand-filling. Swedish hollow drill steel is particularly good and has a worldwide reputation for excellency. It does not follow, however, that steels made by other methods are not efficient.



The Insert Shows a Hollow Cast Ingot by the Tube Method Which Has Been Split on a Planer Without Cutting Through the Plugs

High Pressure Blast Is the Method Employed to Remove the Sand from the Core or Hole in the Bar as Shown

In the Swedish material a peculiar condition is present. The hole is badly decarbonized by the method of manufacture and the extent of this decarbonization varies in bars of different makes.

Decarbonized Layers and Hardening

A question that is worth consideration is this: Is this decarbonized core an advantage or a disadvantage? If it is an advantage, why not duplicate this by controlled practice and not haphazard means of manufacture? If it is a disadvantage, then why is it that steel of this character has such a good reputation for being a good grade hollow drill steel? There is nothing in the steel that can be discerned microscopically or by analysis that proves it to be superior to hollow drill steel of good manufacture made by methods that prevent decarbonization of the hole. Therefore it is fair to assume that the decarbonized wall of the hole is an advantage. On investigating this subject we found that hardened bars with this decarbonized hole do not become so intensely hard on the inside, neither are they so prone to cracking. Bars with radial cracks are of course bad, no matter what the system of manufacture.

The mild steel or decarbonized iron inside the hole acts as a damping effect when hardening is produced. This effect can probably be readily appreciated when the fact is remembered that if a piece of about 1 per cent carbon steel be rough-turned so that all decarbonization is removed from the outside of the bar and this be heated up to just above the transformation point and quenched in water of about 70 deg., the bars will come out hardened in spots in a non-uniform manner. Some places will be hard; others will not. If a further length of the same steel be rough-turned and then ground and polished, this bar, subjected to the same heat treatment and the same speed of cooling, will come out quite file hard all over and not at all spotty. The reason for this is that the rough turning holds the steam arising from the heated metal in contact with the water, and thus causes certain zones to cool at a slower rate than those places where the steam which is generated was quickly removed.

In the case of the polished bar, there is no rough-

ened exterior to hold steam pockets and the steam, as generated, quickly rises to the surface of the cooling fluid and the bar is uniformly hardened over its entire surface. If this bar, which is polished, were covered with a thin tube, then the hardening would not be very pronounced underneath the tube. This of course would vary with the thickness of the tube and whether or not the tube was in good contact with the bar. Such a condition can artificially be produced by decarbonizing the surface of this polished bar. If this decarbonization is carried to a fair depth, 1/32 in., the bar will not be of maximum hardness underneath the decarbonized area after being quenched in water. The thicker the zone the less will be the hardness, and for the same reasons which prevent one from uniformly hardening a piece of similar carbon steel right through to the center when quenched from just above the transformation point. Another way of saying this is that the speed of cooling is only fast enough for a certain amount of penetration or depth of hardness. To harden right across the cross section, alloy steels have to be resorted to, which have a greater lag to transformation.

Hollow Steel from Hollow-Cast Ingots

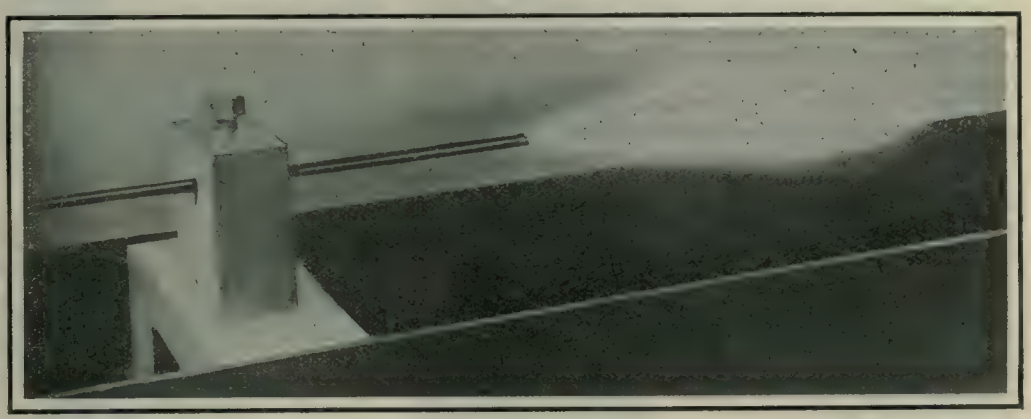
Hollow drill steel made by casting the metal around a tube and mechanically working the hollow ingot down to the required size (filling up the hole with sand and later removing same after rolling) will have an artificially produced equivalent decarbonized core which will be free from any such tendency toward splitting and driving in radial cracks. The surface of the inside of the tube will be comparatively smooth, giving a uniform cooling rate to the inside of the bar, again reducing the tendency for a radial crack to start.

One of the reasons why the carbonless walls of the tube of the bars made by this method do not crack in manufacture is because the mild steel tube is not the result of a decarbonized steel highly impregnated by oxygen and oxides and having a number of microscopical holes where the carbon of the carbides last resided. These holes are places of weakness which may or may not weld up, depending on whether the interior of these microscopical cavities is coated by an oxide layer or filled with gas, either from the gas occluded in this steel or that which has penetrated from the furnace atmosphere. Decarbonized steel is, in my opinion, less strong than mild steel which has been originally made in low carbon and worked down to the required size.

The method employed by the Ludlum Steel Co. in the manufacture of hollow drill steel is to insert a high-grade low-carbon mild steel tube, suitably cleaned by sandblast, into an ingot mold and cast the hot metal around the tube. A mild steel tube, carbon about 0.15 per cent, is plugged at either end and filled up with sand. The hole is drilled through the tube and plugged but it is not pinned; the hole is left open. The tube is then inserted into an ingot mold which is recessed at the foot and a guide is fitted on the top of the tube, centering the tube with the ingot mold. This guide carries a pouring head. In pouring the ingot the hot metal is poured into the pouring head and the metal runs through four small nozzles down the four corners of the ingot mold and around the tube. The tube is cleaned well by sandblasting before being put into the ingot mold and a very excellent weld is produced between the thin wall of the tube and the hot metal. The tube being of mild steel has a higher melting point than the higher carbon of the molten steel, therefore although there is a surface weld between the molten metal and the tube, there is no tendency, or very little tendency, for the tube to burn through. A large number of ingots have been cast by this tube method and not one has burned through. The holes drilled in the plugs are filled up by the molten metal which forms a pin to hold the plug into the tube and in the cast ingot.

One of the illustrations shows a hollow cast ingot by the tube method which has been split on a planer without cutting through the plugs and the holes filled up with the molten metal forming pins can be clearly seen at each end. The smooth, accurate shape of the hole can be readily appreciated and attention is drawn to the particularly small amount of pipe at the top of the ingot, showing the steel to be quite free from gas. As can be seen the weld is nearly perfect down the entire length of the tube. The sand is not removed from the ingot after casting as this sand is employed for the purpose of maintaining the shape of the hole during rolling. The ingots are sent away to the 18-in. mill furnace, reheated to the required rolling temperature and the ingots rolled down to 3½ to 4-in. square billets, depending upon the finished size of the bar.

The method of cutting up billets is interesting. The shear on which these billets are cut is offset slightly so that the end of the billet is dragged down, thereby effectually closing the end of the hole of the billet, cutting out the necessity for plugging. The billets at this stage are just where the usual method of making hollow billets starts, the usual method being to take a 3½-in. billet and drill 1⅜-in. hole down the entire length of it and plug either end of the billet after filling with sand. The billets are then carefully inspected, chipped and ground to cut out any imperfections that may have arisen during manufacture, then sent to the 9-in. heating furnace and rolled down on the 9-in. mill to required size. The bars after inspection are topped and sent to the extracting room.



The Volume of Sand and Air Coming Out at the End of the Small Tube as Contrasted with the Usual Method of Using Only the Air Blast

An illustration shows the machine in operation. High pressure sand blast is the method employed to remove the sand from the core or hole in the bar. The large tube to the right of the machine is the air reservoir carrying high pressure air and the smaller tube parallel with it carries fine sand which has an equalizing valve so as to maintain the same pressure in the sand canister as in the storage. As the air passes across the orifice at the bottom of the sand canister a quantity of sand is sucked down with the air and carried along the small tube which is inserted inside the hole of the bar. The cutting effect of this very high pressure sand blast is quite extensive. It is possible to wear away or drill a hole in a piece of steel by the action of this high pressure sandblast.

The other illustration shows the volume of sand and air coming out the end of this small tube. The usual method is to use an air blast, but this is not quick enough. Another method is to use water in the place of air, known as the hydraulic method. This again

is not so effective as using sand blast. Peculiarly enough there is very little wear on the inside of the tube carrying the high pressure sand blast, as the sand is traveling in the same direction as the tube and the skin friction against the inside of the tube has the effect of driving the sand to the center of the tube and does not scour out the inside of this small tube, which varies in size from ¼ to 3/16 in. It is possible to clean out a 1¼-in. rd. hollow drill steel bar, 20 ft. long, by this process in about one minute.

This method of making hollow ingots and the method of removing the sand from the inside of the bar are covered by patents issued and applied for and is claimed as a big step forward in economical and successful manufacture of hollow drill steel and hollow tubes and tubular bodies generally. The reasons why we believe the tube method of hollow drill steel manufacture is superior to the older methods are:

Greater freedom from external and internal straining. Because of the inherent small crystal size.
Absence of harmful segregation resulting in weakness of the wall of the hole.
Less liability for the steel to crack in the inside of the hole during forging or hardening.
Toughening effect, arising from the mild steel wall of the hole, limiting the intense hardening on quenching.

Electrical Exports Increase

WASHINGTON, Sept. 5—In the face of a world-wide trade decline, exports of electrical goods from the United States are maintaining a strength beyond that evidenced by many other commodities. Figures for July, and for the first seven months of 1921, just available, indicate an optimistic state of affairs especially when the disturbed business and exchange conditions in foreign markets are taken into account.

Figures given in the table below include: Batteries, carbons, dynamos and generators, fans, heating and cooking apparatus, insulated wire and cable, interior wiring supplies (including fixtures), arc and incandescent lamps, magnetos, spark plugs, etc., meters and measuring instruments, motors, rheostats and controllers, switches and accessories, telegraph, including radio, telephones, transformers and electric locomotives.

Exports of Electrical Machinery

	1920	1921	Increase
July	$6,494,332	$6,840,512	5%
First seven months	54,095,088	71,618,254	32%
Fiscal year 1913			$27,046,332
Calendar year 1919			89,925,689
Calendar year 1920			102,870,434

Italian Metal Market Still Stagnant

MILAN, ITALY, Aug. 17.—Prices are unchanged except for copper and brass goods, which have taken another drop. This continued downward movement can only be accounted for by the small demand.

Pig iron is in very small demand; Eglington No. 1 is quoted at 1000 lires ($44) per ton c.i.f. Genoa, and English hematite, mixed numbers, at 600 lires ($26.40).

Here are this week's prices, largely nominal, in lire, f.o.b. Milan, per 100 kg., compared with prices in June and July at dates named:

	June 30	July 27	Aug. 13	Cents Per Lb., Aug. 13
Copper, electrolytic	600	630	650	13.00
Copper sheets	1020	1040	1020	20.40
Brass sheets	900	900	880	17.60
Brass wire	875	880	860	17.20
Brass rods	550	560	535	10.70
Brass tubes	1070	1100	1080	21.60
Black sheets, base, 4 mm	150	160	155	3.10
Galvanized sheets, No. 20	240	235	235	4.70
Tin plate, standard, per case	165	175	175	$7.70

The United States Shipping Board has transferred the title to a building, erected by the Mesta Machine Co. three years ago at its plant in West Homestead, Pa., for the Shipping Board, to the Mesta Machine Co. The sum involved in the transfer was $152,065. The building, a structure 60 x 400 ft., was erected according to the deed, with the understanding that it was to be taken over by the machine company at half its cost of erection following the completion of a contract between the two parties. The transfer of the building is in accordance with that agreement.

BRITISH MACHINERY TRADE

Machine Tool Tonnage Greater Than in 1913—General Movement Smaller

Figures compiled in the American consulate general in London show that, despite a heavy falling off in tonnage of general machinery imports and exports of Great Britain in 1920 and 1921, as compared with 1913, the trade in machine tools has actually increased. Imports of machine tools during the first six months of 1921 were 10 per cent above the figure for the first six months of 1913, while in exports the corresponding increase was 52 per cent.

Machine tool imports were 3.63 per cent of the tonnage of all machinery imports in 1913; 16.8 per cent, in 1920; 6.36 per cent in 1921. Similar figures for exports show 2.47 per cent in 1913; 4.95 per cent, in 1920; 4.69 per cent, in 1921. In value, these figures would be slightly increased, due to the fact that machine tools average higher in unit value than the balance of the machinery entering into British imports and exports.

Textile machinery formed the largest single item shipped out in 1913, 1920 and 1921, with 88,082 tons, 21,139 tons and 79,282 tons respectively. Agricultural machinery provided the largest tonnage of imports in 1913 and 1921, with 18,007 tons and 4911 tons respectively; and, with 4685 tons in 1920, stood second to machine tools, with 7176 tons.

Unit values have advanced heavily, standing in 1921 at approximately 3 times the 1913 figure for all machinery, and at 2½ times the 1913 figure for machine tools. This is brought out clearly in the table.

	First Six Months of— 1913	1920	1921
Imports			
Tons	56,121	42,740	35,284
Value	£3,754,233	£9,215,542	£6,997,965
Unit value	£66.90	£215.60	£198.30
Exports			
Tons	346,252	182,471	276,637
Value	£16,867,776	£23,822,933	£41,120,395
Unit value	£48.71	£130.57	£148.66
Machine Tools, Imports			
Tons	2,040	7,176	2,243
Value	£185,312	£1,567,278	£509,571
Unit value	£90.83	£218.40	£227.18
Machine Tools, Exports			
Tons	8,545	9,035	12,977
Value	£501,532	£1,214,936	£1,885,151
Unit value	£58.70	£134.46	£145.29

British Company to Make Surface Combustion Apparatus

British Furnaces, Ltd., Millbank House, 2 Wood Street, London, S. W. 1., England, with an authorized capital of £25,000, was organized in the early part of July, this year, to manufacture and sell in the British Empire apparatus developed by the Surface Combustion Co. The principal stockholders of the new company consist of the Bryan-Donkin Company, Ltd., machinists and founders, Chesterfield, England; Woodall, Duckham & Jones, Ltd., engineers and manufacturers, London, and the Surface Combustion Co., Inc., 366 Gerard Avenue, New York, owner of the surface combustion patents and manufacturer of industrial furnaces.

The Compagnie Generale de Construction de Fours, 32 Rue de la Grange-aux-Belles, Paris, France, is the sole licensee and manufacturer for surface combustion patented apparatus in France and its colonies, Belgium, Holland, Switzerland, Italy, Spain and Portugal.

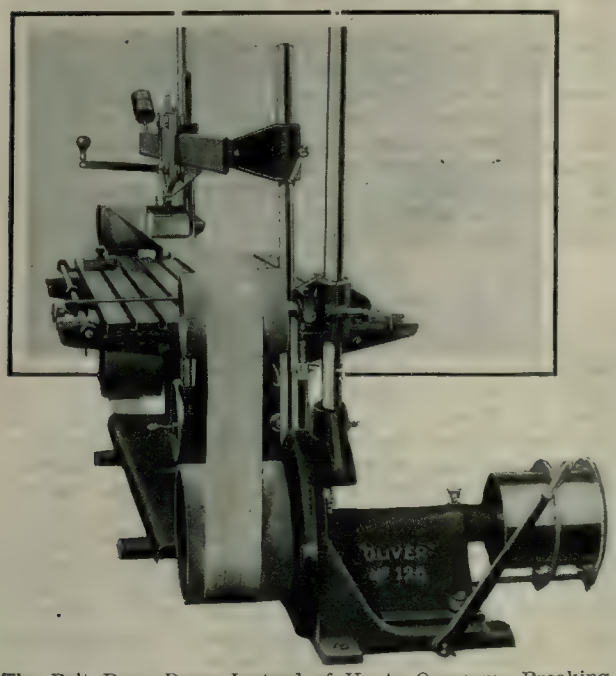
John H. Bartlett, Jr., foreign representative for the Surface Combustion Co., New York, has had charge of this work in the last few years.

The Blaw-Knox Co., Pittsburgh, will occupy booth 716 at the coming National Exposition of Chemical Industries, Sept. 12 to 17 inclusive, in the Eighth Regiment Armory, New York. The company's exhibit includes welded steel plate work, operating models of clam-shell buckets, and sample Blaw-Knox prudential section steel building; also photographs of various other products, including forms, structural steel buildings, transmission towers, water-cooled furnace appliances and miscellaneous steel plate work.

Belt Sanding Machine

The Oliver Machinery Co., Grand Rapids, Mich., has placed on the market a new machine for the rapid sanding and polishing of line and edge moldings, and for sanding and finishing built-up pieces such as desks, chairs, etc. It is said to be adaptable also to the polishing of metal.

The machine as shown in the accompanying illustration will take work of any length and sand to center of 72 in.; taking work on the table 54 in. high and over the floor plate, 72 in. high. There are no overhead belts. The belt is arranged to run down over the pulley instead of up, a feature which not only makes operation safer but is said to overcome the breaking of the sand from the belt, giving the belt a longer life. The idler is adjustable up or down to height of the work and can also be adjusted in a tilting position to keep the sand belt from running to either side of centers. A countershaft is provided to take up belt slack by means of which a flexible tension to suit the work is maintained. Sanding belts up to 10 in. wide may be used.



The Belt Runs Down Instead of Up to Overcome Breaking of the Sand from the Belt

The table is 32 x 96 in. and rolls on ball bearings, a slight push causing it to run the full travel of 36 in. The vertical adjustment is 14 in. The table top is made up of plain wood strips with 1-in. gaps between to allow dust to drop through. The table is provided with an adjustable bar to hold the work. An edging attachment is mounted on the power stand arm and is used for sanding edge work. It is made up of a belt plate adjustable table that can be tilted to 45 deg. up or down and raised or lowered at will. The machine weighs 1400 lb., and is 80 in. high over all, the floor space required being 72 in. wide and any length preferable. It can be arranged for either belt or motor drive and with or without sanding-pad attachment.

Society of Industrial Engineers to Meet

Industrial stability will be the main theme for discussion of the fifth annual convention of the Society of Industrial Engineers, to be held in Springfield, Mass., Oct. 5, 6 and 7. The topics on the program cover production, finance and accounting, sales and industrial relations.

Among the addresses announced are the following:

"Why Industrial Stability Is Essential to the Prosperity of the Country," by F. M. Feiker, assistant to Herbert Hoover, Secretary of Commerce.

"Setting Sales Standards," by E. St. Elmo Lewis, New York.

"Securing the Sales Force's Co-operation in the Attainment of Sales Standards," by Norval A. Hawkins, director of sales General Motors Corporation, Detroit.

"The Influence of Foreign Trade upon Industrial Stability," by Hon. Eugene Meyer, Jr., managing director War Finance Corporation.

The plant inspection committee has selected the following plants for inspection trips: American Bosch Magneto Corporation, Rolls-Royce of America, Inc.; National Equipment Co., Westinghouse Electric & Mfg. Co., Moore Drop Forging Co., Gilbert & Barker Mfg. Co., Greenfield Tap & Die Corporation, Greenfield, and Fisk Rubber Co., Chicopee Falls.

Facts as to Living Costs Wanted

The Department of Labor, through the Bureau of Labor Statistics, is making a study of the methods of adjusting wage scales, and concluding collective wage agreements where cost of living figures enter into the wage adjustment. To that end, the Bureau of Labor Statistics wishes to communicate with the various companies, members of arbitration boards, labor managers, or others who are using cost of living figures in the determination of wage awards.

If any reader of THE IRON AGE, who has not already communicated with the bureau, is using cost of living figures in the adjustment of wages, it will be appreciated by the bureau if he will write to the Commissioner of Labor Statistics, Washington, and inform him of that fact.

Heavy-Duty Tractor Trailer

A trailer designed for heavy-duty service with tractors is a recent addition to the products offered by the Sharon Pressed Steel Co., Sharon, Pa. The accompanying illustration shows the general construction.

The frame is made up of 4⅜-in. channel sections pressed from ⅛-in. steel riveted into one-piece channel-section corner pieces, pressed to a 6-in. radius, with a hole for the stake pocket. The two additional members running lengthwise are of 3-in. pressed steel channel, riveted to the end rails and braced laterally to the frame with V-braces which take the pull of the couplers. The couplers are of forged steel, ⅝ in., either one or two being supplied as required.

The rear wheel and front caster supports are 3-in. pressed steel channels riveted to the side rails and longitudinal members of the frame. The rear-wheel brackets are pressed from ¼-in. steel and have two stiffening ribs on each side, a construction that is claimed by the makers to be stronger than a malleable casting. The rear wheels are of malleable iron, have a 3½-in. face, and are mounted on 3-in. Hyatt roller bearings on a 1-in. hardened and ground shaft. The front casters are equipped with ball and roller bearings and are bolted to a ½-in. steel plate riveted to the frame. The floor of the trailers is 1¼-in. oak recessed flush in the side and end rails. All frame members are made flush on the bottom to afford even support when the trailer is used in connection with a lift truck. The trailer is designated as the Brute, and is said to have been tested with a load of 8000 lb., without showing signs of weakness. It can be furnished in sizes up to 72 in. long and up to 50 in. wide.

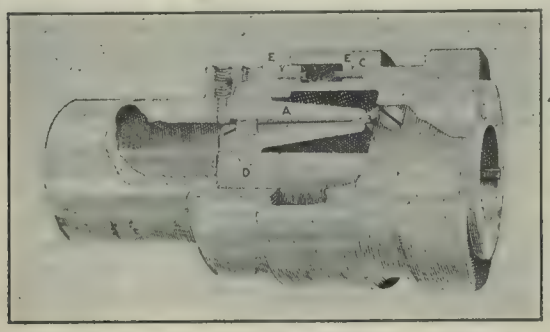


Rear Wheel Brackets Are Pressed from ¼-In. Steel

Positive Locking Friction Clutch

A friction clutch with a positive locking feature, designed to permit of starting its load under friction only and becoming locked against slippage when the clutch is completely engaged, has been recently developed by the Carlyle Johnson Machine Co., Manchester, Conn. This is not a completely new design, however, being but a modification of the standard Johnson clutch, the locking feature having been developed to cover the specific need of certain requirements.

Referring to the illustration it will be noted that an outside shifter sleeve carries a sliding wedge, B, between two toggle levers, A; these expand the friction ring, D, to grip the opposing surface of a cup member. This is briefly the principle of operation of the standard



The Locking Feature Consists of Six Pairs of Opposing Pins on the Edge of the Clutch and on the Shifter Sleeve

Johnson friction clutch. To this the positive locking feature has been added, consisting of six pairs of opposing pins spaced equally distant on the edge of the clutch and on the outside shifter sleeve, as shown at E E. When disengaged both the friction surfaces and the positive pins are out of engagement. As the shifting sleeve is thrown in, the friction surfaces take the load and practically pick it up to full speed before the opposing pins come into contact. With the full throw of the clutch the pins become engaged as a locked drive and slippage under load is impossible.

Senate to Increase Revenues in Its Tax Bill

WASHINGTON, Sept. 6.—No surprise was occasioned by the announcement that the Senate committee on finance had decided to re-write the House tax bill. The reason given was that it is desirable to include in one document every internal revenue law on the statute books. The House bill was characterized by Chairman Penrose as a series of amendments to existing revenue laws and he stated that it is the intention of the finance committee to make the bill "all inclusive." The measure is to be reported to the Senate when Congress reconvenes on Sept. 21.

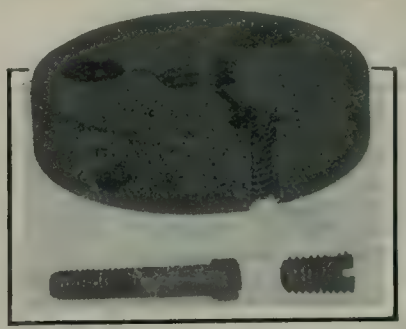
But the conclusion of the committee to re-write the House bill does not by any means find its entire significance in the desire to make it "all inclusive." The fact of the matter is that the House bill is inadequate from a revenue point of view and it remains for the Senate committee to make up the deficiency. In other words, business and other interests are not going to be relieved of taxes to the extent that was stated by House leaders. From the outset there has been considerable skepticism that the Administration will save $500,000,000 in the annual expenditures of the Government, as was planned in framing the House bill. A number of important suggestions for tax legislation that had been made by Secretary of the Treasury Mellon and supported by the Administration were ignored by House leaders. These were considered to be entirely practical and it is thought that they will be resorted to in part, at least, by the Senate committee, with a view to obtaining greater revenue than would be possible under the House bill.

Dr. T. S. Adams, Treasury tax expert, who assisted the House committee on ways and means, in preparing the revenue bill, is also co-operating with the Senate committee on finance. The suggestions of Secretary Mellon, which were largely disregarded by the House, and which are being studied by Republican members of the Committee, involve an assessment of four billion dollars.

Some of the principles advocated by Mr. Mellon were a source of rather general agreement and in consequence are reflected in the House bill. These included such matters as the repeal of the excess profits tax and the lowering of the corporation income taxes. Senator Smoot, a leading Republican member of the finance committee, has prepared a substitute plan for tax revision which calls for a manufacturer's sales tax of 3 per cent, estimated to raise $1,200,000,000. It is largely similar to the measure he prepared some time ago, the substance of which was published in THE IRON AGE, which proposed that taxes shall be raised from six sources only. Senator Smoot does not take a hopeful view with regard to the ability of the Government appreciably to reduce taxes. In a recent address before the Rotary Club in Washington, he predicted that in seven years the United States would face a $5,000,000,000 tax which it was claimed would continue at this rate for half a century.

New Thread Templet Gages

A line of thread templet gages of the familiar round adjustable type but with improvement in the adjustment has been recently placed on the market by the Pratt & Whitney Co., Hartford. The accompanying illustration shows the assembled gage and also the locking and adjusting screws. The latter is a short tapered screw placed parallel to the axis of the gage, one full turn of which changes the effective diameter of the gage about 0.001 in., adjustments finer than 0.0001 being easily made. When the locking screw is tightened the threads of the taper screw form a perfect dowel in both planes, a feature that is said to have been lacking in previous types of adjustable templates. The importance of accurate doweling to maintain a true helix is



One Full Turn of the Adjusting Screw Changes the Diameter 0.001 In

obvious. Both screws are readily sealed after setting. The first thread of the templet is chamfered to the angle of the thread, for ease in starting. The sizes are from 1/16 to 5 in. and larger.

International Engineering Dinner

A dinner to celebrate the homecoming of the mission of American engineers who went abroad to confer the John Fritz medal upon Sir Robert Hadfield of London and Dr. Eugene Schneider of Paris will be held at the Engineers' Club, New York, Oct. 10. The guests will include representatives of the British and French engineering societies.

The appointment of the following committee of arrangements for the dinner has been announced: Calvin W. Rice, secretary American Society of Mechanical Engineers; Frederick F. Sharpless, secretary American Institute of Mining and Metallurgical Engineers; Elbert M. Chandler, secretary American Society of Civil Engineers; F. L. Hutchinson, secretary American Institute of Electrical Engineers; Alfred D. Flinn, secretary United Engineering Society.

The Keystone Steel & Wire Co., Peoria, Ill., has disposed of a bond issue of $3,000,000.

Steel Mill Electrical Engineers Meeting

Program of the fifteenth annual convention of the Association of Iron and Steel Electrical Engineers, which will be held at the Hotel LaSalle, Chicago, Sept. 19-24, has been completed. It follows:

Monday

9:30 a.m.—Business session—election of officers—9:30 to 12.
2:00 p.m.—"Some Recent Developments in Induction Motor Starting," by M. Spencer. "The Electrical Engineer in the Steel Plant and Out," by F. B. Crosby.

Tuesday

9:30 a.m.—"Electrification of Steel Plant Railroads," by R. B. Gerhardt. "Anti-Friction Bearings in Steel Mills," by A. M. MacCutcheon.
2:00 p.m.—Inspection trip.

Wednesday

9:30 a.m.–5:00 p.m.—"Fuel Requirements of Steel Mills," by F. E. Leahy. "The Control of Boiler Operation," by W. N. Flanagan. "General Use of Oxygen in the Steel Mill Industry," by E. A. W. Jeffries. "Waste Heat Utilization for Steam Generation," by G. R. McDermott.

Thursday

9:30 a.m.—Report of electric furnace committee, by E. T. Moore. Report of electrical development committee, by R. B. Gerhardt.
2:00 p.m.—Report of educational committee, by L. F. Galbraith. Comments on safety committee work, by Walter Greenwood.

Friday

9:30 a.m.—Standardization committee report, by W. T. Snyder. Electric Overhead Traveling Crane Specifications, by F. W. Cramer. Report of subcommittee on illumination, by H. L. Kirshberg.
2:00 p.m.—Inspection trip.
7:00 p.m.—Fifteenth annual banquet.

Accountants of Malleable Castings Plants to Meet

The quarterly meeting of accountants of the American Malleable Castings Association will be held at Hotel LaSalle, Chicago, Sept. 12 and 13. The program has not been entirely completed, but consideration will be given to a number of new accounting subjects of general interest, the treatment of which promises to be of exceptional value.

One session will be devoted to papers and reports on machine methods of accounting. These papers and reports will cover the character of the information recorded by the use of the Hollerith tabulating machine, the Stromberg recorders and other makes of machines in use by certain members. The reports will show, in addition to the nature of the information recorded, the results secured and the savings effected.

Another session will be devoted to a presentation of the subject of graph charts designed to show how information can be pictured for the ready grasp of the executive who finds it difficult to read figures and get therefrom their significance. The program will include also papers of an allied nature on the subjects of "The Opportunity of the Cost Accountant to Do Analytical Work for the Executive," and "Daily Control Sheet for the Executive." Consideration will also be given to approved methods of distributing miscellaneous indirect overhead expense, as well as to a number of other important subjects.

Robert E. Belt, secretary-treasurer of the association, is chairman of these meetings.

The Greenville Steel Car Co. has secured new business that will keep the plant in steady operation for the next three months at practically full capacity. President F. L. Fay closed in New York recently a contract for repairing or rebuilding 500 steel cars for the Erie railroad.

The Machinery Club of Chicago will hold its annual picnic at Thatcher's Woods, River Forest, Ill., on Saturday, Sept. 10. A tug-of-war, a baseball game, and a number of races and contests will be features of the outing.

COMING MEETINGS

September

National Exposition of Chemical Industries. Sept. 12. Eighth Coast Artillery Armory, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 12 to 19. Fall convention, Wilkes-Barre, Pa. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

National Association of Brass Manufacturers. Sept. 14 and 15. Fall convention, Cleveland. Secretary, W. M. Webster, 139 North Clark Street, Chicago.

National Association of Cost Accountants. Sept. 14 to 16. Fall convention, Cleveland Hotel, Cleveland. Session on morning of Sept. 15 on cost methods of trade associations. Offices of association at 130 West Forty-second Street, New York.

American Society for Steel Treating. Sept. 19 to 24. Annual convention and exhibition, Manufacturers Building, State Fair Grounds, Indianapolis. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention, Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South LaSalle Street, Chicago.

More building permits were issued in Chicago in August, 1921, than in any similar period in the last seven years. The total number of permits issued was 1051 and the cost of the buildings constructed is estimated at $13,165,000. In August, 1920, permits numbered only 308, and the cost of the buildings $5,525,000. Of the total number of permits for the month just closed, 656 were for residences, 195 for apartment buildings and 150 for factories.

The National Tube Co. has purchased from the Second Avenue Passenger Railway Co. a tract of land on Second Avenue, near Brady Street, just west of and adjoining the National Tube Co.'s Second Avenue plant, Pittsburgh. The sum involved in the transaction was $22,500. The plot has a frontage on the south side of Second Avenue of 77 ft. and a depth of 108 ft. The tract is improved with several brick buildings.

VALLEY OPERATIONS

Industrial Improvement Marked by Periods of Recessions

YOUNGSTOWN, OHIO, Sept. 6.—While industrial improvement in the Mahoning and Shenango Valleys continues to be mixed with periods of recessions, nevertheless the undertone is essentially strengthened. Iron and steel operations are scarcely in excess of 30 to 35 per cent of normal, varying with different interests. One of the principal fabricating interests in the district, for instance, is operating at 60 per cent and reports that incoming business may be expected to sustain this rate.

The fourth blast furnace in the Ohio Works group of the Carnegie Steel Co. will likely be put in blast in September, owing to the pig iron demands of this interest's open-hearth department. A number of stacks in the Shenango Valley will also be lighted this month, while the merchant furnace of the United Iron & Steel Co. at Leetonia, a Hanna interest, is now making iron.

In other industrial directions, there is a marked tendency toward improvement. For instance the Metropolitan Paving Brick Co. has recently started a unit at its Bessemer, Pa., plant which had been idle for fully 1½ years. A representative of the company says that demand for paving brick has shown substantial improvement of late and that the outlook is for a good run of business.

August shipments of the Bessemer Limestone & Cement Co. reached a new high level of 100,000 bbl., with production at 90,000 bbl. Both concerns report sustained betterment in demand from road and building construction interests.

Following a suspension of several months, the Falcon Steel Co. was scheduled to resume operations at its sheet mill plant at Niles this week.

New installations doubling the capacity of its sheet mills at Niles have been practically completed by the Republic Iron & Steel Co., and will be operated as soon as business conditions warrant. Some finishing work remains to be done.

The City of Youngstown has opened bids on cast iron pipe, valves and other materials to be used in connection with a proposed expenditure of $600,000 for a new water distributing system.

Wages in the steel industry, however, are at a low ebb and there is considerable dissatisfaction on this point. Many men are earning less than $100 a month in the face of high living costs, with an additional reduction in prospect.

The rolling mill at Charleroi, Pa., of the Electric Alloy Steel Co., Youngstown, Ohio, has resumed after a prolonged suspension. President L. J. Campbell states that August bookings exceeded those in July and the outlook is for continued good business. Manufacturers who have been out of the market for a long time are seeking material, he states.

Plant Operations

The smelting plant, Portsmouth, N. H., Navy Yard, in continuous operation the past seven years, has been closed. Old materials from most of the Navy yards and stations along the Atlantic Coast were reduced here.

The Ensign-Bickford Co., Simsbury, Conn., fuses, for the past six months operating a short-time schedule, is operating in full. Wages of employees have been cut an additional 10 per cent, making a total of 25 per cent within the past few months.

Four additional tin plate mills were put on at the Laughlin works at Martins Ferry, Ohio, of the American Sheet & Tin Plate Co. on Sept. 1. Of the 23 mills at this plant 16 now are under power.

Ten additional hot mills were put on at the Farrell, Pa., works of the American Sheet & Tin Plate Co., Sept. 2. This means that this plant is operating at 66-2/3 per cent as 20 of the 30 mills now are under power.

The Standard Steel Construction Co., of Port Robinson, Ont., has reopened after a shutdown of six months. The entire force has been re-employed.

The Page, Hersey Tubes, Ltd., Welland, Ont., which has been operating on a part time basis, has started on a six-day week schedule.

The shops of the Southern Railway at Somerset, Ky., have gone on full time basis. The shops which normally employ about 600 men, have been running on part time since last April.

New Driver-Harris Rolling Mill

E. Cooper Wills, who has been engaged as general superintendent of the hot mills and engineer of the Driver-Harris Co., Harrison, N. J., has been in Pittsburgh recently completing the purchase of equipment for the new rolling mill plant on which the company is about ready to start construction. The mill building, which is of all steel construction, 275 ft. long, 100 ft. wide and 22 ft. in the clear, is to be fabricated, erected and completed by the American Bridge Co. The building will be equipped with a 20-in. break down and plate and sheet train, one 9-stand 9-in. mill for wire rods and merchant mill products, four modern type heating furnaces and two electric annealing furnaces. The 20-in. mill is to be driven by an 800-hp. direct-current motor and the 9-in. mill by a 500-hp. direct-current motor. A motor generator set for converting alternating to direct current also is part of the equipment. The mills will run on 600 volts and have a speed ratio of 600 to 300, this flexibility being required on account of the character of the products the company produces.

The products include nichrome, Monel metal, brass and various carbon steels. M. Hoagland Sons & Co., Rockaway, N. J., has the contract for building the mills. The Westinghouse Electric & Mfg. Co. and the General Electric Co. will furnish the motors and generator sets and Fawcus Machine Co., Pittsburgh, the drive for the 20-in. mill. Mr. Wills formerly was general superintendent and engineer at the Rahway, N. J., plant of Nagle Steel Co., and the layout and design of the new plant of the Driver-Harris Co. is entirely in his hands. When completed he will become general superintendent of this plant. F. L. Driver is president of Driver-Harris Co. and Leon O. Hart general manager.

No Date Set for Hearings on Metric System Bill

WASHINGTON, Sept. 6.—No date has been set as yet for hearings which are to be held in connection with the bill of Senator Ladd, of North Dakota, which, after a period of 10 years, would compel the adoption of the metric system, though metal working machinery interests would be excluded from its operation. The latter, however, along with manufacturers generally who are strongly opposed to the metric system, feel that even if they are ostensibly exempted, they would sooner or later be compelled to adopt if it became established by law.

It is understood that the hearings will not begin until after Congress reconvenes. The subcommittee to conduct the hearings is headed by Senator McNary, of Oregon. The other members are Senator Weller, of Maryland, and Senator Jones, of New Mexico. Senator Ladd has stated that it is intended that both the proponents and opponents of the bill be given a hearing, after which the record would be circulated publicly and a subsequent hearing held to hear those whose interest had been aroused and a determination as to the desirability of such legislation be obtained. This is a similar claim that has been made with regard to previous hearings. The Ladd bill is identical with that of Representative Britten, of Illinois.

S. W. Platt, formerly Pittsburgh district manager for Luria Brothers & Co., Reading, Pa., engaged in the purchase and sale of iron and steel, recently filed a bill in equity in Pittsburgh claiming that the company owes him upward of $80,000 in commissions, and asking the court to direct the company to make an accounting with him and pay him the sum which shall be determined to be due.

For a Duty on Foreign Ferromanganese

Manufacturers Favor Free Manganese Ores and Ask 25 Per Cent Protection on Their Product —A Charge of Dumping from Great Britain

WASHINGTON, Sept. 5.—The brief before the Senate Finance Committee in support of a duty in aid of the domestic manufacture of ferromanganese was presented on behalf of the following four companies:

Lavino Furnace Co., furnaces at Sheridan, Lebanon and Marietta, Pa., and Reusens, Va.

E. E. Marshall, furnaces at Harrisburg and Newport, Pa.

American Manganese Mfg. Co., furnaces at Dunbar, Pa.

Southern Manganese Co., electric furnaces at Anniston, Ala.

The statement of these manufacturers was submitted by John J. Howard, general manager Levino Furnace Co., Philadelphia, and is as follows:

Ferromanganese is an alloy of manganese with iron, used for deoxidizing, scavenging and hardening steel. Ferromanganese in previous bills has been improperly classified chiefly because there was no ferromanganese industry in this country to request for proper classification. Ferromanganese is truly a finished product. It is used by the steel man to complete his operation on the purification of pig iron but he does not have to refine the ferromanganese in any way. He takes nothing out of it nor does he add anything to it.

This alloy in former tariffs has been classed along with what may be called raw materials in schedule 3, but the Ways and Means Committee of the present Congress recognized the fact that it was a distinct alloy and put it where it rightfully belongs.

Need of a Ferromanganese Industry

As this is a steel-producing country and we must have a steel industry in order to make any progress and to protect ourselves in time of need, it is also clear that to maintain the steel industry we must also have a ferromanganese industry. This was very clearly demonstrated in the great war when the supply from abroad was suddenly cut off from this country. As steel requires protection, it is self evident that ferromanganese equally deserves protection.

Unless the American producers of ferromanganese are given proper protection at this time they must go out of business and sacrifice the furnace plants they have equipped for this product, entailing the loss of millions of dollars to the owners, loss of earnings to the American employees and loss to the country of a vitally essential industry.

Wars such as the recent one break out suddenly, but an industry like the ferromanganese industry cannot be developed over night nor are the ores available on short notice.

Shortly after the outbreak of the European war and before this country entered it there was practically no ferromanganese available for steel makers in this country outside of that produced by the United States Steel Corporation for its own use, so that the foreign producers could not continue to supply the needs of this country in addition to the European requirements. Therefore it was only through the acquisition of furnace plants and knowledge of where to secure suitable manganese ore in the foreign ore markets by the American ferromanganese producer that the industry was developed here to meet the situation. For the proper protection of the country we should be independent of any other country for our supply of ferromanganese on account of its vital necessity in the production of steel.

New Limits on Manganese

To be in accordance with the custom of the trade, we recommend to have the wording in H. R. 7456, paragraph 301, schedule 3, which now reads:

Provided, that spiegeleisen for the purposes of this act shall not be an iron manganese alloy containing less than 45 per centum of manganese,

be changed so that it shall read:

Provided, that spiegeleisen for the purposes of this act shall be an iron manganese alloy containing less than 30 per centum of manganese,

and to have the wording in paragraph 302, schedule 3, which now reads:

Provided, that ferromanganese for the purposes of this act shall be such iron manganese alloys as contain 45 per centum or more of manganese;

changed so that it shall read:

Provided, that ferromanganese for the purpose of this act shall be such iron manganese alloys as contain 30 per centum or more of manganese.

This line of demarcation, having 44 per cent in manganese as the limit for spiegeleisen, is not in accord with the custom of the trade, as the standard grade of spiegeleisen is that testing from 18 to 22 per cent in manganese, although metal analyzing up to 30 per cent manganese is classed as spiegeleisen. By placing the maximum limit on spiegeleisen at 44 per cent manganese content it appears that some oversight was made, in view of the intention to give protection to the ferromanganese industry, and to correct the error the duty on ferromanganese should be applied on all metal containing over 30 per cent of manganese. It should be clearly understood, however, that metal containing 44 per cent of manganese should not be classed or considered as spiegeleisen.

Enormous quantities of manganiferous and ferruginous manganese ore exist in this country, therefore spiegeleisen does not need protection, whereas ferromanganese does. This will explain why a protective duty on ferromanganese is necessary and not necessary on spiegeleisen.

Domestic Ore Supply Insufficient

Due to our experience during the war, when we were unable to maintain an adequate ore supply for our furnaces, we became convinced that there was not a sufficient supply of domestic ore (a fact strongly supported by the independent steel interests in their testimony before the Finance Committee).

It is the consensus of opinion on the part of the steel interests and the American ferromanganese manufacturers, based on actual experience, that high-grade manganese ore of the quality necessary for the manufacture of ferromanganese does not exist in sufficient quantity or quality in the United States to support the ferromanganese industry, and even such small quantities as may be available occur in remote districts, principally in the Western States, from which the railroad transportation charges per ton alone to bring the ore to the Eastern States (where practically all the ferromanganese is manufactured and consumed) are in excess of the price at which high-grade foreign manganese ore can be landed at Eastern seaboard ports.

In other words, it is the contention of the independent steel interests and the American ferromanganese manufacturers that a duty of no less than 100 per cent on manganese ore will be necessary to afford any kind of protection to a few mining interests in the Western States who are laboring under the belief that with protection they will be able to produce and market high-grade manganese ore for the manufacture of ferromanganese.

An Exorbitant Duty

Even were we to assume that a certain tonnage of high-grade manganese ore could be produced in the

Western States, as was claimed by certain engineers and property owners who appeared before your committee, nothing short of an exorbitant duty on manganese ore would afford them sufficient protection to enable these Western mines to compete, since the American ferromanganese manufacturers will always be able to obtain their supplies of manganese ore in the foreign markets of the world at a lower price delivered at their plants on the Eastern seaboard, notwithstanding the duty they would have to pay thereon, as the railroad freight charges from the producing points in the West on domestic ore to Eastern points would exceed the duty that would have to be paid on imported manganese ore.

It seems to us that a duty on manganese ore will not serve the purpose desired, viz.: to protect the domestic miner, but only burdens the steel industry with a higher cost on ferromanganese, since the ferromanganese makers would naturally have to include in their cost of production the duty they would have to pay on the manganese ore.

The market price for high-grade foreign manganese ore to-day, delivered f.o.b. cars Eastern seaports, is between 20c. and 25c. per unit, which, calculated on an ore containing 50 units of manganese, is equivalent to from $10 to $12.50 per gross ton. On the other hand, the railroad freight rates on manganese ore from California common points, from the Butte and Phillipsburg, Mont., district, and from the Batesville, Ark., district (where limited quantities of high-grade domestic manganese ore are reported to exist) to Eastern consuming points (say Pittsburgh district) amount to $18.66, $14.18 and $16.02 respectively, per gross ton.

The above mentioned market price of 20c. to 25c. per unit for foreign high-grade manganese ore averaging 50 per cent and over in metallic manganese may be considered as a normal price and not a price necessarily due to the present depressed state of business. The average price of foreign high-grade ores over a period of ten years prior to the war did not exceed 25c. per unit, or $12.50 per gross ton, delivered Atlantic seaboard.

It is obvious from this comparison that unless a duty of over 100 per cent is placed on manganese ore no domestic ore will be produced.

The Steel Corporation's Policy

At the hearings before the subcommittee on metals of the Ways and Means Committee the question was asked of a representative of the United States Steel Corporation whether the corporation thought there was sufficient ore in this country to take care of the requirements. In replying he said the best answer to that question is that the Steel Corporation purchased a manganese mine in Brazil within the past year and its only regret was that it had not done so ten years ago. (The inference was that during the many years it had been purchasing the ore from Brazil it had paid enough in profits to the Brazilian mine owners to have paid for the mine.) This is conclusive evidence that the corporation concluded the ore did not exist in this country.

During the hearings before the Ways and Means Committee we asked for free manganese ore and a protective duty on ferromanganese. However, even though we knew the ore did not exist in quantity in this country, if Congress wished to impose a duty on ore for revenue purposes, we were satisfied if a compensatory duty was put on ferromanganese.

In filing this brief with the Senate Finance Committee we do not presume to know what form the final bill will take, but we are still convinced there is not an adequate domestic ore supply and that manganese ore should remain on the free list, and urge that a duty be imposed on ferromanganese of 25 per cent ad valorem, based on the American valuation. It must be borne in mind, however, that should your committee recommend a duty on manganese ore, there must necessarily be an adequate compensatory duty on ferromanganese, adhering to the ratio specified in H. R. 7456.

British Producers' Methods

The unfair methods practiced by the foreign producers in the past lead us to conclude that only an exorbitant specific duty would afford the American industry adequate protection. It is for this reason that we should have an adequate ad valorem duty, with the added advantages of the American valuation plan to meet the situation.

As the result of pernicious propaganda on the part of the American agents of the English ferromanganese producers the question has arisen why, when former tariff bills did not carry a higher duty than $4 a ton, it should now be necessary to impose a duty that would protect the manufacture of ferromanganese. We would like to emphasize again the fact that in former years there were no independent makers of ferromanganese in this country and consequently there was no industry that needed protection as there is at this time.

In the copy of the *Iron and Coal Trades Review*, the leading iron and steel trade journal of England, issue of Aug. 12, 1921, there appear on page 217 quotations on British made ferromanganese as follows:

76 to 80 per cent "for home consumption," £18 per ton.
76 to 80 per cent "for export," £14 per ton.

It is prefectly evident, therefore, that the members of the British pool are resorting again to their pernicious habit of dumping in this country to destroy the ferromanganese industry, in this case the differential being £4 sterling per ton lower than they will sell consumers in their own country.

Steel Companies Not Against a Duty

The steel interests admit that ferromanganese is one of the chief constituents and essential in the manufacture of steel, and it is therefore highly important that the United States should have its own ferromanganese industry by proper protection and that we should not be dependent on other countries for the supply of this most essential article.

The steel interests, as evidenced by their testimony before the Finance Committee, were not opposed to a duty on ferromanganese. They, however, oppose the high rate of duty of 2.2c. per lb. on the metallic contents, as proposed by the Ways and Means Committee, on the basis that it would add too much to the cost of their steel. The proposed duty on ferromanganese is necessarily high because it is burdened with a duty of 1c. per lb. on the metallic manganese in the ore.

The duty proposed in H. R. 7456 on ferromanganese carries protection to both manganese ore and ferromanganese in the proportion of about two-thirds for the ore and one-third for ferromanganese; therefore it is evident that if ore is permitted to remain on the free list and an ad valorem duty of 25 per cent. imposed on ferromanganese, about 66 per cent of the high duty objected to by the steel producer will be eliminated and the necessary protection can be accorded to ferromanganese.

American Industry May Be Wiped Out

It would hardly be consistent for the steel interests to request that their own industry be protected and deny adequate protection to the ferromanganese industry. They assume that ferromanganese would cost them less if a small duty or no duty is placed on the product, overlooking the fact that unless a duty giving adequate protection is granted the American industry will cease to exist and they will have to pay the foreign producer an amount equivalent to the duty that would be necessary to protect the industry in this country. With the American industry out of the way the British producers would be able to fix the price for American consumption as has been their practice in the past.

We contend that the position of the American steel producer would not be changed, for in one case he pays a price for his ferromanganese which includes protection for the American industry and on the other hand, with no duty, he will pay the same amount to the foreign producer to sustain a foreign industry.

The dominating factor of the foreign producers is the British pool, whose avowed purpose is to reclaim the American trade and to drive the American maker out of business by unfair competition. This unfair

competition has already been brought to the attention of the United States Government and is in process of investigation by the Federal Trade Commission.

Output of Merchant Ferromanganese

The American producers of ferromanganese have at present ample furnace capacity to supply all the independent steel makers in this country even under war time consumption.

The accompanying table shows the production over a period, of only four of the producers, and as the output was governed by what was sold, it is only fair to say that this tonnage would have been materially increased had the demand been sufficient.

If the steel makers' memory were not so short, and if they would adhere to actual facts we feel sure they would all plead for protection for a ferromanganese industry. Just one illustration: When the war broke out the foreign supply was curtailed and stocks here rapidly diminished so that there threatened a famine in ferromanganese. The result was that the price of the small amount of ferromanganese available jumped to unheard of prices and threatened a shut down of practically every independent steel plant in the country. Shortly after this the American ferromanganese producers came to their rescue and with gradually increasing production the price was brought down to a reasonable war time level and remained there.

In conclusion, if the ferromanganese industry is permitted to survive, by reason of an adequate duty, then the steel producers would not be subjected to any undue hardship and the United States—the largest producer of steel in the world—by fostering a ferromanganese industry of its own would not be dependent on foreign countries for its supply of this vitally important element.

*Production of American Ferromanganese—Gross Tons**

	1915	1916	1917	1918	1919	1920	1921	Total
Lavino Furnace Co.		8,514	32,622	35,421	22,493	59,737	8,382	167,169
E. E. Marshall			9,603	32,108	2,249	19,900	None	63,860
American Manganese Mfg. Co.	10,059	2,892	None	2,293	9,345	9,991	None	34,580
Iroquois Furnace		7,684	19,771	17,312	None	17,329	None	62,096
Total	10,059	19,090	61,996	87,134	34,087	106,957	8,382	327,705

*The table represents the tonnage of ferromanganese produced exclusive of that produced by the United States Steel Corporation and other steel companies, and does not include the production of several other companies which operated during the war but went out of business immediately after the armistice was signed.

DUTY ON HIGH SPEED STEEL

Sheffield Manufacturers Present Their Views to Senate Committee

WASHINGTON, Sept. 6.—Essentially different points of view were apparent when high-speed steel manufacturers from Sheffield, England, through Arthur Balfour of Arthur Balfour & Co., presented their arguments on Tuesday of last week regarding the proposed tariff duties on their products carried in the Fordney bill. The hearing was referred to briefly in THE IRON AGE of Sept. 1, page 568. Naturally enough, they looked at the matter from the angle of producers who are apprehensive lest duties be imposed which would shut off the American market from their trade. While members of the Finance Committee accorded a courteous reception to the British manufacturers, it was evident that they looked at the matter with the domestic situation in mind. The hearing was not only unusual in that it probably marked the first time in the history of American tariff legislation that foreign manufacturers appeared in person to protest proposed rates, but it was significant of the development in the high speed steel industry of the United States and its competitive effect on an old source of supply. It denoted efforts of American manufacturers of tool steel to expand this industry, comparatively new for the United States and the striving of the British producers to maintain the important trade and long association they have had with the United States.

The vital interest which British manufacturers have in the domestic market was made plain when Mr. Balfour told the committee that probably 18 per cent of the output of Sheffield high-speed steel producers is shipped to the United States, and that some firms do practically all of their business with consumers in this country. He stated emphatically that the duties proposed in the Fordney bill would entirely shut off the American trade. He suggested that the proposed duty of 20 per cent ad valorem on steel valued above 40c. per lb. should be reduced to 10 per cent and that the compensating duty of 72c. per lb. on the tungsten and molybdenum content should be reduced to 35c. per lb. He also protested against the American valuation plan, stating that Sheffield makers have running contracts for 200 to 300 tons with American consumers, and that it would not be possible to determine what the prices would be until the duties are levied or known.

The committee, of course, already has approved and is studying the American valuation plan extensively and is to get further detailed reports from experts of the Treasury Department. But it is obvious that while it discerns difficulties that may arise in putting the plan into effect, it is the attitude of the committee that the present basis of levying duties on the foreign valuation will be virtually impossible of successful operation in the absence of having a very large corps of officials from the Treasury Department stationed in foreign ports throughout the world.

The soundness of the argument made by Mr. Balfour regarding the necessity of trade between the nations and of stabilized exchange was recognized by the committee. But the manner of doing this seemingly represented a difference of opinion, because those members who are desirous of aiding the domestic industry through a protective tariff do not want to sacrifice the interest of United States makers in order to stabilize international currency. Arguments of Mr. Balfour for the necessity of reviving the industry in England were replied to in substance by Senator Smoot by stating that the same thing might be said regarding the industry in the United States. But it was indicated to Mr. Balfour that the committee reciprocated his feelings that it is necessary for England and the United States to maintain business relations and that it is, of course, not desired to unfairly shut out foreign interests from the American market. They sympathized with him in his expressions concerning struggles of the English people to overcome the enormous strain of war.

"All that is asked is to let us live and pay you, because the only thing we can do is to trade goods with you," said Mr. Balfour.

But here again, it was shown that the American people also are under a heavy strain due to the war and that it is necessary to revive domestic industries. Mr. Balfour stated that the cost of melting is 400 per cent higher than it was in 1912 and that the British makers are paying wages which are about the same as those paid in America.

"We do not believe in retaliation in our country," said Mr. Balfour; "we are afraid it would cause mistrust between nations and all we ask is for you to give us what you can."

Mr. Smoot asked Mr. Balfour if he would be satisfied if the tariff made up the difference in the labor cost and equalized the difference in exchange. Mr. Balfour replied that that plan would be satisfactory, provided the so-called high tariff duties were not made permanent.

LOWERED FREIGHT CHARGES

Reduction Made on Iron and Steel Exports—New Pacific Rates Pending

WASHINGTON, Sept. 6. — Following permission granted by the Interstate Commerce Commission to railroad lines east of the Mississippi River, to reestablish export rates on iron and steel products through the Atlantic seaboard ports, amounting to a reduction of a little more than 20 per cent, transcontinental lines have filed an application with the commission asking permission to make reductions in rates on iron and steel products from all producing sections to Pacific coast terminals, the proposed cuts ranging from 25 to 40 per cent. The new application, which applies to all products, from pig iron to finished steel, calls for the establishment of flat rates to the points of destination, regardless of the differentials now obtaining from the nine rate-grouping districts into which the country is divided.

The request, which involves a departure from the so-called long-and-short-haul provision of the act to regulate commerce, is made in order to meet competition through the Panama Canal, though the proposed trans-continental rail rates still will be much higher than those applying to shipments to Pacific coast terminals by way of the canal. The railroads ask that the commission give the matter early consideration, the intention being to apply the reduced rates, if they are allowed to become effective, as soon as possible, and it is believed the permission will be granted to make the new rates operative on or before Oct. 3.

Typical of the present rates and the reduction proposed are those relating to steel bars, hoops, bands and cotton ties. The application seeks to lower rates on these products to $1 per 100 lb. The present rate from New York is $1.83½; from Boston $1.66½; from Pittsburgh and Chicago, $1.58½; from points west of the Mississippi River to the Missouri River, $1.50; and from points west of the Missouri River, $1.25½.

Some of the other major steel products listed in the application, and the proposed new rates, are as follows, rates stated per 100 lb., unless otherwise specified:

Pig iron, billets, blooms, etc., $1 west from Atlantic seaboard to Mississippi River and south of the Michigan-Wisconsin line; 90c from all other points. Bolts, nuts, etc., horse shoes, iron sheets and plates, No. 11 or heavier, welded or seamless pipe minimum weight, 60,000 lb.; boiler flues, not over 12 in. in diameter (minimum weight 60,000 lb.); large nails, spikes, etc., light rails and fastenings and angle bars, locomotive axles, wire and wire goods, wire rods and structural steel, $1.

Corrugated iron sheets, No. 12 and lighter, pipe fittings and connections, $1.15; rough castings and forgings, boiler flues not over 12 in. in diameter, and welded or seamless tubing (minimum 40,000 lb.); nails and horseshoes in boxes (minimum weight 50,000 lb.), $1.25; cast iron pipe and connections, $1 (minimum weight 60,000 lb.), and $1.25 (minimum weight 40,000 lb.); heavy steel rails $20 per gross ton, minimum weight 80,000 lb.

Representative of new rates, which become effective today on shipments from Pittsburgh and the Atlantic seaboard for export, are the following, the first column being stated in cents per 100 lb., and the others in dollars per gross ton:

Eastbound Export Rates Effective Sept. 6, 1921

Pittsburgh to—	Special Iron and Steel Articles	Billets	Pig Iron	Rails
New York	28½c.	$4.70	$4.60	$4.40
Boston	28½c.	4.70	4.60	4.40
Philadelphia	26½c.	4.30	4.20	4.20
Baltimore	25½c.	4.10	4.00	4.10
Norfolk	33½c.	5.50	5.30	4.60
Newport News	33½c.	5.50	5.30	4.60

The railroads had filed applications to make these rates effective last Thursday, but some of the tariffs were delayed and consequently the reductions did not become operative until today. The lowering of iron and steel freight rates on shipments for export has been well received by the trade, and it is expected that it will prove an element in hastening readjustment and the revival of the industry. At the same time, the trade is anxious that there be a general lowering of rates on purely domestic shipments as well.

TO IMPORT SWEDISH IRON ORES

New Agency at Philadelphia for the Famous Kiruna Product

The Trafikaktiebolaget Grangesberg-Oxelosund of Stockholm, Sweden, operator of the famous Kiruna iron mine and the largest and most important firm of iron ore miners and sellers in Sweden, announces that Albert Broden, Temple, Pa., formerly general manager of blast furnaces of the Reading Iron Co., who has been its representative in this country for the last 16 years, has severed his connections on account of his health.

Park & Williams, Inc., who have offices in Philadelphia and Pittsburgh, have been appointed to succeed Mr. Broden and in the future will look after the sales of this ore in the United States. Laird U. Park, president of Park & Williams, has just returned from a trip to Sweden in the course of which, he visited the various mines operated by the company and also went to Narvik, Norway, to inspect the new crushing plant and the modern steel ore dock, which can load three vessels at one time at the rate of about 2000 tons per hour each. A description of the Narvik ore dock appeared in THE IRON AGE of Jan. 9, 1908.

The Trafikaktiebolaget Grangesberg - Oxelosund mines two-thirds of the total of iron ore produced in Sweden, which in normal times has run up to 7,500,000 tons a year. In addition to mines and railroads it has blast furnaces and controls its own vessels. With vessels under construction the fleet will represent over 200,000 tons.

Operations at the company's Kiirunavaara iron mines in the north of Sweden have been considerably increased, and steam shovels are now at work on a sufficient number of benches on the outside of the mountain to permit of taking out over 14,000 tons per day. In the past year work on the Luossavaara iron mountain, located a short distance from Kiruna, has progressed until the mining rate is now 1000 tons per day. The ores in these deposits run 60 up to 69 per cent iron, natural, with phosphorus ranging from 0.05 to 3 per cent, the average ore mines carrying from 0.75 to 1.25 per cent of phosphorus.

Lake Iron Ore Shipments in August

Shipments of iron ore from the Lake Superior region in August were very light as compared with those for August, 1920. This year they were 4,329,158 gross tons, which compare with 9,270,763 tons in August 1920. The decrease from last year was therefore, 4,941,805 tons or 53.30 per cent. The totals by ports, with season shipments, and a comparison with 1920, are given below:

	August, 1921	August, 1920	To Sept. 1, 1921	To Sept. 1, 1920
Escanaba	309,111	1,277,561	758,173	4,394,838
Marquette	129,691	602,567	263,105	2,141,291
Ashland	468,283	1,327,294	1,429,308	4,933,402
Superior	917,693	2,266,497	3,508,928	8,961,424
Duluth	1,833,247	2,351,918	6,472,640	9,352,140
Two Harbors	671,133	1,444,926	2,315,918	5,566,779
Total	4,329,158	9,270,763	14,748,072	35,349,874

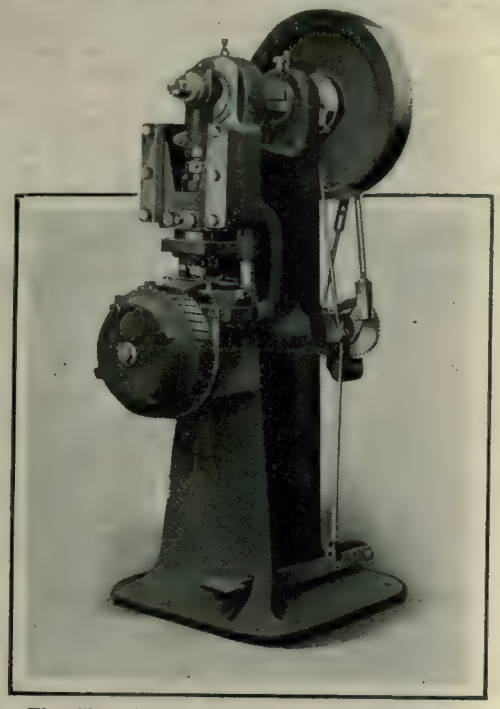
The decrease in season shipments to Sept. 1, 1921, has been 20,601,802 tons, or 58.27 per cent, as compared with an increase for the same period a year ago of 5,751,826 tons.

Of the season's total to Sept. 1, the Great Northern dock contributed only 0.99 per cent, as against 21.63 per cent a year ago. Duluth is credited this year with 43.89 per cent of this season's total as compared with 26.46 per cent a year ago.

Tie-Splicing Machine

A machine designed primarily for splicing short pieces of cotton ties but adaptable to other uses of a similar nature has been brought out by the Renaud Co., Cincinnati. The splices made are double riveted.

The press is of the same design as the ordinary upright press but modified to receive the positive power driven automatic rivet feed. It is operated by a foot lever, its operating features said to have been taken from the Willard power press. The dies are of the combination trimming and piercing type, consisting of a subpress held in adjustment and alignment by heavy guide posts. The lower half of the die is a single piece



The Slots in the Hopper Are Emptied and Refilled During One Revolution

of specially selected stock and has a hole in the center shaped to receive the shearing punch which is also a solid block of the same material. The upper and lower halves of the die are securely fastened to the corresponding halves of the subpress. The punch holes are bushed so that if they become broken or worn they may be replaced. The punches are also removable.

The rivet feed is obtained from the hopper, to be seen in the illustration, which contains the rivets and an auxiliary internal mechanism both of which are positively driven from the crankshaft, there being no chains or gears. The hopper is timed to index one slot at each stroke of the press. As one stroke is required to prepare the tie ends and one stroke to compress the rivets, two rivets are brought to an upright position in front of the operator in time for the next riveting operation. The slots are emptied and refilled during one complete revolution of the hopper, the rivets not used falling back into the hopper and causing no interference.

In splicing, the material is placed between the shear and punch blocks, the pressed tripped, and the pieces are prepared for riveting. The operator then takes one piece, places it over the two rivets standing upright in front of him in the slots, slides it under the hammer, places the other piece on top and then trips the press, compressing the rivets and completing the operation. The production claimed is 1500-2000, 11½ ft. ties per day, the finished splices being uniform and smooth. The machine weighs 1400 lb. net.

A small number of men employed in the drop department, North & Judd Mfg. Co., New Britain, Conn., automobile and carriage hardware, etc., last week walked out following a reduction in wages. Their places were promptly filled at the reduced wage. Wages of employees at this plant have been reduced 5 to 10 per cent.

WEEKLY COMMERCE REPORTS

Department of Commerce to Give Foreign Trade Information by Industries

WASHINGTON, Sept. 6.—Beginning yesterday, *Commerce Reports*, published by the Department of Commerce, became a weekly instead of a daily publication. This change is made as part of the general reorganization plan of the foreign trade service.

Commenting on plans of the Department, Secretary Hoover said:

It is proposed to place information with regard to foreign trade before American business men in more intelligible and constructive form. Heretofore a vast amount of material, which comes in from a staff of 600 foreign agents, including commercial attaches, consular agents, trade commissioners and special agents, has been presented in a daily mass of reports, unsystematized excepting for arrangement to some extent on a purely geographical basis.

The bureau of foreign and domestic commerce is being reorganized on a commodity basis, the object of which is threefold:

1. That specialists in the different great industrial divisions should be incorporated in the bureau for the purpose of giving expert direction to these many foreign agents as to the investigations and services that will be of importance and most useful to their particular branch of industry.

2. That they may, by maintaining close communication with trade associations in different industries, keep in touch with the character of service, information and investigation needed in these industries.

3. That the material coming in may be edited and prepared in such a manner as to be of the most practicable service.

The following divisions have so far been established:

Iron and steel.
Lumber.
Industrial machinery.
Electrical equipment and supplies.
Foodstuffs.
Automotive equipment.
Fuels.
Textiles.
Shoes and leather products.
Agricultural implements and vehicles.
Rubber products.

The men in charge of these divisions have been chosen from the industries themselves and in most instances have been selected in co-operation with their trade associations so that they may bring to the department not only specialized knowledge and sympathetic understanding of the problems of these particular industrial groups but in turn may interpret to the foreign staff the needs of these industries and, as stated above, develop the material received in such form as may be of the greatest use in the industry to which it is related.

In the above sense the weekly form will be departmentalized over the different industries as far as practicable.

In order that there may be the widest distribution and no delay in important information, special material will be released to the press immediately upon its arrival, in advance of the weekly publication.

The present form of the weekly is not final, and it is anticipated that changes and improvements will be made in succeeding numbers. The department will welcome suggestions and criticisms that will lead to making the *Commerce Reports* in this new form more useful to subscribers.

Steel Employment Slightly Better

WASHINGTON, Sept. 6.—Employment in the iron and steel industry finally has shown an upturn, though slight, according to the Employment Service of the Department of Labor, and made an increase of 6726 workers, or 2.2 per cent, in August when compared with July. The report indicates that 1428 firms, in 14 lines of industry, located in the 65 principal industrial centers, employed 1,510,210 workers on July 31, and the number was increased to 1,526,479 on Aug. 31, a net gain of 16,269 or 1.08 per cent. Industrial classifications showing increases in employment are iron and steel and their products; metals and metal products other than iron and steel; railroad repair shops; tobacco manufactures; food and kindred products; leather and its finished products, and stone, clay and glass products. Among the gains, by numbers and percentages, in addition to iron and steel, were railroad repair shops, 3423, or 5.7 per cent, and metals and metal products, 3877, or 5.4 per cent.

As pointed out by the report, at first glance the figures for August seem to show that the low point in the present severe depression has been reached and passed, and that the country has at last definitely set out on the road to normal conditions.

Of the 38 places reporting increased employment are the following important iron and steel towns, together with the percentages of gain: Youngstown, 27.7 per cent; Cleveland, 10.8 per cent; Johnstown, Pa., and Birmingham, 5.2 per cent; St. Louis, 3.3 per cent, and New York, 2.8 per cent. Pittsburgh, on the other hand, showed a decline of 4.4 per cent in employment in August.

Demand for Machinery in Spain

A review of the immediate and potential demand in Spain for machinery of various classes, coming from the commercial secretary to his Majesty's Embassy at Madrid and given in a recent issue of the *Engineer*, London, is summarized in what follows.

The opening for agricultural machinery is wide. Although Spain is primarily an agricultural country, the Spanish farmer has not kept pace with the times. New business often involves educating the buyer first. The tractor has not yet established itself definitely in Spain and although the market is more of the future than the immediate present, the time is opportune for manufacturers to lay the foundations of business by making their machines known.

The metal working industries have obtained a specially high protection, import duties amounting to between 100 and 250 per cent. In regard to screws and threaded nuts the demand has been supplied hitherto mostly from abroad but it is expected that with the present duties home production will increase.

In the Barcelona district it is expected that water turbines will be required for the numerous power plant projects in process. At present this trade is almost wholly in the hands of Swiss and German manufacturers but it remains to be seen what effect will follow a recent Royal decree obliging future holders of water power concessions to use Spanish machinery whenever possible. Centrifugal pumps are also largely required for irrigation purposes.

In machine tools business is temporarily at a standstill. In the Vigo and Corunna areas screws and files are in large demand, the Spanish product being reported as of very poor quality. In this connection the British Vice-Consul at Corunna is stated to have reported that the Germans in quoting prices to merchants in this district add the following clause: "If these prices are found dear, please make us a counter offer."

There is a demand for machine tools, for both metal and woodworking reported by the Vice-Consul at Castellon. In the carpentering and cabinet-making industries much work is done by hand which could with advantage be done by machinery. The manufacture of house furniture has developed considerably of late years and a large export trade has been established. In order to introduce the machinery, it is stated, manufacturers must send representatives or appoint agents with security of their appointment for a number of years, propaganda confined to sending of catalogs not being likely to lead to business.

The Spaniard, it is remarked, does not readily renew his machinery, and in the Barcelona district, at least, hardly any of the profits made during the war seem to have been invested in new installations. Some of the local textile factories are still using machinery that dates as far back as 1880.

South Africa's First Modern Blast Furnace

A brief description of the first modern blast furnace to be built in South Africa by the Newcastle Iron & Steel, Ltd., Newcastle, Natal, with main offices at Johannesburg, is furnished by the company as follows:

Prior to this another company built two small experimental plants during the war with a capacity of about 10 tons per day, which turned out a few thousand tons of pig iron from local ores, but these have now been closed down. The drawings for this company's new blast furnace were supplied by McClure & Sons, Pittsburgh, the dimensions being 70 ft. high, with bosh 14 ft. 6 in., and three stoves 20 ft. x 80 ft., with a provision for a fourth. Two stoves are completed and a third is in course of erection. There is also an iron and steel foundry being built, 92 ft. x 180 ft., equipped with a 20-ton open-hearth electric crane. A brick plant has also been erected for the manufacture of fire and common bricks and all the bricks required for the plant are being made on the spot.

The iron ores will be taken from the company's own mines in the district and are of a fairly high grade; the Hematite ore running from 60 to 67 per cent metallic iron, 0.03 phosphorus, 0.9 to 5 per cent silica with sulphur a trace. Our coke runs from 6 per cent to 12 per cent of ash and sulphur 0.6 to 1.2 per cent. The company has also its own coal property two miles from the works, and dross or fine coal suitable for coking is now being supplied at 3s. 6d. per ton at the colliery.

It is proposed later to erect a steel plant for the manufacture of heavy rails. The site of the works consists of 200 acres on the main line about half way between Durban and Johannesburg with a frontage on the Incanda River.

Southern Raw Material Freight Cuts

BIRMINGHAM, Sept. 6.—Raw material rate reductions ordered to become effective on or before Oct. 1 have not been accepted. The state utilities commission which ordered them expects the carriers to comply, but they have not said whether or not they would appeal to the Interstate Commerce Commission. The rates are preferential. Coal and coke are not affected. Most favored furnaces see no more than 30 to 42 cents saving per ton of iron. These are in the 25-mile zone limit. In stone from over 50 miles from furnace the rate is increased.

The following shows new and old rates from mines and quarries to Alabama City, where the Gulf States Steel and Alabama Co. operate furnaces and general schedule of 25 and 50-mile zones:

To Alabama City From—		*Ore* Present Rate	Proposed Rate	Reduction
Shannon	75 miles	$0.80	$0.71	8.87 per cent
Steinman	77 miles	0.80	0.71	8.87 per cent
		Stone		
Spencer	64 miles	0.60	0.63	5 per cent*

For Distances Under 25 Miles	Present Rate	Proposed Rate	Decrease
Ore	$0.50	$0.37	26.0 per cent
Stone	0.40	0.37	7.5 per cent

For Distances 25 Miles and Under 50 Miles	Present Rate	Proposed Rate	Decrease
Ore	$0.60	$0.47	21.7 per cent
Stone	0.50	0.47	6.0 per cent

*Increase.

Southeastern Fabricating-in-Transit Privilege

BIRMINGHAM, Sept. 5.—Premature report from Atlanta last week was to effect that the Southeastern freight rate committee had approved the recommendation of Southern and Louisville & Nashville railroads for a fabricating in transit privilege on iron and steel products in Birmingham, Atlanta, Chattanooga and other Southeastern points. The committee took the matter under advisement according to custom. It is confidently expected that the action will be favorable, but no decision has been announced.

Plans for the reorganization of the Nickel Alloys Co., Clearfield, Pa., with plant at Hyde, near Clearfield, are under way, with proposal to form a $2,500,000 company and take over the assets of the present organization, which has been in the hands of a receiver for several months. William J. Webster and Leland Lyon are at the head of the reorganization committee; bonds for $1,000,000 will be issued to carry out the details and place the plant, now closed, in operation.

The American Steel Foundries, Chicago, according to a statement by its president, has no money borrowed from any source, and on the other hand, has $2,000,000 in cash, and over $4,500,000 invested in securities, mostly Liberty bonds and certificates of indebtedness. Surplus is over $10,000,000 and inventory has gone down $2,000,000 since the first of the year, although it was low at that time.

The Philippine district office of the United States Bureau of Foreign and Domestic Commerce, was opened in Manila, July 15, with temporary quarters in the Ayuntamiento, the executive building of the Insular Government. The office, in charge of George L. Logan, manager, purposes to cooperate with American business houses.

CONTENTS

Electric Furnace Operating Experiences 581

Experiments with Three Forms of Furnace Bottom—Building Bottoms—Experiments with Roof and Sidewalls—Metallurgical Features

Foundry Irons for Particular Uses 585

Differentiating Characteristics of Gray Iron, Mottled, Chilled or White—Skill of Manufacture—Analyses for Certain Castings

British View of American Steel Making 589

Blast Furnace and Open-Hearth Practice Compared—Coke-Oven Gas as a Fuel—Rolling Mills Here and in England.

Three Types of Alloy Sheet Steel—I 594

Proper High Tensile Material for Aircraft Parts—Specifications, Analyses and Manufacture of the Three Electric Steels.

Manufacture of Drill Steel from Hollow Ingots 596

Process Used by Ludlum Steel Co. and Its Advantages—Influence of Decarbonized Layers

For a Duty on Foreign Ferromanganese 603

Manufacturers Favor Free Manganese Ores and Ask 25 Per Cent Protection on Their Product—A Charge of Dumping from Great Britain

August Pig Iron Production 614

Daily Output 2891 Tons Greater Than That of July—Total for Month 954,193 Tons

Causes and Cures of Depression 584
"Peds" to Attach Trim to Concrete 584
China Buys Locomotives 588
Steel Corporation Analysis Methods 588
Foreign Trade Conditions ...592, 598, 631, 632
Hobbing Large Worm Wheel 593
Census from Mineral Industries 593
Electrical Exports Increase 598
British Machinery Trade 598
Belt Sanding Machine 599
Industrial Engineers' Meeting 599
Facts as to Living Costs Wanted 599
Heavy-Duty Tractor Trailer 599
Positive Locking Friction Clutch 600
Senate to Increase Revenues in Its Tax Bill 600
New Thread Templet Gages 600
International Engineering Dinner 600
Electrical Engineers' Meeting 601
Accountants of Malleable Castings Plants to Meet 601
Coming Meetings 601
Labor Notes 607
Hearings on Metric System Bill 602
Plant Operations 602
High-Speed Steel 605
Lowered Freight Charges 606
To Import Swedish Iron Ores 606
Lake Iron Ore Shipments 606
Tie-Splicing Machine 607
Weekly Commerce Reports 607
Steel Employment Better 607
Demand for Machinery in Spain 608
South Africa's Modern Blast Furnace 608
Southern Raw Material Freight Reductions 608
Southeastern Fabricating-in-Transit Privilege 608
Editorials 610

Benefits of Export Trade—Prices and Buying Power—The Inventor's Opportunity—On the Will to Work.

Correspondence 613

Titanium Treated Rails—Latin American Criticism of United States Practices.

American Exports to Russia 613
Foundry Association Bulletin 629
Ask Freight Rate Reductions 631
Industrial Finance 633
Trade Publications 641
New Books Received 641

Iron and Steel Markets 616
Comparison of Prices 617
Prices Finished Iron and Steel, f.o.b. Pittsburgh 628
Non-Ferrous Metal Markets 629
Personal Notes 630
Obituary Notes 630
Machinery Markets and News of the Works 634
New York Jobbers' Prices 642

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Benefits of Export Trade

Apparently there is a clash between those who hold that to be prosperous the United States needs an export trade and those who contend that payment for the goods exported would bring us fresh trouble. On the one hand it has been argued that we have an excess of productive capacity, hence must have an "outlet" or be but indifferently employed, while on the other hand it has been urged that a large "favorable balance" in merchandise trade is calculated to produce a price inflation that will kill the business.

The more moderate view in favor of our doing an export business is that thereby our various markets are broadened and correspondingly stabilized. We have the same principle in the domestic market. The seller who distributes his goods widely over the country has a steadier market than the one whose trade is local. When domestic demand for a given commodity is good we can export less, and when the demand falls off we may be able to export more. Obviously that is altogether different from an attempt to export all goods when all demand is light in our own country. We know well enough now that as a rule such a thing cannot be done. When demand in general is poor in the United States it is likely to be poor practically everywhere.

The question has often been asked, what is the relative quantitative importance of our domestic and our export trade. The Federal Reserve Board has given the matter careful consideration and expresses the opinion that, very roughly, a normal export trade may be taken at 10 per cent of the whole. The board (in the August Bulletin) arrives at this by taking 1919, with a census estimate of $62,589,000,000 for all manufactured products and $16,013,000,000 for all crops, or a total of $78,602,000,000, while the exports were $7,920,000,000. The board points out that export trade has a stabilizing influence upon prices, because a small excess or a small deficiency in supplies may have a great effect upon the market price.

Obviously this is a totally different thing from planning definitely to export a certain percentage of each of a large number of products and then endeavoring to maintain that percentage, whether demand is good or bad at home or good or bad in the foreign market. It is distinctly the flexibility that is an advantage, and to endeavor to maintain a fixed percentage would be to renounce that advantage entirely.

Again, we should not seek to prevent importations. Tariffs are for the purpose of raising revenue and taking care of unevenness and divergence in legitimate costs of production here and abroad. The individual sells goods in order that he may buy other goods and as a nation we should do the same thing, within proper limits and with proper regulation.

Almost constantly since the armistice questions have been asked relative to the continuance of heavy exports as compared with much lighter imports. The favorable balance in merchandise trade rose to $635,463,660 in June, 1919, its high record, and then declined to $65,501,992 in July, 1920; but that was not the end, for the balance rose again to $454,379,696 in December, 1920, and the figures have given no clear indication of what we ought to expect. The Federal Reserve Board now gives an interesting fact bearing on this question. On the assumption, generally believed to be substantially correct, that there was an even break at the time of the armistice, it was computed that the unfunded balance resulting from our foreign trade amounted to $3,000,000,000 on July 1, 1920, and that this increased in the next fiscal year by $1,500,000,000, making about $4,500,000,000 on July 1, 1921.

Details of German steel exports for 1920 are published in the latest issue of *Stahl und Eisen* to reach this country, that for Aug. 11. They are interesting as giving some measure of the activity of the German steel industry as a whole despite the fact that production data are not yet made public. The 1920 exports were 1,750,601 metric tons, or 145,900 tons per month. This is about 30 per cent of the average of 1912 and 1913 exports which was 468,000 tons per month. For the last two months of 1920 the figures were 176,480

tons and 182,120 tons, respectively, or considerably above the year's average. Structural steel, plates and sheets, rails and pig iron in the order named constituted the principal exports, structural steel running about 25 per cent of the total and plates and sheets 13 per cent. Exports of rails at 152,016 tons exceeded British rail exports, which were 134,400 tons and Germany exported more structural steel than Great Britain, as well as more hoops and strips. It is noteworthy that Germany last year exported more than the combined steel exports of Belgium and France and that the total was more than 50 per cent of that for Great Britain.

Prices and Buying Power

In the early part of the industrial depression that began in 1873, and quite similarly in the case of the depression that began in 1893, the opinion expressed by some very able and intelligent observers was that the country was overdeveloped. Too many factories had been built, too many mines opened and too much railroad mileage constructed. Business was poor because there was not sufficient employment for the facilities.

The idea was not that the employment was deficient, but that the facilities were in excess; just as it might be said of human employment that there were too many men, not that there were too few jobs. In each case the sequel showed that such analysis was wrong. The fault did not lie with the productive facilities, for afterward when activity returned there was much further development, and the greatly increased facilities all found employment eventually.

Little was said in those days about prices being too high. Possibly they were somewhat higher than would have been well, but the decline that followed did not bring about activity. Unemployment had intervened and the buying power was so reduced that men found it impossible to buy freely. The decrease in the total of purchasing power was greater than the decrease in unit prices.

Of late a great deal has been said about commodity prices being too high. No doubt the mental attitude of many buyers was that of assigning the level of prices as a reason for abstention from buying, but it does not follow that this was the main reason. It would be absurd to assume that an economic law can be deduced from what chances to be in men's minds.

Inasmuch as prices needed to come down it was well to have sellers appreciate that buyers were objecting to them. Now, however, we have progressed to another stage. We shall be in error if we adhere blindly to the idea that activity was, is and will be absent through one cause only, that of prices being too high. If a man is guided solely by such philosophy he can have but one view—that as long as inactivity obtains prices are too high, no matter what those prices are.

The buying power is greatly reduced. There is much unemployment and with nearly all those still in employment the wage or salary rate is lower. The earnings of capital, which normally are reinvested, have dwindled greatly and many companies have seen profits turned into losses. For business revival the main point is the building up of buying power, obviously a slow process. An argument frequently made is in substance that capitalists must pull business over the dead center, by seeking investment in construction work. That would distribute some jobs, wages would be paid and the wages could be spent. This would bring about more spending, and so on. The plain difficulty about this is that with the general buying power at a low level capital would not see prospect of an early return on the investment, and therefore would be disposed to wait until the buying power was clearly increasing. That the capitalist does not invest is not conclusive proof that he thinks prices are still too high. He may, for all one knows to the contrary, be satisfied with the prices, but entirely dissatisfied with the immediate prospects for the investment.

The Inventor's Opportunity

The patent lawyers of the country are very busy. This almost always is the case in periods of depression following very brisk business, but this year the condition is even more marked than usual. A chief reason is the desire of manufacturers to secure new products for which there would be a quick demand, and in this way put to work men and machinery that otherwise would be idle. Consequently it is an advantageous time for the inventor who has something worth selling, providing he will listen to a reasonable proposition of purchase.

The war years gave little opportunity for the development of new ideas having to do with peacetime purposes. In the hectic months that followed most industries were too busy supplying their established products to give serious attention to changing them or adding to them, except, of course, that the draughting rooms turned their attention from war to peace. With the falling off in industry, managing officials began to look forward, first to the immediate future, in the effort to maintain the production of their plants, and then to the farther future, getting ready for the return of good times, lest their competitors might steal a march on them.

The patent attorney's clients who are inventors pure and simple and not producers, can profit by present situation, if they have useful patents or patentable ideas, for the attorneys constantly get requests from manufacturers for information pertaining to new products. Some of the machine tool makers are seeking new lines, not necessarily machine tools or mechanisms which go with them. They want something that will sell in a time when machine tool buyers are few—something requiring in its manufacture the precision work for which their shops are equipped. Not all such products will be permanent lines, yet some of them may continue as departments when machine tools again are in strong demand, at any rate until they can be sold to advantage.

Inventors change little in one respect—their inability to gage fairly the money value of their ideas. Occasionally they are too modest, but more often they are visionary in their anticipa-

tion of wealth, wanting tens of thousands where a correct measure would be thousands or even hundreds. Few inventions have a real commercial value until they have been put through a costly developing and refining process, and for that the buyer must pay.

The reputable attorney endeavors to give sound advice to his clients as to patent values, a common suggestion being something down in cash and a royalty based on a minimum annual production, thus insuring against the invention being put aside or produced in such small quantities that royalties would amount to little. A good test of an inventor's faith in his claims is his willingness to accept, through a sale on the royalty basis, a share of the risk of a disappointing demand. The inventor should be willing to back his claim, if necessary, by accepting, through a sale on the royalty basis, a share of the risk of a disappointing demand in the market.

On the Will to Work

The addresses made last week before the American Bar Association in Cincinnati by Attorney General Daugherty and by James M. Beck, Solicitor General, dealt with matters of the highest importance to the nation. They should set many men to thinking, and thinking is sorely needed in this country to-day.

Attorney General Daugherty talked very plainly and vigorously. He planted himself firmly on the platform of law enforcement, saying that as a citizen cannot choose what laws he will obey, so those charged with law enforcement cannot choose what laws they will enforce. The chief interest in the address was in the disclosure that the new Attorney General not only appreciates time-honored doctrine as to the enforcement of the law, but also knows how to apply that doctrine to present-day conditions. He made it perfectly clear that he is not for one minute deceived by those who are disseminating propaganda to dignify crimes committed during the war by disloyal men, nor is he led astray by the attempts of some business men and some labor leaders to evade the law, or by others who under pleas of personal liberty are anxious to see certain laws violated or debated.

Mr. Beck's address discussed present conditions without fear or favor. He spoke in detail of each of the five plagues which Pope Benedict has said afflict humanity: the unprecedented challenge to authority, the equally unprecedented hatred between man and man, the abnormal aversion to work, the excessive thirst for pleasure as the great aim of life, and the gross materialism which denies the reality of the spiritual in human life. We can refer only briefly to one of these plagues as commented upon by Mr. Beck—the aversion to work:

> The great evil of the world to-day is this aversion to work. As the mechanical era diminished the element of physical exertion in work, we would have supposed that man would have sought expression for his physical faculties in other ways. On the contrary, the whole history of the mechanical era is a persistent struggle for more pay and shorter hours, and to-day it has culminated in world-wide ruin; for there is not a nation in civilization which is not now in the throes of economic distress, and many of them are on the verge of ruin. In my judgment the economic catastrophe of 1921 is far greater than the politico-military catastrophe of 1914.

Mr. Beck went on to show that the statistics as to productive industry, particularly the loss of time due to strikes, are literally appalling. Even in Germany, where men are said to be working more generally than in most European countries, 46,600,000 working days were lost in strikes in 1919. In the State of New York alone in 1920 there was a loss due to strikes of over 10,000,000 working days.

Trying to explain the conditions he described, Mr. Beck declared that the present weariness and lassitude of human spirit and the disappointment and disillusion as to the aftermath of the war may have aggravated but they could not cause the symptoms of which he spoke. He knew of but one change in environment that is sufficiently widespread and deep-seated to account adequately for this malady of our time. He referred to the mechanical developments of steam, the gas engine and electricity, and said that in acquiring from the forces of nature almost illimitable power, man has minimized the necessity for his own physical exertion or even mental skill. A machine now not only acts for him, but almost thinks for him. In other words, a man who has had so much done for him by machinery is like the pampered child who cries for more to be done for him and is not willing to do anything for himself.

Perhaps Mr. Beck has loaded too much of our present ills upon the aversion to work which has been recognized as a world-wide malady following in the wake of the war and for much of which time will be the cure. But there will be no dissent from his plea for the rekindling in men of the love of work and for a new development of the spirit of individualism and of the spirit of discipline. In less academic phrase Vice-President Coolidge has just urged upon the country the obligation to "pay ut and work out" of the burdens imposed by the war.

As we penetrate further into the period of industrial readjustment, legislative cures of one sort and another will be proposed, and there will be an increasing tendency to blame those in authority for delays in the return of prosperity. Such criticism, while largely symptomatic of the tendency to depend on laws instead of individual effort, may have its uses in sharpening discussion of the real causes at work, just as the two notable addresses at Cincinnati have done.

Data on wages and employment in the British steel industry are being published by the National Federation of Iron and Steel Manufacturers. Taking June, 1920, as 100 per cent, wages had fallen in May of this year to 65 per cent of the June, 1920, rate, the peak having been 107 per cent in September, 1920. Employment at the end of the same month, however, had fallen to 14.2 per cent of that prevailing in June, 1920, the peak having been also in September, 1920, at 101.9 per cent. The coal strike, of course, was the major cause of this slump. The interesting statement is also made that, taking the paid-up capital at the end of each

month as 100, the market value of the ordinary shares of 39 British iron and steel companies on Dec. 31, 1919, was 149.7, but by June 30, 1921, it had fallen to 97.1. The increases in capital are stated to have been only genuine additions due to extensions and amalgamations.

CORRESPONDENCE

Titanium-Treated Rails and Split-Head Failures

To the Editor: In connection with the admirable article beginning on page 393 of your issue of Aug. 18, where split-head failures of rails are discussed, may I call attention to the fact that practically seamless steel is available for rails through the simple expedient of thorough deoxidation by titanium treatment? Mr. Howard, in the article in question, mentions the probability that split heads would be unknown if this were the case and he evidently refers to internal seams in the head of a rail and not to surface seams in the flange in this statement.

Data have been accumulating for years in this laboratory showing that steel, properly treated with titanium produces rails practically free from internal seams, in decided contrast to nearly all A-rails of ordinary, untreated steel, and lately the conclusion of our tests has been reached from the service results of the rails in track, where the titanium-treated rails have shown less than half as many failures as the normal number. Mr. Howard's idea that fewer failures would result from the use of homogeneous steel is thus very strongly substantiated by this showing.

The report under discussion describes an accident, resulting in loss of life, due directly to the use in track of a segregated rail that developed a split head. A simple way has been known for years, through our researches and investigations, for practically eliminating the particular defect which causes this type of failure. This method consists merely in adding 0.10 per cent of titanium in the form of ferrocarbontitanium to the steel as the last addition in the ladle and allowing at least 10 min. for the reaction to be completed before any ingots are poured. Silicon or aluminum will also deoxidize or "kill" the steel completely but at the risk of producing streaks of non-metallic inclusions, while by the method noted both deoxidation and cleanness are secured.

What excuse is there for the railroads to continue to accept and place in their tracks rails that are not free from this defect of segregation when the preventive for it or insurance against it is so simple, inexpensive, and well known? It is to be hoped that this excellent report by Mr. Howard will be effective in calling attention to this matter so strongly that those who have the authority will see that the traveling public and railroad employees are no longer needlessly exposed to the danger of split-head rail failures which are so readily controlled by attention to the quality of steel used.

GEO. F. COMSTOCK,
METALLURGICAL ENGINEER.

TITANIUM ALLOY MFG. CO.,
NIAGARA FALLS, N. Y.
Aug. 26.

Latin American Criticism of United States Practices

To the Editor: In your issue of May 19, on page 1340, there is an article entitled "South American Prospects." I would like to refer to the paragraph wherein the statement is made that: "There is a feeling in South America that has been promulgated by European exporters and propagandists, that American exporters, after selling them goods, worked some kind of chicanery to change the rate of exchange and make them pay double for their goods, and it will take a long campaign of education to convince the South Americans that the Americans are in no way responsible for the present low rate of exchange."

The exchange question to which the writer of the above mentioned lines refers, although of recent discovery in the States, is as old as Latin American business, and to say that merchants believe that our exporters can influence it one way or the other, except in so far as it is influenced by our sales or purchases, is to accuse them of ignorance of one of the most important points of their business.

As a matter of fact, every importer in Latin America and every man in business in Latin America is acquainted with the fluctuations in the exchange of half a dozen countries. Take, for instance, any merchant importer. He buys in the States in dollars; in England in sterling; in France in francs and in Germany in marks. He has to pay his bills with drafts in these different moneys or the equivalent in his own currency. Furthermore he will have to meet import duties in the manner indicated by his Government, part in gold, part in currency and, possibly, part in drafts in foreign exchange. He, therefore, must know something about exchange and what influences it, since he is really doing business in various values, purchasing in foreign money and selling in the currency of his country.

However, there is a feeling in Latin America, unfavorable to our trade, fostered by European exporters and propaganda, but it can be charged against the short-sighted policy of some of our exporters and the failure on their part to appreciate foreign conditions.

Exporters who do not ship within the period promised when offering goods; who do not comply with shipping instructions; who substitute color, quality or size of articles ordered; who supply inferior goods; who refuse to allow just claims; who insist on cash with order when dealing with long established firms of unquestionable standing: these are responsible for a great deal of the ill feeling at present prevalent and supply the "talking points" for our competitors.

Trading with Latin America is going to be increasingly difficult, even for old established exporters, because buyers, so often deceived in recent years on the quality of our goods and angered by the treatment they have received, are again turning to European manufacturers and exporters. X.X.X.

Santiago, Chile, Aug. 1.

American Exports to Russia

Figures from the Bureau of Foreign and Domestic Commerce, Washington, show the extent of the erstwhile market which the United States had in Russia, compared with its present amount. They picture something of what may again be required by that country, once a stable government is set up and buying power re-established by general resumption of productive effort. The items of iron and steel products, as well as other metal products, and the grand totals of all products shipped to Russia by both seaboards, in the calendar years 1915 to 1920 and in the first six months of 1921, are shown in the following table:

United States Exports to Russia (European and Asiatic)

(Thousands of Dollars, in Calendar Years)

	1915	1916	1917	A	1921*
Agricultural implements	$349	$786	$6,120	$264	$192
Automobiles	24,503	13,793	4,678	140	29
Brass and manufactures	156	3,265	4,293	3	4
Copper, refined ingots, bars, etc.	6,165	14,513	19,148	..	..
Explosives	27,094	223,184	225,953	5,076	29
Firearms	3,056	16,797	55,859	5,585	18
Freight cars	8,018	12,106	2,027	551	..
Lead	1,392	3,352	2,755	27	2
Locomotives	7,440	3,727	11,281	1,862	25
Metal-working machinery	5,883	17,888	7,259	147	1
Nickel, nickel oxide and matte	1,877	3,478	65	..	..
Railway track material	6,939	4,407	5,865	601	..
Sewing machines	229	69	1	..	18
Structural iron and steel	195	68	86	..	..
Typewriters	833	891	236	19	3
Tinplate, terne plate, etc.	374	334	119	8	..
Wire	8,438	13,919	2,449	6	1
Zinc spelter	2,934	3,342	3,024	..	..
Total exports†	$170,232	$470,508	$424,510	$42,800	$12,603

*First six months. †Including many items not listed. A is average of 1918, 1919 and 1920.

GAIN IN IRON OUTPUT

August Production 2891 Tons Per Day Larger Than in July

Net Gain of One Furnace with Others to Blow in Soon

Returns of the output of blast furnaces in August indicate a turn for the better. While still very low, the total output was nearly 3000 tons per day larger than in July and for the first time in 11 months there has been a gain in furnaces blown in over those blown out.

The production of coke and anthracite furnaces for the 31 days amounted to 954,193 gross tons, or 30,780 tons per day, as compared with 864,555 tons or 27,889 tons per day in July. Apart from July, no lower production was made since January, 1904, when the total was 921,231 tons or 29,717 tons per day. In August, 1920, the output was 3,147,402 tons or 101,529 tons per day.

The total number of furnaces in blast on Sept. 1 was 70, as compared with 69 on Aug. 1, with 76 on July 1 and with 201 on Jan. 1. The 70 furnaces in blast on Sept. 1 had a capacity of 30,770 tons per day, as compared with 28,175 tons per day for the 69 furnaces on Aug. 1. In the case of several furnaces there was a distinct gain in operating rate in August as compared with July. Seven furnaces were blown out or banked in July and eight blown in, making the net gain for the month one furnace, as compared with a net loss of 250 furnaces in the 10 months preceding August.

The August output of ferromanganese and spiegeleisen was 3878 tons, as compared with 5524 tons in July. The August output was all ferromanganese, as against only 1509 tons in July.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from August, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
August	72,740	28,789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66 037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51 468
April	33,854	5,914	39,768
May	33,054	6 340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889
August	26,037	4,743	30,780

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101 643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94 473	82,835	105,006	102,720	69.187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51.468
Apr.	70,550	107 592	111,165	109,607	82,607	91.327	39,768
May	73,015	108 422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107 820	110,354	78,340	98,931	27 889
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	30,780
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	.....
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	.....
Nov.	101 244	110,394	106,859	111,802	79,745	97,830	.....
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	.....

Among the furnaces blown in during August were the following:

One Harriet furnace in the Buffalo district; one furnace of the Cambria Steel Co. in western Pennsylvania; No. 4 Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; Nos. 1 and 2 Gary furnaces of the Illinois Steel Co. and one Calumet furnace in the Chicago district and No. 3 Woodward furnace of the Woodward Iron Co. in Alabama. One furnace of the Columbus works of the American Rolling Mill Co. blew in Sept. 1

Among the furnaces blown out or banked during August were the following:

No. 4 Carrie furnace of the Carnegie Steel Co. in the Pittsburgh district; Nos. 3 and 11 Gary furnaces of the Illinois Steel Co. and No. 3 Iroquois furnace in the Chicago district and the furnace of the St. Louis Coke and Chemical Co. at Granite City, Ill., and the last two furnaces of the Colorado Fuel & Iron Co. in Colorado.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiege'eisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,430 022	2,232,455	1,932,159	32,787	23,957	22,228
Feb.	2 209,470	2,181,679	1,625,695	28 105	28.038	29.013
Mar.	2,277,507	2.480,668	1 323,443	26.644	35 275	41,294
Apr.	1,838,677	1.968,542	1.015,621	17,308	27.628	24,310
May	1,586.805	1,128,720	1 024,678	14,604	33,407	9 232
June	1,655,944	2,209,770	883,312	14,254	34.751	4.536
July	1,906,604	2,230,567	715,664	14 805	36.789	5.524
Aug.	2,108,566	2,254,943	807.144	17.419	36,985	3,878
Sept.	1,828,613	2,247,250	.....	20,631	39,546	.....
Oct.	1 295,690	2.393,644	.....	20,238	34,786	.....
Nov.	1,727,656	2.150,075	.....	19,964	26 944	.....
Dec.	1,916,249	2,047,167	.....	15,718	28,023	.....

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for August, and the three months preceding:

Pig Iron Production by Districts, Gross Tons

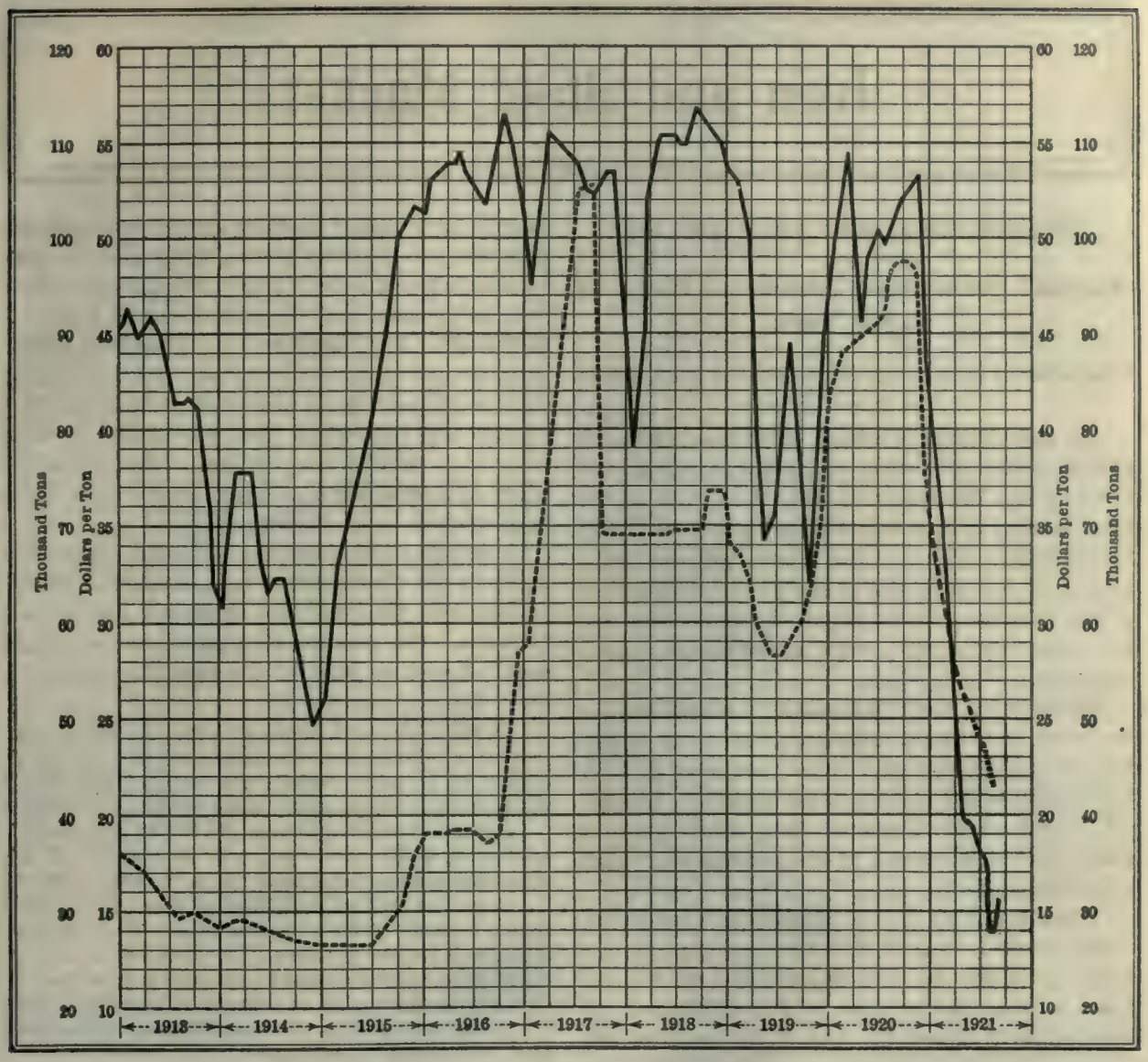
	August (31 days)	July (31 days)	June (30 days)	May (31 days)
New York	44,948	34,407	34,241	37,202
New Jersey	4,689	5,554	6,051	10,291
Lehigh Valley	33,014	24,059	29,929	42,289
Schuylkill Valley	20,735	19,210	21,172	24,471
Lower Susquehanna and Lebanon Valleys	23,939	20,401	25,809	26,491
Pittsburgh district	255,274	185,643	243,025	281,391
Shenango Valley	none	none	12,077	27,981
Western Penna.	47,565	47,680	63,802	73,661
Maryland, Virginia and Kentucky	15,470	14,201	15,289	20,781
Wheeling district	18,076	16,167	18,207	17,981
Mahoning Valley	111,722	92,305	88,515	87,090
Central and Northern Ohio	83,552	80,150	116,003	133,801
Southern Ohio	3,548	6,266	25,798	29,103
Illinois and Indiana	191,658	201,175	214,834	249,671
Mich., Minn., Mo., Wis., Colo and Wash.	27,304	50,764	56,857	65,004
Alabama	72,699	66,573	93,224	94,013
Tennessee	none	none	none	none
Total	954,193	864,555	1,064,833	1,221,221

Capacities in Blast Sept. 1

The following table shows the number of furnaces in blast Sept. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Aug. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Sept. 1 In Blast	Sept. 1 Capacity per Day	Aug. 1 In Blast	Aug. 1 Capacity per Day
New York:					
Buffalo	22	4	1,450	3	1,110
Other New York	4	0	....	0	....
New Jersey	4	1	150	1	180
Pennsylvania:					
Lehigh Valley	18	2	1,065	2	775
Spiegel	2	0	....	0	....
Schuylkill Valley	15	2	670	2	620
Lower Susquehanna	10	1	430	1	395
Lebanon Valley	8	2	345	2	260
Ferro	2	0	....	0	....
Pittsburgh District	55	16	7,750	17	7.000
Ferro and spiegel.	4	1	125	1	180
Shenango Valley	19	0	....	0	....
Western Penn.	26	5	1,950	4	1,540
Maryland	6	1	400	1	340
Wheeling District	15	1	580	1	520
Ohio:					
Mahoning Valley	27	8	3.960	7	3.330
Central and Northern	26	6	2,950	5	2.650
Southern	16	1	115	1	100
Illinois and Indiana	42	11	5 900	12	6,125
Mich., Wis. and Minn.	11	1	485	1	510
Colorado and Missouri	6	0	....	2	775
The South:					
Virginia	16	1	100	1	110
Kentucky	7	0	....	0	....
Alabama	41	6	2,345	5	1,655
Tenn., Ga. and Texas	16	0	....	0	....
Total	418	70	30,770	69	28,175



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302 260	3,015,181	2.416,292
Feb.	2,645,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3 213,091	3,090,243	3,375,907	1.595,522
Apr.	3,334,960	3,288,211	2,478,218	2,739,797	1,193,041
May	3,417,340	3,446,412	2,108,056	2,985,682	1.221,221
June	3,270,055	3,323,791	2,114,863	3.043,540	1,064,833
July	3,342,438	3,420,988	2,428,541	3,067,043	864,555
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	954,193
8 mos.	25,660,277	24,813,145	21,205,737	24,353,431	11,246,914
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	.....
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	.....
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Total, yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.

Blast Furnace Notes

One of the four furnaces of the Rogers-Brown Iron Co., Buffalo, was blown in this week.

It is expected that Tuscaloosa furnace of the Central Iron & Coal Co., at Holt, Ala., will be blown in next week.

In the Shenango Valley the furnace of the Valley Mould & Iron Corporation, Sharpsville, Pa., and one furnace of the Shenango Furnace Co., also at Sharpsville, are scheduled for resumption in the coming week.

The Kalman Co., fabricating interest of Chicago, is preparing to proceed with construction of a plant at Youngstown, Ohio, to supply reinforcing material to its Eastern trade. Work of building a 1500-ft. railroad switch to connect the company's property on Poland Avenue in Youngstown with the Pennsylvania railroad has been started. The first unit will be a modern factory building 60 x 422 ft., and will be the first of three to be erected.

The Triumph Electric Co., Cincinnati, for nearly 30 years manufacturer of 40 deg. Triumph polyphase induction and direct current motors, has been forced to move its Philadelphia office to larger quarters, which are at 709 Arch Street. This territory is under the direction of Arthur H. Allen, district manager.

Iron and Steel Markets

INCREASE IN PIG IRON

August Production Shows a Gain of 90,000 Tons

Competition in Heavier Steel Products—Lighter Lines More Active

An upward turn in output, after nine months of steady decline, is shown in the pig iron statistics for August. The total was 954,193 tons, or 30,780 tons per day, against 864,555 tons in July, or 27,889 tons per day. Taken in connection with the larger buying of mid-August and the firmer tendency of prices, this increase in output confirms what has been said recently of a slight improvement in consumption.

While there was a net gain of but one furnace last month, the larger yield being due to the operation of many stacks at a better rate than in July, the outlook is for further improvement in September. Seven more furnaces have either gone in since the month opened or are scheduled to start up before Sept. 15.

The capacity of the 70 furnaces in blast as the month came in was 30,770 tons per day against 28,175 tons per day for 69 furnaces on Aug. 1, based on their performance in July. The gain of one furnace followed the loss of no less than 250 furnaces from the active list in the preceding nine months.

The slight upturn from the long decline in pig iron prices made consumers cautious. Buying has been less active in the past fortnight; at the same time considerable inquiry is up and the balance between supply and demand is being closely watched in view of the starting up of a furnace here and there.

In finished steel the rate of mill operations has not changed, yet there are not a few reports of better business in August than in July. Competition is rather sharper in the heavier products—plates, shapes and bars—and prices are more commonly 1.65c. and 1.70c. In the Chicago district a number of late transactions would figure out considerably lower if reduced to the Pittsburgh base.

In the Central West inquiries for 7000 tons of tank work are up, in addition to the 17,000 tons recently reported for Mexico.

Interest is being taken by pipe makers in the proposed 90-mile line, which Wyoming producing and refining companies may build, requiring 8000 tons. Manufacturers of iron pipe announced a reduction of $10 to $12 per ton effective Sept. 1, the fourth reduction since the opening of the year.

The lighter products, sheets, tin plate and wire, have made a better showing in the orders of the past two weeks. The leading sheet and tin plate interest showed a gain of 45 per cent last month over July orders and shipments, August being the best month since February. Its schedule this week calls for the operation of 50 per cent of its mills.

The Masonic hotel project in Detroit has been revived and fabricators have been asked to revise their bids on 7000 tons of steel. Pittsburgh has more structural work in sight, chiefly large buildings, than in several months.

The plans for starting up several blast furnaces in the Central West have brought a number of inquiries for 10,000 to 15,000-ton lots of Lake iron ore. The coke market also has grown considerably firmer in view of the expected increase in blast furnace operations.

Demand for tool steel, which is a reliable barometer of operations in metal-working shops, has picked up of late. Orders are coming from widely distributed sources after many weeks of dullness.

German ferromanganese, 76 to 80 per cent, is quoted at 4930 marks per ton, Baltimore, or considerably below the British price of $65, seaboard.

New cuts in the British steel market, as Continental prices stiffen, have given British steel makers a better position. German producers are no longer quoting on semi-finished steel, having orders filling their mills to the end of the year. There is an improved tone in the British market and greater activity is expected.

Pittsburgh

PITTSBURGH, Sept. 6.

Fundamental conditions in iron and steel show no particular change as compared with those of a week ago. The disposition of buyers to confine purchases to actual needs still is quite marked and only in spots are orders at all numerous. In the heavy tonnage products not much is doing, but there is a rather good business in sheets and tin plates, at least as far as the American Sheet & Tin Plate Co. is concerned, while jobbers and consumers are pretty persistent buyers of the wire products, notably nails. The American Sheet & Tin Plate Co. reports the past week to have been the best of any in several months in sheet orders and shipments and that the month of August showed a gain of 45 per cent over July and was the best month the company has had since last February. Its schedule for this week calls for the operation of 50 per cent of its sheet mills. This company also has been enjoying a brisk business in prompt shipment orders for tin plate and has under power 50 per cent of its mills. This is a clear gain of 10 per cent in a week and compares with an operating rate of less than 25 per cent only three weeks ago.

Another fairly bright spot in the situation is the fact that prospective structural business involves several good-sized tonnages which, it is believed, will be placed in the near future. Bids are to be opened Sept. 9 by Pittsburgh for the construction of the ramp for the Boulevard of the Allies which will take 1500 tons of steel, while the general contract for a 9-story addition to the present 11-story building of the Bell Telephone Co. in Pittsburgh and the construction of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 6, 1921	Aug. 30, 1921	Aug. 9, 1921	Sept. 7, 1920
No 2X, Philadelphia‡	$20.84	$20.84	$19.84	$53.51
No. 2, Valley furnace†	21.00	21.00	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2, foundry, Chicago*	21.00	21.00	18.25	46.00
Basic, del'd, eastern Pa.	19.00	19.00	20.26	51.26
Basic, Valley furnace	19.00	19.00	18.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	21.00	21.00	18.50	46.50
Malleable, Valley	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.46	50.96
L. S. charcoal, Chicago	33.50	33.50	33.50	58.50
Ferromanganese, del'd	70.00	70.00	70.00	170.00

Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55 00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. sheet bars, P'gh	30.00	30.00	32.00	68.00
Forging billets, base, P'gh.	34.00	34.00	35.00	75.00
O.-h. billets, Phila.	35.74	35.74	35.74	65 74
Wire rods, Pittsburgh	*38.00*	40.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	*1.70*	1.75	1.75	3.25

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philade'phia	2.00	2.00	2.05	4 85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	*1.65*	1.70	1.75	3.25
Steel bars, Chicago	*1.85*	1.88	2.03	3.63
Steel bars, New York	*2.03*	2.08	2.13	4.13
Tank plates, Pittsburgh	1.70	1.70	1.80	3.25
Tank plates, Chicago	*1.75*	2.00	1.98	3.63
Tank plates, New York	2.08	2.08	2.18	3.63
Beams, etc., Pittsburgh	*1.70*	1.75	1.85	3.10
Beams, etc., Chicago	*1.80*	1.85	2.08	3.48
Beams, etc., New York	*2.08*	2.13	2.23	3.48
Steel hoops, Pittsburgh	2.25	2.25	2.25	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 6, 1921 Cents	Aug. 30, 1921 Cents	Aug. 9, 1921 Cents	Sept. 7, 1920 Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	3.00	7.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	4.00	9.00
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.40	6.00
Wire nails, Pittsburgh	2.75	2.75	2.75	4.25
Plain wire, P'gh	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh.	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	$13.75	$13.75	$12.50	$38.00
Carwheels, Philadelphia	17.00	17.00	16.00	42.00
Heavy steel scrap, P'gh	13.00	13.00	12.50	29.50
Heavy steel scrap, Phila.	11.50	11.50	11.50	26.50
Heavy steel scrap, Ch'go	11.00	11.00	10.25	26.00
No. 1 cast, Pittsburgh	16.50	16.50	16.00	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	**13.25**	13.00	11.50	35.00
No. 1 RR. wrot, Phila.	**14.50**	14.00	14.00	33.00
No. 1 RR. wrot, Ch'go (net)	**11.50**	11.00	9.75	24.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.00	$3.00	$2 75	$17.00
Foundry coke, prompt	4.00	4.00	3.75	18.00

Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.00	12.00	12.00	18.75
Electrolytic copper, N. Y.	**11.75**	11.62½	11.75	18.75
Zinc, St. Louis	**4.20**	4.12½	4.20	7.90
Zinc, New York	**4.70**	4.62½	4.70	7.90
Lead, St. Louis	4.20	4.20	4.20	8 62½
Lead, New York	4.70	4.40	4.40	8.50
Tin, New York	**27.25**	26.75	27.75	45.00
Antimony (Asiatic), N. Y.	4.50	4.50	4.60	7.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 6, 1921, Finished Steel, 2.279c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Aug. 30, 1921,	2.293c.
Aug. 9, 1921,	2.364c.
Sept. 7, 1920,	3.974c.
10-year pre-war average,	1.684c.

a new 20-story structure by this company is expected to be placed Sept. 12. Meanwhile fabricating shops are figuring on an early award of 3600 tons for the construction of the Scott aviation field and airship hangar at Bellefield, Ill. Contracts for the construction of the 8-story addition to the store of Joseph Horne Co., Pittsburgh, which will take 3500 tons of steel, probably will be placed shortly. It has been some time since shops in this district have had so many good-sized prospects.

The general belief still is that the fall will show some improvement in business, but the more common prognostication is that it will be next spring before business really is good. Possibly, price cutting is a little less severe now than it was recently but at the same time few buyers yet are ready to admit that prices have struck bottom. Liquidation of labor has been pretty thorough and the claim of steel manufacturers that they are losing money on every ton of material sold to-day is not disputed, but the notion that railroad freight rates, more especially on raw materials, will be cut between now and the end of the year encourages hopes of lower selling prices. As yet there has been nothing in the way of a conference between shippers and railroad officials for the consideration of freight rates and it is hardly likely that the railroads will make a voluntary cut. Reports are current that a reduction on ore rates is to be made at the conclusion of the lake shipping season.

Pig Iron.—Business for the past week, though of rather moderate proportions, has served to substantiate the prices recently established. We note one sale of 500 tons of No. 3 foundry iron to a Pittsburgh melter at $20.50, Valley furnace, and a like tonnage of gray forge iron to the same melter at $20, Valley furnace basis. The ordinary differentials from the base grade are 50c. and $1 per ton, respectively, and this would mean $21 for No. 2 foundry on the recent sales made of No. 3 foundry and gray forge. Small sales of No. 2 foundry have been made at $21, furnace, both in the Valley and western Pennsylvania points. A few inquiries lately have developed for malleable iron with some makers quoting it at $21 and others at $20. A base of $20, Valley furnace, has been done on a lot of about 180 tons basic iron but this tonnage is too small to be regarded as having established the Valley basic market. A Pittsburgh district melter recently put out an inquiry for 2500 to 3000 tons of basic and probably will close for about 2000 tons this week at about $19, f. o. b. a western Pennsylvania furnace. No. 3 furnace, Shenango Furnace Co., Sharpsville, Pa., went into blast yesterday and will make Bessemer iron, the bulk of which will be taken by the Valley Mold & Iron Corporation. Cherry Valley furnace, Leetonia, Ohio, will be blown in to-morrow.

Average sales prices of Valley basic and Bessemer iron in August as compiled by W. P. Snyder & Co. show that business in Bessemer was at $20 and in basic at $18.33, as compared with $20.87½ and $18.802, respectively, in July.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys.—The market still is a limited affair with prices holding at about recent levels, but with the tendency in the buyers' favor. We note a sale of 100 tons of 80 per cent domestic ferromanganese to a West Virginia melter at $70 delivered, but also that a quotation of this price to a Valley steel maker seeking 100 tons was rejected as too high, and that a quotation of $65 delivered on British materials did not bring an order. Nothing recently has been done on spiegeleisen, which is quotable at about $30 to $31 delivered for sizable lots of 20 per cent material and $32 for small lots. Not enough interest is shown in 50 per cent ferrosilicon to determine where prices are.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent, $68; 78 to 82 per cent British ferromanganese, $58 to $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Not much business is being done and prices to a large degree are nominal. In view of the fact that 4-in. billets have sold as low as $29, there is considerable difficulty in getting buyers to pay more, although most makers are quoting $30. Reports are current that the price of sheet bars has been shaded $1 to $2 per ton, the reports associating an Eastern sheet maker with a purchase said to have been made at $28. Interest in slabs remains limited.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30 to $31; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demands still are few and small and the advantage in prices is with buyers. Recently it was noted that an order was lost against which $40 was quoted and it is now admitted that a quotation of $38 likewise failed to bring an order. Prices are not well established. While some makers are holding firmly to $42 for the base size of soft rods, others are willing to accept $38 and evidently some have gone even lower since the latter quotation failed to bring business. Prices are given on page 628.

Structural Material.—Formal award of the contract for the steel for the new Sixteenth Street bridge, Pittsburgh, has been made to the Fort Pitt Bridge Co., Pittsburgh, which bid $541,822, fabricated, delivered and erected for the 5000 tons which this bridge will require. This is the only important award recently placed here, but as the bids for the general contract for the construction of the 8-story addition for Joseph Horne & Co., Pittsburgh, are in, an award both of the general contract and of the steel is looked for shortly. The Bethlehem Steel Co. is quoting gray mill sections at 1.75c., Pittsburgh, and in view of the saving in the use of such sections standard beams to compete would have to sell, it is held, at 1.70c., Pittsburgh, or less. Plain material prices are given on page 628.

Iron and Steel Pipe.—Effective Sept. 1, the Reading Iron Co. and the A. M. Byers Co. reduced prices of standard wrought iron pipe, both butt and lap welded, $10 per ton. Lower wage and material costs have permitted this reduction. No change has been made in standard steel pipe prices, but observance of the July 7 card on line pipe is not rigid nor are full quotations always insisted upon for oil well pipe. Jobbers are steady buyers of standard pipe, but their purchases are largely to replace sales and there is no anticipatory buying, because of the expectations of price reductions. Discounts are given on page 628.

Nuts, Bolts and Rivets.—Several makers here are seeking higher prices than are quoted in other manufacturing centers and since there has been no material improvement in the demand and there is nowhere nearly enough business to go around, this step is tantamount to a withdrawal from the market by Pittsburgh makers. This action has been forced by reason of the fact that to meet competition on nuts and bolts, steel bars would have to be bought at 1.50c. or less, and makers serving this territory on bars are not inclined to go below 1.65c. Possibly the number of orders received has increased in the past few weeks, but the gain is too slight to occasion cheerfulness, especially as minimum prices have prevailed on such bookings. It is doubtful if operations of plants here average 15 per cent of capacity, as at least two of the larger units are down and others are running spasmodically. Prices and discounts are given on page 628.

Iron and Steel Bars.—Not much activity is noted in this district in soft steel bars, and 1.75c., base, seems to have quite generally disappeared, except as an asking price, and 1.70c. is the more common maximum. Business is reported to have been done down to 1.60c., base, and an Eastern maker, while not quoting bars in this district, is prepared to take small angles at 1.65c., Pittsburgh. No particular interest is shown in reinforcing bars and prices are nominal. The recent reduction in the puddling rate has had no effect yet on local prices of iron bars.

We quote steel bars rolled from billets at 1.60c. to 1.70c.; reinforcing bars, rolled from billets 1.60c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—The demand for spikes and other track fastenings reflects the fact that none of the railroads tributary to Pittsburgh is laying much track at present. Other sections of the country are doing better in this respect, but this does not help Pittsburgh makers of spikes and bolts because there is considerable shading of prices by makers East and West and only by absorbing some of the freight can local makers compete. Sales of standard spikes have been made elsewhere on the basis of the equivalent of $2.40, Pittsburgh. Jobbers serving the coal mines are fair buyers of small spikes. Prices are given on page 628.

Steel Rails.—Railroads tributary to Pittsburgh still are inclined to withhold specifications against their orders placed earlier in the year, and expected improvement in this direction so far has not materialized. The fact that standard rails are one product in which prices have had no decline over the past two years possibly is behind the attitude of the railroads and reports recently current that prices were to be reduced are believed to have emanated from railroad circles. Standard rails did not advance in keeping with the general market during 1920 and current prices are considered to be relatively reasonable. Moreover, a reduction at this time would involve considerably close to 2,000,000 tons which are on the books of makers, and only a few of which have been delivered. Light rails rolled from billets still are quoted at 1.75c., but this is more of an asking than a selling price, and attractive tonnages undoubtedly would develop a lower figure, especially as rerolled rails are readily available at 1.60c., mill.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—Although occasional sales of small tonnages are made at 1.75c., the real market is from 1.65c. to 1.70c. Inquiry for the most part is merely for the purpose of determining prices to establish bids against prospective structural and tank business.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.65c. to 1.75c. f.o.b. Pittsburgh.

Sheets.—The situation has improved to the extent that price cutting is not nearly so severe as it was a short time ago. There are suggestions that some mills have been willing to go to 2.70c., base, in black sheets and to 2.20c., base, on blue annealed, but these prices are only $1 per ton below the regular market quotations and there is some doubt that even this concession has been made, in view of the fact that the mills holding firmly to the regular quotation are getting some business. This is particularly true of the American Sheet & Tin Plate Co., which has experienced the best business in several months in the past two weeks, and is now operating at 50 per cent, the highest mark obtained in several months. This company recently turned down an order for 1500 tons of black sheets, calling for delivery over the remainder of the year. At a price of 2.75c., the company is not anxious for forward business at less than 3c. Prices are given on page 628.

Wire Products.—Buyers still are covering only their immediate requirements and while this means a steady demand, the volume is lacking and manufacturers cannot schedule mill operations very far ahead. Jobbers evidently are disposing of almost a normal amount of nails, as their orders in this product are better than they are in other wire products. Business undoubtedly would be much heavier if manufacturers were willing to guarantee prices, as it is the fear of lower prices that is making buyers confine their purchases so closely to actual needs. There seems to be no cutting of $2.75 base, per keg, on nails, but it is commonly gossiped that concessions of $1 to $2 per ton are being made in wire. Following up its recent announcement giving a Nov. 1 dating on current sales of woven wire fence, the American Steel & Wire Co. has notified the trade that it will guarantee fence prices against a decline until further notice.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Tin Plate.—Demands for early delivery are still strong with those companies which have their mills running, and no trouble is being experienced in obtaining $5.25 per base box, Pittsburgh, for standard cokes for domestic accounts. On a sale of 10,000 boxes for export to Japan, however, the price was slightly below the domestic base, because of competition from Welsh makers. Stock tin plate is selling for $4.50 to $4.75.

Boiler Tubes.—As is the case in practically all lines of finished steel demand for boiler tubes, both steel and iron, is purely hand-to-mouth and few makers have much business ahead. Recent reduction in wrought iron pipe has not yet extended to iron boiler tubes, but reports are heard that a downward revision, not only in prices of iron tubes, but also in those of steel is not far off. Observance of current discounts is said to be rather lax. Discounts are given on page 628.

Hoops and Bands.—The market is fairly steady at 2.25c., base, Pittsburgh, but this does not mean that the demand is good. There is a fairly good market in cotton ties and in hot rolled strips and this condition tends to restrain pressure to sell hoops and bands. It is probable, however, that if any sizable orders were presented in either product, competition would develop and that buyers would not have to go to 2.25c.

Hot-rolled and Cold-rolled Strips.—Conditions are much as they were a week ago. Consumers, who are not fastidious as to specifications and who can quite as well use plates or sheets, have succeeded lately in getting strip steel as low as 2c., base, Pittsburgh. It might be added also that to obtain supplies at this price a fairly large order has to be provided. In small lots the market is not quotable at less than 2.20c. and orders are going on the books to makers from this price up to 2.40c. from buyers who are exacting in the matter of analysis and cannot use anything which might be offered as strip steel. The general asking price on cold-rolled strips is 4c. and some business has been entered at that figure, but sizable orders are being accepted at 3.85c. and this is the more common price.

Steel Skelp.—The market is not especially firm at 1.75c., Pittsburgh, which recently has been the quotation of most makers. This price is being asked, but probably could be shaded on attractive orders. We note one export sale of 3000 tons for shipment to Scotland, at around 1.75c., Pittsburgh.

Cold Finished Steel Bars and Shafting.—The market has settled to 2.40c. base, Pittsburgh, this being the quotation of all makers. Business is fairly good as far as the number of orders is concerned but leaves much to be desired with regard to volume. Buyers are not anticipating their requirements and competition for such orders as are coming out is not keen enough to force much shading of the 2.40c. price. The Cumberland Steel Co. has announced a reduction of $5 per ton in ground shafting, the new prices being $2.75 per 100 lb., mill, for carloads and $3, mill, for less than carloads.

Coke and Coal.—The recent advance in coke prices is well held and on standard furnace fuel the market is not quotable at less than $3 per net ton at ovens. Labor troubles at one plant, which have resulted in the complete suspension of operations, have forced the customers of that company to seek other sources of supply and these purchases have been sufficient to absorb much of the surplus supply. Brokers have been paying $3 for spot and short contract tonnages and prices to consumers have ranged from 15c. to 25c. per ton higher. The spot market therefore is quotable from $3 to $3.25 and the market takes the same range on contracts. For 30 to 60-day contracts operators are quoting $3, while for shipment over the remainder of the year the going price is $3.25. The latter price about equals what could be done on coal. We note one contract involving 10,000 tons a month for September, October and November at $3. Foundry coke is firm at $4 to $4.50, according to quality, with the demand steady rather than active. Moderate purchases for stock by the railroads and industrial consumers have given the coal market a firm tone. Mine run steam coal, Pittsburgh vein, is quotable at $1.75 per net ton at mines, and occasionally commands more. Steam coal is available as low as $1.50 but it runs high in ash and low in heat value. Connellsville by-product coal is quotable at $1.80 to $1.90, mines, and gas coal at $2.25 to $2.50 from non-union fields. Union gas coal cannot be sold under $3 on today's labor costs.

Old Materials.—Business has slackened considerably in the past week in keeping with the slowing up in steel works operations, due to a falling away in orders. This development, however, has found no reflection in scrap prices, which with one or two minor exceptions are just where they were a week ago. We note the sale of 10 cars of machine shop turnings at $8.35 per gross ton, delivered, Brackenbridge, and of two cars of the same material to the same buyer at $8.25. These tonnages, however, had to be sold and the buyer made the prices. On a round tonnage it is doubtful if less than $9 could be done, for the principal users are ready to pay $8.50 for such lots. Dealers will not go short of the market at that price because they fear smaller offerings for a time and it is noted too, that the Dodge Brothers turnings, sold Aug. 26, brought the equivalent of $9, Pittsburgh. Borings offered by Dodge Brothers sold at the equivalent of $10.50, Pittsburgh. Odd lots of heavy melting steel are bringing only $13 to $13.50, but contracts cannot be placed at less than $15, if indeed that low. One large steel company is reported to have paid $15 per gross ton for the steel offered in the last list of the Pennsylvania Railroad, central region..

We quote for delivery to consumers' mills, in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13 00 to $13.50
No. 1 cast cupola size	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa	16.00 to 16.50
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	14.00 to 14.50
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	19.00 to 20.00
Locomotive axles, steel	18.50 to 19.00
Steel car axles	14.50 to 15.00
Cast iron wheels	14.00 to 14.50
Rolled steel wheels	14.00 to 14 50
Machine shop turnings	8.25 to 8.50
Sheet bar crop ends at origin	12.50 to 13.00
Heavy steel axle turnings	10.00 to 10.50
Short shoveling turnings	9.50 to 10.00
Heavy breakable cast	15.00 to 15.25
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.25
No. 1 railroad wrought	12.00 to 13.00

Claims on Bethlehem Steel Co. Disapproved

WASHINGTON, Sept. 6.—Approval has been given by Secretary of War Weeks, it was announced to-day, of the recent decision of Assistant Secretary Wainwright that the War Department has no authority to pay claims of 38,000 former machinists and electricians employed by Bethlehem Steel Co. in connection with the award by the National War Labor Board, amounting to $1,500,000. Secretary Weeks will present a written report to Congress declaring his belief Congress should take cognizance of these claims.

Chicago

CHICAGO, Sept. 6.

The steel market remains quiet, but the business outlook has improved. For August shipments from a prominent local mill were twice those of the previous month. As July was exceedingly dull, the improvement was not great; it was an indication of a slow but cumulative betterment in demand. There are multiplying evidences of the exhaustion of consumers' stocks, which is brought home to the mills by repeated requests for prompt delivery, and here and there are indications of expanding industrial activity. Tool steel, which is regarded as a fairly reliable barometer of the operations of metal-working shops, was practically a drug on the market only a few weeks ago. To-day orders for tool steel are being received in increasing number from widely distributed sources. It is also to be noted that railroad traffic has been steadily growing and while earnings are not yet what they should be, a continuation of the present rate of increase in business would soon put the carriers in a satisfactory position.

Notwithstanding these signs of industrial revival, demand for steel, particularly for plates, structural material and bars, is still far below normal. While this may indicate that buyers still believe that the process of price deflation has not yet been completed, there are some consumers who are inclined to view it as not far away and their judgment is confirmed by recent developments in the local market. An open letting by the Burlington Railroad last week brought out quotations of 1.68c., Chicago, on 1500 tons of plates, and 1.75c., Chicago, on 334 tons of shapes. In fact, current going prices are so low that one local producer is seriously considering shutting down its plate mill until prices take a turn which will permit operation without loss.

Pig Iron.—An inquiry has been received from the American Rolling Mill Co. for 12,000 tons of basic iron. Local sellers are given to understand that the company is undecided as to whether it will buy this tonnage outside or start up its own furnaces and that much depends on the character of the quotations received from other stacks. In view of a freight of $3.50 from Chicago to point of delivery, it is not deemed likely that the business will be placed here. The local market has shown a fairly active condition during the past week or ten days. Just prior to the advance announced in our last issue, a local melter closed for 3000 tons of foundry iron. Individual sales since the advance have covered as much as 500 and 1000 tons. In some cases buyers have bought for delivery over two, three and four months ahead. Furnaces are not disposed to quote on first quarter business. The inquiry for that delivery reported a week ago has been expanded to include 600 tons of malleable iron. Other inquiries current include one from a Southern melter for 600 tons of malleable for delivery over the remainder of the year and another calls for 100 tons of low phosphorus iron. Noteworthy among recent sales may be mentioned 1000 tons of foundry, bought by a South Bend, Ind., melter, and 400 tons of foundry, purchased by a Kewanee, Ill., concern. Local producers are holding firm at present prices and another advance of $1 a ton is looked for in the near future.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil.

1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00
Northern high phos.	21.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil.	21.00
Basic	21.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32.82

Ferroalloys.—The market has been devoid of interest.

We quote 78 to 82 per cent ferromanganese, $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment.—The Northern Pacific has awarded repairs on 500 freight cars to the Pacific Car & Foundry Co. Of this number 125 are all-steel coal cars and the remainder miscellaneous types. The Baltimore & Ohio is inquiring for 1000 all-steel 50-ton hopper cars and 1000 steel underframe box car bodies. Inquiries for tires, axles and wheels are increasingly numerous, but individually small.

Structural Material.—The demand for structural shapes is light and quotations of 1.85c., Chicago, are not uncommon, while attractive business can be placed at a lower figure. Fabricating work is light, the only new inquiry of size being a plant building for the Standard Underground Cable Co. at St. Louis, involving 1000 tons. Recent lettings include:

Frost National Bank Building, San Antonio, Tex., 382 tons to Mosher Mfg. Co.

Masonic Temple, Sioux City, Iowa, 350 tons to Rock Island Bridge & Iron Co.

Atlas Life Insurance Co. Building, Tulsa, Okla., 500 tons to St. Louis Structural Steel Co.

The mill quotation on plain material ranges from 1.80c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—The Missouri Pacific has placed 3000 kegs of track spikes with a local mill at a price reported not to exceed 2.40c., Pittsburgh. While confirmation of this quotation is lacking, it has become apparent that ruling prices on standard railroad spikes and track bolts are not higher than 2.50c. and 3.50c., Pittsburgh, respectively. There is little demand for tie plates.

Standard Bessemer rails $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.50c., Pittsburgh; track bolts with square nuts, 3.50c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Plates.—At an open letting by the Chicago, Burlington & Quincy Railroad on Sept. 2, the low bid on 1558 tons of plates and 8 tons of bars was 1.68c., Chicago, and the low figure on 334 tons of structural shapes was 1.75c., Chicago. In both cases the prices were named by local mills. As the total tonnage involved was attractive, it is improbable that small orders could be placed at the figures named. It is unlikely, however, that buyers will find it difficult to place even small tonnages at 1.85c., Chicago. The plate market is exceptionally weak and rather than continue to incur losses at present prices, one maker is seriously considering shutting down its plate mill indefinitely. In this connection it is pointed out that it costs $2 to $3 a ton more to roll plates than structural material and yet, owing to the present market situation, plates are selling for no more and sometimes for less than shapes. The extent to which the Pittsburgh basing practice has been affected by the decline in demand is indicated by prices submitted to the Southern Pacific on Aug. 23, for San Francisco delivery. On the plates inquired for one producer quoted 1.85c., f.o.b. Chicago mill; another 2.015c., Chicago; three Pennsylvania makers, 1.75c., f.o.b. mill; another mill 1.75c., Cleveland; while four others quoted 1.75c., Pittsburgh. On the structural material the quotations were 1.85c., Chicago mill; 1.915c., Chicago; 1.65c., Pennsylvania mill, and 1.70c., Pittsburgh. There were similar variations in the quotations on soft steel bars, but on the sheets most mills adhered to the ruling market quotations and quoted f.o.b. Pittsburgh. Railroad purchases of plates in this territory are principally for immediate needs. For example, the Rock Island is inquiring for three carloads and the Chicago Great Western for one carload, while the Illinois Central wants three carloads of plates and bars.

The ruling mill quotations range from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Demand continues light and prices remain soft. So far as can be determined the discounts published in this paragraph two weeks ago are as close to the ruling market as any which might be selected. It is to be noted, however, that there are wide variations in quotations and nothing approaching price stability is in sight.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Sheets.—This commodity is far more active than plates, structural shapes or bars. Demand is widely

distributed—jobbers, railroads, roofing manufacturers and sheet metal shops being among the purchasers. Although shading has been reported here and there, the prices announced last week are holding rather generally. The upturn in demand has enabled the local independent to put on two additional hot mills, 16 out of 18 mills now being in operation.

Mill quotations are 2.75c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Bars.—There has been no material improvement in the demand for mild steel bars and the ruling market lies between 1.85c. and 2c., Chicago. Buying of bar iron is still unsatisfactory, as is evidenced by the intermittent operations of mills. Hard steel bar mills also continue to operate on a hand-to-mouth basis.

Mill prices are: Mild steel bars, 1.85c. to 2c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, square and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Cast Iron Pipe.—Detroit has awarded 1500 tons to the Lynchburg Foundry Co., after taking figures twice. The United States Cast Iron Pipe & Foundry Co. is low bidder on 255 tons for the city of Chicago. The American Cast Iron Pipe Co. is low on 600 tons for Cedarburg, Wis. Prospective business includes:

North Platte, Neb., 940 tons of 6-in., bids in Sept. 6.
Table Rock, Neb., 205 tons, Sept. 9.
Fremont, Neb., 250 tons, Sept. 12.
Springfield, Ohio, 80 tons of 6-in.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

Old Material.—Outside of a purchase of a few thousand tons of heavy melting steel by a local user at $11.50 per gross ton, delivered, and an additional purchase of No. 1 railroad wrought by an iron mill at a reported price of $12 per net ton, delivered, there has been no buying of consequence by users. One consumer is offering $14 per gross ton for railroad malleable, but dealers will not consider that price and are buying from the railroads at from $14.50 to $15 per gross ton. There are few changes in quotations to be noted, but such as have developed have been mainly upward. To a large extent market activity is still confined to the dealers. Railroad offerings include: the Grand Trunk (Battle Creek yards), 4500 tons; the Pennsylvania Northwestern Region, 1500 tons; the Pere Marquette, 2500 tons, and the Geat Northern, 2000 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$16.00 to $16.50
Relaying rails	27.50 to 30.00
Car wheels	13.75 to 14.25
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.25 to 10.75
Low phos. heavy melting steel	13.25 to 13.75
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.00 to 7.50
Axle turnings	8.00 to 8.50

Per Net Ton

Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.00 to 10.50
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.50 to 12.00
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.25 to 13.75
No. 1 railroad cast	12.25 to 12.75
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.50 to 13.00
Grate bars	10.00 to 10.50
Brake shoes	11.00 to 11.50
Railroad malleable	13.00 to 13.50
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

Wire Products.—Prices are firm and trade is satisfactory. Although neither the jobbers nor the railroads will abandon their cautious policy of buying only for immediate needs, orders from them are numerous and in the aggregate represent a substantial tonnage. Railroad buying is usually limited to carload lots. Thus the Rock Island bought one car of fencing and the Illinois Central and the Omaha, one car of barbed wire each. Perhaps the most encouraging development is the fact that manufacturers are commencing to take an interest in the market. One manufacturing consumer has placed an order for 500 tons of wire. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 628.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Warehouse Prices.—Jobbers have reduced their prices on cold rolled steel bars and shafting to 4.20c. for rounds and 4.50c. for flats, squares and hexagons.

New York

NEW YORK, Sept. 6.

Pig Iron.—Quite a number of inquiries developed over the holidays, mostly for small amounts and for delivery in the next two or three months. No distinct change appears in the rate of foundry operations, the buying being due to the fact that melters are running out of iron. Prices are not uniformly firm, some business having been done at a little under the figures prevailing ten days ago. The New Jersey heating furnace company that inquired for 1500 tons for first quarter is believed to have closed for its January and a part of February requirements. Blast furnace companies, as a rule, do not care to sell for 1922 delivery at present prices. Several inquiries for 500-ton lots and one for 1000 tons are pending. The recent pig iron inquiry from abroad, supposed to be for several thousand tons, appears to be little more than an attempt to sound out this market, the real objective being the sale of iron produced in India. There are reports not readily traced of the sale of Belgian pig iron in this market in lots amounting to about 1000 tons. Buffalo sellers have been quoting $20 at furnace for No. 2 foundry iron. Nothing has been done in Virginia iron, which is still quoted at $22 at furnace for No. 2.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.)	28.16 to 29.16

Ferroalloys.—A representative of a German producer of ferromanganese has been authorized to quote 76 to 80 per cent ferromanganese at 4930m., seaboard, which at the prevailing exchange value is equivalent to about $59 to $60, seaboard. This compares with the British price of $65, seaboard, and with the American quotation of $70, delivered. The market is quiet and the only sale that is reported is one of 50 tons of domestic alloy. The spiegeleisen market is quiet at prevailing quotations with the sale of two carloads reported. There is no demand for high-grade foreign manganese ore and the 50 per cent ferrosilicon market is inactive but firm at prevailing quotations. We quote as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$65.00
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $27.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal	48c to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—The sudden demand for the small sizes, together with the slight stiffening of pig iron

prices, has increased the price about $5 a ton. Last week several inquiries and orders for small tonnages came in rather unexpectedly until some manufacturers have enough work to last until Dec. 1. Makers in this district are now operating at from 40 to 70 per cent capacity. Some of the orders are attributed to the desire of municipalities to give work to the unemployed. Two sets of bids will be opened Sept 9: 100 tons of 6-in. and 10-in. pipe for Essex Fells, N. J., and 50 tons for Troy, N. Y. We now quote per net ton, f.o.b. New York, carload lots as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—No notable developments in respect to business conditions are to be reported, but one mill has stiffened in its prices by refusing to make further quotations at levels below current quotations. Some of the bar business taken at 1.60c., Pittsburgh basis, has covered material rolled from billets which failed to pass billet purchase specifications and which would otherwise have been sold as scrap. In structural lines an addition to Haddon Hall, Atlantic City, is to be noted, involving 1000 tons, and the following work has been awarded or is about to be settled: Grain elevator for the Western Maryland, at Baltimore, 300 tons, to James Stewart & Co.; Chelsea National Bank, Atlantic City, 350 tons, to the American Bridge Co.; apartment at Madison Avenue and Eighty-fourth Street, New York, 700 tons, to the Paterson Bridge Co.; an addition to the Home Club, West Forty-fifth Street, 400 tons, to George A. Just Co. The Turner Construction Co. is to build a reinforced concrete warehouse in the Brownsville district of Brooklyn. The New York Central is in the market for a round tonnage of material for its shops, including axles, tires, frogs and switches, sheets, bars, plates and shapes.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.03c.; plates, 2.08c. to 2.13c.; structural shapes, 2.13c. to 2.23c.; bar iron, 2.08c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

High Speed Steel.—Quotations of domestic producers are unchanged and continue nominally at about 90c. per lb. for 18 per cent tungsten high speed steel. Steel of foreign origin is also quoted by the importers at 90c. to $1 per lb., no effort for the present being made to shade the American market.

Old Material.—Brokers are finding it increasingly difficult to buy at present prices and the price tendency is upward, though very gradual. Purchasing by mills is slight and confined chiefly to steel, pipe, stove plate and wrought.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to $7.50
Heavy melting steel, rails or equivalent	8.50 to 9.00
Rerolling rails	10.50 to 11.50
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	11.00 to 11.50
Wrought iron track	8.25 to 8.75
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Light iron	3.00 to 3.50
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	3.00 to 3.50
Mixed borings and turnings	3.00 to 3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.00 to 8.50
Stove plate	9.50 to 10.00
Locomotive grate bars	8.50 to 9.25
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Warehouse Business.—The situation is unchanged as far as volume of business is concerned, but prices continue to show a slight weakness. Swedish iron bars, which can be brought into New York in large lots at about 6c. per lb., are now quoted at 10c. per lb. out of warehouse and a fair sized order would probably bring out an even lower quotation. Blue annealed sheets have been quite generally brought down to a basis of 3.28c. per lb. for No. 10 gage and galvanized sheets are now being quoted by practically all warehouses at 5c. per lb. for No. 28 gage. Prices of brass and copper are down ½c. per lb., corresponding with a recent reduction of wages in the brass and copper mills. Rumors of official reductions by independent mills on prices of bars and plates as high as 10c. per 100 lb. are noted by warehouses and may effect another reduction of warehouse quotations. We quote prices on page 642.

Birmingham

BIRMINGHAM, Sept. 6.

Pig Iron.—Several sales of 1.25 to 1.75 per cent silicon iron in yards of one Birmingham maker sold for $18.50. A 300-ton lot of 3.75 to 4.25 per cent silicon sold for $21. The base of $19, silicon 1.75 to 2.25 per cent, was not shaded during the week so far as is known, and all the differentials were exacted at 50c. each. This applied below as well as above base. Clifton iron of the Alabama Co. has sold $2.50 above usual grades. The state of one maker at the end of the week was this: 2000 tons on yards, of which all had been sold but a few hundred tons; orders given for shipment of 1000 tons. This practically put this concern out of the running at the beginning of this week, as it has no stack going. Turning down customers, some of them old and tried, on account of not having the grades of iron wanted, has become both disagreeable as well as usual. The situation needs but a little more demand to increase production. One experienced maker said: "We have received several inquiries for first quarter. I begin to detect more interest in first quarter than in fourth quarter. Melters seem to be convinced that iron is going high gradually, but are apparently willing to take chances with the movement prior to Jan. 1. We are not quoting for 1922." Another maker has sold a small quantity of fourth quarter iron to regular customers taking other iron. The week's transactions embraced small consignments for the Middle West, but the total was not great.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Finishing Mills.—The Gulf States Steel Co. issued from August with 40 per cent increase of active production capacity over that of July and a finishing mill production of 45 per cent compared with average of 20 per cent for first six months of year. Better demand comes from improved feeling in Southern farm circles. The Tennessee company continues operation of 6 of the 9 open hearth furnaces, rail mill, tie-plate mill, car works and Bessemer rolling mill. Some departments of American Steel & Wire Co. are on 6 days a week. Finishing steel plants generally are much busier than a month ago.

Coal and Coke.—Standard foundry coke has come down to the $6 base again following competition.

Cast Iron Pipe.—It was a rather quiet market in high pressure pipe. Base remains firm at $35 for 6 in., but prices are shaded for larger sizes where contracts are especially desirable. Outlook is better than current business. The Stockham Pipe & Fittings Co. has gone on 60 per cent turn following one of a 30 per cent average.

Old Material.—Cast scrap is quite active owing to increased use at pipe shops. Steel scrap is moving somewhat more actively, but prices have not changed. Some advances are momentarily expected.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Sept. 6.

Pig Iron.—A Connecticut melter during the past week purchased 100 tons of eastern Pennsylvania No. 1X foundry iron, September delivery, at $19.50 furnace or $23.56 delivered. Figuring differentials at 50c would bring this furnace's price back to an $18.50 base. In this instance, however, the furnace's base is $19.50, and, in order to secure the business, differentials were ignored. Any weakness in the market for eastern Pennsylvania irons, therefore, appears in higher silicons only. One Buffalo interest heretofore quoting No. 2 plain at $20, No. 2X at $20.50 and No. 1X at $21 has signified its willingness to waive the differential on the No. 1X grade when round tonnages are involved. A sale of 125 tons of Buffalo No. 2X iron was made to a Massachusetts foundry at $20.50 furnace or $25.95 delivered. Otherwise sales of eastern Pennsylvania and Buffalo iron reported this week have been confined to scattered car lots of No. 2X and No. 1X at $20 and $21 on the Pennsylvania irons and $20 to $21 for Buffalo No. 2X. A local foundry purchased two 150 ton lots of Northern charcoal at an indicated full market price. Northern charcoal has been offered here, however, at $28 furnace. Delivered pig iron prices follow:

East. Penn. sil. 2.25 to 2.75	$24.06 to $25.06
East. Penn. sil. 1.75 to 2.25	24.06 to 24.56
Buffalo sil. 2.25 to 2.75	25.46 to 26.46
Buffalo sil. 1.75 to 2.25	25.46 to 25.96
Virginia sil. 2.25 to 2.75	31.08 to 33.08
Virginia sil. 1.75 to 2.25	30.58 to 32.58
Alabama sil. 2.25 to 2.75	30.16
Alabama sil. 1.75 to 2.25	29.66

Finished Materials.—McClintic-Marshall Co. is awarded 600 tons structural steel for a Pawtucket, R. I., theater; the Lehigh Structural Co., 162 tons for the Ford, Green Island, Hudson River power plant; and the Shoemaker-Satterthwait Bridge Co., 123 tons for a Far Rockaway, L. I., power house. Structural awards otherwise were confined to less than 100 ton lots the past week. The 480 tons for the Cornell University building went to interests outside New England. The city of Boston is in the market for 100 tons ⅞-in. and ¾-in. deformed bars. Local mill representatives report a falling off in bookings since last reports, due to the holidays, and a tendency to shade prices on practically everything. Local warehouses have reduced prices on blue annealed sheets 10c per 100 lb. to $3.73 for No. 10; 50c on black to $4.25 for No. 28; and 25c on galvanized to $5.25 for No. 28. Otherwise warehouse prices remain unchanged, with consumption just about holding its own.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Coke.—New England producers of foundry coke are quoting as they did last month—$10.66 delivered where the local freight rate does not exceed $3.40. Several foundries resumed operations this week after periods of inactivity, but on reduced working schedules. The number is not sufficient to warrant an increased movement of foundry coke from ovens. Not enough Connellsville foundry coke is offered here to be a market factor.

Ferromanganese.—Small lots of lump ferromanganese sold this week at as low as 3¾c per lb. and ground at as low as 4½c. f.o.b. Pennsylvania shipping point. These quotations represent the bottom of the market, some small lots having changed hands at as high as 9c.

Old Material.—Without a noticeable increase in actual transactions, the market on machinery cast is firmer due to slightly freer inquiries from foundries. The largest inquiry comes from a Massachusetts textile machinery interest, for 200 tons of strictly No. 1 textile cast, for which the market is around $19.50 to $20, as against $17 to $18 on regular machinery cast. Car-lot sales of stove plate are reported this week at $15.50 delivered Norwood, Mass. The available supply of this material is more or less limited. Pennsylvania mills are sounding out the market on heavy melting steel, but their idea of prices and those of holders of material are still considerably apart. The market for railroad and yard wrought is softer, due to continued offerings and a lack of demand. Interest in turnings has dried up. One dealer is offered seven cars of bushy turnings at $1.50 f.o.b. shipping point, but has no market for same. Quotations on other old materials are inclined toward softness.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $20.00
No. 2 machinery cast	15.00 to 16.00
Stove plate	15.00 to 15.50
Railroad malleable	11.50 to 12.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$6.00 to $6.50
No. 1 railroad wrought	9.00 to 9.50
No 1 yard wrought	7.50 to 8.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.50
Machine shop turnings	2.00 to 2.50
Cast iron borings, rolling mill	3.50 to 4.00
Cast iron borings, chemical	4.00 to 4.50
Blast furnace borings and turnings	2.00 to 2.50
Forged scrap and bundled skeleton	4.00 to 4.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.50
Rerolling rails	9.00 to 10.00

Cleveland

CLEVELAND, Sept. 6.

Iron Ore.—Shipments of Lake Superior ore during August amounted to 4,329,158 gross tons, making the total movement for the season up to Sept. 1 14,748,072 tons, as compared with 35,349,874 tons during the same period last year. August shipments in 1920 were 9,270,763 tons. The August movement showed a slight gain over July, when shipments were 4,047,687 tons, but no increase is expected in September and a number of the ore firms are planning to clean up their shipments by Nov. 1. Present indications are that the season's shipments will barely reach the recent estimates of 25,000,000 tons. In only one year since 1904 have the season's shipments gone below 30,000,000 tons. That was in 1908, when the lake and rail shipments amounted to 26,014,987 tons.

A few merchant furnace interests that are considering the blowing in of their furnaces have put out inquiries for ore in lots of 5000 to 15,000 tons and some of these inquiries are expected to result in the placing of orders a little later.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Sales fell off last week as compared with the previous week, but the volume of business was somewhat better than the average for the past few weeks. With the recent stiffening in prices by some makers there is a spread of $1 a ton in prices on foundry iron. One Valley furnace which recently advanced its price to $21 for No. 2 foundry iron reports small lot sales aggregating 2000 tons at that price. Other interests operating Cleveland and other Lake furnaces and western Pennsylvania furnaces are still quoting $20, but in some cases are making sales at $20.50 to $21, the higher prices usually being for nearby delivery or where competition is largely eliminated. One selling agency reports sales aggregating 6200 tons this month. These include 500 tons of gray forge iron at $20. This seller was offered an additional lot of 1200 tons of forge iron at the same price but declined to take the order. One producer reports sales in the week aggregating 3500 tons of foundry iron, including 700 tons to an Indiana melter and 600 tons to a Michigan furnace builder. Another producer booked 1000 tons in small lots. A 200-ton lot of 2.75 per cent silicon foundry iron brought $21.50, the high silicon differential being figured at $1.50. We note the sale of 200 tons of basic iron at $20. However, $19 is still regarded as the market on this grade for a round tonnage, although most producers are asking $20. A few car lot sales of Southern iron are reported at $19. Sales during August by local interests showed a fair gain over previous months this year. One producer sold over twice as much iron in August

as in any previous month this year and its shipments were 60 per cent greater than in any previous month of the year. With recent improvements in sales September shipments are expected to show a gain over August. Two furnaces are being added to the active list, one River furnace in Cleveland and Cherry Valley at Leetonia, Ohio.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	36.00 to 36.25

Finished Iron and Steel.—The volume of business for the week was rather light and lots of any size are still bringing out low prices. Quotations as low as 1.65c., Pittsburgh, are reported on steel bars, plates and structural material for desirable orders, although some of the mills are not going below 1.70c. While steel bars have sold as low as 1.60c., there are indications that 1.65c. is perhaps now the minimum. Inquiry for 25,000 tons of plates for tank work has come out, including a Mexican inquiry for 18,000 tons, noted in our issue of last week. A Cleveland mill has taken 1000 tons of tank plates for Eastern shipment at about 1.65c., Pittsburgh. A Cleveland consumer has placed 800 tons of steel bars, plates and shapes at lower than 1.70c. The New York Central Railroad has placed repair work on 10,000 cars with car builders and repair companies but it is expected that the greater part of the material required will be supplied from the railroad company's present stock of material. The Lima Locomotive Corporation has taken 5 locomotives for the Clover Leaf Railroad, for which it has placed 160 tons of plates and structural material. In the building field inquiry for small lots of structural material has improved. The Masonic hotel project in Detroit, requiring 7000 tons of steel, which was recently held up, has been revived and bidders have been asked to revise their bids. The stadium for the Detroit baseball park, requiring 700 tons of steel, has been held up indefinitely. The National Iron & Wire Co. has taken the Rawlings school building, Cleveland, requiring 200 tons of steel.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Old Material.—There is moderate activity in small lots of steel making scrap and the market continues firm with no price changes. Dealers are offering $12.35 for heavy melting steel and $8.25 to $8.50 for borings for Canton delivery. Sales of heavy melting steel at $13.50 are reported to a western Pennsylvania mill. Another mill that recently bought considerable scrap will make additional purchases shortly. The local demand is very light. Local dealers are offering $12 for heavy melting steel for delivery to a Cleveland mill, but little is to be had at that price.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails, under 3 ft	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.00 to 8.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in	5.50 to 6.00
Drop forge flashings, under 10 in	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Sheets.—Inquiries and sales are light. Most mills are quoting 2.75c. for black, 3.75c. for galvanized and 2.25c. for blue annealed sheets, but there are unconfirmed reports of shading $1 to $2 a ton on black and galvanized sheets.

Bolts, Nuts and Rivets.—Some of the bolt and nut manufacturers report that August sales were larger than in any previous month this year. Orders continue to show some gain but the demand is for small lots. The rivet market continues dull with prices unchanged. Minimum quotations reported are 2.25c. for structural and 2.35c. for boiler rivets.

Coke.—The demand for carload lots of foundry coke has improved. Standard Connellsville makes are quoted at $4 to $4.50 per net ton.

Buffalo

BUFFALO, Sept 6.

Pig Iron.—Scattered sales of pig iron are the rule in this market. The total business of producers and agencies for the week was less than 10,000 tons and the largest individual sale in this total was one for 750 tons. One furnace has turned its attention to producing malleable iron to fill old contracts, and some small demand just developed. Brokerage competition has apparently been eliminated. All the iron produced by one furnace in August was shipped out. There is some talk of an interest blowing in a furnace but no decision has been reached. Requests for tonnages for delivery beyond 60 days find no interest here and the same policy not to sell on any other than immediate or delivery within two months is still in force. One producer is out of the market by virtue of the needs of its own and subsidiaries, and while they have sold scattered lots at $20 base, they are not anxious for business at present prices.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$21.75
No. 2X foundry, 2.25 to 2.75 sil	20.75
No. 2 plain, 1.75 to 2.25 sil	20.00
Basic (nominal)	21.00
Malleable(nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—Desirable inquiries for billets and wire rods—1400 tons of the former and 800 tons of the latter, the first to appear in this territory in several months represent the sole new development. Bar business is apathetic and while the price of 1.75c. Pittsburgh is maintained on small orders, it is by no means dominant where desirable specifications are presented. Tubular and wire products show better movement than any other material. Generally the optimistic undercurrent has not abated but there is little to base it on. Bar sales are small but sheet piling which has kept one mill busy for some time continues at a fair average. Some export business out of Canada to points in possessions of Great Britain and for finished materials has given rise to a better feeling in the Dominion. Structural business has not brought out any new projects. It is the general belief that any sizable business in this field will be deferred to next year.

Warehouse Business.—While no general falling off in sales is manifest the improvement noticed each succeeding week in August has spent itself, to all appearances. Increase in mill operation has not affected warehouse business as near as can be determined. Inquiry for structural shapes indicates that a fair business is in prospect.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.30c.; galvanized steel sheets, No. 28 gage, 5.05c.; black sheets, No. 28 gage, 4.05c.; cold rolled strip steel, 6.40c.

Coke.—Several inquiries for more than the average tonnage have appeared and indicate a livelier market. There is some difficulty in finding tonnages to fill this unusual demand, as producers are reluctant to increase operation, not knowing the stability of this business and figuring on a possibility of later curtailment. Prices are firm.

Old Material.—About 13,000 tons of heavy melting steel has been sold here by a group of dealers. Most of the tonnage was taken by a steel interest, which has been quite inactive for eight months and lately

has found sufficient business to increase operation in a few departments. A price of $13 was maintained on this business. Larger inquiry has appeared. Several dealers are selling material for the same price as they pay for the stock.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $13.50
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00
Hydraulic compressed	9.50 to 10.00
Railroad malleable	12.00 to 12.50

Cincinnati

CINCINNATI, Sept. 6.

Pig Iron.—While the market was not especially active last week, there are quite a number of inquiries being figured on. One of these calls for 3000 tons of iron for shipment over the remainder of the year, the inquirer having a number of plants scattered throughout the country. A Michigan melter is in the market for 2000 tons of malleable iron and a Chattanooga interest is inquiring for 600 tons of malleable. A central Ohio melter is in the market for 400 tons of foundry iron and a Knoxville melter for a similar tonnage. There is also an inquiry for 700 tons of Southern iron for first quarter. Some sales were reported during the week, including one of 1000 tons of foundry iron to a northern Indiana melter and 350 tons of high silicon iron to a Cleveland district melter. A local melter bought 200 tons of Southern iron and a nearby melter 200 tons of Northern iron. Chicago furnaces have advised the trade that prices will be advanced to $22 on Thursday of this week and announcement of an advance in southern Ohio iron will also likely be forthcoming. Sales made in the week were generally on the basis of $20 to $20.50 for Northern and $19 for Southern iron. It is reported that a Southern furnace has advised melters with contracts for high-priced iron for first half delivery that it will sell this iron at the market and charge the difference to the buyer, if settlement is not made at once. The Marting Iron & Steel Co. will light a stack at Ironton on Sept. 15.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—An Indiana rolling mill in the week bought 1000 tons of sheet bars. The order is reported to have gone to a Chicago district mill at a price at $30, f.o.b., mill. This would be the equivalent of about $28, Pittsburgh. The inquiry for 1000 tons of plates and 500 tons of structural material, reported some weeks ago, is still pending, it not having been decided whether the project for which this material was required, will go ahead. Something definite is expected within the next week or so. Business in finished materials during the past week has been confined almost exclusively to carload lots, although one order for 120 tons of wire fence was placed by a railroad with the leading interest. The usual quotation on plain wire is now $2.25 per 100 lb. Nails, however, are holding firmly at $2.75, there being no evidence of price shading. There is a fair demand for sheets and the recent prices of 2.25c., 2.75c. and 3.75c. for blue annealed, black and galvanized, respectively, are holding firmly. On plates and shapes, 1.75c. is now commonly quoted and on larger tonnages these prices probably could be bettered. No new projects have come up in the structural field. The King Bridge Co. has been awarded the contract for track elevation work at Indianapolis for the Big Four Railroad, taking close to 900 tons. The Pan-American Bridge Co., Newcastle, Ind., has been awarded the contract for a power house at Frankfort, Ind., 165 tons being involved. Plant operations will show little change. The East Side works of the American Rolling Mills will be running practically at capacity in the week. The schedule calls for six open-hearth furnaces and 18 sheet mills. The plants of the Andrews Steel Co. and the Newport Rolling Mills at Newport, Ky., and the Whitaker-Glessner Co. at Portsmouth, will be idle.

Warehouse Business.—Local jobbers report a slow but steady improvement in orders. Tonnages inquired for are becoming larger and the number of buyers is increasing. Local jobbers of sheets have reduced their prices, following the recent changes made by the mills. No. 28 black sheets are now quoted at 4.25c. and No. 28 galvanized, at 5.25c. No other price changes have been made recently. Jobbers quote:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Tool Steel.—Some manufacturers of tool steel have reduced prices approximately 10c. per pound and 18 per cent tungsten steel is now quoted at 90c. per lb.

Coke.—Inquiries in the coke market run all the way from 200 to 5000 tons. Buyers are apparently willing to cover for first quarter at to-day's prices, but operators are not willing to commit themselves more than a month or two ahead. The market is firmer than has been the case recently, though prices have not been advanced noticeably. Several sales of 500-ton lots were made last week, but in the main transactions are confined to one and two-car lots for immediate shipment.

Old Material.—While there is very little activity in this market, the price situation is showing a stronger tendency and advances of from 50c. to $1 a ton have been made in the week. Some inquiries are being received for borings and turnings. Mills in other districts are also feeling the market on heavy melting steel. Dealers are of the opinion that mills would be ready to buy if they were convinced that the market had touched the bottom and are confident that the next 30 days will see a substantial improvement in the scrap market. The supply of borings and turnings is particularly light, as most of the manufacturing plants turning out this material are running at greatly reduced operations. Most dealers have advanced quotations on practically the entire list and the following quotations represent the market today:

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$4.00 to $5.00
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.50 to 11.50
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 10.00
Car wheels	11.50 to 12.50
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	2.50 to 3.00
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	12.50 to 13.50
Burnt scrap	7.00 to 8.00
Iron axles	15.00 to 16 00
Locomotive tires (smooth inside)	9.50 to 10.00
Pipes and flues	4.00 to 5.00

St. Louis

ST. LOUIS, Sept. 6.

Pig Iron.—Selling slowed up somewhat, following the recent advance of $1 a ton, but the market is firm and producers are maintaining $21, f.o.b. Chicago. Inquiries involve about 4000 or 5000 tons of various grades of foundry iron, the bulk of which is for last quarter, first quarter or first-half delivery. The interest in distant delivery indicates that buyers have confidence in the present price and are anticipating needs. One inquiry covers 5000 to 10,000 tons of basic iron for shipment over the next 90 days. The permanent closing of the Sligo furnace at Sligo, Mo., whose output of 25,000 to 30,000 tons of pig iron was taken care of by the

American Car & Foundry Co., is a noteworthy development. There was an inquiry out for a carload of 14 to 16 per cent ferrosilicon. Sales of Granite City by-product coke in the week were about 1200 tons.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham.

Northern foundry, sil. 1.75 to 2.25	$23.88
Northern malleable, sil. 1.75 to 2.25	23.88
Basic	23.88
Southern foundry, sil. 1.75 to 2.25	24.74

Finished Iron and Steel.—Prices are not being well maintained on plates and shapes, and some concerns who quoted less than the market price of 1.85c., f.o.b., Pittsburgh, have not obtained the business because someone else had quoted lower. The Missouri Pacific Railroad bought 3000 kegs of track spikes and 125 to 150 tons of plates at concessions, the exact amount of which could not be learned. The market is holding firm, however, on bars. Galvanized sheets, No. 29 gauge, are in better demand, although there is only a light demand for blue annealed sheets. Some sales are being made to local jobbers to round out their stocks. The railroads are not opening up, but they are going into the market to supply their actual needs. Warehouse business is slightly better.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.50c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—A slight improvement in demand but no orders of consequence placed describes the situation, scattering sales involving a slightly larger tonnage. The coke ovens of the St. Louis Coke & Chemical Co. at Granite City are still operating, although no pig iron is being produced. What sales are being made are on a basis of immediate delivery. Domestic coke is in increased demand. Standard Connellsville foundry coke is quoted at $4.50 to $5 per net ton at ovens.

Old Material.—There is no change in the prices of old materials. Consumers are not interested at present and dealers were forced to lay down in their yards all stocks recently bought from the railroads. Railroad lists before the market this week follow: Cotton Belt, 300 tons, and Pennsylvania, 2500 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron Rails	$13.00 to $13.50
Steel rails, re-rolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.00 to 11.50
Relaying rails, standard section	29.00 to 30.00
Cast iron car wheels	12.00 to 12.50
No. 1 heavy railroad melting steel	10.50 to 11.00
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	10.50 to 11.00
Ordinary bundle sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	5.50 to 6.00
Iron angle bars	11.00 to 11.50
Steel angle bars	9.00 to 9.50
Iron car axles	16.50 to 17.00
Steel car axles	12.50 to 13.00
Wrought iron arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	9.50 to 10.00
Railroad springs	10.50 to 11.00
Steel couplers and knuckles	10.50 to 11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to 9.50
No. 1 dealer's forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	12.50 to 13.00
Stove plate and light cast	11.50 to 12.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.00 to 7.50
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	8.50 to 9.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	7.00 to 7.50
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.50 to 11.00
Railroad brake shoes	8.50 to 9.00

San Francisco

SAN FRANCISCO, Aug. 31.

Pig Iron.—In view of actual business, the Coast market has been very quiet of late, and few if any large transactions have been made in the past week or two. There has been, however, a small volume involving 50 and 100-ton lots. Recently the Southern Pacific Co. rejected the first bids on 800 tons of domestic material, and called for 500 tons and 300 of Nos. 1 and 2 foundry iron (2.25 to 2.75 and 2.75 to 3.25 per cent silicon). Foundry activities at present continue very greatly restricted, but reports of increased inquiry are current, leading some to anticipate better conditions in the near future. The market is more or less nominal as respects prices.

Coke.—This market reflects the dormant condition of pig iron. A few cars have been reported sold, at steady prices, but there is nothing of consequence to state at this time.

Old Material.—The most conspicuous transaction in scrap in the last week or ten days was the placing of around 2000 tons of heavy melting steel, it being understood that the price was in the neighborhood of $10 per gross ton, delivered at the consuming works. Cast iron scrap is moving in small volume at around $20, some prices being slightly above this figure, but buyers' ideas range lower. An inquiry from China for a quantity of scrap shearings was received and probably will be filled.

Finished Iron and Steel.—On Aug. 29, the Building Trades Council's opposition to a prolongation of the strike dissolved, and workers were permitted to seek employment under the so-called American plan for which the Builders' Exchange has been contending. At present it is estimated that about 8000 of the 11,000 men employed in May when the strike was called have returned to work, which is taken to mean that conditions are rapidly reaching their normal. It seems rather early to expect the effects of this change to become evident at this moment, but it is reported that the inquiry for concrete reinforcing bars already has increased, and fabricators are looking for a better condition in the succeeding weeks. Jobbers report a greater movement of stocks and increased replacement buying. Actual transactions of a conspicuous nature have been few in the past fortnight, perhaps the most notable being the sale of 3000 to 3500 tons of high power transmission towers by the Pacific Coast Steel Co. to the Pacific Gas & Electric for its Cordelia-Oakland and Pitt River line. There are two inquiries at present for 75 to 600 tons of relaying rails for a lumber company. A Los Angeles interest is in the market for a quantity of galvanized sheets. The Market Street Railway, San Francisco, is inquiring for 500 tons of girder rails. The Consolidated Steel Co. is figuring on 4000 tons of 60-lb. rails. Plates and sheets are being taken by the Southern Pacific Co. It has been reported that standard section T rails of foreign fabrication were offered the Western Pacific Co. for $37.50, duty paid, delivered alongside, San Francisco, at which figure domestic makers are greatly handicapped. There has been, likewise, a slight stir in the Oriental situation of late, and local interests are now figuring on a transmission tower contract for Japan, which will involve from 1600 to 1700 tons. Japan is also in the market for steel rails and black sheets. Market prices appear to be settling somewhat, but stability has not yet been attained.

Cast Iron Pipe.—A much improved situation is reported throughout the State, especially in southern California, where quite an active municipal business is being done at various points from Los Angeles to San Diego, inclusive. Indications point to an increasing business in waterworks betterments. The city of Alhambra is in the market for 150 tons of the smaller sizes of pipe, and Lancaster received bids a day or two ago for 250 tons of 4 to 8-in. pipe. Public service corporation activity is also better, gas companies extending lines. Prices are on the point of being stabilized, but present prices show a range of from $36 to $40, base. Nearly all shipments of pipe for Pacific Coast points are being made by vessel.

Philadelphia

PHILADELPHIA, Sept. 6.

Though the past week has been quieter in the steel and pig iron trades than preceding weeks in August, partly on account of the Labor Day holidays, there is a general expectation here that a gradual improvement will set in shortly. There has been a tendency during the past week to postpone action on pending projects until after Labor Day. Fair buying of pig iron has continued but prices have remained where they were a week ago. The improvement in buying during August sets that month out as the best of the year in the pig iron trade, with sales in this market totaling 75,000 tons or more.

Pig Iron.—August was the best month of the year so far for the Eastern pig iron trade, with sales by Philadelphia offices aggregating at least 75,000 tons, possibly more. The past week's total sales were smaller than in the two or three weeks preceding. Prices on foundry iron remain at $19.50, furnace, as a minimum for No. 2 plain. A new factor has entered into the pig iron situation, that being the strength of the coke market. Two inquiries by Eastern blast furnaces for coke for the last quarter brought out quotations of about $4 a ton. Offers of $3 and $3.25, Connellsville, for forward delivery were refused by representative bee-hive operators. If coke prices advance there will be an added cost for pig iron manufacture, which can only be offset by reduced freight rates. An appeal for a reduction in transportation rates has been made by Eastern pig iron interests but a considerable period of negotiation is probable before any action can be taken by the Trunk Line Association and the Interstate Commerce Commission. Swedish iron ore is now being offered by a local firm at 9c. per unit, Atlantic seaboard, as compared with about 15c. per unit for Lake Superior ore delivered at nearby furnaces. However, most of the Eastern furnaces still have large ore piles which they will attempt to liquidate before making new purchases. Pig iron sales during the week have been mostly in lots of a few hundred tons each. A New Jersey melter bought 800 tons, which was divided between two furnaces. A fair volume of inquiry is pending, part for immediate shipment and the remainder for the last quarter. Some inquiries for first quarter of next year have been made but sellers are not willing to quote that far ahead. The Robesonia furnace, which has been making low phosphorus iron, turned over to foundry on Tuesday, making four eastern Pennsylvania makers of foundry iron, with prospects that another furnace may blow in shortly.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.84 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	29.24 to 29.74
Basic deliv. eastern Pa.	19.00
Gray forge	20.00 to 21.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Small sales of domestic ferromanganese are being made at $70 delivered in Eastern territory and $75 for shipment west of Pittsburgh. Spiegeleisen is not in demand but is quoted at $27 to $28, furnace, for 18 to 22 per cent grade.

Semi-Finished Steel.—Rerolling mills do not find it possible to buy billets at $30, Pittsburgh, and sell bars at current market prices, hence the demand for rerolling billets is practically nil. Neither is there demand for forging billets because of the low condition of the forging industry. Prices are unchanged.

Railroad Equipment and Supplies.—The Baltimore & Ohio Railroad, reported last week as in the market for the repair of 2000 cars, is now asking for bids for repairing 3000 freight cars of six different types. A better demand from the railroads for tires, wheels and axles is noted. The Pennsylvania Railroad has bought 4850 kegs of spikes at a price reported to be 2.50c. per lb., Pittsburgh.

Plates.—Further weakness in plate prices is apparent, though business of importance is lacking. Sales have been made at 1.70c., Pittsburgh, with every indication that a buyer with a fair-sized tonnage could place it at 1.65c., Pittsburgh. On carload lots or less the price is usually 1.75c. Aside from a little railroad buying for repair work the market is flat.

Structural Shapes.—The nominal price for shapes in small lots is 1.80c., Pittsburgh, but any sizable tonnage commands a better price. As low as 1.65c., Pittsburgh, has been quoted. The Dupont Engineering Co. has awarded about 1000 tons for fabrication to the McClintic-Marshall Co. for a pier at Wilmington, Del. The same project requires about 500 tons of reinforcing bars. The Viscose Building, Roanoke, Va., 1800 tons, is reported to have been awarded to a Philadelphia fabricator. A number of projects which were to have been decided last week were postponed until after Labor Day; hence may be awarded this week.

Bars.—Steel bars continue to show a degree of strength. Soft steel is being sold at 1.75c., Pittsburgh, and there appears to be very little shading on this grade, though reinforcing bars are generally obtainable at 1.70c., Pittsburgh. Bar iron is quoted at 1.65c., Pittsburgh.

Sheets.—The new prices on sheets, announced last week by the leading interest, are generally quoted by all manufacturers, namely 2.25c. for No. 10 blue annealed, 2.75c. for No. 28 black and 3.75c. for No. 28 galvanized, all f.o.b. Pittsburgh.

Wire Products.—Attempts have been made by buyers to break the wire nail price of 2.75c. per lb., Pittsburgh. Offers of 2.50c. have been refused by the mills.

Warehouse Business.—A fair gain in sales from jobbers' stocks is reported, business being much more satisfactory than it was a month or so ago. Prices have not been changed during the week.

Coke.—Foundry coke is quoted at $4 to $4.50, Connellsville. Offers of $3 and $3.25 for furnace coke for forward shipment have been refused by Connellsville operators, $4 having been quoted in one instance.

Old Material.—It is reported that the prices received by the Pennsylvania Railroad on its recent large list of scrap averaged fully $1 a ton above the prices received by the same road a month ago. This reflects in a general way the slight but steady improvement in the scrap trade, but there is still much to be desired as the volume of business continues at low ebb. Each purchase of importance puts prices up slightly on the particular grade in demand. Heavy steel scrap, however, is not in demand because of the lack of steel business and prices remain at $11.50 to $12 per ton. A slight advance in wrought scrap is noted. Cast borings are also slightly firmer. We quote for delivery in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	13.00 to 13.50
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.00 to 9.50
Cast borings (for rolling mills)	9.25 to 9.75
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.75c. to 1.80c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.35 to $2.50
Large boiler rivets ..... 2.45 to 2.60
Small rivets ....65, 10 and 10 to 65, 10, 10 and 5 per cent off list
Machine bolts, small, rolled threads,
70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer,
65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads..70 and 5 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts .....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....60 and 5 per cent off list
Larger and longer sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped..... 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts..... 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38 to $42; chain rods, $38 to $42; screw stock rods, $43 to $47; rivet and bolt rods and other rods of that character, $38 to $42; high carbon rods, $46 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.40 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.60c. to 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 3½	+22½
¼ to ⅜	53½	27	½	36½	18½
½	58½	44	¾	42½	27½
¾	62½	50	1 to 1½	44½	29½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	39½	25½
2½ to 6	60½	48	2½ to 6	42½	29½
7 to 12	57½	44	7 to 12	40½	27½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 4½	+37½
¼ to ⅜	49½	32	½	35½	23½
½	55½	44	¾	42½	28½
¾	60½	49	1 to 1½	44½	30½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	40½	27½
2½ to 4	58½	47	2½ to 4	43½	31½
4½ to 6	57½	46	4½ to 6	42½	30½
7 to 8	53½	40	7 to 8	35½	23½
9 to 12	48½	35	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.15	Nos. 11 and 12	2.35
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.45
		Nos. 15 and 16	2.55

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.45	No. 28 (base)	2.75
Nos. 22 to 24	2.50	No. 29	2.80
Nos. 25 and 26	2.65	No. 30	2.95
No. 27	2.70		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75	Nos. 25 and 26	3.45
Nos. 12 to 14	2.85	No. 27	3.60
Nos. 15 and 16	3.00	No. 28 (base)	3.75
Nos. 17 to 21	3.15	No. 29	4.00
Nos. 22 to 24	3.30	No. 30	4.25

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55	No. 28 (base)	2.75
Nos. 17 to 21	2.60	No. 29	2.80
Nos. 22 to 24	2.65	No. 30	2.80
Nos. 25 to 27	2.70	Nos. 30½ and 31	2.85

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
		Electro-	New	New	St.	New	St.
Aug.	Lake	lytic	York	York	Louis	York	Louis
31	12.00	11.62½	26.87½	4.40	4.20	4.65	4.15
Sept.							
1	12.00	11.75	26.75	4.40	4.20	4.70	4.20
2	12.00	11.75	26.75	4.50	4.30	4.70	4.20
3	12.00	11.75	....	4.50	4.30	4.70	4.20
6	12.00	11.75	27.25	4.50	4.30	4.70	4.20

NEW YORK, Sept. 6.

The tone of all the markets is better but the amount of buying is still light. Elimination of most of the cheap lots has strengthened the copper market. The tin market is quiet and firm. Demand for lead is steady and prices are higher. The zinc market is a little more active and stronger.

Copper.—There has been a perceptible strengthening of the market as the new month opens, which is analagous to the conditions which prevailed at the beginning of July and August. In every case the end of the previous month has witnessed the necessity of some sellers to dispose of weakly held lots of electrolytic copper and, as these have been eliminated, the market has turned stronger. It is doubtful whether electrolytic copper for early delivery could be bought for less than 11.75c., New York, or 12c., delivered, and even then in limited amounts. Most large producers are not willing to meet this level and are asking from ⅛c. to ¼c. higher. Inquiry is fairly good and it is reported that demand from Europe is improving. It is also stated that sales to foreign countries were made last month at concessions under prevailing domestic prices. The market for Lake copper is largely nominal.

Copper Averages.—The average price of Lake copper for the month of August, based on daily quotations in THE IRON AGE, was 12c., New York. The average price of electrolytic copper was 11.70c., New York.

Tin.—With the exception of one day last week when buying was fairly brisk, the market has been quiet but firm. On Thursday, Sept. 1, about 300 tons was purchased by two or three dealers. It appears that the publication on that day of the monthly deliveries of tin showed for August deliveries larger than expected, which is pointed to as the cause of the spurt in demand. Later the market slowed down and there was more metal offered than there were buyers. An explanation of the August deliveries is that one large consumer shipped tin held in warehouses to its mills. Deliveries in the month of August are returned as 3320 tons, with the quantity in stock and landing Aug. 31 at 1761 tons. Imports for the first eight months of the year have been 12,978 tons against 36,688 tons for the first eight months of 1920. Spot Straits tin is quoted to-day at 27.25c., New York, with the London market about £5 per ton higher than a week ago at £161 5s. for spot standard, £163 15s. for future standard and £162 per ton for spot Straits, with total sales reported as 700 tons.

Lead.—The market is firm with a quiet and steady demand. Early on Friday, Sept. 2, the American Smelting & Refining Co. advanced its price 10 points to 4.50c., New York and St. Louis. The outside market is quoted at 4.50c., New York, or 4.30c. to 4.35c., St. Louis. There is a fair demand for future lead and there have been sales with prices at $2 to $3 per ton under those prevailing for early delivery.

Zinc.—Attempts to offer the market down have evidently disappeared and quotations are firmer, but demand has not improved particularly. Prime Western for early delivery is quoted at 4.20c., St. Louis, or 4.70c., New York, and this appears to be the minimum at which it can be bought.

Antimony.—Wholesale lots for early delivery are quoted at 4.50c., New York, duty paid.

Aluminum.—The leading producer still quotes virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery at 24.50c., f.o.b. plant, and importers of the same grade are asking 19c. to 20c., New York, duty paid.

Old Metals.—The market is firmer with a tendency toward higher prices. Dealers selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.50
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Chicago

Sept. 6.—The metals have been generally quiet but the exceedingly low levels to which tin had fallen aroused some speculative interest, which caused it to rebound. Lead has also advanced slightly, although buying is light. Numerous bids have been received at slightly below the market, but lead producers refuse to accept them. Galvanizers are buying spelter more freely and that metal has recovered after slipping down a few points last week. Old metal prices are unchanged. We quote in carload lots: Lake copper, 12.25c. to 12.50c.; tin, 28.50c. to 29c.; lead, 4.40c.; spelter, 4.30c. to 4.35c. in less than carload lots; antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

Sept. 6.—The trade in all non-ferrous metals is dormant. Lead at 4.25c., carlots, is unchanged, while zinc is slightly higher at 4.20c. We quote Lake copper at 12.73 1/2c., to 12.73 5/8c., carlots; tin, 27.86c.; and antimony, 5.23 1/2c. In old metals, we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Foundry Association Bulletin

The American Foundrymen's Association has issued from the office of the secretary, C. E. Hoyt, 140 South Dearborn Street, Chicago, the first number of an eight-page bulletin which is designed to keep the members informed on association activities, to report committee progress and furnish abstracts of current foundry literature. Announcement is made of the election of Robert E. Kennedy, formerly foundry superintendent of the University of Illinois, as assistant secretary. He will act as chairman of the committee on papers and as secretary of all technical committees. Mr. Kennedy is at present in charge of the sand research work of the association. It is announced also that by an arrangement for exchange of papers with the Institution of British Foundrymen, George K. Elliott, chief metallurgical engineer of the Lunkenheimer Co., Cincinnati, has prepared a paper for the annual meeting of the British association, and F. J. Cook, of Rudge & Littley, Ltd., West Bromwich, Staffordshire, will prepare a paper for the next meeting of the American Foundrymen's Association.

The American Pig Iron Association will hold its monthly meeting in Philadelphia on Friday, Sept. 23. After the usual business session the members will be guests of the Alan Wood Iron & Steel Co. at a nearby golf club.

The Truscon Steel Co., Youngstown, Ohio, has received an order for one of its standard steel buildings, to be 80 x 200 ft., to be erected at Beirut, Syria.

PERSONAL

William Chambers, representative of the National Service Corporation, Chicago, and affectionately known as "Uncle Billy" throughout the foundry and foundry supply trade, is recovering from a serious illness at the Presbyterian Hospital, Chicago. He is one of the oldest salesmen in the foundry field.

George P. Hansen has been appointed superintendent of blast furnaces for the American Rollling Mill Co. at Columbus. He was formerly in charge of blast furnaces at the Republic Iron & Steel Co., Youngstown.

Gus F. Ziv, formerly manager of the Chicago branch of A. Milne & Co., announces entry into business for himself as president and treasurer of the Ziv Steel & Wire Co., 4423 West Kinzie Street, Chicago. The company will engage in handling tool and solid drill steel, including hollow drill steel made in Sweden. Norman J. Hyslip has been appointed general sales manager.

Walter Price, Eastern sales manager of the Pawling & Harnischfeger Co., Milwaukee, Wis., manufacturer of electric cranes, hoists and excavators, severed connections with the company Sept. 1, to engage in his own business as an agent for Ford cars in Philadelphia. He has been associated with the Pawling & Harnischfeger Co. for more than 19 years, the greater portion of this time in charge of the Philadelphia office. During the past few years he has been manager of both the Philadelphia and New York offices. He is succeeded by T. E. Gallagher, formerly erecting engineer of the company.

Hugh E. Myers has resigned as chemist with the United Engineering & Foundry Co., Pittsburgh, after 24 years' service and will make an extended tour across the continent.

The appointment of Henry C. Morris, Washington, to head the new fuel division of the Bureau of Foreign and Domestic Commerce, has been announced by the Department of Commerce. He is a graduate of the Massachusetts Institute of Technology. He has had experience as a mining engineer in Colorado, Nevada, California, and in examination work in Mexico, Canada, and Missouri. In 1917 entered the Fuel Administration as a mining engineer, serving until May, 1918, when he was transferred to Bureau of Mines where work included membership on the Capital Issues Advisory Committee and related applications and on the War Minerals Investigation. He was nominated by Secretary Lane as representative of the Bureau of Mines on the economic liaison committee at its inception and served continuously until his resignation, June 1, 1920.

Paul A. Billings has been appointed district sales manager in Michigan and Toledo, Ohio, by the Falcon Steel Co., Niles, Ohio. Mr. Billings will be located at 2306 Dime Bank Building, Detroit.

Walter Graham, who in the war period made investigations for the United States Fuel Administration and the Ordnance Department of the Army, and has also done research work for the Bureau of Standards and the Tariff Commission, is now connected with the Technical Credit Association, 2 Rector Street, New York. It is announced that investigations will be made in chemical, mining, mechanical, metallurgical and other lines.

C. B. Cole has opened a consulting engineer's office at 546 West Washington Boulevard, Chicago, specializing on tools, gages, interchangeable manufacture and inspection systems.

A. G. Sherman, Detroit Vapor Stove Co., at a meeting of the Detroit chapter of the Society of Industrial Engineers, was elected president of the chapter for the ensuing year. F. C. Shafer, Penberthy Injector Co., was elected treasurer.

Chairman John A. Topping of the Republic Iron & Steel Co. is spending September in Canada.

Ross R. Harrison has been made assistant general manager of the Manufacturers Iron & Steel Co., New Brunswick, N. J. The company operates the Neverslip Works at New Brunswick, the Canadian Neverslip Works at Montreal and the Bryden Horseshoe Works at Catasauqua, Pa.

Chairman E. H. Gary of the United States Steel Corporation has gone to Mexico on a vacation trip.

Harry W. Bishop, Jr., who was with LaBelle Iron Works sales department for 10 years and later connected with the Pittsburgh office of the Wheeling Steel Products Co., has become associated with the sales department of the Superior Pipe Co., Pittsburgh, mills of which are at Columbia, Pa.

E. W. Pelton, manufacturing superintendent of the Stanley Works, New Britain, Conn., has recovered from an operation for appendicitis and has returned to his desk.

John B. Smiley, president Poldi Steel Corporation of America, will sail for a two months' stay in Europe on Sept. 20.

Laird Park of the pig iron firm of Park & Williams, Real Estate Trust Building, Philadelphia, has returned from an European trip.

J. R. Stroh has been appointed manager of traffic and mining operations of the Brier Hill Steel Co., Youngstown, Ohio, owing to the retirement of C. H. Haynes as traffic manager. Heretofore Mr. Stroh has been in charge of the mining department.

F. R. Eldridge, Jr., general manager of the Far Eastern Division, Department of Commerce, who accompanies the San Francisco Chamber of Commerce party on a tour to the Orient, sailing from San Francisco on Oct. 1, will make an extended visit to India after the tour of Japan, China, the Philippines and Dutch East Indies. Manufacturers and others who would have Mr. Eldridge make inquiry as to the opportunities in India for trade in their particular products are asked to communicate with him at Washington.

OBITUARY

DANIEL BAKER, president Standard Lime & Stone Co., died on Aug. 8, at his home in Baltimore. He had been in declining health for more than a year. He was born in Frederick county, Maryland, in 1858, and received his education in the public school of that county, later graduating from Western Maryland College. Mr. Baker began his business career as a clerk in a country store. Later he became associated with the business conducted by his father under the name of Daniel Baker & Sons. He continued with that business until 1888 when, with his brothers, William G. and Joseph D. Baker, he organized the Standard Lime & Stone Co. About a year later the brothers organized the Washington Building Lime Co., of which he was president. He also was a director in numerous financial and charitable institutions.

CHARLES H. FOOTE, well known in the steel trade as an officer of the Illinois Steel Co. for a number of years, died Aug. 28 at Burlington, Vt., aged 79 years. Mr. Foote was first vice-president of the Illinois Steel Co. under the John W. Gates régime in the late eighteen-nineties, and had the same connection after the company was taken over by the Federal Steel Co. He was also first vice-president in the early years of the Steel Corporation. His brother, F. H. Foote, was blast furnace manager at South Chicago during a portion of his incumbency. Charles H. Foote was one of the organizers of the Pocahontas Coal & Coke Co., and after the organization of the United States Steel Corporation was president of its Southwest Connellsville Coal & Coke Co. and the Eureka Fuel Co. Mr. Foote leaves two daughters and a son, Thomas W. Foote of Cleveland.

FRANK B. BLAUVELT, vice-president R. K. Carter & Co., New York, iron and steel purchasing agents, died Aug. 31 at Bretton Hall Hotel, that city, at the age of 59. He was born in New York and entered the employ of the Carter company at the age of 12.

JAPANESE INQUIRY GOOD

Tin Plate, Structural Steel, Sheets and Rails Specified—German Ferromanganese at $57, Atlantic Port

NEW YORK, Sept. 6.—Small orders for various kinds of material are reported from South American markets and Japanese purchases continue on about the same level as for some time, neither increasing nor decreasing in their total. Competition from German bidders continues a phase of the South American markets. One exporter in New York, quoting on railroad material for Equador, recently received two small turnouts at about $250 each, but lost the rail portion of the order calling for 5 kilometers of 55-lb. rails, to a German mill. German manufacturers, however, are apparently filling up their books rapidly.

It is reported that German mills are referring foreign orders for gas and water pipe to the United States, claiming that they are unable to quote prices in competition with the American mills. The representative in this country of a large German interest recently received notice that no deliveries on locomotives of any type could be promised under nine months. According to the American commercial attache at Buenos Aires, Argentine, although German competition is keenly felt there in small manufactured articles, they are less effective in bidding on locomotives, machinery and rails. German ferromanganese, 76 to 80 per cent, can be put down on the Atlantic seaboard at a price probably better than 4930 m. (about $57, with the mark equal to 1.15c.). A New York export house during the past two months has placed about $200,000 worth of business in Europe for delivery to its foreign customers.

Inquiries from Japan, although steady, have been rather light lately, particularly in structural material and heavy sheets. There has been some activity in tin plate of oil can size and weight and black sheets as heavy as No. 18 gage, but chiefly up to No. 31 gage, as well as light tonnages of steel bars and light and medium weight rails. A Japanese export house recently booked an order for a total of 700 base boxes of oil can tin plate and another exporter with an inquiry for 1000 base boxes of tin plate approached an independent mill, which refused to accept the order as it had just booked a 9000-box order from the Orient. An inquiry still pending from Japan calls for about 4000 tons of 60-lb. rails and there is a tender, bids on which will be opened in Japan about Sept. 9, which specifies 610 transmission towers involving about 2500 tons of structural material for the Tokio Electric Light Co., Tokio. A bridge inquiry on which bids were recently submitted totals about 650 tons of structural steel. A Japanese contracting company has issued an inquiry for about 1800 tons of 60-lb. rails and a few black sheets of light gage, the order, later to be increased to about 2500 tons. The rails are for an extension to a Japanese railroad line, for which this company received the contract, but a credit basis of part payment and the balance on notes of the company, to be paid when the contract is completed, is requested.

The recent reduction of Swedish prices by about 20 per cent has brought quotations on Swedish iron down to a point where it can be put down in New York, duty paid for about 6c. per lb., and probably a lower price on a large tonnage. High-speed steel of Swedish make is still maintained at from 90c. to $1.15 per lb., depending upon the quality. There is evidently an effort on the part of importers of foreign steel, particularly high-speed steel and other high-grade materials, to maintain the American domestic price pending the settlement of the tariff.

ASK RATE REDUCTIONS

Eastern Pig Iron Manufacturers Petition for Relief from High Freight Rates

Eastern manufacturers of pig iron, principally those in eastern Pennsylvania, but including also a few New York and New Jersey furnaces, have made a joint appeal to the Traffic Executive Committee, Eastern Territory, Trunk Line Association, 143 Liberty Street, New York, for relief from present high railroad freight rates on iron ore, coke, limestone, etc. It is stated that transportation costs for assembling raw materials to make one ton of pig iron are to-day $14.50 for Eastern furnaces, which is approximately 70 per cent of present selling prices, whereas in 1914, when iron sold for $14 a ton, transportation charges for assembling materials for a ton of iron were only $7, or 50 per cent of the selling price. It is stated that present railroad rates are higher than the industry can stand in view of the trend of market prices downward during the past several months. A hearing on the petition will probably be held about Sept. 15. It reads as follows:

As manufacturers of pig iron, operating blast furnaces in Eastern territory, we hereby request your committee to give prompt and favorable consideration to a reduction in transportation charges on the raw materials used in furnace operations, viz.: iron ore, bituminous coal, coke, limestone and dolomite.

We are moved to make this request under the conviction that a substantial reduction is absolutely necessary to permit the operation of the furnaces, and is the prerequisite to a return to activity in pig iron production, which is the basis of the iron and steel industry. Operations at the present time and for several months past have been on a very low level and many plants have suspended entirely.

Liquidation in both labor and prices has progressed to a marked degree. Labor rates have been reduced 40 to 45 per cent from the maximum and tonnage wage rates proportionately. In this respect we have gone much farther than other industries, and yet our cost of production is nowhere near matching up with the price that we obtain. Prices have declined from $30 to $50 per ton prevailing three or four years ago, and in more recent times to to-day's prices of $18 to $20 per ton; and during the period that this decline in the price of pig iron has taken place transportation charges have correspondingly increased, so that we now find ourselves burdened with an abnormally high and prohibitive freight level.

The extent to which the present high cost of transportation affects existing conditions will be apparent to your committee from the fact that in 1914 pig iron was made and sold at $14 per ton delivered, and the furnaces were able to operate. At that time freight assembling costs were about $7 per ton, or 50 per cent of the selling price, whereas to-day transportation charges alone on materials necessary to produce one ton of pig iron (including rail haul on ore from mines to lake port, water and rail transportation to furnaces) and delivery charge amount, in a representative case, to approximately $14.50 per ton, or over 70 per cent of the current pig iron price, leaving less than 30 per cent of the selling price to cover the cost of the ore, coke and other raw materials, as well as labor and general manufacturing expenses.

Freight charges on the commodities we use have advanced since 1917 from 55 per cent in case of iron ore to over 100 per cent on fire brick, with total advance since 1914 of over 100 per cent. The transportation charges alone on inbound raw materials required for a ton of pig iron are to-day greater than the selling price of pig iron in Belgium, and with the prevailing low ocean rates we are confronted with competition from that source which menaces our ability to operate and may result in the extinction of heavy tonnages of raw materials that yield large revenues to the railroads.

The raw materials used in the manufacture of pig iron are low grade commodities. They are transported by the carriers in great bulk and generally in trainload lots, with minimum liability as to loss and damage, all of which tend to low operating costs. Furthermore, the considerable changes that have taken place in our industry have thrown out of all proportion what might be regarded as a normal ratio between prices and transportation charges on the commodities on which we are seeking reductions, and it is quite apparent to us that the rates now in effect are greater than the traffic can bear and certainly higher than the industry can stand. We are all aware that there must be liquidation and we firmly believe that the steel industry, in both labor and selling price, when considering the value of the dollar to-day as compared to its pre-war value, has been fully liquidated. Surely transportation charges must undergo the same process.

Under these conditions we are compelled to ask relief, and we respectfully urge your immediate consideration of the question so vital to us and of no little importance to the welfare of the railroads as well.

Detroit's Back to Normal Convention

The Detroit committee on arrangements for the "Back to Normal" credit convention of the Motor Accessory Manufacturers Association, soon to be held in Detroit, will consist of C. W. Dickerson, vice-president Timkin-Detroit Axle Co., chairman; E. R. Ailes, treasurer Detroit Steel Products Co.; M. A. Moynihan, secretary Gemmer Mfg. Co.; William Hendrie, secretary Detoit Gear & Machine Co., and Thomas M. Simpson, credit manager Continental Motors Corporation.

British Iron and Steel Market

Continental Price Margin Narrowing—British Steel Again Competitive—Demand Improving Slightly

(By Cable)

LONDON, ENGLAND, Sept. 6.

There has been no further increase in the production of Cleveland pig iron, but it is anticipated that three more furnaces will be blowing within a few days. Increased interest is being shown in foundry iron, but prices are still too high, and supplies of No. 3 G. M. B. are practically unobtainable. No. 4 foundry iron may be had in fair quantities and prices are easier.

Hematite position is improving. Six furnaces are now blowing, but makers generally are awaiting the advent of cheaper fuel before making a general resumption of activity. Home demand is increasing. East Coast mixed numbers have been reduced. Foreign ore is quiet and it is difficult to name an exact price, owing to the various freights ruling. Nominal quotations on Bilbao Rubio are 27½s. to 28½s. ($5.09 to $5.27) ex-ship Tees.

British semi-finished steel is now competing with that from the Continent. Welsh sheet bars have been sold at £7 7½s. ($27.29) delivered, and British 2-in. billets are being done at £7 10s. ($27.75) delivered Midlands. Belgium is now quoting billets at £6 15s. ($24.97) f.o.b.; sheet bars at £6 15s. f.o.b. German works are full up to the end of the year and are not now quoting.

Continental finished steel prices are also hardening. Belgian merchant bars are being sold at £8 10s. (1.40c. per lb.) f.o.b., and £8 15s. (1.45c. per lb.) is now being asked. German plates are being done at £9 (1.49c. per lb.) c.i.f. Bombay, and £9 5s. (1.53c. per lb.) c.i.f. is now quoted. German merchant bars of rod sizes are being done at £9 12½s. (1.59c. per lb.) f.o.b. Ordinary sizes are quoted up to £8 15s. (1.45c. per lb.) f.o.b., for December delivery.

British home trade quotations are unchanged, but export figures are generally easier. Demand is showing signs of slight improvement.

Tin plates are quiet and easier. For prompt delivery, 23s. basis ($4.25) is quoted f.o.b. December, and January call for 22s. ($4.07) f.o.b. The Far East is still buying fairly steadily, but other markets are dull. Stocks of wasters are becoming scarce. Sellers of 28 by 20 in. are asking 39½s. ($7.31) f.o.b. Quarter wasters are nominally 16s. ($2.96) f.o.b.

Galvanized sheets are weaker There is some inquiry, but business is done only in meager parcels. Black sheet quotations have been reduced in hopes of attracting buyers, but the Continent is under-cutting in thick gages. Demand from the Far East has fallen off.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.70 per £1 as follows:

Durham coke, delivered	£1	15					$6.47		
Cleveland basic	7	7½	&	7	10*		27.29	&	$27.75
Cleveland No. 1 foundry	7	0					25.90		
Cleveland No. 3 foundry	6	15					24.97		
Cleveland No. 4 foundry	6	5					23.12		
Cleveland No. 4 forge	5	17½					21.74		
Hematite	7	0*					25.90		
East Coast mixed	7	0					25.90		
Ferromanganese	18	0	&	14	10*		66.60	&	53.65
Rails, 60 lb. and up	10	0	to	14	0		37.00	to	51.80
Billets	7	10	to	8	0		27.75	to	29.60
Sheet and tin plate bars, Welsh	8	0	to	8	10		29.60	to	31.45
Tin plate base box	1	2	to	1	3		4.07	to	4.25
							C. per Lb.		
Ship plates	13	0	to	14	0		2.15	to	2.31
Boiler plates	18	0	to	19	0		2.97	to	3.14
Tees	13	0	to	14	10		2.15	to	2.39
Channels	12	5	to	13	15		2.02	to	2.27
Beams	12	0	to	13	10		1.98	to	2.23
Round bars, ¾ to 3 in.	12	0	to	12	10		1.98	to	2.06
Galvanized sheets, 24 g.	20	0	to	20	10		3.30	to	3.39
Black sheets	16	0					2.64		
Steel hoops	17	0					2.81		
Cold rolled steel strip, 20 g.	26	10					4.38		

*Export price.

Prices Being Gradually Reduced—Resumption in Blast Furnaces Slow

LONDON, ENGLAND, Aug. 25.—The situation does not show much improvement. Economic conditions are at last being more clearly recognized by most sections of the community and that is at least a step in the right direction. Wage earners see the advantage of a low wage in preference to none at all, and the general tendency of prices is towards that low level without which no revival in trade is possible. A hopeful feature is the downward tendency of fuel prices. This has already made marked progress, and "slack" has been offered in certain directions at 21s compared with fully 52s last year.

In iron and steel, the resumption of pig iron production has been slow, but more furnaces are gradually being put into operation. In the Cleveland district about 15 are now working, but some of these are producing pig iron for certain steel works and not for the open market. Durham coke is now obtainable at 30s at the ovens, but the ironmasters apparently do not see their way yet to any wholesale reductions in pig iron prices. There is little demand, however, and when supplies of No. 3 foundry are wanted, producers ask the buyers to take an equal quantity of No. 4 foundry. For this mixture they ask a price of 132s 6d per ton, while No. 4 foundry alone is obtainable at 125s. As these figures are above continental rates, the latter iron must continue to be imported. Hematite shows little change, but makers seem to have sold fairly well, and are firmer for export which is now quoted at 155s with the home trade at 160s. The production of pig iron last month was 10,200 tons against 750,600 tons in July of last year.

In finished iron and steel, trade improves only very gradually and makers are realizing the necessity of cutting their prices. At the end of last week steel manufacturers in Scotland and the north east of England reduced the home trade quotations of steel generally by 20s per ton, while for export they appear to be willing to book business at lower figures. There is a general disposition on the part of buyers to hold off however until the market has stabilized itself.

A gratifying feature has been the settlement of the disastrous ship joiners' strike. An arrangement has been made under which there will be an immediate reduction of 6s per week and one of 3s in October, while in December another 3s reduction will be considered. The strike has lasted since the beginning of December last, and had its origin in the proposed withdrawal of the 12s a week bonus granted in the Spring of last year. The strike has been a most unfortunate one having retarded ship building and driven much repair work out of the country.

The Commercial Shearing & Stamping Co., Youngstown, Ohio, has completed a new plant for the production of steel stampings and shearings with a capacity of 3500 tons per month. It is located on a site of 13 1/2 acres. This plant is now producing shearings of plates and blue annealed sheets, cut to size, sketch or design. The products of the plant include steel parts pressed cold up to 1/2-in. in thickness and to dimensions of 48 1/2-in. wide and 120-in. in length, some for the automotive and agricultural implement trades.

The new fabricating plant and warehouse recently completed by the Fred A. Tarrier Co., Columbus, Ohio, is now in full operation. The plant has a capacity of 20 tons of fabricated steel daily and a large stock of steel bars and structural shapes is carried in stock. The company has plans in contemplation for the erection of a new fabricating shop, 60 ft. x 300 ft., but it is not expected that anything will be done on it until next year.

IRON AND INDUSTRIAL STOCKS

Lessening of Liquidation Caused Prices to Turn Upward Last Week

A change for the better is noted in the market for iron and industrial stocks. Higher prices for securities presumably are not due so much to any material increase in investment buying as they are to a lessening of liquidation. The sharp upturn in the raw cotton market has been a contributing factor as well to the better market for securities. Further cuts in prices quoted for automobiles the past week were far less unsettling than when initial reductions were announced. Reports of softness in the market for certain steel products likewise are less disturbing than heretofore, presumably because more people believe a turn for the better has come in the consumption. Certain it is the consumption of copper metal is on the mend and the strength of lead suggests a larger demand for that metal. The proposed reduction in freight rates on iron and steel products from eastern manufacturing points to the Pacific coast is generally construed as constructive. The decrease in the number of idle freight cars is reassuring. While available funds are by no means plentiful, the money situation continues to gradually improve.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis Chalm. com.	29½ - 32¾	Lack. Steel	37 - 39
Allis-Chalm. pf..	.. - 71	Midvale Steel ...	23 - 24¼
Am. Can com...	25½ - 26⅞	Nat.-Acme	14 - 14¼
Am. Can pf.....	79¾ - 81	Nat. E. & S. com.	31¼ - 33⅞
Am. C. & F. com.	122 -125¾	N. Y. Air Brake.	48⅝ - 51
Am. Loco. com..	84¾ - 87½	Nova Scotia Steel	24¼ - 25
Am. Rad. com...	67¾ - 68½	Pittsburgh Stl. pf	.. - 79
Am. Stl. F. com.	22 - 24	Pressed Stl. com.	51 - 53¼
Am. Stl. F. pf...	.. - 80	Ry. Stl. Spg. com.	75½ - 80
Bald. Loco. com.	74⅛ - 79	Replogle Steel ..	20 - 25
Beth. Stl. Cl. B..	47¾ - 50¾	Republic com. ..	45 - 47⅜
Beth. Stl. 8% pf.	.. - 98	Republic pf.	81 - 83
Chic. Pneu. Tool	47¾ - 48	Sloss com.	32⅞ - 35
Col. Fuel	22⅝ - 24¾	Trans.-Williams..	.. - 31
Cruc. Steel com..	54 - 57½	U. S. Pipe com..	12¼ - 14
Cruc. Steel pf...	79½ - 80	U. S. Pipe pf....	41 - 42
Gen. Electric ...	118½ -125	U. S. Steel com.	73¼ - 76
Gt. N. Ore Cert..	27¾ - 29	U. S. Steel pf....	109 -109¼
Gulf States Steel	31¾ - 33¼	Vanadium Steel .	27 - 31½
Int. Har. com...	72 - 77	Va. I. C. & Coke ..	- 63
Int. Har. pf.....	100 -101	West'ghouse Elec.	42 - 44

Industrial Finance

The United States Auto Gearshift Co. of Eau Claire, Wis., manufacturer of hydraulic gearshifting devices for motor vehicles, has filed a voluntary petition in bankruptcy. Schedules reveal liabilities of $278,424.45 and assets of $749,258.42.

Creditors of the Ogren Motor Car Co., 674-702 National Avenue, Milwaukee, manufacturer of passenger automobiles, have assumed charge of the affairs. Informal statements by Clarence J. Richards, 425 East Water Street, attorney for the company, admit liabilities of $125,000 and claim assets of $150,000.

Owing to unsatisfactory earnings, further curtailment or abandonment of dividends on common stock by iron and steel producers in the Mahoning Valley is predicted. For the second quarter, the Youngstown Sheet & Tube Co. paid 50c. per share on its junior issue, while the Trumbull Steel Co. declared 15c. per share. The common dividend was omitted by the Brier Hill Steel Co. and Sharon Steel Hoop Co.

An involuntary petition in bankruptcy recently was filed in the United States court in Pittsburgh against the Sligo Iron & Steel Co., Connellsville, Pa., by the McCairns Foundry Co. which has a claim of $58.33, the Connellsville Machine & Car Supply Co., with a claim of $683.42, and the First National Bank, Greensburg, Pa., on a note for $7,267.68.

A voluntary petition in bankruptcy recently was filed in the United States court, Pittsburgh, by the West Penn Fuel Co. Liabilities were listed at $260,629 and assets at $400,645, of which the principal amount, $394,228, represents debts due on open accounts.

The report of the Canadian Locomotive Co., Kingston, Ont., for the year ended June 30 last makes, as far as earnings are concerned, a very favorable showing, but like some other Canadian industries, the outlook for the current year is not as good as it might be, according to Aemilius Jarvis, chairman of the board of directors, who proceeded as follows: "Net profits for the year were $767,891, which the addition of interest from the company's investments of $59,200 brought up to a total of $827,091. Deductions from this were $90,000 for bond interest, $125,000 for depreciation, the same amount was so appropriated in the previous year, and $6,800 writing down of investments to market value, making total appropriations of $221,800, leaving $605,291 to be added to credit balance of $1,210,983, bringing the total up to $1,816,275. Of this, sinking fund provisions total $15,000 and stock dividends $265,000 or a total of $280,000 in all, leaving a credit balance to carry forward of $1,536,275.

A special stockholders' meeting of Peck, Stow & Wilcox Co., Southington, Conn., small tools, etc., has been called for Sept. 23, to act on a motion to authorize an increase in the capital from $1,500,000 to $2,000,000.

Gross earnings of the Colorado Fuel & Iron Co. for the three months ended June 30, last, were about half those for the corresponding period last year: $7,990,093, as against $14,239,347. Net earnings for the quarter amounted to $682,490, contrasted with $2,130,273 last year. After interest charges, taxes, depreciation, etc., there was a deficit of $273,752. In the corresponding quarter last year there was a surplus of $1,162,571.

The Union Tool Co., Orange, Mass., of which Emory E. Ellis is president and treasurer, has voted to issue 3000 shares of 8 per cent cumulative preferred stock, par $100.

Bankers announce that the recent issue of $3,000,000 8 per cent first mortgage Keystone Steel & Wire Co. sinking fund bonds, recently offered for public subscription, have been sold.

Arrangements have been made for the purchase and retirement of 80,000 shares Motor Products Corporation capital stock at $50 a share. Each shareholder has the right for a period of 14 days from Aug. 23, to sell to the corporation his pro rata of stock, not exceeding 40 per cent, deposit of same to be made with the Empire Trust Co., New York.

The operating net earnings of the Todd Shipyards Corporation for the year ended March 31 last, amounted to $7,359,444, contrasted with $15,224,630 for the previous year, and $12,292,767 for the year before that. Net profits were $3,094,327, $6,617,139 and $1,134,582, respectively, while dividends paid in those three years were $1,540,502, $794,198 and $667,673, respectively. The company ended the past year with a surplus of $1,553,824, whereas the surplus for the previous year was $5,822,941, and for the year before that $456,909.

A receiver has been appointed for the Composite Metal Lath Co., Hobart, Ind. The plant of the company was only recently constructed.

The Valley Forge Steel & Tool Co., 118 North La Salle Street, Chicago, has increased its capital stock from $12,000 to $20,000.

The Ireland & Matthews Mfg. Co., Detroit, manufacturer of automobile parts, mostly metal stampings, announces that it will increase its capital stock by $700,000. The company was organized in 1889 with a capital of $30,000. At present a total of $2,000,000 worth of products is being manufactured annually. The new issue is to provide for greater facilities and the development of several new products.

Walden-Worcester, Inc., to Be Reorganized

The business of Walden-Worcester, Inc., Worcester, Mass., manufacturer of wrenches, will be reorganized under the ownership of a new corporation of which J. Verner Critchley, founder of the Critchley Machine Co., will be president and Warren S. Bellows, formerly general manager of the Walden-Worcester, Inc., general sales manager. The new board of directors will represent the interests of the stockholders of the old company as well as the bank and merchandise creditors. Under an arrangement with the creditors it is believed the company's indebtedness will be paid in full and a going business left in prosperous shape.

The business has been operating under the management of receivers for almost a year, and much of the time has been running on a normal basis of production, a condition which still continues. The details of the new corporation will not be settled until the claims of creditors have been turned in to the depository, and an order of sale secured from the court which appointed the receivers.

Sharp Decline in Earnings

Although production generally increased in the plants of the Lake Superior Corporation, Sault Ste. Marie Ont. during the year ending June 30, last, conditions developed, especially in the last half of the fiscal year, which resulted in a large reduction in the net earnings from operations of subsidiary companies. These earnings in the annual report just sent to the shareholders are shown to be $1,541,293, compared with $3,722,152 in the previous year. "Your directors very much regret," stated President Wilfred H. Cunningham, "that results for the fiscal year, together with the requirements of the Steel Corporation and other subsidiary companies, prohibit the payment of interest on the income bonds."

Machinery Markets and News of the Works

BUILDERS RESUMING

Attractive Orders Have Enabled Some Plants to Re-Open for Three Months

Automotive Industry Improving—Used Tools in Good Demand

The encouraging features of the week are the re-opening of some of the Middle Western shops and the improvement among the automotive industries. One plant in the Cincinnati district has secured an order for special machinery which will take three months to complete, thereby causing the shops to be reopened and 400 men to be put to work. Another shop was scheduled to resume with 50 per cent of its force Sept. 6 because of a new order for 60 machines for several railroad shops. According to the report of the Seventh Federal Reserve district both the passenger automobile industry (eliminating the biggest producers of low-priced cars) and the farm implement business operated in July, 1921, at about 60 per cent of the capacity of the same month the year before. New England reports that the automotive fields furnish the chief source of buying.

Small shops are buying more than the larger plants, taking the cheaper types and often trading in old machinery in part payment for new. In some centers used tools are more active than new, particularly in New England. There a dealer sold 24 tools during the week, 19 of which were second hand.

The Chicago, Rock Island & Pacific Railroad inquiry for about 10 tools is the only new railroad asking of importance. The city of Lynn, Mass., bought 13 tools, 10 of which were lathes, from a Boston concern. At an auction sale of machines of the Burgess Co. & Curtis, aeroplane manufacturers, Marblehead, Mass., on Sept. 1 prices made were comparatively low, but much higher than those at the last previous auction sale in that district.

Formal price reductions include: Ten per cent on a popular line of riveting machines; 15 per cent on a Cincinnati line of grinding machines; 15 per cent by a St. Louis manufacturer of upright drilling and milling machines.

Inquiries have come from the following foreign districts: England, South Africa, Australia, Japan and Mexico. A Cincinnati builder was asked to quote by a New York exporting house which is rumored to represent a syndicate which was recently authorized to develop important resources abroad. It is said that the syndicate will secure bids on $100,000,000 worth of various equipment.

New York

NEW YORK, SEPT. 5.

Though there is but little change in the machine-tool situation the tendency is toward optimism, based on more inquiry and the revival of feelers on propositions which have long laid dormant while prospective purchasers awaited lower prices. Buyers are very thorough in their shopping, spreading inquiries broadcast. As an example, one New York representative received an inquiry for a certain tool from four different sources, which at casual glance would appear to be a demand for four machines, but which he recognized as being for but one. The New York Central is in the market for two engine lathes and one drill press for its shops at Avis, Pa. The Department of Education, New York, is expected to buy considerable equipment this month, including small lathes and milling machines.

The crane market shows but slight change from the preceding weeks. Buyers have little inclination to place orders and several inquiries that have been in the market for some time are still pending. Specifications for the 34 gantry cranes of 3-tons capacity for the piers being erected at Stapleton, S. I., by the city of New York for the Pan American Terminal & Dock Co., have been issued. Bidders are required to deposit $25 for blue prints and drawings. A tender has been issued by the New York State Barge Canal Commission, specification No. 119, calling for bids on a 3-ton burtening crane for erection at the Mott Haven terminal. George P. Coulter, 1713 Sansom Street, Philadelphia, who recently inquired for a 10-ton capacity electric crane for the American Chemical & Sugar Machinery Co., has purchased a used 10-ton crane. The Shepard Electric Crane & Hoist Co., has sold a 6½-ton, 80-ft. span electric crane with 2½-cu. yd. bucket to the Standard Wholesale Phosphate Co., Curtis Bay, Md., and a 3-ton, 21-ft. span underhung traveling crane to the Chapman Valve Co., Indian Orchard, Mass.

C. A. Carey, 247 West Sixty-fourth Street, New York, manufacturer of automobile wheels, has leased the three-story building, 50 x 100 ft., at 221-23 West Sixty-fourth Street, for a new plant. The present works will be removed to this location. C. A. Carey, Sr. and Jr., head the company.

The Air Cooling Corporation, New York, has been incorporated with a capital of $50,000 by R. Purdue, J. C. Bettinson and J. P. Broomell, 17 East Forty-second Street, to manufacture refrigerating machinery and parts.

The Perkins Machine & Foundry Co., Amsterdam, N. Y., has filed notice of change of name to the Collins Loom Works, to specialize in the manufacture of textile machinery.

The International Paper Co., 30 Broad Street, New York, has commenced preliminary construction for its new hydro-electric generating plant on the Saranac River, near Cadyville, N. Y., estimated to cost about $250,000. It will be used for paper mill operation in this section.

The Sinclair Militor Corporation, New York, has been incorporated under Delaware laws with capital of $1,100,000 to manufacture automobiles and parts. It is represented by the United States Corporation Co., 65 Cedar Street.

The Gryphon Rubber & Tire Corporation, Bailey Avenue and 192nd Street, New York, has filed plans for the erection of a two-story addition, 102 x 103 ft., to cost about $75,000. D. M. Whipple is president.

The Pennsylvania Car Co., New York, has been incorporated under Delaware laws with capital of $1,000,000 to manufacture railroad cars and equipment. The incorporators are J. H. Van Moss and James H. Durbin, New York, and L. B. Coppinger, Sharon, Pa. The company is represented by the Corporation Trust Co. of Delaware, Dover, Del.

The Northold Garage Corporation, New York, recently organized, has leased the six-story building, 50 x 100 ft., at 518-20 West 147th Street, for a new automobile service and repair works.

The Morgan Harvester Co., New York, has been incorporated under Delaware laws with capital of $11,000,000, to manufacture harvesting machinery, plows and other agricultural equipment. It is represented by the United States Corporation Co., 65 Cedar Street.

The Safety First Auto Lock Corporation, Brooklyn, has been incorporated with a capital of $250,000 under Delaware laws by Samuel L. Seider, Warner Howard and Chester Clark, Brooklyn, to manufacture special locks and locking devices. It is represented by Woodburn Martin, Georgetown, Del.

The Malcolmson Briquet Engineering Co., 39 Cortlandt Street, New York, has been merged with the St. Louis Briquette Machine Co., St. Louis, under the name of the Malcolmson Engineering & Machine Corporation. The consolidated company will manufacture roll-type briquetting presses, fluxers and other special machinery, parts, etc.

The Ambro Stores & Garage Corporation, 512 Fifth Avenue, New York, has filed plans for a three-story auto-

mobile service and repair plant, 149 x 184 ft., at 527-37 West Eighteenth Street, to cost about $150,000.

The Pyrene Mfg. Co., 17 West Forty-ninth Street, New York, manufacturer of fire extinguishers, has purchased the six-story, reinforced-concrete factory at Belmont Avenue and Peddie Street, Newark, N. J., heretofore owned and occupied by the Aluminum Goods Mfg. Co., to be used as its main works in the Eastern district. The New York plant on East Thirty-second Street will be removed to the new location. The Aluminum Goods Company will remove its plant from Newark to its main works at Manitowac, Wis.

The Florence Pipe Foundry & Machine Co., Florence, N. J., will commence the immediate erection of a new one-story forge shop and works building to cost about $25,000.

The Erie Railroad Co., 50 Church Street, New York, will install considerable mechanical equipment at its new pier to be constructed at the foot of Twelfth Street, Jersey City, N. J., estimated to cost about $1,000,000. R. C. Falconer, company address, is engineer for the work.

Fire, Aug. 28, destroyed the plant of the Rex Novelty Works, Inc., 1421 Grand Street, Hoboken, N. J., manufacturer of composition products, with loss estimated at about $150,000, including machinery.

The Monarch Mfg. Co., Jersey City, N. J., has been incorporated with a capital of $50,000 by Joseph P. Montagne, H. B. Watson and Frederick C. Henn, 665 Newark Avenue, to manufacture pumping machinery and parts.

The State Poultry Producers' Association, Vineland, N. J., has preliminary plans under way for the erection of a new cold storage and refrigerating plant.

Fire, Aug. 31, destroyed the building occupied by the Cooper Hewitt Electric Co., Adams Street, Hoboken, N. J., manufacturer of electrical equipment, with loss estimated at close to $100,000. The company was recently taken over by the General Electric Co.

The Rafter Machine Co., 579 South Grove Street, Irvington, N. J., manufacturer of marine engine parts, etc., has acquired property at Joralemon and Stephen Street, Belleville, N. J., 112 x 164 ft., for a new machine shop. Preliminary plans are being prepared.

The Ampere Boiler & Tank Co., East Orange, N. J., has filed notice of organization to manufacture boilers, tanks, etc. It is headed by Elwood B. Hendricks, 645 Springdale Avenue, East Orange, and associates. The same interests have organized the New York Zinc Co., and the New Jersey Lead Co., both to operate at Newark.

The Celluloid Co., 290 Ferry Street, Newark, will soon take bids for the erection of a new one-story works building, 73 x 210 ft., at Niagara and Wescott streets, estimated to cost about $200,000.

Philadelphia

PHILADELPHIA, SEPT. 5.

S. W. Evans & Son, 4623 Paul Street, Philadelphia, manufacturers of metal products, have awarded a contract to the William Steele & Sons Co., Sixteenth and Arch Arch Street, for an addition to their plant to cost about $125,000.

The Philadelphia Piston & Grinding Co., Philadelphia, is being organized by Harry J. and Earl J. McClees, and Harry D. Weightman, to manufacture automobile engine cylinders, pistons, etc., and operate a general repair works. The company is represented by Thomas H. McCaffrey, 1418 Walnut Street. Application for a State charter will be made Oct. 6.

The Universal Flying Machine Corporation, Philadelphia, has been incorporated under Delaware laws with capital of $50,000 by Emil Sitte and Charles Pampe, Philadelphia, to manufacture airplanes and parts. It is represented by the Capital Trust Co., Dover, Del.

The Franklin Sugar Refining Co., 125 South Orianna Street, Philadelphia, will make extensions and improvements in its power house at Reed and Meadow streets to cost about $20,000.

Ovens, boiler equipment, conveying machinery and other mechanical apparatus will be installed in the new three-story brick and steel plant, 125 x 130 ft., to be erected by the Mayer Baking Co., Sixtieth Street and Hazel Avenue, Philadelphia, estimated to cost $140,000. Contract has been let to the Wark Co., 231 South Broad Street.

Charles Wacker, 1345 West Cumberland Street, Philadelphia, manufacturer of wagons and parts, is taking bids for an addition at 1304-8 West Cumberland Street.

The J. W. Paxson Co., 1021 North Delaware Avenue, Philadelphia, Pa., manufacturer of foundry equipment, has filed plans for a new one-story building at Algon Avenue and Luzerne Street, to cost about $35,000.

The Columbia Steel Equipment Co., Third and Annsburg streets, Philadelphia, manufacturer of steel filing cabinets, etc., has acquired property, 100 x 102 ft., for the erection of an addition.

The Chamber of Commerce, Widener Building, Philadelphia, Sheridan Taylor, secretary, is in negotiations with H. P. French, representative in this country for Anthony H. G. Fokker, Holland, manufacturer of aeroplanes, for the establishment of a branch plant at Philadelphia.

L. M. Davis, 1616 Chancellor Street, Philadelphia, is taking bids for a two and three-story addition to his automobile service and repair building, 60 x 60 ft., to cost about $75,000. Ralph N. Priest, 1627 Sansom Street, is engineer.

The John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire rope and other wire products, has preliminary plans under way for a new one and two-story addition, 500 x 850 ft., for the production of copper and other wire, estimated to cost about $150,000. H. C. Tomilson is company architect.

The Read Machinery Co., Inc., 231 North George Street, York, Pa., has completed plans for a new two-story machine shop, 40 x 100 ft., to cost about $16,000.

The Harrisburg Corporation, Harrisburg, Pa., operating the plant of the Harrisburg Foundry & Machine Works, is planning to establish a department to manufacture an oil burner, known as the Wat-R-Oil Burner.

The Harrisburg Machine & Electric Welding Co., Harrisburg, Pa., is being organized by John Fox Weiss and Elmer R. Erb, Harrisburg, and associates, to manufacture machinery and parts, and operate a general repair works. Application for a State charter will be made Sept. 15.

The Pennsylvania Supply & Mfg. Co., Allentown, Pa., has been incorporated with a capital of $50,000, to manufacture metal products. Harvey L. Kuhns, Allentown, is treasurer.

Electric light and power companies, operating in Pennsylvania, have made application to the Public Service Commission, Harrisburg, for permission to issue bonds and stocks for extensions and improvements as follows: Metropolitan Edison Co., Reading, bonds, $50,000; Sayre Electric Co., Sayre, $40,500; Bradford Electric Co., Bradford, $379,000 in bonds; Penn Central Light & Power Co., Altoona, stock, $547,863; Eastern Pennsylvania Railway Co., Pottsville, bonds, $39,000; and Weisenberg Township Electric Light & Power Co., Topton, stock, $20,000.

The Susquehanna River & Western Railroad Co., New Bloomfield, Pa., is completing plans for a new local machine shop for locomotive and car repair work.

Buffalo

BUFFALO, SEPT. 5.

The Lamson Co., Boston, Mass., manufacturer of pneumatic tubes, conveying machinery, etc., has commissioned J. T. Cowley, Lowell, Mass., architect and engineer, to prepare plans for its new works at Eastwood, near Syracuse, N. Y., estimated to cost close to $1,000,000. The company will remove its plant at Lowell, Mass., to the new location. William F. Merrill is president.

Fire, Aug. 30, destroyed a portion of the plant of the Delaney Forge & Iron Corporation, 300 Perry Street, Buffalo, with loss estimated at about $200,000.

The following electric light and power companies have filed notices of increase in capital, the proceeds to be used for plant extensions, improvements, etc.: The Hannawa Falls Water Power Co., Potsdam; from $300,000 to $1,000,000; Potsdam Electric Light & Power Co., from $22,000 to $75,000; Ogdensburg Power & Lighting Co., from $50,000 to $150,000; and the Massena Electric Light & Power Co., from $50,000 to $150,000.

The Philips Lens Corporation, Rochester, N. Y., has filed notice of change of name to the Phillips-Werth Optical Co.

The Birk-Notman Motor Co., Buffalo, has been incorporated with a capital of $75,000 by R. and F. H. Birk, and W. J. Notman, to manufacture automobile parts and equipment. The company is represented by J. P. Schaus, Curtiss Building.

The Fleman-Gilbert Motor Car Co., Syracuse, N. Y., has been incorporated with a capital of $200,000 by B. Fleman and M. Gilbert, to manufacture automobile equipment and parts. The company is represented by L. O. Grossman, attorney, Syracuse.

New England

BOSTON, SEPT. 5.

Business was spotty in the local machine-tool market the past week. Collectively, it shows considerable improvement, but more used than new tools have changed hands. The most encouraging feature is that buying the past week evidently is not a flash in the pan, for, with few exceptions.

dealers report more new inquiries and considerably more looking about the market for the purpose of getting a line on prices. Elsewhere in New England reports by dealers are not as optimistic. The most active source of inquiries at the moment appears to the automotive field. The more important machine tool houses here are banking on a few of the large industrial plants covering certain requirements this month.

One local dealer reports sales of two dozen tools this week, consisting of six used automatic screw machines, two new No. 4 screw machines, one used hand miller, three used bench milling machines and one used 14-in. lathe to a Greater Boston firm, and one used 24-in. Hendey shaper, one used 16-in. x 8-ft. Prentice lathe, one used 16-in. x 7 ft. Reed lathe, one used LeBlond milling machine, one used six-spindle drill, one new Garvin die slotting machine, one new Carter & Hakes miller, one new Automatic Machine Co. press, one used 20-in. upright drill, one used No. 2 Cincinnati universal grinding machine and one used 8-in. Boynton & Plummer shaper to various New England manufacturing interests. The J. H. Spaulding & Sons Co., North Rochester, N. H., has purchased two Gould & Eberhardt and one Hendey shaper, one 3½-in. radial drill and pipe machine, all rebuilt, part of which will be used in its New York State subsidiary plant.

W. H. J. Fitzgerald & Co., Boston, report sales of two new Standard 16-in. lathes to nearby garage interests, as well as miscellaneous equipment to local dealers. The Southworth Machine Co., Portland, Me., printing machinery, has taken Heald internal grinding machine equipment, while a Worcester, Mass., firm purchased a single grinding machine costing in the neighborhood of $3,000. The Amoskeag Mfg. Co., Boston, has closed on a 12-spindle multiple drilling machine and a 60-ton Northern crane for its Manchester, N. H., plant. Lynd-Farquhar Co., Boston, has sold to the city of Lynn, for a vocational school, the following equipment: Nine 9-in. lathes, one 14-in. lathe, one sensitive drill, one hack saw, one wet tool grinder, all standard belt driven tools, one gas furnace and chucks for the lathes.

Prices for both new and used tools sold the past week are reported as soft and in certain instances liberal terms are offered prospective customers. List prices on one popular selling line of riveting machines have been cut 10 per cent, and those on a Cincinnati line of grinding machines nearly 15 per cent.

Inquiries heretofore referred to come from outside as well as in New England. For instance, a Cleveland threading tool manufacturer is inquiring for horizontal drilling machines of the Garvin type adapted to drill ⅝-in. holes and larger, and a vertical milling machine of the Becker No. 2, No. 2A and No. 2B type, as well as vertical milling machines of the Garvin No. 20 type, only without rotary table and power feed. The same firm is looking for 18 x 24-in. plain milling machines of the Cincinnati Milling Machine Co. type and thread milling machines for short internal and external work. Canadian interests are inquiring for a shear, 72-in. between housings, with a 30-in. throat. One of the largest New England inquiries comes from St. Albans, Vt., and concerns used 5-ft. plain universal radial drills, pulley drive, and three-spindle drill presses.

Both manufacturing interests and dealers were well represented at the auction sale at the plant of the Burgess Co. & Curtis, Marblehead, Mass., aeroplanes, on Sept. 1. While prices paid were comparatively low, they were very much better than those realized at the last New England auction sale. Wood-working machinery sold at good prices, due to keen competition between Boston and New York interests. A Rivett bench precision lathe, with a 47-in. bed, sold at $337.50; a manufacturers' bench precision lathe, with a 42-in. bed, made by the same company, at $275; another with a 42-in. bed at $190; a similar tool at $150; while a bench precision milling machine, made by this firm, brought $85.

A Rahn Larmon 20-in. x 11-ft. screw cutting engine lathe changed hands at $487.50; a 16-in. x 9-ft. Greaves-Klusman screw cutting engine lathe at $300; Bilton plain milling machine, $375; Sipp quick change four-spindle sensitive drill, $237.50, and a Charles G. Allen four-spindle upright drill, $187.50. An F. E. Wells & Sons Co. tool, cutter and reamer grinder, went for $90; a Standard Machinery No. 7-6 inclinable power press, with 1½-in. stroke, $105; H. G. Barr four-spindle sensitive drill, $55; Boynton & Plummer crank and gear shaping machine, $50; Champion Blower & Forge 15-in. upright drill, $45; Grays No. 1 sheet metal cutter, $150, and a sister tool, $165. The rest of the metal-working equipment offered sold on about the same basis.

The city of Boston is erecting a four-story, 43 x 142-ft. chemical and laboratory research building on Harrison avenue, to cost $370,000.

Bids have been taken on a one-story plant, 60 x 100 ft., contemplated by the Williams & Anderson Co., 33 Broad Street, Providence, R. I., jewelry manufacturer.

Coxter's Toy Shop, Collinsville, Conn., is erecting an extension and installing new machinery in the original quarters. A furnace and forge department will be installed in the addition.

Plans are formulating for the creation of the Liberty Sales Co., an organization that will take over the manufacture of spark plugs and automobile accessories formerly produced by the Federal Corporation, Westfield, Mass., now bankrupt.

Officials of the Boston Elevated Railway Co. are again considering the erection of a machine shop in Everett, Mass. Present plans call for the construction of a foundation this fall and the erection of the superstructure in the early spring.

The Majestic Mfg. Co., 70 Commercial Street, and the Persons Mfg. Co., Worcester, have been consolidated under the name of the Persons-Majestic Mfg. Co., capitalized for $100,000 in preferred stock and 600 shares of common, no par value, to manufacture bicycle and motorcycle accessories. Charles A. Persons, 490 Salisbury Street, is president, and Frank E. Billings, 26 Wyola Drive, treasurer.

S. I. DeSimone, 365 Border Street, Boston has filed plans for a new one-story machine shop.

The Hampden Tool Co., 344 Main Street, Springfield, Mass., has awarded a contract for a new one-story shop, 40 x 90 ft. E. J. Pinney, Inc., 374 Main Street, is contractor.

A. F. Robinson, Commercial Avenue and Binney Street, Cambridge, Mass., has awarded a contract to Joslin & Landry, 161 Devonshire Street, Boston, for a new one and two-story boiler and plate shop, 95 x 195 ft., at Binney and Second streets, to cost about $50,000.

The Universal Valve Co., New Britain, Conn., has been incorporated with a capital of $25,000 by E. P. Burns, M. C. and George LeWitt, 17 Main street, to manufacture valves, fittings, etc.

Fire, Aug. 27, destroyed the plant of the United Railway Signal Co., Providence, R. I., manufacturer of railroad torpedoes and other signal apparatus, with loss reported in excess of $75,000.

The Martin Motor Co., Springfield, Mass., recently organized, is arranging for the establishment of a plant to manufacture small automobiles, consisting of a car made of aluminum and duralumin, weighing about 200 pounds. Charles J. Glidden is president, and Charles H. Martin, head of the Martin Rocking Fifth Wheel Co., is interested in the company.

The Silrose Mfg. Co., Providence, R. I., manufacturer of emblems and other metal specialties, has removed its plant from 100 Fountain Street to 44 Franklin Street for increased manufacturing facilities.

C. A. Wilson, 16 Fox Street, West Springfield, Mass., has awarded a contract to Emil Rioux, 65 Summer Avenue, Springfield, for a new one-story machine shop on Riverdale Street, West Springfield, 30 x 50 ft.

Chicago

CHICAGO, SEPT. 5.

The past week has been a quiet one, both store calls and mail inquiries being less numerous. One of the few developments of interest was the appearance of another railroad inquiry, a small list from the Chicago, Rock Island & Pacific, including a 3-in. pipe threading machine, band saw filing machine, pipe bending machine, circular saw filing machine, a D-4-A Grand Rapids drill grinder with capacity up to 4-in. drills, No. 2½ wet tool grinder with 24 x 3½-in. grinding wheel, Yankee single end wet drill grinder for grinding drills from ½ to 4-in., and a 5 WA alternating current motor-driven floor grinder with 12 x 1½-in. wheel. Aside from the Rock Island and the Santa Fe, no railroads are in the market. A large list was included in the Burlington's 1921 budget, but it is likely that action on it will be deferred until next year.

While industrial users of tools are still buying little, many are experiencing an expanding demand for their products and some are increasing their operations. The Aug. 31 report of the Seventh Federal Reserve District shows that the automotive industry is in a far better condition than was generally appreciated. The output of automobile truck manufacturers in July was 87 per cent of the production in that month a year ago. Eliminating the big-

gest producers of low-priced cars from calculations, the passenger automobile industry operated in that month at 57 per cent of the rate of production in July, 1920. The farm implement business is estimated at 57 per cent of 1920. From another source it is reported that an important manufacturer of tractors sold 1200 machines in the month of August. In view of the almost complete paralysis of that industry the first half of the year, the movement of that number of tractors is a source of encouragement. Although it is still held in well-informed circles that there can be no real revival in the farm equipment trade until a year from now, it seems plausible that this fall will at least show an improvement over the rest of 1921. Small shops are, in many cases, getting back to normal faster than the larger industries. A local manufacturer of arbor presses who was on the verge of closing down definitely a few weeks ago, is now finding it difficult to fill the orders which suddenly commenced to flow in. A further evidence of the slow, but steady revival of general business activity is the fact that building permits issued in Chicago in August exceeded the number issued in any similar period in the last seven years. Just when the change in general trade conditions will be reflected in the machine tool market cannot be forecast, but it is the opinion of some that a noticeable improvement in demand will develop before the end of this year and that by next spring trade will be normal.

Only one further change in machine tool prices has been reported the past week, a 15 per cent reduction by a St. Louis manufacturer of upright drilling and milling machines.

The Midwestern Mfg. Co., 126 South Sixteenth Street, Maywood, Ill., has been incorporated with $10,000 capital stock by Lillian Hoffman, Ode L. Rankin and Joseph Lustfield to manufacture novelties and mechanical appliances.

The Moline Plow Co., Moline, Ill., is negotiating for the taking over of the machinery and business of the Moline Engine Co., which operated the Root & Vandervoort plant in EastMoline. The machinery in the East Moline plant is being dismantled and will be removed to the tractor plant of the Moline Plow Co. in Rock Island, Ill., where it will be used for the production of tractor and automobile engines.

The Briskin Mfg. Co., 215 South Hoyne Avenue, Chicago, plans the erection of a two-story addition to its sheet metal works, 50x77 ft., to cost $25,000.

The Hercules Steel Post Co., Niles, Mich., has had plans drawn for a one-story factory, 50 x 250 ft., to cost $25,000.

The Crampton Mfg. Co., manufacturer of store fixtures, 1518 East Fifty-third Street, Chicago, has let contract for a one-story factory, 50 x 150 ft., 6900 Cottage Grove Avenue.

A. W. Zuanstrom, 2331 East Sixty-eighth Street, Chicago, is having plans prepared for a new one-story machine works and automobile repair shop, 46 x 50 ft., at 1532 East Sixty-seventh Street. E. N. Braucher, 6 North Clark Street, is architect.

Considerable electrical equipment and paper-working machinery will be installed in the new one and two-story plant to be erected by the Sewell Clapp Envelopes, Inc., 23 Desplaines Street, Chicago, estimated to cost $250,000. Contract has been let and work will be placed under way at once.

The Ideal Utilities Corporation, Homeward, Ill., has been chartered under State laws to manufacture electrically operated dish-washing machinery and other equipment for domestic service. The incorporators are Owen D. Kinsey, Willis E. Howes and Lewis U. Heller, Homeward.

Fire, Aug. 26, destroyed the automobile service and repair works of Wallace Perry, Aberdeen, S. D., with loss estimated at close to $100,000.

The Northern States Power Co., Minneapolis, Minn., is planning the construction of a new hydroelectric generating plant near St. Paul, Minn.

Ohio

The Cleveland machine-tool market shows very little change, although some dealers report an increase in inquiries for from one to three machines. As a whole sentiment has improved the past few weeks. Orders are coming almost wholly from small shops and these as a rule are reported to be buying cheaper types of machines. Many transactions are trade deals. The seller, to get an order, has to take in some old machinery and consequently cannot figure a profit until he has disposed of this used machinery.

The first signs of increased activity are expected to come from the railroads, as few industrial plants will need additional equipment even with normal operations. A local builder of drilling machines states that his company is getting virtually no orders for standard tools, but that it is making some sales of machines of special types which manufacturers are buying to replace standard equipment with a view of cutting down production costs.



Mr. DuGuay, a salesman of the Van Dorn Electric Tool Co., Cleveland, decided some time ago that if he were to continue to get orders for drills, he would have to take the drill to the work. Accordingly a bench drilling stand supporting a portable drill was attached to the running board of his automobile, as shown in the accompanying illustration.

Conditions in the Cincinnati machinery market have not materially changed the past week. Some companies report the month of August the best for the past several months and expectations are that September will show a steady improvement. A number of shops which have been closed for the past five or six weeks will reopen this week. In at least one of these, 400 men will be put to work, quite a few orders having piled up which cannot be handled from stock. This company is also reported to have secured a large list for special machinery which it will take about three months to complete. The order for 60 tools reported in last week's issue of THE IRON AGE has been confirmed and the shop booking it will reopen this week with about 50 per cent of normal force. The schedule calls for the order to be completed in three months. It is not known where the machines are destined, as shipping instructions have not yet been received. The General Motors inquiry for tools for its Dayton plants is still pending, as is an inquiry from the Imperial Japanese Navy for a number of machines, including eight engine lathes.

The past week a local manufacturer received an order for a machine from England, the first for many months. Some inquiries are coming in, however, for export, South Africa and the Far East being the principal sources. Refrigerating machinery manufacturers report the receipt of a number of orders from South Africa, Australia and Japan. Several inquiries are still pending from these countries. Some interest is also being shown in Mexico as a possible market for machine tools.

A Cincinnati manufacturer is in receipt of a communication from a New York exporting house seeking information on machine tools. The letter states that it has been retained by a syndicate, the name of which was not disclosed, to secure bids on approximately $100,000,000 worth of equipment to be exported. The intimation was given that this syndicate has received a concession from some foreign government, for development of important natural resources. It is expected that more information will be available shortly.

The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio, recently booked an order for 45 dump cars for South Africa. This order follows a number of others from China and Manchuria. Incoming inquiries, the company reports, tend to show that business is steadily increasing

The Electric Furnace Co., Alliance, Ohio, has recently taken export orders for two electric furnaces for melting silver. One order was for a 35-kw. pit type crucible melting furnace,

similar to one installed several years ago, at the plant of the William A. Rogers Co., Ltd., Niagara Falls. The order for this furnace was placed by Mitsui & Co. for shipment to the Japanese Government. The other order came from Johnson, Matthey & Co., London, and was for a standard 50-kw. tilting type.

The Bowling Green Die & Tool Co., Bowling Green, Ohio, will add to its present line of products the manufacture of electric washing machines, designed by R. L. Swartz, superintendent of the company.

The O'Neill Engineering Co., Toledo, Ohio, has been incorporated by Frank O'Neill, Frank R. Smith and others and will establish a plant in the Factories Building, Toledo, for the manufacture of special machinery.

The Aetna Welding Co., 4613 Broadway, Cleveland, has placed a contract for a one-story welding shop, 40 x 66 ft.

Detroit

DETROIT, SEPT. 5

The Perry Mfg. Co., Inc., Argentine, Mich., has been organized to manufacture farm equipment. It is capitalized at $100,000 and is headed by W. L. Coop, engineer and manufacturer, formerly of Flint. The company has taken over the tools and equipment of the Ground Hog Tractor Co., Holly, Mich.

The Commercial Pattern & Mfg. Co., Detroit, has been organized by Ernest J. and Leo J. Rousseau and Lynn C. Beadle with a capitalization of $40,000 to manufacture metal patterns, brass and aluminum castings, etc. The headquarters are at 8772 Quincy Avenue, Detroit.

The Hercules Steel Post Co., Niles, Mich., will soon start construction on a new one story plant, 50 x 250 ft., to cost about $25,000.

The American Forging & Socket Co., Pontiac, Mich., is preparing to build a new foundry, to cost about $30,000.

The True Mfg. Co., which recently located in Eaton Rapids, Mich., plans to start construction on its new plant within 30 days.

The West Foundry Co., Wyandotte, Mich., expects to have its new foundry in production within the next 30 days. It will specialize in gray iron castings. The capacity of the plant will be about 17 tons daily.

The Hoskins Mfg. Co., Detroit, manufacturer of electric furnaces, etc., has filed plans for a one-story top addition to its plant, 60 x 190 ft. H. B. Walker is president.

The Clark Mfg. Co., Adrian, Mich., manufacturer of separators, etc., is planning to rebuild its factory, recently destroyed by fire with loss of about $18,000.

Plans for the erection of a new two-story power house are being completed by the Marquette Lumber Co., 1555 Taylor Street, N. W., Grand Rapids, Mich.

The American Accessories Co., Detroit, has been incorporated with a capital of $25,000 by Lynn C. Beadle and Ernest J. Rousseau, 8772 Quincy Avenue, to manufacture brass and aluminum castings, tools, machine parts, etc.

The Chamber of Commerce, Hillsdale, Mich., is negotiating with the Caskey-Dupree Mfg. Co., Marietta, Ohio, manufacturer of automobile equipment and accessories, relative to the establishment of a local plant.

Baltimore

BALTIMORE, SEPT. 5.

The Bull Dock Lock Washer Co., 269 South Seventh Street, Baltimore, is perfecting plans for its new factory, estimated to cost close to $50,000, including equipment. G. R. Holmes is president.

Lyon, Conklin & Co., 13 Balderstone Street, Baltimore, manufacturers of sheet metal products, have filed plans for a new one-story plant, 40 x 140 ft.

Oliver B. Rutherford, 104 Dolphin Street, Baltimore, has filed plans for a new three-story plant, 28 x 60 ft., estimated to cost about $25,000, for the manufacture of automobile radiators and other metal products.

The American Ice Co., Calvert Building, Baltimore, will build a new machine and repair shop, in connection with its new two-story service building for company motor trucks, 35 x 75 ft., at 1314-20 Ridgely Street. Plans have been compelted.

The Kelly Mfg. & Sales Co., 2503 West Lexington Street, Baltimore, has leased a building for the establishment of a new plant to manufacture sleds, coasting cars and other vehicles. A list of equipment is being arranged. The company was recently organized with John I. Kelly as president, and Andrew J. Kelly, vice-president and general manager.

The City Commission, Lynchburg, Va., has commissioned Lamar Lyndon, 21 Park Row, New York, consulting engineer, to prepare plans for its new municipal electric light and power plant. E. A. Beck is city manager.

The Columbia Railway & Navigation Co., Columbia, S. C., has been granted a preliminary permit for the erection of its new hydroelectric generating plant on the Santee and Cooper rivers, estimated to cost approximately $5,000,000. G. A. Guignard is president.

The Greenwood Petroleum Co., Greenwood, S. C., is planning the erection of a one-story automobile service and repair works for company cars.

Loaders, conveyors, transmission and other machinery will be installed in the new grain elevator to be erected by the Port Commission, Norfolk, Va., plans for which are being prepared. It is estimated to cost in excess of $700,000. Loading and unloading machinery, hoisting equipment, etc., will also be installed on the pier to be constructed by the commission, to cost more than $500,000.

The Norfolk & Western Railway Co., Roanoke, Va., will take bids up to Sept. 12, for double coil steel springs, wire rods, wire nails, and parts for electrical apparatus. J. H. Clemmitt is purchasing agent.

The Bristol Granite & Marble Works, Bristol, Va., has awarded a contract to the Stone Lumber Co., Bristol, for a new building, 40 x 100 ft. A traveling crane has been purchased and other equipment will be acquired. John Shirreffs, Box 317, Bristol, Tenn., is general manager in charge.

W. I. Anderson & Co., Greensboro, N. C., have completed plans for the construction of a new cold storage plant, estimated to cost about $80,000.

The L. Rosenfeld Mfg. Co., Russell and Ostend streets, Baltimore, manufacturer of utensils for dairy and ice cream plants, plans to erect a factory, 40 x 125 ft. Louis Rosenfeld is president.

The Georgia Marble Co., Tate, Ga., will install additional stone-working machinery. H. Litchfield is vice-president.

The Florida Doll Mfg. Co., Monroe Street and Peck Avenue, Fort Myers, Fla., manufacturer of toys, etc., will build an addition and install new machinery.

The Grass Fibre Pulp & Paper Co., Tampa, Fla., is establishing a plant at Leesburg, Fla., for the manufacture of paper pulp, etc. C. F. Logan is consulting engineer.

Pittsburgh

PITTSBURGH, SEPT. 5.

It is doubtful if the local trade ever before experienced a quieter week than the one past. There has been an almost complete absence of inquiries other than those which come out from time to time for estimating purposes. So little is going on that one firm here recently went over the list of projects which had been abandoned or deferred since 1919 and a letter was sent to all, naming current prices on the equipment inquired for. There was only one response to 30 or more letters sent out and this one suggested that if a lower price than quoted was made the company might be interested. Not a crane award has been reported the past week and machine-tool sales have been entirely of individual pieces from dealers' stocks. In manufacturing centers, business is almost at a standstill. It is stated that one Cleveland company has only a dozen men at work when it ordinarily employs hundreds, while another in the same city is said to have more than $2,000,000 worth of tools in stock.

The Wyckoff Drawn Steel Co., Frick Building, Pittsburgh, has plans under way for an addition to its plant at Wyckoff, Pa., one-story, 60 x 240 ft., and estimated to cost about $60,000.

The Point Motor Co., 36 Penn Avenue, Pittsburgh, has taken bids for a new three-story service and repair works, 75 x 110 ft., at Penn Avenue and Bell Alley, estimated to cost about $45,000.

The Moorhead Electric Machinery Co., Pittsburgh, is being organized by William L. Moorhead, Jr., I. R. Moorhead and M. R. Mueller, to manufacture electric equipment, machine parts for electrical apparatus and operate a general repair works. Application for a State charter will be made on Sept. 19. The company is represented by H. J. Rechterwald, 1308 Farmers' Bank Building.

The North Pole Ice Co., Carson Street, Pittsburgh, is having revised plans prepared for its new six-story cold

storage and refrigerating plant, 160 x 190 ft., at 1618 West Carson Street, estimated to cost close to $500,000 with machinery.

The United Auto Service Co., Pittsburgh, is being organized by Edward, Joseph and L. Harry Goldberg, to manufacture automobile parts and equipment, and operate a general machine works for automotive service. Application for a State charter will be made on Sept. 12. The company is represented by Frank R. S. Kaplan, 922 Frick Building.

The Ford Motor Co., Detroit, has acquired about two acres of land at Huntington, W. Va., as a site for a new assembling plant. Preliminary plans are under way. E. Vernon Carter is local manager.

The Hess Coal & Coke Co., Morgantown, W. Va., will build a new tipple at its plant, with installation of new electrical and mechanical equipment for other departments as recently announced.

The Cheylan Electric, Water & Ice Co., Chelyan, W. Va., is considering the erection of a new ice-manufacturing plant, Ernest E. Coon is secretary and treasurer.

The Motor Transport Co., Huntington, W. Va., is planning for extensions and improvements at its works, to include the installation of a new machine and repair department. W. H. Kincaid is general manager.

Indiana

INDIANAPOLIS, SEPT 5.

The Pioneer Brass Co., 418 Pennsylvania Street, Indianapolis, will soon call for bids for a new two-story machine shop, 75 x 175 ft., estimated to cost about $45,000. Charles Brossman, 1503 Merchants Bank Building, is architect.

The Central States Bridge Co., 601 Beecher Street, Indianapolis, has filed plans for a one-story shop extension.

The Knox Engineering & Mfg. Co., Roanoke, Ind., has been incorporated with a capital of 100,000 by A. L. Knox, T. K. Biggs and J. W. Menefee, Roanoke, to manufacture metal products.

The Board of School Trustees, Kendallville, Ind., has completed plans for the erection of its new power house. Improvements will also be made in the present plant.

The Board of County Commissioners, Indianapolis, will take bids until Sept. 27 for extensions and improvements in the power house at the county jail. C. S. Bark, 159 East Market Street, is architect.

Preliminary to the construction of a new plant at Torreon, Mex., for the manufacture of automobiles, the Frontenac Co., Indianapolis, is building a number of model automobiles at its plant for the Compania Automobiles Anahuac de Mexico, headed by A. P. Buquor, vice-president and general manager, and J. A. Carvel, secretary, both of El Paso, Tex. It is proposed to commence construction of the Torreon plant at an early date and have the works ready for operation shortly after the first of the year. The Frontenac Co. will manufacture parts and other equipment for the new cars.

Milwaukee

MILWAUKEE, SEPT. 5.

A gradual increase in the number of inquiries and the broader scope of their origin are the two most important developments in machine tool trade in this section. It is not so difficult to get inquiry to the stage of closing sales as it was for several months past, although it generally requires concessions to make deals. Buyers are still doing an unusual amount of shopping, and spreading a single inquiry over a relatively larger number of sellers probably gives an aspect of more activity than really exists. The time is not yet at hand when large lot buying is in prospect. Business remains limited largely to single orders for replacement or piecing out equipment. In a few shops production has made a slight advance with the recent reduction of stocks of standard machines and orders for special specifications.

The Oshkosh Tractor Co., Oshkosh, Wis., which has acquired the entire business of the LaCrosse, Wis., Tractor Co., has purchased eight acres on Harrison Street, between the main lines of the Chicago & Northwestern and Soo Line railroads, and expects to award contracts within 10 days for the construction of its new plant. Auler & Jensen, local architects, have completed plans for a main building, 150 x 500 ft., of brick and steel, with sawtooth roof of six bays, each 25 ft. wide, with a wing, 25 x 100 ft., as a motor testing room. Provision also is made for a separate power plant, 60 ft. sq., and a detached office building, 40 x 80 ft., two stories. The equipment and materials at LaCrosse are now being prepared for shipment to Oshkosh. In addition to this machinery, the company will be in the market for a considerable list of miscellaneous tools and other equipment. L. W. Melcher, factory manager at LaCrosse, will occupy the same position with the new concern.

The Safety First Automatic Signal Co., Racine, Wis., has been organized with a capital of 1,000 shares of common stock without par value, by C. C. Mortenson, A. J. Riggs and F. G. Haidle, to manufacture signal devices. A plant will be equipped in leased quarters.

The Prime Mfg. Co., 97 Wisconsin Street, Milwaukee, will build a two-story addition, 40 x 50 ft., to its main plant at 653-657 Clinton Street, to accommodate the administration department, now in separate quarters. Part of the building will also be used for laboratory purposes. The Prime company manufactures railroad supplies and brass castings. Orton L. Prime is president and general manager.

The Twin Ports Steel & Tractor Co., Superior, Wis., has changed its name to the Twin Ports Steel & Machinery Co. For some time past the manufacture of tractors has given way largely to the production of general machinery and repairs and the new title is adopted to better express the nature of its business.

George Erlinger & Co., Milwaukee, have been organized in Wisconsin with capital stock of $200,000 to succeed to the business of manufacturing mechanical specialties conducted by George Erlinger at 191-194 Milwaukee Street. The new company intends to enlarge the scope of the business to embrace the manufacture of machinery, tools and similar specialties in addition to tools, dies, jigs, fixtures, etc.

The Board of Education, Prairie du Sac, Wis., has let the general contract to Willis & Deason, Janesville, Wis., for an addition to the high school to be equipped for manual training and general vocational instruction. It will cost about $75,000. The equipment will be purchased in about 60 days.

The Drop Head Projector Co., Fond du Lac, Wis., manufacturer of portable motion picture machines, has increased its capitalization to $750,000, consisting of $700,000 common and $50,000 preferred stock. The company has been reorganized and is preparing to engage in quantity production. The contract for dies and die castings has been placed with the Doehler Die Casting Co., Chicago and Toledo.

The Board of Education, Valders, Manitowoc county, Wis., has placed the general contract for a new high school, with manual training facilities, with Hugo V. Hertling, Inc., general contractor, Manitowoc. The project involves about 125,000.

The Kiechkhefer Box Co., Milwaukee, and a member of smaller allied concerns manufacturing wooden, wirebound, fibre and composition boxes and other packages, have been reorganized into the Kiechkhefer Container Co., capitalized at $1,315,000. The main plant is at Sixteenth and Canal streets. John W. Kiechkhefer is president and general manager.

The Gulf States

BIRMINGHAM, SEPT. 5.

The Chicago, Rock Island & Pacific Railroad Co., 137 West Van Buren Street, Chicago, has awarded a contract to J. E. Nelson, 3240 South Michigan Avenue, for a new engine house and repair shop at Amarillo, Tex., estimated to cost about $50,000.

The Pitts-Noyes Co., 112 East Fifth Street, Austin, Tex., recently organized to manufacture tools, dies, etc., has acquired a local building and plans for the immediate installation of lathes, grinders, presses, and other machine tools. C. K. Noyes, secretary and treasurer, is in charge.

Potter Johnson, Crystal Springs, Miss., has plans under way for a new two-story foundry and machine shop.

Fire, Aug. 23, destroyed the plant of the Flake Graphite Corporation, Goodwater, Tex., with loss estimated at about $500,000. including refining mill, machinery, etc. Plans are under way for the immediate rebuilding of the plant.

The Planters' & Merchants' Mills Co., 200 East Fortieth Street, Austin, Tex., S. M. Ransopher, president, has preliminary plans under way for a new hydroelectric generating plant on the Guadalupe River, estimated to cost about $700,000.

Fire, Aug. 23, destroyed the power house of the Kyle Light & Power Co., Kyle, Tex. It will be rebuilt.

Reed Bingham, Pensacola, Fla., has been granted a permit for the construction of a new hydroelectric generating

plant on the Perdidio River. A branch power station is also planned on the Blackwater River. Work will be placed under way at an early date.

The A. & J. Stove Foundry, Gadsden, Ala., will soon resume operations at its plant, following a shut-down for about 24 months, and has tentative plans under way for the erection of additions.

The Burns Building Board Co., Box 1643, Tampa, Fla., recently organized, has plans under way for its proposed plant to manufacture wall board products. Joseph J. Burns is president and manager.

The National Compress Co., Waco, Tex., is planning to rebuild its cotton compressing plant at Brady, Tex., recently destroyed by fire. The new plant will cost about $125,000 with machinery. R. D. McCaskill is manager.

The McCullough Service & Mfg. Co., Tampa, Fla., recently incorporated, will operate a plant for the manufacture of automobile parts, with service and repair departments. F. L. McCullough is president, and M. G. Gibbons, treasurer.

California

SAN FRANCISCO, AUG. 31.

The past week or ten days have witnessed a considerable revival in the demand for machinery on the coast. While buying is largely confined to the smaller and low priced tools, the volume of business is said to be greater than that which has been prevailing for the last two or three months. There is still much Government and second-hand machine tools available which continue to attract the greatest attention.

The Shell Oil Co., Signal Hill, Long Beach, Cal., has filed plans for the erection of a machine shop, 52 x 75 ft.; forge shop, 52 x 60 ft.; general works building, 76 x 90 ft.; and service building for company trucks, 44 x 130 ft.

The Miller Auto Electric Mfg. Co. Los Angeles, has been incorporated with a capital of $100,000 by Robert C. Camp, Sidney G. Miller and J. F. O. Nelson, to manufacture electrical products. It is represented by L. T. Mayhew, 338 Byrne Building.

The Excelsior Water & Mining Co., Sacramento, Cal., is planning the construction of six hydroelectric generating plants to develop about 115,000-hp.

A one-story machine shop, 36 x 40 ft., will be constructed by the Golden State Woolen Mills, Long Beach, Cal., in connection with rebuilding its plant, recently destroyed by fire with loss of about 200,000.

The J. & M. Brick Co., 503 Boundary Avenue, Los Angeles, has filed notice of organization to manufacture bricks, tiles and kindred products. It is headed by D. B. Jefferies, 1818 West Forty-ninth Street, and E. K. Muller, 422 Cypress Avenue.

G. S. Eyre, Buena Vista, Cal., and associates are planning the construction of a new hydroelectric generating plant on Chalk Creek.

The Arro Plane Co., Scottdale, Cal., has been incorporated with a capital of $500,000 by O. K. Jeffery, John A. Hesse and J. D. Hill, to manufacture airplanes and parts.

The Great Basin Power Co., Walker Bank Building, Salt Lake City, Utah, has plans under way for a new hydroelectric generating plant in the vicinity of Stockmore, Utah, with initial capacity of about 10,000-kw. H. A. Srauss, company address, is engineer.

The Central South

ST. LOUIS, SEPT. 5.

The Unico Motor Products Co., 1229 West Fifty-ninth Street, Kansas City, Mo., has plans nearing completion for two one-story buildings, 60 x 224 ft. and 60 x 160 ft., respectively. The first will be equipped as a machine works for the manufacture of pistons, piston rings, etc., and the other will be used as a foundry. W. R. Alexander is head.

The Common Council, St. Charles, Mo., has commissioned Benham & Mullergren, consulting engineers, Firestone Building, Kansas City, Mo., to prepare plans for the proposed municipal electric power plant, estimated to cost about $200,000.

The Wichita Visible Pump Co., 701 Gilbert Street, Wichita, Kan., E. P. Hayes, head, manufacturer of pumping equipment, parts, etc., is planning for the erection of a new factory, estimated to cost about $60,000.

The Norton Iron Works, Ashland, Ky., is considering preliminary plans for a one-story addition to manufacture wire-fencing. T. M. Adams is president.

The Eagle Motor Truck Co., 6154 Bartmer Avenue, St. Louis, has awarded a contract to Rodinan & Son, 6063 Clemons Avenue, for the superstructure of its new one-story plant on Bartmer Avenue, 50 x 150 ft., estimated to cost $50,000. J. P. Reis is head.

The Producers' & Refiners' Corporation, Tulsa, Okla., has plans under way for the construction of a new oil refinery on a local site.

Fire, Aug. 23, destroyed the machine shops at the automobile works of Christian & Brough, Vicksburg, Miss., with loss estimated at about $65,000. It will be rebuilt.

The Charitan Coal & Coke Co., Marceline, Mo., is planning the construction of a new steel tipple.

The Clarence Automobile Co., Clarence, Mo., is having plans prepared for a new one-story machine and repair works, 100 x 140 ft., estimated to cost about $50,000, including machinery. Burgher Brothers, Hannibal, Mo., are architects. A. Burnett is head.

The Kingston Ice & Light Co., Kingston, Okla., is planning to rebuild the portion of its plant, recently destroyed by fire with loss of about $25,000.

The Lexington Utilities Co., Lexington, Ky., has completed plans for a one-story addition to its power plant. The company recently issued bonds for $560,000 for expansion.

W. B. Collins, Ketcham, Okla., and associates, are organizing a company with capital of $2,000,000 for the construction of a hydroelectric generating plant on the Grand River, estimated to cost about $1,000,000. Byron Kirkpatrick, Tulsa, Okla., is interested.

The Twentieth Century Piston Ring Co., St. Louis, has leased the building at Eighteenth Street and Cass Avenue, which will be remodeld for the manufacture of piston rings.

Canada

TORONTO, SEPT. 5.

With the passing of summer the Canadian machine tool market is expected to show improvement and dealers look for a better demand for equipment within the next few weeks. A number of tool makers have excellent exhibits at the Canadian National Exhibition, now being held in Toronto, and are making the most of the opportunity to show new and special lines of equipment and from the interest taken by the general public it would appear that better times are not far ahead. At present very little is being done in the way of building new plants or additions, and although a number of concerns are in need of equipment for replacement purposes, purchases are being held up until more favorable conditions arise. Municipal and provincial governments continue to buy for public works and this is holding up the demand for this particular line of equipment.

The general contract for the construction of an electric pumping station for Montreal has been placed with the Atlas Construction Co., Ltd., 37 Belmont Street. The city will shortly call for bids for three electric pumps of 30,000,000 gal. capacity; also electric apparatus, transformers, etc.

W. C. Durant, founder of General Motors, Ltd., in Canada, has purchased the property and buildings of the Leaside Munitions Co., Leaside, Toronto, and will install equipment for the manufacture of Durant automobiles. Plans call for a capacity of 100 finished cars a day and it is proposed to manufacture in the Dominion every important part of the car, including electrical equipment and tires. A woodworking plant will be erected for the manufacture of car bodies. The main building on the site, 130 x 640 ft., will be used as a machine shop, where all motors, axles and transmissions will be made. The building program also calls for the construction of a three-story assembling plant, 130 x 160 ft. It is expected to have the works in full operation by next March.

The Wingham Wire Co., Ltd., Hamilton, Ont., has been incorporated with a capital stock of $250,000 by James Chisholm, Thomas B. McQuesten, William G. Welby and others to manufacture wire, wire rope, cables, etc.

Dodge Brothers, Detroit, Mich., have purchased 35 acres in the town of Sandwich, Ont., where they intend to erect an assembling plant to take care of Canadian and British export trade.

NEW TRADE PUBLICATIONS

Gears.—Boston Gear Works, Norfolk Downs, Quincy, Mass. Second edition 1921 catalog. Outlines in full the entire line of gears, bearings and other material carried in stock, listing also material and new sizes not included in previous catalogs. Size 3½ x 5¾ in., 112 pages.

Conveying Machinery.—Freeman-Riff Co., Terre Haute, Ind. Bulletin No. 210. Describes the F-R, Type A, portable flight conveyor. The illustrations include line drawings of the conveyor arranged for unloading coal from car to storage shed and mounted on truck for loading coal from shed into wagons.

Crane Booms.—Pawling & Harnischfeger Co., Milwaukee, Wis. Pamphlet TX. Describes the new skimmer scoop attachment for use with the company's type 205 and 206 excavator cranes. Data and operating cost on a road grading job are given.

Air Compressors.—Bury Compressor Co., Erie, Pa. Bulletin No. 407. Size 8½ x 11 in., 20 pages. Describes the Bury direct-connected, two-stage, three-cylinder, variable-volume, motor-driven, air compressor. Contains also an abridged general catalog supplement illustrating Bury single-stage, power driven machines; two-stage, duplex power driven and vacuum pumps of various classes. Illustrations and a list of users of the Bury patented Pyramid box-plate valve is included.

Electric Furnaces.—Westinghouse Electric & Mfg. Co., electric furnaces which recently have been added to the list of products of the company, described and illustrated in catalog 9-C, just issued. This type of furnace includes the multiple unit designed for use with heats of 1800 to 2000 deg. Fahr. The small hevi-duty furnaces of the multiple crucible type may be operated continuously at 2000 deg. Fahr. Hevi-duty industrial furnaces with applications for annealing, hardening, drawing and enameling, are described in detail. A discussion of the characteristics of these furnaces also is given.

Oil Circuit Breakers.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., treats the application of oil circuit breakers in a 20-page pamphlet known as Special Publication 1643. This includes a complete discussion of the application of circuit breakers, together with an outline of the characteristics of several types of Westinghouse breakers.

Wiring Tables and Illumination Data.—Booklet issued by George Cutter Works, Westinghouse Electric & Mfg. Co., South Bend, Ind., contains much interesting data on wiring and lighting offices, factories, etc. Tables of foot candle intensities recommended for different classes of service, are included in this booklet, and an interesting discussion of lighting installations is given. Several new devices manufactured by the Westinghouse company are shown in the booklet.

Electric Tramrail Equipment.—Cleveland Crane & Engineering Co., Wickliffe, Ohio. Catalog No. 2. Photographs are shown of tramrail systems installed in brass foundries for various operations including the handling of molten metal, for warehouse use, coal handling, handling work in a machine shop and for use in garages and rubber plants. The system is designed for hoisting and conveying loads up to 2 tons. The line of equipment includes hand carriers of various capacities down to a maximum of 125 lb., electric carriers with or without hoists, electric hoists with hand travel, and electric carriers with hoists and platforms or open or enclosed cabs. Tramrail cranes and transfer bridges are also included in the line as well as various tramrail handling attachments and a tramrail scale.

Pneumatic Tool Accessories.—Ingersoll-Rand Co., 11 Broadway, New York, Form No. 8017, 24 pages. Illustrates and describes complete line of Little David pneumatic tool accessories, including air hose, hose couplings, hose clamp and menders, air drill chucks, rivet sets and blanks, rivet set clips and other equipment. Tables of dimensions of all rivet sets and chisels are given.

Small Tools.—Greenfield Tap and Die Corporation, Greenfield, Mass., catalogue No. 46, superseding Nos. 40 and 42, and Lincoln Twist Drill Co., catalogue Nos. 10 and 10-C. Size, 400 pages 5 x 7½ in. Comprehensive catalogue describing the small tools and pipe tools comprising the greater part of the company's product. The tools include screw plates, taps, dies, drills, reamers, milling cutters, bits, arbors, countersinks, hobs, tap and drill kits, mandrels, sleeves, sockets, stocks, tap wrenches, pipe vises and pipe wrenches. More than 70 pages of tables and other information is given for the user and designer of tools and machinery.

Oil Burners.—F. J. Ryan & Co., Philadelphia. Bulletin 1 A. Describes the Mircs Universal Burner. Illustrations include a diagrammatic photograph of the burner, and various furnace applications. Size 8 x 11 in., 4 pages.

Rivet Heating Furnace.—F. J. Ryan & Co., Philadelphia. Bulletin 2 A. Devoted to the Mircs oil-fired, portable rivet heating furnace.

Portable Air Hoist.—The Denver Rock Drill Mfg. Co., Denver, Colo. Booklet 6 x 9 in., 16 pages, describing in detail the Waughoist, model 250. The illustrations include the hoist in use in mining operations, in foundry work, in loading freight and in other operations. Sectional views of the mechanism are given. The general specifications mention the hoisting capacity as 500 to 2000 lb. at 100-lb. air pressure at vertical speed of 68 to 143 ft. per min., depending on the load.

Coal Washeries and Handling Plants.—Simon-Carves, Ltd., Manchester, England. Booklet 9 x 11 in., 56 pages. Describes and illustrates the British Baum coal washing plant, giving sectional drawings and plans of the 150 ton per hour illustration at the Penallta Colliery. Several full page photographic reproductions of installations are also given. Coal handling, crushing and storage plants, with illustrations of the units and of various installations are included. A list of installations and maps of the coalfields of England and Scotland conclude the booklet.

New Books Received

The Management of Men. By Edward L. Munson. Pages xiii + 801; 5½ x 8½ in. Published by Henry Holt & Co., 19 West Forty-fourth Street, New York.

Transactions of the American Institute of Chemical Engineers, Vol. XIII, Part 1, 1920. Pages iv + 463; 6 x 9 in. Published by the Institute and for sale by D. Van Nostrand Co., 8 Warren Street, New York.

Official Proceedings of the Eighth National Foreign Trade Convention Held at Cleveland, Ohio, May 4-7, 1921. Pages 600, 6 x 9 in. A stenographic report of the proceedings and the discussions at the 11 group sessions and the addresses at the general sessions. Issued by the secretary, India House, Hanover Square, New York.

Statistical Abstract of the United States, 1920 (Forty-third Number). Pages xix + 874, 5¾ x 9 in. Sold only by the Superintendent of Documents, Government Printing Office, Washington, D. C.

The Working of Steel. By Fred H. Colvin and K. A. Juthe. Pages 244, 6 x 9 in.; 123 illustrations. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

The Metallurgy of the Common Metals. By Leonard S. Austin. Pages xvii + 615, 6 x 9 in.; 326 illustrations. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York.

Text Book of Mathematics. By Esselborn. In two volumes. Pages, Vol. I, 643; Vol. II, 770; 7½ x 10½ in.; illustrations, 1578. Published by William Engelmann, Leipzig, Germany. Written in German.

The Ideal Electric & Mfg. Co., Mansfield, Ohio, has just issued a complete technical bulletin on "Synchronous Motors for Power and Power Factor Correction." All technical articles, data and descriptions were written and compiled by the chief engineer of the company, Theodore Schou. The company has also completed a bulletin on elevator motors. Both bulletins may be had for the asking.

The *Boletin de Obras Publicas*, Florida 32, Buenos Aires, one of the leading engineering periodicals in Argentina, maintains a free information service for its 6,800 subscribers, most of whom are engineers and contractors. It has been suggested that the American manufacturers of building materials, construction machinery and railroad equipment send catalogs of this class of material to the office of the publication mentioned, to be placed at the disposal of subscribers.

Practical applications of the electric arc welding process is to be discussed by E. Wanamaker, Chicago, Rock Island & Pacific Railroad, at a meeting of the Metropolitan Section of the American Welding Society to be held on Tuesday, Sept. 20, in the Engineering Societies Building, New York.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c.
No. 12	3.33c.
No. 14	3.38c.
No. 16	3.48c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c.
No. 16	4.25c.
Nos. 18 and 20	4.40c.
Nos. 22 and 24	4.55c.
No. 26	4.70c.
No. 27	4.85c.
No. 28	5.00c.
No. 30	5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap..	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¼c. to 18¾c.
High brass wire	16¼c. to 21¼c.
Brass rod	13¼c. to 20¼c.
Brass tube, brazed	26½c. to 31 c.
Brass tube, seamless	18 c. to 20 c.
Copper tube, seamless	19½c. to 22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb...	$6.80	$6.55
			90 lb...	6.90	6.65
			100 lb...	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	36c. to 37c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6c. to 6½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 29c. to 31c.

Old Metals

The market is very quiet with no business. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.50
Copper, heavy and wire	8.75
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

THE IRON AGE

New York, September 15, 1921

ESTABLISHED 1855 VOL. 108: No. 11

Electric Furnaces and Heat Treatment

A Survey of Their Commercial Application to Steel and Other Industries —Over 80 in the United States

BY EDWIN F. CONE

THE electrical heat treatment of steel of all kinds has expanded extensively in the last few years. This has been particularly marked recently. Beginnings were made just before the war in treating steel with electricity as the source of heat, but it was the war which really furnished the stimulus which has made this phase of heat treatment one of importance.

An attempt is made in the following article to present a general, but not necessarily complete, review of the extent to which electrical apparatus or furnaces are used commercially in the United States as a means of heat treating steel. It is not claimed that in the summary every type of furnace has been included, but the facts as presented cover the main features of this remarkable development.

Several companies have developed furnaces of types especially adapted to the product to be treated. Not only are castings and forgings now being treated in such furnaces, but sheets, steel chain, automobile parts, axles, bolts and nuts and small parts for airplanes, as well as non-ferrous and other products. In order to reveal the extent to which this method of heat treatment is being applied industrially, steel, non-ferrous and other installations are included, but no attempt is made to mention laboratory or research appliances.

IT is pretty generally recognized that one of the pioneers, if not the pioneer, in applying electricity to heat-treating problems was T. F. Baily, of the Electric Furnace Co., Alliance, Ohio. One of the earliest Baily installations was made in 1914 at the plant of the William A. Rogers, Ltd., Niagara Falls, N. Y.,



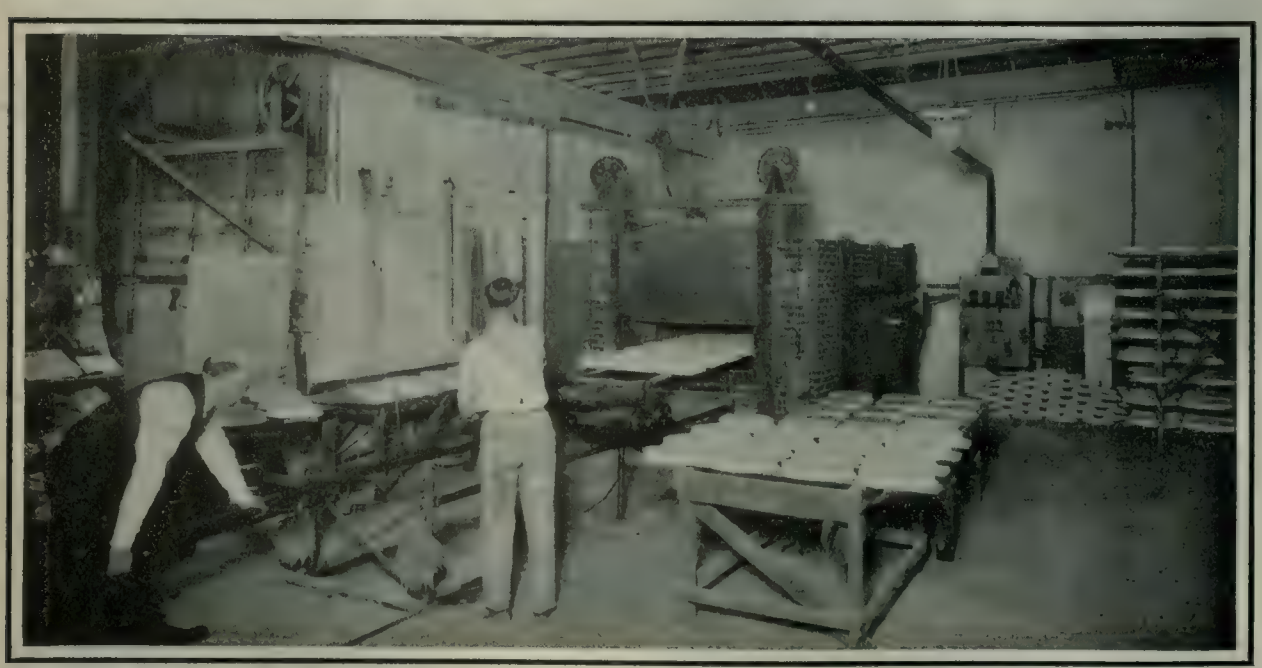
Battery of Eight Electric Heat-Treating Furnaces Installed by Holcroft & Co., Detroit, at the Plant of the Packard Motor Co., Detroit. The first six furnaces operate at 1650 deg. Fahr. and the last two at 1100 deg. Fahr. They are used for hardening and drawing crankshafts

Table of Principal Electric Furnaces Installed or Contracted for as of Sept. 1, 1921, Using General Electric Equipment for Heat Treating Steel, Etc.

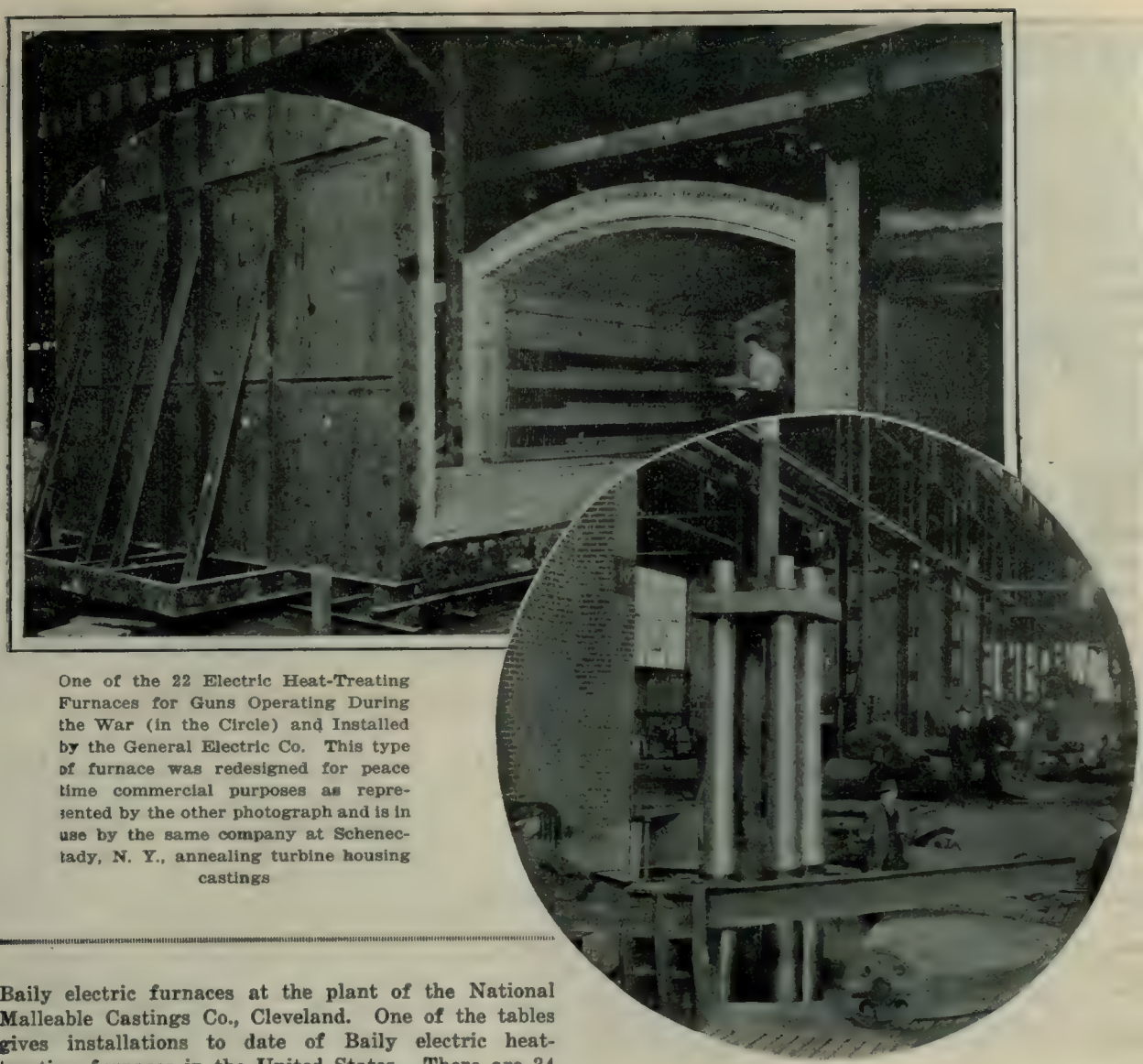
Company and Location	Size of Furnace and Product Treated	Kw. of Each
Adel Clay Products Co., Adel, Iowa	1 Furnace 2 ft. wide, 2 ft. high, 2 ft. long; 50 lb. per hr. Firing clay for phonograph needles	15
Connecticut Elec. Steel Co., Hartford, Conn.	1 Furnace 3 ft. wide, 2 ft. 8½ in. high, 4 ft. 4 in. long; 3000 lb. 12 hr., including 1 hr. soaking period. Annealing steel castings	45
St. Louis Brass Co., St. Louis	1 Furnace 4 ft. wide, 2 ft. high, 10 ft. long; 1300 lb. per hr. Firing vitreous enamel on cooking utensils and lamp reflectors	150
Standard Equipment Co., Cleveland	2 Furnaces 3 ft. wide, 2 ft. high, 6 ft. 4 in. long; 160 lb. per hr.	60
	2 Furnaces 4 ft. 9 in. diam., 2 ft. high; 500 lb. per hr. Carbonizing gears and roller bearings and heat treating ring gears	60
Eastman Kodak Co., Rochester, N. Y.	1 Furnace 1 ft. 6 in. wide, 2 ft. high, 5 ft. 6 in. long; 185 lb. per hr. Annealing glass lens blanks	47
Spencer Lens Co., Hamburg, N. Y.	1 Furnace 4 ft. 6 in. diam., 4 ft. deep. Annealing large glass lenses for telescopes	24
General Motors Corp. (Central Gear), Detroit, Mich.	1 Furnace 4 ft. 9 in. diam., 2 ft. high; 500 lb. per hr. Heat treating gears	60
Chase Metal Works, Waterbury, Conn.	1 Furnace 6 ft. 6 in. wide, 2 ft. 6 in. high, 24 ft. long; 8300 lb. per hr. Annealing brass stock, rods, plate, etc.	425
Aluminum Co. of America, Cleveland	1 Furnace 4 ft. wide, 2 ft. 6 in. high, 10 ft. long. Annealing aluminum	60
Galusha Stove Co., Buffalo, N. Y.	1 Furnace 3 ft. 6 in. wide, 2 ft. high, 5 ft. long; 750 lb. per hr. Firing vitreous enamel on stove parts	95
Acheson Graphite Co., Niagara Falls, N. Y.	1 Furnace, 2 ft. 10 in. wide, 6 ft. high, 9 ft. 7 ft. long; 113 lb. per hr. net. Baking graphite electrodes	75
Crosby Co., Buffalo, N. Y.	1 Furnace 2 ft. wide, 2 ft. high, 3 ft. long; 150 lb. per hr. Hardening dies	20
Standard Pencil Co., St. Louis	1 Furnace 3 ft. 9 in. wide, 2 ft. high, 12 ft. long; 500 lb. per hr. (process). Baking graphite for lead pencils	114
Gleason Works, Rochester, N. Y.	1 Furnace 17 in. wide, 2 ft. high, 10 ft. long; 550 lb. per hr. Hardening gears	72
Amoskeag Mfg. Co., Manchester, N. H.	1 Furnace 3 ft. wide, 3 ft. high, 6 ft. long; 350 lb. per hr. Heat treating steel rolls	48
Waterbury Mfg. Co., Waterbury, Conn.	1 Furnace 4 ft. 6 in. wide, 2 ft. 2 in. high, 16 ft. 9 in. long; 1000 lb. per hr. Annealing brass punchings, etc.	80
Muncie Cap & Set Screw Co., Muncie, Ind.	1 Furnace 2 ft. 9 in. wide, 2 ft. 5 in. high, 7 ft. long; 600 lb. per hr. Hardening cap and set screws	80
Saco Lowell Shops, Biddeport, Me.	1 Furnace 3 ft. diameter, 2 ft. 8 in. high; 300 lb. per hr. Heat treating knitting machine spindles	45
Bishop & Babcock Co., Cleveland	1 Furnace 2 ft. wide, 2 ft. high, 4 ft. 6 in. long; 400 lb. per hr. Annealing brass tubing	50
General Electric Co., Schenectady, N. Y.	1 Furnace 15 ft. 10 in. wide, 8 ft. 7 in. high, 27 ft. 7 in. long; 4000 lb. per hr. Annealing housing castings	690
General Electric Co., Schenectady, N. Y.	1 Furnace 30 in. wide, 24 in. high, 40 in. long; 175 lb. per hr. Pack hardening lathe centers, thrush bearings, boring bars and bushings	20
General Electric Co., Schenectady, N. Y.	1 Furnace 30 in. wide, 24 in. high, 40 in. long; 250 lb. per hr. Drawing temper on high-speed cutting tools	20
General Electric Co. (Baltimore Works), Baltimore, Md.	1 Furnace 3 ft. wide, 2 ft. 8 in. high, 6 ft. 6 in. long; 1300 lb. per hr. Annealing punchings. Each compt.	90
General Electric Co., Schenectady, N. Y.	2 Furnaces 1 ft. 6 in. wide, 2 ft. high, 4 ft. long; 330 lb. per hr. Firing vitreous enamel on resistance tubes	24
General Electric Co., Schenectady, N. Y.	2 Furnaces each 2 ft. 6 in. wide, 2 ft. high, 3 ft. long; 125 lb. per hr. Hardening stamping dies	20
	1 Furnace 1 ft. 6 in. wide, 2 ft. high, 2 ft. long; 160 lb. per hr. Drawing temper on stamping dies	20
	1 Furnace 5 ft. wide, 15 ft. high, 8 ft. long; 50 lb. per hr. (Heating chamber 1 ft. 2 in. wide, 4 ft. high, 3 ft. 4 in. long.) Annealing X-ray tubes	30
General Electric Co. (Bridgeport Works), Bridgeport, Conn.	1 Furnace 15 in. wide, 2 ft. 3 in. high, 2 ft. long; 160 lb. per hr. Hardening dies, tools, etc.	35
General Electric Co. (National Lamp Works)	1 Furnace 3 ft. wide, 2 ft. high, 14 ft. long; 10 cu. ft. bulbs per hr. Annealing miniature lamp bulbs	60

Girod Electric Steel Co., France, has one 265-kw. furnace, 9 ft. wide and 15 ft. long, for annealing 1400 lb. of tool steel stock per hr.

for annealing flat ware. A little later, or in 1915, the Otis Elevator Co., Niagara Falls, installed two Baily furnaces for annealing elevator steel castings. It is claimed that one of the factors which made cast steel anchor chain a commercial success during the war was the proper heat treatment made possible by



An Electric Furnace in the Enameling Industry, Firing Vitreous Enamel on Cooking Utensils and Lamp Reflectors at the Plant of the St. Louis Brass Co., St. Louis. The operating temperature is 1700 deg. Fahr.



One of the 22 Electric Heat-Treating Furnaces for Guns Operating During the War (in the Circle) and Installed by the General Electric Co. This type of furnace was redesigned for peace time commercial purposes as represented by the other photograph and is in use by the same company at Schenectady, N. Y., annealing turbine housing castings

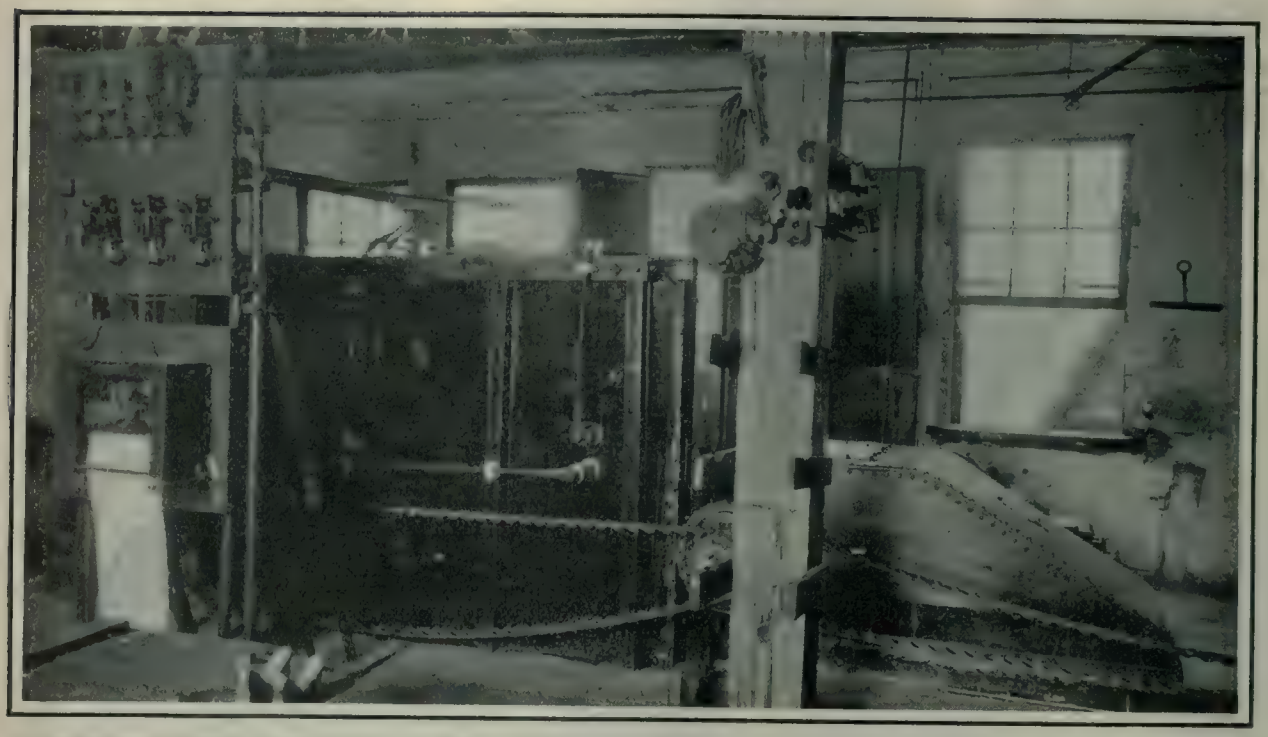
Baily electric furnaces at the plant of the National Malleable Castings Co., Cleveland. One of the tables gives installations to date of Baily electric heat-treating furnaces in the United States. There are 34 such furnaces in this country, one of which is credited to the non-ferrous industry. Of this total 10 were contracted for since Jan. 1, 1920.

Another pioneer in this field is the General Electric Co., which has to its credit the development of large commercial electric heat-treating furnaces of the metallic resistor type. This company states that it

Table of Baily Electric Furnaces Installed or Contracted for on Sept. 1, 1921, for Heat Treating

Company and Location	Product Treated	No. of Units	Kw. of Each	Total Kw.	Daily Tonnage
Wm. A. Rogers, Ltd., Niagara Falls, N. Y.	Annealing flat ware	2	200	400	24
Wm. A. Rogers, Ltd., Niagara Falls, N. Y.	Annealing flat ware	1	200	200	12
Otis Elevator Co., Niagara Falls, N. Y.	Annealing elevator castings	2	150		
			300	450	36
National Malleable Castings Co., Sharon, Pa.	Annealing draw bars knuckles	4	900		
			900	3,600	144
United States Aluminum Co., Massena, N. Y.	Aluminum castings	1	50	50	6
Erie Specialty Co., Erie, Pa.	Small steel parts for airplanes and tractors	2	150		
			150	300	24
Pierce Arrow Motor Car Co., Buffalo, N. Y.	Transmission gears	1	40	40	4
Laclede Steel Co., St. Louis	Railroad axles	1	150	150	12
National Malleable Castings Co., Cleveland	Anchor chain*	6	900	5,400	150
Ingalls-Shepard Forging Co., Harvey, Ill.	Crank shafts	2	900	1,800	144
Braeburn Steel Co., Braeburn, Pa.	Annealing steel	1	600	600	75
Standard Steel & Bearing Co., Philadelphia	Roller bearings and ball races	1	150	150	12
Lamson & Sessions, Cleveland	Heat treating bolts	1	40	40	4
Timken Roller Bearing Co., Canton, Ohio	Roll hardening	1	75	75	5
Mullins Body Corporation, Salem, Ohio	Sheet heating	1	100	100	9
Ohio Steel Foundry, Springfield, Ohio	Annealing castings	1	200	200	18
C. Harold Wills, Detroit, Mich.	Automobile parts**	2	600	1,200	18
Somers Mfg. Co., Waterbury, Conn.	Annealing brass	1	150	150	18
Lorain Steel Co., Johnstown, Pa.	Annealing bolts	1	200	200	24
Ingram Richardson Mfg. Co., Beaver Falls, Pa.	Enameling steel signs, stove parts, etc.	1	600	600	43
Name withheld	Annealing steel	1	360	360	24
		34		16,066	706

One 600-kw. furnace is in use by the Stavanger Electro Staalverk, Stavanger, Norway, for annealing steel castings.
*Described in THE IRON AGE, Feb. 27, 1919.
**Described in THE IRON AGE, June 30, 1921.



A Continuous Conveyor Type (Hagan) of Electric Furnace for Bright Annealing. It is provided with water seal at both ends and the automatic control and temperature recording instruments are at the left

first undertook this work early in 1917 when it developed the vertical cylindrical furnace for heat-treating large gun forgings. The company never did and does not now actually build and install large furnaces but it does manufacture and supply the metallic resistor heating units with refractory insulator supports for installation in the furnace as well as the automatic temperature control consisting of contractor panels operated by Leeds & Northrup controller instruments or in some cases recording controllers.

One of the illustrations shows four gun forgings being lowered into a battery of four furnaces in the plant of the Tioga Steel & Iron Co., Philadelphia. There were installed during the war 22 of these gun furnaces in the following ordnance plants: Tioga Steel & Iron Co., Philadelphia; Inland Ordnance Co., Rochester, N. Y.; Syminton Anderson Co., Rochester, N. Y.; Watertown Arsenal, Watertown, Mass.; U. S. Naval Ordnance Plant, South Charleston, W. Va. These furnaces ranged from 6 ft. in diameter by 11 ft. deep, consuming 200 kw., to 7 ft. in diameter by 35 ft. deep, consuming 700 kw. A large furnace of this type is at present under construction in a Government ordnance plant having dimensions of 8 to 10 ft. in diameter by 105 ft. deep with a connected load of 2700 kw.



This Is a 210-Kw. Electric Annealing Furnace for Annealing Sheet Steel, the Charge Consisting of 16,000 Lb. The furnace is 12 ft. long, 4 ft. 6 in. wide and 3 ft. high and is a product of the George J. Hagan Co., Pittsburgh

With the ending of the war, the company states that its efforts were directed to modifying the design of the gun furnace so as to secure one which would be suitable for peace time needs on a commercial basis. One of the illustrations shows this later type. In it the units consist of heavy metallic windings supported in refractory insulators on the inner walls of the furnace chamber. The pitch and length of the ribbon convolutions can be made so as to concentrate or distribute the heating effect as desired. Such ribbon units can be placed in the hearth or floor of the furnace or under the arch.

One of the tables gives a list of some of the more important metallic resistor type of heat-treating furnaces in commercial use as equipped with G. E. heating units and temperature control. Some were installed and built by furnace building companies and others were installed by the company using them. The General Electric Co. also builds three or four furnaces of this type of relatively smaller size or of such size that the furnace can be built up complete at the plant and shipped to the user in that condition.

Besides the Baily and General Electric heat-treating furnaces there are four other companies which have introduced or are introducing commercial furnaces for heat-treatment as follows:

The George J. Hagan Co., Pittsburgh, has the following installations either made or under contract as follows:

Fowler & Union Horsenail Co., Buffalo:
One 24 ft. regenerative car type furnace having a connected load of 180 kw for operation on 440 volts, 3-phase, 60-cycle power service.
This furnace is used for annealing special steel wire in coil form.

Nash Motors Co., Kenosha, Wis.:
One large rotary furnace, 20 ft. in diameter and having a connected load of 270 kw for operation on 440 volts, 3-phase, 60-cycle power service.
This furnace is used for hardening, annealing and carbonizing automobile parts, varying from a spring clip to a front axle. A description of this installation appears elsewhere in this issue.

Ontario Silver Co., Muncie, Ind.:
One continuous annealing furnace for annealing brass and nickel silver flat ware.
This furnace has a connected load of 75 kw for operation on 220 volts, 3-phase, 60-cycle power service.

Standard Stoker Co., Inc., Erie, Pa.:
One box type annealing furnace having a connected load of 40 kw for operation on 220 volts, single-phase, 60-cycle power service.
This furnace is used for annealing miscellaneous steel castings.

Canadian Allis Chalmers Co., Toronto, Ont.:
One car type sheet annealing furnace having a connected load of 210 kw for operation on 440 volts, 3-phase, 60-cycle power service.
This furnace is used exclusively for annealing special transformer steel in sheet form.

Illinois Watch Co., Springfield, Ill.:
One small rotary enameling furnace, 6 ft. in diameter having a connected load of 31 kw for operation on 220 volts, 3-phase, 60-cycle power service.
The furnace is used exclusively for enameling watch dials.

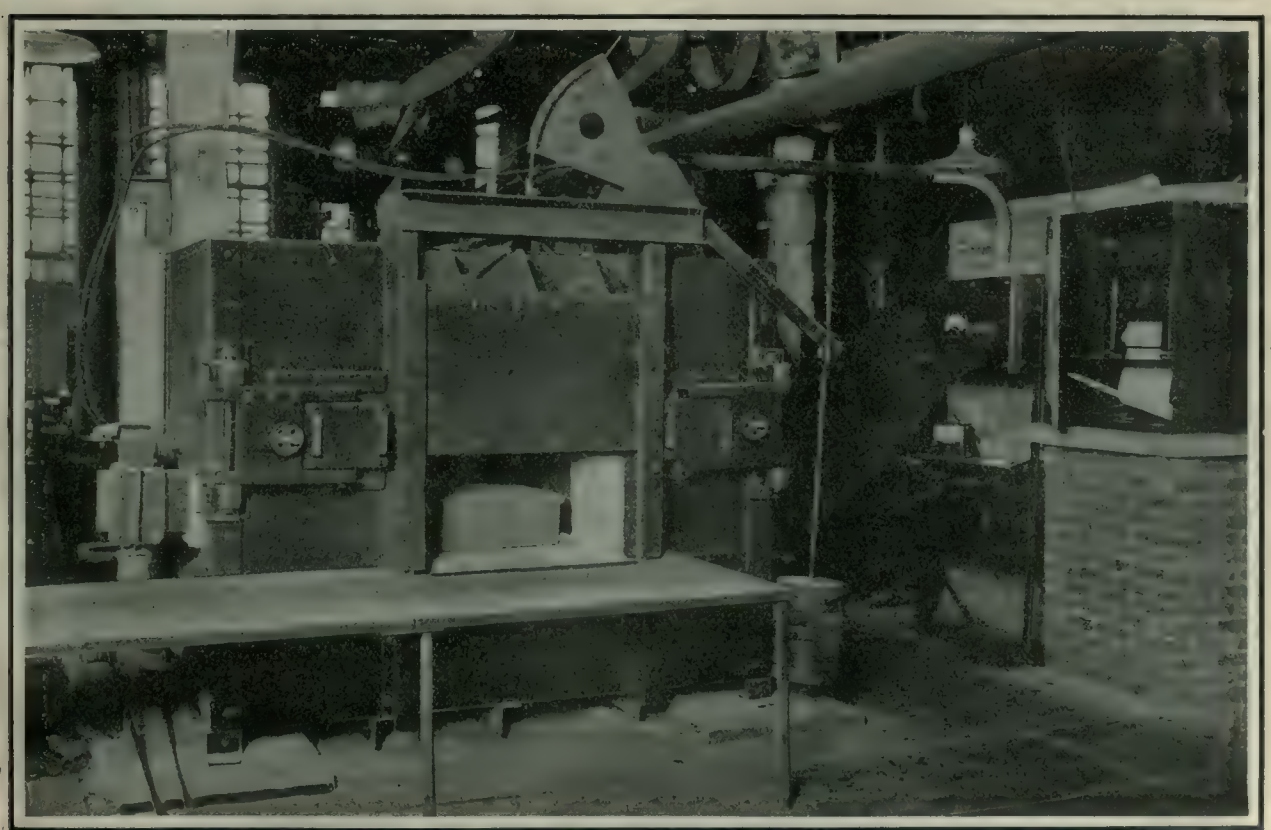
Coonley Mfg. Co., Cicero, Ill.:
One double end enameling furnace 225 kw connected for operation on 220 volts, 3-phase, 60-cycle power service.
The furnace is to be used for enameling cooking utensils.
Total furnaces, 7; of which 5 are treating steel.

Holcroft & Co., Detroit, Mich., have already installed or contracted for the following electric heat-treating furnaces:

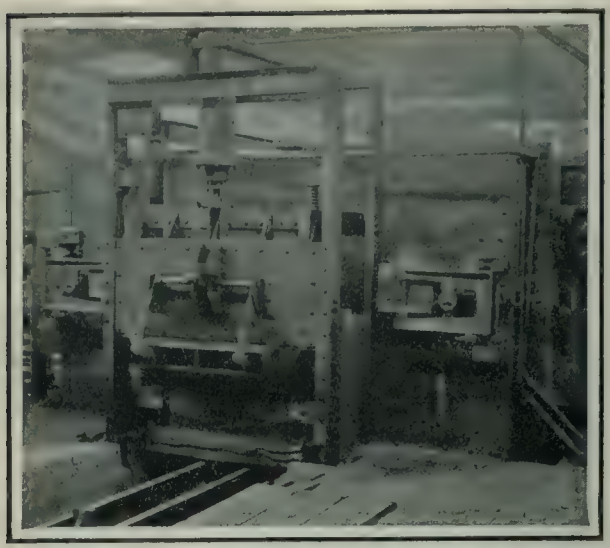


An Electric Carburizing Furnace Furnished by the General Electric Co. to the Standard Equipment Co., Cleveland, for Carburizing Gears and Roller Bearings and Heat Treating Ring Gears

Packard Motor Car Co., Detroit:
Eight (8) furnaces, 2 ft. wide, 2 ft. high, 6 ft. long, 80 kw each.



A Baily Electric Furnace for Heat Treating Bolts at the Plant of the Lamson & Sessions Co., Cleveland



A Baily Electric Heat-Treating Furnace of the Car Type Operating at the Pittsburgh Plant of the Crucible Steel Co. of America

Hardening and drawing crankshafts, 500 lb. and 800 lb. per hour respectively.

Schwartz Hermann Co., Sommerville, N. J.:
One furnace, 2 ft. wide, 8 in. high, 7 ft. 4 in. long, 68 kw and one furnace 2 ft. wide, 8 in. high, 6 ft. long, 32 kw.
Hardening and drawing 500 lb. of temper spring steel per hour.

General Motors Laboratory, Dayton, Ohio:
One furnace, 2 ft. wide, 5 ft. 6 in. long, 15 in. high. 31 kw.
General heat treating, 300 lb. per hour.
Total furnaces, 10; all treating steel.

The Electric Furnace Construction Co., Philadelphia, has, already installed or under contract, the following electric heat-treating furnaces:

Emery Steel Casting Co., Baltimore:
One pit type annealing furnace and soaking pit for small steel castings. The same company also has an electrically heated core drying oven finished by the same builders.

Yale & Towne Mfg. Co., Stamford, Conn.:
One electric recuperative car type furnace, 60 ft. long, 12 ft. wide and 11 ft. high, 180 kva.
It is used for annealing gray iron.

The same company has also sold to the Sociedad Espanola Construccion Naval, Rheinosa, Spain, one furnace, 6 ft. dia., 37 ft. deep, 712 kw. for heat treating 6000 lb. of gun forgings per hour and one furnace, 10 ft. 6 in wide, 7 ft. high, 20 ft. long, for annealing 5500 lb. of gun forgings per hour.

Another company, the American Industrial Furnace Corporation, Boston, has made installations of electric heat-treating furnaces as follows:

Connecticut Broach Co., New London, Conn.:
One furnace, 9 in. wide, 2 ft. high, 5 ft. long, 25 kw.
For hardening and drawing 200 lb. of broaches per hour.

Chapman Valve Co., Indian Orchard, Mass.:
One furnace, 5 ft. wide, 4 ft. high, 6 ft. 10 in. 120 kw.
Annealing 800 lb. of steel and brass castings per hour.

A review of this subject should not close without reference to the electrical heat treatment of alloy steel tubing as carried out by the Snead & Co. Iron Works, Jersey City, N. J., a description of which appeared in THE IRON AGE, Jan. 22, 1920, and which has recently been presented as a moving picture before various technical societies. While the apparatus is not distinctly a furnace, it is a novel and highly successful method of heat treating tubing and gives promise of being applied more generally.

The foregoing analysis, when summarized, presents a striking total of heat-treating furnaces using electricity as a source of heat. In the steel field alone there are about 80 such furnaces now installed or contracted for. They are operating on many kinds of products, including steel and iron castings, automobile parts, tool steel, sheets, etc. At least seven furnaces are operating on non-ferrous material and the application to glass and other industries is growing. It is also of interest that there are already several installations of American electric heat-treating furnaces in foreign countries: Canada, France, Spain, Norway, etc.



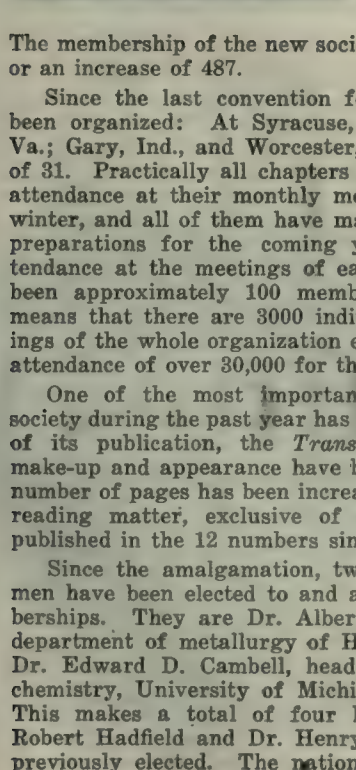
An Electric Furnace for Annealing Steel Castings at the Plant of the Connecticut Electric Steel Co., Hartford, Conn. Its capacity is 3000 lb. of castings every 12 hr., including one hour soaking period

Steel Treaters Meeting in Indianapolis

Third Annual Convention and Exhibition Next Week in a Large Heat-Treating and Industrial Center—Program and Exhibitors



WHEN the American Society for Steel Treating meets in Indianapolis, Ind., next week, Sept. 19 to 24, for its third annual convention and exhibition, it will mark the anniversary of the amalgamation into one large organization of two heat-treating societies. This was accomplished at the second annual convention in Philadelphia last September.



The past year has been a remarkably successful one for the organization. Membership has increased in numbers and an increase in service as well as one in financial assets has been registered. When the American Steel Treaters' Society and the Steel Treating Research Society were amalgamated last year, the combined membership was close to 2750. The membership of the new society on Sept. 1 was 3237, or an increase of 487.

Since the last convention four new chapters have been organized: At Syracuse, N. Y.; Charleston, W. Va.; Gary, Ind., and Worcester, Mass., making a total of 31. Practically all chapters have reported excellent attendance at their monthly meetings during the past winter, and all of them have made extensive plans and preparations for the coming year. The average attendance at the meetings of each of the chapters has been approximately 100 members and guests, which means that there are 3000 individuals attending meetings of the whole organization each month, with a total attendance of over 30,000 for the year.

One of the most important developments of the society during the past year has been the increased value of its publication, the *Transactions*. The general make-up and appearance have been improved while the number of pages has been increased. Over 775 pages of reading matter, exclusive of advertising, have been published in the 12 numbers since last September.

Since the amalgamation, two nationally prominent men have been elected to and accepted honorary memberships. They are Dr. Albert Sauveur, head of the department of metallurgy of Harvard University, and Dr. Edward D. Cambell, head of the department of chemistry, University of Michigan, Ann Arbor, Mich. This makes a total of four honorary members, Sir Robert Hadfield and Dr. Henry M. Howe having been previously elected. The national standing committees have held meetings during the past year and have contributed valuable results toward increasing the efficacy of the society and toward the preparation of the research program and standards for heat treating.

There are a number of causes contributing to the success of the society, one of the most important being decentralization of organization, or that of having many chapters located in industrial centers, easy of access and of greatest benefit to the members. The large portion of the dues, which the constitution provides, should remain with local chapters for payment of expenses incident to securing speakers and sending announcements, etc., has placed the chapters in a sound financial condition with money in their local treasuries to insure active participation in the aims and purposes of the society.

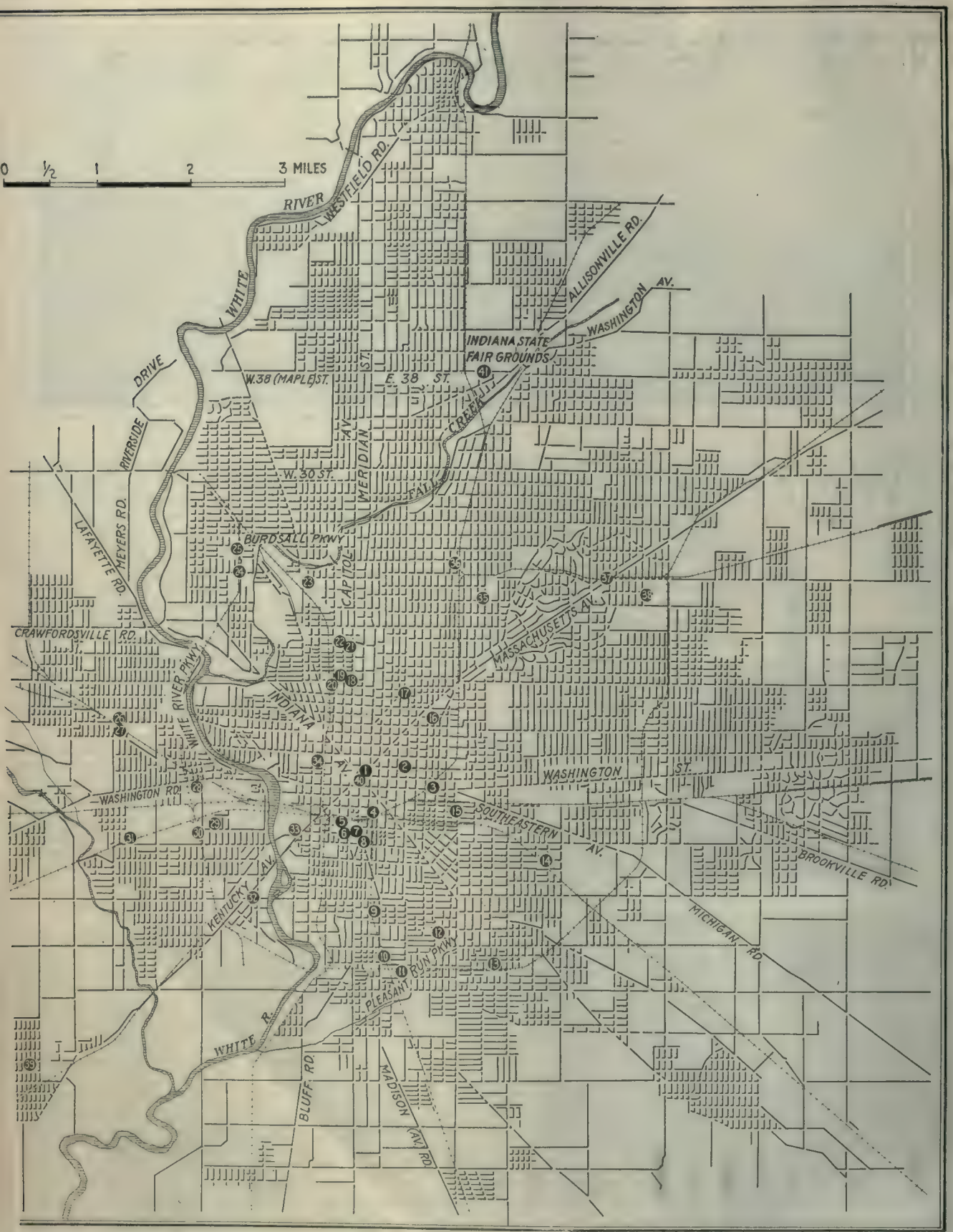
The national president, Lt.-Col. A. E. White, has visited all of the chapters of the society the past winter and has traveled over 10,000 miles, using over six weeks of his time and thus giving to the entire membership a portion of his enthusiasm, his counsel and his advice. The officers of the society believe that it has as yet made but a small impression upon the field of possible members and of its potential usefulness.

Indianapolis and Its Industries

The location selected for the annual meeting this year is one of the important heat-treating centers of the country. The map, reproduced on another page, shows the location of the leading places where heat treating of various kinds is being practiced, as well as the location of the Indiana State Fair Grounds where the convention and exhibition are to be held.

Indianapolis is fast coming to the front as a manufacturing city and to-day it has over 1200 industries, manufacturing some 800 different products. The city is located within 50 miles of the center of population of the United States and claims to be the geographical center of manufacturing. It is, in population, transportation facilities and volume of business transacted, the largest inland city not on a navigable stream in the United States. The population numbers approximately 315,000; 82 per cent of this are native born whites, and 2,000,000 live within 100 miles of the city. In the city itself, 146,000 were listed at the last census as engaged in gainful occupations. There are over 70,000 families, of which 65 per cent own their own homes.

The city has direct railroad connection with all parts of the country by means of 17 railroads. Every one of these is served by a belt railroad, 14 miles in length, which surrounds the city and gives industrial plants ready access to each radiating line. In addition to the steam railroads electric interurban lines, radiating from Indianapolis, comprise one of the most ex-



tensive systems in the United States. There are 13 of these lines, and the number of passengers passing through the terminal station each day numbers approximately 21,000.

The metal working industry is steadily gaining in importance, being second only in volume to the packing industry. The manufacture of automobilies is the leader in the metal trades, and the city is claimed to be second only to Detroit in the number of automobiles built. There are 10 automobile manufacturing plants within the city limits. Manufacture of automobile parts, including drop forgings, body sheets, carburetors, gears, bodies, springs, fans, radiators, etc., all go to make it one of importance in the automotive field.

While the automobile industry is undoubtedly of first importance, Indianapolis has a large number of other metal-working industries that go to make it one of the leaders among the cities of the country. Perhaps the most important of these is the manufacture of chain transmissions and sprockets. The city is also a leader in the manufacture of saws, having one of the largest plants in the country. The machine tool industry is assuming greater proportions and several large companies are now operating there. Among other products

The map on the opposite page shows by numbers the location of some of the Indianapolis plants where heat treating is practiced. The lists below are a key to the map.

Numerical Finding List

No.
1.—General Tool & Gauge Co.
2.—Specialty Gauge & Tool Co.
3.—Cole Motor Car Co.
4.—Modern Tool & Die Co.
5.—Indianapolis Tool & Mfg. Co.
6.—B. C. Atkins & Co.
7.—American High-Speed Chain Co.
8.—Spacke Machine & Tool Co.
9.—Indianapolis Drop Forge Co.
10.—Marschke Mfg. Co.
11.—American Can Co.
12.—Stevenson Gear Co.
13.—Robt. H. Hassler, Inc.
14.—Service Spring Co.
15.—Weidely Motors Co.
16.—Frontenac Motor Co.
17.—Modern Electric & Machine Co.
18.—Stutz Motor Car Co. of America, Inc.
19.—Ott Grinder Co.
20.—Dean Bros. Steam Pump Works.
21.—Stutz Fire Engine Co.
22.—H. C. S. Motor Car Co.
23.—Fairbanks, Morse & Co.
24.—International Machine Tool Co.
25.—Milholland Machine Co.
26.—National Malleable Castings Co.
27.—Link-Belt Co.
28.—Duesenberg Automobile & Motors Co.
29.—Metal Auto Parts Co.
30.—Imperial Drop Forge Co.
31.—Chandler & Taylor Co.
32.—Nordyke & Marmon Co.
33.—Diamond Chain & Mfg. Co.
34.—Zenite Metal Co.
35.—Midwest Engine Co.
36.—National Motor Car & Vehicle Corporation.
37.—Oakes Co.
38.—Premier Motor Corporation.
39.—Lafayette Motors Co.
40.—Monument Circle.
41.—Indiana State Fair Grounds.

Alphabetical Finding Index

	No.
American Can Co., Garfield Park car	11
American High Speed Chain Co., South Meridian, Stock Yards or Garfield car	7
Atkins, E. C., & Co., South Meridian, Stock Yards or Garfield car	6
Chandler & Taylor Co., West Indianapolis or Terre Haute Traction car	31
Cole Motor Car Co., East Washington car	3
Dean Bros. Steam Pump Works, Northwestern car	20
Diamond Chain & Mfg. Co., West Indianapolis car or Stock Yards car	33
Duesenberg Automobile & Motors Co., West Washington car	28
Fairbanks, Morse & Co., Northwestern car	23
Frontenac Motor Co., East Tenth Street or East Michigan car	16
General Tool & Gauge Co., East Michigan car	1
Hassler, Robt. H., Inc., Virginia Avenue car, transfer to Minnesota	13
Imperial Drop Forge Co., West Indianapolis car or Terre Haute traction	30
Indianapolis Drop Forge Co., Garfield Park car	99
Indiana State Fair Grounds, Central and College cars	41
Indianapolis Tool & Mfg. Co., South Meridian car	5
International Machine Tool Co., Riverside car	24
Lafayette Motors Co., West Indianapolis car marked "Mars Hill" or Martinsville traction	39
Link-Belt Co., West Michigan car	27
Marschke Mfg. Co., Garfield Park car	10
Metal Auto Parts Co., West Indianapolis car	29
Midwest Engine Co., Columbia car	35
Milholland Machine Co., Riverside car	25
Modern Electric & Machine Co., Central car	17
Modern Tool & Die Co., three blocks from monument	4
Monument Circle	40
National Malleable Castings Co., West Michigan car	26
National Motor Car & Vehicle Corporation, College car	36
Nordyke & Marmon Co., Stock Yards car	32
Oakes Co., Brightwood car	37
Ott Grinder Co., Northwestern car	19
Premier Motor Corporation, Brookside car	38
Service Spring Co., English car	14
Spacke Machine & Tool Co., South Meridian or Garfield car	88
Specialty Gauge & Tool Co., East Washington and East Michigan cars	2
Stevenson Gear Co., East Washington car	12
Stutz Fire Engine Co., Illinois car	21
Stutz Motor Car Co. of America, Inc., Illinois car	18
Weidely Motors Co., East Washington car	15
Zenite Metal Co., West Michigan car	34

manufactured are oil and gas engines, road building machinery, gray iron and steel castings, steam engines and boilers, freight cars, concrete machinery, hoisting derricks, small tools, metal stampings and electrical apparatus of various kinds. To supply the needs of the various industries, a larger stock of iron and steel is carried by jobbers than in any city in the Middle West, outside of Chicago.

The Chamber of Commerce, through its industrial division, is conducting a never-ceasing campaign for new industries. While no bonuses are offered to bring industries to the city, its natural advantages are stressed, such as its location with reference to the center of population and manufacture, its nearness to the coal fields of Indiana, its railroad facilities and unusually low rates for electric power and artificial gas and the excellence of its labor conditions.

The city is essentially an "open-shop" city. In the metal trades it is practically 100 per cent open and the city as a whole shows an average of 90 per cent of its industries working without union agreements. In the Associated Employers of Indianapolis, the city has an asset in coping with the labor problem. This association today has over 500 members, with employees numbering approximately 46,000. It was organized in 1904, the object being civic, economic and commercial betterment. The fundamental principles of the association's activities are first, securing of harmonious industrial relations between the employer and employee, and insistence on adequate compensation and timely advancement for the employee as measured by his individual efforts; second, unalterable opposition to the principle of the closed shop as un-American, illegal and unfair to the independent workmen, the employer and the public; third, strenuous opposition to strikes, lockouts, boycotts and kindred evils; and fourth, the impartial enforcement of law and strict maintenance of order. The association was one of



The Famous Speedway at Indianapolis Where Special Automobile Races Will Be Staged on Wednesday Morning, Sept. 21, for the Entertainment of the Steel Treaters and Their Guests

the first in the country to carry on an organized systematic campaign of education in industrial matters. It has already distributed hundreds of thousands of pieces of educational and instructive literature, not only to its own mailing list of 2000 business men and employers of labor, but also to public and professional men, clergymen and officers in public service in federal, state, county and municipal government.

There are many points of interest about the city, chief among which are the soldiers and sailors, monument and the motor speedway. The new union station, with its system of elevated tracks, is impressive, over 20,000 tons of steel having been used in its construction. In addition, the city has excellent educational facilities and a system of public parks.

Exhibition and Convention Program

The regular exhibition of heat-treating appliances and processes will be held, in connection with the convention, at the manufacturers building, Indiana, State Fair Grounds. In spite of the business depression, the society has been fortunate in securing a large list of exhibitors who will display the latest and most efficient products and equipment used in heat-treating. A complete report of the exhibitors and what they will show is found elsewhere.

A technical program of 78 papers is scheduled for the convention. A list of the authors and their subjects were printed in THE IRON AGE, Sept. 1. The sessions will be held in the Woman's Building, located close to the exhibition and for the first time there will be simultaneous meetings. The general program for each day follows:

Monday, Sept. 19—Opening Session, 2 p. m.

Address of welcome.....
W. R. Chapin, chairman executive committee, Indianapolis chapter
Welcome to Indianapolis.....City official
Response.....A. E. White, National President
Report of tellers of election.....R. T. Bayless, Chairman
Report of secretary....W. H. Eisenman, National Secretary
Report of treasurer.....W. S. Bidle, National Treasurer
President's address.....A. E. White, National President
Announcements.

Tuesday, Sept. 20

10 a. m.—Papers on carburizing.
2 p. m.—Papers on tool steel.
6 p. m.—Smoker and entertainment.

Wednesday, Sept. 21

10 a. m.—Motor Speedway. 50-mile match race between Duesenberg and Frontenac motor cars.
2 p. m.—Room A: Papers on heat treating equipment. Room B: Papers on alloy steel.
8 p. m.—Dance and entertainment.

Thursday, Sept. 22

10 a. m.—Room A: Program in charge of the Army and Navy. Room B: Papers on alloy steel.
2 p. m.—Room A: Papers on metallographic research. Room B: Papers on heat treating equipment.
6 p. m.—Annual banquet; speakers of national prominence.

Friday, Sept. 23

10 a. m.—Research session in charge of Dr. Harrison E. Howe, chairman National Research Council, Washington, D. C.
2 p. m.—Room A: Papers on heat-treating problems. Room B: Papers on shop management.

Special attention is called to the fact that owing to the large number of excellent and interesting papers, simultaneous sessions will be held on three days of the Convention so that visitors may have the opportunity of attending the sessions which are of the greatest interest.

Army and Navy Session

The Army and Navy Session on Thursday morning will be especially interesting and the following general program will be presented.

The Navy will detail an officer to present a paper on "Laying of the North Sea Barage."

General Amos A. Fries, chief of chemical warfare service, will have a paper presented on some subject of interest to the members.

General C. C. Williams, chief of the ordnance department, has asked F. C. Langenberg, metallurgist Watertown Arsenal, to present a paper on heat treatment at the Arsenal.

Major L. W. McIntosh, assistant to the chief of engineering division, air service, war department, will have a paper presented on "Heat-Treating Problems in Aeronautics."

Research Session

Dr. Harrison E. Howe, chairman of the National Research Council, will preside at the research session on Friday morning. Dr. Howe has consented to secure the speakers for that session, in which the general plan for research in heat treatment will be presented and discussed.

The Exhibitors and Their Exhibits

A

ALCORN, BLOCKHOUSE & CO., Philadelphia—Exhibiting a combination conveyor type furnace, electrically heated, which combines in one the conveyor for such articles as crank shafts, cam shafts, rear axle shafts, and also conveying miscellaneous small pieces, such as rounds, shapes, gears and gear blanks. This furnace was originally designed for the heat treatment of shells, principally 155 mm., and it was eventually adopted by the Ordnance Department as standard equipment. James S. Alcorn and H. M. Austin will demonstrate the furnace.

ARMSTRONG CORK CO., Pittsburgh—Exhibiting the following "Nonpareil" products: insulating brick for all kinds of ovens, furnaces, etc.; high pressure covering and blocks for steam lines, enameling and japanning ovens, feed water heaters, etc.; corkboard for the insulation of cold storage and constant temperature rooms; cork covering for refrigerated drinking water lines, brine and ammonia lines, etc.; also "Circle A" cork brick for floors; an electrically heated furnace will demonstrate the heat retarding properties of "Nonpareil" insulating brick. Represented by J. T. Gower, Cincinnati office.

E. C. ATKINS & CO., Indianapolis—Atkins saws of all kinds, also machine knives, metal cutting machinery, hack saw blades, frames, etc.; also process samples of hand saws from raw material to finished product. Represented by T. A. Carroll, J. E. Andrews, E. C. Drake, T. E. Patton, Robert Arbuckle and Edward Norvell.

ATLAS CRUCIBLE STEEL CO., Dunkirk, N. Y.—Samples of various types of tool steel, including both hot rolled and cold rolled shapes; there will also be an exhibit of fractures, showing the effect of proper and improper heat treatment on the various types of tool steel. Products of the company's high speed drop forging plant, which produces various sizes of blanks for key-way cutters, end-mills and cutters will also be shown. Represented by F. G. Davis, assistant general sales manager; J. A. Disney, sales representative; W. C. Peterson, metallurgical engineer, and F. Kremp, metallurgist.

B

BAUSCH & LOMB OPTICAL CO., Rochester, N. Y.—Metallographic and metallurgical equipment, including microscopes, photomicrographic apparatus and accessories, including new complete metallographic outfits, one of them having the microscope built in as part of the equipment. Represented by W. L. Patterson and I. L. Nixon, both from Rochester.

BELL & GOSSETT CO., Chicago—Exhibiting "Caseite," used in place of cyanide, in either lump or powder form; "Bathite," which is a salts for preheating steel between 1200 and 1600 deg. Fahr., used as a substitute for lead; "Cleancoat," a carbonacious compound used on the top of lead to prevent drossing and oxidation, being a substitute for charcoal; also carbonizing compound, carbonizing pots and boxes (steel and alloy), "Enamelite" (selective hardening material), high temperature cements, quenching and tempering oils, scleroscopes and prestometers.

BETHLEHEM STEEL CO., Bethlehem, Pa.—A feature will be a large illuminated transparency consisting of 32 colored views, showing the various processes of steel manufacture from raw material to finished product; another transparency consisting of charts showing the physical properties of 48 of the standard grades of alloy and carbon steels. The charts include the tensile and hardness results of these steels in their condition as rolled, annealed and after various special heat treatments. Another chart shows physical test diagram, micrographs, fractures, etc., illustrating the effect of quenching steel at the proper and improper temperatures. Products exhibited to include a number of special iron castings made with Mayari iron; an I beam section taken progressively through the various punching, blanking and bending operations in the manufacture of the new Bethlehem structural steel wheels for motor trucks and a representative line of small tools made from Bethlehem tool steel, drop forgings, hardened steel rolls and bolts and nuts. Represented by W. R. Shimer,

sales metallurgist, W. H. Laury, John Moran, W. C. Cutler and Robert MacDonald, all of Bethlehem office.

BRISTOL CO., Waterbury, Conn.—Entire line of Bristol indicating and recording pyrometers, including temperature controllers, together with accessories for these classes of instruments. Exhibit in charge of H. G. Hall, Chicago district sales manager, and H. L. Griggs, general sales manager.

BROWN INSTRUMENT CO., Philadelphia—Apparatus to demonstrate what the research departments of instrument manufacturers are doing today, along the lines of developing newer and more accurate instruments; at this booth will be displayed a potentiometer, so compact that it can be carried under the arm, and yet has a scale of 96 in. long; automatic control showing what has been accomplished during the last year; the heating cycle controller; new cold junction compensated pyrometer, together with the complete line of high resistance indicating and recording pyrometers of single continuous and multiple types; indicating and recording thermometers; indicating and recording pressure gages; tachometers; and all types of instruments for temperature measure and recording. In charge of booth: G. W. Keller, C. C. McDermott, D. J. Jones, R. W. Mayer, E. R. Robinson, and S. C. Ketterer.

BUREAU OF STANDARDS, UNITED STATES DEPARTMENT OF COMMERCE—General equipment available for research and the testing of metals at the Bureau of Standards, shown by transparencies and photographs; copies of publications considered of interest to members will be available for examination. Among the items of interest are the production of pure metals, such as iron and the preparation of gas free alloys, together with the melting of different industrial ferrous and non-ferrous metals by various methods. In connection with this work, methods developed for the determination of gases in metals will be shown. Such investigations which have been pursued intensively for several years at the Bureau of Standards are fundamental, and their perfection must necessarily be achieved before the effects of various gases contained in alloys, such as steels manufactured by various processes, may be determined. Hot and cold working of metals, their heat-treatment and testing, including some applications of the 2,300,000 lb. Emery testing machine, will likewise be exhibited. There will be included the results of recent studies of the properties of metals at high temperatures, including compression tests of different types of bearing metals and tensile tests of carbon and alloy steels under different conditions of rolling and heat-treatment, and applications of magnetic analysis and such special studies as the distribution of stresses in chilled iron and steel car wheels under conditions approximating those of service. The exhibit, as a whole, will illustrate the field of co-operation of the bureau with the metal industries. Dr. G. K. Burgess, H. J. French, and J. S. Vanick, and Miss D. E. Kingsbury will attend.

C

CASE HARDENING SERVICE CO., Cleveland — Exhibiting "Bohnite" and samples of the work which it has produced in the form of gears, cam shafts, etc., cut to show the cross section and polished and etched to show the depth of case; also two machines for testing the hardness of metals, the auto-punch and a quadrant sclerometer, both manufactured by the Rudge-Whitworth, Ltd., Birmingham, England, to be shown for the first time in the United States. Represented by William H. Bell and C. E. Lovejoy.

CELITE PRODUCTS CO., New York—"Sil-O-Cel" Insulating brick, insulating powder, insulating cements, high temperature cements and other products. There will be two demonstrations, one of an electric furnace with standard fire brick used as refractory, three sides and top insulated with "Sil-O-Cel" standard brick and the remaining side uninsulated; furnace will be equipped with pyrometer to show internal heat and thermometers to show temperature difference between walls insulated with "Sil-O-Cel" standard brick and uninsulated walls. The second demonstration will show the heat-resisting qualities of "Sil-O-Cel" brick by means of a blow torch. Represented by Edward F. Davis, H. N. Haberstroh and S. M. Jenkins.

CENTRAL STEEL CO., Massillon, Ohio—Automobile parts made from alloy steel; also a demonstration of the use of the company's oil hardening UMA steels on a gear cutting machine; will also exhibit seamless tubing and cold drawn products made from the company's steels. Represented by F. J. Griffiths, D. N. A. Blacet, L. B. Baker and C. P. Richter.

COLONIAL STEEL CO., Pittsburgh—Exhibiting Colonial high-speed and carbon tool steels, showing fractures and photographs. Represented by Charles M. Brown, vice-president; James E. Barry, special representative; G. W. Hampshire, Detroit representative; Charles Kopenhoefer, Cincinnati and Indianapolis representative; N. B. Hoffman, chief chemist and metallurgist; T. Howe Nimick, assistant to the vice-president.

CRUCIBLE STEEL CO. OF AMERICA, Pittsburgh—Heat treated steel products of various kinds. Represented by J. W. Taylor and F. J. White, Pittsburgh, and C. W. Mayer and H. L. Raynor, Indianapolis, Ind.

D

DEEDS COMMERCIAL LABORATORIES, Indianapolis, Ind.—Carburizing compound, demonstrating methods of use as well as the principle of quenching. Represented by W. C. Horner.

DEEDS & CHAPIN, Indianapolis—"Cinch" Steel Cement, and various dies, tools, and other articles which have been cemented with their products.

DRIVER-HARRIS CO., Harrison, N. J.—Cast Nichrome carbonizing containers of the most popular styles. Represented by H. D. McKinney; L. O. Hart, second vice-president; C. B. Callomon, factory superintendent; F. L. Driver, third vice-president; W. E. Blythe, H. O. Hartdegan and G. A. Rickert, advertising manager.

E

ELECTRIC ALLOY STEEL CO., Youngstown, Ohio—A complete assortment of its various grades of high-speed steel; several tools from its steels which have performed extraordinary feats; a large sample case showing fractured bars in the natural, annealed and hardened, or heat-treated condition in each grade of tool and high speed steel; this sample board shows the grain structure of various degrees of hardness of each of the grades; a complete set of micrographs, showing the cleanness of its cold melt electric furnace steels as well as its crucible cast high-speed steels. Represented by G. Peterson, general manager of sales; G. W. Morrison, general superintendent; J. E. Sandmeyer, field metallurgist, and M. A. Grossmann, chief metallurgist.

ELECTRIC STEEL CO. OF INDIANA, Indianapolis.

ELECTRICAL REFRACTORIES CO., East Palestine, Ohio—Refractories for electric ranges and steel treating furnaces, consisting of electric heating element supports of various types and linings for the same. The products are confined to use in resistance type electric heating devices, where heat up to 2500 deg. is attained. Represented by F. E. Owen, president.

CHARLES ENGELHARD, INC., New York—A complete line of indicating and recording pyrometers and automatic control apparatus. Various forms of thermo-couple mountings will also be shown, particularly Impervite refractory and Impervite hard porcelain tubes. Represented by E. S. Newcomb and G. V. Nightingale.

F

J. B. FORD CO., Wyandotte, Mich.—Chemicals, and cleaning compounds for the hardening room.

G

WILLIAM GANSCHOW CO., Chicago—Exhibiting heat-treated gears and other gears. Represented by A. F. Boissoneau.

GENERAL ALLOYS CO., Chicago—Heat resisting alloys. Represented by H. H. Harris, A. D. Heath, A. L. Grinnell, P. F. McGovern and O. A. Parine.

GENERAL ELECTRIC CO., Schenectady, N. Y.—An oil-tempering bath and a new type of semi-cylindrical furnace for treating carbon steel will be shown. The latter is a new development, being a small furnace whose special features are declared to be its rapid heating, the low voltage required, the strength of construction, especially as regards the heating element, and the accurate control of the temperature. The oil-tempering bath is one of standard construction such as has been built by the company for some time. Represented by C. L. Ipsen, E. F. Collins and C. T. McLaughlin.

H

GEORGE J. HAGAN CO., Pittsburgh—One electric furnace and one combustion furnace, both in operation, together with furnace accessories. The electric furnace is of the ribbon register type, with full automatic temperature control; the combustion furnace is designed for either oil or gas operation, equipped with a Brown automatic temperature control mechanism. Represented by George J. Hagan, Howard G. Hammer, W. C. Buell, Jr., H. C. Adams, R. E. Talley, Alan D. Dauch, F. W. Robertson and O. P. Luetscher.

HALCOMB STEEL CO., Syracuse, N. Y.—Exhibiting a large board showing the steps taken in its mill from the ingot to the finished form, such as hammering bars,

rings, disks, blocks, etc., rolled sheet mill and wire mill products; fractures from bars of all of its tool steels, accompanied by cards showing the principal uses for each grade, including "Dreadnought" high speed steel, "Ketos" oil hardening tool steel, special brands such as "Liberty," "Pyro" die, "Halco," stainless, special vanadium and ordinary carbon tool steels; tensile test pieces of alloy steel, showing the physical properties which may be developed by various heat treatments; also the principal uses in the automotive, aeroplane and motor-truck industries in which these special "Halectralloy" brand steels are used.

HEPPENSTALL FORGE & KNIFE CO., Pittsburgh—Interior and exterior views of the company's plants; nickel steel piston rods, shear knives, die blocks; two racks of drop forgings, made from some of the company's die blocks; data giving the number of forgings of each design that its blocks have made. Represented by J. A. Succop, metallurgical engineer; C. W. Heppenstall, treasurer and general manager.

HOSKINS MFG. CO., Detroit—An electric furnace in operation, using a new type of heating element and controlled automatically by a temperature regulator employing a new principle; also indicating and recording pyrometers and a display of nickel-chromium resistor alloys. Represented by Charles S. Kinnison, W. D. Little, C. F. Busse and W. A. Gatward.

I

IMPERIAL DROP FORGE CO., Indianapolis—Showing manufactured automobile parts. Represented by George O. Desautels, E. E. Russell and E. B. Van Horn.

INDIANAPOLIS DROP FORGING CO., Indianapolis—Dies and drop forgings. Represented by Ferdinand Barnickol, president; John C. Beyer, superintendent; Ferdinand Barnickol, Jr., and L. M. Fehrenbach, purchasing agent.

INDIANAPOLIS LIGHT & HEAT CO., Indianapolis—Industrial electrical appliances.

K

KINNEY MFG. CO., Chicago—Small motor-driven positive pressure rotating plunger pump in operation. Represented by A. J. Munday.

L

LEEDS & NORTHROP CO., Philadelphia—Exhibiting potentiometer pyrometers of the indicating, recording, signaling and controlling types; also complete equipment for heat-treating steel according to the Hump method. Practically the entire exhibit will be in operation. Represented by Henry Brewer, Oscar Brewer, Jordan Korp, C. A. Martin, G. W. Tall, Jr., and A. E. Tarr.

M

MARSCHKE MFG. CO., Indianapolis—Electric-driven tool grinders and swagers, both bench and pedestal type.

MIDVALE STEEL & ORDNANCE CO., Philadelphia—The exhibit will feature what the company is able to accomplish with its tool steels at its own works. Represented by H. E. Rowe, in charge of the tool steel department, and George A. Richardson, in charge of advertising and exhibits.

O

OAKLEY CHEMICAL CO., New York. Exhibiting the powers of Oakite cleaning materials for removing quenching and tempering oils. Represented by Maxwell Lakeman and C. A. Ormsby.

Q

QUIGLEY FURNACE SPECIALTIES CO., New York—Featuring special material used in construction and maintenance of furnaces, boiler settings, kiln ovens, etc., including "Hytempite," high temperature cement, for bonding refractory materials; "Insulbrix," a cellular insulating refractory brick for conservation of heat, and "Carbosand," a highly refractory granular material for making rammed-in linings, special tile, patches and repairs in furnace structures, used with "Hytempite" as a bonding agent.

R

W. S. ROCKWELL CO., New York—Charts and other data to show the principles governing heat-treating operations and their application in modern practice. Represented by M. L. Hollister, Detroit, and H. J. N. Voltmann, New York.

P. H. & F. M. ROOTS CO., Connersville, Ind.—A horizontal low pressure blower, motor driven (to be used for furnishing air to one half the live exhibits); an Acme gas pump, arranged for constant speed motor drive and equipped with diaphragm operated by-pass, used for boosting the gas pressure to hardening furnaces and other industrial appliances; an Acme blower for tight and loose pulley drive; an Acme blower for single pulley drive; an Acme hand blower for portable forges and blacksmith fires; horizontal low pressure blower, pulley drive, with case and headplates cut away to show the rotating parts; also the original Roots blower, made in 1859. Represented by E. D. Johnston, president; C. C. Abbott, vice-president; J. B. Patterson, Chicago district manager, and Y. R. Schively, engineer.

S

SIMONDS MFG. CO., Fitchburg, Mass.—Exhibiting in a double booth, half of which will be devoted to showing the products of the Simonds steel mill, Lockport, N. Y., consisting of carbon and high-speed steel sheets and bars, high-speed steel bits and some of the products made from Simonds steel, half to be occupied by a demonstration of a Simonds inserted tooth metal cutting saw in operation on a cold cutting-off machine. Represented by H. B. McDonald, G. R. Bird, H. D. Weed and R. A. Shaffer.

SMITH GAS ENGINEERING CO., Dayton, Ohio—A few small American Gas Furnace Co.'s furnaces, operating on clean, cold producer gas and a Smith recording gas calorimeter. Represented by R. M. Chatterton, William P. Duff and Earl E. Adams.

SPENCER TURBINE CO., Hartford, Conn.—Turbo compressors for use in supplying air to oil burning furnaces. Represented by S. E. Phillips, secretary, and H. M. Grossman, sales engineer.

STROMBERG ELECTRIC CO., Chicago—Process timing and signalling instruments for controlling the time element and preventing the process from running too short or too long a time; Stromberg No. 35 job time recorders, printing exact time of start and completion of work on any job or operation; Stromberg in-and-out employees' recorders for payroll and time records; Stromberg electric time stamps for stamping exact time on all kinds of papers passing through various departments; Wm. P. Martin, Jr., in charge of booth.

SURFACE COMBUSTION CO., New York—A combination oven furnace for heat-treating high-speed steel, a Glory hole furnace operated at 3000 deg. Fahr., and impact and tunnel burners operated with the company's high pressure system. Represented by Messrs. Hollinger, Evans and Harris.

T

TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y.—Pyrometric instruments for determining temperatures from 500 to 4500 deg. Fahr. Instruments will be in operation showing the method of application for determining temperatures, also for the control of temperatures. Represented by H. B. Brown and A. J. Wagner.

V

VANADIUM ALLOYS STEEL CO., Pittsburgh—High speed, carbon and alloy tool steel and ferrotungsten; also boards displaying various tools, such as milling cutters, threading cutters, dies, forgings, rolls, etc. Represented by J. P. Gill, metallurgist; William R. Mau, Chicago district manager; A. G. Henry, special representative; R. D. Guisewite, Indiana representative.

W

WESTINGHOUSE ELECTRIC & MFG. CO., Pittsburgh—Small furnaces for laboratories, instrument manufacturers, tool shops, etc., with temperatures up to 2000 deg. Fahr.; also, heavy duty industrial furnaces for any kind of heat treating process, any size, any capacity, temperatures up to 2000 deg. Fahr., including single end and double end furnaces. Furnaces in operation.

WILSON-MAEULEN CO., New York—Multiple type pyrometer recorder, the tapalog, its mono-pivot pyrometer indicators and three models of the Rockwell direct-reading hardness tester. Represented by Harry Goldsen, Western representative, and S. C. Horn, Pittsburgh representative.

WITHEROW STEEL CO., Pittsburgh—Samples of continuous die rolled products, together with micro studies and test data showing the comparison of physical properties of forged, upset and rolled pieces. Represented by W. C. Emory, metallurgist; H. H. Bridge, Bridge-Richards Co., Detroit; F. L. Carroll, Steel Sales Corporation, Chicago; F. G. Baldwin and J. P. Tarvin, Baldwin-Tarvin Co., Cincinnati, all sales representatives.

Three Types of Alloy Sheet Steel—II.

Details of Heat Treatment Necessary to Attain Highest Tensile Strength—Hardness and Other Data

BY HORACE C. KNERR*

THE bend specimens and one set of tensile specimens were tested as received, not heat treated. The other tensile specimens were heat treated at quenching temperatures recommended by the steel manufacturer. Two drawing temperatures were used on duplicate sets of specimens to note the effect of variations in drawing temperature. The higher temperature was aimed to give approximately 150,000 lb. per sq. in. ultimate strength.

The specimens were placed in an electric muffle furnace at approximately room temperature, heated gradually to the quenching temperature within about one hour and held for 15 or 20 min. They were then instantly quenched in oil (Houghton's No. 2 soluble), with vigorous agitation until cold. The specimens were reheated to the required drawing temperature in the same furnace, held 20 to 30 min., and allowed to cool in air. Water or oil cooling after drawing might have been preferable for the nickel-chromium steel, on account of its known tendency to temper-brittleness, but it was considered that the specimens were thin enough to insure a sufficiently rapid cooling in air. The temperatures of heat treatment were as follows:

Steel	Quenched in Oil, Deg. at	Drawn, Deg. Lot No. 1	Drawn, Deg. Lot No. 2
Chromium-vanadium steel.	1,650 F. (900 C.)	800 F. (425 C.)	950 F. (510 C.)
Nickel-chromium steel.....	1,500 F. (815 C.)	800 F. (425 C.)	900 F. (480 C.)
Nickel steel, 3.50 per cent.	1,500 F. (815 C.)	700 F. (370 C.)	800 F. (425 C.)

The limited amount of material available prevented further experimentation with heat treatment. Brinell and Shore hardness readings were taken after quenching and drawing. The weld specimens, both acetylene and electric spot, were given the same heat treatment as the 150,000 lb. per sq. in. tensile specimens.

The drawing temperature for Lot No. 2 was shown to be about correct to give 150,000 lb. per sq. in., except for the chromium-vanadium steel, which might have been better drawn at about 1000 deg. Fahr. or upward.

Note—In heat-treating chromium-vanadium steel fittings of slightly higher carbon content (0.30 to 0.40 per cent), satisfactory results have been obtained in production during the past year by regulating the drawing temperature according to Brinell hardness after quenching, which varies with thickness of piece and with tolerance variations in chemical composition, as follows:

Quench in oil at 1600 to 1625 deg. Fahr.
Brinell hardness after quenching, 375 to 420, 425 to 470, 475 to 525.
Drawing temperature, 1050, 1100, 1150 deg. Fahr.
Brinell hardness required after drawing, 275 to 350.

Variations in quenching temperature of plus or minus 25 deg. Fahr. do not greatly affect the tensile strength, ductility or hardness of chrome-vanadium steel. This was shown in a test on samples of steel of similar composition (No. 6135) quenched at varying temperatures, the results of which are given in one of the illustrations.

Bend Tests and Results

The bend specimens were tested in the condition as received from the manufacturer, or box annealed.



Bend Specimens of the Various Alloy Sheet Steels for Aircraft Parts. They were annealed and were 1 in. wide and bent over a diameter equal to their thickness

A V-block with rounded edges was used to start the bend under the compression head of a testing machine, and, after bending to about 90 deg., the specimen was flattened over a sheet of its own thickness in the machine.

The results of bend tests were very positive and are clearly shown in one of the illustrations. Two longitudinal and two transverse specimens from each sample sheet were tested. One complete set (specimen No. 2, of each pair) is shown. The results were as follows:

Bend Test—Material Box Annealed

Chromium-vanadium .....All satisfactory
Nickel-chromium .....All failed badly
Nickel steel, 3.50 per cent.
Unsatisfactory, only a few specimens passed

The 3.50 per cent nickel steel specimens, marked L, withstood bending slightly better than those marked T, otherwise there was no noticeable difference in any type of steel, between either longitudinal and transverse specimens, straight and cross rolled specimens or ⅛ and ¼ in. specimens.

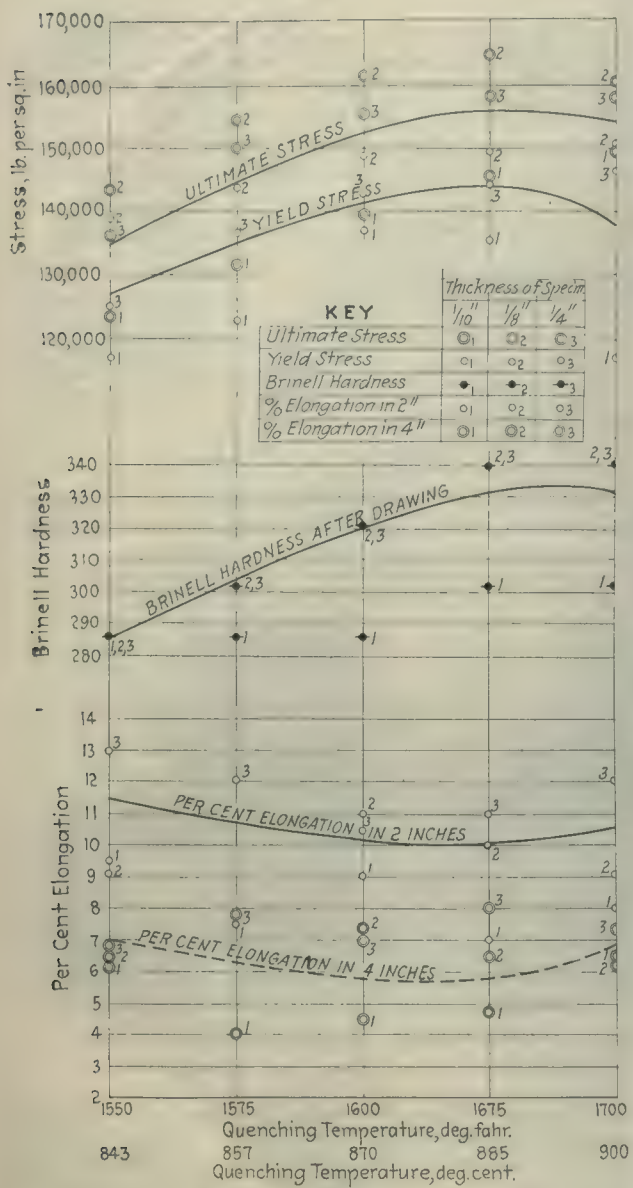
That the distinctly superior quality of the chromium-vanadium specimens in the cold bend test is due mainly to the alloy, rather than to questions of manufac-

*Metallurgist Naval Aircraft Factory, Philadelphia. The first installment appeared in THE IRON AGE Sept. 8.

ture, rolling, annealing, etc., appears probable for the following reasons:

The carbon content of the three steels is alike and the content of other elements common to two or more of them is similar.

The samples were manufactured in the same mill by the same process and presumably with the same degree of skill and care.



Effect of Variation of Quenching Temperature on Physical Properties of the Three Alloy Sheet Steels. Specimens drawn at 1100 deg. Fahr. or 593 deg. C.

All the sheets were box annealed together. (It may be hat an annealing treatment best for one alloy would not be est for another.)

Considerable quantities of chromium-vanadium steel and of 3.50 per cent nickel steel of analyses similar to the corresponding samples in this investigation, but furnished by a different manufacturer, showed similar characteristics in bending. The chromium-vanadium steel was entirely satisfactory, whereas the 3.50 per cent nickel steel failed in spite of systematic efforts to improve its quality by special annealing or heat treatment. (It is also worthy of note that a quantity of carbon-vanadium sheet steel, received from a third manufacturer, at an earlier date, failed badly in the bend test. The specified analysis of the latter steel was: Carbon, 0.35 to 0.45 per cent; manganese, 0.70 to 1.00 per cent; sulphur, 0.05 per cent max.; phosphorus, 0.045 per cent max.; and vanadium, 0.15 per cent min. Vanadium is in itself, therefore, not an assurance of satisfactory cold bending qualities.)

Possible causes of the tendency to split longitudinally in bending have been discussed in another report, No. 2M20-3.

Tensile Tests: Material, Box Annealed

A tensile specimen, direction L, from each sample was tested in the condition as received from the manufacturer, or, box annealed, corresponding to the condition in which the bend specimens were tested and in which the material is worked in fabrication. Test results are given in Table No. 1. (Specimens in direction T were not made on account of lack of material, but tests on the heat treated specimens showed little difference with direction of grain. Longitudinal and transverse tensile tests on similar material from another source in the annealed condition differed little, even when there was a pronounced tendency to split longitudinally in bending.) The following points are of interest:

The annealed chromium-vanadium steel showed the greatest average elongation and the lowest tensile strength and hardness. (The other steels, especially nickel-chromium, might have been made softer by different annealing treatment but lack of time and material prevented further experiments in this direction.)

The low ratio of yield strength to ultimate strength of all types is notable, compared with their high ratio when heat treated.

The yield point and elongation are about the same for all three alloys as would be expected from corresponding annealed carbon steel, but the ultimate strength is higher.

There was more variation in the tensile strength of the annealed specimens than was indicated by Brinell hardness readings.

Tensile Tests, Heat-Treated

The results of tensile tests on heat-treated specimens are given in the tables, with a tabulation of the qualitative differences between cross rolled and straight rolled specimens in Table No. 5. It should be borne in mind that each test represents only one specimen of a given type, thickness, condition and treatment. However, in such small samples, little if any variation between specimens is likely and Brinell hardness readings, especially after heat treatment, showed marked uniformity.

Table No. 1—Tensile Tests of Materials

STEEL, BOX ANNEALED, AS RECEIVED FROM MANUFACTURER—BEND TESTS MADE AND FABRICATION DONE IN THIS CONDITION

Chromium-Vanadium Steel (No. 6135)

Thickness	⅛ In.		¼ In.		Average
Rolled	Straight	Cross	Straight	Cross	
Mark	5L	6L	7L	8L	
Brinell No.	156	163	163	156	160
Shore No.	30	36	38	41	36
Yield lb. per sq. in.	54,000	49,000	42,500	46,800	48,000
Tensile lb. per sq. in.	75,000	100,000	76,400	73,400	81,200
Elong. in 2 in., per cent	27.5	22.5	27.5	32.5	27.5
Red. of area, per cent.	55.0	50.0	52.0	57.0	53.0

Nickel-Chromium Steel (See Analysis)

Thickness	⅛ In.		¼ In.		Average
Rolled	Straight	Cross	Straight	Cross	
Mark	9L	10L	11L	12L	
Brinell No.	199	187	207	192	196
Shore No.	27	24	28	28	27
Yield lb. per sq. in.	53,300	44,200	42,800	40,100	45,100
Tensile lb. per sq. in.	75,100	91,400	96,500	93,200	89,000
Elong. in 2 in., per cent	21.5	23.5	21.0	25.0	23.0
Red. of area, per cent.	51.0	45.0	42.0	39.0	44.0

Nickel Steel, 3.50 Per Cent (No. 2330)

Thickness	⅛ In.		¼ In.		Average
Rolled	Straight	Cross	Straight	Cross	
Mark	13L	14L	15L	16L	
Brinell No.	163	179	170	179	173
Shore No.	35	37	26	27	31
Yield lb. per sq. in.	45,300	47,600	46,500	39,100	44,600
Tensile lb. per. sq. in.	82,400	87,900	107,800	133,300	102,800
Elong. in 2 in., per cent	23.5	26.5	30.0	25.0	26.0
Red. of area, per cent.	46.0	45.0	53.0	51.0	48.0

NOTE.—Shore hardness readings of questionable accuracy. Yield points taken by drop of beam. Brinell hardness readings, 10 mm. ball, 3000 kg. load in these and all following tests.

Analysis of the data reveals a number of significant points, among which are the following:

The tensile properties of the three types of alloy steel are much alike after appropriate (but different) heat treatment; that is, by quenching each steel at its proper temperature and drawing back to give the de-

Table No. 2—Summary of Tensile Tests—Lot No. 1 (Low Drawing Temperature)
(a) Chromium-Vanadium—Quenched 1650 Deg. Fahr.—Drawn 800 Deg. Fahr.

Thick. Spec.	After Q Hb	After Q Hs	After D Hb	After D Hs	Ult. Str.	Yld. Str.	Elong. % in 2 In.	Elong. % in 4 In.	Red. of Area, %
⅛ in. 5 and 6 L1	444	66	357	60	184,750	166,600	5.0	3.1	18.4
⅛ in. 5 and 6 T1	431	63	345	39	178,600	161,500	5.7	3.7	33.4
Aver. ⅛ in.	437	64	351	59	181,670	164,050	5.3	3.4	25.9
¼ in. 7 and 8 L1	418	61	364	56	187,600	164,800	8.0	5.0	40.5
¼ in. 7 and 8 T1	431	64	364	58	185,300	160,800	8.0	4.6	36.0
Aver. ¼ in.	424	62	364	57	186,450	162,700	8.0	4.8	38.2
Grand aver.	430	63	357	58	184,060	163,370	6.6	4.1	32.0
(b) Nickel-Chromium—Quenched 1500 Deg. Fahr.—Drawn 800 Deg. Fahr.									
⅛ in. 9 and 10 L1	431	64	340	58	167,600	141,900	7.7	4.1	44.7
⅛ in. 9 and 10 T1	418	61	330	57	170,000	142,500	6.2	3.6	37.5
Aver. ⅛ in.	424	62	335	57	168,800	142,200	6.9	3.8	41.1
¼ in. 11 and 12 L1	431	63	357	58	175,700	159,400	8.5	5.3	40.0
¼ in. 11 and 12 T1	431	61	357	58	171,800	153,600	10.2	5.8	48.0
Aver. ¼ in.	431	62	357	58	173,750	156,500	9.3	5.5	44.0
Grand aver.	427	62	356	57	171,270	149,300	8.1	4.6	42.5
(c) Nickel, 3.50 Per Cent—Quenched 1500 Deg. Fahr.—Drawn 700 Deg. Fahr.									
⅛ in 13 and 14 L1	437	57	311	53	178,300	150,300	7.0	4.0	49 5
⅛ in. 13 and 14 T1	418	57	325	55	179,700	151,200	6.7	4.2	49.2
Aver. ⅛ in.	427	57	318	54	179,000	150,750	6.8	4.1	49.3
¼ in. 15 and 16 L1	416	57	330	51	178,000	156,200	9.0	4.7	47.0
¼ in. 15 and 16 T1	418	58	340	55	187,300	163,000	8.0	4.9	44.0
Aver. ¼ in.	417	57	335	53	182,650	159,600	8.5	4.8	45.0
Grand aver.	422	57	326	53	180,820	155,170	7.6	4.4	47.1

N*95.—Values given are average of straight and cross rolled specimens. This table, and Table No. 3, permit comparison between L and T specimens of each type of alloy, and also comparison between ⅛ and ¼ in. specimens.

sired tensile strength. There is no marked advantage of one type over another in respect to the combination of tensile strength and elongation (Table No. 4).

There is a pronounced difference in tensile strength and elongation between the ¼-in. and ⅛-in. thick specimens of each type of steel. The ¼-in. specimens of all types exceed the specified requirements, whereas the ⅛-in. specimens fall slightly below, either in tensile strength or ductility, or both. (Table No. 3.)

The yield stress of all the steels is closer to the ultimate than required in the specifications and exceeds the given minimum (125,000 lb. per sq. in.) even in the ⅛-in. thickness. (Table No. 3.)

Average values of all the steels considerably exceed the revised minimum elongation of 8 per cent in 2 in. at 150,000 lb. per sq. in. ultimate (Table No. 4).

Any of these steels would meet the following physical requirements at a low drawing temperature, although this is not recommended:

Ultimate tensile strength.....175 000 lb. per sq. in.
Yield strength .....150,000 lb. per sq. in.
Elongation in 2 in. (¼ in. thick).....8 per cent

For sheets under ¼-in. thick, the elongation or gage length to be some function of the thickness.

The tensile properties and Brinell hardness for a given thickness and drawing temperature are remarkably uniform in each type.

Cross rolling slightly improves the tensile strength and elongation of all the steels, taking the average of longitudinal and transverse specimens (Table No. 5).

(*Note.*—As stated specimens marked longitudinal (L) and transverse (T) may have been reversed in some instances, owing to the absence of means for determining positively which were the true directions in the samples).

The cross rolled samples show, in general, slightly less variation between L and T specimens than shown in the straight rolled samples. This was to be expected, but the difference hardly warrants extra expense in manufacture.

The variation of tensile strength and elongation between L and T specimens in the straight rolled samples is greater than for cross rolled, but is slight for all the steels and follows no definite rule. (In four cases out of 12 the specimens having highest tensile strength also show greatest elongation in 2 in.; in five cases the reverse is true, and in three cases the tensile strength or elongation is practically the same, with the other factor showing a very slight difference.)

The lower percentage elongation of thin specimens in a given gaged length may obviously be explained

Table No. 3—Summary of Tensile Tests—Lot No. 2

DRAWING TEMPERATURE AIMED TO GIVE 150,000 LB. PER SQ. IN. ULTIMATE STRENGTH
(a) Chromium-Vanadium—Quenched 1650 Deg. Fahr.—Drawn 950 Deg. Fahr.

Thick. Spec.	After Q Hb	After Q Hs	After D Hb	After D Hs	Ult. Str.	Yld. Str.	Elong. % in 2 In.	Elong. % in 4 In.	Red. of Area, %
⅛ in. 5 and 6 L2	431	63	269	51	157,500	143,500	7.7	4.7	37.6
⅛ in. 5 and 6 T2	431	62	273	47	153,500	140,000	8.0	5.2	43.2
Aver. ⅛ in.	431	62	271	49	155,500	141,750	7.8	4.9	40.4
¼ in. 7 and 8 L2	431	63	316	46	164,200	148,500	9.7	5.7	41.5
¼ in. 7 and 8 T2	437	64	336	49	165,000	145,400	10.2	6.0	36.0
Aver. ¼ in.	434	63	326	47	164,600	146,900	9.9	5.8	38.7
Grand aver.	432	62	298	48	160,050	144,320	8.8	5.3	39.5
(b) Nickel-Chromium—Quenched 1500 Deg. Fahr.—Drawn 900 Deg. Fahr.									
⅛ in. 9 and 10 L2	418	63	294	47	147,700	135,300	9.0	5.5	45.1
⅛ in. 9 and 10 T2	416	63	302	49	147,700	134,500	8.5	4.7	39.4
Aver. ⅛ in.	417	63	298	48	147,700	134,900	8.7	5.1	42.2
¼ in. 11 and 12 L2	439	64	330	51	157,600	146,000	10.0	5.6	43.5
¼ in. 11 and 12 T2	431	63	336	49	158 600	141.600	11.7	6.5	47.0
Aver. ¼ in.	435	63	333	50	158.100	143.700	10.8	6.0	45.2
Grand aver.	426	63	315	49	152,900	139,300	9.7	5.5	43.7
(c) Nickel, 3.50 Per Cent—Quenched 1500 Deg. Fahr.—Drawn 800 Deg. Fahr.									
⅛ in. 13 and 14 L2	418	56	293	47	144,600	129,700	9.0	5.1	51.2
⅛ in. 13 and 14 T2	423	58	289	46	146,500	133,500	9.5	5.0	45.8
Aver. ⅛ in.	420	57	291	46	145,550	131,600	9.2	5.0	48.5
¼ in. 15 and 16 L2	418	57	307	46	152,600	138,000	10.7	6.6	50.7
¼ in. 15 and 16 T2	418	56	303	45	153,500	141,400	10.0	5.5	45.1
Aver. ¼ in.	418	56	305	45	153,050	139,700	10.3	6.0	47.9
Grand aver.	419	56	298	45	149,300	135,650	9.7	5.5	48.2

NOTE.—Same as Table No. 2, showing values with drawing temperature aimed to give 150,000 lb. per sq. in. ultimate stress.

by their smaller necking down. Strictly, the gaged length should be a function of the dimensions of the cross section in determining ductility by percentage elongation, or the required elongation should be a function of the thickness or area.

The lower unit tensile strength of the thinner specimens of corresponding analysis and heat treatment was probably caused by surface decarburization done in heating, rolling and annealing, which for a given depth would have a greater proportional effect on thin specimens than on thick.

Another possible explanation is that the thick specimens were not drawn as effectually as the corresponding thin specimens under the same heat treatment. This supposition is strengthened by the fact that the average Brinell hardness readings were, in general, about alike for ⅛ and ¼ in. specimens after quenching, whereas after drawing the thin specimens were all decidedly the softer. The temperature and time of drawing were identical, the specimens being treated together, but the thin specimens were doubtless penetrated more quickly by the heat. A longer time of drawing should equalize this condition, if it exists.

Hardness Tests

Hardness tests were made on all specimens, as received, after quenching and after drawing. Results are given in the tables with tensile tests. The following points are noteworthy:

As received, in the box annealed condition, the chromium-vanadium steel was softest and nickel-chromium the hardest in Brinell test. (Table No. 1.) This hardness gradation corresponds with the order of brittleness of the three types of steel under the bend test, but it is believed insufficient alone to account for the great difference in bending qualities of the steels.

Very roughly, the Brinell hardness number multiplied by 500, equals the ultimate tensile strength

Table No. 4—Final Summary of Tensile Tests
Averages, ⅛ and ¼ in. Specimens
Lot No. 1—Low Drawing Temperature (From Table No. 2)

Steel	Chromium-Vanadium	Nickel-Chromium	Nickel, 3.50 Per Cent
Oil quenched, deg. Fahr.	1,650	1,500	1,500
Brinell hardness, quenched	430	427	422
Shore hardness, quenched	63	62	57
Drawn at deg. Fahr.	800	800	700
Brinell hardness, drawn	357	356	326
Shore hardness, drawn	58	57	53
Ultimate stress, lb. per sq. in.	184,060	171,270	180,820
Yield stress, lb. per sq. in.	163,370	149,300	155,170
Elong. 2 in., per cent	6.6	8.1	7.6
Elong. 4 in., per cent	4.1	4.6	4.4
Red. of area, per cent	32.0	42.5	47.1

Lot No. 2—Medium Drawing Temperature
(Aimed to Give 150,000 Lb. Per Sq. In. Ultimate Strength)
(From Table No. 3)

Oil quenched from, deg. Fahr.	1,650	1,500	1,500
Brinell hardness, quenched	432	426	419
Shore hardness, quenched	62	63	56
Drawn at deg. Fahr.	950	900	800
Brinell hardness, drawn	298	315	298
Shore hardness, drawn	48	49	45
Ultimate stress, lb. per sq. in.	160,050	152,900	149,300
Yield stress, lb. per sq. in.	144,320	139,300	135,650
Elong. 2 in., per cent	8.8	9.7	9.7
Elong. 4 in., per cent	5.3	5.5	5.5
Red. of area, per cent	39.5	43.7	48.2

REMARKS.—It is noteworthy that Brinell and Shore hardness after quenching, of Lots 1 and 2, agree very closely, showing uniformity of material.

of the annealed specimens, but there are some pronounced exceptions to this rule in all three types.

The Shore hardness readings are given for what they are worth, but they do not appear to bear a constant relation either to the Brinell hardness, the yield strength or the ultimate strength of the annealed steels.

The Brinell and Shore hardness of all specimens is of the same order after quenching, independent of the alloy and thickness. (Tables Nos. 1a, 1b, 1c.)

The Brinell hardness after drawing, multiplied by 500, gives a fairly close approximation of the ultimate tensile strength, for all the steels at both drawing temperatures, and independent of thickness. The error is, in general, less than 10 per cent, and lies on the safe side for the chromium-vanadium and 3.50 per cent nickel steel (Tables Nos. 1a and 1c), but the estimated value is above the true value for the nickel-chromium steel.

The Brinell hardness after drawing was, in general, lower for the ⅛-in. than for the ¼-in. specimens (Tables Nos. 2 and 3). This corresponds with the lower tensile strength of the ⅛-in. specimens, but is contrary

Table No. 5—Straight vs. Cross Rolling
Qualitative Comparison, Ultimate Stress (S) and Elong. in 2 In. (E)

Drawn Deg. Fahr.	Thickness In.	
Chromium-Vanadium Steel		
800	⅛	Cross slightly greater S and greater E
	¼	Cross slightly greater S and greater E
950	⅛	Cross slightly less S and greater E
	¼	Cross slightly less S and same E
	(5 greater, 2 less, 1 same)	
Nickel-Chromium Steel		
800	⅛	Cross slightly greater S and greater E
	¼	Cross slightly less S and less E
900	⅛	Cross slightly greater S and less E
	¼	Cross slightly greater S and greater E
	(5 greater, 3 less)	
Nickel Steel, 3.50 Per Cent		
700	⅛	Cross slightly greater S and greater E
	¼	Cross slightly greater S and same E
800	⅛	Cross slightly less S and greater E
	¼	Cross slightly greater S and same E
	(5 greater, 1 less, 2 same)	

NOTE.—All types show a slight advantage in cross rolled specimens, that is, they tend to have a higher average ultimate stress and elongation than the straight rolled specimens. The differences are very moderate, however.

to what would be expected from their more rapid cooling in quenching.

The Brinell test is obviously of great value in the inspection of parts after heat treatment. (A load of 3000 kg. with a 10 mm. ball was used throughout, and found satisfactory for the ⅛- as well as the ¼-in. thickness, but for lighter gages a lighter weight and possibly a smaller ball would be necessary, to avoid penetrating the sheet.)

Shore scleroscope readings on the heat-treated specimens show considerable uniformity for each type of steel and may possibly be used as a check upon the heat treatment of parts. Brinell readings are believed to be more reliable when they can be satisfactorily made.

(To be concluded)

Land to Be Acquired, Despite Objections of Illinois Steel Co.

MILWAUKEE, WIS., Sept. 12.—Forty-three acres of land on the south end of Jones island, belonging to the Illinois Steel Co., and partly occupied at present as docks and storage of the Bay View blast furnaces and rolling mills, will be acquired by the city of Milwaukee under condemnation proceedings. The decision was made after a series of hearings conducted by a jury empaneled to determine the necessity for condemnation of the property as a part of the site of proposed municipal lake and rail terminals and docks to insure the completion of the outer harbor project, which is being hastened to execution with the prospect of the consummation of the Great Lakes-St. Lawrence River deep waterway. The Government will expend $4,000,000 in completing the outer breakwater, according to assurances given the jury by Col. W. V. Judson, United States division engineer.

The Illinois Steel Co. opposed the condemnation of its property and at the final hearing held Aug. 31, E. J. Buffington, president of the company, presented a formal statement which read in part as follows:

Absolutely no extension or addition to the plant could be made on account of the lack of room therefor.

On account of the limited space for the storage of raw material, present operations would be curtailed from 50 to 75 per cent.

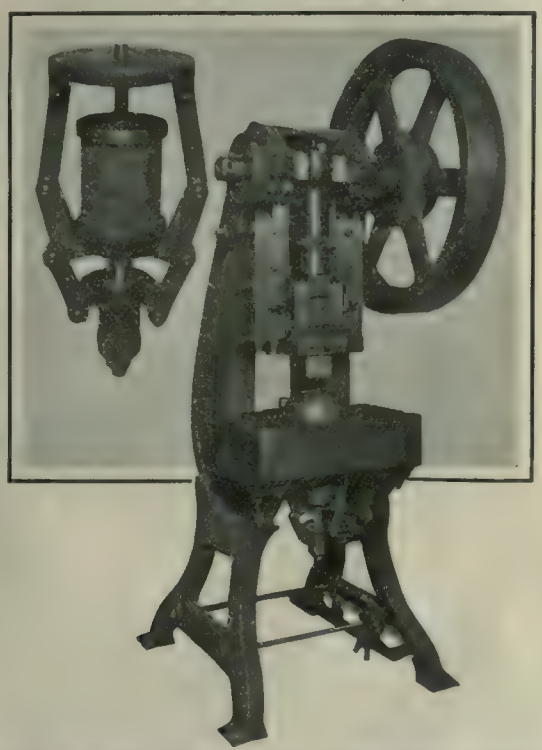
Blast furnaces could no longer be maintained for the reason that there would be no storage room. . . . Little likelihood that this company would wish to spend any money repairing, replacing or remodeling the present layout under such circumstances.

This company would eventually be compelled to abandon the plant on account of the inability to operate the same at its present capacity and on account of the inability to extend the same.

New Attachment for Combination Dies

The E. W. Bliss Co., Brooklyn, N. Y., is bringing out the combination toggle joint spring pressure attachment shown in the accompanying illustration. It is said to possess marked advantages for users of combination dies, particularly where lithographed metal is handled.

The attachment is designed to effect uniform drawing pressure on the blank during the entire draw, producing a more uniform edge and increasing the efficiency of the process by minimizing strain on the metal, reducing wrinkles, breakage and wear on the dies. The application of the toggle motion, in addition to giving a uniform pressure, reduces the total rubber or



The Application of the Toggle Motion Gives Uniform Pressure and Reduces Rubber or Spring Compression

spring compression materially. Strain on the press is reduced and saving in power effected by the elimination of accumulative spring pressure. The reduced compression adds considerably to the life of the rubber or spring, and is said also to permit of economical manufacture with combination dies of shells deeper than heretofore practical. Where reducing operations follow the first cutting and drawing the number of operations can be reduced and certain work that formerly required double action dies can be done in combination and reducing dies. A further advantage offered is that the reduced spring or rubber compression results in proportionate reduction of "back lash" of the press on the up stroke.

The attachment is regularly built in four sizes for standard Bliss presses and to install, no change in the press equipment is necessary. The dies can be removed as with the old style attachment. The depth of draw obtainable on presses No. 18, 19, 20 and 21 is 1¼, 1½, 2 and 2½ in., respectively. To obtain the maximum draws, given presses must have the same stroke and die space as necessary with the old style attachment. While a shell of greater depth may be drawn than with the old style, it is to be understood that to get the maximum depth of draw, correct working proportions between diameter and depth of shell must be maintained.

The Hendee Mfg. Co., Springfield, Mass., motorcycles, has reduced prices on its product 22½ per cent. Two new models have been added to the company's line.

Heavier Freight Movement at Pittsburgh

PITTSBURGH, Sept. 12.—A revival in business that is slow but still perceptible is noted in freight traffic figures for the Pennsylvania, the Baltimore & Ohio and the Pittsburgh & Lake Erie railroads. While purchases of goods and materials are held back in many instances on account of the adjustment of wages and costs, confidence is again an element in the business world.

The Pennsylvania Railroad reports that daily average loaded cars dispatched in the Central Region in August numbered 23,423, an increase of 509 over July, the daily average. The banner day was Aug. 27, when 27,527 were dispatched. For the same month last year, an average of only 16,000 cars was moved daily. Coke shipments from the Connellsville region reflected the low rate of production of blast furnaces and foundries. Shipments for August showed an average of only 400 cars, or 16,000 tons daily, as compared with about 800 cars a day one year ago.

The Pittsburgh & Lake Erie Railroad reports a 10 per cent improvement in the movement of freight in August as compared with July. Shipments of steel, coke, builders' supplies and cement over the company's line from Pittsburgh to Youngstown all showed increases.

The Baltimore & Ohio Railroad reports improvement in shipments of iron, steel, road building materials and coal. Increases in shipments have been recorded in Pittsburgh, Cleveland and Youngstown. Coke shipments on this road are reported to be 10 per cent lower than for the same period a year ago.

New Quick Change Gear Lathes

The South Bend Lathe Works, South Bend, Ind., has added to its line of engine lathes a quick change gear pattern which will be furnished in sizes from 9 to 24 in., swing, inclusive. The plain change gear lathes will be made in the same sizes, as heretofore.

The quick change gear box used is the same as that on the Flather lathe, the company having secured the



Forty-eight Changes Are Obtainable for Both Feeds and Threads

shop rights covering that design. Forty-eight changes are obtainable both for feeds and threads, these changes applying also to the cross feed. All gears in the box are made from steel forgings. As shown in the accompanying illustration the index plate on the box is arranged to receive the plunger for the different changes, the crank lever above being used to operate the clutch of the inside which controls 1 for 2 and 2 for 1 gears. The lever is thrown up from the bottom. Opposite each hole on the bottom there is a notch and as the lever is brought up to make a change an extension on the inner side of the lever drops into the notch, no adjustment being necessary.

The regular equipment includes large and small face plates, graduated compound rest, follower rest (not on the 9 and 11-in. lathes) adjustable stop for screw cutting, semi-machined chuck back, gear guards, wrenches and countershaft.

The City of Youngstown, Ohio, has awarded a contract to the National Cast Iron Pipe Co. to supply pipe 20-in. or under for the first unit of a proposed belt line to be constructed around the city by the water works department. The company bid $38.10 per ton.

Screw Stock Heat Treated With Oil

Application of the Mircs System to Ferrous and Non-Ferrous Material by the Bridgeport Screw Co.—Operating Data

AN application of oil-burning equipment for annealing, heat treating and drying screw stock on a large scale was recently made by the Bridgeport Screw Co., Bridgeport, Conn. The type installed is of the Mircs design for which F. J. Ryan & Co., Philadelphia, are both the contractors and engineers, having recently taken control of the Mircs Fuel Oil Equipment Co. The installation is claimed to be typical of the flexibility of oil burning in heating problems and as an example of its economy. A description of the installation, furnished by F. J. Ryan, president of the company, follows:

The installation covers five pot muffle annealers, one small gage wire annealer used for both ferrous and non-ferrous products and two drying ovens. The Mircs No. 2 universal burner was used throughout the installation with air pressures of approximately 14 oz. The burner mechanically atomizes the oil and is adjustable for use of low or high gravity oils at either low or high pressures. Rearrangement for either operation can be made without the removal of the burner which allows for adjustment to oil market conditions. In the present operations described, Mexican oil of the standard grades now obtainable is used at a pressure of approximately 10 lb.

The manufacturing process surrounding the heat-treating departments is one of exacting demands and the question of uniform, regulated annealing and drying has a direct connection with the ultimate resulting product. The procedure in this department is, first, thorough annealing at temperatures ranging from 1400 to 2000 deg. Fahr. in accordance with the requirements of the charge; second, pickling by a special method developed by the engineers of the Bridgeport Screw Co., and third, a thorough and regulated drying at a temperature of approximately 475 deg. Fahr. The last operation is of keen interest because it is the correctness of this operation that decides to a large degree the quality of the finished product.

After annealing, when the wire is treated in the pickling vats, it must be dried over a proper period and at a proper temperature to eliminate and kill the action of acids that may remain after washing. Unless this remaining acid is thoroughly removed by this drying process, it gradually eats into the steel and the majority of screw head defects can be attributed directly to it. This drying must take place in an atmosphere entirely free of gases. It was therefore necessary to so design the ovens as to secure the heat without exposing the material to the direct action of the gases developed in the burning of the oil.

This was accomplished by building a system of refractory channels emanating from the main combustion chamber, the top of which was covered with interlocking curved cast iron cover plates, the interlocking edges having channel sections for luting. The heat therefore developed in the combustion chamber travels through these flues, heating up the cover plates, and the resulting temperatures in the oven are secured by the radiation from these plates.

It was found that by running two burners on each oven at approximately 800 to 1000 deg. Fahr., a resulting temperature of 450 to 475 deg. Fahr. was obtainable in the baking chamber. It was also found that this could be increased or decreased by adjusting the quantity of the oil being burned.

The pot annealers through which the wire first passes are so constructed that the entire combustion takes place in two combustion chambers at the bottom of each pot directly opposite to each other. The heat developed passes through flues into the annealing chamber by ports distributed in such a way as to give even distribution. Cast iron pots are used as retainers for the wire during annealing, having sealed covers to eliminate any possibility of action from the surrounding gases.

The main casing of the furnace is of riveted steel plate with a structural ring holding refractories constituting the cover. Exhaust gases pass through ports in this cover directly into the room and are exhausted through vents in the roof. No detrimental results have been experienced from these exhaust gases. The following is a brief summary of some of the many heats that have been run on this equipment:

Pot Furnaces

Fur No.	Starting Furnace, p.m.	Temp., Deg. Fahr.	Heat Ended, a.m.	Temp., Deg. Fahr.	Fuel Used	Charge in Lb.	Gals. per Hr.	Gals. Per T.
1	11:00	1,602	8:00	1,681	77	10,667	8.66	4.33
2	11:00	2,048	8:00	2,113	65	10,667	7.00	3.50
3	11:00	1,589	8:00	1,663	74	10,667	8.00	4.00
4	11:00	1,700	6:00	1,800	100	10,667	14.28	7.14
5	11:00	1,333	6:00	1,427	94	10,667	13.28	6.71
1	6:00	1,682	3:00	1,773	91	10,667	11.11	5.55
2	6:00	2,115	3:00	2,204	89	10,667	9.88	4.99
3	6:00	1,666	3:00	1,750	84	10,667	9.32	4.66
4	5:00	1,801	3:00	1,902	101	10,667	12.62	6.31
5	5:00	1,428	3:00	1,507	79	10,667	9.87	4.93

It will be noted that the time of annealing runs between seven and nine hours and that the charge per pot averages slightly more than five tons.

The average oil consumption is in the neighborhood of 90 gal. per furnace or practically 20 gal. for each ton of material brought to temperature and carried through the proper time range. Taking oil at the present average market quotation of 5c. per gal., the cost of fuel is roughly $1 per ton. However, in this instance, nearly 40 per cent of the total weight is invested in the pot and the coil support which can not be considered. Therefore it can be conservatively estimated that $1.60 is the present fuel oil cost in this annealing process. The temperature in the furnaces at the start and finish varied very little which is an indication of the controlability of fuel oil where temperature control is of interest.

The small annealing furnace takes care of annealing of the special light gage wire products, some of which are of the thinness of thread and demand the most exacting attention through this process. The material is coiled in small light gage steel containers which have tight fitting covers. The quantity of the charge varies greatly in accordance with the size of the wire. The furnace has a rated capacity of one ton. The following is a brief extract of a six days' run on this furnace:

Small Annealing Furnace

Starting Furnace a.m.	Temp., Deg. Fahr.	Heat Ended p.m.	Temp., Deg. Fahr.	Fuel Used
7:00	77	6:00	128	51
7:00	128	6:00	171	43
7:00	171	6:00	199	28
7:00	199	6:00	254	55
7:00	254	6:00	298	44
7:00	298	6:00		

It will be noted that the temperature range on this equipment was also well under control.

The following are the results obtained on two runs in the No. 1 bake oven. Both of these ovens are of the same general design and it can therefore be con-



The Pot Muffle Annealers, Oil-Fired, for Annealing Ferrous and Non-Ferrous Wire Stock for Screws at the Plant of the Bridgeport Screw Co., Bridgeport, Conn.

sidered that the results will be approximately the same.

Run No. 1

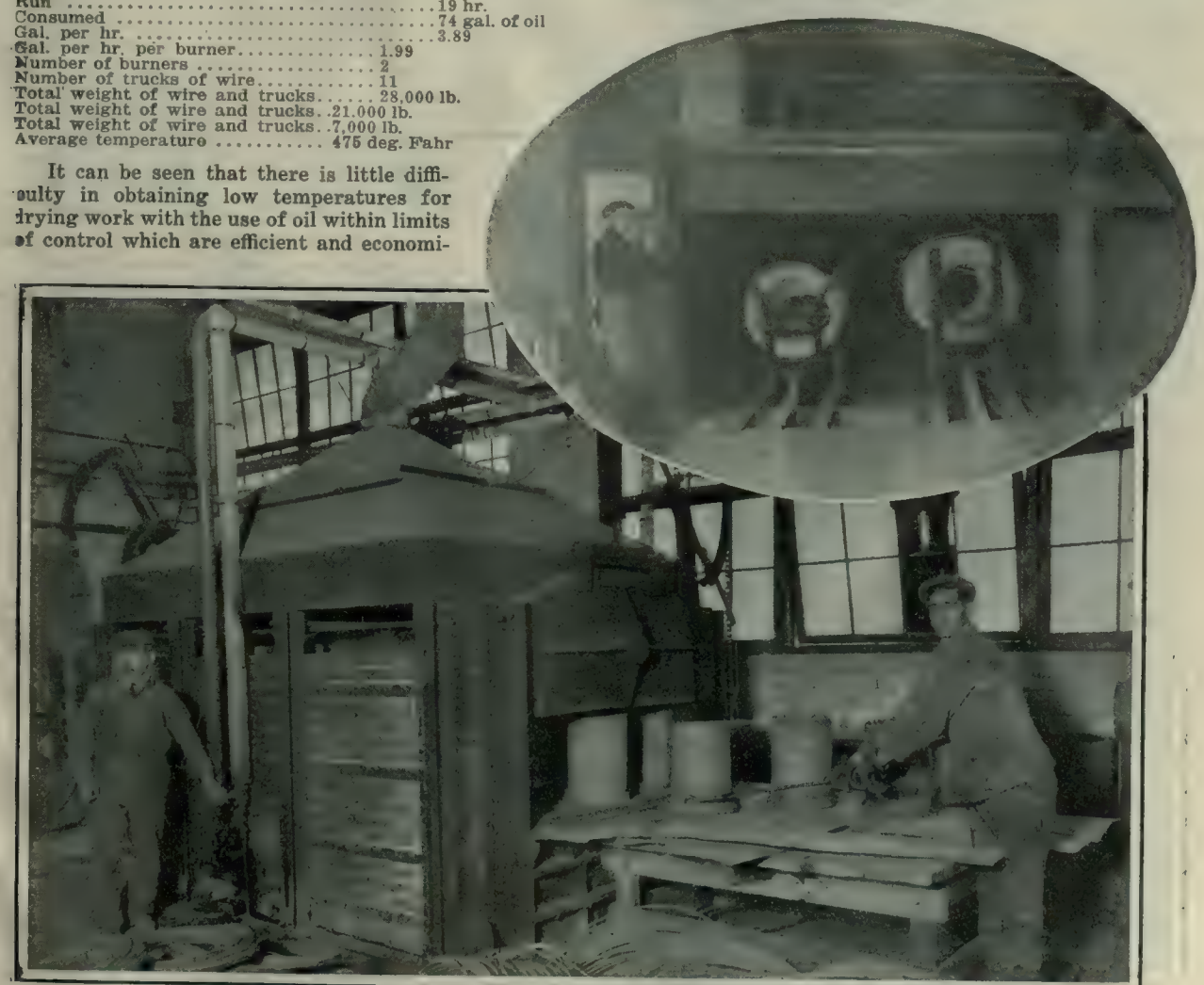
Run	19 hr.
Consumed	80 gal. of oil
Gal. per hr.	4.21
Gal. per hr. per burner	2.10
Number of burners	2
Number of trucks of wire	14
Total weight of wire and trucks	39,000 lb.
Total weight of wire and trucks	28,000 lb.
Total weight of wire and trucks	11,000 lb.
Average temperature	475 deg. Fahr.

Run No. 2

Run	19 hr.
Consumed	74 gal. of oil
Gal. per hr.	3.89
Gal. per hr. per burner	1.99
Number of burners	2
Number of trucks of wire	11
Total weight of wire and trucks	28,000 lb.
Total weight of wire and trucks	21,000 lb.
Total weight of wire and trucks	7,000 lb.
Average temperature	475 deg. Fahr

It can be seen that there is little difficulty in obtaining low temperatures for drying work with the use of oil within limits of control which are efficient and economical and in operations where the necessity of the entire elimination of gases is of prime importance.

The installation described herewith is presented to indicate clearly the fact that a modern, up-to-date organization producing high grade materials in a competitive market has determined that oil burning will give the results necessary and still solve the economical demands. It is believed to be a case which demonstrates that the industry and the technician must still give due consideration to the use of oil as fuel in certain heat-treating developments.



Oil-Fired Annealer for Small Gage Wire and One of the Two Drying Ovens for Drying the Screw Stock

Novel Mechanical Molding of Car Wheels

Foundry Has Moving Platform to Handle Molds from Molding Machines, Through the Pouring Stage and to the Shake-out Machines

FOUNDRIES producing car wheels have been confronted with a number of obstacles which have largely prevented the use of molding machines. The weight and size of the castings and the large amount of sand required for making the molds, together with the space required for the storage of these molds as ordinarily made, created the feeling that many of the economies obtained from the use of machines were difficult to obtain. The desire to cut costs provided the incentive that enabled the Brown Car Wheel Works, Inc., Buffalo, N. Y., to overcome many of these difficulties in rather an interesting manner.

The method of making car wheels is well known, and was analyzed into the following principal divisions:

1—Making the molds, together with the delivery of the sand to the molding floor.

2—Removing the molds from the molding point.

3—Pouring the metal.

4—Allowance of time for cooling.

5—Shaking the castings and sand from the flasks.

6—Removing the castings to the soaking pits.

7—Transporting the sand, properly tempered, back to the storage bins.

8—Returning the flasks to the molding point.

It was decided that, if substantial economies were to be obtained, it would be necessary, so far as possible, to perform these operations mechanically. The installation of molding machines would eliminate much of the labor of making the molds, and the handling of the molds was accomplished by a moving platform, composed of a number of cars, each of suitable size for carrying a mold.

In the outline plan of the installation it will be noted that the cars making up the platform *P* run on a track layout of rectangular shape. The design of the platform is unique in that each car, upon arriving at a corner, without turning, automatically starts in a direction at right angles to its previous motion.

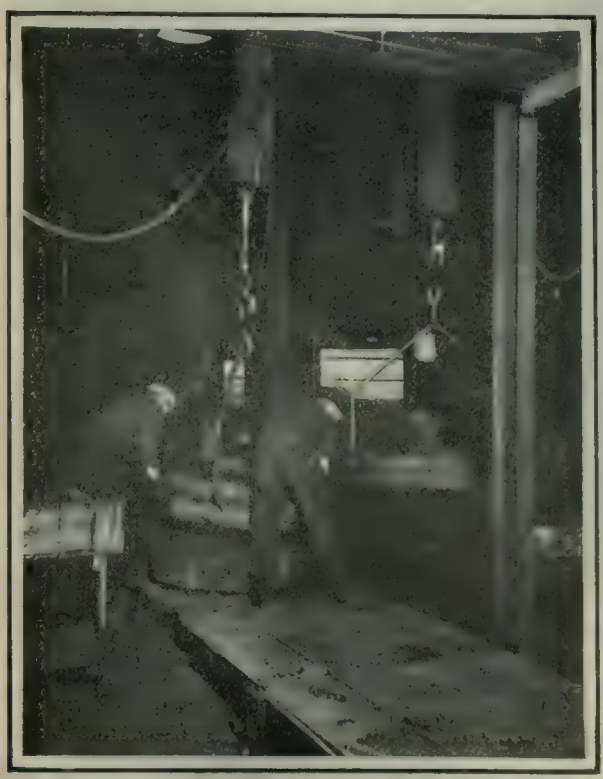
The platform has an intermittent motion, regulated to suit any required condition, and the lines of cars on each side of the rectangle are moved independently. It is operated by pneumatic equipment controlled from station *F*, which is elevated sufficiently for the control operator to get an unobstructed view of the foundry.

On two sides of the rectangle there is one less car than is required to fill the space completely, and the design of the control is such that, upon movement of the control lever by the operator, the platform on one of these sides is advanced a distance equal to one car, the open space at the end of the line permitting this. The line on the opposite side is next advanced the same distance, these two movements thus leaving vacant spaces at the end of each of the other two lines, thus causing the platform to be moved in increments, each equal to the length of one car.

As the action of the control is semi-automatic, the four sides of the platform cannot be advanced other than in correct sequence, and an emergency stop with which the control is equipped makes it possible instantly to stop any side. The intermittent motion of the platform allows it to have the very desirable feature of remaining stationary while the mold is being closed and during pouring. The cars start very slowly from rest, attain maximum speed and then are very gradually retarded, coming to rest with no appreciable jar.

There is little chance for sand and dirt to get on the track, as it is raised well above the level of the foundry floor, and the sides of the cars not only overhang the track, but, being accurately machined on all sides, are in close contact, thus preventing dirt from falling on the track.

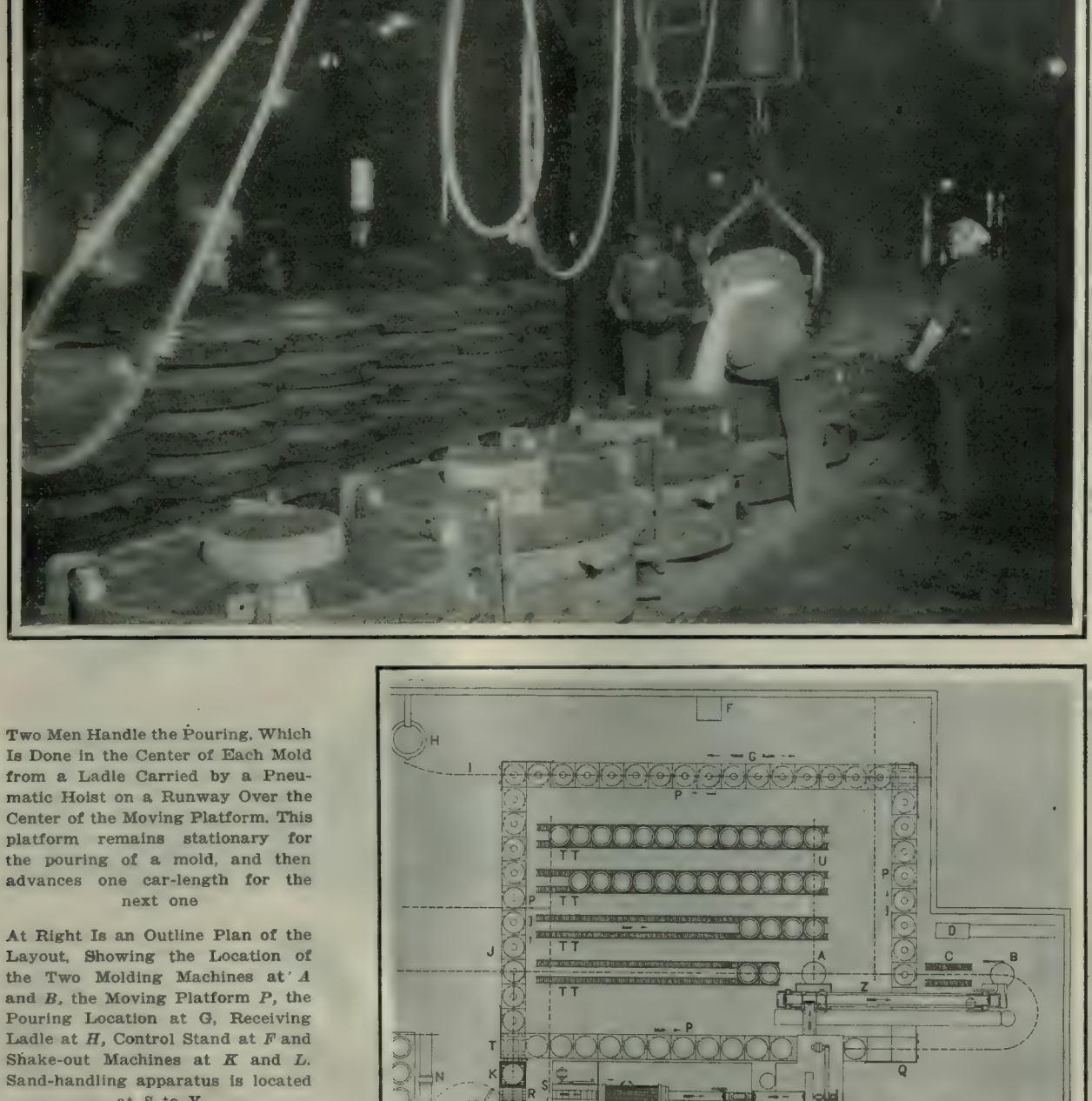
The drags are made on a jar ram roll-over type of machine located at *B*, sufficiently removed from the platform *P* to allow a section of gravity conveyor *C* to be installed, upon which the drag is deposited after ramming and drawing the pattern. The cores are then set, being delivered by the truck *D* from the core room,





At Left, a Cope Is Being Closed on Its Drag, Resting on the Moving Platform; Another Hangs Near; a Third Is Behind the Column

Above, the Two Molding Machines Are Provided with Sand Chutes to Deliver Sand Directly to the Flasks. Moving platform appears at right, and then runs across between the two machines



Two Men Handle the Pouring, Which Is Done in the Center of Each Mold from a Ladle Carried by a Pneumatic Hoist on a Runway Over the Center of the Moving Platform. This platform remains stationary for the pouring of a mold, and then advances one car-length for the next one

At Right Is an Outline Plan of the Layout, Showing the Location of the Two Molding Machines at *A* and *B*, the Moving Platform *P*, the Pouring Location at G, Receiving Ladle at *H*, Control Stand at *F* and Shake-out Machines at *K* and *L*. Sand-handling apparatus is located at *S* to *Y*

and the drag is slid onto a car of the platform *P*. During this time, a cope has been completed on the machine *A*, and when finished is closed over the drag already resting on the platform. In the meantime, another cope and drag mold are being made on their respective machines.

The movement of the platform brings a succession of empty cars up to receive molds, and advances them to the pouring position *G*, the clamping being done at any convenient point between these two positions.

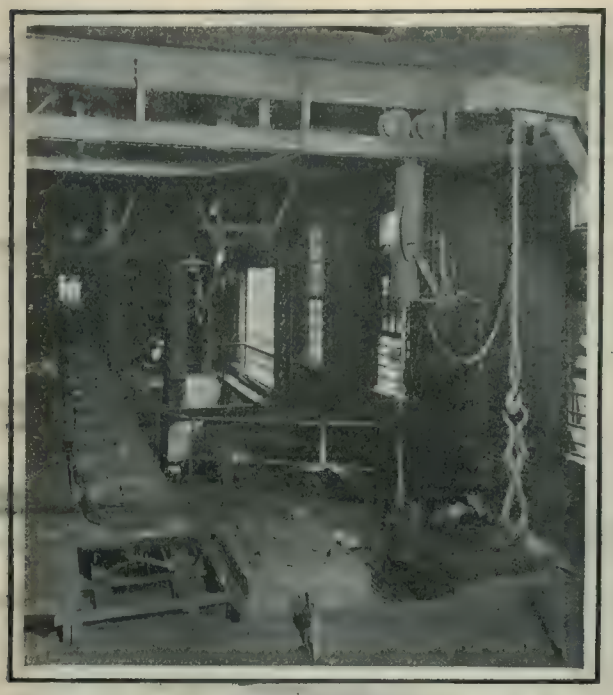
Iron is taken from the receiving ladle *H* in a secondary ladle suspended from an air hoist carried by a trolley running on the track *I*, located directly over the center of the platform. The pouring is done by two men, one standing on either side of the platform, and pouring into the center of the mold. After pouring, the molds are advanced to the position *J*, the time required to travel this distance being allowed for a preliminary cooling of the castings.

On arriving at *J*, the molds are unclamped and carried by an air hoist to the shake-out machine *K*, and the cope carrying the casting is removed to the shake-out machine *L*. After jarring the sand loose, the drag flask is placed on a car in the position *T* and carried by the platform to point *Q*, where it is removed by a trolley to molding machine *B*. The cope flask is carried by a trolley and deposited on the line of gravity conveyors *TT*, pitched toward *U*.

The chiller for chilling the tread of the wheel is bolted to the cope flask, and as it is desirable to allow time for these to cool, a surplus is provided, stored on these lines of conveyors *TT*. A trolley equipped with an air hoist takes them off from the lower end *U* of this gravity conveyor, and deposits them on the molding machine *A* as required.

Sand, as shaken out of the molds, falls through a grating onto the inclined pan conveyor, which delivers it to a rotary screen, where all heavy material is removed. From the screen, the sand falls onto a belt passing over a magnetic pulley removing any iron, and then into an elevator, where it is carried to the top of the building. Here it is automatically tempered, cut and delivered to sand storage bins over the molding machines.

In the view showing the cope being closed on the drag resting on the platform, it will be noted that another finished drag mold is suspended from an air hoist at the right, ready to be deposited on the next





Above Are the Two Shake-out Machines, with Sand-Handling Apparatus in the Pit, and One Line of the Moving Platform at Left

At Right Is Shown the Pouring Location, with Control Platform Against the Wall at Right and Receiving Ladle Beyond It, Under the Cupola Spout. The track overhead carries the pouring ladle

empty car. Still another drag may be seen resting on the gravity conveyor, ready for cores to be set. The view across the two molding machines gives their relative position to the platform and indicates the sand chutes for delivering sand to the flasks.

It requires only two men to pour for the entire foundry, as shown in another view. It should be especially noted that there are no obstructions around, the pouring being done under practically ideal conditions. The view of this section, taken when the foundry was not in operation, makes clearer the location of the pouring track over the platform. The control station can also be seen on the elevated platform in the center of this picture.

The location of the two shake-out machines with reference to the platform is shown in one view, as well as some of the sand handling equipment located in the pit below the floor level. The installation of all this equipment not only made it possible to get the greatest benefit from the use of molding machines, but also to reduce greatly the cost of labor.

One special feature worthy of notice is that the maximum distance that the hot castings are carried, from the time they are taken out of the molds until they reach the soaking pits, does not exceed 15 ft. This greatly improves the quality of the castings, as they all reach the soaking pits at a uniform heat, which is impossible to accomplish with the old method of pouring, where it was necessary to carry the castings varying distances, up to more than 100 ft.

It is now possible to obtain the same quantity production as formerly, in about one-half the floor space. The loss from bad castings has not only been greatly reduced, but the quality of the castings has been improved, and it is possible to obtain a greater uniformity in weight.

Designed by the Industrial Planning Corporation, engineers, Buffalo, the construction was supervised by E. B. Norris, general manager of the Brown Car Wheel Works. The Hermann Pneumatic Machine Co., Pittsburgh, furnished the molding and shake-out machines; the air hoists were made by the Curtis Pneumatic Machine Co., St. Louis. The Mathews Gravity Carrier Co., Ellwood City, Pa., furnished the gravity conveyors; the sand handling equipment was furnished by C. O. Bartlett & Snow Co., Cleveland. The trolley installation, known as the S-T system, was manufactured by the Whiting Corporation, Harvey, Ill.

French Iron and Steel Production Costs

Some figures on production costs were recently contributed to *Information* of Paris by Albert Despaux, who wrote with the evident purpose of pointing out the distress of the French industry in meeting the competition of Germany and that of countries having a depreciated currency. The cost of materials for producing a metric ton of basic pig iron, a ton of ingots, etc., as translated by the *Iron and Coal Trades Review* of London, is as follows:

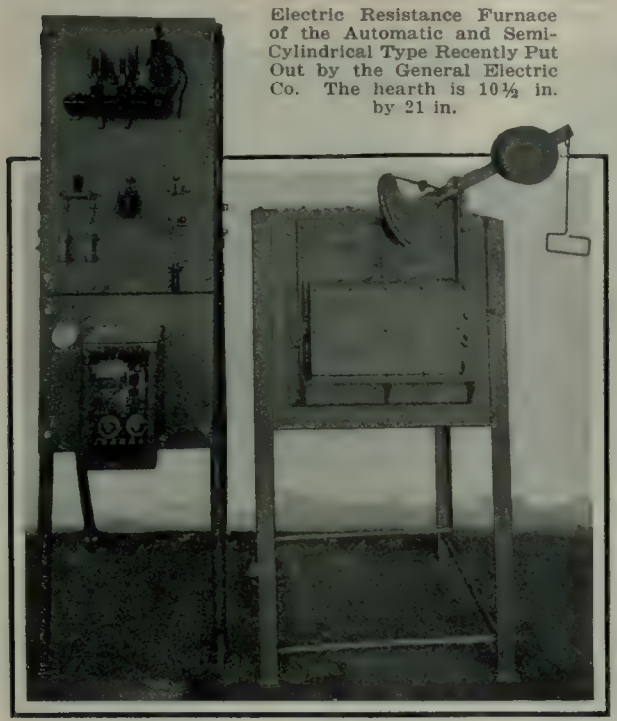
	Francs
3,250 kg. ore at 20 fr.	65
1,300 kg. coke at 125 fr.	162.5
60 kg. manganese ore at 200 fr.	12
1,000 kg. basic pig iron	239.5
1,100 kg. pig iron at 239.5 fr.	263 45
150 kg. coal at 110 fr.	16.50
Addition of ferromanganese	7
150 kg. limestone at 90 fr.	13.50
1,000 kg. ingots	300.45
1,100 kg. ingots at 300.45 fr.	330.50
150 kg. coal at 110 fr.	16.50
1,000 kg. blooms	347.00
1,120 kg. blooms at 347 fr.	388.64
250 kg. coal at 110 fr.	27.50
1,000 kg. beams	416.14
1,150 kg. blooms at 347 fr.	399.05
300 kg. coal at 110 fr.	33.00
1,000 kg. merchant bars	432.05

If account is taken of the recovery resulting from the sale of scale, crop ends and cinder, etc., which represent approximately 35 fr. for a metric ton of blooms and 45 fr. for a ton of beams and merchant bars, it is found that the cost of raw materials comes to 312 fr. for blooms, 371 fr. for beams and 387 fr. for merchant bars. To arrive at the cost prices of merchant bars, it is necessary to add to the latter figure wages (100 fr. per ton), motive power, electricity, works transport, maintenance, supervision, general expenses, etc., which bring the total up to 600 fr. as the minimum for those works which are being operated at present under the least unfavorable conditions. But the home sale price is 380 fr., or 400 fr. at the most, for small orders, figures which only represent the value of the materials entering into the manufacture, but exclusive of all other charges.

NEW HEAT-TREATING FURNACE

Automatic and of the Semi-Cylindrical Type, Insuring Quick Heating

To overcome the objections that have been made to the small electric heat-treating furnace, especially as regards time of heating and flexibility of temperature control, the General Electric Co. has recently developed a new type of automatic furnace, known as the semi-cylindrical type. This furnace, which possesses new and improved features in design and construction, is primarily designed for operation at 1800 deg. Fahr., although by removing the temperature limit fuse it can be safely operated at 2000 deg. Fahr. A description furnished by the company follows:



Electric Resistance Furnace of the Automatic and Semi-Cylindrical Type Recently Put Out by the General Electric Co. The hearth is 10½ in. by 21 in.

The complete equipment consists of the furnace, transformer, automatic control panel and a temperature control instrument which is mounted on the subbase of the panel. The furnace consists of a sheet steel casing, supported on legs, lined with insulating material and having a semi-cylindrical chamber. It is in the design of the heating element that the most radical departure from former types has taken place, eliminating troubles experienced in many small types of furnaces.

The heating element consists of a continuous strip of resistor ribbon formed into an arch or succession of semi-circular turns conforming to the arch of the furnace chamber and extending the whole length of the latter, the proper spacing between turns being maintained by means of insulators. This gives a strong winding which is self supporting and still flexible to expansion and contraction. The two ends of the winding are brought out at the back wall of the chamber, so that the cables of the power supply may be attached. This not only gives a heating element that is strong mechanically but one that gives excellent heating characteristics to the furnace. The heat is radiated direct to the charge and the absence of a muffle allows a lower temperature gradient, as no heat has to be forced through it to reach the charge. Also, since the resistor is of large cross section, the combination of the two factors allows a high power input for the heating-up period with no danger of a burnout.

The heat distribution of the furnace is reported as excellent owing to the spacing of the resistor ribbon, which tends to give uniform temperature from front to back in the chamber. It is also possible to obtain rapid changes of temperature over the range from 1000 to 2000 deg. Fahr. Another feature is that the whole heating unit may be pulled out bodily for inspection or repair, by simply removing the front of the furnace and disconnecting the terminals at the back.

The transformer, which is mounted on the pipe frame of the control board, has four primary coils, insulated from the secondary. The coils may be connected in multiple, multiple-series or series, for 110:220, or 440 volts respectively, at 60 cycles. The secondary has two taps, one 70 volt giving 10 kw. for rapid heating, and the other 50 volt giving 5 kw. for normal operation. A small capacity extension to the secondary is also provided which supplies 110 volts to the contactor coil and for the motor of the temperature control instrument. The transformer is rated 7.5 kw. normal but will give 10 kw. for short periods such as mentioned above, or for one or two hour periods during the day when it is desired to change the temperature quickly.

The control panel carries the furnace contactor, line switch and a double throw switch, which, in its upper position puts the furnace on the 70-volt top of the transformer secondary, and in the lower position on the 50-volt top. The lower position is the normal operation. The temperature control instrument on the lower half of the panel has a scale range of 1000-2000 deg. Fahr., so that the furnace is protected from being set at too high a temperature. If for any reason the instrument should fail, or become inoperative, further protection is provided by a special fuse which melts a little above of 1800 deg. Fahr., opening the main line contactor when it melts, disconnecting the furnace from power supply.

The time required for heating is 1½ hr. from cool to 1560 deg. Fahr. on week-day mornings, when the furnace has been run the previous day, and 2 hr. on Monday morning, or when the furnace is cold.

American Trade with South Africa

Exports from the United States to South Africa increased from $54,891,000 in 1919 to $82,946,000 in 1920. During the same period, shipments from South Africa to the United States decreased from $38,743,000 to $19,063,000, and the "balance" in favor of the United States increased from $16,148,000 to $63,883,000. Principal among the items of iron and steel and other metals imported are those in the following table, which shows also the country of origin. The figures, which are for 1920, show how strongly the mother country is intrenched in the South African market, and at the same time something of what that market is, as a target for American exporters of manufactures of metals. The information was supplied by the United States Vice Consul at Cape Town to the Bureau of Foreign and Domestic Commerce at Washington.

	United States	Great Britain	Germany	All Other
Agricultural implements	$4,654,000	$3,531,000	$75,000	$2,020,000
Arms and ammunition	306,000	2,016,000	....	84,000
Brass and manufactures	76,000	369,000	....	52,000
Copper and manufactures	25,000	192,000	....	17,000
Electrical machinery and material	2,038,000	5,542,000	....	374,000
Enamelware	112,000	485,000	244,000	228,000
Hardware and cutlery	3,849,000	18,419,000	635,000	541,000
Iron and steel manufactures:				
Bars, bolts and rods	218,000	1,895,000	....	388,000
Girders, beams, etc.	75 000	453,000	....	1,000
Hoops	75,000	126,000	....	....
Pipes and fittings	69,000	2,022,000	....	16,000
Wrought iron and steel	228,000	2,121,000	....	120,000
Machinery and parts:				
Boilers	57,000	655,000	....	48,000
Engines	174,000	771,000	....	....
Manufacturing and milling	954,000	4,304,000	95,000	326,000
Mining	948,000	2,041,000	....	566,000
Pumps	249,000	492,000	212,000*	18,000
Windmills	617,000	114,000	....	18,000
Rails and railroad material	346,000	720,000	....	111,000
Tin and tinware	18,000	697,000	....	17,000

*Switzerland.

The New England Iron and Hardware Association will hold its annual fall outing at the Tedesco Country Club, Swampscott, Mass., on Tuesday, Sept. 20. Harry L. Doten, Boston, is chairman of the golf committee.

Rotary Furnace for Automobile Parts

Moving Hearth Is an Annular Ring—Heated Electrically and Controlled Automatically —Suitable for Large Variety of Parts

BY A. D. DAUCH*

HEAT-TREATING automobile parts varying in size and characteristics from a small spring clip to a large front axle is now performed at the plant of the Nash Motors Co., Kenosha, Wis., by a large rotary electric furnace, placed in operation a few months ago by the George J. Hagan Co., furnace and combustion engineer, Pittsburgh. The variety of parts to be treated made the problem of design unusually complex, but there was finally selected a rotary furnace with a moving hearth in the form of a continuous annular ring, electrically heated and automatically controlled. The same furnace performs annealing and carbonizing as well.

The furnace (Fig. 1) has the following dimensions:

Overall outside diameter	19 ft.
Overall outside height	7 ft.
Outside diameter of rotating hearth	15 ft.
Inside diameter of rotating hearth	5 ft.
Width of hearth	5 ft.
Height of heating chamber	2 ft.

The furnace walls are of standard construction, bonded throughout with adamant cement. The arch is formed of specially shaped refractories. The entire furnace is heavily insulated with standard material. The furnace structure is encased in sheet steel properly reinforced with structural beams. The furnace hearth is formed of structural members, is properly insulated and has a refractory hearth. The hearth rotates on a series of 20 roller bearings placed at regular intervals about the circumference of the table. Roller bearings mounted on the inner wall of the furnace prevent side play of the rotary hearth. The clearance space between the hearth and the furnace is closed by sand seals to prevent any infiltration of air into the heating chamber.

Two Adjacent Doors Provide for Charging and Discharging

The furnace is provided with two adjacent doors, pneumatically operated, one for charging and one for discharging. A baffle wall extends across the heating chamber between the two doors to prevent the heated pieces being chilled when cold material is charged.

The hearth is driven by an electric motor through a series of gears and gear reduction machinery (Fig. 2) so as to give six speeds of rotation varying from one complete revolution in 30 min. to one revolution in 75 min.

The electric heating equipment consists of 2 sets of nickel chromium ribbon heating elements mounted on the inner and outer walls of the furnace. The first section or heating zone extends approximately two-thirds the distance around, starting at the charging door, and has a connected load of 210 kw. The soaking or finishing zone has a connected load of 60 kw. (Fig. 3) installed to supply the radiation losses in this part of the furnace, at the same time giving enough additional heat to bring all of the charge to a uniform temperature. The main or heating zone is run at a temperature of 1580 deg. Fahr. and the soaking zone at 1525 deg. Fahr. The heating elements in each zone are separately connected to a General Electric control board (Fig. 4). The temperature of each section is automatically controlled and recorded by means of a two point Leeds & Northrup potentiometer. The temperature of each zone can be set at any desired value within the range of the instrument, i. e., 200 to 1800 deg. Fahr. The total connected load of 270 kw. is connected to 440 volts, 3 phase, 60 cycle power service. One hundred and ten volt, single phase, 60 cycle power service is used for control purposes.

In operation at 1525 deg. Fahr., the average efficiency of this furnace has proved to be 11.75 lb. of steel heated per kwhr. of power consumed. This is at the rate of 170 kwhr. per ton.

The charge per hour consists of approximately 3000 lb. of various automobile parts such as spring clips, steering knuckles, connecting rods and front axles. The weights of the different parts vary from 3 lb. to 180 lb. each. The time the different pieces are in the furnace naturally depends on the cross section and weight of the part. This feature of time in the furnace is very aptly taken care of by the different speeds at which the hearth may be revolved.

Castings and Forgings Are Annealed Over Night

After the furnace operator has removed the final charge of material to be hardened and the main line switch is opened, a charge of grey iron castings and steel forgings is placed in the furnace to anneal over night. The only heat employed for annealing is that drawn from the furnace walls. The temperature of the charge and the furnace in the morning averages about 1000 deg. Fahr. The annealed material is then removed and the furnace is again placed in hardening operation. Approximately 40 min. is required to bring the furnace temperature from 1000 deg. Fahr. to 1525 deg. Fahr.

This furnace is also to be used for carbonizing cam shafts. It is planned to charge a total of 18,000 lb. of carbonizing boxes, packing and material in the furnace at one time.

Advantages Over Oil Furnaces

Some of the advantages of this furnace over the box-type, oil-fired furnaces replaced are as follows:

Due to the uniform rate of heat absorption, distortion on long parts, such as axles, has been entirely eliminated.

In the fuel furnaces, regardless of the fineness of control, there was no assurance that all of the parts in the furnace had reached the proper temperature or had not been overheated. In this electric furnace the work is charged at one place and travels for a given predetermined time around the circumference of the furnace before it can be withdrawn. The temperature, heating time and rate of heating are under absolute control and are duplicated with mechanical precision day after day.

Scaling has been practically eliminated in the electric furnace.

The material annealed in the rotary electric furnace now requires only a flash pickle. This formerly was an item requiring 3 to 4 hr.

The scleroscope hardness test on all parts has been increased from 2 to 5 points. The quality of the material by individual test has proven to be more uniform in strength and other physical properties. The item of labor for handling the same number of parts has been cut in half. To date no material treated in the furnace has been rejected due to faulty heat treatment.

Heat Treatment Reduced to a Mechanical Operation

The most important factor, however, as mentioned by the metallurgical men who have charge of this equipment, is that they have been able to reduce heat treatment to a mechanical operation. The furnace operator is supplied with a heat-treating ticket on which is written the number of pieces, drawing number, speed of rotation of furnace hearth and tempera-

*George J. Hagan Co., Pittsburgh.

ture. It is then an assured fact that the particular product will receive the specified treatment regardless of any of the usual conditions affecting a heat-treating operation. Further, this furnace is so well designed and insulated that working conditions have been vastly improved with the resultant increase in productive effort on the part of the furnace attendants. Three men now do the work which formerly required six men.

Power and Load Factors Benefited

From the electrical superintendent's standpoint this electric furnace presents other advantages worthy of consideration. Due to the unity power factor and high load factor, this equipment has materially benefited power and load factor conditions throughout the plant.

The results secured have resulted in the Nash company's placing an order with the Hagan company for a duplicate equipment of smaller physical characteristics for similar work.

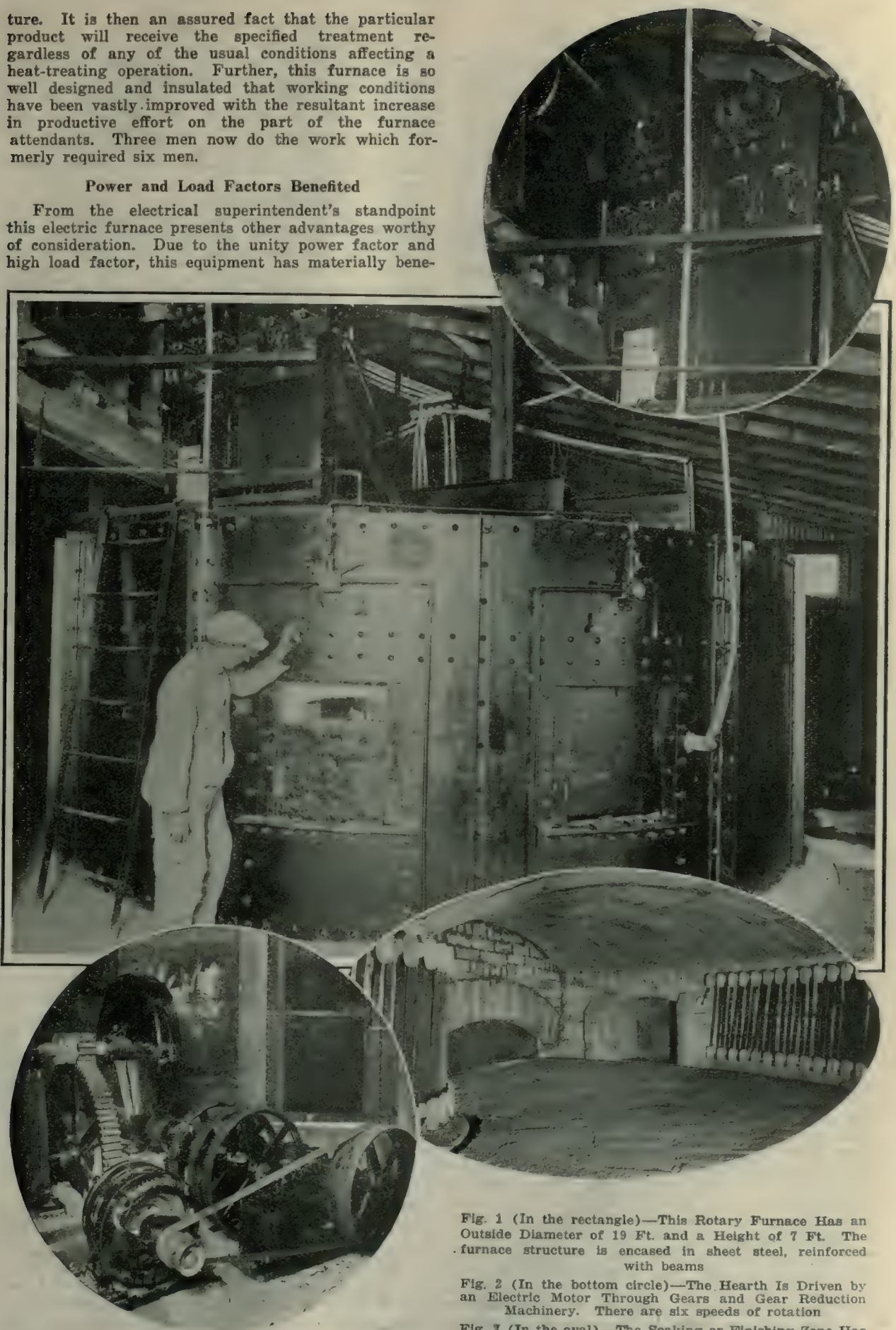


Fig. 1 (In the rectangle)—This Rotary Furnace Has an Outside Diameter of 19 Ft. and a Height of 7 Ft. The furnace structure is encased in sheet steel, reinforced with beams

Fig. 2 (In the bottom circle)—The Hearth Is Driven by an Electric Motor Through Gears and Gear Reduction Machinery. There are six speeds of rotation

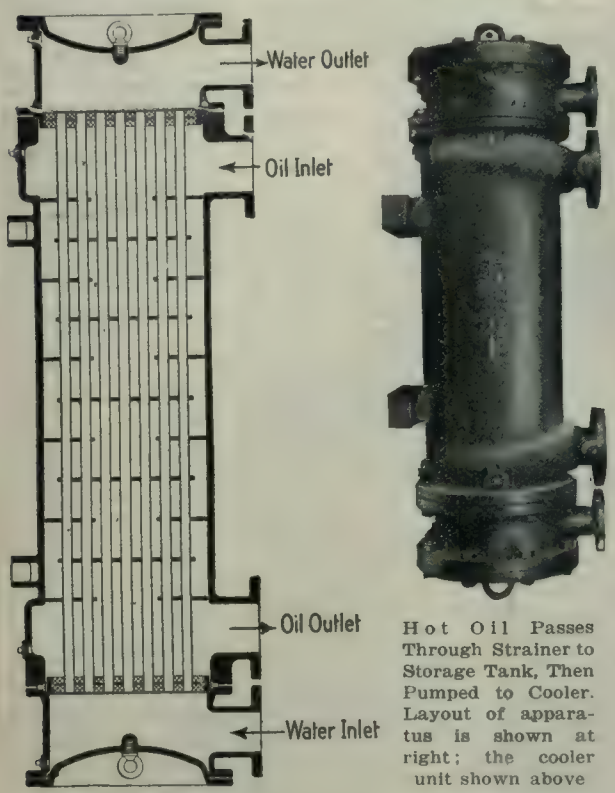
Fig. 3 (In the oval)—The Soaking or Finishing Zone Has a Connected Load of 60 Kw. It is installed to supply the radiation losses in this part of the furnace, at the same time giving sufficient additional heat to bring all of the charge to a uniform temperature

Fig. 4 (In the top circle)—The Heating Elements in Each Zone Are Connected Separately to a General Electric Control Board

Recooling Quenching Oil*

Proper speed of cooling is a determining factor in the degree of hardness bestowed upon steel. The rate of cooling depends upon the size of the piece to be hardened and upon the composition of the steel. It depends also and perhaps to a greater degree upon the rapidity with which the cooling or quenching medium removes the heat, which is in turn determined by the nature of the medium, its fluidity or viscosity, specific heat and temperature.

The particular cooling temperature of oil that will give the best hardening results should be ascertained first, then a suitable recooling system provided to maintain that temperature. Several methods of recooling



Hot Oil Passes Through Strainer to Storage Tank, Then Pumped to Cooler. Layout of apparatus is shown at right; the cooler unit shown above

quenching oil are in use, but circulating the oil in a closed circuit and recooling it in a separate cooler has met favor in modern practice. The accompanying illustration shows an arrangement of apparatus used in this connection. The heated oil is removed from the top of the quenching bath and passed through a strainer to a storage tank, from which it is forced by an oil pump to the cooler, wherein the oil is cooled and thereupon returned to the quenching tank.

The oil cooler unit is shown in the illustration. It is made up of a smooth bore cylindrical cast iron shell to the ends of which are attached cast iron headers. Within the shell there is a bundle of straight tubes of brass or copper through which cold water passes from one header to the other. The headers are separated from the cylinder by the tube sheets. The heated oil flows into the shell at the top, passes transversely across the tubes and around the annular baffles, and leaves the shell at the bottom. During its travel the oil strikes the tubes approximately at right angles, splitting into many fine streams. The water flows in an opposite direction to the oil.

The tube sheets are of composition metal into which the tube ends are cast. The upper tube sheet is rigidly secured to the shell, the lower one forming a floating head construction, which provides for the expansion and contraction of the tubes. The composition material of the tube sheets is dense and its melting point is around 550 deg. Fahr. It does not disintegrate at the temperatures met in practice. The packing between the headers and the shell consists of two rings of rubber separated by one of brass and practically prevents any mixing of the oil and water. All joints on the cooler are external and leakage can be quickly detected. The entire tube bundle is readily removed for cleaning and inspection, without breaking the oil connections. It will be noted that the oil pipe enters the quenching tank at the bottom and the overflow pipe leaves the tank at the opposite side and at the top, an arrangement designed to effect a thorough diffusion of oil through the tank and to effect a maximum cooling.

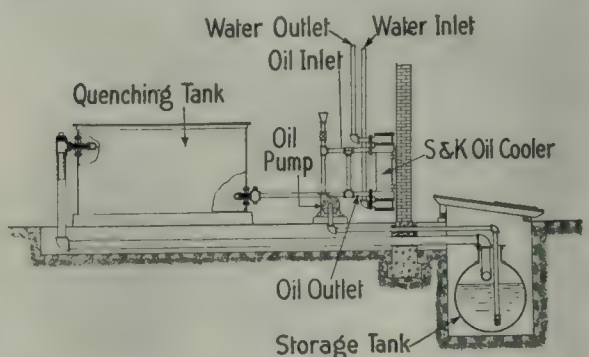
In an installation using a cooler of the type described 3000 gal. of oil were circulated per hour and 774 gal. of water. The oil inlet temperature was 118 deg. Fahr. and the outlet 96 deg., giving a drop through the cooler of 22 deg. The water inlet temperature was 35 deg. Fahr., and the outlet 75 deg., giving a rise in water temperature of 40 deg. The furnace temperature was 1500 to 1550 deg. Fahr. A No. 3 Gould pump driven by a 5-hp. motor, the pump running at 152 r.p.m., was used. The suction of the pump was 2 in., vacuum, and the discharge 32 lb. gage pressure. The length of the cooler described is 64½ in. overall, the diameter of the shell 14 in. and the weight 1000 lb.

The heat surrendered by 1 lb. of steel during quenching as for example, from 1550 deg. Fahr. to 150 deg., is 240 B.t.u. General practice is to specify 1 gal. of oil for every pound of steel quenched per hr.

If we assume a specific heat of oil equal to 0.487 and a density of 7.25 lb. per gal., the temperature rise produced in 1 gal. of this oil by 1 lb. of steel, is equal to $240 \div (0.487 \times 7.25) = 68$ deg. Fahr.

In other words, if the initial temperature of the 1 gal. of oil is 80 deg. Fahr., it will be increased to about 148 deg. by the quenching.

If 3000 gal. of oil are to be circulated per hr. through the cooler, the oil circulation per min. is 362.5



lb. If a water-to-oil ration of unity is chosen, that is, if the same weight of oil is circulated per min. through the cooler as weight of water, we can find the temperature drop of the oil circulated through the cooler. The temperature drop we find to be about 20.5 deg. Fahr. For 2 to 1, 4 to 1 and 6 to 1 water ratios, the temperature drops are 24, 26.5, and 27.5 deg., respectively. Thus, beyond a certain point, increase in the quantity of circulating water does not produce a proportionate temperature drop in the oil.

*From an article copyrighted by S. E. Derby, engineer, Schutte & Koerting Co., Philadelphia.

Less Unemployment in Pennsylvania

HARRISBURG, Sept. 5.—Public works projects, recalls of railroad workers to shops and resumption of industries here and there have improved the unemployment situation at a number of points in Pennsylvania, and reports to the State Bureau of Employment headquarters from Philadelphia and Pittsburgh are slightly more encouraging than in the middle of August. A summary of reports of branch offices of the State Department of Labor and Industry shows more than 250,000 workers listed as idle and registered at the bureaus. The summary of the unemployed registered for work by districts is as follows: Altoona, 18,860; Erie, 14,825; Harrisburg, 13,455; Johnstown, 18,840; McKeesport, 5075; New Kensington, 6050; Philadelphia, 127,000 men and 12,050 women; Pittsburgh, 5665; Scranton, 16,020; Williamsport, 5350.

Electric Furnace Tool Steel Qualities

Vital Considerations in Practice Insuring Regularity—Rôle of Purity of Stock—Some Specifications—Alloy or Reinforced Steels

BY W. J. AND S. STUART GREEN*

"IT is one thing possessing a fiddle and another thing being able to get good music out of it," said a prominent steel man in addressing a rather large gathering of local steel-makers in Pittsburgh, on electric furnace efficiency, which apt expression seems to us, to cover the case of electric furnace tool steels. Certain it is, the electric furnace has yet to come to its full fruition for, unlike all other processes of steel manufacture, its limits have yet to be reached or even correctly defined; hence there is abundant room for more highly technical skill of an exclusive character, bearing in mind that its ultimate product is largely sold on quality rather than price. It is not, except in rare circumstances, a competitor of the open hearth furnace for its quality is altogether beyond that, but it does frankly challenge the best work the crucible can do.

It is not the purpose of this paper to consider electric furnace costs, pit-practice or refractories, as each would require a separate paper were anything more than a shallow treatment attempted. It is furnace practice in-so-far as it controls quality to which the writers have confined their attention. The great majority of electric furnace tool steels being made in basic furnaces, the writers deal only with basic practice.

Materials for Furnace Bottoms

High grade steel cannot be made on a poor bottom; it is therefore emphasized that good bottom materials are as essential as good melting stock and should be sought with the same care. It is not economy to use up old stock already largely disintegrated and, while speaking of economy, the writers wish to say that they have not always found the most expensive bottom material the best, nor likewise have the cheapest materials, as far as first cost goes, proved ultimately so. Discrimination has to be used and, having once selected a satisfactory material, it is well to hold on to it permanently. The curb should be held tightly also on the purchasing department; very liberal powers should be given the electric furnace department in the purchase of all its materials. However, having secured good bottom materials by no means renders a furnace immune from bottom trouble; careful fettling, the thorough cleaning out of all steel puddles and very careful watching of the bottom height are absolute essentials, if one desires freedom from such.

Burnt lime used for basic slags should be selected with considerable care, probably more so than is generally accepted. Slags readily formed are a blessing worth searching for, likewise slags with strong sulphur reducing properties. These virtues are possessed by few limes but, where found, are probably one of the largest money savers handled. First cost is entirely secondary where such a commodity has been secured. A burnt lime of the following average composition served the writers very well:

Ignition loss	11.24 per cent
Silica	1.24 per cent
Iron and alumina	Trace
Lime	86.06 per cent
Magnesia	0.62 per cent

*Pittsburgh.

In spite of a very keen appreciation of the abilities of open-hearth men, the writers deplore the frequent employment of such skill in the control of electric furnaces. It seems to us very much like retaining a heart specialist on a nose and throat case. It should also be said that the electrical department sometimes possess advanced ideas as to the proper operation of a furnace. It has been our experience however that the safest course is to stear clear of all such ideas except where they affect the proper care of apparatus.

High Grade Stock Essential

In the making of best tool steel there is no room in the electric furnace for low grade melting stock, with its attending refining. Final analysis, however excellent, is liable to be highly deceptive if used alone for grading quality, as very much more than analysis is required to constitute the best tool steel. It should always be borne in mind that tool steel making is an art as well as a science. We of course thoroughly believe in analysis in adherence to specification, but we also emphasize the necessity of specifications being drafted by someone who knows where quality comes in, indeed some final latitude of revision should be left in the hands of the steelmaker.

The electric furnace is, fortunately or unfortunately, such an excellent refiner that there is great danger of this feature being very much overdone and cheaper stock being used where best and more costly materials would ultimately prove economical. It is with the foregoing in mind that the writers have itemized the following major considerations affecting quality, which are the result of many years experience in tool steel making, both crucible and electric. They are, however, purely the opinions of the authors, carefully tried in every day practice, and are advanced as such.

FIRST GRADE.—Duplicating First Quality Crucible Steel.

General Specification: Mn, 0.10 to 0.25; Si, 0.15 to 0.25; P and S, 0.020 per cent maximum.

Charge to consist of all heavy melting stock, insuring little oxidation, cleaner stock and only one charge.

Heavy melting stock to be well under above specification in manganese and phosphorus Swedish, "American Swedish" rolling mill iron, ingot iron or similar stock being desirable except as hereafter provided.

Charge shall contain not less than 10 per cent of washed metal or Swedish carbonizing iron, and up to 33 per cent where carbon will allow. Carbon should be figured to just under limit of the specification.

Not less than 20 per cent but preferably up to 40 per cent of heavy electric furnace tool scrap shall be used in all charges. This of course replaces, to the amount used stock described above.

Positively no ore additions, mill-scale or boiling of any kind tolerated. Manganese and phosphorus being well under specification as provided, without such manipulation This means also that no slag shall be taken off.

Final carbon to be adjusted with washed metal or its equal. Heat should be under a white slag for at least one hour before tapping.

No ladle additions of any kind excepting aluminum should be made.

Operating trouble of any kind degrades heat according to degree of trouble.

Every attempt should be made to duplicate crucible conditions both in melting and casting practice.

The following charge indicates a hypothetical first-grade heat:

Quality.—38D-E (first grade tool steel).

Specifications.—C, 0.95 to 1.05; Mn, 0.10 to 0.25; Si, 0.15 to 0.25; P and S, 0.020 per cent.

	Lb.
Electric furnace heavy 38D-E scrap	5,000
Rolling mill iron (C, 0.10 per cent)	7,000
Washed metal (C, 3.50 per cent)	2,000
	14,000

SECOND GRADE—A General Purpose High Grade Tool Steel. *General Specification:* Mn, 0.20 to .35; Si, 0.20 to .30; P and S, 0.015 to 0.030 per cent.

At least 50 per cent of the charge should be heavy melting stock, the balance medium or light, but not sufficient of this latter to necessitate a second charge, which should be avoided.

The heavy melting stock used other than described in next paragraph should be standard open-hearth heavy low phosphorus analyzing phosphorus and sulphur 0.03 per cent maximum; nickel and chromium, under 0.15 per cent each, or equivalent stock.

Not less than 20 per cent but preferably up to 40 per cent of medium and light electric furnace tool scrap should be in charge.

Sand cast low phosphorus pig iron (maximum 0.03 per cent P) or its equal should be in the charge sufficient to melt approximately where desired in carbon. A minimum of 10 per cent should be used.

Heats should be finally adjusted for carbon with washed metal or its equivalent; 500 lb. should suffice; where more than this is required, the jump or part of same should be made with carburite or other satisfactory method.

Partial refinement by usual boiling and slag off is to be tolerated, though not of a drastic nature; or reduction of manganese where necessary, by this means, is permitted. Of course where the previous paragraphs have been followed very little will be necessary and, where feasible, mixture should be designed to eliminate even this manipulation.

In the event of a slag off heat the bath should be carburized with crushed electrode or carburite immediately after the slag off on the bare metal by the usual method. This should be figured as close as possible to specification, but if a further big jump should subsequently be found necessary it should be made with carburite as explained above. Any first-grade heat that has had to be boiled to knock carbon, etc., or has been in other ways a trouble heat, should be included in this grade, always providing the trouble has not been serious enough to further degrade it. This heat should be under a white slag for at least one hour before tapping.

No ladle additions excepting aluminum should be made.

The following charge indicates a hypothetical second-grade heat:

Quality.—FA4 (high-grade general purpose tool steel).

Specification.—C, 0.95 to 1.05; Mn, 0.20 to 0.35; Si, 0.20 to 0.30; P and S, 0.025 per cent maximum.

	Lb.
Medium and light electric furnace FA4 and 38D-E scrap	5,500
Open-hearth heavy low phosphorus scrap	7,000
Sand-cast low phosphorus pig iron (C 3.50 per cent)	1,500
	14,000

A very light boil only will be required to bring this well in specification in manganese and phosphorus required amount of carbon will of course be beaten in immediately after the slag off and finally adjusted with washed metal.

THIRD GRADE.—The Electric Furnace Saleman's Conception of a First Class Tool Steel. *General Specification:* Mn, 0.20 to 0.70; Si, 0.20 to 0.30; P and S, 0.015 to 0.035 per cent.

Heavy, medium and light open-hearth or Bessemer melting stock for major portion of charge.

Free use of pit scrap, skulls, light electric, dirty scrap, etc. Second charging is permissible, i.e., light scrap may be used in quantities as available or desirable.

Crushed limestone may be used entirely for both slags replacing the burnt lime of the better grades.

No washed metal or low phosphorus pig iron should be used for carburizing.

Coke, crushed electrode or carburite should be used for carburizing; added in cold charge in single slag heats or on bare metal after slag off in multiple slag heats.

Final adjustment of carbon with carburite except in those cases where time might be saved with a minimum amount of washed metal.

A 5-point carbon coking in ladle is permissible.

Boiling with ore, etc., and subsequent slag offs of any severity, necessary to finish in specification, is permitted; no limit on amount of ore, excepting, of course, that as little as possible to come in limits will be used.

Short cuts assisting production are permitted, such as soaking electrodes, tapping on fair slags, the freer use of aluminum, etc.

Utilization of accumulations of undesirable scraps can be effected.

While this is a third-grade product, it should be firmly kept in mind that it is a general purpose tool steel and as such should be melted and poured with care and attention consistent with the economies above described, in fact, an attempt should be made to neutralize the deficiencies of melting stock, etc., by more scrupulous care.

It will be seen from the foregoing that native purity of melting stock is worth its price where quality is the first consideration. It will also be seen that no corruption of open-hearth ideas, which represent a very different process, is sought. It is recommended that standard mixtures be formulated and strictly adhered to, avoiding the habit of rigging up a fresh mixture for every heat. Time and thought spent in the exact classification and storage of melting stock is effort that is also well repaid; indeed it is futile to attempt any quality work on any other basis; for quality, if it means anything at all, is a definite standard that can be repeated identically and without deviation every time, not occasionally or by chance or accident, and the very essentials are fundamentals that cannot be conjured with by clever reckoning.

Purity of Melting Stock

The basis of a lasting connection built up by quality is only secured by the foregoing means. It was one of the outstanding features of the old "rule-o'-thumb" steelmakers that they were able to reproduce their qualities with unerring accuracy and it is doubtful, in so far as carbon steel is concerned, whether their first water carbon product has ever been excelled; such product being largely the result of skill and judgment, some of this needs applying to the manufacture of tool steel by the electric process, analysis notwithstanding. Of course training and experience is needed to gain this desideratum and it is only by such that the quality end of electric furnace practice can be fully exploited. We have always looked with some distrust on ingenious furnace manipulation, frequently discovering a formidable "nigger in the wood pile" on close investigation. Therefore we stand firmly for stable standard practice.

Alloy or Reinforced Steels

These are the days of alloy steels or "re-inforced steels," so much so that one is apt to forget the great weight of straight carbon tool steels produced by the crucible process, which is yet to be captured by the electric furnace. Wherever electric furnace qualities are judged almost entirely by analysis, the capture of this business can not, in the writers opinion, be any unqualified success.

The alloy steel field is largely an electric furnace one and the considerations, outlined for carbon tool steels, can be readily applied to their manufacture, imposing very few modifications and these in strict conformity with the basic ideas of quality grades outlined.

The writers have made a considerable quantity of alloy tool steels, including a large amount of high-speed steels, the manufacture of which has been strictly governed by the general principles laid down in the foregoing. It should be said however that the manufacture of alloy steels offers certain liberties, such as the use of alloy ores rather than the reduced metals. Their use is of questionable wisdom in steels of the first quality. A desire for tonnage has, in some cases, suggested the withholding of alloys till late in the heat

in order to facilitate quick preliminaries and consequent quick heats. This has never been the practice of the writers, it being their concern as to how soon they could have the alloys in. Late additions therefore are not advised unless it be possibly in third quality work.

It is also a weakness of some furnace operators to regard an alloy steel as a reinforced steel and therefore able to withstand a certain amount of abuse in melting, but unfortunately by so doing they undo the virtues sought after as this reinforcement is used up to a degree in neutralizing melting deficiencies. It is sometimes felt in alloy work that the actual stock is only a vehicle for the alloys and therefore not required to be of superlative quality itself.

All these ideas however are contrary to actual fact and tend only to place the electric furnace in a subordinate position to the one it should hold, that is, a modern ecohomic tool steel furnace. A first quality alloy tool steel must have a first quality tool steel base, the melting stock and the melting practice must be of a quality strictly in accordance with the desired quality of the finished steel. The addition of alloys to a second quality carbon tool steel can not make it a first quality alloy steel.

In conclusion, the success of the plan depends on the strict and faithful adherence to the considerations set forth and it is the writers' experience that such adherence is very adequately rewarded.

Tax Payments on Appreciated Capital

WASHINGTON, Sept. 13.—Taxpayers who have included appreciated values in determining invested capital contrary to the decision of the United States Supreme Court in the La Belle Iron Works case may file amended returns and pay their taxes within 90 days from Aug. 26 without penalty. This important ruling of the Treasury Department has been issued as T. D. 3220 and relates to income and excess profits tax returns for 1917 and subsequent years.

The ruling follows:

An examination of income and excess profits tax returns for 1917 and subsequent years has disclosed that many taxpayers have used appreciated and inflated values in determining invested capital shown in such returns contrary to section 207 of the revenue act of 1917 and section 326 of the revenue act of 1918.

This office has held consistently that the use of appreciated or inflated values in determining invested capital is not permissible and this ruling has been sustained by the United States Supreme Court in the case of the La Belle Iron Works v. The United States.

All taxpayers who, in the preparation of their income and excess profits tax returns for 1917 and subsequent years, have used appreciated or inflated values in determining the amount of their invested capital are required to file with the collector of internal revenue within 90 days from date of this decision amended returns for each of such years, in which the invested capital shall be computed strictly in accordance with the law and regulations and without the use of appreciated or inflated values. It is not required that such amended returns shall include the figures shown in the original returns which are unaffected by this decision. Only such figures as are necessary to show the correct values used in the computation of invested capital and such totals as are necessary to a redetermination of the tax need be shown. Payment of the additional tax shown to be due on such amended returns must also be made at the time the returns are filed.

Failure to file amended returns within the time specified will subject taxpayers to the penalties provided for in section 3176, United States revised statutes, as amended.

The Colorado Fuel & Iron Co. has announced the virtual closing of its plant at Pueblo, Col. The company will also suspend operations at its iron mine at Sunrise, Wyoming, as well as at several coal mines.

The Reed Foundry & Machine Co., Kalamazoo, Mich., has increased its capitalization from $250,000 to $1,000,000.

Unusual Traveling Crane for Ford Railroad Shop

An electric traveling crane having some unusual features is now being built for the River Rouge plant of the Ford Motor Co. The crane will be installed in the locomotive repair shop where all the repairs to the motive power equipment of the Detroit, Toledo & Ironton Railroad are made. The shop is rectangular in shape and was originally designed for a general repair shop for the Rouge plant but later was converted into a locomotive shop. It was found desirable and necessary to move the locomotives with the crane the length and width of the building and in addition to spot the locomotives at any angle with the bridge girders of the crane. This necessitated a crane having a hoisting unit of the usual design mounted on a turntable with individual motor drive above the hoist truck, so that the hoist unit may be turned through a complete circle. The Shaw Crane Co., of Muskegon, Mich., submitted a design which was approved. The crane is to have a 100-ton main hoist with a 25-ton auxiliary and a bridge span of 55 ft. The hoist truck is of the eight wheel type mounted on two bridge girders. The equipment is to be electrically driven and controlled from a suspended operators cab.

To Survey Commercial Laws of Foreign Countries

WASHINGTON, Sept. 13.—The new division of commercial laws of the Bureau of Foreign and Domestic Commerce soon will begin a world-wide survey of the commercial laws of foreign countries on a scale greater than is said to have ever been attempted by a government agency. A. J. Wolfe, recently appointed chief of the division, is in New York, where he will remain until Thursday of this week, and is conferring with lawyers and business men interested in the undertaking.

A series of carefully prepared questionnaires, it is announced by the Bureau, will form the basis of the survey. These will be sent to legal authorities throughout the world selected by representatives of the bureau and through the co-operation of representatives of the Department of States in foreign countries.

When the material has been gathered it will be edited in the bureau and prepared in the form of special booklets as follows:

"Doing Business under Foreign Laws," with full particulars as to the operations of foreign branches of American firms, organizing companies under foreign charters, taxation, etc.; "Agency Laws of the World," with proper forms for powers of attorney; Bankruptcy Laws of the World; Negotiable Instruments Throughout the World; Sales Contracts and Foreign Laws; Commercial Disputes Before Foreign Courts.

High Cost of Metric System Compulsion

WASHINGTON, Sept. 13.—Compulsory introduction of the metric system would cost 31 companies $21,464,688 or an average cost for each of $715,489.60, which for each worker employed would be $227.40, according to the American Institute of Weights and Measures, which is conducting a campaign in opposition to such legislation. The figures are based upon a questionnaire canvass conducted by the institute. As already stated in THE IRON AGE, hearings will be held upon a bill introduced by Senator Ladd of North Dakota providing for the establishment by law of the metric system after 10 years.

Should the bill be passed, all trade, the Institute of Weights and Measures states, would have to be carried on at the expiration of the period named in a system now strange to the American people. All postage, excises, duties and customs charged and collected by the Government would also have to be based on the metric system, the units of which bear no simple or easily remembered relation to the weights and measures now in use.

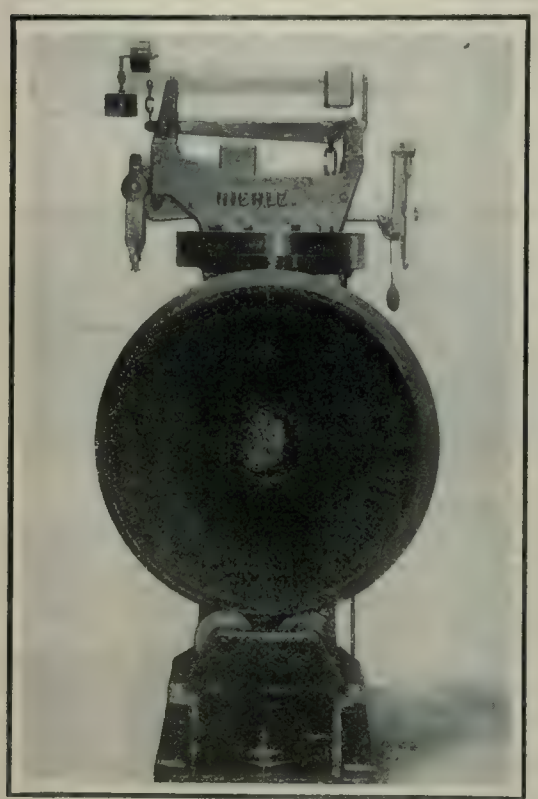
HARDNESS OF CHILLED WHEELS

Machine for Determining Brinell and Shore Values on Same Spot

The problem of making comparative Brinell and Scleroscope hardness test on identically the same spot of metal and on large size pieces has come to be a difficult task where speed of operation and the number of tests made are to be considered.

The Association of Manufacturers of Chilled Car Wheels determined upon an exhaustive study of the hardness of chilled wheels as compared to their wearing and breakage qualities. The makers want to know if any relationship exists and, if so, what it is. Incidentally they expect to determine the value of the hardness test as an indication of the general serviceability of the chilled iron wheel.

This study requires hardness tests by both the



The Special Hardness Testing Apparatus Devised by Riehle Bros. to Determine the Brinell and Shore Hardness of Chilled Iron Wheels at the Same Spot

Brinell and Scleroscope methods and on the same spot. No machine was available for this work. The problem was submitted to the Riehle Brothers Testing Machine Co., Philadelphia, and, after several conferences with representatives of the association, the machine herewith illustrated was designed and built in the Riehle works. It shows a 33-in., 700-lb. car wheel in position ready for the Brinell test. The method of registering the Brinell load is the Riehle lever and beam system which is said to be more dependable than a hydraulic gage reading. At the rear of the machine is shown the familiar Shore scleroscope. The scleroscope and Brinell weighing systems are both carried by the same housing which housing is bolted to a turn table so the whole upper part of the machine can be revolved with the Brinell ball and scleroscope dart in the circumference of the same circle.

To test a wheel the turn table is revolved 90 deg. from the position shown and a car wheel rolled into place resting on the two grooved rollers; an inclined track runs up to the rollers making it easy to push a wheel into place. The turn table is now revolved until the scleroscope comes over the wheel. When the center position is reached, a pin flies into a hole of the turn table and locks it. The scleroscope is now lowered by its rack on to the wheel and the test reading made. The scleroscope is raised, pin withdrawn by the eye shown, turn table revolved 180 deg., when the pin again locks it; the ball is in position directly over the spot tested by the scleroscope ready for the Brinell test. The rollers supporting the wheel rest on a hydraulic plunger and a few strokes of the hand pump shown raise the wheel against the ball. When the wheel touches the ball an initial reading of the depth indicating device is taken. A few more strokes of the hand pump put on the full Brinell pressure which is indicated by the beam rising in the gate. A by-pass valve is momentarily opened, wheel lowers slightly, a stroke or two of the hand pump again puts the wheel just in contact with the ball and another reading of the depth device taken. The difference between this and the first reading gives the actual depth of impression even eliminating any flattening there may have been in the ball.

The by-pass is again opened, the wheel lowers and it is then revolved to a new position for testing. Thus a series of tests can be made around the wheel.

The depth indicating device is entirely new and rests in the Brinell head directly above the ball. Two fingers rest on the wheel while a third one rests on the ball. The relative motion of wheel and ball is thus registered without any intervening mechanism and the most accurate depth readings possible are thus obtained.

British Bid Low for Uruguay Bridge

WASHINGTON, Sept. 13.—With a bid of 977,680 gold pesos, interests representing British fabricators submitted the lowest tender to build the Santa Lucia River bridge in Uruguay, according to a cable received by the Bureau of Foreign and Domestic Commerce. Interests representing American and German fabricators submitted bids also, the American figure being lower than the German bid. The American quotation was 1,081,444 gold pesos while the German bid was 1,084,595 gold pesos. At the present rate of exchange a gold peso is equivalent to 64.33c. The bids represent an almost complete reversal of those which have been made up to recently in South American countries. The German interests, now the highest bidders, have been the lowest, while the British interests, now the lowest, frequently were the highest. It is indicated that competition for business among steel interests of the world has developed to a keen point and that German interests are forced to ask higher figures than heretofore on business, some of which they are said to have been compelled to abandon because of inability to make delivery.

The Link-Belt Co., Philadelphia, will supply the machinery for two locomotive coaling stations for the New York Central Railroad at Solvay and Wayneport, N. Y. The plant at Solvay will consist of a 1000-ton reinforced concrete structure, equipped with 12 undercut gates and coaling chutes, and 12 sand gates and spouts, with necessary piping; two 24 x 36 in. gravity discharge elevator-conveyors having a capacity of 80 tons per hour of run-of-mine coal, etc. The station at Wayneport consists of a 400-ton steel pocket, six coaling gates and chutes; one 24 x 36 in. gravity-discharge elevator conveyor, etc.

An address on "Micro-Motion Study for Current Use," styled "a further indictment of stop-watch time study," is to be made by Dr. Frank B. Gilbreth, consulting engineer, Montclair, N. J., before a meeting of the New York section of the Taylor Society on the evening of Sept. 15, at the Flatiron Building Restaurant, New York. R. H. Wessmann, care of J. F. Tapley Co., Metropolitan Building, Thompson Avenue and Court Street, Long Island City, is in charge of the meeting.

Machinery for the manufacture of corn products and by-products is desired by the Standard Investment Corporation of South Africa, Ltd., Permanent Buildings, Harrison Street, Johannesburg.

New Trumbull-Cliffs 600-Ton Blast Furnace

Plant Completed in Record Time—Compact Arrangement for Labor Saving—Provision for Expansion of Plant and Enlargement of Furnace Hearth

WORK on the new 600-ton blast furnace plant of the Trumbull-Cliffs Furnace Co., Warren, Ohio, was started Aug. 15, 1920, and completed June 14, 1921. In less than ten months an open field on the Mahoning River, across from the Trumbull Steel Co., without railroad connections, was completely transformed: material and equipment were erected and placed in position, tracks were put in, the yard graded and fenced in, machinery turned over and the plant made ready to produce pig iron. This is believed to be record time for construction of a complete blast furnace plant.

Arrangement was made in the layout for the future installation of additional blast furnaces, as well as for a by-product coke plant. Throughout the design, provision is made for extension without interruption at the pumping, power and boiler houses, furnace and cast house, stock house and stock yard, casting, switching and other operations. Moreover, an extension of water lines, sewers, transmission lines, tracks, stock house and stock yard develops with minimum expense and effort from the existing units. As a typical example of provision for expansion, the boilers are so designed, with high settings and distinct combustion chambers for gas and coal firing, that stokers may be installed in the existing settings and the electric power output of the plant increased up to 12,000 kw. Improvements have been introduced which experience of the last few years has taught.

Present rail connections are the Pennsylvania and Erie railroads across the Mahoning River, but an additional connection is to be provided, at the opposite end of the plant, by the Baltimore & Ohio Railroad. As will be seen, the plant is laid out primarily for delivery of hot metal to the mixer at the open-hearth building of the Trumbull Steel Co., and for the time being all raw materials are routed into the plant over the three-track reinforced concrete bridge, which also serves as the delivery track for hot metal to that company.

A new feature is to be found in the provision for screening of the coke at the furnace bins. This consists of two rotary grizzly screens, each having eight motor driven shafts. These shafts and the disks upon them are so spaced that the rotary grizzly removes material under ¾ in. in size. Flow of coke from the bin to the grizzly is controlled by a cut-off gate, and also by a rotary vane feeder. This provides a steady and even flow of coke over the grizzly.

Emergency operation is provided for in a gate and a dead plate furnished over each grizzly, so that coke may be by-passed direct from the bin to the skip hoist bucket, in case the grizzly is out of operation. Underneath each grizzly is a hopper, one hopper delivering braize direct to a braize elevator, the other to an 18-in. belt conveyor discharging to the braize elevator boot. The elevator is a belt and bucket type delivering to a 24-hr. capacity bin. The motors driving the rotary grizzlies, the feeders and the belt conveyor and elevator are electrically interlocked, so that the

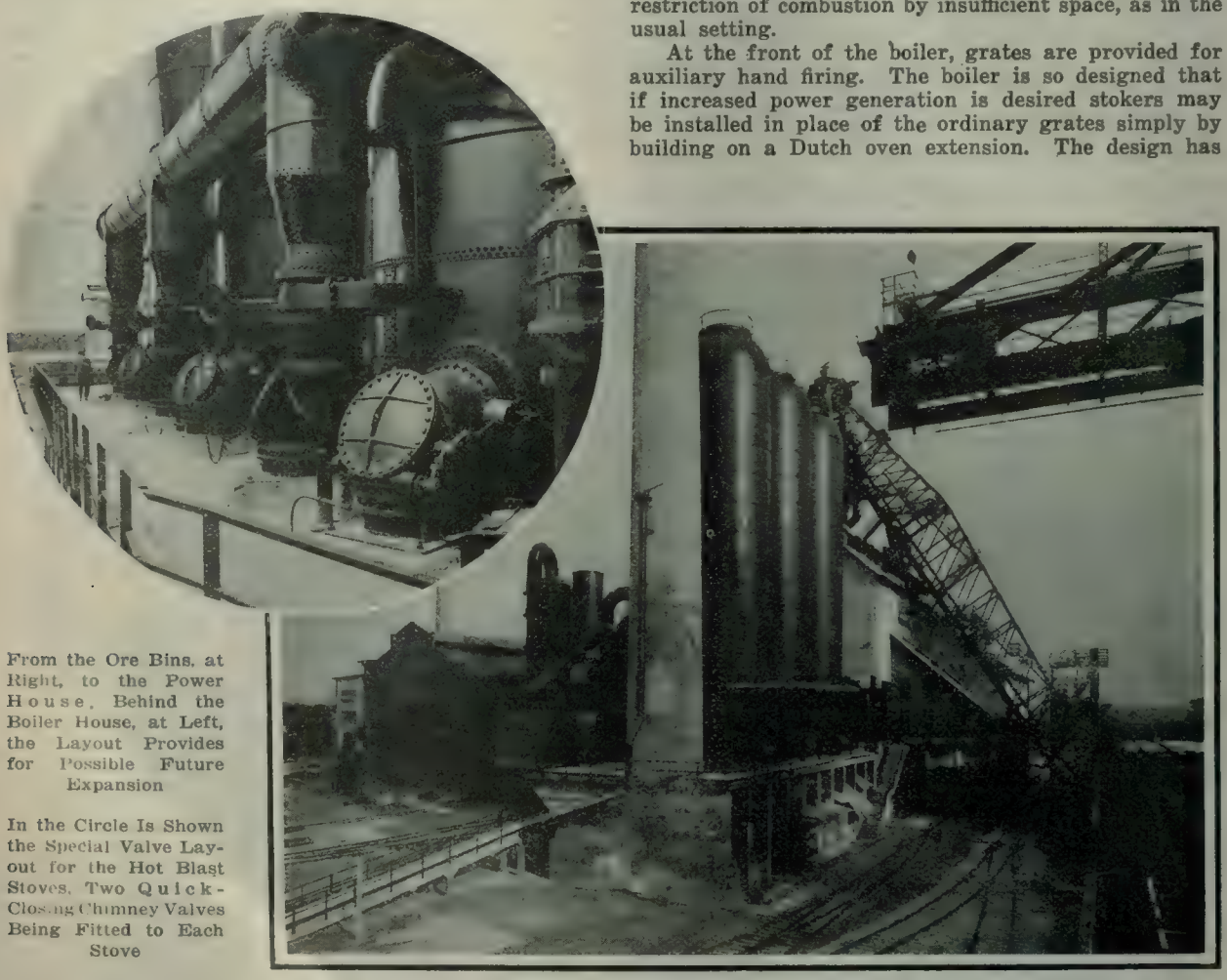


This View Shows the Compactness Which Is So Prominent a Feature of the Layout. The stack is as close to the stoves and to the gas-cleaning equipment as is permitted by considerations of ample working space. The passenger elevator and the blower's office and pyrometer house are conveniently located

motor driving the vane feeder and belt conveyor cannot be started until the motor driving the rotary grizzlies and the belt and bucket elevator is running. There is also provided a 20-per cent speed variation on the motors operating the rotary grizzlies.

The arrangement of cast house is the next outstanding feature. The cast house is 145 ft. long by 102 ft. wide, and has a 4-motor Cleveland Crane & Engineering Co. crane of 94-ft. 6-in. span, with 25-ton main hoist and 5-ton auxiliary hoist. This spans not only the cast house proper (70 ft. wide) from the foot up to the furnace front, but also spans two tracks, one the hot metal track and the other a track for spotting of cars, for removal of scrap and rubbish, and for unloading into cast house of coke braize, clay and sand.

This same crane is also utilized at the slag granulating pit at the foot of the cast house, and for this purpose is equipped with a Hayward 1½-cu. yd. bucket, having perforated bowl and manganese steel lips. The crane serves to unload from car or truck, and places upon the skip hoist house platform the motor armatures for the skip hoist or other material required. In the cast house is a brick and concrete structure providing storage for sand, clay and coke braize, in which there is also provided a mixing room for the preparation of these materials.



From the Ore Bins, at Right, to the Power House, Behind the Boiler House, at Left, the Layout Provides for Possible Future Expansion

In the Circle Is Shown the Special Valve Layout for the Hot Blast Stoves, Two Quick-Closing Chimney Valves Being Fitted to Each Stove

Convenient access is provided, not only by means of stairway but also by an easy incline up the stove foundation to the cast house floor. The grouping of a number of allied operations which must of necessity come under the eye of the blower at the furnace is very noteworthy at this point. The stove platform is at practically the same elevation as the cast house, the latter being reached by an incline not over 2 ft. in height from the stove platform. The stock bins are easily reached by a walkway from the cast house.

This walkway passes the skip hoist house, where the skip hoist, bell-operating cylinders, and distributing mechanism are placed, and also passes the skip incline. The blower foreman is thereby able not only to watch the work in the cast house and about the furnace, but also without going more than a few steps from the cast house, he can always check up on stove practice, or by watching the skip buckets, on the regularity of filling.

Provision is made so that the furnace can be rodded from the cast house, as a check upon the men in the stock house. The shutters in the iron runners are opened and closed by steam cylinders, these being operated from the central control station at the furnace front, where the snort valve wheel, the control for the Berg-Brosius mud gun and signal apparatus are located as one unit.

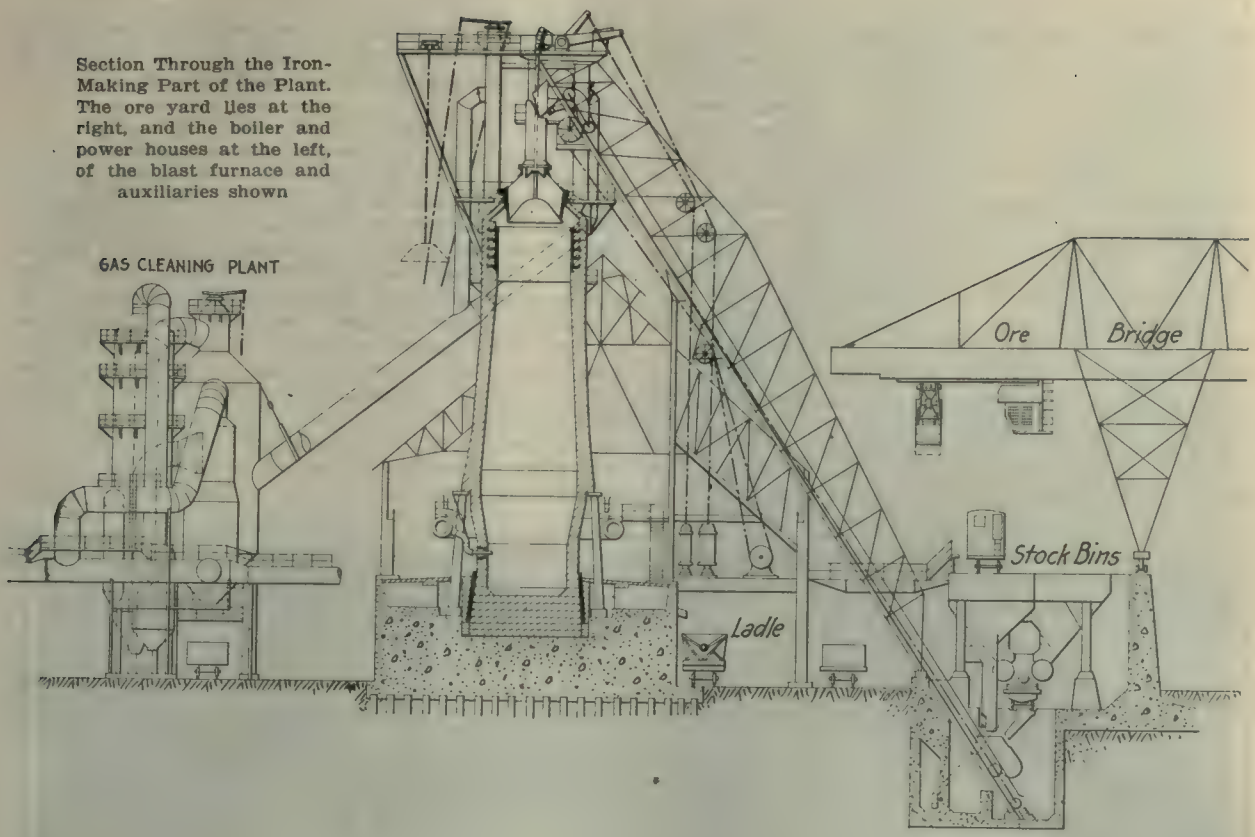
A new type of boiler setting places the boiler high, and gives an exceptionally large volumetric space per boiler hp. for complete combustion either of blast furnace gas or solid fuel. Four 14-in. Birkholz-Terbeck burners are installed at the back of each boiler. The combustion chamber for gas is under the mud drum, there being provided a distinct combustion chamber of large volume for the burning of the blast furnace gas without dilution by excess air through grate bars, or restriction of combustion by insufficient space, as in the usual setting.

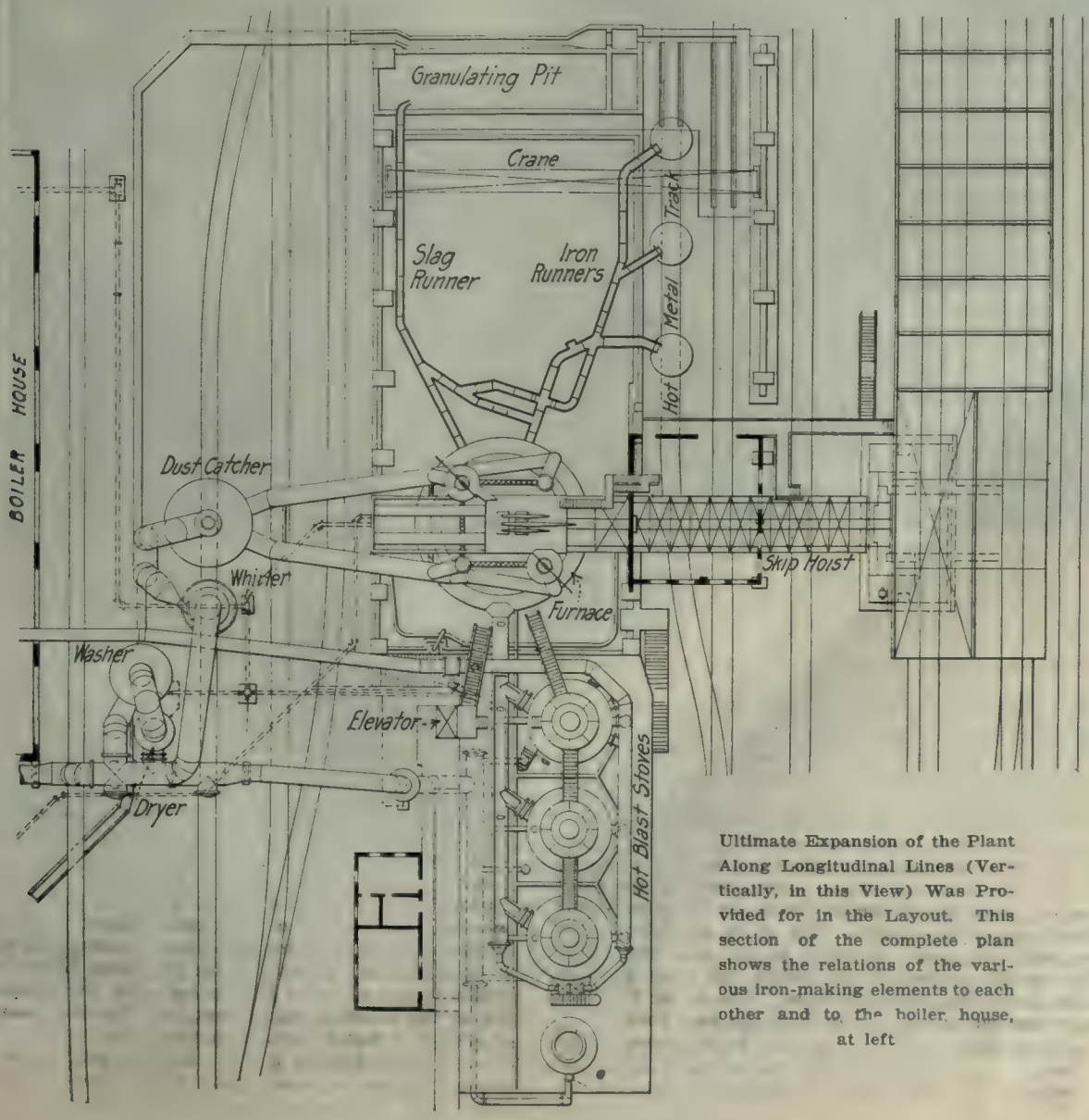
At the front of the boiler, grates are provided for auxiliary hand firing. The boiler is so designed that if increased power generation is desired stokers may be installed in place of the ordinary grates simply by building on a Dutch oven extension. The design has proved to have several very important advantages: it enables the boiler to be run at very high efficiency, due to complete combustion obtained in the large volumetric space; it enables considerable overload to be carried on the boiler, due to generation of high temperatures; it minimizes difficulties due to incrustation of tubes with dust or ash.

In the power house considerable advance in design is shown. Special attention has been paid to daylight lighting. Ample floor space is provided and all the successful features of modern power plant design are incorporated. Special mention should perhaps be made of the high intakes provided for the turbo blower, the advanced type of turbo blower installed, the completeness of the electrical equipment, and the well worked out system of water circulation and re-use.

In the blast furnace proper, the arrangement on the furnace top has been very materially improved as regards safety and convenience in work. The mantle and

Section Through the Iron-Making Part of the Plant. The ore yard lies at the right, and the boiler and power houses at the left, of the blast furnace and auxiliaries shown





Ultimate Expansion of the Plant Along Longitudinal Lines (Vertically, in this View) Was Provided for in the Layout. This section of the complete plan shows the relations of the various iron-making elements to each other and to the boiler house, at left

column have been increased in section and the manner of hanging the circle pipe, discharge trough and bustle pipe has been improved. An auxiliary cinder notch is provided. The iron and steel work of the furnace is so designed that the furnace can be enlarged at succeeding blasts if it should be found advisable. Other matters which should receive particular mention are the evident care devoted to economy in concrete in the foundations, trestle approach, highway bridge and pig casting machine; and the new type of cantilever skip incline, which affords greater rigidity of construction, and increased room in the cast house and on the furnace top.

Particular mention should be made of the improved gas main system, which originated with D. T. Croxton, manager of pig iron sales for the company. Contrary to the usual arrangement, where gas mains are led overhead both at the boilers and stoves, the gas mains here are placed underneath or outside of the stoves and boiler house. At the stoves the large main from the gas-cleaning plant goes to a water seal separator, whence it is led along the piers of the skeletonized stove foundation. From this main, pipes are led directly up through the stove platform to the stove gas burners. The main is given a slope which makes it easy to clean.

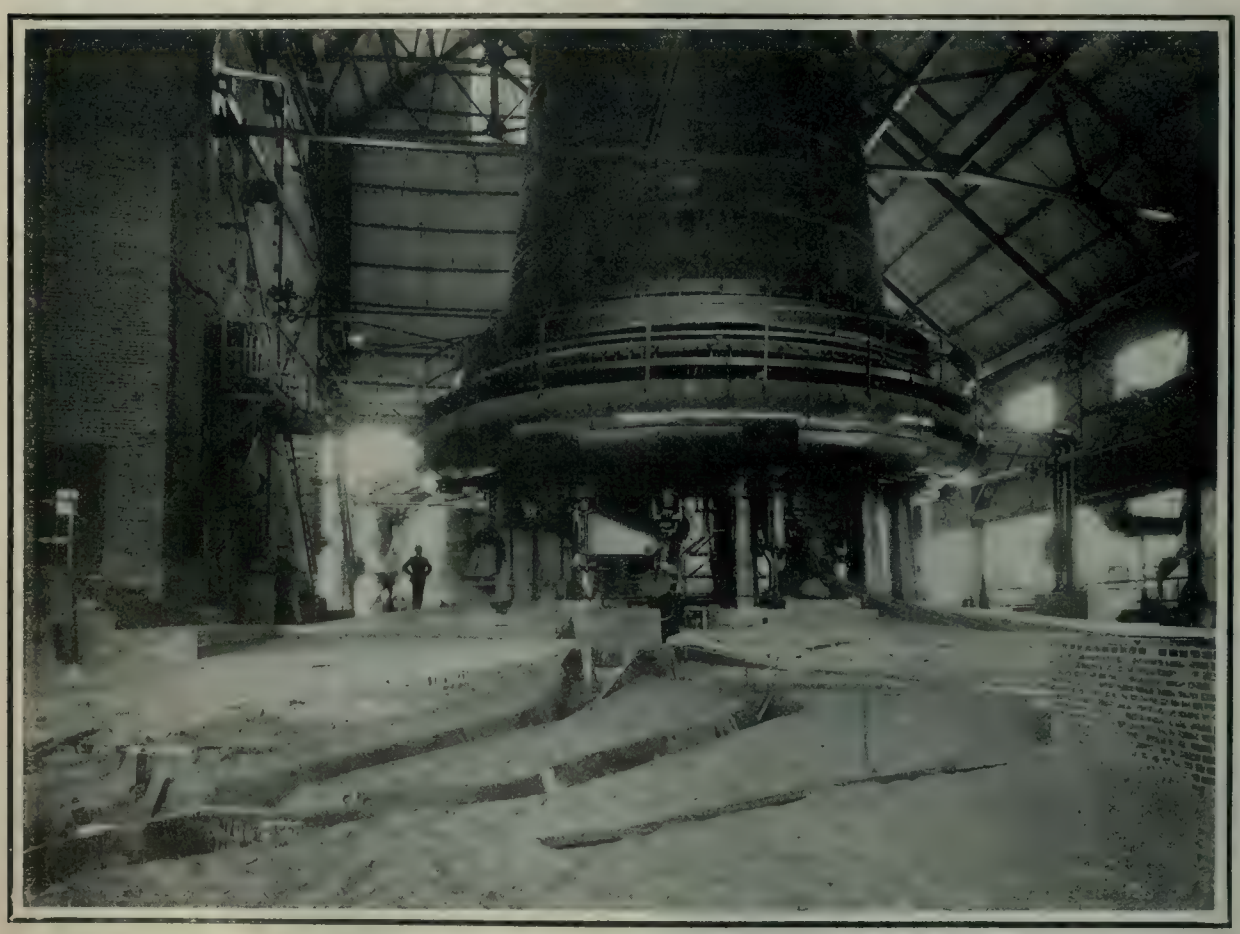
On the boiler house side, the large gas main from the cleaning plant goes to a similar water seal separator, whence it is led along at about yard elevation outside of the boiler house between the engine and boiler houses. This main is also given a slope and provided with downlegs for cleaning. Individual leads are taken from it to each boiler, the pipe for the gas burners coming up through the boiler house floor. This arrangement of mains is conducive both to cleanliness of the plant, ease in cleaning of mains and freedom from gas about the stove operating platform and inside the boiler house. The grouping together as one unit of all elements of gas cleaning is also noteworthy.

Starting with the receipt of raw materials, the ore and limestone are unloaded by a Mead-Morrison movable car dumper, with a 57-ft. cradle and a capacity of 320,000 lb. It is guaranteed to handle 30 cars per hr., and is provided with both dynamic and air braking. It has a travel the entire length of the ore and limestone yard.

Spanning the yard is a Mead-Morrison 11-ton man trolley ore bridge. It has a capacity of 600 tons per hr. from the dumping pile to the storage pile, or from the storage pile to the bins. The method of handling the ore and limestone consists in the movable car dumper placing material in a concrete dumping trough beneath the shear leg cantilever of the bridge. The 11-ton bucket picks up the material and delivers it to the main storage pile under the span of the bridge, or to the stock bins, or to the 50-ton Atlas transfer car, when the materials being handled out of the stock pile are not directly in front of the stock bins into which they are being delivered.

The ore bridge has a cantilever at the shear leg end of such length as to permit delivery by the grab into railroad cars on the track, approximately 32 ft. from the foot of the shear leg. This permits ore buckets to be changed, and also enables the ore bridge to handle repair work at the car dumper. A similar cantilever at the pier leg end allows the ore bridge to handle the skips when they have to be replaced on the skip incline. The bridge has a travel speed of 70 ft. per minute and is of the skewing type, permitting either the shear leg or the pier leg to advance five deg. ahead of the other. It is completely equipped with safety devices to prevent over-travel of either leg or of trolley, and it has magnetic solenoid brakes and rail clamps for provision against high winds.

The stock yard, 270 ft. wide by 505 ft. long, has a storage capacity for 250,000 tons of ore and 80,000 tons of limestone. Operating upon the ore bins is an Atlas 50-ton capacity side dump electric ore car, equipped with air-operated brakes, doors and car pusher arm. The bins are provided with a cross-over and suitable conductors so that the transfer car can work on either of the two tracks on the bins.



In the Foreground Is the Start of the System of Iron Runners. The slag runner appears at right; the gas-cleaning plant is outside the building, at right; the stoves are in the rear, behind the furnace. The ample working space is evident

Designed and installed by the Hoover & Mason Co., the ore bins consist of nine ore pockets with a capacity of 3120 cu. ft. each, four limestone pockets of 2900 cu. ft. each, and five coke pockets of 2900 cu. ft. each. In addition there is one central double compartment coke pocket, each compartment chuting coke to the skip bucket over a rotary grizzly screen. The rollers underneath the limestone pockets are perforated for screening.

The scale cars are Hoover & Mason double compartment type, equipped with air brakes, air operated doors and dial indicating and recording scales. Turn-out tracks for the spare scale car are provided under one part of the reinforced concrete trestle approach, the other part of the approach being bricked in to afford housing for riggers' tools, blast furnace spares, etc.

To give the skip operator a view of the skip pit, as well as of the skip hoist track and the furnace top, the control station for the skip hoist is on the yard level in proximity to the skip incline. The same station houses the control for the bell-operating cylinders, the McKee distributor, the grizzly coke screens and the bell indicating and rodding devices. Connection is provided to the cast house and furnace top by speaking tubes.

The skip incline is of the cantilever type, inclined 57 deg. from the horizontal. Its support is entirely independent of the blast furnace, so as to avoid any side thrust on the shell. It is 171 ft. 6 in. long, with double track for skip cars of the trailer truck type. Skips are operated by a Lidgerwood electric double drum hoist, driven by a single Westinghouse 200-hp. direct-current motor. The hoist has a rope speed of 300 ft. per minute and is designed for an unbalanced load capacity of 20,000 lb. Cutler-Hammer control is supplied.

This hoist is located in a concrete and brick house under the skip truss and above the tracks. This structure also houses the bell-operating cylinders, which are actuated by air from the cold blast main. An auxiliary air supply, provided from the high-pressure compressor line, is automatically admitted through a pressure regulating valve, in the event of drop in the blast line pressure. The control board for the McKee distributor is located in this house. This control is for six-station six-cycle operation, but provision is made for installation of additional panels for different cycles of charging.

The furnace top is of the standard double bell Freyn-Brassert design, having also a McKee distributor. The design of the receiving hopper and throat is worked out to give correct distribution, even when the charge is not revolved. The entire top of the furnace has solid plate guard rails, and special attention has been paid to accessibility of all working parts, and for observing both the distribution of material in receiving hopper and the dumping point of skip.



Pollock Short-Pour Hot Metal Ladles Are Used to Carry Iron from Furnace to Pig-Casting Machine (Here) and to Open-Hearth Mixer, Across the River



Gas Cleaning Plant, Viewed from Stove Platform. The whirler (center) is between the gas washer at left and the dust catcher, behind the corner of the elevator frame

Bleeders are provided with permanent rail platforms, as is also the outrigger. The outrigger has a trolley for facilitating work of repair or relining. Access to the furnace top is by interrupted flight stairs up the skip incline, and also by a bridge from the furnace top direct to the elevator, and by a bridge to the stove top. An extra large door is provided at the gas seal.

The six-passenger Otis elevator is a worm-geared traction type, having a capacity of 1500 lb. load, fully equipped with interlocking devices and emergency safety features. It has push-button control and four landings.

With a capacity of 25,500 cu ft., the furnace is 92 ft. high by 22 ft. 6 in. The iron and steel work includes a heavy continuous cast iron sub-base. The concrete foundation is reinforced by tension bands and the column base and columns are encircled by a reinforced concrete beam, extending between the columns up to within a short distance of the hearth jacket segments. There are ten cast iron columns, with ten tuyeres, placed centrally between columns, thus affording good working room. The columns are offset, which not only allows more room for work about the tuyeres, and places the columns and column base plates at a more remote location from possible breakout, but affords the possibility of enlarging the furnace hearth and bosh in the future. The columns are one piece and entirely free from any cast-on iron lugs.

Bustle pipe, circle pipe and waste water trough are suspended from the mantle. The bustle pipe is insulated with Johns-Manville vitro fire felt, and easement against thrust against the columns, by expansion of the hot blast main, is provided in an expansion joint. Special attention has been given the location of circle pipe connections and waste water trough overflow, so that there is ample room on the bustle pipe walk, and it is free from obstructions.

The hearth jacket is of the standard Freyn-Brassert cast iron segment design, having cooling pipe cast in, and heavily wedge banded and bolted. It is tapered, thus maintaining a safe thickness of hearth wall against erosion and breakouts, and also maintaining ample brick at the bottom to prevent short holes and to prevent the hearth block from rising. The tuyere breast

consists of a solid armor of 1½-in. plates, with openings for the ten tuyeres and for the bronze cooling plates.

Eight bands, 1½ in. thick, reinforcing the bosh, are held by cast steel distance pieces to prevent slipping. The mantle is of a specially heavy built-up plate angle construction, provided with a trough with drainage provisions for collecting shell spray water. The furnace shell, which is especially designed to meet modern furnace lines, is of butt strap construction on both the two bottom rings and the top ring. The intermediate rings are of double lap riveted construction. The shell is surmounted by a dome on which the large bell hopper ring is riveted.

General Refractories Olive Hill steam pressed fire brick lining is fitted with a heavier thickness in the lower inwall, where maximum thickness is required, than in the upper part, where an excessive depth of lining would be detrimental. No interior water cooling is given the lining above the mantle, but a permanent pipe spray with connection is affixed to the shell. A platform at the spray is reached by a short bridge from the skip incline steps.

A new design of bosh and tuyere breast plate is used, having baffles that give positive circulation of water and enable the plate to be more easily withdrawn if cracked or burned. The hearth walls are cooled by the cast iron cooling pipe of the hearth jacket, which extend approximately 9 ft. below the tapping hole. The stock line is afforded protection by cast iron wearing plates of high combined carbon content. These plates, laid integral with the lining, are of small surface dimension in each unit.

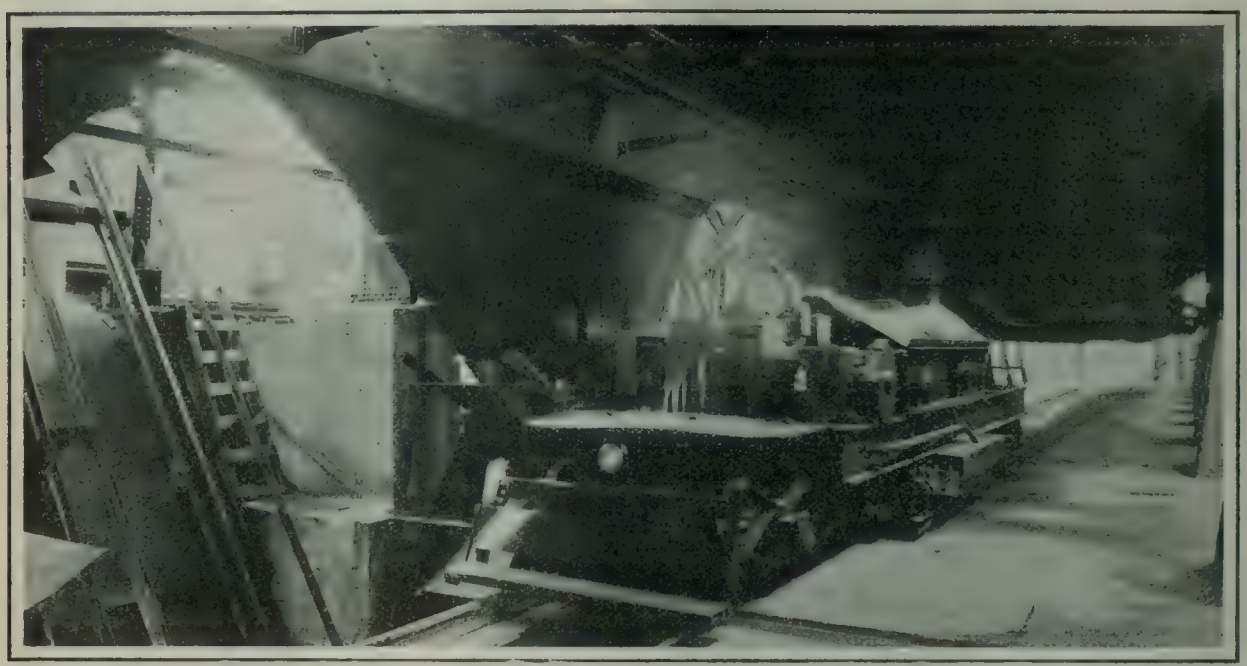
Three hot blast stoves provide a total heating surface of 285,000 sq. ft. They are of the two-pass side combustion type, with a built-in draft flue in the skeletonized reinforced concrete foundation, this flue leading to a Heine reinforced concrete stack, 8 ft. diameter and 225 ft. high, brick lined throughout.

Each stove is equipped with blow-off valve turned down into the chimney flue, with quick closing chimney valves, gas burners and gate type hot blast valves. Provision is made for a future additional hot blast stove. These stoves have 3½-in. checkers with 2-in. checker walls, the design of checkers, arch and draft chamber equalizing the flow of gas down through the checkers, thus overcoming the usual tendency toward segregation of flow of gas in a limited number of checker openings.

All stoves are insulated with "sil-o-cel" powder and brick, and are lined with General Refractories fire brick; handmade inwall quality is used in the combustion chambers and dome, and steam pressed inwall quality in the top of the checkers. The ring wall and bottom of checkers, as well as draft chamber piers and arches, are made of stove quality. The gas main leading to the stoves has a butterfly valve which is intended later on to attach to a new design of gas pressure equalizing equipment to maintain constant pressure in the stove gas main.

The cast house is laid out to run cinder either to cinder ladles or to a cinder pit at the foot of the cast house. The iron runners are designed to deliver to three 75-ton Pollock short-pour hot metal ladles. They have a fall of ⅝ in. to the ft., to give a minimum amount of scrap. Coke dust, sand, loam, clay, furnace tools, copper, etc., are brought to the cast house by the 25-ton crane, and stored in a permanent brick and concrete shed inside of the cast house.

The working cinder notch is 45 deg. from the iron notch. An auxiliary cinder notch is provided, fitted up with a standard cooler and intermediate cooler, so that cinder can be withdrawn here in an emergency. The shutters are all of the Fraser remote control type; and the snort valve wheel, mud gun control and shutter control are all located at one point.



Skip Car Rails Appear at Left. The scale car is shown located over the skip pit

Special lighting facilities have been provided and there are abundant hose connections for both high and low-pressure water. Steam and air are piped to the cast house for use on the mud gun and for other casual requirements. There is a speaking tube from the cast house to the nearby operator's house, and to the furnace top, and there is also a duplex signal apparatus connecting the cast house with the boiler house and power house.

Gas is taken off the furnace by four offtakes from an annular space about the big bell hopper, which reduces the average gas velocity and the production of flue dust. These four offtakes lead to four uptakes, two of which are surmounted by Baer safety explosion valves. The uptakes lead into four downtakes, each two combining into one downcomer. The two downcomers enter the dust catcher radially.

The gas cleaning system is located between the boiler house and the blast furnace. There is one 22-ft. by 40-ft. dust catcher for primary cleaning of gas. The gas is then led to a 12-ft. 6-in. Brassert tangential whirler, where further amounts of fine flue dust are removed. From the whirler the gas is led through a series of goggle valve by-passes, so arranged that the gas can be handled in a variety of ways. It is contemplated to run—and the system is thus arranged—so that all the gas is led through the gas washer, thence through a water seal separator to the main leading to the hot blast stoves and to the boilers. If desired, only the stove gas may be washed and gas sent from the whirler direct to the boilers, or in an emergency rough gas may be sent to both stoves and boilers.

All these gas cleaning elements are located in one unit, completely equipped with platforms, thus making easy their supervision and care. The system includes standard equipment already used on upward of ninety installations, embodying well worked out means for obtaining gas with not to exceed 0.2 grain of dust per cu. ft. The washer has a novel arrangement of sprays which produces a large mass of spray having an intense whirling action. Not only is there an appreciable economy effected in the use of water, but the washer handles and cleans dirty gas even better than heretofore.

To eliminate the nuisance of dust, which has always been such an annoyance at blast furnace plants when the dust catchers are dumped, Mr. Croxton has evolved an arrangement which will deliver the dust from the dust catcher and whirler to the cars in a moist state. This consists of a Bartlett-Snow double screw inclosed conveyor attached to the dust catcher by a special screening casting. Dust flows through this screen and falls into the first stage of the double screw conveyor, which conveys it down into an inclosed trough of water and delivers it to the second screw conveyor, which again lifts the dust out of the inclosed trough and delivers it to the car. The dust, in passing through the double screws submerged in the trough of water, becomes thoroughly pugged and saturated with moisture. The coarse materials that do not pass the screen leading to the pug mill go to the bottom of the dust catcher, where they are removed by occasional dumping of the main dust catcher bell. In an emergency, the entire contents of the dust catcher may be removed in the usual way.

Branches from the gas cleaning plant carry the gas main system to both the stove and boiler gas mains. At both the stoves and boilers water seals are provided; in addition, a further complement of water seals is installed, so that the stoves or boilers may combinedly be cut off from the entire gas cleaning system at cast or shut down, so that the wet cleaning system may be isolated from the dry cleaning system, and so that the entire system can be isolated from the furnace. These water seals are provided with large capacity lines, so that water can be admitted and the seals filled in a very short time.

The blast main system starts at the turbo blowers, the discharge from which has an Ingersoll-Rand multiple-port disk check valve. Motor-operated cold blast valves are provided outside of the power house building. The cold blast main leads directly to the hot blast stoves, being provided with two counterweighted blast relief valves and the usual snort valve, the discharge of which is turned down into the stove flue. The bypass leaves the cold blast main at its end and leads around No. 3 stove, entering the hot blast main at the extreme end from the furnace. It is provided with a McCarthy check and regulating valve.

Hot metal is normally shipped to the mixer of the Trumbull Steel Co., but there is also provided, for the casting of chill iron, a double strand pig casting machine. This is standard Heyl & Patterson equipment, having manganese-steel links and pins. The pig machine strands are mounted on a reinforced concrete structure. This type of construction, originated at the blast furnace plant of the Otis Steel Co., was chosen because of elimination of deterioration encountered with structural steel supports, by reason of the large amounts of steam and water about the operation. The concrete structure provides a continuous platform under the strands, makes for easy replacement of molds, and provides a channel for spray water, which is carried into a sump at the pouring end. The length of rails is limited to 11 ft., to make convenient handling when replacements are necessary. All castings used in the machine and structure can be replaced by open sand castings poured at the cast house of the plant. The machine is laid out for additional strands, with the growth of the plant.

Integral with the pig casting machine is a combined ladle and pouring house. In this is a 55-ton Morgan pouring and ladle handling crane having 100 per cent overload capacity. This serves both to pour the ladles by means of the patented Pollock short pour device, shown in one illustration, and also to remove the ladles from the trucks for relining. A spare ladle is provided, to be held in reserve for lining.

After considerable study the track scales were so located that they serve admirably both for the light and heavy weighing of pig iron cars, as well as for check weights on receipt of raw material into the yard. In the scale house are also incorporated the yard master's office, locker rooms for train crews and washroom facilities. A larger locker and service room for the furnace men is located in proximity to the incline leading from yard level up to the furnace and stove foundation top. Additional toilet and locker rooms are located in the basement of the power house and boiler house, and at the machine shop.

Material quantities used in connection with this job are of interest. There were placed 2246 Raymond reinforced concrete piles, 20 to 30 ft. long; a total of 61,974 cu. yd. of excavation; 31,601 cu. yd. of concrete; 224,365 cu. yd. of fill; 750 tons of reinforcing steel; 1270 tons of plate; 729 tons of castings; 145 tons of structural shapes; 65 tons of forgings; 1251 tons of structural steel in buildings; 1,020,000 building brick; 2,083,000 fire brick, and an average of 371 men were employed per day for the ten months' construction period.

Fabrication and erection of structural steel in buildings and skip incline were done by the Lackawanna Bridge Co.; the Hill Clutch Co., Phoenix Iron Works and the Pennsylvania Engineering Works furnished some of the iron and steel castings. Fabrication and erection of iron and steel work other than structural were done by the William B. Pollock Co. All brick work in furnace, stoves, boilers, power house and offices was placed by the P. J. Brown Construction Co.; the concrete was put in by Arthur G. McKee & Co. Piping was installed by B. Floersheim & Co. Instruments for the blast furnace and power and boiler houses were supplied by the Bristol Co.; pipe covering by the Keasbey & Mattison Co.

Plans and specifications for the complete plant and plant equipment were drawn up by Freyn, Brassert & Co., Chicago. These engineers also had supervision of construction.

New Wire Products Company in Worcester

A new corporation known as the G. F. Wright Steel & Wire Co. has been organized at Worcester, Mass., headed by George F. Wright, son of George M. Wright, former president of the Wright Wire Co., and it has purchased the plant of the Standard Plunger Elevator Co. at Jamesville, a suburb of Worcester. The new company will manufacture wire rope, wire cloth, wire lathing and poultry netting. Some of the special machinery has already been constructed, and it is planned to begin manufacturing at an early date.

The company will be incorporated with a Massachusetts charter and capital stock of $100,000. George F. Wright will be president and general manager, A. B. Peavy vice-president and general sales manager, and Herbert N. Wright, former treasurer of the Wright Wire Co., and one of the founders of that business, will be treasurer and clerk of the company. Another director will be Albert S. Knapp, who was in charge of one of the weaving departments of the Wright Wire Co., and has specialized as a mechanical engineer in the designing of wire machinery.

George F. Wright, head of the business, has been connected with the wire industry for 10 years, learning the business in a practical way in the mills at Worcester and Palmer, Mass. He became assistant general manager of the Wright Wire Co., and continued in this office under the management of the Clinton-Wright Co., and when the larger Wickwire-Spencer Steel Corporation took over the business was made a director and a member and the clerk of the operating committee.

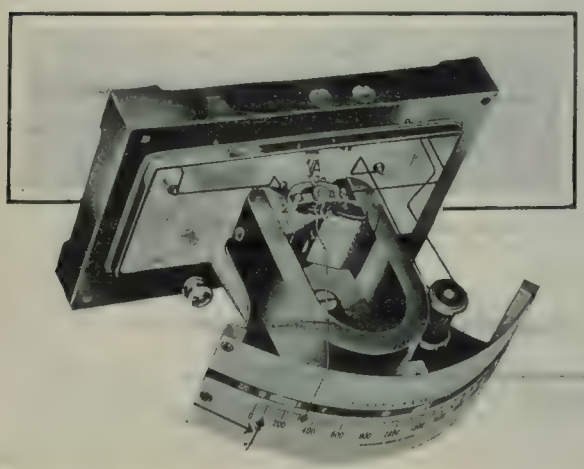
The Standard plunger plant consists of 5½ acres of land, with a main building 150 x 300 ft., one story with monitor roof, and served by a 10-ton electric traveling crane. It is on the Boston & Albany Railroad, with which it is connected by a spur track. It will lend itself readily to its new use. The Standard Plunger Co. recently went out of business.

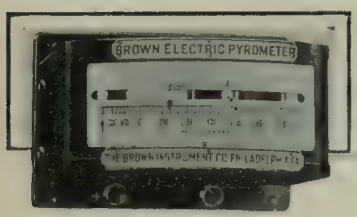
Cold Junction Compensated Pyrometer

The Brown Instrument Co., Philadelphia, is placing on the market a new thermo-electric pyrometer which is automatically compensated in the instrument for changes in cold junction temperatures. A means of setting the pointer of the instrument to zero in the usual manner is included.

It is generally known that the millivoltage developed by a thermo-couple is dependent on the difference in temperature between the hot and cold ends of the thermo-couple. To secure accurate measurements therefore, it is necessary that the cold end be maintained at a constant temperature or that the instrument be compensated for the changes in temperature at the cold junction of the thermo-couple.

It is common practice to use extension or compensating leads to transfer the cold junction from the binding posts of the thermo-couple to a distant point, locating the cold junction at the end of the leads in a cold well in the ground or in a compensating box, where the temperature can be maintained constant. In the pyrometer under consideration the extension or compensating leads are brought to the meter, changes in temperature at the end of the leads also taking place in the meter itself, which can be compensated for the change in temperature. To secure this compensation a Briguet spiral, similar to that used by Darling in England in 1909, is mounted in the instrument, controlling the springs and moving element directly. A second index controlled by thermostatic metal is mounted on the scale and works with change in temperature exactly in relation to the movement of the pointer controlled by the Briguet spiral attached to the moving element.





A Briguet Spiral Is Used for Automatic Cold Junction Compensation. The spiral also controls index for zero setting

In using the pyrometer the pointer is set by the zero adjustor to correspond with the index on the scale. If, for instance, the values for a thermo-couple are based on a cold junction of 75 deg. Fahr., the index will indicate 75 deg. provided the instrument is subject to this surrounding temperature. If the pointer does not correspond with this index, it is set accordingly. When the temperature around the instrument and the cold junction of the end of the compensating leads rises to 90 deg Fahr., the index automatically rises to 90 deg. and the Briguet spiral attached to the instrument pointer causes it to move up to 90 deg., automatically adjusting for the temperature of the cold junction of the thermo-couple.

Any number of thermo-couples with their extension or compensating leads can be brought to one instrument. Recording instruments can also be equipped with the automatic compensation and means for setting the point to zero.

Rubber-Tired Steam Shovel

The Osgood Co., Marion, Ohio, has completed the development of an 18¾-yd. traction revolving steam shovel equipped with solid rubber tires. It is designed especially for use of contractors having jobs that require frequent moves over paved streets or highways. For traveling under its own steam the shovel is provided with a 2-speed gear arrangement by means of which a speed of 3½ miles per hour can be obtained. A means for disengaging the traveling gears for towing has also been provided. Steering is accomplished by swinging the upper body slightly to the right or left. The tires are 40 x 14 in., ribbed-thread mounted on steel rims. They are pressed on the regular 34 x 16 in. cast steel wheels, an arrangement intended to permit the removal of the tires when desired, and by attaching cleats to the rear wheels rendering the shovel ready for service without the rubber tires.

Union Refusal of Coal Wage Modification

Attempts to interest the United Mine Workers of America in the necessity of a modification in the wage agreement in union fields so that operators in those fields can compete with non-union mines are meeting no success. The advisory board of the Northern West Virginia Coal Operator's Association held a conference with John L. Lewis, president of the United Mine Workers in Indianapolis, Sept. 7. The operators explained to Mr. Lewis that by reason of the wage reductions in the non-union fields surrounding northern West Virginia, any of the freight differentials, this region is at a great disadvantage in competition with other fields at the present wage scale. They asked for a reduction in the scale. Mr. Lewis told the operators' representatives that this is an inopportune time to make any reductions in wages; that every unionized mining district has similar arguments and to grant a reduction in northern West Virginia would disrupt the entire mining industry at this time.

Carnegie Veteran Association in Pittsburgh

Formal organization of a veteran employees' association in the city offices of the Carnegie Steel Co., Pittsburgh, was accomplished recently. The title of the organization is the Carnegie Steel General Office Veteran Association, and it is composed of those who have been in the company's service for 20 or more consecutive years. The organization starts out with 175 members, 10 of whom are women. Officers are: Honorary president, Homer D. Williams; president, L. R. Burnett; vcie-presidents, W. W. Blackburn, Thomas Woods, Charles Orchard, John Longabaugh and John O. Leech; treasurer, Howard E. Jeffries; secretary, H. A. Beltz; trustees, J. B. McKillips, H. J. Baer, Anna M. Enright, J. M. Camp and John W. Brandon.

Less Unemployment in Buffalo

BUFFALO, Sept. 12.—Survey of the unemployment situation in Buffalo by officials of the New York State Employment Department, show a material increase in the number of workers who have taken jobs in August and to date in September. The investigation shows about 37,000 workers are now unemployed—a decrease of 2600 from June. Many of these were absorbed by steel interests which increased operation within the past thirty days.

A new application of liquid oxygen, the use of the material in mine rescue breathing apparatus, is being investigated for the United States Bureau of Mines by Dr. F. G. Cottrell, of the National Research Council, formerly director of the Bureau of Mines.

CONTENTS

Electric Furnaces and Heat Treatment 643

Their Commercial Application to Steel and Other Industries—Over 80 in United States.

Steel Treaters Meeting in Indianapolis 649

Third Annual Convention Next Week in Large Heat-Treating and Industrial Center—Program and Exhibitors.

Three Types of Alloy Sheet Steel—II 655

Details of Heat Treatment Necessary to Attain Highest Tensile Strength—Hardness and Other Data.

Screw Stock Heat Treated with Oil 660

Use of Mircs System for Ferrous and Non-ferrous Material by Bridgeport Screw Co.—Operating Data.

Mechanical Molding of Car Wheels 662

Moving Platform for Handling Molds from the Molding Machines, Through the Pouring Stage and to the Shake-out Machines.

Rotary Furnace for Automobile Parts 666

Moving Hearth Is an Annular Ring—Heated Electrically and Controlled Automatically—Suitable for Large Variety of Parts.

Electric Furnace Tool Steel Qualities 669

Vital Considerations in Practice Insuring Regularity—Rate of Purity of Stock—Specifications—Alloy or Reinforced Steels.

New Trumbull-Cliffs 600-Ton Blast Furnace 673

Plant Completed in Record Time—Arrangement for Labor Saving—Provision for Expansion of Plant and Enlargement of Furnace Hearth.

Ferromanganese "Dumping" Is Not Sustained 687

Trial Examiner's Report in Case Before Federal Trade Commission Is in Favor of Agents of British Producers.

Attachment for Combination Dies 659
Heavier Freight Movement at Pittsburgh. 659
Quick Change Gear Lathes 659
French Iron and Steel Production Costs ... 664
New Heat-Treating Furnace 665
American Trade with South Africa 665
Recooling Quenching Oil 668
Labor Notes 668, 680, 689
Tax Payments on Appreciated Capital ... 671
Unusual Traveling Crane 671
To Survey Foreign Commercial Laws 671
Cost of Metric System Compulsion 671
Hardness of Chilled Wheels 672
British Bid for Uruguay Bridge 672
New Wire Products Company in Worcester 679
Cold Junction Compensated Pyrometer ... 680
Rubber-Tired Steam Shovel 680
Carnegie Veteran Association 680
Editorials 682
The Wire Advance—Stages in Readjustment—Electric Furnaces for Heat Treatment—Increased Steel Production.
Correspondence 684
Effect of Seasonal Production on Building—Embrittling Effect of Pickling on Carbon Steel—Device for Working Oxy-Acetylene Torch—Future Increase in Railroad Ton-Miles.
Marshal Foch Guest of American Iron and Steel Institute 686
Program of National Safety Congress ... 688
Coming Conventions 688
Fabrication in Transit Grant 688
Program of Meeting of Electrochemists ... 702
British August Outputs 704
Steel Corporation's Orders 705
Plant Operations 705
Lower Mill Wages 705
Refractories Market 705
August Steel Ingot Production 707
Foreign Market Conditions 708
Industrial Finance 709
Office and Trade Changes 709

Iron and Steel Markets 690
Comparison of Prices 691
Prices Finished Iron and Steel, f.o.b. Pittsburgh 703
Non-Ferrous Metal Markets 704
Personal Notes 706
Obituary Notes 707
Machinery Markets and News of the Works 710
New York Jobbers' Prices 718

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The Wire Advance

The advance in the price of wire products, put into effect on Sept. 10 by the leading producer, and later by its competitors, coming when all other steel products were tending downward, arrests attention and calls for comment. The advance was made after buyers of wire nails and of all the various forms of wire had been told it was impending, and had been given opportunity to buy for two months or more ahead at the prices recently prevailing, based on $2.50 for plain wire and $2.75 for wire nails.

The first reaction to the announcement of a purpose to put up wire was no doubt a question as to the ability of any producer to cause a turn in the market under existing conditions. The pressure from buyers of steel in all lines was for lower prices, regardless of the fact that practically all steel companies have been operating at a loss, and that the steel trade, considering that labor and especially transportation are well above the levels of 1914, has gone further in readjustment than have the manufacturers of commodities entering largely into the cost of living. But the general thinking in the trade apparently had not taken in one important feature of the situation in wire, which was that in the two months since the $2.50 and $2.75 bases for wire and wire nails had been adopted there had been but little departure from those prices. In other words, no producer of wire had made a serious effort to increase his proportion of the going business and his rate of operations by further cutting of prices. With the market stationary—due to the fact, of which the wire companies were painfully aware, that in relation to cost wire products were the lowest on the list—the proposal to make a moderate advance had a foundation of good salesmanship as well as of good psychology.

The time-honored procedure of accepting orders at the prevailing level, pending an advance, was followed in the present instance, and the result was the booking in ten days' time of a larger volume of orders for wire and nails than had been taken over many weeks just preceding. The move disclosed a meagerness of stocks—in warehouses and at the plants of manufacturing buyers of wire—that has probably not been duplicated in the history of the trade. Buyers, sharing the general expectation that regardless of costs all steel products were headed for an indefinite decline, were working on barely more than week-to-week supplies from the mills.

Coming in connection with the recent advances in grain and cotton and the upward turn in pig iron, this effort of the wire manufacturers to get back their cost and to check the long and discouraging decline, will emphasize some possibilities in the situation that should not be overlooked. On a 20 to 25 per cent operation, steel works were plainly dropping below the actual rate of consumption. While rebounds do not mean entering upon a steady up-grade movement, they have always played their part in the preparations for that movement, and therefore have a significance that is not to be minimized.

The consumption of wire has so many ramifications both in manufacture and in the everyday buying of the people that the episode of the past week will have a wide influence. There is the suggestion also that in one or two other products, particularly sheets, in which the declines have been marked, the possibility exists of a similar upturn, even though in general the readjustment of iron and steel values may not have been completed, granting lower freight rates and further economies in labor cost.

Stages in Readjustment

The readjustment in business and industry that became necessary when the discovery was made that things could not continue as they were in the fore part of 1920 is a readjustment that must go by stages. One stage, that of price deflation, is nearly if not quite accomplished for the time being, but other developments must occur. It has become perfectly plain in recent months that business did not stop simply for a price readjustment. The "strike of buyers" was not merely for such lower prices as would induce a resumption of buying on a scale giving business the same appearance of activity as obtained during a large part of last year.

As to price readjustment, the index numbers have been practically stationary of late. In some districts retail prices for food have increased slightly. The cost of living, in general, is not declining notably, though rents are in line for further reductions. As to steel prices, THE IRON AGE index number shows finished steel prices to be about 35 per cent above their ten-year average before the war, which, with iron and steel works wages at more than 50 per cent advance over 1914, freight rates up 75 to 100 per cent and other fundamental items of cost high, represents substantially all the liquidation that can be expected since prices relative to cost are much lower than before the war.

The volume of business now being done in the United States is really very large in the aggregate, possibly larger than a year ago. It is certainly larger in some lines. A curious thing is that while the increased efficiency of labor is universally recognized, many men do not follow the point to its logical conclusion, that for everyone to be employed there must be more work to do, in other words, a greater demand for commodities and services than there was in 1920.

In this matter of changes in prices and in the volume of work done we are having since the armistice on a large scale what before the war we used to have periodically on a small scale. The principle is much the same. Before the war prices would get too high and business would slacken. When the cost of commodities and services got down sufficiently, demand would be created that did not exist at the higher prices and thus the slack would eventually be taken up.

The second stage in any of these readjustments is that of new classes of demand developing, the first stage having brought about deflation in prices for services and commodities. It is at this point that a difficulty arises. Before the war business in general had certain classes of demand to fall back upon. In particular, there were new railroads, skyscrapers and factories required. At the present time these outlets for our surplus potential activity do not exist to the same extent. In railroading, the objective is not so much as formerly an increase in the physical equipment as it is the attainment of greater efficiency in the employment of the facilities. Some skyscrapers are needed, and here and there some are being built or are projected, but we are not going to go in for skyscrapers on an enlarged scale. As to factories, there are some manufacturing lines in which there are too many factories, due to the war.

All this simply means that we are going to adopt new lines of activity, it being quite certain that we are resourceful and ingenious enough to find employment eventually for the unemployed. Every one cannot go back to his old job, for many were receiving wages without doing the corresponding amount of work. Just what the new lines of activity will be cannot be predicted definitely, but they can be found and must be found. We can have overproduction of specific commodities and overdevelopment of specific facilities, but we cannot have overproduction as a whole, for some new thing can be made that people will buy, or some new facility created that people will patronize. Eventually that will be the solution of unemployment. Everybody says we must work harder and be more efficient, and if we do that we are entitled to have more conveniences and luxuries. To get these things and at the same time to provide employment for every one, we must branch out into new lines of production and consumption.

Electric Furnaces for Heat Treatment

The already extensive use of electricity in the heat treatment of steel and non-ferrous products in American plants appears from a review given on other pages of this issue. This new development takes its rank alongside of the employment of electric furnaces in making steel and in melting non-ferrous metals and alloys, in which the United States is the acknowledged leader. In this newer field it is probable also that no other country can show that it now has at least 80 furnaces of various types employed in the heat treatment of steel alone, with nearly a half dozen on non-ferrous products. Already five American electric heat-treatment furnaces are credited to foreign countries.

Among the many products now heat treated electrically, gray iron castings are listed alongside of steel castings; also automobile and aircraft parts, sheets, bolts and nuts and various other steel products. The application to non-ferrous materials is greater than was generally believed and it would appear that this phase of heat treatment is only in its beginnings. Also the use of electricity in the enameling and glass industries is quite extensive. The size and types of furnaces, many of them automatic, are a testimonial to the inventive ability of American electrical engineers. Equally noteworthy is the development of the pyrometric devices which are so vital an adjunct to this industry.

Emphasis on the growth of electrical heat treatment is not intended to throw into the background the extensive application of oil and other fuels to heat-treating operations. Some notable achievements are reported of oil-fired annealers and heat-treating furnaces for steel and other materials. Gas, oil and coal have been used for these purposes for many years. However, the war, and particularly the demand of the ordnance departments of the Government for a quick and closely regulated and efficient source of heat, have been the prime causes of the rapid development in electric lines. Twenty-two electric furnaces of one type were in use during the war on the heat treatment of guns.

There is room for all systems and they will all develop as the demands of industry grow, for the trend is towards more exact results and more exacting materials.

It has been reported in the copper trade recently that Germany is not only the heaviest foreign buyer of copper, but that her purchases have been exceeding those of any other two countries. Official statistics of the exports for the first seven months of this year, just issued, confirm this statement. For the period mentioned Germany has taken 127,632,400 pounds of copper, as against

109,666,200 pounds as the combined exports to France and Great Britain. Germany's purchases are not only twice what they were for the same period in 1920, but they constitute nearly 40.5 per cent of the total exports. Germany is now buying more copper than in 1913, when preparing for war, her purchases then being 33 per cent of the total sold by the United States for foreign consumption.

Increased Steel Production

The 30 steel companies which make monthly reports to the American Iron and Steel Institute of their ingot production made 803,376 tons in July and 1,138,071 tons in August. The months had 25 and 27 working days respectively, so that if the rate of production had not changed the August report would have shown 867,646 tons, while the tonnage actually reported is 31 per cent greater. Plainly that is a remarkable percentage increase for a single month, a fact that is well brought out by the observation that if such a gain were compounded for about six months it would produce a full operation. Since nothing of that sort can be expected the August increase must be viewed as being in part simply a recovery from a particularly low rate.

The 1920 output of the 30 companies that report monthly was 84.2 per cent of the total steel ingot output of the year. The producers who furnished the other 15.8 per cent always provide an element of doubt in considering the monthly reports, for the reason that their operations may not be at the same ratio as obtained in 1920. Assuming that the ratio held good in August, the production of steel ingots by the entire industry was at the rate of about 15,600,000 gross tons per annum, or at the rate of about 30 per cent of capacity, the favorite estimate of actual capacity at the present time being about 52,500,000 tons.

Production in July was at little more than 20 per cent of capacity, regarding the month as a whole, but there was a time in the month when it was particularly light, and probably ran below 20 per cent. No one could assume for a moment that such a low rate could obtain for any length of time. The country is still doing business, and is really doing a fairly large business, but it has been liquidating stocks and it has been doing a smaller amount of construction work, in relation to the stage of general business activity, than is usual. Thus, even with no material improvement in the general tide of business, the quantity of steel production could be expected to increase.

As a matter of fact, that apparently is what occurred in August. The demand upon the steel mills had been in subnormal relation to the amount of steel that was actually being consumed or put into use in ultimate destinations. A dictum that had general acceptance before the war has frequently been recalled in recent months, that dictum having been that the rate of steel production could not go below about 50 per cent of capacity. The dictum rested both upon theory and upon the actual showing, for at no time in the history of the steel industry, until after the inception of the world war, and then for only a very short time, did the American steel industry operate at less than about 50 per cent of capacity.

An interesting question has arisen, whether the increase in productive capacity was responsible for the low percentage rate of operation in recent months. The increase, from 1914, may be taken at approximately 50 per cent. From one viewpoint this increase could not account for operating rates under 33 per cent, for 33 per cent with present capacity is equal to 50 per cent with the pre-war capacity. The matter might be looked at from another angle, possibly. If there had not been the increased capacity last year production would not have been as great, and perhaps some demand would have held over. Everyone knows, at any rate, that if steel consumers and distributers had all realized last fall and winter just what was coming, the stocks of steel that have stood in the way of steel operation in the past few months would not have been accumulated. The stocks are not entirely liquidated yet, so that steel production can increase further merely to get in normal relation with the general volume of work that is being done in the country.

CORRESPONDENCE

Effect of Seasonal Production on Building

To the Editor: The summary of the report of the Committee on Elimination of Waste in Industry in your issue of Aug. 11 makes very interesting reading. In the winter of 1919-20 we put up a small plant, and for a long time will remember many causes of delay and extra expense besides the inclement weather which prevailed.

It is gratifying to note that while the committee does not hesitate to place a large share of the responsibility for waste in building operations on the unions, it is fully alive to lack of efficiency on the part of the contractor and to the fact that there were acts of collusion between workers and contractors, the public at all times paying the piper.

It is evident from the statistics given that there could be much more work for the men in this line, as only one half of the idle time is due to weather conditions. A number of plants had to be expanded and office buildings constructed after our entry into the war and subsequent thereto. Notwithstanding the high costs, it was possible to secure some kind of a return on these investments; but dwellings, either single houses or apartments, showed almost no increase during the same period. It may be assumed that this phase of the situation was responsible for the days of idleness.

Real estate owners could not build at a price that permitted of a rent within reason. For the same reason the individual could not afford to build a home, knowing that to do so meant eventually decreased instead of increased value. In this latter class are many workmen in industrial plants throughout the country, besides many in the various building trades themselves. Even if building costs do come down to an appreciable extent many who desire to own their homes will have to forego ownership seeing that it is closely linked with seasonal production in many lines. There has been more or less agitation of this question but no real forward movement has developed. The fact is that a goodly number of our clerks and skilled workmen should take advantage of building and loan associations or other organizations formed to finance home building were they relieved of the fear of having to seek employment elsewhere because of regular or un-

certain periods of shut downs. Proper study and some education of the public in buying might eventually eliminate a large part of the seasonal periods of non-production or at any rate establish a better average of plant operation.

If the workmen in the building trades were assured of work the year round, save when debarred by weather conditions, perhaps they would in time see the advantage of such a condition with a reasonable daily wage, as contrasted with an extremely high rate of pay but at the same time many days of unemployment.

H. D. MURPHY.

Medford Hillside, Mass.,
Aug. 27, 1921.

Embrittling Effect of Pickling Upon Carbon Steel

To the Editor: On page 334 of THE IRON AGE, Aug. 11, appears a paper entitled "Embrittling Effect of Pickling upon Carbon Steel," which should prove of value to anyone interested in the microscope and its uses in metallurgy. It is not as a piece of research work, however, that it has its greatest value, but rather as an example of the false conclusions and erroneous impressions which can be drawn from metallographic work of inferior quality.

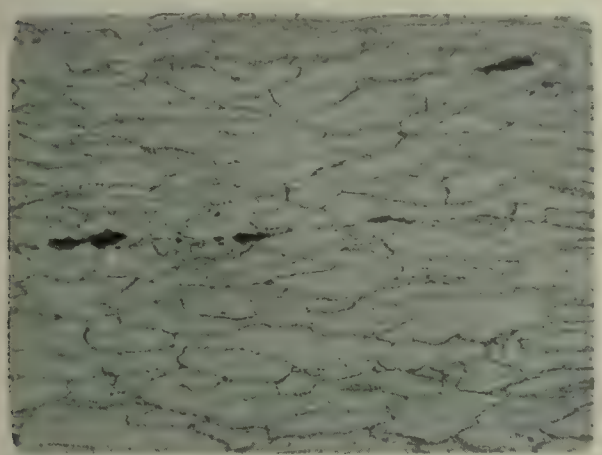


Fig. 1.—Photomicrograph of Section of Black Sheet Etched for 10 Sec. with Nitric Acid and Magnified 200 Diameters

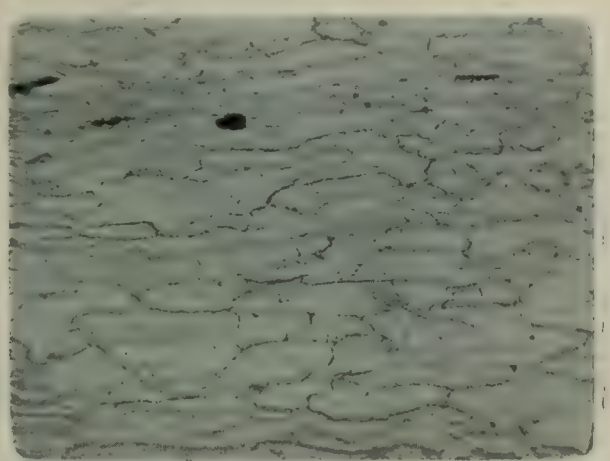


Fig. 2.—Photomicrograph of Pickled Sheet Etched for 10 Sec. with Nitric Acid and Magnified 200 Diameters

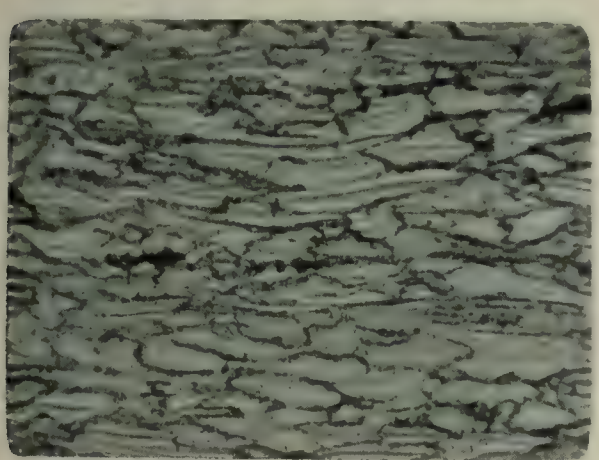


Fig. 3.—Photomicrograph of Section of Black Sheet Etched for 45 Sec. with Nitric Acid and Magnified 200 Diameters

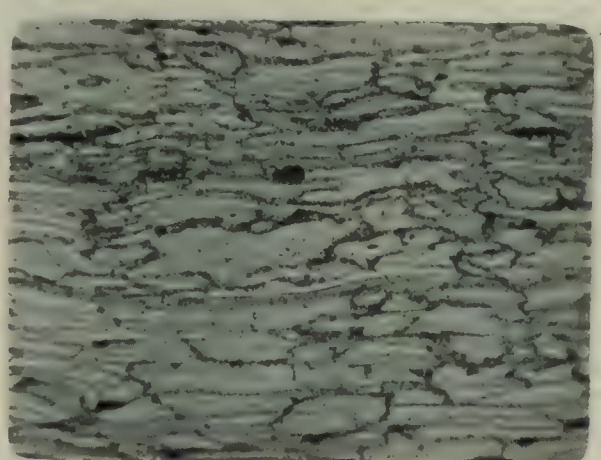


Fig. 4.—Photomicrograph of Section of Pickled Sheet Etched for 45 Sec. with Nitric Acid and Magnified 200 Diameters

All three photomicrographs included in the paper were taken out of focus, the principal difference between Fig. 2 and the others being that the former is more out of focus than the other two, and considerably over-etched. This would, of course, cause the grain boundaries to appear wider and the grain size correspondingly finer, as it is well known that etching causes a selective attack of the grain boundary rather than the grain itself, so that the boundaries become progressively deeper and wider as etching is continued. This effect occurs regardless of any treatment to which the specimen has before been subjected. Therefore, any measurement of the width of grain boundaries is of no significance in such a case, and it is furthermore rather improbable that any accurate grain size determinations could be made on a specimen prepared like the one shown in Fig. 2 of the paper.

Nevertheless, an experiment has been made to determine whether the conclusions might be justified in spite of the weak evidence for their support. Two strips of an ordinary low carbon black sheet were cut side by side and one was pickled for 10 min. in 5 per cent sulphuric acid by volume at 80 to 85 deg. C. Three bending tests were made in each of two directions at right angles on each of these sheets. The pickled sheet endured an average of 5.7 bends before failure, the other 7.7 bends. This showed the pickling to have been effective in causing the brittleness which is known to be due to hydrogen absorption.

Sections were then cut in both directions at right angles from each of these samples and were polished and etched for 10 sec. with nitric acid. The accompanying photomicrographs, Figs. 1 and 2, show the width of grain boundaries and size of grain to be practically identical in both samples. The specimens were then etched for 35 sec. more and the same spots were again photographed slightly out of focus. Fig. 3 will be seen to be the same spot as Fig. 1, and Fig. 4 the same as Fig. 2. The boundaries appear wider and the grains a trifle smaller, duplicating the effect shown in the paper under discussion. Undoubtedly the differences supposed to have been due to pickling were in reality due

to differences in the methods of preparing the photomicrographs.

GEO. F. COMSTOCK,
Metallurgical Engineer, and
A. B. WILSON,
Metallographist.

Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Aug. 23, 1921.

Device for Use With Oxy-acetylene Torches

To the Editor: The writer was very much interested in the article which appeared in the Aug. 11 number of THE IRON AGE, pertaining to a device which I devised to assist in the use of oxy-acetylene cutting torches. This article appeared on page 348.

In the last paragraph a statement was made that the idea was not patented. You will please be advised, however, that patent application has been made covering the device. Perhaps this fact should be called to the attention of your readers. I might state, as a matter of interest, that I have received several inquiries regarding the scale as a result of your article.

G. R. MCDERMOTT.

Engineering Department, Illinois Steel Co., South Chicago.

Future Increase in Railroad Ton-Miles

To the Editor: Your editorial in THE IRON AGE of Aug. 25 which states that the revenue ton-miles of railroads have consistently doubled every 12 years is thought provoking. The intent of this editorial evidently is that this rate of expansion cannot be indefinitely continued because if it were, such a preponderance of wealth and men would be employed in railroading as to strangle economic life. Such a proposition, being entirely academic, can be readily granted.

On the other hand, the inference of your editorial seems to be that we have already arrived at a time when the *rate* of increase in revenue ton-miles is about to decrease. If that is to be believed, the belief should be based on "sterner stuff" than the academic proposition that a doubling of revenue ton-miles every 12 years cannot be maintained indefinitely.

Being remotely located from technical libraries, I am in no position to state to what extent water-borne commerce and the motor truck will eat into railroad tonnage, so I suggest for the present discussion that we leave probable loss of railroad tonnage out of consideration and consider probable gains—gains in the way of new business.

Mechanical power has just begun to be applied to farming. Whenever a farmer buys a tractor, motor truck, stationary engine, or electric power plant, he increases both his purchase and production of railroad ton-miles. The haul of the tractor from the factory to the farmer's station is only a small part of these newly created ton-miles. Back of the finished tractor there is a still greater railroad tonnage of iron ore, coke, limestone, and a lot of finished and semi-finished parts, and innumerable supplies. Furthermore, the tractor (and all other farm power machinery) requires fuel, lubricant, spare parts and repairs. These all make additional railroad ton-miles. The horses displaced by this power machinery were produced on the farm, and their harness and shelter were all that produced railroad ton-miles. Power farming machinery enables one man to produce more, which means that the resulting surplus labor augments city populations with their big need of ton-miles for every human need.

But most important of all, many acres of home-grown feed that would otherwise raise and maintain home-grown horses or mules now are devoted to marketable crops. This is particularly true of our best agricultural acres where heretofore farmers have provided very grudgingly the necessary acres to grow horse feed.

Before the world war it was common to quote statistics to show that the then current rate of agricultural production compared with population prognosticated a need for importing foodstuffs—in other words, we should be unable to supply enough food for ourselves. The stimulus of war prices proved that we had an enormous potential agricultural production. In time, power farming probably will increase this potential, and our farmers will be such efficient food producers that we simply must have large foreign markets for our excess production.

Power farming means farmers who are less self-sufficient, farmers who are increasingly dependent on transportation, farmers who will come to demand and insist upon 365-days-a-year roads, and these roads will require many ton-miles of crushed stone, cement, road oil, and machinery. There is still another aspect of this same situation that has an important bearing on the railroad problem. This increase in ton-miles is largely out along uncongested trunk lines.

In other words, there is nothing alarming in a doubling of railroad ton-miles every twelve years provided the railroad's average gain in efficiency per man is equal to the average gain in efficiency for the shippers.

I am strongly inclined to believe that the railroads' greatest fear of a slackening rate of increase in revenue ton-miles lies in their own failure adequately to prepare for it, not only with commodious facilities, but also efficient personnel.

In view of the influential position THE IRON AGE occupies among the class that is most interested in the future of our railroads, I hope you will not be found partly responsible for a hardening of our commercial arteries when presently we shall roll up our sleeves for some real producing.

IVAR MATTSON.

Fairfield, Iowa, Aug. 28, 1921.

Marshal Foch Will Be Guest of American Iron and Steel Institute

A cablegram from Paris, dated Sept. 13, says: "Marshal Foch has received and accepted an invitation from Elbert H. Gary, chairman of the board of the United States Steel Corporation, to be a guest at a dinner to be given by the American Iron and Steel Institute in New York.

"Marshal Foch plans to sail on the liner Paris on Oct. 22, but his further plans are as yet undecided, except that he will stop in Washington for a day on his way to Kansas City, where he will attend the convention of the American Legion."

Since the beginning of 1921, changes in rates of wages reported to the British Ministry of Labor have resulted in a reduction of about £2,840,000 in the full-time weekly wages of nearly 5,700,000 wage earners, and an increase of about £75,000 for over 300,000 wage earners. The net result is a falling off of £2,765,000 ($10,370,000 at $3.75 per £) for 6,000,000 people, or an average loss of 9¼s. ($1.73) per week.

Pittsburgh has been selected by the directors of the Industrial Cost Association for the second national cost conference, to be held Nov. 2 to 4. The directors have elected Horace N. Peck, New York, as president, and added to the board, James P. McLean, Pittsburgh, Christopher Haigh, Lynn, Mass., and E. J. Wesson, Freeport, Ill.

The Iron Age and Its Readers

The service given THE IRON AGE'S readers in the full reporting in recent issues of the tariff hearings at Washington, particularly in the issue of Sept. 1, is worth noting. The amount of space given to them is one item, as is also the promptness with which the records were put into print. Enough of the dialogue with members of the committee conducting the hearings was given to round out the picture and give the atmosphere from which the reader could know what degree of coloring to give to the facts and figures. Much economic information is crowded into the arguments.

Ferromanganese "Dumping" Not Sustained

Trial Examiner's Report in the Case Before the Federal Trade Commission Is in Favor of Agents of British Producers

DISMISSAL of the complaint of the Federal Trade Commission against American importers of English ferromanganese who are charged with dumping the alloy on the United States market will be ordered if the commission accepts the conclusions of Edward M. Averill, trial examiner, who had charge of the hearings in the case. The examiner has filed his tentative report and asserts that "there is not a scintilla of evidence that the respondents or their principals commonly or systematically imported and sold ferromanganese in the United States at prices substantially less than the actual market value of ferromanganese in England."

Dealing with the claim of domestic makers of ferromanganese that the alloy was dumped in the United States in an effort to injure the industry in this country. Examiner Averill says:

> There is no evidence that the importing and selling of ferromanganese by the respondents or their principals into the United States was done with any intent to injure the industry of manufacturing ferromanganese in the United States, and there are no facts and circumstances proven from which such intent can logically or legally be inferred.

In conclusion, the examiner states:

> From the foregoing findings as to the facts, the examiner holds that the respondents were not guilty of using any unfair methods of competition in commerce as charged in the complaint and that there is no proof of any violation of section 5 of the Act of Congress approved Sept. 26, 1914, entitled "An Act to create a Federal Trade Commission, to define its powers and duties and for other purposes."

Further Steps in the Case

The report of the examiner being only tentative, it does not bring the case to a conclusion, but only represents his views for study by the commission to which the report has been submitted. The next procedure is the filing of the briefs of the commission's trial attorney, I. E. Lambert, and of the respondents, which are to be submitted by Oct. 5. The commission then will set a date for hearing the final arguments previous to rendering a formal decision. The brief of the trial attorney of the commission, it is expected, as a matter of course will take exceptions to the findings of the commission's trial examiner, while the briefs of the respondents will support the findings. The respondents include Crocker Bros. and C. W. Leavitt & Co., of New York, and Frank Samuel of Philadelphia. The complaint against Rogers, Brown & Co., New York, was dismissed in the course of the hearings, owing to the fact that they did not sell for the account of their principals in 1919 in the United States.

The Charge of Dumping

The tentative report of the examiner summarizes the case and explains developments that took place, which still are fresh in the minds of the trade, and on these bases his findings. The report states that the complaint charged that during 1919 the respondents imported and sold ferromanganese in the United States "at prices substantially less than the actual market value or wholesale price of ferromanganese prevailing in England at the time of exporting such ferromanganese to the United States, after adding to such value or wholesale price the freight and other expenses necessarily incident to the importation and sale thereof in the United States. That the said acts of importing and selling ferromanganese in the United States were done with the intent by respondents and their respective principals, of injuring the American industry of manufacturing ferromanganese and of monopolizing some part of trade or commerce in said article in the United States, and that said acts were unfair methods of competition in interstate commerce in violation of section 5 of an Act of Congress approved Sept. 26, 1914, and commonly known as the Federal Trade Commission act."

Market in War Time and Later

After setting forth importations and American production of ferromanganese during the years 1913 to 1920 inclusive, the report explains how imports were shut off during the early part of the war by the British Government and the consequent growth of domestic production, and says that during the period of hostilities the prices asked by American producers for ferromanganese ranged from $200 to $400 per ton. It is stated that a slump in the market followed the cessation of war and that during the early months of 1919 there was practically no market, with the result that most of the commercial American producers ceased the production of ferromanganese. In an endeavor to create a demand, it is pointed out, the price was cut early in 1919 from $250 and $300 to $125 per ton, but with few takers. Specific mention is made of a number of sales in the fall and winter of 1919 when prices dropped to $110 to $130, delivered. Crocker Bros. having disposed of 9720 tons for American producers and 12,095 tons for English producers. Conditions like those in the United States, it is declared, prevailed in England, which found itself with large quantities of high priced manganese ore on hand, facing strikes and a paralysis of industry and finance.

"The five years of titanic struggle," it is stated, "had reversed the financial position held for centuries by England, and from a creditor nation she passed to a debtor nation. The pound sterling was yielding to the American dollar its place as the ultimate measure of value." Drops in sterling exchange are set forth and nominal prices, in the absence of an active market, are given for ferromanganese in England.

The report says that there is no proof as to whether the American or the English producers made the first cut down to $115, but it is declared that during September, October, November and December Crocker Bros. sold ferromanganese at $95 to $110 for the account of Darwen & Mostyn Iron Co., Ltd., Darwen, Lancashire, England, while largely similar sales were being made both by importers and domestic producers, with evidence that the English makers were closely watching the market and expressed willingness to meet prices where it was claimed they had been lowered.

No Collusion

"There was no collusion between the English principals of the respondents and none on the part of respondents to fix prices. Each was in active competition with the other and incidentally they were all in competition with such American producers as had ferromanganese to sell; the efforts of the English producers were solely directed to the sale of their own product, but at the same time they were anxious to obtain the highest price possible and were reluctant to reduce the selling price. . . .

"During the entire period from June to December, 1919, the market was strictly a buyer's market and the offers came from the buyers and it was optional with the seller to either take or leave the offer made," the examiner says.

"The published English home market quotations show that the usual and customary rise or fall of ferromanganese is £2, and to be 'substantially less than the actual market value' there would have to be a 'drop certainly much greater than the customary market fluctuation," the report points out. "The evidence shows

that in comparatively few instances was the sterling equivalent of the American money received by the respondents less than £2 under the trade journal quotations for the home market even after taking into consideration the cost, insurance and freight and the majority of the sales were above the alleged home market quotations."

Program of National Safety Congress

The program of the tenth annual congress of the National Safety Council to be held in the State House, Boston, Sept. 26 to 30, inclusive, shows that there are the following sectional meetings, among others:

An automotive section is scheduled for Tuesday morning, Sept. 27, with Robert A. Shaw, Ford Motor Co., as chairman. Besides reports of officers and committees, papers are scheduled by J. A. Dickinson, mechanical engineer Bureau of Standards, Washington, on "Fundamental Principles of Safeguarding"; by A. L. Kaems, safety engineer Simmons Co., Kenosha, Wis., on punch press safeguarding, and by E. W. Dodge, assistant to general manager Abrasive Co., Philadelphia, on "Why Grinding Wheels Break."

A metals section will have a session also on Tuesday morning, Sept. 27, under the chairmanship of J. A. Oartel, chief of safety bureau, Carnegie Steel Co., Pittsburgh, with John A. Northwood, superintendent safety and welfare department, Cambria Steel Co., Johnstown, Pa., as vice chairman, and J. R. Mulligan, supervisor accident prevention and education, Bethlehem Steel Co., Bethlehem, Pa., as secretary. The papers scheduled for this session include one on "Safe Practices in Pouring in a Foundry," by A. B. Root, Jr., mechanical engineer Hunt-Spiller Mfg. Corporation, Boston; on "Elimination of Steam During Pouring," by R. E. Shaw, district manager B. F. Sturtevant Co., Boston, and on "Electrical Hazards in Foundries and Steel Mills" by Walter Greenwood, safety engineer Carnegie Steel Co., Youngstown, Ohio.

A second session of the metals section, scheduled for Wednesday afternoon, Sept. 28, lists a paper on "Safe Practices in Rolling Mills" by Fred Johnson, superintendent of rolling mills South Works, American Steel & Wire Co., Worcester, Mass., and one on "Safe Practices at By-Products Coke Plants" by F. F. Marquard, superintendent by-products plant Clairton Works, Carnegie Steel Co., Clairton, Pa.

A general round table meeting, scheduled likewise for Tuesday morning, Sept. 27, and to discuss safety bulletins, will be under the chairmanship of George T. Fonda, manager safety and compensation division, Bethlehem Steel Co., Bethlehem, Pa. An education section, also scheduled for Tuesday morning, Sept. 27, will be under the chairmanship of A. T. Morey, general manager Commonwealth Steel Co., Granite City, Ill.

A joint meeting of manufacturing sections is scheduled for Thursday morning, Sept. 29, and the program covers industrial lighting and the need of accident prevention work and the methods to be employed during the present industrial depression, the latter to be opened by W. E. Worth, International Harvester Co., Chicago.

J. F. Tinsley, general manager Crompton & Knowles Loom Works, Worcester, is to contribute to the discussion of what is called the A B C session, Tuesday afternoon, Sept. 27, on "The Essentials of a Plant Safety Organization," and Harry Gilbert, manager safety department, Haskell & Barker Car Co., Michigan City, Ind., is to discuss "The Foreman as the Determining Factor."

Consideration will be taken of the recent tentative classification of scrap put out by the American Railway Association at the quarterly meeting of the scrap iron division of the National Association of Waste Material Dealers at the Hotel Astor, New York, on Sept. 22, 11.30 a. m. The classification contains provisions including terms of sale. A report may be made by the committee appointed to draw up a set of trade customs for scrap iron dealers and consumers.

COMING MEETINGS

September

National Association of Cost Accountants. Sept. 14 to 16. Fall convention, Cleveland Hotel, Cleveland. Session on morning of Sept. 15 on cost methods of trade associations. Offices of association at 130 West Forty-second Street, New York.

American Society for Steel Treating. Sept. 19 to 24. Annual convention and exhibition, Manufacturers Building, State Fair Grounds, Indianapolis. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention, Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

Fabrication in Transit Granted for Sheets

WASHINGTON, Sept. 13.—In a decision handed down last Thursday, the Interstate Commerce Commission held that failure of the railroads to accord fabrication in transit at Parkersburg, W. Va., on iron and steel sheets is not unreasonable, but is unduly prejudicial, and entered an order requiring the carriers on or before Dec. 1 to abstain from such undue prejudice. The complainant is the Parkersburg Rig & Reel Co. The B. & O. at the hearing expressed its willingness to accord fabrication in transit at Parkersburg on all forms of structural steel, but not on sheets. The decision, after pointing out that fabrication of sheets is allowed in western territory, enters into a discussion as to the meaning of plates and sheets and states that the complainant in its brief quoted from an authority on metallurgy to show that the terms plates and sheets are used interchangeably and that, technically, plates are sheets and sheets are plates up to No. 20 gage. No distinction between the two products is made by the carriers in western territory in their tariffs, and it is stated that the evidence is not convincing that the granting of fabrication in transit on sheets of No. 16 gage or heavier would result in any undue extension of the fabrication arrangement. Pointing out that competition exists throughout the country between sheet and plate tanks, the decision quotes the complainant to the effect that unless accorded fabrication on sheets it will be compelled to abandon manufacture of sheet-metal tanks because the difference between the combination rates on Parkersburg, which it is now obliged to pay, and the joint rates with fabrication at that point, amounts on the average to about 23c. per 100 lb.

Chicago Building Trades Still Troubled

Decision of Judge Landis Not Accepted by All Unions and Outlook is Uncertain—The Arbiter's Graphic Description of Conditions

CHICAGO, Sept. 10.—After deliberations lasting throughout the summer, Federal Judge Kenesaw M. Landis, umpire in an arbitration of wage differences between employers and employees in the Chicago building industry, announced his decision on Sept. 7. Wage reductions of from 10 to 36 per cent for skilled and unskilled labor were stipulated and hampering working rules and regulations were wiped out. "Reliable testimony," said the judge, "showed that a 20 per cent reduction in wages, other conditions remaining the same, would produce but a 6 to 7 per cent reduction in building cost. The real malady lurked in a maze of conditions artificially created to give the parties a monopoly and in rules designed to produce waste for the mere sake of waste, all combining to bring about an insufferable situation, not the least burdensome element of which was the jurisdictional dispute between trade members of the same parent organization."

According to the terms of agreement between the parties to the dispute when Judge Landis was appointed umpire, the rates he determined were to remain in force until May 31, 1922, when, or before, he would determine rates for the ensuing year. The announcement of the decision was at first hailed as the final settlement of a long disturbed industrial situation and as the harbinger of a long delayed building boom. Subsequent developments cast doubt on the finality of the award and revive uncertainties which have hitherto held back much projected construction work. Workmen belonging to a number of crafts have expressed their dissatisfaction with the decision by walking out. Four big Chicago jobs, the Federal Reserve Bank, the Northwestern Railroad grain elevator, the Commonwealth Edison Co. power plant and the Quadrangle Club building, are now at a standstill as a result of walkouts by hoisting engineers, steamfitters, plumbers and marble setters.

Unsatisfactory Attitude of Labor

Unless there is a decided change in the attitude of labor, it is unlikely that the local building situation will show any marked improvement. As stated by the judge, "it is no violation of confidence to say that building construction had gotten into bad repute in this community. There was a general disposition to keep away from it as a thing diseased. Capital avoided it. The wise dollar preferred almost any other form of activity or no activity. And this applied to the whole range of building construction, from the cottage to the skyscraper."

The loss of the public faith, the judge pointed out, was not due entirely to the wage question. Harmful and wasteful rules and agreements and jurisdictional strife were more important causes. Consideration of these facts led the judge to fix higher rates of wages for those crafts which agreed to the elimination of these abuses than for those which stubbornly refused to abandon certain practices. The "uniform agreement" applicable to all trades, as worked out by the judge, includes the following salient points:

Points of the Decision

1. That there shall be peaceful adjustment of disputes by arbitration, subject to appeal to the National Board of Jurisdictional Awards, with whose decisions all parties agree to comply.

2. That in case of scarcity of help non-union men may work with union men until such a time as union men may be obtained.

3. That any journeyman may use in his work the tools of any other trade.

4. That small tasks of not over 30 min. duration in any one day belonging to any trade may be performed by any other trade at the discretion of the employer.

5. That there shall be no restriction as to the amount of work a man may do, nor against the use of machinery, methods or appliances, nor against any raw or manufactured material except prison made.

6. That employers may employ or discharge whomsoever of the union they please, and employees may work for whomsoever they see fit.

7. That the foreman, if any, is to be exclusively the agent of the employer.

In fixing the wages of three trades which require work to be done by skilled men that laborers or helpers might do, the judge stated that he was obliged to consider the waste thus occasioned. If, however, these trades expressed their willingness to change their attitude, the judge will advance their wages accordingly. The following trades were not in the arbitration: Carpenters, elevator constructors, plasterers, sheet metal workers, painters, glaziers, fixture hangers.

Gradually Adopting Frick Scale

UNIONTOWN, PA., Sept. 12.—A number of independent coal and coke operations, including the Republic plant of the Republic Iron & Steel Co., Tower Hill No. 1 plant and the plants of the American Coke Corporation, posted notices late last Friday night of increases in wages to the present H. C. Frick Coke Co. scale in this region, being the scale of November, 1917. It is believed that majority of the other independent operations in the region will take similar action, which was started 10 days ago when George Whyel, head of the Whyel interests, announced that the Frick scale would be restored at his plants.

W. J. Rainey, Inc., whose plants are idle as result of refusal of the employees to accept wage reductions approximately 15 to 20 per cent under the Frick scale, adopted the latter, effective Sept. 12. The other independent operations had not followed the Rainey action in its latest cuts.

Action of the other independents means an increase of approximately 10 per cent in scales.

Similar notices, reverting upward to the Frick scale, are expected to be posted at most of the independent operations in the county within the next week.

In Rainey circles it was stated that their plants could not operate unless the present Rainey scale was maintained.

So far the H. C. Frick Coke Co. has taken no action toward a reduction in wages in line with announcement of such readjustment by the Steel Corporation effective Aug. 29. No reduction is expected in the region at this time. Frick operations are being maintained at about 40 per cent coal, with all ovens out of blast.

Some Improvement in Cleveland

The labor situation in Cleveland shows a little improvement, according to the monthly report of the committee on labor relations of the Cleveland Chamber of Commerce. Ninety-nine plants engaged in various industries, each normally having 500 more employees, showed an increase in working forces on Aug. 31 of 1.5 per cent as compared with July 31. The report a month ago showed a gain of 2.5 per cent as compared with June 30. Plants making iron and steel and their products, exclusive of the plants of the United States Steel Corporation, showed a gain of 3 per cent on Aug. 31 as compared with July 31. Automobile plants, and plants making automobile accessories, made a gain of 2.9 per cent. Metal working plants other than iron and steel, these including brass foundries, showed a decrease of 2.40 per cent.

Iron and Steel Markets

ADVANCE IN WIRE

Large Orders Placed at Recent Prices

Important Increase in Steel Output—August Betterment Continues

An advance of $2 to $3 per ton in the prices of the American Steel & Wire Co., effective Sept. 10, has broken the long succession of declines in steel products. Wire prices have been the lowest on the list in relation to cost, and the fact that there had been little cutting in the past two months seemed to invite an effort to turn the tide. Independent producers have followed the Steel Corporation advances, and all mills made large bookings at the old prices before the advances went into effect.

The heavy influx of wire and wire nail orders just before the advance showed the country to be bare of stocks to a degree never known. Jobbers covered 60-days requirements while manufacturing consumers in many cases bought for longer periods. Wire fence, in view of low agricultural buying power, remains at the old price.

The Steel Corporation's wire production, in response to the restocking orders, has gone up to 40 per cent of capacity and promises to increase further. In sheets and tin plate the corporation's rate is still 50 per cent. For all subsidiaries the average is 33 per cent, against 30 per cent in August.

A reduction of 298,000 tons in unfilled orders in August has a more favorable construction than was generally given when it is stated that shipments were 100,000 tons more in August than in July.

That the customers of independent steel companies also called for increased shipments last month appears from a steel ingot output for the country in August of 1,351,628 tons. At 27 working days this was 50,060 tons per day, or 31 per cent greater than the daily rate of 38,126 tons for the 25 working days in July.

While reports are not of one tenor, demand on the whole is better than in August, indicating that July was the low month of the nine. Apart from wire, prices tend lower, the heavy products, plates, shapes and bars lagging most.

In the past week 1.50c. was touched on steel bars, on an exceptional three months' contract, but most sales were at $2 to $3 per ton higher. A number of plate and shape transactions have established a range of 1 60c. to 1.65c.

Irregularity continues in wrought pipe and the discounts last formally announced have yielded by two to three points.

Automobile plants are reducing their stocks in anticipation of slackening sales in the fall. The largest producer expects to buy less steel in October than in September.

Shading of $1 per ton has been done on blue annealed sheets. Warehouse prices on black sheets have been reduced $5 per ton. A Cleveland mill has taken 750 tons of 30-gage black sheets for Japan.

Fully 25,000 tons of fabricated steel work was awarded in the week, including 15,000 tons for the Federal Reserve Bank in New York, and 3000 tons for viaducts in Pittsburgh. About 6000 tons of new work has been added to pending projects. The country's fabricating capacity is in excess of 41,000 tons per week.

Equipment inquiries show some increase. One from the Rio Grande is for 1000 steel cars and the Lackawanna is asking for 1000. The B. & O., which is in the market for 1000 cars and 1000 steel underframe box car bodies, is also figuring on the repair of 3000 to 6000 freight cars of various types.

The pig iron market has been enlivened by inquiries in the East amounting to about 20,000 tons, of which nearly half comes from companies closely connected with railroads. Chicago also shows considerable activity, with prices on foundry, malleable and basic advanced $1.

The stronger situation in scrap is a reflex of what has developed in pig iron. A slight advance in coke is due to the cutting down of output by strikes and in part to larger consumption of blast furnace coke. With wage restoration at independent works to the Frick Coke Co. scale, the strikes are ended.

British ferromanganese has been reduced this week to $58.35, Baltimore, as against a previous market of $65.

Our cable report puts the British steel output for August at 432,600 tons, indicating a marked recovery from the coal strike, as this is close to the January and February rate. Pig iron output at 93,600 tons in August is still abnormally low. Steel companies are working into a better market position as German and Belgian works become farther filled up.

Pittsburgh

PITTSBURGH, Sept. 13.

Increases in wire products ranging from $2 to $3 per ton and the development of a stronger market in scrap and coke have been the outstanding developments of the week in the iron and steel situation. Before advancing prices, the several makers permitted their customers to enter orders for their requirements over the next 60 days for the merchant trade and 90 days for manufacturers. The response has been fairly satisfactory in the matter of orders and now that market prices are above those which buyers paid, it is expected that there will not be much hesitancy about specifications.

The stronger tendency in scrap prices is a direct reflection of the upward trend of pig iron and the fact that production and available supplies are of moderate proportions. Coke prices have advanced because of the revision upward of independent wage scales in the Connellsville district made necessary by the labor troubles growing out of the wage cut made a few weeks ago by W. J. Rainey, Inc. Many of the Connellsville district mining companies were feeling the effects of the strikes. All but one or two of the independent operators have put wages back to the Frick scale, which means an increase of about 10 per cent over the recent scale. W. J. Rainey, Inc., is among those which have adopted the Frick scale. More inquiry and larger sales also have played a part in this advance.

Reports about business in steel vary considerably,

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 13, 1921	Sept. 6, 1921	Aug. 16, 1921	Sept. 14, 1920
No. 2X, Philadelphia‡	$20.84	$20.84	$20.34	$53.51
No. 2, Valley furnace†	21.00	21.00	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2 foundry, Chicago*	**22.00**	21.00	20.00	46.00
Basic, del'd, eastern Pa.	**19.25**	19.00	19.00	51.26
Basic, Valley furnace	19.00	19.00	18.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	**22.00**	21.00	20.00	46.50
Malleable, Valley	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.46	50.96
L. S. charcoal, Chicago	33.50	33.50	33.50	58.50
Ferromanganese, del'd	70.00	70.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. sheet bars, P'gh.	30.00	30.00	32.00	67.50
Forging billets, base, P'gh.	34.00	34.00	35.00	75.00
O.-h. billets, Phila.	35.74	35.74	35.74	65.74
Wire rods, Pittsburgh	38.00	38.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	1.70	1.70	1.75	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*1.95*	2.00	2.05	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.65	1.65	1.75	3.25
Steel bars, Chicago	1.85	1.85	1.93	2.84
Steel bars, New York	2.03	2.03	2.13	4.13
Tank plates, Pittsburgh	*1.65*	1.70	1.80	3.25
Tank plates, Chicago	1.75	1.75	1.98	3.03
Tank plates, New York	*2.03*	2.08	2.18	3.63
Beams, etc., Pittsburgh	*1.65*	1.70	1.85	3.10
Beams, etc., Chicago	1.80	1.80	1.98	2.83
Beams, etc., New York	*2.03*	2.08	2.23	3.48
Steel hoops, Pittsburgh	*2.15*	2.25	2.25	5.50

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 13, 1921 Cents	Sept. 6, 1921 Cents	Aug. 16, 1921 Cents	Sept. 14, 1920 Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	3.00	7.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	4.00	9.00
Sheets, blue an'l'd, 9 & 10.	*2.20*	2.25	2.25	5.50
Wire nails, Pittsburgh	**2.90**	2.75	2.75	4.25
Plain wire, P'gh.	**2.60**	2.50	2.50	3.75
Barbed wire, galv., P'gh.	**3.55**	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$13.50*	$13.75	$13.00	$37.00
Carwheels, Philadelphia	17.00	17.00	16.00	43.00
Heavy steel scrap, P'gh.	**13.50**	13.00	13.00	28.50
Heavy steel scrap, Phila.	11.50	11.50	11.50	26.50
Heavy steel scrap, Ch'go.	11.00	11.00	10.75	24.50
No. 1 cast, Pittsburgh	**17.00**	16.50	16.00	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.25	13.25	13.00	34.50
No. 1 RR. wrot, Phila.	**15.00**	14.50	14.00	34.00
No. 1 RR. wrot, Ch'go (net)	11.50	11.50	11.00	24.00
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	**$3.25**	$3.00	$2.75	$16.50
Foundry coke, prompt	**4.25**	4.00	3.75	17.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**12.25**	12.00	12.00	18.75
Electrolytic copper, N. Y.	**12.00**	11.75	11.75	18.75
Zinc, St. Louis	4.20	4.20	4.20	7.80
Zinc, New York	4.70	4.70	4.70	7.80
Lead, St. Louis	**4.40**	4.30	4.25	8.25
Lead, New York	**4.60**	4.50	4.40	8.37½
Tin, New York	*26.75*	27.25	26.12½	45.00
Antimony (Asiatic), N. Y.	*4.45*	4.50	4.50	7.12½

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 13, 1921, Finished Steel, 2.279c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Sept. 6, 1921,	2.279c.
Aug. 16, 1921,	2.364c.
Sept. 14, 1920,	3.974c.
10-year pre-war average,	1.684c.

some companies finding that the gain in August has not been maintained, while others say that bookings so far this month compare very favorably with those of the same period last month. One important producer has taken a substantially larger tonnage this month than in the same period in August. Activity still is lacking in the heavy tonnage products, despite the fact that the outlook for structural business in this district is brighter to-day than it has been in more than a year. In some quarters there is a tendency to ascribe the increase in structural inquiries to a desire on the part of the general contractors to get under cover before snow flies. Building laws of the city of Pittsburgh are to be amended so that in the future no structures of more than 10 stories will be permitted in the downtown business section. Investors have been seeking permits for higher structures to escape the new law. Actual awards in the past fortnight, however, have been larger than they were previously in some time and because of this some are inclined to believe that the period of waiting is almost at an end.

Demand for prompt tonnages of tin plate still is good and general sheet business is fairly active, although the independent companies have not been getting as many orders this month as were coming to them in August. Buying of tubular goods is entirely hand to mouth, but must be said to be pretty constant as far as standard or merchant pipe is concerned. A cut in resale prices of pipe by jobbers handling the product of the National Tube Co. last week brought reports that this company would cut mill quotations, but there is official denial that any such step is under consideration. Considerable irregularity still marks prices, but with the exception of wire products the drift is lower. It is now admitted that plates and shapes can be bought as low as 1.60c. base, while hoops have gone as low as 2.15c. and bands down to 2c., as compared with 2.25c., the recent quotation on both products.

The pig iron market again has become extremely dull. Makers, however, are holding tenaciously to the advances recently established.

There is no appreciable change in plant activities in this and nearby districts except that there is a possibility of one merchant and one steel works furnace blowing in at an early date.

Pig Iron.—Business is very slack again with prices of all grades well maintained, but based upon only small tonnages. The largest sale reported is one of 1000 tons of Bessemer, which sold at about $20, Valley furnace, but was not for this district. Interest in basic is not particularly keen because melters either have no pressing needs or cannot see their way clear to pay the present asking price of most makers of $20, furnace, in view of the fact that the recent rise from $18 to $20 has not been accompanied by a corresponding increase in prices of finished steel products. Since the advance in iron has enhanced scrap prices, the opportunity for cutting steel costs is slight. All makers evidently are not holding religiously to $20, furnace, since one melter who has been in the market pretty constantly lately insists he has not been obliged to go that high. Foundry iron sales are few and small. Merchant producers are getting $21 for the base grade for carloads, but there is a fairly authentic report that

one of the steel companies recently sold 10,000 tons of foundry iron at $19.50, Valley furnace. It is reported that the A. M. Byers Co. has put out the inquiry for the coke required for its Mattie furnace at Girard, Ohio, but blowing in of this furnace still is in doubt and the decision rests upon the company being able to secure 12,000 tons of forge iron at a price lower than it can make it, and as to whether there is going to be a market for the surplus over its own requirements.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys—Interest in the market is almost nil. The Valley inquiries for ferromanganese, one for 100 tons and the other for 200 to 300 tons, have been deferred because prices named have been above the ideas of the prospective buyers. The company seeking the larger tonnage has set $60 delivered Youngstown as its maximum. Foreign material, said to be English, has been offered as low as $57 c.i.f. Atlantic seaboard, which would mean $63.16 delivered Youngstown. The nominal quotation of English makers is $65 c.i.f. Atlantic seaboard, while domestic makers are quoting $75 delivered, though no recent business has been done at above $70 delivered. We note sales of only one or two carloads of spiegeleisen within the range quoted. A Pittsburgh jobber is seeking a car of 50 per cent ferrosilicon. Most makers are quoting $65 furnace, freight allowed, on this alloy but $60 is about as high as sales can be done to-day.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent, $68; 78 to 82 per cent British ferromanganese, $58 to $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Hardly enough is going on to clearly determine prices. Non-integrated sheet makers do not seem to be any busier than they have been and consequently are not very large buyers of sheet bars. The common quotation is $30, Pittsburgh or Youngstown, but reports continue that sales have been made from $1 to $2 per ton lower. There is even less interest in billets and slabs than there is in sheet bars, due to the fact that the demand for plates remains limited and few of the merchant mill products are selling at all freely. There is no reason to change quotations.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The American Steel & Wire Co. has announced a price of $41 for the base size of common soft steel and this price probably will become the "official" quotation of independent makers. There is not much demand and some uncertainty exists as to whether the new price can be obtained, in view of the fact that the bulk of recent business was done at $38 to $40. Prices are given on page 703.

Structural Material.—The American Bridge Co. has taken 3000 tons for the viaducts for the Boulevard of the Allies, Pittsburgh, its bid being $195,265. The same company also has secured 13 all steel deck barges with the option of taking two more, placed through the United States Engineer's Office, Memphis, Tenn., for service in the Memphis and Vicksburg districts, at $9,250 each. About 3000 tons of steel will be required for these barges. The Jones & Laughlin Steel Co. has taken 550 tons for a new plant at St. Louis for the Standard Underground Cable Co., Pittsburgh. The McClintic-Marshall Co. has taken 125 tons of I-beams for the Palatka Bridge, South Jacksonville, Fla., 100 tons for a storage building for the Union Ice Co., Pittsburgh, and 150 tons for the New York Steam Corporation placed through Stone & Webster, Boston. The Bell Telephone building, which will take 2000 tons, the Y. M. C. A. building, requiring 1500 tons, and the Joseph Horne Co., building, which takes 3500 tons, are expected to be placed before long. Plain material does not reflect in demand the orders which have been placed or are pending. As low as 1.60c. has been done but on small lots 1.70c. and 1.75c. still are quoted. Prices are given on page 703.

Iron and Steel Pipe.—A report late last week that jobbers handling the product of National Tube Co. had revised downward resale prices of standard pipe $6 to $7 per ton and 5 per cent on oil country pipe, started much speculation as to the possibility of a reduction in mill prices by that company. It is officially stated that a reduction in mill prices has not been considered and that the cut in resale prices merely is the result of competitive trade conditions. Until recently the National Tube Co. was not meeting competition and naturally resale prices of jobbers handling its pipe were somewhat above those distributing the product of independent mills. General conditions in tubular goods otherwise are much as they have been during the past two weeks. There is a very fair run of orders from jobbers in merchant pipe and no important deviation from published discounts. Oil well pipe still is very slow of sale and no improvement is looked for until along toward the end of the year or the early part of 1922 when the oil companies are figuring on next year's drilling program. Standard Oil companies are reported to be interested in line pipe and one of them is reported to have placed 30 miles of 6-in. pipe. Prices of this class of material do not have very close relation to published prices. Discounts are given on page 703.

Nuts, Bolts and Rivets.—Outside of the fact that specifications against old orders are somewhat larger than they have been, there is no special change in the situation. Pittsburgh makers are not particularly anxious for business at the prices they would have to meet in competition with those in other centers. Prices and discounts are given on page 703.

Iron and Steel Bars.—The attempt to obtain tonnages of merchant steel bars at less than 1.65c. does not seem to be succeeding and important makers now report that not much difficulty is experienced in obtaining that price. Some makers still are quoting 1.75c. on business in this district because they would be obliged to absorb the freight. Such business as has been done, however, is within a range of 1.65c. to 1.70c. Concrete bars rolled from billets take the same range as mild bars, while those rolled from old rails are quoted at 1.60c., but business in both kinds is limited. Orders for iron bars are reported to be more numerous than they were recently.

We quote steel bars rolled from billets at 1.65c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—Railroads are inquiring pretty constantly for small lots of standard spikes, but actual business still is of limited proportions. Makers here are quoting $2.50 per 100 lb. base, but find it necessary to shade this price to meet competition from other districts. Similarly, small spikes are quoted at $2.75 per 100 lb. base by local makers, but competitive offerings necessitate going as low as $2.65 to get some orders. Prices are given on page 703.

Steel Rails.—Some improvement is noted in specifications against old orders for standard rails, but light sections still are in slow demand and the quotation of 1.75c. for new steel rails is merely nominal. An attractive inquiry undoubtedly would develop a price of 1.70c.

We quote 25 to 45 lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—There is still room for considerable improvement in the demand and competition for passing

orders is so keen that the price advantage is entirely with buyers. On the basis of what is going on, the market is quotable from 1.60c. to 1.70c.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.60c. to 1.70c. f.o.b. Pittsburgh.

Sheets.—While the American Sheet & Tin Plate Co. continues to report an improvement in business and has added further to its active capacity since a week ago, when it had 50 per cent of its mills in operation, the experience of most of the independent makers is that orders this month have not been as large as they were in August. Automobile sheets are not in as good demand as they were recently due to the seasonable decline in production, and also to the fact that some plants have lost business because of price competition and are obliged to curtail schedules. Cutting of the regular market prices of sheets no longer amounts to much and the market may be regarded as steady at 2.75c. base for black, 3.75c. base for galvanized and 2.25c. base for blue annealed. Prices are given on page 703.

Wire Products.—Independent manufacturers have followed the American Steel & Wire Co. which, effective at close of business last Saturday, advanced nails from $2.75 base per keg to $2.90 and plain wire from $2.50 per 100-lb. to $2.60. Coated nails were advanced 10c. to $2.45 per count keg. From the standpoint of costs, no one disputes that the increase was justified, because all products, nails in particular, were selling at a loss at the old quotations. The advance will have the effect of making solid the business now on the books of makers, but there is also the well-known fact that, when there is not enough business to go around, difficulty is often experienced in maintaining new prices. Business was showing improvement when the advance was announced and a good many additional orders than otherwise might have been placed have been taken by manufacturers and jobbers, who were allowed to cover for requirements for 90 and 60 days respectively.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Tin Plate.—Demand is holding up unusually well for this time of the year, and the market is firm, due to the fact that manufacturers of perishable food containers underestimated their requirements, while several independent manufacturers, who formerly operated under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers and now are figuring on adopting the open shop policy, are out of production. Stock tin plate has become pretty well cleaned up, and while occasional sales are made at less, the more common price is $4.75 per base box. Production tin plate is firm at $5.25. The American Sheet & Tin Plate Co. has more than 50 per cent of its tin mills under power.

Hoops and Bands.—The market is weaker, notably on bands, which the past week or so have sold as low as 2c. On hoops the common quotation is 2.25c. base, but business has been done as low as 2.15c. Demand is moderate and competition for passing orders is sharp.

Hot-rolled and Cold-rolled Strips.—The automobile price war is finding reflection in orders which so far this month have fallen off somewhat as compared with August. Automobile makers who have not reduced prices are getting fewer orders and are curtailing production. Some demand is coming from builders' hardware manufacturers, but it is of a piecing out character. Business in hot-rolled strips has been done and lost at 2.25c. base, the market being quotable from 2c. to 2.25c. Cold-rolled strips are quotable from 3.75c. to 4c. base, but the higher figure is passing except for small lots.

Cold-Finished Steel Bars and Shafting.—The market still lacks activity. Slowing down in automobile plant activities, common to this time of the year, is affecting the demand for cold-rolled and cold-drawn steel and has led to some holding up of shipments against orders already in. The common quotation is 2.40c. base, Pittsburgh, but it is reported that the American Steel & Wire Co. is going as low as 2.35c. to secure orders and that some independents are meeting that figure. Shafting demands are limited. Cold-rolled or drawn shafting is quotable at 2.35c. to 2.40c. base, Pittsburgh, and ground shafting at 2.75c. base, mill, in carloads.

Coke and Coal.—The coke market still is feeling the effects of the labor troubles in the Connellsville district. The market has advanced at least 25c. per ton on both furnace and foundry grades. The spot or prompt market on furnace grade now is not quotable at less than $3.25 per net ton, oven, which is believed to be the price paid by the Wickwire-Spencer Steel Corporation, Buffalo, for 10,000 tons for immediate delivery. Brokers lately have been paying this price and this means that the cost to consumers is around $3.35 to $3.40. On contracts covering the remainder of the year, the common quotation is $3.50 per net ton, oven, and some operators who are well sold ahead on coal are not willing to take future business even at that price. The A. M. Byers Coal Co. again is considering blowing in its furnace at Girard, Ohio, and is asking for prices on 15,000 tons a month for last quarter. Foundry coke is moving steadily in small lots at $4.25 to $4.50 per net ton, ovens. The coal market is fairly firm at $1.75 to $2 for mine run steam and by-product coal and $2.25 to $2.75 for gas coal.

Old Material.—The market still has a strong undertone, although the consumptive demand often before has been greater than it is at present. The situation derives its strength more from the fact that available supplies are moderate than because there is a really good demand. This market also is affected by the fact that competing markets are netting shippers higher prices than are obtainable here. All dealers have rather sizeable stocks of steel works grades on their yards, but average costs are so high that none of this material is being offered. Production of scrap, meanwhile, reflects sub-normal building and machine shop activities, not to mention the fact that the automotive industry is slowing down as is usual at this time of the year, while the farmers of the country seem to be making their old implements do. The common bid for heavy melting steel is $13 per gross ton, delivered, but none of this grade recently has sold that low and some melters willing to throw such material down on their yards at $13.50 have failed to secure any. It is really doubtful whether any of this grade today could be bought at less than $14. One company, although a little fastidious as to quality, is paying $14 for material which ordinarily is graded as heavy melting steel. The recent stiffening in the price of pig iron tends to increase the use of scrap and to enhance its value. Machine shop turnings cannot be bought at less than $8.50, although some users are trying to obtain supplies at $8. The United States Cast Iron & Foundry Co. is reported to have bought some tonnages in the East of cast iron wheels and No. 1 cast scrap for its Scottdale, Pa., works, paying about $17 for wheels and from $17.50 to $18 for No. 1 cast, delivered Scottdale. These prices are well above what dealers here claim to be able to get. They report bids of $15.75 to $16 on cast iron wheels and $17 to $17.50 on No. 1 cast.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	13.50 to 14.00
No. 1 cast cupola size	17.00 to 17.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	16.00 to 16.50
Compressed sheet steel	10.75 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.50 to 9.75
Railroad knuckles and couplers	14.50 to 15.00
Railroad coil and leaf springs	14.50 to 15.00
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	19.00 to 20.00
Locomotive axles, steel	18.50 to 19.00
Steel car axles	14.50 to 15.00
Cast iron wheels	15.75 to 16.25
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.50 to 8.75
Sheet bar crop ends at origin	12.50 to 13.00
Heavy steel axle turnings	10.00 to 10.50
Short shoveling turnings	9.50 to 10.00
Heavy breakable cast	15.00 to 15.50
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.25
No. 1 railroad wrought	12.00 to 13.00

Chicago

CHICAGO, Sept. 13.

Recent changes in market conditions have been slight but favorable. There is a healthy demand for sheets, which is reflected in better mill operations, the local independent having all of its capacity under power. Buying of plates, shapes and bars is still far below normal and prices are weak, although no weaker than heretofore. An advance in wire prices brought out a concentration of orders from widely distributed points, including the South, where the rise in cotton has had a favorable effect on general business conditions.

Additional orders for cars and car repairs are being placed by the railroads and a steady increase in purchases by the carriers is looked for. It is noted that railroad car loadings are growing larger every week and that the monthly deficits of a few months past have been transformed into profits. The net earnings of 202 class one roads in July were the largest for any month since October, 1920, and those of an important Western road in August are reported the largest in history.

The local building outlook looked exceptionally bright last week when Judge Landis, umpire in the dispute between contractors and unions, announced his decision. Various crafts, however, are dissatisfied with the award and the judge, upon being advised that they had struck in violation of their agreement, has denied them a rehearing and employers are preparing to introduce the open shop. Notwithstanding the disturbed local situation, building work is expanding in other sections of the West, numerous good-sized fabricating jobs being in prospect and others having been already placed. An export inquiry for 20,000 tons involved in a bridge over the Yellow River, China, is being figured on by one important Western fabricator, and is expected to be awarded before the end of October.

Foundries throughout this territory are expanding their operations and pig iron is steadily growing stronger, having advanced again to $22, local furnace.

Pig Iron.—The improvement in consumption in this section is gradual but widespread, as indicated by sales to diversified industries, including stove makers, sanitary manufacturers, sewing machine manufacturers, pipe shops, wheel companies, malleable foundries serving both the railroads and the automobile plants, jobbing foundries and others. The only important consumer which has failed to show signs of revival is the agricultural implement industry. The increase in demand has been reflected in another advance in price. The Inland Steel Co., which is operating the only blast furnace producing merchant iron in this territory, advanced its prices on foundry, malleable and basic to $22, base furnace, early last week, and was followed a few days later by the leading Northern merchant. A number of important sales were made on the eve of the advance, among them being 700 tons of foundry bought by a Milwaukee melter, and 500 tons of malleable purchased by a local foundry. A sanitary manufacturer located south of here has bought 600 tons of foundry at $22 base furnace, and sales of from 100 to 300 tons at the new prices are also reported. The American Brake Shoe & Foundry Co., with purchasing office in New York, is inquiring for 8000 tons of iron for its various plants, of which about 1000 tons will go to its Chicago foundries. The advance in Northern iron has materially bettered the chances of Southern iron entering this territory again. A Milwaukee melter, in fact, has issued an inquiry for 1000 tons of Southern foundry. There is now only $3 difference in the Chicago delivered prices of Southern and Northern iron and another advance of $1 a ton by the local producers would permit Southern iron to compete on a parity at various points in this territory, among them certain sections of Illinois, Indiana and Michigan. There is little activity in silvery charcoal or low phosphorus. A Milwaukee melter bought one carload of resale copper bearing low phosphorus at $36, delivered. There is little resale material to be found, however. Beehive foundry coke is growing firmer, the minimum going price being $4.25, Connellsville, with most sellers holding at $4.50.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	22.00
Northern high phos	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	22.00
Basic	22.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32.82

Ferroalloys.—A Wisconsin melter has bought 100 tons of ferromanganese at $75 delivered. Two Milwaukee foundries bought a carload each, the price on one being $70, freight allowed, and on the other slightly less than that. A local melter is in the market for one carload. A sale of one car of spiegeleisen is reported at less than $36, delivered. A large Chicago user is inquiring for a car of 50 per cent ferrosilicon and is reported to have been quoted $65, freight allowed. A Milwaukee melter also wants a carload.

We quote 78 to 82 per cent ferromanganese, $70 to $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment: The Denver & Rio Grande is inquiring for 1000 steel general service cars of either 50- or 70-ton capacity. The Chicago, Rock Island & Pacific has let 200 composite gondola cars of 50-ton capacity to the General American Car Co., and repairs on 125 steel gondola cars to the Western Steel Car & Foundry Co. The Delaware, Lackawanna & Western is inquiring for 1000 steel hopper cars of 50 tons capacity. The Baltimore & Ohio, reported last week as being in the market for 1000 all-steel 50-ton hopper cars and 1000 steel underframe box car bodies, is also asking for figures on the repair of from 3000 to 6000 freight cars of various types. The Toledo, St. Louis & Western has ordered five consolidated type locomotives from the Lima Locomotive Co.

Structural Material.—The long-awaited wage award of Judge Landis, umpire in the local building dispute, was hailed as the harbinger of a period of active construction, but, as explained elsewhere in this issue, subsequent developments indicate that a real settlement has not yet been reached. Dissatisfied with the decision, several crafts have thrown down their tools, holding up work on a number of important construction projects, among them the Chicago Union Station. At the same time the umpire has announced that if either party to the dispute files application for a rehearing, it will be granted. Although local construction has not received the impetus anticipated, there are signs of increased activity in other sections of the West. The amount of work actually let has not yet reached sufficient proportions to affect materially the condition of the mills, and prices on plain material are still decidedly weak. The largest fabricating project in this territory now being figured is the Government airship hangar at Belleville, Ill., involving 3600 tons. One important Western fabricator is preparing a bid on a bridge for the Pekin & Hankow Railroad over the Yellow River, China, and it is reported that this structure will call for 20,000 tons of steel. Recent fabricating awards include:

San Jacinto Life Insurance Building, Beaumont, Tex., 950 tons, to Christopher & Simpson Iron Works.

Riley Creek viaduct, Alaska, 467 tons, to Phoenix Bridge Co.

South Side High School, Fort Wayne, Ind., 400 tons, to the Engineering Co., Fort Wayne.

Tomahawk Steel & Iron Co., foundry and machine shop, Tomahawk, Wis., 143 tons, to Worden-Allen Co.

Consolidated Water Power & Paper Co., power plant, Wisconsin Rapids, Wis., 125 tons, to Worden-Allen Co.

Standard Underground Cable Co., plant at St. Louis, 600 tons, to Decatur Bridge Co.

One hundred shaft sets for Montreal Mining Co., Ironwood, Mich., 130 tons, to Worden-Allen Co.

Pending business includes:

Roosevelt Office Building, Indianapolis, 600 tons, Vonnegut & Bohn of that city, architects.

Terrace Theater, Indianapolis, 150 tons, Vonnegut & Bohn, architects, bids in Sept. 20.

Highway bridge, Sauk City, Wis., 586 tons, bids to be at office Wisconsin Highway Commission, Madison, Oct. 7.

Abraham Lincoln High School, Des Moines, Iowa, 800 tons, bids in Sept. 27.

Paul J. Kalman Co., Chicago, warehouse, Youngstown, Ohio, 280 tons.

Consolidated Stone Co., plant Bedford, Ind., 400 tons, to Kenwood Bridge Co.

The mill quotation on plain material ranges from 1.80c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rail and Track Supplies.—The mills are receiving a fair run of small orders for standard railroad spikes and track bolts, ordinarily ranging from 200 to 1000 kegs. Prices are somewhat confused owing to the fact that some mills are quoting f.o.b. works instead of f.o.b. Pittsburgh, but the ruling market does not appear to exceed 2.40c., Pittsburgh, on spikes and 3.40c., Pittsburgh, on bolts.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills. Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—This commodity continues weak with the price situation as unsettled as heretofore. The unsatisfactory character of current demand is reflected in intermittent mill operations. One local plate mill was shut down last week and is still inactive. Notwithstanding the present dearth of orders, there are indications of slowly expanding demand, particularly on the part of the car builders and railroads. Inquiries and orders for car repairs as well as for new rolling stock are steadily becoming more numerous and at the same time the railroads are gradually increasing the forces in their own shops. The Chicago, Rock Island & Pacific has ordered 200 composite gondola cars of 50 tons capacity from the General American Car Co., and the steel for this equipment, amounting to 2,000 tons, has been placed with a local mill. A number of large new inquiries for freight cars are noted in another paragraph. Another large project involving plates has been undertaken by an oil company, the Sinclair Crude Oil Purchasing Co. having awarded the fabrication of 2243 tons for 15 oil tanks at Humboldt, Kan., to the Chicago Bridge & Iron Co. This fabricator is reported to have most of the material in stock, so that the letting will not result in a correspondingly large order for the mills.

The ruling mill quotations range from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Demand is slack and the market remains exceedingly soft, with nothing resembling stable discounts in sight. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 703.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—The improvement in the demand for soft steel bars is so gradual that mill output has not yet been materially affected and prices remain unsettled. As low as 1.75c., Chicago, has been done, but 1.85c. and 1.90c. are commoner.

Mill quotations are 2.75c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Sheets.—The demand for sheets continues to expand, with the result that mill operations are on a decidedly improved basis. The mill of the local independent, in fact, is running full. While the prices quoted below are fairly well maintained, there has been some shading, as low as 3.70c. base Pittsburgh, having been done on galvanized, and 2.60c. and 2c., base Pittsburgh, respectively, on black and blue annealed. Such concessions, however, are the exception rather than the rule.

Mill prices are: Mild steel bars, 1.75c. to 1.90c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, square and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Sheet Piling.—An Eastern mill has booked 300 tons of sheet piling for the Belle Isle Bridge, Detroit, and 100 tons for a bridge at Decatur, Ill.

Wire Products.—The American Steel & Wire Co. announced an advance of 15c. on wire nails and barbed wire and of 10c. on plain wire, effective Sept. 10. The new prices have been generally adopted by competitors. Purchases on the eve of the advances were the heaviest this year and buying has been at an accelerated rate since they went into effect. Jobbers who had permitted their stocks to diminish to the vanishing point because they looked for further price reductions are now buying. Those serving agricultural communities are particularly active, indicating a resumption of buying by the farmers. In the South the advance in cotton has been reflected in a marked improvement in business.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Cast Iron Pipe.—Although the season is growing rather late, there is still a considerable quantity of work in the market. The price situation is substantially unchanged, reports of stiffening heard in some quarters being balanced by low prices named elsewhere. The United States Cast Iron Pipe & Foundry Co. was the only bidder and was awarded 1928 tons of straight 54-in., 241 tons of lugged pipe and 376 tons of special castings by the city of Milwaukee, the price on the straight pipe being approximately $35, Birmingham. Other recent awards include:

Youngstown, Ohio, 850 tons of 4 to 12-in. to National Cast Iron Pipe Co. Bids on about 2000 tons of 12 to 30-in. were rejected.

Cedarburg, Wis., 600 tons, to American Cast Iron Pipe Co.

Troy, Ohio, 150 tons, to National Cast Iron Pipe Co.

Chicago, 255 tons, to United States Cast Iron Pipe & Foundry Co.

Prospective business includes:

Spring Wells, Mich., 450 tons, bids to be in Sept. 13.

Springfield, Ill., 250 tons, Sept. 19.

Forest, Ohio, 300 tons, Sept. 16.

Decatur, Ill., 400 tons, Sept. 12, to be let to contractor who will sublet.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

Old Material.—Aside from a few scattered purchases by gray iron and malleable foundries, the market has been quiet so far as consumptive demand is concerned. Most users still refuse to consider recent advances as permanent and dealers are unwilling to make concessions. There have been few changes in the prices at which sellers are holding their material, but such changes as have taken place have been principally upward. Railroad offerings include: Northern Pacific, 2000 tons; Santa Fe, 1500 tons, and Soo Line, 500 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$16.00 to	$16.50
Relaying rails	27.50 to	30.00
Car wheels	14.00 to	14.50
Steel rails, rerolling	13.00 to	13.50
Steel rails, less than 3 ft.	12.50 to	13.00
Heavy melting steel	11.00 to	11.50
Frogs, switches and guards cut apart	11.00 to	11.50
Shoveling steel	10.50 to	11.00
Low phos. heavy melting steel	13.25 to	13.75
Drop forge flashings	7.00 to	7.50
Hydraulic compressed sheet	7.50 to	8.00
Axle turnings	8.00 to	8.50
	Per Net Ton	
Iron angles and splice bars	14.00 to	14.50
Steel angle bars	10.50 to	11.00
Iron arch bars and transoms	14.50 to	15.00
Iron car axles	18.50 to	19.00
Steel car axles	13.50 to	14.00
No. 1 busheling	9.00 to	9.50
No. 2 busheling	6.25 to	6.75
Cut forge	10.00 to	10.50
Pipes and flues	7.00 to	7.50
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	10.00 to	10.50
Steel knuckles and couplers	11.50 to	12.00
Coil springs	13.00 to	13.50
No. 1 machinery cast	13.50 to	14.00
No. 1 railroad cast	13.00 to	13.50
Low phos. punchings	11.50 to	12.00
Locomotive tires, smooth	11.00 to	11.50
Machine shop turnings	3.50 to	4.00
Cast borings	5.00 to	5.50
Stove plate	12.50 to	13.00
Grate bars	10.50 to	11.00
Brake shoes	11.00 to	11.50
Railroad malleable	13.00 to	13.50
Agricultural malleable	13.00 to	13.50
Country mixed	8.50 to	9.00

New York

NEW YORK, Sept. 13.

Pig Iron.—Inquiries which have developed during the past 10 days amount to about 17,000 tons of foundry and malleable iron. Though very little of this tonnage has been placed, it is confidently expected that contracts amounting to 10,000 tons will be made within a few days. The most interesting transaction was that of a Dover, N. J., melter who inquired for 1000 to 1500 tons for first quarter delivery and compromised with the seller, placing the order for deliveries starting in December and extending over January and February only. Inquiries from hardware interests amount to about 1400 tons, including 400 tons for the first quarter of 1922. No furnaces seem anxious to quote for delivery after Jan. 1, but some will sell for January-February delivery as in the case of the Dover buyer. The market is firmer and $19.50, furnace, seems to be minimum in eastern Pennsylvania for No. 2 plain, while No. 1X is now quoted $1 higher than No. 2X, showing that shading on high silicon iron is not being continued. Furnace operators point to the higher price of coke as one of the indications that the cost of making pig iron will not be lowered by reduced cost of raw material at any time in the near future The price of coke is, however, affected by strikes which may soon end. There is some evidence of increasing melt and foundrymen are showing decidedly more interest in the market.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	$23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25..	22.02
Buffalo, sil. 1.75 to 2.25.....	25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.)	28.16 to 29.16

Ferroalloys.—At least one British producer has today reduced its quotation for standard British ferromanganese from $65 to $58.35, seaboard. This value corresponds quite closely to the British official quotation of £14 10s. for export of this alloy to continental Europe at the present rate of exchange and adding the freight rate to this country. Inquiries consist of several lots of 100 to 200 tons, aggregating about 500 tons, as well as a few smaller lots, but no sales are reported. Inquiry for spiegeleisen is light and sales are few at the prevailing quotations. The market for high grade manganese ore continues lifeless with quotations nominal. Demand for 50 per cent ferrosilicon is small at prevailing prices. We quote as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal..	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.....	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard.....	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard.....	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York.....	55c. to 60c.

Cast-Iron Pipe.—There has been a flurry of municipal askings and purchases, which has brought out low prices in case of attractive tonnages. For instance, the City of New York opened bids for 1200 tons of 16-in. and 20-in. pipe, the Florence Foundry & Machine Co. bidding lowest at $41.70, delivered. Boonton, N. J., purchased 100 tons of 12-in. pipe from the R. D. Wood Co., Philadelphia. Essex Fells, N. J., has awarded the job of furnishing and laying 100 tons to a contractor. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—The week has brought a noticeable improvement in demand, particularly in structural shapes, bars and wire products. Plates, sheets, cold finished bars and some other forms of steel are still dull and featureless. The advance of $2 and $3 a ton on wire products by the American Steel & Wire Co., followed by its competitors, constitutes the strong feature of the steel price situation. Other products are soft and the measure of the decline which has quietly taken place in recent weeks is shown by open bids received up to Sept. 10 by the New York Central Railroad on 1000 tons of plates, shapes and bars. Nearly all of the mills which make all three products put in bids. On steel bars the Carnegie Steel Co. and some of the other independents bid 1.65c., Pittsburgh, but Buffalo companies bid 1.65c., Buffalo. On plates the bids ranged from 2.03c., delivered New York, which works back to 1.65c., Pittsburgh, to 1.75c., Pittsburgh, while on structural shapes most of the bids ranged from 1.70c. to 1.80c., Pittsburgh. One of the indications of a better tone in the steel trade was the placing of a 3000-ton stock order for shapes, plates and bars by a fabricating company, there having been little of such business of this character for more than a year. The price advance on wire products brought out a fairly good volume of business, many jobbers closing on 60-day contracts at the former prices and taking immediate delivery of part of their requirements. Though most of the current improvement is in domestic trade, there is also a slight spotty betterment in export demand. Following the shipment last week of 3000 tons of skelp to Scotland, a leading independent export seller received an inquiry from England for 2700 tons of skelp and plates. Bar business is made better by an increasing number of building jobs. Inquiries for reinforcing bars totaling several thousand tons are pending. The Donner Steel Co., Buffalo, last week started four open-hearth furnaces, and its 10-in. and 14-in. bar mills are in part engaged in rolling orders for a new deformed bar which it has placed on the market. Outside of the 15,000 tons involved in the Federal Reserve Bank Building, New York, the week in fabricated steel has been quiet. For the Federal Reserve Bank six bids in all were received, and while it is understood the contract has been let, announcement is as yet withheld. Among new projects may be mentioned a plant which the Lamson Store Service Co. is planning to build at Syracuse, taking 400 tons, and the George A. Fuller Co. is reported to have the general contract for a building to occupy the Park Avenue frontage of the old Grand Union Hotel site at Forty-second Street.

Awards include a building in New York for the Dodge Sales & Engineering Co., Mishawaka, Ind., 1500 tons, to the Hay Foundry & Iron Works, and the Excelsior Savings Bank Building, New York, 600 tons, to the Hedden Iron Construction Co. The Western Steel Car & Foundry Co. will do the repairs on 125 general service cars for the Rock Island and has been awarded the repairs on 250 hopper cars for the Wabash.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.03c.; plates, 2.03c. to 2.08c.; structural shapes, 2.03c. to 2.18c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—August sales by warehouses showed a general improvement, which is evidently continuing. Prices are weak, due to the uncertainty of mill quotations. It is reported that sales of steel bars have been made by a warehouse in this district at 2.68c. per lb., 10c. per 100-lb. below the prevailing quotation. Sheet prices continue to show a slight decline, galvanized, No. 28 gage being obtainable as low as 4.75c. per lb., black sheets at 4c. per lb. and blue annealed, No. 10 gage, at 3.28c. per lb. While most warehouses handling wire quote bright basic and annealed soft at 3.75c. per lb., a large independent interest still maintains its prices of 3.53c. and 3.38c. per lb. Although we quote Swedish iron bars at 10c. per lb., there is no market on this material, and any quotation is nominal. Discounts on wrought iron pipe have been increased proportionate to the recent mill reduction. We quote prices on page 718.

High Speed Steel.—Business is better, most sellers reporting considerable increase of sales in August over the July business. Quotations on 18 per cent tungsten high speed steel are maintained at about 90c. to $1 per lb.

Coke.—Prices have risen about 25c. the past week, the lowest price of guaranteed foundry coke being $4.25 per ton, Connellsville, and this price is not shaded. The range extends to $4.50. A sale of furnace coke has just been consummated of 7000 tons a month during last quarter for $3.50, Connellsville, base. Many report better business in coke than in pig iron. The strikes of oven operators is a reason assigned to the rising prices.

Old Material.—The advance in prices was more pronounced the past week, several items having risen about $1. No more mills appear to be in the market, the advancing prices being caused by the efforts of dealers to lay down material in yards and of brokers and dealers to cover on old orders. Heavy melting steel, pipe and stove plate continue to be most in demand.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to $7.50
Heavy melting steel, rails or equivalent	8.50 to 9.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	11.00 to 11.50
Iron car axles	18.00 to 19.00
No. 1 railroad wrought	11.50 to 12.00
Wrought iron track	9.00 to 9.50
Forge fire	5.50 to 6.00
No. 1 yard wrought, long	9.50 to 10.00
Light iron	3.50 to 4.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	3.50 to 4.00
Mixed borings and turnings	3.00 to 3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.50 to 9.00
Stove plate	9.50 to 10.00
Locomotive grate bars	9.50 to 10.00
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Birmingham

BIRMINGHAM, ALA., Sept. 13.

Pig Iron—The question now is how long the $19 base for Birmingham iron will last, for it is expected to advance. No business was done under the $19 base last week. No silicons were sacrificed. The leading maker declined to sell 2.25 to 2.75 silicon in round lots at $19. Only one concern has well-assorted stocks. Eight have little or none. The Central Iron & Coal Co. will resume at its blast furnace at Holt Sept. 19 and at its principal coal mines Sept. 26. Forty of the 60 by-product ovens have started and will again supply the city of Tuscaloosa with fuel and light. The company has not a ton of iron on hand. The Alabama Co. has resumed at one ore mine and schedules furnace resumption in October. Stove plants are taking more metal. The largest foundry interest reports a larger outgo than in months and a greater influx of orders. No especially large tonnage has been booked in a single order, but the aggregate of the week must have been 10,000 tons. The rise in cotton has inspired and stimulated the entire South and all business has responded promptly without exception. It is believed that the Southern Wheel Co. has closed a deal for 2900 tons of pig iron in three grades running from base to 3.25 per cent silicon for the Southern plants at Birmingham, Atlanta and Savannah, although the seller cannot be positively located. The price quoted by Birmingham makers on all grades was the base of $19 for 1.75 to 2.25. Some Birmingham makers believe a portion of order was placed at St. Louis.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Cast Iron Pipe—A large sanitary pipe interest shipped the greatest amount of pipe in August in the history of its business. Much extra heavy pipe has gone to the East. The base remains at $40 for standard and $30 for extra heavy. Business is fair to good. The base of high pressure pipe seems to remain at $35 for 6-in. with shading on larger sizes. The Birmingham Water Works is taking a considerable tonnage of 30-in. and 16-in. pipe. Very little is moving to the Pacific Coast this month following 7000 tons last month. Many Southwestern cities are on the eve of ordering and will as soon as they can sell bonds.

Finishing Mills—Finishing steel mills in Birmingham continue to operate on an enlarged schedule. The Gulf States Steel Co. was on 55 per cent in August and is at the same pace now. The Tennessee company maintains a more than 60 per cent schedule with following plants active: Rail mill (9000 tons a week), structural mill at Fairfield, plate mill at Bessemer, car works, tie-plate plant, four furnaces on basic, six of its nine open hearth furnaces.

Coal and Coke—Coal is being mined at 70 per cent of normal and standard foundry coke is fairly active at $6 to $6.50.

Old Material—No. 1 heavy steel is firmer and up $1 with other materials tending upward, but no change in quotations last week. Cast scrap is quite active.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Sept. 13.

Pig Iron.—Eastern Pennsylvania iron appears easier in spots, although in all fairness it should be stated not enough has been sold at lower prices to establish the market. The Robesonia furnace is credited with offering No. 2 plain at $19, No. 2X at $19.50 and No. 1X at $20. The Gurney Heater Mfg. Co., South Framingham, Mass., this week purchased 600 tons No. 2 plain at an indicated delivered price of slightly better than $23.50. A week ago, eastern Pennsylvania generally was quoted at $20 furnace, base. Two 100 ton lots were taken this week on a basis of $20, furnace, for No. 2X and $21 for No. 1X. A New England malleable interest purchased 100 tons Northern special analysis iron at practically $25.50, delivered. Otherwise business was confined to scattered car-lots of Buffalo and eastern Pennsylvania, mostly silicons 2.75 to 3.25 and 4.25 to 4.75 at prices having varying relations to base quotations, the tendency being to shade regular 50c. differentials. Slight improvement is noted in the call for car-lots of Southern special analysis iron from manufacturers' foundries, willing to pay the difference between these and Pennsylvania and Buffalo to secure desired mixtures, on a basis of $19 furnace for No. 2 plain with 50c. differentials. Virginia iron appears weaker without actual transactions. Some inquiry is noted for first quarter, 1922 iron, but no furnace is willing to quote for that delivery. Delivered pig iron prices follow:

East. Penn., sil. 2.25 to 2.75	$24.06 to $25.06
East. Penn., sil. 1.75 to 2.25	23.56 to 24.56
Buffalo, sil. 2.25 to 2.75	25.46 to 26.46
Buffalo, sil. 1.75 to 2.25	25.46 to 25.96
Virginia, sil. 2.25 to 2.75	29.08 to 32.08
Virginia, sil. 1.75 to 2.25	28.58 to 31.58
Alabama, sil. 2.25 to 2.75	30.16
Alabama, sil. 1.75 to 2.25	29.66

Coke.—Foundry orders for winter supplies of coke have begun to make their appearance, but these are not sufficient in number to materially influence the daily output of the New England by-product producers. A large percentage of the foundries, especially the jobbing, have small stocks of fuel on hand and are buying only as absolute necessity requires. The outlook for increased meltings is not sufficiently bright at the moment to indicate a change in their coke buying policy. There is not enough prospective business from day to day to attract outside foundry coke interests to this market. Local producers continue to quote both spot and contract by-product foundry coke at $10.66 delivered.

Finished Materials.—Some fairly attractive tonnages of angles, plates and shapes are hanging over the market, for which mill representatives are quoting 1.65c. f.o.b. Pittsburgh. The market on wire nails is slightly more active, following advices from producers

to cover before the advances. That for other mill products has grown less active. Prices consequently appear firmer simply because there is less opportunity to quote. Jobbing house business is spotty, some concerns reporting greater consumption, while others say business is no more than holding its own. Sentiment regarding fall trade, however, generally is more hopeful among the jobbing interests.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.93; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—The limited buying of No. 2 plain pig iron the past two or three months and the more frequent calls for ground ferromanganese, suggests jobbing foundries are using larger percentages of machinery cast per melt than has been common practice heretofore. Old material brokers, on the other hand, as a rule secure only scattered car-lot orders. The inference is that foundries, with their limited weekly meltings, are securing all scrap needed from local junk dealers. Manufacturers' foundries occasionally come into the market for 100 or 200 tons, a textile machinery maker this week having purchased 100 tons textile scrap at $18 delivered, while another manufacturing interest asked quotations on 150 to 200 tons. There is no concerted buying movement on their part, however. Machinery cast prices take a wide range according to the quality of holdings, but in all instances are firmly held and, if anything, have an upward tendency. Pennsylvania steel mills apparently are not willing to raise bids on heavy melting steel, etc., and yard interests will not meet their prices, consequently the market continues in a deadlock.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $20.00
No. 2 machinery cast	15.00 to 16.00
Stove plate	15.00 to 15.50
Railroad malleable	11.50 to 12.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$6.00 to $6.50
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	7.50 to 8.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.50
Machine shop turnings	2.00 to 2.50
Cast iron borings, rolling mill	3.50 to 4.00
Cast iron borings, chemical	4.00 to 4.50
Blast furnace borings and turnings	2.00 to 2.50
Forged scrap and bundled skeleton	4.00 to 4.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.50
Rerolling rails	9.00 to 10.00

Cleveland

CLEVELAND, Sept. 12.

Iron Ore.—Two inquiries have come out, each for 10,000 to 15,000 tons of high phosphorus ore, on which sellers have quoted $5.35, the regular price for this ore this season, the price being 35c. below regular base on old range non-Bessemer. Furnaces claim, however, that they cannot make pig iron to sell at current prices unless they are able to buy ore at lower prices. With the large ore stocks on hand, it is believed that a furnace would have little difficulty in buying ore on dock at lower than regular prices. One steel plant having long time contracts for ore will require 30,000 tons more ore than it originally specified and this week placed an order for that additional amount. Ore receipts at Lake Erie ports during August were 3,158,447 gross tons as compared with 7,095,450 tons during August last year. Receipts at Lake Erie ports for the season till Sept. 1 were 10,407,882 tons as compared with 24,503,222 tons during the same period last year. August shipments from Lake Erie ports to inland furnaces were 2,135,104 tons as compared with 5,029,207 tons in August, 1920, and the shipments from these docks for the season till Sept. 1 were 7,842,336 tons as compared with 17,626,216 tons till Sept. 1 last year. In spite of the light ore movement this year, stocks on docks are considerably larger than a year ago, the amount on Lake Erie docks Sept. 1 being 9,285,708 tons as compared with 8,554,455 tons on the same date a year ago. August receipts at other than Lake Erie ports were 1,190,454 tons as compared with 2,159,686 tons during August, 1920. The same ports have received 3,659,097 tons this season as compared with 9,226,168 tons up to September, 1920.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Sales during the past week, while mostly in small lots, indicate a broadening demand for pig iron and the market shows a further stiffening of prices toward the $21 quotation on this grade. While the $20 quotation is still being made by some lake furnaces, more business is being taken at from $20.50 to $21, so that the average price at which sales were made was advanced somewhat during the week. One Valley furnace made a number of small lot sales at $21, which it has adhered to recently, and the agency making these sales sold in all about 4000 tons during the week from various furnaces. Another interest that has been on a $20 basis at its several furnaces is now asking $21 for foundry iron and its sales include a small lot from a New York furnace at that price, f.o.b. Buffalo. Another interest sold 4000 tons during the week in small lots of foundry and including some malleable iron at $20 to $21. Locally the price remains at $20.50 to $21 at furnace, although one producer is now asking $22, delivered, basing this price on $21 Valley iron and giving the buyer the advantage of one-half of the freight rate. A local consumer has purchased 1000 tons of malleable iron and this sale is of particular interest in that the iron is for delivery until March 1. This is the first sale reported in many months for extended future delivery and while the price has not been announced it is understood that the buyer paid a little more for the iron than he would have been charged had he bought it for earlier shipment. An inquiry for 400 tons of foundry iron for the fourth quarter came out and brought a $21 quotation, but was withdrawn. Basic iron can still probably be bought at $19 from steel makers, although most merchant furnaces are asking $20. On an inquiry for 1000 tons of basic iron from a Pittsburgh district consumer, a Cleveland furnace during the week quoted $20 Valley, but did not get the order. We note the sale of a car lot of low phosphorus iron at $35, or $1 a ton lower than recent quotations.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	35.00

Alloy Steel.—Recent price reductions by some of the automobile builders upset production schedules and caused hesitancy in placing pending orders for alloy steels. Prices are weak and down close to the pre-war base. Mills quote 3½ per cent nickel steel at 5c. to 5¼c. per lb., chrome nickel steel at 4½c. to 4¾c. and chrome vanadium steel at 5c. to 5¼c., the lower prices being for desirable orders.

Hot and Cold-Rolled Strip Steel.—The market is rather quiet and prices are somewhat irregular. On desirable orders, mills quote hot-rolled strip steel at 2.10c. to 2.15c. and cold-rolled strip steel at 4c.

Bolts, Nuts and Rivets.—The demand for bolts and nuts continues to improve and local makers report prices a little firmer. Consumers are buying in somewhat larger quantities than they have been and a few have placed contracts for the remainder of the year. Orders are coming from jobbers and from about all classes of consumers except the implement manufacturers. The demand for rivets has improved slightly, but is still very light. Prices are weak and irregular with 2.25c. and 2.35c. the minimum quotations for structural and boiler rivets respectively.

Semi-Finished Steel.—There is a moderate demand for sheet bars in small lots and one mill reports sales during the week aggregating 2800 tons. The going price is $30, Youngstown. Since the recent $2 reduction in sheet bars, mills are not inclined to allow the $1 differential on slabs, which are also quoted at $30.

Finished Iron and Steel.—The volume of business changed very little during the week, although some of

the mills report a slight increase in orders and inquiries. The price advance on nails and wire caused a feeling among some customers that prices on other items may have reached bottom and the market might stiffen. However, steel bars, plates and structural material are still weak with average prices probably a little lower than a week ago. Although minimum quotations generally are unchanged, a new low price has appeared on steel bars. Independent mills have followed the American Steel & Wire Co. in advancing prices on nails, wire and wire rods, but before the advance the mills gave their customers an opportunity to cover at the lower prices and booked considerable wire tonnage. Sheet bars are commonly quoted at 1.65c. for car lots, but sales have been made at 1.60c., and even that quotation has been shaded. Plates are generally quoted at 1.65c. to 1.70c., the lower price being fairly common for a desirable order, and some sales are being made at 1.75c., but it is very probable that a good order would bring out a 1.60c. quotation. On structural material, 1.65c. is apparently the minimum quotation. A Cleveland mill which was reported last week to have taken 1000 tons of plates from an Eastern consumer has booked another 1000-ton order from the same source for oil tanks and stills. Lake shipyards are figuring on a 400-foot stone and coal boat requiring 2500 tons of plates and structural material. This is the first definite inquiry for a large freight boat that has reached these shipyards this season. Another inquiry is for 1000 tons of cold-rolled steel bars. The demand for steel from the automobile industry in Detroit is falling off. Car builders are evidently reducing their stock in anticipation of a slackening in sales during the fall. Mills supplying the Ford Motor Co. advise that this company will not buy as much steel for October requirements as it did for September, although it is stated that this company has not yet reduced production. Structural work is inactive. Hard steel bars are quoted with prices slightly lower, ranging from 1.60c. to 1.65c.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Shading to the extent of $1 a ton to 2.20c. is being done on blue annealed sheets, several orders being taken at that price. Black and galvanized sheets are apparently firm at 2.75c. and 3.75c. respectively. Some of the mills are now charging for certain extras that they have been waiving. Orders have fallen off somewhat. A Cleveland mill has taken 750 tons of No. 30 gage black sheets for Japan.

Warehouse Business.—Warehouses have reduced prices $5 a ton on black sheets and will make an advance on nails and wire corresponding to the advance in mill prices.

Old Material.—There is some demand for scrap for shipment to Valley and other mills. This is largely from dealers who have recently taken contracts and the activity is confined to heavy melting steel, borings, turnings and compressed steel. These grades are moving at $13 to $13.50 for heavy melting steel, $8.50 for shoveling turnings and cast iron borings and $10 to $10.50 for compressed steel. For Canton delivery, dealers are offering $12.50 for heavy melting steel. There is no demand from local mills. Prices are firm and unchanged.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails under 3 ft.	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.00 to 8.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Cincinnati

CINCINNATI, Sept. 13.

Pig Iron.—The market was comparatively quiet during the week, though several 100-ton lots were disposed of. Carload business has again become the prevailing activity. A few inquiries, the largest of which is for 400 tons, are being figured on, the bulk of the business coming from Indiana melters. The price situation is firm, southern Ohio irons having advanced during the week $1 a ton to a $21 base, for foundry and malleable. We note a sale of 200 tons of malleable from southern Ohio at the latter figure, and one of 800 tons of foundry iron to a St. Louis district melter at the same figure. Several carload sales of Southern irons were made on the basis of $19, Birmingham, but in one instance $19.50 was secured. The general asking price, however, is $19, and it is reported that a Southern railroad equipment company purchased 6000 tons at this figure. A sale of 100 tons of Chicago iron at $22 was made to a northern Indiana melter. While the week just closed was quiet, the trade is confident that better things are in sight, and preparations are being made to blow in several furnaces. One Marting stack in southern Ohio will go in blast on Thursday, and Tuscaloosa and Etowah in the South are scheduled to resume about Oct. 1.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	23.52

Finished Materials.—The feature of the week was the announcement by the American Steel & Wire Co. of an advance of 15c. per keg on wire nails, 15c. per 100 lb. on barbed wire, 10c. per 100 lb. on plain wire, and approximately $4 per ton on wire rods. It has long been felt by the trade that wire nails and wire products were being sold at prices that eliminated any possibility of the mills securing a profit, but the advance, while expected at some time, nevertheless comes as somewhat of a surprise. At any rate, the announcement was the means of bringing out a fair volume of business, and several orders for 10,000 kegs of nails were placed at the old price of $2.75 per keg. The same condition holds in other products, it being estimated that 20 carloads of wire products were placed before the advanced prices went into effect. In other lines of finished materials, with the exception of sheets, business has been rather quiet. The sheet market is fairly active, and numerous carload orders are being booked for immediate delivery, many of these for shipment to the South, which is, in the opinion of a number of salesmen covering the territory, showing a steady, though somewhat slow, recovery from the business depression. Recent advances in the price of cotton have had a stimulating effect on all lines of business, and confidence in the future is rapidly being restored. While reports are heard that prices on finished material are being shaded, the last published prices are apparently holding on business booked in this territory. For instance, we note a sale of a carload of steel bars at 1.75c., and about 60 tons of shapes and plates at 1.80c. On reinforcing bars, 1.60c. is apparently a general quotation, with a price of 1.55c. reported on an inquiry for 300 tons. In the structural field, the American Bridge Co. was low bidder on 15 barges for Memphis, the tonnage involved consisting of 1400 tons of plates. The same company was low bidder on 200 tons of steel work for Ohio River dams, and the Pittsburgh Trolley & Forge Co. on 100 tons of similar work. Cincinnati Council, Knights of Columbus, are planning the erection of a 10-story club house, and plans for the Masonic Temple will likely be posted shortly. Plans are also posted here for a bridge at Cairo, Ill., to be erected by the Illinois Central Railroad.

Warehouse Business.—Jobbers of wire products report business as steadily increasing, the demand for wire nails and barbed wire being heavy the past week.

The orders for other products, while small, are more in number, and tonnages are increasing slightly. While there have been no further price changes, it is anticipated that one will be made within the next week or so, or as soon as the price situation at the mills becomes more stable. The announcement by the American Steel & Wire Co. of price advances on nails and wire products was received with much interest by local jobbers. It is expected that stiffening of warehouse prices will be noticed, as local stocks are not heavy.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—A better movement in coke is reported, though inquiries are not large. Much of the business being done is in foundry coke for immediate shipment. Prices are firm and operators are not inclined to contract for the future. Some additional ovens are being lighted in the West Virginia field, one operator having added 50 within the past two weeks.

Old Material—Some inquiries are being received for No. 1 machinery cast which is reported to be very scarce. There is very little activity, however, in the scrap market and prices, while firmer, as quotably unchanged.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	12.00 to	12.50
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.50 to	11.50
Heavy melting steel	9.00 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.50 to	3.00
Steel turnings	2.00 to	2.50
Railroad cast	12.00 to	12.50
No. 1 machinery	12.50 to	13.50
Burnt scrap	7.00 to	8.00
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	9.50 to	10.00
Pipes and flues	4.00 to	5.00

Buffalo

BUFFALO, Sept. 13.

Pig Iron.—The Rogers Brown Iron Co. blew in a furnace Sept. 8, stocks having been considerably reduced recently. This is the first blast furnace operation by this interest since the winter. Less than 10,000 tons of iron has been sold in the district, but inquiry has improved in an encouraging way. One interest has total inquiry of almost 20,000 tons, of which two separate propositions are for 2000 tons each. The lowest price is $20 for No. 2 plain and an effort is being made to maintain differentials on the various silicons ranging from $20 to $23. Another producer sold less than 2000 tons at $20 and $21 and reports a falling off in inquiry since the Buffalo market showed a strengthening. With a majority of producers, business is limited to small quantities; one sold a few hundred tons of malleable and another about 300 tons of foundry iron at $20.50. There is evidence that little iron is in the hands of brokers. One furnace having a stack in operation on foundry iron throughout the dull period will go on basic production to fill its own needs and on this basis will operate all month. The company expects its stock of foundry iron will be exhausted before Oct. 1 and if the volume of business is maintained, may blow in a furnace before that date. Its sales for a week were 5000 tons and with the exception of two lots of 1000 tons each and two for 500 tons, the sales were for carload quantities.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75
No. 2 plain, 1.75 to 2.25 sil.	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—Before the advance in wire prices became effective, some desirable business in various grades was closed by a local mill. The tonnage is in the neighborhood of 4000 and is made up of three orders. The advances of the American Steel & Wire Co. will be followed by local mills. Bar inquiry and in particular for reinforcing material has brightened. One bar inquiry is for 500 tons—larger than has been received here in some time. Sheet piling for the Detroit-Belle Isle Bridge has been purchased here from a mill, but figures as to prices and quantity are not available. Rail business has dropped to nothing; whatever contracts are made for rails within the remainder of this year will be for delivery next year, mills expect. Pipe business continues good and some better activity in tin plate is noticed, some buyers desiring to contract on a 60-day basis. Sheet and bar orders are light. Structural work on enterprises of any size is apathetic in contrast to unusual activity in construction business on small buildings. An order for a carload of bolts and nuts was placed with a local agency on which keen competition was met, but the price was not made known. Some fair galvanized sheet orders have appeared, but the same office receiving this business finds plate and shape business extremely dull.

Warehouse Business.—Sheet prices have been shaded and there is some falling off in the demand on all products, but it is particularly noticed in sheets, which for several weeks showed improvement. Some car business expected by warehouses seems to have been taken by mills. In general demand is well balanced and no material is more sought after than another.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.30c.; galvanized steel sheets, No. 28, 5c.; black sheets, No. 28, 4c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 4.05c.

Old Material.—Sales of steel ranging in size from 200 to 500 tons have been made; one buyer having paid $12.50 and another as high as $13.50. Some cast scrap has moved at $16, but other than a feeling of confidence on the part of the dealers, there is little activity except scattered sales in small quantites.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to	$13.50
Low phos., 0.004 and under	14.50 to	15.50
No. 1 railroad wrought	12.00 to	13.00
Car wheels	13.00 to	14.00
Machine shop turnings	4.00 to	5.00
Cast iron borings	4.00 to	5.00
Heavy axle turnings	8.00 to	9.00
Grate bars	8.00 to	9.00
No. 1 busheling	9.00 to	10.00
Stove plate	11.00 to	12.00
Bundled sheet stampings	6.00 to	7.00
No. 1 machinery cast	14.00 to	15.00
Hydraulic compressed	9.50 to	10.00
Railroad malleable	12.00 to	12.50

St. Louis

ST. LOUIS, Sept. 13.

Pig Iron.—The pig iron market is $1 higher, and the price of $24.88, delivered St. Louis, is generally being well maintained. Here and there resales are being made by brokers who bought before the recent advances at less than this. There is a decidedly firmer tone to the market. Buyers are taking on iron more freely, and the fact that efforts are being made to buy for next year's delivery is taken to indicate that melters are convinced that the price has reached bottom. There is an inquiry out for 40,000 tons of foundry iron for export. Several inquiries are out for from 1500 to 2500 tons, some calling for delivery into the first half of next year. A local melter bought 1000 tons of basic iron for September delivery. Another sale of 1000 tons of foundry iron was for delivery commencing in October and continuing through April. Sales of Granite City iron during the last week were 2800 tons made up of lots of 600 tons and less. None of the local by-product producers is selling for delivery beyond October.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham.

Northern foundry, sil. 1.75 to 2.25	$24.88
Northern malleable, sil. 1.75 to 2.25	24.88
Basic	24.88
Southern foundry, sil. 1.75 to 2.25	24.74

Finished Iron and Steel.—The only thing of interest in the structural steel line during the past week was

the report that the Omaha Technical and Commercial High School project had been revived, involving 1000 tons of plates, shapes and bars. The inquiry of the Baltimore & Ohio Railroad for 1000 all-steel 50-ton hopper and 1000 steel underframe box car bodies, as reported in THE IRON AGE last week, created unusual interest. The only railroad here that is buying regularly is the Missouri Pacific. Its purchases last week included a car each of plates and wheels, and smaller materials for immediate needs. It also is understood that it is in the market for steel underframes for repair work. The Missouri, Kansas and Texas Railroad, which recently decided to change from coal to oil in its locomotive fuel, has let contracts to the Graver Corporation, Graver, Ind., for four 100,000-barrel; three 55,000-barrel, and four 20,000-steel storage tanks. Warehouse business continues to grow better.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—Coke is showing increased movement. There is a little better demand for foundry coke. One order placed during the week was for 2000 tons for the remaining months of this year. There was one inquiry out for 2000 to 2500 tons for nearby shipment, and another for 600 to 1000 tons. There is an increasing demand for domestic coke. Standard Connellsville foundry coke is quoted at $4.50 to $5 per net ton at ovens.

Old Material.—Although consumers still decline to become interested in the old material market, the tendency is toward higher levels and some grades have again advanced 50c. per ton over last week's quotations. It is a strictly dealer's market, however, as the prevailing opinion among brokers is that the mills must surely come into the market and they are buying up material with this end in view. However, the mills feel that the small tonnage on their books does not justify them in paying the advancing prices and until the railroads commence to place orders with them they will refrain from making purchases of material. The following railroad lists are before the market this week: Great Northern, 2250 tons; Missouri, Kansas & Texas, 1500 tons; Frisco Railway, 750 tons; Toledo, St. Louis & Western, 700 tons; Chicago, St. Paul, Minneapolis & Omaha, 300 tons, and Chicago & Eastern Illinois, 400 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron Rails	$13.00 to $13.50
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.00 to 11.50
Relaying rails, standard section	29.00 to 30.00
Cast iron car wheels	12.50 to 13.00
No. 1 heavy railroad melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Ordinary bundle sheet	4.00 to 4.50

Per Net Ton

Heavy axle and tire turnings	6.00 to 6.50
Iron angle bars	11.00 to 11.50
Steel angle bars	9.00 to 9.50
Iron car axles	16.50 to 17.00
Steel car axles	12.50 to 13.00
Wrought iron arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Railroad springs	10.50 to 11.00
Steel couplers and knuckles	10.50 to 11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to 9.50
No. 1 dealer's forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	12.50 to 13.00
Stove plate and light cast	11.50 to 12.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.50 to 4.00
Railroad grate bars	8.50 to 9.00
Machine shop turnings	4.50 to 5.00
Country mixed iron	7.00 to 7.50
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.50 to 11.00
Railroad brake shoes	8.50 to 9.00

Philadelphia

PHILADELPHIA, Sept. 13.

Steel prices, with the exception of those for wire products, which were advanced last week $2 and $3 a ton, continue to show a declining tendency. Plates, shapes and bars may now be quoted at 1.60c. to 1.70c., Pittsburgh, the bulk of transactions being at 1.65c. on all three products. The 1.60c. price on bars is said to have been made only when combined with a tonnage of structural shapes and plates. In line with lower prices on steel bars, bar iron is off $1 a ton and is to be had at 1.60c. to 1.65c., Pittsburgh. The new prices on sheets recently announced by the leading interest and followed generally by its larger competitors are not holding. These prices—2.25c. on blue annealed, 2.75c. on black and 3.75c. on galvanized—are being shaded at least $1 a ton. An Eastern coal company is reported to have bought 300 tons of blue annealed sheets at 2.20c., Pittsburgh. In bolts, nuts, rivets and spikes there appears to be less price cutting than has prevailed in recent weeks.

No material improvement in the demand for steel products has come with the month of September, except in wire products, considerable business having been booked in the past week prior to the advance. Plates and sheets are extremely dull and there is only a moderate volume of business in bars and structural shapes.

Pig Iron.—A significant feature of the foundry pig iron market is that consumers who have been buying a carload or two at a time for months are now inquiring for their requirements for last quarter of this year and first quarter of next year. Eastern Pennsylvania furnaces are a unit in declining to quote for next year and one New Jersey furnace has withdrawn all quotations except for September shipment, this being due to the uncertainty as to coke prices. While spot furnace coke is to be had at $3.25, Connellsville, contract coke is not available at this price, some operators naming about $4. As Eastern furnace operators claim to be losing $4 or $5 a ton on iron with present costs, they do not care to accept too much forward business at present prices with the possibility of costs going higher. Sales within the past week have totaled several thousand tons, and there is a fair volume of business pending, mostly in lots of 100 to 800 tons in this district, though eastern Pennsylvania furnaces are quoting on four or five inquiries from the New York and New England districts which aggregate about 20,000 tons. The week's sales included 3000 tons to one melter and 1000 tons to another; also 1000 tons of basic iron to a plate manufacturer, the price being $19.25, delivered. Prices on foundry iron are unchanged, though they are no firmer. No. 2 plain iron is available from at least two furnaces at $19.50, furnace, and No. 2 at $20, furnace. One furnace quotes $20 for No. 2 plain and $20.50 for No. 2X and still another asks $20.50 for No. 2 plain and $21 for No. 2X. With furnaces losing money at present prices, the prospect of other merchant furnaces coming into blast within the near future are not good. One furnace operator was considering putting his stack in operation, but after careful analysis of the situation decided not to do so. Furnace stocks show a slight decrease and much of the iron now on furnace yards is not of standard analysis.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.84 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	19.25
Gray forge	20.00 to 21.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—One British agent is reported to have received authorization to quote ferromanganese at $58.35, Atlantic seaboard; others continue to quote $65. The domestic price remains at $70, delivered. Spiegeleisen is quoted at $27 to $28, furnace.

Semi-Finished Steel.—With little or no demand, prices for semi-finished remain unchanged. Open-hearth

rerolling billets are $30, and forging quality $35, Pittsburgh.

Plates.—The plate market continues exceedingly dull. Probably less tonnage is being booked than in any steel product. Prices are weaker, it being easy to buy plates at 1.65c., Pittsburgh, while 1.60c. can be done on desirable lots.

Structural Shapes.—Some Eastern mills are strongly competing for orders for shapes at the expense of prices. Ordinary lots of shapes can be bought at 1.65c. to 1.70c., Pittsburgh, while a fair-sized tonnage would command a price a low as 1.60c., Pittsburgh.

Bars.—The steel bar price on ordinary lots is now 1.65c., Pittsburgh, but 1.60c. has been done on reinforcing bars of standard specification when combined with orders for plates and shapes. An Eastern company is reported to have quoted as low as 1.50c., Pittsburgh, on steel bars, but this is not confirmed here. Bar iron is off $1 a ton, being available at 1.60c. to 1.65c., Pittsburgh. An export order for 5000 tons of iron or steel bars, threaded at one end, is reported to have been placed by a New York export company at 1.76c., Pittsburgh, including the extra for threading.

Sheets.—A company in the Pittsburgh district has quoted prices on sheets about $1 a ton less than the figures named in the announcement recently of the American Sheet & Tin Plate Co. Those prices were 2.25c. on blue annealed, 2.75c. on black and 3.75c. on galvanized, Pittsburgh. A coal company is reported to have placed 300 tons of blue annealed sheets at 2.20c., Pittsburgh.

Track Supplies.—Railroad companies are inquiring more freely for spikes and track bolts. The Pennsylvania Railroad is in the market for 450,000 to 900,000 spikes and a large quantity of heat-treated track bolts. The Philadelphia & Reading and the Philadelphia Rapid Transit Co. have also inquired for track bolts. It is stated that railroad buying of track supplies has increased considerably within the past few weeks.

Warehouse Business.—A fair improvement in sales of steel out of stock is reported. Jobbers are in some instances buying more freely for stock. Prices on black and galvanized sheets and cold-rolled steel have been revised downward. We quote for delivery in Philadelphia as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage, 3.75c.; galvanized sheets, No. 28 gage, 4.75c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4c.; squares and hexagons, cold-rolled steel, 4.50c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Old Material.—The scrap market shows some evidences of a firmer tendency. Fair tonnages of No. 1 railroad wrought have been sold at $15 and $15.50, an advance of 50c. a ton. Heavy axle turnings are 50c. higher. Heavy melting steel is firmer without any actual change in price. We quote for delivery in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	16.00 to 17.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	9.25 to 9.75
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.50
Stove plate (for steel plant use)	12.50 to 13.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Lake Placid Meeting of Electrochemists

The fortieth general meeting, marking the end of the second decade since the organization of the American Electrochemical Society, will take place at the Lake Placid Club, in the Adirondacks, New York, Sept. 29, 30 and Oct. 1. The technical program will be featured by two symposia on non-ferrous metallurgy and electrodeposition. The program follows, in part:

Thursday, Sept. 29

9:00 a. m.—Miscellaneous papers:

Charles Vickers: "Experiences with Alkaline and Alkaline Earth Metals in Connection with Non-Ferrous Alloys."

W. A. Cowan, L. D. Simpkins and G. O. Hiers: "The Electrolytically Produced Calcium-Barium-Lead Alloys Comprising Frary Metal."

Colin G. Fink and Chas. H. Eldridge: "The Electrolytic Corrosion of Lead-Thallium Alloys."

J. Newton Friend: "A New Theory of the Corrosion of Iron."

Haakon Styri: "Rust Prevention by Slushing."

8:00 p. m.—Meeting in the music room of the Forest Clubhouse. Lecture by Prof. Harlow Shapley, of the Harvard University Observatory, on "Chemistry and the Stars."

Friday, Sept. 29

9:00 a. m.—Symposium on non-ferrous metallurgy:

H. M. St. John: "The Influence of the Electric Furnace on the Metallurgy of Non-Ferrous Metals."

E. A. Smith: "Modern Developments in the British Brass Industry."

T. F. Baily: "Resistance Type of Electric Furnace in the Melting of Brass and Other Non-Ferrous Metals."

N. K. B. Patch: "Comparison of Electric Furnace Practice with That of Fuel Fired Furnace Practice."

H. A. DeFries: "Electric Silver Melting."

F. C. Thompson: "Electric Furnace Melting of Nickel-Silver."

H. A. Winne: "Recent Developments in Electric Furnaces of the Muffled Arc Type."

J. G. Thompson: "Electric Furnace Purification of Zirkite."

M. L. Hartmann and W. A. Koehler: "Physical Characteristics of Specialized Refractories. Part IV. Cross Breaking Strength at 20 and 1350 deg. C."

8:00 p. m.—Lecture by Col. T. S. Woolsey, Jr., on "Practice of Forestry on National Forests," to be held in the music room of the Forest Clubhouse.

Saturday, Oct. 1

9:00 a. m.—Symposium on electrodeposition:

F. A. Lidbury and F. A. Stamps: "An Electric Steam-Generator for Low Voltage."

W. E. Hughes: "Researches on the Electrodeposition of Iron."

T. R. Briggs: "Electrolytic Solution and Deposition of Copper."

W. R. Ingalls: "Electrometallurgy of Zinc."

C. J. Wernlund: "Deposition of Zinc from the Zinc Cyanide Solution."

Wm. Blum and H. E. Haring: "The Electrodeposition of Lead-Tin Alloys."

Wm. Blum: "The Structure and Properties of Alternately Electrodeposited Metals."

Directors of the American Iron and Steel Institute have presented to the Butler Art Institute at Youngstown, Ohio, a bronze bust of Joseph G. Butler, Jr., long a member of the board of directors of the Institute. The bust is the personal gift of the directors, for whom Willis L. King, vice-president Jones & Laughlin Steel Co., Pittsburgh, acted in making the presentation. The speech of acceptance was by James A. Campbell, president Youngstown Sheet & Tube Co., and also a director of the American Iron and Steel Institute. The bust is a replica of the representation of Mr. Butler which stands in the McKinley Memorial Building at Niles, Ohio, both being the work of J. Massey Rhind, New York sculptor.

A course in labor and employment management for Thursday evenings, beginning Sept. 22, is announced by New York University by its department of business management, School of Commerce, Accounts and Finance, 32 Waverly Place, New York. The course is to be conducted by J. D. Hackett, who has been identified with industrial establishments and later on his own account as labor consultant.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.70c. to 1.80c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.20 to $2.50
Large boiler rivets.....2.35 to 2.60
Small rivets ....65, 10 and 10 to 65, 10, 10 and 5 per cent off list
Machine bolts, small, rolled threads,
70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer,
65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads..70 and 5 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts .....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....60, 10 and 5 per cent off list
Larger and longer sizes.....60 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped..... 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts..... 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38 to $41; chain rods, $38 to $41; screw stock rods, $43 to $46; rivet and bolt rods and other rods of that character, $38 to $41; high carbon rods, $46 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.40 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.65 to $2.75 base; 5/16-in., $2.65 to $2.75 base. Boat and barge spikes, $2.65 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.60c. to 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 3½	+22½
¼ to ⅜	53½	27	½	36½	18½
½	58½	44	¾	42½	27½
¾	62½	50	1 to 1½	44½	29½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	39½	25½
2½ to 6	60½	48	2½ to 6	42½	29½
7 to 12	57½	44	7 to 12	40½	27½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 4½	+37½
¼ to ⅜	49½	32	½	35½	23½
½	55½	44	¾	42½	28½
¾	60½	49	1 to 1½	44½	30½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	40½	27½
2½ to 4	58½	47	2½ to 4	43½	31½
4½ to 6	57½	46	4½ to 6	42½	30½
7 to 8	53½	40	7 to 8	35½	23½
9 to 12	48½	35	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.15	Nos. 11 and 12	2.35
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.45
		Nos. 15 and 16	2.55

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.45	No. 28 (base)	2.75
Nos. 22 to 24	2.50	No. 29	2.80
Nos. 25 and 26	2.65	No. 30	2.95
No. 27	2.70		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75	Nos. 25 and 26	3.45
Nos. 12 to 14	2.85	No. 27	3.60
Nos. 15 and 16	3.00	No. 28 (base)	3.75
Nos. 17 to 21	3.15	No. 29	4.00
Nos. 22 to 24	3.30	No. 30	4.25

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55	No. 28 (base)	2.75
Nos. 17 to 21	2.60	No. 29	2.80
Nos. 22 to 24	2.65	No. 30	2.80
Nos. 25 to 27	2.70	Nos. 30½ and 31	2.85

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Sept.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
7	12.00	11.75	27.25	4.50	4.30	4.70	4.20
8	12.00	11.87½	27.00	4.50	4.30	4.70	4.20
9	12.00	11.87½	26.50	4.60	4.40	4.70	4.20
10	12.00	12.00	....	4.60	4.40	4.70	4.20
12	12.25	12.00	26.62½	4.60	4.40	4.70	4.20
13	12.25	12.00	26.75	4.60	4.40	4.70	4 20

New York

NEW YORK, Sept. 13.

The tone of all the markets continues to improve without much increase in buying. Prices for copper have advanced, but buying is not large. The tin market continues quiet, but a little easier. There is a steady demand for lead and prices have again advanced. Buying of zinc has improved only a little, but prices are a shade firmer.

Copper.—There has been a marked improvement in the asking price of sellers not only in the last week, but in the last two or three weeks; the disappointing feature, however, is the absence of domestic buying. Inquiry is fairly good from such sources, but it does not develop into much business. This week a still better feeling is reported and representatives of brass interests state that there has been an improvement in their business. It is also pointed out that the large quantities of scrap brass have been largely consumed so that the outlook for the copper market is better. Electrolytic copper for early delivery is quoted at 12.25c., delivered, or 12c., New York, for early delivery, by some sellers, with others still out of the market. Forward positions are ⅛c. to ¼c. higher. Lake copper is largely nominal at 12.25c., New York. Buying for foreign consumption is and has been good, particularly by Japan and Germany.

Tin.—The week has been dull and uninteresting, and transactions have been very light. For the most part prices here have ruled below parity in London, so that there has been a little buying from that market. On the New York Metal Exchange 50 tons of spot Straits tin has been sold for future shipment at 27c. for July-August shipment and 26.62½c. for December delivery. The London market to-day was about £5 per ton lower than a week ago, with spot standard quoted at £156 12s. 6d. future standard, £158 15s. and spot Straits at £157 7s. 6d. per ton. Spot Straits, New York, to-day was quoted at 26.75c. Arrivals thus far this month have been 2075 tons, with 2085 tons reported afloat.

Lead.—Again last week the American Smelting & Refining Co. advanced its price 10 points, to 4.60c., New York and St. Louis. Quotations in the outside market are 4.60c., New York, or 4.40c., St. Louis. A steady business is reported in both markets, and it is rumored that on this last advance in price heavy buying followed, with the result that the leading interest is not now so keen for business as recently.

Zinc.—Prime Western for early delivery is quoted at 4.20c. to 4.25c., St. Louis, or 4.70c. to 4.75c., New York, for early delivery. While the tone of the market has improved, actual buying has not increased, but the number of sellers at concessions has diminished so that the market can be regarded as firmer.

Antimony.—Wholesale lots for early delivery are quoted at 4.40c., New York, duty paid, with the market quiet.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable from importers at 19c. to 20c., New York, duty paid, while the same grade from the leading domestic producer is quoted at 24.50c., f.o.b. plant, for wholesale lots for early delivery.

Old Metals.—The market is firm and values are higher. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.875
Lead, heavy	4.00
Zinc	3.00
Lead, tea	3.00

Chicago

Sept. 13.—Copper and lead have advanced, while tin has declined. Copper has stiffened principally because stocks in second hands are gone and producers refuse to sell at concessions. The advance of the leading lead producer has carried this metal upward and has induced some buying. In general, the metals are very quiet. Old metal prices remain unchanged. We quote in carload lots: Lake copper, 12.50c. to 12.75c.; tin, 28c. to 28.50c.; lead, 4.50c.; spelter, 4.30c. to 4.35c. in less than carload lots; antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Sept. 13.—The non-ferrous markets continue dull. Lead and zinc are slightly higher. We quote lead at 4.40c., carlots, and zinc at 4.25c. We quote Lake copper at 12.73⅝c. to 12.86⅛c., carlots; tin, 27.36c., and antimony, 5.23½c. In old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Germans Lowest Bidders on Cars and Pumps

WASHINGTON, Sept. 13.—Based on the value of 70.42c. for the gold peso, quoted yesterday, the German makers bid the equivalent of $2,706, American makers $3,225, Belgian makers $3,521 and British makers $4,154 each on small freight cars for the South American market. On pumps the Germans were also lowest at 400 paper pesos each. The lowest American bid was 830 pesos and the lowest British bid 1,618 pesos. In a cable to the Bureau of Foreign and Domestic Commerce, Commerce Attache Edward F. Feeley, Buenos Aires, cautions American makers against too much emphasis being put on price, because quantity, quality, delivery, terms and credit arrangements are not ignored. In these respects American bidders are on at least an even footing with European competitors, and are making better price terms than any of them, with the exception of those in Germany.

Gain in British Pig Iron and Steel Output in August

(By Cable)

LONDON, ENGLAND, Sept. 13.—The production of pig iron in August was 93,600 gross tons and of steel ingots and castings 432,600 tons.

These figures compare with an output of only 800 tons and 10,200 tons of pig iron in June and July respectively and with 2700 tons and 117,200 tons of steel ingots and castings in the same two months respectively. The August steel output of 432,600 tons compares with 483,500 tons and 493,400 tons in February and January respectively. In steel output the industry is rapidly recovering from the paralyzing effect of the coal strike.

LOWER MILL WAGES

Average Reduction of Sheet and Tin Mill Workers Is 41.25 Per Cent from War Peak

YOUNGSTOWN, OHIO, Sept. 13.—Average price of tin plate shipped during July and August by mid-Western mills subscribing to the wage agreement with the Amalgamated Association of Iron, Steel and Tin Workers, was $5 per base box, as disclosed at the bi-monthly settlement here Sept. 12. The subscribers represent the bulk of the independent capacity of the country, and the average price indicates that there has been considerable difference in sales of the constituent companies. The spread on shipments has been from $4.75 to $5.25 per base box.

Two months before, the average price on tin plate shipments was $5.95. There is a difference, therefore, of 19 points in the average price of tin plate in the periods covered, which involves a reduction of 19 per cent in the tonnage rate to be paid affected workers during the September-October period. Under the new annual agreement, the tonnage rate rises or falls at the rate of 1 per cent for each 5c change in selling price. Under last year's agreement, the change was made at the rate of 1⅛ per cent.

Under the new rate, tin mill workers will still be 30 per cent. above base, though 36 per cent. below the peak rate paid during the war.

The average invoiced price of Nos. 26, 27 and 28 gage black sheets was found to be 3.10c per lb., as compared with 3.85c two months ago, and involves a reduction for affected workers of 15 per cent. Union sheet mill employees will be paid 28½ per cent. above base in September and October, but will be 38.5 per cent. under the peak rates paid during the war.

James H Nutt, secretary of the Western Sheet & Tin Plate Manufacturers' Association, acted for the employers, while M. F. Tighe, president of the Amalgamated Association, represented the employees.

Under normal conditions, 25,000 workers would be affected by the agreement.

Mr. Nutt has compiled a statement showing the percentage of reduction from the peak rates for the following operations: Puddling, 51 per cent.; heavy scrap rolling, 52 per cent.; muck rolling, 50 per cent.; heating piles on boards, 42 per cent; knobbling, 40 per cent; bar mill heating and roll hands. 48 per cent; guide mill, base sizes, 41 per cent.; guide mill extras, 44 per cent.

The average reduction on the above and for sheet and tin mill workers, is 41.25 per cent., from the war peak rates.

Plant Activities

Several departments of the Eagle Lock Co., Terryville, Conn., which have been operating on short time, have resumed a 54-hr. per week schedule.

The E. D. G. Jones & Sons Co., Pittsfield, Mass., paper making machinery, for the second time this year has reduced wages of its 250 employees 10 per cent.

The Westfield Mfg. Co., Westfield, Mass., bicycles and motorcycles, which has been operating with a curtailed working force and on short time, has resumed production in all departments.

Largely because of the difficulty in securing automobile bodies, the reopening of the Rolls-Royce of America, Inc., Springfield, Mass., plant was postponed from Sept. 6 until Oct. 1.

The 350 piece workers of the L. S. Starrett Co., Athol, Mass., tool manufacturer, have been notified of a reduction of 10 per cent in their rate of pay. The plant is operating 3½ days a week.

The Millers Falls Co., Millers Falls, Mass., maker of small tools, is operating its plant 50 hr. per week instead of 48 hr. as heretofore. It will not be operated Saturdays for the present and only a limited number of employees has been taken on.

The Graton & Knight Mfg. Co., Worcester, Mass., manufacturer of belting, has adjusted wages to equalize rates of pay. Some employees receive as much as heretofore, while others have had a slight reduction in wages. The plant is operating every week-day and employing about 900.

Smith & Wesson, Springfield, Mass., makers of firearms, scheduled to reopen Sept. 6, remain closed. Harold Wesson, president, states that business, although getting back on a sounder basis, does not warrant the plant's resuming operations. It is possible it will reopen within a month.

More than 1000 employees of the Royal Typewriter Co., Hartford, Conn., reported for work last week. Eight departments are working on a 5-day and the rest on a 4-hr. day per week schedule. The management plans to increase the number of working hours within the near future. The plant had been closed three weeks.

Little Change in Refractories Market

PITTSBURGH, Sept. 12.—The refractories market does not change much. In almost all consuming districts demands are purely hand-to-mouth. Blast furnace interests and steel companies are taking on merely such supplies as are actually needed; most of them have stocks and are drawing from them and are purchasing only for replenishment. Since manufacturers are supplying such demands from their own stocks, plant activities are largely on special sizes and shapes not ordinarily carried in stock. It is doubtful if fire clay and silica brick works, taking the country as a whole, are as much as 20 per cent engaged. In all producing districts there are idle plants, while part time operations rule at those which are running. Conditions both as regards demand and plant activities reflect closely those now prevailing in the iron and steel industry. There has been no change in public quotations of the several kinds of brick, which for the most part are nominal. Sizable orders undoubtedly would lead to price concessions.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $40.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 42.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		65.00
Chrome Brick:		
Standard size, per net ton		52.00

Steel Corporation's Orders Decrease

Unfilled orders on the books of the United States Steel Corporation Aug. 31 were 4,531,926 tons, compared with 4,830,324 tons on July 31. This is a decrease of 298,398 tons, and compares with one of 287,544 tons in July, 364,619 tons in June, 362,737 tons in May, 439,541 tons in April, 649,102 tons in March, 639,297 ton sin February, and 574,958 ton sin January, and represents the thirteenth consecutive monthly decrease reported. The unfilled tonnage a year ago was 10,805,038 tons, or 6,273,112 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28	6,933,867	9,502,081	6,010,787	9,288,443
Mar. 31	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30	5,845,224	10,359,747	4,800,865	8,741,882
May 31	5,482,487	10,940,465	4,282,310	8,337,623
June 30	5,117,868	10,978,817	4,892,855	8,918,866
July 31	4,830,324	11,118,468	5,578,661	8,883,801
Aug. 31	4,531,926	10,805,038	6,109,103	8,759,042
Sept. 30		10,374,804	6,284,638	8,297,905
Oct. 31		9,836,852	6,472,668	8,353,293
Nov. 30		9,021,481	7,128,330	8,124,663
Dec. 31		8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

PERSONAL

Norman Allderdice, formerly in charge of the open-hearth department of the Lorain, Ohio, plant of the National Tube Co., became sales manager for the Pittsburgh and Cleveland districts of Manning, Maxwell & Moore, Inc., on Sept. 1, succeeding Robert A. Bole, vice-president and manager of the Pittsburgh district, who died about four months ago. Under Mr. Allderdice's management the open-hearth department made a splendid record. He carries with him to his new position a knowledge of steel plant machinery and equipment. He is the son of Taylor Allderdice, vice-president National Tube Co. His headquarters will be maintained at 1005 Park Building, Pittsburgh. He is a member of several Pittsburgh clubs, including the Duquesne Club and the Pittsburgh Athletic Club Assocation. H. J. Hair, who has been office manager of the Pittsburgh office, becomes district sales manager for the Pittsburgh territory and E. W. Winship remains as district sales manager in Cleveland.

F. V. Archer, formerly manager of Naumburg & Co., New York, has assumed the duties of vice-president in charge of finance, cost and expenditures of the Thacher Propeller & Foundry Corporation, Albany, N. Y.

G. A. Thompson and J. R. Hussey announce that their interests in the Thompson Machinery Co. have been purchased by the Brown & Zortman Machinery Co., Second Avenue, Pittsburgh, with which company they will in the future be identified.

E. S. Gregg, formerly of Galveston, Tex., but more recently of New York, has begun work as chief of the transportation division of the Bureau of Foreign and Domestic Commerce. He is a graduate of Austin College, Tex., and he took a graduate course in transportation at the University of Chicago. During the war he was connected with the shipping section of the general staff of the War Department. Since the war he has been associated with the American International Corporation as adviser on shipping conditions.

Commander R. C. Hilliard, construction officer, Charlestown (Boston) Navy Yard, has been assigned as construction officer of the Atlantic fleet and reported for duty at Newport, R. I., Sept. 10.

Frank J. Fahey, vice-president Gillette Safety Razor Co., Boston, has returned from a business trip to Europe. He says business conditions are better than a year ago.

Col. Elmer H. Havens, of the steel jobbing firm of Hunters & Havens, Bridgeport, Conn., has been elected president of the Locomobile Co. of America, Bridgeport. Frank R. Hickman is associated with Colonel Havens as vice-president and treasurer. With this change in the officiary of the company the Locomobile Co. also is wholly divorced from Hares Motors, Inc., which had charge of manufacturing and selling the automobiles made at the Locomobile plant.

Ogden R. Adams, machinery merchant of Rochester, N. Y., has been elected president and general manager of the Seneca Falls Mfg. Co., Seneca Falls, N. Y., manufacturer of Star and Adams Short-Cut lathes. Mr. Adams still remains at the head of, and actively identified with, his Rochester business in machinery and equipment.

Oscar J. Maynard, sales department, Langelier Mfg. Co., Arlington, Cranston, R. I., special machinery and tools, has resigned to engage in business for himself. He is succeeded by William R. Renton.

Vernon Campbell, formerly with the Boston office of the Becker Milling Machine - Whitcomb-Blaisdell Machine Tool - Reed-Prentice companies, has associated with the Boston office of the South Bend Lathe Works.

G. E. Sanford, safety engineer General Electric Co., and president American Society of Safety Engineers, will speak on "Foundry Hazards and Safeguards" at the first fall meeting of the New England Foundrymen's Association, Wednesday, Sept. 14, at the Exchange Club, Boston. N. M. Du Chemin, secretary General Electric Co., Lynn., Mass., works safety committee, will address the association members on "Selling Safety."

E. Howard Green has been made chairman of the Worcester, Mass., executive committee of the American Society of Mechanical Engineers, and Harry M. Latham, secretary and treasurer.

John F. Tinsley, manager Crompton & Knowles Loom Works, Worcester, Mass., has been made permanent chairman of a mayor's committee appointed to cooperate with the Worcester branch, National Safety Council in connection with a safety week in Worcester, Sept. 26 to Oct. 3.

George Washington Brown, vice-president and chairman finance committee, United Shoe Machinery Corporation, Boston and Beverly, Mass., last week celebrated his eightieth birthday. Officers and employees of the corporation filled his office with flowers.

Joseph J. Wilson, gray iron foundry manager for the Saginaw Products Co. division of the General Motors Corporation, Saginaw, Mich., has resigned to enter business in Detroit.

Robert S. Fowler, formerly assistant sales manager of the Northway Motor & Mfg. Co. division of the General Motors Corporation, and prior to that for six years with the Anderson Electric Co., Detroit, has been made district representative of the Wheel Trueing Tool Co., Detroit. He will include in his district the territory in southeastern Michigan and Toledo, Ohio. E. F. Robinson, who has been with the company as sales manager, has resigned to resume the practice of law in Ravenna, Ohio.

James A. Campbell, president Youngstown Sheet & Tube Co., Youngstown, Ohio, celebrated his 67th birthday on Monday. Mr. Campbell was born in Ohltown, Trumbull county, Ohio, Sept. 11, 1854. He received messages of felicitation from a wide group of associates in the steel industry.

George B. Bell, Jamaica, N. Y., has been appointed chief of the agricultural implements and vehicles division of the Bureau of Foreign and Domestic Commerce. He was with B. F. Avery & Sons, Louisville, Ky., engaged in export work for 20 years. He was later director of foreign sales with Bateman & Companies, New Jersey. He has traveled in many sections of the world, building up markets for American agricultural implements, and has had experience in this country in manufacturing, traffic, field demonstration, advertising and sales, etc.

William Knudsen, formerly of the Ford Motor Co., has joined the Ireland & Matthews Mfg. Co., Detroit, machinist and sheet metal goods manufacturer, as general manager.

The Bureau of Foreign and Domestic Commerce has announced the appointment of Dr. Samuel McClintock of Chicago as editorial adviser of the new commodities division, which among other things will be concerned with investigations of importance to the major industries. Dr. McClintock is an editorial writer and political economist. Some years ago he was consul in Latin America. He goes to the bureau in Washington from New York, where he was a consulting editor of the McGraw-Hill Book Co. and a lecturer in applied economics at the College of the City of New York.

George A. Armes, recently resigned as president and general manager of the Moore Shipbuilding Co., San Francisco, and Joseph Moore, vice-president of the company, was chosen as his successor. For the war effort Mr. Armes was loaned to the Shipping Board by the Bethlehem Shipbuilding Co. and later became head of the Moore company.

OBITUARY

CHARLES F. BRAGG, president N. H. Bragg & Sons, Bangor, Me., iron and hardware, died at his home in that city Sept. 11 in his seventy-first year. Since its inception, Mr. Bragg was actively associated with the New England Iron and Hardware Association, and probably was one of the most widely known New England iron and steel merchants. He was born in Dixmount, Me., but resided most of his life in Bangor. He served that city as mayor for three terms. Mr. Bragg was one of the promoters of the Bangor & Aroostook Railroad Co., was president of the Orono Pulp & Paper Co., and was interested in various other business enterprises.

RAYMOND SEARING BALDWIN, formerly of J. H. Williams & Co., makers of drop forgings, died at his summer home near Westerly, R. I., from heart disease, Sept. 3, after an illness of several months. He retired from active work last spring, being at the time controller and assistant treasurer of the company. As assistant to the president he had charge of the design and erection of the company's Buffalo plant. He was graduated from Stevens Institute in 1903 and for some time was connected with the Carbon Steel Co., Pittsburgh, as an engineer.

MATTHEW M. SWEENEY, general manager and secretary Fairmount Foundry & Engineering Works, Woonsocket, R. I., died Sept. 7 at his home there following a long illness. He was graduated from Brown University in 1906, and was a member of the American Society of Mechanical Engineers and other societies. He was born in Woonsocket 43 years ago.

MORRIS S. WRIGHT, president and general manager M. S. Wright Co., Worcester, Mass., maker of vacuum cleaners, died Sept. 5 of peritonitis. He was born in Janesville, Wis., June 11, 1859.

CHARLES W. DAVIS, vice-president Standard Underground Cable Co., Pittsburgh, died Sept. 11, in Memorial Hospital, New York, where he had gone for special medical treatment. He was born in Pittsburgh 48 years ago. He received his early education in the Pittsburgh public schools and was graduated from the Western University of Pennsylvania, now the University of Pittsburgh, later taking special courses at the Massachusetts Institute of Technology. He made his home in Sewickley, Pa.

CHARLES WILLIAM ELDREDGE, for several years associated with the Chapman Valve Mfg. Co., Springfield, Mass., and recently in charge of the H. W. Johns-Manville Co., Montreal, branch, died Sept. 9 at his home in East Longmeadow, Mass.

HENRY ELIOT, JR., president Eliot Frog & Switch Co., East St. Louis, Ill., died Sept. 9 at his home in St. Louis, from the effects of a cerebral hemorrhage sustained five months ago. He was born 67 years ago in Cincinnati, where he was educated in the public schools, and went to St. Louis in 1881. He was at one time engaged in the manufacture of railroad supplies, and about 15 years ago became president of the frog and switch company, in which he was active until he was stricken. He was a member of the Masonic fraternity. He is survived by two daughters, Mrs. Edward Mallinckrodt, Jr., and Miss Georgia Eliot. The funeral took place on Sept. 12.

RICHARD B. CARRAN, president R. B. Carran & Sons Co., brass manufacturer, Ludlow Ky., died at his home in that city recently. He was also president of the Ludlow Savings Bank, and a director of the Covington Bank & Trust Co. He was born on the Isle of Man, 63 years ago and came to America at the age of 14. He was employed by the Southern Railway in Cincinnati for 25 years.

WILLIAM HENRY WARRINGTON, president of the Vulcan Iron Works, Chicago, died Aug. 11.

WILLIAM BAXTER MYERS, treasurer Bethlehem Fabricators, Inc., Bethlehem, Pa., died Friday, Sept. 2.

Gain in August Steel Ingot Output

The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in August of 1,138,071 gross tons as compared with 803,376 tons in July, and with 1,003,406 tons in June. The increase, which is the first since last October, was 334,695 tons or 41.6 per cent. Estimating the production of other companies on the basis of those reporting, the total output of ingots in August was 1,351,628 tons, or 50,060 tons per operating day, counting 27 working days in August, against an estimated total of 954,128 tons or 38,126 tons per day for the 25 operating days in July. This is an increase of 397,500 tons or 11,934 tons per day, representing 31.3 per cent increase in the rate of production. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920..	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920...	26,197,843	8,112,753	121,656	34,432,252
January, 1921...	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071

The August ingot production was at the yearly rate of 15,568,660 tons, counting 311 operating days to the year. This compares with a rate in July of 11,857,186 tons, in June of 14,824,437 tons, in May of 17,980,465 tons, in April of 17,242,773 tons and in March of 21,258,405 tons.

The increase of 397,500 tons in the estimated ingot output of all companies in August from that in July compares with an increase of 89,638 tons in the August pig iron output over that of July.

Sligo Furnace to Be Abandoned

The Sligo Furnace Co., St. Louis, Mo., recently blew out its charcoal furnace at Sligo, Dent County, Mo., and it is announced that the furnace will be abandoned. The shut-down is due to the exhaustion of the timber on which the company had depended for its charcoal supply. The uncut timber remaining in the district is too far distant to be transported advantageously. A hamlet of 400 persons has been built up about the furnace and now that the sole industry of the place has stopped most of the inhabitants will go to other districts. The buildings of the town are owned by the Sligo Furnace Co., including a school and a church. The Sligo furnace was built in 1880 by W. F. Crawford and others and was rebuilt in 1891. Its last relining was in 1919. The product was warm blast charcoal pig iron and the annual capacity was 20,000 tons. A considerable part of the output was taken by the American Car & Foundry Co.

The Society of Visual Education of Chicago is making a comprehensive series of motion pictures of milling machine operations in the plant of the Kempsmith Mfg. Co., Milwaukee. The films are being prepared for Governmental purposes for use in vocational education at rehabilitation and industrial schools.

An increase of 13,273 freight cars loaded with revenue freight during the week ended Aug. 27, as compared with the previous week, is shown by reports to the American Railway Association. The total for the week was 829,709 cars, the largest week's loading since Dec. 11, 1920, but 171,599 less cars than were loaded in the same week of August last year.

FAR EAST ACTIVE

British Colonies Interested in Railroad Material—Spanish Ore at $4.50 Per Ton Atlantic Port

NEW YORK, Sept. 13.—Export activity is still confined to Japan and other Far Eastern markets. Japanese purchases of cathode copper are still fairly large and there is an active interest in tin plate, black and galvanized sheets, wire and bars in small quantities. From the British colonies there is a continued brisk demand for railroad material and rolling stock. Several inquiries have recently appeared in the market for small tonnages of rail equipment and locomotives from these sources. Mining interests in South Africa, Australia and Mexico have recently shown an interest in light railroad equipment, locomotives and cars.

There have been some fairly large transactions in electric equipment to be used in the electrification of the Japanese railroads. Sheet buying, however, continues to lead in the Japanese purchases. One inquiry, being handled by a New York branch of a London export house, calls for a total of 1200 tons of black sheets and blue annealed ranging from No. 18 to No. 31 gage. Considerable difficulty has been encountered by this exporter in obtaining quotations from mills on the portion, totaling about 100 tons, of No. 30½ or No. 31 gage sheets 36 x 72 in., packed 13 to the bundle. Inquiry will probably be made in about six weeks by the purchasing agent of the George A. Fuller Co. of the Orient, New York, for a small tonnage of reinforcing bars for a $500,000 reinforced concrete building, which that company is erecting in Kobe, Japan.

Two new iron works are reported recently organized in Japan, the Niniwa Iron Works and the Tanaka Iron Works, both in Osaka, to manufacture machinery and boilers. The latter company is capitalized at 100,000 yen. The Aki Shoji Co., with a capital of 200,000 yen, has been organized in Osaka to deal in pig iron and steel. In view of the large stocks of pig iron in Japan, the stock of the Government iron works alone totaling 196,225 tons, it is reported by the *Far Eastern Review* that no more iron will be imported during the current year.

Chinese Locomotive Purchases

According to reports, the recent public opening of the tenders on 41 locomotives and 300 cars for the Chinese railroads, purchased by the Railway Car Loan Chinese Banking Group, was the first time that a government letting had been opened in public. Only two Mikado type locomotives were awarded to an American builder. These went to the American Locomotive Co. at $52,000 each. Thirty Prairie type locomotives were awarded to the Societe Belge pour L'exportation Industrielle, which represents the Forges Usines et Fonderies de Haine-St. Pierre, the Ateliers Metallurgiques Tubize and the Societe Franco-Belge a la Croyere in Belgium. The six English type locomotives were also placed with this company. The cars were awarded to Fearon, Daniel & Co., representing the Compagnie Centrale de Construction a Haine-St. Pierre.

European prices continue low. An exporter who submitted a bid on 1500 tons of steel bars for Japan based on 1.50c. per lb. Pittsburgh, lost the order. One exporter in New York reports recent sales of black sheets totaling about 350 tons to the Philippines and China.

In line with recent reports that foreign iron ore can be imported profitably, an exporter and importer in New York is now prepared to offer Garrucha ore from Garrucha, Spain, at about $4.50 per gross ton, f.o.b. cars New York. The analysis given is: Fe, 54.3; Mn, 1.77; S, 0.09; and P, 0.021.

Despite recent reductions of prices in Sweden, which have brought Swedish iron bars down to a price of about 6c. per lb. or less c.i.f. New York, carriers of stocks of this material in the United States see slight prospect of any but the most meager sales, as the demand is exceedingly light since the war period when it was impossible to obtain Swedish iron and consumers were forced to resort to substitutes.

British Iron and Steel Market

Continental Prices Still Stiffening—British Position Improves, But Orders Badly Needed

(*By Cable*)

LONDON, ENGLAND, Sept. 13.

Pig iron buyers are awaiting lower prices. There is a better demand for hematite, and more export inquiry, but the price has been reduced, owing to German competition.

Foreign ore is stagnant. Bilbao Rubio is nominally 28s. ($5.21) c.i.f. Tees.

British steelmakers are slightly better placed, but are still badly in need of orders. Continental prices are stiffening. German works are believed to have oversold, and trouble is expected in obtaining deliveries. German merchant bars are quoted up to £9 (1.49c. per lb.) f.o.b. for extended delivery. French merchant bars have sold at £8 2½s. (1.33c. per lb.) f.o.b., but £8 5s. (1.37c. per lb.) is now asked. Sellers of Belgian merchant bars ask up to £9 (1.49c. per lb.) f.o.b. Belgian joists (beams) are now sold at £8 5s. (1.37c. per lb.) f.o.b.

Inquiries are again coming from the Far East for important tonnages of steel wire, and German makers are full until January. Second-hands are being sold at £18 5s. (3.03c. per lb.) cost and freight to Japan, on basis of No. 8 gage, for December and January shipment.

Tin plates are easier, and there is little buying except by the Far East, which continues to make steady purchases. The Welsh output is from 25 to 30 per cent of capacity. Galvanized sheets are now sold by merchants to India at £19 15s. (3.28c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.72 per £1 as follows:

Durham coke, delivered	£1 15	$6.51	
Cleveland basic	7 7½ & £7 10*	27.45 &	$27.90
Cleveland No. 1 foundry	7 0	26.04	
Cleveland No. 3 foundry	6 15	25.11	
Cleveland No. 4 foundry	5 19	22.13	
Cleveland No. 4 forge	5 17½	21.85	
Hematite	7 0*	26.04	
East Coast mixed	7 0 & 6 15*	26.04 &	25.11
Ferromanganese	18 0 & 14 10*	66.96 &	53.94
Rails, 60 lb. and up	10 0 to 14 0	37.20 to	52.08
Billets	7 10 to 8 0	27.90 to	29.76
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.76 to	31.62
Tin plate base box	1 1½ to 1 3	4.00 to	4.28
		C. per Lb.	
Ship plates	13 0 to 14 0	2.16 to	2.32
Boiler plates	18 0 to 19 0	2.99 to	3.16
Tees	13 0 to 14 10	2.16 to	2.41
Channels	12 5 to 13 15	2.03 to	2.28
Beams	12 0 to 13 10	1.99 to	2.24
Round bars, ¾ to 3 in.	12 0 to 12 10	1.99 to	2.08
Galvanized sheets, 24 g.	20 0 to 20 10	3.32 to	3.40
Black sheets	16 0	2.66	
Steel hoops	14 5 & 14 0*	2.37 &	2.32
Cold rolled steel strip, 20 g.	26 10	4.40	

*Export price.

In the editorial on "The Inventor's Opportunity," in our issue of Sept. 8, the last sentence in the last paragraph but one, page 612, should have read: "Few inventions have a real commercial value until they have been put through a costly developing and refining process, and for that the buyer [of the patent] must pay."

The Chapman Valve Mfg. Co., Springfield, Mass., has put into effect a flat wage reduction of 10 per cent for office force as well as other employees. The company employs approximately 700 and has operated on full time without any reduction in its working force.

IRON AND INDUSTRIAL STOCKS

Substantial Recovery in Valuations Since Latter Part of August

That a more general feeling exists of business having reached the turning point is substantiated by the action of prices during the past week for iron and industrial stocks. In the more active securities, recoveries from quotations established in the latter part of August range from $5 to $20 a share. The rebound in inactive stocks naturally has been less. The fact remains, however, securities of practically every industry in the country are tending upward. To-day a small but real investment demand for securities exists, whereas a fortnight ago real liquidation was the keynote in the market for securities. The improvement in stock valuations apparently is largely based on the ability of industry to weather federal tax payments without disturbing the money market enough to influence the pending sale of Government securities; to the improved demand for iron and steel products; to the adjustment of labor to a basis where manufacturing costs, coupled with proposed protective tariffs, place our industries in a more favorable position as regards competition with foreign merchandise; to the recovery in the cotton market, which has revived business to some extent in the South; to Government financial aid to our farmers; and to the Government's efforts to place the railroads in a position to buy much needed equipment—all constructive business straws.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	32½- 33¾	Lackawanna Stl.	39 - 41⅞
Am. Can com....	26¾- 28½	Midvale Stl.....	24 - 25
Am. Can pf.....	80½- 80¾	Nat.-Acme	14 - 14½
Am. C. & F. com.	126½-133	Nat. E. & S. com..	33⅛- 34¾
Am. C. & F. pf..	108⅞-109	N. Y. Air Brake.	50 - 54⅞
Am. Loco com...	87⅝- 93½	Nova Scotia Stl..	23¾- 25½
Am. Loco. pf....	.. -104	Pressed Stl. com.	54 - 60
Am. Stl. Fd. com.	23⅞- 25	Pressed Stl. pf...	.. - 83
Am. Stl. Fd. pf..	.. - 80¾	Ry. Stl. Spg. com.	79¾- 84¾
Bald. Loco. com..	79⅞- 89½	Replogle Stl.....	22¾- 26½
Beth. Stl. com...	50 - 51	Republic com....	47½- 50½
Beth. Stl. Cl. B..	51 - 55	Republic pf.....	82 - 84¼
Beth. Stl. 8% pf.	98½- 99	Sloss com.....	35 - 37
Chi. Pneu. Tool..	50 - 52¼	Superior Stl.	29½- 30⅝
Colo. Fuel	24½- 25	U. S. Pipe com..	13½- 15¾
Cru. Stl. com....	57¾- 61¾	U. S. Pipe pf....	41¾- 43
Gen. Electric....	121½-126¾	U. S. Steel com..	75⅞- 79
Gt. No. Ore Cert.	28 - 28¾	U. S. Steel pf....	108⅞-109¼
Gulf States Stl..	34¾- 40	Vanadium Steel..	30⅜- 35⅝
Int. Har. com...	77 - 81	Va. I. C. & Coke.	65 - 66
Int. Har. pf.....	.. -101	Westingh'se Elec.	43⅝- 45¼

Industrial Finance

The Manufacturers Foundry Co., Waterbury, Conn., has issued $98,625 additional stock, increasing the outstanding capitalization to $295,875.

Stockholders of the Baush Machine Tool Co., Springfield, Mass., have voted to exchange the 12,500 outstanding common shares, par $100, for an equal number of shares of no par value, and to increase the common stock capitalization 37,500 shares, making the total authorized capitalization 50,000 shares of common stock, no par value, and 6100 preferred, par $100. Of the new common shares, 22,500 will be issued for all assets, except cash, of the Huron Metals Co.

The J. R. Stone Tool & Supply Co., 5009 Woodward Avenue, Detroit, has been adjudicated a bankrupt in the United States district court at Detroit. The first meeting of creditors will be held at 10 a. m., Sept. 13, at the office of the referees in bankruptcy in Detroit.

John F. Gerdis, trustee of the John Obenberger Forge Co., Milwaukee, bankrupt, who has been operating the plant by permission of the referee in bankruptcy for three months ending Sept. 12, has secured an extension of the permit to Oct. 31. His request was for a permit to operate until Jan. 12.

The A. P. Swoyer Co., merchandise stock, at 17 North Seventh Street, Philadelphia, has been purchased and the premises leased to the U. T. Hungerford Brass & Copper Co., 510 Arch Street, Philadelphia. Possession was taken by the Hungerford company Sept. 1.

The Motor Wheel Corporation, Lansing, Mich., has organized a steel wheel division, of which Roy F. Irvin has been made sales manager.

Office and Trade Changes

The Concord foundry, Elkhart, Ind., which has been owned by the Chicago Hardware Foundry Co. since Oct., 1919, will be known hereafter as Branch No. 6 of the Chicago Hardware Foundry Co.

The Worcester Brush & Scraper Co., Worcester, Mass., for many years located at 26 Southbridge Street, has removed to a new plant at 456 Park Avenue. Edward F. Fletcher is president.

The Connecticut Iron & Metal Co., Bridgeport, Conn., has filed a preliminary certificate of dissolution. Claims should be sent to Harry Danberg, 86 Savoy Street, that city.

Houghton & Richards, 145 Oliver Street, Boston, dealers in steel, have incorporated under Massachusetts laws as Houghton & Richards, Inc., with a capital of $200,000. Bryan R. Houghton, Stoneham, is president, and George A. Mahoney, 33 Egremont Road, Brookline, treasurer.

Blake, Long & Co., 77 Hurley Street, Cambridge, Mass., sheet metal workers, has been taken over by the Blake-Long Corporation, capitalized for $70,000, which has been granted a charter to manufacture and deal in heating apparatus, ventilation equipment, blower systems, dust collectors and to do a general sheet metal and machine shop business. John J. Shamrock, 26 Taft Avenue, Point Shirley, Mass., is president, and James A. Blake, 132 Baldwin Street, Cambridge, is treasurer.

The National Chain Co. has moved from College Point L. I., to Terry and Cortland streets, Belleville, N. J. The floor space occupied in the new location is 30,000 sq. ft., with room for expansion immediately available.

The Universal Equalizer Co., Cincinnati, has moved from 132 Opera Place to 8 East Pearl Street.

The Springfield Motor Specialties Co., Inc., Springfield, Mass., has been taken over by the Springfield Motor Specialties Co., a Massachusetts corporation capitalized for $100,000. Charles P. Whitall, 1446 Longmeadow Road, Longmeadow, is president, and John G. Waddell, 497 Belmont Avenue, Springfield, treasurer.

The Garlock-Walker Machinery Co., Ltd., wood working and metal working machinery, Montreal, is now located at No. 356 Hingston Avenue.

The Betts Machine Co., Inc., Rochester, N. Y., has opened a Pittsburgh district sales office at 1915 Oliver Building, where direct factory representatives will supply sales and engineering service to the trade. Betts heavy duty machine tools were manufactured at Wilmington, Del., from 1861 until 1918, when the business and organization was moved to its present plant at Rochester.

The New York office of Joseph T. Ryerson & Son, 30 Church Street, has been removed to the Jersey City warehouse, Westside Avenue and Carbon Place, Jersey City. Hereafter, only a small office will be maintained at the former address, in charge of H. R. Heneage, general manager. The telephone number will remain unchanged, all calls for the New York office hereafter going directly to the Jersey City warehouse, with which the New York branch is connected by private wires.

The Texas Supply Co., dealer in oil well supplies, boilers, engines, pumps, tanks, etc., has moved its plant to Houston, Tex., at Lorain and Semmes streets. The company has been in the business of buying and selling oil well machinery for about twenty years at Beaumont, Tex.

J. E. Haetten & Co., dealers in machine tools, contractors' machinery, etc., have absorbed the Engineering Equipment & Supply Co., and have moved from 299 Broadway to new offices at 30 Church Street, New York. Officers of the consolidated company are J. E. Haetten, president; F. C. Young, formerly president of the Engineering Equipment & Supply Co., vice-president; Herbert Wilson, secretary and treasurer, and C. A. Bergmann, chief engineer.

The Reliance Machine & Specialty Co., Boston, has completed arrangements for combining with the Union Machine Co., Fitchburg, Mass. The Reliance Company's Jamica Plain plant will be moved at once to Fitchburg, and combined with the plant of the Union Machine Co., where self-lubricating bushings and bearings will continue to be made. Hereafter, all communications should be addressed to the Reliance Machine & Specialty Co., in care of the Union Machine Co., Fitchburg, Mass.

The name of the Grover Bros. & Wood, manufacturers of the Grover pneumatic tube carriers, has been changed to the Grover Co. The change will in no way affect the status of the company or its personnel. The offices will remain at 428 East Jefferson Avenue, Detroit.

Manning, Maxwell & Moore, Inc., machine tool dealers, 27 North Jefferson Street, Chicago, are adding a line of machinist's supplies to their stocks in that city.

Machinery Markets and News of the Works

PROSPECTS IMPROVING

Machine-Tool Trade Sees More Signs of Activity

Buying Is Limited, but There Are More Inquiries and Sentiment Is More Cheerful

Sentiment is steadily improving and the machine-tool trade is confident that the worst of the depression is past. While purchasers of machine tools are still in very small volume, there is in most centers an increasing number of live inquiries, on which action is expected soon if the improvement in the business situation which has manifested itself becomes more widespread.

The New York and Chicago markets have been very dull the past week, but improvement appears in other sections. The Ansted Engineering Co., Connersville, Ind., bought 10 tools at Cincinnati, the Detroit, Toledo & Ironton, the Ford road, has purchased several tools and the American Steel & Wire Co. at Cleveland has revived a list of eight large tools, mostly lathes.

The International Bed Corporation, New York, has inquired for several new or used tools. The Driver-Harris Co., Harrison, N. J., has asked for prices on a few machines, but may not buy immediately. The Brooklyn schools are considering the purchase of 60 or 70 lathes and bids will be asked for as soon as the appropriation is granted. The New York school board opened bids on Monday for some 400 items, mostly machine shop supplies, but including a number of machine tools.

In New England, prospects are improving. Inquiries are small, but come from diversified industries, indicating possiby a fairly general resumption of fall activity.

A noteworthy feature is the larger inquiry for cranes, particularly for locomotive cranes. Electrical equipment is also showing some activity. One company has booked 100 special electric motors for United States Navy submarines.

Railroad inquiry is not prominent, but the Big Four is expected to close shortly on several tools. A list from the Sewell Valley Railroad covering several tools is still pending at Pittsburgh.

Some makers of shapers have reduced prices about 10 per cent. A Cincinnati manufacturer of portable electric drills has reduced prices on some types 10 per cent. A New York State manufacturer of measuring blocks and gages has made reductions of 10 to 15 per cent. A St. Louis manufacturer of grinding and polishing machines has put reductions of 10 per cent into effect.

New York

NEW YORK, Sept. 13.

A few more prospects for machine tools are appearing, but generally they are rather indefinite, buyers being in no mood as yet to hasten purchases. The trade believes that the worst of the depression has passed and that a gradual improvement in demand may be expected shortly. The Driver-Harris Co., Harrison, N. J., which is installing new rolling mill equipment, has sought prices on a number of machine tools, but purchasing may be deferred. The International Bed Corporation, 50 East Forty-second Street, New York, has inquired for a drill press, shaper, engine lathe and several single-spindle drills, either new or used. The Brooklyn school board is considering the purchase of 60 or 70 lathes, but the appropriation has not yet been made and it is not known how soon bids will be asked for. The New York City school board took bids up to Monday, Sept. 12, on some 400 items, mostly machine shop supplies, but including a number of machine tools. Prices on shapers have been reduced about 10 per cent by some makers.

While the crane market in this district continues dull with the exception of the cranes for the Stapleton, S. I., piers closing Oct. 4, other districts report greater activity, largely confined to locomotive cranes, derricks and hoists. A large manufacturer of electric hoists has booked an order for 40 electric hoists for a Japanese shipyard. An inquiry has been issued by Asano Bussan Co., 165 Broadway, New York, exporter, for a floating grab transporter for handling coal from lighters with a capacity of 100 to 150 tons. A steam shovel is also included in the inquiry, which is for shipment to Japan for harbor use. The Betts Supply Co., Syracuse, N. Y., has requested quotations on a 15 to 20-ton locomotive crane, new or second hand. The Porcupine Co., Bridgeport, Conn., is reported to be on the point of closing its inquiry for cranes. The Mayer Coating Machine Co., Rochester, N. Y., has purchased a 3-ton, 16-ft. span, hand power crane from an unnamed builder and the Phoenix Utilities Co., 71 Broadway, New York, has purchased a 4-ton electric hoist from the Roeper Crane & Hoist Works.

Among recent sales are: Industrial Works, a 15-ton, 40-ft. boom locomotive crane to Dwight P. Robinson, Inc., New York, for export to Brazil; a 100-ton wrecking crane to the Sewell Valley Railroad, Rainelle, W. Va., and a 40-ton locomotive crane to the Western Maryland Railroad, Baltimore, Md.; Roeper Crane & Hoist Works, a 4-ton electric hoist to the Phoenix Utility Co., 71 Broadway, New York.

V. Lowener, 114 Liberty Street, New York, desires quotations on looms for weaving fence wire.

The Air Reduction Co., 120 Broadway, New York, is having plans prepared by Francisco & Jacobus, 511 Fifth Avenue, architects, for its new plant on property recently acquired on Ridge Avenue, Pittsburgh, for the manufacture of commercial oxygen, etc. It will be one and two-stories, 80 x 140 ft., and is estimated to cost about $250,000 with machinery.

The Westchester Buckle Mfg. Co., Mt. Vernon, N. Y., has been incorporated with a capital of $30,000 by K. Dauber, H. Brindberg and Horace London, 302 Broadway, New York, to manufacture buckles and other metal specialties.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, will build two one-story coaling towers, 67 x 187 ft. high, at its new generating plant on Walnut Avenue, 133rd to 134th Street, estimated to cost about $200,000 with machinery. A one-story meter house will also be erected.

M. Hulbert, Commissioner of Docks, foot of Battery Place, North River, New York, will receive bids until Oct. 4 for furnishing and installing cranes, elevators and electric power transmission equipment at piers 12 and 13, Stapleton, S. I. The work will include new boiler plants.

The Royal Metal Furniture Co., 125 Eighth Street, Brooklyn, has plans in preparation for a new one-story factory at Eighth Street and Third Avenue. William Higginson, 18 East Forty-first Street, New York, is architect.

The Flynn Specialties Corporation, New York, has been incorporated with a capital of $200,000 by J. F. and A. L. Flynn, and S. M. Platt, 908 Brook Avenue, to manufacture spark plugs, ignition equipment, etc.

A. L. Cadle, Superintendent of Public Works, Capitol Building, Albany, N. Y., will receive bids until Sept. 28 for one three-ton electric burtoning crane, to be installed on the Barge Canal, Mott Haven, New York.

The Dexter Folder Co., 28 West Twenty-third Street, New York, manufacturer of printing machinery and parts, has awarded contract to the H. K. Ferguson Co., 25 West Forty-third Street, for its plant addition at Pearl River, N. Y., estimated to cost about $100,000.

The Quid Mfg. Corporation, Bay Shore, L. I., has been incorporated with a capital of $1,000,000 by W. S. Johnson and M. J. Bunce, to manufacture engines, motors and kindred products. It is represented by A. F. Wells, Bay Shore.

The Rice Foundation, 12 East Eighty-seventh Street, New York, in co-operation with the city of New York, will build a new one-story power house, 73 x 73 ft. at Pelham Bay

Park, estimated to cost about $25,000. Plans have been completed.

The Robert Bosch Magneto Co., New York, has been incorporated with a capital of $250,000, to manufacture magnetos, spark plugs, starting and lighting systems. It is headed by the former officers of the Bosch Magneto Co., and has established offices at 123 West Sixty-fourth Street. Plans are under way for the early establishment of works in the vicinity of New York, and if possible an existing building will be acquired. Otto Heins is president; Guenther Jahn, treasurer, and Harvey T. Andrews, secretary. The last noted will also act as attorney for the company and maintains offices at 115 Broadway.

R. M. Mansfield, Inc., Babylon, L. I., has been incorporated with a capital of $30,000 by C. P. and S. A. Daly, and W. R. Cleary, Babylon, to manufacture electrical equipment, mechanical products, etc. It is represented by J. T. Cuff, 2 Wall Street, New York.

The Austin Estate, 2406 First Avenue, New York, has filed plans for a one-story forge shop, 50 x 100 ft., at 405 East 123rd Street.

The Ball Compass Co., New York, has been incorporated under Delaware laws with capital of $300,000 to manufacture marine and aeromarine instruments and other precision equipment. It is represented by the United States Corporation Co., 65 Cedar Street.

The Greenpoint Metal Covered Door Co., 13 McKibben Street, Brooklyn, has removed its plant to the factory at 538-44 Porter Street for increased operations.

Simon Gasner & Sons, 1870 Pitkin Avenue, Brooklyn, pipe, plumbing fixtures, etc., have awarded contract to the Turner Construction Co., 242 Madison Avenue, New York, for a new two-story and basement building, 105 x 260 ft., in the vicinity of their present works.

F. C. Schwab, New York, care of Simpson, Thacher & Bartlett, 62 Cedar Street, has leased for 21 years the United States Engineering Corps terminal property at Kearny, N. J., comprising about 30 acres with buildings totaling about 30,000 sq. ft. of space. The new owner is organizing a company to establish an industrial terminal at this location, with a portion of the property devoted to the manufacture of automobiles and automotive equipment. Other industrial plants will also be established.

The Star Machine & Novelty Co., Bloomfield, N. J., has been incorporated with a capital of $100,000 by John Brach, John Cionek and Anthony E. Zaga, 77 Mill Street, to manufacture electric motors and parts, and other machinery.

The Titan Miniature Lamp Co., Orange, N. J., has been incorporated with a capital of $100,000 by George Anderson, Dexter G. Dittell and Alfred J. Grosso, 308 Main Street, to manufacture electric lamps and other electrical products.

The White Metal Mfg. Co., Grand Street, Hoboken, N. J., has completed plans for a new one-story factory on Grand Avenue. Joseph C. Schaeffler & Co., 11 East Fifty-sixth Street, New York, are architects.

The M. W. Kellogg Co., 117 Westside Avenue, Jersey City, N. J., manufacturer of piping, power plant equipment, etc., has filed plans for a one-story addition on Hackensack Avenue, estimated to cost about $11,600.

The Christopher Marine Chain Propeller Corporation, Rahway, N. J., has been incorporated under Delaware laws with capital of $350,000 by Edwin S. and Charles F. Gale, Port Richmond, N. Y., and William B. Christopher, Rahway, to manufacture chains and other equipment for marine service.

The Borough Council, Sea Girt, N. J., will build a new one-story automobile service and machine repair works for municipal automobiles. Plans have been prepared.

A one-story power house, 75 x 80 ft., will be built by the Clark Thread Co., Clark Street, Newark, at its new bleaching works on Broad Street, Bloomfield, N. J.

The New Jersey Die Casting Co., Newark, has been incorporated with a capital of $310,000 by Gunnar Anderson, A. Roy Myers and James Beakbame, 16 Washington Avenue, Irvington, N. J., to manufacture die-castings, dies and other mechanical products.

The J. K. Osborne Mfg. Co., First Street, Harrison, N. J., manufacturer of metal products, has leased a new one-story factory at 14-20 Runyon Street, Newark, for the establishment of a new plant.

The Benjamin Products Corporation, Jersey City, N. J., has been incorporated with a capital of $1,000,000 under Delaware laws to manufacture rubber goods. It is represented by the Registrar & Transfer Co., 900 Market Street, Wilmington, Del.

The Board of Freeholders, Court House, Newark, has directed County Purchasing Agent George C. Bergen to advertise for bids for the construction of a new ash conveyor system and ash storage works at the County Isolation Hospital, Soho; and for the construction of a coal conveyor system and coal storage equipment at the Overbrook Hospital, near Verona, N. J.

The Reliable Japanning Co., Newark, has been incorporated with a capital of $25,000 by Frank Principe, Peter and Walter F. Lynch, 14 Ferdon Street, to manufacture japanned metal products, and electro-plated ware.

The Newark Spring Bed Co., 161 Prince Street, Newark, manufacturer of metal bedsteads, etc., has been directed by the city Zoning Commission to remove its works to another location. A period of 3 months has been granted in which to make the change.

The Gasifier Co., Newark, has been organized by Paul F. and George L. Reichella, 410 Trumbull Street, to manufacture gas machinery and other equipment.

The Auto Sales & Service Co., Newark, N. J., has filed plans for a one and two-story automobile service and machine works at 221-35 Frelinghuysen Avenue, 200 x 397 ft., estimated to cost about $208,000, including equipment.

A machine and repair shop will be installed in the building, 100 x 125 ft., now being erected by the Dorsey Motor Co., Perth Amboy, N. J., estimated to cost about $40,000.

The O'Connor Metal Barrel Co., Elizabeth, N. J., has been incorporated with a capital of $500,000 by H. A. Mullen, Frank J. Kelaber and William R. O'Connor, 11 Elmwood Place, to manufacture steel barrels and other metal containers.

Philadelphia

PHILADELPHIA, Sept. 12.

The Westinghouse Air Spring Co., 1428 Vine Street, Philadelphia, has leased property at 2336-38 Fairmount Avenue for new works. The building on the site will be demolished and a new structure erected.

I. Morris Hall, Inc., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 to manufacture iron and steel products. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Quaker City Iron Works, Tioga and Edgemont streets, Philadelphia, has completed plans for a one-story boiler shop addition. Work will commence at an early date.

The Pneumatic Conveyor Co., Philadelphia, has been incorporated under Delaware laws with capital of $1,000,000 to manufacture pneumatic conveying equipment and other apparatus. It is represented by F. R. Hansell, Land Title Building.

The H. Brinton Co., 213 Race Street, Philadelphia, manufacturer of textile machinery and parts, is completing plans for a new four-story factory at Kensington Avenue and M Street, estimated to cost about $200,000, including machinery.

Paul Beyer, Philadelphia, operating a coppersmithing and other metal-working shop at 834 North Fourth Street, has filed plans for a new one-story works at 312-14 Fairmount Street.

Samuel W. Green, Philadelphia, has acquired the property of the Modern Machine Works Co., 2855-65 Ruth Street, Philadelphia, for $27,000, for the operation of a machine and metal-working plant.

The Montgomery Iron & Steel Co., Ninth Street and Montgomery Avenue, Philadelphia, will build a new crane runway at its plant.

The Electro Self-Winding Phonograph Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 to manufacture talking machines and parts. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Bureau of Water, City Hall, Philadelphia, will install an electric traveling crane at the Shawmut pumping station. Machinery will also be installed at the repair shops of the bureau.

The Kuhn & Jacob Machine & Tool Co., Trenton, N. J., has been chartered under State laws to manufacture machinery and tools. The incorporators are Eugene and Walter Jacob, and George Kuhn, Prospect Street and the Pennsylvania Railroad.

The Trent Rubber Co., Trenton, N. J., has been incorporated with a capital of 10,000 shares of stock, no par value, by William V. Lee, I. M. Martino and Frank H. Thropp, Enterprise Avenue. It will take over and operate the plant of the Trenton Rubber Co., which has been under a receivership for about a year.

A new one-story power house will be erected by S. W. Evans & Son, 4623 Paul Street, Philadelphia, manufacturer of metal products, in connection with the construction of an addition, estimated to cost about $125,000.

The Hurley Motor Co., Broad and Race Streets, Phila-

delphia, is demolishing the building at 219-25 North Broad Street, preparatory to the erection of a new 10-story and basement plant on the site, 80x100 ft., estimated to cost about $350,000. John S. Hurley is president.

A new one-story power house will be erected by the Clifton Yarn Mills, Clifton Heights, Pa., 25 x 52 ft., in connection with other extensions.

The Hydro United Tire Co., Pottstown, Pa., will build an addition to its plant, estimated to cost about $250,000 with machinery.

The Keystone Supply & Mfg. Co., 427 North Ninth Street, Philadelphia, manufacturer of steam equipment, plumbing hardware and fixtures, etc., has completed plans for new works at Bethlehem, Pa., estimated to cost about $175,000.

The Floyd-Wells Co., Royersford, Pa., manufacturer of stoves, ranges, etc., is having revised plans prepared for its two-story addition, 32 x 120 ft. A. S. Kepner, 121 Hanover Street, Pottstown, Pa., is architect.

The Wat-R-Oil Burner Corporation, Harrisburg, Pa., has been incorporated under Delaware laws to manufacture oil-burners, heating equipment, etc., with capital of $2,000,000. It has perfected arrangements with the Harrisburg Corporation for the manufacture of its products until a new plant can be constructed.

The State Board of Public Grounds and Buildings, Harrisburg, Pa., has taken bids for a new one-story automobile service and repair works for State automobiles and trucks, estimated to cost about $130,000. A second unit, to cost approximately a like amount, will be constructed later. T. W. Templeton is superintendent of the department.

The Lower Paxton Township School Board, Lower Paxton Township, Pa., has had plans prepared for the erection of a one-story vocational school at Linglestown, to cost about $50,000. It will include machine shop, metal-working department, electric department, wood-working, etc. Frank F. Fahnstock, Jr., Patriot Building, Harrisburg Pa., is architect.

The Blue Ridge Corporation, Roaring Creek, Pa., will build a one-story machine and repair shop in connection with a new food canning plant.

The Pneumatic Conveyer Co., Philadelphia, has been incorporated under Delaware laws with capital of $1,000,000 to manufacture mechanical conveyor systems, etc. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Argo Paper Mills Co., Gloucester City, N. J., has been organized to operate a plant at the Argo mills, for the manufacture of news-print paper. The company is formed under Delaware laws, and is headed by Frank J. Hummell, owner of the property. It is proposed to have the mills equipped and ready for operation by the close of the year.

New England

BOSTON, Sept. 12.

With few exceptions local dealers are working on prospects that apparently have considerable promise and in a number of instances it is believed actual transactions will be consummated within the next fortnight. Degrees of activity in this respect vary from one or two prospects to several. Inquiries concern new as well as used machinery and come from diversified industries, with piston ring and other automobile parts manufacturers and electrical contractors the most numerous.

As far as can be learned no change in prices has been made, but a maker of boring mills intimates a revision to be announced in the near future. The General Electric Co., West Lynn, Mass., has purchased some gear testing machinery and three additional sets of Pratt & Whitney precision blocks. Two New England railroads are negotiating on several pieces of shop equipment; the Watertown Arsenal, Watertown, Mass., wants three gear cutters, and the city of Boston is inquiring for a gear driven universal milling machine. One dealer reports sales of two 16-in. x 8-ft. gap lathes to a Brockton company and a 13-in. x 5-ft. engine lathe to a Rutland, Vt., manufacturer. School jobs are developing more slowly than anticipated. One of the largest projects of this nature has been postponed for four or five months and one of the largest textile machinery makers has put off purchases of a few needed tools. The Hartford fire board has asked for an appropriation to purchase a small crane, lathes and other equipment for its machine shop.

The auction sale of the National Products Mfg. Co., Inc., 153-155 Washington Street North, Boston, on Sept. 8 was well attended. There is a shortage of used presses in this market and bidding for those at the sale was active and good prices resulted. Milling machines, lathes and the like went slowly at prices considerably less than 50 per cent of the replacement value. The outstanding feature was the sale of two Waterbury Farrel Foundry & Machine Co. No. 106 practically new six plunger automatic eyelet machines, having a replacement value of $2,360 each, which were sold for $1,012.50 each, and a similar machine, but not in as good conditions, sold for $812.50. Bidding for these three machines was especially keen.

Builders of motors report good sales and prospects in the textile and shoemaking industries.

The American Steel Ladder Co., Sanford, Me., steel ladders, etc., is to erect a two-story plant.

A permit has been issued the Ramsdell Specialty Co., 667 West Boylston Street, Worcester, Mass., to rebuild a two story factory, 50 x 60 ft.

The Reliance Machine & Specialty Co., 101-103 Green Street, Boston, oilless bushings and bearings, etc., has completed arrangements for combining with the Union Machine Co., Fitchburg, Mass.

A Massachusetts charter has been granted the Safe Auto Lock Co., Boston, capitalized for $150,000. Stanley B. Andrews 44A Linden Park Street, Roxbury, Boston, is president, and Charles F. A. Smith, 181 Beach Street, Wollaston Quincy, Mass., treasurer.

Isaie Laplante, 586 Mount Hope Avenue, Fall River Mass., is president, and Louis A. Cadoret, 156 Broad Street Pawtucket, R. I., treasurer of the Universal Shuttle Spring Co., Fall River and Pawtucket, a $99,000 corporation recently granted a Massachusetts charter.

Plans are on foot to move the Philadelphia plant of the Standard Steel & Bearings Corporation to Plainville, Conn., as soon as business conditions warrant. Ball bearing machinery installed in the New Haven plant is being moved to Plainville.

The Grip Tool & Machine Co., Worcester, has been granted a Massachusetts charter to carry on a general manufacturing and machine shop business. Carl G. Grip, 17 Paine Street, is president, and John F. Hjort, 1 Mars Street, treasurer. The company is capitalized for $50,000.

The Sachem Mfg. Co., Inc., Brockton, toys, is occupying a new plant on Pearl Street having 7646 sq. ft. of floor space. Ola F. Smith, 794 Pearl Street, is president; Ralph H. Waite, 7 Greenwood Road, vice-president, and B. E. Holmberg, 25 Riverview Street, treasurer. The company recently incorporated under Massachusetts laws with a capital of $40,000.

The Aircraft Construction-Transportation Corporation, New Haven, Conn., recently organized under Delaware laws, has taken over the Connecticut Aircraft Co., and local plant. It will specialize in the construction of airplanes, concentrating production on those of rigid character. S. C. Morehouse is president; Ralph H. Clark, treasurer, and Paul Webb, secretary.

The Excellight Co., Bristol, Conn., has been incorporated with a capital of $25,000 by Rudolph Stern, F. N. Manross and Hjalmar Geruldsen, 28 Merriman Street, to manufacture electric lamps and kindred products.

New coal-handling and conveying equipment, and other mechanical apparatus will be installed at the plant of the City Fuel Co., Quincy, Mass., in connection with rebuilding the works at an estimated cost of $100,000.

A two-story power house addition, 95 x 105 ft., estimated to cost about $75,000, will be constructed by A. F. Robinson, Cambridge, Mass., at his plant at Binney and Second streets.

The Marcy Tool Works, Putnam, Conn., has been organized with a paid-in capital of $31,000 to manufacture tools and other mechanical specialties. A. W. Marcy is president and treasurer.

The Kescot Mfg. Co., 67 Clifford Street, Providence, R. I., manufacturer of metal products, has acquired property at Clifford and Page Streets for extensions.

The Connecticut Light & Power Co., New Britain, Conn., has commenced an expansion and improvement program to cost about $250,000. It will include the installation of new equipment at the Black Rock power plant and a new power distributing plant at New Britain.

Dragat & Troubman, 340 Windsor Avenue, Hartford, Conn., have had plans prepared for a new three-story automobile service and repair works, 95 x 100 ft., on Windsor Avenue, to cost about $100,000.

The American Electric Service & Maintenance Co., 51-57 Taylor Street, Springfield, Mass., operating a plant for machine and electrical repair work, parts manufacture, etc., is arranging for the removal of its plant to a new building on Liberty Street, to provide about double the amount of floor space now occupied. Additional equipment will be installed.

The W. J. Hyland Mfg. Co., 151 Dwight Street, New London, Conn., manufacturer of pipe, plumbing fixtures, heat-

ing apparatus, etc., has plans under way for the erection of a new three-story building, 47 x 85 ft., on Liberty Street.

The Utilities Mfg. Corporation, New Haven, Conn., has been incorporated with a capital of $50,000 by T. F. Cooney, Cheshire, Conn.; J. D. Beecher and W. B. Turley, 865 Chapel Street, New Haven, to manufacture metal specialties, including can-openers, metal button hooks, etc.

The B. F. Zimmerman Mfg. Co., Inc., New Haven, Conn., has been incorporated with a capital of $150,000 by Harry A. Waldron and B. F. Zimmerman, 2088 Chapel Street, to manufacture tools, automobile equipment, etc.

Buffalo

BUFFALO, Sept. 12.

The Ojax Battery Co., Canaseraga, N. Y., has plans under way for the erection of the second unit of its plant for the manufacture of electric storage batteries. The initial unit is nearing completion and machinery will be installed at an early date.

Fire Sept. 7 destroyed a portion of the oil manufacturing plant of the Frontier Mfg. Co., Erie Avenue, Tonawanda, N. Y., with loss estimated at about $30,000.

The Park Metal Ware Co., Orchard Park, N. Y., has been incorporated with a capital of $50,000 by J. and A. Zilliox and J. Petrie. Orchard Park, to manufacture metal goods, automobile parts, etc. It is represented by A. L. Steatemeier, Hamburg, N. Y.

The Cady Products Co., Canastota, N. Y., has been chartered under State laws to manufacture automobile and machine parts, etc. The incorporators are G. B. Cady, A. Case and L. D. Williams. It is represented by D. F. Wallace, Canastota.

The Depew & Lancaster Light, Power & Conduit Co., Lancaster, N. Y., is planning the erection of a new electric plant to replace the present power house at East Aurora, N. Y., formerly operated by the East Aurora Electric Light Co., and recently acquired. Other improvements and extensions will also be made in this section.

Henry Landsheft, 1202 Jefferson Street, Buffalo, manufacturer of automobile bodies, will take bids at once for a one-story addition, adjoining the present works, 35 x 100 ft., estimated to cost approximately $25,000.

G. P. Marton, Harrisburg, Pa., and Levi S. Chapman, 321 Westcott Street, Syracuse, N. Y., are negotiating for the purchase of the plant of the Dunkirk Axle Co., Dunkirk, N. Y., which has been closed for several months. The new interests propose to organize a company and operate the works for the manufacture of axles and kindred products.

The Fedders Mfg. Co., 57 Tonawanda Street, Buffalo, has arranged for the operation of a department for rebuilding and repairing automobile radiators, etc.

The Cortland Grinding Wheel Corporation, Cortland, N. Y., has filed notice of dissolution under State laws.

Cleveland

CLEVELAND, Sept. 12.

Some machine-tool dealers are working on a few more live inquiries than they have had for some time and an improved feeling is noted in the trade. Sales are generally confined to the smaller sizes of machines with most of the orders coming from other industrial centers, the local market being almost lifeless. The American Steel & Wire Co. has revived an inquiry for eight large machines, mostly lathes, on which it is asking new quotations. This inquiry was first put out in July last year. The Detroit, Toledo & Ironton Railroad, now owned by Henry Ford, has purchased a few tools recently and is expected to be in the market shortly for additional equipment.

The management of one local machine tool plant, which was scheduled to resume operations Sept. 12, has decided to remain closed for an indefinite period. Another plant which has been shut down for some time has resumed operations, but may again stop production. The most encouraging feature of the market locally is an improvement in the demand for machine shop supplies.

The only price change reported is a reduction of approximately 10 per cent by a St. Louis manufacturer of grinding and polishing machinery.

The Minerva Engine Co., 1916 East Sixty-first Street, Cleveland, manufacturer of truck and tractor engines, has purchased a 10-acre site on Dunham Road and the Pennsylvania Railroad on which is a factory providing 20,000 sq. ft. of floor space. The building is being equipped for the manufacture of the company's line of engines and additional units will be erected later. C. S. Goby is president and R. L. Long, secretary.

The S. H. Vehicle Co., 3291 East Sixty-fifth Street, Cleveland, has had plans prepared for a one-story factory, 40 x 90 ft., to manufacture parts for wagons.

The Rundle Mfg. Co., which for the past six years has been manufacturing children's vehicles in Columbus, Ohio, is planning to move to Fremont, Ohio, where enlarged capacity will be provided. George W. Rundle is head of the company.

The Williamson Hydraulic Clutch Co., Mt. Vernon, Ohio, has appointed an executive committee of which Edgar Thomas is chairman, to have charge of the management of the company's business. It plans to place a new type of clutch on the market shortly.

The Unitile Co., Uhrichsville, Ohio, has been reorganized as the Donahey Power & Products Co., with a capital stock of $2,000,000 in preferred stock and $2,000,000 common stock, and plans to move to a new location and to erect works for the manufacture of sewer pipe, brick and other products. A. V. Donahey, New Philadelphia, Ohio, is president, and W. E. Knight, Cleveland, secretary. The general offices will be in the Hanna Building, Cleveland.

The Sterling Brass Co., 4610-12 St. Clair Avenue, Cleveland, will hold in abeyance the erection of its new two-story foundry and machine shop, 145 x 200 ft., at St. Catherine and Ninety-third streets, estimated to cost $60,000.

Chicago

CHICAGO, Sept. 12.

Machine-tool inquiries have decreased almost to the vanishing point and store calls are infrequent. Such sales as there are cover used equipment more largely than new. No action has been taken on the pending Santa Fe and Rock Island lists, and no other railroad business is in sight. Auction sales of equipment belonging to industrial concerns in financial difficulties continue to be held without stirring up undue interest among either dealers or users. In some cases bids have been so few that machines have been sold at unusual prices. At a recent sale of the assets of the Security Tool Works, Chicago, a practically new six-spindle drill press, listed by the maker at over $1,000, f.o.b. factory, brought only $210. On the other hand, a number of other machines went at fairly high prices.

A Cincinnati manufacturer of portable electric drills and grinders has reduced prices on some types about 10 per cent. A New York State maker of measuring blocks and gages has announced a reduction of from 10 to 15 per cent.

The crane market is showing some activity after several months of quiet. The Marquette Electric Engineering Co., Chicago, has placed an order for a 20-ton electric overhead traveling crane, and the Chicago, Burlington & Quincy Railroad has bought a 10-ton crane. Negotiations are active on a number of cranes wanted by the Atchison, Topeka & Santa Fe Railroad for its Albuquerque, N. M., shops.

The Ralco Mfg. Co., manufacturer of electrical railroad supplies, 849 West Washington Boulevard, Chicago, has purchased a one-story factory, 100 x 180 ft., at the corner of Lake Street and Albany Avenue, and plans to occupy the premises Oct. 15.

Holmquist & Co., manufacturers of ladders and household woodenware, 82 West Washington Boulevard, Chicago, have purchased a two-story factory, 50 x 125 ft., at 2556-62 Armitage Avenue.

The Warmick Type-O-Phone Mfg. Co., 3501 Wabash Avenue, Chicago, has been incorporated with $40,000 capital stock by William M. Houston, William L. Ford and Henry W. Warmick to manufacture dictation machines.

The Du-Al Co., 1810 Belle Plaine Avenue, Chicago, has been incorporated with $100,000 capital stock by A. K. Hansen, E. H. Lowell and Karl Mockenhaupt to manufacture safety razor blade sharpeners. It has started operations.

The Safstrom Mfg. Co., 6706 South Chicago Avenue, Chicago, has been incorporated with $30,000 capital stock to manufacture timers for Ford cars and other automotive parts and accessories, and has commenced production. The incorporators include John B. Bleco, G. A. Safstrom and E. V. Safstrom.

The Ellison Engineering & Furnace Co., 810 South Second Street, Maywood, Ill., has been incorporated by Earl J. Ellison, W. Scott Hodges and Robert F. Bradburn to manufacture heating, ventilating and drying systems. For a time its manufacturing operations will be confined to assembling parts made under contract in other plants.

The Illinois Penitentiary, Joliet, Ill, will take bids through Zimmerman, Saxe & Zimmerman, 64 East Van Buren Street, Chicago, until Sept. 30, on a one-story power house, 70 x 80 ft., to cost $45,000.

The city of Des Moines, Iowa, will build a two-story high school, 240 x 360 ft., including boiler plant and manual training department, at South West Ninth Street and Loomis Street. G. L. Garton, secretary of the school board, is receiving bids on the structure, the estimated cost of which is $700,000.

The J. Ryan Foundry Co., 506 Forty-first Street, Rock Island, Ill., will erect a two-story plant, to cost $50,000.

The Missouri, Kansas & Texas Railway will receive bids until Sept. 15, on a two-story machine shop, 50 x 150 ft., at Parsons, Kan., to cost $50,000.

The Sheridan-Wilson Garage Co., 64 West Randolph Street, Chicago, is taking bids for a new three-story service and repair works, 75 x 200 ft., at 4616-32 Winthrop Avenue, estimated to cost about $200,000, with equipment. W. G. Uffendell, 39 South State Street, is architect.

The Cross Mfg. Co., Woodstock, Ill., has been incorporated with a capital of $100,000 by Harry Cross, George L. Murphy and Emil Wittenberg, Woodstock, to manufacture automobile parts and equipment, and other products.

The Davenport Ice Co., First and Myrtle streets, Davenport, Iowa, is planning the erection of a new two-story ice-manufacturing plant, estimated to cost about $75,000.

The Common Council, Hecla, S. D., has completed plans for a new municipal electric power house. W. H. Higby is city clerk.

The Chicago, Rock Island & Pacific Railroad Co., 139 West Van Buren Street, Chicago, has awarded a contract to Joseph E. Nelson, 3240 South Michigan Avenue, for a new one-story engine house and repair shop at Amarilla, Tex.

Cincinnati

CINCINNATI, Sept. 12.

Sentiment in the machinery market is steadily improving, and most manufacturers and dealers are confident that the worst of the depression has been passed. A number of orders have been placed the past week, the largest being 10 machines by the Ansted Engineering Co., Connersville, Ind. Included in the list were seven gear hobbers, two drilling machines and one milling machine. Other orders were mostly for single tools. Some business is being done on a trading basis, the customer taking a new machine and giving in part payment used equipment. The Big Four Railroad has not yet taken action on its list for the Beech Grove shops, though negotiations were resumed last week. It is said that buyers are not meeting with much success in securing lower quotations than have already been made against inquiries, manufacturers insisting that prices have been cut to the lowest possible point. Several shops are putting on a few additional men, and while stocks in some instances are large, they are not well assorted, and for this reason operations will be resumed on a part time scale.

The Cincinnati Traction Co., Cincinnati, has awarded to the Hazen-Jones Co. the general contract for an electric transformer house on Walnut Street of concrete and steel. A number of other stations will also be built.

To take care of increasing business, the Enterprise Brass & Plating Co., Cincinnati, has increased its capital stock from $25,000 to $100,000. No extensive additions to the plant are contemplated at present.

The Elcon Engineering Co., Franklin Building, Columbus, Ohio, has been awarded contracts covering the design and installation of a coal-crushing and handling plant for the new power house at Ohio State University.

The Universal Equalizer Co., Cincinnati, has been incorporated with a capitalization of $25,000 by W. J. McCauley, Sam Schwartz, Oscar Schwartz, Joseph F. Pflum and William Thompson to take over as a going concern the business of the same name at 8 East Pearl Street.

The Dayton, Toledo & Chicago Railroad Co., Dayton, Ohio, is erecting a round house at Celina, Ohio, 80 x 100 ft. A repair shop will also be built.

The Allsteel Ridewell Tire & Rubber Co., 513 Lindsay Building, Dayton, Ohio, has completed plans and proposes to commence construction during the fall for its new automobile tire manufacturing plant on South Dayton Street, three stories and basement, 125 x 300 ft., and estimated to cost close to $500,000 with machinery. A. Huetter is president and general manager.

The Columbus Forge & Iron Co., West First Street, Columbus, Ohio, has taken bids for a new one-story and basement addition, 70 x 200 ft., and will award contract at an early date.

The Globe Metallic Works, 1126 Gact Street, Cincinnati, has awarded a contract to F. Mersch & Sons, 1037 Wade Avenue, for a new one-story plant at 917-19 State Avenue, estimated to cost about $15,000.

Detroit

DETROIT, Sept. 12.

The H. M. Reynold Asphalt Shingle Co., Grand Rapids, whose plant was recently destroyed by fire, will start the immediate erection of a new factory.

Work on the new municipal electric light and power plant for Lansing, Mich., will begin within the next 30 days.

The Atlas Crucible Steel Co., Dunkirk, N. Y., will open a warehouse at Marysville, Mich., and install high speed and carbon steel. It is contemplating the erection of a plant there as soon as conditions warrant.

The Ireland & Matthews Mfg. Co., Detroit, will soon increase its capitalization by issuing $700,000 additional stock to be used in plant and equipment extensions.

John Doran, Detroit, care of I. M. Lewis, 503 Congress Building, architect, has plans under way for a new one-story machine shop at Epworth Boulevard and Tireman Avenue, estimated to cost about $20,000.

The McRae Steel Co., Detroit, has been incorporated with a capital of $30,000 by Herbert C. Shotwell, D. Shepard Shine, Jr., and Kenneth C. McRae, 2714 Pingree Avenue, to manufacture iron and steel products.

R. J. Teetor, Muskegon, Mich., has plans under way for a one-story foundry at Cadillac, Mich., to manufacture iron and steel castings, estimated to cost about $50,000. Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago, is engineer.

The Marcellus Corporation, Marcellus, Mich., has been incorporated with a capital of $150,000 by Frank Patch and B. C. Pittman, Marcellus, to manufacture gas and oil-burning engines, pumping machinery, etc.

The Department of Motor Transportation, City Hall, Detroit, has preliminary plans under way for a three-story automobile service and repair plant for municipal automobiles, 200 x 350 ft., estimated to cost about $400,000 with equipment. W. Helmboldt is superintendent in charge.

The Van Atlas Corporation, Detroit, has been chartered under State laws to manufacture automobile parts and accessories. The incorporators are Oscar E. Rasch, James H. White, and George F. Balk, 622 West Foreshaw Avenue.

Pittsburgh

PITTSBURGH, Sept. 12.

Inquiries for cranes are more numerous than in several weeks, even though actual sales still are conspicuous by their absence. The Truscon Steel Co., Youngstown, Ohio, has a request out for bids on a 5-ton low head room crane, with 37-ft. 9-in. span; the National Radiator Co. has inquired for a 5-ton, 3-motor, 37½-ft. span overhead for its New Castle, Pa., works, and the National Tube Co. is seeking a 10-ton or 15-ton, 71-ft. 4-in. span, and a 7½-ton stationary jib crane for its Christy Park works, McKeesport, Pa. It is expected that the Bessemer Gas Engine Co., Grove City, Pa., will soon close for a 5-ton crane for which it inquired a few weeks ago.

The machine tool market still is limited as to sales and inquiries, except for individual tools, are not numerous. So far as can be learned the Sewell Valley Railroad, Ranelle, W. Va., has not yet closed against a list issued about two weeks ago calling for a 1200-lb. steam hammer; a 20-in. engine lathe, with power cross feed and taper attachment to swing 8-ft. between centers, or the same of turret type with turret on carriage, belt driven; one No. 2 or No. 3 universal milling machine, belt driven; a 24-in. high-speed upright drilling machine, back geared, belt driven; a 58-in. or 68-in. 250-ton wheel press, inclinable type, belt driven, and a 60-in. belt driven lathe to turn straight connectors; also two Shay type drivers.

Some activity is noted in electrical equipment, the Ridgway Dynamo & Engine Co., Ridgway, Pa., having recently taken 100 special electric motors for installation in United States submarines, while the General Electric Co. recently was awarded by the Aluminum Co. of America, for installation at Baden, N. C., a 7000-kw. generator, it being the purpose of the Aluminum Co. to develop power for use in its own plant and to sell the surplus to the Southern Power Co.

The Conewango Car Co., Warren, Pa., recently organized under Delaware laws with capital of $550,000, to manufacture freight cars, tank cars, etc., taking over the plant of the Allegheny Steel Car Co. at this location, will break ground at once for a new one-story car repair shop, estimated to cost about $25,000. It will replace a structure recently destroyed by fire.

The Senior Mfg. Co., Pittsburgh, is being organized by J. C. and C. C. Kohne, and D. L. Taylor to manufacture hardware, grinding and sharpening devices, and other special-

ties. It is represented by George Y. Meyer, 1302 Berger Building. Application for a State charter will be made Sept. 26.

The Pittsburgh Engineering, Foundry & Construction Co., Pittsburgh, is being organized by N. J. Wallace, F. C. McCutcheon and J. B. Orr, to manufacture castings and other engineering specialties. Application for a State charter will be made Sept. 27. J. B. Orr, Farmers' Bank Building, represents the company.

The Safety Appliance Corporation, Pittsburgh, has been incorporated under Delaware laws with capital of $200,000, to manufacture drop forgings, hardware products, appliances, etc. The company is represented by the Capital Trust Co., Dover, Del.

The Union Ice Co., Pittsburgh, has completed plans for a new two-story plant, 70 x 160 ft., on Beaver Avenue, estimated to cost about $100,000.

Thomas Holden, Bradford, Pa., has plans under way for a one-story forge shop.

The Tech Food Products Co., Thirty-sixth and Butler streets, Pittsburgh, is planning for enlargements in its cold storage and refrigerating plant to increase the capacity from 700,000 cu. ft. to 2,200,000 cu. ft. Three new electrically operated ice machines will be installed, with auxiliary power equipment.

The P. V. & K. Coal Co., 242 Main Street, Monongahela, Pa., E. H. Robinson, treasurer and general manager, is planning for the installation of new electrical machinery and mechanical equipment at its coal properties at Arnettsville, W. Va.

The Safety Appliance Co., Huntington, W. Va., has been organized to manufacture safety equipment. W. K. Cowden and H. C. Duncan, Jr., Huntington, head the company.

The Hackett Coal Co., Cedar Grove, W. Va., has completed plans for the construction of a new tipple at its property. Other mechanical and electrical equipment will be installed.

The Miller Glass Feeder Co., Wheeling, W. Va., has been chartered under State laws to manufacture feeders for glass machinery and similar glass-making equipment. The incorporators are George A. Blackford, Wheeling, and A. Tegarden, Martins Ferry, Ohio.

Baltimore

BALTIMORE, Sept. 12.

A new power plant will be erected by the Board of Directors, St. Charles College, Catonsville, near Baltimore, in connection with other buildings, estimated to cost about $180,000.

The Universal Products Co., Inc., 1621 Cathedral Street, Baltimore, has been incorporated with a capital of $50,000 by L. Sterling Wagner, Edward L. Quirk and Harry L. Price, to manufacture automobile equipment, bodies, etc.

Fire, Aug. 24, destroyed the main building at the plant of the Thomasville Chair Co., Thomasville, N. C., with loss estimated at about $30,000, including equipment.

The Anheuser Busch Co., Norfolk, Va., with headquarters at St. Louis, has plans under way for an addition to its local ice and cold storage plant, estimated to cost about $250,000 with equipment. Ophuls, Hill & McCreery, Inc., 112 West Forty-second Street, New York, is engineer.

The Winchester Cooperage Co., Winchester, Va., is planning to rebuild the portion of its plant destroyed by fire, Sept. 1, with loss of about $60,000, including equipment. W. A. Higgs heads the company.

The Forbes Aluminum Products Co., Wilmington, Del., has been incorporated with a capital of $4,500,000 to manufacture cooking utensils, screens, etc. The Corporation Trust Co, duPont Building, represents the company.

The Edward Tin Splitting Machine Co., Wilmington, Del., has been incorporated with a capital of $300,000 to manufacture machinery. It is represented by the Capital Trust Co., Dover, Del.

The Raven Red Ash Coal Co., Richlands, Va., is planning for the construction of a new coal tipple at its properties. Construction will commence at an early date.

The Hughes Engineering & Construction Co., Baltimore, has leased property at 316 West Redwood Street, for the establishment of a new plant.

The Columbus Sewer Pipe Co., Columbus, Ga., is planning to rebuild its plant, recently destroyed by fire, with loss estimated at about $75,000. Judson C. Buchanan is manager.

The North State Power Co., Raleigh, N. C., has been incorporated with a capital of $250,000 to operate a local power plant in this section. The incorporators are L. H. Crouch, Raleigh; J. B. Johnson, Cardenas, N. C.; and A. J. Blabock, Willow Spring, N. C.

Electric plant improvements and extensions to cost about $300,000 will be made by the city of Kinston, N. C.

The Midway Foundry Co., Burlington, N. C., has been organized with $25,000 capital stock and is arranging for the establishment of a plant. J. G. King is manager.

The Safety-First Patch Co., 1520 Fidelity Building, Baltimore, has been incorporated with a capital of $100,000 by George E. Thrall, Hugh T. Aldrich and Harvey R. Baker, to manufacture rubber specialties.

The Automatic Clothes-Brushing Machine Co., Harrisonburg, Va., has been incorporated with a capital of $50,000 to manufacture special machines and parts. Julius Wise, Harrisonburg, is president, and W. D. Mitchell, secretary.

The National Bean & Pea Picker Corporation, Atlanta, Ga., has been incorporated with a capital of $250,000 by E. E. Davis and W. A. Sims, Atlanta, and C. W. Rice, Hartwell, Ga., to manufacture harvesting machinery.

Milwaukee

MILWAUKEE, Sept. 12.

The demand for machine tools continues spasmodic and from scattered sources, but is assuming volume. Inquiry likewise is increasing, the past week having developed a moderate number of requests. The experience of sellers has been that considerable inquiry is made merely to obtain some tangible basis for figuring requirements, with no prospect of immediate buying. Nevertheless, the quantity of business growing out of current inquiry is regarded as a healthy sign of the improvement believed to be in the foreground. Local automotive parts makers have been buying some new tools, placing orders generally in single machines or lots of two or three. Tool production in this territory is fluctuating considerably, some shops have enlarged operations since Sept. 1, while others have reduced forces. The Gisholt Machine Co., Madison, Wis., closed Sept. 1 after running on a three-day-a-week schedule for some time past, but expected to reopen this week with the previous force of about 500 men.

The Victor Krefl Mfg. Co., Two Rivers, Wis., manufacturer of automotive accessories and equipment, has decided to transfer its operation to Eagle River, Wis., where local capital has absorbed a requisite interest to insure the relocation. The Krefl company has been in business about a year and recently was obliged to relinquish its leased quarters in Two Rivers. A new factory costing about $30,000 will be erected at once in Eagle River. The present equipment will be about doubled with purchases of new and used tools. Victor Krefl is president and general manager.

The Cadillac Washing Machine Co., Chicago, manufacturer of manual and power-driven washing machines, is negotiating for the lease or purchase of the former plant of the Clinton Creamery Supply Co. at Clinton, Wis., with a view of relocating its plant and headquarters in that city. The Cadillac company recently absorbed the business of the Oden Washing Machine Co., and is incorporated in Illinois with $500,000 capital. E. A. Reinman is president, and H. D. Payne, secretary.

The Oneida Motor Truck Co., Green Bay, Wis., manufacturer of motor trucks and axles, has issued $1,000,000 of 8 per cent serial gold bonds for financing operations. During the spring it made considerable additions to its plant and purchased some new equipment. Lafayette Markle is general manager.

The J. J. Jones Hardware Co., 1017-1019 Third Street, Milwaukee, will build a four-story brick and concrete store and factory, 40 x 120 ft. and will equip two floors as a sheet metal shop and for making hardware specialties. It is also a wholesale and retail dealer in general hardware. The building and equipment will cost about $38,000.

The Neenah Brass Works, Neenah, Wis., has acquired a half interest from John B. Ranz, local, in his invention of a refuse incinerator for dwellings, etc., and is planning to engage in quantity production. The device is built in three sizes.

The Board of Education, Eagle River, Wis., has engaged Parkinson & Dockendorff, architects, La Crosse, Wis., to design a new high school with manual training department, to cost not more than $100,000. It is expected that bids will be taken about Oct. 1 or 15. H. E. Marshall is president of the board.

The Wisconsin Ice & Coal Co., 214-216 West Water Street, Milwaukee, has postponed the construction of an artificial ice producer plant estimated to cost $100,000, at Cambridge Avenue and Thomas Street. Bids taken by C. F. Ringer & Son, architects, were considered too high. New bids will be taken in 30 or 60 days. John H. Kopmeier is president.

The Peerless Electric Co., 2028 Fond du Lac Avenue, Milwaukee, has let the general contract to Byrne Brothers, 3100 Burleigh Street, for a new factory and service building, 46 x 120 ft., part two stories, at Eighteenth Street and North Avenue.

Indiana

INDIANAPOLIS, Sept. 12.

The Vincennes Foundry & Machine Co., First and Perry streets, Vincennes, Ind., has preliminary plans under way for a new plant at Nicholas and Fourteenth streets. J. E. Hartegan is president.

Fire, Sept. 1, destroyed a portion of the coal washery at the plant of the American Coal Co., Bicknell, Ind., with loss reported at about $12,000. It will be rebuilt.

The Indiana Public Service Co., Pearl and West Main streets, Fort Wayne, Ind., will break ground at once for a new power house at 301 Militia Street.

The Bureau of Yards and Docks, Washington, Navy Department, has completed plans for an addition to its power house at Annapolis, Ind., and will take bids at once.

The O. K. Battery Co., 515 Broadway, Gary, Ind., has plans under way for rebuilding the portion of its electric storage battery plant, recently destroyed by fire with loss of about $30,000. The new structure will be one-story, 100 x 200 ft., estimated to cost the amount of fire loss.

The Board of Trustees, Indiana University, Bloomington, Ind., will commence work at once for extensions and improvements in the power house at the institution, estimated to cost about $40,000.

The Central South

ST. LOUIS, Sept. 12.

The St. Louis office of Manning, Maxwell & Moore sold a Warner & Swasey turret lathe to the Guston-Bacon Mfg. Co., Kansas City.

The Standard Stamping Co., 2000 North Broadway, St. Louis, has awarded contract to the A. H. Haessler Contracting Co., Wainwright Building, for a new one-story plant, 107 x 132 ft., at Broadway and Madison Street, for the manufacture of enameled metal products.

The Joplin Center Cord Tire & Rubber Co., 815 Main Street, Joplin, Mo., manufacturer of automobile tires, will build an addition to cost about $25,000. J. L. Courvoiser is treasurer.

The Williams Radiator Co., St. Louis, has leased a local building, totaling about 20,000 sq. ft. of space, for the establishment of a new works.

The Chicago, Rock Island & Pacific Railroad Co., 137 West Van Buren Street, Chicago, has arranged for the immediate erection of its proposed new car repair shop at Trenton, Mo., one-story, 87 x 400 ft., estimated to cost about $80,000.

The Rainbow Oil Co., Greenville, Miss., recently organized with a capital of $500,000, is considering the erection of a new oil refinery. E. L. Wortham, El Dorado, Ark., heads the company.

The Norton Iron Works, Ashland, Ky., will proceed at once with the construction of a two-story addition, 150 x 200 ft., for the manufacture of wire-fencing, wire-cloth and similar products. T. M. Adams is president and general manager.

The City Ice Co., Twenty-first and Campbell streets, Kansas City, Mo., is completing plans for the erection of two new cold storage plants, each about 42 x 80 ft. F. D. Whiting is general manager.

The Ruckel Engineering Co., Hutchinson, Kan., has plans under way for municipal electric power and light plants at Quinter and McCracken, Kan., each estimated to cost about $45,000.

The Cinderella Aluminum Heel Co., 107 South Seventh Street, St. Louis, has leased a local building for the establishment of a new plant to manufacture aluminum heels and other metal products. Robert Tabor is general manager.

The General Woodwork Mfg. Co., 3201 North Broadway, St. Louis, has acquired a local plant, including adjoining property, for the establishment of a branch works to manufacture automobile and truck bodies. It is proposed to install machinery and commence operations at an early date. C. W. Redecker is vice-president and general manager.

The Tennessee Grain Softener Co., Chattanooga, Tenn., recently organized to manufacture metal equipment for grain softening service, is planning the erection of a factory. It is headed by L. E. Glass and B. B. Newman, Chattanooga.

Conveying machinery, loaders, transmission and other mechanical and electrical equipment will be installed in the new grain elevator to be constructed at St. Joseph, Mo., by the Chicago, Burlington & Quincy Railroad, 547 West Jackson Street, Chicago, estimated to cost about $200,000. The Burrell Engineering & Construction Co., 327 South La Salle Street, Chicago, is engineer and will soon call for bids.

The Board of Education, Lawrence, Kan., is arranging a list of machine tools and other equipment for installation in the manual training department at the proposed new high school.

The Progress Pressed Brick Co., Louisville, is planning the erection of an addition to increase the daily capacity from 25,000 to 45,000 brick. A. P. Hildebrand is president.

The Common Council, Crescent, Okla., is perfecting plans for a new municipal electric power plant to cost about $40,000.

The Missouri-Pacific Railroad Co., St. Louis, has had plans prepared for a new one-story car repair shop at Poplar Bluff, Mo. Bids will be asked at once. E. A. Hadley is chief engineer.

Fire, Aug. 25, destroyed the service and repair works of the Ferguson Motor Car Co., Pawhuska, Okla., with loss estimated at about $100,000. It will be rebuilt.

J. H. Schmidt, Muskogee, Okla., and associates, have awarded a contract to Dickman & Nelson, Muskogee, for a new one-story plant to manufacture electric storage batteries and kindred equipment, estimated to cost about $60,000.

The Gulf States

BIRMINGHAM, Sept. 12.

The Eggleston Oil Corporation, Somerset, Tex., is planning the erection of a new refinery to cost about $55,000.

Fire, Aug. 28, destroyed the repair shops of the Ford Motor Co., Tyler, Tex., with loss estimated at about $40,000.

The Van Zandt Cotton Oil Co., Willis Point, Tex., recently organized with a capital of $600,000, is planning for the erection of new works estimated to cost in excess of $100,000. W. P. Allen heads the company.

The Artesian Ice Co., Carbon Hill, Ala., recently organized, is planning the erection of a new ice-manufacturing plant, with machinery installation estimated to cost approximately $15,000. James Nichol, Jr, is president, and I. E. Cooper, secretary-treasurer and general manager.

The Southern Electrolyte Battery Co., New Orleans, has acquired a local building for the establishment of a new works to manufacture electric storage batteries of special type. The structure will be remodeled and equipment installed at an early date.

The Texas Imperial Co., Fort Worth, Tex., is planning the erection of a new refinery with initial output of about 100 bbl. per day.

The Jahncke Dry Dock & Ship Repair Co., New Orleans, has acquired the plants of the Crescent City Machine & Mfg. Co. and the Stearn Foundry Co. for extensions to its works. It is also negotiating for a portion of the Government property known as the Jackson Barracks, and proposes to construct a new works. The expansion program is estimated to cost close to $1,000,000.

The Rule-Jayton Cotton Oil Co., Stamford, Tex., recently organized with a capital of $200,000, is planning the erection of a cotton oil mill estimated to cost close to $100,000. C. M. Francis heads the company.

Harry K. Johnson, 1003 Hibernia Building, New Orleans, and associates have plans under way for a new electric power plant with generating capacity of about 1000-hp., estimated to cost about $200,000 with machinery.

The Baton Rouge Ice Co., Baton Rouge, La., is planning for the installation of new machinery to double the present capacity.

Hopkins & Duffy, Waco, Tex., have awarded a contract to J. M. Bush, Waco, for a new two-story plant, 100 x 135 ft., for the manufacture of automobile bodies, tops and other automotive equipment.

The Louisiana & Arkansas Railroad Co., Stamps, Ark., is completing plans for a new one-story locomotive repair shop. E. F. Salisbury is chief engineer.

The Auto Truck Co., Tallahassee, Fla., has been incorporated with a capital of $50,000 by L. R. Moore and G. E. Mabry, Tallahassee, to manufacture truck parts and other automobile equipment.

The Common Council, Gainesville, Fla., is planning for extensions and improvements in its municipal electric power plant to cost about $30,000.

The Transcontinental Petroleum Co., Tampico, Mex., is completing plans for a new one-story works for the manufacture of oil drums, cans, etc. It is estimated to cost about $450,000.

The new plant of the Tidewater Glass Co., Jacksonville, Fla., will comprise two manufacturing units, each to cost

about $150,000. The installation will include annealing ovens, tanks, glass furnaces, with mold shop, power house, and other departments. Later a number of additions will be constructed. The company is headed by C. H. Dankworth and F. W. Stewart. It is represented locally by the Chamber of Commerce, B. R. Kessler, secretary, which is interested in the project.

The Putnam Fluid Lift Co., Breckenridge, Tex., has been incorporated with a capital of $25,000 by F. M. Gill, C. O. Lund and S. C. Barton, Breckenridge, to manufacture mechanical equipment for oil well and other service.

California

LOS ANGELES, Sept. 6.

The City Council, Sacramento, Cal., is considering a bond issue of $8,000,000 for the construction and operation of a municipal electric power plant.

The Pacific Coast Tire & Rubber Mfg. Co., Los Angeles, has been incorporated with a capital of $2,000,000 by William B. Wightman, J. B. Treadwell and O. C. Emery, to manufacture automobile tires and other rubber products. It is represented by Owen C. Emery, 106A East Broadway, Glendale, Cal.

The Los Angeles & Salt Lake Railroad Co., Los Angeles, has awarded a contract to V. P. Gilbert, 431 Citizens' National Bank Building, for a new one-story works, 100 x 250 ft., at 2204 East Sixth Street.

The Pacific Tank Gage Co., Eddy Street, San Francisco, manufacturer of gasoline and other tank gages, has removed its plant to 167 Jessie Street for increased production.

The Alma Electric & Supply Co., Los Angeles, has been incorporated with a capital of $75,000 by A. E. Westphal, Iver J. McAllister and Joseph O. Poole, to manufacture electrical products. It is represented by Arthur J. Michell, Alhambra, Cal.

The Precision Mfg. Co., Los Angeles, has filed notice of organization to manufacture precision mechanical equipment. It is headed by Iver L. Shogran, 2861 San Marino Street.

The Washington Union High School District, Easton, Fresno County, Cal., will equip a machine shop in a new school building to be constructed. J. A. Poytress is clerk.

D. E. Culbertson, 1222 Ninety-third Avenue, Oakland, Cal., has filed plans for a one-story machine shop at 50 South Eighty-first Street.

E. C. Leach, 40 College Avenue, San Francisco, has filed plans for a new one-story foundry for the production of iron and other metal castings.

The De Corse Mfg. Co., 43 Mesquit Street, Los Angeles, has been organized to manufacture mechanical products and operate a general machine works. M. D. Fraser, 1339 West Twelfth Street, heads the company.

The Power Bureau, Los Angeles, E. F. Scattergood, chief engineer, has plans under way for a new power plant for the municipal power system, estimated to cost close to $100,000.

The Southern California Telephone Co., Los Angeles, has plans under way for a one-story automobile service and machine shop, for company cars and trucks, estimated to cost about $140,000, including equipment.

The San Joaquin Light & Power Corporation, Fresno, Cal., has been granted permission to erect two hydroelectric generating plants on the Kern River. One will have a capacity of about 16,800-hp. and is estimated to cost close to $1,000,000; the other will have a rating of 7700-hp. and will cost approximately $880,000.

The Kansas City Boiler & Welding Co., 1779 North Main Street, Los Angeles, has filed notice of organization to manufacture boilers, tanks, etc. Conrad A. Byloff, 324 West Thirty-third Street, heads the company.

Canada

TORONTO, Sept. 10.

The Canadian National Exhibition has helped to stimulate machine-tool buying a little and some companies having exhibits have received a few small orders, but no large buying is yet manifest. Small tools are still backward, users purchasing only for immediate needs. Some dealers are shading price to secure business, but no reductions have been made in quotations recently.

Arrangements have been concluded for the financing of a $10,000,000 power development at Great Falls, Man., on the Winnipeg River, according to A. W. McLimont, vice-president Winnipeg Electric Railway Co. The plant will have a capacity of 168,000-hp., and is expected to be completed and in operation in 1927. Construction has started and about 200 men are now employed. Later from 1000 to 2500 men will be at work. The project will be carried out by the Manitoba Power Co., Ltd., which is taking over the plant and assets of the Winnipeg River Power Co., Ltd. Sir Angus Nanton is president of the new company and A. W. McLimont, vice-president, will have control of the construction and operation of the plant.

Arrangements have been approved whereby the plant of the Preston Car & Coach Co., Preston, Ont., will be taken over by the Canadian Brill Co., Ltd, a subsidiary of the J. G. Brill Co., Philadelphia, Pa. The new owner will start operations immediately and has a substantial volume of orders on hand. The president of the Canadian company is Samuel M. Curwen, Philadelphia, president of the Brill company and all subsidiaries; first vice-president, H. K. Hauck; second vice-president, A. N. W. Clair, Preston; H. D. Scully is general manager.

The plant and building of the W. C. Hunt Brass Mfg. Co., 30 Holly Avenue, Toronto, was damaged by fire Sept. 6, with a loss of $30,000. It will probably be rebuilt immediately. This makes the third fire in the past two months.

Joseph Langevin, Coteau du Lac, Que., will receive bids until Sept. 30 for electric light and power plants to cost $30,000.

H. W. Hill, Box 164, Preston, Ont., is in the market for 2-ton chain blocks, and a 1½-ton block.

Armstrong Whitworth of Canada, Ltd., 298 James Street, Montreal, whose plant at Longueuil, Que., was closed some time ago, will dispose of the following equipment: Seven automatic screw machines; two boring mills; one centering machine; three jib cranes; four drills; electrical equipment, including one 3 and one 6-ton Heroult electric furnaces, generators, etc.; steam engines; drill fluting machines; grinders; steam hammers; lathes; milling machines; presses; relieving lathes; rolling mills; shears; tanks; metal testing machines; pumps; boiler and steam plant equipment; time clocks; foundry ladles; cranes; also miscellaneous tools, high-speed and carbon steels, motors, etc.

The Wallace Barnes Co., Bristol, Conn., has taken over the plant formerly occupied by the National Machinery & Supply Co., Hamilton, Ont., and will manufacture its regular line of screw machine products, cold rolled spring steel, wire, washers, stampings, springs, etc.

Plans of New Companies

The Pennsylvania Foundry Supply Co., Philadelphia, was organized to meet the special requirements of foundries from the standpoint of quality, price and service. The company is acting as manufacturer, dealer and agent for all kinds of supplies and equipment needed by foundries making ferrous and non-ferrous castings. It is the Eastern distributor of the Mac Co., Inc., Milwaukee, of its parting, high temperature furnace cement, brass cleaner and core compound. It has warehouse facilities in Philadelphia. H. E. Mandel, formerly of the Lindsay Chaplet & Mfg. Co., is general manager.

A new corporation, the Marlin Firearms Corporation, has purchased the former Marlin firearms plant at New Haven, Conn., and has acquired all of the machinery, tools, fixtures, gages, patterns, good-will, inventory, etc., of the business, which has heretofore been conducted by the Marlin Firearms Co. and the Marlin-Rockwell Corporation. The new corporation will manufacture the full Marlin line of repeating rifles and repeating shotguns; also single shot rifles, single guns, double barrel guns and revolvers. The factory organization includes all of the important men of the old Marlin firearms organization—practical gun makers with from 15 to 20 or more years of experience in the manufacture of high-grade firearms. The officers of the company are John F. Moran, president; LeRoy Sargent, vice-president; Reuben Hill, secretary and treasurer. The directors are these officers with Howard E. Adt and Thomas M. Steele.

The Pure Aluminum Co. of America, 180 Centre Street, New York, will manufacture aluminum cooking utensils to be marketed under the name of "Nobolo Ware." The company contemplates the erection of its own rolling mills and has completed arrangements with the Bush Terminal sales representatives to handle part of the distribution of its products. F. E. Grabo, who controls the E. O. Grabo Machine Works, New York, is vice-president, in charge of production. Burnett L. Shaw is president.

The Lumen Bearing Co., Buffalo, and Youngstown, Ohio, manufacturer of machinebronze, brass and bronze castings and bearings, solders and babbitts, has established in Chicago a branch office to handle business west of and including Michigan, with the exception of Detroit, and west of a line from Toledo to Columbus to Cincinnati; Kentucky, Tennessee and Georgia. H. S. Huncke is the Western sales manager, with Henry Waters as associate salesman. The office is located at 15 North Jefferson Street, Chicago.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers or shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c.
No. 12	3.33c.
No. 14	3.38c.
No. 16	3.48c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4 25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.90c. to 4.10c.
No. 16	4.05c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—48	—32	¾ in. Butt...	—30	—13
¾ in. Butt...	—54	—39	1-1½ in. Butt.	—32	—16
1-3 in. Butt..	—56	—42	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—30	—16
7-12 in. Lap..	—43	—27	7-12 in. Lap...	—23	— 7

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	3.75c. to 4.00c.
Annealed soft	3.75c. to 4.00c.
Galvanized annealed	4.50c. to 4.75c.
Coppered basic	4.25c. to 4.50c.
Tinned soft Bessemer	5.75c. to 6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¼c. to 18¼c.
High brass wire	16¼c. to 20¾c.
Brass rod	13¼c. to 19¾c.
Brass tube, brazed	26½c. to 30½c.
Brass tube, seamless	18 c. to 19½c.
Copper tube, seamless	19½c. to 21¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 22½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20	
			Primes / Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$6.80 / $6.55
		90 lb...	6.90 / 6.65
		100 lb...	7.00 / 6.75
IC..	$10.60 / $9.50	IC...	7.20 / 6.95
IX..	11.80 / 10.75	IX...	8.10 / 7.85
IXX..	13.60 / 12.25	IXX...	9.10 / 8.85
IXXX..	15.60 / 14.25	IXXX...	10.50 / 10.25
IXXXX..	17.20 / 16.00	IXXXX...	11.50 / 11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	28c.
Bar	34c. to 35c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5c. to 5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6c. to 6½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb...29c. to 31c.

Old Metals

The market is stronger and prices are a little higher. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.75
Copper, heavy and wire	9.00
Copper, light and bottoms	7.75
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

THE IRON AGE

New York, September 22, 1921

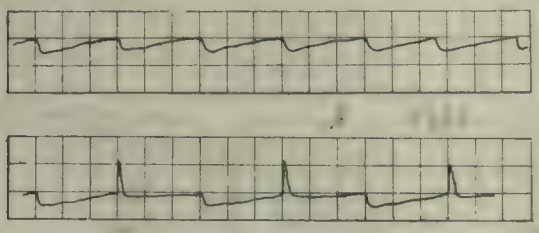
ESTABLISHED 1855 VOL. 108: No. 12

Open-Hearth Furnace Design

Reversing Valves and Their Effect on Efficiency—Chimney Areas and Heights

BY A. D. WILLIAMS*

REVERSING valves for regeneratively fired furnaces have been a source of much trouble. Many different valves have been designed and placed upon the market, and a number of different flue ar-



Figs. 1 and 2—Pyrometer Diagrams of Stack Temperatures. Abnormal conditions showing sudden upward kick in Fig. 2 are due probably to air leakage and the combustion of checker gases passing along the flue toward the stack

rangements have been devised, to eliminate the reversing valve and accomplish the reversal with a multipicity of mushroom valves and dampers. The simple Siemens butterfly valve was the first four-way valve used on these furnaces. In use, however, exposed to the hot gases on one side, and the cool gas or air passing to the regenerators, it soon warps and becomes leaky. These leaks permit air to pass direct to the stack and cool down the waste gases, or if used for gas there is continual leakage of gas, which either burns in the valve or in the stack flue.

While many reversing valves are water sealed, most of these, during the operation of the valve, in common with the butterfly valve, open a direct connection, practically the full area of the valve from gas main or air to the stack. A few valves have been designed which cut the furnace, gas and air entirely off from each other and the stack, but these valves have not come into extended use.

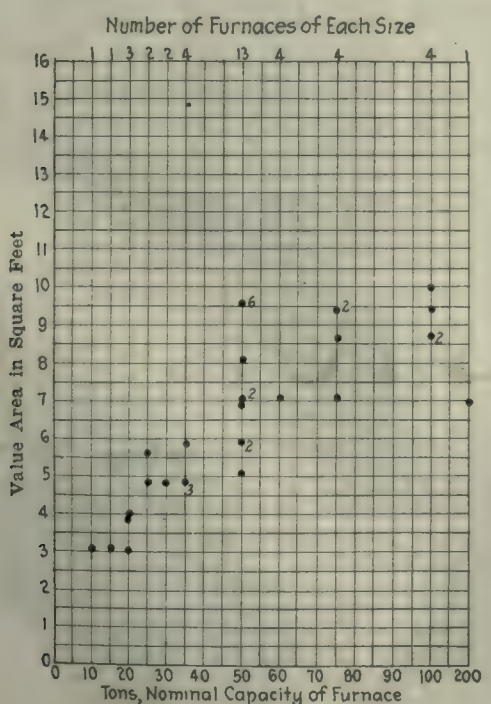


Fig. 3—Gas Valve Areas Spotted

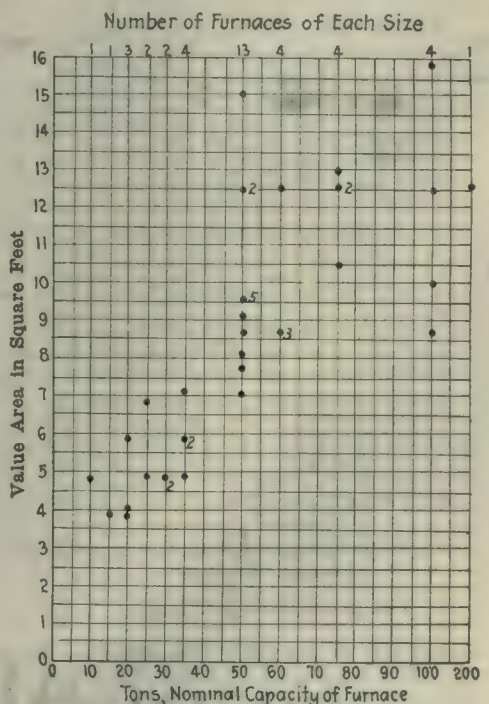


Fig. 4—Air Valve Areas Spotted

Water sealed valves are used extensively. As long as the seal holds they are tight, but there are usually structural limitations to the depth of the seal. When exposed to gas pressure on one side and the stack depression upon the other the seal is unbalanced, and may readily be broken by surges or explosions. In some cases a considerable water area is exposed to the entering gas or air as well as to the waste gases.

Producer gas and stack gases, being several hundred degrees hotter than boiling water, will absorb a

*Consulting engineer, Newark, N. J. Copyrighted by A. D. Williams.

considerable amount of moisture from a very small area of water surface. With all of these valves the sealing lip must be raised, to clear the water surface and the port rims, whenever the valve is operated. From the time the seal is broken until it is re-established the full suction of the stack acts to pull air or gas, and in some cases both, into the stack.

TABLE 1
Reversing Valves

Nominal Diameter Valve In.	Ft.	Mm.	Nominal Area of Valve Sq. In.	Sq. Ft.	Sq. Meters
18	1.50	450	254	1.77	0.164
21	1.75	525	346	2.40	0.223
24	2.00	610	452	3.14	0.292
27	2.25	685	572	3.98	0.369
30	2.50	760	706	4.91	0.456
33	2.75	840	855	5.93	0.554
36	3.00	915	1017	7.07	0.657
40	3.33	1000	1256	8.73	0.808
42	3.50	1070	1385	9.62	0.894
48	4.00	1220	1809	12.57	1.168
54	4.50	1370	2290	15.90	1.477
60	5.00	1525	2827	19.63	1.823
66	5.50	1675	3421	23.76	2.210
72	6.00	1830	4071	28.27	2.630

With some valves the furnace itself is directly connected to the stack through both regenerators at reversal, so that a portion of the stack pull tends to draw air in at the doors. This may or may not be seriously objectionable, according to the distance between the valve and the furnace, and the rapidity with which the valve may be operated.

Effect of Absorbed Moisture

Moisture absorbed from water seals is a direct loss of the amount of heat required to evaporate it and superheat it to the temperature at which it passes out

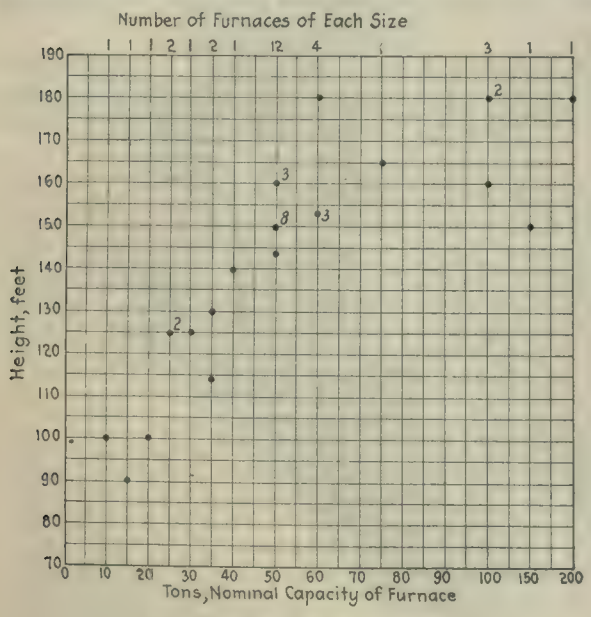


Fig. 5—Stack Heights Spotted

of the regenerator to the stack. In addition, its dissociation probably occurs in the checkers, which may release some oxygen to combine with other combustibles at this point. The reactions here are complex, as certain hydrocarbons dissociate in the checkers, as well as CO_2. A further increment of moisture occurs in certain elements of the charge, and an open-hearth furnace is not particularly efficient as a dryer. At the same time, moisture is carried in by the air supply.

All of this water leaves the regenerator for the stack as highly superheated steam, and its amount is considerable, particularly with large furnaces. In "The Heat Balance of the Open-Hearth" by Sidney Cornell, (*Chemical and Metallurgical Engineering*, May, 1913,) the weight of moisture passing in the flue gases was about 26 per cent of the weight of ingots produced. The water seals in the valves increased the amount of moisture in the producer gas 1 per cent.

As the water seal depends upon its water supply, a very slight stoppage breaks the seal. Frozen water

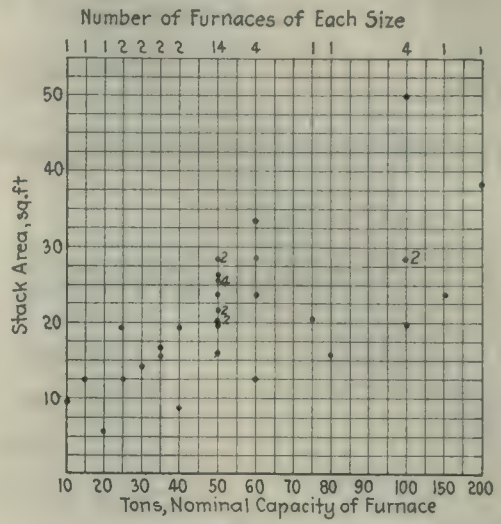


Fig. 6—Stack Areas Spotted

lines in winter frequently cause the superintendent to consign the plant to the tropical regions, particularly when they occur on a cold Sunday morning.

TABLE 2
Reversing Valves and Chimneys in Practice

Nominal Furnace Capacity, Tons	Valve Area Gas, Sq. Ft.	Air, Sq. Ft.	Sq. Ft. per Ton Gas	Air	Chimney Height, Ft.	Area of Bore, Sq. Ft.	Sq. Ft. per Ton
10—1	3.12	4.87	0.312	0.487	100	9.62	0.962
15	3.12	3.12	0.208	0.208	90	12.56	0.837
20—A	3.90	3.90	0.195	0.195	100	....	....
20—3	3.07	4.00	0.154	0.200	...	....	....
20—D	3.90	5.90	0.195	0.295	...	....	....
20—4	...	...	....	....	...	5.85	0.293
25—4	4.90	4.90	0.196	0.196	125	12.56	0.502
25—3	5.65	6.90	0.226	0.276	125	19.64	0.786
30—5	4.90	4.90	0.163	0.163	125	14.2	0.473
30—4	4.90	4.90	0.163	0.163	125	14.2	0.473
35—2	5.90	5.90	0.169	0.169	...	....	....
35—A	4.90	5.90	0.140	0.169	114	17.0	0.487
35—1	4.90	4.90	0.140	0.140	130	15.9	0.474
35—D	4.90	7.10	0.140	0.203	...	....	....
40—7	...	...	....	....	...	9.0	0.225
40—4	...	...	....	....	140	19.64	0.491
50—4	7.06	7.06	0.141	0.141	150	23.7	0.474
50—10	7.06	15.00	0.141	0.300	...	21.5	0.430
50—11	5.94	9.18	0.119	0.184	150	26.27	0.525
50—8	9.60	12.50	0.192	0.250	150	28.27	0.565
50—13-15	9.60	9.60	0.192	0.192	150	25.8	0.516
50—16	9.60	12.50	0.192	0.250	160	20.0	0.400
50—X	5.22	7.75	0.104	0.155	...	....	....
50—4	8.13	8.13	0.163	0.163	...	....	....
50—19	9.60	9.60	0.192	0.192	150	20.0	0.400
50—5	7.00	9.52	0.140	0.190	...	....	....
50—D	5.90	8.70	0.118	0.174	...	....	....
60—13	7.06	12.58	0.118	0.210	180	33.18	0.553
60—3-5	7.06	8.72	0.118	0.145	153	28.27	0.471
75—1	9.42	13.00	0.126	0.173	...	....	....
75—A	9.42	12.56	0.126	0.167	...	....	....
75—3	8.70	12.56	0.116	0.167	...	....	....
75—D	7.10	10.50	0.095	0.140	...	....	....
75—2	...	...	....	....	165	20.36	0.271
80—1	...	...	....	....	...	15.8	0.198
100—3	...	...	....	....	...	19.6	0.196
100—H	10.00	10.00	0.100	0.100	180	28.25	0.283
100—E	8.75	8.75	0.088	0.088	180	50.0	0.500
100—4	9.42	15.90	0.094	0.159	160	28.25	0.283
100—D	8.70	12.60	0.087	0.126	...	....	....
150—1	...	...	....	....	150	23.7	0.158
200—4	7.00	12.56	0.035	0.063	180	38.50	0.193

Water vapor absorbed by the flue gases reduces not only their temperature, but also the stack draft and the amount of heat available for the waste-heat boiler to convert into steam.

As to the valve area required for a furnace, there is as much diversity in practice, as there is with the other proportions of the furnace. Figure 3 is a graphical comparison of reversing valve practice, while Table 2 shows the same data in tabular form. The reference numbers in the table correspond with those given in

preceding articles, which have appeared in *Révue de Métallurgie* in 1919 and THE IRON AGE in 1920.*

Some of these valves are so heavy as to require electric motors or some other form of power for their operation. In these cases the control is located on a pulpit at a central location on the charging floor in the rear of the furnace. Smaller and lighter valves are operated by cables or levers led into the pulpit. Heavy valves have considerable inertia, and for this reason cannot be operated as rapidly, even by power, as the smaller valves which have lighter moving parts.

Furnaces fired by pulverized coal, natural gas, oil, coke oven gas or tar require reversing valves for the air only, the fuel being reversed by shutting off the jet at one end of the furnace and turning on the jet at the opposite end. Some of these furnaces are supplied with one checker chamber at each end, while others are so constructed, with two chambers at each end, that they may be converted with little difficulty to producer gas firing.

Those furnaces in which the air only is preheated have a slight advantage over those in which both the gas and air are preheated, in that no unburnt gas has to be wasted up the stack at reversal. The amount of fuel lost in this manner depends upon the gas-filled volume between the reversing valve and the port, and the frequency of reversal. When the gas is preheated this loss cannot be avoided.

This gas likewise creates an explosion hazard. When the conditions are right this gas burns and passes up the stack as a puff of flame. Again, if it becomes mixed with air, the mixture being below the ignition temperature, and a portion of this mixture is suddenly ignited, an explosion of more or less violence occurs. These explosions damage the walls of regenerative chambers, flues and waste-heat boilers, opening up cracks, so that large amounts of air are drawn into the system, reducing the stack draft and the output of the boiler, by reason of the lowering of the temperature of the waste gases.

Velocity of Gases Through Valves

One factor in regard to valve area that meets with little consideration is the velocity of the gases passing through the valve. In addition, most valves involve a change in direction of flow, totaling 360 deg., 180 deg. in the valve and two 90-deg. changes in the flues. When a stream of flowing gases goes through a passage involving changes in area, velocity changes are involved. The velocity of flow in the normal section of the flue may be represented by $V_{min.}$, and in the contracted area of the valve by $V_{max.}$ The corresponding velocity heads will be $h_{min.}$ and $h_{max.}$ That is, a velocity head $= h_{max.} - h_{min.}$ will be required to produce the increase in velocity. The pressure in inches of water required to produce the increase in velocity will be:

$$p = 0.192\ (h_{max} - h_{min})\ d_t$$

in which d_t = weight in lb. per cu. ft. of the gas in motion at the temperature t deg.

The coefficient of contraction varies from unity, when the areas of the two passages are same, to 0.83 when the area of the smaller passage is 0.01 of the area of the larger passage. This slightly increases the pressure required, but ordinarily a large margin is available to cover this. The loss of pressure due to changes of direction may be expressed by the formula:

$$p = 0.192 r\ d_t \frac{v^2}{2g}$$

in which:

p = pressure in inches of water column;
v = velocity in ft. per sec. of the stream of gas;
g = gravitational constant = 32.2;
d_t = weight in lb. per cu. ft. of the gas in motion at the temperature t deg.;
r = a function of the angle through which the stream is deflected.

The following values are given by Weisbach for short bends in pipes:

Angular change	a =	20 deg.	40 deg.	45 deg.	60 deg.	80 deg.	90 deg.
Coefficient	r =	0.046	0.139	0.188	0.364	0.740	0.984

This last loss, due to directional change in passing through the valve, amounts to 180 deg. in the valve itself and 90 deg. in the flues each side of the valve. For this reason changes of diameter of valve of 6 in. or so are of comparatively small effect upon operation. These losses vary with the square of the velocity in the valve and the flues. Many furnaces are, undoubtedly, choked by the small area of the valves used, and much operating trouble is doubtless due to lack of consideration of these details.

A valve small enough to choke the furnace is an expensive luxury, as it exacts its toll every minute the furnace is working. Added chimney height or forced draft must be provided to overcome its resistance. There is very little doubt that the erratic working of some furnaces with different weather conditions is largely due to the close balance, between draft and resistance, being disturbed by barometric and temperature conditions. These various losses will be gone into in more detail in the design computations.

Figs. 5 and 6 give a graphical comparison of chimney areas and heights, which are tabulated in Table 2. Open-hearth practice in the United States tends to steel self-supporting chimneys lined with fire brick. Even with waste-heat boilers and induced draft the straight chimney is used, while abroad many of the venturi cone (Prat type) chimneys are used. The chimney is required to carry the waste gases to a sufficient height to prevent their becoming a nuisance, not only in the works, but to its neighbors.

Another factor which must be considered in connection with the draft required to operate the furnace is that the gases must be pulled out of the furnace through the ports, down through the checkers and through the valves and flues. That is, the waste gas end of the furnace is below atmospheric pressure, and there is a constant tendency for cold air to be pulled into the system. When the brickwork is new and tight the leakage of air into the system may be slight, but after a few explosions have shaken things up, this brickwork is liable to leak like a sieve. For this reason, gas samples taken at the base of the stack are liable to show a condition of affairs quite foreign to that which actually exists in the gases leaving the heating chamber or the regenerators.

Many tests and considerable investigation of open-hearth furnaces have been made from time to time at different plants. Tests of this kind cannot be permitted to interfere with furnace operation. They must be carried on night and day over several melts. When it is decided to run such a test, the question of cost must be considered, not only in apparatus but in personnel. A large number of observations and chemical analyses must be recorded and analyzed.

Very slight details are liable to vitiate the value of such tests, and it is extremely difficult to impress upon the assistants available the factors that are really essential. Frequently, in fact, the busy executive is unable to devote to the test scheme the preliminary attention he desires, and as a result only a portion of the data required are obtained. Comparatively few of these test results are made known, hence there is much repetition of the work of others.

Inquiries now before structural steel mills call for 280 tons of steel to be used for the initial unit of the factory-warehouse building to be erected at Youngstown, Ohio, by the Paul J. Kalman Co., a Chicago fabricating interest. The plant will manufacture reinforcing steel and when completed will have an annual consumptive capacity of 70,000 tons of bars.

The American Rolling Mill Co., Middletown, Ohio, has made another cut of 10 per cent in salaries and wages. The new schedule was effective Sept 16. The base rate for common labor is now 27c. per hour. The announcement was made that this will be the last reduction in wages to be made this year, regardless of the price of steel.

Molders of the American Steel Products Co., Macomb, Ill., recently struck as a protest against a reduced rate on piece work put into effect by the company. The molders had been earning from $8 to $9 a day and in order to meet competition the company found it necessary to reduce this amount to $6.

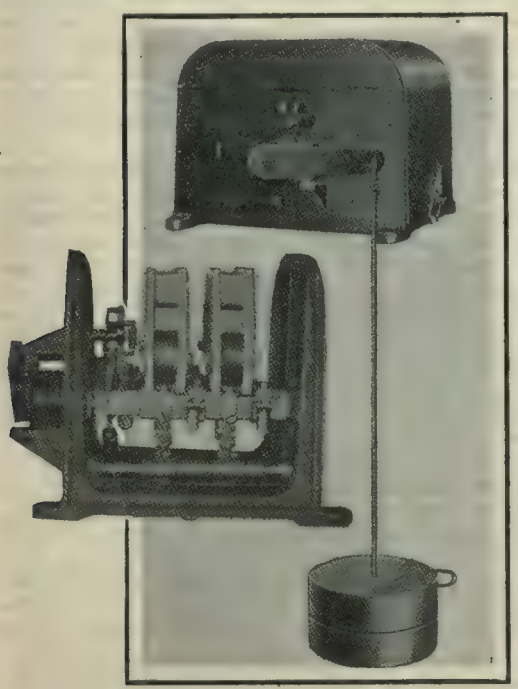
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*Jan. 1, page 35; Jan. 8, page 119; Jan. 29, page 317; Feb. 12, page 475; March 18, page 805; April 29, page 1225; May 27, page 1510; Aug. 5, page 319.

Electric Crane Safety Switch

A new crane safety limit switch, designated as type L C, intended to prevent overtravel of the hoist brake and the consequent damage, has been brought out by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The safety limit guards the equipment irrespective of the kind of control or of the position of the controller handle or brakes. In addition to its safety feature time is saved within the normal operating range of the hoist, as the switch obviates the necessity of approaching the limit of travel slowly and cautiously.

Under normal operating conditions, the limit switch is held in the operating position by the counterweight as shown in the illustration, which overpowers the torsion operating springs, also shown. In case of overtravel the counterweight is raised by the hoisting hook or other moving part, which permits the torsion spring to operate the switch. This disconnects the motor from the line and establishes a closed dynamic braking cir-



In Case of Overtravel, the Counterweight Is Raised by the Hoisting Hook, Permitting the Torsion Spring to Operate the Switch

cuit through the motor armature, motor series field and resistor, which stops the motor, irrespective of the position or type of the controller or brake. The operation of the switch also releases the series magnetic brake which holds the load until the controller handle is moved to the lowering position. As soon as the hook has been lowered beyond the limit the switch is again ready to function as before, as it re-sets itself automatically. The quick-make and quick-break feature of the switch throws it rapidly from the normal to the braking position when approaching the limit and back to the normal operating position when backing out. It will not remain in a partially open or partially closed position and destroy the contacts or fail to function.

The safety limits may be used also on metal mixers, bridges and other applications employing series motors, where it is desired to limit the travel in one direction by applying dynamic braking.

Industrial training, by co-operation between school and shop, has been inaugurated by Pennsylvania State College. A supervisor in each shop gives individual aid to the students working there, on the points where they show weakness. All papers are corrected at the college, and all lessons are sent from there direct to the students. Special text books have been prepared for students in textiles, automobile parts, electrical equipment, iron and steel, machines and tools and other subjects.

Industrial Cost Association

At a meeting of the board of directors of the Industrial Cost Association, held on Sept. 8, the resignation of J. W. Stannard as president and director was accepted and Horace S. Peck, comptroller, S. K. F. Industries, Inc., 165 Broadway, New York, was elected to fill the vacancy. Christopher Haigh, General Electric Co., West Lynn, Mass.; Joseph P. McLean, Pittsburgh Forge & Iron Co., Pittsburgh, and Ernest J. Wesson, W. T. Raleigh Co., Freeport, Ill., were elected directors of the association.

It was decided to hold the fall conference at Pittsburgh, Nov. 2, 3 and 4. The association now has 224 members. The organization has no salaried officers. The board of directors at one time passed a resolution to the effect that at such time as the receipts of the association exceeded disbursements, the secretary-treasurer was to be placed on a salary basis but at no time has this condition existed for a long enough period to justify such action, and it was therefore impossible for this officer to continue to devote his entire time to the association.

In a letter to the membership President Peck explained that for a number of months A. A. Alles, Jr., the secretary-treasurer, through the courtesy of the Fawcus Machine Co. and the Schaffer Engineering Co., devoted his entire time and attention to the affairs of the association and that he still continues to devote as much of his time as possible to this work.

New Plans to Study Drill Steel Breakages

WASHINGTON, Sept. 20.—Plans have been made by the Bureau of Standards and the Bureau of Mines to intensify further study of breakage and heat treatment of drill steel and invitations have been issued to outside experts on the subject, who, it is hoped, will cooperate with the bureaus and act as a consulting committee. Those asked to serve in this capacity are President J. A. Mathews of the Crucible Steel Co. of America; Dr. Van H. Manning of the American Petroleum Institute; B. F. Tillson of the New Jersey Zinc Co.; W. L. Saunders, chairman Ingersoll-Rand Co., and F. W. Benton of the Copper Range Co.

The Bureau of Mines has been conducting research on drill steel at its experimental stations in Rolla, Mo., and Minneapolis, and, having a lack of appropriations to continue them as extensively as necessary is seeking aid through experts in the trade and in the mining industry.

The Bureau of Standards also has been conducting a research with the Bureau of Mines. It is stated that improvements in drill steel have not as yet come up to the standard of those made in the drill themselves and that there has been considerable breakage, causing a cessation in operations in drilling at mines and resulting in heavy costs.

Gain in Employment at Youngstown

August wage distribution by Youngstown, Ohio, industries of $3,349,974 compares with $3,323,982 disbursed in July. This is the first gain in payroll at Youngstown in several months. According to a statement issued by the United States Department of Labor, Youngstown leads other cities in the increase in number of persons employed in industry in August as compared with July. Youngstown's gain is 27.7 per cent, whereas the average increase in 65 principal industrial centers is 1.08 per cent. The Department of Labor bases its figures on reports from 1428 firms in the various cities which usually employ 500 or more persons.

During August the Ford Motor Co. made 109,173 passenger cars and trucks in the United States, breaking its former record for a month's output by 211. Total production of Fords in this country since the beginning of this year is 645,192, an average of 80,650 a month for each of the eight months. The average output for each of the 27 working days of August was approximately 4050.

Electric Furnace Progress in 1921

Discussion of the Merits of Dual Voltages for Melting the Steel and for Refining —Heat Losses and Electrodes Considered

BY E. T. MOORE*

MUCH of the work outlined as a program for research work of necessity involves continuity of operation, a condition which has not been possible to obtain. On this account it has been impossible to complete the work, which anticipated extensive research and the recording of a mass of secured data. However, it is hoped much discussion will result from the suggestions outlined herein, and a much broader scope given to the subject. The plans called for the following lines:

1. A thorough study of the heat losses from electric furnaces.
2. Presentation of operating data on furnace electrodes, according to the electrode specifications drawn up by this committee and presented in a paper before the last convention.
3. An investigation of the merits of dual voltages, and the deleterious effect on the metal, if any, of a relatively high voltage, for melting.
4. Investigation of electric furnace phemonena.

Heat Losses From Electric Furnaces

Considerable attention has been given to the study of heat losses through walls, roof, electrodes, cooling water, and escaping gases. (A bibliography of the literature on the subject is given in the report.)

Messrs. Wolfe and Wysocki in "Heat Losses Through Electrodes of a 6-ton Heroult Furnace" give data for heat losses through the cooling water, but obviously tests of this kind are not complete, since a large amount of heat is lost at the electrodes which is not carried away by cooling water. The figure of 18.7 per cent given for power loss of the electrodes did not represent the complete loss at this point. This is especially true in those furnaces where there is considerable clearance between the roof and the electrodes, which permits the escape of gases in large volume, carrying a tremendous amount of heat with them. The economizer referred to in our last report will prevent the escape of a large amount of heat, and lengthen the life of the electrodes as well.

In the Stobie furnace, which was developed in England and used quite extensively there, the makers claim a device which greatly reduces the heat losses at the opening between roof and electrodes. This device consists of a series of telescoping tubes placed around the electrodes above the roof, and quite effectively seals the opening against escaping gases and heat. The maintenance of tight joints between adjacent sections is a matter which should be investigated.

A considerable amount of heat loss occurs through furnace doors, which should be designed to give as effectual a seal as possible.

Electrode Specifications

An initial specification on any material generally cannot be complete, and the committee has realized that its first attempt to draw up an electrode specification, such as the one presented at our last convention, would be far from satisfactory.

It was hoped, after a year's use of the suggested specification, to send out another questionnaire to manufacturers, and record the results of such use in this paper. The industrial depression has caused the shutting down of most electric furnaces, and operating data under the new electrode specifications are therefore not available. It is hoped the specifications will be criticized and eventually corrected and elaborated.

In the committee report before the last convention reference was made to "a well defined belief that the high rate of melting, obtained by high voltages, is detrimental to the quality of the product, especially to tool steel." A considerable amount of discussion by correspondence has taken place as to the relative merits of dual voltages, the matter dividing itself into three features: Effect of relatively high voltage during melting, on the quality of steel. Effect of relatively high voltage during melting, on the refractories within the furnace. Effect of relatively low voltage during refining, on the refractories within the furnace.

High Voltages During Melting

There seems to be a general opinion that equal results as to metal quality can be secured by either single or dual voltages. Some users feel that there is practically no change in the quality of steel when melted and refined at one voltage anywhere between 100 and 140 volts, such as is used in the Heroult, Greaves-Etchells, Ludlum, and similar types of furnaces. However, there seems to be a decided antipathy for voltages, say 160 to 250, as the extremely long arc with such voltages is detrimental to the metal, particularly high grade tool steels, and also very severe upon the refractories, especially during refining.

On the other hand, while it appears reasonable that detrimental effects to the metal are produced during a high voltage melting period, yet these effects can largely be eliminated by a relatively longer refining period. It is also evident that better steel is made by preventing contamination of the metal, than by allowing contamination and then attempting to eliminate the injurious elements. In other words, we return to the old adage "an ounce of prevention is better than a pound of cure," and whether or not this is worth considering, from the standpoint of commercial steel production, is more or less debatable.

As to just how the steel is affected no one at present, it would seem, can answer, for this brings in such obscure phenomena as the effect of oxygen and nitrogen on molten steel at high temperatures. In a mass of solid steel scrap, having a source of intense heat at its center, with considerable space for gases to play between the fragments of material, we have an ideal condition for the thorough mixing of oxygen and nitrogen with solid, molten, and even vaporized steel.

That such conditions permit of the most active chemical action between the gases and the steel needs no comment. The more intense the action is, the longer must be the period when these gases, oxides, nitrides and other combinations must be eliminated from the final product. This action is present in a greater or less degree in every arc furnace, or open-hearth furnace for that matter, and it might be pointed out now that this may be one of the reasons why the induction furnace is said to produce a higher quality of steel.

Effect of a Long Arc

Assuming, however, that nitrogen is injurious to steel, it would appear that nitrogen fixation would increase when a relatively longer arc with high voltage was used, than with a short arc when lower voltages are used. In other words, the principle of a steel melting furnace with such a long arc is very similar to the Berkelund and Eyde or Schonherr nitrogen fixation furnaces. The fact that the arc is long gives a much greater path of air for the arc to pass through, and it is reasonable to assume as a hypothesis that the greater air gap the arc traverses the greater will be

*Electrical engineer, Halcomb Steel Co., Syracuse, N. Y. The article is the report, substantially complete, submitted by Mr. Moore's committee to the Association of Iron and Steel Electrical Engineers, at the Chicago convention.

the quantity of nitrogen or nitrous oxide produced.

You will readily recall experiments made in the laboratory with an ordinary static machine, and how the length of the arc was varied by increasing the air gap. You also probably noticed that the longer the arc the more perceptible the presence of ozone became, indicating a greater conversion of oxygen to ozone.

While ozone is an allotropic form of oxygen, one and one-half times as dense—a much more powerful oxidizer than oxygen gas, and nitrogen a very inert gas combining only at high temperatures, and then only with a limited number of elements, it would appear consistent to expect similar results with both as expressed in our hypothesis. The fact that nitrogen combines only at high temperatures is a fair indication of its presence in steel, particularly when a long arc is used, as with higher voltages.

As a result of this supposition, it was thought desirable by the committee to investigate thoroughly the phenomena within an arc furnace, by taking photographs of the arcs with a multi-exposure high-speed camera, and simultaneously recording the phenomena of the circuit with an oscillograph. Also a close analysis of the steel, both physical and chemical, was to be made with particular reference to the occurrence of nitrogen in more or less degree, as the value of the melting voltage and consequently the length of the arms were increased.

Microscopic examination of steel has revealed a fine irregular needle structure, which has generally been accepted to be typical of iron nitride. This structure has been studied by a number of investigators, as outlined in the report. In an article in THE IRON AGE, *volume* 108* on "An Occurrence of Nitrogen in Steel," A. A. Blue presents data showing evidences of direct combination of ordinary inert atmospheric nitrogen with iron at moderate heating temperatures.

Presence of Nitrogen at High Temperature

If evidence of nitrogen is found in iron at moderate heating temperatures (not over 1800 deg. Fahr.), it is reasonable to assume that at temperatures several times these amounts, such as exist in the electric furnace, a much greater combination will result. To our knowledge this type of investigation has never been made, although J. Kelleher, in his paper "Some Phenomena Observed in Electric Furnace Arcs," before the American Electrochemical Society, projected images upon a screen through an aperture in the walls of a small single arc dc experimental furnace, from which sketches of the arc could be made.

These sketches showed that the flame of the arc apparently flowed from the electrode to the slag, depressing the slag and flaring out at all sides when the electrode was the negative pole. An arc length of 3 in. was easily maintained, and under these conditions the arc was silent. With the electrode as the positive pole the arc was very unstable, starting below the surface of the slag, the flame moving away from the slag surface and projecting particles of slag into space with considerable force. The arc could barely be maintained, at a greater length than 1 in., and was loud and spluttering.

These observations were of course made in an experimental furnace using direct current, and may have no bearing in a commercial furnace. However, the obscure information obtained certainly warrants further extended investigation and discussion.

In carrying out this work, it was proposed to use a new type of portable oscillograph to record the wave form, building up of current, instantaneous current and voltage wave distortion, high frequency, harmonics and other phenomena. As a number of phenomena in an electric furnace circuit are over in 0.001 second, the ordinary moving picture camera, capable of from 15 to 35 exposures per second, is hopelessly slow, and it was proposed to use a polar multi-exposure high-speed camera capable of taking pictures at the rate of 3000 per second, thus being comparable to the oscillograph in recording the details of transient electrical phenomena.

For some purposes, of course, such speed is not necessary, but for many of the extremely rapid changes in the configuration of visible forms the finely defined, well distinguished, high-speed pictures are necessary if data of any value and utilization are to be secured. The stereoscopic exposures obtainable, when properly mounted, give, with unusual vividness, a view of what is occurring in the arc, as the flame or object appears to stand out in space, disclosing the shape in three dimensions.

The oscillograph and high-speed camera are synchronized so that, by pressure of a single button, the mechanism of both is operated so as to give simultaneous records.

Effect on the Refractories

Irrespective of the merits or demerits of high voltage during melting on the quality of steel, the effect upon the refractories within the furnace is about the same in each case, for the reason that the charge is cold, and most of the heat generated goes into the cold metal. Also, at this stage of operation, there is no blanket of slag to reflect the heat of the arcs in such manner as to cause damage to the refractories.

Unquestionably the use of a relatively lower voltage for refining is desirable, since the amount of power input can be much reduced. With a lower voltage and reduced power input a much shorter arc can be maintained, and this alone will give a prolonged life to the refractories of the roof, and to the walls as well. With a single voltage available, this must be high enough—usually around 100 volts—to give suitable power input to the furnace for reasonably rapid melting, and yet for refining purposes this is too high, because excessive heat radiation from the longer arcs will greatly curtail the life of the roof.

On the other hand, a voltage of 100 for melting, while entirely satisfactory, can reasonably be increased to at least 120 volts without injuring the refractories a bit more than with 100 volts, and in addition more rapid melting is secured, better regulation from the regulators, and the kwh. per ton input reduced. In some instances, a value of even 140 volts would be advantageous, although above this point joint trouble is liable to develop in the electrodes. The values given above are based on 3-phase 6-ton Heroult furnaces.

For refining, a voltage low enough to give sufficient power input into the furnace to maintain heat balance is desirable, and yet not low enough to allow the electrodes to dip into the bath, or the metal and slag to be splashed against the electrodes, by the action of the arcs, as contamination of the metal will result. A value of 60 volts on a 3-phase 6-ton Heroult furnace installation, with 1500 kva. connected capacity, was found ideal from a power input, refractory, and electrical efficiency standpoint, but undesirable because the electrodes would occasionally drop momentarily into the bath, and thus increase the carbon content of the steel. A voltage of 65 was likewise found undesirable.

At 70 volts, however, the arc length is greater, and the vertical distance from electrodes to bath level sufficient to give nearly as good electrical and refractory performance as at 60 volts, but with much greater safety from contamination due to dipping electrodes. Values of 75 and 80 volts are also desirable, but with a slightly decreasing electrical efficiency and refractory life, but greater safety from contamination. Individual installations will require separate consideration, with the selection of a value between 70 and 80 volts, which will best meet the specific case.

General Conclusions

To recapitulate, it would appear that as good steel could be made using dual voltage as with one voltage, provided the melting voltage is not too high; and, in addition, better economy may be secured electrically and from refractories. This economy amounts to quite an amount, so that the use of dual voltages is well justified and, we believe, will pay handsome dividends.

On Jan. 1, 1921, the total number of electric steel furnaces in this country was 356, and we believe this number has not been increased during the first six months of this year. There has been very little activity in the non-ferrous industry, although there has been a small increase in the number of brass furnaces.

*July 7, 1921, page 1.

Three Types of Alloy Sheet Steel—III

Electric and Acetylene Welding Details and Their Effect on Physical Properties —Chrome-Vanadium Steel Adopted

BY HORACE C. KNERR*

ELECTRIC spot welds, although not used to transmit heavy stresses, play an important part in the manufacture of sheet steel fittings, often being used to hold parts in place for brazing and, in some cases, to replace rivets. Tests were therefore made to determine the comparative value of the three alloys in spot welding.

Specimens of ⅛-in. sheet were sheared into strips about ½ in. wide and 4 in. long. A pair of strips was overlapped about ½ in. and a single spot weld applied to join them as in Fig. 1. One set of 5 specimens of each alloy was welded as received and another set was pickled before welding, to remove scale.

Electric Spot Welds

After spot welding, the specimens were heat treated identically with the corresponding tensile specimens and then tested in tension, the breaking load in pounds being determined. The results are given in Table 6. Tests of spot welded specimens show that:

All three steels spot welded satisfactorily.

Removal of scale by pickling greatly improved the strength and uniformity of joints in each case, and the welds were made much more rapidly.

When pickled, the greatest average breaking strength was obtained from the 3.50 per cent nickel steel. Unpickled, chromium-vanadium steel gave best results. The unpickled 3.50 per cent nickel steel showed the greatest variation in strength.

All but two specimens, marked "X," Table No. 6, failed by shearing through the spot weld. These two failed by breaking the specimen in tension, tangent to the spot, and were the two highest in tensile strength.

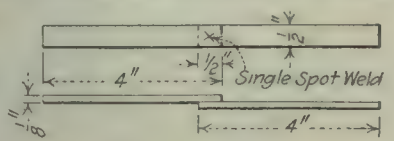
The spot welds varied from 3/16 to ⅜ in. in diameter.

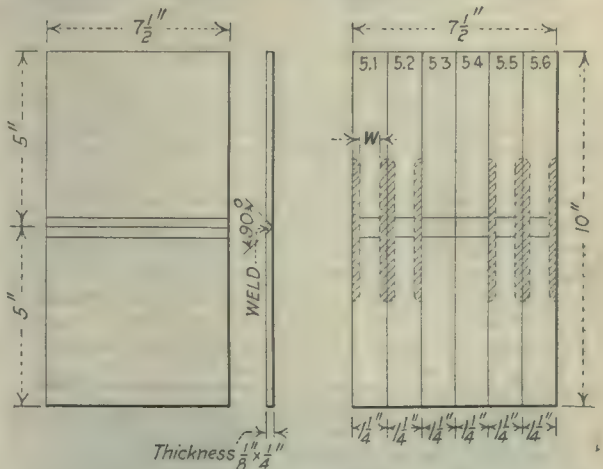
The nickel-chromium specimens showed a tendency to porousness in the weld.

Acetylene Welding

Two sheets, 7½ in. wide by 10 in. long, were taken from each grade and thickness of steel. These sheets were cut in half and the cut edges milled to a 45 deg. bevel, so as to give a 90 deg. V when joined (Fig. 2), the joint being a continuous weld 7½ in. in length.

One set of sheets was welded with copper-plated Norway iron welding rod. The other set was welded with the parent metal, strips about 1/16 to ⅛ in. wide being sheared from the ⅛-in. sheet of each grade for welding rod. No flux was used in either case. The specimens were supported so as to allow free expansion during welding. The sheets were laid on firebrick and preheated with the oxyacetylene torch to a dull red heat for about one inch back from the joint. The ends of the joint were first "tacked." The ⅛-in. sheets were welded in one run; the ¼-in. specimens





Figs. 1 and 2 (Upper and Left) Show Method of Welding Used. Fig. 3 (Right Lower) Size and Appearance of Tensile and Bend Specimens Cast from Original Sheets

*Metallurgist Naval Aircraft Factory, Philadelphia. The first and second installments appeared in THE IRON AGE, Sept. 8 and 15.



Fig. 4—A Front and Back View of the Welded Sheets. This particular one is the bead side of welded sheet No. 12, nickel-chromium, ¼-in. thick, parent metal melt bar, which developed a shrinkage crack (arrow)

required a second run to fill the joint. The weld was little, if any, thicker than the sheet. All sheets warped slightly in welding. For uniformity, all the work was done by one welder, the most skillful operator in the shop. Fig. 4, shows the "bead" side of welded sheet No. 12, nickel-chromium, ¼-in. thick, parent metal melt bar, which developed a shrinkage crack (arrow). The corresponding ⅛-in. sheet (No. 10) also developed

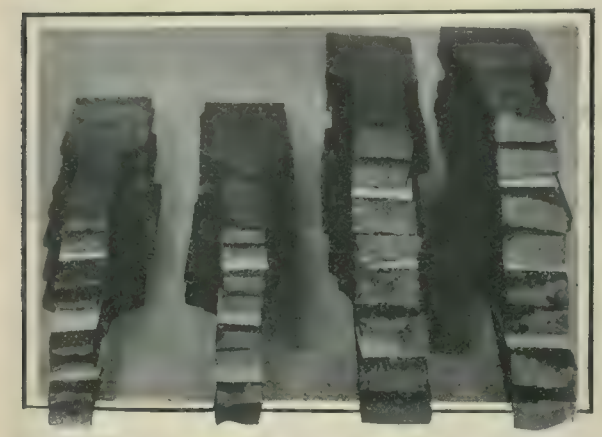


Fig. 5—Welded Tensile Specimens After Rupture, Chrome-Vanadium Steel Sheet

small cracks in the weld. The reverse side of sheet No. 15, 3.50 per cent nickel, ¼ in. is shown. No cracks were found in any of the nickel or chromium-vanadium welds.

After welding, the sheets were cut into tensile and bend specimens as shown in Fig. 3. These specimens were heat treated identically with the corresponding standard tensile specimens before testing. The joint was not "dressed" or ground off, but was tested in the condition as welded.

Average maximum and minimum tensile values for

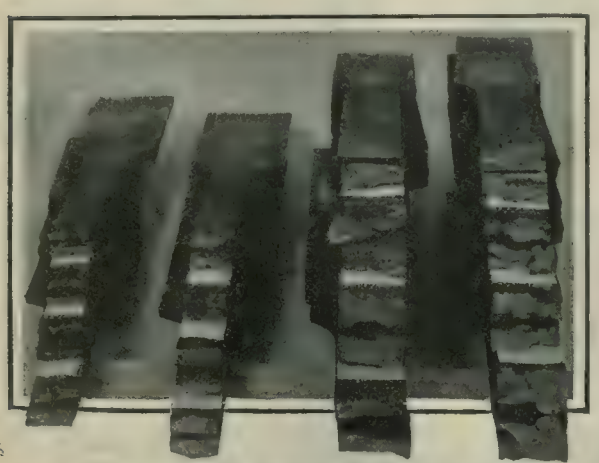


Fig. 6—Welded Tensile Specimens After Rupture, Nickel-Chromium Steel Sheet

⅛ and ¼-in. specimens of each type appear in Table No. 7. A comparison of the results obtained in the three steels, using parent metal and Norway iron melt bars is given in Table No. 8, with a final comparison of parent metal vs. Norway iron for all steels, in Table No. 9. Photographs of welded tensile speciments after rupture are given in Figs. 5, 6 and 7. The following points are noteworthy:

All three steels can be welded either with Norway iron or with parent metal welding rod. Although the latter gives a higher maximum tensile strength, the minimum strength may be as low or lower than the minimum obtained with Norway iron rod. The latter is easier to manipulate, shows less tendency to burn and to develop shrinkage cracks, and is therefore preferable.

When welded with Norway iron, chromium-vanadium steel and nickel-chromium steel gave about the same tensile strength, per cent elongation and variation from minimum to maximum of these properties, chromium-vanadium being slightly superior. Nickel steel 3.50 per cent gave slightly higher average tensile strength and lower elongation with greater uniformity (less variation).

When welded with parent metal the 3.50 per cent nickel steel is distinctly the best in all respects, having a higher tensile strength, greater ductility and greater uniformity of these qualities than the other alloys. The nickel-chromium steel is next in order and the chromium-vanadium lowest.

The welder found the nickel-chromium welding strip somewhat more difficult to manipulate than the others, as it had a tendency to become spongy and "burn."

The difference in strength of welds made with Norway iron and parent metal is much less than the difference between the physical properties of these materials, heat treatment being understood in both cases. See Tables Nos. 8 and 9.

It is noteworthy that the minimum strength values for parent metal welds were less than those for Norway iron welds in the chromium-vanadium and nickel-chromium steels. This was no doubt due to the better quality of welds made with the Norway iron and indicates that the latter is the more reliable medium, at least under the conditions of the present test.

Bend Tests

A few bend tests on welded (heat treated) joints were made. Results are given in Table No. 10. The welds were not dressed, but tested in their natural condition as with the welded tensile specimens.

Note: The operator who performed these bend

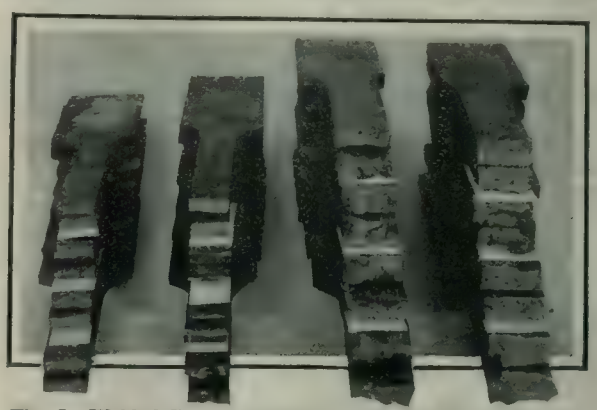


Fig. 7—Welded Tensile Specimen After Rupture, 3.50 Per Cent Nickel Steel

tests recorded which was the convex (tension) side in bending, but failed to arrange this variable in a systematic manner, placing the "bead" or built-up side sometimes up and sometimes down, so that the results are not always strictly comparable.

The 3.50 per cent nickel steel specimens showed distinctly the best bending qualities, with the chromium-vanadium second and the nickel-chromium last, which corresponds to the order of merit in the welded tensile specimens.

The angle of bend withstood by the parent metal

Table No. 6—Electric Spot Welds, Tested in Tension
(Values Give Breaking Load in Pounds)

Spec. No.	Chromium-Vanadium		Nickel-Chromium		3.50 Per Cent Nickel	
	Pickled	Not Pickled	Pickled	Not Pickled	Pickled	Not Pickled
1	4,650	2,745	3,940	2,055	3,585	1,935
2	3,755	2,080	3,740	2,455	4,750	2,890
3	3,715	4,855x	3,160	2,510	4,385	2,980
4	4,770	2,445	3,130	2,490	5,675x	3,235
5	4,105	3,860	2,280	2,095	3,560	1,060
Aver.	4,199	3,197	3,250	2,321	4,391	2,418

Heat Treatment: Spot welded specimens were given the same heat treatment as tensile specimens, aimed to give 150,000 lb. pr sq. in. in the steel. (See Table 3.) Results checked by Brinell hardness readings.

Remarks: Superiority of the specimens of all types from which scale has been removed by pickling is noteworthy.

The chromium-vanadium steel gives the most satisfactory results, considering strength and uniformity.

Specimens marked "x" broke in tension, tangent to spot weld. All others failed by shearing through the weld.

welds was practically the same as that of the Norway iron welds for each given alloy and thickness.

The results obtained from these few tensile and bend tests show great irregularity, due chiefly to sponginess and defective contact in the weld, but it is believed that a careful welder could obtain more consistent results with practice. Too much dependence should not be placed on welded joints in any case, how-

Table No. 7—Oxy-Acetylene Welds, Tension Tests
Chromium-Vanadium Steel

Sheet No.	Melt Bar	Thick, In.	Ultimate, Lb. Per Sq. In. Ave.	Ultimate, Lb. Per Sq. In. Min.-Max.	Elong., Per Cent in 2 In. Ave.	Elong., Per Cent in 2 In. Min.-Max.	Elong., Per Cent in 4 In. Ave.	Elong., Per Cent in 4 In. Min.-Max.	Rating Per Cent of 150,000 Average
5	Norway	⅛	83,200	75,400 94,700	2.6	1.0 3.5	1.3	1.0 1.7	55.5
6	Parent	⅛	47,700	25,800 85,500	0.5	0.0 1.5	0.2	0.0 0.7	31.7
7	Norway	¼	59,000	49,000 66,300	6.0	4.0 7.0	3.0	2.0 3.5	39.2
8	Parent	¼	101,300	90,300 115,200	3.2	1.0 7.0	1.9	1.0 3.5	67.4
				Nickel-Chromium Steel					
9	Norway	⅛	74,400	50,200 90,500	2.0	2.0 2.0	1.0	1.0 1.0	49.5
10	Parent	⅛	83,500	40,700 129,600	0.2	0.0 1.0	0.1	0.0 0.5	55.6
11	Norway	¼	58,800	46,100 68,500	6.3	6.0 7.0	3.5	3.0 4.0	39.2
12	Parent	¼	102,200	66,100 135,500	2.5	2.0 3.0	1.2	1.0 1.5	68.0
				Nickel Steel, 3.50 Per Cent					
13	Norway	⅛	87,250	80,100 97,100	2.5	2.0 3.0	1.2	1.0 1.5	58.1
14	Parent	⅛	132,200	120,400 136,800	2.5	2.5 2.5	1.2	1.2 1.2	88.2
15	Norway	¼	69,050	50,800 95,800	4.6	3.5 6.0	2.3	1.7 3.0	46.0
16	Parent	¼	105,050	72,700 137,400	3.8	3.0 4.5	1.3	1.5 2.2	69.7

NOTE.—All breaks occurred at weld. Each average value represents four tests.

ever, and they should not be required to transmit high stresses. A breaking strength of 25,000 lb. per sq. in. would seem to be a safe allowance for welded joints, heat treated. In special cases, this might be increased to 40,000 lb. per sq. in.

Since starting this investigation a considerable amount of chromium-vanadium steel of similar composition has been welded in the shop in the manufacture of fittings, with satisfactory results, Norway iron welding wire being used. No high stresses are transmitted through welds.

Brazing and Machining

Any of the steels may be brazed by the ordinary methods. The heat of brazing would, of course, remove the effects of previous heat treatment, and the latter must therefore follow brazing. Brazing material of 80 per cent copper, 20 per cent zinc composition has a melting point between 1650 and 1750 deg. Fahr., and will withstand the temperature of heat treatment of even chromium-vanadium steel. Although in the latter case, the margin of safety is rather small, satisfactory results have been obtained for a considerable time in production with brazed chromium-vanadium fittings which require quenching at 1625 deg. Fahr. Heat treatment tends to strengthen the brazed joint. Parts are often held together by electric spot welding before being brazed. This also prevents letting go in case the brazing material softens in heat treatment. Brazed joints develop a tensile strength of about 40,000 lb. per sq. in. and are remarkably uniform. There is less tendency to damage the steel by overheating in brazing than in welding.

All the steels were found more difficult to machine than low carbon steel sheet, but could be sheared, milled, drilled, etc., with ordinary tools in the annealed state with reasonable facility. Tests made at another time on steels of similar analysis, heat treated for 125,000 to 150,000 lb. per sq. in. showed that they could be drilled and machined on milling cutter or lathe with ordinary drills or high-speed cutters, although with some difficulty.

Impact and fatigue tests, at least of a comparative nature, on these three steels would be interesting and valuable, but lack of time has prevented including them in this investigation.

Chrominum-Vanadium Steel Adopted

As the other two types of steel failed to meet the bend test and would therefore not be suitable for the fabrication of fittings of the type intended, and as chromium-vanadium steel showed excellent qualities in bending, and was also satisfactory under all the other tests applied, this steel was adopted. As stated elsewhere in this report, chromium-vanadium steel has now been used in the fabrication of aircraft fittings for about one year. Gages run from 0.035 in. to ¼ in. This material is hot rolled, and is furnished in sheets most of which are 18 in. by 72 in., straight rolled. The manufacturer believed that a carbon content of 0.30

Table No. 8—Comparison of Alloys
Welded with Norway Iron and Parent Metal
(Average of ⅛ and ¼-in. Specimens, Each Alloy)
(Data from Table 7)
Chromium-Vanadium Steel

Sheet No.	Melt Bar	Ultimate, Lb. Per Sq. In. Ave.	Ultimate, Lb. Per Sq. In. Min.-Max.	Elong., Per Cent in 2 In. Ave.	Elong., Per Cent in 2 In. Min.-Max.	Elong., Per Cent in 4 In. Ave.	Elong., Per Cent in 4 In. Min.-Max.	Rating Per Cent of 150,000
5 & 7	Norway	71,100	49,000 94,700	4.3	2.0 7.0	2.1	1.0 3.5	47.3
6 & 8	Parent	74,500	25,800 115,200	1.8	0.0 7.0	1.0	0.0 3.5	49.5
			Nickel-Chromium Steel					
9 & 11	Norway	66,600	46,100 90,500	4.1	2.0 7.0	2.2	1.0 4.0	44.3
10 & 12	Parent	94,880	40,700 135,500	1.3	0.0 3.0	0.6	0.0 1.5	61.8
			Nickel Steel, 3.50 Per Cent					
13 & 15	Norway	78,150	50,800 97,100	3.5	2.0 6.0	1.7	1.0 3.0	52.0
14 & 16	Parent	118,620	72,700 127,400	3.1	2.5 4.5	1.2	1.2 2.2	78.9

All specimens heat treated for 150,000 lb. per sq. in., as in Table No. 3.
Specimens not dressed, weld in "natural" condition.
Breaking stress figured from area of gage length adjacent to weld, therefore, represents stress in sheet at maximum load.
Approximate maximum thickness of weld given for comparison, exceeds thickness of sheets 20 to 50 per cent. Widths identical. All breaks occurred in the weld.
Practically all elongation was confined to the welds, failure having occurred below the elastic limit of the steel.

to 0.40 per cent would more easily meet the specification than the 0.25 per cent to 0.35 per cent originally called for, and at his request the higher content was allowed. This analysis (No. 6135) also met the bend test and physical tests and had the advantage of a lower critical range, which widened the margin of safety in heat treatment after brazing. It has proved satisfactory in manufacture and in service except for a few sheets which failed to harden properly in heat treatment. These were found upon examination to have a non-uniform carbon content which ran as low as 0.20 per cent and showed "ghost line" structure under the microscope. These sheets may have come from a single defective ingot, or they may have been decarburized in rolling heats or annealing.

It is understood from the manufacturer that of the three alloys discussed, the chromium-vanadium steel presents the least difficulties in manufacture, especially with regard to facility of rolling, freedom from scale and tendency to segregation in the ingot.

Prior to the adoption of chromium-vanadium steel a quantity of 3.50 per cent nickel steel and also of plain carbon-vanadium steel, both of 0.30 to 0.40 per cent carbon were tried for the fabrication of fittings. Each of these showed a tendency to split longitudinally when bent, and were therefore unsatisfactory for any but flat work, or where the bend could be made transversely to the length of the sheet or "grain." Neither cross rolling nor special annealing eliminated this tendency to split. The same difficulty has been found with plain low carbon sheet steel, cold rolled and annealed.

In another test, the two longitudinal and two transverse bend specimens, each of ¼ and ⅛-in. sheet, from this lot of chromium-vanadium steel, were heat treated to give about 175,000 lb. per sq. in. (Brinell hardness 340 to 375) and were bent through 180 deg. over a radius equal to three times their thickness. The four ¼-in. specimens showed no cracks, but one of the four ⅛-in. specimens failed on a longitudinal bend.

Similar bend tests were made on sheets of chromium-vanadium steel of 0.35 per cent carbon content, from a different manufacturer, and heat treated to develop 150,000 lb. per sq. in. These withstood a transverse bend, but failed when bent longitudinally.

Molybdenum Steel Suggested

It has been suggested that chrome-molybdenum steel might have superior qualities for the manufacture of high strength sheet steel fittings. Samples of this steel of about 1.00 per cent chromium, 0.35 per cent molybdenum and 0.30 per cent carbon have been obtained from the same manufacturer and will be given tests similar to those outlined above.

Table No. 9—Norway Iron Versus Parent Metal Weld Average—All Alloys

Melt Bar	Spems. Tested	Ultimate, Lb. Per Sq. In. Aver.	Ultimate, Lb. Per Sq. In. Min.-Max.	Elong., Per Cent in 2 In. Ave.	Elong., Per Cent in 2 In. Min.-Max.	Elong., Per Cent in 4 In. Ave.	Elong., Per Cent in 4 In. Min.	Rating Per Cent of 150,000
Norway iron	24	71,950	46,100 97,100	4.0	2.0 7.0	2.1	1.0 4.0	47.9
Parent metal	24	95,300	25,800 137,400	2.1	0.0 7.0	0.2	0.0 3.5	63.4

Ericsson and DeLamater to Be Honored

On the sixtieth anniversary of the battle of the Monitor and the Merrimac at Hampton Roads, Va., tribute will be paid in fitting ceremonies to the memories of Cornelius H. DeLamater and Capt. John Ericsson, pioneers in the development of the naval, marine and industrial interests of the nation, particularly during the Civil War. Bronze tablets will be erected on four sites of buildings in New York, with which these men were identified. The first is the Phoenix Foundry, 260 West Street, where the first iron boats in this country were built; the second, the DeLamater Iron Works, foot of West Thirteenth Street, where were built the first self-propelled torpedo, the first submarine boat and the engines for the original Monitor; third, the Continental Iron Works, Greenpoint, Brooklyn, where the hull of the Monitor was built; fourth, No. 36 Beach Street, where Captain Ericsson lived, worked and died.

The tablets will be unveiled on March 9, 1922, a dinner being held that evening. About 20 societies are behind the movement. The Government has appropriated $35,000, private individuals have subscribed a larger sum for a memorial to Captain Ericsson in Washington, and $5,000 is being raised for the tablets to be placed in New York. Affairs are in charge of the DeLamater-Ericsson Tablet Committee, 29 West Thirty-ninth Street, New York.

Table No. 10—Welded Specimens—Bend Test

(Specimens Heat Treated, Same as Tensile Specimens, Table No. 7)

(Specimens Not Dressed)

Chromium-Vanadium Steel

Thickness	⅛ In.				¼ In.			
Melt bar	Norway Iron		Parent Metal		Norway Iron		Parent Metal	
Specm. marks	5.3	5.4	6.3	6.4	7.3	7.4	8.3	8.4
Convex side	Flat	Flat	Bead	Bead	Bead	Flat	Bead	Bead
Angle to break	26.5	12	26	19.5	2.5	13.5	17	25
Condition of weld	Good	Fair	Good	Good	Fair	Seam (Flat)	Pits (Flat)	Fair

Nickel-Chromium Steel

Thickness	⅛ In.				¼ In.			
Melt bar	Norway Iron		Parent Metal		Norway Iron		Parent Metal	
Specm. marks	9.3	9.4	10.3	10.4	11.3	11.4	12.3	12.4
Convex side	Flat	Bead	Flat	Flat	Flat	Flat	Flat	Bead
Angle to break	19	30	15	32.5	8.5	5.5	12.5	6.5
Condition of weld	Seam (Flat)	Fair	Seam (Flat)	Crack (Bead)	Fair	Seam (Flat)	Crack (Bead)	Cracks

Nickel Steel, 3.50 Per Cent

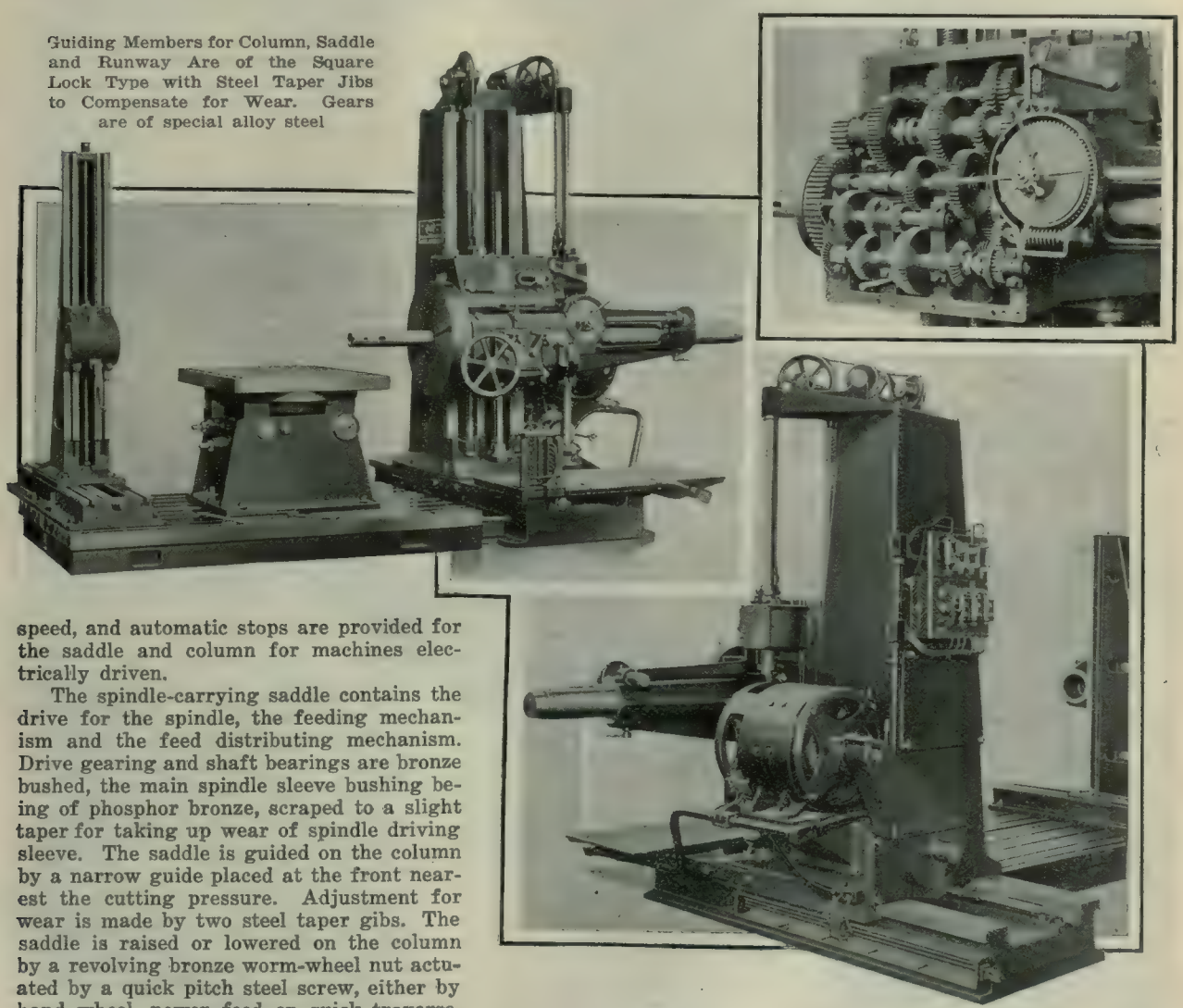
Thickness	⅛ In.				¼ In.			
Melt bar	Norway Iron		Parent Metal		Norway Iron		Parent Metal	
Specm. marks	13.3	13.4	14.3	14.4	15.3	15.4	16.3	16.4
Convex side	Bead	Flat	Flat	Bead	Bead	Flat	Bead	Bead
Angle to break	51	31.5	28	51	18	21	21.5	18.5
Condition of weld	Seam (Flat)	Fair	Good	Good	Fair	Good	Seam (Flat)	Good

NOTE.—Bends made in V-block, under compression head.
"Condition of Weld"—determined by inspection of visible flaws before bending.
"Seam"—indicates defective contact in weld.
"Pits"—indicate blowholes or sponginess.
"Cracks"—indicate cracks in weld, as by local contraction.
"Angle to break"—indicates amount of bending in degrees, from flat, to produce distinct cracking.

New Line of Horizontal Boring, Drilling and Milling Machines

The Pawling & Harnischfeger Co., Milwaukee, has developed a new line of horizontal boring, drilling and milling machines, of which the 4-F machine shown in the accompanying illustration is the smallest size. It is designed for very heavy milling and large boring operations.

Among the features may be mentioned narrow guiding surfaces; feed screws in tension; sliding parts with take-up for wear; saddle counterbalanced with counterweight inside the column; and centralized control. Milling feeds are actuated through quick pitch worm and bronze worm wheels, revolving on quick pitch screws in tension. Externally- and internally-driven face plates are interchangeable. Back gears are close to the spindle, making all drive shafts high speed, and automatic stops are provided for the saddle and column for machines electrically driven.



Guiding Members for Column, Saddle and Runway Are of the Square Lock Type with Steel Taper Jibs to Compensate for Wear. Gears are of special alloy steel

The spindle-carrying saddle contains the drive for the spindle, the feeding mechanism and the feed distributing mechanism. Drive gearing and shaft bearings are bronze bushed, the main spindle sleeve bushing being of phosphor bronze, scraped to a slight taper for taking up wear of spindle driving sleeve. The saddle is guided on the column by a narrow guide placed at the front nearest the cutting pressure. Adjustment for wear is made by two steel taper gibs. The saddle is raised or lowered on the column by a revolving bronze worm-wheel nut actuated by a quick pitch steel screw, either by hand wheel, power feed or quick traverse.

The column is of box construction with two sides straight and two tapering to a long, wide base cast integral with it. The screw for feeding is in tension and is placed near the guide. The column can be traversed in either direction by hand wheel, power feed or rapid traverse from the saddle. The runway for the column is wide and heavy. All guiding members for the column, saddle and runway are of the square lock type with steel taper gibs for compensating wear.

The spindle is an alloy steel forging ground to a sliding fit in its driving sleeve. Power is applied at the front end and the feed at the rear through a rack and pinion, the drive being through a small face plate with a coarse pitch gear or a larger face plate with internal gear. These face plates have slots and tapped holes for the attachment of milling cutters and facing heads. The spindle-driving sleeve is of semi-steel, ground to a taper fit and is provided with adjustable bronze taper shoes for taking up wear.

The machine is driven by motor, constant or variable speed, or by belt. The motor required is 10 hp. and is mounted at the base as shown in the illustration. The machine is double back geared and by three levers 18 spindle speeds, reversible, are obtained. The spindle speeds are in geometrical progression and range from 5½ to 200 r.p.m.

The boring and drilling feeds to spindle are 8 in number, reversible, and range from 0.0076 to 0.45 in. per revolution of the spindle. There are 8 milling feeds to the column and saddle, which are reversible and range from 0.009 to 0.54 in. These feeds are direct from the spindle, back geared and in geometrical progression with no idle gears in mesh. Feed gears and shafts are of alloy steel. Rapid power traverse independent of feeds is transmitted to the saddle and column at a constant speed of 60 in. per min.

Operating controls are within easy reach from the platform attached to the column. Levers are interlocking, it being impossible to have any two conflicting speeds or feeds in action at the same time. The outer support is regularly made with 48 in. vertical and 48 in. horizontal traverse. Graduated steel scales for the main column and saddle, and for the outer support saddle and column are furnished reading to 1/1000 in. by use of the Verniers.

Screw chasing attachments can be furnished for from 2 to 16 threads per in. and for any length within the capacity of the machine. Universal tilting and revolving table or a plain revolving table, with movement by hand or power, can be furnished.

The general specifications include: Diameter of spindle, 4 in.; taper hole in spindle, No. 6 Morse; feed of spindle, 36 in., and vertical travel of spindle saddle, 48 in. The horizontal travel of the column is 48 in. The height of the spindle from 9-in. bed plate ranges from 73½ in. maximum to 25½ in. minimum.

Special Features of Blast Furnace Plant

Gas Burners Under Boilers Supplemented by Auxiliary Coal—Single Venturi Blast Regulating Device—Complete Water System Includes Many Safety Provisions

AMONG the auxiliary features of the new blast furnace plant of the Trumbull-Cliffs Furnace Co., Warren, Ohio, described at page 673 of THE IRON AGE last week, the methods of firing the boilers, of regulating the blast and of handling the water are of outstanding importance. The following paragraphs cover briefly these items.

Method of Firing the Boilers

There is provided 4000 hp. in five units of 800-hp. class "M" Stirling four-pass boilers, built for 231-lb. pressure and 125 deg. superheat. All boilers are gas fired, each being equipped with four improved 14-in. Birkholz-Terbeck burners, placed at the rear of the boiler under the mud drum. The mud drum is set at an elevation of 10 ft., to provide a large distinct gas combustion chamber. The burners are arranged for removal of cone for cleaning.

Control of gas at the burners is by means of butterfly valves on the individual legs to each burner, and gas is shut off by one large gate valve in the main leading from the large boiler house gas main. In addition, this main can be filled with water to form a water seal valve, thus safely isolating any particular boiler when it is to be entered for cleaning or repairs. The boiler house gas main itself is outside of the building at yard level; dust removed from it is washed through a concrete trench direct to the sewer. The main has an auxiliary bleeder at its end, as has also the stove gas main.

All five boilers have provision for auxiliary coal firing, being equipped with Marion shaking grates. Coal is brought into the boiler house by means of a track hopper which discharges onto a Jeffrey belt conveyor. This conveyor was used in the construction work for handling brick, and has been re-installed at the boiler house to eliminate the large amount of hand labor usually employed in unloading coal. This Jeffrey belt in turn discharges to a Weller Manufacturing Co. shuttle conveyor which runs along inside of the boiler house, by means of which coal can be discharged to any point along the boiler house floor.

There are ash hoppers attached to the ash pits of each boiler. These hoppers are provided with gates at such elevation in the boiler house basement that a large truck can run beneath, on a concrete runway from yard elevation down into the basement floor of the boiler house. Ashes will thus be dumped direct from these hoppers into an auto truck, and used for fill on the property.

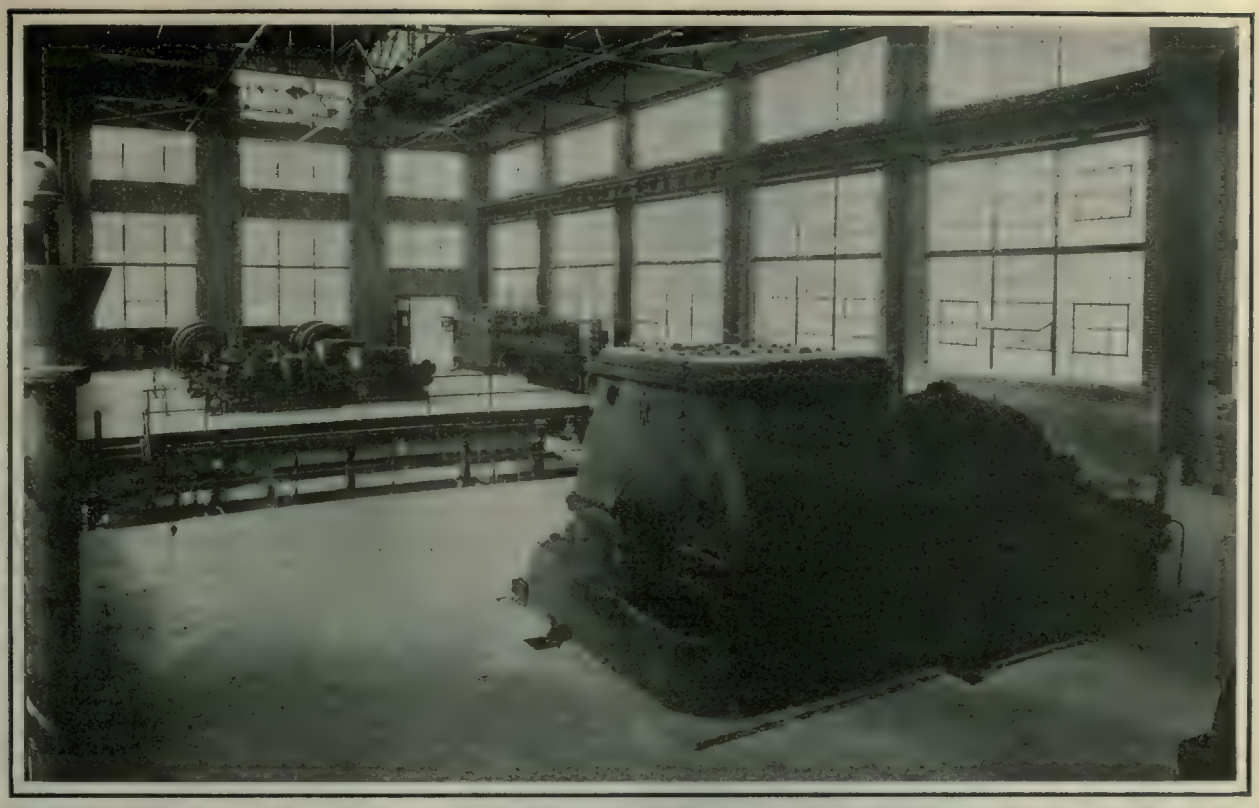
The boilers are substantially built, with particular reference to resisting gas explosions, and the fronts are so constructed that, by addition of a Dutch oven, any standard type of stoker can be placed in them, in the event either of expansion of the plant or desire to generate additional electric power with the existing units. The boilers are placed singly, right and left settings, with 6-ft. aisles.

The Blast and Its Regulation

Two Ingersoll-Rand turbo blowers comprise the blowing equipment. The air blower has five stages



Each of the Five 800-Hp. Boilers Has Four 14-In. Gas Burners, Placed at the Rear, Under the Mud Drum



Possibility of Considerable Future Expansion Is the Predominant Characteristic of This View in the Power House. The turbo-blower is in the foreground. Turbo-generator and motor-generator sets appear in the background, with the switchboard against the right wall. The excellent lighting is evident

and the steam turbine seven. These blowers have a nominal capacity of 45,000 cu. ft. of air per min. at 30 lb. pressure, and will blow 55,000 cu. ft. of air per min. at 22 lb. pressure. The turbines are of new Ingersoll-Rand design, having but two steam admission valves, one for normal load and one for overload.

The regulating device is also of an improved type, consisting of a single venturi instead of the old type of triple venturi. The single venturi is not so sensitively affected by leaks in the intake line, nor by dust or dirt in the air. There is a separate air intake for each blower, which is led up to a considerable distance above the power house roof. Recording gages are provided on each intake to record the amount and regularity of blast volume blown.

Safeguards Feature the Water Supply

The water system of the plant deserves particular mention, as considerable economy is effected in the use of water, at the same time retaining the very desirable element of simplicity of circulation, and furthermore obtaining the possibility of using different sources of water at many points, in the event of failure of any particular source.

Considerable space was saved at the river pump house, which is of novel design, consequently eliminating much concrete and excavation work. The suction well for the pump is inside the pump house, water being led from the pool outside into the tunnel through two 72-in. Link-Belt vertical traveling refuse screens. These are fitted with ⅜-in. screens and driven by 5-hp. motors.

In the pump house are installed three 12-in. 6000-gal. 115-ft. head Worthington pumps, motor driven. Two of these pumps, operating, deliver water to the turbo blower and to the turbo generator condensers. Tail water from the condensers is led by a weir to a sump running lengthwise of the pump basement. From this sump the three 4500-gal. Worthington service pumps, two operating, draw their supply and pump through a 20-ft. by 120-ft. standpipe located between the power and boiler houses.

This standpipe in turn delivers water to the blast furnace, cast house, hot blast stoves, cinder pit, gas washer, pig casting machine and water purifying plant, together with all other miscellaneous uses. The flexibility of this system lies in the fact that the lines are so arranged that, if desired, the standpipe can be by-passed altogether, or it can be used simply as a floater on the service line, no water being actually pumped through it.

Safety provisions are adequately taken care of by connecting the line, that leads from the river pumps to the condensers, to the service water line into which the power house service pumps discharge. In the event of these pumps for any reason being out of commission, the river pumps have sufficient head to keep water on the blast furnace bosh, stoves and water seals and to supply water to the feed water treating plant, thus assuring a supply of water that will prevent damage or serious accident. A further safety provision is afforded in having this same by-pass line from the river pumps discharge, if desired, into the sump from which the basement service pumps draw their supply. This may be found useful in case the condensers have to be taken off.

A further safety provision is found in an ingenious method of returning the bosh water. The overflow water from the furnace is all conserved, and led by a separate pipe line back to a cistern at the extreme end of the basement sump. As long as the level of water in this sump is kept up to the mark by the water coming from the condenser tail water pits, then the return water from the furnace overflows into the sewer and back into the river. However, if the amount of water coming through the condensers and thence to the sump should for any reason be deficient, then the return water from the blast furnace runs into the sump, from which the service pumps pull their supply. Under normal conditions of operation there is about a 40 per cent surplus of condenser tail water going into the sump, over and above the amount of water required at the plant exclusive of condensers.

To safeguard still further the plant supply of water, the lines of the standpipe are equipped with check valves, which will prevent the standpipe from emptying in the event of a break in the line. A final safeguard at the furnace is the provision of check valves in the two distinct water supply lines leading to the circle pipe. Between the circle pipe and these check valves is connected a line from the Worthington high-pressure pump. Inasmuch as this is normally continually kept floating on the high pressure line, the furnace bronze can be preserved in the event of failure of lines or service pumps by opening up the line admitting high-

pressure water to the circle pipe, the check valve preventing escape of this water back into the main service water line.

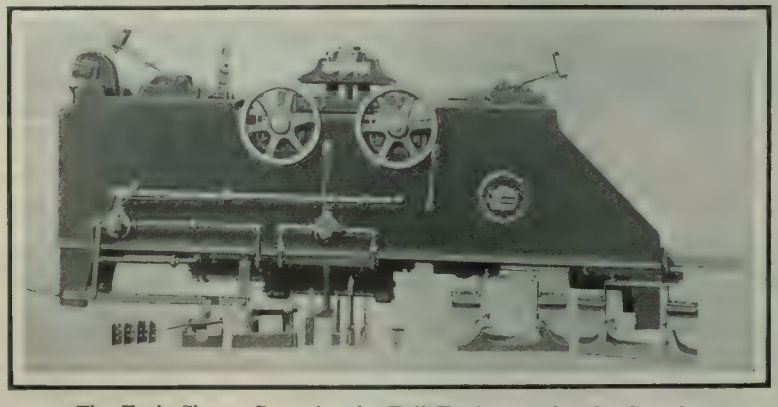
This high-pressure water is similarly piped up to the stove fittings and to the main isolating water seal valve; in an emergency the high-pressure pump can draw its supply of water from the standpipe which, in the event of a very bad accident or breakdown at the pumps or lines, would still remain full of water. It will be seen that the plant is assured of a supply of water that will last almost indefinitely in an emergency, by virtue of the provisions for re-circulation of water.

The boiler feed pumps similarly have a triple source of supply. Normally they take from the feed water heater. In emergency they also draw from the basement sump, from the blast furnace service water lines or from the line leading from the river pumps to the condensers. The turbines similarly draw on two sources for their supply of cooling water, i.e., the service water supply line and the condenser water supply line.

In addition to the Link-Belt traveling screens at the river pump house, the lines are further provided with Elliott twin basket strainers at both of the supply lines to the furnace circle pipe and to the stoves, and also at the line leading to the gas washer. The boiler feed line, the gas washer line and the furnace supply water line are fitted with veuturi meters. A tank is provided at the machine shop to which treated water is pumped from the power house basement for the use of the yard locomotives.

Machine for Assembling and Dismantling Hose

A machine for use in railroad shops in the dismantling and assembling of air-brake, signal and steam hose has been developed recently by the Covington Machine Co., Covington, Va. It is claimed that it will do its work without damage to fittings and without straining or cracking of clamps, besides effecting large savings in labor cost over the usual hand method. It is stated that on a test run, one man dismantled 100 air hose in one hour and assembled 25 air hose ready for service in the same length of time.



The Tools Shown Comprise the Full Equipment for the Complete Range of Work

The entire equipment of tools for the performance of the complete range of work is shown in the illustration. The change from one operation to another is said to be effected in less than 2 min. Air and signal hose are handled by the same tools except the nipple puller which can be put in place in 10 sec. when wanted. Other changes are quickly and easily made. Hose in any condition can be dismantled, even if cut off close up to the fitting. In assembling fittings into new hose injury cannot result as the hose is held rigid without clamping.

Drier Air for Blast Furnaces*

Investigations have shown that the moisture content in air at an altitude of 100 ft. above ground level is about 20 per cent lower than at the ground level, both measurements being made in the neighborhood of a blast furnace. This led to an inquiry as to whether such a difference is universal, or due to specific conditions surrounding a blast furnace.

Further investigation has indicated that a difference of moisture content as high as that observed in the present instance was by no means universal, and was probably due chiefly to the fact that air, even at an elevation of 100 ft. above the ground, in the neighborhood of a blast-furnace plant is very much colder than at the lowermost level. This is ascribed to the tremendous amounts of heat delivered to the air from blast-furnace or rolling-mill plants.

In fact, it is stated that, roughly, each 100 sq. ft. of the area of a blast-furnace plant is heated daily by 60 lb. of coke or coal, in addition to which there is a very large amount of water discharged every minute in the various cooling and washing devices. This leads to the conclusion that, to obtain as dry air as possible it is of advantage to take it from a high elevation.

To meet these conditions, the blowing-engine house at the Rombach mills, when reconstructed, in 1912, was arranged with the suction orifices of all the eight gas-driven blowing engines in a common suction tower 138 ft. high. After the new blower unit was completed, in 1915, fifty-three measurements were carried out, with the result that it was found that air taken through the top of the tower contained, on an average, 12 per cent less moisture than air at the ground level.

In this connection it was found that, when the wind came from the east and northeast, there was a rapid increase in the moisture content in air coming through the suction tower. This is explained by the fact that, at the distance of some 165 ft. from the tower, was a tall stack discharging the exhaust of all the engines driving the blowers. It was evidently the vapor from this exhaust that increased the moisture content in the air.

*From a paper by J. Bronn, in *Stahl und Eisen*, June 16.

Would Abolish Railway Labor Board

Iron and steel makers in the Pittsburgh and Youngstown districts are interested in the attitude of John G. Cooper of the Nineteenth Ohio district, who states that he will institute efforts in the forthcoming session of Congress to abolish the Railway Labor Board through amendment of the Esch-Cummins law. Mr. Cooper has been in consultation with a number of independent steel makers in the Mahoning Valley on the subject.

"The Railway Labor Board is not answering the purposes for which it was created and I am convinced that its abolishment will help to bring the railroad managements and their operating forces closer together," he states. "The time has come when the Government should, as far as possible, keep hands off all legitimate business. Many, looking into the future, realize that too much paternalism in Government is a real menace."

Fewer Accidents in Iron Mines

Reports received by the United States Bureau of Mines from operators of iron mines throughout the country show that accidents in the year 1920 resulted in 106 deaths and 9072 non-fatal injuries. The figures represent decreases of 33 fatal and 26 non-fatal accidents as compared with the previous year. The iron mining industry employed 45,990 men, who worked 13,574,788 shifts, which is practically the same as for 1919. Each employee averaged 295 working days, as compared with 292 the year before.

France Seeks Export Markets for Ore

Autumn Meeting of the Iron and Steel Institute at Paris —Developments in British Basic Iron Will Reduce Iron Ore Imports—Sir Hugh Bell on Politics and Trade

(*Special Correspondence*)

PARIS, FRANCE, Sept. 5.—The autumn meeting of the Iron and Steel Institute, of which the first session opened this morning in the hall of the Comité des Forges de France, will be remembered as notable in many ways. Not only is it the first foreign meeting since that held in Brussels in 1913, but the war which has intervened has changed the whole aspect of the iron and steel industry in Europe, and some indications of the nature of these changes were given in the papers and discussions.

War Questions Uppermost

Another feature which must have struck the thoughtful observer is one which previous meetings have not served to bring to the notice of the average member. This is the extent to which the doings and sayings of great industrialists, such as those at the head of the Iron and Steel Institute and the Comité des Forges de France, affect and are affected by the policies of the nations they represent. The prosperity of all modern civilization depends ultimately on the prosperity of industry, but it is a wise convention that bars political questions from what are intended to be purely technical discussions. Happily, the element of politics did not on this occasion threaten the harmony of the proceedings, although there were times when it was felt that the speakers were skating over very thin ice. Matters such as those which were hinted at and so skillfully avoided are much better discussed privately by those whose knowledge and influence may make discussion fruitful. And when the questions at issue are involved in questions of national policies on which there may be strong divergences in fundamental principles it is perhaps better to postpone discussion altogether until national policies are in better accord. This seems to have been the feeling of the meeting, and the discussions were very diplomatically confined to questions of technical interest.

In the absence through ill health of the president, Dr. J. E. Stead, to whom a telegram was sent conveying the good wishes of the meeting, the chair was taken by Sir Hugh Bell. An address of welcome was delivered by François de Wendel, president of the Comité, who urged the visitors to study the political conditions of his country during their short stay, so as to try to understand the French mentality in regard to post-war problems. He referred to the devastation of the French industrial establishments and pointed out that the "reparations," so far as they had been carried out, had all been made with French money. After stating the strong conviction of France as to Germany's longing for revenge, he said that the friendship of England and France was the best guarantee for the peace of the world.

Comment by Sir Hugh Bell

Sir Hugh Bell, acknowledging the address of welcome on behalf of the institute, recalled a conversation with the grandfather of the last speaker in 1869, prophetic of the Franco-Prussian war, and also his long-standing relations with the Schneider family. Referring to the disastrous seven years which have elapsed since the postponed meeting in France of 1914, he said it rested with ourselves to repair the disasters of the whole world. He agreed with M. de Wendel that we should face facts, although he deprecated political contentions and thought divergences of opinion were inevitable. He looked for a change of spirit. There was nothing wanting on the British side to make for France a situation as favorable as possible for reconstruction. His hope was that the eyes of Germany were opened and that her people now believe that of all the bad ways of gaining commerce war is the worst. Sir Hugh dealt very sympathetically with the injuries of France, indicating that the surest means of recovery lay, not in regarding the possibility of further German aggression, but rather in striving to re-establish international commerce on a sound basis.

Sir Hugh Bell then drew attention to the presence at the council table of Prof. Henry le Chatelier, observing that he had met his father in 1859. On behalf of the council and members he congratulated the professor on the fact that he was about to celebrate his jubilee. After acknowledgments from the professor, Sir Hugh presented the Bessemer medal to M. Charles Frémont.

Iron Ore Deposits of Eastern and Western France

THE paper with the above title by Prof. Paul-René Nicou, of Paris, gives an excellent account of France's iron ore resources and contains suggestions of the desirability of developing a strong export trade to Great Britain. The following is a fairly full abstract:

Britain's Need of Foreign Ores

Many changes have taken place in the relative situations of European iron-making countries within the period comprised between 1914 and 1921. One feature, however, remains the same, and that is the need of Great Britain for foreign ores. These ores she has sought in regions widely distributed, and in these regions she must remain vitally interested in order to ascertain whence and under what conditions she can best obtain the ores required for her blast furnaces.

A fairly considerable import trade in French ores into England had already sprung up before the war, from such ore fields as were adjacent to harbors, such as those of Normandy, Brittany and Anjou, for which Caen and St. Nazaire competed with each other. The ores of Algeria and Tunis, whose purity rendered them specially suitable for the manufacture of high-grade pig iron, were likewise arousing interest, as well as those of Lorraine, among which were the richer of the Briey ores, which had already reached those regions of the United Kingdom more particulaly engaged in the manufacture of phosphoric pig iron.

During the war the eastern ore fields of France were unable to be of any assistance to British metal-

lurgy, having been occupied, from the outset, by the German army, and it was not until after the armistice that the enemy evacuated this district. On the other hand the Algerian, Tunisian, Normandy, Anjou and Brittany ore deposits supplied British works, if not with very large quantities, to as great an amount as the exigencies of war permitted. Numerous colliers, laden with the coal necessary to French industry, returned with the ore cargoes of which the United Kingdom was in pressing need.

Now that circumstances have altered and that France, as the result of the recovery of Alsace-Lorraine, has become, of all the continental nations, the possessor of the largest iron ore resources, it is not surprising that British metallurgists should look once again to France as a source of supply, and that the relations which existed before and during the war should display a tendency to become closer and closer, to the great mutual benefit of both nations.

Production of French Iron Ore

To begin with, it may be of interest to compare present day production with the pre-war production, and briefly to sum up the whole situation in regard to the production of iron ore in France. Recourse will be had, for this purpose, to statistics collected by the Department of Mines. The figures for 1920 are provisional only. In 1913, the latest year for which statistics are not affected by the outbreak of the war, the total production of iron ore in France amounted to 21,917,870 tons, distributed as follows:

	Tons
Lorraine (Meurthe-et-Moselle)	19,978,937
Normandy	812,984
Anjou and Brittany	399,926
Pyrenees	370,347
Other districts	355,676

The overwhelming proportion contributed by Lorraine is clearly shown by the foregoing figures. It amounted to 91 per cent. To the total just given, in order to compare the outputs for 1919 and 1920, must be added the output of ore fields of recovered Lorraine, which produced 21,136,265, making a grand total of 43,054,135 tons, produced from districts now wholly French. Of this total the Lorraine deposits produced 95.5 per cent.

Compared with this total, the 1919 and 1920 figures show an enormous falling off. Those for 1919 were only 9,429,789 tons and those for 1920, 13,871,187 tons, and whereas the 1913 production of iron ore from deposits in Lorraine was 41 millions of tons, the 1919 and 1920 figures are only 8,634,526 and 13,072,419 tons respectively. The almost complete destruction of the mines and iron works of Meurthe-et-Moselle, systematically carried out by the Germans, is the chief cause of this falling off. The production of the rich calcareous ores of the Briey field, which in 1913 were mined to the extent of 15,103,849 tons, had fallen in 1919 to 645,245 tons, but recovered considerably in 1920, in which year it reached 3,466,619 tons. The Longwy ore field suffered similarly, and the output fell from 2,958,-167 tons in 1913 to 189,853 tons and 714,610 tons respectively in 1919 and 1920. In other words, these two ore fields, whose production in 1913 was 18,062,-016 tons, did not produce one million tons in 1919 and barely exceeded four million tons in 1920.

Other French ore fields were similarly affected, although for different reasons. Their production was pushed to a maximum during the war, as they were the only productive ore regions in France outside the German occupation. They therefore enjoyed the advantages of a huge demand, and an influx of enormously increased labor recruited from miners brought from the occupied coal and iron districts, from Moors and Kabyles brought from northern Africa, and from prisoners of war. From the time of the armistice these sources of labor have been almost completely withdrawn.

The metallurgical crisis that took place directly after the armistice owing to the lack of fuel in France similarly served to reduce the orders from home works, and even if some ore fields escaped lightly, others were seriously affected, as the following figures will show:

Ore Output in Other Regions, 1918-1920

	1918	1919	1920
Normandy	812,984	322,929	357,200
Anjou	399,926	52,211	119,984
Pyrenees	370,347	357,095	213,782
Other localities	355,676	63,028	107,802
Totals	1,938,933	795,263	798,768

Reduced demand for ore for export also helped to reduce production. It should, however, be noted that the proportional decrease in these districts, as compared with that of the whole of France, is 56 to 66. It should also be pointed out that the falling off in production of iron ore was not confined to the Lorraine portion of the eastern deposits. The Luxemburg output in 1913 was 7,333,372 tons, whereas in 1919 it was but 3,112,472 tons, and in 1920, 3,704,390 tons, or, taking the latter year as an example, only 50 per cent of the 1913 production.

Transportation of Lorraine Ores

Although the iron ores of Lorraine, the export of which across channel only commenced in 1912 with 28,014 tons (which rose in 1913 to 69,224 tons), have been a much shorter time on the British market than those of Normandy and Brittany, they are destined, sooner or later, very largely to be laid under contribution by British iron makers. The ores of this field are doubtless less favorably situated, from the point of view of transport, than those of Normandy, Anjou and Brittany, seeing that Homécourt, the northern extremity of the ore field, or, at any rate, of the export area proper, is 400 kilometers by rail from the port of Dunkirk, and that it is not yet feasible to make use of any waterway which might afford cheaper means of transport. The project of a north-eastern canal which should link up the Longwy metallurgical region with the Ardnnes and be in communication with existing waterways, thus improving considerably the local conditions, has been discussed over and over again; but the heavy cost which, in existing circumstances, such a project would entail must render its realization a matter of time. Meanwhile the Lorraine ore field will have to rest content with existing means of transport, if cargoes are to be exported from a French port. The canalization of the Moselle, a project often discussed before the war, which would allow of the transport of the Briey ores to Thionville, whence they could be sent, along the Rhine, to Rotterdam, seems likewise one of only distant realization. In these circumstances the low percentage of the Briey ores is an obstacle, in these days of heavy freight charges, consequent of post-war conditions, to any extensive export trade with Great Britain. It could only be on a lowering of these transport costs, and in combination with a return trade in metallurgical coke for use in Lorraine blast furnaces, that such a trade could have any chance of early development. Its importance is, however, so considerable that many minds have been occupied with its solution.

It has already been pointed out that only the richer ores of the Briey field could constitute the material for an export trade to Great Britain. The situation may be said to resemble very closely that of the Westphalian and Belgian blast furnaces, for which the question of railroad transport becomes increasingly important, and for which therefore it is sought to secure increasingly high percentages of iron in the ores transported.

The author has hitherto spoken only of Dunkirk as the French port of embarkation. This does not mean that no others are available. Calais might be a factor in the solution of the problem, while in Belgium, where the economics of railroad administration receive rather more attention that they do in France, the ports of Bruges, Ghent and Antwerp might well enter into consideration.

Ores Best Suited for Export

The ores suitable for export to a considerable distance belong to the great metalliferous formation which was discovered on French territory, extends into Luxemburg, and is found, owing to faulting, in Bel-

gium as well. The production of this vast ore field constituted, before the war, 28 per cent of the whole world output of iron ore, and was exceeded only by one other deposit, that of Lake Superior region in the United States, the ores of which were, however, only richer by 1 or 2 per cent of iron than the Briey ores.

The French portion of the deposit, now that Lorraine has been completely recovered, is by far the more important, seeing that in 1913 it yielded 41 millions of tons as against 6½ millions in Luxemburg and some tens of thousands of tons in Belgium. The increase in the production was most marked in the portions of the field most recently opened up, that is in the Briey basin. This basin had by 1913 reached a production of 15,103,849 tons out of a total of 20 millions from the whole of French Lorraine, or over 75 per cent.

Before its discovery and opening up the iron works of Lorraine had to add to their siliceous ores lean, chalky ores, or even lime, from other regions. They have since been able to use these rich limey Briey ores, thus increasing the iron content of their burden and diminishing their coke consumption. Hence they have been able to compete at far lower prices and under far more favorable conditions, with other countries.

The Older French Lorraine Field

The older French Lorraine ore field extends over 168,910 acres, and is divided into 114 concessions, which, from the standpoint of French mining law, comprises all that is actually workable. There are still thousands of acres which might form concessions either to the north, in the siliceous ore field of Crusnes, or to the south, around Nancy and the Forest of Haye. The entire surface may be estimated at 178,000 to 186,000 acres of workable ore as against 106,260 acres in recovered Lorraine, 8890 acres in Luxemburg, and a few hundreds of acres in Belgium. Of the total, two-thirds belonged to France even before the war, and France now possesses 97 per cent of the entire area.

After dealing briefly with the geology of these ore fields, the author states that the ore is a hydrated oolithic hæmatite formed of a number of small grains consisting of concentric layers, varying from microscopic dimensions to the size of a grain of millet seed. The filling between the grains may be calcareous or siliceous and the oolitic particles are much higher in iron than the cement, containing up to 50 per cent of iron in carefully separated portions. The color varies from light yellow to gray and from red to green or dull blue.

The characteristic feature of the ore is the phosphorus content, which for many years prevented its employment. This feature now constitutes one of its greatest advantages. The proportion of iron phosphide is, throughout the whole formation, practically uniform, and only varies between 1.7 and 1.9 per cent. It is therefore entirely unnecessary to estimate the phosphorus in works using the ore, or in the resulting pig iron which, as compared with other ores, such, for example, as Swedish, is a great advantage.

The iron content of the ore rarely exceeds, in ore dried at 110 deg. C., 42 per cent, and is generally between 32 and 40 per cent, in the seams mostly worked. It often falls to 30 per cent, or even 25 per cent in certain ferruginous chalk used as fluxes. In the Briey district the ore usually runs between 36 and 40 per cent of iron. As an exception there has been found, in a particular mine in the Landres field, a kind of coarse lenticular bed 60 centimeters in thickness, formed of a black ore resembling magnetite, this deposit occurring in the middle of the gray bed. The percentage of iron has exceeded 60.

The ordinary ore contains so much moisture and carbonic acid that it loses from 8 to 12 per cent of its weight on drying at 100 deg. C., and 14 to 24 per cent on roasting at a dull red heat. Attempts have been made to profit by these properties and to roast some of the ores intended for distant transport so as to avoid carrying a useless load over considerable distances. It would be easy thus to obtain from the Briey basin ores containing over 45 per cent of iron and sometimes reaching 50 per cent, but the resulting product readily falls into powder as the result of handling and is likewise highly hygroscopic. Hence these attempts had speedily to be abandoned, and at present the ores of Briey and of other Lorraine ore fields are used entirely in the raw state.

The Nancy Ores

The Nancy ore is usually highly silicious, containing from 12 to 16 per cent of silica as against 6 to 9 per cent of lime. In some localities it becomes calcareous and contains 14 per cent of lime and 10 per cent of silica, as in the Forest of Haye deposits. The iron ore percentages are usually low, being about 32 to 34, and rarely exceeding 35 per cent. From the point of view of iron ore resources the Nancy basin, including areas beneath the Forest of Haye not yet conceded, would appear to contain 200 millions of tons of workable ore. It was the only ore field which, during the war, remained available, being beyond enemy occupation. Output was naturally greatly reduced, as only French works were deriving their supplies from the ore field, and foreign works such as those of Belgium and in the Sarre, which were ordinarily customers, and the greater part of the works in the north of France, and connected with the ore field by waterways, found themselves completely isolated. The production of the Nancy ore field since 1907 has been as follows:

	Tons		Tons
1907	1,942,000	1914	1,030,000
1908	1,963,000	1915	118,000
1909	1,959,000	1916	697,000
1910	2,091,000	1917	846,000
1911	2,041,000	1918	527,000
1912	1,974,000	1919	669,000
1913	1,917,000	1920	816,000

Briey a New Field

The Briey ore field has only fairly recently been opened up and the three subdivisions of Landres, Orne and Tucquegnieux were fully outlined by 1902. The Orne ore field, the oldest known and worked, is situated to the south of the Avril fault. Shafts were opened in the following order: Homécourt (Fond de la Noue), 1897; Joeuf, 1896; Auboué, 1900; Moutiers, 1901; Jarny, 1909; Droitaumont, 1910; Valleroy, 1910, and Giraumont, 1914. The output of the Orne ore field in 1913 constituted 43.2 per cent of the whole output of the Briey region. It has diminished considerably since the war, the Germans having allowed several of the mines to become flooded, or having rendered them unworkable, which has necessitated, since the armistice, heavy repair work, besides which the bad mining methods followed by the German engineers have here, as elsewhere, greatly jeopardized the future methods of mining these deposits.

In the Landres ore field the gray seam, the only one workable, compensates greatly for the absence of the others. It varies in thickness from 5 to 9 meters, except in the west, where it falls, at Dommary, to 4 meters, and eventually pinches out. Throughout the Landres region the iron and lime in the ore, as dried at 110 deg. C., is always in the vicinity of 50 per cent, and varies but little from this proportion. During hostilities the Landres mines, such as those at La Mourière, Joudreville, and Landres itself, were worked by the Germans occupying the region under conditions no better than those of the Orne iron mines.

The Tucquegnieux ore field, which forms the third subdivision of the Briey basin, extends to the east of the Bonvillers, Norroy, and Audun-le-Roman faults, and to the mouth of the Avril fault which marks its southern boundary. Four pits are working, at Sancy, Tucquegnieux, St. Pierremont, and Anderny. They were opened successively in 1904, 1906, 1909 and 1910. The gray seam predominates and its thickness reaches 6 to 7 meters. The ore is fairly high in iron, particularly in the environs of Mairy, and has a markedly calcareous gangue.

Five Billion Tons in French Lorraine

After giving details of the deposits at Longwy, Crusnes, and the ore fields of recovered Lorraine, the author summarizes the resources of the French Lorraine deposits. He states that if all the ore fields be

taken into account it may be estimated that the ore resources of the Nancy field amount to 200 million tons; those of Longwy to 275 millions; those of Briey to 2000 millions, and those of Crusnes to 500 millions. To this estimate must be added the 1750 millions of tons attributed by Mr. Kohlmann in 1913, which gives nearly 5000 millions as the total iron ore reserves of French Lorraine. The ores of recovered Lorraine are obviously lower in grade, and not worth the long journeys required before they could be delivered to British centers. From this point of view it is only the Briey ores which need more detailed discussion.

In order to obtain, under the most favorable conditions, a uniform average composition, many of the mines of Briey have built huge bunkers into which are delivered throughout the day the ores derived from various working places, and where what may be termed automatic mixing takes place, with the result that the lower portions, on leaving the bunkers, yield extremely uniform results. The bunkers at Landres and at Sancy, for example, have a capacity respectively of 16,000 and 12,000 tons. Another factor which contributes to the uniformity of the outputs of any given mine is the degree to which the workings have extended, so that the bunkers receive ore from widely different working places in the same mine. It is thus easier to ascertain the average composition of the output of a mine which has been well opened out and is being fully worked than that of a new mine which has just begun working. In these circumstances it may be said, broadly, that the Briey ores of the gray seam, the only one hitherto worked, yield, on a sample dried at 110 deg. C., 36 to 42 per cent of iron, 9 to 14 per cent of lime, and 4 to 7 per cent of silica, the average moisture of the undried ore being 8 to 11 per cent.

The ratio of phosphorus to iron varies within exceedingly narrow limits, and corresponds exactly with that required in the manufacture of basic pig iron. It should also be noted that the sum of the iron and the lime content of the Briey ore amounts very regularly to 50 per cent.

These ores require less coke in blast furnace working than their low iron content would lead it to be assumed. A mixture of the Briey ores with the ordinary silicious ores of Lorraine leads in practice to a consumption of coke varying from 950 to 1050 kg. per ton of pig iron (19½ to 20½ cwt.). This easy reducibility is a property of no mean value.

Export Ores of Normandy, Anjou and Brittany

The iron ores of Normandy, Anjou, Maine and Brittany are, from many points of view, and particularly from their geographical situation, the most suitable of all the French deposits for British iron works. All the mines are in close proximity to the sea. Those of Segré, in the Anjou ore field, the farthest from ports of embarkation, are only 85 and 135 kilometers distant by rail from Nantes and St. Nazaire respectively, while the Ferrière and Halouze mines, the farthest south of the Normandy mines actually in operation, are within 75 and 80 kilometers of Caen.

The freight question is likewise favorable. The whole of western France normally looks for its coal requirements to foreign countries and, because of its proximity therewith, more especially to Great Britain, while the colliers can count on return cargoes of iron ore, a factor which must exert its influence on the freights each way. Taking the pre-war year 1912, when things were normal, and conditions of the kind to which all look forward in the future, the imports of coal at the three ports of Nantes, St. Nazaire and Caen alone amounted to 2,289,797 tons, and those of coke to 19,686 tons. Out of this total of 2,309,483 tons of fuel, no less than 1,976,536 came from Great Britain. Yet in this year the exports of iron ore from Caen to Great Britain amounted only to 93,604 tons, while those from Nantes and St. Nazaire together did not equal this amount. Before the war a large number of important German companies had acquired considerable interests in the iron ore mines of Western France, and a heavy trade with Westphalia had commenced, which militated against all attempts to foster an ore trade with Great Britain.

The Normandy deposits spread over the three departments of Calvados, La Manche and l'Orne. They are in point of importance the second largest deposits in France, notwithstanding that, according to the 1912 statistics, they contributed, as compared with Meurthe and Moselle, so small a proportion of the total output. The production of ore from the Normandy mines had appreciably increased during the years which immediately preceded the war, and the 1913 output of 831,637 tons would have justified the hope that in 1914 extractions would have reached a million tons. Great developments were in progress at the Soumont mines.

Since the war the situation has greatly changed. The northern works, such as Denain, Isbergues, Valenciennes and Pont-à-Vendin, have been completely destroyed by the Germans, or so vitally injured that it will take many years to restore them. This is one of the reasons for the notable decrease in the iron ore production of Normandy. The Caen works, which drew ore from the Soumont mines, taken over by a company which has eliminated the German element, cannot develop to the extent wished for. Hence the Normandy mines must look for their own development to the export trade with which they can easily cope, while meeting all demands likely to be made upon them for home consumption.

If it be difficult to give definite estimates of the amount of the Normandy deposits, it is still more premature to attempt to do so in regard to those of Anjou and Brittany. From a geological point of view these deposits considerably resemble the former.

During the war production of iron ore in the Anjou-Brittany ore fields fell off considerably, but even with existing appliances the mines of these regions should be capable of an output of 1,000,000 to 2,000,000 tons annually of ore high in iron if rather silicious, and containing a low percentage of phosphorus. Of this output two-thirds could easily be exported. The ports of embarkation are near to the deposits, and are already important centers of the coal trade from abroad.

While, therefore, awaiting more favorable conditions in the Briey district, British iron works can continue, in the future as in the past, to import into Great Britain the ores of Normandy, Anjou and Brittany which are unaffected by the transitory conditions which render the transport charges from eastern France for the moment prohibitive.

A late addition to the above paper was also presented in the form of a note on the devastation of the Briey ore fields only, giving the latest information. It appears that at the outbreak of the war there were 18 mines in operation in the Briey district and one being sunk, employing about 15,000 workmen. During the beginning of the war the field was under the guns of Metz, and for the greater part of the war it was in German possession. The works were dismantled and the mines were operated for the German industry. Only the precipitate nature of the German retreat prevented the destruction of the mines when the Germans left, as was done with the coal mines. Further particulars were given, to the same general effect, but it seems hardly necessary to dwell in too great detail on what may be termed the devastating aspect of the meeting.

Discussion

Prof. Henry Louis congratulated M. Nicou on his very admirable résumé of the iron ore resources of France, and said that his own magnetometric measurements had confirmed the opinion of M. Cayeux that the Normandy synclines were very deep. He ventured, however, to differ from the author when he said that Great Britain for many years to come must depend on foreign ores. He thought the author had been misled by the pre-war position, when about one-third of the ore smelted in British blast furnaces was imported. That was because it was cheaper and more convenient to import ores, owing to railroad freights being high and shipping low. As a matter of fact, Great Britain was better off as regards basic ores than either France or Germany. Home production had been greatly developed during the war and more and more basic steel

was made every day. According to the Geological Survey, Great Britain had 3400 million tons of workable mesozoic ores, as compared with 5000 million tons in France. There were were also 7000 million tons of coal-field ores in Great Britain. He had no hesitation in saying that the Geological Survey had much underestimated British resources, but that did not matter as, under present conditions, much of the ore was not economically workable. He thought a change would take place in the near future in British ore requirements, and that there would be a demand for rich ores to work with a minimum of coke in the blast furnace, in view of the high cost of fuel.

H. K. Scott pointed out that Professor Louis had omitted to consider that the British lean ores were much further from the blast furnaces than was the case in Lorraine, comparing ores of equal quality. He thought the cost of transport would make it impracticable to import ores from the east of France. As regards the large estimates of ore reserves which had been given, it should be remembered that most of the ore would have to be mined by underground methods, and it would be interesting to know what proportion would be actually got.

François de Wendel agreed with Professor Louis that the British ores had not hitherto been used as much as they might be.

Sir Hugh Bell said that British iron masters are now beginning to find that it is profitable to work the home ores, due to the many improvements made in blast furnace practice in recent years. The iron trade is essentially an international trade, and the best place for an English iron works is on the banks of a river—preferably the Tees. In the next few years the world would want all the steel that the iron masters could make on both sides of the Atlantic, on both sides of the Channel, and—if he might venture to say so—on both sides of the Franco-German frontier.

The business session was then adjourned until the following day. In the afternoon a deputation of the institute laid a floral tribute on the tomb of France's unknown warrior, and a deputation from the Council was received by the President of the French Republic at Rambouillet.

Sources of Iron and Steel Imports

WASHINGTON, Sept. 19.—The Iron and Steel Division of the Bureau of Foreign and Domestic Commerce has compiled a table showing the chief sources of iron and steel imports into the United States for the first seven months of 1921 as follows:

	Canada	Belgium	China	Sweden	United Kingdom	Japan
Total	13,569	7,801	5 823	2,702	2,693	2,002
Pig iron	1,692	5,007	5,823	100	400	2,002
Rails	11,692	....	....	....	....	....
Billets	....	2,422	....	246	....	....
Steel bars	40	144	....	1,093	579	....
Sheets and plates	9	100	....	78	1,360	....
Bar iron	56	128	....	756	53	....
Wire rods	49	....	....	429	25	....
Tin plate	31	....	....	....	276	....

The six countries accounted for all but about 2000 tons of the imports during the period under consideration. Australia contributed one shipment of pig iron; Germany sent 440 tons, fairly evenly divided between bars and sheets and plates; and Czechoslovakia sent 350 tons of bars. Other small shipments came from France, Austria, Norway, and Hongkong.

Imports of iron and steel into the United States totaled only 37,050 long tons during the first seven months of 1921. This amount is considerably below the pre-war rate, which ranged from 250,000 to 400,000 tons a year, and is much smaller than the figure for 1920, when 138,000 tons were imported up to the end of July. Pig iron alone amounted to more than 85,000 tons in the first seven months of last year, and rails were up to nearly 27,000 tons.

Navy Department Awards $310,000 Crane Contract

The Navy Department has awarded a contract to the McMyler-Interstate Co., Cleveland, coal and ore handling machinery, etc., for two 50-ton dry dock cranes, one to be erected on the dry dock at South Boston and one on the new dry dock at Puget Sound Navy Yard at Bremerton, Wash. The amount of the contract is about $310,000. The crane for South Boston is to be completed in 250 days and that for Puget Sound, in 280 days.

The cranes will be steam-operated and will travel on rails having a gage of about 22 ft., with 16 wheels on each side. The truck design as developed by this company to meet the Government requirements and specifications is of considerable interest from an engineering point of view.

The cranes are of the traveling, revolving type, with a movable jib or boom. They have a capacity of 50 gross tons at a maximum radius of 90 ft. 6 in. on the main hoist and a capacity of 15 gross tons at a maximum radius of 129 ft. 6 in. on the auxiliary hoist.

A similar crane, though somewhat smaller in capacity, was furnished by this company at the Puget Sound Navy Yard about 20 years ago. This company has supplied the majority of shipbuilding cranes in the United States Navy Yards during the last 10 years. Especially noted among these installations is "the League Island," the largest capacity crane in the world, designed for, and furnished to, the Navy Department at the Philadelphia Navy Yard at a cost of about $1,000,000 and completed in December, 1919.

Cost of Living Again Rises

Figures of the Bureau of Labor Statistics show an advance of about 3 per cent in the cost of living for August, compared with July, though the latest figure is 39 per cent below that for August, 1920. The average wholesale prices of the nine groups of commodities listed are 52 per cent above the average for 1913. Household furnishings are still, as for many months, the highest item on the list; and building materials have for months held the second highest place.

Metals and metal products, at 20 per cent above 1913, show the lowest price of all, with the sole exception of farm products, 18 per cent above 1913. The metal group has fallen 4 per cent during the month, and has lost 78½ per cent of the amount by which 1920 exceeded 1913.

In the following table, all figures given, except for the retail cost of food, are wholesale prices. All are from the Bureau of Labor Statistics, except those for finished steel, which show the averages for the months indicated of THE IRON AGE composite figures. All are based on 1913 at 100. The last column shows the extent of "liquidation" during the past year.

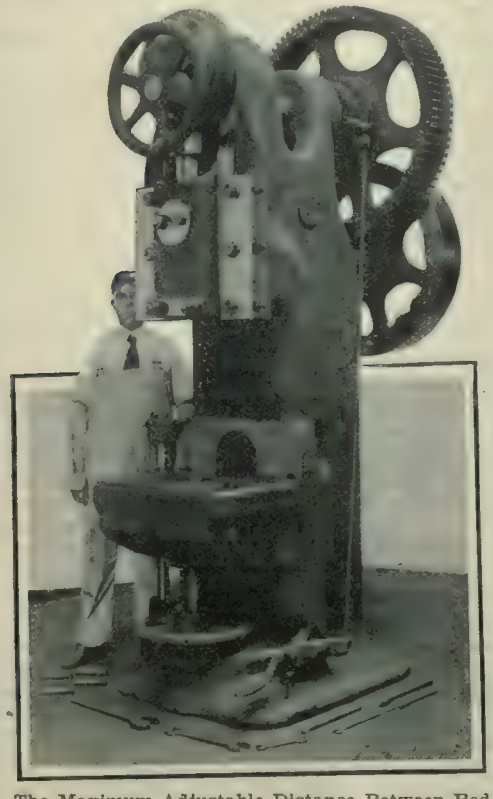
	1920	1921		Percentage Reduction	
	August	July	August	A*	B†
Farm products	222	115	118	47	85
Food, etc.	235	134	152	35	61½
Cloths and clothing	299	179	179	40	60
Fuel and lighting	268	184	182	32	51
Metals and metal prod.	193	125	120	38	78½
Building materials	328	200	198	40	57
Chemicals and drugs	216	163	161	25	47
Housefurnishing goods	363	235	230	37	50½
Miscellaneous	240	149	147	39	66
All commodities	250	148	152	39	65
Finished steel	239	148	141**	41	70½
Retail cost of food	207	148	155	25	48½

*Reduction in one year.
†Percentage cut from the excess of August, 1920, over the average for 1913.
**Since, reduced to 137.

Adjustable-Bed Punching Press

A new punch press the bed of which has a vertical adjustment for varying the distance between the bed and the ram has been recently brought out by the Ferracute Machine Co., Bridgeton, N. J. It has been designed for work requiring a long stroke and unusual height between bed and ram.

A great deal of attention has been given to strong and rigid connection between the bed and the frame. This is accomplished by means of heavy steel bolts, in addition to the support given by the 4-in. steel adjusting screw extending upward from the base. A projection at the back of the bed fitting a vertically planed recess or guide in the frame is designed to keep the bed parallel with the bottom of the ram under all conditions. These devices, it is said, eliminate all appreciable spring.



The Maximum Adjustable Distance Between Bed and Ram Is 30-In.

The press as shown in the accompanying illustration may be used for horning by inserting a horn in the 9½-in. hole in the frame at back of the bed. The hinge formed by the stud at the side of the press permits of swinging the bed out of the way when the machine is used as a horning press.

The ram has 3-in. adjustment and the bed, 9-in. A distance of 30 in. is given between the bed when it is adjusted to its lowest position and the ram when it is at the top of its stroke and highest adjustment. The ram stroke is 8 in. The press exerts a pressure of 70 tons and weighs 13,200 lb.

Metal Working in Kalamazoo

KALAMAZOO, MICH., Sept. 20.—There are 41 concerns in Kalamazoo engaged in the manufacture of products from iron, steel, copper and brass. The metal working industry is thus seen to be easily second in importance in this city and admits supremacy only to one other, that being paper making.

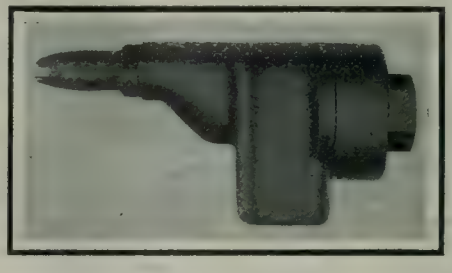
While complete reports are unavailable, the total resources of Kalamazoo's metal companies is in excess of $12,000,000. Their combined authorized capital is approximately $8,000,000 and the aggregate subscribed capital is over $5,000,000.

The corporation reports in the office of the county clerk show in detail the following statements for 1920 and 1919: In 1920 the combined resources totaled $10,733,422.49 as against $9,575,020.84 for the previous year, or a gain of $1,158,401.65 for the twelve months. During the same period there was a shrinkage in capital from $4,270,767 for 1919 to $4,217,627 for 1920.

Improved Oil Burner

An oil burner constructed to separate the gas fumes from the fuel oil, permitting the oil to pass through the orifice without pulsation, is being marketed by the Oil Burning Equipment Co., 5217 Germantown Avenue, Philadelphia.

Gases and oil, passing through the same orifice in a burner cause a fluctuation which sometimes results in extinguishing the flame and which is in most cases a detriment to complete combustion. Low gravity oil has to be heated to a comparatively high temperature to permit of atomizing and when heating the oil a certain amount of gas is produced. The burner described is designed to relieve by a separate channel the gas so generated.



Gases Escape Through Separate Channel in Top of Burner

The burner is shown in the accompanying illustration. The oil is held in suspension in the oil well, which is considerably larger in volume than the orifice through which the oil passes. The gases are thereby allowed to rise to the top of the well and escape through the gas channel in the top of the burner. In case any oil should pass through the opening with the gases, such oil, it is claimed, is heated to a high temperature in passing over the steam chamber and practically gasified in the gas channel. It is further claimed that even should the oil pass all the way through the gas channel to the burner tip it will encounter the steam coming from the mixing chamber and be completely atomized.

The burner is adaptable to heating and annealing furnaces as well as for other purposes. The tips are made in several types and sizes to meet the various requirements of burning fuel oil.

European Iron Ore Resources

France is now the leader among European nations in tonnage of iron ore reserves, with 35 per cent of the total for the Continent; the United Kingdom following with 18 per cent; Sweden with 12.5 per cent; and Germany with 11 per cent. Central and southern Russia, Spain, and Norway are the only others possessing more than 2 per cent of the total, according to a recent report issued by the U. S. Geological Survey (Bulletin 706); numerous maps, statistical tables, and charts relating to principal ore-bearing districts are included in a way to make a comprehensive and valuable report on this subject.

The St. Louis Coke & Chemical Co. is now supplying from its Granite City plant 3,000,000 cu. ft. of gas daily to the nearby towns of East St. Louis, Belleville and Edwardsville. This by-product gas is being bought and distributed by the St. Clair County Gas Co., which formerly manufactured gas for those cities by the use of oil. The Granite City company has a capacity of 8,000,000 cu. ft. of gas daily.

President Campbell Discusses Wages

Conditions in Youngstown Compared with Those in Other Districts—Why the Last Reduction in the East Was Not Followed

IN a message to employees of the Youngstown Sheet & Tube Co., Youngstown, Ohio, President James A. Campbell discusses wages and business conditions in a very frank manner, pointing out some of the difficulties which confront the industry at this time. He solicits co-operation of employees "in meeting a situation which is the worst in the history of this company, if not in the entire history of this district."

"Perhaps the worst feature of the situation," he states, "is the fact that there seems to be no immediate prospect of its becoming better. There are some hopeful signs, but as yet no assurance of permanent improvement. That conditions will eventually change for the better we, of course, all believe, but when this will happen no one can foresee. There is great danger that no material improvement will take place before the end of the coming winter, and that in the meantime our difficulties may increase, rather than decrease.

"Mills in the Youngstown district are handicapped by a number of things entirely apart from the general depression and the lack of demand for their products. One of these is the extremely high freight rates, which make their freight costs over $7 per ton for delivery of products in the Chicago district, and rates throughout the West and Northwest are on the same high basis. On all Eastern orders our differential over Pittsburgh is about 90c. per ton on domestic and 60c. per ton on export business, and it is much greater as compared with Johnstown, Buffalo and especially mills located east of the Alleghenies. In addition to increasing the cost of delivering our products to both East and West, the last 40 per cent increase in freight rates had added very materially to our costs of producing everything we manufacture. For instance, the cost of assembling materials for a ton of pig iron is now about $10, while in 1914 it was about $5. Freight on coal has increased since 1914 from 70c. per ton to $1.50 per ton. Most of the larger plants in the Pittsburgh and lower lake front districts have advantages of water transportation not enjoyed by inland points. So that any advantages we may have in the matter of costs are not sufficient to compensate for the disadvantages arising from the higher freight rates we must pay on shipments both East and West. Prior to the last advance in freight rates, Aug. 26, 1920, we were in stronger competitive position than at present, but when freight rates are restored to a normal basis, this situation will be corrected.

"The wage rate in effect east of Pittsburgh is 25c. per hr. Buffalo has the advantage of a wage rate of 26c. per hr., or about 14 per cent less than that in this district. To meet the last reduction in the East, made July 15, this district should now be paying labor on a basis of 27c. per hr., instead of 30c., which would place it on the same relative basis always heretofore maintained.

"We did not follow this last wage reduction in the East because we believe that labor in the steel industry should not be reduced further until similar reductions have taken place on the railroads, in the building industry, in all of the mining districts, in textile mills, shoe factories and other industries.

"The conditions outlined above have combined to make operation of our plant difficult and costly. We have been and are losing money, and because of the extremely low prices prevailing, our losses will continue until selling prices are higher, or we are able to operate to capacity. A number of plants confronted by these conditions have been shut down indefinitely and their orders filled through other plants where costs are lower.

"What we are doing is to meet conditions as we find them from day to day, trying to secure our fair proportion of the business going, in order to give our workmen employment and help to carry as much of the necessary overhead expense as possible. But what can be done in this direction is limited by our ability to meet competitive prices."

Professor Commons's Views on Labor Problems

LABOR should not go in for legislation looking toward public instead of private ownership nor for participation of labor on boards of directors of corporations, is the opinion of Prof. John R. Commons, head of the economics department of the University of Wisconsin, in an article, "Basic Principles for Labor," which will appear in the "Official Labor Review," the annual publication of the La Crosse Trades and Labor Council, La Crosse, Wis.

Professor Commons is the man generally credited with the drafting of the Wisconsin workmen's compensation act—a piece of legislation that has since been copied in almost every State in the Union. He was also largely responsible for the unemployment insurance bill which was introduced in the last session of the State legislature by Senator Huber and defeated.

"Experience shows," writes Professor Commons, "that neither politics nor labor as a class can manage industry, nor assume the responsibilities of management. Industry cannot be efficiently managed on the basis of popular election of the boss. Efficient managers are self made in the struggle for profits.

"If this is so, then private ownership means great economic power in the hands of business men." Power brings responsibility. The best that legislation can do is to enforce responsibility where irresponsible business does not willingly accept it. Our child labor laws, minimum wage law, accident compensation law and others, are framed on this theory.

"The present business system is responsible for the great bulk of unemployment. Business should be required to assume a share of this responsibility instead of throwing the burden solely on labor. Business men are the only people in a position and with the ability to prevent unemployment. The accident compensation law has induced them to prevent accidents, also to insist that their employees shall prevent accidents, and requires them to bear something less than one-half the burden of unprevented accidents. The Huber unemployment prevention and insurance bill, before the recent legislature, applies the same idea to the prevention of unemployment, by requiring business to compensate workers for about one-third of the loss from unprevented unemployment.

"Federal legislation looking toward prevention of business cycles of prosperity and depression, by better control of money, credit, and banking, along the lines proposed by Irving Fisher and the Stable Money League, is just as much needed for labor as for farmers and business men. This is a big and difficult problem, to which labor should give as much attention as is given by bankers, business men, and farmers.

"Taxation is next in importance for labor. Labor should not try to throw increased taxes on business.

The prosperity of the farmer and business man means better business and more employment. Labor should endeavor to relieve business and farming of taxes and should help to throw the increased burden upon property and income that can not be shown to aid business men or farmers in increasing the prosperity of business and agriculture. The Grimstad bill providing a surtax on bare land values, and exempting buildings, improvements, machinery, personal property, standing timber, and soil fertility from further increase in taxes is an important step toward increasing the profits, wages, and employment that are necessary for prosperity.

"Labor's right to organize is no greater than employers' right to organize, and if labor wants to exempt unions from penalties, damages, and boycotts, it should be willing to exempt employers from penalties from blacklists as well as lockouts. In this respect the British trades disputes act of 1906 is better than the American idea of exempting union of labor, but not exempting unions of employers. The British act treats unions of employers to keep down wages exactly like unions of employees to keep up wages. Both are exempt from penalties. Legislation regarding these two kinds of unions should be entirely separated from the anti-trust laws which try to prevent combinations from keeping up prices. The wage bargain is different from the price bargain. Consumers are not organized; hence the need of anti-trust laws. And employers had not organized against labor until labor first organized against employers. Labor should advocate repeal of the anti-blacklisting law when it asks for exemption from the anti-trust law."

Another article of interest is "Unemployment Insurance" by State Senator Henry A. Huber, father of the unemployment insurance measure which was defeated at the last session.

Senator Huber explains the theories back of the unemployment insurance proposal and predicts that another session will see the measure—or one embodying many of its clauses—written into the laws in this State.

American Plan Adopted

Armour & Co., Swift & Co., Wilson & Co. and the Cudahy Packing Co., leading packers, have adopted the "American shop representation plan," thereby putting out of existence the closed shop in their plants. Matters of reciprocal importance between employer and employee are to be disposed of by councils made up of representatives of the company and of persons employed by it, and all men and women are eligible to election as representatives who are American citizens or who have taken out first papers. The plan was adopted after an expression of the workers of these concerns showing a large majority in favor of it. The shop council is the unit representing the workers and both parties to the negotiations have the right of appeal to a higher council and then to a national council standing for the branches of the company throughout the country.

All Independents Adopt Frick Schedule

UNIONTOWN, PA., Sept. 19.—Wage rates in the Fayette County or Connellsville bituminous district were stabilized last week when the last of the independents announced increases to the H. C. Frick Coke Co.'s present scale, which is that of November, 1917. W. J. Rainey, Inc., whose second reduction, to a point 15 to 20 per cent under the Frick scale, precipitated strikes at its plants and sympathetic strikes at other nearby plants, announced that the Frick wage scales would be effective at the Rainey plants but that operations would be resumed for the time being only at Paul, Stewart and Fort Hill plants, and possibly Elm Grove. The company, it was said, would mine only sufficient coal to supply the Rainey-Wood by-product ovens at Swedeland. It is expected that resumption will come at an early date at the Mt. Braddock, Revere, Royal and Allison plants.

Oliver-Snyder Steel Co. and the Washington Coal & Coke Co. also posted notices announcing the return to the Frick scale. Rainey was the only independent operation to make the second cut; return to the Frick scale by other independent operations, meaning an increase of approximately 10 per cent.

Announcement was made Saturday that coal production would be resumed at the Leisenring No. 1 mine of the H. C. Frick Coke Co. on Monday, Sept. 19. It is expected that other Frick mines will be started during the next few weeks. Until this week, the Frick company has been operating at about 40 per cent coal production. No ovens are in operation.

One hundred and nineteen ovens were fired at the Garwood plant of the Aetna Connellsville Coke Co. this week, it being reported that the company has landed a furnace coke contract for 5000 tons monthly during the remainder of the year at around $3.25 a ton. One coke sale of considerable magnitude to a jobber at $3.40 was reported in the region this week. Furnace coke quotations have been increased now to $3.50. There is a better demand. There is also a slight increase in foundry coke output in the region.

May Cancel Contracts

Employees of the Youngstown Sheet & Tube Co., Youngstown, Ohio, have been advised by President James A. Campbell that those who purchased stock in the company under a special contract, providing for deferred payments, may cancel such contracts at any time. He says:

"When they were made, conditions were such that these contracts gave certain advantages to those holding them, but these conditions have changed in a way that no one could anticipate. The contracts are disadvantageous to the subscribers, and unless the holders have some special reason of their own for completing them, we would advise that they be cancelled and will be glad to return the money paid on them.

"It is our hope that those of our employees who have carried such contracts will benefit considerably by the fact that they have thus saved money that otherwise might have been needlessly spent and is now very useful. At the same time we regret that conditions should have prevented them from becoming stockholders in the company under a plan devised solely for their benefit."

Increase in Salaries of Patent Office Examiners Urged

The American Bar Association, at its recent meeting, held in Cincinnati, as stated by Clarence J. Loftus, counsellor in patent and trade mark causes, Chicago, who attended such meeting, adopted and approved the report of the patent section, which report, among other things, recommended that the salaries of the Patent Office examiners be increased substantially, and that such increase be assumed by raising the fee for filing applications for patents from $15 to $20, and urged that the matter be taken up with Congress to the end that the necessary enactments be promptly passed.

Appeal to President Harding

WASHINGTON, Sept. 20.—Appeal has been made to President Harding, according to Vice-President David Williams of the International Association of Machinists, to expedite the payment of $1,500,000 to 38,000 machinists and electricians awarded to them as employees of the Bethlehem Steel Co. by the former National War Labor Board. The War Department has ruled that it cannot pay the money to the employees in the absence of sanction by Congress, which the employees are seeking to have hasten action through request of the President.

A new method has been developed at the Northwest station of the Bureau of Mines, Seattle, Wash., for the determination of metallic iron in sponge iron, which has been found to be more accurate, simpler and more rapidly performed than any of the existing methods.

MACHINE SPEED CONTROL

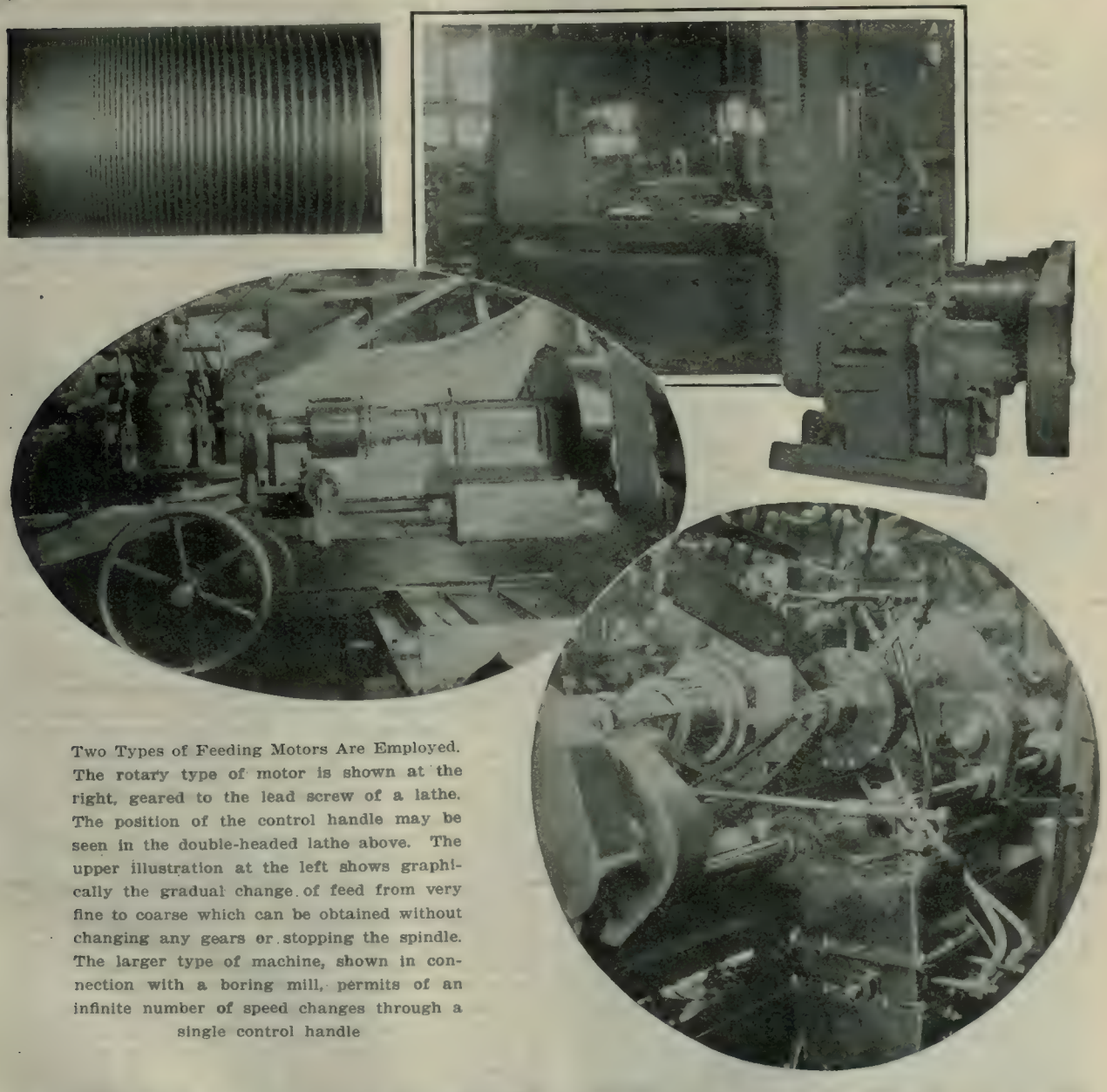
Oil Pressure Transmission for Control of Speeds and Feeds—Device Described

A recent development in the field of speed-control devices, adaptable to the variety of uses for which variable speed power transmission is required, is represented by the Oilgear system, brought out by the Oilgear Co., Milwaukee. It was developed especially for application to the feeding and rapid traversing of machine tool carriages and rams, but is said to be adaptable also to textile, paper mill, chemical and other machinery requiring variable speeds.

The device consists essentially of a pump which can be adjusted through a wide range of capacity and a motor driven by the working fluid, oil, received from the pump. The pump is driven from the machine tool countershaft, the motor being attached to the carriage or ram the feed of which it is desired to control. Two types of feeding motors are employed: the direct acting pushing cylinder, and the rotary. The pushing cylinder type is used when space conditions permit, and in equipping old lathes it is mounted at the rear of the bed behind the headstock, the piston rod extending toward the tailstock and being bracketed to the rear part of the carriage. The rotary type, shown in the accompanying illustration geared to the lead screw of a lathe, is employed in the case of very long machines and frequently for cross feeds, where screw control of the tool slide is necessary. The gradual change from a fine feed of 0.003 in., at one end to a coarse feed of 5/16 in., at the other, which this feed control gives without changing any gears or stopping the spindle, is graphically shown in the separate illustration.

An advantage claimed for this type of feed gear for heavy machine tools is the securing of rapid traverse movement without any additional mechanism, enabling the operator to move heavy carriages and rams promptly and without fatigue. The hydraulic feed permits the operator to readily increase the feeds when cuts become lighter, back out the tool for examination of cutting edge, and return it quickly into the cut without any disconnection of friction clutches, etc. Another advantage on many production jobs is the ability to use two or three different feeds in quick succession on short cuts.

In many cases, it is said, the improvement to be effected justifies installation of the device on machine tools already in operation. Such a case is the double-headed boring and tapping lathe shown. It will be noted that the control handle is within easy reach of the operator. Before installing the device the operator had to turn the large hand wheel more than 70 turns, requiring more than one-half minute of hard work in every 8-min. period, in order to back out the tools and place a new casting in the jig. In addition, the facing cut had to be fed by hand, as the existing feeds were not suitable. It is also noticed that the operator is no longer reluctant to run the tools back for occasional



Two Types of Feeding Motors Are Employed. The rotary type of motor is shown at the right, geared to the lead screw of a lathe. The position of the control handle may be seen in the double-headed lathe above. The upper illustration at the left shows graphically the gradual change of feed from very fine to coarse which can be obtained without changing any gears or stopping the spindle. The larger type of machine, shown in connection with a boring mill, permits of an infinite number of speed changes through a single control handle

examination. The speeding up of the rapid traverse and economies due to correct feeds and greater convenience of manipulation, is said to have effected in this case a 25 per cent increase in output.

Delivery of fluid from the feed controller, varied in quantity and direction, compels the feeding motor to perform exactly the function desired by the operator. The pressure in the system is great or little according to the resistance offered to the cutting tool, but the feed motor moves at the rate of speed wanted by the operator without regard to the pressure which it must exert to do the work. If this pressure rises above the maximum required for feeding, a relief valve opens and the feed motor comes to a standstill, without damage. This function is made use of in locating shoulders, etc., in the work to be machined, as it is only necessary to set rigid stops and let the carriage run against them as desired.

The variable delivery pump described, installed in connection with a 20-ton hydraulic assembling press and driven by the standard Oilgear feed controller, gave a quick return speed to the ram of from 6 to 7 ft. per min., with a pressing speed of about 6 in. per min. at 20 tons. Larger pumps would, of course, give more rapid ram traverse, suitable for production work. The press mentioned was used for general purpose work, mandrel pressing, straightening and broaching.

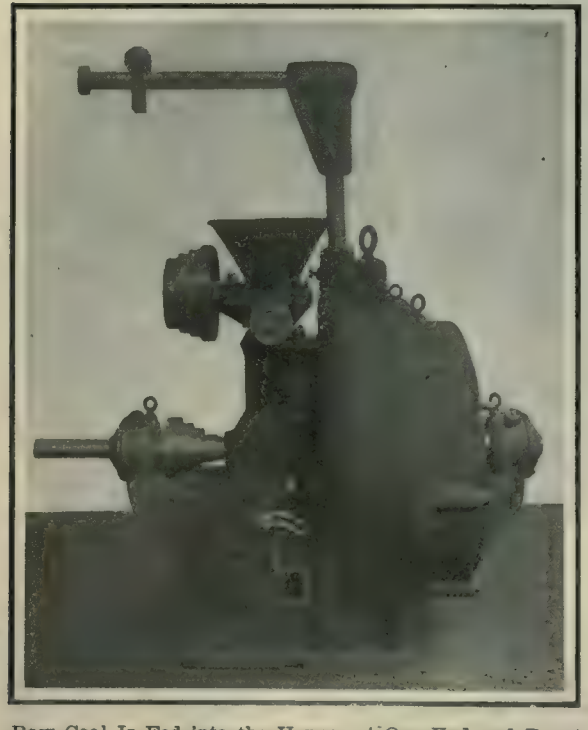
Variable Speed Drive for Spindles

A larger type of machine for driving the spindles of machine tools at any desired speed, from line shaft, constant-speed electric motor, or gasoline engine, has also been developed by the company. The unit shown in the accompanying illustration is of about 10 hp. capacity, and is for driving lathes, boring and milling machines, etc. The principle of operation is similar to that of the feed control system previously described, and secures for the operator an infinite number of speed changes in either direction through the manipulation of a single control handle. The speeds selected by the operator are obtained irrespective of changes in load. An automatic overload gear, adjustable to any desired maximum, prevents overloading the machine. When the maximum is exceeded the speed is reduced, stopping the tool entirely in case of a jam.

Coal Drying and Pulverizing Machine

A recent development of interest in the field of powdered coal apparatus is a self-contained machine recently brought out in England for the drying and pulverizing of coal, combining, it is said, the functions of the crusher or rolls, the dryer, the granulater, the pulverizer and the air separator. It is named the Atritor and manufactured by Alfred Herbert, Ltd., Coventry, England, and 50 Church Street, New York.

In England powdered coal is used principally for firing rotary cement kilns, and it is in that direction that the machine has been first applied. The makers claim, however, that it is equally adaptable to many other uses.



Raw Coal Is Fed into the Hopper at One End and Burnt in a Finely Divided State at the Other. The drying and pulverizing are simultaneous

The raw coal is fed into the hopper at one end and burnt in a finely divided state at the other. The machine is driven by a single motor and requires no auxiliary fans, elevators or conveyors other than what is necessary to feed the raw coal into the hopper. It is said to be continuous in action and to dispense with storage bins for the pulverized coal. The drying and pulverizing go on together, the product being burnt immediately without being given opportunity to absorb moisture. The volatile constituents pass into the kiln and are burned. The makers claim that the cost of operation in power and labor and the cost of maintenance is very small as compared with a plant of the usual type and that with the machine dust and dirt are entirely avoided.

The machine consists of a cast-iron casing in which there is mounted a disk, dividing the casing into two parts. The disk is fixed on the shaft which is carried in the bearings to be seen in the illustration, and which revolves at high speed. Four concentric rings of studs are mounted on the disk, the internal faces of the casing having similar rings of studs arranged so that the disk studs in revolving intermesh with them, without touching. Mounted on the disk at its periphery, on the coal inlet side, there is a fan provided which draws air into the casing.

The hopper has a worm feeding gear driven from the main shaft through a cone pulley arranged to give four variations of feed. The raw coal, which is required to be in pieces of not more than 1 in. cube, is delivered from the hopper into an annular opening formed in the casing around the revolving shaft, and on entering impinges against the disk. Through the same opening the fan draws its supply of air, which in the case of a cement works using the machine was obtained from the cinder cooler at an incoming temperature of about 550 deg. Fahr.

The revolving disk throws the incoming coal outwards away from the shaft, and the path of the fuel is fanwise, and between the fixed rings of studs on the casing and the revolving studs on the disk. Under the influence of the current of air set up by the fan and assisted by a second similar fan on the revolving shaft inside the casing, the coal continues its progress through the machine, traveling inwards away from the inside periphery of the case, between the studs on side of the disk pointing away from the inlet and the studs fixed on the casing facing it. The path of the coal is U-shaped, first away from the shaft and then toward it, the latter direction being against centrifugal force. An arrangement shaped like a Sirocco fan but revolving backwards, prevents the passage of unpulverized lumps, throwing them back between the fixed and revolving studs, where they are broken up. It is claimed that any fineness or dryness of the coal may be obtained, even though the moisture content is as much as 20 per cent, which is greater than usually met in practice. The air, as well as conveying the fuel, acts also as an aid to combustion.

The floor space occupied is 6 ft. 6 in. by 3 ft. 8 in.

It was announced at Detroit Saturday that, effective immediately, the Highland Park plant of the Ford Motor Co. would operate on a five-day basis.

Expansion Prospects as Seen by Washington

Necessity of Greater Movement of Steel to Foreign Lands—Germany's Competition Not Causing Alarm—Markets of Other Countries

BY L. W. MOFFETT

WASHINGTON, Sept. 20.—Reports coming to Washington indicate that the American iron and steel industry is not disturbed as much as other industries in regard to German competition in foreign markets. The view generally taken by steel manufacturers is that Germany has hardly begun to approach anything like normal conditions and that she has far to go before they are reached. In addition to the matter of reparations to be paid over a long term of years, it is pointed out that Germany still faces liquidation and deflation and that activities of her manufacturers in selling in foreign markets are based on more or less artificial devices which sooner or later must give way to natural laws. When that time comes, Germany will have to meet a real test of sound competition. For the present, it is claimed that not enough is known of Germany's commercial processes and her future to establish a clear idea of what may be expected in the way of permanent competition. This is the position of Government officials whose work involves a study of export business, but they feel convinced that what Germany has done and is doing at present is largely a makeshift and low prices quoted on steel and other products, much below those of American and British manufacturers, either represent actual loss to German makers, despite the depreciated mark, and small wages, or the German Government is resorting to heavy subsidies, such as were pointed out some time ago by Secretary of Commerce Hoover. Neither of these conditions, it is claimed, can be maintained indefinitely.

Very Low Prices Named

Attention has been called to the fact that German steel makers and manufacturers of hardware have closed contracts in Latin-American countries at ridiculously low figures, sometimes as much as 50 or 60 per cent under quotations of competitors, a situation which, it is held, cannot possibly accord with sound economics and financing. That this is evident is indicated by the fact that the German makers have been compelled in some instances to abandon their contracts, although it is rather puzzling as to the motive behind the German manufacturers in closing the contracts, unless it is that they hope to gain time in an effort to recover their position by disturbing the markets for manufacturers of America and other competing countries. The lower prices of German makers, it has been stated, may be partially, but far from entirely, explained by the fact that the quality of their products often is greatly below their pre-war standard. In this connection, Government officials are pleased with reports coming from American commercial attachés, consuls and trade commissioners showing that the American steel makers are paying the strictest regard to quality and, moreover, are establishing stronger foreign business relations by extending more liberal credit terms and meeting satisfactorily shipping requirements, such as those relating to packing, delivery, etc. At the same time, the opinion has been expressed that too much attention has been paid to price and that it will be necessary to make some sacrifices in this direction if future competition is to be met thoroughly. It is noted, however, that, as a general thing, American makers are offering tonnage at more attractive prices than British makers are, but this also, it is claimed, is a condition of the present and one that may not obtain long unless American producers stand ready to meet more sharply competitive conditions in the future when the world's purchasing power has recuperated.

Necessity of Expansion

While market conditions of the future are an unknown quantity, American steel manufacturers are thoroughly aware of the necessity of going into the world's markets as never before if they are to maintain satisfactory operations now that capacity has been expanded to such a degree as that which has been built up. Exports of steel tonnage sold during recent years by American producers have averaged approximately 10 per cent of their output. But, as pointed out to the Senate Committee on Finance by Chairman John A. Topping of the Republic Iron & Steel Co., in the course of hearings on the tariff, when he spoke for independent makers, it now is considered necessary to export 20 per cent of the present capacity, in view of home conditions. Roughly, according to Government officials, this will mean the exporting of not less than 7,500,000 tons of rolled steel annually. An idea of what this will involve in the way of building up foreign markets can be gained from a study of past exports. The largest export movement of iron and steel products from the United States was 4,820,216 tons, or about 65 per cent of the tonnage which would have to be exported if 20 per cent of the capacity is to go to foreign market. This shipment was made in 1920, under unusually favorable conditions from the American viewpoint because of the absence of measurably active competition from other steelmaking countries. The heaviest pre-war exports of iron and steel from the United States were made in 1912 with a total of 2,947,597 tons, 1913 ranking a close second with 2,760,133 tons.

Ante-bellum Exports

Further emphasizing the statement that the American industry will be compelled to be active in developing foreign markets if the 20 per cent of capacity is to be shipped abroad is the fact that the largest export movement of iron and steel from all important producing countries prior to the war, including the United States, the United Kingdom, Germany, France and Belgium, totaled approximately 14,500,000 tons, which moved in 1913. This is about 50 per cent of the above conservative estimate of what 20 per cent of the American rolled output will be.

The belief prevails that the American makers will have to concentrate largely on the markets of the orient, Latin-America and British dominions, and maintain their position in the markets of Canada, the largest of all consumers of American steel aside from the United States itself. While, of course, exports will go to continental Europe, doubt is expressed that it will be possible to meet competition in those markets from makers in European countries under normal conditions, except to a limited extent, as in the past. It also is a question as to how much expansion may be brought about in British dominions, except Canada, because of the more favorable tariffs prevailing and under consideration, for English makers. The proposed bar-

gaining tariff in the Fordney bill is expected to be only a partial offset of this situation.

Not Yet Threatened

Simultaneously with the study to develop foreign markets, the American steel makers, as they have indicated to Congress, want fair protection from foreign competition in the domestic market and it is generally conceded that they have asked only moderate protection. It is stated that, despite infrequent flurries of alarm, the domestic market has not been threatened since the war by foreign producers. Any apprehension that German makers would invade it extensively has proved unfounded so far. It is shown, for instance, that during the first seven months of the present year, only 440 tons of steel, chiefly bars, sheets and plates, have been exported to the United States from Germany and that the total imports from all countries for that period amounted to only 37,500 tons.

Restoration of normal conditions obviously may bring about an entirely new situation and one that will threaten American makers both in the export and domestic markets and it is largely because of this that a proper tariff against imports is sought and plans are being made to expand foreign markets. But it is doubted whether Germany will be a strong factor for a long period or ever will regain her past position, when she exported steel in much greater quantities than any other country, her exports in 1913 averaging 479,800 tons a month, or 5,757,600 tons for the year. At the same time, the potential power of Germany, when she recovers, is not being overlooked. The war has stripped that nation of some of its power to the advantage of France, which now is receiving attention as a probably more active competitor of the future. It is estimated that France now has a steelmaking capacity of 8,000,000 tons annually, of which 2,000,000 tons or 25 per cent will be in excess of home demands and therefore will be available for export. Exports of steel by French makers in 1920 were approximately 50 per cent greater than in 1913, averaging 77,750 tons monthly for the eight months of the former year.

When the situation is summarized, it is considered that the American industry is about to enter upon broader expansion than ever before, though it will be compelled to meet obstacles and sharp competition. It is with this view in mind, as it relates to American industries generally, that Government agencies, such as the new commodities divisions of the Bureau of Foreign and Domestic Commerce, are studying foreign markets as much as they can be studied under present circumstances, and are doing their best to keep American trade informed of those vital facts that will be helpful.

MORE ACTIVE MILLS

Operations in Mahoning and Shenango Valleys Are Improved

YOUNGSTOWN, OHIO, Sept. 20.—Following attempts to stabilize the steel market, operations in the Mahoning and Shenango Valleys are considerably improved this week, as indicated by the fact that 70 of 105 sheet mills are under power. The maximum of sheet mill capacity which has been engaged has been 40 to 45 per cent for many weeks. The development is held to reflect the recent price advances in sheets.

Of the 66 open-hearth furnaces in the district, 37 are charged, including 25 of the 51 independent units. Two of the three Bessemer departments are active, while steel output approximates 60 per cent, as compared with recent averages of 50 per cent. Tinplate and wire product departments also expanded their activities this week.

Current sheet mill schedules are: Brier Hill Steel Co., 16 mills; Republic Iron & Steel Co., 7; Youngstown Sheet & Tube Co., 14; Trumbull Steel Co., 12; Newton Steel Co., 10; Sharon Steel Hoop Co., 7; Falcon Steel Co., 5.

Operation of Mattie blast furnace at Girard of the A. M. Byers Co., Pittsburgh, may be started around Oct. 1, while it is currently reported that the Trumbull-Cliffs Furnace Co. is preparing to blow in its new stack about the same time, to supply hot metal to its open-hearth furnaces. The Byers company is operating 22 puddle furnaces and one skelp mill at its Girard works.

Trumbull Steel Co. has 16 tin plate mills on the active list this week. Seven of the Valley's 17 tube mills are rolling, four being operated by the Sheet & Tube company and three by the Republic company. Rod, wire and conduit production is sustained at 50 per cent.

Steel fabricators are enjoying a much better business, as indicated by the operation of its road mesh and hyrib departments night and day by the Truscon Steel Co. Officials report that August bookings were 100 per cent greater than those in April and that aggregate schedules are holding up between 65 and 70 per cent.

District units of the Carnegie Steel Co. are operating on a larger basis, supplying tonnage to other Carnegie company plants. Demand for sheet and tin bar has been such as to accelerate operations in affected departments. Three of the company's six blast furnaces in the Ohio Works group are pouring and additional stacks are likely to be blown in before the end of the month.

In the Shenango Valley, the most noticeable increase in operations has been in subsidiaries of the Steel Corporation, the American Sheet & Tin Plate Co. and the American Steel & Wire Co. The former is operating 20 tin mills and its full complement of sheets units, while the nail department of the latter at Farrell, Pa., is operating at capacity. The Valley Mould & Iron Corporation plant is on a 50 per cent basis.

Only one of 14 blast furnaces in the Shenango Valley is pouring, No. 3 stack of the Shenango Furnace Co.

Plant Operation

Ten of the 20 hot mills of the New Castle, Pa., works of American Sheet & Tin Plate Co. will resume operations Sept. 26. Old Meadows works of this company at Scottdale, Pa., a plant of 8 hot black sheet mills, started up Sept. 19, after having been down since about the middle of last April.

During the first week of September the Hendee Mfg. Co., Springfield, Mass., motorcycles, received orders for 700 machines. Working forces at the company's plant will immediately be increased.

The Chicago Railway Equipment Co., Chicago, will pay a 2 per cent dividend on Oct. 1, to all stockholders of record. This payment will be unusual in that it will be the one hundredth consecutive quarterly dividend of the company. The chief products of the company are brake beams and bolsters for railroad cars, steel transmission poles, reinforcing steel, and all kinds of malleable castings. Its subsidiary plants include the Franklin Steel Works, the Marion Malleable Iron Works, the Grand Rapids Malleable Works, and the Detroit Forge Plant.

The industrial situation at Anderson, Ind., has improved, with the reopening of the rod mill of the American Steel & Wire Co. The wire mill continues in operation. The Ames Shovel & Tool Works and the Anderson Foundry & Machine Co. have resumed operation.

Out of a total of 21 plants, chosen at random from the major industries of Terre Haute, Ind., two are reported operating at 100 per cent capacity, 14 at around 75 per cent of normal, four show no increase in business and one is idle, with no definite plan for resumption.

CONTENTS

Open-Hearth Furnace Design 719

Reversing Valves and Their Effect on Efficiency—Chimney Areas and Heights

Electric Furnace Progress in 1921 723

Merits of Dual Voltages for Melting Steel and for Refining—Heat Losses and Electrodes Considered

Three Types of Alloy Sheet Steel—III 725

Electric and Acetyiene Welding Details and Their Effect on Physical Properties—Chrome-Vanadium Steel Adopted

Special Features of Blast Furnace Plant 730

Gas Firing of Boilers—Single Venturi Blast Regulating Device—Complete Water System

France Seeks Export Market for Ore 733

Autumn Meeting of Iron and Steel Institute at Paris—Developments in British Basic Iron Will Reduce Iron Ore Imports—Comments of Sir Hugh Bell

Expansion Prospects as Seen by Washington 743

Necessity of Greater Movement of Steel to Foreign Lands—German Competition—Markets of Other Countries

How Steel Prices Have Been Liquidated 752

Analysis Shows Steel Lower Than All Other Products Save Those from the Farm and Certain Metals—Building Materials and Furniture Still High

Electric Crane Safety Switch 722
Industrial Cost Association Meeting 722
To Study Drill Steel Breakages 722
Labor Notes 722, 739, 740, 775
Ericsson and DeLamater to Be Honored 728
Horizontal Boring, Drilling and Milling Machines 729
Machine for Assembling and Dismantling Hose 732
Drier Air for Blast Furnaces 732
Would Abolish Railway Labor Board 732
Sources of Iron and Steel Imports 737
Cost of Living Statistics 737
Adjustable-Bed Punching Press 738
Metal Working in Kalamazoo 738
Improved Oil Burner 738
European Iron Ore Resources 738
Machine Speed Control 741
Coal Drying and Pulverizing Machine 742
Plant Operations 744
Editorials 746

How Much Work Is Being Done?—Unemployment Conference—Stainless Iron—American Tin Plate Preferred—"Contract" Buying of Steel.

Correspondence 749

Against Any Duty on Ferromanganese—Embrittling Effect of Pickling Upon Carbon Steel—Universal Steel Classification Code.

International Foundry Exhibition 751
Pittsburgh Foundrymen's Meeting 751
Coming Conventions 751
British View of Tariff on Vanadium 751
August Fabricated Steel Business 753
Canadian Pig Iron Production in 1921 753
More Steel Men at Higher Wages 753
Unemployment Conference Includes Industrial Leaders 754
Frank B. Gilbreth Opposes Stop-Watch Studies 754
Great Activity at German Steel Works 755
Foreign Market Conditions 756, 771, 775
Peak of Industry Was in July, 1920 775
International Co-Operation of Engineering Societies 775
Industrial Finance 777
Book Reviews 785

Iron and Steel Markets 758
Comparison of Prices 759
Prices Finished Iron and Steel, f.o.b. Pittsburgh 772
Non-Ferrous Metal Markets 773
Personal Notes 774
Machinery Markets and News of the Works 778
New York Jobbers' Prices 786

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How Much Work Is Being Done?

There is a difference between business being "good" and its being "active." There may be heavy operations without much profit, and indeed there may be a loss. The terms are not interchangeable, just as it has been found by painful experiences of the individual that earnings and prosperity are not the same thing. Many men had large incomes in 1920 and did not prosper or advance.

As many lines of business are not particularly profitable at this time it is of interest to inquire how much work the country is doing, to see whether the lack of profits is attributable to inactivity in general or to something else. Statistical information of the greatest weight indicates that much work is being done.

Debits to individual accounts at banks are reported by the Federal Reserve Board as indicators of the volume of the nation's business. Figures for recent periods make the following showing, in millions of dollars, while the lag or decrease from the figures for the corresponding periods in 1920 is given:

Bank Debits, Millions of Dollars

Four Weeks Ended	Amount	Lag
May 25	$30,852	17 per cent
June 22	30,651	15 per cent
July 20	29,174	19 per cent
Sept. 7	25,551	20 per cent

In considering the average lag of 18 per cent one must remember that there have been large decreases in dividend payments and large reductions in salaries and wages, while commodity prices have so declined that the same money transfer represents a much greater quantity of merchandise. One can hardly avoid the suggestion that the quantity of business done has increased, when the total of transfers of money has decreased only 18 per cent.

Another indicator to be considered is employment and unemployment. The latest figure for the number of names dropped from payrolls is 5,735,000. That is about one-eighth of the total number gainfully employed during the fore part of 1920. We have heard so much of increased output with decreased personnel that we cannot avoid concluding that if seven-eighths were on full time they would be doing much more work than were the eight-eighths last year. Of those not out of employment many are on short time. There is no indication, however, that there has been a great decrease in the quantity of work, of all descriptions, being done.

A third indicator is the freight movement on the railroads. The June report showed 28,141 million net ton-miles of revenue and non-revenue freight movement, which is 20 per cent more than the average movement in the five years ended June 30, 1914, while it is only 31 per cent below the rate in the best single month on record—August, 1920. The ton-mileage of last June was accomplished with little help from ore and coal movement. If it be said that the movement was largely of road-building and therefore of unimportant material, it is to be noted that a made road does not average over 10,000 tons per mile in weight, while the material is not transported an average of 100 miles, so that there is much less than one million ton-miles of freight per mile of road built, while the June freight movement was 28,141 million.

The country has really been doing a great deal of work in the past few months. One hears much of the inactive lines and little of the active lines. The inactive lines, therefore, may be expected to pick up. There is some abnormality in the situation now, but not as much as there was in 1920, with prices and wages abnormally high and service rendered abnormally low.

The Unemployment Conference

Sharp differences of opinion as to the best methods of conducting the unemployment conference at Washington are likely to develop. Naturally there is a desire to rule out subjects upon which the conferees are likely to disagree, and every one who wishes to see the conference succeed will hope that serious disagreement may be avoided without ignoring fundamental principles which must govern in arriving at wise conclusions.

On one point there can hardly fail to be general agreement—that is, that there should be no division, nominally or actually, into groups representing different classes of people. President Harding has taken a decided stand against any such classification of members of the conference, and Secretary Hoover will act in harmony with the President, thus

avoiding the rock on which the first industrial conference of the Wilson administration split.

Although the conference was not the subject of consideration when General Pershing spoke at the recent dinner in Washington celebrating Lafayette-Marne day, a sentence in that address may well be remembered in connection with the approaching meeting. "The policies of this republic are not determined by labor unions or by any other organizations, but by the consensus of opinion of its patriotic citizens of whatever affiliations."

The members of the conference are confronted by the difficult problem of reducing unemployment in accordance with sound economic principles. If they enter upon their task without regard to what any group of citizens may selfishly advocate, they will take an important step in the right direction.

One of the principles which cannot be ignored is that, in a period of readjustment such as the world is now passing through, labor cost must be reduced in harmony with other costs, and any effort, whether organized or not, to prevent an equitable reduction is a cause of unemployment and will retard the return of prosperity. Thousands have already joined the army of the unemployed because they were not willing to accept reasonable reductions or were not permitted by labor unions to do so, and there is grave danger that many thousands on railroads and in plants may be forced into idleness on account of radical leadership. At the same time, employers have great responsibilities. Most of them have shown a keen appreciation of that fact by giving employment to as many men as possible and by reducing wages only when and to the extent imperatively necessary; but some have not always realized that the loss of a job means much more to the employee than the loss of dividends to the employer.

The Washington conference may be able to accomplish much in bringing about better distribution of work and encouraging public improvements. But all of this would be in the nature of palliatives. A more important achievement, even though not so noticeable in direct effects, will be secured by impressing upon all employers and employees the vast importance of the part they must take in the reconstruction of a troubled world. Never before was there such great need for unselfish and enlightened co-operation.

Elihu Root, in a recent address, said that "it is not what a nation does for itself, but what it does for humanity, that makes it great." It is equally true that the greatness of an industry is not measured merely by the money it makes, but also by the service it renders its employees and the public, by contributing to the well being of those who are employed and by winning the respect and good will of all the people.

A comparison of the world demand for steel in 1920 with that of 1913 is now possible. The statistics of the five leading producing countries—the United States, Great Britain, France, Belgium and Germany—show iron and steel exports last year of 11,499,500 tons, as against 15,737,400 tons in 1913. This decrease of about 27 per cent is in the face of extravagant predictions of a heavy worldwide demand as a result of the war. Yet in the light of post-war developments the showing is excellent. Of particular interest, apart from the fact that the United States and Great Britain changed places last year, the former being the largest exporter in 1920, whereas Great Britain was well ahead in 1913, France exceeded her 1913 exports last year by 54.7 per cent, while 63 per cent was the increase in the case of the United States. Germany's iron and steel exports in 1920 were about 30 per cent of those in 1913, while Belgium's recovery from the effects of the war is measured by exports last year that were 56 per cent of those for 1913.

Stainless Iron

A new alloy steel has appeared in England concerning which some important predictions are being made. It has been called stainless iron, "for want of a better name," and is a direct derivative of the now famous stainless steel, also a British invention.

Stainless iron is really stainless steel with a carbon content of about 0.10 per cent or less. Three British firms are making it and it is a product of the electric furnace. So far as known it has not yet been made or exploited in this country. This new low carbon chrome-iron alloy is distinctly softer than stainless steel and is thus suited to various manipulative operations. Because of its malleability it is offered for a wider range of uses in forging, pressing and stamping than stainless steel, which is admittedly hard to handle and difficult of heat treatment. Already success is reported in producing automobile wheel disks, hoods, bodies, and other products subject to corrosion or tarnishing, thus eliminating painting and varnishing. It is claimed that it will modify industry in the future so far as light metals are concerned; also that, while it is more expensive than brass, it is easier to keep clean. In fact, the pioneers in rustless iron are confident that its possibilities are well nigh unlimited.

The new alloy is expensive, because carbon-free ferrochromium is essential in its manufacture. Its discovery is a striking example of the possibilities of only a slight modification of present simple or complex alloys. The mere lowering of the carbon transforms an alloy heretofore found difficult to handle, into a radically different product. Similar changes in the composition of other alloy steels now in use are being studied and give promise of equally valuable and interesting results.

American Tin Plate Preferred

Before the war Japan was a large buyer of Welsh tin plates. In 1913 that country purchased 5.7 per cent of the total British exports. In 1920 this proportion was only 2.8 per cent, or a decline of about 50 per cent. In 1913 Japan purchased an insignificant proportion of the American tin plate output. During the war that country was forced to obtain its supply from American makers. The interesting fact is that this practice has continued, Japan having bought in 1920 as well as in 1919 about 22 per cent of the total American tin plate exports.

These facts have not been overlooked in Great Britain. Inquiries were made through diplomatic

channels and the commercial counsellor to the British Embassy at Tokio reports as follows:

1. Japanese buyers were forced to take American tin plate during the war, and having become accustomed to it are not disposed to change.

2. The conditions encountered by buyers of British tin plate when it once more became available were not such as to dispose them to prefer it to American. Prices were subject to surcharges for increases in cost of labor and materials, and shipping clauses were also uncertain. These conditions were of course due to labor and economic difficulties in England.

3. Tin plate which did arrive from England was not of the high quality to which buyers were accustomed before the war; while American tin plates have improved in quality since the war, and American manufacturers pay special attention to the adaptation of their product to the requirements of the Japanese market. It is understood, for instance, that for the manufacture of tins for kerosene and foodstuffs by automatic machinery, they are ready to give soft, tough material for ends and stiff material for bodies, to cut the plate so that the grain runs as the buyer desires, etc.

4. There are more suppliers of English tin plates than of American and therefore greater variations in quality.

Of special significance are the statements that Welsh tin plates have not been of the quality to which buyers were formerly accustomed and that the American product has improved in quality since the war. It is to be noted, moreover, that American makers pay special attention to the adaptation of their product to the needs of the Japanese. Commonly heretofore, American exporters have been reproached for their failure to have their products meet the preferences of foreign buyers.

These facts furnish an impressive example of what can be done by American producers of other steel products needed by foreign buyers. Although Welsh tin plate is available at a lower price than American, the latter has been able to hold its Japanese trade due to the reasons mentioned. Superior quality, due partly to larger unit production, and adaptation to the buyers' needs are cardinal points in the holding as well as the expansion of the steel export trade of the United States.

"Contract" Buying of Steel

It is a question whether the practice in vogue in the finished steel trade for many years, that of making "contracts," will be revived. It has been largely disrupted in recent years. There was the Government control of the trade during the war, which practically shelved contracts, and then there was the period of price strain in 1920, when the independent producers were indisposed to accept contracts while the Steel Corporation designated to each customer the amount of contract tonnage it would accept.

Apart from these influences tending to break the trade of its habit, there has been some general disposition on the part of producers to get away from the practice, particularly in the case of annual contracts. Until a few years ago, for instance, it was the practice in the tin plate trade to make contracts for a whole calendar year. Many of the tin plate consumers insisted it was necessary for their safety that they be "protected" by a contract for the whole year. The producers claimed otherwise, and eventually effected what they considered a signal reform. The agricultural implement trade likewise felt that it needed "protection" for its "season," and in many years contracts were made in April or a little later for a manufacturing season that was not to begin until the following August. That practice, also, was modified more or less.

The contract system in the sale of finished steel products has been the subject of much criticism. With considerable justice the usual contract was dubbed "jug-handled" or "option" or "accordeon," because of the flexibility in interpretation as to the quantity of steel actually shipped under it. All the arguments against this system of doing business were logical, and they were more or less convincing except for one that ran the other way, the argument that whatever might be said against the system the practical showing was that both the steel producers and their customers had been quite successful in a business way while doing business after this style year after year.

The vitality of the contract system lay in the fears entertained by both producers and consumers, producers fearing that they might not have orders, consumers fearing that they might not be supplied with steel. When business prospects were fairly good the producers oversold and the consumers overbought. If business turned out to be good the mills fell behind in deliveries and were unable to realize on price advances as soon as circumstances really justified. If business proved poorer than expected the sellers had opportunity to make concessions quietly to their customers, to induce specifying, and the market was less disturbed than if the consumers had hawked their specifications throughout the trade.

There was one evil of the contract system that did not receive as much criticism as it deserved, and that was the evil of the steel market being made to appear stronger that it really was. When conditions were improving, there was what was called "forward buying" and the trade got more or less into the habit of confusing cause and effect. There was forward buying, and then actual tonnage demand upon the mills increased. It was not the contracting that produced the improvement in deliveries and consumption, but rather it was the prospect of improvement that had brought about the so-called "forward buying." The point is illustrated by the fact that in the past few weeks there has been comment in some quarters to the effect that the steel market was in poor condition, because there was no "forward buying." The producers regarded such references as a grim joke, for what they wanted was an immediate operation, not an uncertain prospect of an operation in future.

As conditions stand now, steel consumers may change from a policy of strictly hand to mouth buying to a policy of buying for short periods ahead. It will be interesting to observe signs that the period is to lengthen.

Work has been resumed in five of the Colorado Fuel & Iron Co.'s mines in Las Animas County, Colo. These mines were closed recently following a walkout of the men as a protest against a reduction in wages. About one-third of the strikers returned. The company charges that the men are being intimidated, but no disorders have been reported.

CORRESPONDENCE

Against a Duty on Ferromanganese

To the Editor: The brief as submitted by John J. Howard, general manager of the Lavino Furnace Co., Philadelphia, arguing for a duty on ferromanganese, as published by your valued paper of Sept. 8, has just been brought to the writer's attention, and I feel sure as a leading publication of the iron and steel trade that you will grant the writer a small space in order that he may show a few of the inaccuracies published in this brief.

Mr. Howard advises that he is representing the following companies:

Lavino Furnace Co.
E. E. Marshall
American Manganese Mfg. Co.
Southern Manganese Co., electric furnaces at Anniston, Ala.

It may be well to know that Mr. Marshall and the American Manganese Mfg. Co., as far as all practical purposes are concerned, as to selling are one and the same thing. The Southern Manganese Co., having electric furnaces, or making ferro by the electric process, is not a factor in commercial ferromanganese. The Lavino Furnace Co. and Mr. Marshall have acted in the past as practically one in making a price on ferromanganese, and where it has been possible to maintain prices they have acted in entire accord with one another.

Mr. Howard makes the immediate claim in his brief that ferromanganese should not be classed with pig iron or other semi-raw products, but as a "finished product." The writer really feels that there can be no possible argument as to an error in this statement. Ferromanganese is just as much a semi-raw material as pig iron, ferrosilicon or other products made direct from the ore. The best comparison as to the use of ferromanganese is that it is "the salt to the cook." No steel can be made without the use of ferromanganese for the purpose of deoxidizing or cleaning the semi-finished product. In making steel it is just as necessary as salt to the palate.

When he speaks of the necessity of having a ferromanganese industry in this country he must realize that up to the year 1914 all the steel works, with the exception of the United States Steel Corporation, and at times the Cambria and Bethlehem steel companies, purchased their ferromanganese where they could buy it cheapest, the above named concerns making ferromanganese for their own uses when they felt the necessity of so doing. The ore supplies at all times for any ferromanganese made in this country have come from foreign countries, principally Russia, India and Brazil, and as Mr. Howard rightly argues it would be useless hardship not only to the steel works but the producing companies to place a duty on manganese ore, as there is not sufficient manganese ore available within ordinary railroad transportation limits to induce the mining thereof. In fact, during the war, when every available part of this country was searched there was so little high grade ore discovered and that in such distant parts, that it would not be a factor in producing standard 78 to 80 per cent ferromanganese in this country.

Mr. Howard goes on further to state that in order to protect this new found industry the makers of ferromanganese should have a 25 per cent ad valorem duty based on American values. They require this duty not for the purpose of protecting the ore miners but for the sole and absolute purpose of making sufficient profit in the making of ferromanganese to keep this infant industry on its legs and at the expense of every user of ferromanganese in this country. He continues:

> The unfair methods practised by the foreign producers in the past lead us to conclude that only an exorbitant specific duty would afford the American industry adequate protection. It is for this reason that we should have an adequate ad valorem duty, with the added advantages of the American valuation plan to meet the situation.

As the result of pernicious propaganda on the part of the American agents of the English ferromanganese producers the question has arisen why, when former tariff bills did not carry a higher duty than $4 a ton, it should now be necessary to impose a duty that would protect the manufacture of ferromanganese.

And again he states:

> The dominating factor of the foreign producers is the British pool, whose avowed purpose is to reclaim the American trade and to drive the American maker out of business by unfair competition.
>
> This unfair competition has already been brought to the attention of the United States Government and is in process of investigation by the Federal Trade Commission.

Since Mr. Howard has filed this statement the trial examiner of the Federal Trade Commission has submitted the proposed finding as to the facts and conclusions before the Federal Trade Commission. This has been filed after many hearings and much testimony has been taken, with the following results, and the writer quotes as follows from this finding, page 11, article 19:

> There was no collusion between the English principals of the respondents and none on the part of respondents to fix prices. Each was in active competition with the other and incidentally they were all in competition with such American producers as had ferromanganese to sell; the efforts of the English producers were solely directed to the sale of their own product; but at the same time they were anxious to obtain the highest price possible and were reluctant to reduce the selling price.

And again on page 13, articles 22 and 23, the following are the concluding sentences:

> There is not a scintilla of evidence that respondents or their principals commonly or systematically imported and sold ferromanganese in the United States at prices substantially less than the actual market value of ferromanganese in England.
>
> There is evidence that the importing and selling of ferromanganese by the respondents or their principals into the United States was done with any intent to injure the industry of manufacturing ferromanganese in the United States, and there are no facts and circumstances proven from which such intent can logically or legally be inferred.

With such a distinct and absolute finding, there can be no doubt that all questions such as raised by Mr. Howard in regard to pool operations have been proved untrue.

In Mr. Howard's quotation from the London *Iron and Coal Trades Review* of Aug. 12, page 224, he has omitted the most important part of the quotation, which the writer will give herewith below, exact wording as published in this paper of the date referred to by Mr. Howard:

Ferromanganese:	£	s	d
76 to 80 per cent, loose	18	0	0
76 to 80 per cent, export	14	10	0
76 to 80 per cent, packed	19	0	0
American, 80 per cent d/d		$70.00	

Mr. Howard might not have been aware of the fact that "for export-English" means distinctly Japan, Australia, China or other countries outside of America. The American quotation is distinctly $70 d/d, or in other words $70 f.o.b. seaboard in this country. As recently as date of Aug. 12, the American price of ferromanganese was $65 to $68. Again, Mr. Howard, while giving the production of ferromanganese through the war period, neglects at the same time to give the prices of ferromanganese not only during this period but during the period of five years before the war. The writer furnishes herewith quotations as given in Metal Statistics for the period of 1909 to 1920:

	Aver.		Aver.
1909	$42.73	*1915	$92.21
1910	40.49	*1916	164.12
1911	37.25	1917	309.17
*1912	50.40	1918	245.83
*1913	57.87	1919	132.16
*1914	55.80	*1920	172.33

*Contract Prices Tariff Off. Oct. 4, 1913, $2.50.

The above merely gives the average for each year during this period, but if any one desires to consult the Metal Statistics he can obtain the prices month by month. It will, of course, be noted what prices were obtained by the American producers during the war period or when English ferromanganese was not available. It might have been of considerable interest to the readers of Mr. Howard's argument to note the profits of the American producers during the periods

in question. Mr. Howard has stated that the steel interests, as evidenced in their testimony, were not opposed to a duty on ferromanganese. The writer does not know what part of this testimony Mr. Howard refers to or to what extent the steel interests he refers to might agree to a duty placed on ferromanganese, but the writer has before him numberless letters protesting against this duty on ferromanganese as being purely a fraternal one for the benefit of practically one or possibly two interests, to which every maker of steel in this country will pay his toll.

There is no question at the present time that we are in a most extremely difficult position as to our export business. With Germany, France and England making a most strenuous effort to corral the business which we are most eager for and which is absolutely necessary for our steel works to have, it does seem to be poor policy to saddle every one of the makers with the extra cost of the added duty for the benefit of such a few as are now asking for this. Of oll the products which should come in free to this country it is conceded that there is a greater argument for ferromanganese coming in here at the cheapest possible price than possibly any other semi-finished material, for the simple reason that there are practically no ores that can make this product here.

If a high duty should be levied it would make just so much additional cost to every buyer of ferromanganese and every steel works in this country, even to those works that produce their own ferromanganese, as the added demand for manganese ore would be such that the price of this mineral would be greatly enhanced by the very great increase in the demand made here. If a duty were placed, it would be so purely for the sake of protection and benefaction, and not for revenue, and we believe it would be strongly against the feelings of the greater part of the Republican party.

FRANK SAMUEL.

Philadelphia, Sept. 16, 1921.

Embrittling Effect of Pickling Upon Carbon Steel

To the Editor: In an interesting article on page 334 (Aug. 11), Mr. C. J. Morrison claims that the perplexing problem of acid-brittleness in steel sheets and wire has at last been solved by the aid of the microscope. May I not, with all due respect to Messrs. Morrison and Zanzinger and to the art of metallography, advance a claim in behalf of the pioneers who, at least 50 or 60 years ago, following the general introduction of sulphuric acid as a pickling agent for wire rods, worked out the practice of baking rods and wire to remove acid-brittleness. It seems only just to admit that *they solved the problem* while our generation at most has been able to show the mechanism through which acid produces and heat subsequently removes the condition noted.

Even for the credit of this lesser achievement the chemist has a claim prior to that of the metallographist. It has been common knowledge in the wire trade for the past 10 to 15 years that acid-brittleness is accompanied by, and presumably the result of, the presence of hydrogen in solid solution in the steel, and that upon baking the steel at low temperatures, hydrogen is evolved and brittleness disappears. It is a well established fact that when hydrogen is generated as the result of an attack upon steel by the common mineral acids in hot dilute solution, a portion of the hydrogen is absorbed by the steel through the process of "occlusion" and the steel coincidentally becomes hard on the surface and brittle. It is susceptible of proof in the laboratory that such steel upon heating gives off liberal quantities of hydrogen and regains its original physical properties. The degree of dehydrogenation is a function of time as well as temperature. A short exposure to 500 deg. is no more effective than a longer exposure to 200 deg. and it is even possible to restore toughness to pickled wire by leaving it on the mill floor for two or three weeks with no other treatment. The subject has been sufficiently studied to convince the persons interested that the relation between occluded hydrogen and acid-brittleness is that of cause and effect.

Can Mr. Morrison say as much of the metallographical phenomena described in his article? It would seem to the writer that Mr. Morrison has said either too much or too little. The junction lines between grains are presumably nothing but geometrical lines, indicating planes of contact. They are naturally the first points of attack by acid. If they are actually widened by the action of acid, and this is not merely a surface phenomenon, comparable to the deep etching of a specimen, the result of such widening would presumably be not the embrittling of the steel but its complete disintegration.

I am not prepared to accept Mr. Morrison's conclusion that "brittleness is due to the increase in width of the junction line," nor, without further evidence, to believe that the increased width of the junction lines, except upon the surface, is regularly associated with acid-brittleness. If the widening exists as a surface phenomenon it is easily explained. If it persists throughout the steel it has not been explained at all.

KENNETH B. LEWIS,
Manager of Sales,
Morgan Construction Co.

Worcester, Mass., Aug. 24.

Universal Steel Classification Code

To the Editor: I have read with a great deal of interest the article in THE IRON AGE of Sept. 1, by Messrs. Knerr and Collins, entitled "Universal Steel Classification Code." After a careful study of the matter I believe their proposed system is superior to that of the S. A. E. and I wish to add my indorsement to their plan.

Under the present system of research and investigation new alloying elements of great importance are being discovered every day. A few years ago these elements were regarded as rare metals of insignificant importance. Several good examples of these are titanium, uranium, zirconium, molybdenum, all now finding their way into commercial steels. Who knows at what date some of the other rare elements may come to the front? If this were to happen it would require another revision of the S. A. E. code. Having now 14 elements of alloying importance, with only nine numerals to handle them, where and how would we be able to take care of six or seven more, without extending classification numerals indefinitely? Under the proposed method this is a very easy thing to do, having 24 possible letters, giving a large margin for the future without any change of the basic arrangement.

Take some of the following steels, for instance: Manganese, 18 to 20 per cent; nickel, 3.25 to 3.75 per cent; silicon, 0.40 to 0.60 per cent; carbon, 1.80 to 2.00 per cent; manganese, 14 to 17 per cent; nickel, 3.50 to 4.50 per cent; chromium, 1.00 to 2.00 per cent; silicon, 0.70 to 0.80 per cent; carbon, 1.40 to 1.70 per cent; manganese, 11.00 to 13.00 per cent; chromium, 0.40 to 0.70 per cent; silicon, 0.55 to 0.65 per cent; carbon, 1.10 to 1.30 per cent; manganese, 11 to 13 per cent; copper, 1.25 to 1.90 per cent; silicon, 0.40 to 0.60 per cent; carbon, 1.10 to 1.30 per cent. Then take the steels of the high nickel series; steels such as were used for helmets and rifle-proof armor during war time, containing carbon, 0.37 to 0.47 per cent; manganese, 0.95 to 1.05 per cent; nickel, 1.90 to 2.10 per cent; silicon, 0.15 to 0.25 per cent, and vanadium, 0.15 to 0.25 per cent. While these are all special or "X" steels, the proposed code gives a very simple way of showing their exact classification by means of letters. This would be a very difficult matter to accomplish by means of the numeral system.

The standardization of the alloy steels is a matter of great importance to both the manufacturer and the purchaser and a good system of classification would help greatly to promote a better understanding of the situation. The ability of the electric furnace to furnish high temperatures and the quality of product it makes possible will, I believe, bring many more elements before the steel world which heretofore have been considered of no practical value.

LARRY J. BARTON,
Metallurgist.

Southern Pacific Lines, Sacramento, Cal.
Sept. 8.

WORLD FOUNDRY EXHIBIT

To Be Held in 1922 by British Foundrymen at Birmingham, England

In connection with the annual convention of the Institution of British Foundrymen in 1922 it is proposed to hold an international exhibition of foundry equipment and materials during the convention week, at Birmingham, England. The exhibition will be open from June 15 to June 24 and will comprise exhibits from the United States, France, Belgium and England, embracing every phase of foundry work. It is the first exhibition of this nature held in England and an influential council has been appointed to make it a success.

Invitations to attend have been sent to the American Foundrymen's Association and papers will be contributed from this association as well as from the French and Belgian associations. The exhibition will include appliances and materials in connection with ferrous and non-ferrous foundry trades. English foundrymen are looking forward to seeing modern American foundry equipment and it is expected that the American manufacturers will take advantage of the opportunity.

The exhibition will be held in the large Bingley Hall, which is well adapted for the purpose, every convenience being provided for exhibiting plant in motion. As a large portion of the space has been applied for, it is necessary that American exhibitors send in their applications without delay, addressing them to the Secretary of the Chamber of Commerce, Birmingham, England.

Pittsburgh Foundrymen's Association Elects Officers

The first monthly meeting of the 1921-1922 season of the Pittsburgh Foundrymen's Association, held at the General Forbes Hotel, Monday evening, Sept. 19, was featured by the presentation of "The Story of Ingot Iron," a three-reel film prepared by the United States Bureau of Mines at the plant of the American Rolling Mill Co., Middletown, Ohio.

Appropriate resolutions were adopted for the late Bayard Phillips, secretary of the association for a number of years, who died Aug. 30.

E. D. Frohman, Pittsburgh district sales manager S. Obermayer Co., who attended the international convention of Rotary Clubs in Scotland last summer, and Samuel Sleeth, retired superintendent of the foundry of the Westinghouse Airbrake Co., Wilmerding, Pa., who made a trip last summer, recounted their European experiences.

Officers of the association and the committees for the ensuing year follow:

President, F. H. Clay, Allegheny Steel Co.; vice-president, Samuel B. Cuthbert, Carnegie Steel Co., Braddock, Pa.; secretary and treasurer, William J. Brant.

Executive Committee.—A. J. Hartman, United Engineering & Foundry Co.; John Field, Union Steel Casting Co.; John W. Guay, Fort Pitt Steel Casting Co.; Thomas A. Wilson, Rogers, Brown & Co.; W. B. Robinson, THE IRON AGE.

Foundry Fund Trustees.—William J. Brant; J. Lloyd Uhler, Union Steel Casting Co.; Charles H. Gale, Pressed Steel Car Co., McKees Rocks, Pa.

Program Committee.—W. B. Robinson, chairman, THE IRON AGE; George F. Tegan, THE IRON AGE; L. B. Snow, Hickman, Williams & Co.; William K. Frank, Damascus Bronze Co.; E. D. Frohman, S. Obermeyer & Co.

Membership Committee.—John W. Guay, chairman, Fort Pitt Steel Casting Co.; McKeesport, Pa.; Thomas A. Reynolds, McConway & Torley Co.; H. M. Meixner, Hempfield Foundry; Harry Petty, American Steel Foundry Co.; J. S. McCormick, J. S. McCormick Co.; Gustav A. Bauman, Jones & Laughlin Steel Co.

Social Committee.—A. J. Hartman, chairman, United Engineering & Foundry Co.; L. A. Way, Duquesne Steel Foundry Co., Coraopolis, Pa.; H. P. Spilker, Sterritt-Thomas Foundry Co.; R. W. Jones, Union Switch & Signal Co., Swissvale, Pa.; C. D. Carey, Verona Steel Casting Co., Verona, Pa.; O. C. Dobson, Carborundum Co.; J. Lloyd Uhler, Union Steel Casting Co.; W. S. McConnaughey, Armor Plate Department, Carnegie Steel Co., Homestead Steel Works, Munhall, Pa.; Everett Smith, Sterling Steel Foundry Co., Braddock, Pa.

COMING MEETINGS

September

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention, Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis. Secretary, L. F. Boffey, 19 Park Place, New York.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

Industrial Cost Association. Nov. 2, 3 and 4. National Cost Conference, Pittsburgh. Secretary, A. A. Alles, Jr., Peoples Bank Building, Pittsburgh.

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

A British View of the Tariff on Vanadium

Commenting on the proposed American tariff on metals, and alloys, the *Metal Bulletin*, London, has the following in a recent issue regarding vanadium alloys:

"In view of the proposed new American tariff on imported metals and alloys, it is understood that the Board of Trade has been asked to give the subject its attention, in the interest of British manufacturers. Vanadium is a special case in point. The United States possesses a fairly complete monopoly of this metal, but as the raw material is all derived from United States-owned mines in Peru, consumers in America will be prejudiced by the duty to be imposed. Furthermore, in the case of a British manufacturer exporting to the United States steel containing vanadium, a further duty would become payable on the vanadium content, notwithstanding that the vanadium had already paid duty in the form of concentrates.

"It is a curious instance of warped mentality which advocates the exclusion of overseas products from our market, and simultaneously protests against the exclusion of our products from overseas markets. Surely what is sauce for the goose is an equally toothsome relish for the gander. The way things are going at present there will soon be no geese and consequently no use for sauce."

New Set of Weight Cards

The American Sheet & Tin Plate Co. has issued a new and revised set of weight cards covering black sheets, galvanized sheets, and formed products. These cards are 14 x 20 in. and are clearly printed. They are of particular value to all buyers and users of sheet steel, who are requested to send for them. The company will also send one of its perpetual calendars upon request.

The Titanium Alloy Mfg. Co., Niagara Falls, N. Y., announces the addition of a commercial department to its physical laboratories. There are four units: Testing laboratory, metallographic laboratory, room for experimental heat treating and small experimental foundry.

How Steel Prices Have Been Liquidated

Analysis of the Basic Facts Shows Steel Lower Than All Other Products Save Those from the Farm and Certain Metals—Building Materials and Furniture Still High

BY SIDNEY G. KOON

PERSISTENT statements, said by a daily paper to have general acceptance in Wall Street, and that have been finding their way into the financial reviews and editorial columns of the Metropolitan dailies, are to the effect that "steel has not yielded adequately" —referring, of course, to prices. One paper had it, a few days ago, that the prices of building construction materials " had broken sharply * * * before much was said about a re-action of steel quotations."

What are the facts?

Finished steel is now 37 per cent above its 1913 average; building materials are still 98 per cent above their 1913 level; "all commodities," comprising the nine groups studied by the United States Department of Labor, are 52 per cent above 1913. The only items below steel now are farm products and some of the non-ferrous metals—practically all being raw materials. In general, they are not manufactured products to the same extent as finished steel, and hence contain less of the high cost of labor than is found in steel.

Furthermore, so long as the assembling of the raw materials to produce a ton of finished steel requires the railroad transportation of five tons of ore, coke, limestone, coal and many smaller items, the present abnormal freight rates will continue to hit steel harder than any other major commodity produced in the United States.

Steel prices today are lower, with relation to inescapable costs, than they were before 1914. In other words, the maker of steel beams, bars, rods, wire, plates, sheets and other products has a smaller margin between cost of materials, fuel, transportation, labor and supplies, and the price he can get in the open market for his product, than he had before the war. And that margin is now below his fixed charges; it was not so before.

The question then is:

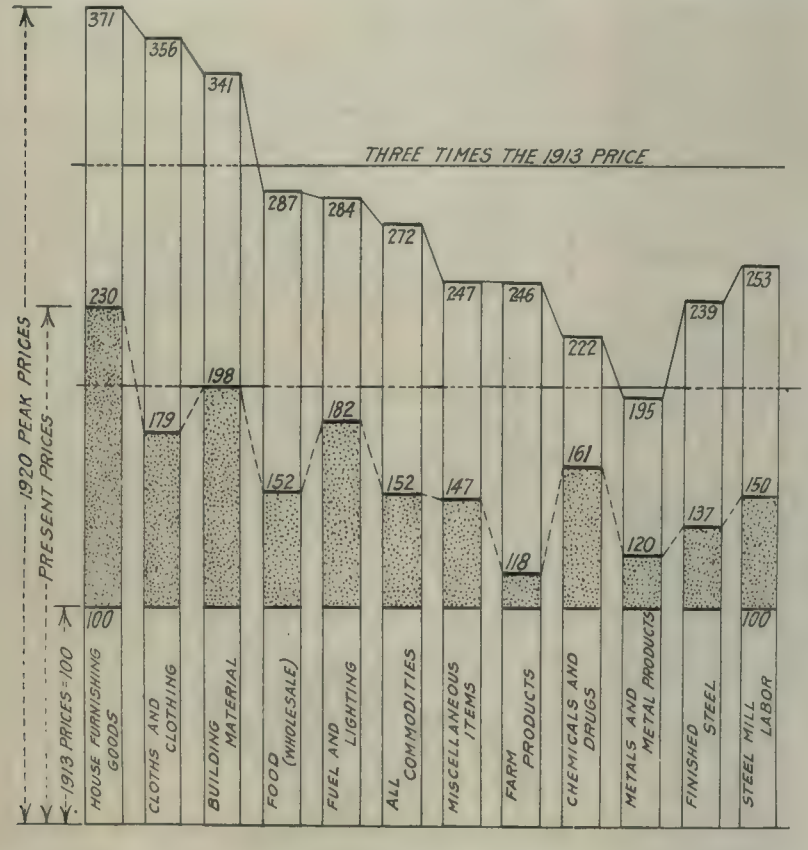
Just how much additional loss do these financial writers wish the steel industry to take in disposing of its output? Losses are now the portion of every manufacturer of steel. How much *more* loss is demanded before the admission will come that "steel has yielded adequately?"

A student of facts—not sentiment—will note that house furnishing goods are 130 per cent "up" from 1913; building materials, 98 per cent "up"; fuel and lighting, 82 per cent "up"; cloths and clothing, 79 per cent "up"; chemicals and drugs, 61 per cent "up"; while steel is only 37 per cent "up." Such an investigator, still in the pursuit of facts—not sentiment—may be pardoned if he wonders why writers in "The Street" are directing their fire at a class of products which have already yielded far more than any of the others mentioned—far more than the average of all.

If completion of general liquidation is desired—and few will question it—then it would seem that the greatest gain in that direction might come from attacking the prices of products which are farthest from it. Steel being, with few exceptions, nearest to pre-war figures, any raid on it must necessarily yield more meager returns than an equally vigorous drive on those in which there is evident profiteering, some being still more than 100 per cent above the pre-war level.

Now as to the facts back of the above figures:

For some years the Bureau of Labor Statistics of the Department of Labor, Washington, has collected prices from all over the United States, from which monthly index figures of the cost of living are prepared. These are all wholesale prices. On pages 100



Wholesale Prices of Nine Groups of Commodities, Together with Their Average, as Reported by the Bureau of Labor Statistics; at Right, Prices of Finished Steel, Based on THE IRON AGE Composite, and Wages of Common Labor, as Paid by the United States Steel Corporation

In each case the lower white section represents the price in 1913 (called 100). The total height of each bar shows the 1920 peak price reached by the corresponding item, the figure being shown also. The upper white section outlines the present recession from the peak of 1920. The shaded area indicates the amount by which present prices exceed those of 1913, the relative price to-day being also shown.

and 101 of the *Monthly Labor Review* for July, issued by the bureau, will be found quarterly figures from January, 1913, to January, 1918, and monthly figures from January, 1918, to May, 1921, inclusive. Average figures for each calendar year from 1913 to 1920, inclusive, are also given. Figures for June, July and August have since become available. All figures are based on the average for 1913, that average being placed at 100.

These figures cover the nine groups of commodities shown in the appended table, and the (weighted) average of all commodities. They do not include steel, as such, but cover it under the general heading "metals and metal products."

It happens that corresponding data for finished steel products are available in THE IRON AGE composite figures. During 1913, the average price per pound of steel rails, bars, beams, plates, sheets, wire and pipe was 1.663c. To-day (Sept. 19) it is 2.279c. Its 1920 peak was 3.974c. These figures, reduced to the basis of 100 for 1913, are shown in the table, as well as on the diagram. The seven products named represent 88 per cent of the total output of finished steel. THE IRON AGE composite is a straight average of the seven individual price figures.

Item	Average for 1913	Peak of 1920 Amount	Month	Present Figure
Farm products	100	246	April	118
Food, etc.	100	287	May	152
Cloths and clothing	100	356	Mar.	179
Fuel and lighting	100	284	Sept.	182
Metals and metal products	100	195	April	120
Building materials	100	341	April	198
Chemicals and drugs	100	222	Sept.	161
House furnishing goods	100	371	Sept.	230
Miscellaneous	100	247	June	147
All commodities	100	272	May	152
Finished steel	100	239	Aug.	137
Steel mill common labor	100	253	All	150

Let us look at it in another way:

Steel has receded 102 "points"; in 1920 it was "up" 139 points; its liquidation is therefore 73.4 per cent. Except for the other metals and the farm products and food, not another item has liquidated so much as 70 per cent. The figures follow:

Item	1920 Excess Over 1913	Present Drop in Points from 1920	Percentage Liquidation
Farm products	146	128	87.7
Food, etc.	187	135	72.2
Cloths and clothing	256	177	69.1
Fuel and lighting	184	102	55.4
Metals and metal products	95	75	78.9
Building materials	241	143	59.3
Chemicals and drugs	122	61	50.0
House furnishing goods	271	141	52.0
Miscellaneous	147	100	68.0
All commodities	172	120	69.8
Finished steel	139	102	73.4
Steel mill labor	153	103	67.3

Having studied these figures from all angles, the open-minded student of economics again faces the question:

Why do the Wall Street analysts and the financial writers strain at a 37-per cent gnat and swallow a 98-per cent camel, a 130-per cent elephant, several other 60-or-more-per cent lions? Would it be a help to better times to force the steel industry into the ruinous position of copper?

Railroads operating between Cleveland and Pittsburgh by way of Youngstown have been requested to reduce the rate on iron and steel from Pittsburgh to Cleveland. The rate of 24c. per 100 lb. is higher than the combination of the local rate from Pittsburgh to Youngstown with that from Cleveland to Youngstown. Each of these rates on steel is 10½c. per 100 lb., making the combination rate 21c. The demand for the cut is made by Cleveland interests buying steel in Pittsburgh. A hearing was conducted Sept. 14 at Columbus by representatives of the Interstate Commerce Commission.

The American Society of Safety Engineers will hold a meeting at the Engineering Societies Building, New York, Sept. 23, at 8 p.m., at which the tentative safety code for ladders will be discussed.

More Steel Men at Higher Wages

Employment in iron and steel works has taken a turn for the better, according to the August report of the Bureau of Labor Statistics, which shows a gain of 4.9 per cent in number of men employed in 113 plants, as compared with July, and a gain of 15.4 per cent in the payroll, evidencing a decrease in the proportion of men working on short time. Of course, the figures are far below those of last year, but the improvement is the first in some time.

It will be noted that the men in automobile plants are making, on the average, about 75 per cent more per day than the men in steel mills. Workers in car building and repairing are making 42 per cent more than those making the steel with which the others work.

Comparative figures for July and August, 1921, and August, 1920, in iron and steel mills, automobile factories and car building and repairing shops follow:

Month	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
July, 1921	113	97,902	$3,774,977	$38.56
August, 1921	113	102,698	4,357,361	42.43
August, 1920	116	180,797	13,879,882	76.77
Automobiles				
July, 1921	47	78,908	2,620,015	*33.21
August, 1921	47	74,283	2,522,602	*33.96
August, 1920	52	129,194	4,549,257	*35.22
Car Building and Repairing				
July, 1921	61	43,373	2,569,383	59.24
August, 1921	61	44,201	2,672,613	60.47
August, 1920	61	70,198	5,113,734	72.85

*Weekly.

Fabricated Steel Business in August

The amount of business booked for fabricated steel work in August showed that the recent rate has been well sustained. The total for August, according to the statistics collected by the Bridge Builders and Structural Society, George E. Gifford, New York, secretary, was 59,300 tons, compared with 60,200 tons for July. The percentage of the capacity of the country's bridge and structural shops taken by the August bookings was 33, against 33⅓ for July. The average for the six months ended with August was 57,550 tons, the leanest month being May, with 50,800 tons, and the best month June with 66,900 tons. The business for January and February totaled no more than 57,600 tons for the two months. The total bookings for the eight months, 403,000, was 28 per cent of rated capacity.

Canadian Production of Pig Iron, First Half of 1921

Canada's output of pig iron for the first six months of this year amounted to a little less than 70 per cent of that for the corresponding period of 1920. The actual figures for the six months' period were 309,206 long tons in 1921 and 449,810 long tons in 1920. The bulk of the output was basic iron, about one-fifth of the total being foundry iron, and a small percentage malleable iron. The output for June showed a further decline from preceding months.

On the other hand, the production of steel ingots and castings in June was the largest for any month up to the present time, the total being 64,103 long tons, or an increase of more than 12,000 tons over the May figure. The June production for this year is somewhat higher than the pre-war monthly average. The total for the six months' period, however, shows a larger slump from the level of 1920 than is the case for pig iron. The total for the half year in 1920 was 547,000 tons, as compared with 259,000 tons in 1921.

The Missouri Iron & Steel Corporation, St. Louis, with properties at Haigart, Mo., and the St. Louis Iron & Steel Co. have been merged, and the name changed to the Consolidated Steel & Iron Corporation. The board of directors also has authorized the issuance of $2,000,000 of preferred stock.

INDUSTRIAL LEADERS

Well-Known Manufacturers Among Members of Unemployment Conference

WASHINGTON, Sept. 20.—Among those accepting invitations of the President to be members of the unemployment conference, which is to begin at 10 o'clock next Monday, are Chairman Charles M. Schwab of the Bethlehem Steel Corporation; President Clarence Mott Woolley, Detroit, of the American Radiator Co.; William Kelly, Vulcan, Mich., of the Penn Iron Mining Co.; President T. E. Edgerton, Nashville, Tenn., of the National Association of Manufacturers, and President Joseph H. DeFrees, Chicago, of the Chamber of Commerce of the United States. In all, 37 had accepted invitations to attend the conference, in addition to members of the Economic Advisory Committee of the Department of Commerce, and other replies are expected. It was intended at first to confine the list of members to 25 or 30, but it was found necessary to enlarge it.

Secretary of Commerce Hoover has been appointed by the President as chairman of the conference, and, it is announced, it is expected that it will at once dissolve into special committees for the formulation of definite plans for submission to the conference as a whole. These committees will, no doubt, it is stated, seek co-operation from further representatives of labor, employers, and civic bodies in formulation of their views. Secretary of Labor Davis, who, of course, will be a member of the conference, has been directing a renewed survey of unemployment in preparation for the conference and co-operating in making the plans for it.

The invitations of the President state that "The conference is called to inquire into the volume and distribution of unemployment, to advise upon emergency measures that can be properly taken by employers, local authorities and civic bodies, and to consider such measures as would tend to give impulse to the recovery of business and commerce to normal."

In the announcement given out by Secretary Hoover it is stated:

"In naming the members of the conference, it has been the desire of the President to secure geographic representation and at the same time have regard to the different elements of the community who are interested and can be helpful in the problem without any attempt at proportional members of particular groups. Those of experience in those industries where there is the largest degree of unemployment have been called upon in larger proportion than from trades where there is less unemployment difficulty. It was impossible to include representation of the whole of some 50 trade groups in the conference and hold its size within workable limits."

Organized labor is to be represented by a number of conferees, among them being President Samuel Gompers of the American Federation of Labor.

AGAINST STOP-WATCH STUDIES

A Second Address by Frank B. Gilbreth Before Members of the Taylor Society

At a dinner meeting of the New York section of the Taylor Society, held at the Flatiron Building restaurant, Sept. 15, Dr. Frank B. Gilbreth, consulting engineer, Montclair, N. J., continued his arraignment of stop-watch time studies in a paper entitled "Micro-Motion Study for Current Use." In it he replied to criticisms of a previous paper of his, made at the April 11 meeting of the Philadelphia section and subsequently published in the June Taylor Society bulletin. In publishing the criticisms, the editor, Dr. H. S. Person, managing director of the society, asked Dr. and Mrs. Gilbreth for more data—descriptions of cases and figures contrasting micro-motion and stop-watch results and suggested a continuation of the discussion of time study. Dr. Gilbreth was vigorous, both in matter and in manner, in making his answer and the evening's discussion was at times heated. The paper, which was a detailed refutation of the arguments of the opponents of micro-motion studies, was read only in part. In summing up, Dr. Gilbreth said:

"According to the managing director of the Taylor Society, the one and only point remaining at issue is conceded to be 'whether the stop-watch technique is so unscientific as to be unsuitable for the determination of standard times and standard rates as a basis for current wage contracts.' What proof has been offered, and in the light of the evidence by what stretch of the imagination can the inaccurate non-method recording stop-watch method be called scientific?

"We have shown that the Taylor philosophy does not countenance standard rates unless founded on real standard times. This leaves simply standard times for current use.

"We ask now, Do the stop-watch advocates still want times for current use only? If so, we claim that even then we can secure more accurate data for less cost.

"If they concede any use for such data in addition to 'current use,' we have still further won our contention, on this one remaining point at issue as to the relative merits of the two methods, for we can furnish all such necessary data, whatever its use.

"Our data are and will continue to be accurate, and their cost as used for current use is and will be negligible, for our data for current use are a by-product of data for permanent use.

"Dr. Person has made certain requests, for the Taylor Society and the public. We have been and shall be glad to accede to these requests. We now consider ourselves justified in making a few requests, as follows:

"1. Of the stop-watch time study men, that they state exactly what they claim their inaccurate non-method-recording stop watch can do for standard times for 'current use' that the micromotion study method cannot do far better.

"2. Of the Taylor Society, that after such data as are requested are submitted, it evaluate the data and publish the findings, without fear or favor, for the sake of science in management.

"3. Of the Taylor Society, that it determine at once the stand that it proposes to take on the subject of accuracy of fundamenal data of management and decide whether it intends to live up to its name as a 'society to promote the science of management' or not.

"4. Of Dr. Person, that he write a paper in which he reviews the 'creed of the management engineer' in its relation to time study and estimates the extent to which this society has lived up to that creed, laying special stress upon keeping faith with one's science and one's fellow engineers, for such faith lies at the base of faith with one's clients and with the community."

Among those taking part in the discussion were Dr. H. S. Person, W. N. Polakov and W. H. Leffingwell. The chairman of the meeting was H. A. Hopf, of the Federal Reserve Bank.

The Basset Direct Process Not Yet Commercial

The report of the Société d'Ougrée-Marihaye (Belgium) a large shareholder in the French Basset Co., warrants the conclusion that the Basset process of iron and steel manufacture has not yet passed the experimental stage, and that the revolution in metallurgy promised by M. Lucien Basset seems still to be far from realization. This statement is made by the London *Ironmonger*.

Ford cars to the number of 117,696 were shipped in August; Studebaker cars were 8642 in number. Shipments of automobiles amounted to 2 per cent above July, but were 28 per cent below August, 1920.

Great Activity at German Steel Works

Most Mills Sold Up for This Year—Semi-Finished Materials Scarce—Heavy Export Selling, Particularly in Railroad Lines

(By Aerial Mail to London)

BERLIN, Sept. 2.—The heavily increased demand in the German iron and steel market which set in with the renewed drop of the mark three weeks ago has assumed still greater proportions and industry is evidently on the eve of another boom period which may outrival that of 1919 to 1920. Prices have been climbing at an unprecedented rate during the past few weeks and there are no indications of a slowing down as yet.

An examination of the causes responsible for the tremendous activity obtaining at the mills shows that the depreciation of the German exchange represents a large share of the present prosperity, evidenced by the heavy export orders. In the domestic market, too, the effects of the fresh deterioration of the mark are noticeable. Customers are anticipating further price advances resulting from dearer raw materials and are overwhelming mills with orders. Aside from the purely speculative reasons, there are other underlying motives of the present boom. The proposed new taxes, whatever their ultimate form, will lead to a general increase of production and living costs. The latter have already sharply risen during the past month and show a further upward tendency. Strikes have been more numerous of late and may be considered as a prelude to another period of wage claims. Serious economic disturbances appear unlikely, as industry has done very well during the past year and can well afford to pay increased wages. The "buyers' strike" no longer exists. It is noteworthy that the rapid upward trend of the market is in a measure caused by a gradual revival of the building trade, where many big projects such as canals, locks, long distance power stations, etc., call for fairly large tonnages of material.

Many Mills Filled for the Year

Under pressure of the enormous demand, mills are finding it difficult to cope with incoming orders. Rhenish-Westphalian mills are now, generally stipulating terms of delivery ranging between 3 and 4 months and most of the mills are sold up for the remainder of the year. Such is the activity in some departments that mills frequently refuse orders or deliberately quote prohibitive prices.

The heaviest price increases have been in the sheet market where 3100 m. ($29.55) per ton is now being named for light plates as compared with 2000 m. ($19.00) at the end of May. Bar iron has jumped to 2700 m. ($25.65) and the Hösch steel works is reported to be asking even 2800 m. ($26.60). The Krupp-Rheinhausen is offering limited quantities of material only, because of the heavy call by the various works of the concern, and the same applies to the Gutehoffnungshütte. The Dortmunder Union has still a limited tonnage to clear off; Phoenix is accepting bar iron specifications for larger gages only. Thyssen, Rhenische Stahlwerke and Haspe are still in a position to meet the demand though quoting higher prices.

Increased Demand for Pig Iron

With the general improvement, a better tone prevails in the pig iron market. Demand by foundries is active and shipments, which showed an increase of 25 per cent during July compared with June, registered a further increase in August.

There is a marked scarcity of semi-finished material. Sheet mills are reporting very satisfactory orders, particularly in light plates, while heavy sheets are less in demand because of the temporary lull in shipbuilding caused by the slump in ocean freight rates, the repurchase of former German vessels, and the precarious situation in international shipbuilding. By far the greatest activity prevails in the wire market, where domestic customers have difficulty in obtaining material, as mills are engaged on large export orders. Base prices for wire nails are around 330 m. ($3.14) per 100 kg. and for open-hearth bolt and rivet stock 350 m. ($3.33) is named. Large export sales of galvanized wire have been made recently with prices in the neighborhood of £12 15s. 6d. ($48.29) per metric ton f. o. b. Hamburg, for No. 8 gage. Demand for barbed wire is also good although prices have not been advancing as rapidly, latest export quotations being 400 m. ($3.80) per 100 kg. f.o.b. Hamburg. The majority of wire mills have specifications on hand for four months ahead and small orders for early delivery are only accepted at premiums.

Export Movement Growing

It is evident that the prolonged struggle in the English coal mining industry as well as the conditions which recently prevailed in Upper Silesia have enabled the Rhenish-Westphalian industry to strengthen its position in the international market. "The German iron industry, aided by the low value of the mark, has at present very little to fear from foreign competition, with the possible exception of the United States." This is the view of a prominent industrialist. Foreign inquiries and orders have been rather numerous, even Belgians appearing as buyers. Japan and China have been heavy buyers of bar iron, while Holland and the United Kingdom have been in the market for rails and track supplies. Apart from wire and wire products, bar iron and sheets are the principal export items. Scandinavian customers have lately contracted for large shipments of light plates, particularly dynamo and transformer sheets. The Russian Soviet Government is also actively buying and has just closed for immediate delivery of a large tonnage of wire nails. Some of the export orders include railroad cars for Belgium, while the agricultural machinery and implement manufacturers have booked substantial orders in Holland and Roumania. The Steffens & Nölle construction shops have just been awarded the contract for the building of a railroad bridge across the Nirova, at Narva, by the Esthonian government. The contract will probably total 26,000,000 Esthonian marks. The German tender is stated to have been 11 per cent lower than the lowest British offer. A list of 10 cranes to be erected at the port of Reval will probably also go to German firms. On tenders recently issued by the Bulgarian Government for railroad freight cars, German quotations were lower than French, Belgian, Italian, and Czecho-Slovakian competition and were close to the lowest bidder, Hungary.

We quote as follows per metric ton; with prices for export averaging 5 per cent higher:

	Marks	
Ingots	1,650	$15.67
Blooms	1,900	18.05
Billets	1,900	18.05
Sheet bars	1,950	18.52
Bar iron	2,700	25.65
Structural shapes	2,650	25.17
Squares and rounds	2,550	24.22
Flats	2,400	22.80
Angles	2,500	23.75
Hoop iron	2,600	24.70
Wire rods	2,700	25.65
Sheets, heavy	2,200	20.90
Sheets, medium	2,500	23.75
Plates, light	3,100	29.45
Sheets for stamping, planished	4,000	38.00
Sheets, galvanized	5,000	47.50
Pipe		
Boiler tubes, 2½ in., per meter	22	0.21
Boiler tubes, 3 in., per meter	33	0.31
Gas pipe, 1 in., per meter	11	0.10
Gas pipe, 1½ in., per meter	18	0.17
Gas pipe, 1 in., galvanized, per meter	27	0.26

The Heller Brothers Co., 879 Mount Prospect Avenue, Newark, N. J., has merged its subsidiary organizations, the Rex File Co. and the Vixen Tool Co., under the Heller Brothers name.

BELGIAN MARKET IMPROVES

Decline in Prices Halted—Mills Make Better Deliveries Than Germany—Government Buys 60,000 Tons of Rails

(*Special Correspondence*)

CHARLEROI, BELGIUM, Sept. 3.—Following a period of almost unparalleled depression, the Belgian market latterly has shown distinct signs of improvement. It is too soon to anticipate a steady advance of prices during the coming months, but it means much that the downward movement of prices has been halted. Prices had reached a level which rendered profitable operation of mills impossible. Three factors of the recent improvement merit attention: First, it should be borne in mind that production had been reduced to a minimum during the past few months, output of pig iron in July amounting to 45,000 tons compared with 93,000 tons average monthly production during 1920. Obviously any slight increase in demand would immediately affect the market and recent weeks have shown clearly that production was inadequate to meet the demand. Second, the German iron industry is brimming with activity and while German quotations are lower than any Continental prices, the mills are unable to compete with Belgian producers on delivery. So great is the discrepancy in terms of delivery that in many markets German competition is practically eliminated for the present. Third, inquiries and orders from abroad, especially overseas, have been rather satisfactory of late. Japanese importers have been active in the Belgian market during the past fortnight.

The Saint-Léonard Co. at Liege has secured an order from a Spanish railroad company for 20 locomotives and tenders on a bid of 3.67 pesetas per kilo for engines and 1.92 pesetas for tenders, the total contract being valued at 5,562,000 pesetas. The Compagnie Centrale de Constructions, Haine-St. Pierre, has booked an order for 250 cars for China. The Franco-Belge Co. at La Croyere have orders on hand valued at 76,000,000 fr. China placed an order for 13 cars, 12 freight cars, and 8 bridges of 30 meters span each with the Ragneno Works at Malines, totaling 9,000,000 fr. A rail order for 4000 tons for the Dutch colonies went to the Rehon works of the La Providence Co. at Marchienne-au-Pont.

Outstanding in domestic business is the Government order for 60,000 tons of rails and track supplies.

Iron of British Analysis Produced

An interesting feature of the pig iron market, aside from the resumption of operations at some stacks which have been idle, is the adaptation of production to English demands. The Providence Belge, for instance, is now producing a special grade of pig iron of high manganese and low phosphorus content such as is turned out by Scottish furnaces. For this grade 265 fr. per ton is asked compared with 225 fr. for inland foundry iron No. 3. The present price of Belgian basic pig iron is around 185 fr.

Demand for semi-finished material has also been better during the past fortnight. Although supplies of domestic producers are not large, no arrangements for increasing production are reported, so far mills evidently preferring to continue obtaining their material from France and Luxemburg. Nominal quotations are as follows: Basic blooms 280 fr., basic billets 295 fr. sheet bars, 315 fr. With foreign material dominating the situation, however, there can be no consideration of a "Belgian" market in semi-finished material.

The general improvement is reflected in a hardening of prices for finished material although no distinct betterment can be reported as yet. Beams, bolts and nuts, and the tube market are still unsatisfactory but hoops and sheets as well as bars have recovered. Export quotations for Belgian mild steel bars advanced by 2s. 6d. to £8 2s. 6d. to £8 5s. probably as a result of a rise in Luxemburg export quotations. Wrought iron bars No. 3 also registered a slight recovery, quoting about £8 12s. f.o.b. Antwerp, while No. 2 iron remained stationary at £7 10s. to £8. No material change has taken place in domestic quotations. A marked revival is noted in the hoop iron market where present export prices have reached the 500 fr. level compared with an average inland price of 520 fr. and some makers even naming 550 fr. Cold rolled material, however, under pressure of German competition, has remained unchanged. The rail market, through recent substantial domestic and foreign orders, is developing favorably with prices tending upward. A rapid change has come over the wire market. Although the mills had to lower domestic and export prices toward the middle of August, the past fortnight brought a fair volume of orders, particularly from the Far East, for wire rods and products, sending prices up to the level of the first week of August. We quote galvanized wire for export at 18s., plain bright wire at 14s., barbed wire at 20s., and nails at 14s. per 100 kg. f. o. b. Antwerp. Tube prices were reduced 5 per cent.

Exports of Pig Iron, Bar Iron and Rails Increase

A factor in the further improvement of the market is the extent to which French competition may be effective. It is noteworthy that the Government recently made a 50 per cent reduction in freight rates on ores from the frontier to Liege and Charleroi, which corresponds to about 10 fr. per ton and is expected to result in cheapening of production costs by 30 to 40 fr. per ton. It is hoped that this reduction will bring Belgian prices to a competitive basis. On the other hand, this advantage is offset by the marked reduction of French coke prices (30 fr. per ton) while the declared readiness of the French Government to lower freight rates on iron and steel with a view to aiding export trade is being seriously considered. Belgian iron and steel exports during the first half of 1921, compared with the same period of 1920, are shown below:

	Metric Tons	
	1921	1920
Pig iron	61,251	4,698
Semi-finished	3,100	2,700
Sheets and plates	61,910	52,997
Bar iron	223,978	139,771
Beams, girders, etc	19,767	18,061
Rails	67,344	15,570
Wire and wire nails	29,000	30,000
Cast-steel products, machined	33,000	27,700

The bar iron figures are significant. Not only have shipments been nearly doubled compared with 1920 but a comparison with the 1913 figures—308,706 tons, shows that this year's exports are 75 per cent greater than those of the last peace year.

Situation in France Unfavorable

LONGWY, FRANCE, Aug. 29.—Very few furnaces are in operation in Lorraine, only 18 units working out of the 67 existing furnaces. The de Wendel works is responsible for 9 furnaces, Knutange for 2, the Hagondange works 3, Rombas 2, Auduh 1, and Thionville works 1 furnace. In Strassburg the labor agitation against wage reductions is still acute and the workers are returning to work with great reluctance. The coal traffic at the harbor of Strassburg is increasing, large quantities of fuel being shipped from the Ruhr and Sarre districts.

It does not appear that the reduction of 50 francs per ton in the price of coke will seriously affect the price of pig iron. The pig iron producers have been operating at a loss and no substantial reduction seems possible. The manufacturing consumers of iron are complaining that no reduction has been decided on in the price of fuel for their use, the decline of 50 francs applying only to the steel works and furnaces.

In the automobile industry there is a slight improvement. The Peugeot works is now producing 700 cars and 250 motorcycles per month. French manufacturers are extremely anxious to receive a share of the large specifications which have been submitted to them recently. Two steel works have booked 12,000 tons of heavy section rails. Output in light sheets is so curtailed that it is almost impossible to obtain sufficient for the automobile industry.

ON THE ART OF BUYING

Profits and Growth of Business Depend Upon Wisdom in Purchases

BY JOHN J. RALPH*

Buying is the crystallization of all thought, initiative, planning and dreaming of the entire organization. It is the most important single concrete thing done by the entire organization. All moneys received from any source, less profits and plus losses, are expended as a result of past or present buying.

In all times the prophet has been the most honored of men and considered to be the wisest. The past is past and we can find those who can tell of it. The present is here and what is is. The future is to come and who can tell what is to be? Yet every purchase made is a gamble on the buyer's foresight into the future.

For every purchase made the buyer receives his reward. If wise, it is profit; if unwise, a loss. Further, every unmade purchase which hindsight shows would have been wise nets a loss in profits foregone. Caught between alternatives, he must buy, for unless he buys he cannot sell.

In ordinary times, when conditions are seemingly constant and the future cast in the same mold as the present, and there is no indication of crisis, the problems of buying seem simple. Just anticipate the same for to-morrow as is happening to-day, plus the normal increase or less the normal decrease.

Mistakes in buying are absorbed without realization of the foregone profits, and not until they have sapped the life blood and there is no longer vitality to meet new competition, changed industrial conditions, or new methods of production, are mistakes realized.

Buying as a Function of Management

Buying is not an independent operation. It is a distinct function of management and is the final declaration of decisions reached. Costs are a combination of the results of past buying and present purchases. Overhead is the cost of capitalized past buying. Running expense is the cost of present buying. Sales costs are the price paid for the distribution of product.

What fixes the price obtained for product? Demand, competition and supply. Competition is largely misunderstood. It embraces competition of dissimilar goods as well as the struggle between producers of the same article. This very largely fixes price. Profits are the difference between price and cost, are they not? Yet cost is the price of buying.

Buying is an opportunity. Always there have been those who made profits in every line. To-day in almost all fields there are those starting out who will grow, and some who will become great. This will come because of their management, and the final showing of their management will be in their purchases.

Some will purchase with foresight. Others will live through their ability to purchase knowledge and skill. Not a few will score through wise buying of production equipment. Money is the master instrument of others, while many will find their living margin in their ability to obtain distribution at low cost.

A certain amount of foresight in each of these will insure success. Pre-eminence in each will make certain not only growth but phenomenal results.

The high cost of sales is really the high cost of buying. Who pays the selling cost in any industry? The man who buys the products of that industry. And he pays the cumulative cost of all the previous buying, clean down to the raw materials as they are taken out of the earth.

The Different Elements in Buying

All buying is not equally important. The purchase that saves ten dollars per year for ten years is many times more important than the purchase that will save twenty dollars this year. Neglecting to make a purchase that will make ten dollars for ten years is many times as serious an oversight as that which loses twenty dollars in the bill that comes in to-morrow for goods to be used immediately.

Of prime importance is, of course, the basic purchase involving site and building selection. On this will depend largely the overhead the plant will be under during its natural life. Labor, taxes and transportation ease or trouble are what are bought with the site and building, also an interest charge. These will have their effect on every dollar's worth of product put out. Hidden away in the balance sheet, not realized for what it is, for all the coming years it pays dividends for foresight or takes toll for the lack.

Of less importance is the equipment, for the life of this is not so long, and losses here can be more easily seen and remedies applied. But the importance is greater per dollar of purchase than for current goods, because it is also a mortgage on the future, and the product cost sheet renders a daily and yearly judgment on the quality of the purchase.

Per dollar, current buying is the least important, for it is in the plant to-day and released to-morrow. The total of profit and loss is small per unit and is quickly taken. Yet while it is the least important, it is the most insistent in making itself recognized. If one's judgment has been vindicated, the proof is easy, and quickly seen in the variation of price level or in the ease or difficulty of passage of product through the shop. If that judgment has been bad, there is the pile of scrap in the yard that tells of poor quality, the customer's complaint, or the tell-tale market quotation.

Yet even in this purchasing there is one type of error of judgment for which there is no penalty record. Where in the balance sheet is the item that says—

Lost Sales due to:

Improper working tools and consequent lack of quality?

High prices, the result of cumulative bad buying?

Poor prices due to:

Inferior product or out of date design and materials?

Neither these nor several other items are to read from the yearly balance sheet, for that tell-tale shows only what was done, and offers no recrimination on the results and penalties paid for sins of omission.

The Influence of Quantity

The design and characteristics of the output having been settled, there is a tendency to consider the matter closed, and to feel that further buying for materials and current supplies is merely a matter of form. This is not correct. No judgment that covers a period of time should be treated as absolutely right, for there is always an advance possible in the art, whether in the development of new materials, new methods of manufacture, or new possibilities of perfection of output.

In many cases the savings possible on any one piece are extremely small, but the cumulative effect may well be large. Five dollars is not large, but five dollars net is 5 per cent on $100 of investment, and it is upon net returns on investment that the health of any enterprise depends.

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Electrical Engineers Meet

CHICAGO, Sept. 20.—The Association of Iron and Steel Electrical Engineers convened at Hotel LaSalle, Chicago, yesterday, for a five-day meeting, with an attendance of 500. On Tuesday afternoon, the members were the guests of Chicago independent steel mills at an outing held at Northwestern Park, near Chicago. Games and dancing were features of the program. The association has added 125 members in the last nine months, its present enrollment being 1350.

The first meeting of the newly organized Associated Technical Societies of Detroit, was held in the Detroit Board of Commerce, Sept. 16. Prof. John C. Parker, of the University of Michigan, presented the ideas and aims of the new organization. Every technical association in Detroit was represented at the meeting.

Iron and Steel Markets

IMPROVEMENT HOLDS

Chiefly in the Lighter Products

An Advance in Sheets—Heavy Lines Still Unstable

The steel trade recognizes the good effect of the stir in the wire trade connected with the recent price advance, and on a smaller scale the sheet market has had some notice in the past week. Three or four independent companies have announced an advance of $5 per ton. It is not yet clear how far this will be followed. The Steel Corporation has made no change, though it is expected to do so, and thus far the chief effect has been to give a few mills more sheet orders at their former prices than they have had in some weeks.

The larger contribution the lighter products —wire, sheets and tin plates—are making to current mill operations is emphasized by a further slight increase in total steel output, as expressed in ingots, at the same time that the heavier products —rails, plates, structural shapes and bars—show on the whole no increase.

A gradual increase in the buying of steel, even though actual consumption may not change in any marked degree, is a common expectation for the autumn months, but buying for forward delivery is not looked for until 1922. Meanwhile there is a definite effort by steel manufacturers to limit their losses on current business. Plate mills particularly have suffered, and in several cases such mills have been shut down to await some sign of price stability.

An effort is being made in the Pittsburgh district to lift the prices of semi-finished material. Recently on a 5000-ton inquiry for slabs $29 at Youngstown was quoted, as against the usual $30, but later the $29 price was withdrawn.

There are indications that makers of hoops, bands and strips will make a stand for a $5 advance over the recent low level in that line.

Reductions in wrought pipe announced Sept. 16, amounting to $8 to $10 per ton on standard and line pipe, only recognized formally the lower basis on which sales had been made for some time. There is a $10 reduction on lapweld steel boiler tubes, but the seamless tube trade continues without published prices. Presumably iron pipe will not remain above the level of steel.

Structural steel lettings, which at times seem to be increasing, are shown to have been fairly uniform for six months ending with August. The August total was 59,300 tons, or about one-third of a month's fabricating capacity, while the six months' average was 57,550 tons. Lower prices continue to be reported on fabricating and erecting. At Chicago the uncertainties of building trades wages are holding back much projected work.

Recent price advances on Northern pig iron have given Southern iron an opportunity to come into Northern markets, but no large sales have been made. Considerable business is still pending in the East, including one inquiry for 10,000 tons from a Massachusetts melter. Some eastern Pennsylvania furnaces have advanced their quotations 50c. and sales of 5500 tons of basic in the Pittsburgh district have been accompanied by an advance of 25c., making the prevailing quotation $19.25, Valley. Buyers in the Chicago district are specifying more freely and throughout the country the pig iron market is showing more firmness.

On the present low rate of production sellers of pig iron still have a margin on which prices may be edged up further, without giving owners of idle furnaces encouragement to blow in.

Inquiries for small lots of lake iron ore have been received at Cleveland from companies which usually produce steel-making iron only, but are considering going into the manufacture of foundry iron if suitable ore can be obtained at price concessions. It is now estimated that the shipments of ore by lake will not exceed 21,000,000 tons.

The reduction in British ferromanganese to $58.35 at Baltimore and Philadelphia has led to a fair amount of buying, and domestic ferromanganese has been reduced to equivalent delivered prices.

Exports of iron and steel for August are estimated at 73,792 tons, apart from several unimportant items unreported. This is the lowest tonnage since January, 1909, and compares with 86,523 tons in July, 1921, and 431,484 tons in August, 1920.

On the recent 4000-ton Japanese rail order placed in this country the delivered price was slightly under $50, much of the freight being absorbed by Japanese interests having vessel space. Another export inquiry on which there is sharp international competition is for 16,000 tons of 80-lb. rails for the Bolivian Government.

Pittsburgh

PITTSBURGH, Sept. 20.

Realization on the part of steel manufacturers that recent prices over-discounted such benefits as have accrued from the liquidation of labor and other costs is finding reflection in an effort to put back prices to levels more nearly in line with present day conditions. The Brier Hill Steel Co. and the Inland Steel Co. in the past week announced an advance of $5 per ton in the prices of sheets, and this step has been followed by all but a few of the other independent makers. The American Sheet & Tin Plate Co. has not yet taken action, although it is admitted officially that it will make this advance. Effort also is being made to lift the prices of semi-finished material and it is probable that before this week ends makers of hoops, bands and strips will announce an increase of $5 per ton over the recent low point. Meanwhile, the recent advance in wire products gradually is being established, at least on nails, sales of which have been made at $2.90 base, per keg, Pittsburgh. Actual advances in other products are lacking, but in a broad way steel manufacturers are making a good deal of an effort to get away from ruinous prices, as recent competitive quotations are commonly designated. The only exception to this trend has been steel tubular goods, which the National Tube Co. reduced $8 to $10 per ton, effective Sept. 16, this reduction being met by all of the independent makers.

Fairly good business continues in the lighter

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 20, 1921	Sept. 13, 1921	Aug. 23, 1921	Sept. 21, 1920
No. 2X, Philadelphia‡	**$21.34**	$20.84	$20.84	$53.51
No. 2, Valley furnace†	21.00	21.00	20.00	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2, foundry, Chicago*	22.00	22.00	20.00	46.00
Basic, del'd, eastern Pa.	19.25	19.25	19.00	51.26
Basic, Valley furnace	**19.25**	19.00	18.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	22.00	22.00	20.00	46.50
Malleable, Valley	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.46	50.96
L. S. charcoal, Chicago	33.50	33.50	33.50	58.50
Ferromanganese, del'd	*60.00*	70.00	70.00	....
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	60.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	60.00
O.-h. sheet bars, P'gh.	30.00	30.00	30.00	67.50
Forging billets, base, P'gh.	34.00	34.00	34.00	75.00
O.-h. billets, Phila.	35.74	35.74	35.74	65.74
Wire rods, Pittsburgh	**41.00**	38.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	*1.65*	1.70	1.75	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	2.00	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	*1.60*	1.65	1.75	3.25
Steel bars, Chicago	*1.75*	1.85	1.93	2.73
Steel bars, New York	*1.98*	2.03	2.13	4.13
Tank plates, Pittsburgh	*1.60*	1.65	1.80	3.25
Tank plates, Chicago	1.75	1.75	1.98	3.03
Tank plates, New York	*1.98*	2.03	2.18	3.63
Beams, etc., Pittsburgh	*1.60*	1.65	1.80	3.10
Beams, Chicago	1.80	1.80	1.98	2.83
Beams, etc., New York	*1.98*	2.03	2.18	3.48
Steel hoops, Pittsburgh	2.15	2.15	2.25	5.50

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 20, 1921 Cents	Sept. 13, 1921 Cents	Aug. 23, 1921 Cents	Sept. 21, 1920 Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	2.75	7.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	3.75	9.00
Sheets, blue an'l'd, 9 & 10.	2.20	2.20	2.25	5.50
Wire nails, Pittsburgh	2.90	2.90	2.75	4.25
Plain wire, P'gh.	2.60	2.60	2.50	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$14.50**	$14.00	$13.00	$37.00
Carwheels, Philadelphia	17.00	17.00	17.00	43.00
Heavy steel scrap, P'gh.	**14.00**	13.50	13.00	28.50
Heavy steel scrap, Phila.	11.50	11.50	11.50	25.50
Heavy steel scrap, Ch'go.	**11.50**	11.00	11.00	24.50
No. 1 cast, Pittsburgh	17.00	17.00	16.50	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.25	13.25	13.00	33.50
No. 1 RR. wrot, Phila.	15.00	15.00	14.00	34.00
No. 1 RR. wrot, Ch'go (net)	11.50	11.50	11.00	23.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$2.75	$16.50
Foundry coke, prompt	4.25	4.25	3.75	17.50
Metals				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.25	12.25	12.00	18.75
Electrolytic copper, N. Y.	**12.12½**	12.00	11.75	18.75
Zinc, St. Louis	*4.17½*	4.20	4.17½	7.80
Zinc, New York	*4.67½*	4.70	4.67½	7.80
Lead, St. Louis	**4.45**	4.40	4.25	8.25
Lead, New York	**4.65**	4.60	4.40	8.00
Tin, New York	*26.50*	26.75	26.12½	44.00
Antimony (Asiatic), N. Y.	4.45	4.45	4.50	7.12½

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 20, 1921, Finished Steel, 2.200c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Sept. 13, 1921,	2.279c.
Aug. 23, 1921,	2.321c.
Sept. 21, 1920,	3.974c.
10-year pre-war average,	1.684c.

Composite Price, Sept. 20, 1921, Pig Iron, $20.01 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 13, 1921,	$19.81
Aug. 23, 1921,	18.97
Sept. 21, 1920,	47.83
10-year pre-war average,	15.72

products, such as nails, wire, sheets and tin plate, and the response to the reduction in steel pipe has been satisfactory, at least as far as merchant pipe is concerned. The heavier lines still are sluggish, although some fair sized structural projects recently booked by the American Bridge Co. have brought business in plain material to the Carnegie Steel Co. There is not much question that the slant of demand is upward, but to chart it would disclose a saw-tooth, rather than a straight line. The common expectation is that the remainder of the year will see a gradual increase in business, but there are few who expect that the industry will get into anything resembling a normal stride until next spring. It is emphasized this week that so long as railroad freight rates remain unliquidated and are an obstacle to a reduction in costs and selling prices, there hardly will be confident buying. Few now expect that there will be any reduction in rates before Jan. 1.

General plant operations are somewhat heavier than they were recently, but the gain is chiefly on the side of finishing mills. The Jones & Laughlin Steel Co. last week put on an additional blast furnace at its Woodlawn, Pa., works to make Bessemer iron because of the demands for merchant pipe. This change, however, is accompanied by some reduction in open-hearth furnace operations. A few open hearths have gone on in the Youngstown district and the Wheeling Steel Corporation has resumed making steel at its Portsmouth, Ohio, works. There has been an increase in active ingot capacity of Carnegie Steel Co. of about 5 per cent from the average of the past few weeks. The plants of the American Steel & Wire Co. in this district are running heavier, both in the making and the finishing of steel. The American Sheet & Tin Plate Co. is running 70 per cent of its sheet mills and more than 50 per cent of its tin plate mills, or about double the rate of a month ago. Mattie Furnace of the A. M. Byers Co., at Girard, Ohio, will go into blast about Oct. 1.

The pig iron market is dull but firm. The trend of scrap prices still is upward, but the flurry in coke occasioned by the appearance of several inquiries at the time when labor troubles threatened appears to be subsiding.

Pig Iron.—Although actual business is extremely limited, there is no sign of uneasiness on the part of producers, and consequently no tendency to deviate from prices established a few weeks ago. We are raising the minimum price on basic iron 25c. per ton to $19.25, because three lots involving 5500 tons re-

cently were sold at that price and there is nothing to indicate that any tonnages now are available at less. The asking price of all makers on this grade is $20, furnace, but as yet this figure has not found basis in sales. Only carload lots of Bessemer are being moved and these usually at $20, Valley furnace. There is one inquiry for 1500 tons of Bessemer but the specification calls for iron of less than 0.02 in sulphur and few makers are interested. One who has some iron of this kind has quoted $21, Valley furnace, against the inquiry. The National Radiator Co. has put out an inquiry for 3000 tons of No. 2 and No. 2X foundry iron for delivery over the remainder of the year, in equal amounts, to its plants at New Castle and Johnstown, Pa., and Trenton, N. J. The price of $21, furnace, for No. 1 grade is well observed.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.25 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys.—American makers of ferromanganese are meeting English competition. We note the sale of 100 tons of 78 to 82 per cent domestic material to a West Virginia steel maker at $65.25 delivered, as compared with $70, the price on the last previous sale. This price was above the delivered price of English material, which at $58.35 c.i.f. Atlantic seaboard, would mean $63.55 delivered, Pittsburgh district. The Trumbull Steel Co., Warren, Ohio, seeks 100 tons of 80 per cent ferromanganese for October delivery. There is no reason to quote other than minimum prices in a dull market like the present one. Melters do not seem interested in spiegeleisen and the only sale recently noted in 50 per cent ferrosilicon was a carload to a Pittsburgh steel foundry interest at $60, furnace, freight allowed.

We quote 78 to 82 per cent domestic ferromanganese at $65 delivered; 76 to 80 per cent, $63; 78 to 82 per cent British ferromanganese, $58.35, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Although actual business still is of moderate proportions, interest on the part of consumers in the market is keen, evidence of which is found in rather numerous inquiries. Generally, makers are not disposed to sell sheet bars at less than $30, but a large Eastern maker is said to have cut substantially below this figure and one other maker, competing for business, has met the lower price, which, it is understood, was $28. We note the sale of a fair sized tonnage of forging billets at $35, Pittsburgh, but nothing of importance recently has been done in rerolling billets, nor in slabs. The latter forms generally are held at $30.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demand still is rather limited despite the somewhat livelier market in wire products, and while all makers now are quoting $41, Pittsburgh, for the base size of soft rods, no claim yet is made that this price has been established by considerable sales. However, none of the makers is willing to consider less than $41 now. Chain makers are specifying fairly well, but demands from rivet manufacturers still are few and small. Prices are given on page 772.

Steel Skelp.—Very little demand exists for either pipe or boiler tube skelp and prices are merely nominal. On the latter grade, some makers still are talking 1.90c., but there have been no sales recently at that price. On pipe skelp, the common asking price is 1.75c., but quotations of 1.70c. have failed to bring orders and with sheared plates available at 1.65c. the common belief is that skelp will have to go that low to interest buyers.

Structural Material.—The American Bridge Co. has taken 4200 tons for the addition to the department store of the Joseph Horne Co., Pittsburgh, and 1800 tons for 16 Government river barges. This company also will fabricate and erect 100 tons for an addition to the plant of Wyckoff Drawn Steel Co., Ambridge, Pa. The McClintic-Marshall Co. reports taking 525 tons for the Southard Street viaduct, Trenton, N. J., and 355 tons for a new building for the Bell Telephone Co., Scranton, Pa. The Jones & Laughlin Steel Co. has taken 100 tons for a new building for the Walmer Hardware Co., Wilkinsburg, Pa. Competition for structural awards still is extremely sharp and the price advantage entirely with investors. If no consideration is given overhead and other charges, the bids against some projects would indicate a plain material base considerably below current quotations. Plain material is in somewhat better demand as the result of recent awards, but there is room for considerable improvement. The common quotation on structural beams is 1.65c., Pittsburgh. Prices are given on page 772.

Iron and Steel Pipe.—Effective Sept. 16, the National Tube Co. reduced quotations on all kinds of steel tubular products. In standard pipe and line pipe, the reduction, as compared with the July 7 card of the company was $8 per ton on butt weld and $8 to $10 per ton on lap weld. The company in the latest card makes a change in the size brackets on lap weld pipe. In the July 7 card, 7-in. to 12-in. pipe took the same discount, but in the new card, 7-in. to 8-in. pipe is quoted at one discount and 9-in. to 12-in. pipe at another. New prices on oil well casing, tubing and drive pipe also are down $8 to $10 a ton. On large outside dimension pipe for large oil and gas lines, the reduction runs from $10 per ton in the larger sizes to $14 per ton in the smaller sizes. There has been a rebracketing of sizes of water well casing, the smaller sizes holding at the July 7 discounts, while sizes from 4¼-in. up have been reduced from $9 to $25 per ton. Independent makers quite generally have adopted the new card. The new prices more than absorb any concessions from the July 7 card which have been made on standard pipe, but do not approximate the prices which have been named against recent inquiries for line pipe, in which, in markets like the present one, very low prices, usually come out because of the large lots ordinarily sought and the eagerness of makers for such business. So far, there has been no change in wrought iron pipe, which was reduced $10 to $12 per ton by leading makers on Sept. 1. Business in standard pipe is fairly good, but could be much better than it is in old country goods. Line pipe inquiries are fairly numerous and a few are for good sized tonanges. Discounts are given on page 772.

Nuts, Bolts and Rivets.—New demands are few, but makers are getting a larger number of specifications against old orders than was the case recently. Price cutting is less severe and quotations mean a little more than they did recently. Prices and discounts are given on page 772.

Iron and Steel Bars.—Activity still is lacking in merchant steel bars and prices are rather poorly defined. Some makers still are asking 1.75c., but this is at least $2 per ton above the price ideas of buyers, and some are not willing to go even that high, in view of the reports from other centers of business being done at a lower figure. These, who may have big tonnages to place later, regard 1.50c., base, as the ultimate level, but tonnages which might develop such a price are lacking at the moment. Small lot business generally is being done at 1.65c. to 1.70c., and this also is the range on concrete reinforcing bars. Makers of iron bars are disinclined to consider less than 2.25c. for so-called refined iron bars.

We quote steel bars rolled from billets at 1.65c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—There is a fair run of orders for small lots of standard spikes, the railroads merely taking on such supplies as they actually need. The general asking price is $2.50 base, per 100-lb., but this has become

more of an asking than a selling price, because competition has developed a quotation as low as $2.40 and this is the basis of most sales. Similarly, $2.75 base is asked for small spikes and bolts and barge spikes, but the more common selling price is $2.65. Prices are given on page 772.

Steel Rails.—Light sections rolled from billets still are generally quoted at 1.75c, base, but this is largely an asking price because the demand is very limited and there is no question that a concession of $1 and possibly $2 per ton would be made on anything like an attractive inquiry. Requirements of both the contractors and the coal mines, at the moment, appear to be small. Specifications against orders for standard rails are better this month than they were in August, but in view of the fact that not much time remains between now and winter for laying rails and that the railroads have considerable tonnage due them on old orders, it is probable that there will be a considerable carry over of 1921 business into 1922.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Wire Products.—The common report is that both jobbers and manufacturers now are specifying promptly against their orders and that business is more satisfactory than it has been at any previous time this year. However, most of the shipments carry the prices in effect prior to Sept. 12. Sales of nails at $2.90 base per keg have not been numerous, nor have they involved very large quantities, but makers are adhering to the new base.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Sheets.—Recent action of several independent makers in advancing prices $5 per ton appears to have stimulated buying for the reason that the American Sheet & Tin Plate Co., which has not yet followed the advance, this week is scheduling 70 per cent of its sheet mills which compares with 52 per cent last week and about 35 per cent a month ago. Youngstown district independents also are operating about 70 per cent this week. A number of independent makers have followed the lead of the Brier Hill Steel Co. in marking up prices $5 per ton, but a number of others are waiting on the American Sheet & Tin Plate Co. to take this step and that company is expected to make the advance. In holding to the bases of 2.75c. for black, 3.75c. for galvanized and 2.25c. for blue annealed, the leading interest is stipulating that orders taken at these prices are for shipment at its convenience and that its prices for contract or forward deliveries are $5 per ton higher. The Inland Steel Co. is making a double quotation on blue annealed sheets, quoting 2.25c., base, on the heavier gages and 2.50c on the lighter. Prices are given on page 772.

Tin Plate.—The report still is one of an urgent demand for early shipment and no weakening in prices. There have been reports that production plates have sold at $5 per base box, Pittsburgh, but so far as the American Sheet & Tin Plate Co. is concerned the price still is $5.25 and independents in this and nearby districts deny having shaded this quotation, at least on domestic business. On export sales it is admitted that orders have been taken as low as $4.50, this price having been dictated by Welsh competition. Stock items are reported to be pretty well liquidated and most makers now will not consider less than $4.75 per base box for such material. Operations are holding up well. The American Sheet & Tin Plate Co. schedule for this week calls for the operation of 52 per cent of its mills, while McKeesport Tin Plate Co. is running all of its 44 mills, the Jones & Laughlin Steel Co. 50 per cent, and the Wierton Steel Co. 39 of its 50 mills, or almost 80 per cent. The latter company yesterday started up eight mills at its Clarksburg, W. Va., plant.

Cold-finished Steel Bars and Shafting.—Orders for both screw stock and shafting have shown some increase in the past week, but the market still is a long way from being active. Plant operations range anywhere from 10 to 50 per cent of capacity with most makers nearer the lower than the higher figure. Independent makers generally are quoting 2.40c. base, Pittsburgh, for cold-rolled or drawn screw stock and shafting and are getting this price in most districts. The American Steel & Wire Co., however, is quoting 2.35c. and independents are meeting this price in competitive districts. Ground shafting still is quoted at 2.75c. base, mill.

Plates.—Demand still is limited and there is no special change in the general situation except that possibly makers are a little less eager for business carrying a price of less than 1.65c., than they were recently. There is no money even in large tonnages at that price, and the number of mills which will take business at that figure is smaller than it was recently.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.60c. to 1.70c. f.o.b. Pittsburgh.

Boiler Tubes.—A new card dated Sept. 16, of the National Tube Co., reduces prices of all sizes of lap weld steel tubes $10 per ton and this cut has been followed generally by other makers. The National Tube Co. has not yet resumed issuing public quotations on seamless boiler tubes. No change has been made yet in discounts on charcoal iron boiler tubes, but one is expected shortly, not only because of the cut in steel tubes but because iron tubes were not cut when iron pipe declined Sept. 1. Demand is slow for all kinds of tubes, but particularly for iron tubes, due to the relatively high prices. Discounts are given on page 772.

Hoops and Bands.—A rather determined effort is now being made to restore the recent base of 2.25c. for both hoops and bands. As far as cooperage requirements are concerned, practically all makers now are quoting this price, but on the heavier gage which can be rolled on bar mills, competition is being encountered and there remains some basis for a price of 2c.

Hot-Rolled and Cold-Rolled Strips.—Less tendency to cut prices is noted, and while sales of hot-rolled strips carrying a price of 2c., and in cold-rolled strips at 3.75c., have not entirely ceased, the more common quotations now are 2.25c., base, for hot-rolled and 4c., base, for cold-rolled strips. It is probable that mills which have been naming the low prices will withdraw them shortly because of the big losses they spelled.

Cut Nails.—Public quotations still are 3c., base, at mill for carloads and 3.10c. for less than carloads, but on carload business 2.90c. has been done and on really attractive orders 2.75c. would not be turned down without consideration. Demand in this district is moderate.

Coke and Coal.—The market is no stronger and possibly is slightly weaker than it has been. Inquiries against the prospective lighting up of a number of idle blast furnaces have almost petered out and now that labor troubles in the Connellsville district appear to have been amicably adjusted, there is not the anxiety for spot tonnages there was last week and the week before. The A. M. Byers Co. will blow in its Mattie furnace, Girard, Ohio, Oct. 1, and has contracted for 15,000 tons of coke per month for four months, beginning Oct. 1. The business did not go to any of the Connellsville district operators and the common assumption is that the coke will be provided from a steel works by-product plant. Details as to prices are not avialable. Furnace coke still is quotable from $3.25 to $3.50 per net ton, oven, but the market is not as firm at those prices this week as it was last week. Foundry coke finds a steady demand at about the same prices as a week ago, although it is claimed that on some recent business as much as $4.75 has been obtained. The coal market is quotable from $1.75 to $2 for mine run steam, $1.85 to $2 on mine run by-product and $2.25 to $2.75 for mine run non-union gas.

Old Material.—Trend of prices still is upward, though there is little apparent activity by melters. Quietly, however, they are putting out inquiries, while a number of high-priced contracts are being readjusted, the melters taking on additional tonnages at a price which brings down the average. Dealers lacking supplies sufficient to meet their contracts in steel works grades are showing some anxiety to cover them.

(*Continued on page* 775)

Chicago

CHICAGO, Sept. 20.

The feature of the steel market during the past week was an advance of $5 a ton on black and galvanized sheets by independent mills and a reduction of from $8 to $10 a ton on steel pipe by the National Tube Co. During the days of grace allowed to customers by the sheet mills, heavy purchases were made at the old prices with the result that producers have accumulated substantial backlogs sufficient, in some cases, to keep their capacity busy for from two to three months. Jobbers have covered on sheets just as they covered when wire and nails were advanced, and it is interesting to note that they are also taking a livelier interest in bolts and nuts notwithstanding the fact that discounts are still soft.

Cast-iron pipe continues to move in fairly good volume, and prices, particularly on the smaller sizes, are stiffening. In the heavier steel commodities, plates, structurals and bars, there are as yet no signs of price stability and the situation appears to be reaching the point where mills will find it cheaper to shut down their capacity and take the overhead loss chargeable to their idle equipment rather than continue to take business at going prices. One local producer, in fact, has had its plate mill idle for over a fortnight, and is disinclined to resume operation until prices advance to a point which will permit it to roll steel without incurring a heavy loss.

New business in pig iron is light, but specifications against contracts are coming in more freely, being received in some instances from melters who had not authorized shipments for seven months.

Mill operations in this district show a slight gain. The Inland Steel Co. is now on a 30 per cent basis, while the operations of the Illinois Steel Co. reached 36 per cent the middle of last week only to decline again to 30 per cent.

Pig Iron.—There are few new inquiries or orders of size to report, but specifications against contracts are coming in more freely. In some cases, melters who have not specified for seven months are asking for shipments. The exhaustion of melters' yard stocks probably accounts for the recent rebound of the market to a larger degree than increased operations. While it is undeniable that melt in this district is appreciably larger than a month or two ago, the situation among foundries is decidedly spotty. With some exceptions, intermittent operation seems to be the rule. With the receipt of orders for castings, the melter is led to believe that the turn has come, only to find himself without work a week or two later. A Milwaukee sanitary manufacturer has bought 600 tons of resale Southern foundry, 2.75 to 3.25 per cent silicon, at a flat price of $25 delivered. An inquiry for 200 tons of low phosphorus is current. Reports from the South indicate that furnace output there is on the increase. One merchant furnace was recently blown in and two others are scheduled to go in in the near future. One Southern producer is now quoting on first quarter business at the present price of $19, base, Birmingham. Beehive foundry coke is growing firmer, the minimum quotation now being $4.50, Connellsville, with some producers holding at $4.75.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	22.00
Northern high phos	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	22.00
Basic	22.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32.82

Ferroalloys.—The reduction of foreign ferromanganese to $58.35, seaboard, brings the local delivered price down to $66.75. Two local sales of about 100 tons each have been made by domestic producers at this price, and an inquiry for 200 tons for Chicago delivery has just been issued. A number of carload inquiries for spiegeleisen are current. Some local steel mills are releasing shipments against alloy contracts. A large Chicago user is reported to have bought a car of 50 per cent ferrosilicon at less than $62, delivered.

We quote 78 to 82 per cent ferromanganese, $66.75 to $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment.—The Chicago, Milwaukee & St. Paul has let repairs of 100 composite gondola cars to the Western Steel Car & Foundry Co. The Pittsburgh & Lake Erie has awarded repairs on 1000 freight cars to the Standard Steel Car Co. The American Refrigerator Transit Co. is considering the repair of 100 refrigerator cars.

Structural Material.—Although some craftsmen have returned to work, the local building situation remains unsettled and it is still strongly felt in some quarters that the only solution is the introduction of the open shop. In the meantime, uncertainty is holding back much projected work. Structural activity in other sections of the West is of a more encouraging character and mills report a slow increase in their bookings in plain material. An accumulation of orders has permitted the Inland Steel Co. to resume the operation of its 28-in. structural mill. Much of the current fabricating work is small, involving from 20 to 100 tons per job. The largest pending project, the Government hangar at Belleville, Ill., involving 3600 tons, has been advanced another step towards construction through the taking of bids on the general contract. The W. M. Sutherland Building & Construction Co., St. Louis, is low bidder. Notwithstanding the trend towards betterment, the volume of current construction work is not yet sufficient to change the broad aspects of the market. Competition between fabricators is still very keen and plain material prices are soft. Fabricating awards include:

Standard Oil Co., 50 stills, Whiting, Ind., 1500 tons, to Petroleum Iron Works.

Consolidated Water Co., power house, Biron, Wis., 114 tons, to unnamed fabricator.

Michigan Lumber, Land & Iron Co., owned by Henry Ford, automobile body plant, Iron Mountain, Mich., 250 tons, to Worden-Allen Co.

Union Saw Mill Co., Huttig, Ark., conveyors, 125 tons, to Worden-Allen Co.

Evansville, Indianapolis & Terre Haute Railroad, bridge over Eel River, 200 tons, to Mount Vernon Bridge Co.

Prospective business includes:

Great Northern Railroad, single track draw span bridge, State of Washington, 530 tons, bids taken Sept. 19.

Huntington-Ohio Bridge Co., toll bridge, Huntington, W. Va., 4000 tons of structural as well as reinforcing steel, plans being prepared by C. A. P. Turner Co., Minneapolis.

The mill quotation on plain material ranges from 1.80c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—Railroad orders for standard spikes and track bolts are numerous, but small, ordinarily ranging from 500 to 1000 kegs each. The largest individual order reported is 2500 kegs of spikes bought at 2.40c., Pittsburgh. Inquiries for tie plates are negligible, but there is a slight improvement in the demand for light rails.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—Demand has not recovered sufficiently to give any semblance of stability to the market. Prices still vary widely, extreme concessions being made whenever a large inquiry of attractive specifications appears. A local mill will furnish about 2000 tons, principally plates, for 15 oil tanks at Humboldt, Kan., the fabricating award of which was noted last week. A price of 1.60c., Chicago, is reported to have been quoted on this tonnage, but confirmation is lacking. Present going prices are so unsatisfactory that one local interest which recently shut down its plate mill has determined not to resume operation until business can be booked without loss. Railroad car repair work is steadily gathering momentum and constitutes the chief feature

of the plate market. While many roads seem disposed to let repairs to car builders, a few lines have materially increased their own shop operations. The Burlington is reported to have eight shops running full.

The ruling mill quotations range from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Although demand is still far from satisfactory, jobbers are buying more freely than heretofore and prices are showing some signs of firmness. Among manufacturing consumers, the automobile plants are still foremost. Their operations, however, have fallen off somewhat during the current month with the result that purchases of bolts and nuts have been scaled down accordingly. The output of the leading maker of cheap cars is said to have decreased 15 per cent. This company, however, is in the market for from 12,000,000 to 15,000,000 nuts as well as a quantity of bolts for October requirements. For mill prices, see finished iron and steel f.o.b. Pittsburgh, page 772.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Little tonnage in mild steel bars is coming on the market and most new business is in small lots. Prices are still irregular, going quotations ranging from 1.75c. to 1.95c., Chicago mill, depending on the size of the inquiry and the desirability of the specifications. Demand from manufacturers continues light and reinforcing jobs are not so numerous as some time ago. Considerable local work is still being held in abeyance because of the uncertain building situation. The Kalman Construction Co. has been awarded 200 tons for a bank at Sheboygan, Wis., and the Corrugated Bar Co. has the contract for 125 tons for a sewage disposal plant at Indianapolis. Demand for bar iron is at a low ebb and mill operations are intermittent. Mills rolling rail carbon steel bars are on a somewhat more satisfactory basis, although orders are still far below normal.

Mill prices are: Mild steel bars, 1.75c. to 1.90c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, square and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c., base.

Sheets.—The Inland Steel Co. last week announced advances of $5 a ton on black and galvanized, bringing the former up to 3c. and the latter up to 4c., base Pittsburgh. This action was followed by most other independents and in the days of grace allowed by the mills buyers hastened to cover their needs for some time ahead. The American Sheet & Tin Plate Co. has not yet advanced. The Inland company is now operating all of its hot mills and is booked ahead until the latter part of December. Other mills likewise have accumulated substantial backlogs. Notwithstanding the changed complexion of the sheet market, many buyers continue to press the mills with inquiries calling for prompt shipment, often setting definite dates of shipment which cannot possibly be observed. Jobbers and roofing manufacturers have been especially prominent in the current buying movement, although purchases have been widely distributed. There has been no change in the price of blue annealed, as competition from mills rolling light plates is an obstacle to any tendency toward firmness.

Mill quotations are 2.75c. to 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. to 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Wire Products.—Buying is still active, but purchases at the new prices are mainly in small lots for prompt shipment. Some jobbers have covered their needs for a month or two ahead, but on the whole buyers are not piling stocks. Railroad purchases are still of the hand-to-mouth variety. Mill operations are rapidly improving as a result of the increased demand. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 772.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Cast Iron Pipe.—Pipe shops are well booked in sizes ranging from six to 10-in. with the result that prices are firmer. No bids of less than $33.50, Birmingham, on those sizes are reported, and some makers are adhering to a minimum of $34. Negotiations on 3800 tons for Hammond, Ind., are approaching a conclusion. The United States Cast Iron Pipe & Foundry Co. is the only bidder on 1700 tons of 60-in. for Cleveland. The opening of bids on 300 tons at Forest, Ohio, was postponed until Sept. 23. The Lynchburg Foundry Co. is low bidder on 450 tons for Spring Wells, Mich.

Recent lettings include:

Decatur, Ill., 400 tons, to National Cast Iron Pipe Co.
St. Paul, 175 tons, to Glamorgan Pipe & Foundry Co.
North Platte, Neb., 940 tons, to Colorado Fuel & Iron Co.
Sidney, Ohio, 300 tons, to James B. Clow & Son.
Springfield, Ohio, 80 tons, to United States Cast Iron Pipe & Foundry Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Warehouse Prices.—Lap-weld and seamless boiler tubes have been marked down, the reduction on 4-in. lap-weld being from the former price of 40c. a foot to 36½c., while the reduction on 4-in. seamless was from 57c. to 47c. per foot. Prices on charcoal iron tubes remain unchanged.

Old Material.—Limited consumptive demand still characterizes the market. A steel mill bought about 1000 tons of heavy melting at $11.75 per gross ton delivered, while an iron mill paid $12 a net ton for 1000 tons of No. 1 railroad wrought. Aside from these purchases, there has been little buying by users. A growing demand for car wheels is noted, but on the other hand cast and malleable grades, which were comparatively active in recent weeks, are now dull. Sellers continue to buy railroad material, but are not bidding prices up as actively as heretofore. Some advances are noted in the quotations below, but on the whole the market has undergone little change. Railroad offerings include: The Rock Island, 3800 tons; the Elgin, Joliet & Eastern, 625 tons, and the Chicago Great Western, 500 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$16.00 to	$16.50
Relaying rails	27.50 to	30.00
Car wheels	14.00 to	15.00
Steel rails, rerolling	13.00 to	13.50
Steel rails, less than 3 ft	12.50 to	13.00
Heavy melting steel	11.50 to	12.00
Frogs, switches and guards cut apart	11.50 to	12.00
Shoveling steel	11.00 to	11.50
Low phos. heavy melting steel	13.25 to	13.75
Drop forge flashings	7.00 to	7.50
Hydraulic compressed sheet	7.50 to	8.00
Axle turnings	8.00 to	8.50
	Per Net Ton	
Iron angles and splice bars	14.00 to	14.50
Steel angle bars	11.00 to	11.50
Iron arch bars and transoms	14.50 to	15.00
Iron car axles	18.50 to	19.00
Steel car axles	13.50 to	14.00
No. 1 busheling	9.00 to	9.50
No. 2 busheling	6.25 to	6.75
Cut forge	10.50 to	11.00
Pipes and flues	7.50 to	8.00
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	10.50 to	11.00
Steel knuckles and couplers	11.50 to	12.00
Coil springs	13.50 to	14.00
No. 1 machinery cast	13.50 to	14.00
No. 1 railroad cast	13.00 to	13.50
Low phos. punchings	11.50 to	12.00
Locomotive tires, smooth	11.00 to	11.50
Machine shop turnings	3.50 to	4.00
Cast borings	5.00 to	5.50
Stove plate	12.50 to	13.00
Grate bars	10.50 to	11.00
Brake shoes	11.00 to	11.50
Railroad malleable	13.00 to	13.50
Agricultural malleable	13.00 to	13.50
Country mixed	9.00 to	9.50

The K. & L. Radiator Co., Allentown, Pa., manufacturer of automobile radiators, has filed notice of change of name to the Mack-Landis Corporation.

The Autocar Co., Ardmore, Pa., manufacturer of automobile trucks, has arranged for a note issue of $1,500,000. David S. Ludlam is president.

New York

NEW YORK, Sept. 20.

Pig Iron.—Of the inquiries for foundry and malleable iron reported pending last week, a wheel company in the St. Louis district has purchased about 3000 tons of Southern foundry iron and 800 tons from a St. Louis furnace, and it is expected that a Massachusetts machine company, which has been inquiring for 10,000 tons, will close before the end of the week. The General Electric Co. has bought about 2000 tons and sales amounting to from 2000 to 3000 tons have been made in the immediate New York district, including 750 tons of No. 2X for October delivery. Several inquiries for fair tonnages of high silicon iron, including one for 300 tons of 3 per cent silicon, are pending. In eastern Pennsylvania, $19.50 furnace continues to be the minimum for No. 2 plain with $19 for the same iron at Buffalo.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	$23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25..	22.02
Buffalo, sil. 1.75 to 2.25.....	25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.)	28.16 to 29.16

Ferroalloys.—The reduction in the price of British ferromanganese to $58.35, seaboard, announced a week ago, has had its effect and the market has been more active than in many weeks. Sales are reported as totaling at least 1000 tons, most of it British alloy. Sales of the latter are reported to have been made at $58.25, seaboard, or slightly under the price announced last week. Some domestic ferromanganese has been sold in competition with this price and the American makers are evidently willing to quote on the basis of the British seaboard price, the delivered price varying with the location of the consumer. Under the circumstances there is no definite domestic price, such as has prevailed recently, but generally it may be figured as the British quotation plus freight to the point of consumption. Besides the sales mentioned there is an inquiry for 125 tons from one consumer for early delivery. The spiegeleisen market is inactive, with prices unchanged. There is absolutely no demand for high-grade manganese ore, quotations for which are nominal. In view of the very considerable accumulations in this country, imports of manganese ore have fallen off sharply in recent months. The 50 per cent ferrosilicon market is inactive but steady. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, .6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.....	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard....	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard.....	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York.....	55c. to 60c.

Finished Iron and Steel.—A slight improvement in demand for steel products is accompanied by weakness in prices, particularly on plates, shapes and bars. The advance of $5 a ton on sheets by leading manufacturers, which was put into effect the latter part of last week, apparently is not general, as some companies have not notified their sales representatives here to make any changes. Thus the range in prices on sheets is from 2.25c. to 2.50c. on blue annealed, 2.75c. to 3c. on black and 3.75c. to 4c. on galvanized, all base Pittsburgh. Soft steel bars are now quoted from 1.50c. to 1.60c., Pittsburgh, the lower price applying usually to reinforcing quality, while plates and shapes have declined to 1.60c., Pittsburgh, and even this price does not seem firm at the moment, though sales representatives of the steel companies are informing their customers that prices are "on the bottom." It is interesting to note that each month since May has shown a slight gain in structural steel work and the record for September will doubtless show a substantial gain over August. Included in this month's lettings is the Federal Reserve Bank, New York City, mentioned last week, requiring 14,000 tons of steel. The general steel contract was awarded to Post & McCord, New York, and the American Bridge Co. will roll and fabricate the steel. A number of large apartment houses for New York are being informally figured upon, including one at Riverside Drive and 110th Street and another at Broadway and Ninetieth Street. The Hedden Iron Construction Co. has been awarded 800 tons for an apartment house near Broadway and 110th Street. The American Bridge Co. was awarded 700 tons for a bridge between Troy and Cohoes, N. Y., also two buildings for the Driver-Harris Co., Harrison, N. J., totaling 200 tons. Bids went in Saturday on an interstate bridge at Trenton, N. J., requiring 500 tons. A warehouse for R. H. Macy & Co. at Thirty-sixth Street and Eleventh Avenue, New York, was awarded to the Levering & Garrigues Co., 1200 tons. The First National Bank, Richmond, Va., is in the market for an addition, 700 tons. Several other large projects which have been in the market for weeks are being indefinitely held up. Some very low prices are being made by fabricators, an example being a $58 price for fabrication and erection of a warehouse, a beam and column job. Little of importance has developed in the way of general inquiry for steel products, most of the inquiries and orders being for small tonnages. The General Petroleum Corporation, 71 Broadway, New York, is inquiring for 1500 to 2000 tons of plates and smaller tonnages of angles, channels and bars for fabrication of plates. It is planned to ship the steel by boat from New York to California. Bids will possibly be received also on completely fabricated tanks. The Western Pacific Railroad is in the market for 1000 50- or 70-ton general service steel gondola cars. No new railroad repair work has come into the market.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c. to 1.98c.; plates, 1.98c. to 2.03c.; structural shapes, 1.98c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—The number and size of transactions continue on a par with August business. Although no official changes have been made, except in pipe prices, there is less tendency to shade by the smaller warehouses. Galvanized sheets, No. 28 gage, are undoubtedly still obtainable at 4.75c. per lb., and within a week one transaction is reported at a price better than 4.50c. per lb., but the price is generally 5c. per lb. Small lots of blue annealed sheets, No. 10 gage, are reported as high as 3.53c. per lb., although the average quotation is 3.28c. per lb. The recent reduction of steel pipe by mills from $8 to $10 per ton has been followed by a warehouse reduction of from $8 to $12 per ton, which is expected to aid materially in stabilizing quotations, heretofore largely nominal. Brass and copper prices are unchanged since Sept. 1. The lowest quotations for these products on page 786 are the prices on medium and large-sized lots out of stock, while the higher prices are for small lots from warehouse. Dealers in old metals report a firmer tone and believe that, if it continues for a week or two longer, it may be considered as a permanent improvement. We quote prices on page 786.

High-Speed Steel.—Business is confined to a few small orders, although a majority of producers report a slight improvement this month. Quotations continue nominal at 90c. to $1 per lb. for 18 per cent tungsten high-speed steel.

Cast-Iron Pipe.—No fresh municipal inquiries have come before the trade, though private buying continues satisfactory. Prices in this district are being held fairly firm, those who use the recognized proportions of pig iron and scrap claiming that lower prices cannot be made. We quote per net ton, f.o.b. New York, carload

lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—Some items have taken a slight raise the past week, though otherwise there is but little change. Dealers in this vicinity have their yards well stocked with material and it is expected to take considerable buying by mills to force the prices up markedly. The two principal items changing hands are heavy melting steel and No. 1 machinery cast, the latter item having risen in price. One eastern Pennsylvania mill is reported to have paid $12.75 for choice heavy melting steel.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to $7.50
Steel rails, short lengths, or equivalent	8.50 to 9.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	11.00 to 11.50
Iron car axles	18.00 to 19.00
No. 1 railroad wrought	11.50 to 12.00
Wrought iron track	9.50 to 10.00
Forge fire	5.50 to 6.00
No. 1 yard wrought, long	10.00 to 10.50
Light iron	3.50 to 4.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	3.50 to 4.00
Mixed borings and turnings	3.00 to 3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.50 to 9.00
Stove plate	9.50 to 10.00
Locomotive grate bars	10.00 to 10.50
Malleable cast, (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Birmingham

BIRMINGHAM, ALA., Sept. 20.

Pig Iron.—Last week closed with Birmingham iron very firm at base of $19, silicon 1.75 to 2.25. A few lots had been sold on a $19.50 base by one maker, but $19 was the rule. The $19 base applies for all fourth quarter. One maker sold out on the 1000 tons of low silicon on yards and joined the galaxy of those with none. Another maker sold 850 tons in 11 lots in five days, all but 120 tons for prompt delivery. Two carloads brought $19.50. The feature of the week was the reappearance of buyers from the Middle West. Evansville took three lots from one maker in the same day. Ohio points booked small lots and Louisville reappeared for a small tonnage. A sale of 500 to 700 tons in Chicago territory was made. It was 2.25 to 2.75 silicon and brought $19.50. A proffer of 2000 tons at $19.50 for the first 1000, which was to be 2.25 to 2.75 silicon, with same price for the second 1000, which was to be 3.25 to 3.75 silicon, was turned down. Following the advice of Southern makers, melters in the South are ordering fourth quarter requirements at $19 and getting away from the hand-to-mouth system. A Southern pipe maker took 1500 tons during the week for October and November delivery. There are inquiries for other pipe tonnage. The stack of the Central Iron & Coal Co. at Holt resumed Monday after nearly a year of idleness. The company has no iron on yards. Indications point to a total of 60,000 tons of merchant iron on Alabama yards by Oct. 1. A small advance in price is regarded as coming soon.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Cast-Iron Pipe.—The high pressure pipe market is not active, although total bookings by Birmingham plants last week approximated 4000 tons, the National Cast Iron Pipe Co. getting 1000, United States Cast Iron Pipe & Foundry Co. 2500 and American Cast Iron Pipe Co. 600 tons of known bookings. The National Cast Iron Pipe Co. continues to operate at about capacity. The base is $35 for 6 in., with larger sizes selling at shaded prices. Sanitary pipe is fairly active at the base of $40 with $30 extra heavy.

Coal and Coke.—Domestic coal is much brisker, due to the stimulation caused by rise in cotton prices, and steam coal users are more inclined to discuss future contracts. Standard foundry coke remains at a base of $6.

Old Material.—Yard men are less inclined to take offers of the consumers and some are holding for higher prices. No. 1 cast is not as easily gotten at the quoted price as formerly and No. 1 steel is held $1 higher than the quotation by some yards. A general marking up in another week if steel and iron remain as firm is expected. We quote per gross ton, f.o.b. yards, as follows:

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Sept. 20.

Pig Iron.—Business, current and prospective, is better. Prospective business aggregates all of 20,000 tons, including 10,000 tons No. 2 plain, fourth quarter shipment, from a heating appliance manufacturer; 1000 tons No. 2X and 1000 tons No. 1X, shipment over the rest of the year, from a textile machinery interest; and 500 tons No. 2X, last quarter shipment, from a machine tool interest. The remainder is made up of several hundred tons No. 1X from a Connecticut hardware manufacturer, and smaller tonnages, largely for silicon 2.25 to 2.75 and higher, from diversified interests. The largest sale reported this week is 2000 tons eastern Pennsylvania No. 2 plain, No. 2X and No. 1X at $20 furnace base and regular differentials. A Maine melter took 150 tons eastern Pennsylvania No. 1X, nearby shipment, at $21 furnace, and four 100-ton lots, high silicon and special analysis, sold without competition, mostly to Connecticut foundries, at private terms. A small amount of Virginia special analysis iron also figures in the week's sales. French, Belgian, Luxemburg, Lorraine and Sarre Region sand-cast pig iron, most of it high in manganese and sulphur, with silicons ranging from 0.8 to 4 per cent, is offered c.i.f. dock Boston, or ex-dock, duty paid. Eastern Pennsylvania furnaces are holding more firmly to the $20 furnace base, with the tendency upward rather than downward. The report that the Robesonia furnace has offered iron at $19 furnace base is without foundation. The Buffalo market is firm at $19.50 to $20 base, and Southern and Virginia furnaces are not inclined to shade prices. A considerable tonnage on old contracts is being shipped into New England. Further readjustments on such contracts are reported. Delivered pig iron quotations follow:

East. Penn., sil. 2.25 to 2.75	$24.56 to $25.56
East. Penn., sil. 1.75 to 2.25	24.06 to 25.06
Buffalo, sil. 2.25 to 2.75	25.46 to 25.96
Buffalo, sil. 1.75 to 2.25	24.96 to 25.96
Virginia, sil. 2.25 to 2.75	29.08 to 32.08
Virginia, sil. 1.75 to 2.25	28.58 to 31.58
Alabama, sil. 2.25 to 2.75	30.16
Alabama, sil. 1.75 to 2.25	29.66

Coke.—Orders for by-product foundry coke booked the past week involve a larger tonnage than those for the corresponding period last month or for the previous week, but business is by no means active. A few of the largest New England foundries are melting as high as 200 tons daily, but a majority are doing very much less, and the average jobbing foundry is operating on a greatly reduced weekly schedule notwithstanding a general marking down of quotations on castings. Any increased buying of coke, therefore, appears to be based more on a desire to have stock on hand prior to the winter months than to any appreciable betterment in going business. The market for good grade Connellsville foundry coke is firmer at $4 to $4.50 on cars at ovens. Both the New England Coal & Coke Co. and the Providence Gas Co. are quoting on a basis of $10.66 delivered.

Sand.—The market for molding sands is easier, quotations on good grades having been lowered about 25c. per ton, or from $2 to $1.75 on cars shipping point. The demand continues more or less restricted.

Finished Material.—Small structural tonnages are increasing, while large are decreasing. The McClintic-Marshall Co. is awarded 185 tons by Stone & Webster for a New York Steam Corporation plant addition, and the New England Structural Co. 102 tons for a Newton, Mass., theater. Bids are asked on 1500 tons for a First National Bank, Boston, building in Buenos Ayres. Stone & Webster are the engineers and York & Sawyer, New York, the architects. Bids will soon be asked on 500 tons for a Boston office building. The market on structural steel and plates is soft at 1.65c., Pittsburgh. The demand for steel products in general compares favorably with that noted during the latter part of August. The call for galvanized sheets is especially good just now. Warehouses have advanced wire nails 15c. per keg, and barbed wire and wire products in general in proportion. They report a slight improvement in the consumption of iron and steel and are less inclined to shade prices to secure business than heretofore.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—Most New England foundries are still able to secure all the machinery cast needed at 65c. to 70c., delivered, from local yards. Yard interests in some instances allow foundries to pick out material wanted and quote one price on shipments extending over several weeks. Old material dealers, nevertheless, report more doing in car lots with the market about 50c. per ton higher on the inside. Stove plate is scarce and in some request, and the market has stiffened about 50c. On the other hand, railroad malleable, pipe, turnings and borings are dull and unchanged in price. Railroad wrought is firmer, due to increased inquiries, and slightly more interest is shown in forged scrap and bundled skeleton. Going business in steel is limited, but the market is firm in anticipation of early buying by Pennsylvania mills.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.50 to $20.00
No. 2 machinery cast	15.50 to 16.50
Stove plate	15.50 to 16.50
Railroad malleable	11.50 to 12.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$6.00 to $6.50
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.00 to 8.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	2.50
Cast iron borings, rolling mill	3.50 to 4.00
Cast iron borings, chemical	4.00 to 4.50
Blast furnace borings and turnings	2.50 to 2.75
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	12.00 to 13.00
Car wheels	12.50 to 13.50
Rerolling rails	9.00 to 10.00

Cleveland

CLEVELAND, Sept. 19.

Iron Ore.—The several inquiries for small lots of ore ranging from 10,000 to 25,000 tons, which have come out recently, have not resulted in sales and ore men are doubtful whether they will lead to the placing of orders. The inquiries are from furnaces that have plenty of ore suitable for making steel making pig iron, but are considering making foundry iron provided they can buy the grades of ore they need cheap enough to permit them to make a profit with present pig iron prices. While a few small lot ore sales have been made in the past few weeks at concessions from regular prices, the most of these have been of ore classified as off grade, on which there is more or less price irregularity. In fact, it is claimed that only in one case has a price concession been made on standard ore, that being on some ore that had to be moved this season. However, the market has not been tested and a round lot inquiry might bring out considerable price concession. Some resale ore is on the market on which the owners have not set a price, but are asking for offers. Present estimates are that the season's movement will not exceed 21,000,000 tons. A few weeks ago, the estimate was 25,000,000 tons. A falling off in shipments is expected early in October and the shipping season will close very early. Some of the Lake Superior docks will shut down Oct. 31 and one dock has advised that it will not start up its steaming plant, which means that it can be operated only a short time in November, as freezing weather usually necessitates the thawing of ore after about Nov. 10.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The demand for foundry iron appears to be slowly increasing. Sellers are getting more orders from diversified industries that have worked their stocks down to the point where they must replenish their supply. Sales during the week were fully equal in volume to any of the few previous weeks. Buying is nearly all in small lots and consumers are not contracting for delivery beyond the end of the year. September shipments will probably show some gain over August. There is virtually no change in the price situation. With lake furnaces, $20 is still a common quotation for No. 2 foundry, although producers are making some sales at $20.50 and $21, the higher prices usually being charged when they have the advantage of freight rate. One Valley furnace continues to make sales at $21 and another Valley producer advanced its price from $20 to $21 during the week. A Cleveland furnace made a local sale of 100 tons at $21 Valley, or $21.96 delivered, but $20.50 to $21 at furnace still generally represents the local market on foundry iron. We note the sale of 500 tons of basic iron by a Cleveland interest at $19.25 Valley furnace for shipment from a western Pennsylvania furnace to a nearby consumer, this figuring back to a furnace price of about $19.75. A local furnace sold 300 tons of malleable iron at $20 furnace for shipment to Pittsburgh, or virtually on the basis of $21 Valley furnace. One leading interest reports sales this month aggregating 15,000 tons. Another local interest sold from 6000 to 7000 tons during the week, including a 1000 ton lot of malleable and one 1000 ton lot of foundry iron. The General Electric Co. placed orders during the week for 1500 tons of Nos. 1 and 2 foundry iron for its Erie, Pa., plant. A Pittsburgh sanitary interest placed 400 tons of Southern iron with a Cleveland selling agency at $19 base.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	35.00

Semi-Finished Steel.—An inquiry is pending for 5000 tons of slabs on which $29, Youngstown, was quoted, but as the prospective purchaser did not immediately place the order, this quotation was withdrawn. The general quotation for slabs is $30.

Finished Iron and Steel.—The finished iron and steel market shows a firmer tendency. Low prices were found to do little in increasing sales and mills are inclined to reduce losses by getting somewhat higher prices. The extreme weakness that recently developed in steel bars has evidently disappeared. One mill is credited with the sale of 1000 tons or more at a delivered price, including low cost water haul that figured back close to a 1.50c. Pittsburgh basis, but was understood to have withdrawn that price. The present minimum price on steel bars is evidently 1.60c. for desirable orders with 1.65c. the more common quotation. The minimum quotation on plates and structural material is 1.60c., but some mills are quoting these at 1.65c. to 1.75c. Plate mills in particular are showing more resistance to price concessions. Hard steel reinforcing bars are commonly quoted at 1.60c. The volume of new business during the week was rather light and no local inquiries for round tonnages came out. However, recent orders for

wire rods and products brought out some good specifications, including one for 1500 tons of wire rods. In Detroit the Ford Motor Co. took quotations on round lots of steel bars and sheets for October requirements. Increased activity is noted in the building field. The Republic Structural Iron Works Co. has taken the Glenville High School, Cleveland, requiring 150 tons of steel, and the Forest City Steel & Iron Co. has taken the Free Building, requiring 100 tons. Bids have been received for the Guarantee Security Discount Co. building, Akron, requiring 1000 tons, a bridge at West Palm Beach, Fla., requiring 1000 tons and the John Adams High School Building, Cleveland, requiring 300 tons. New bids have been received for the Masonic Temple, Detroit, requiring 7000 tons, but there is some uncertainty as to whether this steel will be placed immediately.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Most independent mills have advanced sheet prices $5 a ton to 3c. for black, 4c. for galvanized and 2.50c. for blue annealed. However, the advance on blue annealed sheets applies only to the lighter gages, as most mills are still quoting No. 12 gage and heavier at 2.25c. The advance brought out considerable business that consumers were given an opportunity to place before the new prices became effective. Automobile body sheets have been irregular for some time and several mills have reduced prices on these by cutting the differential from 2.10c. to 1.50c., making the present price for No. 22 gage 4.35c., based on a 3c. black sheet price. This compares with a recent 4.70c. price for automobile sheets.

Warehouse Business.—Jobbers have decided that for the present they will make no advance in warehouse prices on sheets, as they were able to replenish their stocks at the prices that prevailed before the advance.

Old Material.—The market is fairly active and firm with price advances on a few grades. Mills in the Valley district have made additional purchases of scrap and there is considerable demand from dealers for material to cover on these contracts. There is also a demand for scrap for Weirton and Canton delivery. The grades that are most active are compressed steel, borings and turnings. Sales of compressed steel are reported at $10.85 for Youngstown and $11.85 for Weirton delivery. Dealers are offering $8 to $8.25 for machine shop turnings for Valley shipment. Locally the demand continues very light, although one Cleveland mill is buying heavy melting steel to lay down in its yard, for which it is paying $12.50, or possibly higher, and dealers are offering $12.25 for this grade. Owing to some demand from the Youngstown district, flashings have advanced.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails under 3 ft.	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.50 to 7.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.25 to 8.50
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	6.75 to 7.00
Drop forge flashings, under 10 in.	6.75 to 7.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Coke.—The demand for foundry coke has increased to a considerable extent owing to the fact that many foundries are placing stock orders for small lots for winter requirements. The market is firm and several producers have advanced prices 25c. per ton. Quotations on best grades of standard Connellsville coke range from $4.50 to $4.75 per net ton at oven. We note the sale of 800 tons of Virginia foundry coke at $6.

Bolts, Nuts and Rivets.—The improvement in the demand for bolts and nuts previously noted continues and prices appear a little firmer. While sales are mostly in quite small lots, some of the manufacturers are getting a better volume of car lot orders. Plant operations have been increased somewhat. The demand for rivets continues very dull and prices are weak, with 2.25c. for structural and 2.35c. for boiler rivets the minimum quotations in this market.

Cincinnati

CINCINNATI, Sept. 20.

Pig Iron.—While there are no spectacular features, the market showed more activity during the past week, some fair-sized sales being reported. Some of these were made in cities outside of the Ohio River district, giving rise to the belief that industrial conditions in those cities are on the upgrade. One of these sales was for 1200 tons, and another for 500, both Southern iron, at $19, base, Birmingham. In the Cincinnati district, the activity was not so pronounced, though we note a sale of 500 tons of malleable, and several 100-ton orders. A few inquiries are being figured on, one from the Louisville & Nashville Railroad being for 300 tons of Southern iron, and one from a Dayton melter for 150 tons. The price situation is stronger, and on the sale of malleable reported above, $21.50, Ironton, was done. Foundry iron is held at $21, and basic at $20. The minimum in the South is $19. Some interest is being shown in iron for first quarter, but furnaces are not quoting for other than immediate shipment. Tuscaloosa furnace in the South blew in to-day and Etna stack at Ironton Thursday last. The Alabama Co. will blow in one stack on Oct. 10.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	24.02

Finished Material.—The feature of the market during the week was the heavy booking of sheets. Local sales agents report that they were literally swamped with business and that orders were received from all sources. A particularly gratifying feature of the situation was the number of orders received from the Southern district. This is taken to indicate a big improvement in the general condition in the South. The reason for the heavy increase in business is probably the fact that the independent mills announced an advance of $5 per ton on sheet prices, but allowed their customers to cover for 30 days' requirements at the old prices. Several offers to buy 1000 tons of sheets are reported, but the mills generally are only booking business for delivery six weeks ahead. Other lines of finished material are quiet and prices are, if anything, softer. On plates it is said that 1.65c. can be done even on moderate tonnages. Bars are being held at 1.70c. for carload lots. On reinforcing bars, however, 1.50c., Pittsburgh, is being quoted by some re-rolling mills, and it is said that this price has also been made on new billet stock. Bookings of wire products slowed down somewhat during the week as most of the jobbers and manufacturers placed their orders before the price advances went into effect on Sept. 10. The only structural letting reported during the week was the Kellogg Avenue bridge at Cincinnati, involving 900 tons, which went to E. M. Sculley, Columbus, Ohio, at his bid of $108,000. The only new project to come up was a 20-room schoolhouse with an auditorium for the Board of Education at Richmond, Ky. Bids for this school will close with C. C. & E. A. Weber, architects, Cincinnati, on Oct. 5.

Warehouse Business.—Local jobbers are greatly encouraged as the result of an increased number of orders during the past week. Small lots for immediate shipment continue as the prevailing activity, but the number of orders received is much greater and the tonnages heavier. Jobbers in wire products continue to report good orders. Prices on nails will be advanced during the week to $3.40 per keg, base, and on plain wire to 3.10c. per lb. In the lighter gages of blue annealed

sheets, an advance of $2 per ton has been made. This applies to No. 14 and No. 16, No. 10 and No. 12 remaining the same as previously quoted.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c. under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.40 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—The coke market is showing some activity, and while orders are confined to one and two car lots, the aggregate is fairly heavy. We note a sale of 100 cars of furnace coke, and 1300 tons of foundry outside this immediate district. Prices are stiffening, Connellsville coke being from 25c. to 50c. higher than last week. Wise County and New River coke are unchanged.

Tool Steel.—The market continues dull, although some improvement was noticed during the past couple of weeks. Prices show no change, high speed steel being quoted at from 85c. to 90c. per lb.

Old Material.—The United States Cast Iron Pipe & Foundry Co., Addyston, Ohio, is in the market for a heavy tonnage of cast scrap, and it is said will buy as much as 5000 tons if the price is right. Dealers report a scarcity of cast scrap and some of them have marked the price up another dollar per ton. A West Virginia steel plant is inquiring for borings and turnings. Local foundries, however, are not showing much interest in the market, although one of them has made an offer on 1000 tons of cast scrap which was turned down by the local dealers on account of the price being out of line.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	12.00 to	12.50
Relaying rails, 50 lb. and up	26.00 to	26.00
Rerolling steel rails	10.50 to	11.50
Heavy melting steel	9.00 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.50 to	3.00
Steel turnings	2.00 to	2.50
Railroad cast	12.00 to	12.50
No. 1 machinery	13.50 to	14.50
Burnt scrap	7.50 to	8.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	9.50 to	10.00
Pipes and flues	4.00 to	5.00

St. Louis

ST. LOUIS, Sept. 13.

Pig Iron.—Inquiries for pig iron are said to have slowed up a bit, following the recent advances, but the market is firm. Orders are being placed for immediate delivery, and buyers are insistent upon this, demanding car numbers as soon as possible. Buyers have been waiting as long as they could, and their stocks have run down to a low point. A local steel manufacturer took 600 to 800 tons of basic, and a nearby Illinois melter purchased 600 to 800 tons of foundry iron for prompt shipment. A Western consumer bought 500 tons. Negotiations are on for an order of 1500 to 1800 tons for shipment over the next 60 days. The recent advances in Northern irons have put them on a par in this market with Southern foundry, the market price being $24.88, St. Louis, for the former, as against $24.91 for the Southern product. So far there has been no buying of consequence of Southern foundry. Business among the stove manufacturers is increasing. There are inquiries out for a car each of ferromanganese and spiegeleisen.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$24.88
Northern malleable, sil. 1.75 to 2.25	24.88
Basic	24.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—St. Louis fabricators received with satisfaction the word from Washington that the lowest bidder on the airship hangar to be built at Belleville, Ill., by the Government was a St. Louis concern, the W. M. Sutherland Construction Co. About 3500 tons of structural steel is involved. The Scottish Rite Cathedral contract, involving 3000 tons of structural steel, has been let to the John Hill Construction Co. Local fabricators were disappointed at the letting to Jones & Laughlin, Pittsburgh, of 600 tons for the Standard Underground Cable Co. plant at St. Louis. This order was reported in Chicago as having gone to the Decatur Bridge Co. Railroad requirements for the week were only a few carload orders. The Pennsylvania placed an order here for several hundred pounds of tool steel. Some weakness is reported in structural shapes and plates and bars, and some sales are being made at less than the market prices. There is a growing demand for sheets, especially on the part of local jobbers. Warehouse prices are unchanged.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The coke market is showing more strength, and standard Connellsville foundry coke is now quoted at $5 per net ton at ovens. Orders for immediate shipment are increasing, and the situation generally is improved. In the last week 7500 tons of Granite City furnace coke was sold for shipment over the next 60 days. Business among the stove plants in the St. Louis industrial district is improving.

Old Material.—A few purchases of small tonnage were made during the week, but the market is comparatively quiet as far as demand for consumption is concerned. There is, however, considerable demand for No. 1 railroad cast scrap and stove plate. The mills still refuse to consider the recent advances in prices of heavy metaling steel as permanent, and brokers are unwilling to make any concessions at present. The high-priced old material recently bought by the dealers from the railroads is now being shipped, and if the mills remain adamant, there probably will be a scramble among the dealers to unload at a loss. The following railroad lists are before the market this week: Chicago, Rock Island & Pacific, 3151 tons; Mobile & Ohio, 715 tons; Nashville, Chattanooga & St. Louis, 400 tons; Kansas City Southern, 150 tons; Wabash, 150 tons, and a list issued by the Southern Railway aggregating 9500 tons, very little of which will move in this market.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$13.00 to	$13.50
Steel rails, rerolling	12.00 to	12.50
Steel rails, less than 3 ft.	11.00 to	11.50
Relaying rails, standard section	29.00 to	30.00
Cast iron car wheels	12.50 to	13.00
No. 1 heavy railroad melting steel	11.00 to	11.50
No. 1 heavy shoveling steel	9.50 to	10.00
Ordinary shoveling steel	9.00 to	9.50
Frogs, switches and guards, cut apart	11.00 to	11.50
Ordinary bundle sheet	4.00 to	4.50
	Per Net Ton	
Heavy axle and tire turnings	6.00 to	6.50
Iron angle bars	11.00 to	11.50
Steel angle bars	9.00 to	9.50
Iron car axles	16.50 to	17.00
Steel car axles	12.50 to	13.00
Wrought iron arch bars and transoms	13.00 to	13.50
No. 1 railroad wrought	10.50 to	11.00
No. 2 railroad wrought	10.00 to	10.50
Railroad springs	10.50 to	11.00
Steel couplers and knuckles	10.50 to	11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to	9.50
No. 1 dealer's forge	6.00 to	6.50
Cast iron borings	5.50 to	6.00
No. 1 busheling	9.50 to	10.00
No. 1 boilers cut in sheets and rings	6.00 to	6.50
No. 1 railroad cast	13.50 to	14.00
Stove plate and light cast	11.50 to	12.00
Railroad malleable	10.00 to	10.50
Agricultural malleable	9.00 to	9.50
Pipes and flues	7.50 to	8.00
Heavy railroad sheet and tank	6.00 to	6.50
Light railroad sheet	3.50 to	4.00
Railroad grate bars	8.50 to	9.00
Machine shop turnings	4.50 to	5.00
Country mixed iron	7.00 to	7.50
Uncut railroad mixed	8.00 to	8.50
Horseshoes	10.50 to	11.00
Railroad brake shoes	8.50 to	9.00

Buffalo

BUFFALO, Sept. 20.

Pig Iron.—A decided falling off in inquiry and sales has affected producers in this district, and unless extraordinary tonnages are booked before the end of the month, September business will show a smaller movement of iron than the preceding month. There is evidence that a number of foundries are operating in a limited way, but their pig iron requirements are not up to expectations. This is attributed to the greater use of old material. Furnace operation has not changed. One producer is known to have stored almost 100,000 tons of iron. Its sales are limited and certainly not equal to the present production. Total inquiry in the hands of one interest for a week is less than 3000 tons —in contrast with the situation a week prior, when it was engaged with more than 20,000 tons. A producer sold about 1500 tons at $20 base. Another sold nothing and notices a falling off in the small inquiry which has been fairly steady. An agency which demanded a price of $21 base has sold but a few carloads.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75
No. 2 plain, 1.75 to 2.25 sil.	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—Business in pipe, on which prices have been reduced, has been unusually good. Improvement in the demand for bars has been definite and the lowest price now quoted is 1.60c. A mill is now quoting 1.65c. on its regular run of inquiries for small lots. Two attractive inquiries for reinforcing bars are out and both involve about 500 tons. Some desirable orders from jobbers have been placed with a bar mill, but the usual trend of business is for carload lots and less. Some increase in bar mill operation is pending. An interest having two bar mills in operation may put in a third within a few days. Wire business is quiet since the announcement of advances in price was made and most tonnages are booked on a 30-day basis. One interest has made some desirable sales for October delivery in this material. Structural activity is limited to small lots and nothing of attractive size is within sight.

Warehouse Business.—The only departure from the ordinary run of warehouse business has been an unusual demand for bands. Two orders calling for sizable tonnages in this material have engaged one warehouse and on one, to fill the demand, sheets cut to size were utilized. While figures on these tonnages are lacking, the orders are regarded as unusual "warehouse" orders. Bar and shape business continues fair, not with particular reference to the size of individual orders, but bearing more on an increase in the number. Advance in wire prices is expected to have a healthful effect on the market in that it indicates to buyers that a turn has developed and that price cutting has terminated.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.30c.; galvanized steel sheets, No. 28, 5c.; black sheets, No. 28, 4c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 4.05c.

Old Material.—There is difficulty in filling orders for cast scrap and a gross price of $15.75 is now the rule. Consumers have not indicated a desire to pay $13.50 for steel after several sales at that figure were completed. The market is a trifle weaker in this commodity. Generally the same optimistic feeling is prevalent, but no large movements have been made.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $13.50
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00
Hydraulic compressed	9.50 to 10.00
Railroad malleable	12.00 to 12.50

San Francisco

SAN FRANCISCO, Sept. 14.

Pig Iron.—The past week or ten days has not witnessed any perceptible revival in actual business on the Coast, judging from the volume of sales reported. Few, if any, transactions are conspicuous by the tonnage involved; in fact, it appears that buyers have been refraining from extensive participation, confining their interest almost entirely to immediate needs, which at this time are rather light. There is no apparent change in prices, which, however, are nominal only.

Coke.—The sale of 500 tons of domestic coke to the Southern Pacific Co. a few days ago was the largest single transaction reported of recent date. While the actual figure has not been disclosed, it is understood to be considerably below the current market price. The inactivity of foundries continues greatly to curtail the demand for coke in this district. Some rather cheaper foreign coke has been offering.

Cast Iron Pipe.—Although actual business has not been particularly large of late, the market is considered in good condition, and operators expect considerable activity in municipal work, especially in southern California, in the succeeding weeks. Private corporation business still is light. Redwood City, Cal., will ask for bids on Sept. 19 for 65 tons of 4 and 8-in. pipe, and Madera will be in the market for 17,900 ft. of 4, 6, 8 and 10-in. pipe, which will be used for extending the present water works.

Finished Iron and Steel.—Little more than a continuation of the better inquiry for materials, which was recorded in the last report, has developed in this market recently. The interest in structural steel continues, and considerable buying in small lots is being done, but as yet there appears to be no manifest tendency to proceed with new large jobs. Jobbers report a good movement of stocks and steady replenishment buying. In the last week, certain jobbers have been purchasing freely, Belgian bars, which were offered at $1.95, f.o.b. docks, duty paid, a price below that of domestic bars. Tank plates of foreign fabrication also have been available at the attractive price of $2.15, f.o.b. docks, duty paid. The South continues to be a steady taker of sheets. One of the few sizable inquiries is for about 2200 tons of tank material for an oil company. Steel operators on the Coast point to the present freight rates as disadvantageous to the expansion of business here, and say that the new rate of $5.70 a net ton on steel shipments moving from Pittsburgh to New York en route to the Orient threatens to divert the movement of steel from this port. Against the current rate of $19.20 for transcontinental shipment from Pittsburgh to San Francisco and thence to the Far East is $17.31, the charge via New York and the Canal.

Old Material.—The general limitation of activity by iron and steel interests makes unnecessary much purchasing of scrap, even if most foundries were not well supplied already; in fact, the large stocks held by railroads, dealers and producers in the country seem to preclude the possibility of a greatly increased consumption in the near future. The largest single sale of scrap reported involved 500 tons of steel plate punchings for ballast, on the basis of $15 a net ton, f.o.b cars, San Francisco. Cast iron scrap and heavy melting steel continue nominal at practically unchanged prices, while turnings and borings are offered at about $5 gross ton, delivered.

The snow problem in cities is the subject of a meeting to be held at the Engineering Societies Building, New York, on the evening of Friday, Sept. 23, by the Metropolitan section of the American Society of Mechanical Engineers. Henry L. Doherty is to present the leading paper, and a number of engineers have been invited to participate in the discussion.

The Biggam Trailer Co., 425 East Water Street, Milwaukee, has recently increased its capital stock to $250,000 preferred and 15,000 shares of common stock without par value.

Philadelphia

PHILADELPHIA, Sept. 20.

Steel prices continue very weak, though there is some indication of resistance on the part of a few companies whose losses at present selling prices are said to be greater than if their mills were allowed to remain idle. There is a feeling of hopefulness, however, because of a belief that consumers must soon realize that prices have actually reached bottom or very close to it. Within the past week prices of plates, shapes and bars have become definitely established at 1.60c., Pittsburgh, with reports of quotations as low as 1.50c., Pittsburgh, on plates and bars. The advance of $5 a ton on sheets first announced by a Youngstown maker has not become general, and, in fact, some quotations, particularly on the heavier gages of blue annealed, have reached the lowest point since the decline, namely 2c. to 2.10c., Pittsburgh. Such low prices are not general, but have been made in a few instances. The reduction of about $10 a ton on steel pipes and steel tubes by the leading interest has been quite generally followed by its competitors.

In pig iron there is a slightly firmer tendency, some makers having advanced their prices 50c. a ton on foundry grades.

Pig Iron.—Foundry iron has been advanced 50c. a ton by some of the makers in this district, the advance being due partly to the better position furnace order books are in as a result of recent buying and partly to the growing determination of operators to cut down their losses. A further advance of 50c. a ton is predicted and may take place within the week. This places No. 2 plain iron on the basis of $20, No. 2X at $20.50 and No. 1X at $21.50, all f.o.b. furnace, though at least one seller with freight rates averaging more than $1.50 a ton is still quoting on the basis of $19.50. Pig iron business in this district is showing no marked expansion, but a fairly satisfactory volume is being booked, mostly in lots of a few hundred tons, and furnaces are selling and shipping more than they are making. For example, one furnace has sold 11,000 tons so far this month, which is more than its monthly output. Consumers are usually anxious to cover for the remainder of the year, and in some instances are inquiring for first quarter of next year. One or two sales for January-February shipment have been made, but generally sellers are unwilling to make commitments beyond Jan. 1. The firmer tendency in the coke market leaves furnace operators in doubt as to what their production costs may be next year. Furnace coke is available for shipment over the remainder of this year at $3.50, Connellsville, but quotations have not been made beyond that period. A 100-ton sale of basic iron was made at $19.50, furnace, but there is no inquiry for larger tonnages. Low phosphorus iron is dull with prices unchanged. The Princess furnace will go out of blast within a week, thus putting the entire Virginia iron-making industry on the inactive list. The Robesonia furnace, which blew in several weeks ago to make copper-bearing low phosphorus and foundry iron, will go out of blast this week and may require some lining repairs. A quantity of iron sufficient to take care of expected wants of its customers has been piled.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying frm 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.84 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	19.25 to 20.75
Gray forge	20.00 to 21.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Coke.—Furnace coke for delivery over the remainder of the year is now available at $3.50, Connellsville. Foundry coke is quoted at $4.25 to $4.75, Connellsville.

Ferroalloys.—Domestic producers of ferromanganese are meeting the prices named by agents of the British producers, namely $58.35, Atlantic seaboard. Demand has improved, one maker having booked 1000 tons in small lots during the past week. Spiegeleisen is nominally quoted at $26 and $27, furnace.

Semi-Finished Steel.—While there is virtually no demand for billets, producers have no difficulty in getting $30 for rerolling quality and $35 for forging quality, Pittsburgh, on such small orders as they are booking.

Plates.—The plate market continues decidedly weak, and while there is no confirmation of reports of quotations as low as 1.50c., Pittsburgh, it is definitely established that the market is at least on a 1.60c. basis. Small orders have been taken at the latter price. Some makers are showing more resistance toward the low prices. An Eastern company has, for example, set its price at 1.65c., and may decide to quote 1.75c., Pittsburg, with a determination to let its mills remain idle rather than to continue taking business at such a heavy loss. Eastern car builders are figuring on 1000 steel hopper cars for the Delaware, Lackawanna & Western and 1000 steel car bodies for the Baltimore & Ohio.

Structural Material.—Shapes are now obtainable at 1.60c., Pittsburgh, on ordinary lots, and it is intimated that fabricators, figuring on particularly desirable work, have been given protection at a shade under this price. In this immediate locality considerable work is being held up on which action had been expected at an earlier date. The Chestnut Street pier work, requiring about 1000 tons, may be awarded this week. Other important enterprises on which no decision has been reached include the addition to Haddon Hall, Atlantic City, and a new Stanley theater. A high school for Pottstown, Pa., will require 350 tons of steel and a school building at Kearney, N. J., 265 tons. Figures are being obtained for an office building to be erected at Fifteenth and Locust streets, Philadelphia.

Bars.—Though quotations as low as 1.50c., Pittsburgh, on steel bars are commonly reported, it is stated that such prices have applied only to sizable tonnages of reinforcing bars. For example, 800 tons of reinforcing bars for the Western Maryland Railroad elevator at Baltimore were bought from an Eastern mill at less than 1.50c., Pittsburgh. The price generally quoted on merchant steel bars is 1.60c., Pittsburgh. A fair volume of business is being booked, but mill operations are not noticeably increasing. Bar iron is quoted at 1.60c. to 1.65c., Pittsburgh.

Sheets.—A Youngstown maker of sheets advanced prices last week $5 a ton, but other makers have not generally followed this advance, though some still have the matter under consideration. Coincident with the advance, some mills made the lowest prices which have yet been quoted. For example, heavy gages of blue annealed sheets have sold from 2c. to 2.10c., Pittsburgh, and there have also been concessions on black and galvanized.

Warehouse Business.—A fair gain in sales of steel out of stock is reported.

Old Material.—The market continues quiet with prices virtually unchanged. However, there is a firm undertone. We quote for shipment to consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	16.00 to 17.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.50
Stove plate (for steel plant use)	12.50 to 13.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

British Iron and Steel Market

Makers' Position Improves with Stiffening of Continental Prices—Activity Still Retarded by Fuel Prices

(By Cable)

LONDON, ENGLAND, Sept. 20.

Cleveland iron is again stagnant. Sellers quote No. 3 foundry at £6 ($22.32) for October delivery, but consumers show no anxiety to purchase. Coke prices are keeping up, and hindering the re-starting of more furnaces. Iron-masters state that they are now running at a loss.

Hematite is more active. Nine Northeastern furnaces are now blowing. Makers are so anxious for orders that they are cutting shipment prices. The home demand is quiet. Bilbao Rubio ore is quoted at £1 8s. ($5.21) and upward, c.i.f., Tees.

British steel makers are securing more export orders by cutting quotations, but home trade buying is still in abeyance. Guest, Keen & Nettlefolds, Ltd., are partly reopening their plants, to enable their workers to tide over the present crisis.

Continental competition is less keen, as prices from across the Channel are advancing. French merchant bars have been sold at £8 7½s. (1.39c. per lb.) f.o.b., but £8 12½s. (1.43c. per lb.) f.o.b., is now asked. Belgian merchant bars are quoted up to £9 (1.49c. per lb.) f.o.b., for shipment in 6 to 8 weeks. German merchant bars also are held at £9 f.o.b. for December and January shipment.

German plates 3/16 in. thick and under are quoted at £9 f.o.b. for shipment in 6 weeks. German wire nail makers refused 23s. ($4.28) c.i.f. for Japanese specifications. British wire rods are obtainable below £11 10s. ($42.78) f.o.b.

Tin plates are more active, especially for home consumers, and fair business is being done in odd sizes. The Far East is still buying. More mills have started, and the Welsh output is now about 30 per cent of capacity. It is anticipated that it will reach 45 per cent before long.

Galvanized sheets are weak, business being done at £19 10s. (3.24c. per lb.) f.o.b. for No. 24 gage, and at £28 5s. (4.69c. per lb.) f.o.b. for Shanghai specifications. There is more inquiry, and more mills are running. Belgium is quoting on No. 15 gage black sheets at £10 10s. (1.74c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.72 per £1 as follows:

Durham coke, delivered	£1 15	$6.51
Cleveland basic	7 7½ & £7 10*	27.45 & $27.90
Cleveland No. 1 foundry	7 0	26.04
Cleveland No. 3 foundry	6 5	23.25
Cleveland No. 4 foundry	5 19	22.13
Cleveland No. 4 forge	5 17½	21 85
Hematite	7 0*	26.04
East Coast mixed	7 0 & 6 15*	26.04 & 25.11
Ferromanganese	18 0 & 14 10*	66.96 & 53.94
Rails, 60 lb. and up	10 0 to 14 0	37.20 to 52.08
Billets	7 10 to 8 0	27.90 to 29.76
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.70 to 31.62
Tin plate base box	1 1 to 1 2½	3.90 to 4.18
		C. per Lb.
Ship plates	12 10 to 14 0	2.08 to 2.32
Boiler plates	18 0 to 19 0	2.99 to 3.16
Tees	12 10 to 14 10	2.08 to 2.41
Channels	11 15 to 13 15	1.95 to 2.28
Beams	11 10 to 13 10	1.91 to 2.24
Round bars, ¾ to 3 in.	12 0 to 12 10	1.99 to 2.08
Galvanized sheets, 24 g.	19 0	3.15
Black sheets	16 0	2.66
Steel hoops	14 5 & 14 0*	2.37 & 2.32
Cold rolled steel strip, 20 g.	26 10	4.40

*Export price.

High Fuel Cost Hampers Pig Iron Output—Semi-Finished Steel Lower

LONDON, ENGLAND, Sept. 7.—Business in the iron and steel trades still hangs fire. The main reason is the high cost of production which is everywhere preventing manufacturers from reopening their works and producing at a normal rate. Each day sees further collieries forced to shut down owing to the high wages they have to pay, which in turn prevents them from reducing the selling price of their products. Only recently the Stavely Coal & Iron Co., shut down one of its collieries on this account. Until the miners are willing to accept a reasonable wage for their work, costs cannot come down. The iron and steel trade in the meantime is waiting on cheaper fuel.

In the Cleveland district there are now 14 blast furnaces blowing and, though the demand for foundry iron has certainly increased, makers cannot see their way to relight their furnaces on a wholesale scale. There is practically no foundry iron available except No. 4, for which 125s. is asked for both home and export. No. 3 G. M. B. is quoted at 135s. In the hematite trade business is a little more brisk, but makers had to cut the prices to get the orders and, because there was business to be done, reduced the home trade quotation to the level of that for shipment material; East Coast mixed numbers are now quoted at 140s. for both home and foreign consumption.

A welcome feature in the finished and semi-finished steel markets is the fact that continental makers are now out of the running for semi-finished steel and, British makers being inclined to cut their prices, have at last secured some good sized orders. In finished steel, however, prices here are still far above those at which material can be supplied by the continental makers, with the result that business does not show any marked improvement. Home quotations were recently reduced by 20s. a ton, but the drop has not proved sufficiently attractive to buyers.

Here and there one hears of improvements in employment such as the reopening of the Ebbw Vale Steel & Iron Co., works, and Palmer's Steel Works, both of which have been idle for six months or more, but this really only means that the works have got together a sufficiency of orders to justify them making a start, and are going through that program. An instance of the depression in the trade in Sheffield is shown in the reports of the Sheffield Bankers' clearings which up to Aug. 20 were more than £16,000,000 below the aggregate of the same period last year. For the week ended Aug. 20 the turnover totalled £841,561, a fall of over half a million pounds compared with the same week a year before.

Union Steel Casting Co. Absorbed

The fixed assets and inventories of the Union Steel Casting Co., 53 Gerard Street, Roxbury, Boston, have been purchased by the Roxbury Steel Casting Co., a Massachusetts corporation, capitalized for $50,000. Isaac E. Sexton, Winchester, is president of the new company, and Perley C. Rogers, Quincy, treasurer and general manager. These two gentlemen and George A. Sexton constitute the board of directors.

J. T. Phelps remains as superintendent of the Roxbury Steel Casting Co. and the foundry organization will be as heretofore. R. L. Adams continues in charge of the laboratory. The new company has rebuilt the open-hearth furnace, which now has 15-ton capacity, and has made minor changes to facilitate production of open-hearth castings ranging in size from 1 lb. to 12 tons, and to handle any specification castings required. The new management expects to resume operations this week. It plans to maintain a normal working force of 220, but will begin operations with a somewhat reduced number.

The New York Central Railroad, Grand Central Terminal, New York, will receive bids until 12 o'clock noon, Sept. 29, for immediate requirements for shop and operating equipment, including rolled steel gears, wire fence, track bolts, volt cables and parts, manganese frogs and bottom plates for crossing frogs, as per specifications on file at the office of W. C. Bower, purchasing agent.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.60c. to 1.70c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.20 to $2.50
Large boiler rivets..... 2.35 to 2.60
Small rivets .....70, 10 and 10 per cent off list
Machine bolts, small, rolled threads,
70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer,
65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅝ in. x 6 in.:
Smaller and shorter rolled threads..70 and 5 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts .....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....60, 10 and 5 per cent off list
Larger and longer sizes.....60 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped..... 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts..... 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $41; chain rods, $41; screw stock rods, $46; rivet and bolt rods and other rods of that character, $41; high carbon rods, $49 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.40 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.65 to $2.75 base; 5/16-in., $2.65 to $2.75 base. Boat and barge spikes, $2.65 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	List
2 to 2¼ in.	41	1¾ to 1⅞ in.	10
2½ to 3 in.	52	2 to 2¼ in.	20
3¼ to 13 in.	57	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb		Cents per Lb.	
No. 8 and heavier	2.20–2.45	Nos. 11 and 12	2.30–2.55
Nos. 9 and 10 (base)	2.25–2.50	Nos. 13 and 14	2.35–2.60
		Nos. 15 and 16	2.45–2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 22 to 24	2.60–2.85	No. 29	2.85–3.10
Nos. 25 and 26	2.65–2.90	No. 30	2.95–3.20
No. 27	2.70–2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75–3.00	Nos. 25 and 26	3.45–3.70
Nos. 12 to 14	2.85–3.10	No. 27	3.60–3.85
Nos. 15 and 16	3.00–3.25	No. 28 (base)	3.75–4.00
Nos. 17 to 21	3.15–3.40	No. 29	4.00–4.25
Nos. 22 to 24	3.30–3.55	No. 30	4.25–4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 17 to 21	2.60–2.85	No. 29	2.80–3.05
Nos. 22 to 24	2.65–2.90	No. 30	2.80–3.05
Nos. 25 to 27	2.70–2.95	Nos. 30½ and 31	2.85–3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

Sept.	Copper, New York: Lake	Copper, New York: Electrolytic	Tin: New York	Lead: New York	Lead: St. Louis	Zinc: New York	Zinc: St. Louis
14	12.25	12.00	26.50	4.60	4.40	4.70	4.20
15	12.25	12.00	26.25	4.60	4.40	4.70	4.20
16	12.25	12.12½	26.00	4.60	4.40	4.70	4.20
17	12.25	12.12½	....	4.60	4.40	4.70	4.20
19	12.25	12.12½	26.37½	4.60	4.40	4.67½	4.17½
20	12.25	12.12½	26.50	4.65	4.45	4.67½	4.17½

New York

NEW YORK, Sept. 20.

Some metals have shown improvement and some are unchanged both as to buying and prices. Demand for copper continues very light but prices are firm. There is moderate buying of tin, with steadiness as to value. Lead is the most active of the metals and prices have advanced again. With no improvement in the demand for zinc, the market is easier.

Copper.—This market presents the rather unusual spectacle of prices advancing in the last few weeks, but without the increase in buying usually seen in such circumstances. The situation is a distinct disappointment to sellers, both inquiry and buying being very light. An appraisal of values is difficult under the circumstances, but on electrolytic copper, where quotations are at all obtainable, 12.12½c., New York, is generally named, or 12.37½c., delivered, on early shipment. It is possible that 12.25c., delivered, could be done, but there has been no real test of the market. Lake copper is quiet and nominal at 12.25c. to 12.37½c., delivered. The explanation of the small demand is that consumers are not having an active demand for their finished products, although sentiment in that part of the trade is better than for some time. There is also the opinion that the advance in price of copper was not justified and that the metal will be obtainable on a lower basis later. The estimate of the U. S. Geological Survey that stocks of refined copper in the country are from 750,000,000 to 1,250,000,000 lb., while it represents a wide "spread," is not generally accepted by the trade, the outside figure being considered high.

Tin.—The moderately active demand for Straits tin which has been the feature of the market for most of the last few weeks continues, and sales for the week this report covers have probably totaled 500 tons of future shipment metal at prices ranging from 26.25c. last Friday to 26.62½c. last Wednesday. Probably 200 tons was sold on Sept. 14 and 200 to 300 tons on Sept. 15, with light sales on Sept. 16. Business for October-November shipment from the East was done in small lots yesterday at 26.37½c., while 26.50c. was bid at the close. On some of the days consumers and dealers were equal participants in the business and inquiry from consumers has been fair most of the time. Spot Straits tin, New York, is quoted to-day at 26.50c., and quotations in the London market are as follows: Spot standard, £155 10s.; future standard, £157 15s.; spot Straits, £156 5s., or about £1 per ton lower than a week ago. Arrivals thus far this month have been 2225 tons and 3050 tons is reported afloat.

Lead.—Another advance was made late to-day by the American Smelting & Refining Co. from 4.60c. to 4.65c., New York and St. Louis. Quotations of independents are largely nominal at 4.65c., New York, or 4.40c. to 4.45c., St. Louis, but few of these producers are quoting in this market, the present demand being largely satisfied by the leading interest. Buying is reported good, with some consumers heard from for the first time in a long period.

Zinc.—This market continues featureless and slightly easier, prime Western for early delivery being available as low as 4.17½c., St. Louis, or 4.67½c., New York. Unconfirmed reports are that one or two sellers have offered as low as 4.15c., St. Louis. Buying by galvanizers and others is spasmodic and generally for small lots, but there is more inquiry for forward delivery.

Antimony.—The market is nominally unchanged at 4.45c., New York, duty paid, for wholesale lots for early delivery.

Aluminum.—The leading domestic producer continues to quote virgin metal, 98 to 99 per cent pure, at 24.50c., f.o.b. plant, in wholesale lots for early delivery, while the same grade from importers is obtainable at 19c. to 20c., New York, duty paid.

Old Metals.—The market is fairly firm and is marking time awaiting developments in the new metal market. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.00
Lead, heavy	4.00
Zinc	3.00
Lead, tea	3.00

Chicago

Sept. 20.—Trading has been exceedingly dull in all the metals and slight declines are noted in tin and zinc, the former being now quoted at 28c. and the latter at from 4.25c. to 4.30c. Old metal prices are unchanged. We quote in carload lots: Lake copper, 12.50c. to 12.75c.; tin, 28c.; lead, 4.50c.; spelter, 4.25c. to 4.30c. in less than carload lots; antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Sept. 20.—The lead market is quiet and unchanged while slab zinc is dull and lower. We quote lead at 4.40c. carlots and zinc at 4.17½c. We quote Lake copper at 12.98½c., carlots; tin, 27.36c.; and antimony, 5.23½c. In old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

The General Alloys Co., New York and Chicago, announces a new heat resisting alloy at a base price of 20c. per lb. This alloy, it is claimed, has about four times the life of steel and retains its shape at high temperatures. It is covered by a patent recently issued. It will be sold under the trade name of X-ite and is the fourth material to be sold under the Q-alloy trade name.

Production of Portland cement in August amounted to 10,244,000 bbl., a gain of 15 per cent over the average August of the past four years. Each month of the year has seen a consistent increase in production over its predecessor, but stocks have fallen sharply, due to excess of shipments (12,340,000 bbl. in August) over production every month since April.

Ground has been broken for an addition to the plant of the Wyckoff Drawn Steel Co., Ambridge, Pa., which, when completed, will put under cover more than half an acre of manufacturing space. The American Bridge Co., will fabricate the steel, amounting to about 100 tons, and it is expected to have the new portion of the plant in operation early in 1922.

PERSONAL

Paul Boulanger, a director of Thyssen & Co., Mulheim, Ruhr Region, Germany, is now visiting the United States on a tour of inspection of heavy material handling appliances in use here. Mr. Boulanger recently visited the Farrell Steel Works of the Carnegie Steel Co., at Farrell, Pa. and has also investigated the ore handling machinery at Duluth. His headquarters while in this country are with F. A. Borgemeister, 50 Church Street, New York.

Charles B. Tamm, for several years chief purchasing agent LeRoi Co., Milwaukee, manufacturer of automobile and tractor engines, has resigned to become assistant general manager of the Hydro-Hoist Co., a subsidiary of the Heil Co., Milwaukee, manufacturer of steel dump bodies, compartment truck tanks, hydraulic hoists, etc.

C. C. Hanch, Indianapolis, vice-president National Automobile Chamber of Commerce, is to become executive vice-president of the United States Automotive Corporation. The subsidiaries of the corporation are the Lexington Motor Co., the Ansted Engineering Co., the Ansted Spring & Axle Co., the Connersville Foundry Corporation, the Fayette Trimming & Painting Co., and the Teetor-Hartley Motor Corporation. Frank B. Ansted is president of the corporation. Mr. Hanch will have headquarters at Connersville, Ind., home office of the United States Automotive Corporation. Mr. Hanch had long been connected with the Nordyke & Marmon Co., Indianapolis, and with the Studebaker Corporation, South Bend, Ind. During the war he was chief of the automotive products section of the War Industries Board. After the war he went to Europe as trade commissioner for the Department of Commerce.

The American Steel Export Co. has closed its branch office at Rio de Janeiro, Brazil, and J. D. W. Snowden, general representative in charge, has returned to the United States. His present address is 5228 Laurens Street, Germantown, Philadelphia.

W. G. Jones has been elected vice-president and treasurer of the W. A. Jones Foundry & Machine Co., Chicago, and will continue to serve as general manager.

Stuart F. Brown, formerly production engineer with the Whitin Machine Works, Whitinsville, Mass., manufacturer of textile machinery, is now manager of the Whitinsville Spinning Ring Co.

J. C. Holt, president Antrim Iron Co., Grand Rapids, Mich., has returned from a four months' trip through Europe.

J. M. Meany, formerly Western manager Clyde Iron Works, Duluth, Minn., has become president of the Ball Engineering Co., Portland, Ore.

P. S. Van Wyck has joined the Mesabi Iron Co., Babbitt, Minn., having resigned from the Great Western Railroad.

Edward Flad has resigned as a member of the Missouri Public Service Commission and will return to St. Louis to follow his profession as a consulting engineer.

John D. Hurley, president Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, manufacturer of air and electric tools, arrived in New York on the New Amsterdam Sept. 9 and reached the home office in Chicago, Sept. 15. Accompanied by Mrs. Hurley, he has just completed a six weeks' trip abroad, visiting all the principal points of Continental Europe.

A. F. Soben, formerly assistant chief engineer American Machine & Mfg. Co., Atlanta, Ga., has opened offices in Los Angeles, Cal., as consulting engineer and designer of special and automatic machinery.

I. N. Zavarine, formerly metallographist Winchester Repeating Arms Co., New Haven, Conn., has been appointed assistant in the mechanical engineering department of the Massachusetts Institute of Technology, Boston.

S. E. Allen, engineer Stevens-Duryea Co., Chicopee Falls, Mass., automobile manufacturer, has resigned to accept a position on the Pacific Coast. E. E. Nichols, superintendent, has resigned, but has made no plans for the immediate future.

J. M. Lloyd has resigned as superintendent of the Lowellville, Ohio, plant of the Sharon Steel Hoop Co., Sharon Pa., effective Oct. 1, after serving two and a half years.

L. R. Samuels, formerly assistant sales manager William Jessop & Sons, Inc., New York, high-speed steel, has returned to that company after a year's absence. He will make his headquarters in New York.

N. W. Elmer, formerly engineer for the Harry M. Hope Engineering Co., Boston, has opened an office in Quincy, Mass., as consulting engineer in conveying and mechanical handling.

Chester C. Jackman, formerly factory manager Victor Saw Works, Springfield, Mass., has been made vice-president and treasurer of the Dolman Mfg. Co., Springfield.

John M. Smith, formerly designer for the Hooven, Owens, Rentschler Co., is now in the engineering department of the Gardner Governor Co., Quincy, Ill.

Earl F. Heimpel, M. E., formerly chief engineer of the Edison Portland Cement Co., Stewartsville, N. J., has resigned to join the sales force of the M. J. Dougherty Co., piping fabricator and engineers, Philadelphia. He is a graduate of Lehigh University, has had a wide experience in the engineering field and will be located in the home office.

James A. Brakes, Jr., has become structural engineer for the Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., having resigned his position as head of the department of mechanical engineering at Ohio Northern University, Ada, Ohio.

Robert L. Crane, for 23 years Western New York manager Henry Prentiss & Co., Inc., has terminated his connections with that company and will continue in the same line of business under the name of Crane Machinery Co., with offices at 501 D. S. Morgan Building, Buffalo. He is now establishing selling connections with a view of having in the near future branch offices in Rochester, Syracuse and Albany.

Parker M. Robinson has been transferred from the marine engineering department of the Westinghouse Electric & Mfg. Co. to the power sales department of the same company and has been sent to Los Angeles, Cal., as a specialist in steam power apparatus.

M. C. Gillett has become manager of the plant of the Standard Heater Co., Williamsport, Pa., having been transferred from the management of the Philadelphia branch office.

D. T. Farnham, formerly consulting industrial engineer, St. Louis, has become vice-president of C. E. Knoeppel & Co., Inc., New York.

W. L. Conrad, for many years manager of the office of the late H. L. Gantt, assisting in the introduction of industrial management methods, has opened an office in New York for consulting practice along the same lines.

Boyd Fisher, formerly with the Tabor Mfg. Co., Philadelphia, as industrial engineer, is now with Lockwood, Greene & Co., Boston.

Edmund L. Barto and Harry J. Phillips, formerly sales engineer and chief engineer, respectively, of the New York office of the Austin Co., have formed the Barto-Phillips Co., engineer and builder, with offices at 280 Madison Avenue, New York, to engage in the engineering design, construction and exportation of all classes of industrial buildings, including power house and equipment requirements.

ACTIVE BUYING BY JAPAN

A 4000-Ton Rail Contract—Hydroelectric Project Including 1800 Transmission Towers

NEW YORK, Sept. 20.—Japanese buying and pending contracts for large projects continue to hold first place in exports of iron and steel. In all foreign markets there is evidence of lessening competition from Germany, due to the filled-up condition of the German mills, coupled with the more or less hand-to-mouth buying that now prevails in practically all markets. One of the recent large inquiries was for 4000 tons of 60-lb. rails for the Imperial Japanese railroads. These have been placed with Suzuki & Co. at a reported price of $49.98 per ton delivered Japanese port. A contract for 660 tons of structural steel for a Japanese bridge has been awarded to Takata & Co., and an order for 850 tons of bridge material for erection in the vicinity of Tokio is pending. Probably the largest business pending in the Far East at present is that represented by the pipe, plates and transmission towers required for the hydroelectric project on the island of Formosa. The contract will probably be awarded this month and will include six lines of pipe 1137 ft. long, about 1400 tons of tank plates to be bent for riveted pipe, and 225 miles of steel transmission towers, which at eight to the mile would number in the neighborhood of 1800.

Renewed activity is also reported from Chinese sources, particularly Hong Kong and Shanghai. Tin plate continues fairly active in the Orient, one New York exporter having recently booked an order for about 1000 base boxes of tin plate for a Japanese consumer. Black sheets of light gage still represent a large portion of the export business with Japan. One reason for the continued sheet demand is that dealers in Japan have received numerous lots of sheets of unsuitable quality, in some cases from Continental sources, in others from sources in the United States, and have had instructions from their customers to cancel unless satisfactory material can be delivered without delay. This has led to numerous orders of sheets for early delivery. The orders are chiefly for black sheets and in many cases these are galvanized in Japan.

For International Co-operation of Engineering Societies

Calvin W. Rice, secretary American Society of Mechanical Engineers, is chairman of a committee which is arranging for a dinner of engineers in New York, Oct. 10, in the interest of a new movement for international co-operation among engineering societies. The dinner is to mark also the return of the mission of 13 representatives of American engineering societies sent abroad to confer the John Fritz medal upon Sir Robert Hadfield and Eugene Schneider. Sir Robert Hadfield has sent a message to this country in aid of the movement which will be launched on Oct. 10. He advocates a world engineering council of Anglo-Saxons. Voicing, he says, the opinion of British engineers, Sir Robert is confident that the engineers of Great Britain and the United States are going to pull together. He has recently advocated the federation of engineering societies of the entire British Empire through an executive council similar to the American Engineering Council of the Federated American Engineering Societies.

The celebration referred to above, which will be at the Engineers' Club in New York, will be attended by engineers representing the Allied nations. Invitations have been extended to many men prominent in public life on both sides of the Atlantic.

Another Reduction Expected

Owing to wage reductions by independent competing interests, another cut is contemplated by independent iron and steel makers in the Mahoning and Shenango Valleys. Going rate for day labor in the Youngstown district is 30c. per hr., as compared with 25c. east of the Alleghenies, and 27c. paid by southern Ohio interests. When action is taken, the common labor rate in the valleys will be reduced to 27c. and rates for semi-skilled and skilled workers proportionately readjusted.

Successful generation of electric power at more than 1,000,000 volts at commercial frequencies has just been accomplished at the high voltage engineering laboratory of the Pittsfield, Mass., works of the General Electric Co. The laws of corona were checked at similar potentials and found to hold. A short transmission line was tested for corona conditions and results indicated that a line using 4-in. diameter conductors or larger would be necessary at 1,000,000 volts.

A certificate of incorporation of the Builders' Steel Co., Windsor Street, Hartford, Conn., has been filed with Connecticut authorities. The company is composed of Harry Ogens, A. Azier and S. Rome, and will engage in the structural steel business.

An agreement of the creditors to accept stock in the Mutual Truck Co., Sullivan, Ind., in exchange for their claims against the company, opens possibilities of the plant resuming operations.

Pittsburgh Iron and Steel Market

(*Continued from page* 761)

Available supplies are so limited that only a moderate demand is sufficient to stiffen prices. Dealers' stocks average too high to be offered at current prices and there is a marked tendency on the part of producers to hold for higher prices. The Ford Motor Co., which is reported to have 100,000 tons of scrap piled up at its works in Detroit, is said to have rejected an offer of $150,000 for 35,000 tons of turnings, included in the stocks. This is almost $4.50 a ton, Detroit, and equal to about $9.50 delivered, Pittsburgh common freight points. Some consumers in this district still are trying to buy trimmings at $8, but only stray cars which have to be moved can be bought at less than $8.50 and on tonnages $9 is minimum. We note sales of compressed sheets at $11.50, bundled sheets sides and ends at $10 and short shoveling turnings at $10. Heavy melting steel is not available at less than $14, at which price there was one sale of 5000 tons. Foundry grades are firm, but rerolling rails are easier, because demand for rerolled bars and light rails is so light that rerolling mills are more cautious buyers.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00
No. 1 cast cupola size	$17.00 to 17.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	11.00 to 11.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.50 to 10.00
Railroad knuckles and couplers	14.50 to 15.25
Railroad coil and leaf springs	14.50 to 15.25
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.50 to 18.00
Railroad malleable	13.00 to 13.50
Iron car axles	20.00 to 21.00
Locomotive axles, steel	19.50 to 20.00
Steel car axles	15.00 to 15.50
Cast iron wheels	16.00 to 16.50
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	8.75 to 9.00
Sheet bar crop ends at origin	13.00 to 13.50
Heavy steel axle turnings	10.50 to 11.00
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	15.00 to 15.50
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.50
No. 1 railroad wrought	12.00 to 12.50

Resumes on Open Shop Basis

The plant of the Whitaker-Glessner Co., Portsmouth, Ohio, which in common with all plants of the company has been down for the past two months on account of a dispute with the Amalgamated Association of Iron, Steel and Tin Workers, over the question of the open or closed shop, resumed operations last week on an open-shop basis. A portion of the open-hearth department and several finishing mills are in operation.

SHEET PRICES ADVANCED

Tonnages Accepted at Previous Levels Before Announcement—Low Bar Prices

YOUNGSTOWN, OHIO, Sept. 20.—All Valley independent interests have followed the lead of the Brier Hill Steel Co. in advancing prices on all grades of sheets. The new quotations are $2.50 per 100 lb. for No. 10 blue annealed; $3 for No. 28 gage black and $4 for No. 28 gage galvanized. The Republic Iron & Steel Co. and Youngstown Sheet & Tube Co. have reduced prices of standard steel pipe $8 per ton on all butt weld sizes, $10 on 2 to 8-in. lap weld and $8 on 9-in. and larger lap weld, and are otherwise following the new quotations of the National Tube Co.

The Newton Steel Co., the principal district independent producer of full-finished sheets, has reduced the price of No. 22-gage auto body stock from $4.70 to $4.35, the new quotation being based on $3 black sheets. Independents in this district are generally adhering to the advanced prices on wire and nails. Where prices have been advanced, makers accepted tonnage at the previous levels to meet requirements of their customers over a period of 30 days and in some cases longer. This accounts for acceleration of sheet mill schedules to approximately 65 per cent of normal, perhaps the best productive rate at any time this year.

In other directions, prices have been firmer and there is a pronounced tendency among independent makers to stabilize the market. Still further advances in sheet prices are looked for and intimation is made that another $5 increase may be made, especially in view of firmer prices on pig iron, heavy melting scrap and semi-finished materials.

In announcing the advanced prices of sheets, an official of the Brier Hill Co., which operates 28 sheet mills and ranks as one of the largest independent sheet makers in the country, said: "We were compelled to advance our prices because we could not manufacture sheets at the prices we were receiving. We are restoring prices to a point where there is a chance to break even."

Light Steel Products

Makers generally report a firmer demand for the lighter steel products, though the improvement is not shared by the heavier materials. It is pointed out that the market as a whole is firmer, notwithstanding the reductions in some products which had been relatively higher than others and so distinctly out of line. The whole movement is held to be in the line of stabilization, with further adjustments likely.

New business is developing in all parts of the country, report makers of metal lath, fireproofing materials, sash and products entering into both road and building construction. In most instances, buyers demand speedy shipment, ordering against immediate requirements. A large fabricator catering to building construction states that Pittsburgh, Detroit and Boston are the most active buying centers. Another district interest is figuring on two large contracts for metal furniture, one involving $95,000, including interior metal work.

Sheet buying has progressed since the middle of August and carload business has replaced to some extent the small orders which characterized the market most of the summer, ranging down to bundled lots. While some auto makers who did not reduce prices have trimmed their sheet specifications, the effect has not been noticeable in operations. The Ford Motor Car Co. has been a consistent buyer of sheets and strip steel, and is still taking large tonnages, though its strip requirements have shown a moderating tendency. As a result, strip departments of the principal independent makers have been curtailed within the past two weeks, some mills suspending several days each week.

What effect the price reduction in pipe may have is problematic, as makers have not looked for tonnages of lap weld in any volume until next year, due to inactivity of oil drilling groups. Makers believe that butt weld buying, which has largely sustained production the past month, will be stimulated to some extent and that jobbers may enter the market more actively.

Rolling for Export

Several large interests report that they are now rolling more steel for export than at any time in five or six months.

The Youngstown Sheet & Tube Co. has started its 9-in. merchant bar mill on an accumulation of orders, the demand being largely for reinforcing bars and similar requirements. Very little of the tonnage is for automobile makers. The nominal price range on bars is 1.60c. to 1.65c. though business has been accepted within the past two weeks at a price which figured back to 1.50c. mill.

Increased buying of tin plate has strengthened the going price of $5.25 on production plate, which has been consistently upheld by the principal maker in this territory. That stock plate has sold considerably lower, ranging down to $4.75 per base box, is indicated by the bimonthly examination of sales sheets of mid-Western union mills, which disclosed an average price of $5.

Firmer pig iron and scrap prices will result in stronger prices on semi-finished material, say makers, who predict an early advance on open-hearth sheet bars from $30 to $32. Heavy melting scrap is held from $13 to $13.50, though dealers say the range is up to $14. Run-of-mine coal is quoted at $3.25, while blast furnace coke is selling at $3 in the spot market and is firm at that price.

Exports Still Declining

WASHINGTON, Sept. 10.—Exports of iron and steel for August continued to show a decline, the total for 23 of the chief products being only 73,792 tons, the lowest since January, 1909, when they amounted to approximately 68,000 tons. Radiators, scrap and horseshoes are not included in the August compilation, taken from advance figures of the Division of Statistics, Bureau of Foreign and Domestic Commerce. The exports of these products in July were: scrap, 1524 tons; horseshoes, 12; radiators, 238. Exports for August, 1920, including all of the principal products, totaled 431,484 tons, while for July, 1921, they were 86,523 tons.

Higher French Duty on Tin Plates

The London Association of Tin Plate Merchants, in a circular letter issued recently, draws attention to the serious effect the new French tariff will have upon the Welsh tin plate trade, and points out, according to the *Metal Bulletin*, London, that the French pre-war import duty was 13 francs per 100 kg., net weight, whereas the latest tariff imposed by the French authorities is 39 francs per 100 kg. gross weight plus 1.1 per cent, of the total value of the plates. As the association points out, this duty represents approximately £10 per ton on tin plates imported into France, which is at least £2 10s. per ton more than the value of French steel bars sent into Great Britain. The association urges upon the government the seriousness of the position and suggests that manufacturers protest to the departments concerned and press for better terms. The new rates make the French duties on tin plates and black plates as follows:

Tin plates—39.00 francs per 100 kg. gross weight, plus 1.10 per cent on the total value of goods.

Black plates	Rects.	Circles
Up to 0.4 mm.....	15.40	16.80 francs per 100 kg.
0.41 to 0.6.....	14.00	15.40 francs per 100 kg.
0.61 to 1.0.....	12.60	14.90 francs per 100 kg.
1.1 mm. and thicker....	10.50	11.90 francs per 100 kg.

Plus 1.10 per cent surcharge on total value.

The French Government is protesting against the Safeguarding of Industries Act, recently passed by Great Britain on the ground that French export trade would be seriously affected by it. The new French tariff, it is believed, will have a serious effect upon South Wales, and the matter will probably be taken up by the Welsh Tin Plate Manufacturers' Association.

IRON AND INDUSTRIAL STOCKS

Further Net Gains Appear to Be Based on Something Constructive

Still further net gains were made the past week in going market values of iron and industrial stocks. The upswing was less pronounced than during the previous week, however, and was marked by more irregularity. Less than three months ago, United States Steel common was approximately $9 a share cheaper than it is to-day, and values of a large number of other important securities have advanced as much or more. The irregularity of prices the past week might be expected under the circumstances. The success of the recent Government financing with its tremendous oversubscription is a clear indication of the growing confidence in the country's future. Evidence is at hand daily of a greater consumption of staple commodities. It is reasonable to assume that prices for such commodities will improve with consumption. The major upward movement of security values therefore appears to be based on something constructive. The volume of daily turnover in securities denotes a slightly broadening tendency of investment buying, yet it cannot be said it is general. Public investment buying at the moment appears to be attracted more to bonds and notes yielding 6 per cent or better than to common and preferred stocks.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	32¾ - 34½	Int. Har. com.	77½ - 82
Allis-Chalm. pf.	— - 75	Lackawanna Steel.	40 - 43
Am. Can com.	27 - 28⅜	Midvale Steel.	24⅞ - 26½
Am. Can pf.	— - 82	Nat. Acme.	15 - 15½
Am. C. & F. com.	126¾ - 131¾	Nat. E. & S. com.	34¾ - 37¼
Am. C. & F. pf.	108 - 111	N. Y. Air Brake.	55¾ - 58½
Am. Loco. com.	89¾ - 93	Nova Scotia Steel.	24¼ - 25
Am. Loco. pf.	— - 104¼	Press. Steel com.	59 - 60
Am. Radiator com.	— - 68½	Ry. Stl. Spg. com.	84 - 87
Am. Steel F. com.	24½ - 25¼	Replogle Steel.	24½ - 26
Am. Steel F. pf.	— - 84	Republic com.	49⅜ - 54⅞
Bald. Loco. com.	87¾ - 91¾	Republic pf.	85 - 85¾
Bald. Loco. pf.	— - 98	Sloss com.	36½ - 39⅜
Beth. Steel com.	51⅞ - 52½	Sloss pf.	— - 71
Beth. Stl., Cl. B.	54¼ - 57⅝	Superior Steel.	31 - 33½
Beth. Stl., 8% pf.	99¼ - 100½	Transue-Williams.	— - 34½
Chic. Pneu. Tool.	50 - 52½	Un. Alloy Steel.	24 - 25
Colorado Fuel.	24½ - 25	U. S. Pipe com.	15¼ - 15¾
Cruc. Steel com.	61 - 65⅛	U. S. Steel com.	77⅜ - 79⅞
Cruc. Steel pf.	82 - 84	U. S. Steel pf.	109⅛ - 109⅝
General Electric.	125 - 127¾	Vanadium Steel.	32¼ - 35
Gt. No. Ore Cert.	28 - 29¾	Va. I. C. & Coke.	67 - 70
Gulf States Steel.	38½ - 42¼	Westingh'se Elec.	44 - 45¼

Industrial Finance

The Laconia Car Co., Laconia, N. H., has anticipated $200,000 8 per cent serial notes, maturing Jan. 1, 1922.

Directors of the Youngstown Sheet & Tube Co., Youngstown, Ohio, have declared a dividend of 50c. per share on the 800,000 shares of non-par value common stock outstanding, and the regular dividend of $1.75 on preferred stock, both payable Oct. 1 to holders of record Sept. 20. It is announced that the common dividend was not earned during the third quarter and will be paid from surplus. The common payment is the same as was distributed July 1 for the second quarter.

Directors of the Brier Hill Steel Co., Youngstown, Ohio, have declared the regular preferred dividend of $1.75 per share, payable Oct. 1 to stock of record Sept. 20. The common dividend was omitted.

Directors of the Newton Steel Co., Youngstown, Ohio, have authorized the regular preferred dividend of $1.75 per share for the third quarter, payable Oct. 1 to stock of record Sept. 20.

The National Cash Register Co., Dayton, Ohio, has increased its capitalization from $15,000,000 to $30,000,000. The increase was made in the company's second preferred stock, which was raised from $5,000,000 to $20,000,000. Stock will be offered to present holders of second and third preferred stock, as an exchange issue. Officials of the company state that the issue is not to provide for extensions to the Dayton plant, as none are contemplated at the present time. There will be, however, approximately $10,000,000 of the new issue left that will be available for expansion if such a course is ultimately decided upon.

J. T. Joyce, who was appointed receiver of the U. S. Auto Gear Shift Co., Eau Claire, Wis., upon filing of a voluntary petition in bankruptcy, has been elected trustee, under bond of $10,000. Creditors will meet Oct. 1 to consider disposition of the property. Assets of $749,258 and liabilities of $278,424 are reported in schedules officially filed.

Office and Trade Changes

William Jessop & Sons, Inc., New York, high-speed steel, have recently opened their new office and warehouse at 112-118 North May Street, Chicago. This branch is under the management of C. V. Luin.

The Standard Steel Works has completed its new works and general offices at North Kansas City, Mo., and has removed to that city from Kansas City, Mo., its executive headquarters and present plant. This with its additional floor space, more than trebles present capacity for the manufacture of Standard steel products.

Ernest E. Lee, 115 South Dearborn Street, Chicago, has been appointed district representatives for the boiler feed regulators and pump governors of the Northern Equipment Co., Erie, Pa.

Henry Bryant & Co., Inc., 85 Oneida Street, Milwaukee, dealer in iron and steel products and waste materials, scrap metal, etc., has filed amendments to its articles, changing the corporate style to Waukesha Steel Products Co., and increasing the capital stock from $25,000 to $50,000. Officers of the company are: President, Henry Bryant, Waukesha, Wis.; vice-president, C. H. Doty; secretary, Helen Israel.

The Henry & Wright Mfg. Co., Hartford, Conn., machine tools, recently was reorganized with Charles J. Sorrells, C. S. Sorrells & Co., New York, president; Jonas O. Hoover, Chicago, vice-president and chairman of executive committee; Tom B. Owens, T. B. Owens & Co., New York and Ft. Worth, Texas, treasurer; Mrs. Daniel M. Wright, secretary; and Frank M. Rogers, Chicago, general manager and assistant treasurer. William G. Allen, Hartford, is superintendent and plant manager.

The T. & A. Engineering Corporation, New York, has been incorporated with a capital of $100,000 by S. and M. Thompson, and L. Aghamaliah, to manufacture automobile equipment and mechanical specialties. It is represented by C. S. Aronstam, 100 Broadway.

The Rex File Co. and the Vixen Tool Co., Newark, N. J., have been consolidated with the Heller Brothers Co., Newark, N. J., and will continue the production of files, rasps, tools and steels. Walter D. Craft, who has been secretary-treasurer of the Vixen Tool Co., will act as domestic sales manager of the consolidated companies.

The Flynn & Emrich Co., manufacturer of iron castings, Baltimore, is anxious to secure representatives in Raleigh, N. C.; Charlotte, N. C.; Columbia, S. C.; Charleston, S. C.; Knoxville, Tenn.; Indianapolis, Ind.; Little Rock, Ark.; Wichita, Kan.; Des Moines, Iowa; Memphis, Tenn., and Cincinnati.

Inquiries made of 4586 concerns in the devastated districts, according to the *Bulletin* of the French Ministry of Labor, showed that 1020 of those operating in 1914 had not re-opened by March 1, 1921; 2817 were operating partially; 749, or 16.3 per cent, had been completely restored. Compared with the force of 818,104 employees in 1914, only 381,453 were at work in 1921, a loss of 53.4 per cent.

The Massachusetts State Free Employment Office, Boston, reports that in August the number of orders from employers was 15 per cent greater than in July, but 36 per cent less than in August, 1920. The number of positions filled increased 9. The average attendance of applicants for employment was 1611, an increase of 16 per cent as compared with July. The greatest demand for labor comes from the building and wood working industries.

In addition to the pamphlets prepared by the various committees of chemists of the United States Steel Corporation, reference to which was made on page 588 in THE IRON AGE of Sept. 8, the second edition of "Sampling and Analysis of Alloy Steels" is off the press and copies may be secured in the same way and at the same charge as the other pamphlets.

At the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., all employees, including the office force, have gone on an 8-hr. day basis with an additional 10 per cent reduction in pay. The plant for some time has been operated on a five-hr. day, five-day week schedule. No reduction in the number of employees has been made recently.

Machinery Markets and News of the Works

CONDITIONS ARE SPOTTY

Improvement in Some Markets Offset by Extreme Dullness in Others

Prospects Are Somewhat Brighter in All Sections, However, and There Are More Live Inquiries

Although more inquiries for machine tools are noted there is as yet no well-defined turn for the better in sales. In some markets, however, a fair amount of business has been done in the past week or two compared with the inactivity of recent months.

Contrasted with encouraging reports from some sections are reports of extreme dullness in others, notably New York and Chicago. The expectations of a trade revival to begin in September have not materialized so far as these market centers are concerned and the first half of this month has shown little if any improvement over August.

Municipal projects seem to offer the best prospect of early buying. Bids were opened at Philadelphia on Sept. 16 on 35 tools for a repair shop for the water works department. Camden, N. J., took bids recently on about 40 tools for its public schools, but has taken no action yet. The Federal Government is considering the purchase of about 55 tools for the schools of Washington, D. C., but may not buy for a few months. Bids for about 25 tools for the manual training school of Canton, Ohio, were opened Sept. 16 and it is expected that the orders will be placed soon. The Board of Prison Inspectors of Pittsburgh is asking for prices on 15 tools to replace those destroyed in a fire and riot recently. The list includes lathes, milling machines, drill presses, pipe cutting machines and some woodworking machinery.

Very little new railroad business is developing. The Virginian Railroad is in the market for six tools and the Chesapeake & Ohio has received prices on eight machines. The New York Central is expected to purchase soon a large planer and a large lathe for which it inquired some weeks ago.

Among the sales of more than ordinary importance reported are six oil country lathes for shipment to Venezuela; a car wheel lathe to the Connecticut Co.; four tools to the National Safe & Lock Co., Cleveland. A report that a Western railroad had bought $80,000 worth of tools is not confirmed.

New York

NEW YORK, Sept. 20.

The machine-tool business is still dull, there having been no improvement this month worthy of note. There are few inquiries for tools and those who do come into the market are looking for "bargains," and usually buy used machines. The New York Central Railroad is expected to close shortly on a large planer and a large lathe for which it inquired some weeks ago. The Connecticut Co., operator of street railroads, has purchased a car wheel lathe. Among recent export orders is one from an oil company for six oil country lathes to be shipped to Venezuela.

Don A. Carpenter & Co., El Paso, Tex., are in the market for two hydraulic wheel presses of 100 and 200 tons' capacity, respectively.

The market in cranes continues dull with few new inquiries of any size. The situation in hand-power cranes and hoists is much better. Among current inquiries is one from the Austin Co., Philadelphia, which was awarded the building contract by F. W. Tunell & Co., Philadelphia, glue and fertilizer. A bucket crane of about 5-tons capacity, 69-ft. span for handling a 2 to 2½-cu. yd. bucket is included in the contract. The American Sugar Refining Co., 117 Wall Street, New York, is in the market for nine motor-driven winches. The Gallup-American Coal Co., 25 Broad Street, New York, which recently inquired for a 10-ton hand-power crane, has obtained one from an associated company. Among recent sales are a 20-ton chain hoist and a 20-ton tandem trolley with I-beam sold by the Chisholm-Moore Mfg. Co. to the Lyman Stone Co., Hamburg, N. J. The 3-ton, 16-ft. span hand-power crane recently purchased by the Mayer Coating Machine Co., Rochester, N. Y., was sold by the Roeper Crane & Hoist Works.

H. F. Holbrook, Inc., West End Avenue and Sixty-seventh Street, New York, manufacturer of automobile bodies, has negotiations under way for the purchase of a one-story plant in the New York district, totaling about 120,000 sq. ft. of floor area, for the establishment of new works. It is proposed to enlarge the building to provide facilities for an annual production of about 1500 automobile bodies. H. F. Holbrook is president.

Newport Motors, Inc., New York, has been incorporated with a capital of $500,000 by G. H. Hinman, A. Adamson and E. J. Keegan, to manufacture automobiles and parts. It is represented by W. W. Gage, 1819 Broadway.

The New York Steam Co., 280 Madison Avenue, New York, has awarded a contract to Stone & Webster, Inc., 120 Broadway, for a new power house at Fifty-ninth Street and the East River, estimated to cost about $400,000 with equipment.

The Inwood Consumers' Ice Mfg. Corporation, New York, has been incorporated with a capital of $220,000 by S. C. Murray, E. Marks and N. F. Schmidt, 220 Broadway, to construct an ice-manufacturing and refrigerating plant.

The International Spectacle Corporation, New York, has been incorporated with a capital of $50,000 by D. Hines, L. McCormick and J. L. Gorman, to manufacture electric lighting equipment and fixtures, and other electrical devices. It is represented by C. M. Rubanks, 50 Pine Street.

The Fulton Ice Co., 18 East Forty-first Street, New York, will build a new two-story plant, 50 x 207 ft., at 138-40 Cherry Street, estimated to cost about $100,000 with machinery.

The Mohican Brass & Copper Works, New York, has been chartered under State laws to manufacture brass, aluminum, copper and other metal products. The incorporators are E. P. McIntire, E. G. Michaels and J. J. Devitt. It is represented by C. S. Lorentzen, 68 Broad Street.

The Paige-Detroit Service Co., 514 West Fifty-seventh Street, New York, hase leased the building at 529 West Fifty-fifth Street for the establishment of a new automobile service and repair works.

The T. & A. Engineering Corporation, New York, has been incorporated with a capital of $100,000 to manufacture automobile parts and equipment. M. Thompson, 189 Montague Street, Brooklyn, is the principal incorporator.

The Mason Tire & Rubber Co., 233 West Fifty-eighth Street, New York, is planning for the enlargement of its works at Kent, Ohio, to double the present capacity.

The Guy Disc Valve Motor Corporation, New York, has been incorporated under Delaware laws with capital of $1,500,000 to manufacture automobile engines, parts, etc. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Archer Automobile Development Co., Saratoga Springs, N. Y., has been incorporated with a capital of $150,000 to manufacture automobile equipment, parts, etc. S. B. Archer, Saratoga Springs, is the principal incorporator.

The Hamlin Hygrostat Corporation, New York, has been incorporated with a capital of $20,000 by J. A. Hamlin, E. Bernstein and J. T. Mulligan, to manufacture air condition-

ing equipment and other devices for atmospheric regulation. Adolph Bangser, 30 Broad Street, represents the company.

The Safety Blade Holder Co., New York, has been incorporated with a capital of $50,000 by C. B. and J. B. Cahn, and C. Stern, to manufacture metal holders and similar products. It is represented by Harold Flatto, 261 Broadway.

The Richelieu Motor Co., Asbury Park, N. J., manufacturer of automobiles and parts, has acquired property on Asbury Avenue as a site for a new plant. Initial buildings will be devoted to the manufacture of motors of the Duesenberg type and for assembling work. Robert G. Poole is treasurer.

The Borough Council, Essex Fells, N. J., has approved a bond issue of $30,000, the proceeds to be used for the installation of new pumping equipment and other machinery at the municipal waterworks.

The Joseph Toye Co., 353 Bank Street, Bridgeton, N. J., has awarded a contract to the H. H. Hankins & Brothers Co., Bridgeton, for a new one-story foundry 40 x 80 ft., estimated to cost about $14,000. The W. P. Cameron Engineering Co., Witherspoon Building, Philadelphia, is engineer and architect.

Fire, Sept. 11, destroyed a portion of the machine repair shops and engine house of the Erie Railroad, Jersey City, N. J., with loss estimated at close to $500,000, including equipment and rolling stock. Headquarters of the company are at 50 Church Street, New York.

The Wilcox-Durand Glass Co., Newfield, N. J., has completed plans and is taking bids for a new one-story machine shop, 31 x 100 ft., for general machinery construction and repairs.

The Automatic Safety Davit Co., Highlands, N. J., has been incorporated with a capital of $60,000 by William Fehlhaber and Harry N. Johnson, 141 Bay Avenue, Highlands, to manufacture marine equipment.

The Theodore Smith & Sons's Co., Iron Works, 76 Montgomery Street, Jersey City, N. J., manufacturer of boilers, dredging buckets, etc., has filed plans for a new two-story building at 197 Van Vorst Avenue, to cost about $10,000.

The Florence Foundry Co., Florence, N. J., is considering the erection of a new one-story foundry, 40 x 100 ft. C. L. Reeves is superintendent.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until Sept. 28 for extensions to the power plant at Lake Denmark, N. J., comprising boiler, air compressor, pumping machinery, electrical equipment, etc. C. W. Parks is chief of the bureau.

The Piano Hammer Joint Improvement Co., Newark, has been incorporated with a capital of $125,000 by Jules Morel, Rudolph Strand and Joseph H. Weiser to manufacture piano mechanism equipment, piano movement joints, etc. The company is represented by Joseph Steiner, 790 Broad Street.

George C. Bergen, county purchasing agent, Room 252 Court House, Market Street, Newark, N. J., will receive bids until 11 a. m., Oct. 7, for the construction of a coal conveyor and coal storage equipment at the Essex County Hospital, Overbrook, N. J., and for the construction of an ash conveyor and ash storage tank at the Essex County Hospital for Contagious Diseases, Belleville, N. J. Runyon & Carey, 843 Broad Street, Newark, are engineers.

The Tiffany Mfg. Co., Newark, has been incorporated with a capital of $50,000 by S. E. and Carlos W. Curtiss, and Paul J. Landemare, 784 Broad Street, to manufacture automobile equipment and supplies.

The Hewes & Phillips Iron Works, Newark, has filed notice of dissolution under State laws.

The Cortland Tire & Rubber Co., 344 Cortland Street, Belleville, N. J., manufacturer of automobile tires, has filed notice of dissolution under State laws.

The Mulberry Metal Stamping Works, 352 Mulberry Street, Newark, has filed notice of organization to manufacture metal products. William Hichman heads the company.

Philadelphia

PHILADELPHIA, Sept. 19.

Municipal projects afford the chief activity in this district. The most interest was manifested in a list of about 35 machines, bids for which were opened by the Department of Public Works, city of Philadelphia, at noon, Sept. 16. The tools are for a new repair works of the water department at Twenty-ninth and Cambria streets. From six to 10 machine tool houses bid on each machine and a wide range of prices prevailed. For instance, on a group of eight lathes the bids ranged from $8,799 to $19,464, though in the case of some of the lower bids the machines were not according to specifications asked, 12 speeds having been demanded of lathes, whereas bids were turned in on lathes with but eight speeds. No purchasing has been made yet of the 40 tools demanded by the manual training schools of Camden, N. J., bids of which were opened two weeks ago. The Federal Government is testing prices with a view towards buying about 55 machines for the schools at Washington in a few months. The schools of Williamsport, Pa., opened revised bids Sept. 15 for a list of tools. School business is not popular with many houses because specifications call for the installation of machines sold as well as strict provisions incident thereto.

Two Southern railroads gave out lists. The Chesapeake & Ohio asks for eight machines "for estimating purposes only," including one 20-in. lathe, three 18-in. lathes, a bolt cutter and a pipe threader. The Virginian Railway wants about six tools, including lathes, radial drills, a bolt cutter and bushing press.

The increase in inquiries the past two weeks has changed the tone of the market from pessimism to optimism.

The following is the range of prices bid on the principal machines for the city of Philadelphia: One 30-in. x 11¼ ft. centers, geared head engine lathe, single pulley drive, $2,964 to $5,165; eight 20-in. x 9½ ft. centers, geared head lathes, $8,799 to $19,464 for the group; one 2¼-in. geared head turret lathe, $2,244 to $3,679; one 15-in. brass lathe, $835 to $1,390; one 5-ft. plain radial and one 2-ft. plain radial, $3,400 to $5,474 for both; one 30-in. vertical sliding head drill press, single pulley drive, $636 to $1,640; one horizontal boring machine, 3½-in. bar, $6,430 to $7,755; one 24-in. and one 16-in. back geared crank shaper, $1,685 to $2,990 for both; one No. 2 universal geared head milling machine, $1,418 to $2,823; one 30 in. x 30 in. x 7 ft. planer, belted motor drive, with three heads, $3,505 to $4,860; one 34-in. vertical boring mill with turret head, $2,580 to $3,730; one single head bolt threading machine, 2 in. capacity, belt drive, $1,098 to $1,180; one 40-ton hydraulic press, $935 to $1,824; one 2-in. drill grinder, $135 to $1,350; one No. 2 Knight combined milling and drilling machine, $665 to $1,300; one ⅝-in. capacity sensitive drill press, $180 to $350; two air hammers, equivalent to No. 4 B and No. 1 B, Nazel, $2,104 to $3,450 for both; one 15-ton crane, $4,672 to $5,850.

Specifications for two 20-ton cranes for the transit department of the city of Philadelphia were made public today.

The Haverford Cycle Co., 503 Market Street, Philadelphia, manufacturer of bicycles and parts, has acquired the property of the Ace Motor Corporation, Erie Avenue and Sepviva Street, manufacturer of similar products, from the receivers for $500,000. The plant and assets of the Ace company will be used by the new owner for general expansion.. Max M. Sladkin is president.

The Collins Carriage Co., Philadelphia, has leased the building at 158-62 North Twenty-second Street, for the establishment of a new body building plant.

The Bureau of Water, City Hall, Philadelphia, has commenced excavations for its new one-story machine and repair shop, 160x200 ft., to cost about $115,000, including machinery. C. E. Davis is director of the department.

Fire, Sept. 14, destroyed a portion of the Point Breeze plant of the Atlantic Refining Co., Passyunk Avenue, Philadelphia, with loss reported at about $100,000, including oil equipment, etc.

L. M. Davis, 1616-18 Chancelor Street, Philadelphia, will build a two and three-story addition to his automobile service and repair plant, 60x60 ft., estimated to cost about $80,000. Plans have been prepared.

The Mercer Motors Co., Trenton, N. J., manufacturer of automobiles, has disposed of a note issue of $2,000,000 and bonds in the amount of $500,000, the proceeds to be used for general operations and expansion. Following the recent separation from Hares' Motors, Inc., the company has perfected arrangements for immediate production. Theodore E. A. Barthel has been elected vice-president and treasurer, and George L. Catlin, assistant treasurer and secretary. J. W. MacMorris is general plant superintendent.

The Corweg Shuttle Valve Motors Co., Atlantic City, N. J., has plans under way for new works for automobile assembling, repairs and testing. It will be three stories, 100x200 ft., and is estimated to cost about $200,000. Harry M. Veix, 738 Broad Street, Newark, N. J., is architect.

Fire, Sept. 10, destroyed the plant of the Lackawanna Cutlery Co., Nicholson, Pa., manufacturer of knives and other cutlery, with loss estimated at $75,000.

The Lehigh Valley Railroad Co., Wilkes-Barre, Pa., is planning to replace present steam power equipment with electrical machinery at its frog shops at Weatherly, Pa.

The Warren Light & Power Co., Scranton, Pa., has arranged for a bond issue of $212,500 and stock issue of $30,000, the proceeds to be used for general operations and extensions.

Fire, Sept. 9, destroyed the electric pumping plant of the Berwick Water Co., Berwick, Pa., with loss estimated at about $100,000, including pumps, motors and other equipment. It will be rebuilt.

The Blair Ice & Cold Storage Co., of Hollidaysburg, Pa., recently organized with a capital of $100,000, is arranging for the erection of a new four-story plant. G. B. Miller, 1112 Allegheny Avenue, is president.

J. F. Richards, Nanticoke, Pa., will commence the immediate erection of a new machine shop and foundry, estimated to cost about $100,000, including equipment.

The Sayre Electric Co., Sayre, Pa., has arranged for a stock issue of $311,000, the proceeds to be used for extensions and general operations.

The Electric Manganese Steel Co., Reading, Pa., has been incorporated with a capital of $75,000 to manufacture steel products. Ray A. Houck, 117 West Windsor Street, is treasurer.

The Vulcweld Rubber Co., Pottstown, Pa., has plans under way for rebuilding its tire manufacturing plant, destroyed by fire several months ago. Recently it has been manufacturing its tires and tubes at a plant at Armstrong, N. J.

The Carbon Battery & Electric Co., Lansford, Pa., has been chartered under State laws to manufacture electrical equipment. Milton Kleckner, Lansford, is treasurer.

New England

BOSTON, Sept. 19.

Sales of machine tools the past week include a new 800-lb. special designed drop hammer to a Massachusetts textile machinery maker; a large used Baush multiple drill to a maker of pipe fittings for a Canadian subsidiary; new Whitcomb planer to William Hardy & Sons, Fitchburg, Mass., brass screw plates, this firm not having covered on its full machine tool requirements; four new hand milling machines to a New Hampshire maker of textile machinery accessories which recently closed on special profiling equipment; one 18 in. x 8 ft. and one 14 in. x 6 ft. used engine lathes to two local concerns; a used 14-in. lathe and a disk grinder to a Massachusetts street railroad company; new riveting machinery and a used Barnes geared drill to two Boston firms; small drilling equipment to a Lynn, Mass., manufacturer, and truck equipment for handling ladles to the Gilbert & Barker Mfg. Co., West Springfield, Mass.

While the range of tools involved is fairly wide and companies purchasing represent diversified interests, business was not as good as generally expected. Dealers, especially those handling used as well as new machinery, have been unable to close on numerous prospective orders, and indications are that some of these will not be purchased in the near future, due to the inability of purchasing agents to obtain appropriations. On the other hand, buyers have signified their intention of covering on some needed equipment before long. Two of the largest machine tool interests, having closed on prospects the past two or three weeks, report little indication of new business.

The Maine Central Railroad has definitely decided to abandon inquiries on three fairly large machines for one of its repair shops, having substituted machinery heretofore used elsewhere. It is reported the General Electric Co. also has transferred equipment from subsidiary plants to its West Lynn, Mass., works rather than purchase new tools at this time. The Boston & Albany Railroad has done nothing toward purchasing a 2500-lb. single frame steam hammer needed at West Springfield shops. The city of Boston has not covered on its gear driven universal milling machine. The lowest bid submitted was $1,400. The Power Construction Co., Worcester, Mass., has postponed purchasing crane requirements, but it is anticipated Stone & Webster will close on the Ford, Green Island, cranes in the near future.

The National Acme Co., automatic screw machines and products, is to have an exhibit at the Eastern States Fair to be held this month at Springfield, Mass.

Isaac E. Sexton, Winchester, Mass., is president and Perley C. Rogers, 53 Gerard Street, Roxbury, Mass., treasurer of the Roxbury Steel Casting Co., Boston, capitalized for $50,000, recently granted a Massachusetts charter.

The Richard French Iron Works, formerly of Worcester, Mass., recently was reorganized with a capital of $70,000. It will erect a one-story plant, 65x150 ft., in Millbury, Mass., at a cost of $25,000. Raymond Tracy is president; George C. Bell, vice-president, and Alexander V. Campbell, treasurer.

The Rex Top & Body Co., 388 Newbury Street, Boston, manufacturer of automobile bodies, etc., has been acquired by Paul L. Pryor and James F. Malone. It will be continued in operation with Mr. Pryor as president, and Mr. Malone, treasurer.

The Providence Radiator & Electric Heating Corporation, Providence, R. I., has been incorporated under Delaware laws with capital of $2,000,000 to manufacture electrical and mechanical products. The incorporators are Daniel Owen, P. S. Howland and M. A. Colter, Boston. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Hampden Tool Co., Springfield, Mass., has awarded contract for a new one-story factory on St. James Avenue, 40x100 ft., estimated to cost $12,000. Plans have been filed.

The Builders' Steel Co., Hartford, Conn., has been incorporated with a capital of $50,000 by Samuel Rome, Abram Azia and Harry Ogens, 172 Belden Street, to manufacture iron and steel products.

The K. B. Noble Co., 249 Pearl Street, Hartford, Conn., manufacturer of contractors' machinery, has filed plans for an addition, estimated to cost about $30,000.

The Wopeco Machine Co., New Haven, Conn., has been incorporated with a capital of $60,000 by W. S. Perry, J. W. Commerford and G. H. Woodruff, 902 Chapel street, to manufacture shear grinding machines, can-opening machinery, parts, etc.

The Middlesex Machine Co., Middletown, Conn., is arranging for the early operation of its new plant at 686 Windsor Street, for the manufacture of grinding machinery, parts, etc., following its recent acquisition by the New Haven Sherardizing Co., Hartford, Conn. In the future, the company will be known as the Middlesex Machine Division of the New Haven Sherardizing Co. Plans are being perfected for increased production. F. A. Brassill is chief engineer in charge.

The Hartford Grinding Co., 236 Albany Avenue, Hartford, has filed notice of organization to manufacture grinding equipment. Maurice Millard, 25 Seyms Street, heads the company.

W. L. Hayes, Hartford, Conn., has filed plans for a new one-story forge shop on Albany Avenue.

The United Illuminating Co., Bridgeport, Conn., will install a machine shop in connection with its new generating plant, now in course of erection at the foot of East Main Street. It will be equipped for electric machinery repairs, parts manufacture, etc.

Buffalo

BUFFALO, Sept. 19.

The Niagara Falls Felt & Paper Co., Niagara Falls, N. Y., a subsidiary of the Niagara Falls Power Co., Canal Basin, has awarded contract to the Read & Coddington Engineering Co., 238 Portage Road, for a new plant on Sugar Street, estimated to cost about $300,000 with machinery.

The Standard Thermometer Co., Cleveland, N. Y., has been incorporated with a capital of $25,000 by W. G. Hamilton, J. Happle and J. G. Boyd, to manufacture thermometers and other measuring instruments. Jacob G. Smith, First National Bank Building, Syracuse, N. Y., represents the company.

The Corning Foundry Co., Corning, N. Y., has filed notice of dissolution under State laws.

The New York Central Railroad Co., Grand Central Terminal, New York, will build a new coaling plant at Wayneport, N. Y.

The Syracuse Lighting Co., Syracuse, N. Y., has arranged for an increase in capital stock from $4,000,000 to $5,000,000, the proceeds to be used for extensions and general operations, etc.

The W. & J. Carson Co., Buffalo, has been chartered under State laws to manufacture automobile equipment and accessories. The incorporators are W. J. and J. C. Carson, and L. R. Anthony. It is represented by Kent, Cummings & Means, Dun Building.

Cleveland

CLEVELAND, Sept. 19.

The improvement in the machine-tool market that many manufacturers and dealers looked for this month has as yet failed to materialize. Dealers continue to book a few orders, mostly for single machines. Buyers as a rule are the smaller machine shops. Some machine tool builders report a fair amount of orders in prospect from companies which will need additional machine tools as soon as their business picks up. New bids for about 25 machines for the manual training department of the McKinley School, Canton, were opened Sept. 16, and it is expected that this business will be placed shortly. Orders for two machines, a horizontal boring mill and a milling machine, have been placed by the National Safe & Lock Co., Cleveland.

The Kelley Island Lime & Transportation Co. has placed an order with the Cleveland Crane & Engineering Co. for a 10-ton crane with a 40-ton bridge and a 5-ton auxiliary. This inquiry had been pending for some time.

Operating conditions in Ohio foundries show little improvement. The last reports received by the Ohio State Foundrymen's Association indicate that average operations were 16.6 per cent of capacity and September is not expected to show much gain.

The Columbia Metal Stamping Co., 1538 East Forty-ninth Street, Cleveland, has been reorganized and its name has been changed to the Columbia Metal Stamping & Die Co. No change will be made in the line of products. The new officers are F. C. Koch, president; A. E. Koch, vice-president, and Frances Koch, secretary.

The Ohio Steel Castings Co., Cleveland, has been organized to take over the local plant of the Aetna Steel Castings Co., 2284 Scranton Road, which went into bankruptcy some time ago. The new company has been incorporated with a capital of 1000 shares of no par common stock. John W. Thompson is president and treasurer; C. S. Fenton, vice-president; Harry Greshen, general manager, and John A. Elden, secretary.

The Zerk Lubricator Corporation, recently organized, has acquired a portion of the plant formerly occupied by the Richard Automobile Co., 7800 Finney Avenue, South-east, Cleveland, and is placing it in operation for the manufacture of lubricating systems for automobiles and machine tools. Some new equipment has been purchased.

The Twin Dry Cell Battery Co., Cleveland, has purchased the plant of the Guide Motor Lamp Co., 11400 Madison Avenue, Cleveland. It is being remodeled and some new equipment installed.

The City Council, Ashtabula, Ohio, has plans nearing completion for its new municipal electric power plant, estimated to cost about $400,000. Stone & Webster, 147 Milk Street, Boston, are engineers. M. H. Turner is city manager.

The Willys-Overland Co., Toledo, Ohio, is arranging for a bond issue of $20,000,000, the proceeds to be used for general operations and financing, plant extensions and improvements for increased automobile production.

Chicago

CHICAGO, Sept. 19.

Most dealers report that business is as quiet as at any time this year. The tendency toward a revival in interest on the part of the buyers which seemed to be developing in August, is no longer in evidence and the first half of September has been decidedly dull. Although there are signs of improved operations among some machine tool users, there is as yet no well-defined turn for the better. Here and there are shops which are fairly busy on automotive or railroad work, but there are as many which have little or nothing to do. The chief present interest in machine tools is in used equipment, but even this is not moving fast. Prospective buyers of used tools are discovered only after a careful canvass by sales forces and even when found they are hard to sell.

At a recent auction sale of the equipment of the Sundstrom Mfg. Co., Chicago, machines were sold at about one-third of list and, in some cases, for less. Purchases by users were in the minority and the lack of active competition in the bids was evident in the prices obtained. For example, a relatively new Lodge & Shipley 24 in. x 14 ft. geared head motor-driven engine lathe with 10-hp. motor, sold for $925. A No. 2½ Rockford universal milling machine brought $900 and a No. 70 Heald internal grinding machine with extra internal spindle was bought at $600.

Building permits in Chicago for the week ended Sept. 15 numbered 251 as compared with 109 for the same week in 1920. The frontage covered by the 1921 permits was 6895 ft. as against 3006 ft. for the corresponding period a year ago. Construction activity is confined principally to dwelling houses, there being little industrial building.

The W. H. Schroff Fuel Oil Burner Co., 5076 Lincoln Avenue, Chicago, has been incorporated with $2,500 capital stock by C. V. Kellogg, Fred B. Fiz and William H. Schroff to manufacture small industrial and residential oil burners.

Breeze & Bettle, 112 West Adams Street, Chicago, have been incorporated with $20,000 capital stock by C. J. Levey, Griscom Bettle and J. L. Breeze, Jr., to manufacture small boilers for household use, particularly adapted to oil burning. For the present the boilers are being built by the National Machine Co. Griscom Bettle is president and J. A. Murray, secretary.

The Great Western Stamping Works, Sioux Falls, S. D., was recently incorporated by local business men to manufacture novelties, such as paring knives and lamps. C. F. Hoffman is the inventor of a number of articles which will be made in the new plant.

The Decatur Furnace & Foundry Co., manufacturer of the "Wonder" domestic heating furnace, Decatur, Ill., has taken over the foundry of the McLaughlin company, in East Cerro Gordo Street, and will expand its output.

The Chicago Store & Office Fixture Co., 818 South Clinton Street, Chicago, has purchased the block bounded by Grand, Trumbull, Augusta and Homan avenues, and will erect a three-story plant to cost $150,000.

Henry Yerkey, Viola, Ill., has begun excavating for a new machine shop, 30x40 ft., to be erected adjacent to his garage.

The Knox Engineering Co., Roanoke, Ind., manufacturer of governors for Fordson tractors, will move to a 7-acre tract in Columbia City, south of the Columbia Iron Works, where it will erect a machine shop. The first unit will be 50x150 ft.

Fire recently did $8,000 damage to the plant of the Rogers Foundry & Mfg. Co., Eleventh Street and Pearl Avenue, Joplin, Mo.

Spingold & Son, 750 Taylor Street, Chicago, are receiving bids through A. V. Capraro, architect, 105 North Clark Street, on a two-story garage, 75x120 ft., 1918 South Morgan Street, to cost $50,000.

Chalmers & Williams, Inc., 208 South La Salle Street, Chicago, has started construction on a one-story addition to its plant at Chicago Heights, Ill., to cost $50,000. It manufactures mining machinery.

The Sheffield Foundry Co., 2020 Herndon Street, Chicago, will make extensions and improvements in its one-story plant to cost about $12,000. Carl O. Kuehne, 1572 North Halsted Street, is architect.

The North American Car Co., 328 South La Salle Street, Chicago, is completing plans for a new one-story car erection shop, 80x120 ft., at 135th Street and California Avenue, Blue Island, Ill., estimated to cost about $40,000. Bids will be taken soon.

The Chicago & Northwestern Railway Co., 226 West Jackson Boulevard, Chicago, is considering the erection of new repair shops at Winona, Minn., estimated to cost about $200,000, including yard improvements.

The Great Western Auto. Co., 22 East Michigan Street, Duluth, Minn., has awarded a contract to Jacobson Brothers, Columbia Building, for a new two-story service, repair and parts manufacturing plant, 100x140 ft., at 2533 Superior Street, estimated to cost about $115,000. Carl E. Nystrom, Palladie Building, is architect.

Detroit

DETROIT, Sept. 19.

The Detroit Trailer Co. has a contract for 50 four-wheel 5-ton trailers for Brazil. The Mansfield Steel Corporation, Detroit, has the order for 97 steel combination bodies for the trucks and trailers.

The Northern Engineering Works, Detroit, reports the sale of two 5-ton type "E," electric traveling cranes of about 30-ft. span to the Philadelphia Rapid Transit Co. These cranes are of the double hook type and were sold through the company's Philadelphia office.

Construction of a sawtooth manufacturing building, 240x300 ft., has been started by the Oakland Motor Car Co., Pontiac, Mich., a subsidiary of the General Motors Corporation.

The Wales Co., Kalamazoo, Mich., has leased the plant of Dewing & Son, on the Michigan Central Railroad, for larger quarters and better shipping facilities. It manufactures gas heating appliances.

The New-Way Motor Co. Lansing, Mich., has received an order from the Portable Machinery Co., Passaic, N. J., for the immediate delivery of 80 stationary engines at $275 each.

The Self-Lock Nut Co., Constantine, Mich., has been incorporated with a capital of $25,000 by A. E. Trachsel, Constantine, and E. L. Trachsel, Ann Harbor, Mich., to manufacture special lock-nuts and other mechanical devices.

The Rickenbacker Motor Co., 1551 Harper avenue, Detroit, recently organized to manufacture automobiles, has preliminary plans under way for a one and two-story plant for initial production. H. L. Cunningham is in charge.

The Parcol Industries, Inc., Alpena, Mich., has been incorporated with a capital of $50,000 by H. H. Campbell, George K. Parsons, Alpena, and H. J. Collins, Pontiac, Mich., to manufacture electrical appliances and equipment.

The B. B. M. Ice & Refrigerating Machine Co., incorporated under Delaware laws with capital of $225,000, has filed notice of organization to operate a plant at De-

troit for its machinery manufacture. Henry J. Berry, 702 St. Antoine Street, Detroit, is vice-president.

The Northern Auto Co., Petoskey, Mich., has plans under way for a new two-story works, 120x204 ft., estimated to cost about $80,000. Smith, Hinckman & Grylls, Washington Arcade Building, Detroit, are architects.

Cincinnati

CINCINNATI, Sept. 19.

An improvement is reported in the demand for used equipment the past week, but orders for new tools still are light. No new lists have been issued and inquiries are confined to single machines. A report was current that a Western railroad had bought approximately $80,000 worth of tools from a local manufacturer, but this has not been confirmed. Several propositions are before the trade which call for a number of tools, but as these have been hanging fire for some time it is not expected that they will develop into orders within the next few weeks. A Chicago dealer in new and second-hand machinery is said to have bought a number of used tools from local manufacturers the past week. The same dealer is also reported to have placed a sizable order for new tools with an Indiana manufacturer. Sentiment in the trade is vastly improved and while manufacturers admit that order books are not showing great improvement, they are very optimistic regarding the future.

The Buckeye Body Co., Columbus, Ohio, has taken over the property of the Immel Co., automobile and body manufacturer. The new company is composed of former stockholders of the Immel Co., who purchased the plant at a receiver's sale. J. W. Dinsmore is president.

The Miami Iron & Steel Co., Dayton, Ohio, has taken over the property of the S. T. & G. A. Gebhart Co., which has been in the hands of a receiver for some time. The new company is capitalized at $50,000. John A. Thiele is president and treasurer.

The Dayton Aluminum Mfg. Co., Dayton, has increased its capitalization from $10,000 to $50,000. It was recently amalgamated with the Consolidated Mfg. Co., and operations will be carried on in the plant of the latter company at 28 North Canal Street. The company plans an expansion of its business of manufacturing aluminum cooking utensils.

The Central Cold Storage & Warehouse Co., Cincinnati, has acquired an existing building on Elm Street for a new cold storage plant. It will be remodeled and equipped at a cost of $200,000.

The Star Ice & Storage Co., Zanesville, Ohio, is completing plans for a new one-story cold storage and refrigerating plant on Fountain Alley, estimated to cost about $50,000. The George B. Bright Co., 103 Marquette Building, Detroit, is architect and engineer.

Pittsburgh

PITTSBURGH, Sept. 19.

Although actual business is still of small proportions, inquiries are increasing and it is expected that orders soon will materialize. The Board of Prison Inspectors has asked for bids on 15 tools to replace those destroyed in the riot and fire several weeks ago at the Western Penitentiary, Pittsburgh, N. S. The list includes one 20-in. lathe, one 30-in. planer, 24-in. shaper, 31-in. drill, 20-in. drill, 16-in. grinder, 10-in. grinder, one No. 3 universal miller, double end punch and shear, one ripping and cutoff saw, one matcher and molder, band saw, 30-in. pattern making lathe, motor-driven electric blower and one 6-in. power pipe machine. Bids should be directed to the Board of Prison Inspectors and marked attention of E. D. Wheeler, purchasing agent. Machine-tool dealers report the sale of a fair number of machines out of stock and an occasional order which has to be supplied by the makers. Among the latter was a 48-in. roll lathe. Business in cranes still is better in the prospective than in the actual. One company is figuring on 34 semi-portable cargo handling cranes for the city of New York, to be rented to and installed at the docks of the Pan-American Terminal Co. Formal specifications have been issued and an award is expected by Oct. 1. In electrical equipment is noted the purchase from the Crocker-Wheeler Co., Ampere, N. J., by the Universal Steel Co., Bridgeville, Pa., of one 600-hp. 250 volt, direct current mill motor and one 750-hp. alternating current mill motor.

The National Mining Co., Monongahela, Pa., has been granted permission to build a new tipple at its Star mine. Plans will be prepared at once.

Property of the Pittsburgh Metal Spinning & Stamping Co., 821-23 Locust Street, Pittsburgh, will be offered for sale by the receiver for the company, the Potter Title & Trust Co., on Sept. 30. It consists of a three-story building, fully equipped for the manufacture of metal products.

The Condon Bearing & Supply Co., Pittsburgh, is being organized by B. J. Condon, C. B. Williams and P. B. Riale, to manufacture machine bearings and operate a general machine repair works. Application for a State charter will be made on Oct. 11. The company is represented by Dalzell, Fisher & Dalzell, 450 Fourth Avenue.

The West Penn Power Co., Pittsburgh, has arranged for a bond issue of $3,022,000, for extensions and improvements.

Fire, Sept. 14, destroyed a portion of the plant of the Carnegie Cooperage Co., Second Avenue and First Street, Carnegie, Pa., with loss estimated at $75,000, including machinery.

The Sanitary Collapsible Barrel Co., Apollo, Pa., has broken ground for its proposed new plant, 50x160 ft., to cost about $42,000.

The Star Glass Co., Morgantown, W. Va., has completed plans for a new plant, estimated to cost about $225,000 with machinery, to replace its former works, destroyed by fire. The main factory will be 45x500 ft., supplemented with two one-story buildings, each 50x150 ft., and other structures, including machine shop, cooper shop, power house and office building. Louis Kauffield is manager.

The Appalachian Power Co., Bluefield, W. Va., has arranged for a bond issue of $2,500,000, the proceeds to be used for extensions, improvements, etc. C. N. Mason is vice-president.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, has awarded a contract to the Foundation Co., 120 Liberty street, for the buildings to be erected at its generating plant at Logan, W. Va., estimated to cost about $1,500,000. The work will consist of an addition to the turbine department; boiler department, with installation of new underfeed stokers; switching station, etc. Francis R. Weller, 408 Hibbs Building, Washington, is engineer.

The E. P. Bailey Co., Nitro, W. Va., has completed plans for a new one-story foundry and machine shop, estimated to cost $100,000 with equipment.

The Waugh Foundry & Machine Works, Inc., Williamson, W. Va., has been incorporated with a capital of $50,000 by C. S. Waugh, W. P. T. Varney and J. T. Johnson, Williamson, to manufacture machinery, castings, etc.

Baltimore

BALTIMORE, Sept. 19.

The Chapman Self Locking Nut Co., 721 Equitable Building, Baltimore, is being organized to manufacture a self-locking nut for use on railroad tracks, etc., patented by H. D. Chapman. It is planned to capitalize at $1,000,000 and establish local works.

The Miners' Coal Co., Steyer, Md., recently organized with a capital of $500,000, is planning for the installation of electrical and mechanical equipment at its properties. A power house and pumping plant will also be erected. G. J. Lee is president, and M. C. Walker, secretary.

The Phillipp-Kell Co., Inc., Holliday and Centre streets, Baltimore, manufacturer of sheet metal products, will soon commence the erection of a new plant estimated to cost about $50,000.

The Lee Silver Mfg. Co., 223-25 North Holliday street, Baltimore, has been chartered under State laws to manufacture iron castings, tools, implements, etc. The incorporators are Lee Silver, S. Hyatt and I. William Schimmel.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until Sept. 28, for extensions and improvements in the power plant at Annapolis, Md.

Conveying equipment, transmission apparatus, electric motors, etc., will be installed in the new plant to be constructed by the Western Maryland Dairy Co., Linden Avenue and Dolphin Street, Baltimore. Bids will be asked about Oct. 1.

The Brooklyn Cooperage Co., Baltimore, a subsidiary of the American Sugar Refining Co., has plans under way for a new plant in the Brooklyn district to cost about $300,000, including machinery.

The Norfolk & Western Railway Co., Roanoke, Va., will commence the immediate erection of a new repair shop and engine house at East Radford, Va.

The Insulation & Specialty Corporation of America, Wilmington, Del., recently organized with a capital of $500,000, has leased offices at 3154 duPont Building, and is selecting a site for the erection of a plant to manufacture fiber products. Paul C. Hennig, head of the new company, formerly connected with the Continental Fibre Co., Newark, Del., and the American Vulcanizer Fiber Co., Wilmington.

Heaters & Freezers, Inc., Wilmington, has been incorporated with a capital of $40,000 to manufacture heating equipment, refrigerating apparatus, etc. It is represented by the Corporation Trust Co. of America, duPont Building.

The Vacumeter Mfg. Corporation, Columbus, Ga., has been incorporated with a capital of $500,000 by B. Crawford Jenkins, James H. Farish and J. J. Albright, Columbus, to manufacture measuring instruments and other precision equipment.

To carry out the details of its proposed new steel and iron works at Hancock, Md., the Hancock Steel Co., Martinsburg, W. Va., has arranged for an increase in capital from $500,000 to $3,500,000. It has about 20 acres and will soon commence the erection of the initial units, estimated to cost about $200,000. The ultimate plant will give employment to about 1500. Ernest McGeorge, 1900 Euclid Building, Cleveland, is engineer; F. Vernon Aken heads the company.

Fire, Sept. 10, destroyed a portion of the steel fabricating plant of the Virginia Bridge Corporation, Alexandria, Va. and included property of the Dominion Glass Works and the Mutual Ice Co., with total loss estimated at $350,000.

The Board of Directors, Southwestern State Hospital, Marion, Va., has plans under way for the erection of a new power house. Eubank & Caldwell, Express Building, Roanoke, Va., are architects.

The Holt Power-Light Co., Wilmington, Del., has been incorporated with a capital of $2,000,000 to manufacture isolated electric lighting plants. It is represented by the Delaware Registration Trust Co., 900 Market Street.

The Texas Co., Houston, Tex., and 17 Battery Place, New York, is considering the erection of a new oil refinery at Portsmouth, Va.

Milwaukee

MILWAUKEE, Sept. 19.

While machine-tool sales the first half of September were hardly of an extent justifying the word volume, nevertheless more real business developed than for the same periods of July and August. Current inquiry is fairly active, but offers nothing notable in the size of prospective purchases. Demand is limited to one or two tools which usually are wanted immediately. Production of tools in Milwaukee and vicinity has not yet been resumed on an appreciable scale.

The Smith Engineering Works, Milwaukee, manufacturer of ore, rock and gravel handling machinery, has broken ground for a one-story brick and steel addition at Thirty-second and Locust streets, 75 x 100 ft., to cost about $45,000 equipped. The general contract has been placed with the Worden-Allen Co. Charles F. Smith is president and treasurer.

The Gauger-Johnson Mfg. Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture machinery. The principals are F. A. Gauger, H. W. Landwehr and R. W. Johnson, 733 Thirty-first Street.

The Electric Welding & Mfg. Co., 145 Clinton Street, Milwaukee, has changed its name to the Welded Products Mfg. Co., to better designate the nature of its business. The principal officers are Oscar Greulich, president, and George F. Luehring, secretary and treasurer.

The Milwaukee department of public works will take bids about Oct. 1 for a brick and steel building, 50 x 125 ft., one story and basement, at Clinton and Florida streets, to be used for cast iron pipe storage. Some power and hand crane equipment will be required, but details are not yet available. C. E. L. Malig, City Hall, is engineer in charge.

The Five Ball Spark Plug Co., Milwaukee, has been incorporated with a capital stock of $100,000 and will lease or build a plant for the production of patented spark plugs for internal combustion engines. The incorporators are Louis Neeb, A. J. Schneider and E. C. Kahn, 4129 Highland Boulevard, Milwaukee.

The Van Buren Garage Co., 174 Ogden Avenue, Milwaukee, has let the general contract to the Robert L. Reisinger Co., 464 Oakland Avenue, local, for a brick, steel and concrete garage and machine shop, 60 x 130 ft., two stories and part basement, at Martin and Van Buren streets, to cost about $40,000 with equipment. T. M. Ackerman is president.

The Board of Education, Cudahy, Wis., has decided to purchase a site and secure plans and specifications for a new high school with vocational training facilities to cost approximately $150,000. An architect has not yet been selected. F. H. Williamson, 505 Van Norman Avenue, Cudahy, is president of the board.

Thor Rosten, 613 Williamson Street, Madison, Wis., manufacturer of special tools, dies, fixtures, jigs, etc., will build a new shop, 40 x 90 ft., to cost about $15,000. Work will begin immediately.

The Kiel Woodenware Co., Kiel, Wis., which serves the city and industrial and domestic consumers with electric current, will build an addition to the power plant and is in the market for additional generating transformer and other equipment.

The Northwest Engineering Co., Green Bay, Wis., which is building industrial, logging and yard cranes mounted on tank type tractor chassis, has incorporated with a capital stock of $400,000 preferred and 1000 shares of common stock without par value. The incorporators are Victor Minahan, Sr., Joseph Z. Finzel, and Victor I. Minahan, Jr., all of Green Bay.

The Standard Unit Parts Corporation of Chicago, an Illinois corporation capitalized at $100,000, has been granted a charter to operate in Wisconsin. Branch offices and shop are to be established in Milwaukee, with an investment of $15,000. It manufactures metal specialties, particularly for motor vehicles.

The Foster Construction Co., 114 Grand Avenue, Milwaukee, has taken the general contract for the erection of a new high school costing $300,000 for the city of Munising, Mich., to contain a manual training department. The architect is John D. Chubb, 109 North Dearborn Street, Chicago.

Brunett's Heating System, Inc., of Minneapolis, organized in Minnesota several months ago with $1,200,000 capital stock to manufacture heating devices, especially for farms and isolated places, has acquired a site at Rice Lake, Wis., and started work Sept. 15 on the erection of a plant to cost about $75,000 for the initial unit. The principals are D. A. Brunett and H. A. Swenson, Minneapolis, and A. F. Thelander, Rice Lake.

The Peterson Estate, Soldiers Grove, Wis., will rebuild its power dam and hydroelectric generating plant on the Kickapoo River at a cost of approximately $50,000 and has engaged E. E. Dillion, Washington Building, Madison, Wis., as consulting and contracting engineer. Clarence Peterson is manager of the estate.

The F. Rosenberg Elevator Co., 174 Reed Street, Milwaukee, has awarded the general contract to the Raulf Co., 53 Patton Building, local, for its new plant at Franklin and Becker streets and the Chicago, Milwaukee and St. Paul Railroad tracks. It will be of brick and steel, one story, 120 x 233 ft., and with equipment will cost about $100,000. The architects are Martin Tullgren & Sons, 425 East Water Street.

The Central South

ST. LOUIS, Sept. 19.

The Missouri Pacific Railroad Co., Railway Exchange Building, St. Louis, has completed plans for six new locomotive repair shops at different points. The largest structure will be one-story, 45 x 400 ft., and the five other shops, 44 x 240 ft. E. A. Hadley is chief engineer.

The Banner Fork Coal Co., Kentenia, Ky., is planning the construction of a new power house at its properties, with the installation of new electric haulage and operating equipment at the mines.

The Riverside Brick & Tile Co., Knoxville, Tenn., has been incorporated with a capital of $40,000 by R. P. Black, B. C. Ogle and J. W. Dooly, Knoxville, to manufacture brick, tile, etc.

The Klanke Machine Co., Muskogee, Okla., has been chartered under State laws to manufacture machinery and parts. The incorporators are E. E. Klanke, James E. Whiteside and Glenn Alcorn, all of Muskogee.

The Buick Motor Co., Flint, Mich., is having plans prepared for a new service and repair building at Memphis, Tenn., two stories, 100 x 225 ft., estimated to cost close to $90,000. W. C. Lester, 636 News-Scimitar Building, Memphis, is architect.

The Hillman Syndicate, Bowling Green, Ky., is planning for the construction of a new oil refinery on a local site.

The Eagle Saw Works, Chattanooga, Tenn., recently organized, has acquired a local plant and will install equipment for the manufacture of saws. It is headed by F. L. Underwood and J. E. Harris.

The Thompson-Case Oil & Rubber Co., Chattanooga, Tenn., has filed notice of change in name to the Thompson-Case Rubber Co., at the same time increasing its capital to $50,000 for extensions in its plant to manufacture tires.

The Blue Diamond Mining Co., Centertown, Ky., is planning for the installation of new equipment at its properties, including air compressors and other power apparatus. Robert A. Bridges is vice-president.

W. H. Eason, receiver for the Harvey Steel Products Corporation, Jackson, Tenn., will offer the company's property at a sale on Sept. 28. It is three stories, totaling about 125,000 sq. ft. in floor space.

The Knoxville Fertilizer Co., Knoxville, Tenn., is completing plans for a new plant to cost about $350,000, including machinery, and will consist of two one-story buildings, 160 x 350 ft., and 100 x 300 ft., respectively. James W. Dean is secretary and treasurer.

The Super-Service Motor Association, Colorado Building, Denver, Colo., has plans under way for the new three-story repair plant and parts manufacturing works, 125 x 250 ft., at Speer Boulevard and Bancock Street, estimated to cost about $250,000. H. W. J. Edbrooke, Tabor Opera House Building, is architect.

The General Iron Works Co., 1720 California Street, Denver, Colo., has preliminary plans under way for a new brick and steel foundry at Blake and Thirty-third streets, estimated to cost in excess of $200,000 with equipment.

Seattle

SEATTLE, Sept. 13.

The surplus shipyard stocks have reached in a competitive way into the machine-tool trade, including both heavy-duty and light machines, which constantly get in the way of new sales. Jobbers are asked to make estimates on new machinery, with the discovery later that the business has gone to the shipyard stocks. These surplus stocks, however, are dwindling, and it is becoming increasingly difficult for buyers to get suitable sizes and dimensions.

The sale of manual training machinery for the high schools of the State, which promised last summer to amount to millions of dollars, has been greatly reduced owing to the State-wide demand for tax reductions, and as a consequence the budgets in every high school have been cut.

Among the sales of the week by Seattle jobbers was a complete garage outfit, including an 18-in. Economy Rockford lathe and a No. 3 Toledo press. The demand for machinery has been almost exclusively for garages. The demand for electric drills has exceeded that of any fall season in the past three years. Lathes and small tools are moving into Oriental export.

The Barde Industrial company is preparing to move its offices, warehouse and storage yards to First Avenue, South, and Lander Street. The new warehouse is 114 x 330 ft., one story.

The Gulf States

BIRMINGHAM, Sept. 19.

The Southwestern Portland Cement Co., Los Angeles, Cal., and El Paso, Tex., has acquired about 250 acres at Waco, Tex., and plans the establishment of a new works estimated to cost about $1,000,000, including machinery. Carl Leonardt is president.

The El Paso Electric Co., El Paso, Tex., has arranged for a note issue of $750,000, the proceeds to be used for extensions and betterments.

The Plains Lubricating Co., Amarillo, Tex., recently organized, has acquired a local building for the establishment of a plant to manufacture lubricating oils. Equipment will be installed at once. L. S. Lahm is president, and M. E. Lahm, secretary.

Loading and unloading machinery, conveying equipment, etc., will be installed at the new municipal water terminal to be constructed by the City Commission, Tampa, Fla. W. D. Hall, city manager, has submitted plans for the project, calling for an expenditure of $945,000. A bond issue to total $1,000,000 is being arranged.

The Christian & Brough Co., Vicksburg, Miss., is completing plans for rebuilding its machine shop, to replace the structure recently destroyed by fire with loss in excess of $50,000. It will be one-story, 85 x 100 ft. W. A. Stanton, Vicksburg, is architect.

The Cisco Clay & Coal Co., Cisco, Tex., will expend close to $150,000 for equipment for installation at its new brick manufacturing plant, designed for a daily output of about 50,000 brick. C. B. Bush is president.

The Maryland Refining Co., New Orleans, has acquired a site and will commence the immediate erection of a new oil refinery, estimated to cost in excess of $500,000 with machinery.

The Common Council, Harlingen, Tex., has approved a bond issue of $32,000 for the installation of a municipal electric lighting plant. Plans will be prepared at once.

The Treasury Department, Washington, is taking bids up to Oct. 4, for the installation of a new refrigerating plant at the United States Marine Hospital, Key West, Fla. J. A. Wetmore is acting supervising architect.

California

LOS ANGELES, Sept. 13.

The Superior Machine Co., Glendale, Cal., has awarded contract to the Roy L. Kent Co., 130 South Grand Boulevard, for a new one-story plant, 75 x 175 ft., at Colorado Street and San Fernando Road, estimated to cost about $25,000. Charles B. Morton is manager.

The International Signal Co., Los Angeles, has been incorporated with a capital of $100,000 by James D. Alcorn, L. C. McAdams and C. O. Baker, to manufacture signal equipment and devices. It is represented by Carl B. Sturzenacker, 227 H. W. Hellman Building.

The Bowman Carriage Co., Sacramento, Cal., has awarded a contract to A. W. Norris, Sacramento, for a one-story machine and repair shop at Twelfth and D streets, estimated to cost about $25,000.

The Pacific Pipe Co., 201 Howard Street, San Francisco, manufacturer of iron pipe, has plans under way for a new one-story factory at Cypress and Twentieth streets, Oakland, Cal. Construction will be handled by the company under day work.

The Severin Motor Co., Oakland, Cal., formerly of Kansas City, Mo., will soon take bids for the first unit of its new plant at East Fourteenth Street and Fifty-fourth Avenue, one-story, 60 x 450 ft., and estimated to cost about $100,000. It will be followed by other units in the near future, bringing the cost up to about $400,000. M. I. Diggs, Easton Building, Oakland, is architect.

The Durant Motor Co. of California, Oakland, Cal., has awarded a contract to the P. J. Walker Co., Monadnock Building, San Francisco, for its new plant at the end of East Fourteenth Street, at the city limits. It will consist of a two-story, reinforced-concrete building, with four wings, totaling 800 x 800 ft., and is estimated to cost about $750,000. Construction will commence in about 30 days.

The Southern California Edison Co., Los Angeles, has made application to the State Railroad Commission for permission to build a new hydroelectric power plant in the Big Creek section. It will have an initial generating capacity of 70,000-hp., and ultimate capacity of 400,000 hp., and is estimated to cost in excess of $5,000,000.

The Crystal Ice Co., Long Beach, Cal., has acquired property, 75 x 100 ft., on American Avenue, as a site for a new plant, estimated to cost about $45,000. C. H. Taylor heads the company.

Canada

TORONTO, Sept. 19.

Dealers report a better demand for machinery. Big lists, however, are still absent, but users are appearing in larger numbers for single tools and equipment for replacement purposes. The equipping of new industrial plants is not being done at present, although there are several announcements of companies preparing to go ahead with the construction of factories, and it is expected that these will be a big factor in a better demand early next year. Users of small tools are buying only what is required for immediate needs, but dealers state that business is all that could be expected under existing conditions. Some reductions in prices have recently been made in machinery and tools ranging from 5 to 15 per cent.

The International Harvester Co., Chatham, Ont., has secured a local building for the manufacture of motor trucks, etc.

The Canadian Gary Motor Truck Co. has secured a building on Atlantic Avenue, Toronto, and will install equipment at once for the manufacture of trucks, etc.

The Sapco Spring Co., Ltd., Cherry and Front Streets, Toronto, will extend its plant and increase the capacity for the manufacture of truck springs, etc.

The Watkins Mfg. Co. of Canada, Ltd., Kingston, Ont., has been incorporated with a capital stock of $15,000 by James McK. Hughes, William McA. Nickle and others to manufacture machinery, metals and to rebabbitt automobiles, marine, traction and other mechanical parts, etc.

The City Council, Montreal, will install new boilers in pumping station on Craig Street, cost $15,000. Bids will also be called shortly for four new pumps costing $15,000 for the Rielle street pumping station.

The Universal Cement Casket Co., Dunnville, Ont., is having plans prepared by Barber, Wynne-Roberts & Seymour, 40 Jarvis Street, Toronto, for a factory.

The William Rogers Co., River Street, Niagara Falls, Ont., will build a boiler house to cost $13,000.

The Kingston General Hospital and Queen's University, Kingston, Ont., will build a power plant.

BOOK REVIEWS

America and the New Era. A Symposium of Social Reconstruction, edited by Elisha M. Friedman. Pages xxx + 500; 5½ by 8 in. Published by E. P. Dutton & Co., New York.

This publication is a grouping together under five general headings of various articles which have appeared from time to time since the armistice and constitutes a sequel to a previous publication entitled "American Problems of Reconstruction, a Symposium on the Economic and Financial Aspects." Altogether it contains twenty-eight articles, two by Mr. Friedman under the head of "Perspectives, Social and Political." The remaining 26 are each from an authoritative source, depending on its nature. There is also a foreword by Secretary of Commerce Herbert Hoover.

Under the head of "Social Progress versus Cycles of Change" five articles are grouped, each with some phase of war as its base, and with discussions on the possibility of lasting peace, including consideration of the "League of Nations." Under the head of "Some Economic Aspects of Social Problems," four articles are grouped dealing with land ownership, overpopulation of the cities at the expense of agriculture, immigration and that development of war which is here termed "Women in Industry."

The remaining articles are grouped, six under the head of "The New Nationalism" and eleven under the head of "The Conservation of Human Resources." This last group is very interesting, since it is largely based on findings made in the handling of the various armies employed in the war. Vocational guidance, industrial hygiene, health conservation, nervous strain and mental hygiene are among the subjects intelligently discussed.

The editing of all this wealth of material and the supplying of brief notes as to the authors are well done. There is an analytical table of contents, a bibliography and an index. E. C. R.

A Record of Ships Built. Under this title the New York Shipbuilding Corporation has issued a beautifully illustrated 64-page brochure, 9 x 12 in., picturing and briefly describing many of the outstanding naval and merchant vessels built at its yard in Camden, N. J., during the past 20 years. In a summary of 265 ships built and now building, the aggregate overall length is given as 88,001 ft., or 16 2/3 miles, and the total power as 1,982,835 hp., a figure raised above 2,000,000 by engines of 19,200 hp. built for hulls constructed in other yards. Prominent in the description are the new Shipping Board passenger liners, designed during the war as transports and changed over after the armistice. The frontispiece shows the superdreadnought Idaho passing up the East River towards the Brooklyn navy yard.

Training Industrial Workers. By Roy Willmarth Kelly. Pages, xxl + 437, 5¾ by 8½ in.; forms and illustrations, 71. Published by Ronald Press Co., New York.

The need of education by those who constitute the rank and file of industry and the necessity of vocational guidance seem to be the reasons which have led to the writing of this book. For, as John M. Brewer, Ph.D., associate professor of education, Howard University, says in an introduction for the book, the question, "Why not try education?" must occur to those who study the human problems of industry.

Setting forth an educational creed for industry and in condensed form covering the complexity of industry, as the kinds of industry, types employed, geographical location, seasonal fluctuations and financial resources, a comprehensive sketch of the earlier forms of apprenticeship is given. The beginnings in modern industrial education and national and state aid for vocational training, together with the development of the possibilities of schools and classes in vocational training, are described.

Thus leading up to the rapid developments in recent years of what is termed a new profession, viz: employment management, a heterogeneous mass of information is given, collected from many of the outstanding industries which have specialized in one or more phases of industrial training. Some mention of plans of factory management and labor management is made, and the fixing of the responsibility for what is termed the "new program" is described.

There are several appendices giving an educational survey of technical schools and classes, the training plans in detail of representative organizations such as the General Electric Co., Westinghouse Electric & Mfg. Co. and others, a classification of industrial schools and training methods and a very complete bibliography. The entire text of the book is conveniently sub-headed, which, together with the index, makes it a very ready reference work. E. C. R.

Quin's Metal Trades Directory of the United Kingdom. Pages 291, 5¼ x 8½ in. Published by the Metal Information Bureau, Ltd., 7 East India Avenue, London, E.C.3.

This directory represents the first effort to compile a classified list of the non-ferrous metals interests of Great Britain, and the showing is surprising of the number of firms engaged in one or more branches of that trade. Lines represented include, in addition to non-ferrous metals, tin plates, galvanized sheets and a number of iron and steel products. Following the alphabetical section which gives the names and addresses of the various firms is a classified section in which dealers in metals and other products are listed under their respective headings.

New Books Received

Petroleum Laws of All America. By J. W. Thompson. Pages, vii + 645, 6 x 9 in., paper covered. Published by Bureau of Mines, Department of the Interior and obtainable at 40c. per copy from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Railroad Shop Practice. By Frank A. Stanley. Pages, xii + 331, 6 x 9 in.; illustrations, 391. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Drawing Room Practice. By Frank A. Stanley. Pages, x + 253, 6 x 9 in.; illustrations, 487. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Analytical Mechanics for Engineers. By Fred B. Seely and Newton E. Ensign. Pages, xiv + 486, 6 x 9 in.; 454 illustrations. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York.

Bituminous coal produced up to Sept. 10 is estimated by the United States Geological Survey at 271,716,000 net tons, compared with 365,081,000 tons for the same period last year. Weekly output has been lower, every week since the middle of February, than the output for the corresponding week of 1920, 1919, 1918 or 1917.

Directors of the Youngstown Sheet & Tube Co., Sept. 13, declared a dividend of 50c. a share on the common stock, and the regular dividend of $1.75 on preferred, both payable Oct. 1 to holders of record Sept. 20. Officials announced that the dividends would be paid out of surplus.

Notices have been posted at the plants of American Sheet & Tin Plate Co. of a cut in wages of skilled workmen of 12 per cent in hot mill workmen and 7 per cent in tin house workmen. This reduction merely is in keeping with the recent revision made in union mills, based upon the bi-monthly sales average and upon which the American Sheet & Tin Plate Co. wage scales are based.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers or shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.90c. to 4.10c.
No. 16	4.05c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½ in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
7-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER

	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¼c. to 18¼c.
High brass wire	16¼c. to 20¾c.
Brass rod	13¾c. to 19¾c.
Brass tube, brazed	26½c. to 30½c.
Brass tube, seamless	18 c. to 19½c.
Copper tube, seamless	19½c. to 21¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 22½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$6.80	$6.55
		90 lb...	6.90	6.65
		100 lb...	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	28c.
Bar	34c. to 35c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c. to 6c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6c. to 6½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb... 29c. to 31c.

Old Metals

The market is firmer with a tendency toward higher prices. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.00
Copper, light and bottoms	7.75
Brass, heavy	4.75
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

THE IRON AGE

New York, September 29, 1921

ESTABLISHED 1855 VOL. 108: No. 13

New Ford Foundry Plant at River Rouge

Laid Out for Quantity Production—Uses Direct Blast Furnace Metal Mixed with Cupola Metal in Definite Proportions as Required—Conveyor Systems Highly Developed

BY L. B. BREEDLOVE*

NOTEWORTHY for its especially developed equipment, the new foundry of the Ford Motor Co. at the River Rouge plant has various features which represent decided departures from previous practice. The mechanical equipment for large volume production of small castings is perhaps the most complete in existence, and requires a very small number of skilled men. This foundry represents the results of the development work and experience of the company over the last ten years. Its daily output when completed with be all the castings necessary for the production of 5000 cars and 2000 tractors, or approximately 2500 tons of castings.

The first unit of four cupolas has been in operation for approximately six months, while at the same time construction work on the remaining five units, making 24 cupolas in all, is being pushed. The foundry buildings consist of two main groups—the cupola buildings and foundry building—joined together under one roof. The three cupola buildings are each 264 ft. long, 44 ft. wide, 78 ft. 6 in. high, spaced 132 ft. apart and attached to the west side of the foundry building. To the east of the cupola buildings a continuous crane runway of 41 ft. 6 in. span is provided at 34 ft. above ground level.

At the cupola buildings and 12 ft. below this runway, on the charging floor level, are the bottoms of the storage bins, and below these the blowing equipment is housed. The walls are of brick at the first floor and stucco above, with continuous mechanically operated steel sash windows, which represent in area of glass 40 per cent of the total wall surface.

The foundry building consists of 18 bays, each bay 66 ft. wide, giving outside measurements of 1188 ft. long by 595 ft. wide, or a floor space of about 16 acres. The steel trusses are especially designed, each bay having a monitor the full length, 32 ft. wide at its base and 30 ft. high. The lower chord of the trusses is 28 ft. 6 in. above the floor line. Both north and south sides of each monitor are equipped with continuous mechanically operated ventilating steel sash windows for a height of 26 ft., which provides excellent ventilation and daylight conditions.

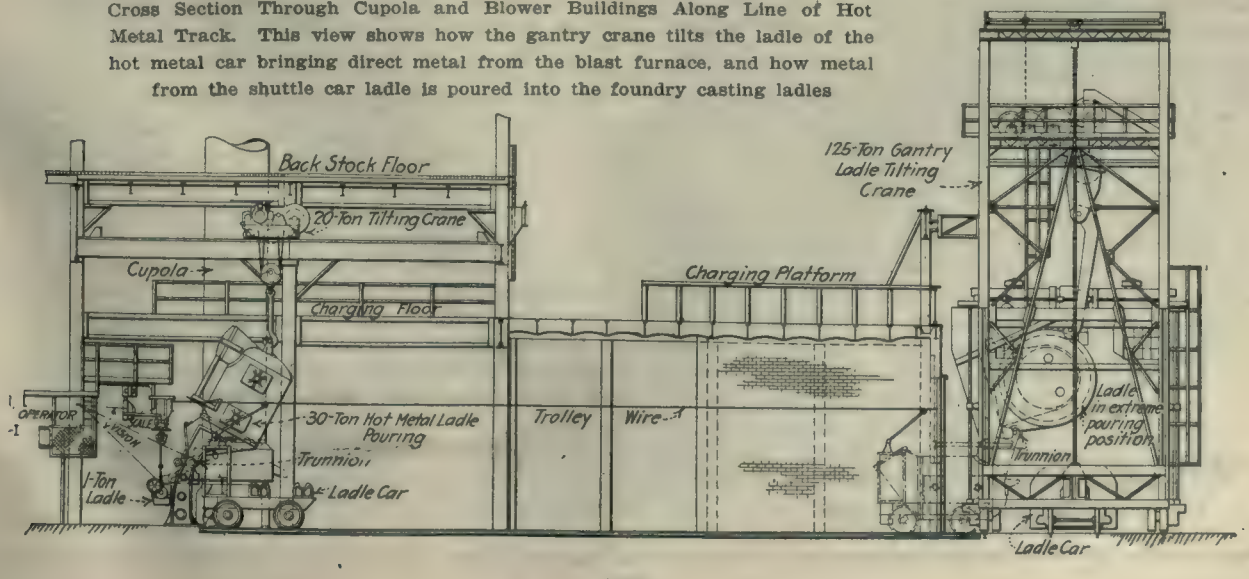
Below the wall sash the walls are of brick, those above are of stucco, and the roofs tile. The glass surface in the side walls represents in area of glass nearly 60 per cent of the total surface. The weight of the structural steel work contained is: Foundry building 8,000 tons, cupola buildings 9,000 tons, walkways, bins, conveyor supports, etc., 8,000 tons, or a total of 25,000 tons. All floors are of reinforced concrete construction.

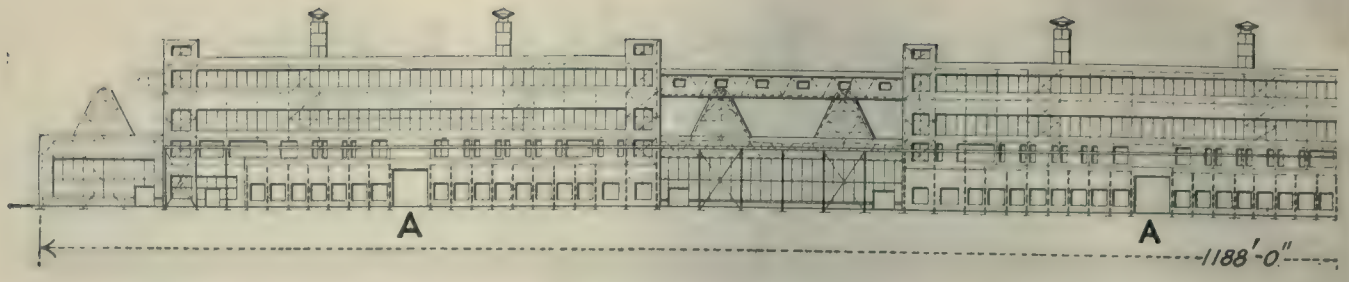
Use of Direct Metal

While the making of castings directly from the furnace has been practiced more or less since the discovery of reducing iron from the ore, this foundry is probably the first to adopt the use of direct metal on a large scale. Close uniformity in the composition of the metal coming from the furnace is essential to the

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Cross Section Through Cupola and Blower Buildings Along Line of Hot Metal Track. This view shows how the gantry crane tilts the ladle of the hot metal car bringing direct metal from the blast furnace, and how metal from the shuttle car ladle is poured into the foundry casting ladles





West Elevation of the Plant, Showing the Three Cupola Buildings, Each 264 Ft. Long, with the Less Lofty Foundry Structure Beyond, Four of the 18 Foundry Monitors Appearing Between the Cupola Buildings.

use of direct metal; in the past the variation in the furnace product has hindered its use. The Ford blast furnaces are producing foundry iron, remarkably uniform in analysis, from Hanna and Carpenter ores. The following table taken from all analyses for one month shows in a general way the uniformity of product.

	Average Cast Analysis	Average Daily Range	Maximum Variations
Silicon	3.04	2.72 to 3.32	2.44 to 3.54
Sulphur	0.027	0.024 to 0.032	0.021 to 0.040
Phosphorus	0.50	0.48 to 0.60	0.46 to 0.60
Manganese	0.71	0.65 to 0.71	0.58 to 0.78
Total carbon	3.80	3.75 to 3.90	3.72 to 3.94

As the foundry at Highland Park is not yet using direct metal, the blast furnaces produce for it one or two casts each day, with 3.50 per cent or over in silicon. This accounts for the range in the maximum variations shown above. The desired analysis of the castings from the foundry is practically constant for any particular part, however, and all castings for cars and tractors will fall within the following ranges:

Silicon	2.25 to 2.50 per cent
Sulphur	0.060 to 0.095 per cent
Phosphorus	0.45 to 0.50 per cent
Manganese	0.65 to 0.80 per cent
Total carbon	3.40 to 3.50 per cent
Brinnell test	187 to 212

The percentage of direct metal used with the cupola product varies with the particular castings to be made. In the case of the cylinder blocks for Ford cars—for which all castings are designated as "T" parts—the ratio is practically 40 per cent direct metal to 60 per cent cupola metal, while for other "T" parts a 50 to 50 per cent mixture is used, and in some instances a 60 to 40 per cent mixture. For castings of the Fordson tractor similar mixtures are used. In some of the large castings 80 per cent direct to 20 per cent cupola metal has been used with success, but in general the intention is to use a 50 to 50 per cent mixture, at least for the immediate future.

Operations are so arranged that the variation in the composition of the particular cast from the furnace may be cared for by varying the cupola mixture correspondingly, to give the desired composition for the castings being made. It might be pointed out that the principal part of the scrap charged comes in the nature of back stock from previous casts of known constituents, thereby removing much uncertainty. The remaining part is composed of scrap from the various departments of the company, and is in general excellently balanced. Experience here has shown that a mixture containing 50 per cent or less of direct metal gives the most satisfactory results in the work of casting and in the castings.

Operation has shown that the influence of the silicon in imparting fluidity to the iron is greater than past experiments have indicated and that the relation of temperature to fluidity is probably of less importance than former practice has shown. The temperature of the mixture is lower at the time of casting, hence sand burning has been lessened considerably, and at the same time castings produced having clear and smooth surfaces. At this lower temperature the influence of silicon in producing desirable qualities in the castings is apparently slightly increased.

Furnace iron, after standing 6 hr. in the furnace ladle, has been successfully used in the lower mixtures; however, under ordinary operation the furnace iron is not allowed to stand over 4 hr. in the foundry mixer type ladles. At the end of that time the iron in the mixer ladle is either mixed with fresh hot metal from the furnaces or is sent to the small pig casting machine provided near the center of the foundry. At the end of the day's pouring the hot metal remaining is also sent to the pig casting machine. Direct metal is also used in the jobbing castings.

Cupola Arrangement Symmetrical

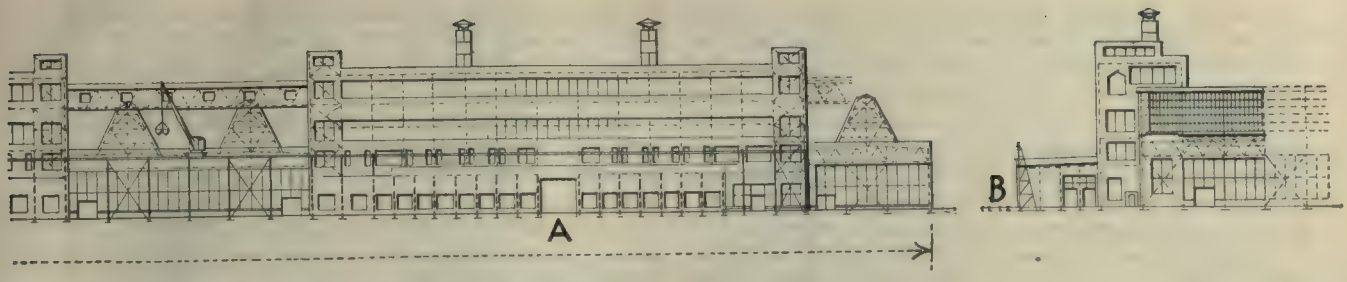
Twenty-four cupolas are arranged on a center line 224 ft. from the north-and-south center line connecting the two blast furnaces. Eight of these cupolas are placed symmetrically about the east-and-west center line of Furnace A, thereby bringing the south end of the foundry group in line with the end of the stove platform along the main driveway into the plant. The other two groups of cupolas are located with center lines 396 ft. and 792 ft. north of this south group. The cupolas are 78 in. in diameter, having drop bottom and outside air chamber of Whiting Foundry Co. design. There are eight cupolas in each of the three cupola buildings, four being uniformily spaced in a group each side of the building center line.

The shafts of the cupolas pass up through the main charging floor and the back stock floor into a brick-lined breeching supported on the conveyor floor. This breeching is rectangular in shape with circular top increasing in height toward the stack. One 8-ft. stack, centrally located, is provided for each four cupolas. The top of this stack is 95 ft. above the tuyeres and has a double cone discharge top. The cupola shafts extend into the breeching about 4 ft.

The bottom of the breeching is bricked in such a manner that the cinders and dust particles thrown down by the change of direction and velocity of the gases is conducted to bins suspended under the floor, and thence by chutes to industrial cars on the lower floor. Apparently a negligible amount of cinders and dust is deposited on the building roof, while in the bins 1/3 cu. yd. of cinders per cupola is collected in 8 hrs. of operation.

At the level of the main charging floor, 22 ft. above the foundry floor line, and above the blower rooms and the slag tracks and exposed to the weather, are the storage bins for yard scrap, etc. This storage platform, 44 ft. wide, is continuous over the hot metal tracks and blower rooms, or for the length of each of the cupola buildings. A crane runway, 12 ft. above this platform, has the same space. This runway is continuous for the length of the foundry and serves the full length of the three cupola buildings. On it is mounted a 5-ton, electric driven locomotive crane with 50-ft. boom, arranged to use grab bucket or lifting magnet.

Directly below this storage platform and on each side of the hot metal tracks are the blower rooms, each of which houses four No. 11 Sturtevant high-pressure



and One at Each End. At *A* are the three entrances for hot metal, direct from the blast furnaces. At *B*, in the partial south elevation, is the location for the hot metal ladle car and the gantry crane

rotary blowers, driven by direct current motors. The blast piping is so arranged that each blower is individually connected to one cupola, and collectively to any cupola in the group of four. Underneath the storage platforms, and between the blower room and cupola building, two passageways are provided for traffic, one being north bound and the other south bound. Between the cupolas and the east wall of the cupola building slag tracks are installed.

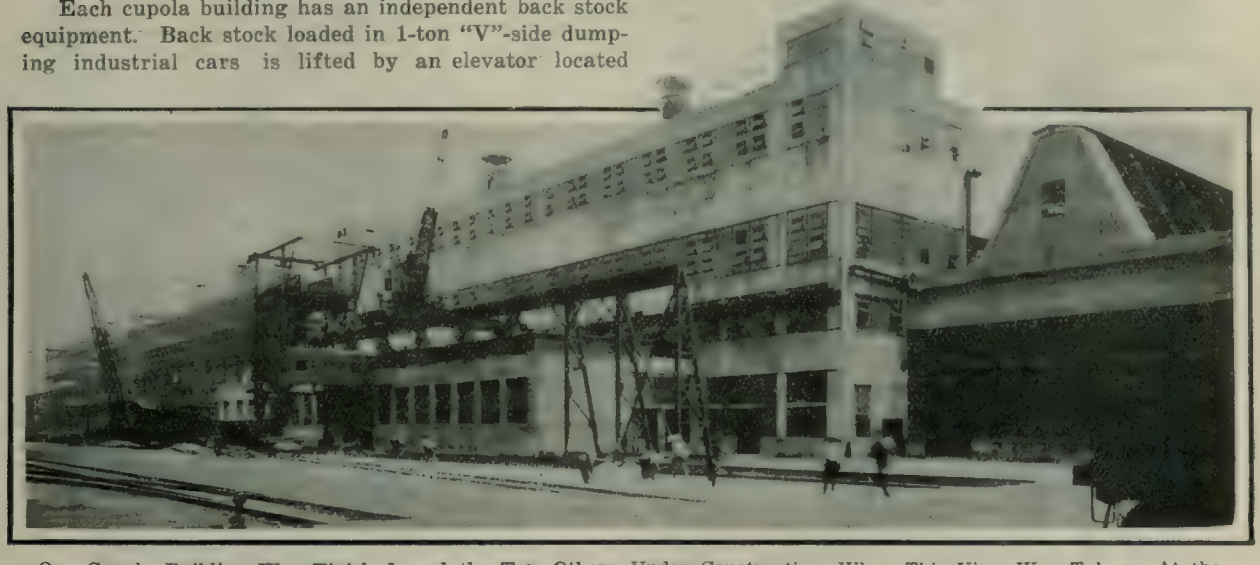
Handling Back Stock

Each cupola building has an independent back stock equipment. Back stock loaded in 1-ton "V"-side dumping industrial cars is lifted by an elevator located beyond the knock-out platforms and the tumbler equipment to a 12-ft. gallery. These galleries are located above the roof between two monitors on the center line of the cupola buildings, and at the same level as the back stock floor of the cupola building.

These cars are pushed by trucks back to the cupola building, weighed on special track scales and switched to the tracks running parallel to the cupola line. The cargo of these cars is dumped into chutes leading from that floor into the sides of the cupola shaft, slightly above the pig charging door. Two chutes for each cupola are provided, and the opening of each is controlled by a hand-lever operated flap gate. These chutes are designed so as to give uniform distribution of the charge on the shaft. The cars are returned on another track through the same gallery.

A 40-ton bin, suspended from the conveyor floor, for coke or limestone, is provided for each cupola. Each bin has two chutes arranged to discharge into "V"-side dumping 1-ton industrial cars running parallel to the cupolas. The cars, after being weighed on special track scales, are discharged as needed into the charging chutes feeding the cupolas. These bins are fed by a system of 30-in. belt conveyors running in overhead galleries, which transport the coke from the coke screening building in the coke and by-product group, a distance of 1500 ft. from the foundry. Limestone is unloaded near the coke screening building into a large track hopper, and is transported by the same conveyor system.

This system of conveyors, passing through the coal pulverizing building, supplies it with coal, which in turn supplies the main power plant with pulverized coal. About 3 to 5 hrs. operation of this system will be necessary to supply the cupola buildings with limestone and coke, and about 14 hrs. for the coal requirements of the pulverizing building. This system of conveyors will be subject to an interlocking electrical control, and after each change of cargo the belts will be automatically swept by revolving brushes.



One Cupola Building Was Finished, and the Two Others Under Construction, When This View Was Taken. At the right appears the end of one of the eighteen long, high monitors spanning the foundry proper. The traveling boom crane for handling stock appears over the blowing engine house, with the 125-ton hot-metal dumping gantry crane immediately adjacent

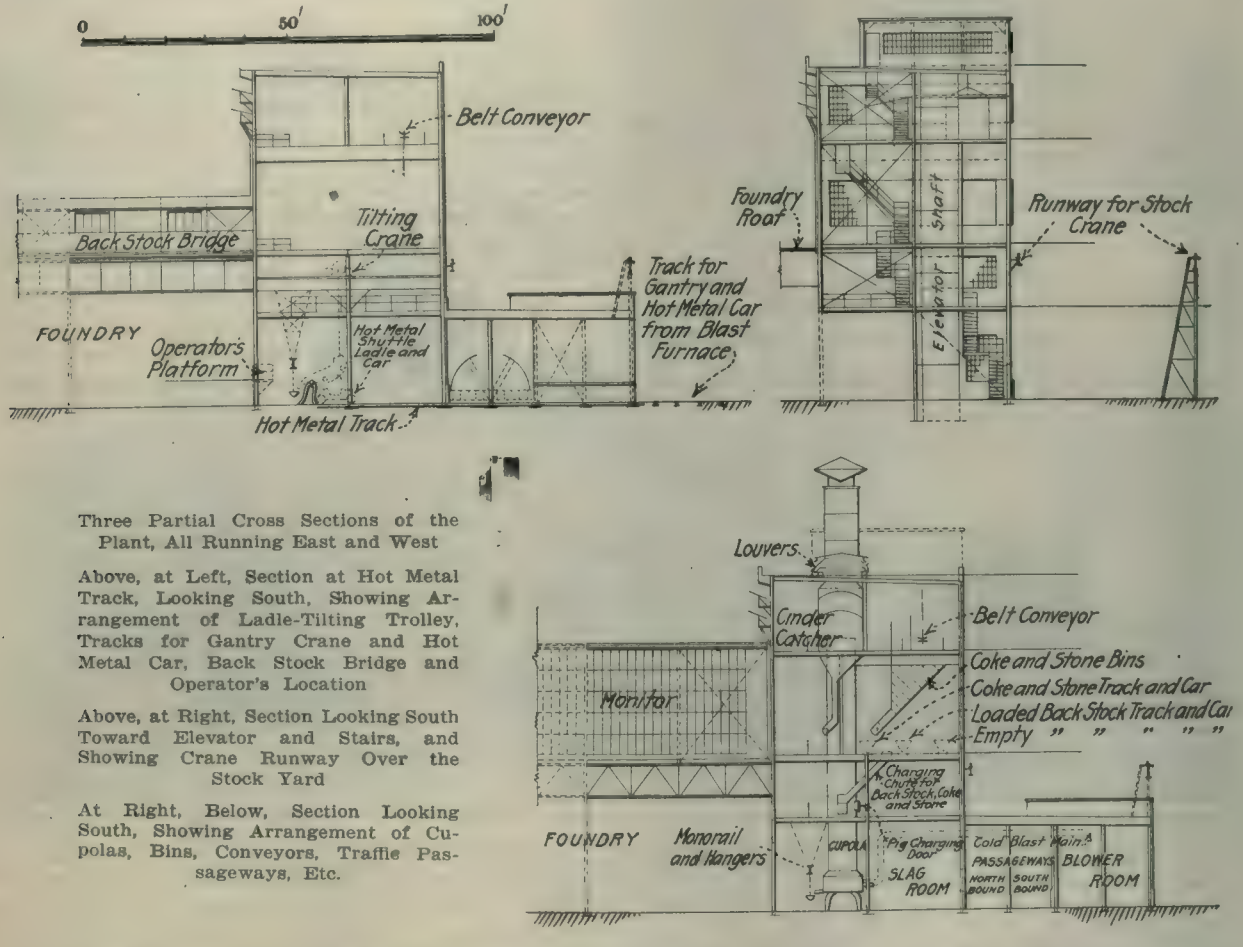
How the Direct Metal Is Handled

Hot metal is transported from the furnaces in 75-ton Pollock ladle cars. After being weighed on the track scales near the pig casting house, the cars are switched to the foundry track and spotted at the cupola hot metal tracks. Spanning this foundry track is a 125-ton Wellman-Seaver-Morgan gantry ladle tipping crane, which is self propelled and serves the three cupola buildings. The hot metal is discharged into a 30-ton top inlet, end outlet, Treadwell mixer-type ladle, mounted on a track at right angles. This track, on the center line of the cupola building, extends from the outside hot metal track to the line of the pouring spouts of the cupola line. Transfer arrangement is provided so that an empty ladle can be moved to one side while a loaded ladle is brought in.

These mixer-type ladle cars, electrically driven, are controlled by an operator located in a balcony in full view of all operations. This operator also controls the 20-ton Pawling & Harnischfeger tipping crane, by which the hot metal is discharged into the 1-ton foun-

dry ladles. Monorail overhead tracks, with a liberal number of crossovers, are provided in front of the line of cupola pouring spouts, on which the 1-ton foundry ladles are conveyed. The crossovers are operated from the floor somewhat ahead of the progress of the 4-wheel pivot carriages. Large dial automatic scales are provided at each cupola, and at the direct metal ladle position. From the cupolas the 1-ton ladles are conveyed to the pouring positions along the mold conveyors.

Eight systems of three conveyors each, of approximately 270-ft. run, are provided for the pouring of the larger castings. The three platform conveyors are arranged parallel, with the return cooling conveyor in the middle. The mold conveyors move at a rate of 10 ft. per min. while the return cooling conveyor travels



Three Partial Cross Sections of the Plant, All Running East and West

Above, at Left, Section at Hot Metal Track, Looking South, Showing Arrangement of Ladle-Tilting Trolley, Tracks for Gantry Crane and Hot Metal Car, Back Stock Bridge and Operator's Location

Above, at Right, Section Looking South Toward Elevator and Stairs, and Showing Crane Runway Over the Stock Yard

At Right, Below, Section Looking South, Showing Arrangement of Cupolas, Bins, Conveyors, Traffic Passageways, Etc.

24 ft. per min. The 70 ft. of the mold conveyor run nearest the cupola is used for the pouring stations, while the remaining 200 ft. serves as the mold assembly line.

During this distance of travel the molds are assembled in the following manner, each operation being done by different workmen; the iron bottom board and the rammed iron drag are placed, the cores, wires and supports are inserted, the iron cope put on and clamped, the risers and gates are covered with paper to protect the mold from dirt. Metal is poured into the moving molds in the pouring range, the ladle being supported on overhead monorails and moved by hand to correspond to the speed of the molds.

Cores are made, mostly by hand, in metal core boxes away from the heat of the ovens. The cores after being made are placed on the trays of spring mounted pendulum type conveyors, power driven, on overhead tracks, which carry them to the spray tables at the core ovens. Sixteen core ovens, approximately 15 ft. by 60 ft. outside, are provided. Steel open-side cabinets about 4 ft. square by 6 ft. high, having shelves of various heights and mounted on overhead carriages, carry the cores through the oven. The speed of this conveyor is about 2 ft. per min., and the distance traveled approximately 120 ft.

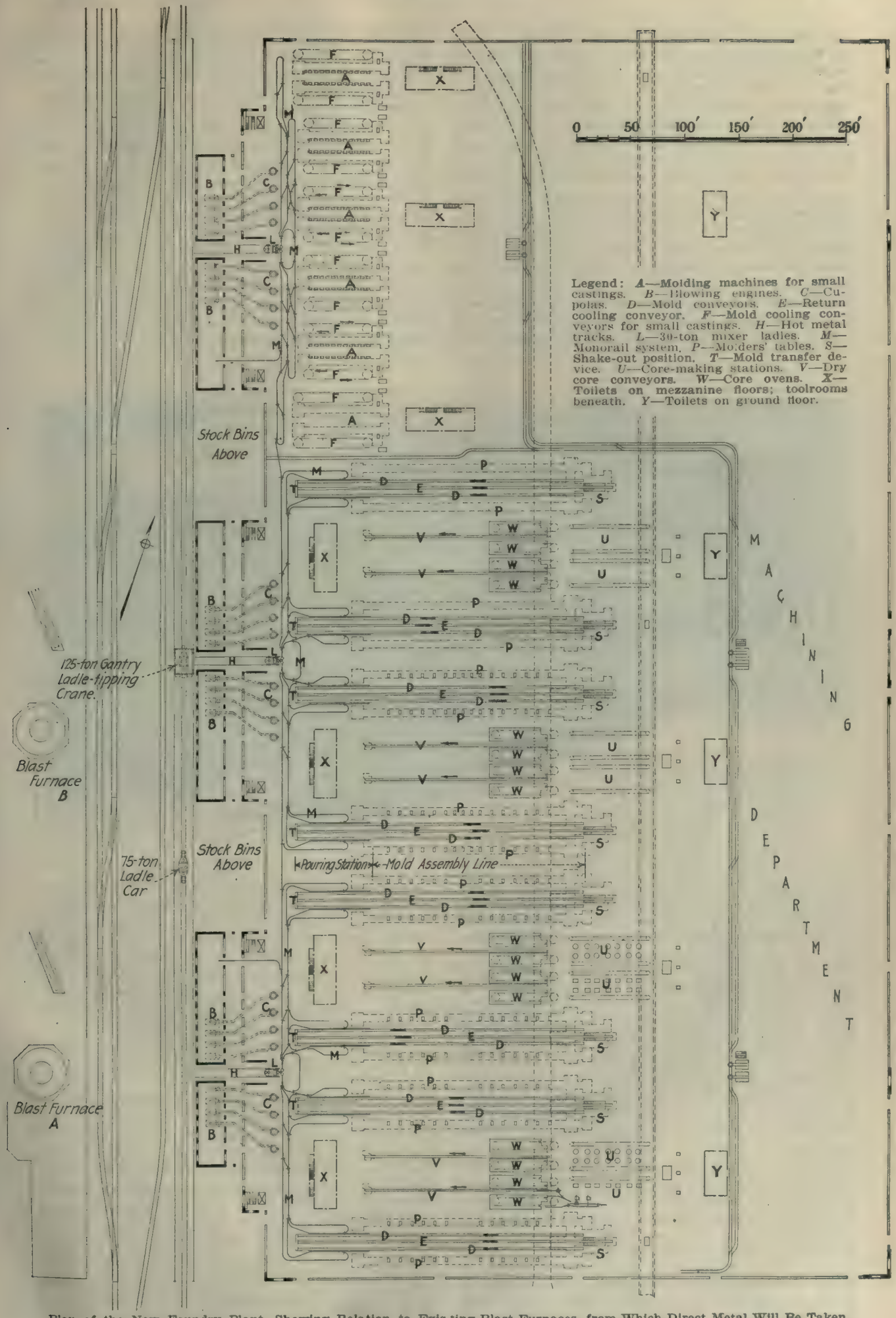
All ovens are fired on both sides by unenriched coke oven gas, produced in the coke plant as a by-product. The gas and the correct amount of air are mixed in a Sellack regulating set, and the mixture supplied to the plain pipe burners under constant pressure. The gases of combustion are exhausted above the roof by a slight fan draft.

The cores are sprayed in the stalls of a revolving four-quadrant shield, each stall having an independently revolving table of convenient height. This shield and the revolving tables were originally power driven, but this drive did not prove as satisfactory as hand operation. The cores are taken from the pendulum conveyors on one side of the revolving spray stalls, sprayed, and removed from the opposite side and loaded onto the cabinet type conveyor within easy reach for passage through the oven.

Baked cores are removed at the loading end from the return side of the oven conveyor, and are placed by hand on the dry core conveyor, which transports them to the rear of the ovens, to storage space. They are then loaded on cabinet type four-wheel trucks and pulled to the desired position along the mold assembly conveyors.

At the west end of the mold conveyors the molds are transferred by means of an overhead compressed air transfer arrangement, which skids them on rails from each conveyor alternately to the central return cooling conveyor. This latter is covered for practically its entire length, thereby forming a smoke tunnel from which the smoke is discharged above the roof by means of a fan.

This conveyor delivers the molds containing the cast-



Plan of the New Foundry Plant, Showing Relation to Exis ting Blast Furnaces, from Which Direct Metal Will Be Taken, and Indicating How the Transfer of This Metal Is Accompl ished, from the Hot Metal Ladle Car to the Shuttle Ladle Car and Thence to the Foundry Pouring Ladles. Arrange ments of monorail system, of mold and core conveyors, of blowing systems, etc., are made clear

ings onto the knock-down grating platform, where the clamps and flasks are taken apart by means of hand hooks, the molding sand dropping below and the castings swung, by means of specially designed clamps attached to a monorail carriage, onto a flight conveyor, which carries them up to an overhead cooling balcony.

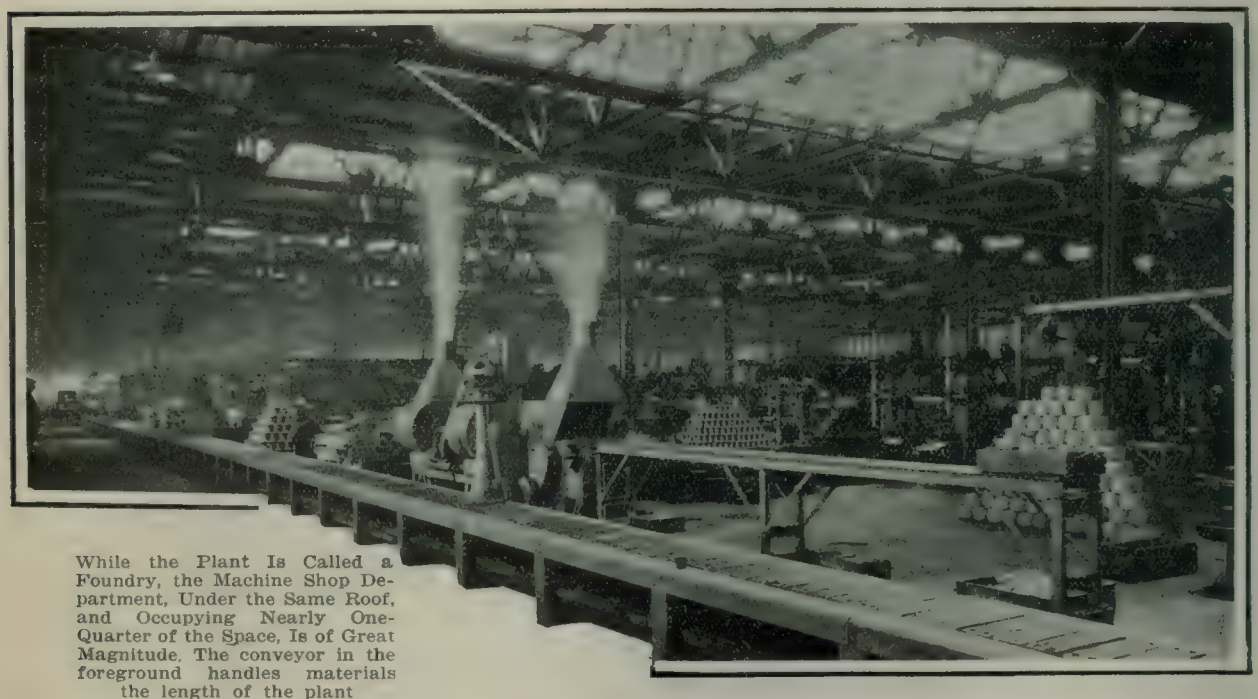
To avoid distribution of dust, a strong down draft is maintained on this knock-down grating. The air, coming from this grating, passes through a settling chamber and is exhausted above the roof. This settling chamber has a 30-ton capacity for recovered sand. At first practically all the bits of charred and burning paper from the molds were forced out of the exhaust stack, but the installation of a series of baffles in the settling chamber prevented this.

The sand falls through the knock-down grating onto a conveyor which elevates it to equipment, supported above the foundry floor, where it is crushed and screened twice and the iron removed by magnets. From this equipment the sand is returned by flight conveyors to the bins above the molders' tables, which are conveniently located along the mold assembly conveyors. The openings of the bins above the molders' tables have specially designed quick opening gates. A small grating, in front of each molder's table, permits the return of sand falling over the tables, by means of a flight conveyor, to the crushing and screening equipment. It was the intention to make this grating quite large in order to avoid any shoveling; but it was found that, with a large grating, much sand was allowed to fall from the tables unnecessarily, while with the smaller opening the workman is more careful in the operation of the bin gates, in order to avoid the shoveling.

After the castings have cooled sufficiently, they are conveyed to the knock-out grating, where the cores are removed by hand. A down draft, maintained over this grating, passes through a settling chamber and is exhausted above the roof. The sand falls through the grating onto a belt conveyor and is put through a crushing, screening, mixing process, the iron is removed, and the sand is delivered back by conveyors to the bins in the core departments ready for use. This system actually recovers 90 per cent of the sand.

From the clean-out, the castings are transported to the tumbler department, thence to the chipping platforms, and from there by trucks to the conveyor leading to the machining department in the foundry building, or to the loading platform for shipment to the Highland Park plant. From 300 to 400 large horizontal back-geared tumblers of special design, driven by belts from overhead shafting, are to be installed. As standard mills on the market have not given satisfactory results in continuous service, these units were built from designs by the Ford organization. In chipping, the air hammer is used whenever possible. For all necessary grinding of fins, gates, spouts, etc., portable emery wheels driven by flexible shafts are employed.

Twelve mold conveyor systems for small castings are provided. These vary in overall centerline lengths from about 60 ft. to approximately 100 ft., according to the type and weight of the particular castings to be made, in order to provide a return run of sufficient length for cooling. These conveyors are of the pendulum type without springs, equipped with one or more bracket trays carried on four-wheel trucks, running on overhead tracks and around 12 ft. diameter sprocket wheels. The traveling speed varies from 8 to 20 ft. per min. Two conveyors are arranged parallel, so that the return sides are about 12 ft. apart. The Pridemore electric jar ram molding machines are located in two lines parallel to the conveyor center lines, between the groups of the conveyors.



While the Plant Is Called a Foundry, the Machine Shop Department, Under the Same Roof, and Occupying Nearly One-Quarter of the Space, Is of Great Magnitude. The conveyor in the foreground handles materials the length of the plant

About twelve molding machines are to be provided for each mold conveyor. This number was determined from the experience of the foundry at the Highland Park plant with much different conveyor equipment. However, with the new equipment, the production has considerably exceeded the expected output. The molds are made up, clamped and placed on the conveyor, travel past the pouring station and are removed by hand to the knock-down gratings located at the end of the return cooling run.

Similar sand conveyor and conditioning process equipment, cooling balconies and the same type of finishing equipment are to be installed, with these mold conveyors, as described in previous paragraphs. Metal patterns are used for all production work, but a few wood patterns are in use in jobbing work. The metal patterns are mostly made hollow and plated and attached to plates.

A jobbing foundry of 40 tons daily capacity is located in the main foundry building. The jobbing cast-

ings cover a wide range in weights and analyses, and are required for replacements, new additions and development work, primarily for the main foundry equipment. In addition, the requirements of the coke plant group, the blast furnace department and the sedan body building departments will be cared for as far as possible. This jobbing foundry is served for its entire length by a 25-ton overhead electric crane of 60 ft. span. A 3-ton electric furnace of the single-phase type, with two electrodes, is now being moved to this jobbing foundry, and in the immediate future a second electric furnace of larger capacity is to be installed. This furnace will probably be of 15 tons capacity, but operations have not yet become extensive enough to forecast the demand on the jobbing foundry.

Each conveyor drive throughout the foundry is equipped with one or more breaking pins, and electrical overload relays, as a protection against overloading and emergencies. A large number of the conveyors are driven by a especially designed Ford gear reduction unit, which has proved very satisfactory.

It is interesting to note that a large amount of the floor and industrial track haulage is done by a so-called "Ginny," which consists of the mechanical equipment of the Ford car, mounted on solid rubber tired wheels having a narrow gage and a 48-in. wheel base. The channel body frames of these units are semi-circular at the ends, so that no coupling is necessary for handling the industrial track cars. The fuel used is motor fuel of 50 per cent benzol and 50 per cent gasoline, which is made at the plant and is, also, retailed to the public from a service station at the coke plant group. These units have proved quite satisfactory for heavy haulage. Storage battery platform trucks are also used extensively.

A portion of the floor space at the east side of the main foundry building, 124 ft. x 1100 ft., is occupied by the machining department. Here all machine work on the cylinder blocks for the cars and tractors, tractor crank cases, housings, etc., or in general the heavier castings, is completed. All the equipment of this department is arranged for large scale quantity production, and consists essentially of specially designed machines, fixtures and jigs for the operations accomplished. The machines are designed in general to use special heads or fixtures holding a number of castings, and are grouped according to the sequence of the operations.

All machines have unit drive. During the progress through this department the castings are carried on power-driven platform conveyors, or pushed by hand on roller type runways, provided to each machine, thereby requiring a minimum of lifting by each machine operator. A power-driven platform conveyor carries the castings, after the machine work is finished, to the loading platform directly to the north of the main foundry building. This department can handle each day the complete daily output of the foundry, in cylinder blocks of both classes, and the heavier type of other castings such as housings, tractor crank cases, etc.

Maintenance and operation of the mechanical equipment will require continuously from 400 to 500 men. Under the maintenance department the following shops will be grouped: blacksmith, tinsmith, structural, machine and electric repair shop. The blacksmith shop has power hammers, and will employ from 15 to 20 men. The tinshop has power machines, and will employ about 25 men. The structural fabricating shop is equipped to handle steel plates up to 72 in. and beams up to 16 in. and will employ about 30 men. The machine shop is fully equipped to handle all operations on material up to 5 ft. diameter and will employ about 50 men. The electrical repair shop will employ about 15 men.

The ventilating and heating system is of the hot blast type, through galvanized iron ducts placed above the lower chord of the trusses. The duct outlets are brought down to approximately head level. Two fans of the multi-blade type, each handling about 60,000 cu. ft. per min., with the necessary heating stacks, are placed overhead in each bay, and feed into independent ducts. The direct heat loss is approximately 70,000,000 B.t.u. per hr., while the air change loss is approximately 140,000,000 B.t.u. per hr.

Two electric traction elevators, 6 ft. x 8 ft., running to the top floor, are provided in each cupola building. Four similar elevators are placed in the main foundry building for elevating the back stock. Ample walkways and stairs are provided around all conveyors and other equipment. Safeguards around all equipment have been very carefully designed. In the foundry and cupola, the connected power in motors will be, when fully complete, approximately 12,000 hp., and in the machine department 2000 hp. The factory demand is around 90 per cent.

Moderate Improvement in Coke Region

UNIONTOWN, PA., Sept. 24.—There are indications that September may definitely mark the turning point in the furnace coke industry in the Fayette county or Connellsville bituminous region. There is a firmer demand and tone to market inquiries and a noticeable increase in coke production this week. Price has been advanced to a minimum of $3.25 and ranges upward by various stages to $3.60. One inquiry for 5000 tons of furnace coke monthly resulted in keen bidding, but so far as is known no one quoted a price which was less than $3.25.

Observers are watching the next step to be made by the H. C. Frick Coke Co. Coal production at the Frick mines is gradually being increased, the big Leisenring No. 1 plant at Connellsville having resumed work in coal output last Monday. It is understood that other Frick superintendents have had orders to prepare for resumption, although official announcement is still lacking. So far the Frick company has put no ovens in operation.

Operations in the region are now on a uniform wage scale, all companies paying the Frick scale, which is that of November, 1917.

Prizes for Employees

The National Cash Register Co., Dayton, Ohio, recently distributed $8,000 to employees who had submitted the most valuable suggestions for improvement of their product during the first six months of this year. The first prize, which consisted of $150 and an educational trip to Cleveland, Dunkirk, Buffalo and Syracuse, was won by two tool makers, their suggestion being the adoption of a ball-bearing parallel in sensitized drilling. Ten of the leading prize winners were also awarded the educational trip. One hundred dollars in prizes was also distributed to the winners of a special suggestion contest for slogans to be used in the company's advertising. A. M. Wise won first prize with the slogan, "National in Name, Universal in Use." The banner given by the company in each contest to the department contributing the most valuable suggestion was presented to the tool supply department. Frederick B. Patterson, the new president of the company, made the distribution.

A protest against House Bill 7456, paragraph 386, wherein a duty of two cents per pound is imposed on pig tin, while tin ore would come into the United States duty free, was passed at the meeting of the metal division of the National Association of Waste Material Dealers, which held quarterly meetings at the Hotel Astor, New York, last week. Members of the association claim that such an arrangement would discourage and destroy those industries devoted to the reclaiming of tin in the United States. No meeting of the iron and steel scrap division was held.

KROM SINTERING SYSTEM

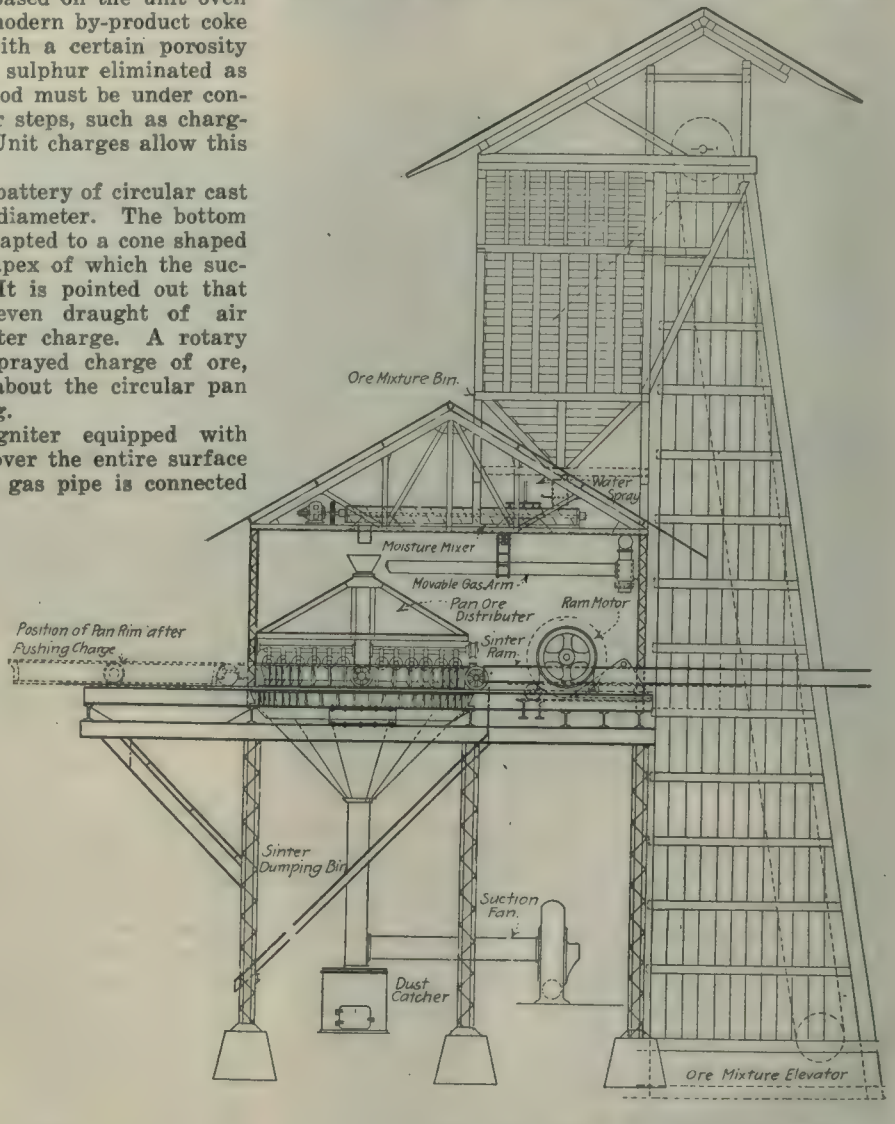
Retaining Walls of Pan Form Motor Driven Ram for Discharging

The method of discharging the product is the novel feature of the Krom sintering system, invented and developed by S. A. Krom, Sintering Engineering Co., 25 Beaver Street, New York. The retaining walls of the cast iron pan holding the charge on the grate form a motor-driven ram for pushing off the finished sinter. The rim or the retaining wall of the pan is mounted on wheels and is provided with a cast steel plow, which travels clear of the grate and rips the sinter cleanly from the grate, at the same time breaking it into desirable sizes. It is claimed that this discharging operation is automatic, fast and positive in its results; that for a very large tonnage but two men are required in the pan room, an operator and helper.

This system of sintering is based on the unit oven principle, such as employed at modern by-product coke ovens. To obtain a material with a certain porosity and strength and with as much sulphur eliminated as possible, the heat treatment period must be under control and independent of all other steps, such as charging, igniting and discharging. Unit charges allow this ideal condition.

The Krom system employs a battery of circular cast iron pans from 12 to 25 ft. in diameter. The bottom or grate portion of the pan is adapted to a cone shaped sheet iron extension, from the apex of which the suction draught is drawn down. It is pointed out that this construction insures an even draught of air through all portions of the sinter charge. A rotary distributor spreads the water-sprayed charge of ore, flue dust, coke or coal, evenly about the circular pan without compression or packing.

A motor-driven traveling igniter equipped with burners for gas or oil, which cover the entire surface of the pan, is used. A pivoted gas pipe is connected permanently with the traveling igniter. In a two-pan battery the charging distributor and the igniter travel over the pan by motor power on semi-circular tracks; in the case of three or more pan units the tracks are laid in a straight line oyer the extent of the battery and the igniter receives its gas supply from an automatic valve at each pan location.



The Retaining Walls of the Cast-Iron Pan Holding the Charge on the Grate Form a Motor-Driven Ram for Pushing Off the Finished Sinter. The broken lines on the platform (at the left and one-third the distance from the bottom to the top of the illustration) represent this ram's position immediately after a discharge has been made. The sinter has fallen into a hopper underneath, thence has glided down a chute to the dumping bin

Though the sintered material may drop slightly into the openings of the grate, its porosity allows the air to pass through. It is wedged in the openings so lightly that the plow has no difficulty in dislodging and removing. As the rim moves outward in the discharging operation the sinter falls into a hopper and thence into a sheet iron dumping bin where it is immediately quenched to protect the bin.

The 12 ft. diameter pan has a capacity of from 250 to 500 tons per day; the 25 ft. pan, 1000 to 2000 tons, according to the nature of the charge to be treated. Unit additions may be made at rates as low as 10 to 20 tons a day. For the Krom system in use a low repair and labor cost is claimed and no royalty charges are made.

The system was recently installed for the commercial sintering of Clinton hematite ore of the Birmingham, Ala., district at the plant owned by J. D. Lacey, 350 Madison Avenue, New York. The capacity will be increased, results so far having proved satisfactory.

With the Clinton hematite ore about 4 or 5 per cent of coke breeze, or 8 per cent of coal dust is mixed before charging; also 10 to 15 per cent of water.

An Error Corrected

In the communication of Frank Samuel, Philadelphia, which appeared on page 749 of THE IRON AGE of Sept. 22, a quotation was made from the report of the trial examiner of the Federal Trade Commission in the complaint filed against American importers of ferromanganese from England. By an error of the printer the word "no" was omitted. The sentence should have read: "There was *no* evidence that the importing and selling of ferromanganese by the respondents or their principals into the United States was done with any intent to injure the manufacture of ferromanganese in the United States, and there are no facts and circumstances proved from which such intent can logically or legally be inferred."

"Use a hook to clear away cuttings" enjoins an illustrated poster published by the National Safety Council. "Steel chips curl up and are as sharp as razor blades. You're sure to get cut if you pull them away by hand." The illustration depicts a machinist using the hook.

President Farrell Testifies at Washington

Appears in Rehearing of Application of United States Steel Products Co. to Operate Ships Through Panama Canal—Says Jobs of 30,000 Men Are in Danger

WASHINGTON, Sept. 27.—President James A. Farrell of the United States Steel Corporation appeared yesterday as a witness before Examiner Fuller of the Interstate Commerce Commission in connection with the taking of testimony at a rehearing on the application of the United States Steel Products Co. to operate ships through the Panama Canal. In May, 1920, the commission authorized the Steel Products company, exporting subsidiary of the Steel Corporation, to continue the operation of its ships through the canal. Some months ago, the commission ordered a rehearing on the allegation of shipping interests using the canal that competition between ships passing through the canal and the Elgin, Joliet & Eastern Railroad, operating out of Gary, Ind., to northern Illinois points and the Bessemer & Lake Erie Railroad, operating in Pennsylvania, exists in violation of the Panama Canal Act. Representing counsel for the Steel Products company were three of its most prominent attorneys, R. V. Lindabury, Charles S. MacVeagh and Charles S. Belsterling, while Louis Pfeiff, traffic manager for the Steel Products company submitted statistical exhibits tending to show that the Steel company engaged in coastwise trade through the canal so as to assure service for the parent company at a time when the lines that had been operating through the canal had sent their boats to more profitable business across the Atlantic Ocean. Frank Lyon, counsel for the Luckenbach companies, conducted the cross-examination of Mr. Pfeiff with a view to bringing out the nature of the competition between the Steel Products company line and the lines not affiliated with any large shipper, which he called independent lines.

Reason for the Service.

Mr. Farrell said that the steamship service of the Steel Corporation was established to enable the corporation to meet competition anywhere in the world and so it could send its products to ports to which regular service was not maintained and where facilities for loading or unloading heavy articles might not be available. The steamships of the corporation frequently carry lighters knocked down, to be set up and used where steel is to be delivered. In the same way, they carry facilities for loading and unloading heavy commodities.

"The Luckenbach company entered the Pacific Coast service in 1920," said Mr. Farrell. "It was in the general steamship service long before that, but it did not enter the coast-to-coast service until long after the United States Steel Products Co. had entered it."

It is believed that this testimony was offered with the impression that the Luckenbach company was raising the question whether the commission should allow the Steel Products company to operate ships through the canal. No evidence was given that the Luckenbach company was opposing a continuance of that permission other than the fact that Mr. Lyon was present to cross-examine witnesses introduced by the Steel Products company to show that there had been no substantial change in conditions since the commission issued its permission other than a reduction in the amount of business to be done.

Mr. Farrell Amused.

Amusement was expressed by Mr. Farrell at the idea that there is or could be such competition between the railroads operated by the United States Steel Corporation or its subsidiaries as to bring the operations of the Steel Products line within the provision intended to keep railroad-owned ships out of the canal. Mr. Farrell said that even if the Elgin, Joliet & Eastern and the Bessemer & Lake Erie were lines not controlled or influenced by the Steel Corporation, they could not be factors in the making of transcontinental rates, or rates from the Pittsburgh district to New York. He declared that they are in a pocket so far as rate making is concerned.

"The competition that is to be feared," said Mr. Farrell, "is not the competition between the rail and water lines and the rail lines involved in this proceeding, but the competition from European steel makers and European steamship lines to the west coast of the United States, especially the United American or Harriman line and the Hamburg-American. The combination between the Harriman and Hamburg-American makes possible the spectacle of American ships carrying German steel to American ports. It is possible to use the Luckenbach lines to Hamburg and back to San Francisco at a rate on steel of $3 a ton less than from New York to San Francisco. I do not say that that is being done now, but it is possible. The rates are so made that the steel could be shipped to Hamburg by the Luckenbach line and then back to San Francisco for less than from New York to San Francisco. That is the kind of competition that is to be feared.

Employs 30,000 Men.

"Our Pacific Coast business gives employment to about 30,000 men, with the services of whom we will have to dispense if the foreign competition continues to grow as it has been growing. In time of unemployment such as the present, that, it seems to me, is a serious matter."

Among the facts brought out by the testimony of Mr. Pfeiff was that the competition from Europe for the steel business of the American Pacific Coast is such that, in a commercial sense, it may be said that the western part of the United States has been "annexed to western Europe." Germany and Belgium, it was stated, are dominating that market and England is getting into it because the water rate from the ports of western Europe to Pacific Coast ports is only a little more than $7 a ton, which is less than the inland rate from Pittsburgh to New York. American steel makers, it was stated, are obtaining a little of the business because time of delivery is a factor. Mr. Pfeiff said that the customs duties and cost of transfer from the boat to destinations away from the water front of the Pacific ports enable Americans to take a little of the business, but Europeans control the market, even in competition with the mills in Colorado. The situation, owing to the low value of European money in comparison with the dollar, was described as being as unsatisfactory from an American point of view as it was in 1914 just prior to the outbreak of war when European steel makers were taking practically all the business.

It was brought out that the Steel Products steamship line does not participate in the various steamship conferences, but observes the rates and rules put out by the conference. One of the exhibits submitted by Mr. Pfeiff showed that while the Isthmian Line in the 13 months ending July 31, 1921, paid out $304,000 in canal tolls on traffic it carried through the canal to Pacific Coast ports of the United States and Vancouver, B. C., it transported only 10 per cent of the westbound traffic and 12 per cent of the eastbound.

Frank T. Bentley, traffic manager for the Illinois Steel Co.; Louis C. Bihler, traffic manager for the Carnegie Steel Co., and J. E. Steyers, general freight agent of the Bessemer & Lake Erie, gave testimony similar to that given by them a little more than one year ago when the commission gave permission to the Steel Products company to continue the operation of ships through the Panama Canal.

Reconstruction of French Steel Plants

Rebuilding Permits Adopting Advanced Practise—Hot Drawing, Mechanical Properties at High Temperatures and Heat Treatment Discussed by Iron and Steel Institute

(Special Correspondence)

PARIS, FRANCE, Sept. 10.—The final session of the Iron and Steel Institute's autumn meeting, held on Sept. 6, was largely occupied with the question of devastations and the progress of reconstruction in the plants of the war area, visible evidence of which was afforded in the excursions which occupied the remainder of the week.

War Issues to the Front

It is evident that there is very strong resentment at the systematic destruction of metallurgical plants by the Germans. This would be better understood by visitors from England if the whole of the Midlands and the Cleveland district had been put out of action, as well as half the coal mines and plants in Durham. Perhaps the average Englishman is too ready, after any and every kind of fight, to say, "Well, let's shake and forget it." But it certainly does seem that an attitude of this kind is the only policy which can save Europe. This attitude is naturally distasteful to those who have suffered so much; but it seems rather a pity that there has been a tendency to develop heart-to-heart talks on differences in points of view regarding purely political matters at a purely technical congress. If we may judge by some of their informal conversation, the French hosts of the British members know exactly what is in Lloyd George's mind and what are his inflexible intentions. In this respect they certainly have the advantage over their guests, and probably over Lloyd George as well.

In spite of the war damage and devastations, the French metallurgical industry seems to have come fairly well out of the war. Much of the plant which was removed to Germany has been recovered and replaced, while the metallurgical wealth of the restored territory is not an asset to be ignored. There are also some fine plants in full going order in the restored territory. The Thyssen interests completed the works at Hagondange just before the war, and this plant—one of the most up-to-date in Europe—is now in French hands entirely undamaged. The Lorraine works are turning out the cheapest steel in the world and are not yet working at full capacity, so the fact that other works are not in commission is not likely to affect France's position as a producer in the present state of the world's trade. The English maker, undersold in his own country, cannot altogether see that the French have very much to complain about under present conditions. In three or four years' time, when all the devastated plants have been reorganized and equipped in accordance with the most up-to-date practice, the devastations will probably be regarded as a blessing in disguise. Some of the English plants, which have been trying to keep going under adverse conditions, may be wishing before long that they had been devastated, too, and start a cry on their own account.

The reconstruction which has already taken place is really remarkable, and further activity on the same lines should assure a brilliant future for France in the iron and steel industry. At any rate, neither the state of mind of Lloyd George nor the state of Europe is likely to be materially affected by the heart-to-heart talks which took place during the various entertainments so kindly provided by the hosts of the Iron and Steel Institute.

Destruction and Rebuilding of French Works

THE first paper read at the second session was by Prof. Léon Guillet, of Paris, on the "Position of the Metallurgical Industries of Northern and Eastern France: Their Destruction and Reconstruction." Nearly in full, the paper is as follows:

It is of interest to note, in the first instance, the situation in which France found herself as the result of the invasion, so far as her metallurgical needs were concerned.

The French production of coal in 1913 was 40,844,000 tons, and 50 per cent of this production was from the occupied regions. The iron ore production in 1913 had risen to 21,918,000 tons. Of this amount 83 per cent was mined in the invaded regions. The pig iron production was 5,207,000 tons, of which 2,560,190 tons were produced in the East and 933,089 in the North. Of the total, 64 per cent of the productive capacity passed into enemy hands. Finally, of a total steel production amounting to 4,934,000 tons, 2,528,630 tons were made in the East and 1,165,888 tons in the North. By reason of the situation of the works, 63 per cent were on the side of the battle-front farthest removed from France. The list on the opposite page enumerates the principal iron works destroyed, but it should be noted that this list comprises only works making pig iron and steel, and does not include foundries, some of which, like those of Muller & Roger at Noyon, were exceedingly important. Nor does it include engineering works having subsidiary metallurgical shops, although, as in the case of the Société Française de Constructions Mécaniques (Anciens Etablissements Cail) at Denain, some of these were of considerable size. The amount of material removed by the enemy from iron works totaled: 56,321 tons of plant and machinery and 51,429 tons of stock yard material and finished products.

A point that requires emphasizing is that of all this destruction only a very small proportion was due to actual war damage. The bulk of this destruction was deliberate, and had as its object the putting of French iron works out of action for many years to come. In support of this statement may be adduced such facts as that in works situated along the actual firing line, whose destruction might otherwise be attributed to war damage, dynamite cartridges are known to have been used to destroy all the producing plant, such as furnaces, rolling mills, and hammers. The author has himself removed, at the Biache Saint-Vaast Copper Works, near Arras, a whole series of high explosive cartridges from the principal parts of the plant and machinery.

In regard to works situated at a considerable distance from the front two distinct periods are noticeable, more especially in the case of works in the Sambre. Soon after the invasion the enemy encouraged the captured work people to continue at work, and proceeded with the completion of workshops and plant then in course of construction. At, however, the beginning of 1916 came the period of a general inspection of the invaded works, when note was taken of which works should be destroyed and which should be despoiled. Shortly afterward the work of destruction was commenced; entire shops, pillars, girders, and roofs, as

well as shop tools, were removed, and what could not be taken away was, generally speaking, destroyed. In some regions so systematically was this destruction carried out that a whole arsenal of works-breaking machinery was created for the purpose. In a number of works the overhead travelers were called into service to drop heavy tups all over the machinery, floors and foundations, wherever, that is, they could reach.

Name of Works	Plant	Output and Number of Workers
Etablissements Arbel Hauts-Fourneaux de la Chiers	5 open-hearth furnaces, important forge and hammer shops, 4 blast furnaces, 3 converters, rolling mills	300 tons of steel, 2100 workmen, 82,000 tons of pig iron
Hauts - Fourneaux, Forges et Aciéries de Denain et Anzin.	8 blast furnaces, 4 converters, 10 open-hearth furnaces, 12 puddling furnaces, rolling mills and foundries	334,677 tons of pig iron, 396,262 tons of steel, 6500 workmen
Usine de l'Espèrance	4 blast furnaces, 12 puddling furnaces, converters and rolling mills	142,843 tons of pig iron, 152,825 tons of steel, 1900 workmen
Société Métallurgique de Gorcy	Blast furnaces, forges, and wire mills	
Aciéries de Longwy	9 blast furnaces, 6 converters, rolling mills and foundries	364,680 tons of pig iron, 314,234 tons of steel, 6744 workmen
Usine d'Homécourt	7 blast furnaces, 4 converters, 2 open-hearth furnaces, rolling mills, &c.	453,650 tons of pig iron, 345,000 tons of steel
Aciéries de Micheville	6 blast furnaces, 4 converters, rolling mills and foundries	389,599 tons of pig iron, 208,832 tons of steel, 3000 workmen
Aciéries du Nord et de l'Est	7 blast furnaces 5 converters, 2 open-hearth furnaces, rolling mills, &c.	242,890 tons of pig iron, 192,308 tons of steel, 4800 workmen
Forges et Aciéries de Pompey	4 blast furnaces, 3 converters, 1 open-hearth furnace, rolling mills, and forge and foundries	
Hauts-Fourneaux et Fonderies de Pont à Mousson	8 blast furnaces, 26 cupolas, foundries and coke ovens	285,000 tons of pig iron, 179,000 tons of castings, 6200 workmen
Société Métallurgique de Pont-à-Vendin	3 blast furnaces, steel works and rolling mills	
Usines de la Providence (Hautmont et Rehon)	3 blast furnaces, 3 open-hearth furnaces, rolling mills and foundries.	196,000 tons of pig iron, 220,000 tons of steel, 2300 workmen
Etablissements Raty et Cie	4 blast furnaces, foundries	94,677 tons of pig iron, 335 workmen
Etablissements de Saintignon et Cie	5 blast furnaces	173,393 tons of pig iron
Société Métallurgique de Semelle-Maubeuge	7 blast furnaces, steel works, open-hearth and Talbot furnaces, rolling mills, foundries	4250 workmen
Société Lorraine Industrielle	2 blast furnaces	51,702 tons of pig iron, 125 workmen
Forges de Vireux-Molhain	Open-hearth furnaces, rolling mills, foundries	91,319 tons of finished products, 1200 workmen
Etablissements de Wendel	8 blast furnaces, 6 converters, rolling mills	393,723 tons of pig iron, 330,207 tons of steel, 2383 workmen

Reconstruction

The work of reconstruction has been truly remarkable, taking into consideration the conditions under which it had to be undertaken. After the armistice it was impossible to rely on finding anything that might be needed in the immediate locality. Everything had been systematically destroyed or stolen. Machinery, raw materials and labor were lacking, and the workmen were scattered far and wide. On the other hand, the lack of coal and of means of transport made it impossible to rely on the regions still intact, besides which the latter, suddenly diverted from the manufacture of munitions to the requirements of peace, and with very meager resources, could not for a long time be expected to grapple with the heavy demands with which they met. Indeed, by a paradoxical position of affairs, it was the very works to which firms more in the center of France would ordinarily have looked to provide coal and ores which were themselves most in need of material and fuel for their own reconstruction.

Details will be given of how this situation was met and of the results accomplished.

Société Anonyme des Hauts-Fourneaux, Forges et Aciéries de Denain et d'Anzin

This company had suffered very seriously. At the opening of 1921 only two workshops were at work, the refractory products department and the iron foundry. These departments were housed in two main buildings, each 120 x 15 meters, (394 x 49 ft.) provided with six overhead cranes of a capacity varying from six to 40 tons. By March, 1921, the production of refractories had reached 820 tons, while in the foundry 400 tons of iron castings and 40 tons of steel castings had been produced. This represents, however, but an infinitesimal part of the work of reconstruction. Foundations and constructions had already been put in hand to a value of 63,000,000 francs, and orders placed for further plant to the value of 103,000,000 francs. These orders include four blast furnaces of 300 tons capacity, with Stahler bin chargers (of which the first furnace will be blown in this year), four 30-ton basic converters, and a reserve mixer of 500 tons; four 40-ton open-hearth furnaces with two mixers, one of 150 tons and the other of 50 tons; a central power station, the building of which is already finished, and the plant for this power station, comprising seven 4100-hp. gas engines, seven 3200-kw. alternators, and four gas blowing engines of 100 m³. capacity at 0.50 m. mercury (35,000 cu. ft. at a pressure of 7.35 lb. per sq. in.) The recuperation of the heat of the gases escaping from the gas engines will be undertaken in boilers and in turbo alternators.

Société des Aciéries de Longwy

The efforts put forth here have been no less considerable. Formerly the company possessed nine blast furnaces, seven at Mont-Saint-Martin and two at Moulaine, six km. (3¾ miles) from the steel works and connected therewith by a private railroad. The whole plant was systematically pillaged and destroyed. The Moulaine furnaces were restarted in July, 1919, and a furnace was blown in at Mont-Saint-Martin in January, 1920. Two more followed in April and July, and seven are now either working or ready for blowing in. Occasion has been taken to replace the blowing engines destroyed by much more powerful new ones, and the capacity of these seven blast furnaces which before the war was 32,000 tons per month has now risen to 38,000 tons per month.

The open-hearth plant contained twelve gas producers, one 350-ton mixer, three 60-ton tilting furnaces, and two 20-ton fixed furnaces. It was served by 14 overhead cranes and had just been completed when war broke out. The producers and the mixer have disappeared, while of the open-hearth plant only the dismounted shells of the two fixed furnaces remain. The structural steel work of the shops was, for the most part, demolished and the steel members cut up by means of the blowpipe and dispatched into Germany. The overhead cranes, with the exception of two, were taken away. The two that remained were kept for the purpose of stripping and loading up the material pillaged from the works.

Here again work has begun. The first 25-ton open-hearth furnace was put into operation in July, 1920, and the second in September of the same year. The structural steel work and overhead cranes have been restored, as well as one of the 60-ton tilting furnaces, which has been completely rebuilt. This open-hearth department is already capable of producing 8000 tons of open-hearth steel per month. Within five or six months its reconstruction will be complete and its monthly capacity will then reach 15,000 tons.

The basic steel department comprised two 200-ton mixers and three 18-ton and four 24-ton converters. The latter, installed in 1914, had not, at the outbreak of the war, been got to work.

After the armistice the condition of the plant was as follows: Of the mixers nothing but the shells remained. The three 18-ton converters had been demolished and the four 24-ton converters had been removed to Ger-

many, as had also a 20-ton overhead crane, part of the roof and the whole of the basic shop plant. The charging machines, the cupolas, the overhead transporters, the lime bins, and most of the floor plates had been destroyed, as well as one of the blast blowing engines and the four compressors. Of the accessory plant, such as stripping cranes, ladles, ingot molds, capstans, slag crushers, etc., nothing escaped either destruction or removal.

The first care of the company after the armistice was to recover the four 24-ton converters which had been taken to recovered Lorraine. Thanks to ceaseless work, these four appliances were restored by July, 1920, and on Aug. 16 the first charge was blown.

Whereas in the blast furnace and steel departments some little salvage remained, the 14 trains of rolls working in 1914 were systematically pillaged or destroyed. The problem of reconstruction was therefore more complicated, as it was impossible to recover the 14 mills and their accessories. The first care was to put in order the blooming mill, the heavy sheet mill, and the semi-continuous, the principal parts of which had been stolen but were recoverable. Reconstruction to this extent would allow of some degree of rolling down the steel works output. This program was sedulously followed in face of innumerable difficulties, for not only had much accessory plant been destroyed, but the mill parts recovered from Germany had suffered enormously in the course of dismantling and removal. Despite all these difficulties the company was able to start these three mills in July, 1920. There still remain to be reinstalled the whole of the sheet and section mills to replace those destroyed. The company will profit by the occasion by introducing all the most recent improvements and thus creating a plant corresponding completely with the latest metallurgical practise and with the economic conditions which the post-war situation imposes. The whole of this plant is on order, and much of it would have been put down by now had the contractors been able to keep their engagements. Thus, in less than two years a new works has arisen on the ashes of the old, not, it is true, complete, and still far short of what it was before the war, yet forming, as a whole, a unit capable of producing, monthly, 20,000 tons of rolled steel.

The Rehon works near Longwy were in great part destroyed and dismantled. Of the three blast furnaces, however, two were not beyond repair, and on May 23, 1919, one was blown in again and the second was similarly got to work on Oct. 14 in the same year. For this purpose a 500-kw. electrogenerative set and a blowing engine had to be repaired. From Oct. 15, 1919, to Aug. 15, 1920, the various central power station engines were got to work.

The basic steel plant, which had been entirely dismantled, was recovered from the Sarre district, as well as the rolling mills. The first cast was poured at the steel works on Nov. 18, 1919, less than a year after the liberation of the works. On June 8, 1920, the electric mill drive was first started, and by the end of the month the first blooms were being sent out. By Nov. 30 in that year the 950-mm (37½-in.) mill was in operation. Two years had been found necessary to repair the plant installed in 1910-1911. Besides this, over 8000 tons of material stolen by the enemy had been recovered.

Compagnie des Forges et Aciéries de la Marine et d'Homécourt

The Homécourt works, which were among the most important in France, comprised blast furnaces, steel works, rolling mills, and all accessory plant.

Out of seven blast furnaces provided with 29 Cowper stoves and capable of producing 1200 tons of pig iron per day, two have been restarted. The two 1000-hp. steam blowing engines and the five 1200-hp. gas blowing engines have been replaced by two 1700-hp. gas engines and a 2000-hp. turbo-blower, installed as a temporary measure. Two 160-ton mixers were destroyed. They will be replaced and reinstalled at the steel works. Out of 56 boilers giving 7360 m² heating surface and supplying steam for the blast furnace blowing engines, the steel works blowing engines, and the blooming and reversing mill engines, only 30, with a heating surface aggregating 3000 m², remained, (32,300 sq. ft. out of 79,200 sq. ft.) the rest having been either removed or destroyed.

The basic steel works, consisting of four converters of 17 to 21 tons capacity, capable of producing 1200 tons of ingots daily, the basic shop and all the accessory plant had been entirely destroyed. Among the rest were two 3000-hp. blowing engines and a series of pumps which had been reduced to scrap.

The steel works is in process of restoration. The building itself has been rebuilt. The open-hearth shop, with its two 40-ton furnaces and its producers, had been removed in their entirety into German works. The iron work of the shop buildings and the producers have been recovered and reinstalled.

The rolling mills of the Homécourt works consisted of two trains of blooming mills of 2750 × 1100 mm. for ingots of four to five tons, driven by steam reversing mill engines, and a two-high reversible 850-mm. mill of four stands, one for billets and three for large sections and rails. This mill was driven by two steam reversing mill engines. There were also a three-high 635-mm. mill for smaller sections with three stands, driven by a 1500-hp. three-phase motor, a three-high universal mill for flats up to 800 mm. wide, driven by a 2500-hp. motor, and a three-high Lauth mill for medium-sized plates with a three-high stand of 2200 × 750 mm. rolls for smooth sheets and an 1800 × 700-mm. stand of rolls for chequered plates driven by a 2500-hp. three-phase motor, besides a large shop for the straightening and dressing of rails and sections, machine tools for making beams, and Lackawanna planing machines.

[Editor's Note: 2750 × 1100 mm. = 108¼ × 43¼ in.; 850 mm. = 33¼ in.; 635 mm. = 25 in.; 800 mm. = 31½ in.; 2200 × 750 mm. = 86½ × 29½ in.; 1800 × 700 mm. = 70⅞ × 27½ in.]

Only the mill buildings remained standing, and these badly damaged. All the plant and tools had been taken away. There were left but two bare housings in the medium plate mill and the 1500-hp. electric motor of the medium three-high section mill, likewise badly damaged. One blooming mill has been recovered, as well as the two 2500-hp. motors which had been taken to a German works.

At present the mills are in course of reinstallation and work is in hand in preparation for the future reinstallation of the blooming mill, of a Morgan billet mill, and of a universal mill for large plates up to 1.2 m. (47 in.) in width.

Much of the central station electric plant, particularly two 2000-hp. electrogenerative sets, had been removed. These have been recovered and are being remounted. The other motors, which had been badly damaged, are being repaired.

At the works of this company both the steel department and the rolling mills were utterly destroyed. Before undertaking the work of reconstruction an agreement was entered into with the Compagnie des Forges et Aciéries de la Marine et d'Homécourt that the work of the two companies should be carried on jointly, sections, rails, girders, U-sections, angles, etc., being made at Micheville while Homécourt should specialize in sheets, plates, blooms, and billets. The Micheville works will comprise:

The six blast furnaces which existed in 1914, renovated and altered so as to produce 250 tons of pig iron each per day.

Two gas-fired mixers of 600 tons capacity each.

A steel works provided with four 28-ton converters, space being allowed for a fifth.

Two car-casting sets and an overhead casting crane as a stand-by. Space has been provided for two electric furnaces for refining purposes, to be installed later.

A battery of unfired soaking-pits with 36 holes and two gas-fired soaking-pits with 24 holes each will be installed.

The rolling mills will consist of an 1150-mm. (45-in.) blooming mill driven by a steam reversing engine and two steam hydraulic shears, and a 44-in. American blooming mill driven by a reversible electric motor of 12,000 to 15,000 hp. These two blooming mills will suffice to feed two semi-continuous American mills, comprising:

1. A heavy section mill consisting of one stand of 36-in. breaking down rolls, driven by a reversible electric motor of 10,000 to 12,000 hp.; two stands of 28-in. three-high rolls driven by an electric motor of 3000 hp., and one stand of

28-in. finishing rolls driven by a 1500-hp. motor. These four stands, arranged tandem at distances allowing of simultaneous rolling in each, will allow of an output of 60 tons per hour.

2. A small section mill consisting of five stands of rolls arranged tandem so as to allow of the simultaneous and automatic rolling of products with an output of 40 tons per hour. This mill will be driven by two electric motors of 1500 hp. each, and one of 500 hp. It will be fed from two continuous mill reheating furnaces, each capable of supplying 40 tons of blooms per hour, charging cold.

Space has been provided behind the 1150 mm. blooming mill for the installation of a continuous mill for billets and flats similar to the one to be erected at Homécourt. At the end of the mill will be installed cooling beds, live roller gear, bar banks and overhead travelers, in order rapidly to remove and deal with the mill output.

The necessary energy will be supplied by a central station containing six 6000-hp. gas engines (three of which are on order) generating three-phase current at 5500 volts. This power house will be connected up with the "Sidérurgie Lorraine" system, which connects up all the power houses of the leading works of the region. There will also be:

1. A power-house comprising four gas-engines of 1500 hp. each, coupled with continuous current 450-volt generators.
2. Two Rateau turbines of 1500 hp. with 550-volt three-phase alternators, using the waste steam from the mill engines.
3. A Rateau turbine of 1500 hp. with a 450-volt continuous current generator, using the waste steam from the reversing blooming-mill engine.
4. Two 1500 hp. 5500-450 continuous commutators insuring liaison between the two stations.

There will also be installed a basic shop and a slag mill corresponding wtih the size and needs of the works. Space has been provided for a battery of coke ovens capable of supplying the whole of the coke required by the blast furnaces. The coke oven gases will be used to heat the reheating furnaces, mixers, etc.

Up to June, 1921, 436,000 m³ of foundations have been dug, 40,000 m³ of cement put in, and 600 ferro-concrete pillars have been put in position. Nos. 1 and 2 blast furnaces, which were partly destroyed, have been repaired; a blast furnace blowing engine, taken away by the Germans, has been recovered, and a battery of boilers has been got into working conditions. A blast furnace was blown in in March, 1921. The whole of the iron work of the former steel melting shop and rolling mills has had to be taken down and has been renovated and rebuilt. Over 6000 tons of iron work have been involved in this reconstruction.

Vireux-Molhain Ironworks

This company has also put forth great efforts, and its present state of reconstruction may be summarized as follows:

Two 20-ton fixed, open-hearth furnaces are in course of being built, as well as one 300-mm. rolling mill. A tire and axle shop has been restarted, as has also a foundry. The fitting shops, boiler shops, smithies, and cylinder-boring shops are also at work. In addition to the foregoing an 800-mm. sheet mill, a 550-mm. mill, a 25-ton tilting open-hearth furnace, a slag cement plant, a slag brick works, and a steel foundry are in course of construction.

Etablissements Arbel

This company had two important centers, the Douai works in the Nord and the Couzon works in the Loire. The former have been entirely removed or destroyed. They consisted of a group of several works. The most important was devoted to the manufacture of stampings; chassis and bogies of tram cars and other rolling stock and automobiles; boiler seatings, etc., and to structural steel work. These have been entirely rebuilt in handsome shops 308 m. long and 120 m. wide. Over 1000 tons of structural steel work is now being turned out monthly. A second works, which is at present devoted to the repair of cars, has been fully at work for the past two years. A third works consists of the open-hearth steel works and rolling mills. The buildings will be completed by about the end of September; the foundations are ready and the first deliveries of plant are momentarily expected.

Finally a fourth works will be devoted to making boilers and cars and is in course of being built. It will cover a very large area and the machine tools ordered are actually in course of delivery. Before the end of the year it is anticipated that this works will be in regular activity. The four works provide employment for over 1200 workmen, a figure which gives some idea of the enterprise shown. A power station developing 1200 kw. supplies the energy to this undertaking.

The basic steel works were begun in 1920 and the converter shop in May, 1921. At present four blast furnaces are ready as well as the power stations which contain gas engines aggregating 1500 hp.; four gas blowing engines for the blast furnaces and one for the steel works. All the gas engines and blowing engines were recovered after the armistice, from where they had been transported by the enemy. The company hopes that the steel works and blooming mill (which has likewise been recovered) will be ready by the end of the year, and the new rolling mills by the end of 1922.

Joeuf and Messempré Works of de Wendel & Co.

The destruction of the Joeuf works was largely carried out by means of a heavy tup which Messrs. de Wendel have had placed on a pedestal at the works. It has been decided to restore the works at Joeuf to their pre-war condition. On the other hand, the undertakings at Messempré, which in 1914 were distributed among three small works, will be combined into one, between Messempré and Osnes. The reconstruction at Joeuf is in an advanced state. Four blast furnaces have been blown in: Nos. 7 and 8 on June 11, 1919; No. 6 on May 27, 1920; and No. 5 on Oct. 19, 1920. Two more (Nos. 1 and 4) are ready for blowing in, and Nos. 2 and 3 will be ready very shortly.

The steel works was restarted on June 8, 1920, and the blooming mill, which has been partly restored and temporarily completed, was put to work on June 8, 1920. The wire mill, which has been entirely rebuilt, was restarted on Oct. 25, 1920. The rail and billet mill are in course of completion and will be started almost immediately. The new three-high 600-mm. mill is ready, while two thin sheet mills and two tinplate mills have been got to work at Messempré in April and in October, 1920, respectively. The complete reconstruction of this works is under consideration.

Works of the Société du Nord et de l'Est

This company combines the interests of three older undertakings:

Aciéries du Nord et de l'Est, at Valenciennes.
Espèrance works, at Louvroil.
Société Métallurgique, at Pont-à-Vendin, Wingles.

At the outbreak of war these three works were in an advanced state of completion. At the two first the first stage of working had been reached, but not at the Pont-à-Vendin works. The repair of the more serious damage enabled, at most, the resumption of this stage at the first two works. At Pont-à-Vendin important fresh resources were needed to begin with. The carrying out of the pre-war program in its entirety would have clashed with the interests of the component companies. On the other hand, the extent of the work of destruction was such that there was no necessity to reconstruct identically with the original plan. For this reason it was decided to postpone until later the reconstruction of the Pont-à-Vendin works and to employ the resources thus liberated to realize the very feasible programme of the two older works at Espèrance and the Nord-Est. Their reconstruction was undertaken in two stages.

The first involved the realization of the pre-war productive capacity of the Valenciennes and Louvroil works, that is to say, three 200-ton blast furnaces at Valenciennes and two 180-ton furnaces at Louvroil, with basic steel works and blooming and other mills capable of rolling every kind of section and of utilizing the entire output of the steel works.

The finishing mills of these two works having been destroyed as well as their buildings, this portion of the

plant was redesigned in accordance with the most recent practice. All the mills being electrically driven, the company decided to enlarge the power stations. The mills comprise:

At Valenciennes: One 850-mm. reversible mill of four stands, which is actually in existence; one three-high 600-mm. mill with reversing engines; one 325-mm. semi-continuous billet mill and one 275-mm. mill, served by the same billet mill.

At Louvroil: One 350-mm. two-high sectional mill; one 280-mm. two-high sectional mill and one 280-mm. tin plate mill.

Resumption of work could only be undertaken slowly and progressively. The figures relating to the number of workmen employed give a fair idea of the progress realized at these two works: November, 1918, 89; June, 1919, 870; March, 1920, 1450; December, 1920, 1900; April, 1921, 3200. The first year's work consisted solely of digging the foundations, and actual reconstruction did not commence until 1920 at Valenciennes. It was then possible speedily to set the fitting shops to work, driven in the first instance by a gas engine working on a lean gas. The steel works and the railroad tire and axle department were got to work in 1921. In regard to the remaining installation here and at Louvroil, which was either removed or systematically destroyed by dynamite, reconstruction, despite the energies of both workmen and staff, is far from being within sight of completion.

At the present moment two blast furnaces out of three are in working order at Valenciennes, together with the blowing engines, gas cleaners, and accessories. The open-hearth plant is nearly restored, the mixer is under repair, and the blooming mill and reversing mill are in course of installation, while the other mills are on order.

At Louvroil there only remains the brickwork of the blast furnace mantles to be completed, the bricks being already available. The steel works is in course of erection and the foundations for the new mixer are in. The blooming mill proper is ready and its extension and bar bank in hand. The power station has been restored to its pre-war capacity and its enlargement arranged for. The 350-mm. and 280-mm. mills, as well as the 280-mm. tin plate mill, are on order, and the buildings themselves nearly ready. The electrical machinery is also on order. The gas producers, the reheating furnaces, and the machine tool equipment remain to be completed.

Conclusions

From this short account the following facts emerge:

1. The destruction of the large works in the Nord and in the eastern districts of France was not due to the war alone. The destruction was deliberate, systematic, and thorough. This applies equally to works situated along the front.

2. The reconstructional energy has been admirable and widespread, and despite financial difficulties arising out of the incomplete peace treaty, the works are, little by little, resuming their activities.

3. In the course of their reconstruction the works have been modernized. The objects of the enemy have thus been frustrated and the future industry has an outlook as prosperous and promising as that of victorious France as a whole.

Discussion

There was no discussion, properly speaking, on this paper, but the author exhibited a number of striking lantern slides showing the condition of various plants before and after devastation. He emphasized the systematic and scientific nature of the destruction. In some cases plants were removed entirely to German territory, but they were brought back and re-erected on the original sites after the armistice. In rebuilding, the opportunity was taken to adopt improved practice whenever possible, and great improvements had been made, for example, at the Senelle-Mauberge works.

Sir Hugh Bell said he had seen the whole of the battle line at Easter, 1919, from the Belgian coast to Verdun, and it was extraordinary what destruction had been done over a length of 400 miles and a depth of 20 to 30 miles. French enterprise and courage had now, two years later, accomplished remarkable things, and he offered, on behalf of the institute, sincere condolences and sincere congratulations on the way France had tackled her reconstruction problems. He thought it was not desirable now to cast our eyes back to the past, but rather to look forward to the future. Sir Hugh then announced that news had been received of the death in Russia of Prof. Dimitris Tschernoff, the veteran metallurgist and an honorary vice-president of the institute, and the members rose in their places and paid a silent tribute to his memory.

An Investigation of Hot Drawing on the Mandril

The secretary then read a paper by Eugène Schneider, with the above title, which was not discussed. Although full of mathematical equations, it is of considerable practical value, and its conclusions should permit of a rapid and certain determination at sight on all the elements of drawing. The trial tests can be done without fear of any incidents, and the operation giving the best efficiency for a specific product with hydraulic machines of specified duty can be obtained. Under these conditions the method of working will no longer be empirical. All engaged in drawing hollow blanks should study the original paper. The following practical considerations are mentioned therein:

In a general manner it is better to keep a little below the maximum elongation obtainable. We can avoid the surprises which may be caused by large differences of temperature, and which we will enumerate below:

(*a*) Slowing down of the press can produce break-down, or, in case of limited power, the blockage of the blank in the die and on the punch.

(*b*) Signs of break-down in drawing of the blank, giving a diameter often smaller than that allowed for.

(*c*) Staving of bottom of blank due to the retaining of the temperature in this thicker region. This accident is especially to be feared with punches very conical at the end, and in that case it is advisable to keep well below the maximum elongotion. To insure this, the maximum elongation corresponding to the thickest part of the wall should be adopted.

(*d*) Contraction of the mouth of the blank, which is to be feared especially in the case of long and thin blanks, where the section is very cold when it arrives on the die.

(*e*) Erosions and striation of dies, which are principally produced with blanks at a low heat.

Dies should have, as nearly as possible, the ideal section indicated in the paper and should be very smooth and very hard. Certain kinds of chilled cast iron with dressed surfaces give good results. The surfaces of blanks must be well cleaned outside and inside before drawing.

The dies must be abundantly lubricated with black grease. It is well to heat them at low temperature before putting in service, and to be sure of their perfect support in the die-carrier.

The punches require every care both as to finish and quality. The tensile strength should be 65 to 70 kg. per square mm., and tool marks or erosions should be avoided, as these greatly diminish the life.

The spraying after each press should be done regularly on all the surface and on the greatest length possible, in such a way as to avoid deformation.

Apply a mixture of tallow and black lead, or of grease with black lead, carefully over the punch before drawing, in order to prevent the blank adhering to it, and to facilitate the detachment.

When the blanks have very thick bottoms the die should have a diameter slightly greater or equal to the external diameter of the bottom. It often occurs that when a blank is very eccentric it turns to the drawing without the die having touched it; if it is thick the torsion is often very important.

When a blank has an internal diameter appreciably larger than that of the punch, the roughed blank must be treated very regularly; if not, the drawing tends to create more elongation in the hot part, which often diminishes the thickness and creates an eccentricity which did not exist before drawing.

A table in the paper gives some examples of drawings in several dies. This procedure enables very large total elongations to be obtained. It is to be especially recommended in the case of blanks with very weak sides, and with some quick presses. The pass must be divided

out in such a manner that the work must be greatest at the first die and decrease successively on the others. This method of operation also allows the stroke of the press to be reduced and diminishes the wear on the last die, which has only light work to carry out.

Mechanical Properties at High Temperatures

An excellent piece of research work, carried out in the laboratory of the Compagnie des Forges de Chatillon Commentry et Neuves-Maisons at Montluçon by E. L. Dupuy, of Paris, was presented under the title "An Experimental Investigation of the Mechanical Properties of Steels at High Temperatures."

The author, to begin with, for the purposes of the investigation, took the values of the breaking stress and contraction of area as characteristic of the mechanical properties at various temperatures. The results obtained appear to show that the mechanism of fracture is not the same at different temperatures.

The figures obtained cannot therefore be taken as invariable measures of the same phenomenon: it is necessary to regard the curve representing the breaking load or the contraction of area not as a single curve exhibiting a certain number of singularities, but as a series of different curves, plotted one with another on the same diagram. The observed phenomena are therefore fairly complex, for besides the temperature and the composition it is necessary to take into consideration the nature and physical structure of the elements constituting the aggregate. To sum up, steels can be divided as follows:

1. Below A1 (and having A2 as their limit):

Dead soft steel: ferrite which undergoes deformation by cleavage before fracture.

Hypo-eutectic steels: only the ferrite undergoes appreciable deformation; fracture takes place when the pearlite areas come into contact with each other.

Eutectic steels: fracture almost without any deformation.

Hyper-eutectic steels: brittleness due to the presence of cementite.

2. Austenitic region:

No matter what the carbon percentage is, the γ-iron is entirely plastic.

3. Region comprised between A1 and A2:

The plasticity increases with the proportion of γ-iron.

4. Region comprised between A2 and A3:

Fracture almost without deformation owing to the low proportion of γ-iron and the brittleness of iron in the β region.

5. Intervention of the liquidus:

Sudden and simultaneous fall in the breaking stress and the plasticity.

Discussion

Colonel Belaiew drew attention to the very high temperatures used and said it was important to get, as the author had done the mechanical properties over 1200 deg. C. The results obtained were very much what it was expected they would be, but it was important to have the author's experimental confirmation.

Professor Guillet pointed out the value of studies of this kind in view of the need for alloys resistant to high temperatures in modern engineering developments, especially in internal combustion engineering.

Dr. W. H. Hatfield said that at the Brown-Firth research laboratory they had examined practically all the ordinary steels at the higher temperature, with pretty much the same results. He drew attention to the fact that the tables of data on which the author's curves were based were not published. This was always desirable, as some authors were inclined to produce remarkable curves from very few determinations. M. Dupuy, interposing, said he had made 40 to 60 determinations for each curve in the case of each steel. Dr. Hatfield said this was excellent and the paper was very valuable, indeed, especially if considered in relation to M. Schneider's paper on hot drawing.

Heat Treatment Curves

A paper on "The 'Characteristic Curves' of the Heat Treatment of Steels," by Albert M. Portevin and Pierre Chevenard, was introduced by the latter author. Its nature may be indicated by quoting the opening paragraphs:

At the outset of a quantitative investigation of the influence of cooling, it should be pointed out that recent researches on the hardening of steel have led to the establishment with, in this instance, great accuracy, of the mutual relationship which exists between the two fundamental factors of all heat treatment—the temperature of heating and the rate of cooling.

The final condition being a function of these two variables, it is easy to see the interest attaching to plotting a graphic representation of the result of a treatment by taking, for any given steel, these variables as co-ordinates. This method leads, as the authors will presently show, to the establishment of what they have termed the "characteristic curves" of the heat treatment of the steel in question. Such curves not only combine, within a single diagram, the fundamental data of every possible heat treatment, but they also afford a means of defining accurately the annealed and hardened states of the particular steel, and therefore constitute the basis and indispensable preliminary of every treatment properly carried out with a particular object.

In order that such a graphic representation may be plotted properly, it is necessary that the values from which it is built up shall be susceptible of numerical definition so as to be capable of measurement. The authors will therefore first describe how they evaluate the rate of cooling and how they define the final state, that is to say, the result of the treatment.

The authors proceed to describe their methods, to give some examples of characteristic curves, and to indicate the utility of such curves in heat-treating problems.

Discussion

Professor Guillet related some quaint old recipes for hardening steel and pointed out the advantages of researches such as that of the authors for insuring regular conditions of heat treatment.

Sir Robert Hadfield said he had seen the apparatus of M. Portevin at the Ecole Polytechnique and it was the finest apparatus for the hardening of steel he had ever seen.

Sir Hugh Bell said excellent results were obtained by the old empirical metallurgist, who knew exactly what he was doing, although he did not know why he was doing it.

The business sessions then concluded with the usual votes of thanks, discussion by correspondence being invited on the following papers:

N. T. Belaiew: "Damascene Steel."

K. Honda: "Does the Critical Point Depend on the Strength of the Magnetizing Field?"

A. M. Portevin: "On Constituents Found in Tungsten and Molybdenum Steels."

A. M. Portevin and V. Bernard: "A Contribution to the Study of Coalescence."

H. W. B. Swabey and R. Genders: "Manufacture of Shells in Canada During the War. 1914-1918."

A deputation of the institute visited the cemetery of Passy and laid a bronze wreath on the grave of the late Sidney Gilchrist Thomas, and in the afternoon parties of members left Paris to visit various industrial centers and inspect iron and steel plants.

Strike Declared Illegal

The Massachusetts Supreme Court, in a final decree in the case of the Springfield Foundry Co., Springfield, Mass., against the officers and members of the International Molders' Union of North America and local union 127, has ruled that the purpose of a strike beginning Jan. 14, last, against the individual contract system was "for an illegal purpose." The decree perpetually restrains the union from conspiring against the company to achieve the closed shop; from compelling the company to abrogate its individual contract; from molesting the company employees; from picketing, and from interfering with the business of the company, or "by the payment of strike benefits or other emoluments to any person for the purpose of maintaining a conspiracy against the plaintiff."

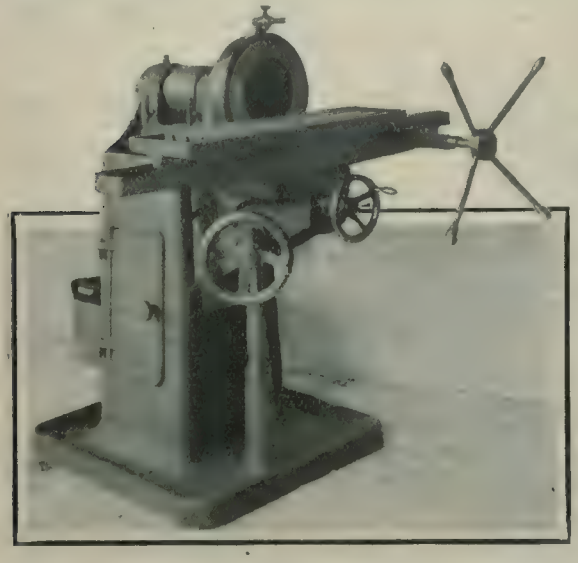
The Royal Typewriter Co., Hartford, Conn., recently sold a consignment of typewriters to the Russian Government, compensation being in sealskins, sables and other furs instead of money. The company has disposed of the furs in Argentina and other South American countries.

Knee-Type Ring Wheel Grinding Machine

A recent development in grinding machines for the rapid and accurate production of flat surfaces is being offered by the Graham Mfg. Co., Providence. The machine is a species of surface grinder, the cutting being done on the face of an abrasive ring.

As shown in the accompanying illustration the machine bears a general resemblance to a plain milling machine. The head, however, is separate from the column; the spindle is arranged for high speed, and the table is moved backward and forward by a pilot wheel resembling that of a screw machine.

An interesting feature is to be found in the method of varying the surface feed of the abrasive ring. A ring of heavy section is used the face of which can be quickly dressed to give any width of cutting surface and from 4200 to 5100 ft. per min. range on 1780 r.p.m. The outside diameter of the abrasive ring shown is 12



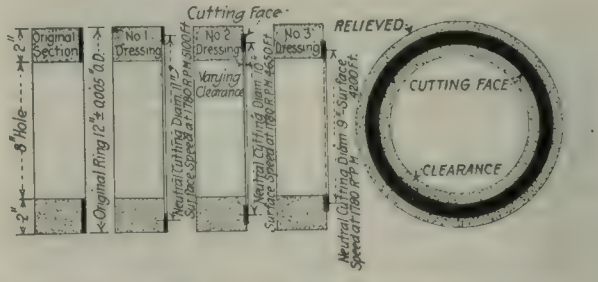
in.; the inside or hole, 7 in.; leaving a face 2½ in. wide. Grinding is usually done, however, on a face from ¾ to 1½ in. This cutting portion will not always be at the outer diameter, and with a ring dressed to 1 in. and located next to the hole, the neutral cutting diameter is 8 in. This is another method of varying the surface speed, permitting also, it is said, the use of a ring section of great strength. Dressing is readily accomplished as there is ample accommodation on the table for the holder especially designed and which uses commercial truing devices. The height of the ring when new is 3 in., and wears down to ½ in. or less. A number of rings may be required, depending on the variety of the work.

In a general way the machine as shown can be rated as having a capacity of 6 x 12 in., no width dimension being necessary as it is unlimited across the table. The top of the table will rise to center, and drop 7 in. The extreme travel of the table is 16 in., and can be moved back 3½ in. from the cutting face. Ordinarily the head is set over just enough to give clearance and although this is not sufficient to give a concave surface, concaving can be done if desired. Sometimes the head is set perfectly straight, which is said to increase greatly the capacity of the machine.

The head is cast separately and bored to receive bushings which in turn carry the outer races of Timken roller bearings. The front bushing is tight and placed to reduce the overhang as well as to reduce the effect of heat changes from temporary shut downs. The rear bushing has a close sliding fit and is pushed by a spring to automatically take up end motion and wear. Further adjustment is by a castellated nut and cotter. The spindle is of low-grade tool steel, ground to take the bearings, and has a collar shrunk on and machined to take the abrasive ring holder. Felt-packed dust collars protect the running parts and glass oilers indicate the height of lubricant. The abrasive ring holder is of pressed steel, accurately machined and well balanced. The abrasive ring is clamped by drawing a cone-shaped ring into a taper in the body and an adjustment flange screwed upon a large hub sets out the ring as it becomes worn.

The table block sits on the knee and has gibs fitted for movements in two directions, being also fitted with an adjustable nut that takes the cross-feed shaft and hand wheel. This is indexed in thousandths and regulates the depth of cut. The table is moved by means of pinion and rack. The drive is by belt from countershaft or from motor on the ceiling or wall. A motor may be mounted on a bracket at the back and attached end-to-end to the grinder spindle by a flexible coupling. Other arrangements of motor drive may be furnished.

The height to the center of the spindle is 42 in. and floor space 6 ft. square is required for operation. The power required is from 5 to 15 hp., the speed being 1780 r.p.m. giving 3700 to 5200 ft. per min. on neutral surfaces from 8 to 11 in. in diameter. The table work-



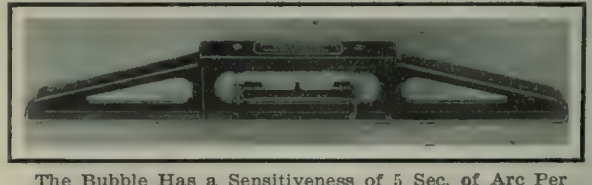
The Surface Speed of the Abrasive Ring Is Varied by Dressing the Face to Any Width of Cutting Surface, As Shown Above. The machine is shown at the left

ing face is 10 x 24 in. Many modifications of the machine can be made such as table design, magnetic chuck, special holders, automatic cross and table feeds and others.

Precision Machine Alining Level

The Universal Boring Machine Co., Hudson, Mass., has placed on the market a precision machine alining level, which, in design and construction, is said to be a departure from the usual instrument of its class. The frame is of cast iron, of truss construction, and the leveling surface or base, 27 in. long.

The vial used is the best Jena glass, specially ground and is contained in a japanned brass case, which, in turn, is mounted on two brass studs, lacquered, one at each end, being held in place by two locknuts working against each other. On one end of the case there are



The Bubble Has a Sensitiveness of 5 Sec. of Arc Per Graduation

two cross adjusting screws that work on the stud. Adjustments in the same manner as of level vials on surveying instruments are thus permitted. The bubble in the vial has a graduated sensitiveness of 5 sec. of arc per graduation, equivalent to showing per graduation on the vial a variation of 0.00029 in. per ft. The vial is stationed on the level casting in a manner that provides additional protection from breakage. The level casting is insulated from the palm of the hand by means of a rubber composition handle. Because of the extreme sensitiveness of the vial, unusual care is exercised in finishing the level casting. The base is not wet-ground finished as usual, but the leveling surface is first planed. All holes are then drilled, following which the casting is allowed to season for one full month under cover. It is next hand scraped and carefully tested, and finally the vial is adjusted. The level completed weighs 9¾ lb.

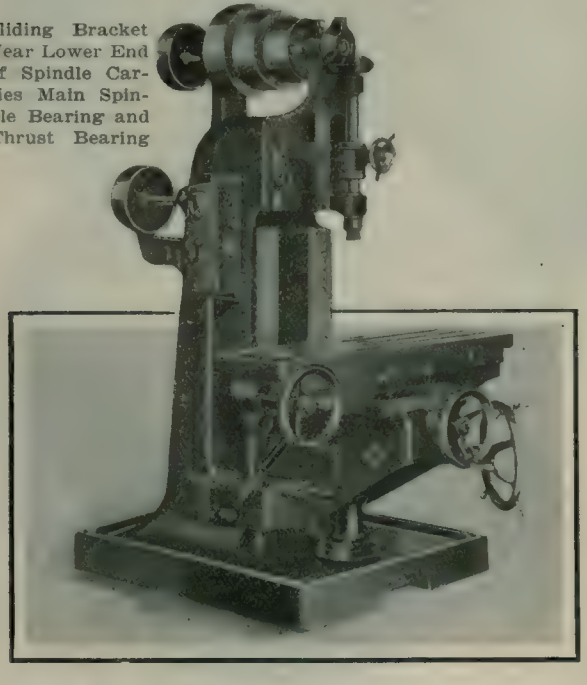
The Wickwire-Spencer Steel Corporation, Spencer, Mass., division recently awarded 14 cash prizes to employees for the best kept yards in Wire Village.

Vertical Milling Machines

Four new machines have been added recently to the line offered by the Jackson Machine Tool Co., Jackson, Mich. They are the 5A and 6A, and the 10A and 10B vertical spindle milling machines, designed for production and die-sinking purposes.

The 5A and 6A machines are very much the same as the company's No. 5 and 6 die sinkers previously offered, except that they are not equipped with the cherrying attachment. The spindle has a vertical movement, manipulated by hand power through mechanism which permits of both hand feed and rapid traverse. Near the lower end of the spindle there is a vertically sliding bracket called the spindle housing which carries both the main spindle bearing and the thrust bearing. This is operated for slow feed by the handwheel at the right and for rapid traverse by the spoked pilot wheel. A slight turn of a small knurled hand wheel engages or disengages the slow feed, which when disengaged leaves the rapid traverse free to operate. The spindle and housing is counterbalanced by a weight inside the column. A micrometer stop is provided for determining the depth of cut and vertical position of the spindle. The spindle housing may be clamped in position for a longitudinal or transverse cut when the proper depth is once obtained.

The distance from center of spindle to face of column in both machines is 14 in., the cross travel of table 13 in. and the vertical travel of spindle, 5 in. In the 5A machine the longitudinal travel of the table is 32 in., vertical travel of table, 17 in. and surface of table



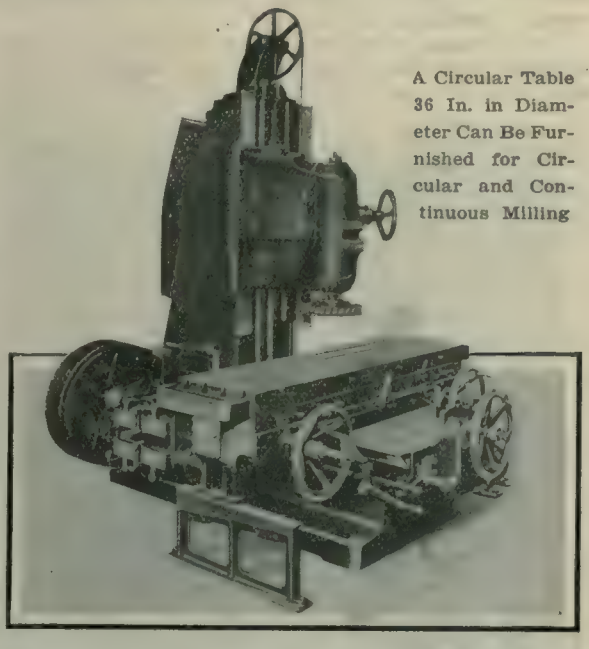
Sliding Bracket Near Lower End of Spindle Carries Main Spindle Bearing and Thrust Bearing

13 x 40 in. The corresponding dimensions in the 6A machine are 40 in., 21½ in., and 13 x 48 in., respectively. The spindle speeds are given as 50, 80 and 125, and the taper hole in spindle, No. 11 B. & S.

The 10A and 10B machines were designed for machining large, flat surfaces rapidly and with close accuracy. These machines are practically the same as the No. 10 die sinker except that the head carrying the vertical spindle and cherrying mechanism has been removed and a head carrying a heavy vertical milling spindle substituted. The distinguishing feature of the 10A and 10B machines is in the feed. The No. 10A has a table and cross-rail feed ranging from 0.001 in. to 0.015 in. per revolution of the spindle, while the No. 10B machine has a range of feeds from 5/16 in. to 16 in. per min. regardless of the speed of the spindle. All feed changes are controlled at the feed change box on the right hand side of the base.

Inside the head there is a back gear arrangement whereby 13 changes of spindle speed, from 8½ to 310 r.p.m. are obtained. A pull-pin lever on the lower left hand side of the head is used for quickly shifting from direct to back gear. All other changes of speed are from the speed change gear box on left hand side of the base. The lower end of the vertical spindle has a flange, integral with it, 6½ in. in diameter, with a ¾ in. keyway across the face of it, and two holes for securing and driving large cutter heads. It also has a 13/16 in. diameter hole throughout its length for a draw-in bolt and a No. 13 B & S taper hole at the bottom end.

A circular table 36 in. in diameter can be furnished for circular and continuous milling. The specifications



A Circular Table 36 In. in Diameter Can Be Furnished for Circular and Continuous Milling

include: vertical movement of head, 24 in.; distance from center of spindle to face of column, 18½ in., working surface of the table 18 x 72 in.; longitudinal travel, 56 in., and cross travel, 18 in. The size of motor required is 10 to 15 h.p.

Unemployment in the Valleys

Employment conditions in the Mahoning and Shenango Valleys are still far from stable. Youngstown managers of charitable agencies estimate that half a million dollars will be needed to aid the unemployed and their families during the coming winter. The Community Corporation, the governing agency for about 25 charitable and philanthropic institutions, estimates that fully 2500 families in Youngstown and environs will need food, clothing and shelter this winter. Conferences of leading manufacturers have been held with municipal authorities to discuss ways and means to alleviate conditions and to aid the unemployed.

Ordinarily about 45,000 workers are employed in Mahoning Valley industrial plants. It is estimated that less than 10,000 are now permanently employed, while the number who are working regularly or intermittently is placed at 23,000. Less than 8000 are wholly unemployed, it is claimed, due to the fact that many men who formerly worked in iron and steel plants have obtained work in road building, in construction or have gone to other sections.

The situation with respect to Youngstown's foreign colony is regarded as especially serious, because of the fact that many workers have large families. Many have been compelled to live on their savings, with the result that savings deposits in financial institutions have shown sharp decline within the past nine months.

New Castle, Pa., plant of the Carnegie Steel Co., which has been down tight since early summer, will resume operations shortly. Two blast furnaces at this works are being warmed up preparatory to blowing in and as soon as sufficient iron is available the steel works and bar mills will be started up. Big demands upon the American Sheet & Tin Plate Co. for sheets, have necessitated the starting up of the New Castle plants to provide that company with sheet bars.

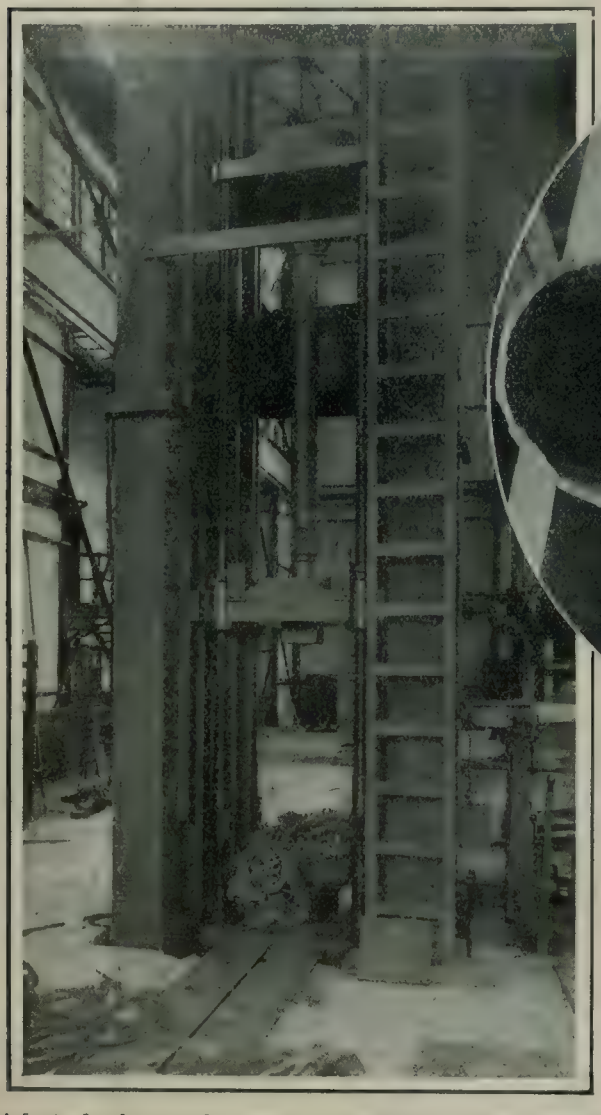
TESTS OF ROTARY DRILL PIPES

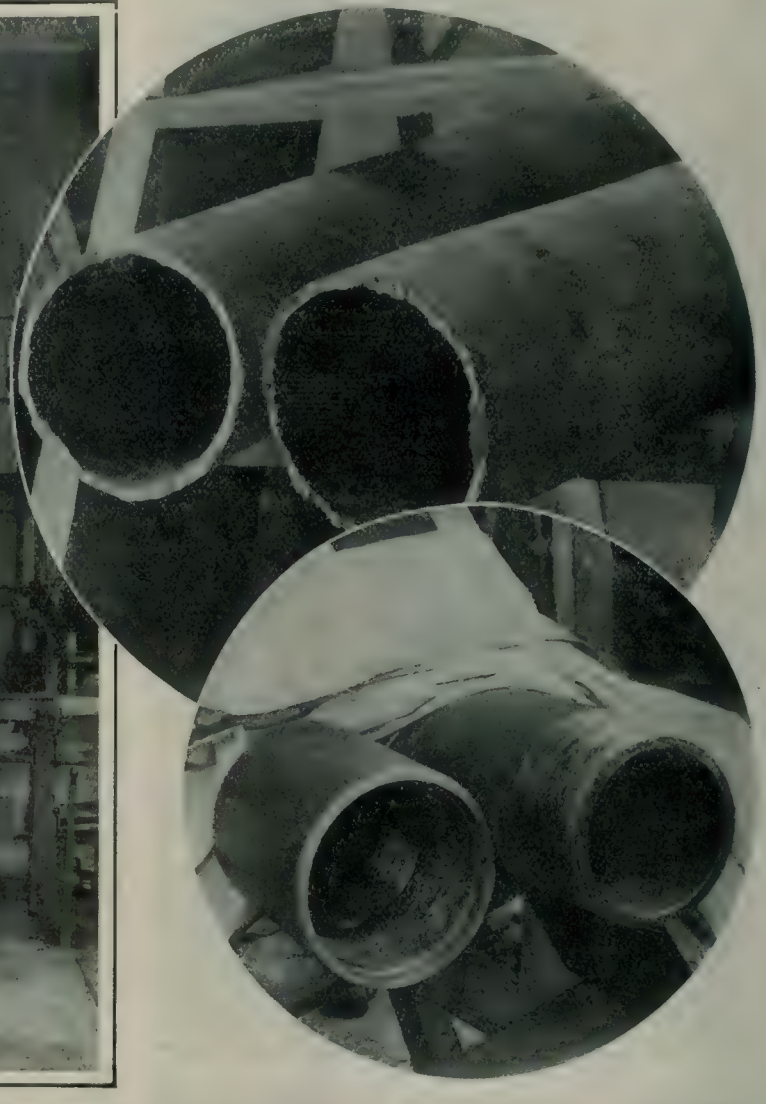
Deeper Threading Necessary to Develop Full Strength of Pipe

BY A. H. STANG*

A number of rotary drill pipes for oil wells and oil well casing pipes have recently been tested in tension at the Pittsburgh Branch, Bureau of Standards. It is thought that the results of these tests may be of interest to the steel industry since very few such test results have been published.

Each of the pipes tested was a standard 6 ft. length, threaded at both ends with standard pipe threads and provided with couplings into which were screwed special steel adapters by means of which the pipe length was attached to the 600,000-lb. testing machine, as shown in the accompanying illustration.





Pipe No. 1 was a seamless iron pipe, upset at the ends so that the effective area of material at the root of the threads was greater than in the body of the pipe. Drop of beam of the testing machine occurred at 172,000 lb. and the maximum load sustained was 317,900 lb. The pipe failed near the center of its length, after considerable necking down, showing a fairly even break, as in the illustration. Pipe No. 2 was of steel, with upset ends very similar to those of pipe No. 1. The drop of beam value for this specimen was 322,000 lb. and the maximum load sustained, 534,000 lb. The pipe had begun to neck down, but at this load one of the couplings pulled off the pipe. The tops of the threads of both the pipe and the coupling were sheared off but the threads were by no means stripped. The radial contraction in the pipe, due to the applied load, had evidently been so great that the coupling was able to slip off over the tapered threads of the pipe with little damage to either set of threads. The other coupling was so loose, after the failure occurred, that it could be turned off the pipe by hand. Fig. 3 shows the condition of the threads in the pipe and in the coupling at the conclusion of the test. Pipe No. 3 was also of steel, the ends of which were not upset. No drop of beam value was obtained, for one of the couplings pulled off at a load of 182,000 lb. The failure was very similar to that of pipe No. 2.

The other pipes were designated as oil well casing pipes, ends not upset, and were tested in a similar manner. All threads were cut on a taper of ⅜ in. per ft. All but one of them failed, as did pipe No. 2 and a further detailed description of each test is not considered necessary, the accompanying table giving the data obtained.

The manner of failure of these pipes raises the question whether the threads used for such large pipe were properly designed. From these few tests it would seem that a deeper thread is necessary in order to develop the full strength of the pipe.

Results of Tension Tests of Pipes Used in Oil Wells

Pipe No.	Diam., In.	Weight, Lb. Per Ft.	Material	Threads, Per In.	Maximum Load, Lb.
1	6	23½	Iron	8	317,900†
2	6	23½	Steel	8	534,000*
3	6	23½	Steel	8	182,000*
4	5 5/16	17	Iron	11½	168,400*
5	5 5/16	17	Iron	11½	153,400*
6	5 5/16	17	Iron	11½	137,760*
7	5 5/16	17	Iron	11½	126,000*
8	10	40	Iron	10	314,000*
9	10	40	Iron	10	217,300*
10	10	40	Iron	10	194,000*
11	10	40	Iron	10	265,860*
12	10	40	Iron	10	387,800‡

*Coupling pulled off the pipe.
†Broke at center of pipe.
‡Pipe broke just within the lower coupling.

*Associate physicist, Bureau of Standards, Pittsburgh. The article is published by permission of the Director, Bureau of Standards.

Expects Great Revival of Business

Cabinet Officer Predicts Unprecedented Business—Is Well Informed as to Iron and Steel—Dr. Julius Klein Denounces Dismal Stories as to Export Trade

BY L. W. MOFFETT

WASHINGTON, Sept. 27.—With the unemployment conference meeting in Washington arranging preliminaries looking to definite plans to relieve the labor situation, and a tone of increased optimism expressed in Government circles as to the business outlook, there is a general feeling that once American industry has been revived to a stable basis, it will enter upon broader activities than ever before. Recognition is given to the fact that considerable time may be required before normal conditions are restored, but there is a growth of cheerfulness over the gradual improvement being made in the basic industries, including iron and steel. While it is conceded that the struggle back to healthy operations may be a difficult one, confidence is expressed that their resumption will mean unusual activity not only in the domestic market but in foreign trade as well.

A Cabinet officer whose duty requires him to keep in close touch with the industries of the country, and whose judgment as to the iron and steel situation is accepted as being unusually sound, last week gave it as his firm conviction that it is only a matter of time, the length of which he said he would not attempt to estimate, when this basic industry, taken as the barometer of trade, would see an unprecedented revival of business.

Demand for Steel

Referring to the expansion in the capacity of steel output, this official gave it as his opinion that this will be more than taken up by such sources as foreign markets, material required to maintain the American merchant marine, for general purposes of reconstruction and the way of new requirements calling for the use of steel instead of other materials. Admittedly, foreign trade is lagging, as is pointed out by Walter S. Tower, head of the Iron and Steel Division of the Bureau of Foreign and Domestic Commerce, who says that the present outlook for exports during the remainder of the year shows little or no prospect for a larger tonnage than that of the past four months. The view is held, however, by Government officials that once recovery has been made from depression in foreign markets the iron and steel industry will enjoy a larger trade from those sources, and, as is well known, it is making preparations looking to this end.

Director Klein's Prediction

Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, in an address last Friday night before the Boston Export Round Table, vigorously denounced dismal stories from supposedly well informed business experts regarding the utter collapse of American export trade, partly for inland manufacturers, because of demoralized banking and transportation facilities, supplemented by struggling European competition. He asserted vigorously that American interests will hold their own in those markets and trades in which they have a real abiding interest. He pointed out that the past few months of anxiety have certainly been a trial by fire, "but those months have emphatically not revealed any inherent weakness in our foreign trade efforts and ambitions in spite of the alarmist reports and propaganda of many who unintentionally, or otherwise, are retarding our recovery from the present slump.

The director deplored the spirit of "nationalism" which he said, has been permeating practically every country of the globe, resulting in obstacles to American foreign trade in the shape of preferentials and subsidies to home industries, with heavy surtaxes and prohibition upon foreign goods. He said that "the precarious state of many foreign budgets and the imperative demands for economies and price reductions will require early and drastic modification of such expensive artificial stimulants to trade and that the guidance of international trade by sound business principles depended largely upon their removal."

Is Germany a Terror?

In speaking of what he called "the exporter's pet terror, German competition," the director cautioned that it takes more than price cutting to win and hold an export market permanently. Quality, delivery terms, and credit arrangements are three vitally important business factors and these should be taken into account in analyzing vague reports concerning German success. He said that the latest reports received in the Department of Commerce indicate a fundamental change from the pre-war qualities of German goods due to serious shortages of raw materials, industrial equipment, and skilled artisans. Even the much feared advantage of the German exporter in his depreciated mark exchange is of doubtful value, especially in industries requiring the purchase of non-German raw materials.

"It is well to remember, furthermore," said Dr. Klein, "that as her exports increase the value of the mark will automatically rise, although this return toward normal will be retarded by cash indemnity payments. Before the war, American merchandise was sold all over the world by German distributing houses. Now American merchants are taking care of their own sales, thereby depriving Germany of one of the keystones of her foreign trade structure. In the course of time, Germany will doubtless get back to her pre-war status as third, perhaps even second, among the rivals for various important markets," said Dr. Klein, who added "that it would be well to remember in accomplishing this feat she will be facing a very different America from that which confronted her before the war."

Latin-American Conditions

Turning to Latin America, the director first called attention to Cuba which he said was the best market in all of Latin America for American goods, taking about 36 per cent of our total exports to that region. The present depression in our Argentina trade, said Dr. Klein, is due mainly to the exchange situation which Argentina is experiencing in marketing its surplus agricultural and pastoral products. He said conditions are improving in that country. In some respects the Far East presents a more hopeful picture of reviving trade prospects than other overseas markets.

In closing, the director called attention to the preparations now under way for the provision of more effective and practical service to the sadly harassed exporters of the country by the Department of Commerce. He spoke of the 15 new commodity divisions, each in charge of an experienced executive whose especial duties will involve the establishment of direct contact with exporters and manufacturers on one hand and with the conditions and problems in their overseas markets on the other. He also mentioned the new division of Foreign Commercial Laws, the new Transportation Division, the change in *Commerce Reports* from a daily to a weekly publication and the reorganization

of the Government's foreign trade promoting machinery generally.

Gloomy Reports Not Justified

Gov. W. P. G. Harding of the Federal Reserve Board, in an address last week at Charlotte, N. C., said gloomy forebodings of last winter with respect to the banking situation are no longer justified. He stated that "the corner has been turned and we have passed the most acute stage of the readjustment period."

Greatest Need

Expressions of the Government officials regarding American opportunities for the maintenance and development of foreign market confirm those which have been made by farsighted business itself. As to the domestic market, the Cabinet officer who commented particularly on the iron and steel situation, pointed out that the greatest single need is for the resumption of a buying movement by the railroads of the country. It is felt that this is being retarded by delay on the part of Congress in taking up the railroad refunding bill. Some satisfaction has been derived, however, from the action of large financial interests in purchasing railroad equipment and trust certifications. The railroads are in pressing need of steel and it is believed that the decline in prices would prove attractive to them if they possessed the purchasing power and induce them to come into the market. It is stated that repairs for cars alone will take a large quantity of steel, figures showing that while ordinarily 5 per cent of the railroad rolling stock is in need of repair, at present 17 per cent of the railroad freight cars of the country are out of repair.

Concerning the statement with regard to steel requirements to maintain the American merchant marine, it was declared that the repairs alone for these ships will take more steel than was required for the complete construction of American vessels before the war. It was assumed, as a matter of course, that an adequate American merchant marine will be maintained, the statement being made that unless this is done, talk of developing a satisfactory export trade for America is absolutely idle.

New Line of Motor Driven Grinding Machines

A line of alternating current motor grinders of the type shown in the accompanying illustration has been recently developed by the J. G. Blount Co., Everett, Mass. The machines are built in three sizes: ½ hp. with 8 x 1 in. wheels; 1 hp. with 10 x ½ in. wheels, and 2 hp. with 12 x 1½ in wheels.

Among the salient features are SKF ball bearings in dust-proof mountings; bearings secured to the shaft by a light drive fit and locknuts; high carbon steel



The Starting Switch Is of the Textile Snap Type

spindles ground to size and adjustable rests of one piece. The flanges are machined all over, the inner flanges being pressed to the shoulder of the spindle. The tool tray and water pot are separate and detachable. Motors are of Westinghouse design, with starting switch of the textile snap type mounted on the motor facing the operator.

The machines are regularly equipped with grinding wheels, one coarse and one fine. Exhaust guards can be supplied in place of plain guards, if desired.

The Advance-Rumely Co., Laporte, Ind., manufacturer of agricultural machinery, has put in effect a 20 per cent reduction in wages in the oil pull and foundry departments. The working hours have been increased from 36 to 55 a week.

Specifications for Steel Forgings

Among the eleven standards of the American Society for Testing Materials now before the American Engineering Standards Committee, 29 West Thirty-ninth Street, New York, for consideration and approval are:

Specifications for Carbon Steel and Alloy Steel Forgings (A18-21).

Specifications for Quenched and Tempered Carbon Steel Axles, Shafts and Other Forgings for Locomotives and Cars (A19-21).

Specifications for Carbon Steel Forgings for Locomotives (A20-21).

Specifications for Quenched and Tempered Alloy Steel Axles, Shafts and Other Forgings for Locomotives and Cars (A63-21).

Specifications for Carbon Steel Car and Tender Axles (A21-18).

Specifications A18-21 for carbon steel and alloy steel forgings are general specifications covering the various classes of carbon steel and alloy steel forgings, on which the other specifications have been based with the addition of special requirements to suit the conditions of use. In submitting these specifications for approval by the American Engineering Standards Committee, the American Society for Testing Materials has presented data listing the companies, etc., that use them in their entirety or as general specifications upon which have been based other specifications suited to the particular needs. These specifications have been translated by the Department of Commerce into French and Spanish in connection with the development of foreign trade.

The American Engineering Standards Committee would be glad to learn from those interested of the extent to which they make use of these specifications and to receive any other information regarding the specifications in meeting the needs of the industry. The committee also has before it for approval the method adopted by the American Society for Testing Materials as standards for the analysis of manganese bronze (B27-19) and for the analysis of gun metal (B28-19), and desires to learn from those interested the extent to which these specifications are used and any other details concerning them.

American-flag vessels carried 39 per cent of our exports by weight and 72 per cent of our imports by weight in the year ended June 30, 1921, according to data furnished the Bureau of Foreign and Domestic Commerce by the records and information section of the Shipping Board, says E. S. Gregg, chief of the Transportation Division of the Bureau. The percentage of imports carried in American bottoms is high because of large shipments of crude oil brought in by tankers belonging to domestic oil companies. Of the total foreign trade of 96,084,582 long tons, 52 per cent was carried in our ships.

American Society for Steel Treating

Heat Treatment Problems, Alloy and Tool Steels and Other Subjects at Third Annual Convention — The Exhibition

CONSIDERING the prevailing industrial depression, the third annual convention and exhibition of the American Society for Steel Treating in Indianapolis, Ind., last week was a distinct success. There was a large attendance of members and visitors, officially estimated at 9000 for the five days. The registration of members was reported at about 1475 out of a total of over 3200. The technical sessions were all unusually well attended. The exhibition was held in the spacious auditorium of the exposition building at the Indiana State Fair Grounds and the technical sessions in the Woman's Building close by. Featuring the entire meeting was the elaborate program of entertainment prepared by the Indianapolis chapter.

Two new honorary members were elected at the regular meeting of the board of directors. They were Dr. John A. Mathews, president Crucible Steel Co. of America, New York. and Elwood Haynes, Kokomo, Ind., pioneer in the development of the automobile and inventor of stellite.

Technical and Other Sessions

A WEALTH of technical and general papers was provided for the meeting—over 70 on various subjects. Only a few were actually presented at the sessions, the remainder being offered by title and all of them to be printed for the first time in the society's *Transactions*. The sessions were all handicapped by the fact that the papers were so long that an adequate presentation consumed too much time, or because the brief abstracts prepared in printed form were insufficient, and as a result a free and beneficial discussion was in most cases impossible. As a whole the papers were of a higher order than previously. For the first time simultaneous sessions were attempted. There were also one or two sessions of a special nature.

Session on Carbonizing

A group of papers devoted to carbonizing problems was presented Tuesday morning, Sept. 20, when Dr. J. C. Hartzel, consulting metallurgist, Cincinnati, presided.

The first paper was by S. C. Spaulding, metallurgist Halcomb Steel Co., Syracuse, N. Y., on "A Comparison of the Rate of Penetration of Carbon into Various Commercial Steels in Use for Case Carbonizing." The steels investigated comprised plain carbon, cold rolled, chrome-silicon-manganese, chrome-vanadium, 3.50 per cent nickel, 5 per cent nickel, two types of chrome-nickel and a chrome-molybdenum. Test bars were run for periods of from 5 to 50 hr. at 1600 and 1700 deg. Fahr., allowed to cool in pots and then the depth of case measured. Some of the typical test pieces were given different heat treatments to show their effects on case and core. Time penetration curves for each steel and each temperature were given and a combined sheet showing all steels plotted to same co-ordinates for one temperature. From his investigations Mr. Spaulding indicates the superiority of the chrome-nickel and chrome-molybdenum steels in so far as rate of penetration of carbon is concerned. Chrome-vanadium and chrome-silico-manganese come next, then straight carbon with the nickel steels last. This would indicate nickel to be a retarding agent when present alone, but a helping agent when present with chromium. The difference between cold rolled and hot rolled straight carbon steels shows the retarding effects of high phosphorus and high sulphur. He found vanadium in percentage of 0.17 to be of no effect in the rate of penetration of carbon. From the standpoint of microstructure the tests indicate the superiority of the alloy steels over the straight carbon. They are more easily refined by single treatment and much superior after double treatment. Chrome-molybdenum steel appears to be an exception to this in that its case is not readily refined by either single or double treatment.

Alloy Carbonizing Boxes

C. M. Campbell, superintendent Pioneer Alloy Products Co., Cleveland, discussed the question, "Do Alloy Carbonizing Boxes Pay?" The author considered some of the factors governing the life and performance of carbonizing boxes, such as critical point at or below average atmospheric temperatures; low co-efficient of



New Officers of the American Society for Steel Treating: President, F. P. Gilligan; First Vice-President, F. C. Lau; Second Vice-President, R. J. Allen; Treasurer, J. V. Emmons. The present secretary, W. H. Eisenman, was re-elected

expansion and contraction at high temperatures; good elastic limit and ductility at high temperatures; tendency to resist carbon absorption up to and including temperatures of carbonization of steel, and resistance to oxidization. Resistance to warping and cracking seems to depend largely upon the first two factors and is independent of the shape of the box. Lack of grain growth is also important. The alloy which seems to possess most of these features is one having a nickel base with some chromium and iron. Attempts are being made to produce alloys of iron and chromium (iron base with chromium and silicon 1.5 to 3.5 per cent) in order to produce a medium priced box. These alloys resist oxidization as well as nickel, chromium, iron alloys up to 2000 deg. Fahr., but they will crack at from 600 to 1200 furnace hr., while the alloy which meets the five conditions mentioned stands up 1800 furnace hr. and better, depending on size and shape of box. Figures were given, taken from actual experiences, which tended to show that increasing the number of furnace hours, which a box will stand up, decreases the charge per furnace hour against the work. The suggestion was also made that carbonizing boxes might be supplied by centralized warehouses as a means of reducing the cost. In the discussion, it was brought out that alloy boxes can be made much lighter than hand cast iron boxes, thus saving a great deal of labor on the part of the workmen.

Carbonizing With Charcoal

H. Schagrin, chief chemist U. S. Naval Ordnance plant, Charleston, W. Va., described some of his experiences in "Carbonization with Wood Charcoal." The pieces used were inexpensive drop forgings of acid Bessemer steel. No precautions were taken as to the mesh of charcoal used, it being a mixture of powdered with pieces up to 30 mesh. The procedure followed was to place a layer of charcoal to a depth of one inch on bottom of carbonizing box, pack in one layer of forgings about 12 in. long as closely as possible and cover with charcoal, adding another layer of forgings and repeating the operation until about even with top of box. The forgings when allowed to cool in the box showed a silvery color indicative of very little surface oxidization. A good portion of the charcoal was consumed by air leakage, but this does not mean that air came in contact with pieces to be carbonized. The boxes were all charged when the furnace was at a temperature of 300 deg. Fahr. The object of the test was to determine the amount of penetration that takes place at 1400 and 1500 deg., and at excessively high temperatures, say 2000 deg. Fahr. From photomicrographs shown it was evident that carbonization actually began at 1450 deg., after being in furnace 1½ hr., and at 1950 deg. it was possible to secure a penetration of 1/16 in. for about 1½ to 2 hr. carbonizing period.

The paper was quite freely discussed. V. E. Hillman, Worcester, Mass., stated that he had made some experiments with wood charcoal but the results were disappointing, without the use of energizers. Answering a question, Mr. Schagrin said that various kinds of wood charcoal were used, including hickory and pine. It was necessary to heat higher with wood charcoal in order to get penetration, and that temperature was a very important factor. Free cementite was very pronounced at 2000 deg.

H. H. Harris, president General Alloys Co., Chicago, read a paper illustrated with lantern slides on the "Design of Heat Treating Containers." The author also discussed the question of the ratio of compound to the work treated and suggested that efforts be made to determine how much compound is essential to the best work after given temperature and penetration are available. In designing containers a number of points should be kept in mind, including the dimensions of the parts to be treated, the dimensions of the furnace, the number of parts to be placed in each container, and the number of containers to be placed in each furnace; as well as the weight, wall section and conductivity of the containers, and methods of handling and cooling. It is also desirable to get the largest possible cubical box content into the furnace with due regard to flue space for heat circulation.

Session on Tool Steel

Tuesday afternoon's session was devoted to the reading of a number of papers on tool steel. The first was by A. H. d'Arcambal, metallurgist Pratt & Whitney Co., Hartford, Conn., on "Physical Tests on High-Speed Steel." The author described transverse tests at room temperatures and tensile tests ranging from room temperatures to 1200 deg., conducted on two types of high-speed steel, one an 18 per cent tungsten, 1 per cent vanadium grade, and the other a 14 per cent tungsten, 2 per cent vanadium grade. Different hardening treatments were given the specimens, and after being tested the fractures were examined, samples file-tested and photomicrographs made. The transverse tests showed that samples quenched from a high temperature and drawn to 1100 deg. Fahr. possessed the necessary hardness and gave a high fiber stress, showing almost double the strength of specimens quenched from the same temperature and not drawn. Quenching into a bath at 1100 deg. Fahr. and not drawing gave about the same fiber stresses and exactly the same microstructure as samples quenched into oil and not drawn. Tensile test specimens quenched from a high temperature and drawn to 1100 deg. Fahr. showed the maximum tensile strength when pulled at 600 deg. Fahr. Specimens quenched from the high temperature and not drawn gave about 70 per cent of the tensile strength of samples quenched from the same temperature and drawn to 1100 deg. Fahr. before being tested at room temperature. The higher vanadium type of steel gave lower transverse tensile readings than the 18 per cent tungsten grade.

A. E. Bellis, Bellis Heat Treating Co., New Haven, Conn., discussed the "Influence of the Heating Medium on Structural Changes in Steel," and A. W. F. Green, metallurgist John Illingworth Steel Co., Philadelphia, read a paper on "Preparing Tool Steel at the Mill." L. K. Marshall, metallurgist North East Electric Co., Rochester, N. Y., described the methods employed by his company in a paper, "Tool Steel Manipulation." Discussion of the latter paper brought out a number of interesting points in regard to the efficiency of the spark test, which it appears is becoming quite commonly used in checking various types of steel.

Session on Heat-Treating Problems

One of the most important papers presented was delivered by E. J. Janitzky, metallurgist Illinois Steel Co., South Chicago, Ill., entitled "A Contribution to the Problems of the Influence of Mass on Heat Treatment." The author takes as a basis an investigation conducted by the British Engineering Standards Association on a 0.45 per cent carbon steel and on the test results of this he has conducted a mathematical analysis which he claims makes it possible to predict or determine the hardness of various sections of carbon steel depending on the heat treatment. That is, by the application of mathematical principles to these data "it is possible to correlate hardness with the diameter of heat-treated bars both in the quenched and drawn condition. From the equations thus established it is possible to predict the hardness of bars of any given diameter when given heat treatments used in these experiments." The author answered a number of questions and added that he had found also that his mathematical formulae or equations worked equally well on nickel steel and on nickel-chrome steel.

"Coarse Grained Forgings: Their Detection and Correction," by L. S. Cope, sales engineer Dannemore Steels, Inc., New York, was presented by the author. An abstract follows:

"Many forgings fail due to the fact that they possess a very coarse grain structure. The manufacturer of the forgings blames the steel maker for this condition while the steel manufacturer in turn blames the heat treater. As a matter of fact it is the forger who is to blame in a great many cases. Methods of detecting coarse grained forgings are discussed. Several well known methods are possible but all involve the destruction of the forgings. The author, however, has hit upon a method which does not destroy the

product and which may be used on a production basis. It consists in dipping polished portions of the forgings in dilute nitric acid, and noting the appearance of the wiped surface. This, however, does not put a stop to the production of coarse grained forgings. Coarse grained structure in forgings may be greatly reduced by the use of annealing and normalizing operations on pieces which must be heated to very high temperatures to properly carry out the forging process and the intelligent designing of forging furnaces."

W. J. Priestley, superintendent hot metal division United States Naval Ordnance Plant, Charleston, W. Va., read a brief abstract of his paper on "Fracture Tests on Steel to Determine Its Quality," which decribes an inexpensive fracture test for steel forgings, blooms, billets or bar stock for locating flakes, slag, blow holes, or pipes, etc. The author also gives results of physical tests which substantiate the data disclosed by such fractures.

Sessions on Alloy Steel

There were two sessions on alloy steel which were combined into one on Thursday morning, Sept. 22.

Molybdenum Steels

At this session H. J. French, physicist Bureau of Standards, Washington, read an abstract of his paper "The Effect of Heat Treatment on the Mechanical Properties of a Carbon-Molybdenum Steel and a Chrome-Molybdenum Steel." A summary of the important results of the paper is as follows:

In a steel containing 0.27 per cent carbon, 0.90 per cent chromium, and 0.50 per cent molybdenum, the Ar_1 transformation is first split and lowered when cooling from 960 to 1000 deg. C (1760 to 1830 deg. Fahr.) at about 0.15 deg. C (0.27 deg. Fahr.) per second, the low point being observed at about 480 deg. C (895 deg. Fahr.). In water quenching from the highest temperature, a lower hardness is obtained than when similarly cooling from 960 deg. C (1760 deg. Fahr.). In this respect the chromium-molybdenum steel behaves similarly to steel containing 0.20 per cent carbon and 1.00 per cent molybdenum except that the observed changes are produced from higher temperatures.

In normalizing the chromium-molybdenum steel, a low limit of proportionality and impact resistance are obtained when using temperatures between about 780 to 845 deg. C (1450 to 1550 deg. Fahr.). The fact that no material changes in tensile or impact properties are produced by oil quenching the chromium-molybdenum steel from a wide range of temperatures when subsequently tempered at 540 deg. C (1000 deg. Fahr.) has been confirmed. To produce high impact values in the hardened steel, a tempering temperature in the neighborhood of 650 deg. C (1200 deg. Fahr.) is required.

In a steel containing 0.20 per cent carbon and 1.00 per cent molybdenum, for each maximum temperature of heating there is a critical rate of cooling which will lower Ar_1. The higher the initial temperature the slower is the rate of cooling required to produce the lowered transformation but by whatever combination this is produced the position of the "low point" is fixed within a narrow temperature range about 525 deg. C (975 deg. Fahr.). Its suppression can readily be brought about, however, by increasing the rate of cooling.

A high temperature transformation is observed slightly above and almost merging with Ar_2 when the steel is cooled from temperatures at or above 960 deg. C (1760 deg. Fahr.) at a rate of temperature change approximating 0.15 deg. C (0.27 deg. Fahr.) per second but is not observed when cooling at a much faster rate. Ar_2 is fixed at about 760 deg. C (1400 deg. Fahr.) independent of the maximum temperature of heating or rate at which the steel is cooled.

The most suitable temperature from which to harden the steel is in the neighborhood of 910 deg. C. (1670 deg. Fahr.). Free ferrite is found after quenching from 830 deg. C. (1525 deg. Fahr.), but the observed changes in mechanical properties with rise in quenching temperature within this range cannot be explained by known changes in carbon or iron, by differences in the rate at which the steel passes through the critical ranges resulting from changes in initial temperature of cooling, by unsatisfactory hardening or by the lowered Ar_1 transformation (except as related to a molybdenum change), for they are opposite to the changes found in plain carbon steel under similar conditions of treatment.

For the production of definite tensile strength, water quenching is to be preferred on account of the higher proportional limit, ductility and impact values obtained and conversely better tensile properties are obtained for a given impact resistance.

Raising the quenching temperature from 910 deg. C. (1670 deg. Fahr.) to 980 deg. C. (1795 deg. Fahr.) does not materially alter the mechanical properties of the steel when subsequently tempered at a relatively high temperature, 540 deg. C. (1000 deg. Fahr).

Toughness of High-Speed Steels

A paper, "The Toughness of High Speed Steels as Affected by Their Heat Treatment," was presented by M. A. Grossman, metallurgist Electric Alloy Steel Co., Youngstown, Ohio. The investigation was conducted in order to determine the best treatment of two high-speed steels of common analysis to attain the greatest toughness for certain thin section cutting tools. The Charpy impact machine was used. The author has found that there is a certain quenching temperature slightly below the proper-hardening range for which the steel is brittle on being quenched and acquires no toughness on being drawn up to 1100 deg. Below this quenching range, drawing imparts toughnes but lowers the hardness. Above that range drawing at 1100 deg. imparts toughness while at the same time developing secondary hardness. The toughness and hardness tests were carried out on the same test pieces. The data show that the development of secondary hardness in the proper hardening range is accompanied by an acquiring of toughness which may properly be called "secondary toughness" and that just below the proper hardening range there is a range of temperature which, while giving good hardness results in the steel being brittle and remaining so even with subsequent drawing to 1100 deg.

Nickel-Silicon and Other Steels

C. M. Johnson, director of research Park Works, Crucible Steel Co. of America, Pittsburgh, read in abstract his paper on "Some Alloy Steels of High Elastic Limit, Their Microstructure and Heat Treatment." The results of heat treatment and physical tests on a series of nickel-silicon steels, the same steels containing small percentages of chromium and vanadium and other modifications with other elements such as titanium, zirconium, tungsten and molybdenum.

"The Mechanical Properties of Some Chrome-Vanadium Steels" by J. S. Vannick, metallurgist research laboratory Department of Agriculture Washington, was presented briefly by the author who discussed three groups of steel: One containing 0.30 to 0.40 per cent carbon, 0.14 to 0.20 per cent vanadium with chromium varying up to 14.50 per cent; a second one with 0.30 to 0.60 per cent carbon, chromium 1.00 per cent and vanadium ranging from none to 0.65 per cent, and a third containing 0.15 to 1.20 per cent carbon, 1.00 per cent chromium, and 0.20 per cent vanadium.

Lantern slides of curves and photomicrographs were used for all these papers and for the presentation of many of the papers at other sessions.

A Non-Ferrous Session

An unlooked-for phase of the program was a brief session on special products. "Dow Metal and Its Applications" was the title of a paper by J. A. Gann, research department Dow Chemical Co., Midland, Mich. This alloy is one of magnesium with aluminum and its early history was outlined in an article in THE IRON AGE. This new paper, by curves showing the variation in physical properties of these alloys with increasing aluminum content, clearly indicates that alloys of widely different properties are readily obtained and that for many purposes the best combinations of physical properties are obtained with 6 to 12 per cent aluminum. These alloys are susceptible to heat treatment, the relative effect on the physical properties depending on the percentage of aluminum. Photomicrographs in the paper readily explain these facts and others.

"Brass Forgings" were discussed in a paper by H. L. Hess, the H. L. Hess Co., Philadelphia, which presents one of the most recent developments in non-ferrous metallurgy. The author discusses the machinery used in producing non-ferrous forgings and the possibilities of the finished product.

Two other papers on this program were "Duralumin," by W. B. Stout, president Stout Engineering Laboratories, Detroit, and "Heat Treatment of Copper

and Brass," by F. L. Helrigel, metallurgist Motor Products Co. Detroit.

Sessions on Equipment

The commercial phase of the program was embraced by two sessions devoted to papers on heat-treating equipment. Nine papers were on the regular program for presentation, most of which were delivered, while there were eight papers presented by title.

Special Sessions

Two programs were carried out which were of a special nature and not distinctly technical.

One of the Thursday morning sessions was conducted as an Army and Navy program. F. C. Langenberg of the Watertown Arsenal, Watertown, N. Y., described the methods employed at that plant on its heat-treating department, particularly the methods of routing material, and Mr. Branden, of the chemical warfare service, discussed some of the recent developments in that service. Commander Leary delivered an interesting account of the mine barrage laid in the North Sea during the war and of the work of the navy railroad batteries in France, using moving pictures. Films of the recent bombing of the ex-German destroyers, cruisers and the battleship Oestfriesland were shown.

Research was the subject of a special program on Friday morning at which the following prominent speakers appeared: Prof. C. A. Adams, Harvard University, and chairman of the division of engineering, National Research Council, "National Aspects of Research"; Lt.-Col. A. E. White, director department of engineering research, University of Michigan, Ann Arbor, Mich., "What the University Owes Industries"; E. P. Hyde, director of research Nela Research Laboratory, General Electric Co., Cleveland, "Field Industrial Research," and G. K. Burgess, chief division of metallurgy, Bureau of Standards, "The Role of Government Laboratories in Industrial Research," this being read by H. J. French in the absence of the author.

The Exhibition and Other Features

BECAUSE of the general condition of business the exhibition was not the success which characterized the one last year at Philadelphia. There were, however, more exhibits under actual working condition than at the two other exhibitions and the attendance was large each day. A list of the exhibitors and their exhibits appeared in THE IRON AGE, Sept. 15, and that program was carried out. About 23 industrial plants threw open their places for inspection during the week and the invitations were liberally responded to.

Delegates to the convention from the various chapters held several meetings at which business and other matters pertaining to the welfare of each and all the chapters were freely discussed. One committee was appointed to formulate plans to increase the interest and the attendance at the meetings of the various chapters.

The question of the place for the next convention and exhibition will be decided soon, invitations having been received from Chicago, Pittsburgh, Buffalo, Newark and Boston.

The Banquet

Nearly 400 members and guests attended the annual banquet on Thursday evening in the Riley room of the Claypool Hotel. The society's retiring president, Lt.-Col. A. E. White, presided, and after a round of vaudeville and other entertainment numbers, the evening was turned over to the toastmaster, Dr. Albert Sauveur, professor of metallurgy, Harvard University, who introduced first Governor McCray of Indiana and Mayor Jewett of Indianapolis. Following these were Dean A. A. Potter, dean of engineering, Purdue University, who spoke on "The Engineering Society and Public Service," and Prof. Comfort A. Adams of Harvard, director of engineering division, National Research Council, whose subject was "Co-operation in Engineering Research." Howard E. Coffin, vice-president Hudson Motor Car Co., Detroit, and member of Naval Advisory Board, taking as his subject "Our Air Policies and the National Defense," delivered a thrilling account of recent developments in aircraft, closing with a moving picture reproduction of the sinking of German submarines and battleships recently by bombs dropped from army flyers. He asserted that such destruction was easily accomplished despite efforts in certain high quarters to minimize the achievements.

Officers for Next Year

At the opening session on Monday afternoon, Sept. 19, after an address of welcome by the mayor's representative and a response by W. R. Chapin, chairman of the convention committee, and by Lt.-Col. White, the president, new officers for the ensuing year, elected by a referendum vote were announced as follows:

President—F. P. Gilligan, secretary-treasurer, Henry Souther Engineering Co., Hartford, Conn.

Vice-President—F. C. Lau, consulting metallurgist, Chicago.

Second Vice-President—R. J. Allen, metallurgist, Rolls-Royce Co., Springfield, Mass.

Treasurer—J. V. Emmons, metallurgist, Cleveland Twist Drill Co., Cleveland.

Secretary—W. H. Eisenman, Cleveland (re-elected).

Directors—J. J. Crone, Philadelphia, E. J. Janitzky, South Chicago; H. J. Stagg, Syracuse; and A. E. White, University of Michigan, Ann Arbor, Mich., the retiring president.

In retiring from the office of president, Colonel White, after reviewing the work of the society for the year, said that research work in the field of steel treatment is a great one and that experts should be kept in it. "Our research committee," he said, "had been attempting to find itself and to prepare recommendations relative to future activities. The situation is not one, essentially, of finding work, but rather one of finding money with which to do work. It is a dream of your president, though he had not yet broached this matter to the directors, that the time will come when our convention and exhibition will net the society a sufficient sum that our research committee may have funds available with which to do work."

The report of the retiring treasurer, W. S. Bidle, Cleveland, showed an excellent financial standing, with debts all paid and a substantial amount to the credit of the society.

Slight Improvement in Pennsylvania

Reports from the district employment offices of the Pennsylvania Department of Labor and Industry indicate a slight improvement in the industrial conditions of the State. The unemployed total, however, is placed at 288,940, which is only a few thousands less than the previous report covering conditions as of Sept. 1. Recalling of railroad employees, miners and a few steel workers has contributed to the betterment in the situation. Many of the miners and railroad men who were recalled had been employed at other work and have thus made places for those who were without work. Opening of schools and colleges has taken a few men from jobs and created openings, but the effect so far has been almost unappreciable. The majority of the offices carried large enrollments of college men who desired work for the summer, but in most instances were unable to place them. The estimates of the unemployment in the various districts as of Sept. 15 follow: Altoona, 17,585; Erie, 15,675; Harrisburg, 13,300; Johnstown, 13,640; McKeesport, 4915; New Kensington, 6050; Philadelphia, 126,000 (women's office, 12,150); Pittsburgh, 58,800; Scranton, 15,225; Williamsport, 5000.

At a recent conference between officers of the Phoenix Horseshoe Co., Joliet, Ill., executives of the Amalgamated Association of Iron, Steel and Sheet Metal Workers and employees, a wage controversy, pending since July 1, was amicably settled. A reduction of 26 per cent on a tonnage basis and a cut to 30c. per hr. for laborers were agreed upon. The 8-hr. day was abolished and ten hours with no overtime substituted.

Fuel Requirements of Steel Mills Analyzed

Solid, Liquid and Gaseous Fuels Discussed with Relation to Their Fitnesses for Many Uses—Limitation Outlined and Safeguards Suggested

BY F. E. LEAHY*

FUELS are available in solid, liquid and gaseous forms.

SOLID

Coal { Lump, Slack, Pulverized } — Coke { Metallurgical, Domestic, Coke Breeze }

LIQUID

Oil — Tar

GASEOUS

Natural Gas—By-Product Gas—Producer Gas—Blast Furnace Gas

Economic considerations include transportation, storage and distribution. In general, requirements include fuels for boilers, blast furnace hot blast stoves, heating furnaces, soaking pits, metallurgical furnaces and general utilities.

Steel mills have probably a more varied fuel requirement than any of the other large industries, and fuel is utilized in various operations in nearly every existing form. The quantities required are large, and the availability and handling of the fuels are the determining features in economical operation.

In this paper I will endeavor to outline some of the peculiar requirements of steel mills, and the reasons why it is desirable to use a certain kind of fuel in each of the various steel mill operations. This paper will apply more generally to a plant consisting of blast furnaces, steel producing furnaces and rolling mills.

Of the total quantities used, fuel in the solid form, as coal or coke, is in most cases the largest consumed; that in the gaseous form second, and lastly, that in the liquid form. The latter two forms may interchange, due to peculiar economic features existing in the district in which the plant is located.

Coal, Its Inspection and Uses

Coal is consumed in the operation of boilers, heating furnaces and gas producers. All coal received at the plant should first be satisfactory to an inspector. He should report as to the grade and physical qualities, noting the quantities of bands, ribs or slate contained; also the sizes, to provide against injury to the crushing equipment which may occur when large lumps of slate are carried with the coal into the crusher. It is a good practice, and general practice at many plants, to have a classification by chemical analysis in addition to the inspection, in order to determine its proper use in boilers, heating furnaces or gas producers.

When coal is to be used in gas producers, supplying gas for open-hearth furnaces, a limit should be placed on the amount of sulphur and ash in the coal. This should be done, on account of the sulphur affecting the metallurgy of the furnaces, and the ash affecting the operation of the producer itself.

If the fusing point of the ash is low, there is danger of the ash clogging the producer and slowing down the operation by preventing the air from passing uniformly through the fuel bed. Also, the producer may be of such capacity that, in the 24-hr. period in which it is making gas, the space might be insufficient to take care of the ash in the coal. Any coal containing ash above this amount will fill the producer before the normal cleaning time, and the producer must either be immediately cleaned or a delay experienced.

Coal, after being inspected and analyzed, is generally delivered to the conveying equipment, to be raised to the crusher bins. After being crushed to a given size, the coal is passed through screens where the slack is separated from it, and the screened coal delivered to the producer plant, while the slack is sent to the boiler house. If it be desired to supply heating furnaces with crushed coal, the shipment is usually made from the crushers, sized as desired, for the purpose. For heating furnaces it may be either slack or screened coal, depending on the firing equipment used.

By proper supervision and care in the distribution, a varying grade of coal may be received and economically utilized. This, of course, presupposes that coal will be paid for according to quality. At times it will be found that coal billed as lump is more nearly run of mine; with the proper vigilance, however, this can be brought to the attention of the proper authorities and the payment adjusted.

Where and How Coke is Used

Next in importance, from the standpoint of fuel consumption, is coke. This is used in blast furnaces, cupolas and kilns. It should be carefully selected, so that a uniform product may be obtained where it is used. While its use is not as diversified as coal, the large quantity consumed would seem to require that proper supervision be given to its selection.

In many plants the coke as received is passed through screens and graded before it is used. It is usually graded as follows: the large size (all that will not pass through a 1-in. mesh screen) is classified as furnace coke and the small size (all that will not pass through a ½-in. mesh screen) as domestic coke. The residue, after screening domestic coke, is called coke breeze.* Domestic coke is used to a limited extent in cupolas, and where the supply is in excess of the demand it is sold to the surrounding public for use in domestic heating furnaces. Coke breeze in the average plant is usually quite small in amount, and is generally consumed in making bottoms in soaking pits, or burned on special grates as boiler fuel.

In some plants coke breeze is no longer produced in a negligible quantity. A more careful screening of the coke has resulted in the production of an increased amount of coke breeze. In consequence this fuel is brought into more prominence, and financial returns justify the installation of the equipment necessary for its utilization under boilers.

Gaseous Fuels Ideal

Fuel in the gaseous form is adapted to meet the demands of any of the diversified requirements of steel plants. The supply of natural gas is now far below the demand, and has almost disappeared from the steel mills. Natural gas at one time was the standard for all open-hearth plant operation, but due to lack of supply has now been almost eliminated for all metallurgical furnaces, except in isolated cases where the amount used is small. This fuel was the most satisfactory of all the gaseous fuels, and met every requirement.

In changing from natural gas to a substitute many difficulties were encountered, which were gradually overcome until to-day this fuel has been replaced without any handicap to the metallurgical operation. By-product gas is fast becoming a satisfactory substitute for natural gas. When debenzolized by-product gas was used through the same lines and burners as those previously used for natural gas, difficulty was at first experienced. In open-hearth furnaces objections were made, when this fuel was used alone, to its lack of

*Fuel and experimental engineer, Carnegie Steel Co., Duquesne, Pa. The paper was presented before the Association of Iron & Steel Electrical Engineers, in convention at Chicago.

*Sometimes spelled "braize."

luminosity. To overcome the absence of illuminants in the gas, tar or oil in addition was burned simultaneously with the gas.

Some plants have been experimenting with the burning of by-product gas in open-hearth furnaces without tar or oil, and have been able to dispense with their use and get the desired results with by-product gas alone. The products of combustion of by-product gas and natural gas are so nearly alike in analysis that it is difficult, from the theoretical standpoint, to understand why they cannot be used interchangeably. The density of by-product gas is approximately one-half that of natural gas and many of the objections to by-product gas are attributed to the fact of its being relatively lighter. Some operators state that such gas tends to rise, and destroy the roofs and brick work of the furnaces.

Producer Gas and Its Producer

The next fuel gas in point of attractiveness, when by-product gas is not available, is producer gas. This gas is used in metallurgical furnaces, and with some changes in furnace construction can be used as a substitute for natural gas. It is used in the open-hearth and reheating furnaces, the results obtained varying in different plants.

Many difficulties can be traced to the gas producers themselves. In their selection care should be taken to provide ample capacity, and mechanical operation wherever possible. Many types on the market have mechanical pokers and coal feeders, as well as ash removal, leveling and rotating apparatus.

These features all have their advantages, and the manufacturers claim various results for them. In some cases published results of the performance of the producers are hard to duplicate in steel mill practice, as the results shown on these tests were secured from a better grade of coal than used in the steel plants. Any acceptance tests should be made on the same coal as that used in the plant. The producer should be operated at the capacity it is intended to operate in regular service, and the test be continued over a period sufficiently long to eliminate any chance of errors.

Care in the selection of the producer and in the design of the gas producer plant will give excellent operation of the open-hearth plant, with low fuel costs. The producer house should be located as close as possible to the open-hearth plant, and the connecting flues should be built overhead to facilitate the weekly cleaning, so that the time lost in cleaning flues will be reduced to a minimum. Some plants maintain continuous operation of their open-hearth furnaces during flue-cleaning periods by substituting by-product gas for producer gas on the furnace during that period.

In combined blast furnaces and steel works a large quantity of fuel is available, over that required for blast furnace purposes, in the form of blast furnace gas. In recent years study has been given to improving the efficiencies of all units consuming this fuel.

By the application of the waste-heat type of boiler, using this gas as fuel, efficiencies are obtained equal to that of any boiler fuel. In former practice, on account of the type of boiler used, which could not efficiently utilize this gas, due to the limited low initial temperature, the boiler practice was not good, as the efficiencies were low. Improved type fireboxes and burners equipped with regulating attachments have contributed largely towards obtaining and maintaining high efficiencies.

Without the use of economizers, some modern blast furnace gas-fired boiler plants now obtain in regular operation thermal efficiencies in excess of 75 per cent. Some years ago the average efficiencies obtained in steel mill boiler plants, burning blast furnace gas as fuel, did not average over 55 per cent. The economic returns possible are large, and many plants have already changed over to the more efficient type of equipment.

Gas Used in Hot Blast Stoves

The development of the modern blast furnace hot blast stove, with improved burner, has brought this type of blast furnace gas consumer up to efficiencies of 70 per cent, and in some cases better. The advances made in stove operation by this development may be realized when former records are examined and it is discovered that the efficiencies of the stoves, like the boilers, seldom exceeded 55 per cent.

Blast furnace gas used in modern blast furnace stoves with smaller checker openings must be cleaned. A few dry gas cleaners are now in use, and their designers claim for them cleaning equal to that obtained from wet washers. Whether dry cleaning or wet cleaning be used it is absolutely necessary, for the successful operation of these small checker opening stoves, that the dust in the gas be reduced below the point where it will deposit and clog the checker openings.

It has been the practice to require that, in wet washers, the dust content shall be reduced to not over 0.25 grain per cu. ft. The dry gas dust cleaning plant manufacturers assert that when the gas is dry cleaned, a dust content not over 0.50 grain per cu. ft. is sufficient. Before this can be positively decided it will be necessary to compare for a few years the results obtained from stoves now operating on dry cleaned gas with stoves operated on wet cleaned gas.

In gas engine practice, using blast furnace gas for fuel, is obtained the highest thermal efficiency. Blast furnace gas engines are installed for blowing blast furnaces and for power generation. Recent advances in the utilization of waste heat, by exhausting the gas engine through a waste-heat type boiler, have developed some interesting possibilities.

Liquid Fuels and Their Uses

Fuel is used in the liquid form as oil or tar, and the following instructions for its use apply: A storage tank should be provided of ample capacity for receiving and holding at least a 24-hr. supply. This tank should have a heating coil, so that the oil or tar may be maintained at the proper temperature to maintain fluidity. The lines through which the fuel is pumped should be insulated and heated. The usual practice is to run a steam line, inclosed with the oil or tar lines and covered by insulation common to both, to the point of consumption. Here should be a heater equipped with a steam coil. The temperature should be maintained constant at the temperature found by experience to give the best results.

To maintain a uniform temperature, in some cases the oil or tar is kept circulating through a closed circuit, but where the consumption is continuous this is not necessary. Suitable pumps should be provided, equipped with pressure regulating attachment, to maintain a constant pressure on the line. It is common to provide spare pumping capacity to guard against delay.

Various types of burners or atomizers are used; in the steel industry, steam atomizing is most generally resorted to. Very seldom is mechanical atomization used, the particular field for this type being in marine practice rather than land. The burners or atomizers are usually classified as internal or external mixing, according to their construction. For certain burners it is necessary to screen the oil or tar before using, to prevent clogging of the burner. Other burners are available, of such generous proportions that the oil or tar can be used as received without screening. Careful attention should be given to the design of the firebox in which this fuel is used, as a number of failures to secure satisfactory results have occurred where boilers were improperly arranged for the burning of liquid fuel.

General Summary

To summarize, steel mill fuel requirements are as follows: For boilers the general practice is to use slack, pulverized coal, blast furnace gas, coke breeze, tar, and under some conditions by-product gas. By-product gas is, of course, available only when the supply is in excess of the metallurgical furnace demands, usually only on Sundays and holidays, so that this gas is consumed only in negligible quantities under boilers. Slack is burned under boilers in either chain grate, overfeed or underfeed stokers, all giving quite satisfactory results, from the thermal efficiency standpoint. Pulverized coal can be applied to almost any boiler, provided the firebox is enlarged, and excellent

results are obtained. Blast furnace gas is burned under boilers of the waste heat type, with very good efficiency.

Coke breeze can be burned on certain types of chain grate stokers, which stokers are usually provided with an air blast, and the air can be controlled to the various sections of the stoker. Very good efficiencies can be obtained on this class of equipment. Good efficiencies are reported when using coke breeze mixed with coal on underfeed stokers, but as far as I know coke breeze has not been successfully used direct on chain grate stokers.

Blast furnace stoves are operated on blast furnace gas, and for high efficiencies, using stoves with small checker openings, it has been demonstrated that it is necessary to clean the gas.

Heating furnaces are fired with pulverized coal, or coal on either underfeed or chain grate stokers and on chain grates, very much the same as used in boiler practice. Where accurate temperature control and relatively high efficiency are desired, then it is more usual to apply a gas in some form to fire these furnaces. A heating furnace built on the regenerative plan is limited to the use of gas only.

Heating furnaces of the continuous type, equipped with recuperators and supplied with either a liquid or gaseous fuel, are the most highly developed efficient type of billet heating furnaces, from the fuel standpoint. Intermittent operation of the furnace, causing a sticking together of the billets, sometimes gives trouble, which may be reduced by careful attention of the heater to shut off the gas as soon as mill operation ceases. In this type of furnace the billets enter at the rear or coolest part of the furnace, and are gradually pushed forward to the front or hottest part, where they are discharged to mill tables.

Soaking pits are generally fired with either producer, by-product or natural gas. They are built on the regenerative plan and recent improvements in checker design and burner equipment have resulted in securing very good efficiencies.

Most of the metallurgical furnaces, as open-hearth furnaces, are of the regenerative type, and the fuel is either pulverized coal, producer, by-product or natural gas, or a liquid fuel.

Transportation is an important factor in the selection of various fuels, and all plants should be equipped with the proper track facilities to provide the necessary space for storage, and for shifting of cars. The storage supply must be designed to meet the plant requirements for a period sufficient to overcome irregularities in delivery. If the distance from the source of supply to the plant is short and transportation reliable, the storage capacity may be reduced correspondingly.

The general trend in the steel plants to-day is toward improvements that will show increased output and good economic returns, through the conservation of fuel, and the large advancement in improved methods of using fuel in the mills is following along such lines as will tend to conserve the energy commonly called waste heat.

PROPOSED LOWER RATES

Application of Transcontinental Bureau Will Soon Be Heard

WASHINGTON, Sept. 27.—Plans have been almost completed by the Interstate Commerce Commission for exhaustive hearings at a number of places regarding the so-called fourth section application of the Transcontinental Freight Bureau to lower rates on iron and steel and other commodities to Pacific Coast terminals. Specific reductions, averaging approximately 25 per cent, in proposed rates on all important iron and steel products from producing centers throughout the country, were stated on page 606 of THE IRON AGE of Sept. 8.

The application seeks to put the decreased rates to Pacific Coast points into effect without lowering those applying to intermediate points and it being a notable fact that interests in the Intermountain territory have always strongly combated this policy, it is believed that the forthcoming hearings will find them making a lively fight against the proposed reductions. The pending application is interpreted as a move by the carriers, one that has the support of the iron and steel industry, to re-establish conditions that brought about the well known Spokane case and its numerous appendices. It asks for authority to establish rates from so-called Eastern points of origin to Pacific Coast ports to meet competition through the Panama Canal. As a matter of fact, however, the points of origin actually extend as far West as Colorado, and include all iron and steel producing sections, so that the term "Eastern" is only relative.

Protestants against the granting of the application state that if granted it would restore operation of the "back haul" principle of making rates, which is opposed vigorously by Spokane and other intermediate interests. The carriers have contended for this principle on the ground that it is the way in which rates were originally made, for before the transcontinental lines were established, goods were brought from these so-called Eastern points to the Western ports by ships and then carried into the interior by wagons and other primitive transportation. The carriers point out that to require them to keep their rates at the interior points down to the level of the terminal rates would be to penalize them for having established through routes and supplying a superior service at lower costs than previously existed.

When ships disappeared from the Panama Canal route the commission, on complaint of the intermediate points, withdrew fourth section permission and required the alignment of rates in accordance with the letter of the long-and-short-haul section, divested of the proviso. Subsequently the Intermediate Rate Association asked that rates be graded from the intermediate points to the Western ports, but the commission, after service had been resumed through the canal, dismissed the complaint.

In one of the California interior terminal cases the commission modified the back-haul principle of rate making by authorizing the carriers to establish rates to the more distant points provided they would make rates at the intermediate points by adding to the terminal rates factors not higher than three-fourths of the local rates from the ports to the interior points. The pending application, hearings on which probably will begin soon in Chicago, proposes that the rates to the intermediate points be made by adding to the terminal rates the locals from the nearest terminals. The nearest terminal is defined in the application as the one having the lowest rate to the intermediate destinations, regardless of the actual mileage.

It is believed that the protestants will use as an argument against departures the fact that the transcontinental carriers on their Eastbound traffic have observed the terms of the long-and-short-haul part of the fourth section. They objected to the fourth section permission on Eastbound freight and won their fight, though it is pointed out that possibly this was due to the fact that the transcontinental lines were in a hurry to establish rates that would enable them to meet competition through the canal.

John B. Edgerton, president of the National Association of Manufacturers, will give a complimentary luncheon to Indiana manufacturers at the Claypool Hotel, Indianapolis, Oct. 13. There will be round table discussion of questions of moment to manufacturers, such as taxation, tariff, transportation, waterways, merchant marine, labor relations, etc., with the purpose of helping to devise common methods whereby the national organization can work for the betterment of all the industrial centers.

New Blast Furnace of the Crane Iron Works

Historic Iron Plant at Catasauqua, Pa., Modernized—Earliest Successful User of Anthracite Now Uses Coke as Fuel—Third Furnace on the Same Spot

BY RICHARD PETERS, JR.*

TOWARD the close of our Civil War, John Percy of the Royal School of Mines, London, gave to the iron making world his monumental work on the metallurgy of iron and steel, which for more than a generation was the leading authority on the subject. The author dwells at length on the anthracite furnaces in the United States, concluding with the statement that "the principal manufacture must always cling to the Lehigh and Schuylkill and Lower Susquehanna valleys in Pennsylvania, where the ore is abundant, the coal near at hand, the flux on the spot, where the whole land is a garden and therefore food cheap and labor plentiful, and the great sea ports not far off."

To a certain degree the prophecy of some sixty years ago has been fulfilled, although the changes brought forth by time and new methods have modified, to some extent, the broad assertions made. Of the districts mentioned by Percy, the Lehigh Valley has more nearly survived its promise, and while the anthracite coal used originally as fuel has been almost entirely replaced by coke from the western part of the State, and the local brown ores have given way to the Lake Superior hematites, yet the magnetites of New Jersey still remain as an important part of the burden of the furnaces in the Lehigh district.

The successful use of anthracite coal as fuel for iron smelting measured the start of the pre-eminent position which this country enjoys in the manufacture of pig iron. It is therefore of more than passing interest to note the recent completion of a modern blast furnace at Catasauqua, Pa., on the site of the pioneer plant which first produced pig iron as a commercial success with anthracite. By the rebuilding of the No. 2 furnace at its Crane Iron Works division, the Empire Steel & Iron Co. has made a noteworthy addition to the present reconstruction by American iron makers.

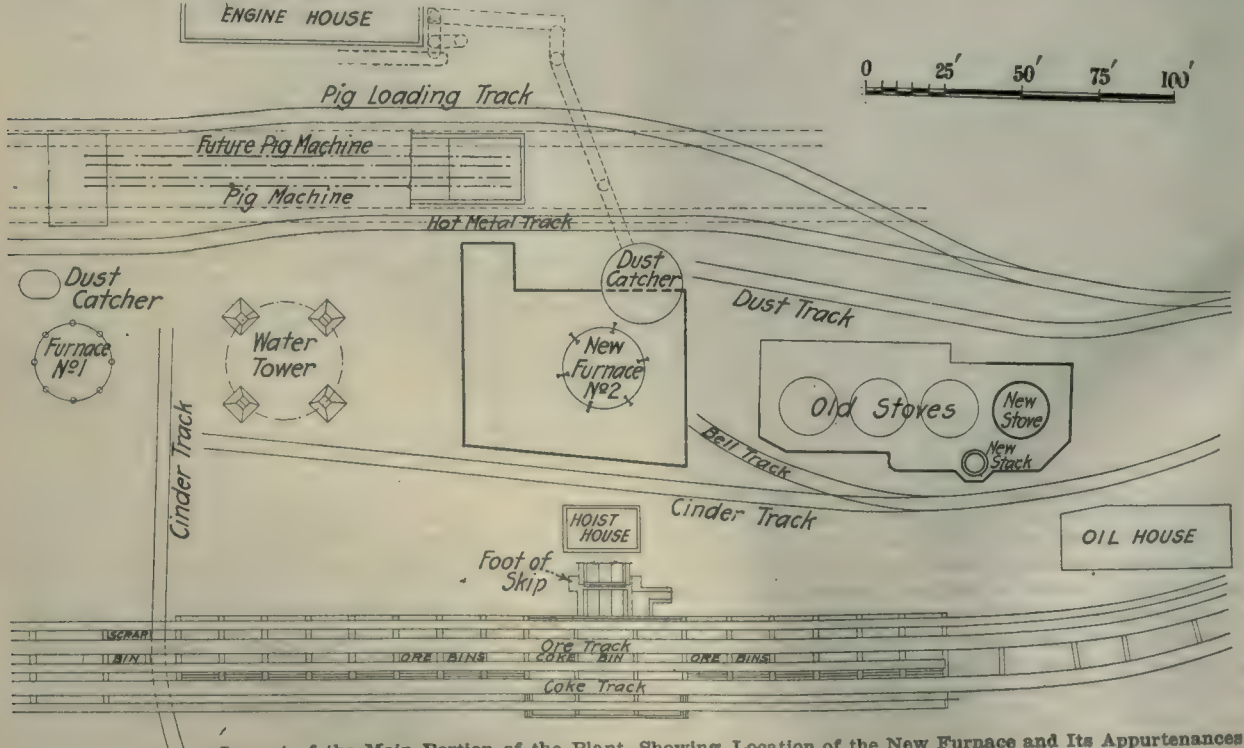
To comprehend more clearly the significance of the work, it is of interest to look backward over the history of this unit. In the period between 1825 and 1840, the iron masters of the eastern section of Pennsylvania made many attempts to smelt iron by using anthracite coal as fuel, but, with the exception of a three months' campaign at Pottsville in 1839, the results were commercially unsuccessful.

The Lehigh Coal & Navigation Co. was anxious to have established on its waterway iron works which would use its fuel. Its board of directors therefore passed a resolution, early in 1839, offering to give in fee simple all the water power of any of its dams between Allentown and Parryville, excepting that necessary for navigation purposes, to any company which would expend $30,000 in building iron works to smelt ores with anthracite as fuel.

Signifying its intention of accepting this proposition, the Lehigh Crane Iron Co., organized May 16, 1839, sent its representative, Erskine Hazard, to Wales to engage David Thomas, a practical furnaceman, to come to America to supervise the erection of a plant. Thomas had demonstrated the successful application of Neilson's hot blast to anthracite iron smelting at the Ynyscedwin Iron Works, in his native country. Upon his arrival, he immediately commenced the erection of the first furnace, a few miles from Allentown.

Construction work was attended by difficulties unknown to our present engineers, as in those early days there were no railroads in the Lehigh Valley, and few foundries or machine shops capable of making or handling castings of any size. A large part of the blowing apparatus was brought over from England, and

*Manager of sales Pulaski Iron Co.



Layout of the Main Portion of the Plant, Showing Location of the New Furnace and Its Appurtenances

even some of this had to be remade here, owing to the fact that a portion of it was too large to be taken into the hold of the vessel chartered for the purpose.

The original furnace was constructed of stone, of the usual type of the period, 30 ft. square at the base and 45 ft. high, with a 10-ft. chimney surmounting the furnace head. The bosh was 12 ft. in diameter, while the hearth tapered from 5 ft. 6 in. to 4 ft. 6 in. The hot blast oven, built on the ground, was arranged for coal firing, as no attempt was made in those days to bring the gases down from the open top of the furnace.

Blowing apparatus, consisting of two vertical iron cylinders, was worked by a pair of enormous wooden walking beams, bound with iron straps, which were driven by gears meshing into segments on the peri-



While the Blast Furnace (No. 2) Is New, from the Foundation Up, the Three Stoves Serving the Previous Furnace Were Retained. A fourth has been added, however, somewhat larger than its mates

phery of a breast water wheel 12 ft. in diameter and 24 ft. long.

After numerous delays, the furnace was lighted July 3, 1840, and the following day made its first cast of some 4 tons of iron. The enterprise being a success, the company erected a second furnace in 1843, using similar lines, but improving the arrangement of the hot blast by placing it near the furnace head. A third unit was built in 1846, giving the works a total weekly capacity of 420 tons.

Until 1855, when the Lehigh Valley Railroad was opened, all the raw materials for the plant were brought in by canal boats or by teams, and the dirt roads of the countryside must have swarmed with wagons draying in the local brown ores from the neighboring counties.

In 1880, No. 3 furnace having fallen down, it was determined to dismantle the original three stacks, leaving Nos. 4, 5 and 6, which were built in 1849, 1850 and 1868 respectively. Two new furnaces, designated as Nos. 1 and 2, were built in 1880 and 1885, and at this time Whitwell stoves were installed. These were built under the personal supervision of Thomas Whitwell, and were the first of this type erected in Eastern Pennsylvania. The furnaces were not of the modern type of shells resting on columns, but consisted of stone work supporting the boshes, with iron extensions, giving them the appearance of old fashioned railroad water tanks. The Crane Works were described by an early writer as a "noble pile," and old illustrations of the picturesque plant are hard to recognize as those of a smelting works.

In the early sixties the furnaces at Catasauqua probably constituted the largest single plant in the United States. Furthermore, greater production per furnace than was reached elsewhere was accomplished by the bold steps taken by Thomas, in blowing the stacks with higher blast pressure than had ever been previously attempted. An early writer, in commenting on Thomas' efforts, remarks:

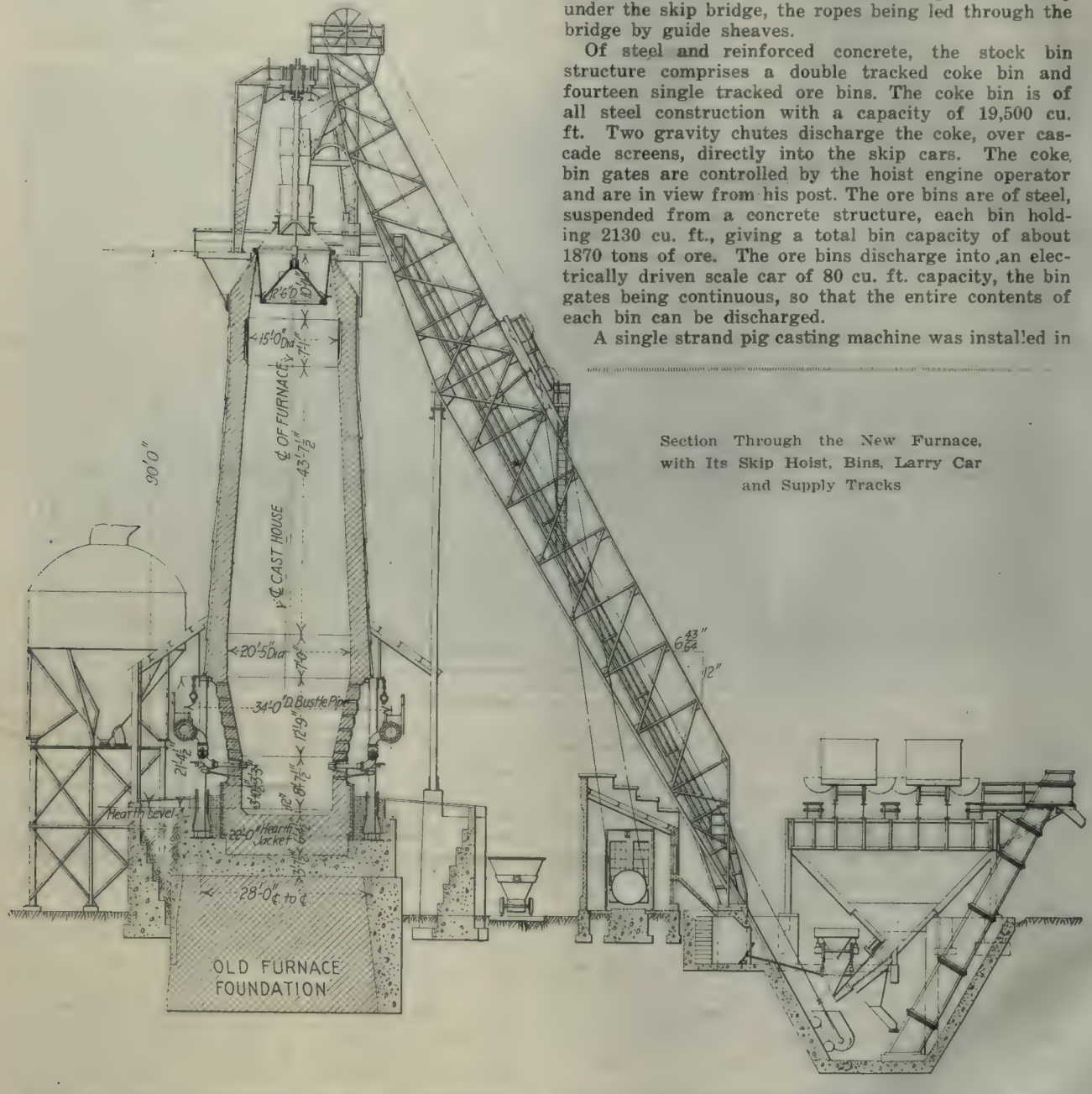
"The consummate skill and long experience of the manager must no doubt avoid or redress the ordinary troubles of the process, but the immense production can be accounted for only by the enormous consumption of oxygen. It is a satisfactory evidence of the constancy and reliability of the chemical and mechanical laws at our command for making iron that the introducer and oldest producer of anthracite iron in America has not been superseded, but is able still to lead off the greatly enhanced production with high figures. It is evidently no game of chance, but a trial of practical wisdom based on experience, and insured by the improvement of all the means at the disposal of man."

In the past 30 years the work of rebuilding and dismantling contracted the plant to but two furnaces, still known as Nos. 1 and 2, and during this period much of the original plot was restored to its former condition. It may well be understood, therefore, that when the Empire Co. decided to build a modern furnace on the site of a much rebuilt plant, the engineers were confronted with difficulties widely in contrast to that of laying out work on virgin ground. Many existing appurtenances were to be retained, for economical reasons, and the expansion of the plant was limited on one side by the Lehigh canal and on the other by the main street of the town of Catasauqua, while the ground between these boundaries is of limited area. This space was ample for the six old stacks, for in the early days the necessary raw materials were not of great proportion, and the stock trestles were arranged between the furnaces, as well as adjacent to the canal.

Credit is therefore due the engineers and contractors, Arthur G. McKee and Co., Cleveland, who furnished designs and materials and supervised the erec-

tion under a fixed contract. The improvement program involved the entire reconstruction of the furnace stack, the addition of a skip bridge, top structure and McKee revolving stock distributor, stock trestle and bins, hoist engine, scale car, pig casting machine and ladle cars, one new stove, new boilers, pumps, water tower and other auxiliary equipment.

The old stack was completely demolished and the foundation enlarged for the new work. The new furnace has a height of 90 ft., hearth and bosh diameters of 15 ft. and 20 ft. 5 in. respectively, and a 78-deg. bosh. The shell is ½-in plate with ¾-in. bottom ring, ⅝-in. top ring and ¼-in. top cone. The hearth jacket



Section Through the New Furnace, with Its Skip Hoist, Bins, Larry Car and Supply Tracks

is 1¼-in. plate, 9 ft. high, cast iron hearth cooling plates 4 in. thick, with cooling pipes, being placed inside the hearth jacket. The tuyère breast is 4 ft. 9 in. high, of 1-in. plate.

Eight rows of copper cooling plates are used in the hearth and tuyere breast. The new lining involves a total of 332,000 brick (9 in. equivalents), giving a furnace volume of 19,310 cu. ft. Cast iron wearing plates 6 ft. high are suspended from the top cone for protecting the brick work at the stock line. The large bell is 11 ft. 3 in. in diameter, the small bell 5 ft. 6 in. The stock distributor is electrically driven and controlled, its operation being interlocked with the hoist engine, so that the revolving and charging cycle is entirely automatic. The furnace top is equipped with a 25-ton trolley hoist for dismantling the furnace for repairs, and for raising material from the ground to the furnace platform.

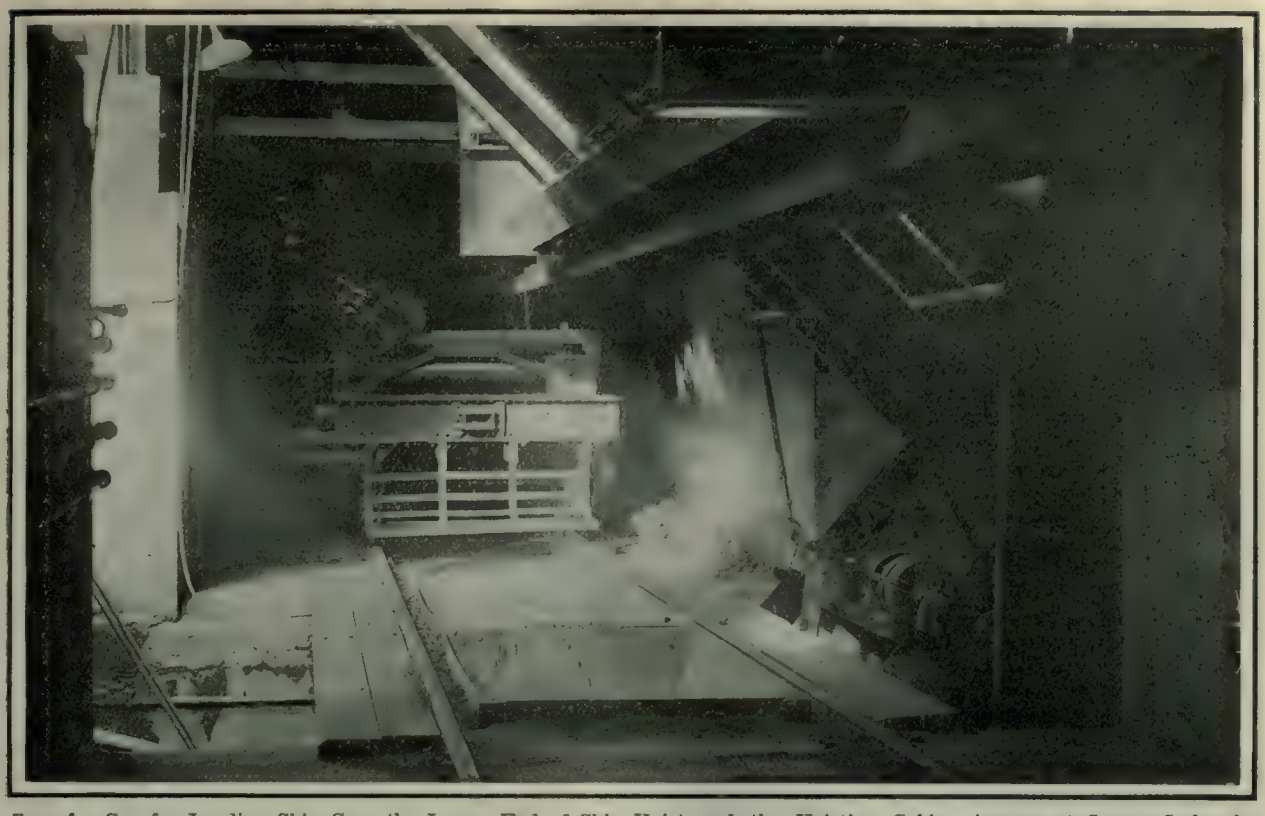
Of the through truss type, the skip bridge is double tracked, supported by a shear leg, independently of the furnace stack. The bridge has a steel plate deck and a stairway from the ground to the top platform. Each skip car has a capacity of 100 cu. ft. of material. A new steam hoist engine was installed, having 12 x 14 in. cylinders and a double grooved drum 66 in. in diameter. The hoist ropes are 1 in. in diameter. The hoist engine house is placed directly under the skip bridge, the ropes being led through the bridge by guide sheaves.

Of steel and reinforced concrete, the stock bin structure comprises a double tracked coke bin and fourteen single tracked ore bins. The coke bin is of all steel construction with a capacity of 19,500 cu. ft. Two gravity chutes discharge the coke, over cascade screens, directly into the skip cars. The coke bin gates are controlled by the hoist engine operator and are in view from his post. The ore bins are of steel, suspended from a concrete structure, each bin holding 2130 cu. ft., giving a total bin capacity of about 1870 tons of ore. The ore bins discharge into an electrically driven scale car of 80 cu. ft. capacity, the bin gates being continuous, so that the entire contents of each bin can be discharged.

A single strand pig casting machine was installed in a structure of sufficient size to house a second strand when required. A 75-ton mixer type hot metal ladle car receives the metal from the furnace runners and delivers to the pig machine.

The boiler equipment of this furnace formerly consisted of approximately 3480 hp. of water tube boilers. This was augmented by the addition of two new 505-hp. Stirling boilers equipped with Kling-Weidlein aspirating type burners for blast furnace gas. Other additions to the power equipment consist of two steam turbine driven pumps, each with a capacity of 2,500,000 gal. per day. A water tower giving storage for 80,000 gal. was also installed.

Increase in the size of the rebuilt furnace made



Transfer Car for Loading Skip Car; the Lower End of Skip Hoist and the Hoisting Cables Appear at Lower Left, the Dumping Chute in Lower Center

necessary additional stove heating surface, which was provided by adding one 20 ft. by 100 ft. McKee side combustion stove, to augment the three Cowper stoves of smaller dimensions built in 1909. This work also included new air and gas mains and their connections.

The new stack is designed to produce foundry, forge and basic iron from a mixture of about 65 per cent New Jersey magnetite ore from the mines of the Empire Steel & Iron Co. and 35 per cent non-Bessemer Mesabi ore. Local stone is used, with Connellsville coke as fuel.



Casting at the New Furnace. It will be noted that the closed or mixer type ladle is used. The pig machine appears at the left

STEEL MEN PROMINENT

Charles M. Schwab and James A. Campbell Appointed on Committees at Unemployment Conference

WASHINGTON, Sept. 27.—Of vital interest to the entire nation because of its human, economic and commercial phases, and greatly concerning such an institution as the iron and steel industry because of the large number of workmen it engages, the outcome of the unemployment conference, called into session yesterday, will be watched with exceptional interest. The formidable task laid before the 52 members of the conference has been begun in earnest and in an expeditious manner and hope is entertained that it will reach concrete plans for solution of not only emergency needs, but adopt practical measures of a permanent nature to prevent a recurrence of the present labor condition. This is the keynote that sounds throughout the conference, struck first by President Harding who opened the conference, repeated by Secretary of Commerce Herbert Hoover, who outlined specific ideas as to purposes it is hoped to accomplish, and expressed by members of the conference. Many suggestions already are at hand, among them those contained in the agenda of the Economic Advisory Committee of the Department of Commerce, but until the conference has proceeded with a careful study of its work it is not possible to say what plans may be adopted. It is intended that the subcommittee on the various subjects being taken up will be able to report their findings by Wednesday, Oct. 5, but in the meantime the subcommittee on Public Hearings, of which S. McCune Lindsay is chairman, started hearings today when different witnesses were heard, among them being F. I. Jones of the Employment Service, and Ethelbert Steuart of the Bureau of Labor Statistics, Department of Labor.

Iron and Steel Industry.

That the labor situation as it pertains to the iron and steel industry will be made familiar to the conference and perhaps concrete suggestion for its solution outlined is indicated by the fact that two of the most prominent men in the industry are members of the subcommittees, which were named by the committee on organization, the latter being headed by Henry N. Robinson, Los Angeles, president of the Los Angeles Trust Co., chairman of Bituminous Coal Commission in 1920 and a member of President Wilson's second industrial conference. The two steel men are Chairman Charles M. Schwab of the Bethehem Steel Corporation, and President James A. Campbell of the Youngstown Sheet & Tube Co. Mr. Schwab was made a member of the subcommittees on Emergency Measures by Manufacturers and Emergency Measures in Shipping, while Mr. Campbell was made a member of the subcommittees on Unemployment Statistics and Emergency Measures by Manufacturers.

The first work of the conference is to meet emergency needs of the unemployment situation and simultaneously with this an exhaustive study will be made in order to bring out the exact facts concerning unemployment. A statement given out by the conference points out that estimates of the number of unemployed vary from 3,000,000 to 5,500,000 and it is felt that reliable data as to the extent, geographical distribution and industrial distribution are imperative before relief measures can be put into effect. The committees named were selected because they are considered to be particularly qualified to handle the subjects to come under their purview. After the emergency measures and the collection of statistics are completed, the conference will be regrouped into committees whose functions will be to recommend permanent measures by which unemployment can be held at a minimum. The public hearings are to be held every day for the next week at the same time that the work of the small specialized committees is progressing.

President Campbell's Views.

The underlying necessity to bring about economic readjustment and to solve the unemployment problem is the restoration of the purchasing power of the farmer, according to President James A. Campbell of the Youngstown Sheet & Tube Co., a member of the unemployment conference. Mr. Campbell informally expressed his views yesterday while the conference was being organized and is expected to set them forth formally and in more detail during discussion of the problems before the conference. The view has been stated previously by Mr. Campbell and he still is thoroughly convinced that it represents the primary solution to the problem of unemployment.

The reduction of freight rates on his products is a requisite to restore purchasing power of the farmer, Mr. Campbell said. If transportation charges are reduced, it was pointed out, they will result in lower costs for things the railroads themselves require.

"In my opinion, some freight rates can well be lowered now," Mr. Campbell stated. "The railroads are paying 12 per cent less for labor, they are getting their fuel more cheaply, and the general steel schedule has declined 43 per cent in price since 1920."

Mr. Campbell is of the belief that high retail prices, and rents would be automatically lowered if there were reductions made in transportation charges and the buying power of the farmer restored.

Improvement in Refractories Not Sustained

PITTSBURGH, Sept. 26.—August improvement in the demand for and shipments of fire clay and silica brick was not maintained this month, but despite a decline in the shipments of about 5 per cent, the trade is almost uniformly of the belief that the low point of business has been reached. This feeling is based upon the definitely larger orders going to the steel mills in most producing districts and the knowledge that outside of the Steel Corporation subsidiaries, few of the steel manufacturers have any considerable reserve stocks of brick. Such orders and specifications as lately have been received indicate the very low point to which the iron and steel interests have allowed their stocks to fall, and while manufacturers have rather heavy stocks, it is doubted if this fact would stem an advance should there be a sudden increase in orders.

Large producers are making a firm stand at the prices established several week ago, but we hear of concessions being made in both fire clay and silica brick by the smaller manufacturers, some of whom probably find need of ready cash. As low as $28 is reported to have been done on Pennsylvania silica brick. Demands for concessions are being firmly resisted by the large producers who insist that present quotations fully discount any reduction in costs they have been able to effect. Until fuel and freight charges are lowered, it is asserted that any concessions from current prices mean a loss. It is the experience of some companies in central Pennsylvania, which buy their coal, that the freight charge now is as much as the freight and the cost of the coal combined was before the war.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $37.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 40.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		52.00
Chrome Brick:		
Standard size, per net ton		65.00

The Yale & Towne Mfg. Co., Stamford, Conn., locks, etc., has adopted a plan to aid employees in financing home building projects. The company has set aside $250,000 for this purpose.

CONTENTS

New Ford Foundry Plant at River Rouge 787

Uses Direct Blast Furnace Metal Mixed with Cupola Metal in Definite Proportions as Required—Extensive Conveyor Systems

Reconstruction of French Steel Plants 796

Researches on Hot Drawing, Mechanical Properties at High Temperatures and Heat Treatment Discussed by Iron and Steel Institute

American Society for Steel Treating 807

Heat Treatment Problems, Alloy and Tool Steels and Other Subjects Discussed at Third Annual Convention—The Exhibition

Fuel Requirements of Steel Mills 811

Solid, Liquid and Gaseous Fuels Discussed with Relation to Their Fitness for Many Uses—Limitation and Safeguards

New Blast Furnace of Crane Iron Works 814

Historic Iron Plant at Catasauqua, Pa., Modernized—Earliest Successful User of Anthracite Now Uses Coke as Fuel

Lowest Iron and Steel Exports in 12 Years 824

Total for August One-Sixth of August, 1920—Eight Months' Total 44 Per Cent Below 1920

Iron and Steel Electrical Engineers Meet 826

Numerous Technical Problems Discussed—Fuel Economy Given Special Attention —Exhibit of Equipment Large

Plant Operations 793, 845
Krom Sintering System 794
Rehearing of Steel Products Co. on Panama Canal Case 795
Knee-Type Ring Wheel Grinding Machine 802
Precision Machine Alining Level 802
Vertical Milling Machines 803
Labor Notes 801, 803, 810, 825, 829, 846
Tests of Rotary Drill Pipes 804
Expects Great Revival of Business 805
Motor Driven Grinding Machines 806
Specifications for Steel Forgings 806
Proposed Lower Freight Rates 813
Steel Men at Unemployment Conference. 818
Editorials 820
Key Points in Unemployment—Railroad Returns in Future—Progress in Heat Treatment—Conditions for Construction Work—The Deporting of Immigrants.
Correspondence 823
Price Reductions in Steel—The Inventor's Opportunity Is Also the Manufacturer's Opportunity.
Peak of Industry Was July, 1920 825
Labor Conditions in Germany 829
Foreign Market Conditions 843, 849
Coming Conventions 845
Exceptions Filed in Ferromanganese Case 846
High Retail Prices for Nails 847
Iron and Industrial Stocks 857

Iron and Steel Markets 830
Comparison of Prices 831
Prices Finished Iron and Steel, f.o.b. Pittsburgh 844
Personal Notes 846
Obituary Notes 847
Non-Ferrous Metal Markets 848
Machinery Markets and News of the Works 850
New York Jobbers' Prices 858

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Key Points in Unemployment

So far as the steel industry is concerned, the unemployment conference at Washington can limit its search for causes of unemployment to three. There are others, but if these three were remedied the industry would soon be on its way to a scale of activity that would give work to tens of thousands of men who are idle to-day or working only a fraction of each week:

1. Transportation charges nearly double those of immediately pre-war time.

2. Fuel cost more than double and in some cases nearly three times that of 1914.

3. Building trades labor cost double that before the war, with performance of building trades labor often below that of pre-war time.

It has been shown over and over that the excessive freight rates of to-day bear more heavily upon steel than upon any other commodity, seeing that to produce a ton of steel requires the transportation of five tons of raw materials and supplies, as against little more than a single ton in the case of lumber, grain, leather, cotton or any other of the more common commodities. It has been shown also that this excessive transportation cost is excessive railroad labor cost. Vice-President Atterbury of the Pennsylvania Railroad told employees of that line this week that the two outstanding factors thus far unliquidated are coal and transportation, and that unless there is a further reduction in railroad labor costs the carriers face receivership or Government ownership.

The high fuel cost that is hobbling the steel industry is again unliquidated labor cost—first that of mine labor and second that of railroad labor.

One of the most widely accepted causes of shrinkage in car loadings and in the volume of construction work calling for structural steel and other products of iron and steel works is the refusal of union workers in the building trades to accept reductions in wages in line with the reductions already realized in the cost of living. Thousands of railroad workers, steel workers and coal miners are out of work because building trades workers prefer idleness to a reasonable readjustment of the war price of such labor.

Steel works labor has suffered repeated reductions. Railroad labor has been reduced but 12 per cent. Coal miners insist on the continuance of war-time wages, and workers in the building trades stand in the way of a demand for materials of construction that would give employment to hundreds of thousands.

The inquiries of the unemployment conference will ramify in many lines. As to major causes of the present industrial depression it will probably be agreed that they are world-wide and an inevitable part of the world's war burden. But when consideration is given to special and removable causes which bear upon the chief of the manufacturing industries—steel and the great allied metal-working trades—attention may well be concentrated upon three key factors. They are transportation, coal and the unbending attitude of building trades labor.

Railroad Returns in Future

So many complicated questions in connection with the railroads have engaged attention that few men, perhaps, realize how soon will expire the two-year period for which the Transportation Act fixes the standard of railroad operating income. The date is March 1, 1922, five months hence. The general authority of the Interstate Commerce Commission is to fix such rates as will yield for the carriers as a whole or in rate groups a fair return on the value of the property. The percentage of return may be changed later at any time by the commission, but the act decreed that for the two years to March 1, 1922, the rate should be 5½ per cent, the commission being authorized, however, to add one-half of one per cent for the purpose of making betterments. This the commission did, and the charges that became effective Aug. 26, 1920, were intended to yield 6 per cent. Of course they have not done so.

Effective March 1, 1922, or later, the commission can alter the present 6 per cent to any other rate. This cannot be done, however, in such a manner as directly to make up to the railroads any deficit they may have this year, because the act prescribes the disposition of any excess, in a year, over 6 per cent. That is, the commission is at liberty to prescribe a rate, say 8 per cent, and fix transportation charges accordingly, but the act arranges what shall be

done with the extra 2 per cent if the railroads earn it. One-half is to go to the commission to make up a contingent fund, the other half being retained by the carrier to pay interest and dividends against a year in which it has earned less than 6 per cent. The provisions in the act whereby each year is a unit may possibly be regarded as unfortunate. A railroad is "out" by all of the deficit it may have in a year, but it is "in," as an offset, only one-half of what it may make in excess. It may be mentioned that there is a provision, now purely of theoretical interest, that if a railroad is lucky enough to build up a reserve fund of 5 per cent, by retaining its half of extra earnings, it can use additional money accumulated "for any lawful purpose."

Thus the opportunity for the railroads to make up any deficit they may have for this year are quite limited. That there will be a large deficit is entirely probable, even if the net operating income continues to increase as it has been doing lately. During the first six months of this year the amount earned was at the rate of 1.8 per cent per annum. In substance, the railroads earned nine-tenths of one per cent in one-half the time in which they were expected to earn 6 per cent. To escape a deficit they would have to earn the other 5.1 per cent in the remaining half of the year, or at the rate of 10.2 per cent a year.

No doubt it is largely on account of the provision of the Transportation Act that each year shall be reckoned separately that railroad managers are especially indisposed to reduce rates at this time. In one sense, an extra dollar earned next December may do a railroad twice as much good as an extra dollar earned next January. The December dollar could be used for interest and dividends, but only 50 cents of the January dollar would be available if the 1922 earnings of the road should exceed 6 per cent. The other 50 cents would go to the commission.

In connection with all such matters, however, it should be remembered that the law allows wide latitude of interpretation to the commission, it being prescribed that rates be considered "under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment." Thus if the railroads do make some additional money it may be absorbed in maintenance instead of being split half to the railroad's reserve fund and half to the commission's contingent fund.

Progress in Heat Treatment

If the number of technical and other papers presented at last week's annual convention of the American Society for Heat Treating be the criterion, then progress in heat treatment has been marked in the past year. Over 70 papers were prepared dealing with carbonizing, tool steel, alloy and high-speed steel, heat-treating problems and equipment, metallographic research and various other subjects. Many of the papers were of a high order and registered a marked advance in the practical and theoretical knowledge of the art. For an organization only three years old, such an accomplishment is a credit to the enthusiasm of the members and the efficiency of the officials. Few of the older societies could do as well.

If, however, our measure of the progress in heat treatment be the amount of information actually made public and discussed at the convention last week, the results would not be so pronounced. Without doubt one of the principal benefits of such a convention to those who take the trouble to attend is the hearing and discussion of the largest number of papers possible. The pre-printing of a few papers and this followed by a full discussion is productive of the largest measure of profit, in contrast with the presentation by title or verbal abstract of a large number of topics and almost no discussion. The latter was the situation last week. With no papers pre-printed and with many of the printed abstracts inadequate, there resulted a distinct disappointment in the lack of opportunity to discuss some of the topics. Another unfortunate phase of such a procedure is that since all the papers are held for publication in the society's monthly journal, many of the important papers cannot be made public until late in the year, and this is naturally a damper on the enthusiasm of some authors.

There has been marked progress in heat treatment. The cooperation of some of the country's best metallurgists last week and the genuine enthusiasm and interested attendance at the sessions, particularly at those on alloy and other steels, is proof positive of progress in the knowledge of the subject and of a desire for better mastery of it by the rank and file.

Conditions for Construction Work

The everyday necessities of life in the United States, in food, clothing, shelter, etc., and including amusements as a necessity in accordance with present day philosophy, are being met fairly well, yet many men are working only part time while others are entirely out of employment. Whether by artificial aid or in the natural course of events, work for idle hands will develop. This work will be along the line of new construction. The work we have done in all the past can be divided into three general classes: First, the work necessary simply for us to keep going, by providing food, clothing, transportation, etc.; second, the production of goods exported, and third, new construction. The continued insistence in so many quarters that we must have a large export trade proves that there is general recognition of the fact that we cannot keep ourselves busy by simply doing work of the first class mentioned.

Often men balk at the idea of construction work through being impressed with the works of construction we have that we do not fully realize. That is a narrow view. Of construction work there is no end. If the hen house is large enough to accommodate all the hens a family cares to keep, it may be advantageous to acquire a cow, in which case there is need of shelter for her. There may be enough bedrooms in the house, but a sleeping porch might be a desirable addition.

The country had such an experience in 1920, with apparent shortages of labor and transportation, that in construction work in future it is likely to take strongly to such classes of construction work as are calculated to reduce the amount of work needed to keep things going. In the individual factories "labor saving machinery" has been intro-

duced. A similar policy can be pursued in more general and public matters. One of the most promising fields is that of power generation and distribution. We may have more factories than we need for the production of some articles of ordinary consumption, of which men want so many and no more, but we do not have too many economical central power stations or transmission lines. We can convert more coal at the pit mouth into power and distribute the power. We can develop water power. The investor requires assurance that his investment will pay, that there will be demand for the service provided. In such matters, nothing is better assured than the future of demand for power, as the rapid and continuous demand for coal from the beginning of coal mining testifies. The manufacturer of a commodity is limited. The public taste varies from time to time and the manufacturer may have difficulty in modifying his equipment or methods to follow the varying demand; but power, supplied by electric current, is simply power.

Useful ideas for construction work can always be found. The limitations in the past always have been the supply of capital and the cost, not the cost in the absolute so much as the cost at the time the project is considered, by comparison with the expected cost in future. The cost of some classes of construction may be artificially maintained, but not the cost of all classes of construction at a time when materials are in ample supply and there are idle men. As to the supply of capital, enough has been said in the criticisms of the federal tax law of 1918 to convince a normal man that under proper conditions much capital would be forthcoming.

The Deporting of Immigrants

A gentleman of foreign birth, now a citizen of the United States, who has had long and valuable experience in working among immigrants in this country, and is now devoting his attention to education of the foreign born in the English language, especially in iron and steel mills, calls the attention of THE IRON AGE to the unsatisfactory operation in some respects of the so-called "Three Per Cent Immigration Law."

Although the Department of Labor at Washington and the officials of Ellis Island have endeavored to enforce the law in a humane way, it has been impossible to prevent some cases of apparent injustice which have resulted in the separation of families and in other hardships. Because the number of immigrants arriving was larger than permitted by law, it has become necessary frequently to deport a considerable number who had hoped to make their homes in this country.

The deporting of an alien who has spent the savings of years to come to this country is a proceeding, even when required by law, which causes a feeling of resentment on the part not only of the person excluded but also of all who are related to him.

In answers to criticisms that have been made, Secretary Davis of the Department of Labor asserts that within the law he has exercised every leniency, but adds that after all the law must be enforced, and he describes frauds and impositions which have been practised or attempted on the immigration service. Owing to the many other matters of importance demanding the attention of Congress, it is probably too much to expect that a complete and permanent immigration law will be enacted this year, but it is not too much to demand that a bill now before Congress shall be passed. This bill authorizes the Department of Labor to appoint agents to be stationed at certain points in Europe to pass upon the character and merits of each applicant for entrance to this country, and to issue permits to those qualified. Thus the efforts of steamship companies to increase their business regardless of the character of the immigration encouraged would be thwarted, and many men and women would be prevented from enduring the suffering to which they are subjected under the present law.

SHEET MILLS BUSY

Doubt as to Whether Present Rate Can Be Maintained in the Valleys

YOUNGSTOWN, OHIO, Sept. 27.—Press reports have been prone to exaggerate expansion in steel plant operations, which are still averaging up well on tonnage driven to the mills by pressure of recent price advances. That production in affected departments is likely to suffer curtailment when this tonnage is rolled is common comment in the industry. There is a strong tendency abroad to place undue emphasis upon specific instances of improvement and to draw general, though often unwarranted, conclusions therefrom. The general trend in the Mahoning and Shenango Valleys, however, the past month and a half, has been progressive and as yet there are no sure signs that a reversal is to be encountered. The likelihood of over-emphasizing the importance of a moderate improvement in an effort to create optimism is obvious.

Hence the private opinion of a number of well-informed executives as to the immediate outlook is somewhat different from press statements, though all, naturally, are hoping that the buying movement which was instigated by price changes, may be sustained. A sidelight on actual conditions may be gleaned from the fact that one Valley sheet interest, which started the week with 17 active mills, reduced the number to 13 within several days, finding that business did not warrant the larger operations.

The aggregate improvement is partially attributable to the fact that all of the smaller, non-integrated sheet producers entered business on their books at the old figures of 2.25c. for blue annealed, 2.75c. for black and 3.75c. for galvanized. How these interests will share in business at the higher figures is somewhat problematic.

One of the sustaining encouraging influences, though, is found in the steady but slow expansion in productive capacity of subsidiaries of the leading interest in the two Valleys. On Monday the blast was put on two furnaces of the Carnegie Steel Co. at New Castle, Pa., which had been idle for a number of months. Bar and blooming mill operations will add to the activity of the New Castle plant within a short time. Iron production in the district will be still further enlarged about Oct. 1 when the A. M. Byers Co. lights its Mattie stack at Girard, for which it has already contracted for coke. Due to shortage of iron, the company has suspended its puddling and skelp mill departments at Girard for a short period.

While active sheet mill capacity shows some additions this week, output is scarcely above 75 per cent. Mills are being operated in the Mahoning Valley on the following basis—Youngstown Sheet & Tube Co., 15; Brier Hill Steel Co., 17; Trumbull Steel Co., 13 and one jobber; Republic Iron & Steel Co., 9; Newton Steel Co., 10; Sharon Steel Hoop Co., 7; Falcon Steel Co. and Mahoning Valley Steel Co. 7 each, for total of 86. This is actually the largest sheet mill schedule in this territory at any time this year.

CORRESPONDENCE

Price Reductions in Steel

To the Editor: The dependability of the statements contained in your publication can always be used as a basis in reaching conclusions.

Permit me to congratulate you upon the intelligent and exhaustive résumé of the general iron and steel business situation, as contained in your last issue. I am primarily interested in its application to the steel business.

According to your statement, steel prices to-day are only 37 per cent above the prices of 1913, which, taking everything into consideration, is an extremely small advance in price; and the logical conclusion cannot be avoided that if everything else that enters into the general business of the country had been willing to bear its share of the burden proportionately, the business of the country would not be in its present depressed condition.

I note particularly the fact that the excess in building materials in 1920 over 1913 was 241 per cent, with a drop at the present time of 143 per cent, that the price of steel mill labor in 1920 was 153 per cent above 1913, with a drop from 1920 of 103 per cent, or 67.3 per cent. Farm products have declined 87 per cent and food products 72 per cent of their excess.

A careful diagnosis of your article and taking into consideration the comparisons I take the liberty of making in this letter, the conclusion cannot be avoided that the main cause of the present depression in business is almost entirely due to the persistency with which the various labor unions throughout the country have not only insisted upon maintaining pre-war wages, and in some instances, as of very recent date in the case of the printers, are asking for an increase in wages.

Is it not possible in some way to reach the intelligent, fair-minded and level-headed union men in the country, and call their attention to these facts, and make them realize that they are to-day the stumbling block in the progress of business? They will undoubtedly, without any question whatever, have to come down from the lofty pinnacle upon which they are attempting to stand, and the quicker they do this the more satisfactory the results will be to them and to the country at large.

The steel industry has done its full part in the past few months, has borne the burden of depreciation and if our other industries will fall in line, we will soon come to a condition of prosperity.

LOUIS C. TETARD,
Secretary, National Steel Rolling Co.
New York, Sept. 23.

The Inventor's Opportunity Is Also the Manufacturer's Opportunity

To the Editor: Your editorial in your issue of Sept. 8, entitled "The Inventor's Opportunity," might well be supplemented by another entitled "The Manufacturer's Opportunity."

It is a fact that not for twenty years past has there been the incentive for manufacturers to purchase new inventions of real, demonstrated value covered by valid patents, that now exists.

For many years the inventor of a meritorious appliance, who has at last got the attention of the head of an industrial plant equipped to make and market the appliance, has usually been told:

"Yes, your invention is ingenious and will work all right, but it is really of no interest to us. We can get all the business we want making our standard line of goods and the trade takes them at good prices. It really doesn't pay us to bother with these new things and upset our production schedules, and have to spend money to develop and market something different. Sorry to disappoint you. Good day!"

In very many cases the manufacturer was right; but we have come now on totally different conditions, such as none of us ever experienced before. The seller's market that has endured so long is gone. It is a buyer's market to-day and all the indications are that it will be a buyer's market for a long, long time to come.

The plain, well known fact is that our producing capacity in all lines of manufacture has been enormously expanded during the past four years, while the purchasing ability of half or three-quarters of the world's population has been greatly reduced by the impoverishment resulting directly and indirectly from the war.

Therefore the manufacturer who makes standard goods in open competition must enter the race for survival of the fittest or run the risk of indictment and prison by entering combinations to kill competition.

Henceforward the big profits in manufacturing will be made by the concern which can offer something different from and better than any one else, and which can protect its exclusive right to make and sell it by strong patents. There is no better or safer investment that a manufacturer can make to-day than the purchase of such patents of proved value.

CHARLES WHITING BAKER,
Director, the Engineering Business Exchange.
New York, Sept. 22, 1921.

More Activity at Wheeling

WHEELING, W. VA., Sept. 26.—Steel plants in this district are having better operations now than before in several months, due to the enlargement of orders for sheets and tin plate, for the manufacture of which there is considerable capacity here and in nearby towns. The Wheeling Steel Corporation, the largest unit in the district, is doing little at its Wheeling City plants, but an accumulation of orders enabled it to start up a portion of its steel works department as well as several sheet mills at Portsmouth, Ohio, recently, and this week will see more activity at its Steubenville works, which for several weeks past have been running from 30 to 40 per cent of capacity. One battery of by-product ovens at this plant was started up last night and next Saturday or Sunday night, No. 2 furnace will be blown in and it is the expectation of the management shortly to blow in the Top Mill furnace, located on the West Virginia side of the river almost opposite the Steubenville works. Open hearth furnaces at the Steubenville plant are 50 per cent engaged, and also all of the sheet and jobbing mills on single turn. At Benwood, W. Va., the steel works and pipe furnaces are fairly constantly employed and the Belmont plant is operating in keeping with the requirements of skelp from Benwood. The National Tube Co. Riverside plant at Benwood, also is showing signs of life after several weeks of idleness, two of the seven pipe furnaces there being in operation.

Plants of the American Sheet & Tin Plate Co. in this district are averaging about 50 per cent operations, in connection with which is a little more activity at the Mingo, Ohio, works of Carnegie Steel Co., which supplies sheet bars for the Wheeling district plants of the former. Weirton Steel Co. is running close to normal maximum capacity. Six of the 7 open-hearth furnaces at Weirton, W. Va., are making steel, while the company has all of the 26 tin plate mills at that plant, 5 of 12 at its Steubenville, Ohio, works and 8 of the 12 at its Clarksburg, W. Va., plant running full time. Its strip mill operations at Weirton are averaging between 25 and 30 per cent. Operations of the Follansbee Bros. Co., Follansbee, W. Va., which have been almost 100 per cent, are expected to drop slightly this week, due to a falling away in the automobile demand for sheets. Considerable work remains to be completed at the new plant of this company at Toronto, Ohio, and reports that it would start up Oct. 1 appear to be a little premature.

Lowest Iron and Steel Exports in 12 Years

Nearly Every Item Shares in Slump—Total for August One-Sixth of August, 1920—Eight Months' Total 44 Per Cent Below 1920

WASHINGTON, Sept. 27.—At no time since the iron and steel industry of this country first made a serious attempt to develop foreign markets have exports fallen so low as they did during August, when they aggregated only 75,827 gross tons, valued at $27,647,-

Imports of Iron and Steel—Gross Tons

	August		8 Months Ending August	
	1920	1921	1920	1921
Ferromanganese	9,804	320	33,515	5,801
Ferrosilicon	1,048	1,318	10,484	3,250
Pig iron	10,662	2,433	96,049	18,028
Scrap	24,714	2,016	110,386	23,397
Bar iron	1,198	179	3,666	1,185
Structural steel	183	41	1,033	446
Billets without alloys	761	23	17,731	2,738
All other billets	443	55	3,245	1,074
Steel rails	8,549	2,874	35,501	14,772
Sheets and plates	273	42	1,177	1,874
Tin and terne plates	49	..	271	308
Wire rods	651	47	2,621	552
Total	58,335	9,348	315,679	73,425
Manganese ore and oxide	99,601	28,939	334,590	326,342

816. It is necessary to go back to January, 1909, when the outward movement of iron and steel totaled approximately 68,000 gross tons, to find a level so low as that of August. The slump in exports, which began in February, is, of course, due to the world-wide depression from which some students think there is now a gradual recovery. Imports also were at a low point and totaled only 9348 tons, valued at $1,949,892.

August exports were more than 10,000 tons less than those for July, the latter having been 86,523 tons, valued at $27,639,787, according to the figures of the Bureau of Foreign and Domestic Commerce. That

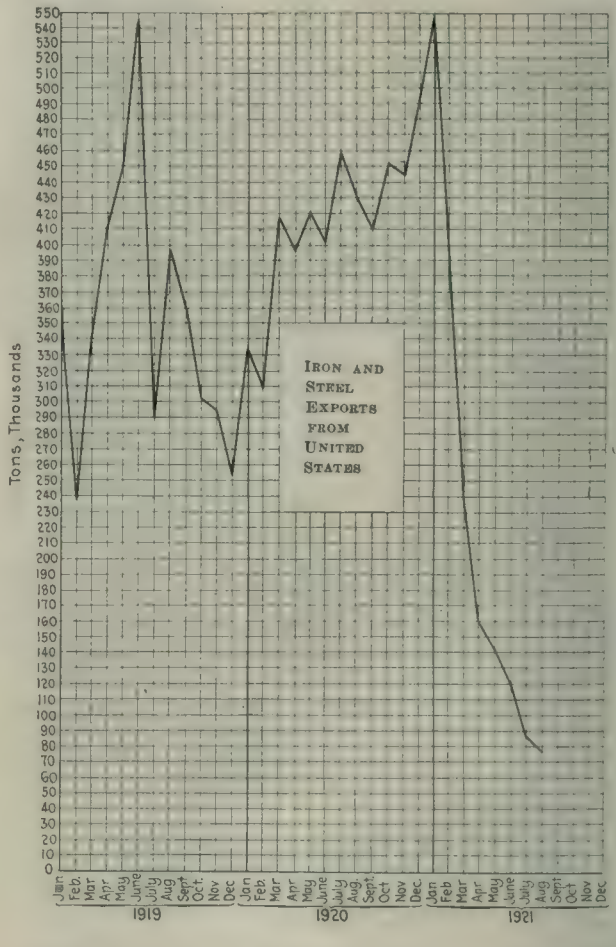
Exports of Iron and Steel—Gross Tons

	August		8 Months Ending August	
	1920	1921	1920	1921
Ferromanganese	252	5	1,186	418
Ferrosilicon	31	..	337	218
Pig iron	22,362	2,419	151,357	17,912
Scrap	37,573	1,616	121,594	25,814
Bar iron	3,566	257	25,954	11,546
Wire rods	12,988	351	90,572	11,314
Steel bars	54,344	5,179	417,631	157,877
Billets, ingots, blooms	20,920	2,447	176,450	6,773
Bolts and nuts	766	1,023	25,055	20,473
Hoops and bands	2,613	1,386	34,519	14,780
Horseshoes	240	42	1,385	405
Cut nails	468	7	1,764	595
Wire nails	10,197	1,112	54,148	18,407
All other nails, including tacks	704	219	7,239	3,462
Cast pipe and fittings	5,651	2,930	36,593	40,178
Welded pipe and fittings	28,385	10,537	176,060	299,215
Radiators and cast house boilers	674	380	4,959	2,023
Railroad spikes	1,205	196	10,999	6,753
Steel rails	56,160	4,782	389,963	261,720
Galvanized sheets and plates	10,219	2,354	74,053	42,920
All other sheets and plates	1,781	456	19,443	10,209
Steel plates	65,769	9,388	560,274	293,275
Steel sheets	12,721	14,169	104,982	84,628
Ship plates punched and shaped	3,318	25	28,682	7,937
Structural steel	36,603	9,852	273,298	254,662
Tin and terne plates	16,424	2,647	156,419	79,909
Barb wire	8,000	973	80,151	21,346
All other wire	15,550	1,075	109,806	56,764
Total	431,484	75,827	3,134,873	1,751,533

the value of July exports, with their greater tonnage, were somewhat less than that for the August exports, apparently is explained by slightly heavier movement of some of the finished lines in August.

The decided drop in exports in August stands out strikingly, when the movement is compared with the exports for August, 1920, which aggregated 431,484 tons, valued at $89,065,536, so that the tonnage of exports for August of this year was only 17.4 per cent of that of last year. For the eight months period ending with August, 1921, exports totaled 1,751,533 tons, valued at $493,022,231, compared with 3,134,873 tons, valued at $693,666,843, for the same period of last year.

Imports for the eight months period ending with



August amounted to 73,425 tons, valued at $20,228,916, as compared with 315,679 tons, valued at $33,850,363, for the same period in 1920. Manganese ore imports in August, 1921, totaled 28,939 tons, valued at $144,-500, showing a big increase over the inbound movement for July, which totaled only 5028 tons.

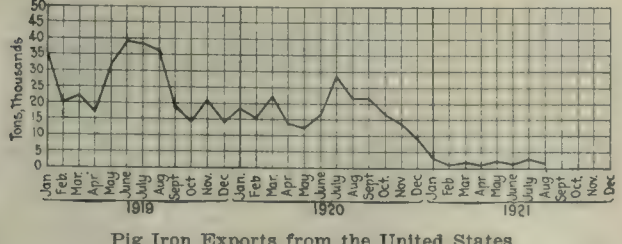
Steel sheets constituted the greatest single item of export for August, the total being 14,169 tons, of which 10,526 tons went to Japan and 2229 tons to Canada. Japan also was the greatest importer of sheets from the United States for the eight months, shipments to that country during this period having been 36,300 tons, and Canada ranked second, taking 24,848 tons. Welded pipe made up the next largest item of export in August, when the foreign movement totaled 10,537 tons, of which Mexico took 2936 tons and British India 2648 tons. Mexico was much the largest export market for the eight months period, having taken 101,752 tons, as against 30,627 tons shipped to British India, second in rank. Steel rail exports in August totaled 4782 tons, of which Honduras took 1413 tons and Canada 1322 tons.

Exports, January, 1919, to August, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
Eight months	1,751,533	18,548	6,773

Of the 2354 tons of galvanized sheets and plates exported in August, Canada took 1049 tons, and of the 42,920 tons exported during the eight months Canada took 16,179 tons. Of the 2647 tons of tin plate exported in August, Canada took 1717 tons and for the eight months took 16,285 tons; Japan took 178 tons and 14,198 tons respectively; Italy, 96 tons and 6174 tons respectively. The total exports of this product for the eight months were 79,909 tons.

Canada also was the greatest export market for steel plates and structural steel during August and the eight-month period. Of the 9388 tons of plates exported in August, Canada took 6084 tons, and of the 293,275 tons exported during the eight months, 75,891 tons were exported to that country. Japan took 3262 tons in August and 23,213 tons during the eight months, while 17 tons were shipped to the United Kingdom during the month and 44,704 tons during the eight months. Of the 9852 tons of structural steel exported in August, Canada took 4094 tons, and during the eight months took 44,793 tons; Japan took 1687 tons and 39,718 tons respectively; British India 1608 tons and 27,272 tons respectively. The total exports of structural steel for the eight months were 254,662 tons.



Pig Iron Exports from the United States

Exports of machinery showed a slight gain in August over July, the respective total values having been $15,178,004 and $14,758,741. Metal working machinery to the value of $931,563 was exported in August, the total value for the eight months having been $16,833,061

Principal Foreign Buyers

The rank of the principal markets is considerably different for August trade from that reported for July, the leading countries in August being:

Countries	Gross Tons	Countries	Gross Tons
Canada	25,967	United Kingdom	1,779
Japan	16,534	Argentina	1,554
Mexico	6,755	Australia	1,192
British India	6,086	Brazil	1,072
Cuba	2,249	Philippine Islands	1,064
Honduras	2,046	Rumania	1,017

Peak of Industry Was in July, 1920

Preliminary figures from the unemployment studies of the National Industrial Conference Board, 10 East Thirty-ninth Street, New York, show that in the four industries that have been covered the high point of employment, from which the recent declines are usually estimated, registered a volume of employment that was 57 per cent higher than that of 1914, immediately before the war stimulation.

"It is obvious," said an official of the board to the New York *Times*, "that in any discussion of the amount of unemployment to-day, or of a return to 'normal' activity, this fact must be taken into the account. In these four industries the total decline from the 1920 peak has been 43 per cent. The percentage of decline, of course, is a percentage of a larger figure than is the percentage of increase, so that a 43-per cent decline from the peak more than wipes out the 57-per cent increase from the lower level. But the decline from the 1914 level to-day is very much smaller than seems generally to be supposed. For the four industries reported on, the figures collected show a decline of 11 per cent below the 1914 level of employment.

"These reports are made up from reports from 625 foundries, in all parts of the country, 25 paper mills, 150 printing establishments and 19 meat packing houses.

"The index numbers and percentages for these four industries are shown in the following table:

	Index No. 1914	Peak, 1920	Sept., 1921
Foundry	100	163	87
Paper	100	157	96
Printing	100	110	82
Meat packing	100	138	103
Composite	100	157	89

"In the printing business the peak of employment was in June, 1920; in the foundry business, it was in August, 1920; in the paper business it was as late as September, 1920; and in the meat packing business it was in June, 1920. In none of these four industries did the peak of employment actually occur in July, 1920, but that is the average or medial line, and that is generally true of all the industries of the country. The figures reported by the conference board for these four industries cover plants having an aggregate of 141,139 employees in 1914, 222,066 at the peak in 1920, and 126,120 at present."

Andrew J. Allen, secretary of the Associated Employers of Indianapolis, has written to President Harding, Secretary of Commerce Hoover and the industrial employment survey officials at Washington, asking them to obtain verification of the figures, 25,000, forwarded to Washington by the Indiana free employment service bureau as the number of unemployed in the city. Mr. Allen, who keeps in close touch with the labor situation, states that the figures should not be more than 10,000.

The Pawling & Harnischfeger Co., Milwaukee, manufacturer of electric traveling cranes, contractors' machinery, machine tools, etc., has extended the working hours in its plant from 48 hr. to 55 hr. a week without overtime. A notice posted in the plant for the information of employees explained the business situation and the necessity for the change.

Iron and Steel Electrical Engineers Meet

Numerous Technical Problems Discussed in Five-Day Meeting—Fuel Economy Is Given Special Attention—Exhibit of Equipment Is Large

FROM Sept. 19 to 24, inclusive, the fifteenth annual convention of the Association of Iron and Steel Electrical Engineers was held at Hotel La Salle, Chicago. The sessions were well attended by both members and guests, registration totaling more than 400. Exhibits of electrical devices, numbering 41 were shown in a large hall adjoining the room in which the technical discussions were held. Two afternoons were set aside for inspection trips. No particular works were visited by the members in a body; instead, small groups were formed which went to plants in which they were especially interested. The program throughout was handled in an excellent manner, and bore earmarks of the earnest efforts of A. O. Swartz, chairman of the convention and publicity committee. On Friday evening the annual banquet was held, followed by a dance. The banquet differed from its predecessors in that there were no invited speakers, but instead professional entertainers provided music and amusement.

Both the national and sectional officers for the coming year were announced at the conclusion of the banquet by Ernest S. Jefferies, electrical engineer, Steel Co. of Canada, the retiring president. The national officers are as follows: President, W. S. Hall, electrical engineer Illinois Steel Co., South Chicago; first vice-president, R. B. Gerhardt, electrical engineer Bethlehem Steel Co., Sparrows Point, Md., second vice-president, L. F. Galbraith, electrical engineer, West Penn Steel Co., Brackenridge, Pa.; directors, R. R. Shepherd, electrical superintendent Steel & Tube Co. of America, Indiana Harbor, Ind.; I. N. Tull, electrical engineer McKinney Steel Co., Cleveland; F. H. Woodhull, electrical superintendent Lukens Steel Co., Coatesville, Pa.; W. H. Gilbert, electrical superintendent Tennessee Coal, Iron & R. R. Co., Fairfield, Ala.; treasurer, James Farrington, electrical superintendent, La Belle Iron Works, Steubenville, Ohio; secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

The sectional officers include: Chicago, chairman, James L. Mills, electrical engineer North Works, Illinois Steel Co.; secretary, W. H. Williams, Williams-Beasley Co.; Cleveland, chairman, C. B. Skelly, American Steel & Wire Co.; secretary, A. R. Lintern, Nichols-Lintern Co.; Birmingham, chairman, J. E. Fries, chief engineer Tennessee Coal, Iron & R. R. Co.; secretary, F. M. Sturgess, electrical engineer American Steel & Wire Co.; Pittsburgh, chairman, A. C. Cummings, electrical engineer Carnegie Steel Co.; secretary, John F. Kelly; Philadelphia, chairman, George H. Schaeffer, electrical engineer Carpenter Steel Co.; secretary, L. O. Morrow, L. O. Morrow Co.

Abstracts of Papers and Discussions

A FEATURE of the technical sessions was the amount of time provided for discussion. Not more than two papers were read at any one session, and the remainder of the period was set aside for comments. After each discussion the author of the paper was called upon to answer questions asked, or criticisms offered. One entire day was devoted to the subject of fuel economy. The general fuel requirements of steel mills were outlined by F. E. Leahy, fuel and experimental engineer Carnegie Steel Co., Duquesne, Pa.*

Steel Mill Fuel Requirements

He enumerated the different kinds of fuels used, and briefly described their application, from the standpoint of economy. He pointed out numerous ways in which fuel formerly wasted at steel plants has been conserved. Fuel in gaseous form, he said, is adapted to meet the demands of any of the diversified requirements of the steel plants. By-product gas is being successfully used in metallurgical furnaces and elsewhere, as is producer gas. In the waste heat type of boiler using blast furnace gas, efficiencies are obtained equal to that of any boiler fuel. Without the use of economizers, some modern blast furnace gas-fired boiler plants now obtain, in regular operation, thermal efficiencies above 75 per cent, whereas some years ago they did not average over 55 per cent. The highest thermal efficiency obtained through the use of blast furnace gas for fuel is in gas engine practice.

In discussing Mr. Leahy's paper, G. R. McDermott, assistant engineer Illinois Steel Co., South Chicago, stated that in every steel works a plant heat balance should be worked out, with the blast furnace as the starting point. In other words, provision should be made, first for disposing of all blast furnace gas, then for utilizing all of the waste heat of the open-hearth furnaces, and so on through the plant, until the coal-fired boilers are reached. In this way the use of new fuel would be kept down to a minimum.

Gordon Fox, Freyn Brassert & Co., Chicago, pointed out that most boilers using blast furnace gas are not of the waste-heat type, but get their heat by radiation rather than convection. Commenting on this point, Mr. Leahy stated that, as the boilers referred to in his paper were of the waste-heat type, they gave better results than the older type of boilers, their efficiency sometimes reaching 75 per cent. From waste-heat boilers, with later modifications in design, the Jones & Laughlin Steel Co., he stated, had obtained efficiencies of 80 per cent. A discussion of boiler efficiencies caused Wilfred Sykes, chief electrical engineer Steel & Tube Co. of America, Chicago, to make the criticism that high boiler efficiencies are generally discovered under test, when every regulatory precaution is taken, whereas the actual efficiency of a boiler can be ascertained only by securing results over a long period of operation under ordinary conditions.

Using Waste Heat Usefully

Waste heat utilization for steam generation in a steel plant was covered in a paper by G. R. McDermott.† Numerous applications of the waste-heat boiler are mentioned, and results are presented of comparative tests of water-tube and fire-tube boilers using waste heat. Specific reference is made to the fire-tube type of boiler using waste heat, designed by C. J. Bacon, formerly steam engineer of the Illinois Steel Co., South Chicago. This type has shown greater efficiency, in tests referred to by Mr. McDermott, than the water-tube boilers. The popular impression that fire-tube boilers are not as efficient as water-tube boilers he attributed to the fact that only the usual types of tubular boilers and methods of using them are considered.

As a matter of fact, he said, the heating surface of tubular boilers can be made as effective and more so than that of water-tube boilers. The trouble with the usual fire-tube boilers, especially when used for waste-heat applications, is that the area for the passage of gases is too large, and there is not sufficient length of travel for the gases. These objections are overcome by

*The paper, substantially in full, will be found on page 811.

†A paper on this subject, by Mr. McDermott and F. H. Willcox, was read Nov. 15, 1920, before the Western Society of Engineers. An abstract of that paper appears on page 899, THE IRON AGE, April 7.

making a long boiler of small diameter, or, what amounts to the same thing, dividing the boiler into two or more passes. The matter of tube size is also a large factor, and if the question of cleaning were not of such real importance, the tubes could, to great advantage, be as small as locomotive tubes, or even smaller.

Waste gases from large gas engines, such as those using coke oven and blast furnace gas as fuel, are of sufficiently high temperature and quantity to justify the installation of waste-heat boilers, said Mr. McDermott. On account of the comparatively low waste gas temperature, it is necessary to confine the design of the boiler to that of a fire-tube type with small flues. No installations of waste-heat boilers using the exhaust from gas engines have been made in this country, but there have been a number in Europe. One of these, in the Westphalian coal district, is described by the author who, himself, recently designed a fire-tube waste-heat boiler to use waste gases at a temperature of 850 deg. Fahr. from a 3300-kw. blast furnace gas engine.

In the discussion, the objection was raised that the formula used, in determining the rate of heat transfer for water-tube and fire-tube boilers, was empirical, and that there is no assurance that it would apply with different designs of either type of boiler. It was also pointed out that the computations covering fire-tube boilers with smaller diameter tubes, 1 and 2 in., were entirely theoretical, and that actual results with such boilers might differ materially from those which Mr. McDermott worked out mathematically. In closing the discussion, the author stated that boilers with small tubes, through which the gases are passed at high velocity, had been developed in England, and that a British government commission appointed to investigate steel mills in occupied territory in Germany had discovered that such boilers, utilizing exhaust gas from gas engines, are being used with success to supply steam to drive turbines.

Boiler Combustion Control

Control of boiler operation was the subject of a paper by Walter N. Flanagan, steam engineer Ohio Works, Carnegie Steel Co., Youngstown. He pointed out that boiler control is a relatively recent development and offers large possibilities for economy. Hand methods of control, especially the centralized and well co-ordinated means that have been applied in connection with the use of instruments to show the operation of individual boilers, represent a great step in advance of the guesswork formerly used; but at best these can give only approximately correct results, particularly where a fluctuating load is carried. With the best of hand control, the boilers are continually being driven above and below the economical range of operation, even though the average lies well within. This causes an increased fuel consumption, which is augmented by the fact that since the air and fuel and draft supply all have to be readjusted by the operator, each time he tries to correct for the load change, there is a chance for improper combustion every time the load changes, with resulting fuel loss.

Mr. Flanagan said that there are numerous examples of automatic control in use to-day, and described one of particular interest to electrical engineers, because of the wide use of electricity as a controlling medium. All of the auxiliaries, i.e., forced draft fans, stokers, and induced draft fans, are driven by d.c. motors. The armature current for each motor is taken directly from the line, supplied either by d.c. main units, motor-generator sets, or house turbines. The fields of the motor are supplied from a small motor-generator set, consisting of one d.c. variable speed motor, and a generator for each set of auxiliaries, i.e., one for forced draft fan motors, one for stoker motors, and one for induced draft fan motors (if such are used). The motor speed is controlled by a field rheostat operated by a compensated steam pressure regulator, which moves the rheostat to a definite position for every given pressure.

In every plant there is a more or less appreciable drop in pressure between the boilers and the point of consumption, which varies as some power of the load. The regulator is connected to the steam main at or near the point of consumption. This pressure drop causes the regulator and rheostat to move through the full range, as the demand increases from no load to maximum load. The rheostat is so designed that, for each position of the regulator, i.e., for each load, it gives the correct motor-generator set speed to produce the proper field voltage, so that the stokers and fans will have a correct speed to deliver the necessary quantity of coal and air to meet that load. Since all of the stoker motors receive the same armature and the same field voltage, and the forced and induced draft fans likewise, all of the boilers carry the same load and change their rating at the same time. The control of any number of boilers on the same load is centralized in one regulator, with a motor-generator set, and the operation of a large number of boilers is thus reduced to the terms of one, and that one is taken care of automatically, so far as combustion is concerned.

In discussing the paper, Joseph Harrington, Brady Foundry Co., Chicago, and member executive committee, Fuel Section, American Society of Mechanical Engineers, questioned the value of a graph presented by the author of the paper, showing the variation of combined boiler and stoker efficiency per boiler output in per cent of normal rating. He asserted that efficiency of combustion has no relation to rate of combustion, that the time element does not enter, and consequently capacity should not affect efficiency. He asserted that such progress has been made in boiler operation that the same efficiency can be secured at normal rating, at double rating, or 250 per cent of rating.

Touching on this point, Mr. Flanagan stated that, in his opinion, such results can be secured only when the radiation loss is constant, whereas ordinarily, when the load increases, the ash increases and the flue gas temperature rises. Referring again to the subject of control, he stated that automatic control of both coal and air supply is far more satisfactory than automatic control of one and hand control of the other, as there is inevitably a lag between the automatic operation and the manual operation.

Production of Cheap Oxygen

Probably the most interesting paper of the convention was one on the Influence of Cheap Oxygen on Economy of Fuel and of Time, by E. A. W. Jefferies, consulting engineer, Worcester, Mass., and father of the president of the association. In this paper, read in the absence of the author, who was ill, is contained the first public announcement of his discovery of a method to produce cheap oxygen. The new process has been put into practice and successfully demonstrated on a large scale, not in a production of oxygen, but in a separation of helium from the natural gases of Texas, which, he states, is a much more difficult task.

Mr. Jefferies was one of three engineers authorized by the government to investigate the possibilities of producing helium for use in balloons and dirigibles. He does not explain his new process in detail, but states that in general it consists of liquefying the air by compression and expansion, and then distilling off the volatile nitrogen, just as it is now done by the Linde and other processes used to supply oxygen in cylinders. Instead, however, of consuming large amounts of power to drive compressors, and then throwing practically all the work away by free expansion into the still, the new method is based on the simple idea of carrying on the distillation under pressure, that is, at the pressure to which air is originally compressed.

By this means the nitrogen, which is 79 per cent of the whole volume of the air, leaves the still under the original pressure. It can then be heated to increase its volume and power capacity, and used in a piston engine to drive the compressor. For this purpose very little heat is required to do a lot of work, because the efficiency of conversion of heat put into a gas, already under pressure, is about 75 per cent, whereas only about 15 per cent of the heat put into raising steam is converted into work. Thus a method has been evolved which requires no external power to operate, but uses

instead a comparatively small amount of fuel.

Nature imposes only a small resistance to the separation of a mixture of gases; in fact, only about 3 hp. is theoretically required to separate 1000 cu. ft. of oxygen per hour from the atmosphere and the new method, when applied on a large scale, works at about 60 per cent efficiency, which is ten times as efficient as current practise. A combined effect of these two favorable factors, that is, of high processed efficiency and of the fact that the small amount of power required can be supplied by the heat instead of from outside sources, has made it possible to produce oxygen at a cost ranging from 8c. per 1000 cu. ft., when produced at 4000 cu. ft. per min., to 28c. per 1000 cu. ft., when produced at 400 cu. ft. per min.

Benefits from Use of Oxygen

Mr. Jefferies pointed out the far reaching effects which he expects his discovery to have on industry. By converting bituminous coal into gas by a mixed current of steam and oxygen, he believes that public service companies will be able to reduce their costs markedly.

In the open-hearth furnace the use of oxygen would speed up operation, and cut down proportionately the amount of gas consumed. The difference of only a few degrees in melting temperature makes a great difference in the time required per heat. The introduction of a small stream of oxygen into the gas ports, he believes, will result in a great change in practise —probably a reduction of 50 per cent in time and fuel, which, of course, would greatly influence the cost of making steel. It would involve some change in constructing furnace roofs, but Mr. Jefferies states that he has been assured by certain prominent steel manufacturers that this aspect of the problem presents no great difficulty. There are also possibilities of the use of oxygen in the blast furnace, with like economies.

In commenting on Mr. Jefferies' paper William S. Aldrich, combustion engineer American Bridge Co., stated that lack of suitable refractories might stand in the way of oxygen enrichment in combustion chambers. He pointed out that clay commences to soften at about 3250 deg. Fahr. and completely volatilizes at 4050 deg. Fahr.

Mr. Flanagan asserted that it would not be necessary to increase temperatures to 4000 deg. Fahr. to obtain a great improvement in open-hearth practice. An increase of a few hundred degrees would materially shorten the time of melting, and result in great economy. The radiation of the heat would be absorbed by the steel, and not necessarily go to the brick work. Some changes in design would probably have to be made, and in this connection Mr. Flanagan referred to what had been done in boiler design, the flame being entirely inclosed by water-cooled tubes, so that the refractories are not touched.

Electric Furnace Report

In the report* of the Electric Furnace Committee, of which E. T. Moore, electrical engineer Halcomb Steel Co., Syracuse, N. Y., is chairman, the opinion was expressed that as good steel can be made using dual voltages as with one voltage, provided the melting voltage is not too high, and at the same time better economy is secured electrically and from refractories.

In discussing electric furnaces, George Schaeffer, Carpenter Steel Co., Reading, Pa., stated that the breaking of electrodes causes great losses in efficiency, which are not taken into consideration in theoretical tests. He stated also that his company has used dual voltages without success, owing to the rapid wear on the refractories. A. C. Cummings, Carnegie Steel Co., Duquesne, Pa., related the experience of his company with both graphite and amorphous carbon electrodes. The principal objection to the amorphous electrode is that it is subject to frequent breakage. This has been overcome to a large extent at the Carnegie plant, however, with the result that operators prefer the amorphous to the graphite electrodes, because of their longer life.

*Published, substantially in full, on page 723, THE IRON AGE, Sept. 22.

Main drive equipments were discussed in the report of the Electrical Development Committee, R. B. Gerhardt, electrical superintendent, Bethlehem Steel Co., Sparrows Point, Md., chairman. Main roll drive equipments put into operation or placed on order since last year are enumerated, and comments offered on unusual installations. Attention is called to the development of the gas engine as a prime mover in steel plants. Single units have been installed with a capacity of 4000 kw., which is considerably more than with the older units.

It has also been successfully demonstrated that a gas engine installation can be operated from a single furnace in blast, by using a gas holder and certain automatic regulating valves in connection with it. At Sparrows Point, since last March, from two to four gas-electric units, depending on the load requirements, and two 47 and 84 by 60 in. gas blowers, have been operating, with only one 500-ton furnace in blast. The report emphasizes the possibilities of the super-power systems now projected, in connection with steel plant operation. An interconnection with such a system would make it possible to maintain full output on the generating station during week ends, and periods when the mills are idle and the furnace gas and heat now wasted.

Use of Super-Power Energy

In the discussion of proposed super-power systems, President Jefferies, A. J. Gaudy, Sessions Engineering Co., Chicago, and A. C. Cummings, Carnegie Steel Co., pointed out advantages which might be derived by the use of the electron manipulation tube recently introduced. This tube would greatly simplify co-ordinating systems in which currents of different frequencies exist. It was also suggested that such a tube, by virtue of its ability to change frequencies very rapidly, might make the flywheel set on reversing motors unnecessary. Mr. Gaudy stated that a mercury arc rectifier had been used with success in Switzerland, for purposes similar to that for which the electron tube is intended, but the application was not so wide.

Paper on Anti-Friction Bearings

An exhaustive discussion of anti-friction bearings, their merits as compared with the oil-ring type of bearings, when applied to motors, and the possibilities of their more extended use in steel mill motors, is contained in a paper presented by A. M. MacCutcheon, chief designing engineer Reliance Electric & Engineering Co., Cleveland. The comments on this paper indicated disagreement as to the extent to which anti-friction bearings can be applied to motors, and that installations have not been uniformly successful.

G. E. Stoltz, Westinghouse Electric & Mfg. Co., East Pittsburgh, averred that ball bearings can well replace bearings that are grease lubricated, and where the motor is not subject to great shock. But where the motor is subjected to vibration and is operated at high speeds, trouble is likely to be encountered. He does not believe that anti-friction bearings can be generally applied, and states that further adoption of them for certain uses would force manufacturers to assume the burden of carrying two lines of motors.

D. M. Petty, Bethlehem Steel Co., South Bethlehem, Pa., spoke favorably of anti-friction bearings as applied to motors, stating that aside from all other advantages the benefit derived from preventing oil from getting into the motors could not be overemphasized. He asserted that from 80 to 90 per cent of motor failures are due directly or indirectly to the entrance of oil into armature and field windings.

Steel Mill Electrical Engineers

The duties of the steel plant electrical engineer were given a broad interpretation in a paper presented by F. B. Crosby, electrical engineer Morgan Construction Co., Worcester, Mass. Although he is perforce a specialist, his innumerable contacts with allied engineering interests demand that he be a specialist of great versatility. His activity should not be confined exclusively to engineering problems, but by virtue of his intensive training in straightforward reasoning, and correct discrimination between fact and fancy, he

should assume an active part in the defense and development of our industrial system, the foundations of which are being shaken by unsound propaganda. In a narrower sense, the steel plant electrical engineer can exert influence for good by promoting economies in his own field, as, for example, through standardization.

To show the effect of such work, Mr. Crosby stated that he had used the association's specifications as the basis for the purchase of over 100,000 hp. of main-roll motors in the last three years. While there is still great diversity of opinion on proper standards for so-called mill-type motors for mill tables, transfers, screw-downs, etc., Mr. Crosby believes that practical specifications could be formulated which would at least fix the principal mechanical dimensions, such as length of shaft, size of bearings, distance from center line of shaft to bottom of base, the spacing and size of foundation bolts, as well as the horsepower ratings and speeds. A comparison of printed publications of three manufacturers shows that their standard lines of mill-type motors up to 180 hp. include 23 different hp. ratings and 30 different combinations of power and speed ratings for 230-volt, 60-min., 75 deg. Cent., compound-wound inclosed motors only.

In discussing the predetermination of power requirements, Mr. Crosby pointed out difficulties involved in such determinations in the case of plate, sheet and merchant mills. More nearly accurate data can be obtained from continuous than other types of mills, and the author briefly described the method employed by his company to predetermine the power requirements of continuous mills.

Electrifying Steel Mill Railroads

Electrification of steel plant railroads was covered in detail in a paper by R. B. Gerhardt, electrical superintendent Bethlehem Steel Co., Sparrows Point, Md. He discussed comparative costs of steam and electrically operated roads, operating problems which would be encountered in the electrification of steel plant lines and safety considerations. His conclusion was that economy was on the side of electric operation, and predicted that electricity would replace steam on steel plant lines.

The report of the Standardization Sub-Committee on Illumination was presented by the chairman, H. L. Kirschberg, consulting illuminating engineer, Pittsburgh. The committee prepared a table showing present practice in illumination in 15 representative steel companies. The tungsten filament lamp, in the vacuum type for small units and the gas-filled type for large units, seems to be generally used and, in the opinion of the committee, to be preferable to other types. It was brought out that in some cases carbon lamps are used, where there is excessive vibration. D. M. Petty, Bethlehem Steel Co., stated that his company had decided to install a new mill type 220-volt Mazda lamp, as it is believed that this lamp will stand consideraby more vibration than the carbon lamp, at the same time giving much more light.

Revised general specifications for electric traveling cranes for heavy duty steel mill service were submitted by the Crane Standardization Committee, F. W. Cramer, engineer of tests Cambria Steel Co., Johnstown, Pa., chairman. As the discussion included both favorable and unfavorable comment concerning the proposed code, acceptance was deferred to a mail vote.

The report of the Educational Committee, L. F. Galbraith, electrical engineer West Penn Steel Co., Brackenridge, Pa., chairman, consisted of a manual of instructions for crane operators. Mr. Galbraith pointed out that general educational work had failed to gain the interest of the men, and it was for this reason that a manual of special application had been prepared. In discussing the manual, J. F. Chapman, electrical engineer Colorado Fuel & Iron Co., stated that it would fill a very real need. There is no published material of much value to the ordinary workman in the electrical department, and heretofore he has been forced to gather such information as he could from his fellow employees, themselves poorly informed. His company has conducted classes and issued bulletins to enlighten employees regarding their daily tasks, and has achieved a large degree of success. He recommended that further manuals of this type be prepared.

General specifications of a.c. motors for main roll drives, as revised by the Standardization Sub-Committee on Motors, were read by D. M. Petty, chairman. The report of the Safety Committee was presented by the chairman, Walter Greenwood.

Recent developments in the methods of starting polyphase induction motors of the "squirrel-cage" type by means of auto-transformers or compensators, were described in a paper prepared by Millard C. Spencer, designing engineer Crocker-Wheeler Co., Ampere, N. J. Developments in induction motor starter design, he asserted, have been toward strict interchangeability throughout, simplification of the wiring, and complete accessibility of all parts; and the design of overload relays, toward a temperature-operated device, rather than a mechanical time limit mechanism, for protecting a motor against injury due to overheating.

Labor Conditions in Germany

WASHINGTON, Sept. 27.—The common impression that agriculture and industry in Germany are running at full tilt and labor is entirely employed is shown to be erroneous by a census taken on Aug. 4 in 534 of the more important of the 2250 municipal employment bureaus, the results of which have been published in Germany and forwarded to the Bureau of Foreign and Domestic Commerce by Economist Consul Maurice Parmelee, Berlin. There were registered 248,737 male applicants for work, for whom there were available 34,774 vacancies, and 89,473 female applicants, for whom there were available 40,851 vacancies and 338,210 applicants of both sexes, for whom there were available 75,625 vacancies. In other words, there were vacancies available for about 14 per cent of the male applicants, 46 per cent of the female applicants and 22 per cent of the total. This shows an improvement over July, when there were vacancies available for only 17 per cent of the total number of applications.

In the manufacture of machines and instruments, classified as the metal industry, it is shown by the Aug. 4 census that there were 63,247 applications for work and only 3590 vacancies; in the weaving industry, including dyeing and finishing, 8873 applications and 1584 vacancies; in leather and leather manufactures, 3812 applications and 338 vacancies; in clothing and cleansing, 11,013 applications and 3461 vacancies; in the building trade, excluding locksmiths, carpenters and unskilled laborers, 5221 applications, with an excess of vacancies, which totaled 7482.

Prospects of a settlement of the strike of the building trades in Pittsburgh are brightened by an agreement recently reached between representatives of the contractors' and the carpenters' union. The settlement is believed to forecast agreements between the contractors and other crafts. The agreement with the carpenters, however, must be considered a victory for the unions, for while a wage reduction of 25c. an hour has been accepted, the contractors signed the new scale for a period of two years, instead of one as formerly, and recognition of the union, which is involved, means that the attempt to put the building industry on an open shop basis has been given a decided setback.

Charles M. Magnuson, Duluth, Minn., has been awarded the contract by the Chippewa Iron Mining Co. for the construction of 4½ miles of spur track to connect the company's Armstrong Bay mine on the Vermilion Range to the main line of the Duluth & Iron Range Railroad. The grader established his first camp and started grading on Sept. 22. It is the intention to grade the entire railroad this fall so that the steel may be laid early in the spring.

More than 150 miners, employed by the American Manganese Mfg. Co. at Dunbar, Pa., walked out recently and refuse to return to work unless granted the H. C. Frick Coke Co. scale of wages.

Iron and Steel Markets

OUTPUT INCREASING

Betterment Still Chiefly in Lighter Products

Effort to Advance Plates, Shapes and Bars—Pig Iron More Active

Leaders in the steel trade speak of larger mill operations in the last quarter of the year with a confidence they did not show as September opened. The past week has brought further signs of betterment.

Following the advance of $5 per ton in sheet prices made by several independent makers, the Steel Corporation's sheet subsidiary announced that from Sept. 22 its prices also would be based on 2.50c. for blue annealed, 3c. for black and 4c. for galvanized sheets. As in wire products two weeks previous, the sheet advance brought a flood of orders and specifications at the old prices, estimated at close to 200,000 tons.

Sheet manufacturers are running at 70 to 75 per cent of capacity under the replenishment demand developed by the new turn in the market. There is pretty general adherence to the new prices on black and galvanized sheets, but a few mills still quote blue annealed in all gages at 2.25c., while some name that price only on No. 12 gage and heavier.

Along with the sheet advance has come an effort to lift the sheet bar market. Two or three independent mills ask $32, or $2 above the present contract basis.

Not a little stir was created by the action of the Carnegie Steel Co., which became known on Monday, putting its prices on plates and structural shapes at 1.75c. and on bars at 1.65c. These figures are $2 per ton below those last announced, but are $2 to $3 higher than the actual market of recent weeks.

It is too early to tell how far independent producers of the heavier products will hold for the advanced prices or how they will fare with the Steel Corporation itself, in view of its policy of meeting competition. A first effect has been the appearance of inquiry for bars for the last quarter of the year, and in some cases for structural shapes and plates. It is well understood that in the heavy products, especially rails, plates and shapes, present and prospective demand is only a fraction of capacity.

The increased rate of wire, sheet and tin plate production is encouraging, but these light products make a smaller increase in ingot output than might be gathered from some optimistic reviews of the week.

The New York Central Railroad has placed orders for the repair of more than 4000 cars, thus doubling its July order. The B. & O. has bought 1000 new cars, but half of them will be built from its own stock of steel.

A small Western road has placed 12,000 tons of rails and 1000 tons of angle bars, besides spikes and track bolts—an outstanding contract in the general dearth of rail business. A part of these rails will be shipped this year.

Tank builders have been somewhat larger buyers of plates. Two oil companies will place orders requiring 2000 tons of plates and shapes. Chicago mills have had some plate business for oil storage tanks to be built for stock.

The pig iron market shows a decided increase in buying. A sanitary manufacturing company has purchased 15,000 tons of foundry iron for last quarter delivery, 5000 tons for each of its three plants. For Southern iron the price was on the basis of $19, Birmingham, for No. 2. On some of the Northern iron the price was 50c. below the recent quotation of $21, Valley, but for the greater part $21 was paid. Sales amounting to 25,000 tons of foundry iron were made in the Philadelphia district, 22,000 tons at Buffalo and about 8000 tons at Boston. In eastern Pennsylvania, sales have been made at an advance of 50c. and some furnaces have marked up their quotations $1.50. A strong feature of the present situation is the low stocks held by merchant furnaces. On the whole, the foundry iron situation is stronger, but prices do not yet encourage idle merchant furnaces to blow in.

Japan is a continuously heavy buyer of sheets, especially in light gages. Another item in Oriental trade is the reported award of the great Yellow River bridge for the Pekin & Hankow Railroad to Belgian contractors at $10,500,000, though the financing is still in doubt.

After weeks of limited demand and dragging prices the buying of 2500 tons of electrolytic copper by one large domestic consumer is significant. Prices and demand for lead and zinc are also distinctly better.

Pittsburgh

PITTSBURGH, Sept. 27.

Predictions that the last quarter of the year would develop definite improvement in the iron and steel market are being fulfilled. The experience of makers of wire products with regard to business following their marking up of prices has been duplicated by the sheet makers, whose recent advance of $5 per ton has brought a flood of orders and specifications, largely at the old prices. It is estimated that orders for sheets provoked by the announcement of higher prices aggregate in the neighborhood of 200,000 tons, and there has been a quick response to this development in sheet mill operations, it being figured that about 75 per cent of all the sheet mills of the country will be in operation at the end of the week. The movement away from prices which were showing the steel makers substantial losses this week has extended to plates, shapes and bars, at least as far as the Steel Corporation is concerned, as its principal subsidiary has notified district offices that the price of plates and shapes now is 1.75c., and on bars 1.65c., also that former quotations were to be withdrawn. This attempt at an advance is not as clear-cut as that in wire and sheets, for demands for the heavier products remain limited and as yet few of the independent companies have taken action.

An effort also is being made to boost semi-finished steel, announcement having been made by a couple of makers of sheet bars to $32 and $32.50 for sheet bars

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Sept. 27, 1921	Sept. 20, 1921	Aug. 30, 1921	Sept. 28, 1920
No. 2X, Philadelphia‡	**$21.84**	$21.34	$20.84	$53.51
No. 2, Valley furnace†	21.00	21.00	21.00	47.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2, foundry, Chicago*	22.00	22.00	21.00	46.00
Basic, del'd, eastern Pa.	19.25	19.25	19.00	51.26
Basic, Valley furnace	19.25	19.25	19.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	22.00	22.00	21.00	46.50
Malleable, Valley	**20.50**	20.00	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.96	50.96
L. S. charcoal, Chicago	*31.50*	33.50	33.50	58.50
Ferromanganese, del'd	60.00	60.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. sheet bars, P'gh	**32.00**	30.00	30.00	65.00
Forging billets, base, P'gh.	34.00	34.00	34.00	70.00
O.-h. billets, Phila.	35.74	35.74	35.74	60.74
Wire rods, Pittsburgh	41.00	41.00	40.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	*1.60*	165	1.75	3.25
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	2.00	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.60	1.60	1.70	3.25
Steel bars, Chicago	1.75	1.75	1.88	2.73
Steel bars, New York	1.98	1.98	2.08	4.13
Tank plates, Pittsburgh	1.60	1.60	1.70	3.25
Tank plates, Chicago	*1.65*	1.75	2.00	3.03
Tank plates, New York	1.98	1.98	2.08	3.63
Beams, etc., Pittsburgh	1.60	1.60	1.75	3.10
Beams, Chicago	*1.75*	1.80	1.85	2.83
Beams, etc., New York	1.98	1.98	2.13	3.48
Steel hoops, Pittsburgh	**2.25**	2.15	2.25	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire Per Lb. to Large Buyers:	Sept. 27, 1921 Cents	Sept. 20, 1921 Cents	Aug. 30, 1921 Cents	Sept. 28, 1920 Cents
Sheets, black, No. 28, P'gh.	**3.00**	2.75	2.75	7.00
Sheets, galv., No. 28, P'gh.	**4.00**	3.75	3.75	8.50
Sheets, blue an'l'd, 9 & 10	**2.25**	2.20	2.25	5.25
Wire nails, Pittsburgh	2.90	2.90	2.75	4.25
Plain wire, P'gh	2.60	2.60	2.50	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$15.00**	$14.50	$13.75	$37.00
Carwheels, Philadelphia	17.00	17.00	17.00	43.00
Heavy steel scrap, P'gh	14.00	14.00	13.00	28.50
Heavy steel scrap, Phila.	11.50	11.50	11.50	24.00
Heavy steel scrap, Ch'go.	**11.75**	11.50	11.00	23.00
No. 1 cast, Pittsburgh	17.00	17.00	16.50	42.00
No. 1 cast Philadelphia	17.00	17.00	17.00	39.00
No. 1 cast, Ch'go (net ton)	**13.50**	13.25	13.00	32.00
No. 1 RR. wrot, Phila.	**15.50**	15.00	14.00	32.00
No. 1 RR. wrot, Ch'go (net)	11.50	11.50	11.00	22.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$3.00	$16.50
Foundry coke, prompt	4.25	4.25	4.00	17.50
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.25	12.25	12.00	18.50
Electrolytic copper, N. Y.	12.12½	12.12½	11.62½	18.50
Zinc, St. Louis	**4.35**	4.17½	4.12½	7.70
Zinc, New York	**4.85**	4.67½	4.62½	7.70
Lead, St. Louis	4.45	4.45	4.20	7.75
Lead, New York	**4.70**	4.65	4.40	7.75
Straits tin, New York	**26.75**	26.50	26.75	43.50
Antimony (Asiatic), N. Y.	**4.60**	4.45	4.50	7.12½

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 27, 1921, Finished Steel, 2.236c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets	These products constitute 88 per cent of the United States output of finished steel.	Sept. 20, 1921, 2.200c. Aug. 30, 1921, 2.293c. Sept. 28, 1920, 3.903c. 10-year pre-war average, 1.684c.

Composite Price, Sept. 27, 1921, Pig Iron, $20.10 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham	Sept. 20, 1921, $20.01 Aug. 30, 1921, 19.64 Sept. 28, 1920, 47.83 10-year pre-war average, 15.72

as compared with $30, the recent nominal quotation and $29, at which some business actually has been done.

Evidence of the improvement in business is not confined merely to the advances in prices. At least three steel works blast furnaces will be added to the active list this week, one at the LaBelle Iron Works, Steubenville, Ohio, and two at the New Castle, Pa., works of Carnegie Steel Co. It is commonly expected that the Crucible Steel Co. soon will relight one of its idle furnaces at Midland, Pa., and the Mattie Furnace of the A. M. Byers Co. at Girard, Ohio, goes into blast the last of the week. The steel works of the New Castle, Pa., plant of the Carnegie Steel Co. will resume as soon as iron is available from the blast furnaces about to start up. The Carnegie Steel Co. as a whole had more than 30 per cent of its ingot capacity engaged last week, and a higher rate is probable this week, due to the demands of the American Sheet & Tin Plate Co. and independent tin plate makers dependent upon the Carnegie company for sheet bars. Besides the gain in sheet mill operations, there also has been a substantial increase in the activities of the makers of tin plate. Wire plants in this district are operating at close to 50 per cent of capacity, with some enlargements noted in the activities of the American Steel & Wire Co., both at Donora, Pa., and the Schoenberger Works in Pittsburgh. Slight gains have been recorded in active pipe-making capacity, but there has been some slowing down at the plants making automobile steel incident to the contraction in that industry. Whether the revival of the past few weeks is the beginning of a real market or merely is a flash in the pan, still is an open question. It is frankly admitted that large and confident buying still is lacking, and that much of the recent buying has been inspired by the higher prices and possibly by a desire of buyers to be at least partially protected against possible shortages which might easily develop during the winter in the event of any transportation or labor troubles.

There continues to be considerable following to the idea that until the railroad labor and freight-rate situation is thoroughly ironed out, there will be much hesitancy on the part of buyers about anticipating their needs. The thought is that with lower freight rates lower prices could be quoted on iron and steel, and even those who maintain that present prices fully discount such a freight reduction as is likely to be made admit that the idea of lower prices, based on lower freights, must be carried out before the industry can hit a real stride.

The pig iron market has been featured by the sale of 15,000 tons of foundry iron for last quarter delivery

to the Standard Sanitary Mfg. Co., which has served to give real support to recent quotations.

Pig Iron.—Trading has been confined almost entirely to foundry iron. The Standard Sanitary Mfg. Co. has bought 5000 tons of No. 2 and No. 2X grades for each of its three plants for delivery over the last quarter. The iron for its Louisville plant was bought at $19, Birmingham, for No. 2 plain, with the usual differential of 50c. above that price for the No. 2X iron. The iron for its Pittsburgh and New Brighton plants was bought at $20.50 to $21, Valley furnace for No. 2, but only a small proportion of the 10,000 tons was secured at the lower figure, and since it is doubtful whether any more iron is available at that price we make no change in our quotation of this grade, of $21, Valley furnace. The National Radiator Co. has bought 500 tons of No. 2 foundry iron for its Trenton, N. J., plant, at $20.50, from an eastern Pennsylvania furnace. The Westinghouse Electric & Mfg. Co. is in the market for approximately 1300 tons of foundry iron for its Trafford City, Pa., plant. We note moderate sales of malleable iron at $20.50, and it is doubtful if any tonnage of this grade now could be bought for less, while some makers are asking $21. An effort is being made to secure $20.50, furnace, for standard Bessemer, but so far it has not succeeded. There is very little interest at the moment in either basic or Bessemer iron. Jackson County makers of silvery and Bessemer ferrosilicon have advanced prices $2 per ton.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.25 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.50

Ferroalloys.—Business still is limited in this and nearby districts. Steel makers merely are covering their actual needs and forward buying is entirely lacking. The Trumbull Steel Co., Warren, Ohio, has not yet closed against the 100 tons of 80 per cent ferromanganese for which it recently inquired. The lowest price named against this business by domestic makers was $65 delivered, while English material was offered at $58.35 c. i. f. Atlantic seaboard, or with a freight of $6.16 from Baltimore, $64.51 delivered, to which must be added the freight tax. Interest by consumers in spiegeleisen still is meager; prices are nominal in the absence of business. Interest in 50 per cent ferrosilicon also is lacking and no business recently has been done here in the lower grades of ferrosilicon or in silveries.

We quote 78 to 82 per cent domestic ferromanganese at $65 delivered; 78 to 82 per cent British ferromanganese, $58.35, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Large specifications and orders for sheets following the advance recently announced find reflection in a much livelier market in sheet bars and also in an effort on the part of makers to obtain higher prices than they would accept recently. The latter development, in addition to the larger demand, is due to the higher prices lately established on scrap and to the higher valuation of pig iron. The effort of sheet makers is to get tonnages as cheaply as possible, since little, if any, of their business carries the new prices. An Ohio company is understood to have secured a tonnage as $31.10 delivered, equal to about $29 back at the shipping point, but considerable doubt now exists that less than $30, Pittsburgh or Youngstown, could be done and some makers have named a price of $32.50. Little is going on in billets or slabs, which nominally may be appraised at $30, Pittsburgh or Youngstown.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Inquiries are more numerous, but actual business remains small. Most makers of wire products have their own steel and rod making capacity and the increase in business in those products does not have much effect upon the rod demand. Rivet makers are not much busier than they have been and do not call for many rods. Chain makers are ordering shipments out fairly steadily. The new price of $41, Pittsburgh, for the base size of soft rods still is to be established by sales. We note a sale of 1500 tons of rods for shipment to Japan on a basis of $38 for soft rods. Prices are given on page 844.

Steel Skelp.—The market is not at all firm even at 1.65c. Pittsburgh, for pipe skelp, as this price has been quoted and has failed to bring an order. Business in pipe is better, but apparently has not increased sufficiently to bring those companies not making their own skelp into the market. An appraisal of present price possibilities is from 1.60c. to 1.65c.

Structural Material.—The outstanding feature of the market is the higher price ideas of the Steel Corporation in an announcement naming 1.75c., base, for plates and shapes and withdrawing lower prices which were outstanding. The flow of structural awards to Pittsburgh district fabricating shops continues good. The American Bridge Co. has taken 2000 tons for the extensions and new building of the Bell Telephone Co. in Pittsburgh and 200 tons for one of the dams of the Ohio River near Wheeling, W. Va. The Jones & Laughlin Steel Co. has taken 300 tons for the Greenfield School, Pittsburgh. The McClintic-Marshall Co. has been awarded 900 tons for a combination church and office building, Los Angeles; 780 tons for the George Washington Hotel, Washington, Pa.; 450 tons for a building for the American Tar Products Co., Chicago; 350 tons for an office and transportation building in Detroit; 280 tons for a wharf in Kahulur, Island of Maui, Hawaii; 100 tons of beams, rafters, etc., for the Logan Clay Products Co.; 100 tons for the Oswego High School, Oswego, N. Y., and 75 tons for a mill building and boiler house extension at the Ellwood-Ivans Tube Works, Oakland, Pa. The University Club of Pittsburgh recently sold its club house to the Pittsburgh Athletic Association, which the latter will raze, using the land for an addition to its present home, while the University Club is planning a new building. Plain material prices given on page 844.

Nuts, Bolts and Rivets.—Actual business in all three products still is of limited proportions, but the market is better to the extent that competition is less severe and there is more stability to prices than there was recently. Prices and discounts are given on page 844.

Iron and Steel Bars.—Demands for merchant steel bars from makers here still are moderate and this is not surprising in view of the fact that makers in other districts have been naming much more attractive prices. The Steel Corporation is reported to have named a quotation of 1.65c. on merchant bars and to have withdrawn any lower quotations which may have been out. It is not clear yet whether independents who have named less than 1.65c. will follow the lead of the Steel Corporation. Two Youngstown makers virtually have withdrawn from the market rather than accept business at the prices recently current. There is no change in iron bars.

We quote steel bars rolled from billets at 1.60c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—The railroads still are pursuing a hand-to-mouth policy in purchases, but competition for business, even of this sort, is so sharp that prices do not show much strength. Some makers are holding to $2.50 base per 100 lb., but the more common selling price is $2.40 and some business has gone at the equivalent of $2.35, Pittsburgh. Prices on small spikes also are rather unsteady, sales having been done as low as $2.60 base, as compared with the nominal quotation of $2.75. Prices are given on page 844.

Wire Products.—Specifications from jobbers against orders recently entered are satisfactory, but consumers who buy direct from the mills and who did not have

requisitions in at the time prices were advanced, are balking at paying the new prices and using every effort to buy at the old quotations. This effort has not been successful, and orders from this source have fairly established nails at $2.90 base per keg.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Sheets.—Effective Sept. 22, the American Sheet & Tin Plate Co. advanced its prices $5 per ton, meeting the advance announced about a week previously by most of the independent makers. All business on the books of the company not carrying a specified price, it was stated, would be invoiced at the new prices of 3c. base for black, 4c. base for galvanized, and 2.50c. base for blue annealed sheets. Just as the independents were flooded with orders and specifications at the old prices following the announcement of an advance, so the American Sheet & Tin Plate Co. has experienced a rush of such business. The past week with that company is stated to be the largest it ever enjoyed in orders for early delivery and specifications as distinct from business put upon its books carrying extended deliveries. All of the business lately taken is for shipment at the convenience of the company and there has been, in consequence, a decided increase in operating schedules to complete the business as promptly as possible.

Tin Plate.—There seems to be no let up in the demand for supplies for immediate shipment and the market is growing firmer, despite the fact that the past week has seen a further expansion in mill operations. The Standard Tin Plate Co., Canonsburg, Pa., resumed operations at 50 per cent of capacity at midnight, Sept. 25, while the Weirton Steel Co. has its Clarksburg, W. Va., plant of 12 hot mills all on, and altogether is operating at its three plants 43 of a total of 50 mills. The American Sheet & Tin Plate Co., which last week operated 52 per cent of its mills, this week has 65 per cent of them under power.

Cold-Finished Steel Bars and Shafting.—There seems to be a better feeling, but the improvement has not filtered through to the demand, which still is moderate, and with more sellers than buyers, prices favor the latter. The common quotation on cold-rolled and drawn bars and shafting is 2.40c. base, Pittsburgh, but 2.35c. has been done and it is intimated that on really desirable tonnages 2.30c. might be done. Ground shafting still is quoted at 2.75c. mill, in carloads.

Plates.—The market is still inactive, except for such demands as are created in structural awards and a few tank inquiries. The South Penn Oil Co. is reported to be in the market for four 55,000-barrel oil storage tanks, for which about 1000 tons of plates will be required. As low as 1.60c. has been done on plates, but the market is not very clearly defined since the Steel Corporation now is quoting 1.75c. and is understood to have withdrawn the lower quotations that have been outstanding.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.60c. to 1.75c. f.o.b. Pittsburgh.

Boiler Tubes.—Leading makers of charcoal iron boiler tubes have cut prices $10 per ton by increasing the discounts 5 points. The new prices are effective as of Sept. 21. This cut matches one recently made in lap welded steel tubes.

Hoops and Bands.—A base of 2.25c. has been generally re-established on hoops and some are also quoting that price on bands, but concessions on the latter product have not entirely disappeared. Business does not improve much.

Hot-Rolled and Cold-Rolled Strips.—Business is lighter in keeping with conditions in the automotive industry, but the absence of business means less price cutting, and quotations of 2.25c. on hot-rolled and 4c. on cold-rolled are more representative than they were recently.

Iron and Steel Pipe.—Considerable activity has developed in line pipe since the recent reduction in prices and more business has been placed in the past week than before in several months. Among the orders was one for approximately 120 miles of 10-in., 8-in. and 6-in. for a line to be jointly constructed in the Mid-continent field by the Producers' & Refiners' Corporation and the Midwest Refining Co. We also note several other orders involving from four to 25 miles, for shipment into various districts. Improvement also is noted in the orders for oil well pipe, it being observed that some jobbers who had been ordering out about one car of casing a month now are seeking two and three cars a month. Increased building operations are helping the demand for merchant pipe. Observance of the Sept. 16 card is rigid in merchant and oil country pipe, but competition for line pipe business still is sharp and buyers are able to obtain lower prices than are quoted in the card. Discounts are given on page 844.

Chain.—Leading makers have increased the discounts by 5 to 15 per cent, effective Sept. 20, on breast chains, cart back, cart breeching chains and pins, machine, coil, passing link, heel and well chains, halter chains, loops and rings, dees, bridle squares and steel rings. Otherwise chain prices established in July are being observed. Demand is better, but not active.

Coal and Coke.—The market on foundry coke is slightly stronger, due to the fact that in addition to a continued good spot demand, a number of fair-sized contracts for the last quarter have been entered by melters anxious to be protected against their requirements during the remainder of this year. The market still is quotable from $4.25 to $4.75, and there have been reports of business at $5, but this probably represents the sale through brokers who have exacted more than the usual commission. A number of inquiries have come out against the possible lighting up of several blast furnaces, but these demands have not strengthened furnace coke prices because a number of Connellsville operators anxious to start up idle ovens are actively seeking orders, while Connellsville coke is meeting rather strong competition from steel works by-product coke in the East. We continue to quote beehive oven coke at $3.25 to $3.50, per net ton, oven, but the lower figure is more representative of to-day's possibilities of sizable tonnages. Starting up of steel works by-products plants has resulted in a large demand for by-product coal, which has strengthened the price of that grade. We note a good-sized contract for last quarter in that grade at $2.10 per net ton, mines, and on current sales prices range from $1.90 to $2. Steam coal is rather sluggish at from $1.75 to $1.90 on mine run, while gas coal is quotable from $2.25 to $2.50.

Old Material.—The market is firm but not quotable on sales at any advance over the prices of a week ago. There are no offerings by dealers of heavy melting steel now at less than $15 per gross ton delivered, but thus far efforts to obtain this price have not been successful. Sales of this grade have been made in the Youngstown district at $13.50, which would be equivalent to from $14.05 to $14.30 to Pittsburgh common rate points. The highest price yet reached here on sales is $14, but it is doubtful whether less than $14.50 now would be accepted and we recognize that price in our quotation.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast cupola size	17.00 to 17.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	11.00 to 11.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.50 to 10.00
Railroad knuckles and couplers	14.50 to 15.25
Railroad coil and leaf springs	14.50 to 15.25
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¾-in. and thicker	17.50 to 18.00
Railroad malleable	13.00 to 13.50
Iron car axles	20.00 to 21.00
Locomotive axles, steel	19.50 to 20.00
Steel car axles	15.00 to 15.50
Cast iron wheels	16.00 to 16.50
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	8.75 to 9.00
Sheet bar crop ends at origin	13.00 to 13.50
Heavy steel axle turnings	10.50 to 11.00
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	15.00 to 15.50
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.50
No. 1 railroad wrought	12.00 to 12.50

Chicago

CHICAGO, Sept. 27.

Local mills report an appreciable improvement in demand for practically all types of finished steel, including plates, shapes and bars, which hitherto were inactive. The Illinois Steel Co. has had the best week in point of orders booked and specifications received since April, and other producers also note a betterment in buying. The increase in business has been reflected in improved operations. The steel output of the Illinois Steel Co. has been jumped from 30 to 38 per cent, and one additional blast furnace has been blown in, making a total of nine active stacks. Although this furnace was put in primarily for the purpose of changing over from one stack to another, the company will probably continue to operate nine furnaces if the recent improvement in demand is sustained. The Inland Steel Co. is also running its mills at a better rate, now being on a 35 per cent basis, while the Mark Mfg. Co. is maintaining an average operation of between 40 and 50 per cent.

Jobbers have been prominent in the recent buying movement. Their appearance in the market is regarded as indicating their belief that present going prices are at bottom and that further changes in the market may be in an upward direction. The reaction which has already taken place in sheets and wire products was the natural result of sharp competition which brought prices so far below costs that mills lost all incentive to seek further business at those levels. A similar reaction in plates, structural steel and bars is looked for by some observers. In fact, an unofficial report received from New York to-day states that Steel Corporation subsidiaries have established a minimum of 1.65c. for bars and 1.75c. for plates and shapes f.o.b. Pittsburgh. Whether these prices will be adopted by the local subsidiary cannot be learned at this time, and in view of the fact that Pittsburgh basing has been largely ignored in this territory for some time, developments are awaited with interest.

Another important element in the revival of demand is the railroads. A Western line has placed an order for 12,000 tons of rails and the New York Central has distributed repairs on 5000 freight cars. Just as the railroads are showing a disposition to break loose from the restraints which have guided their buying policy throughout the year, labor difficulties again threaten them. A vote now being taken by the Brotherhood of Railway Trainmen shows a large majority of the members in favor of a strike. At the same time, the Pennsylvania Railroad, which has sought to deal with its own employees without outside interference, has defied the United States Railroad Labor Board.

Another industry which has been an important factor in recent buying is the oil industry. The construction of tanks and the laying of pipe lines occupy an important place in the programs of oil producers because the low prices now prevailing on their products make an increase in storage facilities highly desirable. Notable among recent orders for steel coming from this source may be mentioned one placed by the Midwest Refining Co. and the Producers' & Refiners' Corporation with the Mark Mfg. Co., Chicago. This calls for 90 miles of plain end gas line pipe in 14-in., 12-in. and 10-in. sizes, for use in the Wyoming fields.

Pig Iron.—Demand is somewhat more active than a week ago, but individual purchases are somewhat smaller than before the recent advance. Orders commonly range from 100 to 200 tons and current inquiries are of similar size. Perhaps the largest inquiry pending is 1000 tons of No. 2 foundry wanted by a Duluth melter for delivery over the rest of the year. Inquiries for two 200-ton and one 300-ton lot of foundry have been received from Illinois melters, while a Wisconsin foundry is in the market for 100 tons of malleable. The only active merchant blast furnace in this district is booked two months ahead and merchant stocks on furnace yards the country over are low. During August shipments exceeded production, so that stocks as of Sept. 1 were less than those reported at the beginning of the previous month. In fact, present stocks on furnace banks are said to be not over one quarter what they were in the depression of 1914. A sale of 300 tons of copper bearing low phosphorus has been made at approximately $39, delivered. A Louisville melter has bought 200 tons of charcoal at $28.25, base, furnace, and subsequent sales have been closed at $28, base. Jackson County producers of silvery have advanced their prices $2 a ton, effective Sept. 27, on silveries and Bessemer ferrosilicon.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	22.00
Northern high phos	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	22.00
Basic	22.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	34.82

Ferroalloys.—Two sales of 200 tons each of ferromanganese have been made by domestic producers at the price recently announced by foreign makers, namely, $58.35, seaboard, plus the freight from New Orleans, or $66.75, Chicago. An inquiry for 500 tons of 14 to 15 per cent ferrosilicon is current. The local buyer who has been in the market for 50 per cent ferrosilicon has not yet bought, as was reported last week. A St. Louis district plant is also inquiring for a carload of 50 per cent.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment.—The New York Central has distributed repairs as follows: 500 40-ton steel underframed box cars to the Streetor Car Co., Kankakee, Ill.; 500 of the same type to the Ryan Car Co., and 500 of a like type to the Standard Steel Car Co.; 500 50-ton steel hopper cars to the Buffalo Steel Car Co.; 500 of the same to the Detroit plant of the American Car & Foundry Co.; 500 of the same to Ryan Car Co.; 250 of the same to the Steel Car Co., Euclid, Ohio; 500 box cars to the Koppel Industrial Car & Equipment Co. The Michigan Central has let repairs on 500 40-ton steel underframe box cars and 250 50-ton steel twin hopper cars to the Illinois Car & Equipment Co. The Big Four has let repairs on 500 50-ton all-steel box cars to the Madison (Ill.) plant of the American Car & Foundry Co.

Structural Material.—Several local crafts today applied to Judge Landis, umpire in the recent building dispute, for a rehearing of their respective cases. Whether this action will expedite a settlement of the building situation is an open question. In the meantime, practically no new work is being released in this city. Evidences of activity are to be noted in other sections of the West, although the rate of improvement is slower than had been anticipated. The view that high freight rates constitute the main obstacle to better conditions is rapidly gaining adherents among fabricators. A recent investigation conducted by the Bridge Builders and Structural Steel Society indicated the freight on fabricated jobs averaged $25 a ton, or about 40 per cent of the average delivered price. Mills report an appreciable increase in bookings, with the jobers particularly conspicuous as buyers. There has been little change in plain material prices. Fabricating awards include:

Kansas City Power and Light Co., power house, Kansas City, 600 tons, to Kansas City Structural Steel Co.

Western Maryland Terminal Railroad elevator, Baltimore, 274 tons, to Pittsburgh Bridge & Iron Co.

Texas College of Industrial Arts, music hall and auditorium, Denton, Texas, 223 tons, to Austin Bros. Bridge Co.

Coal and sand station, Semet Solvay Co., Solvay, N. Y., 363 tons, to Link Belt Co., Philadelphia.

Two-ton unloading tower for New Zealand, 100 tons, let by Mead Morrison Mfg. Co. to unnamed fabricator.

City of Los Angeles, shed, 494 tons, to unnamed fabricator.

State of Idaho, highway spans, Jefferson County, 118 tons, to unnamed fabricator.

Four-story building for W. R. Wallace, Salt Lake City, 148 tons, reinforced concrete substituted for structural steel.

Prospective business includes:

University of Illinois, natural history building, Urbana, 120 tons, F. C. King & Co., Champaign, general contractor.

Blum Building addition, Michigan Avenue, Chicago, 500 tons.

Government, Leclaire Canal Locks, Rock Island, Ill., 150 tons.

Division of highways, Illinois, two 60-ft. spans near Goodfield, and one 100-ft. span near Limestone.

The mill quotation on plain material ranges from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—One of the smaller Western roads has bought 12,000 tons of rails and 1000 tons of angle bars, together with some spikes and bolts, part of which are to be shipped this year and the remainder in 1922. This is the first rail order reported in this territory since last winter. Although this tonnage was bought at the present price of $47, mill, the opinion is common in railroad circles that action on their needs for next year will not be taken until the mills announce their prices for that delivery. Spikes and bolts are moving rather freely in lots of 500 to 1000 kegs, and prices seem somewhat firmer. One order for 300 kegs of bolts, in fact, was placed at 3.50c. Pittsburgh. Tie plates and light rails are quiet.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills. Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—Mills are encouraged by a noticeable increase in both orders and specifications. This turn for the better is not confined to plates, but applies equally to structural steel and bars. Substantial orders have been received from jobbers and numerous others have come from widely distributed sources. Apparently the idea is gaining headway among buyers that prices are close to bottom and that no benefit can be derived from further waiting. Despite the undeniable betterment in buying, there continues to be wide variation in going prices. On tank plates as low as 1.60c., f. o. b. local works has been quoted recently by an independent rolling a limited range of sizes. From 1.75c. to 1.80c., Chicago, is being done rather commonly, and on a relatively insignificant inquiry covering about 200 tons 1.65c., Chicago, was named. The railroads continue to place car repair orders calling for considerable steel. The New York Central, which distributed the repairs of 4000 cars in July, has exercised its options, practically doubling the original orders. Tank builders are also a source of plate tonnage. While they are not operating at capacity, they are busier than generally supposed. Oil storage tanks are of standard dimensions and fabricators are constructing many of them for stock in order to have them in readiness when purchasers appear.

The ruling mill quotations range from 1.65c. to 1.80c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—The Ford Motor Co. bought about 10,000,000 nuts and some bolts last week, but its total purchases were considerably below what had been expected owing to the fact that its operations have been reduced. Demand for bolts and nuts remains unsatisfactory and discounts are irregular. In some cases, makers are absorbing the freight from Pittsburgh on all except very small orders. For nominal mill prices, see finished iron and steel, f. o. b. Pittsburgh, page 844.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Orders and specifications for soft steel bars were heavier last week than for some time. Jobbers were prominent purchasers, but forge shops and other manufacturing users also came into the market. Some reinforcing steel continues to be bought, but on the whole the tonnage going into building work has been disappointing. The Cook County Detention Home, a local reinforcing project, calls for 340 tons which has not yet been placed. The railroads refrain from buying bar iron, evidently in the hope of securing lower prices. The mills, which are operating intermittently, refuse to sell for less than 1.75c., Chicago, on the grounds that their costs will not permit it. Hard steel bar mills have booked more business in September than during any month since early in the year, but are still on an unsatisfactory basis.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Sheets.—The American Sheet & Tin Plate Co. on Sept. 22 advanced its prices to conform with those adopted by the independents the week before. Demand has not been so active since prices went up, but this is not surprising, as practically all pending business was closed on the eve of the advance. The local independent is sold out on all except some of the heavier gages for fully two months ahead. Jobbers have not yet advanced their quotations in conformity with the changes in mill prices.

Mill quotations are 3c. for No. 28 black, 2.25c. to 2.50c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Wire Products.—Jobbers are buying more freely for quick turnover, but as yet are not piling stocks. Railroad purchases are fair, a typical recent purchase being 1200 kegs of nails. The merchant trade of the leading producer is now well over 60 per cent of normal, and its output of all products exceeds 40 per cent.

We quote warehouse prices f.o.b. Chicago; No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Cast Iron Pipe.—Springfield, Ohio, will take bids Sept. 30 on 1000 tons of 20 and 24-in. to be sublet by a general contractor. St. Paul, Minn., will receive tenders Oct. 3 on 140 tons of specials. Spring Green, Wis., has rejected bids on 200 tons. Hammond, Ind., has let 3800 tons to the United States Cast Iron Pipe & Foundry Co., and Springfield, Ill., has awarded 250 tons to the National Cast Iron Pipe Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Old Material.—Speculative activity by dealers dominates the market. While users refuse to pay the prices at which sellers are buying much railroad material, they do come into the market occasionally and pay considerably more than they did a month or two ago. Thus about 1000 tons of heavy melting was bought at $12.25 per gross ton. Inquiries are numerous, but dealers find it difficult to convince users that recent advances will hold. Although it is difficult to put one's finger on the ruling market, it is apparent that a number of items quoted below are higher by from 25c. to 50c. a ton than prices named. Railroad lists are not numerous. The Burlington offers 4000 tons, the Monon 600 tons, the New York Central a blind list.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$16.00 to $16.50
Relaying rails	27.50 to 30.00
Car wheels	15.00 to 15.50
Steel rails, rerolling	13.50 to 14.00
Steel rails, less than 3 ft.	13.00 to 13.50
Heavy melting steel	11.75 to 12.25
Frogs, switches and guards cut apart	11.75 to 12.25
Shoveling steel	11.25 to 11 75
Low phos. heavy melting steel	13.75 to 14.25
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.50 to 8.00
Axle turnings	8.00 to 8.50

Per Net Ton

Iron angles and splice bars	14.00 to 14.50
Steel angle bars	11.00 to 11.50
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	18.50 to 19.00
Steel car axles	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.75 to 11.25
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.75 to 11.25
Steel knuckles and couplers	12.00 to 12.50
Coil springs	13.50 to 14.00
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.50 to 13.00
Grate bars	11.00 to 11.50
Brake shoes	11.00 to 11.50
Railroad malleable	13.25 to 13.75
Agricultural malleable	13.25 to 13.75
Country mixed	9.00 to 9.50

New York

NEW YORK, Sept. 27.

Pig Iron.—While no large tonnages have been sold during the past week, the market is firmer and $20.50 for No. 2 plain at eastern Pennsylvania furnace now seems to be the minimum, with at least one furnace asking $21 for No. 2 plain and $22 for No. 2X. One company is quoting $20.50 for No. 2 plain, $21 for No. 2X and $22 for No. 1. Sales include 500 tons of No. 2 foundry at $20.50 to a radiator company and 100 tons of Virginia iron, 2.25 to 2.75 silicon, at $23 furnace. This is the first Virginia iron sold in this district for a long time. A Bridgeport, Conn., melter has been inquiring for 700 tons of foundry iron and 200 tons of malleable. The New York Central is in the market for 500 tons of foundry iron. Several other inquiries ranging from 100 to 500 tons are pending. Several sellers have withdrawn from the market temporarily.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No 2 fdy., sil. 1.75 to 2.25..	23.02
Buffalo, sil. 1.75 to 2.25.....	25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.)	28.16 to 29.16

Ferroalloys.—Demand for ferromanganese has lessened after the comparatively heavy sales a week ago and only 300 tons is reported to have been sold in the last week at the prevailing quotations. Inquiries are confined to a few carload lots. The spiegeleisen market is also inactive, sales of a few carloads being reported, as well as inquiries for similar amounts. Quotations are unchanged. There is no demand for manganese ore. The 50 per cent ferrosilicon market is lifeless at prevailing quotations.

Imports of ferromanganese in August are reported as only 320 gross tons, bringing the total for the first eight months of the year to 5801 tons, as compared with 33,515 tons for the first eight months of last year. Imports of manganese ore in August were fairly large at 28,939 tons, bringing the total for the year to Sept. 1 to 326,342 tons, as against 334,590 tons for the same period a year ago.

Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.....	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard.	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude per net ton, Atlantic seaboard....	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude per net ton, Atlantic seaboard.....	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York.....	55c. to 60c.

Finished Iron and Steel.—The intimation that the Carnegie Steel Co. would announce minimum prices of 1.75c., Pittsburgh, on plates and shapes and 1.65c., Pittsburgh, on steel bars has had a steadying effect upon the steel market. Independent steel companies which have been selling at lower prices began to receive telephone calls Monday morning from customers who inquired whether contracts for fourth quarter shipment would be accepted at prevailing quotations, which average about 1.60c. for plates, shapes and bars. Generally such requests for forward shipments have been turned down, the mills preferring to take only business for immediate shipment at present prices. Whether independent mills would follow the lead of the Steel Corporation in advancing prices on plates, shapes and bars remains to be seen, but the news that such an advance might be put into effect created a feeling of hopefulness that consumers would soon realize, as some of them seemingly already do, that steel prices are "on the bottom." Jobbers and fabricators have shown more interest in the past week in buying for stock, and while the orders are not large, usually limited to about 100 tons, the total volume shows an improvement. Moreover, it is pointed out that inquiries and orders are coming from more diverse sources. The action of the American Sheet & Tin Plate Co. last week in advancing sheet prices $5 a ton, following similar action the week before by some of its independent competitors, has not spread throughout the entire sheet manufacturing trade, a few companies still quoting the old prices. However, the advance by the leading interest has stimulated buying of sheets, particularly for export to Japan, to a degree that is quite remarkable as compared with recent buying lethargy. Orders for Japan for light gage sheets have been heavier than could be booked for early shipment, especially as there was a predominance of 30½ gage. While reports continue of quotations as low as 1.50c., Pittsburgh, on plates and bars, it is difficult to confirm such transactions. A car company in the East has offered several mills an attractive specification of about 500 tons of plates, shapes and bars at 1.50c., and so far as could be learned no mill was willing to accept the order. On the other hand, a locomotive company placed 500 tons of plates with an Eastern mill at a price so attractive that competitive bids were not invited. Some mills have shown a degree of resistance to the extremely low prices, which may be strengthened by the reported action of the Carnegie Steel Co. in naming higher quotations.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c. to 1.98c.; plates, 1.98c. to 2.03c.; structural shapes, 1.98c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—A larger volume of inquiries is reported generally, although purchases of small quantities still prevail. While there is undoubtedly a distinct improvement, dealers are inclined to attribute it to the usual fall buying that follows the dullness of July and August. However, the fact that there is any improvement is considered a good omen. In reply to a questionnaire sent to customers by a brass and copper mill, a majority stated that stocks were low and their purchases were made only to fill orders received. Sheets continue stiff, No. 28 gage, galvanized, being quoted in some instances for small lots as high as 5.25c. per lb., although the prevailing price is 5.00c. per lb. Warehouses that have been quoting tin plates, charcoal and wasters, without regard to the usual differentials, have revised prices on the old basis. A reduction of warehouse prices on boiler tubes is expected in about a week. We quote prices on page 858.

High Speed Steel.—Business continues to show a slight improvement, a few purchases being made by the Government and some activity being noted among automobile manufacturers. Machine tool builders and tool makers are still out of the market. Producers continue to quote 90c. to $1 per pound for 18 per cent tungsten high speed steel.

Structural Material.—Structural steel work continues to expand and September will go on record as the best month of the year. Numerous projects are being talked of which have not definitely come into the market and if actual lettings come up to expectations, the last quarter of the year will show a hopeful degree of activity. Among the new projects are a few apartment houses, one at Broadway and Ninetieth Street for Samuel H. Golding, requiring 1300 tons of steel; another at Riverside Drive and 110th Street for the Paterno interests, 700 tons, and another at Fifth Avenue and Seventy-third Street, 900 tons. Three public schools in Brooklyn soon to be set total 2400 tons and a newer project, public school No. 189 for Manhattan, will require 700 tons. A high school building for Atlantic City, N. J., up for bids, will require 1000 tons. Other projects include 400 tons for a factory building for the C. A. Reed Co., Williamsport, Pa.; 500 tons for a swing span for the Philadelphia & Reading Railroad at Atlantic City; 300 tons for an extension to a telephone building in Boston. The American Bridge Co. was awarded 200 tons for a highway viaduct at Edgewater, N. J. The Lehigh Structural Steel Co. will fabricate 600 tons for the First National Bank Building, Miami, Fla. The Hinkle Iron Co. was

awarded 250 tons for a building for the Sinclair-Valentine Co. in West 130th Street, New York.

Railroad Equipment.—The New York Central Railroads has distributed orders among several car companies for the repair of 5000 freight cars, practically doubling the orders awarded several weeks ago. The Bangor & Aroostook Railroad has ordered 200 steel-frame box cars from the Standard Steel Car Co. The Delaware, Lackawanna & Western Railroad may place an order this week for 1000 steel cars. The Monongahela road, owned by the Jones & Laughlin Steel Co., is in the market for 50 steel gondola cars.

Cast-Iron Pipe.—The city of New York awarded the contract for 210 tons of 8-in. pipe to Garabeld & Glority, local contractors. Private buying continues in fair volume for this time of year, at least on the small sizes. Practically all of the Eastern manufacturers have enough business to keep them operating at more than 50 per cent capacity for two months. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—The feature of the week was the rejection by an Eastern steel company of 75 cars of scrap which are alleged to have contained mixtures of inferior material. As a result, dealers and producers are loading cars with more care. Price trend is still upward. A Pittsburgh mill has offered $14.50, delivered, for heavy melting steel, but few dealers and brokers in this vicinity will ship because of the high freight rates and the extra hazard in case of rejection. An eastern Pennsylvania mill is reported to have offered $13.50 for heavy melting steel. Feeling continues optimistic.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to $7.50
Steel rails, short lengths, or equivalent	8.50 to 9.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	11.50 to 12.00
Iron car axles	19.00 to 20.00
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track	9.50 to 10.00
Forge fire	5.50 to 6.00
No. 1 yard wrought, long	10.50 to 11.00
Light iron	4.00 to 4.50
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	3.50 to 4.00
Mixed borings and turnings	3.00 to 3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	9.00 to 9.50
Stove plate	10.00 to 10.50
Locomotive grate bars	10.00 to 10.50
Malleable cast (railroad)	8.50 to 9.00
Car wheels	12.00 to 12.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

St. Louis

ST. LOUIS, Sept. 27.

Pig Iron.—No particularly large order for pig iron was placed this week, but there was a fairly good carload business, most of which was for immediate shipment. A sale of 350 tons of Northern foundry iron for last quarter requirements is reported, shipment of which is to be made promptly, although the buyer wanted last quarter delivery. Inquiries are out for 1000 tons in scattered lots. Prices are being firmly maintained on the basis of $22, Chicago. Trade among the stove factories continues to be on the increase. An inquiry has been received from a local steel manufacturer for a car of 50 per cent ferrosilicon.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$24.88
Northern malleable, sil. 1.75 to 2.25	24.88
Basic	24.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—The advance of $5 a ton on black and galvanized sheets made last week by several companies has been met by the American Sheet & Tin Plate Co. An unusually heavy demand was developed for sheets of all kinds, with the exception of blue annealed. Galvanized roofing sheets were in especially good demand. Stove pipe stock was another item in which there was considerable activity, being a seasonable proposition. The firmness of the lighter sheets is having a good effect on the heavier items. A number of building projects involving considerable tonnage of steel already listed in THE IRON AGE have not yet reached the fabricators' hands. The Pennsylvania Railroad bought a carload of wheels, and the Missouri Pacific purchased a small amount of tool steel, the rest of the railroad's purchases being very small. A traveling salesman has picked up a fair lot of carload orders in Arkansas for bars and structural steels. No change has been made in warehouse prices.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—Sales of coke this week have been mostly in carload lots, which amounted to a fairly large volume. That consumers need coke is shown by their insistent demands for immediate shipments. Stove plants continue to report better business, and they are buying for their immediate needs. One of the large producers of coke in the Connellsville district has increased the price of foundry coke to $5.50 per ton, but the range is from $4.75 to the higher figure. Roberts by-product coke for domestic purposes has been increased 50c. a ton to $9. delivered.

Old Material.—Prices have made another advance during the last few days, some grades being marked up from $1 to $2 per ton. The advances brought out considerable buying, both by consumers and dealers. Among the sales reported were 3000 tons to the Commonwealth Steel Co., 1500 tons to the Scullin Steel Co., and 4000 tons to the American Car & Foundry Co. The following railroad lists are before the market this week: Texas & Pacific, 5750 tons; Chicago, Burlington & Quincy, 2000 tons; Wabash, 200 tons; Norfolk & Western, 200 tons; Chicago, Indianapolis & Louisville Railway, 750 tons, and an open list from the Cleveland, Cincinnati, Chicago & St. Louis.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$14.50 to $15.00
Steel rails, re-rolling	12.50 to 13.00
Steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard section	29.00 to 30.00
Cast iron car wheels	14.50 to 15.00
No. 1 heavy railroad melting steel	11.50 to 12.00
No. 1 heavy shoveling steel	11.00 to 11.50
Ordinary shoveling steel	10.50 to 11.00
Frogs, switches and guards, cut apart	11.50 to 12.00
Ordinary bundle sheet	5.50 to 6.00

Per Net Ton.

Heavy axle and tire turnings	$7.50 to $8.00
Iron angle bars	11.50 to 12.00
Steel angle bars	10.50 to 11.00
Iron car axles	20.00 to 20.50
Steel car axles	15.50 to 16.00
Wrought iron arch bars and transoms	15.50 to 16.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Railroad springs	12.00 to 12.50
Steel couplers and knuckles	12.00 to 12.50
Locomotive tire, 42 in. and over, smooth inside	9.50 to 10.00
No. 1 dealer's forge	8.50 to 9.00
Cast iron borings	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 1 boilers cut in sheets and rings	7.00 to 7.50
No. 1 railroad casts	15.00 to 15.50
Stove plate and light cast	12.00 to 12.50
Railroad malleable	10.50 to 11.00
Agricultural malleable	10.00 to 10.50
Pipes and flues	8.50 to 9.00
Heavy railroad sheet and tank	7.50 to 8.00
Light railroad sheet	4.50 to 5.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	6.00 to 6.50
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	9.00 to 9.50
Horseshoes	11.00 to 11.50
Railroad brake shoes	9.50 to 10.00

Buffalo

BUFFALO, Sept. 27.

Pig Iron.—About 22,000 tons of pig iron has been sold here and plus improvement in inquiry and greater furnace operation in prospect, the situation generally shows improvement. The size of orders has undergone some change and with one producer especially there is a tendency to get away from the carload scale which has prevailed and orders for 200 tons and thereabouts are now the rule. One interest sold about 10,000 tons, of which 8000 tons was made up of two orders. A producer has settled on a differential plan and announces adherence in the future. The base price is $20, and for each advance of 50 points in silicon there will be a corresponding advance of 50c. per ton. The $20 base price is firm and in proof thereof is the refusal by one interest to take a sizable tonnage where the buyer sought to place the business at $18.50. No local producer quoted less than $20. The interest now operating the only furnace blowing on basic expects to blow in a furnace to make foundry iron either Oct. 1 or Oct. 15. About 7000 tons has been inquired for with one interest—a noticeable improvement over the volume of inquiry in any week in September. The same maker sold 4000 tons, but no large order helped make this total. In sales of 3000 tons by one furnace the $20 price was firm. Four blast furnaces are now blowing in this district.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.00
No. 2 X foundry, 2.25 to 2.75 sil.	20.50
No. 2 plain, 1.75 to 2.25 sil.	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	31.75

Coke.—Inquiry has improved and comes from a wider circle. One interest has urged its customers to take immediate action toward filling anticipated needs.

Finished Iron and Steel.—Sheet orders have been stimulated with announcement of price advances and both black and galvanized material showed better demand. Before the advance became effective one interest booked sufficient business in various sizes to insure three weeks' rolling. Orders ranged from carload lots to 200 tons. The general observation was that all stocks were low and that notice of price advance forced many jobbers into the market. There is a dearth of structural activity and corresponding dullness in plates and bars. Pipe business has maintained a fair average but reductions in this commodity did not stimulate business to any marked extent. Tin plate demand has increased, and is probably due to harvest conditions. Bolt and nut business is good and one interest has taken an order for two minimum carloads—now regarded as unusually large business. Another inquiry for bolts and nuts of unusual size sent out by a local purchaser did not go to a local interest. In structural work only two small jobs have been awarded. The Lackawanna Bridge Co. will fabricate 100 tons for a bridge in Holyoke, Mass., and 80 tons for a bridge in Essex County, N. Y. A number of alteration and repair jobs calling for tonnages ranging from five to 15 tons have been booked. Only a few bar orders have been placed with a mill which is maintaining a price of 1.60c.

Warehouse Business.—Anticipated advances in warehouse sheet prices have brought out some satisfactory orders. The average of business generally has improved and while the best movement is in sheets, other materials have been in demand. The new schedule of sheet prices is expected within a few days.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.30c.; galvanized steel sheets, No. 28, 5c.; black sheets, No. 28, 4c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 4.05c.

Old Material.—With one exception the largest mills have bought heavy melting steel. Most of the tonnages went for $13, but there is not much material to be obtained at this price now. The one mill which has not purchased has had considerable material on hand and it is not likely there will be any purchases in a long time. Better demand for turnings and borings is evident and there has been a more satisfactory movement of heavy breakable cast scrap and hydraulic compressed. Quick delivery is a usual condition of a purchase.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $13.50
Low phos., 0.00¢ and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00
Hydraulic compressed	9.50 to 10.00
Railroad malleable	12.00 to 12.50

Boston

BOSTON, Sept. 27.

Pig Iron.—Sales have increased and prices are stronger. One active eastern Pennsylvania furnace has advanced prices 50c., another $1, and a Buffalo furnace 50c. a ton. Higher silicon iron shows greater strength than lower, due to establishment of 50c. silicon differential on No. 2X and $1 on No. 1X, whereas less than a month ago differentials were disregarded. Those Buffalo and eastern Pennsylvania furnaces not advancing prices hold strongly to previously established quotations, and have turned down round tonnages rather than make concessions. Sales the past week approximate 8500 tons, including 3500 tons against the 10,000-ton No. 2 plain inquiry noted last week; 1000 tons No. 1X and a like amount of No. 2X eastern Pennsylvania by a textile machinery interest; 300 tons, silicon 1.25 to 1.75, and 200 tons No. 2 plain eastern Pennsylvania by another textile concern; 100 tons No. 1X and 100 tons No. 2X eastern Pennsylvania by still another; 700 tons Northern charcoal and 300 tons Buffalo, four grades in all, by a Massachusetts foundry; 200 tons No. 2X eastern Pennsylvania by a western Massachusetts, and 100 tons by a Rhode Island melter; 250 tons No. 2X to a Massachusetts foundry; numerous car lots of Buffalo, eastern Pennsylvania, Alabama and Virginia, mostly high silicon, without competition. Details regarding the 3500 tons are lacking. Most other lots sold were on a basis of $20.50 for silicon 2.25 to 2.75. The charcoal iron sold at $30 furnace base. As far as is known no iron was sold for 1922 delivery. Some melters who recently purchased iron and others who have not are making general and private inquiries. An eastern Pennsylvania company will blow in two small furnaces, closed since February last. Another has sold 40,000 tons for delivery between now and Jan. 1, and is practically sold up. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$24.56 to $26.06
East. Penn., silicon 1.75 to 2.25	24.06 to 25.56
Buffalo, silicon 2.25 to 2.75	25.46 to 26.46
Buffalo, silicon 1.75 to 2.25	24.96 to 25.96
Virginia, silicon 2.25 to 2.75	29.08 to 31.08
Virginia, silicon 1.75 to 2.25	28.58 to 30.58
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Finished Material.—The New England Structural Co., Boston, is awarded 550 tons structural steel for a 12-story office building, and 100 tons for a South Boston plant. Other business placed the past week was confined to small tonnages, of which there is an increasing amount. For the Bradbury building, Boston, 183 tons will be let this week, as will 400 tons for the Lamson Co., Syracuse, N. Y., plant. The Bath Iron Works, Bath, Me., inquiry for approximately 1500 tons of plates and shapes for five lightships has become active again. A slightly better inquiry for wrought pipe is noted with actual business in car lots. Sheets are quiet, consumers having covered before the recent advance. Deformed bars are in better demand than other kinds. The market for plates, shapes and bars is soft at 1.60c. to 1.70c., Pittsburgh.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Warehouse Business.—Consumption of iron and steel is increasing, although slowly. Individual orders placed with the warehouses usually call for small amounts of stock, but the number of orders booked daily, on the average, is gaining. At the moment activity is confined more to shapes and plates than other materials. Most warehouses have a good assortment, but small stocks. The market on galvanized cut nails has advanced 50c. per keg to $8.30 base.

Coke.—The demand from small melters for foundry coke for winter storage continues to increase, and developments in the Connellsville district have stimulated interest among the large consumers. Consumption of spot fuel also is increasing. The demand and consumption is still considerably below normal, however. The New England Coal & Coke Co. has brought in another battery of ovens, making 240 ovens in operation, and 80 out. A total of approximately 1500 tons of Connellsville foundry coke has been placed in New England since last reports at $4.50 ovens. The market on Connellsville cokes as offered here is $4.50 to $5.50 ovens.

Old Material.—The market for old material fails to reflect the activity in pig iron. That for No. 1 machinery cast is firmer, however, due to the small available supply at less than $19 delivered, and to continued dickerings on 100-ton lots. Small foundries continue to buy from local yards at approximately 70c. per 100 lb. No. 2 machinery cast appears scarce and stove plate is not obtainable at less than $15.50 delivered. The market on heavy melting steel is firm in anticipation of business. Interests recently selling to Pennsylvania mills did so at prices which will permit their placing orders here for some of the material. Slightly more inquiry is noted for machine shop turnings. A broker this week sold a car of old car wheels at $16 delivered. The old material market otherwise is without special feature.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.50 to $20.00
No. 2 machinery cast	16.50 to 17.50
Stove plate	15.50 to 16.50
Railroad malleable	11.50 to 12.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$6.50 to $7.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.00 to 8.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.50 to 4.00
Cast iron borings, chemical	4.00 to 4.50
Blast furnace borings and turnings	2.50 to 2.75
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	12.00 to 13.00
Car wheels	13.00 to 14.00
Rerolling rails	9.00 to 10.00

Birmingham

BIRMINGHAM, ALA., Sept. 26.

Pig Iron.—Birmingham pig iron business continues to consist largely of small lots for prompt shipment, but fourth quarter is being covered more and more by stove makers, pipe founders, radiator works and the like. No very large tonnages have come to the surface, but high pressure pipe lettings secured by Birmingham works will soon call for them. Not as much business was done in the Middle West as during the previous week, but enough additional orders came to show that the gate has been opened. Southern makers are slow to advance because they wish to make sure of the competitive territory. The base has remained at $19 where frequently $19.50 might have been gotten. The Alabama Co. has definitely fixed Oct. 10 as the date for resumption and the Republic Iron & Steel Co. will probably blow in a stack around the same date. Stocks are so ill-assorted and so low that some interests must resume to do business at all. The Southern melt is undoubtedly increasing, radiator works, for instance, operating at 100 per cent. Gadsden car works and other foundries have gone from four to six days of operation. Oil mills and ginneries are active and calling for machinery repairs and brick and cement plants are in full operation. A lot of small business has come to the foundries and all are in the market for pig iron. The largest deal of the week was for 1500 tons of pig iron for a sanitary pipe interest, its fourth quarter supply. The iron situation becomes stronger with persistence and each added degree of strength is being nailed down by conservative policies.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Cast Iron Pipe.—The National Cast Iron Pipe Co. remains at about 100 per cent of operations with continuity of new orders, the latest being 400 tons for Decatur, Ill.; 850 for Youngstown and 150 for Troy, Ohio. Base remains at $35 for 6 in. High pressure pipe is looking up. Sanitary pipe is fairly active at $40 for standard and $30 for extra heavy.

Coal and Coke.—Semet-Solvay by-product works at Fairfield will resume this week in order to supply the Alabama Co. with coke for its Alamaba City furnace. The by-product plant of the Central Iron & Coal Co. at Holt has also resumed. Standard foundry coke remains firm at $6.

Finishing Mills.—The tremendous influx of orders for nails has added impetus to the wire drawing mills. The Gulf States Steel Co. approached the end of September with 60 per cent of production in finishing mills. It was more than that at the mills of the American Steel & Wire Co. The Tennessee company is on day and night turn at the Ensley rail mill. This interest has a cargo of manganese ore coming from Brazil on the steamer Craster Hall. All steel works have speeded up.

Old Material.—The scrap dealers are holding out for an advance of $1 on No. 1 cast and some will not sell at the present quotations. Stove plate has advanced several dollars a ton. Steel remains weak on account of the limited territory within range of the Birmingham yards.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Cincinnati

CINCINNATI, Sept. 26.

Pig Iron.—A number of fair-sized sales were reported during the week, the business being principally in Southern irons. A sanitary manufacturing company closed for 5000 tons at $19, base, Birmingham, for last quarter and another melter south of the Ohio bought 1000 tons. A sale of 5000 tons of Northern basic to an Indiana melter was made recently, but not then reported. Several 200-ton sales and a few 100-ton lots were made, indicating more interest in the market by melters. There are practically no inquiries from this district, other than carload lots, but the inquiry from other districts is more encouraging. It is reported that a Southern furnace has made a price of $19, base, for first quarter but no business has been booked. According to the best figures available, the average operation of foundries in the State of Ohio during September will be about 25 per cent of capacity compared with 16 per cent during August. Stove shops are running better, and jobbing foundries are showing a slight improvement. Belfont stack at Ironton will probably resume shortly, and the Republic Iron & Steel Co. will blow in one furnace in the South next month. Prices of silvery and Bessemer ferrosilicon irons have been advanced $2 by Jackson County makers.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	32.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	24.02

Warehouse Business.—No change is reported in warehouse business, buyers purchasing only for immediate needs and in small quantities. A reduction of $3 per ton has been made in cold-rolled products, these now being quoted at 4.10c. for rounds and 4.60c. for flats, squares and hexagons.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.10c. under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.40 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—Increasing interest is reported in the coke market with prices stiffening. Carload sales are more frequent and at widely distributed points. One operator in West Virginia is reported to have withdrawn from the market, as he has booked all the business he cares to take on at the present prices. Connellsville foundry coke is quoted at $4.25 to $5.50, Wise County at $5.50 to $6, and New River at $7 to $7.50.

Finished Material.—Sheets continue to be the leader in the finished material market and the tonnage booked during the week was very satisfactory. Practically all of the sheet mills have now advanced to 2.50c., 3c. and 4c. for blue annealed, black and galvanized, respectively. While offers were being made to purchase sheets at the former prices for delivery during the first quarter, none of this business was acceptable to the mills, which are not quoting for delivery over a longer period than six weeks. Some small bar, shape and plate business was booked, the orders being confined mostly to carload lots. There is one inquiry, however, for 300 tons of structural material from a northern Ohio fabricator. Prices are a shade weaker in the local market, bars having been quoted at 1.60c. in less than carload lots and shapes and plates at 1.65c. Some wire and nail orders were placed at the recently advanced schedule. In the structural field an addition to the American building at Dayton calls for 100 tons. Schenck & Williams, Dayton, Ohio, are the architects. The Columbus Forge & Iron Co. awarded the contract for its new building to the Middle States Construction Co. About 300 tons is involved. The Tond Creek Coal Co., in West Virginia, awarded the contract for a mining tipple, bridge and trestle to the Kenwood Bridge Co., approximately 170 tons. The contract for the erection of the Kellogg Avenue Bridge, Cincinnati, reported last week as having gone to E. M. Sculley, Columbus, has not been formally awarded. Pending business includes an addition to the Oakley Public School, Cincinnati, estimated to cost $400,000. The Roosevelt office building at Indianapolis, which will take 600 tons, will not be up for bids before the first of the year. Plant operations in this territory will not materially change. The American Rolling Mill Co. is running at approximately 75 per cent in its sheet mills and the Whitaker-Glessner Co., at Portsmouth, at about 40 per cent. The Andrews Steel Co. and the Newport Rolling Mill Co. are still idle.

Old Material.—There is practically nothing being done in the local scrap market, though some interest is reported from other districts. No price changes have been made recently.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	12.00 to	12.50
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.50 to	11.50
Heavy melting steel	9.00 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.50 to	3.00
Steel turnings	2.00 to	2.50
Railroad cast	12.00 to	12.50
No. 1 machinery	13.50 to	14.50
Burnt scrap	7.50 to	8.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	9.50 to	10.00
Pipes and flues	4.00 to	5.00

The Eagle Lock Co., Terryville, Conn., has placed all departments heretofore on a 24-hr. weekly schedule on a 40 hr. basis. Several departments are working on a 55 hr. schedule.

Cleveland

CLEVELAND, Sept. 26.

Iron Ore.—There is little improvement in the ore shipping situation owing to the fact that in the readjusment of shipping schedules by consumers the amount of ore that had been released during the past month for shipment this season somewhat exceeds the reductions that other consumers have made in their shipping orders during the same period. Recent inquiries for small lots of ore have evidently not yet resulted in any sales. Another inquiry has come out, this being for 15,000 tons of manganiferous ore.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—One Cleveland interest took 1000 tons of No. 2 foundry iron for the Standard Sanitary Mfg. Co. for immediate shipment and another booked 1500 tons of malleable iron in southern Ohio. The Sanitary company also bought 3000 tons of foundry iron from another seller at $21.50 for No. 2X for last quarter. Another producer sold 2700 tons of foundry iron in small lots. The price situation shows virtually no change in this or the Valley district. Lake furnaces in Ohio continue to quote No. 2 foundry at $20 to $21, with the former as the most common price. For Cleveland delivery quotations range from $20.50 to $21 at furnace. The lower price might possibly be shaded, although car lot sales are reported at $21. In the Valley, $21 is apparently firmly maintained on round lot orders. Buffalo has evidently been the weakest point in the market recently, but a Buffalo steel plant advanced its price on No. 2 foundry iron from $19.50 to $20.50. Greater activity is reported in foundry grades in the East. A Cleveland interest made several sales for eastern shipment on the basis of $21 western New York furnace, or equivalent to about $20.25 Buffalo. Other sales include 700 tons of off foundry at $18.50. The basic market is inactive. Considerable small lot inquiry for low phosphorous iron has sprung up and a 300-ton lot was sold at $35. That price, however, is evidently being shaded. September shipments will show considerable gain over August.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$21.21
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	35.00

Semi-Finished Steel.—Several independent mills this week advanced prices on sheet bars to $32. For some time $30 has been the general quotation.

Finished Iron and Steel.—Some mills are continuing their efforts to get prices on a firmer basis. The Carnegie Steel Co. this week announced that its minimum prices would be 1.65c. for steel bars and 1.75c. for plates and structural material. This is $2 a ton lower than the prices named in the last formal price announcement, but higher than the minimum prices that have been prevailing recently. However, it is too early to tell whether all the independent mills will come up to the Steel Corporation's prices. At least some are still quoting prices that have been prevailing. Steel bars in round lots can still be bought at 1.60c. and plates and structural material at 1.60 to 1.65c., the latter price being the minimum with some of the mills. Local plate mills have stiffened on their prices to 1.70c. to 1.75c. Hard steel reinforcing bars are quiet and weak. While 1.60c. is the usual quotation, this might be shaded on desirable orders. The volume of business is improving slightly, and some consumers are buying in larger lots than they have been, evidently feeling that prices may not go lower than the recent minimum. The Ford Motor Co. is understood to have placed about the usual amount of steel for its October requirements, but is not releasing orders for all the tonnage, thus protecting itself against a large inventory, should car orders fall off next month. One industry that has shown considerable improvement recently is the manufacture of steel barrels. There is little activity in the building field,

although fabricators are quoting on a few small orders. The Solar Refining Co. has an inquiry out for 950 tons of plates and structural material. The Rock Island Railroad is inquiring for 15 Mikado type locomotives requiring 700 tons of plates.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—The market has stiffened following the advance to 3c., 4c. and 2.50c. for black, galvanized and blue annealed sheets respectively made by the leading interest after similar advances by several independent mills. The advanced prices are generally quoted on black and galvanized sheets, but some mills are still quoting blue annealed sheets in all gages at 2.25c. and others are on the same basis for only No. 12 gage and heavier sheets. The Ford Motor Co. during the week placed about 3000 tons of sheets for October delivery. Little sheet business has been placed at the advance in prices, as most consumers were taken care of before prices were marked up. Sheets in tank steel quality in blue annealed gages are quoted on a plate basis of 1.75c.

Warehouse Business.—Local jobbers report an improved demand for sheets. Warehouse prices on sheets are unchanged and will not be marked up until it becomes apparent that the higher mill prices will hold.

Strip Steel.—Quotations on hot-rolled strip steel range from 2.10c. to 2.25c., the latter being the common quotation for the narrower sections. Prices on cold-rolled strips range from 3.75c. to 4c.

Cast-Iron Pipe.—On an inquiry from Cleveland for 1700 tons of 48 and 60-in. cast-iron pipe, the United States Cast Iron Pipe & Foundry Co., the only bidder, quoted $41.80 per ton delivered.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is growing slowly and the market shows increasing firmness. Jobbers and some classes of consumers are buying more freely. One local maker reports that September sales will run about 33 per cent over those in August. The demand for rivets continues dull. The Champion Rivet Co. has withdrawn prices and is now adhering to 2.50c. Pittsburgh for structural and 2.60c. for boiler rivets. Minimum prices by some makers are about $5 a ton lower.

Coke.—The foundry coke market is fairly active, considerable business being booked at $4.50 and $4.75 in lots ranging from one to four cars for immediate shipment.

Old Material.—There is a fair amount of activity in the scrap market in the Youngstown district and local dealers are devoting their attention to that and other territories, as there is no demand in Cleveland. Because of the absence of sales to local consumers, Cleveland prices on items that are in any way active are based on prices that are being paid at other Ohio consuming points and this has resulted in some price changes. Dealers are paying $14 to $14.50 for heavy melting steel for Youngstown delivery and there is a good demand for machine shop turnings for Youngstown consumers, for which dealers are offering $8.25. Compressed steel is quoted at $11 to $11.25 for Youngstown delivery and sales of flashings are reported at $10 delivered at the same consuming points.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.00 to $12.50
Steel rails under 3 ft.	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.50 to 7.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.25 to 8.75
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	7.00 to 7.50
Drop forge flashings, under 10 in.	7.00 to 7.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Philadelphia

PHILADELPHIA, Sept. 27.

Continued improvement in the iron and steel markets is noted, and while conditions are changing very slowly, the net results are encouraging to the trade. In finished steel lines, the most important development is the announcement by the Carnegie Steel Co. that its prices on plates and shapes are now 1.75c., and on steel bars 1.65c., Pittsburgh. While these prices are a reduction of $2 a ton from the last "official" quotations of the Carnegie Steel Co., they are actually an advance, as recent business has been taken at competitive prices made by independent mills. It is not likely that this announcement will have the immediate effect of putting up prices quoted by independents, but it has already stiffened the market somewhat by reducing the number of extremely low quotations. Another effect has been a sudden interest among buyers in fourth quarter contracts. Every steel company has received inquiries from its customers as to whether it would contract for fourth quarter at the current quotations, and such inquiries have been quite uniformly turned down. Likewise, there has been a greater tendency to refuse attractive business when offered at low prices. For example, a jobber has tried to place 2000 tons of plates, shapes and bars for stock at 1.50c., Pittsburgh, but apparently without success.

More makers of sheets have followed the $5 a ton advance recently put into effect by the American Sheet & Tin Plate Co. and some of the leading independents, but a 2000-ton order for blue annealed is reported to have been placed last week at 1.90c., Pittsburgh. Sheet manufacturers have been giving their customers ample opportunity to cover at the outstanding quotations before putting into effect the new prices, which are now generally observed.

A further advance in foundry pig iron places the market on a minimum basis of $20.50, furnace. Probably 25,000 tons was booked here within the past week. Among pending inquiries is one for 5000 tons of basic and another for 3000 tons of gray forge.

Payment of long standing accounts by Eastern railroad companies has had a beneficial effect upon steel companies and has placed the roads again in a position where they can use their credit more freely in making purchases of needed material.

Pig Iron.—Another advance in foundry iron has been put into effect by Eastern furnaces and the market is from 50c. to $1.50 higher than a week ago, depending upon the furnace. Nearly all of the active furnaces in this district now ask $20.50, furnace, for No. 2 plain iron, 1.75 to 2.25 per cent silicon, and $21 for No. 2X, 2.25 to 2.75 per cent silicon. For No. 1X iron the differential is $1 or more above the price of No. 2X. The Warwick furnace, which has sold its output for the remainder of the year, has virtually withdrawn from the market by naming prices higher than its competitors are asking, its schedule being $21 for No. 2 plain, $22 for No. 2X and $23.75 for No. 1X, all f.o.b. furnace. The Thomas Iron Co. has decided to put its smallest furnace, at Hellertown, Pa., in blast in about two weeks, and has named the following prices for fourth quarter delivery: No. 2 plain, $23; No. 2X, $23.50; No. 1X, $24.50, furnace. If the demand for iron is sufficient to justify it, the same company will also put in blast its Alburtis furnace in four or five weeks. Demand for foundry iron has been fairly well sustained, sales in this market during the week having totaled at least 25,000 tons, of which the greater part was booked by one furnace company. A fair volume of inquiry is pending, including that from a Westfield, Mass., machinery company for 10,000 tons of No. 2 plain upon which eastern Pennsylvania furnaces quoted. The lowest quotation from this district is said to have been $19.50, furnace. One furnace, which quoted this price, later withdrew it. So far as reported, the business is not yet placed. An inquiry for 5000 tons of basic comes from a Harrisburg company, and a Pottstown company is inquiring for 3000 tons of gray forge iron. There have been numerous sales within the week of foundry

iron in lots of 1000 tons or more, and several of 500 tons and some smaller tonnages. A favorable indication is the purchase of iron by jobbing foundries, indicating a slight resumption of activity in that industry. Malleable iron is higher, sales having been made at $22.50 and $23, furnace. Pending business in basic and gray forge will probably be negotiated at about $20, furnace. The last important sale of basic in this district was at $19.25, delivered. The attitude of Eastern producers on prices appears to be very firm, and most of them have sufficient orders on hand to await developments in the situation. If the market advances a few dollars above its present level other furnaces will undoubtedly be put in blast. The coke situation is a factor which makes for higher costs. One Eastern furnace is reported to have covered for its fourth quarter coke at $3.50, Connellsville. This adds close to $1 per ton to the cost of making iron compared with a month ago.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.34 to $22.04
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.84 to 22.54
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	19.25 to 20.75
Gray forge	20.00 to 21.00
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Semi-Finished Steel.—With prices of finished steel showing some signs of a firmer tendency there is a little more interest in rerolling billets, but no business of importance has resulted. An advance of $2 a ton on sheet bars has been announced by leading makers, making the present price $32, Pittsburgh. Billets are still quoted at $30 for rerolling quality and $35 for forging quality, Pittsburgh.

Light Rails.—Prices quoted on 25 to 45-lb. sections range from 1.60c. to 1.75c., Pittsburgh.

Plates.—Although plates continue to be the weakest and least in demand of all steel products, there is a slight improvement. One leading Eastern producer is operating its plant at a better rate this week than it has had in months. The notice served upon the trade by the Carnegie Steel Co. that its price on plates had been fixed at 1.75c., Pittsburgh, has tended to hasten the acceptance by consumers of some of the outstanding low quotations. While plates are still obtainable from independent companies at 1.60c., Pittsburgh, it is probable that fewer quotations below that price are being made this week. Some offers of orders at 1.50c., Pittsburgh, have been turned down by the mills.

Structural Shapes.—The price of shapes remains at 1.60c., Pittsburgh, but the naming of 1.75c. as the price of the Carnegie Steel Co. has resulted in a stiffening of this quotation, there being less inclination by the mills to shade that figure. Offers of stock orders by jobbers and fabricators at 1.50c., Pittsburgh, have apparently not found willing sellers. The Chestnut Street pier work, about 1000 tons, has been awarded to the Bethlehem Fabricators, Inc. Horace T. Potts is in the market for about 800 tons for a new steel warehouse. Several other important jobs are pending, including a 1000-ton school at Atlantic City and a swing span for the Philadelphia & Reading, 500 tons.

Bars.—Though 1.50c., Pittsburgh, has been freely done on reinforcing bars, it is stated that a considerable part of the current bar business is being taken at prices ranging from 1.60c. to 1.75c., Pittsburgh, the higher figures usually applying to less than carload orders. Within the past week 2000 or 3000 tons have been put up to local offices for quotations, including 750 tons for the Chesapeake & Ohio Railroad, with 150 tons of plates. An inquiry from a local construction company for a water filtration job calls for 750 tons of reinforcing bars. Demand for bar iron is light and the price remains at 1.60c., Pittsburgh.

Sheets.—Most of the independent mills have now advanced sheet prices to the new levels originally named by the Brier Hill Steel Co. and later announced by the American Sheet & Tin Plate Co. These new prices are 2.50c. for blue annealed, 3c. for black and 4c. for galvanized, Pittsburgh. Some of the makers were slow in making the advance, giving their customers full opportunity to cover at the former prices. In a few instances outstanding quotations will be given protection for a few days more. One large order placed last week by an automobile body maker called for 2000 tons of blue annealed at a price reported as 1.90c., Pittsburgh.

Bolts, Rivets and Spikes.—Track bolts are quoted at 3.75c., Pittsburgh, railroad spikes at 2.50c., Pittsburgh, structural rivets at 2.40c., and boiler rivets at 2.50c., Pittsburgh, but all of these prices are being shaded on attractive business.

Warehouse Business.—Sales of steel out of stock continue to show gains. There have been no price changes and we quote for local delivery as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage, 3.75c.; galvanized sheets, No. 28 gage, 4.75c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4c.; squares and hexagons, cold-rolled steel, 4.50c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Railroad Equipment.—The Baltimore & Ohio Railroad has placed an order for 1000 steel cars, the business being divided between two companies.

Old Material.—A better demand for stove plate has resulted in an advance of $1 a ton within the week. No. 1 railroad wrought is up 50c. a ton. Other grades of scrap have not changed in price. The demand for heavy melting steel in this district is very light, due largely to the fact that steel mills still have fairly good stocks on hand, based on present operating requirements. Better prices for steel scrap in the Pittsburgh district are causing some of the Eastern supply to go to that district. We quote for delivery in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	16.00 to 17.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.50 to 16.00
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	13.50 to 14.00
Stove plate (for steel plant use)	13.50 to 14.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Sheet Bars Advanced

YOUNGSTOWN, OHIO, Sept. 27.—Independent makers to-day advanced the price of open-hearth sheet bars from $30 to $32. It is indicated that a further increase may be expected within the next 30 days.

The Wheeling Steel Corporation posted notices in Beech Bottom, Martins Ferry and Wheeling plants of the Whitaker-Glessner Co., announcing the company is willing to resume the mills. The notice reads: "We are willing to reopen the mills of the plant. The starting of operations will depend upon the number of men reporting for work, who were employed here when the plants closed down."

British Iron and Steel Market

Lower Freights to the Far East Are a Stimulant —Tin Plate in Greater Demand—Continental Competition Less Active

(By Cable)

LONDON, ENGLAND, Sept. 27.

Pig iron is quiet, with an easier tendency. There is a fair demand for hematite from home consumers, but the export business is stagnant. Belgian foundry iron is quoted up to £4 7½s. ($16.28) f.o.b. Foreign ore is dull. Sellers of Bilbao Rubio ask 28½s. ($5.30) ex-ship Tees.

There is a better demand for some specifications of British steel. More sheet and bar mills are starting up, but any large business is handicapped by the chaotic state of shipbuilding. The Scottish position is still bad. The Mossend and Glengarnock works are now closed. Some Northeastern engineering and machinery works are cancelling orders, pending the removal of war bonuses heretofore paid to employees.

Continental prices are advancing, but business is declining. French merchant bars are held at £8 15s. (1.45c. per lb.) f.o.b. Sellers of Belgian merchant bars ask up to £9 (1.49c. per lb.) f.o.b. Both these quotations are based on shipments in from six to eight weeks. German merchant bars are quoted at £9 (1.49c. per lb.) f.o.b., with shipment date not specified.

French beams are being sold at £8 7½s. (1.39c. per lb.) f.o.b., but £8 10s. (1.41c. per lb.) is now asked. Belgian rails are quoted at £8 to £8 15s. (1.33c. to 1.45c. per lb.) f.o.b.

Freights to the Far East from the United Kingdom and Continent are lower; consequently German wire nails are obtainable at 23¼s. ($4.33) per pikul (1.33½ lb.) keg, cost and freight to Japan.

There is an improved demand for tin plate for both home and export delivery. Output is increasing, but prices are falling. No further drop in Welsh steel bars is anticipated. Galvanized sheets are in better demand.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.72 per £1 as follows:

Durham coke, delivered	£1 15	$6.51	
Cleveland basic	7 7½ & £7 10*	27.45 &	$27.90
Cleveland No. 1 foundry	7 0	26.04	
Cleveland No. 3 foundry	6 0 & 6 5*	22.32 &	23.25
Cleveland No. 4 foundry	5 19	22.13	
Cleveland No. 4 forge	5 17½	21.85	
Hematite	7 0*	26.04	
East Coast mixed	6 10	24.18	
Ferromanganese	18 0 & 14 10*	66.96 &	53.94
Rails, 60 lb. and up	10 0 to 14 0	37.20 to	52.08
Billets	7 10 to 8 0	27.90 to	29.76
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.70 to	31.62
Tin plate base box	1 0½ to 1 2	3.81 to	4.09
		C. per Lb.	
Ship plates	12 10 to 14 0	2.08 to	2.32
Boiler plates	18 0 to 19 0	2.99 to	3.16
Tees	12 10 to 14 10	2.08 to	2.41
Channels	11 15 to 13 15	1.95 to	2.28
Beams	11 10 to 13 10	1.91 to	2.24
Round bars, ¾ to 3 in.	12 0 to 12 10	1.99 to	2.08
Galvanized sheets, 24 g.	19 0	3.15	
Black sheets	16 0	2.66	
Steel hoops	14 5 & 14 0*	2.37 &	2.32
Cold rolled steel strip, 20 g.	26 10	4.40	

*Export price.

FURTHER EXPORT BETTERMENT

Japanese Sheet Buying Heavy—Chinese Bridge Reported Placed

NEW YORK, Sept. 25.—Inquiry continues active but buying is confined almost entirely to Japan, from which the demand for black sheets of various gages is reported very large. So great has been the number of orders for sheets of light gage (Nos. 30½ and 31 gage) that one large export corporation is reported as unable to book further orders for these gages at present. In other foreign markets there is an active interest in American products and prices, if the number of inquiries and requests for prices may be considered a criterion. Australia, New Zealand, South Africa, South American countries, China, India and the Near East are all showing a renewed interest in current American quotations.

The representative of a large British export house with a New York branch, who is traveling in South Africa, reports that little business is possible unless material is sold in small tonnages out of warehouse. Consumers there only purchase for immediate needs and can generally obtain such small quantities as are needed from the warehouses that some companies have established in the larger cities. A majority of these warehouses stock up from British sources. An inquiry from Holland for 5000 tons of basic open-hearth wire rods that first appeared about eight months ago and later was repeated has been issued for a third time in the United States. When it first came, this inquiry aroused but slight interest in export circles, as it was believed that it would undoubtedly be awarded to some Belgian or German mill, Continental prices being approximately 50 per cent of the American quotations on wire rods. Evidently it is impossible to place this order with Continental mills or for some reason American rods are preferred if the price is satisfactory.

Some exporters to the Far East report a growing tendency of Japanese buyers to demand shipments on sight draft, refusing to open letters of credit, an attitude probably influenced by the generous offers that have been made of late by Belgian and German and other European sellers.

There is a report that the contract for the construction of a steel bridge over the Yellow River on the line of the Pekin-Hankow Railroad in China has been awarded by the Government to a Belgian company, which bid $10,500,000. This report is not confirmed by consulting engineers in the United States, and there is doubt as to the financing of the project. A report appeared on Aug. 6, stating that the bridge had gone to a Belgian company, but on Aug. 24 the contract was still unplaced.

No action has been taken as yet on the tender for Formosa, involving six lines of heavy pipe, 1400 tons of tank plates, and 225 miles of transmission towers.

Representatives of German interests in the United States state that they are turning down numerous inquiries for small and fairly large tonnages of finished steel products, being unable to obtain shipment from the mills, which are filled with domestic orders and export contracts to other foreign markets. Some of these representatives report an interest among American consumers in wire and wire nails, particularly the latter, which it is increasingly difficult to obtain, as the Continental prices are advancing and the mills are filling up rapidly.

Committee Comes to Unanimous Agreement

WASHINGTON, Sept. 27.—The Committee on Emergency Measures by Manufacturers of the Unemployment Conference this afternoon reached unanimous agreement for emergency relief in the present situation. The recommendations made are not to be made public until submitted next week to the entire conference. It is reported, however, that among the measures suggested were rotation of labor, shorter hours and weeks. The wage question is understood not to have come before the entire committee. This is said to have been threshed out yesterday before the subcommittee and to have developed sharp difference of opinion with apparent understanding that it was not to be included in recommendations. The committee was the first to make a report and now will go to work on recommendations looking to permanent measures of relief.

The committee on public works is said to have recommended that Federal and State governments and municipalities co-operate and begin public works operation at once, for which the Federal Government has appropriated $75,000,000, to be used in road building.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Cincinnati	0.325	Jacksonville, all rail	0.555
Indianapolis	0.345	Jacksonville, rail and water	0.46
Chicago	0.38	New Orleans	0.515
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.60c. to 1.70c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.20 to $2.50
Large boiler rivets ..... 2.35 to 2.60
Small rivets .....70, 10 and 10 per cent off list
Machine bolts, small, rolled threads, 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads, 65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer, 65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅝ in. x 6 in.:
Smaller and shorter rolled threads..70 and 5 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts .....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ in. x 4 in.:
Smaller and shorter .....60, 10 and 5 per cent off list
Larger and longer sizes.....60 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped..... 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts..... 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....3.25c. to 3.50c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $41; chain rods, $41; screw stock rods, $46; rivet and bolt rods and other rods of that character, $41; high carbon rods, $49 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.35 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.60 to $2.75 base; 5/16-in., $2.60 to $2.75 base. Boat and barge spikes, $2.60 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.45	Nos. 13 and 14	2.60
Nos. 9 and 10 (base)	2.50	Nos. 15 and 16	2.70
Nos. 11 and 12	2.55		

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

Machine-Tool Dealers to Meet Oct. 19

The Machine Tool Section of the National Supply and Machinery Dealers' Association, of which L. H. Swind, Swind Machinery Co., Philadelphia, is chairman, will meet at the Hotel Astor, New York, on Wednesday, Oct. 19, coincident with the fall meeting of the National Machine Tool Builders' Association. A speaker will be selected by the National Machine Tool Builders' Association to address the dealers. Other features of the program include discussions of present business conditions. Terms of payment by dealers' customers will be discussed, this problem having become acute because of the tendency during the past six months to request long terms, which if the dealer gives must, he believes, be financed by the manufacturer. The subject of trading in old macines at too high a price will also be considered with a view to improving the present situation. There will also be time for discussion of other subjects to be suggested by the members.

Industrial Cost Association Meets

The New York Section of the Industrial Cost Association opened its fall and winter activities with a dinner-meeting at Keen's Chop House, Sept. 22. H. S. Peck, comptroller, S K F industries, and president of the national organization, acted as chairman. The contemplated program of the fall conference of the association, to be held at Pittsburgh, Nov. 2, 3 and 4, was outlined and there was earnest discussion of specific problems of cost accounting procedure which were presented for solution by various members. Among those taking part were A. Boren, Yale & Towne Mfg. Co.; J. M. Howell, General Electric Co.; H. D. Starr, N. J. Zinc Co.; C. A. Porter, Harding Co., and J. H. Ramsey, Electro-Dynamic Co.

Two papers, "Should Abnormal Burden Be Included in Current Monthly Costs?" presented at the national conference at East Aurora, N. Y., May 26, 27 and 28, by T. J. Haley, Fawcus Machine Co., Pittsburgh, and by H. B. Pavitt and W. L. Erdman, Allegheny Steel Co., Pittsburgh, were read. Discussion of the papers was scheduled for the next meeting.

Gear Manufacturers' Meeting

The semi-annual meeting of the American Gear Manufacturers' Association will be held at the Powers Hotel, Rochester, N. Y., Oct. 13 to 15. At this meeting, as was decided upon at the meeting of the general standardization committee and chairmen of sub-committees held in Niagara Falls in the spring, a definite program of activity along the line of standardization will be announced. With each committee's report there will be a special report outlining that committee's phase of standardization work.

The following program of papers has been prepared:

"Gear Tooth Wear," by S. O. White, Warner Gear Co.
"Duralumin as a Material for Worm and Other Gearing," by R. W. Daniels, Bausch Machine Tool Co., Springfield, Mass.
"First-Hand Impressions of Europe," by E. S. Sawtell, assistant general manager, Tool Steel Gear & Pinion Co.
"Tooth Forms," by H. W. Miller, Fellows Gear Shaper Co.

During the meeting the plant of the Gleason Gear Works in Rochester will be inspected and luncheon will be served at the Gleason plant.

Work has been started on the taking down and rebuilding of the trestle work for the Port Arthur, Ont., blast furnace owned by the Palatine Mining & Development Co., which acquired the furnace of the Atikokan Iron Co., at Port Arthur, some months ago. The construction work is being done by Hancock & Co., who are also rebuilding the bridges and culverts on the Pee Dee Railway between North Lake and Gunflint, to give access to the Polson mine.

The Milwaukee Department of Public Works, Sept. 25, called for bids for equipment for the new Riverside pumping station consisting of one 25,000,000 and two 22,000,000 gallon vertical triple expansion crank and flywheel type pumping engines. Bids close Oct. 24.

COMING MEETINGS

September

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis. Secretary, L. F. Boffey, 19 Park Place, New York.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

American Society of Lubrication Engineers. Oct. 13 and 14. First annual convention, Chicago. Secretary, J. L. Overholt, Monadnock Block, Chicago.

American Gear Manufacturers' Association. Oct. 13 to 15. Fall meeting, Powers Hotel, Rochester, N. Y. Secretary, F. D. Hamlin, 4401 Germantown Avenue, Philadelphia.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

National Supply and Machinery Dealers' Association. Oct. 19. Meeting of machine tool section, Hotel Astor, New York. Secretary, Thomas A. Fernley, 505 Arch Street, Philadelphia.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

Industrial Cost Association. Nov. 2, 3 and 4. National Cost Conference, Pittsburgh. Secretary, A. A. Alles, Jr., Peoples Bank Building, Pittsburgh.

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

New England Iron and Hardware Association

The New England Iron and Hardware Association held its annual fall outing at the Tedesco Country Club, Swampscott, Mass., Tuesday, Sept. 20, afternoon and evening. Approximately 70 attended. During the afternoon there was an 18-hole golf tournament, with 40 contestants.

Fred L. Avery, Avery & Saul, South Boston, president of the association, presided at a dinner following the golf tournament. He introduced Austin H. Decatur, Decatur & Hopkins Co., Boston, president National Hardware Jobbers' Association, who spoke on the value of associations. Harry L. Doten, Austin & Doten, Boston, chairman of the golf committee, made the presentation of prizes won during the afternoon.

Tin Plate Mills Resume

The plant of the Standard Tin Plate Co., Canonsburg, Pa., which has been idle since about the first of June, resumed operations at midnight, Sept. 25, 12 of the 24 hot mills and a corresponding amount of finishing capacity going on. This plant, up to June 1, has been operated in all departments under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers, but under a new agreement reached with that organization only the hot mills and the tin house hereafter will be operated as union units. All other departments are on the open shop basis and wages will be on a sliding scale, based upon the average sales prices of tin plate as determined in the bimonthly wage settlement between the Amalgamated Association and the Western Sheet Manufacturers' Association. On the present basis of tin plate, common labor in this plant will be paid 28½c. per hr.

PERSONAL

Elbert H. Gary, chairman United States Steel Corporation, returned Tuesday from his visit to Mexico.

J. H. Redhead, for many years connected with the National Malleable Castings Co., Cleveland, and during the past few years assistant manager of sales of that company, has resigned to become associated with the Reliance Co., Cleveland, recently organized to promote and finance industrial enterprises and to deal in securities.

William M. Clyde, for the past 12 years Cincinnati manager of the Motch & Merryweather Machinery Co., has resigned to enter the real estate business. Mr. Clyde went to Cincinnati from Detroit 12 years ago. He will be succeeded in Cincinnati by E. A. Shriver, for some years in charge of the sales of grinding machinery at the Pittsburgh office of the Motch & Merryweather Machinery Co.

W. B. Topping, general manager of sales Republic Iron & Steel Co., Youngstown, Ohio, has gone to Canada for a vacation. He expects to be back Oct. 3.

G. Muntz, president Tropenas Co., Brooklyn, has just returned from a seven months business trip around the world, having visited Japan, China, India, Italy, Germany and Holland.

F. E. Stapleford was elected president of the Cincinnati Association of Purchasing Agents at the annual meeting on Sept. 22. J. C. Kreis was elected vice-president; G. C. Merkel, treasurer, and E. W. Simpkinson, secretary. The entire membership, numbering 80, will attend the convention of the National Association at Indianapolis, commencing Oct. 10.

A. L. Humphrey, president Westinghouse Airbrake Co., Wilmerding, Pa., has been notified by President Harding that he has been included in the appointments of members to the conference on unemployment.

Robert McKean, general manager Riter-Conley Co., Pittsburgh, recently returned to this country after an absence of two and a half years in France, where he had charge of the European interests of his own company and the McClintic-Marshall Co., an affiliated company.

Donald Tulloch, secretary Metal Trades Association, Worcester, Mass., has returned from a three months' trip abroad.

James A. Campbell, president Youngstown Sheet & Tube Co., is among those who have accepted invitations during the past week to participate in the unemployment conference which opened in Washington on Monday of the present week. Among the acceptances were those of John D. Ryan of the United Metals Selling Co.; M. F. Tighe, president of the Amalgamated Association of Iron, Steel and Tin Workers, and John A. Penton, secretary American Pig Iron Association.

Alexis Doster, assistant treasurer Union Hardware Co., Torrington, Conn., has designed to accept a position with the Torrington Mfg. Co.

George Shortmeier, formerly New York manager for the Madison Rubber Co. and later district manager at New York for the Sinclair Oil Co., has been placed in charge of the Bosch Magneto Corporation branch at New York, replacing O. S. Stanley. Charles L. Shedd is now manager of the Bosch branch at Detroit, taking the place of Roy Davey, who has been made manager of the manufacturing sales department at Springfield, Mass. Mr. Shedd was at one time promotion manager of the truck division of the Packard Motor Car Co. at Detroit, subsequently served as official distributor at Omaha for that company and still more recently acted as sales manager of the Republic Truck Corporation at New York.

William W. Wolfe has been appointed manager of sales of the Highland Iron & Steel Co., Terre Haute, Ind., with headquarters at 208 South LaSalle Street, Chicago.

George H. Lambkin, who has been associated with the Sterling Wheelbarrow Co., Milwaukee, manufacturer of equipment for contractors and foundries for the past twelve years, has been appointed manager for the New York territory, with an office at 141 Center Street, New York.

Roland H. Boutwell, Standard Horse Shoe Co., Boston and South Wareham, Mass., has returned from a three months' trip in Europe. Mr. Boutwell spent much of his time in France.

M. J. Cavalier, professor of metallurgy in the University of Toulouse, has just arrived at Columbia University to take up his work as French exchange professor. He will be at Columbia from Oct. 1 to Oct. 30. Professor Cavalier, rector at Toulouse and a widely known authority on metallurgical chemistry, comes to America as the result of arrangements for an annual exchange of professors of engineering and applied science between French and American universities.

H. D. Eller, for the past five years manager of the iron and steel department of Viele, Blackwell & Buck, 49 Wall Street, New York, exporters and importers, has been appointed New York district manager for the Newton Steel Co., Youngstown, Ohio. Previous to his connection with Viele, Blackwell & Buck, Mr. Eller was with the American Cotton Oil Co., 65 Broadway, New York. He is succeeded as manager of the iron and steel department by C. C. Marrin.

J. A. Durfee, since March 1, 1920, works manager of the Page Steel & Wire Plant of the American Chain Co., Monessen, Pa., has resigned. A farewell dinner was tendered Mr. Durfee Saturday evening, Sept. 10, by the 40 or more superintendents and foremen of the Page Works, at which time he was presented a handsome smoking set. Before actively engaging in business again Mr. Durfee will enjoy a vacation at his country home near Cleveland.

A. J. Billimoria, Bombay, India, head of the firm of managing agents of the Tata Iron & Steel Co. and of the other various Tata interests, is now in New York on business with Perin & Marshall, consulting engineers. He will return to London in October and proceed later to India.

W. W. Lukens, president Alan Wood Iron & Steel Co., Philadelphia, has resigned on account of ill health, and will give up his duties Nov. 1. His successor has not yet been chosen.

Exceptions Filed in Ferromanganese Case

Accompanied by a recommended cease and desist order, which would prevent the respondents from importing and selling ferromanganese in the United States at a price substantially less than the actual market value or wholesale price at the time of exportation to the United States after adding to the market value or wholesale price the expenses necessarily incident to the importation and sale, Trial Examiner I. E. Lambert of the Federal Trade Commission has filed exceptions to the tentative report of Examiner Edward M. Averill. The latter, in passing upon the so-called ferromanganese dumping case, held that there was nothing to substantiate the charges against the importers of ferromanganese and his recommendations, if adopted by the commission, would result in dismissal of the proceedings. Briefs of the respondents and the trial attorney are to be filed with the commission by Oct. 15, the date having been extended from Oct. 5, the one which had been originally set.

A bill in equity brought by the Moore Drop Forging Co., Springfield, Mass., against members of the Massachusetts State Board of Conciliation and Arbitration, to restrain the latter from holding a hearing respecting a labor dispute between the plaintiff and members of the labor unions, has been dismissed by the Massachusetts Supreme Court. In its opinion, the court stated that where a strike exists involving more than 25 employees the public concern in the matter is sufficient to justify an impartial investigation by an unbiased board of public officers within the bounds set forth in the statutes.

OBITUARY

HENRY J. KIMMAN, since 1902 manager of the Cleveland plant of the Chicago Pneumatic Tool Co., died in Cleveland, Sept. 7. He was born in Haarlem, Holland, in 1863 and emigrated to America with his parents and settled in Chicago in 1870. He served with the Adams-Westlake Co. and other manufacturing concerns in Chicago and the Far West. He converted the basement of his home on Nineteenth Street, Chicago, into a small machine shop, working days as a machinist for hire and working evenings for himself. Possessing an imaginative mind he designed, and in collaboration with his brother, T. P. Kimman, built the first practical portable piston air drill, known as the Little Giant. Soon after engaging in the manufacture of air drills he became associated with E. N. Hurley and they formed the Standard Pneumatic Tool Co. in 1898 and he became associated with the Chicago Pneumatic Tool Co. in the consolidation of pneumatic tool interests in 1901, at which time he became manager of the Cleveland plant of the Chicago Pneumatic Tool Co. and remained in active charge of the plant until his death.

LEWIS DEWEY COLLINS, treasurer and assistant general manager Massey-Harris Harvester Co., Batavia, N. Y., died suddenly at the home of H. W. Robinson, assistant general manager of the European office of the Massey-Harris Co., Ltd., Toronto, Can., in London, on Sept. 17. He was about to complete a European trip in the interests of his company. He began his career in the harvesting machinery business in 1884 with the Johnston Harvester Co., as office boy. He was born in Batavia, Dec. 10, 1866. For a time he worked in a hardware store. In 1910 he was elected vice-president and treasurer of the Massey-Harris company and a few months later became treasurer and assistant general manager. He was a public-spirited man, being actively interested in the public schools, the church, civic betterments and Masonic affairs.

ALTON L. DICKERMAN, mine developer, died recently at his home at Colorado Springs, Col., due to injuries received five years ago when he went down with a ship that foundered off the Virginia capes. He was 71 years old. It is said that he was the first engineer to discover ore below the dykes on the iron range in Minnesota. He was born in Stoughton, Mass., in 1850 and was graduated from Tufts College in 1869 and completed his mining education in Friburg, Saxony. He was a pioneer in the iron and copper fields of Minnesota and Michigan; later he visited the Alaskan and Mexican gold and copper fields. Following this he turned his attention to Colorado mines. He was a member of several organizations, including the Engineers' Club of New York.

ALLAN RANSOM, widely known in the machine tool trade, died suddenly at San Francisco, Sept. 21, at the age of 61. Mr. Ransom was one of the partners of the Marshall & Huschart Machinery Co., Chicago, and was vice-president of that company until poor health forced him to retire about ten years ago. He then moved to the Pacific Coast where he subsequently engaged in the machinery business and latterly manufactured pistons in Los Angeles and San Francisco. At one time he was with the Lodge & Davis Machine Tool Co. at Cincinnati and later was with the Prentiss Tool & Supply Co. at its Chicago store. The deceased was a brother of George Ransom, president Ransom Mfg. Co., grinding machines, Oshkosh, Wis.

SAMUEL S. VOORHEES, chemist with the Bureau of Standards, Washington, D. C., and chairman of the corrosion committee of the American Society of Testing Materials, died recently at a hospital in Portland, Me., following an operation.

JOHN STANTON, formerly president Delhi Specialty Co., now the John Stanton Co., metal product manufacturer, Cincinnati, died at his home in Cincinnati recently, aged 92 years.

CHRISTIAN D. WISELOGEL, founder and president Peerless Wire Works, Lafayette, Ind., died at his home in that city Sept. 16, aged 60.

DAVID H. WILSON, Wyckoff, N. J., chief electrical engineer for the Erie Railroad Co., died Sept. 16.

JAMES CRAIG STEWART, Boston, senior partner Stewart Boiler Works, Worcester, Mass., died Sept. 22, at the Peter Bent Brigham Hospital, Boston, in his sixty-fourth year, as a result of a shock. He was born in St. John's, New Brunswick. He became associated with his father in the boiler business Feb. 1, 1878, under the firm name of Charles Stewart & Son, on Exchange Street, Worcester.

WILLIAM GOLDSBOROUGH SMYTHE, sales manager American Screw Co., Providence, R. I., died at his home in that city Monday evening, Sept. 19, having never recovered from a serious illness in Atlantic City, in March, last, since which time he has not been active in business. He was born in Eastern Shore, Md., Dec. 14, 1841. Previous to associating with the American Screw Co., he was New York manager of the Russell & Erwin Mfg. Co., New Britain, Conn. He joined the Providence corporation in 1903, and shortly afterward was made a director.

JOHN B. TOWNLEY, an official of the Foster Engineering Co., Newark, N. J., belt shifters, died recently at the Hotel Marie Antoinette. He was born in Washington, D. C.

JOSEPH BRENT, superintendent of the water supply and plumbing system of the Cambria Steel Co., Johnstown, Pa., was killed in an automobile accident at a curve on the road between Johnstown and Ligonier, Sunday evening, Sept. 25. Mr. Brent was 37 years old, a native of Johnstown, and had been with the Cambria Steel Co. since 12 years of age.

High Retail Prices for Nails

The recent advance in wire nail prices has raised a question as to the relation of mill prices to those charged the ultimate consumer who buys over the counter at the hardware store. A canvas recently made brought together the prices charged by 78 retail hardware stores, about half of which are located in New York, Pennsylvania or Massachusetts. In the remainder, the States of Delaware, Maryland, Virginia, North Carolina and Georgia were represented. The most common price charged over the counter for wire nails in 1913 was 4c. per lb.; but fourteen out of the 78 stores, which in nearly all cases are located in small towns, had a pre-war price of 5c., and 17 had a pre-war price of 3c. The average pre-war price for the 78 stores was 3.95c. The average price for the 78 today figures out 6.39c. Eight out of the 78 stores are now asking 8c. per lb.; 24 are asking 7c. and 26 are asking 6c. or 6½c.

The average mill price of nails in 1913 was $1.70 per 100-lb. keg, whereas the nails now being sold at retail were bought by jobbers at $2.75 per keg. It is evident that in very many cases retail prices now being asked give an exaggerated idea of the extent to which nails and wire products have been advanced by the producers over the prices ruling in pre-war time. In other words, there has been no such readjustment of retail prices from those prevailing in war time as has taken place in jobbers' and manufacturers' prices. Ordinarily nails are to the hardware man what sugar is to the grocer; but an advance of 3c. to 4c. per. lb. in the retail price of nails, where the advance by the mills over the 1913 average is but 1.05c., would suggest that some dealers are looking on nails as a source of profit. Thus the buyer of nails over the counter is led, in the case of stores selling at 8c. and 7c. per lb., to believe that the steel industry has not readjusted its prices in proportion to those in other lines, whereas in fact, as has been shown in these columns, steel prices are nearer to pre-war prices than those in any other line save only farm products and the class designated by the Department of Labor as "Metals and Metal Products." The low position of the latter, as is well known, is due in part to the disastrous decline in copper.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Sept.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
21	12.25	12.12½	26.62½	4.65	4.45	4.70	4.20
22	12.25	12.12½	26.87½	4.65	4.45	4.70	4.20
23	12.25	12.00	27.00	4.70	4.45	4.75	4.25
24	12.25	12.00	....	4.70	4.45	4.75	4.25
26	12.25	12.12½	27.00	4.70	4.45	4.80	4.30
27	12.25	12.12½	26.75	4.70	4.45	4.85	4.35

New York

NEW YORK, Sept. 27.

A distinct improvement is reported in all non-ferrous metals and there have been advances in some quotations. Copper demand is better and there has been some fairly heavy buying. Straits tin continues to be sold in steady volume. The demand for lead persists and prices have again advanced. The zinc market shows a distinct betterment in demand and prices. Antimony is also higher.

Copper.—The feature of the week has been the buying by one large consumer of about 2500 net tons or 5,000,000 lb. of electrolytic copper at prices admitted to be 12.25c. to 12.37½c., delivered. This is the largest sale in many weeks, and the market reflects a distinct improvement in inquiry from other large consumers. Other sales are also noted for both domestic and foreign account. It is the general opinion that the limited amount of metal available at 12.25c., delivered, has been cleared up entirely and that the market is firm at 12.37½c., delivered, or 12.12½c., New York, for October delivery. These are the same quotations which prevailed a week ago, but then they were nominal and could be shaded. Some sellers are now asking 12.50c., delivered, as a minimum. For the first time in several months the end of the month has found practically no copper in weak hands. The situation on the whole is therefore better than in some time. Lake copper is quoted at 12.25c. to 12.37½c., delivered, and largely nominal.

Tin.—Straits tin has shown a moderate volume of transactions for some weeks, and the past week has been no exception. On one day at least 300 and perhaps 400 tons of spot and future shipment was sold at prices ranging from 26.62½c. for the former to 26.87½c. for the latter. Most of this business was taken by consumers. On other days, including yesterday and to-day, the market has been exceedingly quiet and at times stagnant, but the price tendency has been upward or at least firm. It is interesting to reflect that in the last month hardly a week has passed in which there has not been at least a moderate buying of Straits tin, much of it being taken directly by consumers. The quotation for spot Straits to-day is 26.75c., New York. London prices are about £2 per ton higher than a week ago, with spot standard quoted to-day at £157 2s. 6d.; future standard, £159 5s., and spot Straits, £157 12s. 6d. Arrivals thus far this month have been 2560 tons and 3025 tons is reported afloat.

Lead.—This market continues to advance, the leader being the American Smelting & Refining Co. which again raised its price on Friday, Sept. 23, five points to 4.70c., both New York and St. Louis. A steady business is reported by both the leading interest and independents, the latter selling very little metal as low as 4.70c., and quotations from that source ranging as high as 4.75c. to 4.80c., New York. The St. Louis outside market is quoted at 4.45c. to 4.50c.

Zinc.—This market has suddenly come to life and is stronger than in many weeks. The fact that the cheaper lots have evidently been eliminated and that producers' are limiting their sales to output and not moving any of their accumulated stocks, as a rule, are two principal causes for the present strength of the market. Prime Western sold yesterday as high as 4.30c., St. Louis, and the market to-day is easily quotable at 4.35c. to 4.40c., St. Louis, or 4.85c. to 4.90c., New York, some sales being recorded at these prices. It is estimated in some quarters that output is below 20 per cent of capacity. It is also understood that special grades of zinc used in the manufacture of certain galvanized wire products have sold lately in liberal amounts at a marked advance over the corresponding price of prime Western.

Antimony.—The market is stronger and wholesale lots for early delivery are quoted at 4.60c., New York, duty paid, due largely to the fact that holders of spot metal recently advanced their quotations.

Aluminum.—The leading producer of virgin metal, 98 to 99 per cent pure, continues to quote 24.50c., f.o.b. plant, in wholesale lots for early delivery and the same grade from importers is obtainable at 18c. to 20c., New York, duty paid.

Old Metals.—The market is strong with an advancing tendency. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.00
Lead, heavy	4.20
Zinc	3.25
Lead, tea	3.00

Chicago

SEPT. 27.—In a quiet market tin, lead and zinc have advanced. The rise in lead was no doubt influenced by the advance announced by the leading producer, although the usual buying movement following an advance has not yet made its appearance. There has been some buying of spelter, but prices have stiffened largely because sellers refuse to take further business at concessions. Old metal prices remain unchanged. We quote in carload lots: Lake copper, 12.50c. to 12.75c.; tin, 28.50c.; lead, 4.65c.; spelter, 4.40c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

SEPT. 27.—The price of the leading interest at St. Louis is 4.70c., carlots, although other producers were quoting 4.45c. Slab zinc was quoted at 4.20c. to 4.25c. There is very little trading. In old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Hangar Contract Awarded

WASHINGTON, Sept. 27.—The contract has been awarded to the William M. Southerland Building & Contracting Co., St. Louis, the lowest bidder for the construction of the army hangar, roadway and gas holder at Belleville, Ill. The bid of this company was $1,093,160. About 3500 tons of steel is involved.

An interesting pamphlet with both English and Japanese texts has been published by the Japanese Steel Works, Ltd., whose plant is at Muroran, Hokkaido. Illustrations of the plant are given, showing that the Muroran works are extensive and diversified. There are four blast furnaces, with an annual capacity of 160,000 tons; coal washing and coke plants; steel works with an annual capacity of 130,000 tons of ingots for gun forgings, etc.; blooming mill and finishing mill, forging presses, tempering and shrinking equipment, machine shops, etc. Other works are located at Hiroshima, where shells, breech mechanisms, torpedo tubes and steel and iron castings are manufactured, also pumping machines, refrigerating plants, ingot molds and various machine tools.

AUSTRIAN MARKET IMPROVES

Prices Advance—Import Quota to Jugo-Slavia Increased—Numerous Electric Projects

(*Special Correspondence*)

VIENNA, AUSTRIA, Sept. 4.—A slight improvement in the Austrian iron and steel market is reflected in the recent price increase for bar iron by 100 kr. to 3000 kr. per 100 kg. by the Alpine Montangesellschaft. The improvement is largely attributed to the lessening of German competition, German mills evidently being fully occupied. Moreover, German quotations have lately equalled Austrian inland prices. The Steiner iron works at Salzburg has resumed operations at its rolling mills, which have been idle for some time, and many new incorporations have lately been registered. At Breitenlee, near Vienna, a new malleable pig iron works is being established and the erection of a steel works is planned at Reutte, in Tyrol, in which German capital is interested. Several foundries, which have been idle during the recent months, have resumed operations. The Alpine Montangesellschaft is now operating three out of six blast furnaces and a fourth will be blown in shortly. The number of open-hearth furnaces in operation has increased from seven to ten. Production costs, through depreciation of the krone, are increasing and the upward tendency of prices is expected to continue. The railroads are again coming forward with moderate orders. The Jugo-Slavian Ministry of Trade has increased the agreed import quota for Austrian industrial products by 600,000,000 kr. Under the revised agreement the quota for iron, steel and manufactures has been increased as follows: Bar iron, structural shapes, beams, girders, etc., from 204,000,000 kr. to 308,000,000 kr.; steel of all kinds from 50,000,000 kr. to 100,000,000 kr.; wire nails, subject to special conditions, from 50,000,000 kr. to 100,000,000 kr.

In the machinery market the majority of the larger works, as well as the manufacturers of special machinery are well employed, although the small plants report a dearth of orders. Export trade has been fairly active but the increasing severity of foreign customs restrictions compels sellers to go to the lowest limit in quoting prices. Italy has increased duties by 400 per cent for some classes of machinery. As duties must be paid in gold, exports to Italy are burdened with a duty amounting to 60 per cent of the invoice value. Negotiations between Italy and Austria for a commercial treaty will shortly be reopened. The automobile industry has nearly completed a number of old export orders for the United Kingdom, Holland and Scandinavian countries, and is open for new business. Czecho-Slovakia and Balkan countries are taking small shipments of automobiles. For the first time an Austrian automobile works has been awarded a large contract by an American firm, the Oesterreichische Waffenfabriksgesellschaft having secured an order for 800 cars. The company's plant is at Steyr and is considered one of the best-equipped works in the country.

Notable activity prevails in the electrical industry, which is benefiting by the large electrification and hydro-electric projects under way or planned. Exports of electric material are satisfactory. The Siemens-Schuckert works has established a branch at Agram, in Jugo-Slavia, which is supplied with Austrian semi-finished products. The Vienna municipal authorities have voted 6,400,000,000 kr. for the reorganization of the heating and lighting systems of the city and environs. Another large project, involving about 10,000,000,000 kr., provides for the development of hydro-electric power on the Ybbs and the Lunz-Kienberg-Gaming canal. The completion of this project will cause a radical change in power supply for the many industrial plants in the affected districts.

CRISIS IN CZECHO-SLOVAKIA

Many Works Close Down—Keen German Competition—A New Steel Making Process Introduced

(*Special Correspondence*)

PRAGUE, CZECHO-SLOVAKIA, Sept. 5.—The crisis in the Czecho-Slovakian iron and steel industry is assuming proportions which will severely test the economic structure of the country. The situation has been growing worse during the past few months, and the fact that the Prague Iron Co. has now blown out the last of its seven blast furnaces, is illustrative of the seriousness of present conditions. This company has laid off 50 per cent of its men and further curtailment is imminent. A considerable reduction of prices was made in August by the Prague Iron Co., but the cut failed to prove a stimulant. Other works refused to follow the example, it being held that coal and coke prices must be reduced before a lowering of iron and steel prices could be considered. Negotiations have been entered into with the miners in the Ostrau mining district, but the men have adopted a rather hostile attitude toward reductions, threatening to go on strike.

New Steel Making Process

The Prague Iron Co. has closed down its ore mines and is arranging for a special process of steel production in which scrap, with small additions of pig iron, forms the charge. There are still fairly large quantities of scrapped war material available which will be used while the required pig iron will be imported from Germany, where quotations are lower than Czecho-Slovakian prices. Evidently this arrangement is not merely an emergency measure, as the company is having its open-hearth furnaces reconstructed and adapted to the new process.

Reports from other centers are equally unsatisfactory. The Branka iron works at Troppau has closed down because of labor trouble, the Witkowitz steel works has discharged 3000 men and another 2000 will be dropped should the slump continue, while the Hahn works at Oderberg and the Freistadt Steel & Iron Works have shut down completely. Other plants are working 2 or 3 days a week and production has declined to about 30 per cent of normal. The financial position of these works is precarious since some of them are operating large coke plants and the country is flooded with coke, for which there is practically no demand.

Preparations for Near East Trade

German competition, although not quite as active as formerly, is nevertheless felt and tends to accentuate the critical situation. In an effort to meet German competition in the Near East, the Prague Iron Co., in co-operation with other enterprises, has established an export warehouse at Esseg, Jugo-Slavia, and another one at Agram is to follow. Plans are also under way for an extensive working of the Turkish and South-Russian market as soon as economic conditions in those territories have somewhat stabilized, it being intended to establish sales branches at Constantinople and Galatz, Roumania. In Galatz the Skoda works is erecting stores for machinery later on to be shipped to the Don and Jekaterinoslav coal districts and it is likely that the Skoda works will also direct operations at the central bureau at Constantinople.

All these are preparatory measures, however, and there is nothing to indicate an early improvement in the tone of the market. In the engineering and metal industry, conditions are better but still far from satisfactory. Few, if any, of the works are operating on full time, though export prices are on a profitable basis. The outlook for the rolling stock industry is better since the recent voting of a government credit of 450,000,000 kr. for new rolling stock.

John E. Edgerton, president of the National Association of Manufacturers, will give a complimentary luncheon to manufacturers of the State of Ohio at the Sinton Hotel, Cincinnati, on Friday, Oct. 14. The object of the luncheon is to discuss general business conditions and industrial development.

Machinery Markets and News of the Works

SMALL RAILROAD ORDERS

Big Four, Louisville & Nashville and Erie Make Purchases

Machine-Tool Business Continues Dull—September Has Not Brought Expected Improvement

September has not brought the improvement in the machine-tool trade that was expected. Many dealers and tool builders report that their September sales have shown no gain over August. Prospects are more numerous, but it is difficult to get orders.

There is a little railroad buying, but it is scarcely important enough to lend much encouragement. The Big Four has bought about a dozen tools at Indianapolis for its Beech Grove, Ind., shops and the Louisville & Nashville has purchased a few machines. A car wheel lathe bought by the Erie railroad is the only railroad purchase of importance in the East, but the New York Central is expected to close shortly on about a half dozen tools. At Chicago the Santa Fe has issued an inquiry for several additional tools for its shops at Albuquerque, N. M. The Union Railroad, a subsidiary of the United States Steel Corporation, has revived a list of tools originally put out about a year ago.

Although there are more inquiries, few of them call for more than one or two tools and the demand for used machines predominates to a large extent. A company starting in business at Skowhegan, Me., has purchased nine used tools. The Dalton Mfg. Corporation, Sound Beach, Conn., and the Wright Aeronautical Corporation, Newark, have each purchased a few used tools.

The Durant Motor Co. is inquiring at Cleveland for six or eight single or multiple spindle drilling machines.

School business continues to look promising, though many projects of this kind are being held up. The New York Board of Education is expected to issue a new list of about 100 tools soon. The Indianapolis public schools are in the market for a few tools.

New York

NEW YORK, Sept. 27.

Purchase of a car wheel lathe by the Erie Railroad is the only railroad buying of importance that has taken place recently in this market. The New York Central, which is in the market for a half dozen tools, has taken no action, but is expected to do so soon. It is understood that prospective purchases by the Big Four have been officially approved and that instructions have been sent to Cincinnati to place orders for several machines inquired for several months ago.

Buying is confined almost entirely to single machines and used tools predominate. The Dalton Mfg. Corporation, Sound Beach, Conn., and the Wright Areonautical Corporation, Newark, have each purchased several used machines.

The New York Board of Education is expected to advertise for bids soon on about 100 machine tools for manual training departments. This is in addition to tools that will be required for Brooklyn schools.

The crane market in this district continues stagnant, although a number of small inquiries are out. Builders, who will submit bids on the cranes for the piers being erected by the city of New York at Stapleton, S. I., are reported to have decreased in number from about 30 at the start to 20 manufacturers. An inquiry is in the market from the Baldwin Locomotive Works, Philadelphia, for a traveling derrick of about 50 tons capacity. John A. Savage & Co., Crosby, Minn., recently in the market for a locomotive crane for Sagamore mine, Riverton, Minn., have purchased.

Among recent sales are: Whiting Corporation, one 30-ton, 52-ft. span overhead traveling crane with two 15-ton trolleys, to the American Trading Co., 25 Broad Street, New York, for export to China; Shepard Electric Crane & Hoist Co., 21 1-ton, 2-ton, 3-ton and 5-ton electric hoists and one back-geared motor, making a total of 40 electric hoists within the past month to Frazar & Co., for shipment to a Japanese shipyard; a 6-ton, 69-ft. span bucket crane to the Austin Co., Philadelphia, for F. W. Tunell & Co., glue and fertilizer, Philadelphia; a 3-ton, 30-ft. span, single, I beam crane to the Atlantic Ice & Coal Corporation, Atlanta, Ga., and a 3-ton, 21-ft. 4-in. span, single I beam crane to the city of Kinston, N. C.; Northern Engineering Works, four 3-ton, 36-ft. span, 3-motor overhead traveling cranes to the A. M. Castle Co., Chicago, for a new warehouse; Pawling & Harnischfeger Co., a 5-ton overhead traveling crane to the Illinois Glass Co., Philadelphia.

Machinery and equipment estimated to cost in excess of $2,000,000 will be exported to Calcutta, India, by the American Mfg. Co., Noble and West streets, Brooklyn, N. Y., manufacturer of cordage and bagging, for its new plant. The company has acquired about 35 acres at Calcutta and will remove a number of its United States plants to the new site. The works are being established at this point owing to economical labor.

The National Generator Co., New York, has been incorporated with a capital of $500,000 by W. W. Harris, W. C. Swift and S. Null, to manufacture electric and steam generating equipment. It is represented by W. J. Bloch, 317 East Eighteenth Street.

The Collite Corporation, Utica., N. Y., has been incorporated with a capital of $100,000 by G. R. and D. A. Hughes, and J. Rothstein, Utica, to manufacture electric lighting fixtures and kindred equipment. Dunmore, Ferris & Dewey, attorneys, Utica, represent the company.

The Inwood Consumers' Ice Mfg. Corporation, New York, recently incorporated with a capital of $200,000, has acquired property at Ninth Avenue and 213th Street, 100 x 200 ft., for its new ice-manufacturing and refrigerating plant. It will be one-story, occupying practically the entire site, and estimated to cost about $300,000. R. L. Belgardo is president. The company is represented by N. F. Schmidt, 220 Broadway.

The May-Ficklern Concrete Steel Co., New York, has been incorporated with a capital of $100,000 by E. O. Gray, R. H. Ring and F. S. May, 280 Broadway, to manufacture steel reinforced concrete products.

The Crown Motors Corporation, New York, has been incorporated with a capital of $1,000,000 under Delaware laws by John T. McGovern, M. E. Nolan and E. C. Ballantyne, New York, to manufacture automobiles and motors. The company is represented by the Delaware Registration & Incorporators' Co., Ford Building, Wilmington, Del.

Hoisting and conveying machinery and other material-handling equipment will be installed by the Consolidated Forwarding & Building Supply Co., Brooklyn, at its new pier and freight house at the foot of North First Street and the East River, Williamsburg, 250 x 500 ft., secured under lease.

The Normandy Co., New York, has been incorporated with a capital of $200,000 under Delaware laws, to manufacture carbon and alloy steel products. The incorporators are Frederick Angeloch, Anson M. Beard and J. Carlisle

Swain, New York. It is represented by the United States Corporation Co., 65 Cedar Street.

The Hardwell Mfg. Co., New York, has been chartered under State laws to manufacture machinery and parts. The incorporators are T. and T. O. Bosshard, and E. G. Weller. It is represented by W. M. Bennett, 15 William Street.

The American International Corporation, 120 Broadway, New York, affiliated with Stone & Webster, Inc., and the Ulen Contracting Corporation, both of the same address, has secured a contract for the construction of 128 miles of railroad line for the Government of Bolivia, with cost estimated at $7,000,000.

Joseph W. Powell, general manager Emergency Fleet Corporation, Washington, is considering tentative plans for re-conditioning the steamship Leviathan, including engine and boiler department, and other mechanical departments. Former bids received aggregated $8,900,000 for the work. The present cost is estimated at about $7,000,000, including new machinery.

The International Wire Chair Co., Brooklyn, has been chartered under State laws to manufacture wire and metallic furniture. The incorporators are N. C. Suskin, C. S. Lubin and Monte London, 55 Liberty Street, New York.

The Victor Saw Works, Inc., Middletown, N. Y., has been incorporated with a capital of $100,000 by W. E. Cross, W. P. Jeffery and J. B. Greene, Middletown, to manufacture saws and other mechanical products. It is represented by Cornell, Lockwood & Jeffery, 2 Rector Street, New York.

Fire, Sept. 16, destroyed the plant of the Duffney Brick Co., Mechanicsville, N. Y., including engine and power house, drying plant, coal trestle, etc., with loss estimated at about $200,000.

The American Piston Co., Brooklyn, has been chartered under State laws to manufacture pistons, piston rings, etc., for automobile motors. The incorporators are J. J. and N. R. Taglin, and J. A. O'Brien, 1402 Broadway, New York.

The Standard Railway Fuse Corporation, New York, has been incorporated with a capital of $50,000 by G. E. McClure, E. D. Purcell and P. H. Miller, New York. It is represented by Newmark & Miller, 154 Nassau Street.

The Steel Blue Corporation, New York, has been incorporated under Delaware laws with capital of $75,000 to manufacture steel and iron products and is represented by Arthur W. Britton, 65 Cedar Street.

The Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, is arranging for the installation of new steel tanks, totaling 55,000 bbls., at its properties at Tulsa, Okla.

The State Ice Mfg. Co., New York, has been incorporated with a capital of $350,000 by L. and L. Jakobson, and E. J. Stern, to build an ice-manufacturing and refrigerating plant. It is represented by Schwartz & Jakobson, 150 Nassau Street.

The Progress Iron Works, New York, has leased ground floor property at 104-110 East Thirty-second Street, for a local establishment.

The Driver-Harris Co., Harrison, N. J., will build an addition on Somerset Street, one-story, 95 x 275 ft., estimated to cost about $30,000.

The Triumph Lock Co., 44 Paterson Street, Jersey City, N. J., has filed notice of organization to manufacture locks and locking devices. James O. and Wells W. Wilson, 104 Baldwin Avenue, head the company.

Fire, Sept. 20, destroyed the forge shop of Ennis Brothers, First Avenue, Asbury Park, N. J., and adjoining property of the Asbury Park Mill Co., and the Weeden Automobile Painting Co., Asbury and first avenues, with total loss of about $75,000.

A new plant for the manufacture and repair of automobile truck bodies for company service will be established by the Great Atlantic & Pacific Tea Co., Provost Street, Jersey City, N. J. A list of machinery and equipment to be installed has been arranged.

The White Metal Mfg. Co., Grand Street, Hoboken, will soon take bids for its new plant on Grand Street, to consist of a one and six-story building, 135 x 136 ft., and 58 x 65 ft., respectively. Joseph C. Schaeffler & Co., 11 East Fifty-sixth Street, New York, are architects.

William A. Jones, Washington and King streets, Mt. Holly, N. J., has plans under way for a one and two-story addition to his automobile service and repair plant, 100 x 200 ft.

The Eclipse Phonograph Co., Keyport, N. J., is planning the erection of a local factory to manufacture electrically operated talking machines and parts. For some time past it has been manufacturing at the plant of the Aeromarine Plane & Motor Co., Keyport. The company is arranging for a stock issue of $300,000, to carry out the project and for general expansion.

The Ideal Elevator Co., 20 Clinton Street, Newark, N. J., has filed notice of organization to manufacture passenger and freight elevators, and parts. M. Jackerson heads the company.

Property of the Wolkoff Machine Works, 1080 Springfield Avenue, Irvington, N. J., will be sold by Samuel I. Kessler, receiver, on Oct. 7.

The L. W. Co., Stuyvesant and Springfield avenues, Irvington, has filed notice of organization to manufacture automobile radiators and other metal products. Edwin J. Williams, 70 Washington Avenue, Irvington, heads the company.

Philadelphia

PHILADELPHIA, Sept. 26.

The Department of City Transit, 1211 Chestnut Street, Philadelphia, William S. Twining, director, will take bids up to Oct. 4, for furnishing and installing two 20-ton electric traveling cranes in new substations to be erected on Cumberland and Griscom streets.

The Westinghouse Air Spring Co., 1428 Vine Street, Philadelphia, will commence the immediate erection of its new building on property recently acquired at 2336-38 Fairmount Avenue.

The Moulton Ladder Co., Philadelphia, has acquired the five-story building, 30 x 72 ft., at 154 North Third Street, for new works.

The Columbia Steel & Shafting Co., Widener Building, Philadelphia, has acquired the one and two-story buildings on Cedar Street, on site 165 x 348 ft., for use in connection with its works.

Egnal & Motusan Brothers, North Third Street, Philadelphia, will soon commence the erection of a two-story automobile service and repair plant, 75 x 120 ft., on Woodstock Street, to cost about $75,000.

The Belgrade Wagon Works, Belgrade and Cambria streets, Philadelphia, has filed plans for the erection of a new one-story shop.

The Cobb's Creek Motors, Philadelphia, is being organized by George R. Stull and Frank L. Shallow, to manufacture motor truck and automobile parts, and operate a general repair works. Application for a State charter will be made Oct. 3. The company is represented by Reber, Granger & Montgomery, 1001 Chestnut Street.

The Curran-McDevitt Motor Co., Philadelphia, has been incorporated in Delaware with capital of $350,000 to manufacture automobile equipment. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Electric Manganese Steel Co., Reading, Pa., is having plans prepared by William H. Dechant & Son, Baer Building, for a new one-story foundry, 40 x 140 ft., for the manufacture of steel castings and estimated to cost about $50,000.

The Forbes Aluminum Products Co., Easton, Pa., recently organized in Delaware with capital of $4,500,000, has plans in progress for the erection of a factory, the initial unit to give employment to about 400. The company is represented by the Corporation Trust Co. of America, duPont Building, Wilmington, Del.

The Universal Iron Mfg. Co., Mount Carmel, Pa., has been incorporated with a capital of $50,000, to manufacture iron and steel products. S. E. Bergstresser, Mount Carmel, is treasurer.

Louis Kimmel, Lancaster, Pa., has acquired the plant and property of the Uniset Tool Co., Lancaster, at a receiver's sale and plans to operate the works.

The Bremer-Talis Co., Schwenkville, Pa., has plans under way for a new two-story automobile service and repair works, 60 x 125 ft., at Main and Perkimonen streets, estimated to cost about $100,000 with equipment. Schermerhorn & Phillips, 430 Walnut Street, Philadelphia, are architects.

The Keystone Supply & Mfg. Co., 927 North Ninth Street, Philadelphia, manufacturer of steam supplies, heating equipment, etc., has awarded contract to F. B. Glassmire, Bethlehem Trust Building, Bethlehem, Pa., for a new one and two-story plant, 300 x 400 ft., on East Fourth Street, Bethlehem.

The Frantz International Refrigeration Co., Reading, Pa., has been incorporated with a capital of $300,000 to manufacture refrigerating and ice-making machinery. John H. Paul, Reading, is treasurer.

The Lehigh Valley Coal Co., Mahanoy City, Pa., will commence the immediate installation of new electrically operated pumping machinery at its Buck Mountain mine. It will have a capacity of 3000 gal. per min.

A conveyor system, ovens, power apparatus and other mechanical equipment will be installed in the new plant to be erected by the Butter Krust Baking Co., Sunbury, Pa., to

be two stories, 70 x 130 ft., estimated to cost about $150,000.

The Victory Belting Co., Catasauqua, Pa., has acquired a site for a new plant to manufacture mechanical link belting. A specialty will be made of chain belting for automobile motor fans. William R. Thomas, Catasauqua, is interested in the project.

The E. & G. Brooke Iron Co., Birdsboro, Pa., is considering the installation of an aerial tramway from its French Creek mines to its Birdsboro furnaces. The cable line will be equipped with electrically operated ore buckets.

Frank A. Sieberling, head of the Lehigh Tire & Rubber Co., New Castle, Pa., is negotiating for the purchase of the plant of the Portage Tire & Rubber Co., recently placed in receivership. Upon acquisition, it is proposed to operate the plant in conjunction with the Lehigh works. Mr. Sieberling formerly was president of the Goodyear Tire & Rubber Co., Akron, Ohio.

New England

BOSTON, Sept. 26.

September will show less actual business booked than many machine-tool houses anticipated earlier in the month, and it is evident that several prospects will be carried into October, at least, due to financial reasons. Plant construction in New England, as far as it has bearing on the metal-working industry, has dropped almost to the vanishing point. The possibilities of new business therefore are limited largely to replacements, of which there are few; to the automobile accessories industry, which apparently is the most promising at the moment; to companies going into the manufacture of something new, requiring individual pieces of additional equipment with the buying tendency toward used machinery; and to concerns starting in business, usually small and unimportant. One of the largest New England plants recently transferred more than 100 machine tools from outlying plants rather than purchase new equipment.

The machines sold the past week were confined to a few houses, and included nine used tools to Skowhegan, Me., interests starting in business; a No. 8S Standard power press to a local manufacturer; motor-driven drill press to a Boston concern; power hack saw to a Fall River coal company, and a used 20-in. upright drill to a Worcester firm. New York interests have been negotiating here for automatic screw machine equipment for export, and a central Massachusetts construction company is inquiring for three or four tools, but apparently is in no hurry to purchase, while a few new inquiries on individual upright drills have come to light. The Narragansett Electric Lighting Co., Providence, R. I., bought a used 32-in. lathe for its South Street generator station.

While prospects for immediate business are not especially bright, lathe chucks, die heads, drills and other small tools are moving much better, and manufacturers of some kinds of machinery are securing orders for parts, indicating that the time is drawing nearer when purchases of new equipment must be made. Shops here and there are beginning to show life, and a few tool builders are increasing operations. For instance, the Perkins Machine Co., Warren, Mass., recently secured orders for 10 presses and has increased its working force. A Boston die and special machinery maker is running full and, although with less help than during the war, is doing a larger business. Another local company is busy on a fairly large order for dies and other equipment from Gray & Davis, Cambridge. One New England manufacturer of surface grinders is putting through a fairly good stock order, while a Lowell manufacturer of munitions is resuming operations after a period of inactivity.

Most manufacturers of hack saws have reduced prices 10 per cent, but distributing interests have been slow to take similar action, consequently there is a spread in the market from 25 to 35 per cent discount.

The Simonds Mfg. Co., Fitchburg, Mass., saws, has issued new discount sheets dated Sept. 1, showing a general downward revision in prices. The most conspicuous change is in solid tooth saws.

The Board of Education, Ansonia, Conn., will erect a trade school to cost $100,000. L. W. Robinson, New Haven, Conn., is the architect.

Bids are being asked on the construction of a one-story boiler house, 50 x 56 ft., 32-ton coal pocket, and an overhead ash bunker contemplated by the Ware Woolen Co., Ware, Mass.

Frank W. Sickles, 683 South Main Street, is president, and A. Raoul Silber, 39 Spruceland Avenue, treasurer of the Radio Development Corporation, Springfield, a $25,000 Massachusetts corporation, given a charter to develop and manufacture electrical devices, especially radio appliances.

The Rule-Form Machine Co., Worcester, capitalized for $100,000, has been granted a Massachusetts charter to manufacture machinery and appliances used in the printing industry. Owen F. Trainor, 105 Woodland Street, is president, and John F. Hjort, 1 Mars Street, treasurer.

The W. J. Hyland Mfg. Co., 151 Dwight Street, Springfield, Mass., manufacturer of heating equipment, etc., is taking bids for a new three-story plant on Liberty Street, 47 x 85 ft.

Fire, Sept. 16, destroyed a portion of the plant of the Eastern Metal & Refining Co., Charlestown, Mass., with loss estimated at $20,000.

The M. & M. Machine Products Co., 369 North Main Street, Pawtucket, R. I., has filed notice of organization to manufacture machinery and parts. James F. McCaffrey heads the company.

The Williams & Anderson Co., 33 Broad Street, Providence, R. I., manufacturer of emblems and other metal goods, has awarded contract to Bowerman Brothers, Industrial Trust Building, for a new one-story plant on North Main Street, 60 x 160 ft., with extension, 60 x 100 ft., estimated to cost about $65,000.

The Quartermaster Department, United States Army, Branford, Conn., has completed plans for a one-story automobile service and repair works on a site near the armory. It will cost $25,000.

The Lyons Mfg. Co., 101 Sabin Street, Providence, R. I., has acquired the Metal Products Mfg. Co., 195 Eddy Street, which it will merge with its organization. E. A. Willemin, heretofore connected with the latter company, will be superintendent of the metal products department of the Lyons company.

The Packard Auto Radiator Co., 293 Fountain Street, Providence, R. I., has filed notice of organization to manufacture automobile radiators and other metal products. Adolph H. Jodat, 74 Newman Avenue, Seekonk, Mass., heads the company.

The H. M. Howe Co., 417 Fountain Street, Providence, R. I., operating an automobile repair works, has awarded contract to the C. I. Bigney Construction Co., 357 Westminster Street, for a new one-story plant, 60 x 130 ft., with extension, 40 x 50 ft.

Cleveland

CLEVELAND, Sept. 26.

Manufacturers of drilling machinery report an improvement in inquiry from the automobile industry, largely in single machines, but prospective purchasers are slow in placing orders. While machine-tool builders do not expect automobile companies to purchase much equipment to increase their output, orders are looked for from this source during the next few months for considerable equipment to reduce the cost of production, as price competition among car builders is expected to be very keen. The Durant motor interests recently asked for quotations on six or eight single and multiple spindle drilling machines, but no intimation has been given as to when this business will be placed. A local builder of drilling machines reports a better volume of inquiry from the textile industry in the East.

Dealers state that the demand for machine tools is still dull and shows little change from week to week. September sales will be about the same volume as during August. An occasional order is placed for two machines, but usually sales are confined to single tools. There is a fair demand for used machinery but, according to dealers buyers insist on very low prices. The demand for electric tools shows a little improvement in orders from companies engaged in car repair work.

Makers of various lines of conveying equipment report considerable improvement in inquiry, but orders are slow in being placed.

The Van Dorn Electric Tool Co., Cleveland, will shortly place on the market a line of polyphase alternating current motors, in capacities from 1 to 15-hp. Until the present time it has manufactured motors only for its own line of electric tool equipment.

The C. O. Bartlett & Snow Co., Cleveland, has taken an order for conveying equipment amounting to about $75,000. for the coal storage plant to be erected by the Government at Mobile, Ala.

The Simonson Wire Specialties Co., Cleveland, has established a plant at 1684 Columbus Road and is manufacturing wire garment hangers and other wire specialties. A. W. Simonson heads the company.

The Woods Engineering Co., Alliance, Ohio, has completed a new factory, 63 x 125 ft., and has installed considerable machinery for the manufacture of a new type of jack for

automobiles, known as the Morrison automobile double range continuous lift jack.

The Napoleon Tool & Machine Co., Napoleon, Ohio, has changed its name to the Napoleon Products Co. and has increased its capital stock from $40,000 to $50,000. Sidney Thompson, president and treasurer Defiance Screw Machine Products Co., Defiance, Ohio, has taken an interest in the company, which is engaged in repair work, and is preparing plans to manufacture automobile parts and accessories.

The Waukon Rubber Co., Elyria, Ohio, recently organized with a capital stock of $500,000, plans to erect a factory to manufacture rubber specialties. J. W. Dewhurst will be secretary and general manager.

The J. L. Simpson Co., Bellefontaine, Ohio, will build a branch foundry in Lima, Ohio.

The National Razor Mfg. Co., Amherst, Ohio, is planning the erection of a one-story factory, 40 x 100 ft.

The Cleveland Electric Illuminating Co., Cleveland, is arranging for a power plant addition, 25 x 73 ft.

Fire, Sept. 14, damaged a portion of the plant of the Republic Rubber Co., Canton, Ohio, with loss estimated at about $22,000.

The Ball Welding & Bonding Co., Cleveland, has awarded contract to the Austin Co., 16112 Euclid Avenue, for a new one-story and basement plant, 90 x 180 ft., estimated to cost about $50,000.

The Barber-Foster Engineering Co., Swetland Building, Cleveland, manufacturer of cranes, hoists, etc., has acquired property at Conneaut, Ohio, as a site for a new plant.

Buffalo

BUFFALO, Sept. 26.

The Jamestown Metal Desk Co., Blackstone Avenue, Jamestown, N. Y., has completed plans and will take bids at once for a new one-story plant on Blackstone Avenue, 81 x 100 ft. Beck & Tinkham, Frick-McGee Building, are architects.

The Earl I. Maltby Roofing Co., Erie Avenue, Tonawanda, N. Y., is planning the immediate rebuilding of the portion of its plant destroyed by fire, Sept. 19, with loss estimated at about $25,000. The factory was new and in course of erection, with machinery installation under way. The equipment loss is estimated at $17,000.

The Iroquois Natural Gas Co., Iroquois Building, Buffalo, has plans under way for the erection of a new gas purification plant in the vicinity of the works of the Donner Steel Co., estimated to cost about $400,000 with machinery.

Reorganization plans are being considered by officials of the Buffalo Hoist & Derrick Co., Erie Street, Buffalo, manufacturer of hoisting equipment, buckets, etc. The City Trust Co. is acting as trustee for the company for the benefit of creditors and stockholders.

The Meldrum-Gabrielson Corporation, Industrial Building, Syracuse, N. Y., manufacturer of milling machines and parts, has completed foundation work for its new one and two-story plant on West Fayette Street, and will commence the immediate erection of the superstructure. It will be 60 x 160 ft. and is estimated to cost $75,000.

The Cambria Power Co., Inc., Sanborn, Niagara County, N. Y., has been granted permission to build a new electric light and power plant at Cambria.

Fire, Sept. 17, destroyed a building at the plant of the Union Cutlery Co., Olean, N. Y., with loss estimated at $20,000.

The Waterloo Water Co., East Main Street, Waterloo, N. Y., has completed plans for a new one-story, electrically operated pumping plant, 47 x 65 ft.

Cincinnati

CINCINNATI, Sept. 26.

Local dealers report continued improvement for machine tools. Inquiry is better and sales during the week were more numerous than for some time. A central Ohio manufacturer purchased three tools and is expected to close for several more shortly. The Big Four Railroad is reported to have closed for four boring mills and the Louisville & Nashville Railroad was also in the market, buying one bushing press and two upright drills. Local manufacturers have received a number of inquiries from the St. Louis and Southwestern district. The inquiry from the General Motors Corporation for Dayton plants is still active, as is one for several tools from the McCook Field, Dayton, which bought a special machine the past week. Indianapolis Public Schools are also in the market for small tools for manual training purposes. The Columbus Forge & Iron Co. will likely be in the market shortly for drop forging equipment for an addition to the plant, contract for which was let last week.

The Vonnegut Machinery Co., Indianapolis, Ind., is in the market for a motor generator set, the direct current end to be of 90-kw. capacity for 250 volts pressure, to be driven by a 100 to 125-hp., three-phase, 60-cycle, 2200-volt or 2300-volt synchronous or slip ring motor; also for second-hand motors and generators.

The Columbus Forge & Iron Co., Columbus, Ohio, has awarded contract to the Middle States Construction Co., Columbus, for an addition 70 x 300 ft. It is also the intention to remodel some of the buildings and install new machinery. The company in addition to drop forgings makes a specialty of the manufacture of anvils.

The clay mill of the Harbison-Walker Refractories Co. at Scioto Furnace, Ohio, was destroyed by fire Sept. 16. The loss to the building and machinery is estimated at $30,000.

The City Council, Marietta, Ohio, has plans under way for the erection of a new hydroelectric power plant for municipal service. G. H. Gampers, 220 New First National Bank Building, Columbus, Ohio, engineer, will call for bids at an early date.

Chicago

CHICAGO, Sept. 26.

Word comes from Indianapolis that the Big Four has purchased about a dozen machines for its Beech Grove, Ind., shops. Aside from this purchase, no railroad buying has been reported. The Santa Fe, however, has issued additional inquiries for its Albuquerque, N. M., shops, as follows: One 3-ft. radial drill, one 6-ft. radial drill, three 24-in. upright drills, one circular shear for No. 14 gage iron or less, one multiple punching machine for punching 20 gage holes, one cornice brake, one Dries & Krump No. 186 punch and shear, or equivalent, one 8-ft. squaring shear.

The market still remains quiet and it is probable that the September sales of local dealers will fall considerably below those of August. There has been little change in prices, the only reductions announced recently being 5 per cent by an Ohio manufacturer of shapers and about 9 per cent by a maker of bolt cutters. Store trade is light and used equipment is more in demand than new tools. While prospective business is light, there are a few fair-sized inquiries which are expected to develop into orders. One dealer reports he is working on an inquiry for a shaper, a milling machine, punch press, squaring shear and an automatic surface grinder. The American Steam Truck Co., 20 East Jackson Boulevard, Chicago, recently organized, is expected to purchase some equipment in the near future. It has taken possession of part of the Geyser Electric Washer Co.'s plant, Bloomingdale Road, Chicago, and at present is confining its work to assembling parts contracted out to other manufacturers. Later it expects to expand the scope of its operations.

The Burrell Co., 201 East Avenue, Kankakee, Ill., has been incorporated with $15,000 capital stock by W. C. Burrell, E. G. Canham and Charles Hyer to manufacture plumbers' supplies, tools and machines.

The Improved Oil Cup Mfg. Co., 300 North Wells Street, Chicago, has been incorporated with $6,000 capital stock to manufacture oil cups. The incorporators include Max B. Schneider, Anton K. Fixary and L. R. Rhomberg.

The Electric Units Corporation has been incorporated by F. J. Maas, Samuel Labow and Robert H. Stoll to manufacture heating elements for electrical heating appliances. It has secured space on the second floor of the building at 3511 Lincoln Avenue, Chicago.

The Chicago, Burlington & Quincy Railroad will build a machine shop, 30 x 50 ft., at Herrin Junction, Ill.

The National Stamping & Electric Works, 424 South Clinton Street, Chicago, has purchased the property of the Lindstrom-Smith Co., 3212-40 West Lake Street, and contemplates the erection of a $60,000 addition, 130 x 155 ft., to be ready by Jan. 1. The plant purchased includes the machinery and equipment of the Lindstrom-Smith Co. It is 135 x 250 ft. and with the contemplated annex will be 405 ft. long.

The Superior Welding Co., 313 Knoxville Avenue, Peoria, Ill., has purchased 56 ft. of adjoining frontage. An addition which will practically double the present facilities will be started next spring.

J. M. Schaab, 1601 Fourth Avenue, Rock Island, Ill., has let a contract for a one-story garage, 62 x 150 ft., to cost $50,000.

The General Iron Works Co., 1720 California Street, Denver, Colo., expects to take bids in December on an iron foundry at Thirty-third and Blake streets, to cost $500,000.

The Milwaukee Avenue Motor Sales Co., 2051 Milwaukee Avenue, Chicago, has let contract for a one-story garage, 110 x 150 ft., 2518-28 Milwaukee Avenue, to cost $100,000.

The O. K. Battery Co., Gary, Ind., has plans under way for rebuilding the portion of its electric storage battery plant recently destroyed by fire with a loss of $30,000. It will be one-story, 100 x 200 ft.

The Atchison, Topeka & Santa Fe Railroad Co., 80 East Jackson Boulevard, Chicago, will commence the immediate erection of a new reinforced-concrete power plant at its Albuquerque, N. M., works, to cost about $150,000.

The Waukegan Foundry Co., Terminal Building, Waukegan, Ill., has been incorporated with a capital of $60,000 by Andrew K. Barr, Elmer T. Kidmore and Elmer Olavey, to manufacture iron, steel and other metal castings.

The Cabinet Range Co., Granite City, Ill., is planning the erection of a new plant to manufacture stoves, ranges, etc., estimated to cost about $250,000, with machinery. A. Holloway heads the company.

The Badger Concrete Mixer Co., Winthrop Harbor, Ill., has revised plans nearing completion for its new plant, one-story, 80 x 260 ft., and estimated to cost about $60,000, for the manufacture of concrete-mixing machinery and parts. Bids will be asked at an early date. Headquarters of the company are in the Majestic Building, Milwaukee.

The Silica Brick & Engineering Co., 175 West Jackson Boulevard, Chicago, has leased for 10 years the plant of the Winchester Repeating Arms Co., at 5821 West Sixty-sixth Street, for the establishment of a new plant.

The Henningson Engineering Co., National Building, Omaha, Neb., is preparing plans and will soon call for bids for a new municipal electric power plant for the city of Madison, Neb., estimated to cost close to $75,000.

Baltimore

BALTIMORE, Sept. 26.

The Republic Boiler & Radiator Co., Woodberry, Baltimore, is reported to be planning expansions and the installation of additional equipment to cost about $1,000,000. E. L. Stock is president.

The Floatless Carburetor Co., 916 Munsey Building, Baltimore, recently incorporated with $100,000 capital stock, is understood to be planning the establishment of a factory. R. Contee Rose is interested.

The Baltimore Car & Foundry Co., Curtis Bay, Baltimore, has arranged an improvement program at its plant and will place work under way at once, to include the installation of new equipment, repairs to present machinery, etc.

A one-story machine shop, 35 x 50 ft., will be erected by the Canton Co., Water Street, Baltimore, in connection with a new plant for the Cooknut Corporation at First Avenue and Fifteenth Street, Canton. The works will cost about $90,000.

Herbert S. Michael, Inc., 1701 North Charles Street, Baltimore, has been incorporated with a capital of $100,000 by Herbert S. Michael, LeRoy R. Hatter and Clayton C. Dobbs, to manufacture mechanical products.

The Auto Parts Co., Inc., 104 North Front Street, Baltimore, has been incorporated with a capital of $100,000 by John and George Beck, and Joseph N. Nechamkin, to manufacture automobile parts and other equipment.

The Shore Transit Line, Salisbury, Md., is planning the erection of a one-story repair shop and service works for its motor trucks, with department for parts manufacture.

The Western Maryland Railroad Co., Continental Building, Baltimore, has filed plans for additions to its local works estimated to cost about $350,000.

The Automobile Mfg. Co., 1301 Fidelity Building, Baltimore, has been incorporated with a capital of $50,000 by John D. Nock, Irvin J. Sullivan and Frank P. de Hoff, to manufacture automobile parts and equipment.

Lyon, Conklin & Co., 13 Balderstone Street, Baltimore, manufacturers of sheet metal products, are perfecting plans for the erection of a new factory totaling about 100,000 sq. ft. of floor space. It is proposed to break ground early next year.

The Hughes Engineering & Construction Co., 316 West Redwood Street, Baltimore, has been chartered under State laws to manufacture engines, power house equipment and other machinery. The incorporators are Charles H. Gunther, Charles C. Sweglar and Theodore J. Robinson.

The Curtis Motor Co., 116 Richmond Street, Baltimore, has been incorporated with a capital of $50,000 by Leslie H. Curtis, Thomas R. Moore and Walton B. Booker to manufacture automobile and truck parts, and operate a general repair works.

The L. R. Roberts Typewriter Co., Wilmington, Del., has been incorporated with a capital of $3,500,000 to manufacture typewriters and parts, calculating machines, etc. It is represented by the Corporation Trust Co. of America, du Pont Building.

The Standard Bolt Corporation, Wilmington, Del., has been incorporated with a capital of $5,000,000 to manufacture bolts, nuts, rivets, etc., and is represented by the Corporation Service Co., Wilmington.

The Common Council, Pilot Mountain, N. C., is planning the erection of a new municipal electric power plant. Bonds will be issued.

Fire, Sept. 13, destroyed the planing mill and machinery at the plant of the Whiteville Lumber Co., Whiteville, N. C., with loss estimated at $100,000. It will be rebuilt.

The Harris-Brockman Mfg. Co., Greenville, S. C., manufacturer of pumps and pumping machinery, is planning the installation of a number of machine tools and other equipment. It has recently increased its capital to $200,000.

The Hayward Rubber Co., Wilmington, Del., has been incorporated in Delaware with capital of $200,000 and headquarters at Philadelphia, to manufacture automobile tires and other rubber products. The incorporators are William C. and L. T. Zimmerman, Philadelphia; E. C. Boyd, Wilmington. It is represented by Harry P. Joslyn, Ford Building, Wilmington.

Fire, Sept. 20, destroyed the plant of the Central Sash & Door Co., Macon, Ga., with loss estimated at about $150,000, including machinery, power equipment, etc.

The James Robertson Mfg. Co., Richmond, Va., recently organized with a capital of $350,000, will operate a local plant for the manufacture of pipe and steam specialties, gas fitters' supplies, etc. Louis Miller is manager.

Anheuser-Busch, Inc., St. Louis, will make additions and improvements at its ice-manufacturing plant at Norfolk, Va., to cost about $250,000. A large portion of this amount will be expended for new equipment. Ophuls, Hill & McCreery, Inc., 114 West Forty-second Street, New York, is engineer.

Milwaukee

MILWAUKEE, Sept. 26.

Although improvement in the demand for machine tools exists, business is of small volume and distributed over a wide area. Inquiry is slowly increasing but is decidedly spotty. Makers of milling machines are receiving more frequent requests for prices, which indicates to them better prospects, but transactions are still few and limited to single tools. Locally, the call for metal-working equipment is mostly for repairs or replacement. Some large shops which have little or no work in hand are employing the time overhauling plants in preparation for resumption of production. This is developing some demand in a small way for new machines. There still are a great many used tools on the market and purchasers hold out for material concessions, which limits business.

The Horel-George Metalware Co. of Eau Claire, Wis., has been incorporated with a capital stock of $25,000 to manufacture metal products, principally utensils. The incorporators are Ira S. Horel, John W. George and S. E. Horel.

The Wisconsin Iron & Wire Works, 1660 Booth Street, Milwaukee, will build an addition to its power plant and install several new boilers, the whole to cost about $12,000.

The V. Krefi Co., Eagle River, Wis., has filed articles of incorporation, the capital stock being $75,000 and the incorporators, Victor Krefi, Ben Sohr and Edward Hammes. It is a reincorporation of the V. Krefi Mfg. Co. of Two Rivers, Wis., which is transferring its factory and offices to Eagle River, where a new plant will be erected immediately. It manufactures shock absorbers, bumpers, spot lights and other automobile accessories.

The Galloway-West Co., 24 West Division Street, Fond du Lac, Wis., has engaged Martin Tullgren & Sons, architects, 425 East Water Street, Milwaukee, to design a four-story addition, 60 x 160 ft., to its cold storage warehouse and dairy products plant, which will require supplemental generating, boiler and refrigerating equipment. Details are not yet available. M. E. West is manager.

The Merrill Wood Products Co., Merrill, Wis., is erecting a two-story addition, 30 x 50 ft., and will install a self-feed rip saw with 40-hp. motor, a cut-off saw and a new automatic lathe. A second addition is planned for early spring and will require one electric elevator and some conveyor equipment.

The Davis Light & Power Co., Galesville, Wis., has been incorporated with a capital stock of $60,000 to take over the commercial light and power department of the Davis Milling Co., which is investing about $45,000 in new hydroelectric generating and transmission equipment. Incorporators of

the new company are Ben W. Davis, Alfred N. Sagen and W. S. Wadleigh.

The Ke-No Co., Sheboygan, Wis., manufacturer of furniture novelties and specialties, will invest about $50,000 in the construction and equipment of an addition at Pennsylvania Avenue and East Water Street. Plans are being completed by W. C. Weeks, local architect, who will take bids in about two weeks.

The Fire & Police Alarm Post Co., Milwaukee, has been organized with $25,000 to manufacture a patented type of cast iron and steel standard for municipalities. It takes over the business established some time ago by William R. Callahan, chief purchasing agent, city of Milwaukee, who appears as incorporator with W. F. Thanhauser, P. J. Hayes and Thomas E. Hayes.

The Dort Motor Car Co., 242 Fourth Street, Milwaukee, will build a $35,000 garage, service and sales building, 120 x 120 ft., one story, at Mason and Van Buren streets. The architect is A. C. Eschweiler, 141 Wisconsin Street.

The Universal Toy Mfg. Co., Milwaukee, has been organized with a capital stock of $50,000 to build a factory for the manufacture of wood, metal and mechanical toys. The incorporators are Stephen A. Park, Jr., George F. Hayden and H. H. Hering, 674 Fifty-second Street, Milwaukee.

The Oshkosh Tractor Co., Oshkosh, Wis., has let contract for the substructure of its new machine shop and assembling plant, 150 x 500 ft., to A. Nielson & Son, Neenah, Wis. Auler & Jensen, local architects, are now asking bids for the erection of the superstructure of brick and steel, with sawtooth roof. It will cost about $275,000 and is to be ready Dec. 1. A. D. Paine is president and general manager.

The Cataract Mfg. Co., Milwaukee, is a new $25,000 corporation organized to manufacture water pumps, gasoline engines and other hydraulic equipment for farms, industrial and domestic purposes. The incorporators are John F. Dunphy, Leo W. Siensby, attorney, and Frank R. Lueck, 1306 Wells Street, formerly second vice-president Fabricated Ship Corporation, Milwaukee.

The Brunett Perfect Heating System, Inc., Rice Lake, Wis., expects to let contracts Oct. 1 for the erection of its new plant, of brick and steel, 100 x 200 ft., one story and part basement, for the production of hot air furnaces designed especially for farms and isolated localities. It is incorporated with a capital stock of $1,200,000 in Minnesota and has been granted a Wisconsin charter.

The La Crosse Washer Co., La Crosse, Wis., manufacturer of domestic washing machines, which suspended production in 1917 because of war conditions, has completed arrangements to resume operations Jan. 1, 1922. Materials are now being contracted for and the factory is undergoing a general overhauling.

Detroit

DETROIT, Sept. 26.

The Oakland Motor Car Co., Pontiac, Mich., will resume work at once on the erection of its new one and two-story plant for engine manufacture and other automobile construction. Foundation work was placed under way some months ago and later discontinued owing to business conditions. It will cost in excess of $2,000,000 with machinery. The duPont Engineering Co., McKerchey Building, Detroit, is engineer and contractor.

The True Mfg. Co., Eaton Rapids, Mich., has been incorporated with a capital of $100,000 by C. O. Brownell, C. C. Hall and J. C. Dreher, Eaton Rapids, to manufacture agricultural machinery and equipment. It is completing plans for a local factory and will commence erection at an early date.

The Grand Rapids Show Case Co., Grand Rapids, Mich., has awarded a contract to John McNabb & Son, Murray Building, for a five-story addition, 100 x 132 ft., estimated to cost about $80,000. S. D. Young is president and general manager.

The Peaubien Ice & Coal Co., 4205 West Jefferson Avenue, Detroit, will take bids at once for a new one and two-story ice-manufacturing and refrigerating plant on Twelfth Street. The George B. Bright Co., 103 Marquette Building, is engineer. S. P. O'Brien is president and general manager.

The Fort Shelby Garage, care of Albert Kahn, 1000 Marquette Building, Detroit, architect, has awarded contract to the John Bollin Co., 1257 Book Building, for a new four-story automobile service and repair plant, 130 x 150 ft., estimated to cost about $300,000. A complete machine and repair department will be installed. John Gillespie is head.

The Sand & Lime Products Co., Detroit, has acquired the plant of the Fairview Brick Co., foot of St. Jean Avenue, and will use the works for the manufacture of pressed brick, developing a capacity of about 40,000 brick per day. T. C. Taylor is president and L. H. Tussell, treasurer.

The Atlas Drop Forge Co., Lansing, Mich., has commenced the erection of a one-story addition.

M. R. Carrier, president Federal Drop Forge Co., Lansing, Mich., states that his company has just received a $20,000 order for drop forgings from a Lansing automotive plant.

Contract for the new Ford Motor Co.'s body plant at Iron Mountain, Mich., has been let to the Worden-Allen Co., Chicago. Construction will start immediately.

The Wireless Vacuum Cleaner Co., with offices in the Book Building, Detroit, has been organized to manufacture wireless vacuum cleaners. Production is being carried on in temporary quarters, but negotiations for a factory are nearing completion. The officers are W. S. Richards, president; F. D. Siebert, vice-president; F. W. Edward, treasurer, and A. F. Stryker, secretary.

The Rogers Foundry Co., Detroit, has been incorporated with $35,000 capitalization by C. O. Rogers, Monroe, Mich., Alex Hungler and William Reinhold, 448 Yale Street, Detroit, to operate a foundry and machine shop.

The Gulf States

BIRMINGHAM, Sept. 26.

The Mexia Refining Co., Telephone Exchange Building, Mexia, Tex., has completed plans and awarded a contract for its new oil refinery to Charles B. Miller & Co., Fort Worth, Tex. It will have a daily capacity of 3000 bbl., and is estimated to cost about $300,000, of which about $150,000 will be expended for machinery. A power house will also be erected.

The Bear Rubber Mills Corporation, San Antonio, Tex., has been incorporated under Delaware laws with capital of $1,000,000 by Donald E. Cameron, Charles Massey and Claude J. Kelly, San Antonio, to manufacture rubber products. It is represented by the United States Corporation Co., 65 Cedar Street, New York.

The Harrisburg Machine Co., Harrisburg, Tex., has been chartered under State laws to manufacture machinery and parts and operate a general repair plant. The incorporators are F. D. French and R. A. Fenzl, Harrisburg.

The Bonnie Coal Co., Tuscaloosa, Ala., recently organized, has plans under way for the installation of electrical, power house and other mechanical equipment at its properties. C. C. Huckaby, Blocton, Ala., is consulting engineer in charge. William Jones is president and manager.

The Southern Cement Block Machine Co., Orlando, Fla., is contemplating the erection of a new plant to manufacture machinery for cement block production. Samuel Lindsey heads the company.

The Dallas Co-operative Ice & Mfg. Co., 907½ Commerce Street, Dallas, Tex., will take bids in November for its new one-story plant on Spring Avenue, 65 x 200 ft., estimated to cost about $75,000. O. J. Bouis, company address, is engineer.

The Darco Co., du Pont Building, Wilmington, Del., a subsidiary of the du Pont Powder Co., has acquired about 160 acres at Marshall, Tex., as a site for its new plant for the manufacture of Darco, a product produced from lignite. The initial works are estimated to cost about $1,500,000, and will give employment to approximately 500.

The Arcadia Compress Co., Arcadia, La., is planning to rebuild the portion of its cotton compress plant, destroyed by fire Sept. 7, with loss estimated at about $65,000.

The Fort Payne Light & Power Co., Fort Payne, Ala., has preliminary plans under way for a new power house to serve the coal-mining district in this vicinity. A. A. Miller heads the company.

Fire Sept. 18 destroyed a portion of the car shop, tool works, and other mechanical buildings of the Gulf Refining Co., Fort Tampa City, Fla., with loss estimated at $35,000.

The Standard Scale & Fixture Co., Tampa, Fla., has been incorporated with a capital of $50,000 to manufacture scales, balances and kindred products. A. L. Franklin is president; and James A. Miller, treasurer and general manager.

The Washington Ice Co., 611 Louisiana Street, New Orleans, will take bids in about 60 days for the erection of a new ice-manufacturing and cold storage plant.

Fire Sept. 14 destroyed a portion of the plant of the Central Cotton Oil Co., Jackson, Miss., with loss estimated at about $75,000, including machinery.

The Grass Fibre Pulp & Paper Corporation, Leesburg, Fla., will commence the immediate erection of its new pulp and paper mill, to have an initial daily output of about 40 tons. The company was organized recently with a capital of $1,000,000. W. F. Stovall is president, and E. R. Lacy, vice-president and general manager.

Pittsburgh

PITTSBURGH, Sept. 24.

The local machine-tool market is quiet but not without encouraging features. Chief among these is the revival of a list put out a year ago by the Union Railroad, the interplant system of the Steel Corporation in the Pittsburgh district. Bids are still being received against the list recently issued by the Western Penitentiary and awards are expected in a couple of weeks. A fair amount of business continues in individual tools from dealers' stocks and in some instances it has been found necessary to call upon makers to fill an order. New developments are lacking in the crane market. No new inquiries have been received and negotiations still are in progress on those against which bids were asked two or three weeks ago. Competition for crane orders is so sharp that the price advantage is largely with buyers.

The Rust Engineering Co., 1905 Fifth Avenue, Pittsburgh, is completing plans for a new oil refinery for the Leonard Oil & Gas Co., Newark, Ohio., J. W. Leonard, president. It will be one-story, and with machinery is estimated to cost about $200,000.

The Denk Engineering Co., Pittsburgh, has been incorporated under Delaware laws with capital of $150,00 to manufacture mechanical products. The incorporators are F. J. Denk, Leo J. Schaedle and A. H. Peabody, Pittsburgh. It is represented by the Capital Trust Co., Dover, Del.

The P. Wall Mfg. Supply Co., Pittsburgh, has been chartered under State laws to manufacture iron and steel products. H. E. Leety, 6320 Philips Avenue, is treasurer.

The American Sheet & Tin Plate Co., Pittsburgh, is making extensions and improvements at its works at New Castle, Pa., to cost about $60,000.

Edward Hazlett, 35 Twelfth Street, Wheeling, W. Va., has had plans prepared for a new two-story automobile service and repair works. Construction will commence at an early date. Edward B. Franzheim, 1425 Chaplaine Street, is architect.

The Windsor Coal Co., Wheeling, W. Va., is planning for the installation of electric and other mining equipment on properties in Brooke County, recently acquired.

The Schoolfield-Harvey Electric Co., Charleston, W. Va., has been chartered under State laws to manufacture electrical products. The incorporators are Raymond R. Schoolfield and Leonard P. Harvey, Charleston.

The Duquesne Light Co., Pittsburgh, has preliminary plans under way for a new electric plant in the Bellevue district.

In connection with the installation of new electrical and mechanical equipment, the Hess Coal & Coke Co., Morgantown, W. Va., is planning the reconstruction of its coal tipple at the Granville, W. Va., mines, with new operating machinery.

Indianapolis

INDIANAPOLIS, Sept. 26.

The Victor Bearings Co., Indianapolis, has been organized with a capital of $300,000 to take over the Modern Die & Tool Co., at Georgia and Pennsylvania streets, and has plans under way for the erection of new works at Steele Street and Massachusetts Avenue, estimated to cost about $50,000. It is proposed to have the plant ready for operation within 90 days, and the present works will then be removed to this location. W. L. Sandage, heretofore president of the Modern Die company, will also head the new organization. R. G. Wolcott is vice-president and H. A. Schlotzhauer, Jr., treasurer.

The Sullivan Boiler & Mfg. Co., Sullivan, Ind., has been incorporated with a capital of $50,000 by J. W. Lindley, C. H. Bedwell and W. T. Mellott, Sullivan, to manufacture boilers and other plate products.

The Active Coal Co., Indianapolis, a subsidiary of the Gale Grain Co., 607 Board of Trade Building, P. M. Gale, president, is taking bids for its new coal-handling plant at Senate and Fourteenth streets, estimated to cost about $50,000. Bacon & Teislow, 30 West Ohio Street, are engineers.

The Batesville Cabinet Co., Batesville, Ind., has had plans prepared for a new three-story and basement addition, 100 x 162 ft. Contract for construction will be awarded at an early date. Martin Fisher, Brighton Bank Building, Cincinnati, is architect.

The Swivel Joint & Shaft Co., Plymouth, Ind., has been incorporated with a capital of $75,000 by A. W. and William O'Keefe and C. A. Abrahams, Plymouth, to manufacture shafts, special joints, and other steel specialties.

The Coats-Steamer Automobile Co., Indianapolis, recently organized in Delaware with capital of $5,000,000 to manufacture automobiles, is negotiating with the Chamber of Commerce, Terre Haute, Ind., for a site for the erection of a new plant. The proposed works will be about 75 x 600 ft.

The Repel-Arc Furnace Co., Indianapolis, has been organized to take over the manufacture of the repelling arc furnaces heretofore produced by the Industrial Electric Furnace Co., under the Von Schlegell patents. The new company will be operated under the direction of Easterline & Angus, Indianapolis, consulting engineers. Furnaces will be manufactured at a local plant in sizes from ½ to 2 tons.

The Columbus Steel & Tube Co., recently organized, is equipping a plant at Columbus, Ind. The principal stockholders are Q. G. Noblitt, Frank H. Sparks and Albert G. Redmond, officers of the Indianapolis Air Pump Co., 1625 Bellefontaine Street, Indianapolis.

Robert Sharon is president of the Gould Motor Co., Marion, Ind., recently organized to manufacture the Gould motor. The company is seeking a location for a plant.

The Guttman-Rawley Furniture Mfg. Co., Shirley, Ind., has leased the plant of the McClure Mfg. Co., North Marion, Ind., and will move its factory there. In addition to furniture it will manufacture automobile tops and will equip the plant with a new line of machinery.

The Central South

ST. LOUIS, Sept. 26.

The Kansas City Light & Power Co., Kansas City, Mo., has acquired a site at Glasgow, Mo., for its new electric generating plant, estimated to cost about $1,000,000.

The City Ice Co., Campbell and Twenty-first streets, Kansas City, Mo., has plans under way for a new one-story mechanical shop at Harrison and Twenty-third streets, 100 x 140 ft.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, has awarded contract to the Widmer Engineering Co., Syndicate Trust Building, St. Louis, for the first unit of its new St. Louis plant, to be one and two stories, 300 x 525 ft.

The Cosden Refining Co., West Tulsa Street, Tulsa, Okla., is planning for the erection of additions to the steam power plant at its oil refinery, estimated to cost about $100,000.

The Oklahoma Producing & Refining Co., Tulsa, Okla., has plans under way for additions to its refinery to increase the output about 20,000 bbl. per month. The storage department of the plant will also be enlarged. The work is estimated to cost about $150,000, including machinery.

The Hart Cotton Machine Co., Chickasha, Okla., is said to be planning for the early rebuilding of its factory, recently destroyed by fire with loss of about $90,000.

The State Board of Public Affairs, Oklahoma City, Okla., George F. Clark, chairman, will build a new power house at the State Confederate Home, Ardmore, Okla.

The Chicago, Rock Island & Pacific Railroad Co., 137 West Van Buren Street, Chicago, has awarded a contract to T. S. Leake & Co., 608 South Clark Street, for an addition to its shops and engine house at Eldon, Mo., to cost about $50,000.

The National Wire & Steel Co., 2100 Baltimore Avenue, Joplin, Mo., has broken ground for its new one-story building, 50 x 200 ft., at 513 East Fifth Street.

Fire, Sept. 20, destroyed a portion of the plant of the Southern Boiler & Tank Works, Memphis, Tenn., with loss estimated at $100,000, including machinery.

The Heron Metal Bed Co., Main and Chestnut streets, Chattanooga, Tenn., is planning the erection of additions, with improvements in present works, estimated to cost about $22,000.

The Board of Education, Kansas City, Mo., is arranging a list of machinery and equipment for installation in the Woodland High School. J. B. Jackson is secretary.

Conveying machinery, ovens, boiler and other mechanical equipment will be installed in the new plant to be erected by the Smith Baking Co., 437 West Park Street, Oklahoma City, Okla., to be one-story and basement, 100 x 150 ft., and estimated to cost about $150,000. H. P. Anthony, 1109 Waldheim Building, Kansas City, Mo., is architect.

The Hadley Fire Cement Co., Chattanooga, Tenn., with headquarters at Providence, R. I., C. B. Hadley, president, is contemplating the erection of a new local plant to manufacture refractory furnace linings, fire brick cement, etc.

The Clarksville Ice & Coal Co., Clarksville, Tenn., is planning to rebuild the portion of its ice-manufacturing plant, recently destroyed by fire with loss of about $50,000.

The Progressive Auto Service Co., 207 West Broadway, Louisville, recently organized, has preliminary plans under way for a new two-story building, to include a machine shop department. L. H. Prescott is president and manager.

The Missouri, Kansas & Texas Railroad Co., Railway

Exchange Building, St. Louis, has awarded contract to T. M. Johnson, Sedalia, Mo., for a one-story addition to its machine shop at Parsons, Kan., to cost about $18,000.

H. M. Jones, El Dorado, Ark., and associates, have plans under way for the construction of a new two-unit oil refinery with a daily capacity of about 500 bbl.

The Common Council, Stuttgart, Ark., has preliminary plans under way for the construction of a municipal electric light and power plant.

California

LOS ANGELES, Sept. 20.

The Western Pipe & Steel Co., 444 Market Street, San Francisco, is planning for the early occupancy of its new plant at South San Francisco, comprising the former works of the Shaw-Batcher Shipbuilding Co. It is expected to give employment to about 500 for initial operations.

The Davis Radio Signal Co., Los Angeles, has been incorporated with a capital of $25,000 by Charles L. Davis and Louis Gastineau to manufacture signals and signal devices. Gates & Randles, 514 San Fernando Building, represent the company.

The Los Angeles Fabricating Co., Los Angeles, has awarded a contract to the Austin Co., Los Angeles, for its new one-story steel fabricating plant, 90 x 160 ft., estimated to cost about $80,000.

The Big Four Truck Co., Sacramento, Cal., manufacturer of automobile trucks and parts, has plans under way for its new works at Richmond, Cal. The site totals about 11 acres and the main building will be 70 x 350 ft. Electric traveling cranes will be installed.

The Dyeson-Hickox Co., 2062 Santa Fe Avenue, Los Angeles, has filed notice of organization to manufacture machinery and parts. Elmer Hickox and J. G. Dyeson head the company.

Directors of the Modesto and Turlock Irrigation District, Turlock, Cal., have approved plans for a new hydroelectric generating plant at the Don Pedro dam, estimated to cost in excess of $150,000. Bids will be called for at an early date. R. V. Meikle, Turlock, and Percy Jones, Modesto, are joint engineers for the project.

The Pacific Sanitary Mfg. Co., Fifth and Hensley streets, Richmond, Cal., manufacturer of sanitary ware, has awarded contract to Carl Overa, 2105 Roosevelt Street, for a one-story addition, 150 x 300 ft.

The Potts Stove & Burner Co., 2826 South San Pedro Street, Los Angeles, has filed notice of organization to manufacture stoves and heating equipment. H. S. and T. E. Potts, 790 East Forty-first Street, head the company.

The Star Truck Co., Los Angeles, has had plans prepared for a new plant on Commercial Street, including a two-story structure, 42 x 90 ft., and two one-story buildings, 40 x 110 ft., and 28 x 100 ft., respectively. Construction will be placed under way at once. John J. Frauenfelder, 1116 Story Building, is architect.

The Utah Iron & Steel Co., Salt Lake City, Utah, has arranged for an increase in capital from $2,500,000 to $5,000,000, and 50,000 shares of common stock without par value. The proceeds will be used for additions to the company's plant at Midvale, estimated to cost in excess of $2,500,000.

Canada

TORONTO, Sept. 26.

The machine-tool market continues fairly active. The chief demand, however, is for equipment for replacement purposes with little or no buying for new plants. Inquiries are increasing and many look like real orders. The railroads have again started to buy limited quantities of equipment and dealers are of the opinion that the demand will increase in the early future. The announcement that the Durant Car Co. has taken over the plant of the Leaside Munitions Co., at Leaside, Ont., has caused much interest among dealers who expect to derive considerable benefit from this and other like undertakings. Small tools have not improved to any extent, but a steady volume is moving.

The Georgetown Woolen Mills, Georgetown, Ont., are in the market for a 15-hp. Fairbanks-Morse motor, slow speed.

The Canadian Automatic Carburetor Co. will establish a plant at the corner of Royce Avenue and Dundas Street, Toronto.

The Canadian Gary Motor Trucks Corporation will establish a plant at Fort William Ont., to supply the Western Canada trade. It is a new subsidiary of the American company and will be incorporated for $4,500,000.

Dodge Brothers, Detroit, have purchased 35 acres at Sandwich, Ont., with 350 ft. water frontage, and propose to erect an assembling plant.

IRON AND INDUSTRIAL STOCKS

Steels Show More Consistent Firmness Than Do Other Issues

Two significant things have transpired since last reports. First, Eastern Federal Reserve banks reduced commercial rediscount rates from 5½ to 5 per cent. Second, many million dollars' worth of equipment trust certificates, purchased from the Railroad Administration, were resold to individual investors. The first is conclusive evidence of an easing in the general banking situation. The second denotes confidence in our railroads at a most trying period in their history. With these two developments have come an increased demand and better prices for iron and industrial stocks without abatement in the absorption of bonds in general as well as long and short-term notes. Steel stocks show more consistent firmness than most other groups of issues. Investors evidently are attracted by the sound financial condition of steel companies, as contrasted with others, while the revival of buying of steel products is believed by many to be a forerunner of higher prices for same. The recovery in stocks of late has been less rapid than it was prior to the recent setback, and therefore more satisfactory from the standpoint of the banking institutions and the real investor.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	33½- 34⅝	Int. Har. com.....	77½- 80⅞
Am. Can com.....	26⅜- 28¼	Int. Har. pf.....101	-101¼
Am. Can pf.....	79 - 80	Lackawanna Steel.	40⅞- 43
Am. C. & F. com.	125½-128	Midvale Steel.....	25¼- 26¾
Am. C. & F. pf...	108 -109	Nat. E. & S. com.	35½- 37¼
Am. Loco. com....	88½- 91	Nova Scotia Steel.	23⅞- 25⅜
Am. Loco. pf.....	104 -104½	Press. Steel com..	55 - 58⅞
Am. Steel F. com.	24½- 25⅛	Press. Steel pf....	— - 85½
Am. Steel F. pf...	— - 83	Ry. Stl. Spg. com.	82½- 83¾
Bald. Loco. com..	86½- 90⅝	Replogle Steel.....	23½- 25½
Bald. Loco. pf....	— - 98	Republic com.....	49⅞- 53⅝
Beth. Steel com..	51½- 51¾	Sloss com.....	37 - 40¾
Beth. Stl., Cl. B..	52⅜- 56⅛	Sloss pf.....	— - 71
Beth. Stl., 8% pf..	98½-100	Superior Steel.....	28½- 32¾
Chic. Pneu. Tool..	52 - 52⅜	Transue-Williams.	— - 36
Colorado Fuel.....	24½- 25¼	Un. Alloy Steel...	25 - 26
Cruc. Steel com...	60 - 64⅝	U. S. Pipe pf.....	15 - 15½
Cruc. Steel pf.....	— - 81	U. S. Steel com...	77½- 80¼
General Electric..	121¼-127	U. S. Steel pf.....109	-109½
Gt. No. Ore Cert..	28 - 29	Vanadium Steel...	30 - 33⅝
Gulf States Steel.	37 - 40½	Westingh'se Elec.	44 - 45⅜

Industrial Finances

Westinghouse Electric & Mfg. Co. quarterly of 2 per cent on the common stock payable Oct. 31, to stockholders of record Sept. 30; also regular quarterly of 2 per cent on the preferred stock, payable Oct. 15, to stockholders of record Sept. 30.

Directors of the Trumbull Steel Co., Warren, Ohio, have declared a dividend of 15c. per share on the non-par value common stock and $1.75 per share on the preferred stock, both payable Oct. 1 to holders of record Sept. 20. The dividends are the same as were paid July 1 last for the second quarter.

The Scripps-Booth Motor Car Co., Boston, Mass., has filed a voluntary petition in bankruptcy. The liabilities total $43,203.

William Henkel has been appointed receiver for the Dobbins Core Drill Co., Inc., 147 West Forty-second Street, New York.

A petition in bankruptcy has been filed against the Columbia Tool & Machine Co., Fourth and Brown streets, Philadelphia, by a number of creditors.

Walter S. Butler has been appointed receiver for the Lorrain Car Co., Richmond, Ind., manufacturer of automobiles. The liabilities are said to total $35,000.

Government Requirements

Government departments and bureaus are advertising for bids as follows:

Bureau of Supplies and Accounts, Navy Department: 15,000 lb. sheet lead, opening Oct. 18; 100 tons foundry pig iron for Norfolk, Va., opening Oct. 11; 50 forward finished propellers and 50 after finished propellers for torpedoes, opening Oct. 11.

Air Service, U. S. Army: 1115 pieces of terne plate for McCook Field, Dayton, Ohio, bids until Sept. 30.

Bureau of Yards and Docks, Navy Department: 10-ton hand-operated overhead crane, for Yorktown, Va.; extension to cast iron water supply main at Quantico, Va.

Lighthouse Service: 2500 lb. round head steel rivets. Address Lighthouse Inspector, Third District, Tompkinsville, N. Y.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers' for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ⅛ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.75c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex.	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	4.10c.
No. 16	4.25c.
Nos. 18 and 20	4.40c.
Nos. 22 and 24	4.55c.
No. 26	4.70c.
No. 27	4.85c.
No. 28	5.00c.
No. 30	5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
9-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¼c. to 18¼c.
High brass wire	16¼c. to 20¾c.
Brass rod	13¾c. to 19¾c.
Brass tube, brazed	26½c. to 30½c.
Brass tube, seamless	18 c. to 19½c.
Copper tube, seamless	19½c. to 21¾c

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 22½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb...	$6.80	$6.55
			90 lb...	6.90	6.65
			100 lb...	7.00	6.75
IC..	$10.75	$9.25	IC...	7.15	6.90
IX..	12.00	10.75	IX...	8.15	7.90
IXX..	13.75	12.25	IXX...	9.15	8.90
IXXX..	15.50	14.00	IXXX...	10.15	9.90
IXXXX..	17.00	15.75	IXXXX...	11.15	10.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits, pig	29c.
Bar	36c. to 40c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	20c.
No. 1 solder	18c.
Refined solder	15½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6¼c. to 6½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	29c. to 31c.

Old Metals

The market continues strong with an upward tendency. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.25
Copper, heavy and wire	9.25
Copper, light and bottoms	7.75
Brass, heavy	4.75
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	4.00
Lead, tea	2.50
Zinc	2.25

THE IRON AGE

New York, October 6, 1921

ESTABLISHED 1855 VOL. 108: No. 14

New Interstate Mill Has Pack Cooling Bed

Runout Table Also a Prominent Feature, All Rollers Having Individual Motor Drive and Those Next to Bed Are of Swiveled Cone Type

BY GILBERT L. LACHER

TO the Interstate Iron & Steel Co., Chicago, goes the credit of having placed in operation a pack cooling bed which is the first installation of its kind in the industry. This innovation is a salient feature, at the company's South Chicago works, in a new merchant rolling mill designed and built by the Morgan Construction Co., Worcester, Mass. In general, the mill is similar in arrangement and mechanical details to the construction used in other Morgan mills, but the pack cooling bed and a number of other important deviations from previous design mark another forward step in the interests of maximum economy and quality in the rolling of both plain carbon and alloy steels.

Together with the hot runout table serving it, the bed was provided for handling products, such as alloy steel, requiring special treatment during the cooling process from mill to shear. It is so designed that when cooling such material as spring flats, there is absolute control of the time from the finishing rolls to the pack, of the size of the pack, the time in the pack, and of the time from the pack to the shear. Operation of the bed thus far indicates that it can handle alloy steels of any commercial degree of hardness desired, and that it will deliver stock to the shear straight and at a temperature suitable for shearing. This is being done without sacrifice of output and without incurring unusual expense.

About 300 ft. long, the bed is a combination of an Edwards inclined gravity escapement bed and a horizontal notched bed, and was designed especially for the slow cooling of alloy spring steels. The inclined portion of the bed is narrower than usual, as the horizon-



Especially Designed for the Slow Cooling of Alloy Spring Steel Rods, the Hot Bed Is a Combination of a Narrow Inclined Gravity Escapement Section and a Horizontal Notched Section. Between the two sections are jointed packing bars. Finished material is accumulated in bundles on the packing bars and by them transferred to the horizontal section, across which it is moved pack by pack. This permits the annealing of material of small cross section, which would otherwise cool too rapidly

tal portion provides the necessary space in which the cooling is completed. The principal innovation in design is to be found in a packing device introduced between the inclined and horizontal portions of the bed. This apparatus consists of a series of jointed bars actuated by two shafts. The packing arrangement permits the annealing of material of small cross-section, such as spring steel, which would otherwise cool too fast. Some spring alloy steel, in fact, is of such analysis that it would not pass the required specifications for softness if cooled on an ordinary bed, unless it were annealed later.

On this cooling bed, however, the annealing is automatically done in process between the mill and the shear, this result being accomplished by accumulating the bars in the packing device and depositing them in packs in the first notch of the horizontal portion of the bed. The rolled bars may reach this point at varying degrees of temperature, depending upon the length of time they are allowed to take in passing over the inclined portion of the bed. The principle of packing bars is not new, as it has been used before on hand-cooling beds, but mechanical packing as executed in this installation is an innovation. The packing device extends the entire length of the bed, and will handle spring flats from 1½ to 6 in. wide.

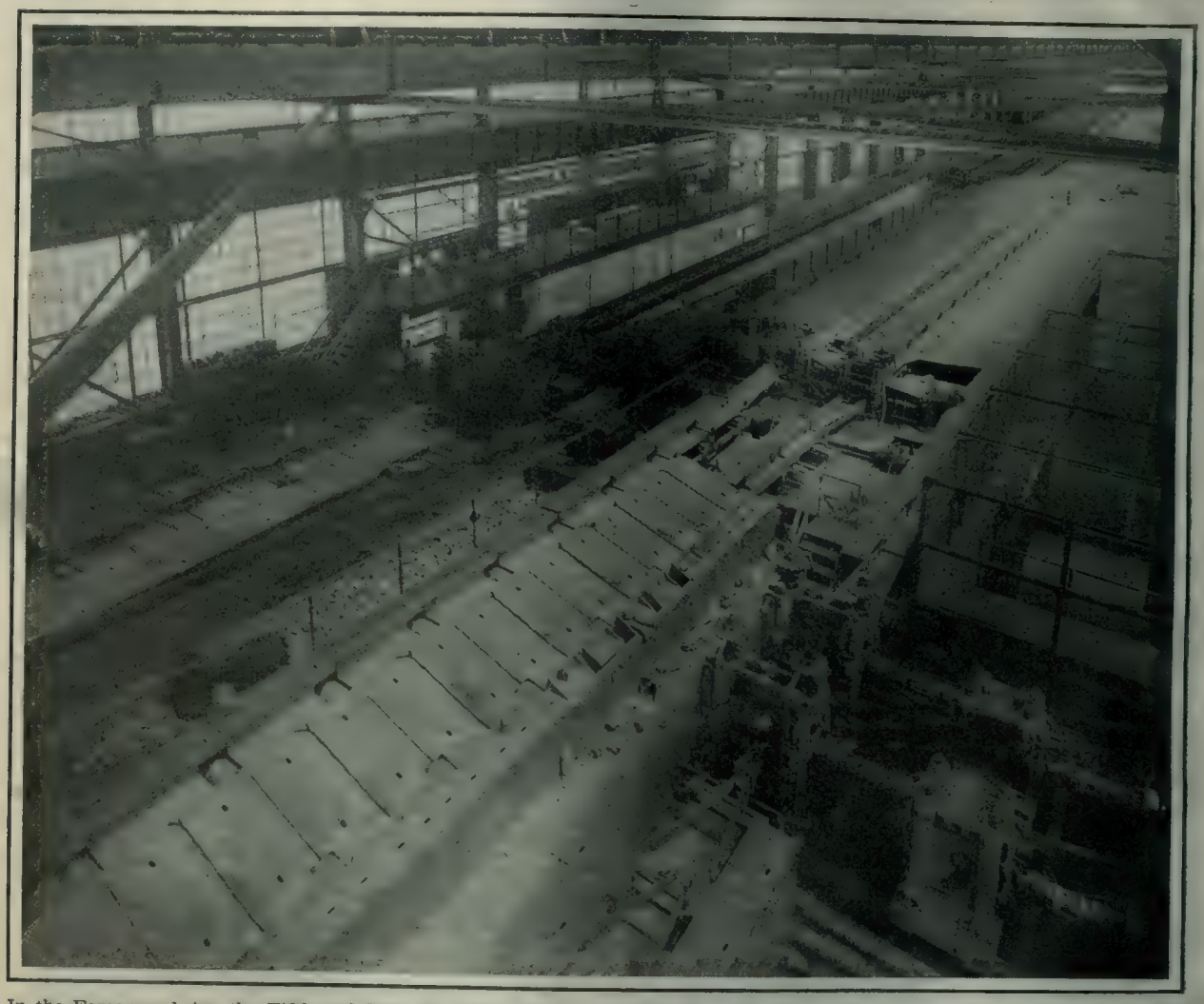
When cooling flat rolled spring stock, the horizontal portion of the bed advances the packs by lifting and carrying them from notch to notch until, after leaving the last notch, they are discharged upon the shuffle bar assembling table, and are ready to go to the shear. When the cooling bed is not handling material that requires packing, it advances the rolled product in single bars, substantially like any of the other Morgan mechanical beds.

Control of all the motors operating the constituent parts of the bed, as well as the rollers of the runout table, is concentrated in a switchboard attached to the side wall at a height of several feet above the top of the inclined rack. The motors operating the horizontal carryover portion of the bed are capable of lifting 150,000 lb. of bars. The whole arrangement by which bars can be handled separately in notches, or in packs as desired, has been patented by the Morgan Construction Co.

A Morgan No. 5-Q motor-driven shear handles the product of the entire mill. The length of the knives is 30-in., the stroke is 3 in., and all parts of the shear under strain are of steel, including the frame, gears, clutches, knife holder, etc. The shear delivers the cut lengths to a 65-ft. back shear table, complete with gage bar and hand-traversed gage heads. An electrically-operated kickoff discharges the cut material into a cradle, which is mounted on a scale platform, having a capacity of 60,000 lb. The beam scale and platform were furnished by Fairbanks, Morse & Co.

From the scale the finished material is carried by overhead crane to a depressed loading track, located on the opposite side of the building and running parallel with the cooling bed. The track is 300 ft. long, thus insuring ample space for a supply of cars for shipment.

A novel and interesting part of the cooling bed is the hot runout table. Each of the 93 rollers is individ-



In the Foreground Are the Fifth and Sixth Roughing Stands, Grouped Close Together. The intermediate and finishing mills, staggered "duo-type," appear in the middle background, with the special pack cooling bed in the distance (upper right corner of cut)

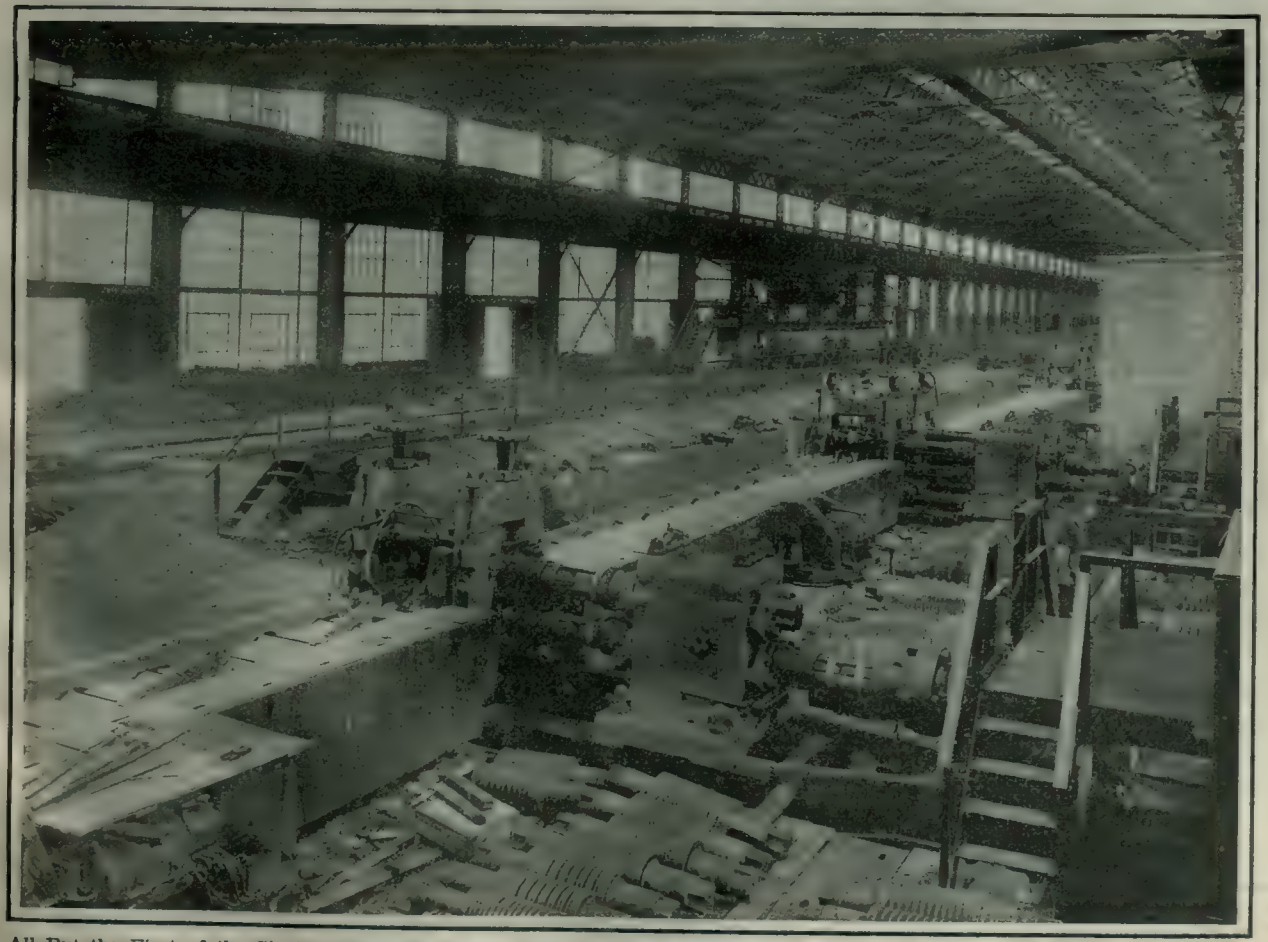


Throughout the Length of the Cooling Bed the Run-out Table Has Cone Rolls, Each Driven by a Variable Speed Motor. Roll and motor are swiveled. By changing the axis of the shaft connecting them, material is carried broadside across the face of the roll and lifted into the first notch of the inclined cooling bed

ually driven by its own motor, the motors being ½-hp. capacity each, and using alternating current. Their speed can be varied from 370 to 210 r. p. m., with a range in frequency from 26 to 14 cycles. Brief details of the drive of these rollers, as well as of the main rolls, will be given next week.

From finishing mill to cooling bed the rollers in the table are of standard cylindrical type. Throughout the entire length of the cooling bed, however, cone rolls have been provided. Each cone roll and the motor operating it is swiveled on a vertical arm. In normal position the cone rolls throw the bars against a guide. Thus, bars can be delivered from the finishing mill practically at butt ends, and when one bar is thrown against the guide, the succeeding one takes its place, and is likewise diverted toward the guide.

To deliver the rolled bars from the runout table to the escapement portion of the cooling bed, the direction of the integral axes of rotation of the rolls and motors is changed, so that the material is carried broadside



All But the First of the Six Roughing Stands Show Here, with the Last Four Grouped in Pairs, Thus Shortening the Runs and Permitting Better Control of Finishing Temperatures



Material May Pass from the Intermediate (14-In.) Mill to the (12-In.) Finishing Mill Either by Transfer Table or by Repeater. In this view, the repeater was not adjusted for use

across the face of the rolls to the small end of the cones, where it is lifted off into the first notch of the bed. The rolls and motors are brought back to normal position by a spring return.

The merchant mill itself is of the well-known Morgan combination of continuous and staggered duo-type. It contains six 16-in. continuous roughing stands, two 14-in. intermediate stands and four 12-in. finishing stands, the 14-in. and 12-in. stands being staggered. The six roughing stands are driven from a line shaft by gears from a constant speed three-phase, 60-cycle, a. c. 1500-hp. Allis-Chalmers Mfg. Co. induction motor, having a speed of 78 r. p. m. The last four of these six stands are tied together in pairs. This arrangement shortens the runs, with the result that better control of finishing temperature is possible. Temperature control is important, particularly in rolling some alloy products, such as chrome spring steel.

The finishing mills have capacity to roll rounds from ⅝ in. to 3 in. in diameter, equivalent sections of squares and ovals, and flats up to 6 in. wide. On the 14 in. mill, rounds from 1⅛ in. up to 3 in. in diameter, and squares and flats of equivalent weight per foot, may be finished. The construction of the finishing mill is two-high throughout, and the speeds of the various roll stands are proportional, to take up the growing length of the rolled bar. From the last stand of the roughing mill, material is carried by transfer to the first stand of the 14-in. mill, and thence by transfer to the last stand of the 14-in. mill.

From the latter stand, material is carried to the first stand of the 12-in. mill, either by transfer or by repeater. The repeater is easily adjusted into position, and is generally used in handling material of small cross section, such as small rounds and squares. After steel has been carried through the first stand of the 12-in. mill, it is passed on to a special "Y" skew roll table which delivers it in proper position to the next pass. The remaining passes are connected with the same kind of tables, but of progressively greater length. When rolling light sections these tables are not employed, but instead, the material is looped from stand to stand, for which purpose provision has been made in the table construction.

At present, when material is finished in the 14-in. mill, it has to pass through the idle 12-in. stands, taking the same course it would pursue if the 12-in. mill were being used, and passing on to the runout table for delivery to the cooling bed after leaving the last idle stand. In the future, however, it is planned to add another cooling bed parallel with the present one, to serve the 14-in. mill exclusively. This would permit of the delivery of material direct from the 14-in. mill to the bed.

The new merchant mill is served by two Morgan Construction Co. gravity-charge continuous heating furnaces, with hearths 13 x 34 ft., and fired by gas from two Morgan 10-ft. producers. Heated billets from the furnaces are carried by a billet conveyor to a motor-driven dividing shear, capable of shearing up to 6 x 6 in. hot. From the shear, billets are conveyed to the first stand of the 16-in. roughing mill. Adjacent to the furnaces is a billet storage yard, with a capacity of 15,000 tons, which is served by a 10-ton Morgan Engineering Co. traveling magnet crane.

On the other side of the main building containing the furnaces is a leanto, in which are located the gas producers, a cracked coal pit, the Link-Belt Co. coal crusher, and pits for uncrushed coal, ash and scale. This department is served by a 10-ton Morgan Engineering Co. bucket crane, which elevates coal from the coal pit to the crusher, and from the crusher to the top of the gas house, and also loads ashes and mill scale. Coal for producer use is dropped direct from railroad cars through a trestle into the uncrushed coal pit.

Adjacent to this coal pit is the concrete scale pit, into which the mill sewers are drained. The scale is dug out of the pit and loaded into cars by the overhead crane. The installation of the scale pit in a separate building is a departure from the usual practice, as ordinarily mill scale is handled in the main building.

The main mill structure is 105 x 900 ft., with con-

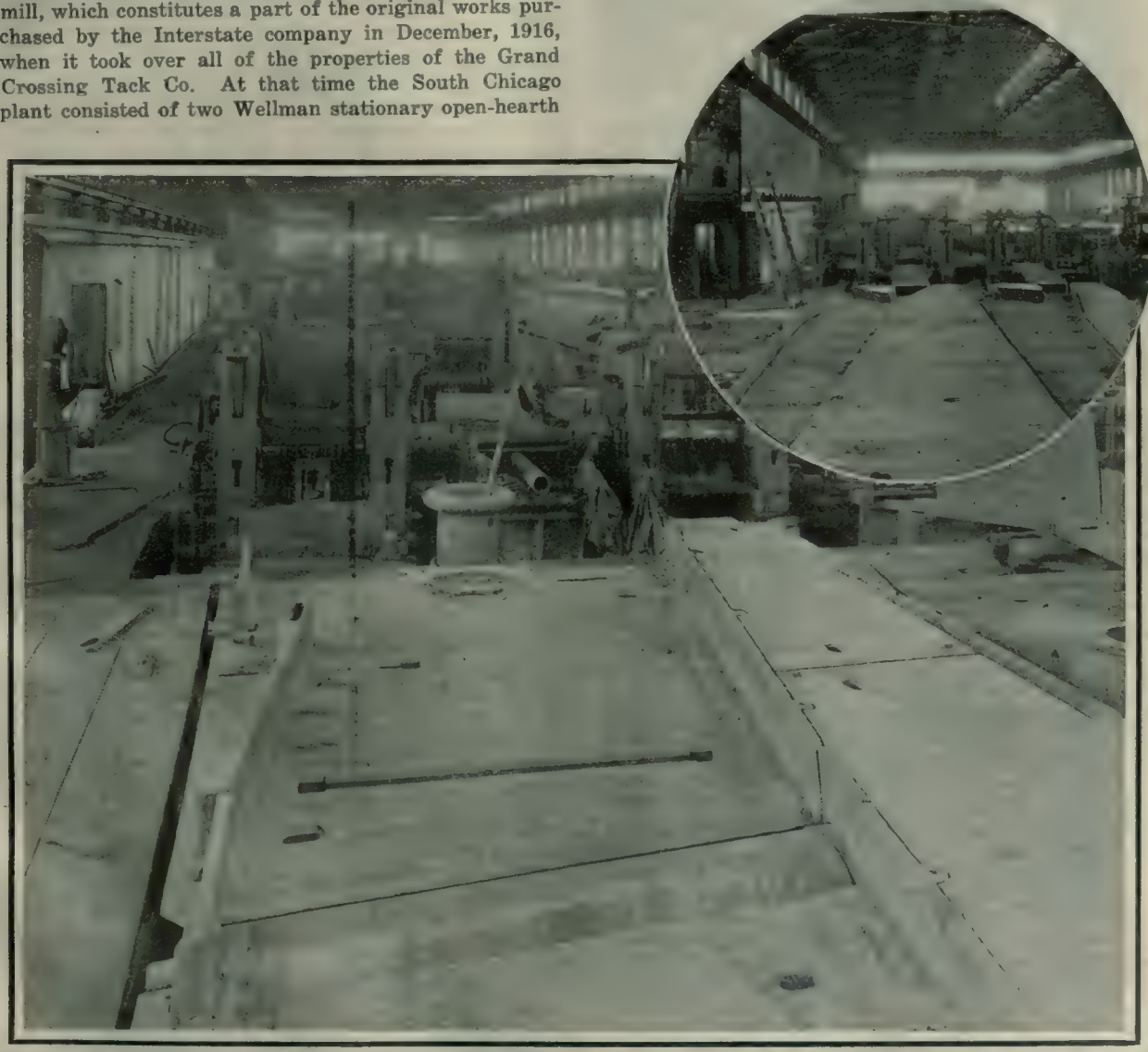
crete foundation, brick and concrete trim and continuous sash in the side walls. The roof is of the Pond type. Three walks hung under the monitor, extending the whole length of the building, are used for operating the windows and cleaning the glass; these walks are served by a stairway at each end. The roof is of tile furnished by the Federal Cement Tile Co., Hammond, Ind. The building has two Morgan Engineering Co. 15-ton overhead traveling cranes.

Water is supplied by a new pump house, containing two 4,000,000 gal. per 24 hr. centrifugal pumps, constructed by the A. S. Cameron Steam Pump Works, New York. Each pump is driven by a 125-hp. a. c. motor. A pump of similar capacity and design, but connected with a d. c. motor, is held in reserve for use in case of an interruption in alternating current. Water is drawn from the Calumet River, and power-driven revolving screens furnished by the Chain Belt Co., Milwaukee, prevent floating debris from entering the pipes. Floating on the line is a 100-ft. standpipe of 250,000 gal. capacity. It is estimated that water from the standpipe will carry for 45 min. the heating furnaces, open-hearth furnaces and other equipment in which the water supply must not be interrupted. During that time the pump operated by d. c. motor can be put into operation, thus insuring a continuous water supply.

It is expected that the new merchant mill will have a capacity, when running full, of upwards of 120,000 tons of carbon and alloy steel bars per year. Billets for rerolling are furnished by the adjoining blooming mill, which constitutes a part of the original works purchased by the Interstate company in December, 1916, when it took over all of the properties of the Grand Crossing Tack Co. At that time the South Chicago plant consisted of two Wellman stationary open-hearth 40-ton furnaces, two four-hole soaking pits and a 35-in. blooming and billet mill, with an annual capacity of 55,000 tons of ingots and 50,000 tons of small billets.

Since that time the two original open-hearth furnaces have been increased in capacity to 60 tons each, and four additional 75-ton furnaces have been constructed, two of them just recently. The two original four-hole soaking pits have been supplemented by three other four-hole pits, making a total of five pits and 20 holes. The building is equipped with one modern stripper crane; a 7½-ton stiff-legged Morgan Engineering Co. charging and drawing crane has recently been added. The annual capacity of the steel works is now 250,000 tons of ingots.

Other new equipment includes an ingot chariot or car, used to deliver ingots from the pits to the blooming mill approach table, either butt first or top first. The car, which is of unique construction, was designed by the Interstate Iron & Steel Co. and built by the Morgan Engineering Co. It is similar to a roller table, having five 12-in. diameter rollers, mounted on a steel frame carried on six steel wheels running on a 3-ft. gage track. Both the rollers and the car wheels are driven through gears and a clutch by one reversing motor equipped with a brake. The rollers are operated in either direction, through the clutch, engaged by a solenoid and disengaged by a spring, which then engages the clutch with the car wheels and vice-versa. The ingot cannot be rolled from the car until it is in



Between the 12-In. Stands Are Special "Y" Skew Roll Tables. The skew rolls (one shows in foreground) deflect material to a position on the table from which it will be carried dir ectly into the next stand. The insert shows the triangular deflecting blocks in the skew roll tables, which give them the "Y" shape, and which were not in use when the lower view was taken

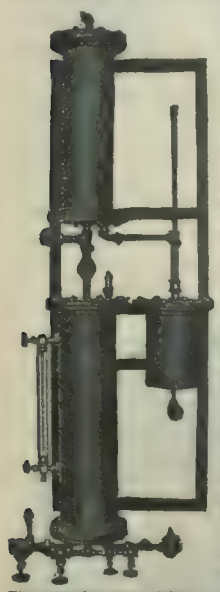
position, bumped against the blooming mill approach tables, where the solenoid operating the clutch is permitted to function, being in contact at this one point only.

A feature of the Interstate works is the thoroughgoing manner in which it takes care of the inspection of alloy steel billets, preparatory to rolling into bars. A separate building, 85 x 700 ft., is devoted to this work. Billets are first put through a pickling bath, from which they are carried to the inspection and chipping floor by overhead cranes. There are three pickling vats, each 5 ft. wide, 20 ft. long, and 4 ft. deep. These are equipped with hinged counterbalanced covers, and with ducts which draw off the fumes and discharge them outside the building.

Every billet handled is carefully examined on all sides by inspectors, who chalk-mark seams, laminations and such other structural defects as are incident to the hot rolling of alloy steel. As many as 200 pneumatic hammers are at work at one time, the air being furnished by three direct-connected Ingersoll-Rand air compressors of 1322 cu. ft. capacity. Twelve swingframe grinding machines are used to remove defects from steel too hard to chip. Two overhead electric traveling cranes of 80-ft. span and 10-ton capacity handle billets both to and from the chippers and the grinders.

Wall Set for Distilling Water

An improved evaporator wall set to supply small quantities of distilled water is being marketed by the Griscom-Russel Co., 90 West Street, New York. It has a capacity of from 15 to 30 gal. per hr. depending on the steam pressure available.



For Drinking Water an Aerating Filter Is Used

The set consists of an evaporator containing coils of brass tubing and to which steam is supplied. The vapor from the evaporator passes to a distiller and is condensed in the coils of that unit by circulating water which flows through the shell. If the distilled water is to be used for drinking it is passed through an aerating filter, but if for laboratory or manufacturing processes, the filter is omitted.

The evaporator and distiller units are of the Reilly coil construction. The set mounted complete on an angle iron frame with the piping, as shown in the illustration, ready for steam and water connections to be made to it, measures 7 ft. high by 2 ft. 4 in. wide.

Southern Ohio Pig Iron and Coke Association

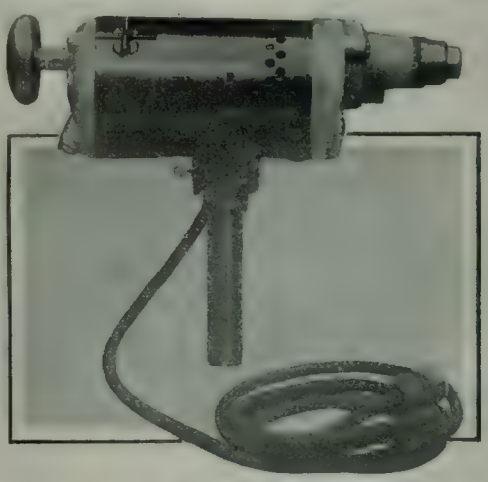
The fourth annual meeting of the Southern Ohio Pig Iron and Coke Association was held at Columbus, Ohio, on Sept. 28. The principal business was the election of officers for the coming year and an interesting report from the traffic committee on railroad freight rates and their relation to the costs of production of pig iron and coke in the southern Ohio district. The association members were the guests of the American Rolling Mill Co. during their stay in Columbus.

The officers elected for the coming year are as follows: President, Ralph H. Sweetser, American Rolling Mill Co., Columbus, Ohio; first vice-president, Charles R. Peebles, Ashland Iron & Mining Co., Ashland, Ky.; second vice-president, W. N. Jeffries, Hanging Rock Iron Co., Hanging Rock, Ohio; third vice-president, L. D. Heustis, Portsmouth Solvay Coke Co., Portsmouth, Ohio; fourth vice-president, Morris M. Wheldon, Wellston Iron Furnace Co., Wellston, Ohio; fifth vice-president, Joseph F. Savage, Hamilton Furnace Co., Hamilton, Ohio; secretary and treasurer, F. P. Colville, Eaton, Rhodes & Co., Ashland, Ky.

The first session was held in the Columbus Athletic Club where the members and guests were entertained by the American Rolling Mill Co., and after routine matters were disposed of, the session was devoted to a discussion of the report of the traffic committee presented by J. L. Roney, traffic manager for the American Rolling Mill Co. Mr. Roney's report included some data recently compiled by his company with reference to its sheet making department. The figures disclosed that the increase in the cost of production of sheets, due solely to the higher railroad rates, was 104 per cent above the cost of 1914. The report also suggested that the association ask every member to compile comparative freight cost data for the present year and the year 1914, as well as labor cost reductions at furnace and ovens, this information to be placed in the hands of the railroad executives and the Interstate Commerce Commission. At the evening session, which was held at the Columbus Country Club, where the members were also guests of the American Rolling Mill Co., a plan was suggested that two classes of the present 62 members be created; active members to include those members identified with the actual production of coke and pig iron, and associate members, including those residing outside the immediate territory from which the members of the association are drawn.

Portable Electric Drill

The Electro-Magnetic Tool Co., 2902 Carroll Avenue, Chicago, has placed on the market a new ½-in. drill, designed to meet the demand for a low-priced



A Series-Wound, Universal Type Motor Is Used

well-made tool which will fill the requirements of the garage, service station, small machine shop, construction or installation gang. The drill is offered at a price of about one-half of the company's standard line and, in fact, of most high-grade drills of this capacity. A simple and rugged stand makes the tool into a drill press and doubles its usefulness.

The drill itself has a series-wound, universal type motor, with large mica insulated commutator, square brushes with pig tails and an aluminum ventilating fan. The gears are of high quality steel, hardened and ground, and are removable. The spindle shaft is equipped with ball thrust and is made of steel hardened and ground. The bearings are Cramp special bearing bronze. A positive standard make switch gives control of the tool, and all connections are made in the switch box, the cover of which is removable and allows for reconnection or changing lead cords without opening the tool. The commutator may be inspected and the brushes removed by taking off a cover plate.

Are Iron and Steel Prices Out of Line?

American Rolling Mill Co. Makes Statement of Cost of Manufacturing Sheets in 1914 and 1921—Quotes Statement of President Grace

"ARE Iron and Steel Prices Out of Line?" is the title of a pamphlet which has just been issued by the American Rolling Mill Co., Middletown, Ohio. It reads as follows:

"During the last nine months there have been drastic reductions in the prices of iron and steel. In spite of these reductions, it seems to be the general impression that the price of sheets is still high and has not taken a drop in proportion to other commodities. Such an impression is incorrect. The base price of steel black sheets to-day, when compared to actual cost of production, is a great deal lower than it was during 1913 and 1914.

"The three principal factors governing the cost of iron and steel are the cost of raw materials (including fuel), of transportation and of labor. Raw material and transportation costs are entirely beyond the control of the manufacturer.

"Only in the item of labor can the manufacturer be influential in reducing costs, and reductions in labor rates must necessarily be slow. To-day wages and salaries in the steel industry have been liquidated further than in any other industry.

"A very recent analysis of cost figures brings forth rather startling information which we believe will be of interest to everyone using and dealing in iron and steel sheets. The table accompanying this bulletin shows graphically the increases in the cost of the most important items entering into the manufacture of a net ton of sheets.

Selling Prices and Manufacturing Costs of a Net Ton of Sheets—1914 Compared with 1921

	1914	1921
Selling price of sheets per net ton	$40.00	$60.00
Increase per ton		$20.00

Analysis of Costs as of August 31, 1921

	1914	1921	Increase per Ton of Materials	Increase per Net Ton of Sheets
Pig iron per gross ton.	$12.89	$20.00		
Freight	1.00	2.10		
War tax	.00	.06		
Total	$13.89	$22.16	$8.27	$5.79
Foreign scrap per gross ton	$6.88	$6.71		
Freight	1.90	3.92		
War tax	.00	.12		
Total	$8.78	$10.75	1.97	.50
Limestone per net ton	$ .15	$ .20		
Freight	1.00	2.00		
War tax	.00	.06		
Total	$1.15	$2.26	1.11	.38
Coal per net ton	$ .93	$2.50		
Freight	1.15	2.24		
War tax	.00	.07		
Total	$2.08	$4.81	2.73	5.81
*Increased labor cost per net ton of sheets, 1914 to 1921				10.07
†Grand total				$22.05

*Tonnage and hourly labor only. No salary costs included.
†Note that this total covers only the principal items of cost. Hundreds of other items would have to be included to make a complete analysis.

"Besides the items shown in the table, there are proportionate increases in the cost of refractories, brick, lumber and the hundreds of other materials of maintenance necessary for the operation of a steel plant. Furthermore, taxes and other overhead charges are higher now than they were during 1913 and 1914.

"When manufacturing costs are considered, it is quite evident, from the figures given herein, that sheets to-day at $3 per 100 lb. base are much lower in price than they were in 1913 and 1914 when the low price of $2 per 100 lb. was reached.

"The prices of Armco ingot iron black and galvanized sheets and special grades of steel sheets, such as automobile body steel, furniture steel, etc., are based upon the price of steel black sheets. The price differentials for these grades are more or less standard and have varied little during the last several years. Manufacturing costs for producing these special grades have also increased and so, when compared with pre-war prices, to-day's prices for all grades of sheets are not only lower than in 1914 but very, very much lower.

The following is quoted from a brief presented to the Senate Finance Committee, on Aug. 25, 1921, by W. H. Abbott, vice-president Wheeling Steel Corporation, in behalf of the independent manufacturers of sheet steel:

"Directly and indirectly, not less than 80 per cent of the total cost of producing steel sheets in this country, is in the item of labor. The increase in cost per ton between 1912 and the first quarter of 1921 is shown by the following schedule:

Actual Average Cost of Labor Producing Common Black and Blue Annealed Steel Sheets per Net Ton

	Year, 1912	First Quarter, 1921
Producing labor	$13.28	$22.86
Labor repairs and maintenance	.43	1.20
Total	$13.71	$24.06

A difference of $10.35—equaling an increase in labor costs over 1912 of 72 per cent."

"The 1914-1921 increase of $10.07 in the labor cost of a net ton of sheets, shown in the above analysis of cost table, checks very closely the $10.35 increase in cost from 1912 to the first quarter of 1921 shown in Mr. Abbott's brief:"

Effect of Freight Rates on the Cost of Steel

"Mr. Grace, president Bethlehem Steel Co., has made a statement explaining that if allowance is made for the increase in costs due to railroad charges, steel products are now lower than before the war. In announcing new and lower prices for steel products going into effect on July 5, last, Mr. Grace said:

The increase in freight rates has been the largest factor in increasing the cost of manufacturing steel products because the making of a ton of finished steel involves the transportation of more than five tons of raw materials. The cost factors next in importance are materials and labor.

Taking as an example the price for structural shapes, under the new schedule of prices, 2 cents a pound or $44.80 a gross ton, the comparison with pre-war prices, reflecting concretely the three more important cost factors is as follows:

1st: The increase over pre-war cost in transportation on ore, coal, limestone, scrap and miscellaneous supplies amounts to $7.85 per ton of finished steel.

2nd: The increase in the cost of coal, ore, limestone, alloys, refractories, lubricants and miscellaneous supplies at point of shipment amounts to $7.10 per ton of finished steel.

3rd: The increase in the cost of labor under the present wage scale, as compared with pre-war wages in the steel plant proper, is $5.64 per ton of finished steel.

These items account for an increase in present day costs over pre-war costs of $20.59 per ton of finished product. The new price of $44.80 for structural steel is equivalent to a pre-war price of $24.21 per ton, or 1.08 cents per pound.

Statistics covering the last twenty years show that in only one month (December, 1914) has structural been sold as low as this figure (1.08 cents). The ten-year pre-war average (1904-1913) was 1.51 cents per pound.

The figures I have used are the result of actual compilation made by the company's comptroller in the every-day conduct of the business.

"Structural steel and sheet-bars compare very favorably as to costs. Sheet manufacture starts with the sheet-bar. Considerable labor is required in converting

sheet-bars into sheets and the greater part of this additional labor is highly skilled, requiring high wages.

"Transportation and fuel costs must be very materially reduced if the present prices of iron and steel sheets are to be maintained."

Earnings of Workers in Different Industries—Earnings in June, 1921, in Comparison with Highest Wages Received

	Pay Period	Highest Period Earnings	Earnings in June 1921	Percentage Decrease from Peak
Iron and steel	½ mo.	$80.05	$43.90	45.1
Auto manufacturing	week	36.69	32.78	18.7
Car building and repair	½ mo.	76.98	66.31	13.8
Cotton manufacturing	week	23.71	17.56	25.8
Cotton finishing	week	27.33	22.40	18.1
Hosiery and underwear	week	21.71	16.58	24.1
Woolen goods	week	26.81	23.40	12.7
Silks	2 weeks	48.53	44.51	8.2
Men's clothing	week	35.71	30.09	15.7
Leather	week	27.80	23.05	13.5
Boots and shoes	week	25.07	23.33	6.9
Paper making	week	30.38	24.53	19.2
Cigar manufacturing	week	22.89	19.47	14.9

(The above taken from a Department of Commerce bulletin.)

Comparison of Percentages of Wage Reductions in Various Industries

Sheet mills*	38.6 per cent
Railroads	12 per cent
Street cars	10 to 12 per cent
Building trades	12.5 to 25 per cent
Coal mining	00 per cent
Metal manufacturing industry	17.5 per cent
Glass workers	12.5 to 15 per cent

*Taking into consideration September settlement.

Belgian Pig Iron and Steel Production

Pig iron production in Belgium during the first seven months of 1921 shows a steady decline from 112,330 metric tons produced in January to 45,330 metric tons in July. In January, 26 blast furnaces were in operation, and on July 21 the number had fallen to 14. The average number of furnaces in blast per month in 1913 was 54, averaging a monthly production of 207,058 tons.

	Furnaces in Operation	Output, Tons
Hainaut, July	6	21,400
Liege, July	5	16,340
Others, July	3	7,590
Total, July	14	45,330
June	18	68,510
May	21	75,790
April	22	96,230
March	24	106,360
February	26	105,390
January	26	112,330
		Monthly Average
1920	28	93,033
1919	13	20,881
1913	54	207,058

Production at Steel Works and Iron Rolling Mills

	Steel Works			Iron Works
	Pig Iron Output	Castings	Finished Material	Finished Material
Hainaut, July	10,390	2,090	19,940	8,730
Liege, July	9,370	400	15,270	300
Others, July	4,430	610	3,720	1,560
Total, July	24,190	3,100	38,930	10,590
June	49,230	5,850	63,100	12,410
May	57,950	5,830	64,930	11,270
April	103,140	7,270	91,940	13,290
March	91,240	6,630	93,430	10,960
February	93,310	6,400	86,370	12,270
January	114,360	6,590	93,280	18,230
	Monthly Average			
1920	99,366	5,060	94,311	13,487
1919	26,822	983	28,513	5,741
1913	200,398	5,154	154,922	25,362

The program of the twenty-eighth annual convention of the National Implement and Vehicle Association, to be held at the Congress Hotel, Chicago, Oct. 12 to 14, inclusive, includes speakers of national prominence, among them: Hon. Henry C. Wallace, Secretary of Agriculture; Hon. Herbert Hoover, Secretary of Commerce; Hon. W. P. G. Harding, Governor Federal Reserve Board; Gen. W. W. Atterbury, vice-president Pennsylvania Railroad; and William H. Barr, president National Founders' Association.

CENTRAL STEEL CO. FORMED

Merger of Three Massillon Companies Completed—Details as to Products

Steel mill properties with combined assets estimated in excess of $20,000,000 have been brought together in the merger announced by THE IRON AGE of Aug. 25. of the Central Steel Co., the National Pressed Steel Co. and the Massillon Rolling Mill Co., all of Massillon, Ohio.

The new corporation, it is announced, takes the name of the Central Steel Co. and the following officers have been elected: Chairman of the board of directors and president, R. E. Bebb; first vice-president, F. J. Griffiths; second vice-president, C. C. Chase; third vice-president, H. M. Naugle; secretary and treasurer, C. E. Stuart.

The reorganized company has outstanding 300,000 shares of no par common stock and $10,000,000 of preferred stock. The merger of the three companies brings the Central Steel Co. into prominent position among the large steel producing corporations of the country with complete modern equipment and facilities for producing all kinds of commercial alloy steels, hot and cold-rolled sheets, hot-rolled strip steel and light structural steel sections in a combined annual output of 450,000 to 475,000 tons of finished material.

The Central Steel Co. brought to the merger 10 open-hearth furnaces of 65 to 75 tons capacity, 34-in. blooming mill, 24-in., 18-in. and 12-in. finishing mills, 24-in. sheet bar mill, cold-drawing and heat-treating departments and a record of being the largest producer of strictly alloy steels in United States. The Central company annual product runs from 300,000 to 325,000 tons.

The National Pressed Steel Co., which will function in the future as a division of the Central Steel Co., is a producer of hot-rolled strips and plates and finished structural steel joist sections with a present capacity of approximately 100,000 tons annually. Equipment is all modern and includes slab furnaces, annealing furnaces, complete pickling and finishing facilities, electro-driven hot-rolling mill with gage range from No. 15 to 1 in., widths up to 24 in. and lengths up to 130 ft., cold-forming steel lumber section mills, electric welders and other equipment for furnishing steel lumber finished and painted ready for use.

The Massillon Rolling Mill Co., which also will be operated as a division of the Central Steel Co., brings to the merger 12 hot sheet mills, 16 cold sheet mills, 18 annealing furnaces and complete equipment and facilities for turning out a complete line of sheet steel. Several new buildings and new machinery were recently added to this property, most of which was just put in operation last March. The plant as it is operating produces approximately 50,000 tons of sheet products annually and the arrangement is such that an increase of 50 per cent in production can be achieved without additional buildings or power equipment. The Massillon Rolling Mill plant was designed and functions especially as a producer of sheets for the automotive industry, though sheets are also produced for metal furniture, enamelware, and the general sheet trade. The gage range is 11 to 30, widths up to 48 in. and lengths up to 120 in. on the lighter gages. Complete facilities are available for pickling, annealing, cold rolling and all sorts of finishes.

All trades and industries have been asked to cooperate in the "Perfect Package Movement" to be inaugurated by the railroads, steamship lines and express companies in the United States and Canada, in November, which has been designated as "Perfect Package Month." The purpose of the movement is to stimulate further public interest in good packing of shipments and to enable the carriers to improve the transportation service of the country. During November, an examination of all shipments sent by freight or express, will be conducted, to obtain information as to the best shipping methods carried on by the various trades and industries.

Maladjustments in the Industrial World

Economic Law Not Suspended by the War—No Time for Any Group to Assert Itself Selfishly—Problem of Unemployment Considered by a Keen Observer

BY WALTER DREW*

THE war left industry in a condition of inflation, chaos and maladjustment. The Government ceased to be paymaster, abdicated responsibility, and turned the jumbled mass back to private management to straighten out. The Government under wartime necessity discarded all economic considerations to secure immediate results and taxed the people to pay the bill. Private industry must now make good wartime loss and pay wartime obligations, but in doing this it cannot, like the Government, ignore economic laws. It must produce for these purposes, but its production must also conform to recognized and established principles. The private employer must produce at a price which will enable his goods to find a market.

Economic law was not suspended during the war. It kept on working. It is working now, and it is the one law that cannot be repealed or modified. The sooner private industry, therefore, is able to conform itself to the essential requirements of economic law, the sooner it will be in a position to take up and bear the heavy burden laid upon it. Our law-makers should learn first of all that they cannot repeal or change these essentials and that any measures they may adopt contrary to them will only retard and delay the nation's return to a healthy basis.

All in the Same Boat

This is no time for group or class interest to assert itself selfishly. We are all in the same boat and no separate interest can gain any advantage over others at this time without injuring itself. One of the first and most important matters to be corrected is the maladjustment of different branches of industry. The farmer and some other groups have already gotten down to nearly the pre-war level of production and prices. The farmer, getting only 13 per cent more for his products than before the war, cannot buy the products of an industry priced at 100 or 200 per cent more than pre-war prices. This is one example of the result of maladjustment. The farmer ordinarily is the nation's greatest buyer. His demand for the products of other industries and for the services of labor to make those products will remain at a standstill until those industries have come into line with him in the matter of liquidating costs and prices.

Another instance of maladjustment is the railroads. While they are getting a high return for service, they were left with a legacy of wartime expenses for both materials and wages which have kept them in the poverty class. According to estimates made prior to 1914, the railroads in normal times use directly and indirectly 40 to 50 per cent of the iron and steel products of the country. Now they can only live from hand to mouth, and the workers who would ordinarily be making things for the railroads to use are idle because of the lack of railroad buying power. Also, until the expenses of the railroads are much more greatly reduced, freight rates of practically prohibitive amounts must be continued in force, laying a burden upon all productive industry and most of all upon the farmer who can bear it the least.

Another instance of maladjustment is the coal situation. Under agreements which do not expire until the spring of 1922, a wage cost for coal is entailed which keeps the price of that universal essential in production and transportation at an excessive and unreasonable figure. This high cost of coal, like high freight rates, is a great burden upon production, preventing the manufacturer from reducing his costs to a level that will move his goods and, of course, preventing him also from giving employment to workmen.

Employer Not Real Wage Payer

The first great fact in employment is that it is not the employer who is the real wage payer. It is the consuming public which hires the worker and pays him for his services. But there are forty-five million wage earners in the country, and when to this number their families and dependents are added, it is evident that workers themselves constitute a very large majority of the consuming public. In other words, it is the worker who pays the wages of other workers to make things for his use. The employer is a mere middleman between the buying public and the worker. He is a salesman, as it were, of the worker's services and he cannot sell that service any more than he can any other commodity if the public refuses to buy at the price demanded. It is not in the option of the employer to give employment. It is his function only to interpret so far as he can the public demand for materials and service and to undertake to supply that demand, paying the penalty if his guess does not prove right.

Labor Cost

Another vital fact is that labor cost constitutes the great bulk (according to some economists as high as 85 or 90 per cent) of the cost of the finished product in its progress from the raw state to the final consumer. The lesson of this is clear. There can be no general liquidation of costs and a return to a normal basis, and there can be no correction of the maladjustments between the different branches of industry, until labor cost has been generally liquidated, not in one but in all fields of industry. So long as this is not done, there will be abnormal and unequal conditions remaining, which to the extent to which they exist, will retard the return to a normal basis. In building, for example, the workers insist that so long as building materials remain high building labor should not be reduced, yet the chief cost of making, handling and transporting building materials is labor cost. We have several years of back construction to make up. Mr. Hoover estimates a million and a half homes are needed, and probably seven to ten billions of dollars await investment in building when those who build or who loan money for building can be assured that the investment will be upon a basis where it will not show a future loss.

All of these conditions—on the railroads, in the mine fields, in the building situation and others—are artificial and are therefore possible of correction. They cannot be corrected, however, if individual groups are going to assert their selfish interests to the detriment of the common good. Unless there is unselfish, common and united action, we will have to await the slow but inevitable workings of economic law, paying a bitter and unnecessarily high price for our lack of collective intelligence and regard for the common welfare.

This is no time for petty politics. If the party in power does not see and act upon the necessity for a broad, statesmanlike view of the situation, it will most surely be held to account. Its one hope of continuance in power is to recognize in the largest possible way its responsibility for action in the nation's interest and in accordance with fundamental economic principles. Above all, management, to which has been shifted since the war the responsibility of bringing order out of chaos under most adverse conditions, must be permitted

*Counsel National Erectors' Association.

to function without undue limitation or unfair attack. Aside from tax and revenue legislation, which will help and not cripple industry, there is one field especially where wise legislation can be of great and immediate benefit, and that is in connection with the railroads. If this great basic industry, whose service is essential to all other industry, can be permitted to function on a basis of efficiency with proper freedom and proper responsibility on the part of railway management, a lowering of freight rates and renewal of railroad buying may be confidently looked for. Business men and the public generally are no longer sympathetic with unjust attacks upon the roads. Their sins were in the past and have been more than atoned for. Now it is time to free them to the extent that they may render full service to the country and their securities again be the foundation stone of our financial system.

Emergency measures in the way of public expenditures to relieve present unemployment should not obscure the real situation. In some ways such measures while just and necessary add to the problem, for the nation's productive industry is called upon to bear indirectly the cost of labor when the demand for marketable products is not such as to enable it to employ such labor directly. England has shown us that such a course cannot be continued indefinitely.

TAX REVISION BILL

Important Provision of the Measure as Reported By Senate Committee on Finance

WASHINGTON, Oct. 3.—The tax revision bill of the Senate Committee on Finance, which, according to the majority report, will raise $3,324,000,000 in revenue for the fiscal year ending June 30, 1922, takes into account an anticipated shrinkage of more than $1,000,000,000 in income and excess profits taxes. The sum it is estimated will be raised is $136,000,000 less than experts of the Treasury have figured would be returned this fiscal year under the present law, but exceeds by $84,000,000 the revised total under the House bill. Efforts are to be made to pass the bill in the Senate within two or three weeks, but because of opposition it is a matter of speculation as to how much success the supporters of the measure may have in bringing about its enactment as quickly as they hope. The measure was taken up in the Senate yesterday for consideration.

As pointed out by the majority report, the most important changes recommended by the Senate committee from the standpoint of revenue are:

> The repeal of the excess profits tax, which would reduce the revenue about $400,000,000 annually; the repeal of the surtaxes in excess of 32 per cent, involving an immediate loss of from $80,000,000 to $90,000,000 a year; the repeal of the capital stock tax, involving an annual loss of about $75,000,000; the reduction of the transportation taxes by one-half on Jan. 1, 1922, and their final repeal as of Dec. 31, 1922, involving a reduction of $131,000,000 during the calendar year of 1922, and an eventual loss of $262,000,000 per year; and the adoption of an additional income tax upon corporations of 5 per cent, which would increase the revenue about $260,000,000 annually.
>
> Reasons for repeal of the excess profits tax, in the opinion of the committee, have been set forth so completely from time to time that "the time for discussion is past and the time to repeal the tax has arrived."

With regard to the surtaxes, the report says:

"Your committee recommends a reduction of the maximum surtax from 65 per cent to 32 per cent in the belief that in the near future the lower surtax will, by stimulating sales and profit taking, and by making possible transactions now blocked by excessive surtax rates, not only facilitate needed business readjustments, but actually increase the revenue. In the long run, in the opinion of your committee, the 32 per cent rate will yield more revenue than the 65 per cent rate."

This Year's Returns

The report estimates returns this fiscal year from income and profits taxes at $1,880,000,000 as against approximately $3,000,000,000 of actual collections in the fiscal year ended last June 30.

It is declared in the report that the committee has acted on the assumption that, with the exception of the special railroad expenditures, which will be nearly if not wholly completed in the fiscal year 1922, the aggregate expenditure for the fiscal year 1923 will be substantially as large as in the fiscal year 1922. The special railroad expenditures included in the 1922 budget amount, in round figures, to $500,000,000; and the receipts from customs and miscellaneous sources for the fiscal year 1922 are estimated at $730,000,000. Deducting both amounts ($1,230,000,000) from the total estimated expenditures of 1922 ($4,034,000,000) leaves in round figures $2,800,000,000 to be supplied by internal taxes for the fiscal year 1923.

"The revenue bill as recommended by your committee," says the report, "will raise during 1923, it is estimated, $2,735,000,000. The difference or deficit of $65,000,000—about equal to the corresponding surplus for the fiscal year 1922—can and should be avoided, by saving and economies. Your committee deliberately recommends a tax program to meet ordinary expenditures on the present scale, and assumes that a reasonable measure of retrenchment and reductions will be accomplished."

To Relieve the Taxpayer

There is an amendment in section 250 of part 4 of the administrative provisions which is intended to relieve the taxpayer in case of additional assessments made without complete knowledge of all taxes in the case. The new provision, as proposed by the Senate Finance Committee, would extend the time for the payment of deficiencies to 18 months from the passage of the Revenue Act. This change is of vital importance to the steel industry and other branches of trade affected by the decision in the LaBelle Iron Works case.

Paragraaph "F" of section 250 makes this provision and authorizes the Commission of Internal Revenue to require taxpayers to furnish a bond with sufficient sureties conditioned upon the payment of deficiencies, in accordance with the terms of extension granted. It is provided that in lieu of other interests provided by law as a part of such deficiencies, the rate of interest on these sums shall be 2/3 of 1 per cent per month from the time the extension is granted, except where such other interest provided by law is interest in excess of the rate of 2/3 of 1 per cent. If the deficiency or any part of it is not paid in accordance with the terms of the extension, the Treasury would be authorized to add, in lieu of other interests and penalties provided by law, the sum of 5 per cent of the deficiency and interest on the deficiency at the rate of 1 per cent per month from the time it becomes payable, in accordance with the terms of the extension. These provisions were drafted to prevent undue hardship to lumber men and others who are obliged to pay back taxes, in accordance with the Supreme Court decision in the LaBelle case.

Decline of Iron and Steel Shipments

WASHINGTON, Oct. 4.—Decline in the transportation movements of iron and steel articles in the United States for the second quarter, ended June 30 of the current year, is sharply reflected when compared with the movement for the same quarter of last year.

The summary of freight commodity statistics of Class 1 roads, just issued by the Interstate Commerce Commission, makes the following comparison in net tons possible:

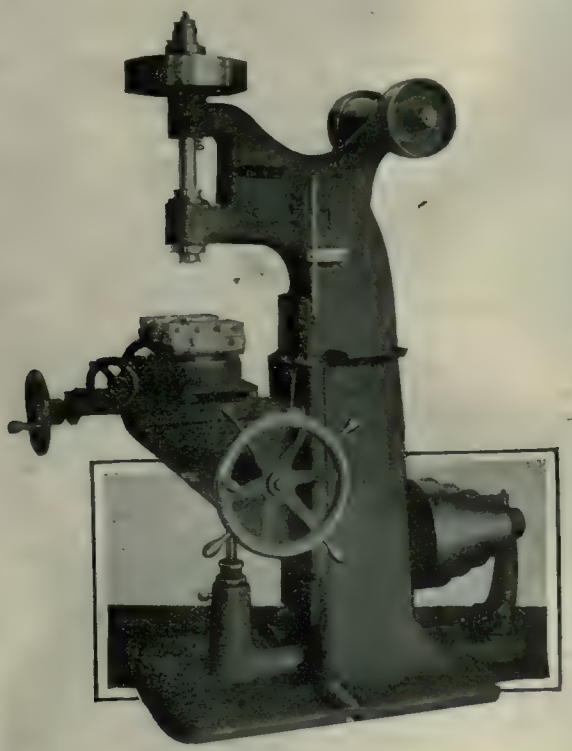
	Second Quarter Ending June 30, 1921	June 30, 1920
Pig iron and blooms	1,156,458	3,833,953
Rails and fastenings	677,702	681,401
Bars, sheets, structural and pipe	2,906,459	6,433,342
Other metals, pig, bar and sheet	488,848	1,264,703
Castings, machinery and boilers	1,093,372	2,483,828

The estimated average weekly wage in Connecticut is $26.30, as compared with $32.70 a year ago.

Improves Die Sinking Machine

Improvements intended to effect more convenient operation and easier maintenance have been made in the die sinking machines of the Pratt & Whitney Co., Hartford. The cherrying attachment shown in the illustration has also been recently developed and is offered in connection with the No. 2 and 3 machines.

Among the general improvements it may be mentioned that the driving spindle has been provided with a positive pin lock in four positions so that the chuck or collet can be tightened without holding the driving belt. The spindle pulley has a new system of oil grooving opposite to the direction of rotation so that oil is continually carried upward, providing adequate lubrication without loss of oil. A floating babbit washer takes the thrust of the cut on the spindle, a system of oil grooving distributing the lubricant evenly over the bearing surface. The main drive cone has been fitted with a hollow spindle, communicating oil holes delivering the oil to a series of felt packed grooves. To protect the ways from chips and dirt, leather wipers held by cast iron caps are attached to the knee.



Improvements Include a Positive Pin Lock in Four Positions. Cherrying attachment in non-working position. When working the arm is dowelled and clamped to a boss at lower spindle bearing

The vise capacity has been increased for larger work, the vise being strengthened in proportion. A telescopic elevating screw is now furnished in place of the old type of straight screw. The elevating wheel shaft is mounted with a thrust bearing for ease of operation and the outboard bearings for the knee and vise slides have been straightened to eliminate chance of breakage, the slides themselves being grooved and protected with covered oilers to prevent sticking.

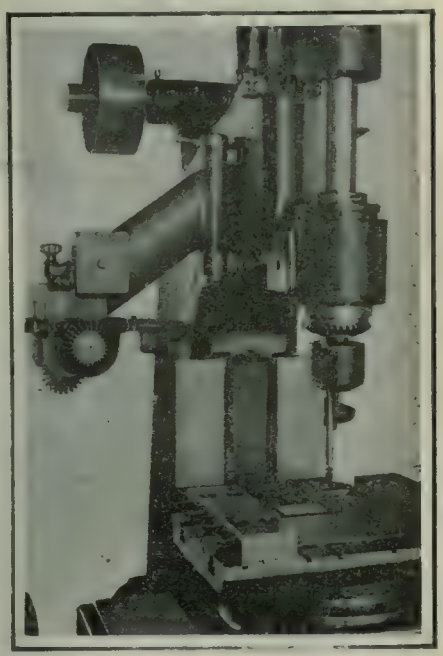
The cherrying attachment is pivoted in a bracket attached to the side of the column. When in a working position the arm is dowelled and clamped to a boss at the lower spindle bearing and the attachment is said not to interfere with the regular functions of the machine. The backs of the cutter teeth are utilized for driving the cutters. These are made in the form of gear teeth and mesh with a spur pinion. Two pinions, 8 and 12 pitch are furnished to permit varying the tooth space on small and large cutters. Bevel gears transmit the power to the cutter pinion. The end of the machine spindle is threaded to receive the driving gear. The mating driven gear is mounted on the pinion shaft by a friction adjustable for varying conditions.

Cutters from 1 to 6 in. diameter can be accommodated. The smaller size cutters are mounted on conical centers, the larger sizes being provided with a comparatively small hole for which cylindrical centers are utilized. The method of mounting the cutters on centers is such that half of the cutter diameter can be utilized.

Electrifying the Chilean State Railroad

The Westinghouse Electric International Co. recently received final confirmation of a contract to supply equipment to electrify the Chilean State railroad between Valparaiso and Santiago and the Los Andes branch. The contract covers the most important railway electrification undertaken since the beginning of the war and is the largest ever undertaken by an American firm outside of the United States. The main line, which is 116 miles long now is under steam operation and connects the leading seaport, Valparaiso, with the capital, Santiago, while the line to Los Andes is 28 miles long, and forms the Chilean State railway section of the trans-continental line to Buenos Aires. The contract, which has a total value of $7,000,000, was secured in keen competition with German and other European companies. The equipment to be furnished consists of 11 local passenger locomotives, 15 road freight locomotives, seven switching engines and five sub-stations of 4000 kw. capacity each.

The 3000-volt direct current system which will be used will be strictly American in character. The capacity of this equipment will be 50 per cent greater than the present traffic demands, and the plans have been so drawn that an increase of traffic capacity three times the present demands can readily be obtained. Owing to the abundance of water power in Chile, and the high price of fuel, all of the Chilean railroads eventually will be electrified, and the present project is the first step in this direction. This contract is the third large order for electric railway supplies recently received by the Westinghouse Electric International Co. from foreign countries in the past few months, the others being obtained from France and Japan. Other American concerns who share in the contract are the Baldwin Locomotive Works, the Pressed Steel Car Co., and the Anaconda Copper Mining Co. The Errazuriz-Simpson Co. of Chile will build the overhead construction.

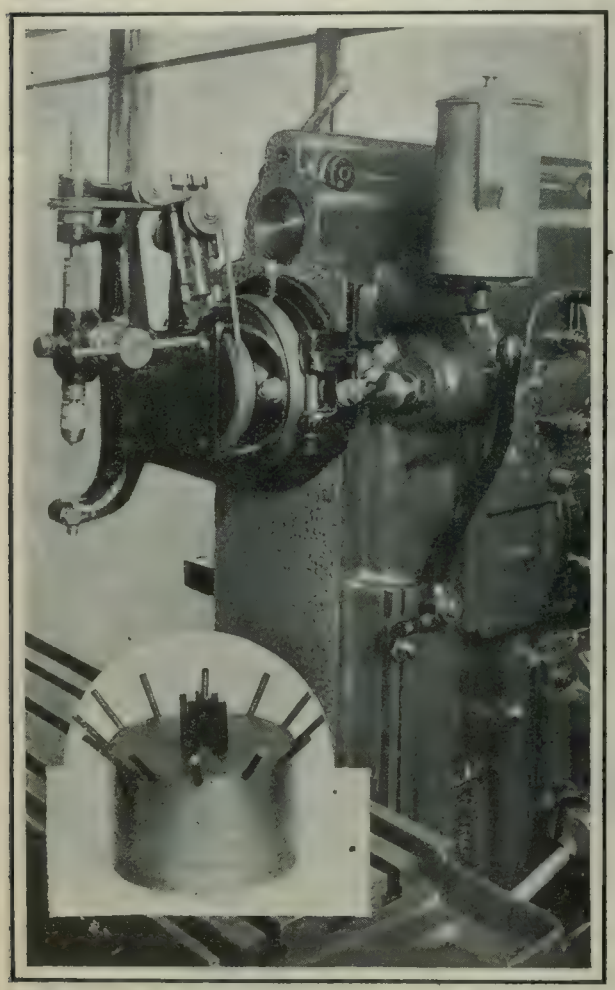


Fifteen corporations and thirty individuals were indicted by the Hamilton County grand jury, sitting at Cincinnati, on a charge of having violated the Valentine anti-trust law by conspiring in restraint of trade to maintain prices of cement. All of the corporations and the individuals are connected with the building trade industry and are users or sellers of cement. The grand jury also investigated the brick industry, but no indictment was returned.

Spotting and Routing Attachment

The spotting and routing attachment shown in the accompanying illustration, for use on milling machines, is being marketed by E. L. Krag & Co., 50 West Randolph Street, Chicago. It has been designed for the laying out and drilling of holes up to and including 3/16 in. diameter, in dies, jigs, templates, master plates and models.

The attachment is supplied for all standard makes of milling machines and is mounted by means of a swinging clamp using only one locking screw. A locating screw in the base is adjusted and locked in place and the attachment alined permanently. A driving arbor, inserted in the milling machine, is constructed with a spring dog, engaging automatically when the machine is started. The spindle is driven by a round belt kept in uniform tension by a compensating spring



Spotting and Routing Attachment Mounted on Milling Machine. In the insert the center holes have only 0.002 in. wall between. In the outer holes the drill was started on the corner

idler. The ratio of speed is 7 to 1 with the spindle of the milling machine, and feeding by the sensitive spindle enables the use of a very small drill. The knee of the milling machine is locked firmly in place, eliminating any possible sag of the table. It is pointed out that the combination of the sensitive feed, the drill support immediately above the work and the table made rigid by locking the knee accomplishes a degree of accuracy unattainable if any one of the three conditions are lacking.

The spindle housing and the bracket holding the guide bushings are cast in one piece. By turning the spindle friction plug slightly to the right the spindle can be locked firmly in any position when using the attachment for routing. Guide bushings are of tool steel. After being hardened, the hole is lapped to size and then the bushing ground concentric with the hole. The spindle pulley and idler bearings, as well as the end thrust for the spindle, run on micro-chrome balls, all bearings being ground before hardening. The attachment has full circular movement and is graduated into 360 deg. and capable of instant adjustment to any angle. For scientific instruments and other work requiring similar accuracy, the attachment can be used in connection with the Johansson compound slide.

The device is manufactured by F. K. Krag, Chicago.

May Manufacture Equipment

WASHINGTON, Oct. 4.—Investigation has been ordered by Director of the Budget Charles G. Dawes, regarding the difficulty of retaining employees and using equipment that the Washington navy yard already has for the manufacture of metal office equipment such as desks and filing cabinets, for the use of the Government. One of the difficulties that has presented itself is as to whether or not the manufacture of such materials by the Government would be in violation of its contracts with private concerns. The investigation is being directed largely to this phase of the situation. In case it is found practical to produce the metal articles referred to, it is hoped that the work will enable the Government to keep employees who have been scheduled for dismissal in line with the policy of making reduction in forces, and at the same time use up surplus supplies now on hand, resulting in supposed economies for the Government.

Government officials also make the claim that metal furniture could be turned out at the navy yard at a lower cost than the Government can buy it in the open market, though the statement is seriously questioned, because there is not the proper equipment at the yard to do this work. Moreover, surplus sheets that may be on hand are not of the highly finished kind that are required to make office furniture, and apparently the latter would have to be bought from mills. Furniture for naval vessels, however, is made at the Norfolk yard, which is equipped for this kind of manufacture.

Imports of Iron and Steel

Up to the end of August, United States imports of iron and steel from Europe this year have aggregated 17,104 tons. More than 60 per cent of the total has been pig iron and semi-finished steel, with bars and sheets and plates making up the bulk of the remainder. Belgium alone sent nearly 60 per cent of the imports, with Sweden and the United Kingdom together accounting for an additional 33 per cent of the total.

Belgium has been the chief factor in supplying pig iron and billets, but other lines from Belgium have been relatively unimportant. Sweden has been strongest in imports of bars and wire rods, and the fact that Sweden stands next to Belgium in total tonnage has not generally been recognized by current reports regarding competition of European steel in domestic markets. British shipments of sheets and plates is another significant item, but most of the others are not of enough importance to deserve special comment.

Savage Mountain Clay to Last 100 Years

According to a recent survey by the Savage Mountain Fire Brick Co., Frostburg, Md., there is enough clay in the 8-ft. veins extending into Savage Mountain to supply the plant for the next 100 years. The fire clays of western Maryland were discovered in the 50's on the eastern slope of the mountain, lying in a pitch of from 30 to 35 deg. and in an inaccessible place. The company's operations were started in 1862, having been organized by the late Lovelace M. Gorsuch. In normal times the company employs in mines and yards over 200 men, including its allied works at Potomac, W. Va.

Work has been started on the taking down and rebuilding of the trestle work for the Port Arthur, Ont., blast furnace owned by the Palatine Mining & Development Co., which acquired the furnace of the Atikokan Iron Co., at Port Arthur some months ago. The construction work is being done by Hancock & Co., who are also rebuilding the bridges and culverts on the Pee Dee Railway between North Lake and Gunflint, to give access to the Polson mine.

Safety First—Last—And All the Time

Tenth Annual Congress of National Safety Council Urges That No Stone Be Left Unturned to Insure Continuous Freedom from Industrial Accidents

OFFICERS and the executive committee of the National Safety Council realize that one of the most effective ways of making the industrial worker a safe worker is to bring safety to him through the home. They realize that the child in the public or parochial school not only is the best means of driving home to the workman the lesson of safety, but that only through succeeding generations of children, thoroughly schooled in safety principles, can the nation hope to attain safe working and living conditions. The 1900 people attending the tenth annual congress of the council, held in the State House, Boston, Sept. 26 to 30, inclusive, were urged, upon returning home, to bring all possible pressure to bear on their local school committees or other bodies or individuals governing the schools to introduce courses of safety studies.



ARTHUR H. YOUNG

Resolutions were adopted by the executive committee advocating "the safety education of all school children, as well as students of our colleges and universities, both for their own safety and to stimulate interest in the conservation of life and a better citizenship, and the mobilization of all community forces, including city and state, at safety councils, for intensive and permanent campaigns against accidents of all types." The idea is to conduct hereafter aggressive and continuous campaigns of education through the school, the press and the various civic agencies, that the interest of the whole community shall be aroused, and safety be given a place in the community life.

Work accomplished by the national body, the local bodies and individuals during the past year, as exemplified in the numerous reports by officers and committees, and the evidences of substantial advancement in safeguarding human life, limb and usefulness, are more impressive than it might be under normal conditions, due to handicaps encountered. Largely because of industrial plants closing, there was a net loss of 425 in membership, leaving 3626 at the close of the fiscal year. In addition, the general business depression made necessary a material reduction in the number employed by the National Safety Council, as well as retrenchment in other directions. Work by the local and the individual also had its curtailment in one form or another.

It is interesting to note that most companies withdrawing from the national organization during the past year did so with the signified intention of renewing membership as soon as conditions warrant a resumption of business activities, and that the national organization, despite all handicaps, is operating at 90 per cent of capacity.

Massachusetts "No-Accident" Week

The keynote of the congress was the recognition of the work, and the thorough understanding of the scope of the national body's undertakings, by the press and the New England people. Several things usually in order at previous congresses of this kind were lacking. For instance, heretofore it has been the custom to have a safety week in those cities in which the congress is held. This time the Massachusetts Safety Council, with the help of other bodies, staged a State "no-accident" week. Other New England states were interested in the movement, and the co-operation of public and private institutions, industries, and of individuals and organizations was such that unquestionably it was the biggest no-accident demonstration ever attempted.

Standardization in analyzation of accidents, discussed annually, took an entirely new angle as a result of a paper, Analysis of Accident Cases—a scientific method based on the actual causes of accidents, regardless of the medium through which they occur, prepared by H. W. Lueck, Commonwealth Edison Co., Chicago, and presented by Homer E. Niesz of that company. In theory, the proposed method generally was considered fundamental, but the suggestion invited considerable discussion.

Mr. Lueck presented a basis for analyzing accidents as to cause, which materially differs from the analysis which for many years has been adopted, officially or unofficially, as standard. The purpose was to present a list which covers industrial accidents of all types, whether occurring in connection with the operation of a public utility, a steel mill, a mine, or some other branch of industry.

Standardized Analysis of Causes

"For many years there has been a demand for a means of supplying information to the one in charge of safety work, which will enable him to lay his hand on the causes of the accident, whether these causes be methods, conditions, equipment or personnel. Without this information a safety supervisor must of necessity work in the dark. The aim of accident statistics has been to fulfill this need, but those charged with the responsibility of reducing accidents know only too well that the mark has been missed.

"For example, we find from the old analysis that nearly 20 per cent of all accidents occurring in the electrical industry are caused by 'handling material.' With this information, where is the safety supervisor to start in his efforts to eliminate this class of accidents? Perhaps some of these accidents are caused by men attempting to lift weights beyond their strength to move. If so, the primary cause of the accident is an attempt to do a class of work beyond the ability of the injured. Possibly some of these so-called handling material accidents are caused by needless haste, contributory negligence of others, lack of proper instruction or other causes. If so, this fundamental cause is the information which the safety engineer must have, in order effectively to combat accidents which, under the old system, would be buried under the general heading—handling materials.

"For some time, particularly during the past two years, much has been said concerning the need for standardizing accident statistics. Each branch of industry has a classification which differs from the other branches, and even within a particular industry there is a lack of uniformity which makes it extremely difficult, if possible at all, to combine statistics. Several committees are working on standardization. It is evident that the primary step to be taken is to adopt a classification which will be adaptable generally, and which will be of most value to the man directing accident prevention.

"Statistics obtained from an analysis of accidents which include any but primary causes are obviously misleading. Secondary or contributory causes should of course receive attention, but there is time for this when the much more important work of controlling the actual causes is well in hand. In the classification presented herewith are twenty-three causes of accidents, each primary in character. Any advantage gained from the use of classifications now in general use is

obtainable through the adoption of the one here submitted, and in addition there are here a number of new features of decided importance."

Reasons Why Accidents Occur

This classification is, to a certain extent, a tabulated analysis of reasons why the human element fails to function. This is obviously a point in its favor, if the statement so often heard and so seldom verified is true, that 85 per cent of industrial accidents can be attributed to carelessness. The twenty-three causes of accidents as given were:

A—Lack of proper supervision:
1. Altercation
2. Class of work beyond the ability of injured
3. Defective tools or devices
4. Improper tools or devices
5. Lack of proper instruction
6. Method pursued not suitable for work
7. Protective devices not used
8. Rules not observed
9. Safety appliances not provided
10. Defective material
11. Lack of proper inspection and maintenance

B—Shortcomings of workman:
12. Contributory negligence
13. Conceit
14. Intemperance
15. Lack of concentration
16. Mechanical manner of doing work
17. Needless haste
18. Physical condition of injured
19. Poor judgment
20. Stubbornness
21. Wilful carelessness

C—Miscellaneous:
22. Elements
23. Non-industrial

It was contended that either the present or the new classification should be adopted, rather than both; that this classification offers for the first time an opportunity for standardization of causes, regardless of the industry involved. It was pointed out that certain modifications or amplifications can be made to adapt this classification to any particular industrial branch, and the different classifications were taken up in detail as to application.

One point was brought out vividly in the almost numberless discussions and papers on accident prevention. In previous years there was, due to business conditions, the question of whether industry had the right to make wearing of safeguards by workmen a condition of employment, resulting in a wide divergence of opinion. The concensus of opinion, as expressed at this congress, was that industry has that right, and innumerable instances were shown where important industries are exercising it. It also was definitely established that the day has passed when industrial management considers "safety first" a luxury. Instead, it has become a necessity.

Responsibility of the Foreman

The foreman, as usual, was the subject of much discussion, insofar as his relation to "safety first" instructions to workmen, and the carrying out of those instructions, are concerned. It repeatedly was stated, as many times before, that the safety engineer looks to the foreman as the best means of getting across the safety idea to the workman. But more emphasis was placed during this congress on the foreman's being held responsible for the safety of employees under him. The impression gained is that hereafter he will be more conspicuous in safety work.

Illustrations of the general attitude toward the foremen are found in the remarks of General E. L. Sweetser, commissioner of labor and industries, State of Massachusetts, who said: "If I could fix the responsibility of the accident on the foreman, or any other one in charge, instead of the one insured, I would do so," and in the remarks of J. F. Tinsley, general manager Crompton & Knowles Loom Works, Worcester, Mass., who said: "When we succeed in getting our foremen thoroughly imbued with a safety consciousness, we will have made a gigantic stride in solving the present phase of the industrial safety problem. Any lack of results to date must be attributed in a large measure to the fact that on safety our foremen are still 'at large.' We must see to it that they are put 'in captivity' as soon as possible."

Metal Section Discusses Foundries

The first session of the metal section was given over entirely to foundry problems. A. B. Root, Jr., mechanical engineer Hunt-Spiller Mfg. Corporation, Boston, in a talk on Safe Practices in Pouring in a Foundry, confined himself to safety measures in his particular plant. In connection with safety appliances used in pouring, he displayed an apron which attracted considerable attention. It is used only by men pouring from large ladles, is made of asbestos, puts on over the head, and covers the man to below the knees, tieing around the waist. Although stiff at first, it soon becomes pliable, and has materially reduced burn accidents. Mr. Root pointed out that the apron shown in the National Safety Council books covers a man only a distance of approximately 12 in. from his waistline.

Although the application of gas masks has materially increased, 95 diversified industries using them since the war, their development during the past two or three years has been along lines other than general design, as was revealed in an address by Capt. Guy H. Burrell, Mine Safety Appliance Co., Pittsburgh, accompanied by latest mask models. In the discussion, emphasis was laid on the various gas hazards encountered in by-product coke oven plants, and the seriousness of these from the humanitarian standpoint.

Previous to Capt. Burrell's talk, these same dangers frequently were referred to in a paper on The Hazards of a By-Product Coke Plant, prepared by F. F. Marquard, superintendent By-Products Plant, Clairton Works, Carnegie Steel Co., Clairton, Pa., the largest by-product plant in the country, and presumably one of the best equipped with safety appliances. The inference drawn from these two addresses is that the day is passing when men will give up their lives in performing hazardous duties in places where deadly gases are encountered.

Safe Practises in Rolling Mills

Many papers presented, on the best measures to be taken to safeguard workmen, were of a personal nature, dealing mostly with appliances used in individual plants or departments. The paper by Fred Johnson, superintendent of rolling mills, South Works, American Steel & Wire Co., Worcester, Mass., on Safe Practises in Rolling Mills, given before the metal section, is a case in point. The hazardous nature of work in a rolling mill is generally recognized, and results obtained in safeguarding lives in such mills are all the more significant because of this fact. Mr. Johnson went into detail concerning those measures taken in his particular plant, and the reasons for them.

He gave figures, compiled by years, from 1912 to date, treating with sixteen different kinds of accidents, from the most trivial to fatalities. In 1912 there were fifty-five accidents in his department; in 1913, thirty-eight; in 1914, twenty-three; in 1915, thirty-two; in 1916, fifty-one; in 1917, twenty-five; in 1918, eighteen; in 1919, five; in 1920, two; and so far this year but one. During those years when accidents were more numerous, 35 per cent of the total each year concerned hand and foot accidents, and the largest percentage of foot accidents resulted from unloading hot billets, falling from buggies as they came from the blooming mill. He said in substance that successful efforts were made in the steel industry to reduce accidents, long before the National Safety Council was organized.

"In years gone by, the success of rolling mill operations was gaged by tonnage produced and cheapness of production. When I was put in charge of our rolling mill, we, like our predecessors, had 'big tonnage' and 'low cost' absolutely in mind, as the main things we should strive for. And, like our predecessors, we strove for them. And, still like our predecessors, we attained them.

Tonnage and Cost Not Now First

"Of course, during all this striving for big tonnage and low cost, we kept hearing from our officials 'safety first', but it never once occurred to us that they actually meant it—not first, before tonnage and cost. I distinctly remember Judge Gary saying 'safety first' fifteen years ago. And so for several years we worked for safety first—after tonnage and cost. But the time came when some of us 'waked up' to the fact that this safety first talk meant safety first, not after production and cost, but first—ahead of everything.

"It was inconceivable to some of us who had come up from the bottom that our superiors meant it. Just how they convinced us that they meant it is of individual experience. There came a time when I realized that my success as an individual depended not first on record tonnage at low cost, but first on the freedom of my department from accidents.

"Let us say, then, the cornerstone of safe practises in rolling mills is a determination on the part of our executives to produce safety first—then produce steel; and the realization of everybody in the organization, particularly the workmen, that this is what is wanted and will be insisted upon.

"To-day things are different—so different that I sometimes give way to the feeling that we are getting to be mollycoddles, some of us play the game so safely. But the fact of the case is, we are preaching and getting across to our men the fact that they must not take chances. Now, if anything goes wrong, our men do not jump in as they would in battle, regardless of consequences, and sacrifice everything, rather than let the mill stop. And this is a big factor in eliminating accidents."

Automobile Accidents Stressed

The remarkable growth of the automobile industry during the past few years, and the injection of the motor truck into our national transportation problem, together with the large percentage of accidents and fatalities directly due to the automobile, necessarily occupied a conspicuous place in the deliberations and discussions. It was pointed out that in Massachusetts alone 60 per cent of travel is on highways, and 40 per cent of freight moved is done with motor truck. Conditions the country over are much the same. The importance of motor transportation, especially from the freight standpoint, is more likely to increase than to decrease. It therefore is necessary for all states to co-operate in the adoption of a uniform system to combat accidents, and of uniform truck weights and speed schedules, for there are not enough dollars in the United States to allow the automobile transportation problem to go on unrestricted.

In 1892 it cost Massachusetts $2,800 per mile to construct good roads, ten years later it cost $6,000, while to-day it is costing $40,000. Various states already are nearing the taxable limit in road construction and safety first expenditures. The motor truck must not be kept off the road; it must be kept on the road. So dependent is industry on transportation, however, that unless we are able to work out wisely a solution to the highway problem, we shall find the United States handicapped in keeping people employed.

Officers for the Coming Year

Arthur H. Young, manager industrial relations International Harvester Co., was elected president for the ensuing year, to succeed Charles P. Tolman, chairman manufacturing committee National Lead Co., New York.

Among the twenty-four directors elected to serve three years are: C. B. Auel, Westinghouse Electric & Mfg. Co., Pittsburgh; C. H. Blakemore, Norfolk & Western Railway, Roanoke, Va.; Robert W. Campbell, Illinois Steel Co., Chicago; C. B. Connelley, Department of Labor and Industry, Harrisburg, Pa.; A. E. Davidson, Chesebro-Whitman Co., New York; Marcus A. Dow, New York Central Lines, New York; E. H. Fiesinger, Solvay Process Co., Syracuse; George T. Fonda, Bethlehem Steel Co., Bethlehem, Pa.; Robert Herdegan, Dominion Forge & Stamping Co., Ltd., Walkerville, Ont., Canada; Dexter F. Kimball, Cornell University, Ithaca, N. Y.; Harold A. Ley, Fred T. Ley & Co., Springfield, Mass.; R. M. Little, director of rehabilitation State of New York, New York; C. G. Rice, Pittsburgh Railways Co., Pittsburgh; L. A. Shondy, Bethlehem Steel Co., South Bethlehem, Pa., and R. J. Young, Illinois Steel Co., Chicago.

The following were elected directors to fill vacancies caused by death or resignations: George E. Morgan, Otis Elevator Co., New York, and Fred M. Wilcox, Industrial Commission of Wisconsin, Madison, for the term ending 1922, and L. D. Burlingame, Brown & Sharpe Mfg. Co., Providence, R. I., for the term ending 1923.

Section Officers Elected

The metal section elected the following officers for the coming year: Chairman, J. R. Mulligan, Bethlehem Steel Co., Bethlehem, Pa.; vice-chairman, John A. Northwood, Cambria Steel Co., Johnstown, Pa.; secretary, Walter Harte, Jones & Laughlin Steel Co., Pittsburgh.

The construction section election resulted as follows: Chairman, F. A. Davidson, Dwight P. Robinson Co., New York; first vice-chairman, Frank S. Robinson, General Builders' Association, Detroit; second vice-chairman, W. F. Ames, McClintic-Marshall Co., Pittsburgh; secretary, J. H. Schultz, James Stewart & Co., Inc., New York.

Officers elected for the coming year by the automotive section were: Chairman, A. L. Kaems, Simmons Co., Kenosha, Wis.; vice-chairman, E. F. Blank, Buick Motor Co., Flint, Mich.; secretary, M. K. Averill, Dodge Brothers, Mishawaka, Ind.

A new section, the Drop Forge, was organized during the congress, of which E. C. Evans, Wyman-Gordon Co., Worcester, Mass., is chairman; C. A. Smith, Pittsburgh Knife & Forge Co., Pittsburgh, vice-chairman, and G. A. Kuechenmeister, Walkerville, Ont., Canada, secretary pro-tem. The election of the chairmen of the program, membership and bulletin committees was placed in the hands of the executives. It developed that the American Drop Forge Association was strongly in favor of a drop forge section.

Western Railroads Make Much Better Showing

August earnings of Western roads, just announced, were larger than had been generally expected, and are regarded as a sure indication of the steady revival in business conditions. The Chicago, Burlington & Quincy showed a net operating income of $4,375,960 as against a deficit of $4,566,998 in the same month of 1920. The net income for August, 1921, is the third largest in history, and not taking into account certain unusual adjustments which swelled the revenues of its largest month, stands second to August, 1918, when the net income was $100,000 larger. The Atchison, Topeka & Santa Fe reports a net operating income of $8,379,406 for August, 1921, as against a deficit of $3,869,266 for August, 1920. Reports of the Chicago & Northwestern, the Chicago, Milwaukee & St. Paul, the Illinois Central and other lines, are of a similar character.

Not only are railroad earnings increasing but car loadings are steadily growing larger. According to a report by the Car Service Division of the American Railway Association, 853,762 freight cars were loaded during the week ended Sept. 17, or 105,644 more than during the first week of the month, when the observance of Labor Day caused a temporary decline in weekly totals.

The loadings of the week were also the largest since Dec. 4, 1920, but were still 137,404 cars short of the number loaded in the corresponding week of September, 1920.

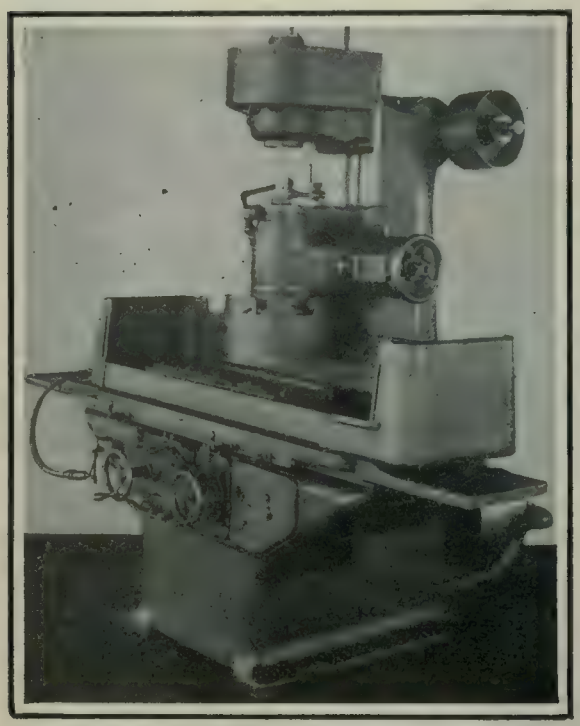
Absorbed by English Electric Co.

The plant and business of the Canadian Crocker-Wheeler Co., at St. Catharines, Ont., has been taken over by the English Electric Co. of Canada, Ltd., which was recently incorporated, by the parent organization, the English Electric Co., Ltd., London, England. Important developments are in prospect at the St. Catharines plant as a sequel to its purchase by the British firm. The new concern has secured a large order from the Hydro-Electric Commission, and another contract has been entered into with the Toronto Transportation Commission. The Canadian company will pay special attention to the manufacture of electrical equipment and rolling stock for railroads and tramways and of switchgear and control apparatus of all kinds.

Improves Vertical Surface Grinder

New features have been incorporated in the 14-in. vertical surface grinding machine of the Pratt & Whitney Co., Hartford. The machine is of the movable platen type and is shown in the accompanying illustration.

The ball bearing mounting of the spindle has been redesigned, the weight of the unit being carried on springs set against the upper bearing. This is intended to provide an automatic take-up so that no adjustment for wear is necessary. Lubrication in the upper section is provided for, the oil dripping from



Hand Operation of the Table Has Been Simplified by a Sliding Gear in Place of a Clutch on the Hand Wheel Shaft

regulation oilers through the bearing and falling into whirling cups which throw it back into the bearing by centrifugal force. In the lower section the oil flows from the reservoir through the upper bearing and runs along the spindle to the lower bearing, the grinding wheel face plate acting as a retainer and ribs in this plate throwing the oil continually up into the bearing by centrifugal force.

An aperture in the column with a removable cover provides access to the spindle counterweight. The table drive has been strengthened by hardened shafts, gears and clutches, lubricated from sight feed oilers. The drive shaft unit is removable as split bearings are now used. Hand operation of the table has been simplified by providing a sliding gear in place of a clutch on the hand wheel shaft. The table reverse has a dwell in the pinion drive so that the table comes to a stop before reversal takes place, an arrangement said to eliminate jumping and protect the clutch mechanism. The feed shaft has been fitted with a keyed coupling for easy removal of the main drive unit. The main drive belt idlers are now equipped with roller bearings lubricated by grease cups.

The tank has been redesigned. A series of baffle plates cast integral with the tank are provided with openings alternately at top and bottom. The solution flows over and under these plates in a manner intended to provide clean solution, free from grit, to the last compartment from which it is pumped back to the work. The settling pan can be lifted off giving accessibility to all compartments. To add to the oil retaining capacity of the main drive cone at the rear, the hollow stationary shaft, keyed to the bracket is provided with grooves packed with felt, the grooves being connected to the center oil hole.

The motor drive is provided with an adjustable base to permit correct adjustment of the drive belt to the step of the main drive cone. This is said to prevent creeping and curling in the corner. The drive for the rotary tilting chuck, plain and magnetic, is now equipped with a flexible coupling to facilitate mounting the unit and aligning the drive shaft. The demagnetizing switch has been improved to make the current reversal positive, quick and smooth.

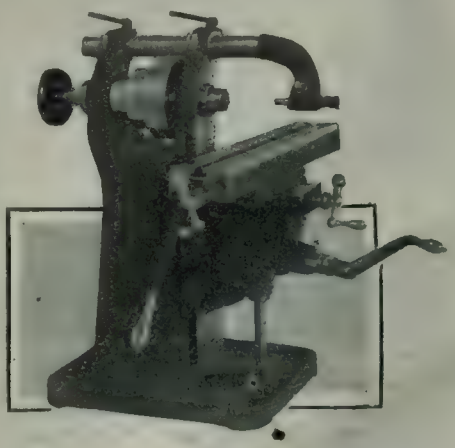
New Bench Hand Milling Machine

The Pratt & Whitney Co., Hartford, has recently brought out the new bench hand milling machine shown in the accompanying illustration. It is designated as the No. 3.

The regular equipment includes the overhanging arm, drawback, set of wrenches and 2-speed wall countershaft. The bench space occupied is 25 x 22 in., the height 21 in. and the weight 185 lb. net. The spindle and drawback are the same as in the company's No. 3 bench lathe and all bench lathe spindle attachments will interchange. The table will accommodate attachments conveniently and accurately, and in addition, is adapted for the No. 3 bench lathe head and tailstock.

The table working surface, sides 30 deg. angle, is 17½ x 2¾ in. The maximum longitudinal travel of the table is 8¼ in., with screw and 4 in. with rack. The maximum and minimum distances from center of the table to the end of the spindle are 2⅞ in. and 15/32 in. respectively. The table transverse adjustment with screw is 2 7/16 in. The minimum distance from table top to center of spindle with overhanging arm in down position, is 7/16 in. The maximum vertical adjustment of the table from center of the spindle is 6½ in. with screw, no vise and 4 3/16 in. with screw, with vise. The width of the table slot is 0.45 in.

Micrometer dials are graduated in thousandths on all screws. The spindle is of tool steel, hardened and ground, and is made conical at the front end. The front bearing is double taper and of tool steel, hardened and ground, the rear bearing being of non-gran bronze. Both bearings are adjustable for wear. The hole through chuck seat is 0.650 in. Spindle speeds are given as 153 to 1510 r.p.m. and the cone steps as 2½,



The Spindle and Drawback Are the Same as in the Company's No. 3 Bench Lathe, and All Bench Lathe Spindle Attachments Will Interchange. In addition, the No. 3 bench lathe head and tailstock may be used

3½, 4½ in. in diameter. Countershaft speeds are 128 and 512 r.p.m.

Additional equipment is furnished upon order, including a vertical milling attachment which is mounted over the spindle nose, a plug draw-in collet supplying the drive. The overhanging arm is reversed and the attachment clamped to it, an arrangement making for stability.

The American Society of Lubrication Engineers will hold its first annual convention in Chicago on Oct. 13 and 14. The society was established to promote a better understanding of the problems of lubrication and the use of liquid fuel. The convention will be open not only to members of the society, but to all interested. J. L. Overholt, Monadnock Block, Chicago, is the secretary.

Effect of Exchange on Machinery Exports

Practical Man Presents Interesting Phases of Present Conditions, Showing Fallacy of Claim That a Depreciated Currency Is Desirable

WASHINGTON, Oct. 4.—Recent press comment seems to betray a great deal of confused thinking on the subject of the influence of European exchange rates on our foreign trade. Great stress has been laid on compensation paid German labor, and little or nothing is heard of the effect of exchange on the other items entering into the total cost of production in countries having depreciated currencies. A keen observer, who has had practical experience in the machinery business, considers a hypothetical case and discusses the situation as follows:

"Let it be assumed that in 1913 Argentina purchased a locomotive at about $35,000 United States currency, having received tenders for it from German and American manufacturers and that both bids were substantially equal. Also assume that of the elements entering the cost of this locomotive, the raw materials, labor and overhead were equal so that if transportation, etc., cost $5,000, the items in the cost of the above engine would represent: Labor, $10,000; raw materials, $10,000; overhead, $10,000.

"Now if Argentina were to enter the market again in the near future for a locomotive of somewhat smaller size so as to have the same delivered cost in the present market, the situation as applied to the proposed American unit would probably be somewhat as before, but the costs applying to the German equipment would be profoundly changed.

Pay of German Machinists

"German machinists in 1920 were receiving about 264 marks per week as compared with the 24 marks they received in 1913. Other labor is paid from 10 to 20 times the pre-war rates. But as the mark has depreciated to, say, 5 per cent of its former value, German labor is receiving far less than the old rates. On the other hand, it is obvious that the standards of living of German labor cannot be greatly reduced for a considerable period, and as so much of the German food supply is imported, it appears that the above condition cannot continue very long.

"The situation with regard to raw materials is less disconcerting. If they can be produced in Germany, the cost would probably compare with that of labor, for to a great extent the cost of raw materials is the cost of the labor needed to produce them, and, although the German prices as expressed in marks are very high when compared with prices in the world's markets, these prices are still low. But for raw materials as well as labor, there is a strong tendency for the German price to rise to the level of the world's markets.

"In those cases where the raw materials are not produced in Germany, it is obvious that the German manufacturer would need to pay the full price for them in the world's markets and, apart from fluctuations, exchange would not influence the transaction.

Most Profound Influence

"But it is in connection with overhead that the most profound influence is felt. A bond for 10,000 marks issued in 1910 can still be redeemed for 10,000 of the present day marks, unless it was one of the issues specifying gold or had some similar restriction. Other forms of invested capital are in a like predicament.

"If the Hamburg-American line paid a 10 per cent dividend in 1913 and again in 1921, the real value of the latter dividend was probably about 5 per cent of that of the former year or only a negligible return upon the gold value of the original investment. Even in the case where some German firm to-day pays a 100 per cent dividend, it only corresponds to about a 5 per cent return on the gold value of the stock at its former par.

"For these reasons, it is clear that present quotations made on German made machinery in the various competitive overseas markets represent a great deal of uncertainty as to the overhead charges included.

"It may be inferred that in most cases the overhead charges are not in line with those necessary in other countries. This situation is also only temporary. German capitalists are suffering seriously and will make every effort to regain the old position, but this can only happen when specie payments are resumed, and this required 15 years in the United States after the civil war.

"For the purposes of this article the new cost of the smaller German locomotive mentioned above can be assumed to be somewhat as follows: Labor, say, $7,500; raw material, say, $7,500; overhead, say, $500; transportation, say, $5,000; total, $20,500.

Taxes in Germany

"It is possible that something like this has happened, but even at that the analysis is far from complete. Taxes in Germany are now very heavy and must be further increased. Also, there is the 26 per cent export tax under the reparations agreement. There are other items too numerous to consider here.

"Generally speaking, in international trade the exchange rate is not so serious a matter. After a time relative values are established and business can be conducted on almost any basis so long as it is stable. But when exchange fluctuates, business suffers. It becomes too much of a speculation and conservative managers find it necessary to allow a margin in their estimates so that they will be protected. During recent months, American exporters have had a great advantage over their British competitors in their trade with Japan, because the London rate has been fluctuating widely while the New York rate has been relatively steady. While, at first, this may seem a small matter, it has real importance and German bidders in South American and Asiatic markets now frequently submit their bids in United States or British currency.

Fallacious Reasoning

"It has sometimes been suggested that it is an advantage to have a depreciated currency, and that Great Britain has deliberately accomplished this in order to have an advantage in international trade. The fallacy of this reasoning may be suspected from the keen spirit all Europeans manifest in their efforts to reestablish their former exchange rates. Also, Italy has recently taken official notice of the superior position of the United States dollar among the currencies of the world. Following the American civil war this country did not enjoy real prosperity until specie payments were resumed in 1879. Those who lived through those years of reconstruction can give personal testimony to the hardships inflicted by 'greenbacks.'

"In appraising the effects of exchange on Germany's foreign trade, it is very important to consider the amount of the overhead burden included in the ultimate costs. While it is well known that German labor is inadequately paid, it is obvious that most of the gain acquired through exchange, as shown in German quotations abroad, is at the expense of capital invested in Germany and so soon as this fact is realized by those capitalists, it probably will be discontinued.

"It has been said that 90 per cent of the cost of a steel ship, considering everything from the ore mine to completion, is labor, so that German quotations abroad for new vessels will probably be controlled very largely by the labor item. At the other extreme, the overhead is the controlling item in the cost of producing dyes, and the effect of present exchange rates should be profound. As for machinery, each class may be considered correspondingly."

New Sizes of Turret Rotary Shears

Three new sizes of the Southwark-Gray turret rotary shear have been added to the line of the Southwark Foundry & Machine Co., Philadelphia. They are designated Nos. 0, 2 and 3, for material 16 gage, 8 gage and ⅜ in., respectively.

The underlying principle of this design was outlined in a description of the No. 1 shear, appearing in the May 27, 1920, issue of THE IRON AGE, page 1527. Stated briefly, the cutters while working can be changed to any degree of a circle enabling the machine to shear various shapes without turning the sheet or plate dur-



The Cutters Automatically Feed the Stock Through the Shear. Both cutters are power driven

ing the cut. Furthermore, the shear cuts any shaped openings up to double the throat depth at any distance from the end of sheets or plates, regardless of length. Cuts as wide as the throat depth are made in one continuous operation, greater widths up to double the throat depth being cut by first shearing in as far as possible from one edge and then giving the material a half turn or turning it over and the balance of the cut made from the opposite edge.

The line to be cut is followed by means of the turret, which is revolved by the guide wheel, the course of the cutters being changed to follow the line in the same way that the course of an automobile is changed by means of the steering wheel. When the position of the cutters is changed the direction of the feed is correspondingly changed. The cutters automatically feed the stock through the shear, although the material may be guided through by hand if desired. In the larger sizes both cutters are power driven.

The machine shown in the accompanying illustration is the No. 3, the throat depth of which is 36 in., the cutters 4 in. in diameter, and the cutting speed 10 ft. per min. The height is 6 ft. 6 in., the length 7 ft. 3 in., and the width 3 ft.

Fighting for the Open Shop

The strike called against the Wheeling Steel Corporation appears to be petering out. The company has succeeded in reopening its Portsmouth, Ohio, works and has enough orders and a sufficient force of men to keep the plant going. It is believed by the officials of the corporation that when enough orders have been accumulated to warrant a resumption at their Wheeling and Yorkville, Ohio, works, they will not have much trouble in getting together a sufficient working organization. The company shows no indication of abandoning its fight for the establishment of the open shop principle in its various plants, and unlike other previous efforts in this direction, public sentiment largely is with the company this time. Building trades unions appear to have lost the fight in this city to maintain the closed shop and a good deal of new construction is in progress which is entirely on an open shop basis.

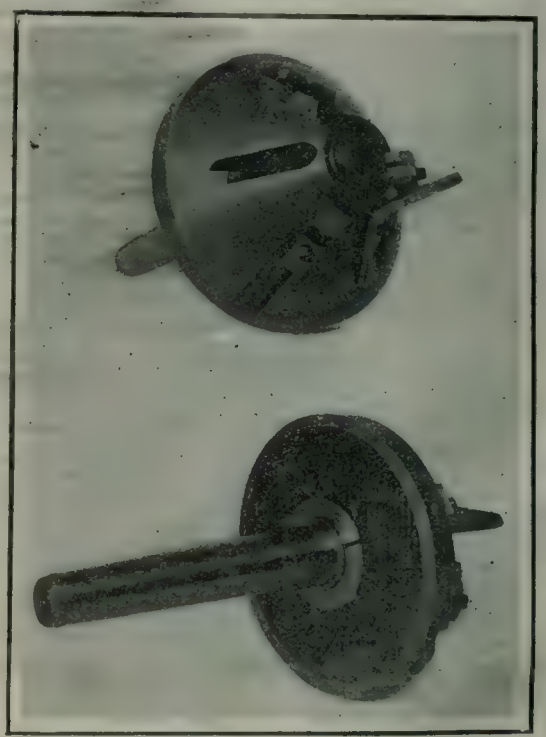
Business sentiment is much more cheerful than it was even as recently as three or four weeks ago, and while nobody expects a sudden revival, the belief is general that the worst has been seen and that there will be a steady, gradual upturn in orders during the remainder of the year.

Universal Piston Grinding Attachment

A universal piston grinding attachment, known as style No. 509, has been brought out by the Norton Co., Worcester. It is furnished only with the company's autopart regrinding machine, with which it will be included as part of the regular equipment.

The attachment can be used on pistons from 2¾ to 7½ in. in diameter. As shown in the accompanying illustration, the fixture consists of a dead center upon which revolves a cast iron cone having three dove-tail slots. In each slot there is mounted a hardened tool steel, slidable member, the upper surface of which is ground conically. This upper surface is parallel to the bottom of the slot so that the movement of the jaw is along an element of the cone. The jaws have a transverse groove to permit the corner of the wheel to travel beyond the piston. The jaws are also slotted longitudinally and locked in place by a taper pointed screw.

The surfaces upon which the piston rests being elements of a cone, an accurate setting of the jaws is unnecessary, being merely set by the eye to bring the clearance groove into proper position. The cast iron cone revolves upon the end of a dead center on a conical bearing, and is driven by the regular drive pin ex-



Universal Piston Grinding Fixture for Use with Auto part Regrinding Machine. It will take pistons 2¾ to 7½ in. in diameter

tending from the face plate of the machine into the cored slot shown. The piston is driven by a spline made of a small piece of sheet steel screwed to the side of one of the jaws. A shallow slot is filed in the skirt of the piston to engage this spline. For cases where slotting the skirt is not desired, a special driver is furnished.

The bearing of the cast iron cone on the end of the dead center is tapered, wear being taken up by turning a split adjustable thread collar immediately in back of the cast iron piece. Oiling facilities are provided by means of drilled holes leading from the back of the center to the inside of the bearing.

Meeting of the American Engineering Council

Dean Cooley Elected President—Action Taken on Patent and Government Contract Matters and Engineering Employment Service

THE election of Mortimer Elwyn Cooley, dean of the College of Engineering and Architecture of the University of Michigan, as president of the American Engineering Council of the Federated American Engineering Societies was announced at a meeting of the executive board of the council held at the Cosmos Club in Washington on Sept. 30. Dean Cooley assumes office at once and will carry out an extensive program in the interest of the public and the profession of engineering.

The new head of organized engineering is a past president of the American Society of Mechanical Engineers and has a long record of distinguished service in education, under the government and in private capacities. He was born in Canandaigua, N. Y., March 28, 1855, and was graduated from the United States Naval Academy in 1878. Mr. Cooley was vice-president of the American association for the Advancement of Science in 1898; director of the American Society of Civil Engineers, 1913 to 1916; vice-president of the Society for the Promotion of Engineering Education, 1908-09, and president of the Michigan Engineering Society in 1903.

Resolutions on Patent Matters

The council adopted the report of the committee on patents, headed by Edwin J. Prindle, New York, urging the passage of the Lampert bill to remedy conditions in the Patent Office, which, the committee asserted, were menacing the nation's industrial and agricultural welfare. A resolution approved by the council expressed the conviction that the Lampert patent office bill "provides the least increases in force and salaries which can possibly stop the retrogression of the Patent Office and enable it to make progress toward recovering an efficient condition, and by increases in the fees for patents, supplies the funds necessary to enable the Patent Office to continue to be self-supporting."

The committee opposed the passage of the Stanley Senate bill which provides for an amendment to the Patent act, requiring that patents to aliens be granted with a condition that unless such patents be worked in this country within two years after the granting of the patents, the government may grant licenses under them.

Employment in Engineering

The executive board engaged in a long discussion of the report of the special committee on employment, finally appointing a committee of the board to draft resolutions which would crystallize the general thought brought out by the discussion. The committee reported the following resolutions which were adopted:

"Whereas, the need is pressing for a unified employment service for engineers, national in scope, local in application, and financed for adequate service, and

"Whereas, the contributions which the constituent societies of the Federated American Engineering Societies are able to make to the employment bureau have been found inadequate to provide an employment service such as engineers require, therefore, be it

"Resolved: That the executive board of the American Engineering Council endorses in principle a paid employment service but in the reduced fees to members of organizations supporting said service, and be it further

"Resolved: That a committee of five members of the executive board be appointed by the chairman and that the boards of direction of the four founder societies be requested each to appoint a member of its board in order to form a joint committee of the nine members on engineering employment with the power to organize an employment bureau on a plan which will invite the co-operation of interested organizations."

The question of government contracts was discussed by the board, which made recommendations, among them the following:

Basis of Government Contracts

"That government work be normally carried out through unit price, or lump sum contracts, or by the purchase and hire method; where none of the above methods are applicable to conditions, that the cost-plus method be used in which the contractor is refunded the actual cost of the work, plus an accorded compensation which increases if the work is done below the estimated cost of the work, and decreases if the work costs more than estimated, but never sinks below zero;

"That there be appointed by the President an inter-departmental board on standardization of contracts, consisting of one representative of each government department engaged in construction. That this board recommend policies to govern in the standardization of contracts within each department. Each department should have a small board representative of each bureau engaged in construction, and should seek to unify and standardize contract practices within the department, and the chairman of these departmental boards might preferably constitute the inter-departmental board, which should be only advisory in character. That when the contracts of each department shall have been by itself thus standardized, that the inter-departmental board consider these contracts and make necessary recommendations to harmonize and secure, so far as feasible, uniformity of practice in the different departments;

"That all government officials shall recognize the importance of exerting the utmost efforts to make prompt partial payments on government contracts at reasonable intervals as stated in the contracts, for all services rendered and materials delivered by the contractor, on the work that has been accepted by the government inspector;

"That payment shall in all cases, as far as possible, be made by the official or agency directing the work, and not by an outside accounting or financial agency, in order to avoid the burden on the contractor of delays in payments when made by such agency not directly concerned with, or responsible for the efficiency, economy and dispatch of the work."

No Engineering Assembly in January

In view of the business depression, it was decided not to hold an engineering assembly next January. The committee in charge of the arrangements was converted into a program and entertainment committee for the annual meeting of the council to be held in Washington in January.

The executive secretary was authorized after advice with the committee on procedure to organize in such states as may seem necessary a State administrative committee. The purpose of such committee is to have a direct medium whereby the federation may obtain prompt action in relation to any of its activities.

The board announced the resignation as assistant secretary of A. C. Oliphant, who is to become associated with M. O. Leighton & Co., consulting engineers of Washington.

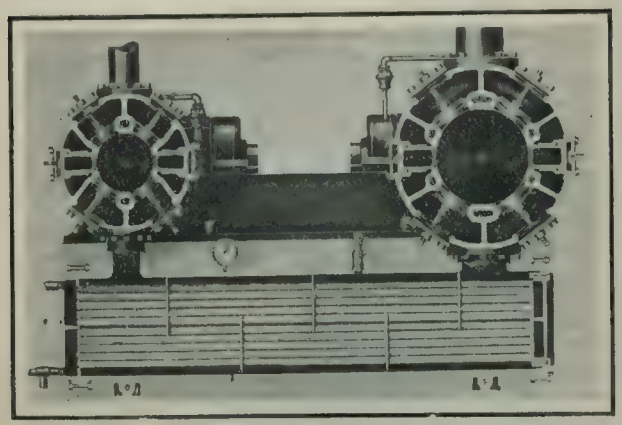
The board received the report of Col. A. S. Dwight, the federation's representative on the deputation of thirteen which went abroad to confer the John Fritz Medal on Sir Robert Hadfield and Dr. Eugene Schneider. British engineers, he reported, manifested an active interest in the federation. Steps have already been taken to organize the engineers of the British Empire along the lines pursued by the Federated American Engineering Societies.

The application for membership of the Vermont Engineers' Society and the Associated Engineers of Spokane were approved.

New Line of Air Compressors

The Ingersoll-Rand Co., 11 Broadway, New York, is offering a new line of belt driven air compressors known as the Imperial type XCB. The company's plate valves, for both the air intake and discharge, and the 5-step clearance control for regulating the compressor's output have been incorporated in the new machines.

In the plate valves used the valve is supported throughout its operation in proper alinment without any form of wearing guide, which, it is emphasized is a very essential feature in the life of the valve. The clearance control is the same used on the company's larger direct-connected electric motor driven compressors, and is intended to secure efficient operation at partial loads. The compressor is automatically loaded or unloaded in five successive steps, which are obtained by the reduction or addition of clearance space to the air cylinders. The compressor will operate at full, ¾, ½, ¼ and no loads. The design of the clearance control is said to be such as to secure efficient operation at any one step, the reduction in input power required being practically in proportion to the reduction in output capacity.



Section Through Cylinders and Intercooler Showing Clearance Valves and Pockets

The clearance pockets are made integral parts of the compressor cylinder and the regulation is obtained by control of the volume of air taken in and compressed. It is claimed that this method of control eliminates loss of power due to wastage of air and leakage. The clearance pockets in the cylinder are automatically thrown in communication with the ends of each cylinder in proper succession, the process being governed by a predetermined variation in receiver pressure. With the compressor operating at partial capacity a portion of the air is compressed into an added clearance space instead of passing through the discharge valves. On the return stroke this air expands giving up its stored energy to the pistons. The inlet valves remain closed until the cylinder pressure equals the intake pressure, at which point they are opened automatically and free air taken into the cylinder for the remainder of the return stroke. Thus, it is pointed out, the inlet capacity is reduced without reducing the intake pressure. On a two-stage compressor clearance space in proper proportion is added simultaneously for both high and low cylinders.

The mechanism for regulating the compressor is independent of the running gear. In the loading and unloading, the difference between any two steps is small enough to prevent undue electric current fluctuation.

The new line of belt driven compressors equipped with clearance control, can be furnished single-stage for low pressures and two-stage for higher discharge pressure. The piston displacement capacity for 100 lb. discharge pressure ranges from 610 to 1505 cu. ft. of free air per minute. Short belt drive attachment with floating idler can be furnished.

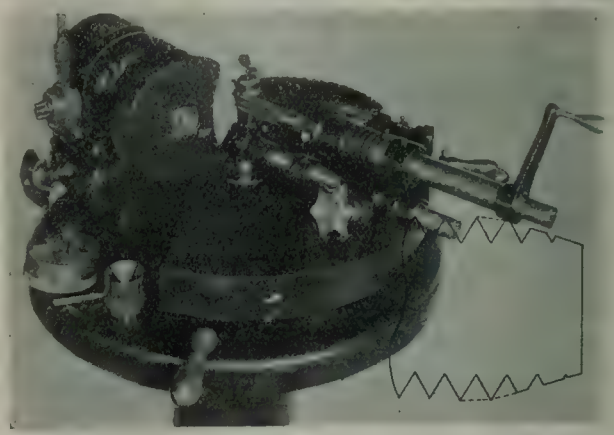
The Union Hardware Co., Torrington, Conn., has gone on full time, fifty-five hours per week.

New Tap Grinding Machine

A tap grinder designed to sharpen taps of any style and having any number of lands or flutes from 2 to 6 inclusive, has been developed recently by the Bickford-Switzer Co., Greenfield, Mass. The sharpening is done by grinding an eccentric relief on top of the cutting land and the limit of capacity is 1½ in. diameter for hand taps, 1¼ in. for tapper or machine-nut taps and 2 in. for pipe taps. Countersinks and chucking reamers of not more than 6 flutes can also be sharpened.

The machine grinds the different lands of the tap consecutively, a cam on the main or work-carrying spindle riding against a positive shoe and thus causing the tap to approach and recede from the wheel as it is revolved on its own centers. The squared end of the tap is driven by a bell center, the point end being supported by a male or female center as required. The two centers are made on a revolving plate which remains out of the way to give space for inserting the shank of a long tap that is required to be held in the chuck. The different cams are made together in a single shell and mounted on the work spindle in a manner that when the spindle is turned in the backward direction the cams do not revolve, but will start forward from any position when the spindle is turned forward. This arrangement assists in setting the tap to bring the proper relative position between its cutting land and the cam, which is accomplished by turning the tap backward until the contact point of the wheel is in a position between two tap lands and then turning the tap forward.

The head carrying the main spindle is arranged to clamp in the desired position on the rocker shaft, a flat spring underneath holding the head over to keep the particular cam in use in contact with its shoe. A small cam shaped collar forces a shoe into contact with the cam it is desired to use. A lever at the left feeds the work forward to a position opposite the wheel, a lever at the right setting it to the desired angle. The wheel is fed in as the work is revolved by the crank. A feature of the machine is the provision for changing the angle of the work as it passes the wheel, giving a rounded contour where the angle of the bevel near the end of the tap approaches the parallel sides. This is intended to prolong the life of the tap, taking off the point of the tooth that projects on one land as when the tap is sharpened by ordinary methods. It is also of value when sharpening chucking reamers as it eliminates the use of a hone to take off the sharp corner. The machine as shown in the accompanying illustration is self contained and equipped with a ¼ hp. motor. It is mounted on a column and weighs 300 lbs.



The Lands of the Tap Are Ground Consecutively. A cam on the work-carrying spindle causes the tap to approach and recede from the wheel

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Hurwitz Brothers Iron & Metal Co., Syracuse, has purchased a tract of five acres in South Buffalo, on Marilla Street, and is establishing a branch modern scrap iron and metal yard with trackage accommodation for 40 cars. The company is in position to handle large tonnages of railroad material and now has on hand about 3000 tons.

American Electrochemical Society

Discusses Non-Ferrous Metallurgy, Electric Melting Furnaces, Corrosion and Other Subjects at Annual Fall Meeting

THE board of directors of the American Electrochemical Society, in departing somewhat from usual custom in selecting the Lake Placid Club, N. Y., for its annual fall meeting, Sept. 29, 30 and Oct. 1, made no mistake, for the attendance was larger than expected by the most optimistic. Over 110 were registered and the meeting was a success both from the technical standpoint and from that of recreations, which are always a feature of this society's meetings. It was also the fortieth general meeting, marking a milestone in the society's history.

Symposium on Non-Ferrous Metallurgy

A symposium on non-ferrous metallurgy was the feature of the technical program. This was held on Friday morning, Sept. 30, with Acheson Smith, president Acheson Graphite Co., Niagara Falls, N. Y., and president of the society, in the chair. Ten papers were scheduled and presented.

Electric Melting Furnaces

Two papers dealt with electric furnaces for melting brass and other non-ferrous alloys. H. M. St. John, Detroit Electric Furnace Co., Detroit, delivered the first one, entitled: "The Influence of the Electric Furnace on the Metallurgy of Non-Ferrous Metals." The author described the successful electric furnace, as used in brass foundries, rolling mills, and refining plants, as a machine for melting metal, operated by a mechanic who follows definite instructions, and declared, in summarizing, that the electric furnace in the brass melting industry has shown the following tendencies in its influence upon that industry:

A gradual breaking down of the secretiveness as to methods and results which has characterized this industry in marked degree.

The replacement of the experienced brass melter by a mechanic who may know next to nothing about brass but who can operate the electric furnace in accordance with instructions—just as he might operate any other semi-automatic machine.

The melting of high-quality brass and bronze in ton lots, or approximately ten times the amount of the average crucible heat.

The more convenient and economical handling of charges consisting wholly, or in large part, of new metals.

A more complete utilization by the foundry itself of chips, borings, grindings, concentrates and metal-bearing wastes.

A more complete recovery by the smelter and refiner of the metal contained in concentrates and foundry wastes purchased by him. Also a more efficient salvaging of junk metals.

Inclusion of zinc and the other white metals directly in the charge originally placed in the furnace, thus eliminating the laborious and expensive speltering process.

The introduction of mechanical charging methods, at a great saving of time and labor.

The elimination of fuel storage and handling, as well as the necessity of disposing of ashes and combustion gases. Brass foundries can now be built without stacks, while some who already have them are pulling them down.

Rapid progress in the determination of factors upon which successful brass melting depends, and which have previously been undetermined because of the inexact nature of the process.

Progress in the development of refractory and other materials needed by the electric furnace in order to produce the most favorable results of which it is capable.

The elimination of oxygen, sulphur and other contaminating elements, from the atmosphere to which the molten metal is exposed.

The melting of copper alloys at an average net loss of less than 1 per cent, as compared with the 2 to 3 per cent which was formerly considered good practice.

A reduction in the amount of hand labor necessary and an improvement in working conditions due to the more nearly automatic operation of electric furnaces.

A more exact temperature control which permits of nearly perfect duplication of results.

Rapid progress in the application of direct pouring from the furnace into molds.

The production of a better average quality of metal than was formerly possible, even in the crucible.

A marked reduction in the overall cost of melting copper alloys, as compared with fuel-fired furnaces.

The rapid disappearance of the crucible from rolling mill work, and a somewhat more gradual reduction in its use elsewhere.

The gradual restriction of open-flame furnaces to a relatively narrow field of use.

In response to questions as to costs, Mr. St. John replied that he estimated the electric melting cost, when plant operations are normal, as one-half that of crucible melting and two-thirds that of gas or oil.

Dr. Horace W. Gillett, Bureau of Mines, Ithaca, N. Y., made the interesting statement that in his very recent canvass of the situation as to what companies had by this time installed electric melting furnaces which had been contracted for, as announced last spring in his paper at Atlantic City, every company operating a rolling mill had already installed the expected furnaces and were ready to operate—a fact which he thought bore out the author's statement that the crucible was rapidly disappearing from rolling mills as a melting medium.

Dr. J. W. Richards, secretary of the society, Lehigh University, Bethlehem, Pa., stated that papers on this subject were being eagerly sought and read in Great Britain, and some were already translated into foreign languages.

The other paper on electric melting was by T. F. Baily, Electric Furnace Co., Alliance, Ohio, entitled "Resistance Type Electric Furnace in the Melting of Brass and Other Non-Ferrous Metals." The author presented a brief abstract. In considering an electric furnace for such a purpose, he outlined 11 various features to be considered, such as: Quality of metal; simplicity of construction; current consumption; electrical load factor; power factor; labor for controlling the furnace; adaptability to various alloys; adaptability for melting various raw materials; renewals, repairs and upkeep; total cost per ton. His summary was as follows:

In summarizing the various advantages and disadvantages of the resistance type furnace as compared with other types, it is to be noted that, based on current consumption alone per ton of metal melted, the resistance type furnace does actually take more kilowatt hours per ton than any other type; but it is also to be noted that it earns, in most cases, as compared with other types, a better power rate, and that if the cost of electricity per ton of metal is at the usual rate which obtains from central stations for such service, then the actual cost per ton of metal melted for electricity is, in some cases, less when the resistance type furnace is used than when the arc type furnace is used; then, when taking into consideration rates where a penalty is made by the central station due to low power factor, the advantage of the induction type furnace as to lower current consumption per ton of metal melted is, to some extent, offset. Then, the labor for controlling the resistance type furnace is materially less than the arc type; and, due to its larger capacity per unit, is also lower in cost of furnace operation than the induction type. Again, as to the labor required for handling the furnace, the larger capacity of the resistance type furnace, as compared with the induction furnace, is an advantage; and, due to its simplicity of operation, the resistance type furnace requires a smaller crew to handle than is the case with the arc type furnace. Then, due to its ability to handle various mixtures, it has a distinct advantage over the induction type furnace, which must be built distinctly for one mixture, and cannot, from an electrical standpoint, be used for any other metal, without replacing the entire bottom of the furnace. As

compared with the arc type furnace, the hearth arrangement is such as to make it possible to build a much more substantial hearth lining than in furnaces of the arc type; and the same simplicity of construction gives a similar advantage with reference to the melting of various classes of raw material of any analysis.

So that, when taking into consideration the total cost per ton of merchantable castings or bars produced, and adaptability over a wide range of alloys, such as must be met with in any mill or foundry, the resistance type furnace comes more nearly filling all the requirements than any other type of electric furnace for melting now made.

Some sharp exceptions were taken to Mr. Baily's claims by makers of arc and other type furnaces. Mr. St. John declared that some of the advantages claimed are common to all types and Dr. Gillett pointed out that the arc and induction types were quite common to rolling mills, whereas the resistance type was more general in foundries. In response to question by Dr. Colin G. Fink as to the highest temperatures attained in resistance furnaces, Mr. Baily stated as high as 3300 deg. Fahr. had been attained in a Baily furnace melting 0.05 per cent carbon steel experimentally for three weeks or so.

Electricity and Fuel Heat Compared

A paper on the "Comparison of Electric Furnace Practice with That of Fuel Fired Furnace Practice," by N. K. B. Patek, works manager Lumen Bearing Co., Buffalo, N. Y., was presented in abstract by E. L. Crosby, Detroit Electric Furnace Co. In such a comparison, according to the author, the important considerations are cost of electrical energy and fuel, and efficiency of operation. His experiences are that the cost of the metal melted, the melting losses and the solution of gases in metal are substantially the same in the electric and in the fuel-fired furnace, providing intelligent operation is pursued. The claims of the electric furnace makers for marked savings in melting loss are somewhat exaggerated, though it is true certain types of alloys may be melted in an electric furnace with a reduction in this loss as against melting the same alloy in efficiently operated fuel-fired furnaces.

Mr. Crosby pointed out that the author's plant did not operate under standard manufacturing conditions, as the Baily furnace in use melts a high zinc alloy and the Detroit rocking furnace works under high temperature conditions, so that the conclusions do not repsent the industry as a whole. C. B. Gibson, Westinghouse Electric & Mfg. Co., Pittsburgh, stated that the experience of his company in the use of electric melting has been that the cost was one-half that of natural gas when operating conditions were normal.

Mr. Crosby stressed the recommendation that the society in the future seek to obtain papers on this subject from users of electric furnaces and not sellers, and thus eliminate as far as possible all advertising features. This was heartily seconded by several, though there were some who spoke in favor of the experience of both sides being made public.

Melting Silver Electrically

"Electric Melting of Silver," by H. A. De Fries, consulting engineer, New York, was presented in abstract by Dr. Richards. According to the author electric melting of silver eliminates high crucible costs and the necessity of an experienced melter, so essential to gas or oil-fired crucible practice. To produce a ductile silver, it is essential to have temperature control, a reducing atmosphere and a quiet molten bath, and the difference between the pouring temperatures of bar silver (1038 to 1093 deg. C.) and of rolling mill and casting silver (1293 to 1304 deg. C.) is pointed out. A more ductile and tougher metal is produced by the introduction of an iron block into the bath. Dr. Richards pointed out that the features of the paper were the phenomena of oxygen absorption or spitting of the silver and the use of the iron (wrought) block. The paper describes an electric silver melting equipment.

Dr. E. F. Northrup, Ajax Electrothermic Corporation, Trenton, N. J., recounted some experiences in melting about 1,000,000 lb. of silver and the difficulty with small holes in the rolled product, such as thin sheets, suggesting that perhaps an injury to the silver was done pouring from the spout to the mold, and Dr. Fink said that the block of iron taken from silver baths had the appearance of being black or weather worn with a peculiar erosion, and Dr. Richards called attention to the fact that the pouring of all metals drags with them a certain amount of oxygen to a greater or less degree.

Nickel Silver from Electric Furnaces

"Electric Furnace Melting of Nickel Silver" was the subject of a paper by Dr. F. C. Thompson, professor at Sheffield University, England. It was abstracted by Dr. Richards and presented the advantages of the externally heated electric furnace for nickel silver melting as covering a reduction in the loss of zinc to less than 1 per cent, a minimizing of the occlusion of gases, and a tougher alloy owing to less carburization.

In the discussion it was pointed out by H. M. St. John that rocking arc furnaces are as good as induction in such cases and Dr. Gillett testified that he had melted nickel silver in such a furnace with little loss of zinc.

A description of muffled arc melting furnaces was the subject of a paper, "Recent Developments in Electric Furnaces of the Muffled Arc Type," by H. A. Winne, power and mining engineering department, General Electric Co., Schenectady, N. Y., which was abstracted by John Seede of that company. A description of the furnace appeared in THE IRON AGE of April 14 and 21, 1921.

British Brass Industry

"Modern Developments in the British Brass Industry," by Ernest A. Smith, British Non-Ferrous Metals Research Association, Birmingham, England, was presented in abstract by E. L. Baldwin, General Electric Co., Niagara Falls, N. Y. Actual conditions in the British brass industry were discussed, as well as the developments by means of the utilization of existing scientific and technical knowledge. The author covered electric brass furnaces in England, the extension, hot pressing and forging of brass; rolling mill practice; annealing; composition of industrial brasses and treatment and utilization of scrap brass.

A paper, "Aluminum-Copper Alloy," by R. J. Anderson, metallurgist U. S. Bureau of Mines, Pittsburgh, was read by title in the absence of the author and was not discussed.

Session on General Topics

The first session was devoted to papers of a general nature covering several different topics.

Deoxidizers for Non-Ferrous Castings

One of these was by Charles Vickers, "Experiences with Alkaline and Alkaline Earth Metals in Connection with Non-Ferrous Alloys." The author is a consulting foundry engineer, Buffalo. He discussed sodium and calcium as deoxidizing agents in non-ferrous alloys, and said that the former of all the alkaline metals serves as a suitable deoxidizing agent in making copper castings of superior torsional strength, while calcium, when in combination with an acid element, as silicon, produces castings of good electrical conductivity. Barium and strontium require a vast amount of research work in this connection, according to the author's experiences. He stated that this combination is being successfully used in the production of copper castings possessing high electrical conductivity.

Discussing this paper, Dr. Fink said that in developing an alloy suitable for the deoxidation of copper or bronzes, it is important that one take in account the melting point of the products of reaction. For example, when using calcium metal as a deoxidizer of copper, the high melting point of calcium oxide makes separation of the fluid copper from the solid calcium oxide difficult.

Dr. Richards added that besides the melting point one must take into account the coalescing power of the lime particles. If calcium oxide had the tendency to coalesce or gather together readily it would float to the top of the liquid metal.

John Seede and C. G. Schlenderberg, Westinghouse Electric & Mfg. Co., both emphasized the importance

of high electrical conductivity in cast copper for electrical purposes, and the objection to using any deoxidizer which is not completely eliminated.

New Corrosion Theory

"A New Theory of the Corrosion of Iron," by J. Newton Friend, municipal technical school, Birmingham, England, was presented in abstract by Dr. Fink. After discussing the known facts and theories and the still unexplained phenomena of rusting, the author puts forward an auto-colloidal theory which postulates the corrosion as starting by the formation of colloidal ferrous oxide which, by contact with the air, flocculates to hydrated ferric oxide, which latter is alternately reduced by contact with iron and oxidized by contact with air, thus continuing the corrosion and the production of rust.

W. E. Hughes, electrometallurgist in H. C. H. Carpenter's private laboratory, London, England, referred to a recent experimental confirmation of Friend's theory. Under the microscope the progress of corrosion was actually observed to proceed in a manner very close to that outlined by Dr. Friend.

Rust Prevention by Slushing

A paper entitled "Rust Prevention by Slushing" was presented by Haakon Styri, chief S. K. F. Research Laboratory, Philadelphia, who emphasized the importance of preventing rust on steel parts which cannot be given a permanent coating of paint or metal. Tools, arms and ball bearings are among the products which must be protected with a temporary covering, such as grease. "It happens," he said, "that we have found on slushed balls and bearings in our stock rooms that rust develops under the slushing grease, and it happens also that material in process will rust. In order to eliminate these difficulties we have undertaken a rather thorough investigation and have shown that a prerequisite for protection against rust by greases is a thorough cleaning of the steel parts by an aqueous solution, preferably an oil emulsion, which leaves a thin oil film for a short time protection. Such an oil emulsion is also a very good grinding liquid. It protects from rust and gives a fine finish.

Söderberg Electrodes

At the conclusion of one of the sessions Professor Richards gave a brief account of the recent installations in Norway and Sweden of the Söderberg self-baking carbon electrode, described in THE IRON AGE, April 22, 1920. He spent the greater part of the past summer in those countries and said that in one instance as much as 1000 amperes per electrode were used. A tilting 6-ton Heroult furnace has been fitted out with these electrodes, which are fed in in sections 7 ft. long; the roof was about 3 ft. above the bath. Dr. Richards also referred briefly to the use of the Söderberg electrode for aluminum furnaces.

The Spring Meeting

Announcement was made that the annual spring meeting will be held in Baltimore next April, and that one of the features will be a symposium on electric furnace iron castings.

Malleable Castings Research Program Bears Fruit

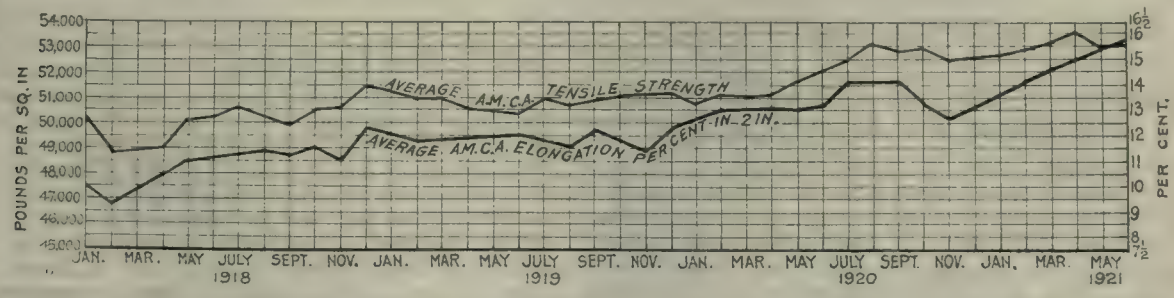
Dissemination of Technical Data Among Member Plants Results in Steady Improvement in Quality of Product

COVERING the result of the tensile test of bars sent daily from each plant, a bulletin has just been issued from the office of Enrique Touceda, Albany, N. Y., consulting engineer for the American Malleable Castings Association. The bulletin throws an interesting light on the results of consistent research work covering a period of years, the value of which has been particularly demonstrated during the past three or four years.

Those who have kept in touch with the commendable work fostered by the association in the improvement of malleable castings will recall the unhealthy condition in which the malleable industry found itself some seven or eight years ago. Except in a few cases, there was at that time no such thing as individual uniformity, either in manufacturing methods or in the resultant product of different malleable foundries. This condition was due largely to the lack of authoritative information on correct metallurgical practise, a haziness and uncertainty concerning air furnace and annealing oven construction, coupled with a secretive policy pursued by those plants which were making some progress through their own efforts at research.

Foundries that were still working in the dark continued to turn out a product lacking in all the qualities possessed by the better grade malleable castings obtainable to-day, and one that was little better than gray iron in ductility. The result was that the inferior product, in many cases malleable in name only, repeatedly proved its unworthiness in service, and cast a suspicion and stigma on all malleable castings, regardless of quality.

But the foresight of the association saved the industry from impending disaster, for, some years after its organization, a competent engineer and metallurgist was commissioned to inaugurate and carry on an intensive research program. As fast as this work bore fruit, the findings were disseminated among the member plants in the nature of recommendations for alterations in general plant practises, and great improvement in the physical properties of malleable iron has resulted since that time.



In This Diagram the Base Line Represents the Standard A. S. T. M. Requirements in Both Tensile Strength and Elongation. The two curves show average results obtained by A. M. C. A. plants

Malleable castings as at present manufactured, in conformity with association standards, instead of being of uncertain quality and lacking in uniformity, are of high quality and integrity. They are said to be on a plane of dependability the equal, if not the superior, of the best mild steel casting or forging, while they can be machined at almost double the speed of either.

How Much the Improvement Has Been

The most marked advance in development has been made in the past 3½ years, during which period the

ultimate tensile strength of the product of association members as a whole has increased from an average somewhat under 49,000 lb. per sq. in. to over 53,000 lb.; and from an average elongation under 10 per cent in 2 in. to nearly 16 per cent.

Reports of bars tested by the consulting engineer for the month of June, in the bulletin referred to in the opening paragraph, show the highest average percentage of elongation of the association as a whole was attained, 15.77 per cent in 2 in., or over twice the elongation required by the American Society for Testing Materials in its standard specification for malleable cast iron. Since elongation, which is the measure of ductility, is the property on which malleability depends, it will be seen that this report marks a new high level in the research program. Since the first of the year, the rise in percentage of elongation has been steady and uninterrupted, and has increased a full 2 per cent.

High water mark for average ultimate tensile strength was reached in April of this year, when the figure of 53,530 lb. per sq. in. was recorded. The June value for this property was 53,038 lb., which is in excess of the A.S.T.M. requirements by slightly over 8,000 lb.

Reference to the chart, showing average ultimate tensile strength and elongation for the product of the membership as a whole, for 1918, 1919, 1920 and the first six months of 1921, indicates clearly how these two properties have increased during this interval. The average of both properties has always been well in excess of the A.S.T.M. standard requirements of 45,000 lb. per sq. in. tensile strength and 7½ per cent elongation in 2 in. It is clear that this margin, when added to the factor of safety already included in standard specifications, offers exceptional safeguards to the user of those malleable castings furnished by a majority of the members of the association.

Why the "Ups and Downs" in the Chart

The constancy in the average values of these properties maintained throughout 1919 and the spring of 1920, with little apparent improvement over a period of several months, is readily accounted for by the fact that during that time 22 new plants were added to the list of test bar contributors. None of these had previously profited by the research work, and their submitted test bars in most cases had the effect of lowering the general average of the association, until the effect of the new influence began to assert itself. The same effect was felt from August to December of 1920, when four new contributors were added. No new contributors were added from April to August, 1920, nor from December, 1920, to June of this year.

This fact, taken in conjunction with the improvement in quality of the new contributors through the assistance of the consulting engineer and his corps of visiting inspectors, had the effect of a steady and rapid increase in both physical properties. The slight retrogression in the average values of both properties, marked by the dropping of the curves from August to November of 1920, is explained by Professor Touceda as having been due to the serious handicap experienced by the foundries in getting good pig iron and coal during that exceptional period of demand for all commodities.

Another interesting fact revealed by the bulletin is the high percentage of perfect scores made by members of the association. By a perfect score is meant the ability of every bar submitted by a member to equal or surpass the standard specifications of 45,000 lb. tensile strength or 7½ per cent elongation in 2 in. In June of the present year 87 per cent of the contributors made perfect scores. Comparing this record with those for the same month of the previous years, we find that perfect scores were attained by but 29 per cent of the contributors in June of 1918, 57 per cent in 1919, 74 per cent in 1920. Out of a total of 31 contributors in June, 1918, of whom 29 per cent attained perfection, all but one made perfect scores in June of the present year. Only 2.53 per cent of all bars cast and submitted for test during June failed to pass the standard A.S.T.M. specifications, as against 15.12 per cent for June, 1918.

This general improvement of the product of all members is reflected in the number of certificates that were awarded by the consulting engineer for the quarter ending June 30; sixty-one plants having been awarded the coveted certificate, the highest number yet issued for any quarter. The awarding of a certificate is not based upon the test bar record alone; the general plant practise as reported by the consulting engineer's corp of inspectors being considered in its effect upon the product. Through this safeguard, the purchaser is assured that the test bar record of each day's production can be considered as truly representative of the castings. Castings made by certificate-holding plants are called "certified" malleable castings.

COKE OUTPUT INCREASES

Production of By-Product Fuel in August Estimated at 1,402,000 Tons

WASHINGTON, Sept. 27.—The production of by-product coke improved during the month of August, according to the report of the Geological Survey. The total output is estimated at 1,402,000 net tons, an increase of 9.1 per cent over the 1,285,000 tons produced in July. These figures are based on reports from 69 of the 70 by-product plants in the United States and include estimates for the company not reporting. Production during August was 38 per cent of the rated monthly capacity of about 3,861,000 tons. Of the total number of plants, 54 were active and 16 were idle.

Owing to the increase in production of beehive coke to 248,000 tons, the total production of coke in the United States in August reached 1,650,000 net tons. When compared with the record for July, this was an increase of 185,000 tons and exceeded the June output by 8000 tons. Compared with the average monthly production in 1920, however, August production showed a decrease of 62 per cent.

The highest monthly average of by-product coke, according to the survey, was attained in 1920, when it was 2,565,000 net tons, while the highest monthly average of beehive coke during the past four years was attained in 1917, when it was 2,764,000 net tons. The figures of the survey show plainly the change in position of the two processes of coke production, the by-product output having outstripped the beehive production in 1919, when the respective monthly averages were 2,565,000 and 1,748,000 net tons. Screenings and breeze are not included in the figures of production.

The extent of the depression in the coke industry and its importance is a factor limiting coal production, as shown by the fact that at present the quantity of raw coal consumed is over 4,500,000 net tons per month less than in the industrially active year, 1918.

The highest monthly average of coal consumption in by-product ovens was in 1920, and amounted to 3,685,000 net tons, while the lowest consumption since 1917 was in July, 1921, which amounted to 1,864,000 tons. Beehive ovens consumed a monthly average of 4,354,000 net tons of coal in 1917, and reached their lowest point in July, 1921, when the consumption of coal by those ovens was only 286,000 net tons. These figures assumed a yield of merchantable coke of 69.6 per cent in the coal charge in by-product ovens, and 63.4 per cent in beehive ovens.

Production of soft coal showed a decided improvement during the week ended Sept. 17, and for the first time since early in June passed the 8,000,000 ton mark. The total output, including lignite, coal coked at the mine, and mine fuel, is estimated at 8,139,000 net tons. In comparison with the week ended Sept. 3, the most recent week of full time production, this was an increase of 533,000 tons, or slightly over 7 per cent.

CONTENTS

New Interstate Mill Has Pack Cooling Bed 859

Runout Table Feature—All Rollers Having Individual Motor Drive and Those Next to Bed Are of Swiveled Cone Type

Are Iron and Steel Prices Out of Line? 865

American Rolling Mill Co. Statement of Cost of Manufacturing Sheets in 1914 and 1921—Statement of President Grace

Maladjustments in the Industrial World 867

Economic Law Not Suspended by War—Problem of Unemployment Considered by a Keen Observer

Safety First—Last—and All the Time 871

Tenth Annual Congress of National Safety Council at Boston Discusses Means to Insure Continuous Freedom from Industrial Accidents

Effect of Exchange on Machinery Exports 875

Interesting Phases of Present Conditions, Showing Fallacy of Claim That a Depreciated Currency Is Desirable

American Electrochemical Society 879

Discusses Non-Ferrous Metallurgy, Electric Melting Furnaces, Corrosion and Other Subjects at Annual Fall Meeting

Pig Iron Production for September 888

Daily Output 2070 Tons More Than for August—Net Gain of Twelve Furnaces Over Number in Blast on Sept. 1

France Exports Most of Lorraine Steel 909

Impressions Gained on Recent Tour of Iron and Steel Institute—Use of Blast Furnace Gas for Power the Outstanding Feature in Lorraine

Hand of Engineer Guides the Conference 915

Secretary Hoover and Others Given Credit for Doing Much to Insure Success of Washington Deliberations on Unemployment

Wall Set for Distilling Water..... 864
Southern Ohio Iron and Coke Association 864
Portable Electric Drill..... 864
Belgian Iron and Steel Production..... 866
Central Steel Co. Formed..... 866
Tax Revision Bill..... 868
Decline of Iron and Steel Shipments..... 868
Die Sinking Machine..... 869
Electrifying the Chilean Railroad..... 869
Spotting and Routing Attachment..... 870
Washington Navy Yard May Manufacture 870
Imports of Iron and Steel..... 870
Savage Mountain Clay..... 870
Vertical Surface Grinder..... 874
Bench Hand Milling Machine..... 874
Turret Rotary Shears..... 876
Universal Piston Grinding Attachment.. 876
Labor Notes.....876, 916
Meeting of American Engineering Council 877
New Air Compressors..... 878
Malleable Castings Research Results.... 881
Coke Output in August..... 882
Editorials 884
Need of a Survey in Steel—Normal in Industrial Growth—Menace of the Mark—Electric Non-ferrous Metallurgy
Correspondence 886
Heat Utilization — Prevention of Brittleness in Pickling Steel
Patent Office Needs Men..... 886
Greater Business Press..... 887
Coming Meetings 887
Iron Mining Industry.....887
To Extend Credit to Users Through Jobbers 901
Slow Progress in Pittsburgh-Plus Case.. 903
Ferromanganese Case Hearing..... 905
Three-Shift System in British Works..... 908
Foreign Market Conditions.....903, 908, 911
Italy's New Duties on Steel..... 912
Reduced Export Freight Rates..... 913
Protection for Pacific Coast..... 913
Office and Trade Changes..... 917
Tap Grinding Machine..... 878

Iron and Steel Markets 890
Comparison of Prices 891
Prices Finished Iron and Steel, f.o.b. Pittsburgh 904
Non-Ferrous Metal Markets 905
Personal Notes 906
Obituary Notes 907
Machinery Markets and News of the Works 918
New York Jobbers' Prices 926

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Need of a Survey in Steel

What percentage of the country's iron and steel output is taken by the railroads? Where does the automobile industry stand in the list of consumers? How much steel is bought in a year for the purposes of agriculture, for mining, for the production of petroleum, for building, for maintaining and extending the iron and steel industry itself? How much goes to the industries producing textiles, chemicals, foods? Where in the consuming list are the industries devoted to clay, leather and rubber products?

These questions are constantly being asked, not only by producers of iron and steel, but in the great collateral activities represented by the machinery and all metal working trades. When a steel company seeks an additional outlet for its ingot capacity, the choice of the new finished material line is preceded by a careful survey to determine the relation of supply and demand in the various fields. This procedure has been gone through repeatedly in the past 20 years as steel companies which once rolled only billets and rails and bars have taken on one by one other lines, as plates, shapes, sheets, wire, tin plate or pipe.

The fact is, however, that there is a notable lack of exact knowledge in the steel industry itself concerning the channels of steel consumption. It is true also that producers of foundry pig iron as a rule can make but the roughest approximation of the final destinations of the castings into which their pig iron enters, or of the machines into which the castings are assembled.

It is no easy matter to apportion the steel consumption of the United States. The railroads stand at the head of the list of consumers, but estimates of the railroad percentage which have found acceptance have ranged all the way from 20 to 40. Apart from the railroads, it is well known that various industries take considerable percentages of the country's rolling mill output, shipyards, agricultural implement works, car works, mining, the automobile industry, fabricating shops standing well up in the list. Then there is Government work and municipal work. No small tonnage feeds down into lines which reach the ultimate consumer through the hardware store and plumbing and sheet metal shops. Then there is the total, by no means small, made up of a great number of unmeasured and immeasurable uses. There is the steel of wearing apparel, the steel staple of the book binder, and the steel of the key ring. The insignificant crimped bottle cap amounts to more than 25,000 tons of steel per year.

The concentration of the country for three years on steel production for war purposes put all previous reckonings as to channels of steel consumption out of joint. To-day there is a demand from many directions for information that is up to date. The old percentages of railroad consumption do not count. For many months railroad buying has been an indeterminate quantity, and the new place it will take in the consuming list may be difficult to measure for a good many months more. The readjustment through which the country is passing will bring many changes in the distribution of steel output in the period just ahead. Iron and steel manufacturers will need all the light that can be thrown on the question of the ultimate destination of rolling mill products in every line. Why may not the American Iron and Steel Institute function in making the survey of iron and steel uses that will give the industry the chart it needs? Such an undertaking well carried out would yield the most valuable results. The institute at the same time would acquire material indicating the directions in which steel manufacture could most usefully expand. It must be said that the steel industry has not been forward in propaganda work—in finding and developing new uses for steel. The record of the cement industry in that respect is well worthy of imitation.

If the directors of the American Iron and Steel Institute have been questioning in what direction the institute may extend its usefulness with the largest results, we commend to their consideration these two lines of research: First, on what sources of demand has the steel industry depended in the recent past, and to what extent in the case of each? Second, in what directions, new and old, can propaganda work be carried on with best effect for the increase of iron and steel consumption at home and abroad?

Normal in Industrial Growth

No small part of the present dissatisfaction with industrial conditions is due to expecting too much. The United States has had a wonderful industrial development. The disposition is to regard this as coming naturally, like sunshine or the tides, when the fact is that great effort must be put forth. Unless we invent something or work harder or more efficiently, we cannot expect production or commercial movements or any of the indexes of activity to show an increase greater than the growth in population. That growth, from 1910 to 1920, was 14.9 per cent.

We should recognize that the past decade has been particularly lean in developments that make for efficiency and hard work, as well as in inventions that reduce the amount of effort necessary to produce a given result. One of the most notable things that has occurred in the decade 1911 to 1921 has been an increase in the number of motor vehicles in use from less than half a million to more than ten million. Other things being equal, the effort necessary to operate and repair these vehicles and supply them with their necessities must be taken from something else. That can be done, but the question must be faced whether abnormal growth in any line, particularly one contributing largely to pleasure, represents real progress when it is secured at the expense of normal development in other directions.

The common thinking is that we ought to be and are increasing our activities by more than the 15 per cent increase in population in a decade. But results in various fields are far from bearing out that view. A 15 per cent increase in bituminous coal production in ten years would give us about 490,000,000 tons for this year, while the actual production promises to be about 400,000,000 tons, or about 18 per cent less. It is to be remembered that while there is work in producing coal there is much more work in consuming coal. While we might have made progress whereby we can properly spend effort in consuming coal that was formerly expended in doing something less useful, we should also have made progress in economical utilization of coal, whereby a ton would do more work now than ten years ago.

We expect the railroads to haul more freight year by year per unit of track and equipment. The fact is that the rate of movement in ton-miles in the first six months of this year was about 25 per cent greater than the average rate ten years ago, while our population increased only 15 per cent. Per unit of transportation furnished there are probably more men employed on railroads now than ten years ago, but to give proof of economic progress, we should have increased the efficiency of the men or the physical facilities, since otherwise we have to draw the effort from some other activity.

Some familiar facts of performance in the trades having to do with building warrant the assertion that in this important industrial group the average of individual effort has declined rather than advanced. The labor unions in those trades, in some cases aided and abetted by employers, have brought about conditions that instead of stimulating have tended to kill building initiative.

The truth is, our industrial organization has not become so much more efficient that we can do everything on a scale that is a distinct advance over ten years ago. Last year we seemed to be very active, but the pronounced activity in certain lines was largely at the expense of others. For the future conditions will force us to pay for what we get. If we have greatly expanded activities we must pay for the increase by hard work, efficiency and invention.

The Menace of the Mark

Comment on the menace to American trade in the low value of the German mark diverts attention from the vastly more serious menace of a collapse in German finance. Relatively, it is a small matter that German exports are encouraged, if indeed it is at all disadvantageous to the United States that Germany should have an export trade.

It is not the decline of the mark, but the declining of the mark, with a trend toward no value at all, that has the threatening aspect. Were the mark stabilized, no matter at what figure, adjustments would occur. The French franc is valued at only a trifle over seven cents, against 19.3 cents at gold parity, but we do not have a flood of French goods. In the first seven months of this year our imports from France, according to the official figures, were 65 per cent of our exports to France. There is an adjustment, in that prices in France relative to prices in the United States are in relation to the depreciation in exchange.

The German mark dropped in exchange to four-fifths of a cent last week, against 23.8 cents at gold parity. Even at that low level a trade basis could be established, but a steadily declining value is another matter entirely. Prices and wages in Germany have not advanced in keeping with the decline in the mark, and thus Germany has low wages with which to make exported goods.

The decline of the mark is due to the activity of the printing presses. German note circulation before the war was 2 billion marks. In 1918 it was 16 billion. Now it is 82 billion and the printing presses are still going. Many bankers believe there is a sinister purpose behind this activity, for continuance of this policy must result in German financial collapse, and that would mean complete collapse. There is the menace of demoralization of European currencies, but that is only one thing. Industrial and moral collapse of Germany could not be without the most serious results in other European countries. A representative of the American steel industry, just returned from three months' sojourn in France, during which time he studied conditions in detail, gives it as his opinion that there is but one menace to France's complete recovery, and that is a collapse of Germany.

It is not a question of what the Germans have done to the mark. It is a question of what they are doing and intend to do. Were the German Government's policy directed to a stabilization of the mark, trade and other conditions could adjust themselves. The gravity of the situation has long been recognized by the British and French Governments, which have as ambassadors to Berlin men very well versed in finance and able to advise and co-operate with the German Government along the line of rehabilitating German finances, but the

circumstantial evidence is that advice, if given, has not been heeded.

Before the possibilities threatened by the financial policy being pursued by the German Government, the possible loss of a little of our merchandise trade sinks into insignificance. Always our domestic trade is by far the greater concern, and it is difficult to imagine its being conducted actively and with confidence if there is not a moderate degree of stability in Europe.

Electric Non-Ferrous Metallurgy

One of the points emphasized in the symposium on non-ferrous metallurgy which American electro-chemists conducted at their annual fall meeting last week, as reported on other pages, was the wide use of electric melting in the industry. This is true not only of copper and brass but also of the higher priced metals, as silver and nickel-silver. It was brought out that when operating conditions are normal, electric furnace melting of brass or copper can be conducted at close to one-half the cost of crucible melting and that it is highly efficient and satisfactory. Such economy, however, is only attained on a fairly full operation. There was cited the action of large brass rolling mills in completing contemplated electric furnace installations very lately and in going ahead with their program of operating entirely with electricity, and this in the face of unfavorable business conditions.

The use of electric furnaces in American mints where silver and other coins are made has shown a considerable increase. While aluminum and its alloys are more difficult to handle than some of the others, their manipulation in electric furnaces was reported as in most cases satisfactory and economical. Where large scale operation is possible it is evident that electricity has come to stay not only in brass and copper where it had its first success, but in practically all non-ferrous alloys.

Patent Office Needs Men

WASHINGTON, Oct. 4.—Relief in the unemployment situation could be given by the passage of the bill now before Congress providing for aid to the Patent Office, according to Thomas S. Robertson, United States Commissioner of Patents. In an interview Mr. Robertson said:

"One thing that the present Congress should do to aid in relieving the unemployment situation is to pass promptly H.R. 7077 for the relief of the Patent Office. Many new industries which would employ men are being delayed because their promoters will not go forward with the work until they are assured that the patent situation is favorable to the new project. At the present time, the patent office has over 60,000 cases awaiting action. In some branches, it is over 11 months after an application for patent is filed before the invention can be reached for consideration, and in the meantime the factories stand idle.

"The cause of this delay is lack of a sufficient force in the Patent Office, which is valiantly trying to cope with its rapidly increasing work with an entirely inadequate force. The Patent Office is self-supporting. The bill now before the House of Representatives will give urgently needed relief without in any way eating into the taxes of the people, as it only allows the Patent Office to use some of its own surplus receipts."

CORRESPONDENCE

Heat Utilization

To the Editor: Combustion losses are comparatively insignificant when compared with the poor utilization of the heat released by combustion. True economy may be attained only when all of the heat practically utilizable is converted into useful service. In order that heat may be utilized for a particular purpose, its potential or temperature must be sufficient to effect the desired operation, and a sufficient quantity of heat must be available. Potential heat energy in the form of coal, oil, wood or hydropower is the most important asset of the world. Fuel conservation has not a tithe the importance of heat energy conservation.

Iron cannot be brought to a forging heat, even when in the form of the finest wire, by all the millions of thermal units available in the hot water springs of the Yellowstone National Park acting for millions of eons of time. Converted into the form of electricity, this energy may be utilized to melt steel in the electric furnace.

Years ago the manufacture of steel was a secret art. The heat was supplied by burning coal. Hours and hours of careful furnace operation resulted in a few small crucibles of molten steel so close to its freezing temperature that it was difficult to teem it successfully. Necessarily steel was costly. Then came the gas producer and the regenerative furnace.

Steel had been the weapon of princes and kings. Now steel became the servant of man, in peace, in war. Its output is measured in millions of tons. All this was rendered possible by the better utilization of heat energy.

Potential heat energy is a resource of the greatest value to man. Heat, power and light are its products. Modern civilization depends upon heat utilization. The real problem of the world is not the conservation of the great natural resources, but their economical utilization.

A. D. WILLIAMS,
Consulting engineer.

P. O. Box 92, Newark, N. J.

Prevention of Brittleness in the Pickling of Steel

To the Editor: The writer has noted with interest an exchange of letters in your publication relative to corroding brittleness. On Sept. 22, Kenneth B. Lewis refers to the generation of hydrogen as the result of acid attack upon steel and to the generally recognized assumption that this generation of hydrogen is the cause of pickling brittleness.

In connection with this discussion it is of interest to note that there is about to be put on the market in this country an organic chemical known as pikelette, intended to be mixed in minute proportions in the pickling bath. It is claimed as one of the functions of pickelette that it suppresses the formation of hydrogen and hence eliminates in steel the pickling brittleness referred to. The compound is of foreign invention and is at present widely used in Great Britain and on the Continent. In Germany it is used by practically every steel plant that employs the pickling process.

GEORGE W. EMLEN, JR.,
Matthew Addy Co.

Philadelphia, Sept. 30.

American Iron and Steel Institute Meeting

The date for the fall meeting of the American Iron and Steel Institute has not been decided. It was expected that the meeting would be held Friday, Oct. 28, the usual time, but as it is hoped that Marshal Foch will be the guest of honor and as he will not sail until Oct. 22, it is probable that the meeting will be postponed until some time early in November.

A GREATER BUSINESS PRESS

Course in Industrial Publishing to Be Started in New York

A noteworthy step was taken by the technical and industrial journals of New York at a recent meeting of the New York Business Publishers' Association in the establishment of a course in industrial publishing. Such a course has been in contemplation for a long time. It has taken just such an experience as that through which all industry is now passing to bring home to the men of the industrial press the call for a forward movement. Industry is looking more than ever to the journals published in its various fields to show the way. That those who are engaged in business journalism and those who are to come into it as their life work may be better equipped to serve business, a course has been organized and will be conducted by the Business Training Corporation of New York, which the New York Business Publishers' Corporation has retained for that purpose. The course will include lectures, conferences, textbook work, problems and a personal commenting service. Classes are about to start in New York and soon will be organized in other publishing centers. One of these classes is now being formed in the office of THE IRON AGE.

Although the course is designed primarily for the benefit of members of the editorial and business staffs of trade and technical periodicals, it will be open to all who are interested in the field. It is intended not only to give instruction, but to develop the business as a whole by setting up higher standards of editorial and business service and showing how these standards can be attained.

Among the topics covered are: Distinctive features of industrial publishing; its code of ethics; personal qualities required for success; determining editorial policies; getting the right kind of articles; securing accurate reports and data; writing for industrial papers; building up circulation; creating advertising; departmental management; service to the industry; service to advertisers; basic policies and tendencies.

"We look upon this undertaking," said H. M. Swetland, president of the United Publishers' Corporation and chairman of the educational committee, "as one of the most important steps ever taken toward making industrial papers even more valuable to their readers and advertisers. This course will help us all to gain a broader and more accurate knowledge of the fundamentals of the business; it will provide a sound and thorough training for those who are coming along on our papers; and it will serve to attract and develop new men for us from the industries we serve."

Steel for Navy Yards

WASHINGTON, Oct. 4.—The Bureau of Supplies and Accounts, Navy Department, is asking bids to be submitted by Nov. 1 to furnish approximately 1600 tons of shapes, 2100 tons of bars and 1200 tons of black sheets. These lots are for stock purposes at various Navy yards and are practically the same as those on which bids were asked in August but subsequently withdrawn.

Ore Case Hearings

WASHINGTON, Oct. 4.—The Interstate Commerce Commission has set Oct. 10 as the day to resume iron ore case hearings in Chicago before Examiner Hosmer. The case involves the protest of ore shippers against both old rates and increased rates on shipments from Lake Superior mines to Lake Erie ports.

A continuous electrically heated ring type gear furnace is to be installed by the George J. Hagan Co., Pittsburgh, in the Dodge Brothers automobile plant at Detroit. The furnace is to work on a 220-volt, 3-phase, 60-cycle power service and has a rating of 90 kw.

COMING MEETINGS

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis. Secretary, L. F. Boffey, 19 Park Place, New York.

National Implement and Vehicle Association. Oct. 12 to 14. Congress Hotel, Chicago. Secretary, E. W. McCullough, 76 West Monroe Street, Chicago.

American Society of Lubrication Engineers. Oct. 13 and 14. First annual convention, Chicago. Secretary, J. L. Overholt, Monadnock Block, Chicago.

American Gear Manufacturers' Association. Oct. 13 to 15. Fall meeting, Powers Hotel, Rochester, N. Y. Secretary, F. D. Hamlin, 4401 Germantown Avenue, Philadelphia.

National Hardware Association. Oct. 18. Meeting of metal branch, Marlborough-Blenheim Hotel, Atlantic City, N. J. Secretary, George A. Fernley, 505 Arch Street, Philadelphia.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

National Supply and Machinery Dealers' Association. Oct. 19. Meeting of machine tool section, Hotel Astor, New York. Secretary, Thomas A. Fernley, 505 Arch Street, Philadelphia.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

Industrial Cost Association. Nov. 2, 3 and 4. National Cost Conference, Pittsburgh. Secretary, A. A. Alles, Jr., Peoples Bank Building, Pittsburgh.

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

The Iron Mining Industry

WASHINGTON, Sept. 30.—The following statement of results of the 1920 Census of Mines and Quarries, covering the calendar year 1919, is a summary by totals, of the principal statistics compiled for producing iron-ore enterprises in the United States. Iron ore was mined in the following states: Alabama, Arkansas, California, Connecticut, Georgia, Idaho, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Montana, New Jersey, New Mexico, New York, North Carolina, Pennsylvania, Tennessee, Texas, Utah, Virginia, Washington, Wisconsin and Wyoming. The amount reported as the total value of products includes the estimated value of ore mined in 1919, based on the sales value of ores shipped. This amount also includes receipts for by-products, power sold, and miscellaneous work or services furnished other enterprises.

Iron Ore Mining Industry—Principal Statistics for Producing Enterprises

Number of enterprises	292
Number of mines	474
Number of beneficiating plants	74
Mineral lands operated, total (acres)	248,362
Persons engaged in industry (total)	49,223
Proprietors and firm members (total)	41
Salaried employees	2,996
Wage earners (average number)	46,186
Wage earners Dec. 15 or nearest representative day:	
Above ground	19,111
Below ground	29,074
Power used (horsepower)	372,479
Capital	$502,193,814
Principal expenses:	
Salaries	$6,960,768
Wages	$76,376,616
Contract work	$1,671,783
Supplies and materials	$27,312,102
Fuel	$8,722,438
Power	$1,594,231
Royalties and rents	$24,997,552
Taxes	$30,965,448
Expenditures for development (included in the above items)	$14,657,841
Products, total value	$219,539,045
Iron ore:	
Quantity (tons, 2,240 lb.)	61,173,254
Value at mines	$218,217,905

IRON OUTPUT GAINS AGAIN

September Production 2070 Tons Per Day Larger Than in August

Net Gain of Twelve Furnaces Largest in Over a Year

The output of blast furnaces in September continued to show the moderate improvement which set in in August, after many months of decline. The total output was 2070 tons per day larger than in August as compared with a gain of 2891 tons per day in August over that of July. The feature of the returns is the relatively large number of furnaces blown in during the month.

The production of coke and anthracite furnaces for the 30 days in September amounted to 985,529 gross tons or 32,850 tons per day as compared with 954,193 tons or 30,780 tons per day in August. In September, 1920, the output was 3,129,323 tons or 104, 310 tons per day.

The total number of furnaces in blast on Oct. 1 was 82 as compared with 70 on Sept. 1, with 69 on Aug. 1 with 76 on July 1 and with 201 on Jan. 1. This records the first marked increase in furnaces blown in since last fall, when the downward movement began. The 82 furnaces in blast on Oct. 1 had a capacity of 35,650 tons per day as compared with 30,770 tons per day for the 70 furnaces on Sept. 1. Fourteen furnaces were blown in and only two blown out or banked during September, which compares with a net loss of 250 furnaces in the ten months preceding the month of August this year.

The September output of manganese-iron alloys was 3289 tons, all of it ferromanganese, as compared with 3878 tons of the same alloy in August.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from September, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889
August	26,037	4,743	30,780
September	27,189	5,661	32,850

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94,473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	39,768
May	73,015	108,422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107,820	110,354	78,340	98,931	27,889
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	30,780
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	32,850
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	.....
Nov.	101,244	110,394	106,859	111,802	79,745	97,830	.....
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	.....

Among the furnaces blown in during September were the following: One Susquehanna furnace in the Buffalo district; one furnace of the American Steel & Wire Co. and one Alliquippa furnace of the Jones & Laughlin Co. in the Pittsburgh district; Nos. 2 and 3 New Castle furnaces of the Carnegie Steel Co. and No. 3 Shenango furnace in the Shenango Valley; the Cherry Valley and Mattie furnaces in the Mahoning Valley; two Central furnaces of the American Steel & Wire Co. and one River furnace in northern Ohio; Marting furnace of the Marting Iron & Steel Co. in southern Ohio; one Joliet furnace of the Illinois Steel Co. in Illinois and the Tuscaloosa furnace in Alabama.

Among those blown out or banked during September were the following: The Robesonia furnace in the Lebanon Valley and the Princess furnace in Virginia.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,430,022	2,232,455	1,932,159	32,787	23,957	22,228
Feb.	2,209,470	2,181,679	1,625,695	28,105	28,038	29,013
Mar.	2,277,507	2,480,668	1,323,443	26,644	35,275	41,294
Apr.	1,838,677	1,968,542	1,015,621	17,308	27,628	24,310
May	1,586,805	1,128,720	1,024,678	14,604	33,407	9,232
June	1,655,944	2,209,770	883,312	14,254	34,751	4,536
July	1,906,604	2,230,567	715,664	14,805	36,789	5,524
Aug.	2,108,566	2,254,943	807,144	17,419	36,985	3,878
Sept.	1,828,613	2,247,250	815,692	20,631	39,546	3,289
Oct.	1,295,690	2,393,644	.....	20,238	34,786	....
Nov.	1,727,656	2,150,075	.....	19,964	26,944	....
Dec.	1,916,249	2,047,167	.....	15,718	28,023	....

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for September, and the three months preceding:

Pig Iron Production by Districts, Gross Tons

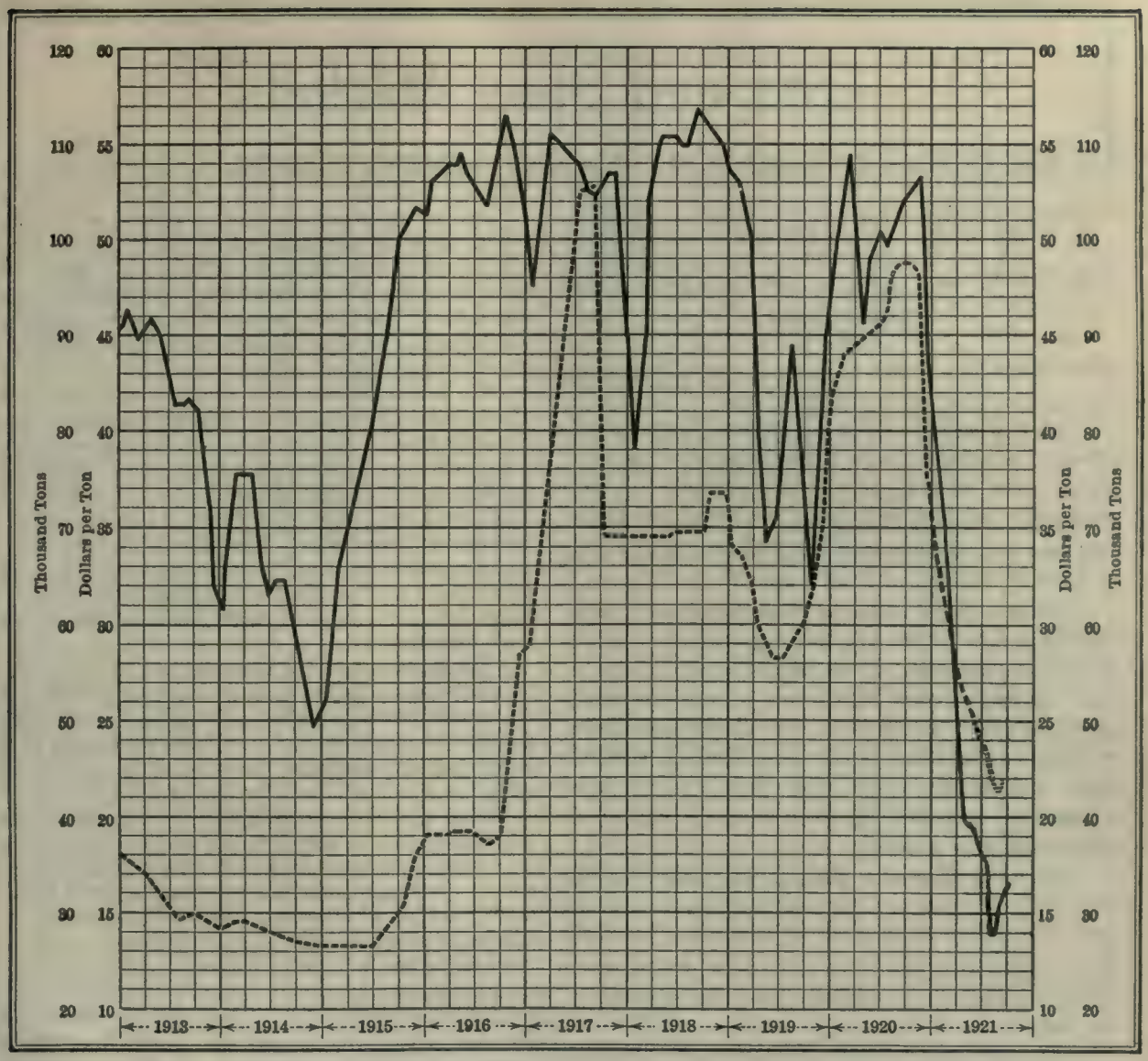
	September (30 days)	August (31 days)	July (31 days)	June (30 days)
New York	50,970	44,948	34,407	34,241
New Jersey	4,370	4,689	5,554	6,051
Lehigh Valley	27,566	33,014	24,059	29,929
Schuylkill Valley	23,126	20,735	19,210	21,172
Lower Susquehanna and Lebanon Valleys	21,903	23,939	20,401	25,809
Pittsburgh district	250,128	255,274	185,643	243,025
Shenango Valley	8,649	none	none	12,077
Western Penna.	60,073	47,565	47,680	63,802
Maryland, Virginia and Kentucky	16,046	15,470	14,201	15,289
Wheeling district	18,706	18,076	16,167	18,207
Mahoning Valley	125,705	111,722	92,305	88,515
Central and Northern Ohio	110,327	83,552	80,150	116,003
Southern Ohio	8,200	3,548	6,266	25,798
Illinois and Indiana	171,380	191,658	201,175	214,834
Mich., Minn., Mo., Wis., Colo. and Wash.	14,641	27,304	50,764	56,857
Alabama	73,739	72,699	66,573	93,224
Tennessee	none	none	none	none
Total	985,529	954,193	864,555	1,064,833

Capacities in Blast Oct. 1

The following table shows the number of furnaces in blast Oct. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Sept. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Oct. 1 In Blast	Oct. 1 Capacity per Day	Sept. 1 In Blast	Sept. 1 Capacity per Day
New York:					
Buffalo	22	5	1,725	4	1,450
Other New York	4	0	....	0	....
New Jersey	4	1	145	1	150
Pennsylvania:					
Lehigh Valley	18	2	920	2	1,065
Spiegel	2	0	....	0	....
Schuylkill Valley	15	2	770	2	670
Lower Susquehanna	10	1	400	1	430
Lebanon Valley	8	1	165	1	345
Ferro	2	0	....	0	....
Pittsburgh District	55	18	8,650	16	7,750
Ferro and spiegel	4	1	110	1	125
Shenango Valley	19	3	1,150	0	....
West. Pennsylvania	26	5	2,000	1	1,950
Maryland	6	1	440	1	400
Wheeling District	15	1	620	1	580
Ohio:					
Mahoning Valley	27	10	4,650	8	3,960
Central and Northern	26	9	4,100	6	2,950
Southern	16	2	440	1	115
Illinois and Indiana	42	12	6,380	11	5,900
Mich., Wis. and Minn.	11	1	485	1	485
Colorado and Missouri	6	0	....	0	....
The South:					
Virginia	16	0	....	1	100
Kentucky	7	0	....	0	....
Alabama	41	7	2,500	6	2,345
Tenn., Ga and Texas	16	0	....	0	....
Total	418	82	35,650	70	30,770



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302,260	3,015,181	2,416,292
Feb.	2,645,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
Apr.	3,334,960	3,288,211	2,478,218	2,739,797	1,193,041
May	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
June	3,270,055	3,323,791	2,114,863	3,043,540	1,064,833
July	3,342,438	3,420,988	2,428,541	3,067,043	864,555
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	954,193
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	985,529
9 mos.	28,794,231	28,231,415	23,693,702	27,482,754	12,232,443
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	.....
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Total yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.

Changes in Binghamton, N. Y., Plants

E. H. Titchener & Co., manufacturers of wire goods, now located on Spring Forest Avenue, Binghamton, N. Y., have purchased the plant on Walnut Street alongside the Erie railroad tracks occupied until last spring by the Binghamton factory of the American Fork & Hoe Co. The Stewart Phonograph Co., Cleveland, has purchased the Titchener plant. These transactions give the Titchener firm increased space, establish a new factory in Binghamton and provide for the use of an idle plant.

The firm of E. H. Titchener & Co. was organized in 1881, its principal product being wire staples. Since that time, it has built up a business in wire staples and miscellaneous articles, such as rings, hooks, eyes, pins, handles, also patented forms and novelties.

No Freight Reduction

No reduction in freight rates on iron ore, limestone and dolomite will be made by the railroads at this time, as requested by iron and steel interests of Pittsburgh and Youngstown. The industries asked for a reduction of 25 per cent. A conference on the subject was held recently in New York by representatives of the railroads and various large steel companies. Industrial representatives believe the reduction was deferred in view of a possible revision of freight charges early next year.

Iron and Steel Markets

OUTPUT STILL GAINING

Pig Iron an Index to Larger Steel Operations

Sheet Bookings Reach 260,000 Tons—Operations at 35 to 40 Per Cent

For the second time since the low dip in July pig iron production is an index of definite improvement in the steel industry. The pig iron total for September was 985,529 tons for 30 days, or 32,850 tons per day, as compared with 954,193 tons in the 31 days of August, or a daily rate of 30,780 tons.

Fourteen blast furnaces were blown in in September and two went out, making a net gain of 12. The daily capacity of the 82 furnaces active on Oct. 1 is estimated at 35,650 tons, as against 30,770 tons for the 70 furnaces in blast one month previous. The Steel Corporation blew in six furnaces last month, in view of the increased steel production required by recent large orders in sheets and wire products.

September showed a gain of over 900 tons per day, or 19 per cent, in the output of blast furnaces making iron for the market, in distinction from the steel companies' product, this gain following a steady succession of declines since the opening of the year.

A further pig iron gain is indicated for October, seven blast furnaces being scheduled to blow in in the first half of the month.

Steel Corporation operations are now at about 38 per cent of capacity as against 35 per cent last week. In the Chicago district the Illinois Steel Co. is on a 39 per cent basis this week and the Inland Steel Co. at 40 per cent.

There is little change from the recent alignment of demand which brought larger activity to wire, sheet, tin plate and pipe mills, without betterment in the rail, plate, shape and bar total. The advance in sheets, it now appears, was preceded by bookings of about 260,000 tons by Steel Corporation and independent mills. One order was for 1000 tons to go into steel barrels. The size of unrolled orders on the books of some of the rail mills is not calculated to hasten rail contracting for 1922. There are other rail mills that would welcome an early settlement of next year's rail prices and of freight reductions, that they might get to work.

Structural steel lettings of the week covering sizable projects aggregate fully 18,000 tons, with an 8000-ton structure for a Masonic temple at Detroit the conspicuous item, and fresh proposals total about half the amount, including 3000 tons for a new roadway for the Manhattan bridge in New York.

The St. Paul railroad is about to buy 3000 cars and is inquiring for 1000 steel underframes for its repair work.

Testimony is not uniform as to the recent effort to advance plates, shapes and bars. At least the decline in these products appears to have been checked and some independent producers are making sales at 1.60c. for bars and 1.65c. for plates and shapes. The Chicago district still shows continued sharp competition in all three lines.

The principal sales of foundry irons were about 12,000 tons at Cleveland and 10,000 tons to a Massachusetts machinery company, while in steel making iron 9000 tons of basic has been sold in the Philadelphia district at $20.50, delivered, an advance of $1.25 over the price paid for the last considerable tonnage of this grade. The selling of iron bought on speculation has had a somewhat depressing effect at Chicago, and resale iron has been a factor in the East, but for the most part recent advances have been maintained.

The situation in old material has been enlivened by advances in prices paid by dealers, and on sales of considerable railroad and other scrap higher prices have been paid. The efforts of dealers to get corresponding advances from steel companies and other buyers have been rather stiffly resisted.

Importers with connections in Germany cannot get mills there to accept round orders from American buyers for wire nails. The speculative feature of the exchange situation may account for the reported filling of German seaport warehouses, but business is apparently being diverted from the United States to South America and the Far East.

British steel makers report less trouble from Continental competition, owing mainly to slow deliveries from the Continent and partly to stiffening prices. Activity is increasing. Eighteen Cleveland district blast furnaces are now active, compared with eleven a month ago.

Pittsburgh

PITTSBURGH, Oct. 4.

October starts with promises of less accretions to steel company order books. This is not surprising in view of the fact that acceptance of large tonnages of wire products and sheets at the old prices prior to last month's advances has fortified a good many consumers and distributors against their immediate requirements and naturally there is some disposition to move slowly until some of these purchases have been digested. Such gains as have been recorded in business since about the midddle of July have been confined pretty closely to the lighter products such as wire, nails, sheets, tin plate and pipe. There has been no very pronounced improvement in the demand for the tonnage products and it is the experience of the leading subsidiary of the Steel Corporation that September was a leaner month than August.

A number of the independent makers of plates, shapes and bars have advanced their quotations to meet those announced about ten days ago by the Steel Corporation, but so far as actual business is concerned it is impossible to record any advance over the prices which recently have been common. There is more structural business than there was even as recently as a month ago, but it is evident that fabricating companies had figured on material in stock because there has been only a slight gain in the mill orders for plain structural material. A definite and even

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 4, 1921	Sept. 27, 1921	Sept. 6, 1921	Oct. 5, 1920
No. 2X, Philadelphia‡	$21.84	$21.84	$20.84	$53.57
No. 2, Valley furnace†	21.00	21.00	21.00	47.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2 foundry, Chicago*	*21.00*	22.00	21.00	46.00
Basic, del'd, eastern Pa.	**20.50**	19.25	19.00	51.26
Basic, Valley furnace	19.25	19.25	19.00	46.00
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	*21.00*	22.00	21.00	46.50
Malleable, Valley	20.50	20.50	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.96	47.96
L. S. charcoal, Chicago	31.50	31.50	33.50	58.50
Ferromanganese, del'd	60.00	60.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. sheet bars, P'gh.	32.00	32.00	30.00	65.00
Forging billets, base, P'gh.	**35.00**	34.00	34.00	70.00
O.-h. billets, Phila.	35.74	35.74	35.74	60.74
Wire rods, Pittsburgh	41.00	41.00	38.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.60	1.60	1.70	3.25
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	2.00	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.60	1.60	1.65	3.25
Steel bars, Chicago	1.75	1.75	1.85	2.73
Steel bars, New York	1.98	1.98	2.03	4.13
Tank plates, Pittsburgh	1.60	1.60	1.70	3.25
Tank plates, Chicago	1.65	1.65	1.75	3.03
Tank plates, New York	1.98	1.98	2.08	3.63
Beams, etc., Pittsburgh	1.60	1.60	1.70	3.10
Beams, Chicago	1.75	1.75	1.80	2.83
Beams, etc., New York	1.98	1.98	2.08	3.48
Steel hoops, Pittsburgh	2.25	2.25	2.25	5.50

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Oct. 4, 1921 Cents	Sept. 27, 1921 Cents	Sept. 6, 1921 Cents	Oct. 5, 1920 Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	2.75	6.75
Sheets, galv., No. 28, P'gh.	4.00	4.00	3.75	8.25
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.25	5.00
Wire nails, Pittsburgh	2.90	2.90	2.75	4.25
Plain wire, P'gh	2.60	2.60	2.50	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$16.00**	$15.00	$13.75	$37.00
Carwheels, Philadelphia	17.00	17.00	17.00	41.00
Heavy steel scrap, P'gh.	14.00	14.00	13.00	28.00
Heavy steel scrap, Phila.	**11.75**	11.50	11.50	23.00
Heavy steel scrap, Ch'go.	**12.25**	11.75	11.00	22.50
No. 1 cast, Pittsburgh	**17.50**	17.00	16.50	41.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	39.00
No. 1 cast, Ch'go (net ton)	13.50	13.50	13.25	30.00
No. 1 RR. wrot, Phila.	15.50	15.50	14.50	31.00
No. 1 RR. wrot, Ch'go (net)	**12.50**	11.50	11.50	21.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$3.00	$17.00
Foundry coke, prompt	4.25	4.25	4.00	18.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**12.62½**	12.25	12.00	18.25
Electrolytic copper, N. Y.	**12.37½**	12.12½	11.75	18.25
Zinc, St. Louis	**4.55**	4.35	4.20	7.50
Zinc, New York	**5.05**	4.85	4.70	7.65
Lead, St. Louis	**4.50**	4.45	4.20	7.50
Lead, New York	4.70	4.70	4.70	7.50
Tin, New York	26.75	26.75	27.25	42.50
Antimony (Asiatic), N. Y.	**5.00**	4.60	4.50	7.00

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Oct. 4, 1921, Finished Steel, 2.236c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel.

Sept. 27, 1921,	2.236c.
Sept. 6, 1921,	2.279c.
Oct. 5, 1920,	3.867c.
10-year pre-war average,	1.684c.

Composite Price, Oct. 4, 1921, Pig Iron, $19.93 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 27, 1921,	$20.10
Sept. 6, 1921,	19.64
Oct. 5, 1920,	46.59
10-year pre-war average,	15.72

a substantial gain has been made in business as a whole as compared with the low point of the year, but there is no pretense that conditions are satisfactory and more and more the opinion is becoming general that the new year will have arrived before what may be termed a real turn will be seen.

There is general recognition of the fact that iron and steel prices to-day are as low as they reasonably can be without further wage reductions and a wage cut is a step the industry as a whole hesitates to take, in view of the fact that the reduction in wages to iron and steel plant workmen has far outdistanced those in a large number of other industries. The problem of unemployment is getting the serious attention of steel manufacturers and the recent efforts to get prices up is associated closely with an attempt to keep plants running and to provide as much work for the greatest number of men possible. A solid foundation for business will hardly be established until the labor unions recognize the changed economic and industrial conditions through willingness to accept more reasonable wages, and there also has been liquidation of fuel and railroad freight rates. Such developments cannot well be effected over night and since the present steel prices discount what already has happened, the industry feels that if it is to do its part in keeping down unemployment it is entitled to the prices which now rule.

The principal reason buying is not more urgent and confident lies in the fact that in most products there is no doubt about deliveries. Possibly it is a little harder now than it was recently to secure immediate shipment of sheets, but in all other lines manufacturers are keeping right up with their deliveries.

The pig iron market has had a very quiet week, but the situation in scrap iron and steel has been enlivened by what the steel manufacturers term a "dealers' boom," which has found expression in the payment by dealers of stiff advances over recent prices at primary points. Consumers are resisting strongly the attempt to wring higher prices out of them and it is worthy of note, as showing that the demand is not very strong, that a large Pittsburgh independent steel company last week rejected 25 cars of material because it was not up to specifications. There is very little change in the fuel situation.

Pig Iron.—It is doubtful whether this week's business will total more than 2000 tons. Recent purchases by the Standard Sanitary Mfg. Co. have removed that company as a possible buyer for a time, while the Westinghouse Electric & Mfg. Co., which recently asked for prices on about 1300 tons of foundry iron, is inclined to regard a price of $21, furnace, for the base grade as too high. The business in foundry iron is of lots of one to two carloads, which, however, have been moved at a basis of $21 for No. 2 plain. The largest sale reported of the steel making grades is one of 500 tons of standard Bessemer for prompt delivery, at $20, Valley furnace. Almost no interest is being taken in basic iron at present and while most makers are refusing to consider offers of less than $20, no sizable tonnages yet have sold at that price. W. P.

Snyder & Co. report the average price of basic iron from Valley furnace for September at $19.25 and Bessemer at $20, as compared with $18.33 and $20 respectively in August.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.25 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.50

Ferroalloys.—The market is showing a little more life than was recently true, particularly in 50 per cent ferrosilicon, of which there has been one sale of 300 tons for shipment over the remainder of the year to a large foundry interest. The quotable market on this material, based on sales, is $60, freight allowed, at which price several carloads for early delivery have been moved. Consumers are trying to break this price, but the effort so far has not been successful. An inquiry for 500 tons of 75 per cent ferrosilicon has reached this market, but the buyer and sellers are considerably apart on prices, the bid being around $100 and the asking price around $125, furnace, freight allowed. The most interesting feature of the market with reference to ferromanganese was a purchase recently made by a Youngstown district steel maker of 100 tons of 80 per cent foreign material at $60, delivered. This price means only $53.28 at seaboard and is a full $5 per ton below the recent quotation. American makers still are quoting $65 delivered east of the Mississippi River, but have shaded those quotations slightly in competition with foreign material. There is no interest in spiegeleisen and quotations are nominal. The recent advance of $2 per ton in Bessemer ferrosilicon and silveries appears to be in sympathy with pig iron rather than because of any material increase in demand.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $65 delivered; 78 to 82 per cent British ferromanganese, $58.35, c.i.f. Atlantic seaboard; German, $53.28 c.i.f. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Practically all makers of sheet bars have advanced their price to $32, Pittsburgh or Youngstown, thus re-establishing the price named early in July. Such a step was necessary as a means of protecting the recent advance in sheets, for ability to buy bars at recent prices, which ranged as low as $29, would have enabled non-integrated sheet makers to continue to take low-priced business. Demand at the new price is not heavy. Billets and slabs are neglected, but with sheet bars at $32 the effort now is to get $30 for 4-in. billets, $31 for slabs and $32 for small billets. Little demand exists for forging billets.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Bessemer and open-hearth sheet bars, $32; slabs, $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Specifications against contracts placed at the old prices are coming along fairly well, but the new base of $41, Pittsburgh, for No. 5 gage common soft rods to date has found almost no basis in sales. All makers are holding firmly to that price on new business, but new customers are few. Prices are given on page 904.

Plates.—Demand remains extremely limited, with the bulk of the sales of small lots against which common prices have been 1.65c. to 1.70c. The quotation of 1.75c. is merely an asking price and large users insist that if they had sizable orders to place they could do 1.60c. readily. Prices are given on page 904.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.60c. to 1.75c. f.o.b. Pittsburgh.

Structural Material.—Structural shapes are showing more activity than is noted in other tonnage products, but the total bookings are woefully short of taxing mill capacity. The attempt to stabilize the market at 1.75c. has not been successful and on actual business 1.60c. to 1.65c. covers the price range. Structural awards have been fewer in most shops here. Steel for the airship hangar, Scott field, Belleville, Ill., amounting to 3800 tons, has been awarded to the McClintic-Marshall Co. This company also was the successful bidder for three public schools in Brooklyn, New York, taking 2400 tons; for a new building for the Berkshire Knitting Mills, Wyomissing, Pa., calling for 710 tons; for an apartment house for the 920 Fifth Avenue Corporation, New York, taking 830 tons; for a factory building for C. A. Reed & Co., Williamsport, Pa., taking 413 tons; for an apartment house at 34 East Fifty-first Street, New York, calling for 241 tons; for a hospital at Hackensack, N. J., requiring 650 tons, and for two cable way towers placed by the Lidgerwood Mfg. Co., New York, for export, taking 105 tons. The Jones & Laughlin Steel Co. has the contract for the addition to the plant of the Townsend Co., New Brighton, Pa., calling for 500 tons and the Memphis Steel Construction Co. will fabricate 400 tons for the plant of the E. Z. Opener Bag Co., New Orleans. The Dravo Contracting Co. recently was awarded a drill boat by the Government for use in the improvements of the Hell Gate channel. This boat has a 10-ft. center drill and 1200 tons of steel will be required for its construction. The same company also has taken three river barges for the Pittsburgh district U. S. Engineer's office, taking 400 tons of steel. Plain material prices are given on page 904.

Wire Products.—Makers here report good specifications against orders and contracts booked at the old basis of $20.50 base per 100-lb. for wire and $2.75 base per keg for bright nails, but all such requirements are accommodated readily and new business is falling short of making good the completed tonnages. The best business is in nails, but fence makers are specifying fairly against galvanized wire. Manufacturers find no trouble in keeping up with their deliveries and until they fall behind there is little likelihood of any further advance in prices.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Steel Rails.—Not much demand exists in either standard or light rails. There is a fair movement of the former on old orders, but it is doubtful whether the railroads will take all the tonnage they placed earlier in the year because it is getting late for laying rails and most of the Eastern lines put off the work last spring waiting on a reduction in the wage scales. Light rails do not reflect either the larger coal mine operations or the fact that contractors are busier now than they were earlier in the year. The regular quotation on light sections rolled from billets is 1.75c. base, but it is noted that a price of 1.70c. failed to bring an order, due to competition from re-rolled rails which are quoted from $36 per gross ton mill to $36 delivered.

Spikes and Track Bolts.—Demand for spikes still is of moderate proportions. Both the railroads and jobbers are buying as supplies are needed because there is no question at the moment about deliveries. Not only can makers make prompt shipments, but they are anxious for business and prices are soft. Activity also is lacking in track bolts, demand for which is entirely for small lots. Quotations merely are asking prices and probably would be shaded against really attractive orders. Makers here are trying to obtain the usual extra of 1c. per lb. on less than carloads of a size. Prices are given on page 904.

Hot-Rolled and Cold-Rolled Strips.—Demands are slightly more numerous, but efforts to get prices up are not particularly successful. The market is quotable from 2c. to 2.25c. base for hot-rolled strips and 3.75c. to 4c. base on cold-rolled.

Iron and Steel Bars.—There is no perceptible increase in the demand for merchant bars upon Pittsburgh and Youngstown makers, and actual prices still are somewhat indefinite. The common asking price is 1.65c., but orders have been accepted at 1.60c., and suggestions have been made by buyers that even less could be done on attractive tonnages. There is not much inquiry for reinforcing bars and recent improve-

ment in the demand for iron bars has not been maintained. The common quotation on the latter is 2.25c. base, but some business has been taken at 2.15c.

We quote steel bars rolled from billets at 1.60c. to 1.65c.; reinforcing bars, rolled from billets, 1.60c. to 1.65c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.15c. to 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Steel Skelp.—The higher prices now quoted on plates have caused some strengthening in quotations on skelp. Some makers now are asking 1.75c., Pittsburgh, for the latter, but, as is true of plates, 1.60c. to 1.65c. is more representative of to-day's possibilities. There is little call for skelp despite a better movement in tubular goods.

Iron and Steel Pipe.—The upward slant of orders, which began about the middle of July, continues, most makers reporting September business to have registered a fair gain over August, which in turn was better than July in the matter of bookings. Despite the gains, there remains considerable room for improvement in both steel and wrought iron pipe, none of the makers being sold very far ahead. Line pipe constitutes the most active spot, but competition for passing business is so sharp that the price advantage is entirely with buyers. The Ohio Fuel Supply Co. recently closed for 28 miles of 4-in. line pipe and 6 miles of 6-in. pipe.

Sheets.—The higher prices recently established are beginning to find some basis in sales, although as yet only small tonnages are involved. The total amount of business driven in before the advance is understood to have been more than 250,000 tons, and as it practically all was for early shipment, mill operations have further expanded. The American Sheet & Tin Plate Co. has all of its sheet plants in operation this week but as some of them are not running full, the active units fall just short of 90 per cent of the total number of mills embraced by this company.

Tin Plate.—Although the demand for perishable food container tin plate has practically disappeared, there continues to be sufficient demand for general line plate to sustain the recent high rate of mill operations. The American Sheet & Tin Plate Co. again this week has 65 per cent of its mills running, while the independent plants are even more fully engaged. Weirton Steel Co. has 43 of its 50 tin plate mills running while the Jones & Laughlin Steel Co., which recently was running 16 of its 32 mills, now has 20 of them on and the Standard Tin Plate Co. has put on four additional hot mills, and has 16 of its 24 mills engaged. The McKeesport Tin Plate Co. has all of its 44 mills running. Production plate is well established at $5.25 per base box, Pittsburgh, on domestic business, but stock items, although not plenty, are slightly weaker, having sold around $4.50 recently. The full range on the latter is $4.50 to $4.75.

Cold-Finished Steel Bars and Shafting.—This line has not shared in the general improvement in the steel business. Most makers are carrying rather sizable stocks and in an effort to liquidate them, quotations as low as 2.20c. and 2.25c. have been made. These prices rule, however, only in such business as can be supplied from stock and represent a writing down of inventories. Against new rollings 2.40c. is the common quotation, and it is doubtful whether the price would be shaded except on very attractive orders.

Hoops and Bands.—The effort to establish a base of 2.25c. for these products does not seem to be meeting much success, owing to the fact that the demand still is limited. Several makers, however, will not accept business in the lighter gages of narrow material at less, but difficulty is experienced in getting more than 2c. on the heavier gages.

Nuts, Bolts and Rivets.—A revision of prices, which has been generally adopted, puts rivets at a flat base of $2.40 for large button head and $2.50 for cone head, which is slightly above recent low prices but somewhat below what some makers have been asking. The new discount on small rivets is 70, 10 and 5 per cent off list, against the former discount of 70, 10 and 10 per cent. An average advance of 5 per cent has been made in machine, carriage and lag bolts, but nuts have been cut $3 to $5 per ton by an increase in the discount. Inquiries are more numerous but actual business still leaves much to be desired. Prices and discounts are given on page 904.

Coke and Coal.—The placing of a few fair-sized contracts for shipment over the remainder of the year has not appreciably disturbed the market for furnace coke, which still is quotable at from $3.25 to $3.50 per net ton oven. The Empire Steel & Iron Co., Catasauqua, Pa., recently closed for 7000 tons a month for the remainder of the year at about $3.25, and the Adrian Furnace Co., DuBois, Pa., has contracted for 20,000 tons for shipment over three months at slightly above this figure. The Colonial Iron Co., Riddlesburg, Pa., and the Thomas Iron Co., Hokendauqua, Pa., have inquiries out for about 7000 tons a month. Spot demands for furnace fuel are few and small, and not much trouble is experienced by buyers in covering them at $3.25, oven. Foundry coke finds a steady demand at prices ranging anywhere from $4.25 to $4.75 per net ton oven. The coal market is quiet, with prices showing no special change from those of a week ago or $1.75 to $1.85 for mine run steam, $1.90 to $2.10 on by-product and $3.25 to $3.50 on gas coal.

Old Material.—Prices still are headed upward, but the advance is due more to what is called a "dealers' boom" than to a really big demand from melters. The latter, in this district at least, are resisting strongly the attempts by dealers to obtain higher prices, but are obliged to pay some advance to secure needed supplies. But they are buying sparingly and thus far it has been impossible to put prices up as much or as rapidly as they have gone up in primary markets. Dodge Bros. scrap, which was sold recently, brought $5.60 Detroit for turnings and $7.30 for borings, which would mean $10.50, and $12.20, respectively, delivered to Pittsburgh common freight points, or about $1 a ton above the highest bids recently made by consumers in this district. Correspondingly high prices were paid for other kinds of scrap offered by Dodge Bros. Malleable sold at $12.40, Detroit; compressed sheets, $8.20; busheling, $7; shoveling steel, $10.50, and low phosphorous steel, $11.50. Dealers have paid $13.50 a net ton, or $15.12 a gross ton for heavy melting steel offered by the Pennsylvania Railroad, Central Region, which compares with $14.50, the highest bid of any of the Pittsburgh district steel makers. Compressed sheets, offered by Westinghouse Electric & Mfg. Co., were taken by dealers at $11.25, East Pittsburgh, or at least 50c. a ton above what they could be sold at to mills to-day. Either the dealers have become frightened by the recent improvement in the steel business and are covering against short sales, or are bidding up prices in the hope of establishing levels which will enable them to unload profitably the large stocks of high-costing material they have on their yards. The Pennsylvania Railroad, Eastern Region, closed bids at noon to-day on 25,000 net tons of scrap. The list includes 12,000 of No. 1 rails, which compares with 16,500 tons of this grade offered in the September list.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast cupola size	17.50 to 18.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	11.50 to 12.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	10.00 to 10.50
Railroad knuckles and couplers	15.00 to 15.25
Railroad coil and leaf springs	15.00 to 15.25
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.50 to 18.00
Railroad malleable	13.00 to 13.50
Iron car axles	20.00 to 21.00
Locomotive axles, steel	19.50 to 20.00
Steel car axles	15.00 to 15.50
Cast iron wheels	16.50 to 17.00
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	9.00 to 9.50
Sheet bar crop ends at origin	13.00 to 13.50
Heavy steel axle turnings	10.50 to 11.00
Short shoveling turnings	10.50 to 11.00
Heavy breakable cast	15.00 to 15.50
Stove plate	12.00 to 12.50
Cast iron borings	9.50 to 10.00
No. 1 railroad wrought	12.00 to 12.50

Chicago

CHICAGO, Oct. 4.

The betterment in demand for steel is sustained but the price situation has not yet been materially affected. Although reports from Eastern markets seem to indicate that plates, structural steel and bars are firmer there, the same cannot be said in the Chicago district. The expansion in business during the past two weeks has not yet reached sufficient proportions to give the mills comfortable backlogs, but it is apparent that the tendency is in the right direction. While buying is more liberal than it has been for months, it is evident that caution still controls the purchasing policy of many consumers and that there are still those who feel that railroad freight reductions and further wage cuts must come before the industry will reach a stable basis. On the other hand, it is contended by some observers that present mill prices are considerably below costs and discount the very developments counted on to bring prices to bottom. It is not thought likely that reductions, if made, will bring rates back to the 1914 status, as it is generally conceded that railroad earnings were too low at that time. If, therefore, it be agreed that the element of transportation costs in the manufacture of steel will settle at a point somewhat higher than the pre-war level, present going prices for mill products cannot be far from bottom, barring the introduction of unforeseen operating economies.

Ignoring speculation as to future developments in the market, it cannot be denied that considerable work is going ahead which cannot be delayed. Railroad lettings of car repairs as well as of new equipment are steadily becoming more numerous. Oil storage tank construction and fabricating work are also calling for increasing quantities of steel and miscellaneous demand is better.

Mill operations in this district have shown a further increase. The Illinois Steel Co. is on a 39 per cent basis, while the Inland Steel Co. is producing at the rate of 40 per cent of ingot capacity. The former company has added another furnace at South Works, making a total of 10 active stacks out of its 29.

Ferroalloys.—A local melter has purchased a carload of 50 per cent ferrosilicon at less than $60, delivered. An inquiry for 750 tons of 14 to 15 per cent ferrosilicon is in the market and it is reported that as low as $32, delivered, has been quoted. Two other inquiries for the same material, amounting to 100 tons each, are pending.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Pig Iron.—The market is quiet, but producers report that they are in a fairly comfortable position as a result of bookings accumulated during September and the latter part of August. Shipments of by-product coke during September indicate that local melters are operating at about 73 per cent of normal, while those at outlying points are on a 30 per cent basis. Foundry operations, however, are still spotty, and while there has been an appreciable improvement, it has not been of the sustained character necessary to restore the confidence of buyers. It is to be noted, however, that some melters are commencing to lay up a little stock of both coke and iron. So far as local producers are concerned, pig iron prices remain unchanged, but certain tonnages bought on speculation have been unloaded recently at a concession of $1 a ton. Sales of foundry and malleable aggregating close to 1500 tons have been made within the past week on this basis. The amount of this iron still outstanding is not great, however, and when it is disposed of prices are expected to recover their former firmness. A railroad is in the market for 750 tons of malleable and 200 tons of foundry. A Minnesota melter is inquiring for 100 tons of foundry and several fair-sized inquiries for charcoal have been received from the East. There is also an inquiry for 100 tons of charcoal pending for local delivery. Several sales of from 100 to 200 tons for Eastern delivery have been closed at the new base of $28, furnace. Jackson County silvery appears to be holding at the advanced quotations, but Tennessee material is available at lower prices. Low phosphorus is being offered at $38.50, delivered, or about $32, Eastern furnace. The Mark blast furnace at Indiana Harbor is now warming up and will be blown in within a few days. It will be employed partly on steelmaking iron for the Mark Mfg. Co., and partly on merchant iron for the leading Northern merchant.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	$21.50 to 22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00 to 22.00
Northern high phos	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	21.00 to 22.00
Basic	22.00
Low phos., Eastern furnace, sil. 1 to 2 per cent copper free	32.00
Silvery, sil. 8 per cent	33.53 to 34.82

Railroad Equipment.—The Chicago, Milwaukee & St. Paul is in the market for 1000 50-ton composite general service cars and 2000 40-ton dumping stock cars. It is also asking for prices on 1000 steel underframes to be applied on cars which it will repair in its own shops. The same road has let repairs on 300 50-ton composite gondola cars to the Bettendorf Co. The Baltimore & Ohio has distributed its orders for car bodies as follows: Five hundred hopper car bodies to the Cambria Steel Co., 500 hopper and 500 box car bodies to the Standard Steel Car Co. and 500 box car bodies to the American Car & Foundry Co. The New York Central Lines, which let orders for a large number of car repairs a week ago, contemplate the award of repairs on another large lot of cars.

Structural Material.—The apparent settlement of the local building strike is accepted with caution, as the unions have previously shown their lack of good faith. If it becomes clear, however, that stable conditions are actually at hand, it is likely that considerable work will be released despite the lateness of the season. In other sections of the West, a steady expansion of construction activity is to be noted with the result that mills are getting more business from both the fabricators and the jobbers. Plain material prices have not changed materially, but the tendency, if any, is upward. The largest pending fabricating job, the Government hangar, Belleville, Ill., involving 3600 tons was finally award to the McClintic-Marshall Co. at a reported price of $65, delivered. Other recent lettings include:

Masonic Temple, Davenport, Iowa, 443 tons, to Decatur Bridge Co.

Pressure tank, Los Angeles, 358 tons, to Baker Iron Works.

Buffalo Marine Construction Co., dry dock, Buffalo, 1200 tons, to Lackawanna Bridge Co.

Masonic Temple, Sioux City, Iowa, 337 tons, to Rock Island Bridge & Iron Works.

Colorado & Southern Railway, two oil storage tanks, Wichita Falls, Tex., 312 tons, to Chicago Bridge & Iron Co.

Waterway Paper Products Co. plant, Chicago, 177 tons, to Federal Bridge & Structural Co.

F. Rosenberg Elevator Co. plant, Milwaukee, 125 tons, to Federal Bridge & Structural Co.

Memorial building and auditorium, Wakefield, Mich., 175 tons, to Worden-Allen Co.

Wisconsin Valley Electric Co., Wausau, Wis., transmission towers, 100 tons, to Federal Bridge & Structural Co.

Bahai Temple, Wilmette, Ill., 105 tons, to Federal Bridge & Structural Co.

Pending business includes:

Government, LeClaire canal locks, Rock Island, 150 tons, Penn Bridge Co. low bidder.

Gallup-American Coal Co., Gallup, N. M., power house, 325 tons.

Harris Theatre, Indianapolis, 150 tons.

Trestle, Wisconsin Steel Works, Chicago, estimates not yet asked.

The mill quotation on plain material ranges from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—Orders for spikes and bolts are more numerous, but prices are no firmer. On the contrary, as low as 2.25c., Pittsburgh, has been done in a few instances on standard spikes. No large purchases are reported, most orders ranging from 500 to 1000 kegs. Little new business in tie plates is devel-

oping, but specifications are being taken out fairly well. There is little demand for light rails.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills.
Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—The improvement in demand noted a week ago has been sustained. Good-sized orders continue to come from jobbers, tank fabricators and car builders, with the result that many who feared that the recent revival in trade was a mere flash in the pan, now look forward confidently to a steady, although perhaps gradual, betterment in buying. It is conceded that the change in sentiment is more marked than the change in actual conditions. Plates are still the weakest commodity in the finished steel market and there has been no material change in going prices, but the tendency appears to be in the direction of greater firmness. Some of the steel for the car repairs recently let by the New York Central Lines has been placed with a local mill, one order calling for 1000 tons of plates, shapes and bars and another for 1250 tons. An inquiry for 2500 tons is still pending. Fabricators of oil storage tanks are also active in the market, a southwestern builder having bought 2000 tons of plates from a local mill within the past few days.

The ruling mill quotations range from 1.65c. to 1.80c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Demand is still unsatisfactory, but owing to the losses incurred taking business in the face of sharp competition, makers are taking a firmer attitude. One important bolt manufacturer has announced a new list of minimum discounts and these are being adopted by most other makers:

Carriage bolts, small rolled thread, 65 and 10 and 10 off; cut thread, 65 and 10; larger and longer, 65 and 10; machine bolts, small, rolled thread, 70 and 10 and 5; cut thread, 70 and 5; larger, 65 and 10 and 5; machine bolts, cold punched, chamfered and trimmed, small, 65 and 5; larger, 65; lag bolts, 70 and 10; hot pressed nuts, blank, $5.50 off; tapped, $5 off; cold punched nuts, blank, $5.25 off; tapped, $5 off; small rivets, 70 and 10 and 5 off; large structural rivets, $2.40 base; large boiler rivets, $2.50 base.

Discounts announced on stove bolts, plow bolts and semi-finished hexagon nuts are substantially the same as those published last week under finished iron and steel, f.o.b. Pittsburgh, page 844. That the above discounts have not yet been adopted by all makers is indicated by the fact that on an attractive local inquiry, now pending, the following were quoted, f.o.b. Chicago:

Small machine bolts, rolled thread, 70 and 10 and 10 and 5 off; cut thread and large, 70 and 10 and 5 off; carriage bolts, small, rolled thread, 65 and 10 and 10 and 5 off; cut thread and large, 65 and 10 and 5 off; lag bolts, 70 and 10 and 7½ off.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅝ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅝ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Sheets.—Business has fallen off since the advance, but in some cases this is due to the fact that mills having heavy bookings ahead cannot make the delivery asked for. The new prices on black and galvanized are holding rather steadily, but blue annealed is still available at from 2.25c. to 2.35c. base, Pittsburgh.

Mill quotations are 3c. for No. 28 black, 2.25c. to 2.50c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.
Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Cast Iron Pipe.—The unemployment conference called by the President is expected to result in a further expansion of public works with a favorable effect on the cast iron pipe market. Despite the lateness of the season, actual inquiries now before the trade call for considerable tonnage. The only change to be noted in the price situation is the disappearance of the extreme concessions reported some weeks ago and a concomitant tendency toward stability.

Recent lettings include:

Cleveland, 1800 tons of 48- and 60-in., to United States Cast Iron Pipe & Foundry Co.
Cuyahoga County, Ohio, 1700 tons of 6- to 12-in., sublet by contractor to United States Cast Iron Pipe & Foundry Co.
Minneapolis, 200 tons, to National Cast Iron Pipe Co.

Prospective business:

Board of Local Improvements, Chicago, 713 tons of 8-in., to be sublet by contractor.
Marietta, Ohio, 375 tons of 12-in., bids to be taken Oct. 10.
Cincinnati, 250 tons. Oct. 5.
East Youngstown, Ohio, 250 tons, Oct. 11.
Bay View, park sewage pumping station, Toledo, Ohio, 65 tons of flanged 36-in. and specials, Oct. 3.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Wire Products.—The increase in demand has been sustained and further improvement is noted, particularly in the South, where there has been a marked change for the better. Jobbers are the most prominent buyers and the railroads are steadily increasing their purchases, although their individual orders are rarely more than a carload. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 904.

We quote warehouse prices f.o.b. Chicago; No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Bars.—Mills report better booking in soft steel bars, both specifications and new tonnage being heavier. Demand is widely distributed, coming from jobbers, forge shops, automobile manufacturers, bolt makers, and other users. A fair amount of business has been done in reinforcing bars, although prospective concrete jobs still greatly outnumber actual lettings. The Paul J. Kalman Co. has booked 150 tons for the Bahai Temple, Wilmette. Among pending projects are a home economics building at Purdue University, 75 tons, and an armory, Danville, Ill., 65 tons.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.
Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Old Material.—A number of substantial purchases by users have been made at advanced quotations. A large steel melter has bought several thousand tons of couplers, knuckles, springs, steel wheels and guard rails for a local and a St. Louis district plant and another important interest has bought a fair tonnage of malleable. There have also been moderate purchases of material by two iron mills in this district. Advances of from 25c. to $1 a ton are to be noted on most of the items listed below. Railroad lists are more numerous. The Chicago & Northwestern offers 4000 tons, the Pennsylvania, Northwestern region, 2500 tons, the Pennsylvania, Southwestern Region, 3000 tons, and the Erie, the New York Central and the Michigan Central blank lists.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Relaying rails	27.50 to 30.00
Car wheels	16.00 to 16.50
Steel rails, rerolling	14.00 to 14.50
Steel rails, less than 3 ft.	13.50 to 14.00
Heavy melting steel	12.25 to 12.75
Frogs, switches and guards cut apart	12.25 to 12.75
Shoveling steel	11.75 to 12.25
Low phos., heavy melting steel	14.25 to 14.75
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	8.00 to 8.50
Axle turnings	8.50 to 9.00
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	11.50 to 12.00
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.00 to 19.50
Steel car axles	14.00 to 14.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	6.75 to 7.25
Cut forge	11.00 to 11.50
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.25 to 11.75
Steel knuckles and couplers	13.00 to 13.50
Coil springs	14.00 to 14.50
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	13.25 to 13.75
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.50 to 6.00
Stove plate	12.75 to 13.25
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00
Railroad malleable	13.50 to 14.00
Agricultural malleable	13.50 to 14.00
Country mixed	9.00 to 9.50

New York

NEW YORK, Oct. 1.

Pig Iron.—The Westfield, Mass., machinery company, which had been in the market for 10,000 tons of No. 2 plain for several weeks, has contracted for its full requirements, dividing the iron among several companies. A Bridgeport company, which was in the market for 700 tons of foundry iron and 200 tons of malleable, has bought resale iron, but it is not believed that there is much resale iron now to be had. The New York Central has closed for 500 tons and several other buyers have bought small tonnages. A machinery company is expected to be in the market in two or three weeks for 500 tons and a New Jersey melter is expected to close for 500 tons before the close of the week. The usual quotation on eastern Pennsylvania iron is $20.50, furnace, for No. 2 plain, $21 for No. 2X and $22 for No. 1. One Pennsylvania furnace which expected to blow out Oct. 1 has taken on considerable business of late and has decided to remain in blast. Reports from foundries connected with textile and hardware concerns indicate improvement in business, but the general jobbing trade is not very active.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	23.02
Buffalo, sil. 1.75 to 2.25	25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16

Ferroalloys.—Demand for ferromanganese is very light, and quotations for the American and British alloy are unchanged. A Youngstown consumer is reported to have bought 100 tons of German ferromanganese at $60, delivered, or an equivalent of around $53, seaboard, but any confirmation of this report is not obtainable. It is, however, a fact that one seller of German ferromanganese is able to quote about $53, seaboard. Inquiries are confined to a few carload lots. There have been sales of a few carloads of spiegeleisen at $26, furnace, but otherwise the market is very quiet. There is no demand for manganese ore, quotations for which continue nominal. There is no activity in the 50 per cent ferrosilicon market, but it is reported that about 2000 tons of resale material is offered, this being material contracted for but never delivered. Quotations are as follows:

Ferroalloys	
Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton.	$58.35
Spiegeleisen, 20 per cent, furnace, per ton	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal.	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ores	
Manganese ore, foreign, per unit, seaboard.	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Finished Iron and Steel.—Outside of fabricated steel work, business could hardly be called active. About 6000 tons of steel has been closed for sizable building and bridge projects and nearly 7000 tons of new work has come into the market. The other noteworthy item is an expansion in railroad car inquiries and a sustained buying by the railroads of day to day needs. For example, one road has bought 700 tires and 400 wheels. The Baltimore & Ohio has placed 500 hopper car bodies with the Cambria Steel Co. and a like number with the Standard Steel Car Co., 500 box car bodies with the Standard Steel Car Co. and a like number with the American Car & Foundry Co., and is inquiring for 1000 70-ton coke car bodies and 1000 50-ton gondolas. The Erie is inquiring for repairs for 250 drop and gondola cars. In new car work the St. Paul is in the market for 2500 general service cars, the Rio Grande & Western for 1000 general service cars, and the Lackawanna Railroad plans to buy 1000, and perhaps 2000, 50-ton hopper cars, but claims prices named are too high, largely through the prices of the specialties. The Great Northern is in the market for 30 underframes for dining cars. Among new fabricated steel jobs, an additional roadway for the Manhattan bridge, involving 3000 tons, on which bids are to be received Oct. 10, is conspicuous. Other inquiries include the following: 800 tons for the Back Bay telephone exchange, Boston; 550 tons for the Philadelphia & Reading bridge at Atlantic City; 1000 tons for a high school at Providence; 1000 tons for a high school at Springfield, Mass., and 700 tons for the Harris-Forbes Building. Awards include the following: 150 tons for the Surf apartment, Rochester, N. Y., and 300 tons for a sintering plant for the Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., both to the Lackawanna Bridge Co.; 200 tons for a boiler house for the Cherry River Paper Co., W. Va., and 900 tons for a chemical laboratory, Yale University, both to the American Bridge Co.; 1300 tons for the Golden apartment, Ninetieth Street and Broadway, to the Hinkle Iron Co.; 1100 tons for the National Surety Co. to the Levering & Carrigues Co.; 700 tons for a Paterno apartment to the Paterson Bridge Co.; 400 tons for C. A. Reed & Co., Williamsport, Pa., to the McClintic-Marshall Co., which company is expected to erect the Hackensack hospital, taking 700 tons. It is reported that the Russell Wheel & Foundry Co. will erect the 8000-ton structure for the Masonic Temple, Detroit. No decision has apparently been made on 1900 tons of bars and plates, mostly plates, for the General Petroleum Co. Low prices have been named on 700 tons of reinforcing bars for the concrete portion of a boardwalk at Coney Island, for which the Phoenix Construction Co. has the general contract. As to prices, the minimum appears to be 1.60c., Pittsburgh base, for the heavy rolled products—shapes, bars and plates—though on a firm attractive offering this price might still be shaded. The effect of the advances in pipe and sheets has, like that in wire products, been followed by cessation of buying after those protected by the lower prices were covered.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.98c. to 2.03c.; plates, 1.98c. to 2.13c.; structural shapes, 1.98c. to 2.13c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead or 38c., the domestic rate.

Warehouse Business.—Practically all warehouses report a far better month's business for September than for several months past. Although there is a better tone to the market, prices are still unchanged, most quotations being largely nominal. Prices of black and galvanized sheets continue stiff with few sales reported under the current quotation of 4c. per lb. for black and 5c. per lb. for galvanized. In the brass and copper market, prices are stiff and business fair but still confined to numerous small orders that are not always profitable to handle.

High Speed Steel.—Market conditions are unchanged, purchases continuing fairly numerous but small. Producers quote 90c. to $1 per lb. for 18 per cent tungsten high speed steel.

Cast-Iron Pipe.—No municipal contracts are now pending but small orders are sufficiently abundant to have a strengthening effect on prices, particularly quotations on the smaller sizes. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—The market continues to show activity, particularly in the Pittsburgh and Valley districts, where as high as $14.50 per ton has been done on heavy melting steel, according to one dealer. While heavy melting steel quotations continue unchanged for the present, some items have registered a slight advance and there is noticeable a general stiffening in the market. The weekly buying prices of a broker with an office in this district have been increased this

week from 25c. and 50c. per ton to as high as $1 and $1.50 per ton.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to $7.50
Steel rails, short lengths, or equivalent	8.50 to 9.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	11.50 to 12.00
Iron car axles	19.00 to 20.00
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track	9.50 to 10.00
Forge fire	6.00 to 6.50
No. 1 yard wrought, long	10.50 to 11.00
Light iron	4.50 to 5.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	4.00 to 4.50
Mixed borings and turnings	3.50 to 4.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	9.00 to 9.50
Stove plate	10.00 to 10.50
Locomotive grate bars	10.00 to 10.50
Malleable cast (railroad)	8.50 to 9.00
Car wheels	12.00 to 12.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Cleveland

Cleveland, Oct. 4.

Iron Ore.—Ore shipments fell off during September, the lake movement during that month being 3,913,122 gross tons as compared with 4,329,158 tons during August. The total movement to Oct. 1 was 18,661,194 tons as compared with 44,273,356 tons during the same period last year. Shipments are expected to taper off during the next two weeks and some of the ore firms plan to be about through with their shipments by Oct. 15, and others by Nov. 1. While a little ore will probably be moved during November, the shipping season will be practically over by Nov. 1, or a month earlier than usual. Late inquiries for ore have not resulted in sales and no more sales are expected this season except possibly small lots of special grades for mixtures. Two recent inquiries from southern Ohio for ore for making foundry iron did not result in sales. One furnace, after being offered no ore at below regular prices, withdrew its inquiry, deciding that there would be no profit in making foundry pig iron at prevailing prices unless it could buy cheaper ore. Lake Superior ore on hand at furnaces and Lake Erie docks Sept. 1 amounted to approximately 35,500,000 tons as compared with approximately 32,000,000 tons on the same date a year ago. Dock and furnace yard stocks were about 3,000,000 tons larger on Sept. 1 than on Aug. 1. Furnace stocks on Sept. 1 amounted to approximately 26,200,000 tons. Improved furnace operations in August were reflected in a slight gain in the consumption of lake ore. The amount consumed during August was approximately 1,322,000 tons as compared with 1,195,000 during July.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Sales of foundry iron are still being made in fairly good volume and October is expected to show an increase over September in both sales and shipments. Sales by local interests during the week aggregated approximately 12,000 tons, including two or three 1000-ton lots. Outside of a few small lots of malleable iron, all the business booked was in foundry grades. One local interest reports an increase of 100 per cent in sales during September over August, another a gain of 33 per cent and another a gain of 10 per cent. September shipments showed an increase of from 30 to 40 per cent over the previous month. Sales during the week included 800 tons placed by a Pittsburgh district sanitary interest with a Valley furnace and 700 tons purchased by a Cleveland jobbing foundry. The market is firm at recent price levels and some producers who are below $21 on foundry iron seem inclined to stiffen up a little on prices. However, $20 is still quoted for this grade by lake furnaces, although some sales are being made at 50c. to $1 a ton higher. One Cleveland producer is now asking $21 for outside shipment to points having the same freight rate as from the Valley or a lower rate. For Cleveland delivery several sales are reported on the basis of $20.50 to $21. A 400-ton lot for Eastern shipment from a New York furnace was sold on the basis of $20.25, Buffalo. No sales are being made for delivery beyond Jan. 1. Inquiries pending include one for 1200 tons from an Ohio manufacturer of heating equipment. The only basic inquiry during the week was from a West Virginia melter for 3000 tons.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$21.21
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	35.00

Semi-Finished Steel.—Several mills are holding to the recent advance of $2 a ton to $32 for sheet bars and while no sales are reported at the advance, it is understood that one inquiry for 2000 tons and another for 3000 tons have failed to bring out a lower quotation.

Finished Iron and Steel.—The demand for finished iron and steel shows an improvement in orders from widely diversified industries. The price situation shows no appreciable change. Some independent mills are adhering to 1.65c. for steel bars and 1.75c. for plates and structural material, which the Carnegie Steel Co. announced last week as its minimum prices, but two or more independent mills are still naming 1.60c. for steel bars and 1.65c. for plate and structural material. However, there are intimations that the lower prices may be withdrawn. Hard steel reinforcing bars are weak, sales being made at 1.55c. Bolt and nut manufacturers are buying steel bars more freely than for some time. The demand from the automobile manufacturers is spotty, but some of the car builders are still operating at good capacity. A Cleveland car equipment company has placed 600 tons of steel bars for car repair work ordered by the Baltimore & Ohio Railroad. The demand for plates is not active. The Solar Refining Co., Lima, which inquired for 750 tons of plates for tank work, has placed that tonnage with an independent mill. In structural lines, the Masonic Temple, Detroit, requiring 8500 tons, has been placed with the Russell Wheel & Foundry Co., Detroit. The structural situation has improved and some of the smaller fabricating shops are filled with work, mostly for buildings requiring 100 tons or less. The Republic Structural Iron Works Co. has taken the John Adams School, Cleveland, requiring 300 tons, and the John G. Pool Co., Dayton, has taken 120 tons for an addition to the American Building in that city.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Attempts of mills to establish prices on higher levels have been unsuccessful as far as blue annealed sheets are concerned, as these can be purchased at 2.25c. for all gages, although some mills are naming this price only for No. 12 gage and heavier sheets, adhering to 2.50c. for the lighter gages. Black and galvanized sheets are firm at 3c. and 4c. respectively. As most consumers placed orders before the price advance, the present demand is light. Late orders include 1000 tons placed with a Cleveland mill by a steel barrel manufacturer.

Warehouse Business.—Warehouses are still adhering to the old prices on sheets in spite of the advance in mill prices. Other warehouse prices are unchanged.

Coke.—The demand for foundry coke for prompt shipment continues fairly active and prices are firm. Two producers are now quoting standard Connellsville grades at $5 per ton for the last quarter. Prompt shipment prices range from $4.50 to $4.75.

Bolts, Nuts and Rivets.—The improved demand for bolts and nuts previously noted continues. Prices have firmed up and makers claim that at present there is little if any shading of recent minimum prices. Cleveland makers have not changed prices quoted recently, although Pittsburgh makers are reported to have made some revisions in discounts, as shown on page 904 of this issue. Local quotations on small carriage bolts with rolled threads range from 60, 10 and 5 to 65, 10 and 10 off list. Inquiry for rivets has improved slightly. Prices are still weak, although the leading local manufacturer is adhering to higher prices it recently placed in effect —2.50c. for structural and 2.60c. for boiler rivets.

Old Material.—The market is a little firmer on active items, but as there is no demand from Cleveland mills, local prices are based largely on the Youngstown market involving a $2.10 freight rate from Cleveland. Very little scrap was sold to consumers during the week, but there is some activity on the part of dealers in the Youngstown district, who are buying material to cover against recent mill orders. Sales are reported at $14 to $14.25 for heavy melting steel, $9.10 for mixed borings and turnings and $11.50 for compressed sheet steel scrap for Youngstown delivery. The latter grade has advanced locally 50c. or more a ton.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.00 to $12.50
Steel rails, under 3 ft.	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.50 to 7.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	9.25 to 9.35
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	7.00 to 7.50
Drop forge flashings, under 10 in.	7.00 to 7.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	7.50 to 8.00

Buffalo

BUFFALO, Oct. 5.

Pig Iron.—Not more than 10,000 tons of iron was sold in this district last week—a contrast with the movement of the preceding period when 22 000 tons were sold. The producer who sold about 15,000 tons of iron in the week ending Sept. 24 found a barren field in the week that followed and sold but 500 tons. It is shipping on old contracts. Some stiffening is evident in the policy of this furnace to get $21 for the base grade. It has virtually abandoned the $20 base price and has refused business at this price. It is sold up to Oct. 15. Iquiries for 9000 tons engaging one interest are composed of small lots and but one embraces 1000 tons. The $20 price is maintained for the base grade and malleable is quoted at $20.50. Sales by this interest were 4000 tons. The delivery situation with reference to 1922 is becoming more important as 1921 nears the close. One furnace is practically out of the market by virtue of refusing to quote for first quarter delivery on the basis of present prices. One inquiry for 5000 tons was disregarded because the furnace does not care to book a tonnage of that size with conditions so unsettled. Canvass of Eastern buyers by one producer showed improved foundry conditions with particular reference to radiator and heating interests. The furnace which made this survey sold 5000 tons at $20 and $21.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.00
No. 2X foundry, 2.25 to 2.75 sil.	20.50
No. 2 plain, 1.75 to 2.25 sil.	20 00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—There is hardly a local interest which has not subscribed to the expression of improvement. While none is able to report normal business, it is evident that the local market has picked up considerably. Tonnages are now embracing three figures rather than two—the rule so far this year. Bars, shapes, plates and cold-finished material are in good demand and several desirable orders for bolts and nuts have been placed here. Evidences of the depleted condition of stocks are coming to light daily, and in illustration of this one interest cites an instance of a buyer who found no raw material with which to start work on a sizable order and then made delivery the determining factor in placing the order. One day's business with an agency was greater than any day in 1921. The 1.65c. price on bars is being maintained on the general run of orders. Structural business is slow. The Progressive Structural Steel Co. has been sold to the Ferguson-Allan Corporation and the plant formerly occupied by the first named company will be enlarged.

Warehouse Business.—Sheet prices out of warehouses have been advanced to conform with recently announced mill schedules. The price on cold-rolled round shafting has been slightly reduced. A greater number of orders are appearing, but they do not seem to show any greater total in tonnages. Sheets are moving at a fair rate but structural material is not in great demand.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2 80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3 55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 3.95c.

Old Material.—Greater activity is manifest all along the line. Prices are somewhat stronger and some dealers find themselves confronted with an unusual situation; having bought considerable material when the market was higher they now feel disinclined to take advantage of a demand, where prices are less than they paid. A number of small but encouraging sales have been made and generally the feeling is better.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.004 and under	16 00 to 17.00
No. 1 railroad wrought	13 00 to 14.00
Car wheels	14.00 to 15.00
Machine shop turnings	6.00 to 7.00
Cast iron borings	6.00 to 7.00
Heavy axle turnings	9 00 to 10.00
Grate bars	10.50 to 11.00
No. 1 busheling	10 00 to 11.00
Stove plate	13.00 to 14.00
Bundled sheet stampings	7 00 to 8.00
No. 1 machinery cast	16.00 to 17.00
Hydraulic compressed	10.00 to 10.50
Railroad malleable	12.00 to 13.00

Boston

BOSTON, Oct. 4.

Pig Iron.—Sales in this district the past week were again comparatively large, between 12,000 and 13,000 tons. They include 3000 tons of regular analysis No. 2X and 3000 tons No. 2X with phosphorus 1.30 to 1.50 to a textile machinery maker, 2000 tons eastern Pennsylvania No. 2 plain and other round tonnages, details about which are lacking, to a radiator company, and a long list of 100 to 450 ton lots, mostly eastern Pennsylvania No. 2X and No. 1X, all for delivery over the rest of the year. Included in the smaller lots is 400 tons of No. 1X western Pennsylvania iron at $22, furnace, the first sale of iron from that district reported in this market for several months. Prospective business is confined to small tonnages. That of the Framingham Foundries for 200 tons of No. 1X and 100 tons of No. 2X represents the maximum. In the open market $20 base apparently is the bottom on eastern and western Pennsylvania and Buffalo iron. Some of the large tonnages taken this and last week, however, were at approximately $19, furnace base, this applying both to eastern Pennsylvania and Northern foundry iron, and even car lots have been booked on that basis. Competition from a Northern furnace with an advantage of 16c. in freights over eastern Pennsylvania has been a fractor. The undertone of the market, therefore, is more unsettled than appears on the surface. In so far as this market is concerned, Virginia irons are $23 to $24, furnace base, a sale of 100 tons No. 2X at

$23.50, furnace, representing the bottom. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$24.56 to $26.06
East. Penn., silicon 1.75 to 2.25	24.06 to 25.56
Buffalo, silicon 2.25 to 2.75	25.96 to 26.49
Buffalo, silicon, 1.75 to 2.25	25.46 to 25.96
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Finished Material.—Bids are asked on 700 tons of structural steel for a Federal Street, Boston, office building, for 300 tons each on a Boston telephone exchange, a Providence, R. I., high school, and a Springfield, Mass., high school, and on 150 tons for a Wakefield, Mass., high school. Indications point to other round tonnages coming on the market before long. The New England Structural Co. is awarded 1100 tons for a theater and office building, Boston. The market on structural steel is 1.60c., Pittsburgh. A notable increase in plate sales for stock is noted, but no large tonnages are involved. A New England railroad has bought approximately 500 plates representing about 50 tons. This order illustrates going business. The plate market ranges from 1.60c. to 1.65c. The Bath Iron Works, Bath, Me., has bought approximately 1500 tons of ship plates, shapes, bars and tubes from the Midvale Steel Co., and approximately 150 tons of boiler plates from the Worth Steel Co. Prices on bars take a wide range, 1.50c. to 1.75c., Pittsburgh. A round tonnage of bars, flats, etc., was taken this week by a local warehouse at 1.50c., and smaller tonnages by various other stockers at 1.60c., 1.65c. and 1.75c. Manufacturers are buying few bars. New England steel mills are busier, some of them running on full time,

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $3.95 to $4.45; structural steel, $2.81½ to $2.96½; plates, $2 91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $6.50; Norway iron round, ¼-in. to 2½-in., 5.75c. to 6.75c. per lb. net; other sizes, 7.75c. base.

Cast Iron Pipe.—The usual dullness in cast iron pipe business prevailing this time of year does not hold this season, with municipalities and private companies inquiring and buying freely. Moreover, there are large tonnages sure to take the form of inquiries next spring. West Springfield, Mass., will open bids Wednesday of this week on 1100 tons of 16-in. pipe, Class B and C, for a new supply line to furnish the repair shop of the Boston & Albany Railroad. On Thursday of this week, Malden, Mass., will open bids for about 60 tons of 6- and 8-in. pipe. Some municipalities wish pipe with quick delivery, thereby giving them fewer pipe foundries to choose from. One of these near-future delivery demands was that of Woburn, Mass., which wanted 100 tons. A charitable feature of present business is that several municipalities are buying pipe to give the unemployed jobs in laying it, as instanced by Beverly, Mass., which is employing out-of-work employees of the United Shoe Machinery Corporation. Buying is expected next spring on the part of Boston, Brockton, North Adams and Springfield. We quote per net ton in carload lots, f.o.b. Boston and district as follows: 3-in., $66.70; 4-in., $56.70; 6-in., $51.70; 10-in. and larger, $50.70; 12-in. and larger, $49.70; with $4 differential for Class A and gas pipe.

Warehouse Business.—The warehouse market on cold-rolled steel is 20c. per 100 lb. lower, on Wayne iron 50c. and on Norway iron $1 to $1.35, according to size. Otherwise prices are unchanged, but inclined toward softness, notwithstanding a slightly better demand. Going business is not of sufficient proportions to eliminate competitive prices when consumers shop around the market. Cap and set screws are 5 per cent cheaper, and machine screws and machine screw nuts even more so.

Coke.—Although prices on foundry coke in the Connellsville district are firmer, New England producers continue to quote on a basis of $10.66 delivered where the local freight rate does not exceed $3.40. The undertone of the market for local coke is reported very strong, however. The past fortnight has witnesssed a considerable increase in the aggregate daily New England foundry melt, which fact, coupled with nearing winter months, has resulted in much freer shipping instructions on coke contracts and additional tonnage bookings. These have not as yet been reflected in the shipments from Everett, Mass., and Providence, R. I., but should be shortly.

Old Material.—Foundries are, perhaps, buying machinery cast a little more freely, but the market is a long way from being active, and in this respect entirely out of line with the pig iron market. Prices are strong and tending upward, although not quotably higher. Brake shoe makers have taken additional stove plate tonnages at about $16.50 delivered. There is not enough being done in railroad malleable to really constitute a market and prices are largely nominal. Heavy melting steel is about 50c. higher in sympathy with advices from outside markets. Both rolling mill and chemical borings are in better demand and 50c. higher as a result. Forged scrap and bundled skeleton also are more active, with average sales around $5.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.50 to $20.00
No. 2 machinery cast	16.50 to 17.50
Stove plate	15.50 to 16.50
Railroad malleable	11.50 to 12.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.00 to $7.50
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.00 to 8.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	4.00 to 4.50
Cast iron borings, chemical	4.50 to 5.00
Blast furnace borings and turnings	2.50 to 2.75
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	12.00 to 13.00
Car wheels	13.00 to 14.00
Rerolling rails	9.00 to 10.00

Birmingham

BIRMINGHAM, ALA., Oct. 4.

Pig Iron.—Any doubt which may have existed in the minds of buyers during the early part of the week as to the firmness of the $19 base price for Birmingham standard iron was dissipated by the end of the week, and the aggregate inquiries for first quarter 1922 deliveries would indicate that buyers are also well satisfied that rock bottom has been reached. The feature of the market during the week was the gradual shifting of hand-to-mouth buying to more substantial lots, even spot iron. A close estimate of the movement of stock iron during the month will approximate 30,000 tons of foundry iron. This tonnage exceeds the previous month's record by several thousand tons. In addition to this record, it is significant to note that no iron was piled on the yard by the active stacks, notwithstanding the fact that one of the large producers has two of its stacks producing at capacity. This same interest will probably blow in an additional stack by the middle of the present month. In addition to the furnace located at Holt, which was blown in about the middle of September, definite announcement has been made that one stack at Gadsden will be producing iron by Oct. 10, and still another at Thomas by the same date. These two stacks will increase production at the rate of approximately 500 tons per day. With a spread of $3 to $3.50 per ton between Northern and Southern irons, Birmingham sellers are again quoting and delivering iron for use at points in Indiana and Ohio. Practically no iron has moved into these territories for six to eight months past. There has also been a decided improvement in Southern iron consumption, and at the present time there is one large foundry in the Birmingham district busily engaged night and day on sugarhouse machinery for Mexico. The general castings business has also shown improvement, even sash weights and O G washers.. These last mentioned products are being shipped as far West as San Antonio, Texas, in carload lots.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, Si 1.75 to 2.25	$19.00
Basic	18.00
Charcoal warmblast	35.00

Cast-Iron Pipe.—The manufacturers of high test cast-iron pipe report a fairly satisfactory business

during the week. While no large lettings are reported, small lots aggregated a tonnage which will insure no curtailment of production under present rate. The three plants in the district proper, while not operating all pits, are running on full time and at the rate of approximately 50 per cent of pit capacity. No change in price is recorded, but an advance will be necessary should pig iron advance even 50c. per ton. Base price for 6-in. pipe is $35 per ton with slight concession for larger sizes. Volume business for cast iron sanitary pipe has shown an increase. The Central Pipe & Foundry Co. has resumed operations at its Anniston plant, thus creating a total of 12 out of 13 plants in operation at Anniston, the largest sanitary pipe production center in the world. Cast iron soil pipe is quoted at $40 per ton f.o.b. works for small pipe and $35 per ton for large or heavy pipe.

Coal and Coke.—The recent "cold snap" has stimulated the domestic coal market, and the users of steam coal have shown a decided tendency to come into the market during the past week. Approximately 10,000 tons of steam and bunker coal moved by water from the mines to New Orleans and Mobile the past week. At least 350 beehive coke ovens were fired by the furnace interests, and a portion of the Ensley by-product ovens of the Semet-Solvay Co. have been put in commission. One large producer of by-product coke supplying commercial coke will "warm up" 100 beehive ovens the coming week. It is understood that additional Mexican coke orders have been received. Strictly standard foundry 24 and 72-hr. coke is selling for $5.75 to $6 per ton at the ovens. The Barrett Co. is operating 60 beehive coke ovens in the production of "pitch" coke for foundry trade. The residuum pitch which heretofore was supplied to foreign markets for binder purposes is now being utilized in the manufacture of coke of high grade. Its manufacture has been tried in every available type oven, but the old beehive oven of slow carbonization conditions has proven ideal.

Old Material.—The firmness of the pig iron market has been reflected in the old material market and some materials have shown slight advances. Scrap steel is the most inactive material, due to the fact that the largest user in the South is practically out of the market at this time. No. 1 cast and unoxidized stove plate are fairly active. Turnings of all character are unsought at this time. Some of the large dealers have comparatively large stocks on hand, and seem willing to continue to stock on the strength of activity in pig iron.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	10.00 to 11.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

St. Louis

ST. LOUIS, Oct. 4.

Pig Iron.—The melt of pig iron in this district is increasing and there is an improvement in inquiries and sales. A nearby Illinois melter bought 1500 tons of basic iron. No inquiries of importance are pending, although the number calling for from a carload to 200 tons make up a fairly large volume. The stove factories in St. Louis, Belleville and Quincy report a revival in demand, 11 firms canvassed by the Federal Reserve Bank indicating August sales from 12 to 20 per cent over those in July, although from 54 to 62 per cent under August, 1920. Prices are being well maintained, and the market is firm.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$24.88
Northern malleable, sil. 1.75 to 2.25	24.88
Basic	24.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—Although no business of consequence was placed, the last week was marked by an encouraging lot of inquiries from the railroads. The principal inquiry came from the Cotton Belt, which asked for prices on 10,000 tons of 85-lb. A. S. C. E. rails for 1922 requirements. The Terminal Railway Association has an inquiry out for two cars of tie plates. The Wabash inquiries included 30 tons of tie plates, a carload of wheels and other material. The Missouri Pacific has a lot of small inquiries out, including a car of axles. That road bought 500 lb. of tool steel. The fabrication contract for the Government hangar at Belleville, involving 3600 tons of steel, has been let to the McClintic-Marshall Co. St. Louis contractors are figuring on the Masonic building at Springfield, Mo., involving 50 tons of bars. There is no change in warehouse prices. The National Enameling & Stamping Co. resumed operations Oct. 3 at Granite City, starting three furnaces. Its St. Louis rolling mill will resume the latter part of the week.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The higher levels in coke are being held to more generally than they have been, the range in price of Connellsville coke being from $4.75 to $5.50. The trade is interested in an inquiry from a Western melter for 7500 tons of furnace coke. The demand for domestic coke is increasing, although it lacks the necessary stimulant of cold weather.

Old Material.—Prices on old material are unchanged. However, the tone of the market is strong, and it appears that it would take but little increase in demand to send prices upward. Railroads are said to be releasing requisitions for supplies more freely, which should mean slightly better operations at some of the consuming plants, so that a better volume of buying should result. However, the improvement has not as yet had any material effect. The following railroad lists are before the market this week: Pennsylvania, 2500 tons; Kansas City Terminal, 400 tons; St. Louis Southwestern, 250 tons; Wabash, 100 tons; Kansas City Southern, 100 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$14.50 to $15.00
Steel rails, re-rolling	12.50 to 13.00
Steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard section	29.00 to 30.00
Cast iron car wheels	14.50 to 15.00
No. 1 heavy railroad melting steel	11.50 to 12.00
No. 1 heavy shoveling steel	11.00 to 11.50
Ordinary shoveling steel	10.50 to 11.00
Frogs, switches and guards, cut apart	11.50 to 12.00
Ordinary bundle sheet	5.50 to 6.00
Per Net Ton	
Heavy axle and tire turnings	$7.50 to $8.00
Iron angle bars	11.50 to 12.00
Steel angle bars	10.50 to 11.00
Iron car axles	20.00 to 20.50
Steel car axles	15.50 to 16.00
Wrought iron arch bars and transoms	15.50 to 16.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Railroad springs	12.00 to 12.50
Steel couplers and knuckles	12.00 to 12.50
Locomotive tire, 42 in. and over, smooth inside	9.50 to 10.00
No. 1 dealer's forge	8.50 to 9.00
Cast iron borings	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 1 boilers cut in sheets and rings	7.00 to 7.50
No. 1 railroad casts	15.00 to 15.50
Stove plate and light cast	12.00 to 12.50
Railroad malleable	10.50 to 11.00
Agricultural malleable	10.00 to 10.50
Pipes and flues	8.50 to 9.00
Heavy railroad sheet and tank	7.50 to 8.00
Light railroad sheet	4.50 to 5.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	6.00 to 6.50
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	9.00 to 9.50
Horseshoes	11.00 to 11.50
Railroad brake shoes	9.50 to 10.00

The Heppenstall Forge Co. of Bridgeport, Conn., is changing all the heating furnaces in its forge department from coal to oil fired. A similar type of oil-fired furnace has been in use at the plant of the Heppenstall Forge & Knife Co. in Pittsburgh since April. The machine shop at Bridgeport is working single time, and preparations are being made for putting the forge shop on a schedule of two to three days a week.

Cincinnati

CINCINNATI, Oct. 4.

Pig Iron.—By comparison with preceding ones, the market was dull last week, carload sales predominating. We note, however, a sale of 500 tons of Bessemer iron at $21, Ironton, and 100 tons of Northern iron to an Indiana melter at $21.50, Chicago. A Kentucky melter also purchased 200 tons of Bessemer at $21.50, Chicago, and another took 200 tons of charcoal at $28, furnace. A central Ohio melter bought 250 tons of Southern iron to complete mixtures, paying $19 base, Birmingham. The only inquiry of consequence is from the American Radiator Co. for 500 tons for its Birmingham plant. There was a little activity in alloys, and we note a sale of 500 tons of 50 per cent ferrosilicon to a steel foundry at $60, delivered. Several carload sales of spiegeleisen and ferromanganese were also made. It is reported that several furnaces in the South are considering resuming operations about Nov. 1 and some of them are now feeling out the coke market. There have been no price changes noted during the week, though several lake front furnaces are reported to be quoting at $20, furnace, in competitive territory.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil	32.86
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	24.02

Finished Material.—There has been some little covering by manufacturers and jobbers in the heavier steel products in anticipation of higher prices which are expected to follow the recent announcement by the Steel Corporation of minimum prices it will quote. While the volume of business is not heavy quotations made during the last week or so are being closed. Some mills have already withdrawn quotations lower than 1.70c. on bars, shapes and plates. The volume of sheet business fell off considerably during the past week, but a number of orders had been booked at the advanced prices. In wire and wire products, orders are reported as fairly numerous. Some shading of prices on cold-rolled steel and screw stock are reported. There are no new inquiries of size being figured on. The Big Four Railroad has asked for bids on 5500 pairs of angle bars, 700 kegs of track bolts and 5000 kegs of track spikes. There is no particular activity in the structural field, the only new project coming up being the Catholic Club at Memphis, Tenn., involving 500 tons of steel. Pending projects include a building for the Indianapolis Athletic Club, a shop for Purdue University at Lafayette, Ind., and a 25-story office building for Columbus, plans of which are being prepared by Frank H. Packard. There were no lettings reported.

Warehouse Business.—Jobbers report orders more numerous and for increased tonnages. A reduction has been made in boiler tubes to correspond to recent reductions made by mills. Galvanized sheets are $5 a ton lower, being now quoted at 5c. Blue annealed and black sheets are unchanged.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.10c. under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.40 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—Sales have fallen off considerably but the tonnage of foundry coke moving is still fair. There are no inquiries of size, one and two carload sales constituting the bulk of the activity. Prices are firm at previous quotations.

Old Material.—There is some activity in the scrap market, and inquiries are increasing in number. Increased activity on the part of the dealers has resulted in advancing prices from 50c. to $1 throughout the list. Sales are mostly confined to carload lots, but the starting up of steel plants in this district is expected to soon create a demand for heavier tonnages.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$4.50 to	$5.50
Iron rails	12.50 to	13.00
Relaying rails, 50 lb. and up	25.50 to	26.50
Rerolling steel rails	11.00 to	12.00
Heavy melting steel	9.50 to	10.00
Steel rails for melting	9.50 to	10.50
Car wheels	12.50 to	13.50
Per Net Ton		
No. 1 railroad wrought	9.00 to	10.00
Cast borings	3.50 to	4.00
Steel turnings	2.50 to	3.00
Railroad cast	12.50 to	13.00
No. 1 machinery	14.00 to	15.00
Burnt scrap	8.00 to	9.00
Iron axles	16.00 to	17.00
Locomotive tires (smooth inside)	10.00 to	10.50
Pipes and flues	4.50 to	5.50

Report on Lake Erie-Ohio River Canal

Interest in the report of the Army Engineer office of the War Department on the proposed Lake Erie-Ohio River canal was dampened in the Pittsburgh and Youngstown districts by the recommendation that the projected waterway be delayed at this time on account of the great cost and the need for Government economy. The decision favored the eastern route from Ashtabula to Pittsburgh via the Mahoning River through Youngstown. The army engineers, however, give interested parties an opportunity to present reasons why the canal should be started at this time. They state that they would like to make a further investigation into the economic reasons why the canal should be built before making a final report. Managers of larger steel companies do not regard very seriously the suggestion that the industries in the affected districts should largely finance the undertaking, because of the financial difficulties which now confront them.

To Extend Credit to Users Through Jobbers

The Black & Decker Mfg. Co., whose products consist principally of electric motor driven shop equipment, such as portable electric drills, grinders, etc., has put into effect what it terms the Black & Decker national credit service. The company's products are sold through jobbers and the new service enables users to buy through jobbers by paying 23 per cent of the regular price of the item in cash and the balance in six equal monthly payments. Nothing extra is added to the standard price for the credit and no interest is charged.

The company has supplied jobbers with printed forms to be used for orders taken under this plan. The jobber forwards these orders to the company which discounts them for the jobber so that every sale made under this plan is in effect a cash sale for the jobber. The plan is an acknowledgment that the principal obstacle in the path of normal sales to-day is financial.

St. Louis Labor Conditions

Replies received from questionnaires addressed by the Eighth Federal Reserve Bank at St. Louis to 210 leading employers in that district, with an estimated normal complement of 215,784 workers asking for employment data developed that the number of employees of the reporting interests decreased 57,653 or 21.3 per cent between the dates Aug. 1, 1920, and Aug. 1, 1921. On Aug. 1, 1920, the number was 7743 or 3.5 per cent above normal, and on Aug. 1, 1921, the total was 49,910 or 23.1 per cent under normal. Wages, figured on a semi-monthly basis decreased $4,858,038 or 30.1 per cent between Aug. 1, 1920, and Aug. 1, 1921.

The Eighth Federal Reserve district includes eastern Missouri, southern Illinois, southern Indiana, Kentucky, Tennessee, Arkansas and Mississippi.

Preparations have been made to start one of the three Southern furnaces of the Republic Iron & Steel Co. in the Thomas group at Birmingham, Ala., according to announcement from the general offices at Youngstown, Ohio.

Philadelphia

PHILADELPHIA, Oct. 4.

The announcement a week ago that the Carnegie Steel Co. had "fixed" its prices for plates and shapes at 1.75c. and for bars at 1.65c., Pittsburgh, has had the effect of raising slightly the quotations of independent steel companies. At least three of the Eastern plate mills have adopted 1.75c., Pittsburgh, as their price, though one mill has taken some orders within the past few days at 1.65c. Included in these orders was a plate contract for fourth quarter, the first contract this company had written in 13 months. One or two mills are still quoting 1.60c., Pittsburgh, on plates and shapes, and there are outstanding quotations at that level from nearly all mills, which will be given adequate protection. The steel bar price has stiffened so that 1.60c., Pittsburgh, now appears to be the minimum on any new business. Just how effectual these price advances will be remains to be seen, but the steel companies making them explain that they have been getting very little business at the lower levels, particularly on plates, and they will be no worse off if they attempt to get a price more in line with costs of production. The recent advance of $5 a ton on sheets has not been wholly effective, except in putting on the books of the mills a fairly good volume of business at the old prices. There has been very little business done at the higher level, which some mills are not strictly adhering to.

There is a very much better tone in the market and steel companies are more hopeful of a gradually expanding trade during the fall and winter. Consumers in a greater diversity of lines have been coming into the market, and though their orders are small, it is a possible indication that stocks of material on hand are pretty well depleted.

Two sales of basic iron totaling 9000 tons constitute the greatest activity in steel-making iron in this district in a single week since the depression set in.

Pig Iron.—An Eastern manufacturer of plates has bought 4000 tons of basic iron for early shipment at $20.50, delivered. A central Pennsylvania consumer has bought 5000 tons, the delivered price also being approximately $20.50. In one sale the furnace price was $19.25 and in the other $20. This represents an advance in basic iron since the last sale of importance of $1.25 per ton, delivered. More significant, however, is the fact that this is the greatest activity in steel-making iron in this district in a single week this year. The foundry iron market is quieter. An interesting indication of the status of consumers' stocks is the requests which furnaces are getting to hurry up shipments of orders on their books. Another Eastern furnace has virtually withdrawn from the market to the extent that it is not actively soliciting business, though it will take care of its regular customers who apply for iron. This furnace has enough orders on hand for two or three months' operation and its owners and agents will await developments in the market before actively selling again. More furnaces are coming into the market for business. The Port Henry, N. Y., stack of Witherbee, Sherman & Co. will be blown in shortly, this furnace having a better freight rate into New England than either Buffalo or eastern Pennsylvania furnaces. The Adrian furnace will probably go in about Nov. 1 and the Hellertown furnace of the Thomas Iron Co. at an earlier date. Prices for foundry iron have not changed except that another furnace has advanced to a basis of $21 for No. 2 plain, but this grade is still obtainable at $20.50, furnace. The extra for No. 2X is 50c. and $1 a ton, depending upon the furnace.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.34 to $22.04
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.84 to 22.54
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29 74
Basic deliv. eastern Pa.	20.50
Gray forge	20.50 to 21.50
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Semi-Finished Steel.—There is no demand for billets, slabs or sheet bars. Prices are unchanged.

Plates.—Two Eastern plate mills have followed the action of Carnegie Steel Co. in naming 1.75c., Pittsburgh, as their minimum for plates. Another has adopted a range from 1.65c. to 1.75c., the lower price applying only to attractive specifications, and this company may shortly advance to a flat 1.75c. price. Plates are still obtainable, however, at 1.60c., but some of the companies quoting this price say they may withdraw it any moment. There has been very little business at the low levels, hence the makers believe they have nothing to lose and everything to gain by attempting to get a price more nearly in line with what it is costing them to produce plates. No new car work has come out, but there is still considerable locomotive work pending, including 120 for Argentina, 50 for the Chicago, Milwaukee & St. Paul and 23 for the Atlantic Coast Line.

Structural Material.—While the 1.60c. price on structural shapes has not entirely disappeared, some producers are making an effort to obtain 1.65c., Pittsburgh. Very little new structural work is up in this district, but fabricators are figuring on a fair volume of business, mostly for other sections of the country. Fabricators are showing a disposition to put in stocks, but the orders as a rule are small.

Bars.—Steel bars are now quoted at 1.60c., Pittsburgh. Any outstanding quotations below this price will shortly be withdrawn if not acted upon. A leading independent has taken a few contracts for fourth quarter. Bar iron is quoted at 1.60c., Pittsburgh, but there is very little business. A better demand for railroad spikes is reported, but prices are weak, 2.40c., Pittsburgh, having been shaded on some of the business recently taken.

Sheets.—Not all of the makers of sheets have conformed to the recent advance of $5 a ton put into effect by the leading mills. Very little business apparently has been done at the higher level, but most of the mills booked a fair voume of business at the old prices on which present operations are based.

Rivets.—An Eastern maker of rivets has advanced prices 10c. per 100 lb., making structural quality 2.50c. and boiler quality 2.60c., Pittsburgh.

Warehouse Business.—Cold-rolled steel has been reduced $5 a ton by local warehouses.

Old Material.—A firm undertone in the scrap market is due very largely to the hesitancy of dealers in selling at present quotations for fear that they would not be able to "cover" at a profit. While mills have succeeded in picking up small lots of heavy melting steel around $12 a ton, no one can be found who would sell a tonnage at this price. The same situation applies more or less to other grades of scrap. Some prices have advanced slightly within the week, but it will require a larger demand to bring about any marked advance. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.75 to $12.00
Scrap rail	11.75 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	16 00 to 17.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.50 to 16.00
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.50 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	10 50 to 11.00
No. 1 cast	17.00 to 18.00
Railroad grate bars	13 50 to 14.00
Stove plate (for steel plant use)	13.50 to 14.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.25 to 13.75
Iron car axles	No market
Steel car axles	No market

GERMAN STEEL UNOBTAINABLE

Mills Refuse Orders from the United States—German Exporters Converting Marks Into Materials in Warehouse

NEW YORK, Oct. 4.—Although the Association of German Industry, which recently convened in Munich, Germany, intimated that Germany would be forced by the war indemnity to flood the world's markets with German goods, the flood is evidently being intentionally diverted from the United States, for at present, agents of German interests here state that they are unable to obtain shipments of any kind of iron or steel manufactures. According to reports received by the representatives of such interests as the Hugo Stinnes combination, Thyssen & Co., the Westphalia Iron & Wire Works, the Gelsenkirchen-bergwerks Aktien Gesellschaft, etc., German mills are sold up, but largely with contracts to exporters and export organizations in Bremen, Hamburg and other ports. The warehouses in some ports, notably Bremen, are reported filled to overflowing, in some instances exporters having contracted for the entire output of certain mills over a limited period.

In the meantime, although shipments of material continue to South American markets and the Far East, little can be obtained for "overseas" shipment. This recent frenzied buying is said by New York exporters to be largely speculative, the direct result of the demoralization of the German mark. With rapidly dwindling confidence in the future of the mark, exporters are as far as possible turning their assets into tangible property, which depreciates in value far less rapidly than the mark.

Agents and representatives of German interests in New York report that they are rejecting a large volume of orders daily, because of inability to fill these orders through their connections in Germany. One representative of a large German combination states that he could place at least 100,000 kegs of wire nails if he could obtain shipments. This estimate is based on actual offers of orders from American consumers. Another reports having cabled a firm offer for a total of 80,000 kegs of wire nails to fill three orders that have been placed with him by American buyers. An order for a total of 50,000 lb. of plain wire was recently rejected by a German agent unable to obtain quotations from his Continental connection and another for 3000 tons of wire rods was refused by the New York export connection of a German seller.

German Aluminum Higher

The present disinclination to sell is evidently not confined to the manufacturers and sellers of iron and steel. Aluminum of German manufacture, which has been selling in the American market for 3c. to 4c. per lb. less than the official quotation of the Aluminum Co. of America, is reported to have been increased to a point where it is now quoted at 23c. per lb. delivered New York, 1½c. per lb. less than the market and with a 1c. per lb. addition for the importer to cover handling and profit, ½c. per lb. less than the domestic price. The output of the two largest producers, in Germany, who recently combined, is estimated at 40,000 tons per year. Recent low quotations were generally confined to a few small independent producers of ingot aluminum, who have evidently now withdrawn from the market.

Contrasted with this refusal to ship material to the United States, German activity is reported to be continuing in South America, even the New York representatives of German interests evincing a keen interest in large projects in South American countries, upon which they may quote for material and equipment to the American contractors who obtain the contracts for construction.

Recent Pacific Coast Quotations

According to the sales manager of a large Pacific coast steel company, German competition is being severely felt on the coast. His reports of quotations submitted by Germany, however, are based on the prices given two or three weeks ago. He states that an order was recently placed by a Portland, Ore., buyer for a tonnage of bars of German origin at 1.70c. per lb., c.i.f. Portland, and offerings have been made as low as 1.65c. per lb. c.i.f. Pacific coast ports. A Seattle company about three weeks ago purchased 500 tons of 60-lb. rails, A.S.C.E. specifications at $37.50 per gross ton, c.i.f. Seattle, this price including all accessories, angle bars, bolts and spikes. It is further reported from the Pacific coast that the purchasing agent of one of the transcontinental lines has received a quotation of $34 per gross ton, c.i.f. Pacific coast port, on a minimum order of 5000 tons of rails. The recent decline in the domestic market, according to this sales manager, has tended to prevent buyers from acting on German and other foreign quotations until the bottom were reached in our own prices, but with the margin still wide, heavier buying may be expected if deliveries are at all good.

Some importing of Caucasian manganese ore from the port of Poti, Georgian Republic, may be done in the near future and at present German ferromanganese made from this ore is obtainable in the United States. Exports from the Georgian Republic have been greatly curtailed since the war, because of the extremely communistic government of the country, which has insisted upon heavy taxation of foreign capital and exports of ore. One seller of foreign ores in New York states that 50 per cent manganese ore from this district can be put down in New York for about $11.50 c.i.f.

A representative of Belgian interests who has been successfully selling Belgian pig iron to Pacific coast consumers because of the low ocean freights from Belgian ports to Pacific coast ports, reports that he has under negotiation an order for several thousand tons of foundry iron of Belgian origin to a New England consumer, at slightly lower than current domestic quotations.

The Shiva Nath Cycle & Motor Co., Ltd., Chapra, India, has been organized to manufacture and import motorcycles, accessories, automobile bodies and motors. The company states that it is in the market for a 1500 to 2000-hp. engine for use in its plant.

Slow Progress in Pittsburgh-Plus Case

WASHINGTON, Oct. 4.—No date or place to begin hearings by the Federal Trade Commission in the so-called Pittsburgh-plus case will be named until after the commission has gathered the necessary evidence, according to Chairman Thompson. He stated that work of obtaining evidence from the various steel producing points still is under way and that it is not possible to say how long it will be before it is concluded. Originally it was intended to begin the hearings early in September, but the task of gathering the required material, it is stated, has proved to be greater than had been anticipated.

No successor has been named as yet to John Garland Pollard, whose term as a member of the commission expired Sept. 26. It is commonly understood that Judge Vernon Van Fleet, South Bend, Ind., now associated with the Department of Justice in connection with work of reorganization, will be named to succeed Mr. Pollard.

It is assumed that the successor of Mr. Pollard will go over the evidence in the Pittsburgh-plus case, and it is a source of speculation as to whether he may ask that the vote by which the complaint was issued be reconsidered. This vote was 3 to 2, Mr. Pollard being one of those voting in favor of its issuance, so that, of the present personnel of the commission, there are two who voted for and two who voted against issuance of the complaint. Consequently a vote to reconsider could result in abandoning the complaint should the new member vote to that effect, although admittedly there is no indication that this will be done, but the possibility apparently exists.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.295	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Cincinnati	0.325	Jacksonville, all rail	0.555
Indianapolis	0.345	Jacksonville, rail and water	0.46
Chicago	0.38	New Orleans	0.515
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.60c. to 1.75c.

Sheared plates, ¼ in. and heavier, tank quality, 1.60c. to 1.75c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.40 case
Large boiler rivets.....$2.50 case
Small rivets .....70, 10 and 5 per cent off list
Machine bolts, small, rolled threads, 70, 10 and 5 per cent off list
Machine bolts, small, cut threads, 70 and 5 per cent off list
Machine bolts, larger and longer..65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....65 and 10 per cent off list
Lag bolts .....70 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract: small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $41; chain rods, $41; screw stock rods, $46; rivet and bolt rods and other rods of that character, $41; high carbon rods, $49 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.35 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.60 to $2.75 base; 5/16-in., $2.60 to $2.75 base. Boat and barge spikes, $2.60 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.15c. to 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.45	Nos. 13 and 14	2.60
Nos. 9 and 10 (base)	2.50	Nos. 15 and 16	2.70
Nos. 11 and 12	2.55		

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Sept.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
28	12.37½	12.12½	26.62½	4.70	4.50	4.90	4.40
29	12.50	12.25	26.50	4.70	4.50	4.95	4.45
30	12.50	12.25	26.75	4.70	4.50	5.00	4.50
Oct.							
1	12.62½	12.37½	....	4.70	4.50	5.00	4.50
3	12.62½	12.37½	26.75	4.70	4.50	5.05	4.55
4	12.62½	12.37½	26.75	4.70	4.50	5.05	4.55

New York

NEW YORK, Sept. 27.

The improvement in non-ferrous metal markets foreshadowed a week ago has continued during the past week with added momentum. Copper is strong with prices advancing. There has been little or no change in tin and lead, but zinc has shown an upward tendency with good buying.

Copper.—The purchase of 5,000,000 lb. of copper a little more than a week ago by a leading brass interest took out of the market most of the metal that was available at the prices paid, namely, 12.25c. to 12.37½c., delivered. Since then prices have stiffened, with 12.62½c., delivered, for electrolytic the minimum to-day (Tuesday) and some sellers are holding for 12.75c., delivery in October, and 13c. has been paid for November and December delivery. A few of the leading sellers report their idea of price for October shipment as 13c., but this has not yet been confirmed by sales. The same brass interest which bought 5,000,000 lb. a week or so ago is in the market for an additional lot of 10,000,000 lb. and there are two or three other inquiries which aggregate 5,000,000 lb. more. The fact that the brass companies are again in the market for relatively large quantities, following a period in which they have bought comparatively little, has stirred up a degree of optimism in copper circles that has been lacking for many months. Sales in September are reported to have totaled close to 100,000,000 lb., which is a decided improvement over preceding months.

Copper Averages.—The average price of Lake copper for the month of September, based on daily quotations in THE IRON AGE, was 12.19½c. The average price of electrolytic copper was 12.01c.

Tin.—On Wednesday of last week the Straits tin market was dull, practically no transactions taking place. On Thursday there was a fairly active demand from dealers, consumers showing little or no interest, but there were few sellers at any price. There were offers of 26.62½c. and 25.75c. without bringing out any tin. On Friday there was a better tone and close to 200 tons was sold at a price at or around 27c. On Monday the market was dull and Tuesday was also quiet. Tin sold during the week at 26.50c. for November delivery. London prices to-day (Tuesday) are lower than a week ago, spot standard being quoted at £156 10s.; future standard, £158 10s., and spot Straits, £157. Statistics on United States consumption in September show a total of 2605 tons, which is about the quantity that had been predicted. August consumption was 3300 tons, but preceding months of the year were much lower, averaging about 1500 to 1600 tons.

Lead.—While the lead market does not show the degree of activity noted in copper and zinc, the demand is improving and prices are holding firmly. The quotation of the American Smelting & Refining Co., 4.70c., New York, is probably the minimum, some independent producers asking a slightly higher price. We quote 4.50c., St. Louis, and 4.70c., New York.

Zinc.—A decided improvement in the demand for zinc has resulted in a stiffening of prices. Prime quality for October shipment has been sold at 4.55c. and 4.60c., St. Louis, the former price ruling on a majority of sales on Monday and Tuesday of this week. Demand exceeds the quantity that is being produced and producers are averse to selling from their reserve stocks, which were made at much above to-day's costs, until the market is high enough to let them out without too great a loss. The principal users of zinc, including the sheet mills, brass mills and galvanizers, have all been more active in the market, not only for immediate shipment, but for November and December. For November quotations are 4.60c. to 4.65c. and for December, 4.65c. to 4.70c.

Antimony.—This metal is higher, being quoted at 5c. to 5.25c., New York, duty paid. There is a fair demand.

Aluminum.—The leading producer continues to quote 98-99 per cent virgin metal at 24.50c. per lb., f.o.b. plant, in wholesale lots for early delivery. The same grade is offered by importers at 18c. to 19c., New York, duty paid.

Old Metals.—The market continues strong and inquiries are becoming frequent. While business has not yet started, the prospects are good. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.50
Lead, heavy	4.20
Zinc	3.25
Lead, tea	3.00

Chicago

OCT. 4.—Copper and spelter have advanced not because of any marked expansion in demand but rather on account of greater firmness on the part of sellers. The wholesale price of antimony has also advanced slightly but this has not been reflected in the less than carload price. Old metal prices have gone up rather generally. We quote in carload lots: Lake copper, 12.75c. to 13c.; tin, 28.50c.; lead, 4.65c.; spelter, 4.65c. On old metals we quote: Copper wire, 7.75c.; crucible shapes, 7.75c.; copper clips, 7.75c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.75c.; lead pipe, 2.75c.; zinc, 2c.; antimony, 7c.; pewter, No. 1., 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Oct. 4.—The lead market is quiet but firm at 4.50c., carlots, while slab zinc is strong at 4.50c. We quote Lake copper, carlots, at 12.74c. to 12.74½c.; tin, 27.61c. to 27.73c.; antimony, 5.73½c. In old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Bethlehem Company Acquires Dry Dock

The Bethlehem Shipbuilding Corporation, Sparrows Point, Baltimore, a subsidiary of the Bethlehem Steel Co., Bethlehem, Pa., will take immediate possession of the plant of the Baltimore Shipbuilding & Dry Docks Co., Baltimore, recently acquired, and will operate the works in conjunction with the Sparrows Point plant. The acquired property will be used primarily for ship repair work, with the main Bethlehem plant utilized for all shipbuilding operations. During the war period, the Baltimore Shipbuilding plant gave employment to a maximum of 12,000 men. The consideration for the plant is said to be $3,500,000.

Ferromanganese Case Hearing

WASHINGTON, Oct. 4.—The Federal Trade Commission has set Friday, Oct. 21, as the date to hear final arguments in the so-called ferromanganese anti-dumping case. The arguments are to begin at 2 p. m., and occupy the remainder of the day. Briefs in this case are to be filed with the commission on or before Oct. 15.

PERSONAL

W. S. Tower Appointed Attache—Succeeded in Bureau by Luther Becker

WASHINGTON, Oct. 4.—Walter S. Tower, recently named as the first chief of the iron and steel industrial division of the Bureau of Foreign and Domestic Commerce, has been apopinted commercial attache of the bureau at London and sails to-morrow from New York to take up his new duties. He succeeds Alfred P. Dennis as commercial attache, Mr. Dennis having been named to make an investigation of agricultural conditions in Europe. Mr. Tower has been succeeded as head of the iron and steel division by Luther Becker, Montclair, N. J., who now is serving as acting chief of the division.



LUTHER BECKER

While the transfer of Mr. Tower so soon after his appointment as head of the division came as a surprise, it has been stated that he was selected with the idea in mind to send him aboroad in the service of the bureau. His past experience, part of which was his connection with the Consolidated Steel Corporation, is held to qualify him specially for his new and important work as commercial attache.

The training of Mr. Becker through his official activities with the machine tool and iron and steel trades also has fitted him for work as head of the iron and steel division. He graduated in 1904 from Lehigh University with the M. E. degree and from there served a special apprenticeship course of one year in the shops of Niles-Bement-Pond Co., New York. He then became connected with F. W. Horne, Yokohama, Japan, as sales engineer, selling machine tools, hardware and heavy machinery for 25 or more of the leading machine tool builders of the United States. After serving for three years in this capacity he returned to the United States and became associated with the Bethlehem Steel Co., and was sales agent for five years of the company's St. Louis district office. Following this service, he went with the United States Steel Products Co., in its New York office as manager of the Batavia and Soerbaya offices in Java, Dutch East Indies, remaining in this position for three years, and was manager of the Tokyo, Japan, office of this company during the years 1919 and 1920.

Fritz R. Lindh, formerly chief engineer of the Graton & Knight Mfg. Co., Worcester, Mass., has joined the sales organization of the Chicago Belting Co. He was graduated from West Point in 1914. During the war he was located at Sandy Hook and Aberdeen, Md., first as a captain and later as a major. Leaving the army, Mr. Lindh was about seven months in the advertising business as an account executive for Cleland, Inc. He joined Graton & Knight in July, 1920, succeeding Dr. Wison as head of the engineering department. For the last six months most of his time has been occupied assisting Vance McCarty in sales work. With the Chicago Belting Co. he will be in charge of its Pittsburgh direct factory branch, besides making personal engineering surveys for many of the larger users of belting throughout the United States. His address will be: Chicago Belting Co., 336 Third Avenue, Pittsburgh.

Harry W. Eastwood, who for the past four years has had charge of the steel mill and crane division of the Cutler-Hammer Mfg. Co., Cleveland branch, has been made branch manager, taking the place of Lynn B. Timmerman, who leaves to enter the automobile business in Lima, Ohio. The Cleveland office and territory of the Cutler-Hammer Mfg. Co. continues as a part of the central district, comprising the Cleveland, Pittsburgh and Cincinnati offices and territory. A. G. Pierce of Pittsburgh is district manager and has associated with him in addition to Mr. Eastwood, R. I. Maujer as branch manager of the Cincinnati office and P. S. Jones as branch manager of the Pittsburgh office.

E. R. Spencer, formerly sales engineer Thomas Spacing Machine Co., Pittsburgh, now is connected with the Defiance Motor Truck Co., Defiance, Ohio.

K. A. Juth, American Metallurgical Corporation, Boston, spoke on "Trouble in the Hardening Room" before the Providence, R. I., branch of the American Society for Steel Treating at Providence, Oct. 5.

Edward M. Huggins, formerly assistant chief engineer Snead & Co., Jersey City, N. J., has been made chief engineer of that company. He was graduated from Lehigh University in 1900 with the degree of mechanical engineer and has been with the Snead company since 1913. Prior to that he was with the E. H. Mumford Co., maker of foundry molding machinery, for seven years, serving in various capacities, including that of chief engineer.

Walter H. Rastall, chief of the heavy machinery industrial division of the Bureau of Foreign and Domestic Commerce, left Washington October 4 for a trip which will take him to New York, Cincinnati, Indianapolis, Chicago, and Rockford, Ill., where he will confer with machinery manufacturers with regard to work of building up export trade. He will return to Washington October 15 and later will make a similar trip to other cities.

The Midvale Steel & Ordnance Co. announces the appointment of Herbert H. Moffitt as manager of sales in the Washington district, with headquarters at 1121 Woodward Building, that city. The Washington district embraces the District of Columbia, Virginia and the eastern section of North Carolina.

Richard H. Collins, formerly vice-president of the General Motors Co., and president and general manager of the Cadillac Motor Car Co., Detroit, has acquired control of the Peerless Truck & Motor Corporation, Cleveland, through the purchase of about $4,500,000 in stock, and has been elected president and general manager of the Peerless corporation. H. A. Tremaine, formerly president, remains on the board of directors.

A. L. Jones, Jr., has been transferred to the Kansas City office of the Worthington Pump & Machinery Corporation from the Deane works at Holyoke, Mass.

Eugene A. Leinroth, formerly with the Chicago Pneumatic Tool Co. at Philadelphia, has joined the Albro-Clem Elevator Co., Cleveland.

E. E. Aldous has been appointed representative of the American Steel & Wire Co. in the St. Paul-Minneapolis-Duluth territory, with headquarters at St. Paul. Mr. Aldous has been connected with the company for 20 years in different positions.

The Peerless Drawn Steel Co., Massillon, Ohio, has appointed recently L. C. Jenkins, 1008 Lincoln Bldg., Louisville, Ky., in charge of sales throughout Kentucky, Knoxville and Memphis; Walter E. Mills, Chattanooga, Tenn., for Chattanooga and Nashville; John F. Glenn, 404 Candler Bldg., Atlanta, Ga., for that city, and C. H. Krauss, Jefferson County Bank Bldg., Birmingham, Ala., for Texas, Arkansas, Louisiana, Mississippi, Alabama, Georgia (not including Atlanta), Florida, South Carolina and North Carolina.

James A. Slater, who has been manager of sales of the National Malleable Castings Co. in Chicago, has been appointed assistant sales manager at the company's general offices in Cleveland, succeeding J. H. Redhead, who recently resigned. Mr. Slater, who was transferred from the Cleveland office to Chicago several years ago, will have charge of miscellaneous sales.

H. P. Parrock has resigned as general manager of the Lumen Bearing Co.'s plants at Buffalo, N. Y., and

Youngstown, Ohio, but remains on the Youngstown directorate. He will engage in professional work, at present at 164 Lancaster Avenue, Buffalo, covering the design and construction, but more particularly the active operation of foundries, specializing in brass foundry work. His connection with the Lumen Bearing Co. began in 1910, and he served at different times as sales manager, manager and general manager. For two years after graduating in 1901 from the Massachusetts Institute of Technology he served as assistant superintendent of the rolling department of the Pennsylvania Steel Co., and from 1904 to 1909 was superintendent of the steel foundry of the Youngstown Foundry & Machine Co.

Victor Arkin has severed his connection with the Logan Machine & Mfg. Co., Chicago.

Ira S. Snead, general sales manager Snead & Co., Jersey City, N. J., has been elected vice-president of that company succeeding the late H. P. Macdonald. Mr. Snead was graduated in 1913 from the Sheffield Scientific School, Yale University, and holds a degree of mechanical engineer.

The Eastern Fuel Co. has added to the sales force of its New York office, J. F. Whelan, formerly in charge of the Matlack Coal & Iron Corporation, offices at Newport News, Va., and Philadelphia.

OBITUARY

H. P. MACDONALD, vice-president Snead & Co., Jersey City, N. J., who died Aug. 25 at his summer home at New London, Conn., made several important inventions relative to the electrical heat treating of ferrous and non-ferrous metals by means of internal resistance and in the automotive field his inventions include a method of pre-heating gasoline by means of electrical current. He was born in Louisville, Ky., in 1880 and was graduated from the Massachusetts Institute of Technology in 1901 with the degree of civil engineer. In the same year he entered the employ of Snead & Co., serving successively as assistant superintendent, general superintendent, chief engineer and vice-president. He was a member of several societies, including the American Society of Mechanical Engineers, the American Society for Steel Treating, the Society of Automotive Engineers and the American Society of Civil Engineers.

SALMON P. JONES, for many years engaged in the foundry business in Cincinnati, died in his home in that city recently, aged 71 years. Mr. Jones was a former sheriff of Hamilton County and was prominently identified with many fraternal orders. He also travelled extensively following his retirement from active business some years ago.

EDGAR T. WARD, prominent as an iron and steel merchant and organizer both in Sheffield, England, and in the United States, died Sept. 27, at his summer home, Needham, Mass. Mr. Ward, who was 79 years of age, was born in Sheffield, where he entered the steel business, ultimately becoming a manufacturer. In 1881 he went to Boston, and two years later took up the representation of Seebohm & Dieckstha1, Sheffield. In 1894 Mr. Ward in association with his son, John Ward, and George H. Nash, a steel merchant of Chicago, established the Ward & Nash Co., which was dissolved five years later, Mr. Ward continuing as representative of Seebohm & Dieckstha1. In 1899 he organized the house of Edgar T. Ward & Sons, and in 1905 he founded the Union Twist Drill Co. He retired from active business in 1912 and in 1918 the Ward company was reorganized as the Edgar T. Ward's Sons Co., under which name it still operates. He is survived by his three sons, Edgar Ward, president; John Ward, treasurer, of Edgar T. Ward's Sons Co., and Asline Ward, Newton Highlands, Mass. There are five daughters.

WILLIAM R. JURACK, secretary-treasurer Standard Die Casting Co., and secretary Chas. Jurack Pattern Mfg. Co., Milwaukee, died Sept. 25 from the effects of an operation. He was born in Milwaukee and was 35 years of age. Mr. Jurack was one of the best known figures in the Central Western pattern and die casting industries.

ANDREW G. YOUNG, traffic manager, American Sheet & Tin Plate Co., who during the war was in charge of the routing of shipments of war material for the Government, died Sept. 29 at the home of his daughter, Mrs. O. A. Locke, Cleveland, as the result of heart trouble. Mr. Young was born in Peoria, Ill., Dec. 29, 1861, and entered the railway service in 1879 as a clerk in the freight office of the Toledo, Peoria & Western Railroad. In 1899 he became traffic manager of the American Tin Plate Co. and retained that position when the American Tin Plate Co. and the American Sheet Steel Co. were consolidated and became a subsidiary of the United States Steel Corporation. He was a member of the Duquesne Club, the Pittsburgh Field Club, Pittsburgh Athletic Association, Pittsburgh Chamber of Commerce, the Pittsburgh, New York and Chicago traffic clubs and the Railroad Club of New York. He also was a Mason and a Shriner. Funeral services were held on the afternoon of Oct. 1, at St. Andrew's Episcopal Church, Pittsburgh, the pallbearers being Eugene W. Pargny, president; S. A. Davis, vice-president; J. I. Andrews, vice-president; J. L. Neely, assistant general traffic manager; D. M. Buck, metallurgical engineer, American Sheet & Tin Plate Co.; L. C. Bihler, traffic manager, Carnegie Steel Co.; J. F. Townsend, traffic manager, National Tube Co.; H. G. Dow, assistant general freight agent, Great Northern Railroad, New York, formerly of Pittsburgh.



ANDREW G. YOUNG

OSCAR BRADFORD, president, the Expanded Metal Co., died at his home in Chicago, Sept. 28. He was born in Springfield, Ill., 77 years ago and after serving in the civil war, engaged in the jobbing and manufacturing business in St. Louis. In 1891, in Chicago, he took up the manufacture of expanded metal. He was associated with the early developments of the pneumatic tool and a pioneer in the use of concrete reinforcement. He retired from active business several years ago.

JOHN F. MCELROY, president Vinton Truck Co., Vinton, Iowa, was recently killed when he came in contact with a live electric wire.

The American Chamber of Commerce in Spain plans to issue in the early part of December a special number of its monthly bulletin to foster American trade in Spain. For information one should address the American Chamber of Commerce in Spain, Rambla de los Estudios 8, Barcelona, or Eugene L. Perea care of Boera Brothers, Staten Island Ferry Terminal Building, New York.

Traffic handled by the Ohio region of the Erie Railroad averaged 4780 loaded cars per day in September, the best monthly record this year, indicating improved industrial conditions in affected territory. The best daily record for the Ohio region this year was on Sept. 28, when the loaded cars moved totaled 5692.

Practical applications of autogenous welding in the steel mill will be discussed by Walter Petry, superintendent of welding, American Rolling Mill Co., Middletown, Ohio, at a meeting of the Cleveland section of the Association of Iron and Steel Electrical Engineers to be held on Monday evening, Oct. 10, at the Hotel Statler, Cleveland.

British Iron and Steel Market

Greater Activity All Along the Line—Continental Competition Hampered by Slow Deliveries—Tin Plate Demand Better

(*By Cable*)

LONDON, ENGLAND, Oct. 4.

Eighteen Cleveland furnaces are now in blast. The general pig iron situation is unaltered, consumers buying only from hand to mouth. Hematite buying was stimulated by recent cuts, but there were no substantial sales resulting from it.

Foreign ore is dull, the best grade of Rubio selling for 28½s. ($5.33) ex-ship Tees.

Steel consumers generally are awaiting lower prices, but the sheet business is improving, owing to delays in Continental deliveries. The general position is, however, still poor. Dorman, Long & Co., Ltd., the Consett Iron Co., Ltd., Wm. Beardmore & Co., Ltd., and the Lanarkshire Steel Co., Ltd., are all closed down.

Northeastern steel workers' wages have been reduced 25 per cent, under a sliding scale.

The Clyde shipbuilding output for September was fourteen vessels, totaling 42,942 gross tons register.

There is a fair inquiry from the Far East for Continental steel, but British merchants are experiencing difficulty in placing orders in Germany. Quotations are practically unchanged.

French merchant bars are held at £8 10s. to £9 (1.42c. to 1.50c. per lb.) f.o.b.; Belgian merchant bars are quoted at £8 7½s. to £9 (1.40c. to 1.50c. per lb.) f.o.b.; both for shipment in six to eight weeks. German merchant bars are offered at £9 (1.50c. per lb.) f.o.b., with shipment date unspecified.

French beams are held at £8 5s. to £8 10s. (1.38c. to 1.42c. per lb.) f.o.b. German thick plates are quoted at £8 5s. (1.38c. per lb.) f.o.b.; ¼-in. plates at £8 10s. to £9 (1.42c. to 1.50c. per lb.) f.o.b., for shipment in six weeks. German wire nails are now to be had at 23s. ($4.30) per picul (133⅓ lb.) keg—equivalent to 3.22c. per lb.—cost and freight to Japan.

Continental pig iron is stiffening, Luxemburg producers being booked for October shipment, and quoting £4 7½s. to £4 10s. ($16.36 to $16.83) f.o.b. for November shipment.

Tin plates show an improvement in demand. More mills have been put into operation. Several works have accepted low figures to start up, 20¼s. ($3.79) basis f.o.b. having been done for November and December. Sellers are now asking 20½s. ($3.83).

Buyers of Continental sheet bars are canceling contracts, owing to delayed deliveries. There is more business in galvanized sheets, but prices are weak, less than £18 (3.01c. per lb.) basis f.o.b. having been accepted.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.74 per £1 as follows:

Durham coke, delivered	£1 15	$6.55
Cleveland basic	7 7½ & £7 10*	27.58 & $28.05
Cleveland No. 1 foundry	7 0	26.18
Cleveland No. 3 foundry	6 0	22.44
Cleveland No. 4 foundry	5 19	22.25
Cleveland No. 4 forge	5 17½	21.97
Hematite	7 0*	26.18
East Coast mixed	6 10	24.31
Ferromanganese	16 0 & 14 0*	59.84 & 52.36
Rails, 60 lb. and up	10 0 to 14 0	37.40 to 52.36
Billets	7 10 to 8 0	28.05 to 29.92
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.92 to 31.79
Tin plate base box	1 0½ to 1 2	3.83 to 4.11
		C. per Lb.
Ship plates	12 10 to 14 0	2.09 to 2.34
Boiler plates	18 0 to 19 0	3.01 to 3.17
Tees	12 10 to 14 10	2.09 to 2.42
Channels	11 15 to 13 15	1.96 to 2.30
Beams	11 10 to 13 10	1.92 to 2.25
Round bars, ¾ to 3 in.	12 0 to 12 10	2.00 to 2.09
Galvanized sheets, 24 g.	18 0 to 18 10	3.01 to 3.09
Black sheets	16 0	2.67
Steel hoops	14 5 & 14 0*	2.38 & 2.34
Cold rolled steel strip, 20 g.	26 10	4.42

*Export price.

Steady But Gradual Improvement

LONDON, ENGLAND, Sept. 21.—Generally speaking conditions in the iron and steel trades improve only very gradually. During the past fortnight works have certainly secured a few more orders, which enable them to keep going, and in some instances to re-open, but the world demand for steel is still a long way behind that of normal. Cutting for export of course goes on from week to week, but prices are still far too high for overseas buyers to take any considerable interest, especially as the Continent has been under-quoting us for some months past.

But here too the position is an obscure one. Germany has heavily committed herself and has now practically withdrawn from the market except for one or two items, after forcing prices up. This step enabled French, Belgian and Luxemburg producers to raise prices also, but certain overseas buyers, notably the Far East, who have been making fairly steady purchases, have become frightened by the rise and are withholding.

There is no doubt that it is the instability of world prices of steel generally that is hindering business, which, of course, are in the main due to the high cost of production. The seriousness of the position has been fully understood by at least one large steel works, Guest, Keen & Nettlefolds, Ltd.; to give employment while the slump lasts, this company has reopened one or two plants to tide the men over the crisis.

It is interesting to note that experiments have recently been made with a new fuel, and two of our railroads, which had already experimented with locomotives fitted with oil burners, are now engaged on adaptions for a fuel which consists of compressed coal dust and crude oil. It is understood that no special burner is required and that an ordinary locomotive fire box can be used without any special alterations. In connection with railroads, a long needed step is being taken in the way of getting freight rates down, and conferences are being held with a view to reducing the rates, mainly of essential raw materials, by no less than 10 per cent on the existing level of charges. A further meeting is to be held next month when it is expected a final decision will be announced.

Three-Shift System in British Iron Works

The three-shift, or eight-hour, system has proved a failure in the iron works of the Newcastle (England) district, according to a report of the Board of Conciliation and Arbitration for the iron and steel trade in the north of England. The system was introduced in the iron works at the beginning of 1919, but Vice Consul Brooks reports from Newcastle that instead of promoting increased output without increase of cost, the output has decreased and costs have risen very considerably.

Farm Implement Prices Reduced

The International Harvester Co. has announced reductions ranging from 10 to 20 per cent in the prices of practically all farm implements and machinery, effective Oct. 1. Reductions of 10 to 15 per cent were made in March and April and tractor prices were reduced in July.

Reductions in freight rates and cuts in rates of railroad employees' wages are demanded by the National Industrial Traffic League, whose membership comprises many of the large industrial enterprises of the country.

France Exports Most of Lorraine Steel

Impressions Gained on Recent Tour of the Iron and Steel Institute—Use of Blast Furnace Gas for Power the Outstanding Feature in Lorraine

(Special Correspondence)

LONDON, Sept. 17.—The excursions of the Iron and Steel Institute last week to many of the leading iron and steel plants in France gave a good insight into the present condition of the industry, though the time allowed for the various visits was too short for detailed study. This was especially the case as regards the Lorraine district, where a very full program of visits had been arranged, involving long journeys by automobile.

Blast Furnace Gas Engines Everywhere

No particular changes in practice appear to have been introduced in the Lorraine works now under French ownership, and many of the foremen speak German and nothing else. Under present trade conditions it is no doubt the best policy to defer any changes that may be contemplated and to make the most of the existing plant as it stands, retaining those members of the staff who are familiar with the more important operations.

The most impressive feature of the blast furnace plants to the English visitor was the thorough utilization of the gas, involving extensive cleaning plant. A power house full of large blast-furnace gas engines is as much standard practice in Lorraine as, say, water-cooled tuyeres elsewhere. Only one steam engine was seen during the whole of the Lorraine trip.

The French View of Germany

On the excursions, as at the business sessions in Paris, no opportunity was neglected of presenting to the English visitors France's point of view on international politics. It was done very cordially, with quiet and logical argument, and with all the signs of organized propaganda. No offense could be taken at this unorthodox addition to the lavish hospitality and friendly reception accorded by our French hosts. Indeed it cannot be denied that it provoked much sympathy and a better understanding of the French point of view, and to that extent served a most useful object. If one cannot agree with his friends on certain subjects, it is at any rate a good thing to understand the prime reasons for the difference.

It must be admitted, as frankly and as cordially as their hosts put their case, that the visitors were not convinced of Germany's sinister intentions regarding a new war of re-conquest. Nor was the British ironmaster, deeply involved in troubles of his own, convinced of his ability to aid in the economic restoration of the French industry or even of the urgent necessity for any such aid. The war damage and devastations were certainly impressive, but there are other factors which appealed to thoughtful and observant members. Where reconstruction is needed to meet the requirements of current trade, such reconstruction appears to have been rapidly accomplished, as, for example, in the magnificent new pipe foundry at Pont-à-Mousson. The Marine and Homécourt steel works, on the contrary, are practically as left by the Germans—completely devastated. The product of these works can be supplied from other plants, which are able to meet a bigger demand than now obtains, and in the circumstances it is not surprising that reconstruction is postponed.

Much Lorraine Steel Exported

France, in fact, is working for export, and something like 95 per cent of the output of the Lorraine and Luxemburg works is said to be sent out of the country. It is believed that the ex-German works of Lorraine were acquired on exceptionally good terms, and they are not standing idle. British visitors could not unreasonably draw the conclusion that the complete restoration of the French industry depends far more on the restoration of the world's trade than on anything else, and that, as far as current business is concerned, France is probably in a better economic position than Great Britain. As to the future, France probably has it in her power to attain a dominating position in the iron and steel trade of the Eastern hemisphere, if she devotes her energies to the full development of the magnificent resources now in her possession.

These are the impressions of the present writer, gathered during an admittedly short visit which may quite possibly have led to mistaken conclusions. They are, apparently, not quite the impressions which it was hoped would be received by the visitors, but are recorded for what they are worth, and they do not differ substantially from the impressions of the majority of the English visitors. Of the personal friendliness, cordial welcome and magnificent hospitality accorded, both by the reception committee and the members of the various firms whose works were visited, one cannot speak too highly, and many happy memories will be treasured of the visit of the Iron and Steel Institute to France.

Hayange

Coming now to the Lorraine excursion, the party first visited the Hayange works of De Wendel & Cie., which have been the property of the De Wendel family since 1704. There are two groups of blast furnaces, four being at Hayange. Of these, two are of 200 tons capacity and two of 150 tons. The latter will be replaced by two new 200-ton furnaces. At Paturel there are six blast furnaces, two of 180 tons and four of 225 tons. The basic plant, built in 1880, consists of six converters, and it may be mentioned that Hayange was the first works in Lorraine to adopt the Thomas-Gilchrist process. There are two blooming mills and five stands for rolling rails and girders, and a press for sleepers. The open-hearth plant was built between 1903 and 1910, and consists of four 60-ton furnaces, a fifth being under construction. There are also plate and sheet mills and a galvanizing shop. The Moyeuvre works are some miles away, and comprise eight blast furnaces, four basic converters, rod and bar mills, and two batteries of coke ovens with by-product plant. The company obtains its ore from mines in the neighborhood and also from Briey. The local ores are brought to the Hayange blast furnaces through a tunnel 2½ miles long, driven under the hill. Liquid air cartridges are used in mining, as they permit rapid access to the working face after blasting.

The company owns collieries at Petite-Rosselle, where there are six double shafts and where the output in 1913 was 2,209,765 tons. They also own a new colliery at Hamm, in Westphalia, the 1913 output of which was 550,000 tons. Most of this was converted into coke in four batteries of 50 coke ovens. The blast furnaces were using Westphalian coke at the time of the visit. The company has interests also in collieries

in Dutch-Limburg, Belgium, and the north of France. The coke ovens near the Moyeuvre blast furnaces were started in 1913, and were the first in Lorraine. Tar and ammonium sulphate are recovered and gas is supplied to a part of the surrounding district.

German Ownership Frustrated

In 1913 the Hayange works produced 847,000 tons of pig iron and 773,000 tons of steel, and the company had 22,297 employees in its Lorraine works. During the war the property of the company was sequestrated and administered by the German civil and military authorities, who ordered liquidation. In 1918 judgment was given in favor of a German purchasing syndicate, but the end of the war intervened. The works of Hayange and Moyeuvre, which were completely stopped at the time of the armistice, were partly restarted at the beginning of 1919, but were handicapped by inadequate supplies of coke. At present nine out of the 18 blast furnaces are at work.

Practically all the equipment at Hayange is of German make, and was presumably installed before the war. Up-to-date bunkers, electric transfer trolleys, and skip-charging are features of the blast furnace plant, of which the layout is excellent. The casting houses are arranged between the furnaces, served by overhead electric cranes and electro-magnets. Trolley ladles for slag and metal are provided with hydraulic tilting gear. Blast pressure is 500 mm. of mercury (about 10 lb.). At each tap 40 tons is teemed into two ladles and 20 tons on the pig beds. The foundry iron runs 3.0 to 3.5 per cent silicon, while for the steel works they use metal with 0.5 to 0.7 silicon and 0.09 sulphur. The sulphur seems on the high side for British practice. The mud gun is used at the tap hole. Stoves have their own stacks. Slag-granulating plant is provided at each furnace, but no granulating was being done at the time of the visit. Three large power stations supply the Hayange and Moyeuvre works with blast and electric power, using gas engines of the Nürnberg type.

In the Bessemer shop there are six 13-ton converters and three semi-circular casting pits, one casting ladle serving a pair of converters. The arrangements at the Joeuf works were rather more modern, car-casting being adopted, while the most advanced practice was seen at Hayange.

The steel mill was well arranged and equipped, but presented no special features. A fair amount of work was going through, mostly I-beams, channels and angles of various sections, and some rails. An hydraulic press was working on steel railroad sleepers.

During the greater part of the war the works were run by the Germans at about 30 per cent capacity.

Joeuf

After the annexation of Alsace-Lorraine by Germany in 1870 the Hayange and Moyeuvre works were outside the French customs frontier and the De Wendels and the Schneider interests founded the Joeuf works, which began operating in 1880. At the end of 1913 they comprised eight blast furnaces (four of 200 tons and four of 140 tons), a basic plant of six converters, a blooming mill, a two-high mill for rails and girders, a billet mill, and a wire mill. A three-high mill of 650 mm. was under construction. Joeuf was occupied by the Germans from Aug. 2, 1914, to Nov. 17, 1918. The works were thoroughly devastated, and the huge lump of iron used to smash the rolling mills is now to be seen on a pedestal at the works' entrance. It has been playfully named Fritz.

Reconstruction began after the armistice. Two blast furnaces were restarted in June, 1919, and the steel works and blooming mill in July, 1920. Now four furnaces are in blast, two are ready for blowing in, and the other two will be ready very shortly. The steel works were restarted on June 8, 1920, the blooming and wire mills are in operation, the rail and billet mills are nearly ready, and the new three-high 600 mm. mill is quite ready. In 1913 the works produced 394,000 tons of pig and 330,000 tons of steel. The wire mill was in full operation at the time of the visit, and the general layout gave an excellent impression. Gas-fired continuous billet heating furnaces were installed. The billet heating furnaces seen later at Hagondange were also of the continuous type, but semi-gas fired (coal fires with steam-forced draft). The latter were engaged on heavier work and had special arrangements for handling the hot billets which were very effective in operation. The billets were withdrawn by a winch and tongs on a rising and falling table in front of the discharge door of the furnace. The table is then lowered to below floor level (trap door plates closing automatically over it), and transfers the billet to line rollers under the floor which take it to the three-high rolls. For heavy billets, especially when the reheating furnaces are so grouped as to make a clear floor almost imperative, this system is excellent, and at Hagondange it served to keep the rolls continually supplied without a hitch. Such elaboration was not, however, needed at Joeuf.

De Wendel & Cie have a works at Messempré, in the Ardennes, for rolling high grade thin steel sheets. This plant, completely destroyed during the war, is under reconstruction.

Homécourt

The works of the Compagnie des Forges et Aciéries de la Marine et d'Homécourt afforded a striking example of devastation. Although reconstruction has been begun, it is very little advanced, and there was little to show the visitors except a roof and excavations for mill housings, etc. There were originally seven blast furnaces, of which nothing but the shells were left by the Germans. Out of the 29 Cowper stoves, 25 were pillaged and four totally destroyed. The gas engines and electric generators of the central power station and the rolling mill engines were removed. The steel department of four 17-ton Bessemer converters and the rolling mill building were utterly destroyed, even the foundations having been undermined and the superstructures brought down.

The reconstruction scheme includes the laying down of a large blooming mill, a Morgan billet mill, and a universal mill for large plates up to 1200 mm. Two of the blast furnaces have been restarted. In the blast furnace power house, blast and electric power were provided by two large gas engines by the Société Alsacienne de Constructions Mechaniques, of Mulhouse, while in the central power house six gas engines by Erhardt & Sehmer, of Saarbrücken, were driving electric generators. Presumably these engines had been recovered from Germany.

Droitaumont Iron Mines

The iron mines of the Société des Mines de Droitaumont are in the Orne district of the Lorraine ore field. The pit was sunk in 1910 and the ore is obtained from the gray seam. It is freely calcareous and contains 34 to 40 per cent of iron. The depth of the shafts averages about 600 ft. and a good deal of water is encountered from time to time. The 1913 output was 404,687 tons. The pit-head arrangements are very up-to-date, with powerful tipplers and modern arrangements for circulating the tubs.

Hagondange

The Hagondange works were built by Thyssen between 1911 and 1914, and are among the most modern in Europe. They were acquired after the war by the Union of Consumers of Metallurgical Products and Industries. They extend over 1250 acres and comprise six 300-ton blast furnaces, five 30-ton converters, one 80-ton tilting open-hearth furnace and one of 60 tons, two electric furnaces of 10 tons each and one of 18 tons. The annual capacity is 600,000 tons of steel, and the number of workmen employed is 6000. All the blast furnace gases are cleaned for power purposes. There

are 12 Thyssen gas engines and 12 gas blowers, the blast pressure of 600 mm. of mercury (about 12 lb.) being the highest in the district. At the time of the visit the dry-cleaning plant was not being used, owing to the amount of moisture in the gas, which was put through Thyssen washers. In the Bessemer shop, the casting arrangements were reminiscent of open-hearth practic. Overhead casting ladles run the whole length of the shop, and the car-casting system is employed in straight pits above ground level, running out at right angles to the furnace platform. Passing the soaking pits, the visitors were impressed by a very powerful electrically-driven blooming mill. The billet reheating furnaces have been noted above. Throughout the works every mechanical device was adopted for the expeditious handling of materials. The company owns nearly 14,000 acres of iron ore concessions in Lorraine, with an annual productive capacity of 1½ million tons. A picturesque garden city adjoins the works and houses nearly 3000 of the employees.

Rombas

The Rombas steel works were originally founded in 1888 by a German company,, the Rombacher Huttenwerke, owning iron ore mines in Lorraine, coke ovens in Zeebrugge, and collieries in Westphalia. In 1913 the works produced 770,000 tons of pig iron and 610,000 tons of steel, and the steel capacity has since been increased by another 300,000 tons. In October, 1919, a combine of the Compagnie des Aciéries de la Marine et d'Homécourt, the Société d'Aciéries de Micheville, and the Société des Hauts-Fourneaux de Pont-à-Mousson formed the Société Lorraine des Acieries de Rombas and purchased the works for 125,000,000 francs. This new company, in association with a powerful group of Belgian iron works and banks, also acquired the Deutsch Luxemburgische works at Differdange and Rumelange, and controlling interests in the Dillingen works. The group also controls a large number of iron mines in Lorraine.

The Rombas works has eight blast furnaces arranged in line, the first four being of 170 tons each, Nos. 5, 6 and 7 of 225 tons each, and No. 8 of 250 tons. The first four have vertical hoists; 5, 6 and 7 have skip charging, and No. 8 has an inclined hoist. The last named is 730 cu. m. in capacity, 30 m. high, and has eight tuyeres. There are eleven gas-driven blast furnace blowing engines totaling 4810 hp. The gases are cleaned by alternating dry and wet Silesian purifiers, Scheile & Schwartz fans and purifiers, and Theisen scrubbers. There are two 1250-ton mixers, six 32-ton converters, and preparations are being made to erect four 70-ton tilting open-hearth furnaces. The installation of rolling mills is extensive and powerful. The company also owns four 200-ton blast furnaces at Maizières, which is connected with the Rombas works by an 8-kilometer (5 miles) private line, enabling molten pig to be brought to the mixers.

A visit was also made to the blast furnaces and foundries of the Société de Pont-à-Mousson, where the vertical casting of large iron pipes is a specialty. Some account of these works is reserved for a future communication. Another party visited the Creusot and St. Chamond works, while a third inspected the modern blast furnaces and steel plant near Caen, in Normandy.

Luxemburg Plants

A small group of .nembers made a trip into Luxemburg, which was not featured on the official program. They visited the works of the Société Metallurgique des Terres Rouges in which Schneider & Co. now have the largest interest, but which were formerly the property of the German Gelsenkirchen Co. The new company has 15 blast furnaces in three districts, with basic converters and rolling mills, having a total capacity of 1,000,000 tons of steel per annum. The works of the Arbed company were also inspected, the name being an abbreviation of Aciéries Réunies de Burbach-Eich-Dudelange. The company owns 14 blast furnaces in two localities, with basic Bessemer and open-hearth plants, rolling mills and foundries. This company is also connected with works at Dommeldange, where there are three blast furnaces, steel works, foundries and structural shops, and also with blast furnaces, steel works and mills at Esch-sur-Alzette.

The Luxemburg plants are a splendid addition to France's metallurgical resources, mention of which was apparently overlooked in the speeches at Paris and those members who availed themselves of the opportunity of visiting them must feel grateful for the privilege. It is understood that France is exporting somewhere around 2,000,000 tons, or practically the whole of the steel produced in the Lorraine and Luxemburg works, formerly owned by the Germans and acquired at a low valuation.

German Prices Go Higher as Mark Depreciates

Low Value of Mark, Increased Coal Prices, Wage Claims and Prospects of Freight Advance Main Causes of Rise

(By Aerial Mail to London)

BERLIN, GERMANY, Sept. 16.—The period of calm that followed the frenzied increasing of prices lasted only a few days. Prices continue upward, almost in proportion to the decrease in value of the mark. The tone of the market, however, has become a little quieter and as not all of the peak prices quoted by jobbers a fortnight ago could be maintained, warehouse quotations are now showing but a small margin over the mill prices. The slight retardation in the upward trend of works prices has been caused by the fact that mills are booked for months ahead and in most cases are declining new orders. In view of the continued depreciation of the mark, the increase in the price of coal wage claims by labor and an expected advance in freight rates, it is difficult to foresee an end to the present upward trend of prices.

Scarcity of Light Plates

Pig iron No. 3 has advanced 50 m. per ton and is now quoted at 1250 to 1300 m. f.o.b. Lorraine or Luxemburg furnace. The semi-finished material market is virtually unchanged; billets, open-hearth, being quoted at 2100 to 2400 m., Bessemer 2000 m., average, and the same price has been named for sheet bars. In the finished iron and steel market, there is an extraordinary scarcity of light plates. Supplies of plates are difficult to obtain as the Siegerland mills are sold out for the next five months, and the situation is further aggravated by the strikes in the Siegerland district. Jobbers are asking 3700 m. per ton, and get it, but the works quotation is about 3500 to 3550 m. The Black Sheet Association offers medium sheets at light plate base prices and few works are willing to quote lower prices. The strongest tone prevails in the wire market where steel wire prices have rapidly advanced. The Association of Steel Cable Manufacturers has announced a further increase of 40 to 50 per cent on all grades as from Sept. 7, when wire for cable No. 14 U. S. Steel gage was quoted at 7350 m. compared with the former price of 5320 m., and No. 20 gage 9250 m. (former price 6280 m.). In addition, the surcharge on galvanized wires was increased 800 m. per ton. There is considerable irregularity in the cold rolled hoop iron market, some makers quoting 410 m. per 100 kg. while others name 530 m. Bar iron is rather firm and most mills are turning down inquiries. During the past few days there has been substantial export buying, light rails, bar iron, wire rods, and drawn wire being especially in demand. Bar iron has been quoted at 98 to 100 florins f.o.b.

German or Dutch port, while quotations on medium sheets were in the neighborhood of 105 florins.

During the past week quotations were as follows, per metric ton, unless otherwise stated:

	Marks
Bar iron	2800
Structural shapes	2650
Tees and channels	2550
Z-iron	2580
Squares and rounds	2750 to 2850
Half round iron	2800 to 2900
Angles	2800
Flats	2750
Concrete bars	2800
Hoop iron:	
Hot rolled	2850
Cold rolled	4500
Annealed, for packing	4000
Galvanized	5800
Wire rods	2800
Wire, bright	4000
Wire, galvanized, according to grade	4400 to 4550
Rails, steel	2350
Sheets:	
Heavy	2400
Medium	2800
Double planished	3800 to 4300
Galvanized, per 100 kg.	500 to 600
Plates:	
Light	3600
Tank	2600
Blooms	2050
Ingots	1750

Pipe

	Per Meter
Boiler tubes:	
2¾ in.	20.00
3½ in.	40.00
Gas pipe:	
⅜ in.	4.80
¾ in.	8.00
¾ in., galvanized	9.85
1 in., galvanized	20.00

Pig Iron Prices Unchanged

The Association of Corrugated Flue Tube Manufacturers has revised prices as from Sept. 1, as follows: Boiler plates, bottoms 2640 m.; tubes for stationary boilers 7100 m.; for ships' boilers 7600 m.—all per metric ton, f.o.b. Essen. At a recent meeting of the Pig Iron Syndicate is was decided to leave the present maximum prices for pig iron unchanged until the end of October.

Metal Position in France

NANCY, FRANCE, Sept. 15.—In heavy bars and other semi-finished material there are numerous foreign inquiries. Pig iron is extremely active and large tonnages have recently been exported to the United Kingdom.

Buyers are complaining that there is too great a difference in the prices of various mills on rolled bars. Lorraine mills offer rolled bars at 39 fr. less 2 per cent whereas other districts quote 63 fr. per 100 kg. for the same quality, the average price being from 41 to 55 fr. per 100 kg. Location of the mill and its distance from mines are responsible for these price differences.

Speculators were responsible for the latest upward movement in the prices of finished material. Thomas pig iron is decidedly improved, showing an increase of 12 fr. per ton. Foundry iron is quoted from 181 to 186 fr. per ton, according to origin. In Longwy, one producer has offered foundry iron at 175 fr. per ton, on a 50 ton inquiry, payment at 30 days from date of invoice. Hematite is fixed at 400 fr. per 1000 kg.

Rails Awarded Belgian Firm

WASHINGTON, Oct. 4.—The Belgian steel manufacturing firm of Ougrée Marihaye has been awarded the contract to furnsh 3000 metric tons of steel rails and 8000 pairs of fishplates for use in the construction of the Tangier-Fez railroad in Morocco at 398 French francs per ton for the rails and 478 French francs per ton for the fishplates, f. o. b. port of Kenitra, Morocco, according to Consul General Maxwell Blake, Tangier. Other bidders included four French, one Spanish and two English interests, no American interest having submitted figures.

The Northfield Knife Co., Litchfield, Conn., has filed a final certificate of dissolution.

ITALY'S NEW DUTIES ON STEEL

Higher Rates Imposed Against Countries Which Have Raised Their Tariffs

(*Special Correspondence*)

MILAN, ITALY, Sept. 10.—The new Italian tariff which was very suddenly put into effect by the Government on July 1, though it had been under discussion since 1917, revised all items and greatly increased the number of dutiable products. It has 953 headings, or more than double the number contained in the old tariff issued in the year 1887. Each of the 953 divisions includes several subdivisions covering the various forms of products, so that it is very difficult for an article to escape the duty. More than 3000 different articles are specified. Especially detailed are the schedules in the important section of "metals, products of the metallurgical and mechanical industry, implements and vehicles." In the old tariff this section included only 64 paragraphs, while in the recent one it includes 269.

The duty a commodity must pay when entering Italy is indicated in the new tariff by two combined figures: the first figure shows simply the duty, the second figure shows the "coefficiente di maggiorazione"; that is, the number stating how much the duty must be increased. For instance:

For steel ingots an import duty of 30 lire per metric ton is indicated, with 0.8 as "coefficiente di maggiorazione"; which means that ingots pay 30 plus (30 x 0.8) = 54 lire per ton. Motorcycles pay a duty of 120 lire, and the coefficient is 1, therefore the full duty is 240 lire for each motorcycle. A gold watch pays 1.50 lire plus a coefficient of 2, making a total of 4.50 lire for each watch.

It is evident that the new tariff has been created with the purpose of protecting domestic manufacture, and this is the real reason for the complicated system of the coefficients. While the first figure (duty) will remain unchanged, the coefficients are subject to revision any time the conditions of production and international commerce may require it. In other words, the coefficients can be increased or decreased according to the greater or less need of protecting the national industries and the special agreements which may be entered upon with the other countries.

This new system of adding the coefficient to the duty has been suggested by the urgent need of a basis to work on in dealings with countries which lately have increased their tariffs. It can be considered a mild form of countervailing duties against countries which have imposed heavy import duties on Italian products; at the same time it is designed to come to the help of domestic industry which at the present time is badly shaken by the world crisis and not in a position to fight foreign competition. Practically all of the pre-war treaties of commerce with other countries are now inoperative, as they have been so much modified by special decrees, limitations, import prohibitions, etc., that the need to arrange for new treaties is apparent.

In the trade relations between America and Italy it is evident that if Italy can obtain friendly treatment from the United States for her export products, such as oil, lemons, essences, silk, etc., the coefficients on American export products, such as iron, steel and machinery, will be considerably lowered. It must be borne in mind that the new tariff is not at all final, because the coefficients are subject to revision.

All duties must be paid in gold lire. As there are now no gold lire in Italy, payment can be effected in paper lire at the day's rate of exchange for gold. This rate of exchange is fixed every fortnight by the Ministry of the Treasury on the exchange of the dollar. For the fortnight Aug. 15 to Aug. 30 the gold lira stood at 452 per cent of the paper lira. Therefore,

the duty on steel ingots being 54 gold lire, amounted in paper lire to 4.52 times 54, or 244.08.

It will be interesting for American exporters to know the present import duties on the main items of iron and steel shipped to Italy from the United States. They are as follows:

	Duty in Gold Lire per 100 Kilos	Coefficient	Total Duty, Lire per 100 Kilos
Iron, manganese, lead, copper, zinc ores	Exempt		
Pig iron for foundry or steel manufacturing purposes	1.25	2.5	4.375
Pig iron, when containing more than 15 to 25 per cent Mn	1.75	2.5	6.125
Metals for ferro-alloys (chrome, manganese, molybdenum, silicon, titanium, tungsten, vanadium) 90 per cent or more	40.00	0.5	60.00
Puddled iron	3.00	0.8	5.40
Ingot steel	3.00	0.8	5.40
Blooms and sheet bars	7.00	0.5	10.50
Steel rails	7.00	1.0	14.00
Scrap Material			
Steel and iron scrap of any kind but for remelting purposes	1.00		1.00
Tinned scrap for detinning purposes	Exempt		
Steel and iron turnings, drillings and borings	1.00		1.00
Crop ends, rail ends, discard blooms and billets, old axles, shafting, etc., when in pieces not exceeding 500 mm. length	3.00	0.5	4.50
Cast iron scrap	1.00		1.00

Steel bars, plates, tubes, etc., pay duties varying from 12 to 30 gold lire per 100 kilos, according to thicknesses or degree of manufacture.

Reduced Export Rates on Shipments to the South

WASHINGTON, Oct. 4.—Effective on Thursday of the present week, export rates on iron and steel products for shipment through South Atlantic and Gulf ports will be lowered approximately 20 to 25 per cent. By permission of the Interstate Commerce Commission authority was granted to reduce them on the same basis as were those from the same points of origin to North Atlantic ports, the latter becoming effective Sept. 6. The latest decrease was authorized upon application of the carriers, which were authorized to establish the new rates upon five days' notice. Prior to the reductions effective Sept. 6 the rates to South Atlantic and Gulf ports were slightly under the New York and other North Atlantic ports, due to the 40 per cent advance last year to the latter points and the 33 1/3 per cent advance to the former points.

Indicative of the former and new rates to South Atlantic and Gulf ports are the following:

From	Finished Steel in Cents per 100 Lb. to South Atlantic Ports Former Rate	Finished Steel in Cents per 100 Lb. to South Atlantic Ports New Rate	Billets in Gross Tons To South Atlantic Ports Old	Billets in Gross Tons To South Atlantic Ports New	Pig Iron in Gross Tons To South Atlantic Ports Old	Pig Iron in Gross Tons To South Atlantic Ports New
Youngstown, O.	40	31.5	$6.665	$5.30	$6.40	$5.10
Toledo, O.	46.5	37	7.865	6.20	7.465	5.90
Indianapolis, Ind.	56	44	9.335	7.30	8.935	7.10
Ft. Wayne, Ind.	54	43	9.065	7.10	8.665	6.80

	Billets in Gross Tons to Gulf Ports Old Rates *A	Billets in Gross Tons to Gulf Ports Old Rates †B	Billets in Gross Tons to Gulf Ports New Rates A	Billets in Gross Tons to Gulf Ports New Rates B	Pig Iron in Gross Tons to Gulf Ports Old Rates A	Pig Iron in Gross Tons to Gulf Ports Old Rates B	Pig Iron in Gross Tons to Gulf Ports New Rates A	Pig Iron in Gross Tons to Gulf Ports New Rates B
Chicago	$10.00	$8.40	$7.90	$6.70	$9.60	$8.00	$7.60	$6.40
Peoria, Ill.	9.465	8.40	7.90	6.70	9.465	8.00	7.60	6.40
St. Louis	8.265	8.265	7.90	6.70	8.265	8.00	7.60	6.40
Cincinnati	8.125	7.875	7.90	6.70	7.875	7.50	7.60	6.40

*A—When for countries other than Europe and Africa.
†B—When for Europe and Africa.

Hearings on the application of transcontinental lines to lower rates on iron and steel for export through Pacific coast ports and to reduce eastbound rates on canned goods and other articles will be begun on Nov. 11. The hearings are the result of protests against this particular application by intermountain shipping interests.

A New Britain, Conn., branch, American Society of Mechanical Engineers will be organized this week and officers elected.

PLEA FROM PACIFIC COAST

Need of Protection for Steel Industry Urged in Letter to Senate Committee

John Williams, labor commissioner of the Pacific Coast Steel Co. has forwarded to the Committee on Finance, United States Senate, Washington, the following brief in favor of a protective tariff, based on the American valuation plan:

"We beg respectfully to direct your attention to a condition affecting the steel industry on the Pacific Coast which, in our opinion, challenges the future existence of this industry in this particular section of the United States, viz., the importation of German and Belgian steel products.

"Indicative of the situation confronting us, we desire to bring to your attention the fact that this company has two plants, one located in Seattle, Wash., and one in South San Francisco, neither of which is the product of war-time conditions, but the outgrowth of steady development during the past 20 years, and which we believe are capable of meeting the needs of the territory which they are now serving.

"The progress made by the Pacific Coast Steel Co. since its inception has been coincident with the growth and expansion of the states on the Pacific slope and contiguous states. The demand for tonnage, however, is limited and compared with large steel manufacturing plants our production is small, which in turn means that the cost of steel making on the Pacific Coast is higher than at Eastern plants where the larger demands enable them to maintain quantity production. Future progress is now seriously threatened through the menace of foreign importations, principally emanating from Germany and Belgium.

"German steel bars are being quoted on the Pacific Coast at this time on the basis of $1.65 per 100 lb., and orders have been placed at a price approximately of $1.70 per 100 lb. The reason larger tonnages of bars have not been placed by Pacific Coast buyers with German and Belgian mills is because of curtailment in the requirements of steel here, which condition has been prevalent during the past year. It is evident, however, that as conditions in the steel market become normal, with the consequent spread in prices between our costs and the price at which foreign steel can be bought, it is only a question of time until the entire Pacific Coast will be flooded with these importations, which can only mean the elimination of steel plants now operating in this section, and the throwing out of work of men engaged in this industry, which necessarily follows, will accentuate the suffering now existent due to unemployment.

"The low prices being offered by German and Belgian interests can largely be attributed to long hours and low labor rates paid in those countries, together with depreciated currency, low rates of exchange and extremely cheap water rates. In point of example regarding low water rates—it is now possible to ship steel bars from Antwerp to San Francisco for less than one-half the rate by rail from San Francisco to Fresno, Cal., a distance of 180 miles.

"Our cost of production, which due to higher labor rates prevailing on the Pacific Coast is higher than in the East, is also immeasurably increased through the necessity of our being compelled to transport raw materials necessary to the production of steel from interior Western and Middle Western points and considerable distances on the Pacific Coast.

"These conditions make the menace of cheap steel importation a serious problem for the interests of the Pacific Coast, and one that we believe can only be solved by a duty on foreign material based upon the American valuation plan as emphasized in the tariff bill now under consideration by the Finance Committee.

"We earnestly request your consideration of the facts set forth herein and, if necessary, will have a representative appear before the committee, if in the judgment of the committee this course is deemed advisable."

SHEET DEMAND STRONG

Large Volume of Business at Youngstown—Foreign Ferromanganese Bright

YOUNGSTOWN, OHIO, Oct. 4.—To all intents improved buying of iron and steel is on a firmer basis this week and is in some products, especially sheets, exceeding expectations of independents. Inquiries are being translated into orders in considerable volume, coming from both the jobbing and consuming trades. A number of substantial orders involving blue annealed sheets are now in course of rolling. If the current rate of sheet business keeps up the Republic Iron & Steel Co. will start the additional units at its Niles works, doubling the capacity of its original sheet mill plant, purchased from the old DeForest Iron & Steel Co. Eight mills have been installed housed in buildings erected parallel to the old plant. Owing to depression in the industry, this installation was never brought fully to completion by the company, and work was stopped last winter. Probably a month's work will be required before the equipment is ready for production. Hiring of machinists and other skilled workers for the Niles plant indicates the company's intention of placing the mills in readiness if business warrants.

More Advances Probable

It is, of course, no longer a secret that the independents are making concerted efforts to strengthen prices and much business has undoubtedly been driven to the mills under stimulus of such a movement. Accordingly, still further advances are looked for in sheets and sheet bars within a comparatively short time, though the mills will continue their practice of protecting customers against price increases for a limited period. Pointing to the advances in scrap materials, an independent predicts an early increase in the quotation of pig iron, to $21 or $22. Some sheet tonnage has been accepted by several district mills at prices in advance of the current market, in consideration of delivery advantages. This applies particularly to galvanized grades, some bookings having been made at 4.05c. and some at 4.10c. These, however, are in the minority.

Many More Inquiries

Valley mills received more inquiries the last two weeks in September than all during the summer, in some cases. The principal producers are booked from three to six weeks ahead in this department. One interest is rolling a sizable order of blue annealed to be used for ice containers and has added to its active galvanizing capacity due to pressure of demand from Southern buyers. One of the largest independents is working off an order for No. 13 gage blue annealed, among a miscellaneous variety of orders. Considerable tonnages of this grade are going to makers of stovepipe who are generally ordering heavier gages than they did during the war, indicating one phase of the return to normalcy in this industry. Due to decline in its productive rate, the Ford Motor Co. has been specifying less freely against sheet contracts, though it has been taking 1500 tons and more each week from Valley makers. Producers are generally requiring that commitments on their books at the old prices be taken at once and will not guarantee delivery later at the old prices. Much of this low-priced business has now been worked off the books.

Southern Buyers Active

Sheet buying in general continues to receive impetus from Southern buyers, while much of the tonnage moving represents jobbers' requirements for roofing and other building materials. Makers predict that prices will shortly advance, blue annealed from 2.50c. to 2.75c. for No. 10 gage, black from 3c. to 3.25c. and possibly higher for No. 28 gage, and galvanized from 4c. to 4.25c. Many carload lot orders are being placed on producers' books. Price advances have extended to seconds in all grades and crop ends.

Makers of semi-finished material, particularly sheet and tin bar, have been benefited by improved buying in these divisions, non-integrating interests especially enlarging their demands. The aggregate of such business on makers' books at the opening of the week was in excess of 18,000 tons. Fresh advances in open-hearth sheet bars from the new price of $32 are looked for.

A Stabilizing Influence

Independents regard the action of the Carnegie Steel Co. in advancing bars to 1.65c. and plates and shapes to 1.75c. as a stabilizing influence. Though the new prices do not average higher than recent independent quotations, they represent an advance over actual prices due to the liberal price-cutting in these lines. Incoming plate tonnage is still largely sporadic and makers are inclined to regard a number of inquiries put out by tank car interests as a test of the market rather than representative of prospective business.

Though 2.40c. base, Pittsburgh, is regarded as the market on cold finished bars, a Valley interest which is not operating has quoted 2.25c., and there are intimations that 2.20c. has been done on such business.

The Valley steel company which has been in the market for 200 to 300 tons of 80 per cent ferromanganese has closed on imported material at $60, for which it consistently held out. When the company originally put forth its inquiry the market was $72, delivered. The price quoted includes delivery to the buyer's plant.

Purchase of 400 tons of fluorspar at $14.60 by a Valley steelworks plant represents a new low price in the current market, though still regarded by consumers as too high. The market spread is from $15 to $16, while a company which has been buying in carload lots has been obliged to pay from $16 to $17.

An offer of $55 per ton on 50 per cent ferrosilicon was made last week by a district buyer, which compares with the going price of $60.

The Youngstown Steel Car Co. has received an order from the New York Central Railroad for the repair of 500 cars for the Pittsburgh & Lake Erie, which is in addition to a similar order placed several months before. The bookings of this company insure its steady operation until March 1 next.

Somewhat heavier buying has resulted from price reductions in steel pipe, involving chiefly merchant grades. Recent inquiries included one for 200 miles of 4 to 10-in. line pipe for Texas oil drilling interests. Butt-weld buying largely predominates with both district makers.

Coke Output Gains

UNIONTOWN, PA., Oct. 4.—Coke output in the Connellsville region continues to gain consistently with firmer demand and price. Additional ovens are being put into blast in various parts of the region daily. W. J. Rainey, Inc., this week fired 180 ovens at Mt. Braddock and has in operation 80 ovens at Elm Grove. The H. C. Frick Coke Co. has no ovens in operation, but it is expected that orders for firing ovens will be forthcoming shortly. The Frick company is now producing about 50 per cent normal in coal, operations at Leisenring No. 1, Continental No. 1, Trotter and York Run having been resumed during the past fortnight on a basis of about 50 per cent.

Shipments of freight out of the region are now running about 1000 cars, or a little more daily off the Monongahela division of the Pennsylvania Railroad. About 90 per cent is coal and coke with coke shipments running about 125 cars a day, an increase of 75 cars daily during the past month over July and August. Coal shipments are showing an increase of better than 100 cars daily over July and August.

Furnace coke is quoted at $3.25 to $3.75; foundry coke at $4.25 to $4.75. Pittsburgh seam coal is quoted at $1.70 to $2.25.

The Federal Drop Forge Co., Lansing, Mich., reports improvement in business. An order for $20,000 worth of castings was just landed by President M. R. Carrier.

Hand of Engineer Guides the Conference

Secretary Hoover and Others Given Credit for Doing Much to Insure Success of Washington Deliberations on Unemployment—Progress Being Made

BY L. W. MOFFETT

WASHINGTON, Oct. 4.—Recommendations made by the various committees of the unemployment conference as emergency measures to relieve the existing labor situation have been accepted generally as possessing the merit of practicability. Applied in good faith by all interests concerned, with a ready willingness to make temporary sacrifices, should they be necessary, confidence is expressed that the conference has worked out proposals that will have a far-reaching effect upon the economic life of the country. With temporary readjustment approached through the means urged, it is felt that when it resumes its sessions next Monday, the conference will be in a strong position to prepare permanent measures that will forestall recurrence of the present condition of unemployment.

That the machinery suggested for emergency measures, and to be suggested for permanent relief, will start off smoothly without any friction whatever is probably more than the conference can reasonably expect, because it is anticipated that in evolving new methods effecting changes in the industrial, financial and economic policies of the entire country, certain discord will prevail in given cases for a while. The process, to become entirely satisfactory, it is pointed out, will require time and must be more or less gradual, as is true of all other vast undertakings. It is a source of gratification, however, that so far there has been comparatively little dissension discernible, though differences of opinion there have been in the conference, with the possibility, if not probability, that much greater conflicts of opinion will be expressed when the plans for a permanent program are taken up. Past history of conferences where employers and representatives of employees have sat together to solve labor problems had unquestionably given an air of skepticism as to the opportunity to work out constructive plans at the present conference, but it likewise is equally true that the expeditious and favorable progress made so far has dissipated doubt to a great extent and created an increased hope and belief that the conference is actually going to come to satisfactory agreement that might easily mark an extremely important turn in the labor and industrial history of the United States. Until that eventuality develops, there no doubt will be mental reservations, but it cannot be denied that a fortunate state of mind with this object in view pervades the conference. Significant of this were statements given out simultaneously by President Joseph H. DeFrees of the Chamber of Commerce of the United States and President Samuel Gompers of the American Federation of Labor, both of whom are members of the conference.

Mr. DeFrees, in an appeal to business men and chambers of commerce, urged support of the emergency measures of relief that have been recommended, stating that "business has a great responsibility in the situation, it must furnish employment." Mr. Gompers, in a formal statement, pronounced the conviction that "the trade union movement in each community will join energetically in the task of providing work for the thousands who are idle," and said American labor would give its "whole-hearted support" to the emergency program, which, he asserted, "provided an opportunity for the co-operative action of all the agencies and institutions in each community to bring relief to the unemployed." These two statements, it is said, already have aided in speeding up the plans proposed to municipalities, states and private institutions, to relieve the situation.

Without any attempt to predict what may be the outcome of the program adopted and the one to be taken up, it is evident that the favorable progress so far made is due in no small part to the background which the conference had charted for it from the outset, though at liberty, as it has done in some instances, to deviate from it in some particulars. This background plainly was the work of the Economic Advisory Committee of the Department of Commerce, organized by Secretary of Commerce Herbert Hoover to present a complete study, with suggestions to relieve the emergency situation and to prevent a return of such a labor condition as that now present. The study of this committee having been impartial and earnest and the conference joining in the spirit, it seems apparent that this has been an important element in the headway made, for the suggestions as to emergency measures by the committee have been adopted in a large measure and some expect its suggestions as to permanent relief will be treated similarly. The soundness of the measures is attributed to the high character of its personnel and this at once is a tribute to both the economist and the engineer, for the committee is made up of these classes, reflecting the view of Secretary Hoover as to the necessary qualification for such an important task.

To the steel industry as such the most interesting recommendations made for emergency relief were those of the manufacturers' committee, which, among others, consists of such men as Chairman Charles M. Schwab of the Bethlehem Steel Corporation; President James A. Campbell of the Youngstown Sheet & Tube Co., and President W. H. Stackhouse of the National Implement & Vehicle Association, chairman of the committee.

The Committee Recommendations

These recommendations are as follows:

Manufacturers can contribute to relieve the present acute unemployment situation by—

(a) Part time work, through reduced time or rotation of jobs.

(b) As far as possible, manufacturing for stock.

(c) Taking advantage of the present opportunity to do as much plant construction, repairs, and cleaning up as is possible, with the consequent transfer of many employees to other than their regular work.

(d) Reduction of the number of hours of labor per day.

(e) The reduction of the work week to a lower number of days during the present period of industrial depression.

(f) That employees and employers co-operate in putting these recommendations into effect.

A large number of employers have already, in whole or in part, inaugurated the recommendations herein set forth, and for this they are to be commended, and it is earnestly urged upon those employers who have not done so to put same into use, wherever practicable, at the earliest possible opportunity.

(g) Specific methods for solution of our economic problems will be effective only in so far as they are applied in a spirit of patriotic patience on the part of all our people.

During the period of drastic economic readjustment through which we are now passing, the continued efforts of anyone to profit beyond the requirements of safe business practice or economic consistency should be condemned. One of the important obstacles to a resumption of normal business activity will be removed as prices reach replacement values in terms of efficient producing and distributing cost plus reasonable profit.

We therefore strongly urge all manufacturers and wholesalers who may not yet have adopted this policy to do so, but it is essential to the success of these measures when put into effect that retail prices shall promptly and fairly reflect the price adjustment of the producer, manufacturer and the wholesaler.

When these principles have been recognized and the

recommendations complied with, we are confident that the public will increase their purchases, thereby increasing the operations of the mills, factories and transportation companies, and consequently reducing the number of unemployed.

Revising Working Schedules

This program will affect industrial establishments, including those of the steel industry, in the way of revising working schedules so as to give employment to a greater number of workmen. What may be possible in the way of producing for stocks, engaging upon new construction and repair work and readjusting prices is a question in view of the fact that producing costs in some steel lines already exceed prices obtained, but the recommendations concede by implication that some manufacturers and wholesalers have adopted the policy suggested so far as prices are concerned. It is inferred equally as plainly, however, that it is necessary for retail prices to reflect the price adjustment of the producer, manufacturer and wholesaler. Much complaint has been made that retail prices have not assumed their proper share in the readjustment, although many retail interests vigorously resent this. In this connection significance is seen in the statement of the committee that "One of the important obstacles to a resumption of normal business activity will be removed as prices reach replacement values in terms of efficient producing and distributing cost plus reasonable profit." Also it is maintained that labor will have to share its part and accept smaller wages in many instances and including the construction lines, the stimulation of which is especially stressed by the conferences as being a necessity. The suggestion that the problem of meeting the emergency of unemployment is primarily a community problem has met with general approval and accordingly the leadership is held to be with the mayors of the cities and plans urged for building up committees in communities to start public works through employment and registration agencies. Recommendations largely similar are made as to governors and States in order that work that can be done immediately should be begun.

When the Conference Resumes

Reports as to what may be done by the conference when it resumes its sessions to inaugurate permanent plans are numerous and some of them are disturbing. They are of more or less natural origin, and among other things have it that serious complications, if not open breaks, will develop over such subjects as wage reductions and proposed legislation. These being anticipatory in character, do not justify a great amount of consideration, but it is certain that President Harding, Secretary Hoover and others who are striving to bring about successful results will bend every energy to see that insurmountable conflicts of opinion are avoided. One of the possibilities of sharp differences that may arise, it is said, relates to the Adamson 8-hr. law, and some members of the conference plainly are of the belief that it should be wiped off of the statutes, but organized labor, as is well known, would vigorously oppose such a recommendation. There is, of course, a general and firm conviction that railroad rates must be reduced as one of the necessary fundamentals looking to a complete economic readjustment and some think that doing away with the Adamson law would be a forerunner in this direction. At the same time, others feel that rates can be reduced at once without waiting for action on such suggested legislation, which, it is stated, probably could not be expected, and in any event would require a long time for accomplishment. Those who think railroad rates can be reduced immediately without any legislation being required appear to have good grounds for their belief. It is reported from sources that cannot be disregarded that railroad executives themselves are now taking up plans looking to a general lowering of rate levels, and if this should eventuate, it is pointed out, a long stride toward readjustment would have been brought about. It is hoped that this would restore the farmers' purchasing power, cause a reduction in fuel costs, and establish other wholesome principles that are so vital before industry can again become normal.

AN IMPOTENT BOARD

Congressman Cooper's Views in Regard to Present Labor Problems

Following decision of the Railroad Brotherhoods to strike, despite the recommendations of the Railroad Labor Board that they accept its findings, Congressman John G. Cooper of Youngstown, Ohio, representing the nineteenth Ohio district, emphasizes the inadequacy of the board's authority. He contends cumulative evidence indicates that the board has failed to fulfill the mission for which it was created, viz. settlement of disputes arising between railroad operators and their employees.

"The Railroad Labor Board has been functioning for over 18 months," he states, "and while I believe that its members have worked hard to try and accomplish the things for which the board was created, yet at this time I am fully convinced they have failed for the reason that they have no power to enforce any decree or decision they may make. It is very evident at this time that the railway managers and employees of the railroads will not obey and carry out the decisions of the board.

"In short, we have a Government board costing the people about a quarter of a million dollars a year, attempting to do something it has no power to enforce. One of the most important things our country needs to-day is a closer working relationship between employer and employee, but we will never have this condition so long as we have governmental commissions attempting to settle their affairs for them. I am convinced that since the establishment of the board the railroad managers and their employees are farther apart than they ever were before, and that both sides, instead of trying to reach an agreement among themselves, pass on their difficulties to the board. I believe the Government should keep its hands off and permit employers and employees to work out their own industrial affairs."

Improvement in Chicago Building Situation

CHICAGO, Oct. 1.—The final settlement of the local building trades dispute, together with the announcement of railroad earnings for August, materially brightened business skies in this territory. The Chicago Building Trades Council last night unanimously voted to reaffirm the recent wage decisions handed down by Judge Kenesaw M. Landis, umpire in a dispute between the contractors and unions. The decision was concurred in by both the carpenters' and plumbers' unions, which had withdrawn from the negotiations previous to the award by the umpire. The vote of the council will reopen construction on more than $60,000,000 worth of contracts, which had been delayed or halted by sporadic strikes of employees dissatisfied with the Landis award. The action of the council was undoubtedly given impetus by the announcement of the umpire that he would grant a rehearing on none of the points in the dispute unless his award was accepted and the men returned to work.

Fourth Classification Added

Following a two-day conference between representatives of the Amalgamated Association of Iron, Steel and Tin Workers and the Western Sheet and Tin Plate Manufacturers' Association, it was announced that a fourth classification has been added to the jobbing mill scale, under which heaters and helpers will receive 15 per cent less than for work under classification two. Under classification four, the rate will vary according to the gage of material rolled. The same rates as in classification two will apply to all other positions in the fourth classification.

The Supreme Motors Corporation, Warren, Ohio, has received an order for 2500 motors and has on its books business aggregating $800,000 in value.

SHORT TRADE ITEMS

The Rusfal Mfg. Co., 132 North Seventh Street, Philadelphia, has purchased the good will and complete equipment of Joseph Carr Co., general machinist, 132 North Seventh Street, that city. A complete reorganization of every department of the business will immediately be made. The combining of the two concerns carries with it a knowledge and experience of many years in designing, developing and making intricate mechanical devices, tools, scientific instruments, experimental work, quantity production, etc.

L. C. Biglow & Co., Inc., 232 West Fifty-fifth Street, New York, have been appointed New York district agents for the Hartford Tap & Gauge Co., the Hanson-Whitney Machine Co., Inc., the Taylor & Fenn Co., and the Whitney Mfg. Co., all of Hartford, Conn. They will handle taps of all kinds, finished after hardening, correct in lead, outside diameter and pitch diameter, with shank and thread concentric; also plug thread gages of greatest accuracy; also bore grinding machines, two spindle automatic spline milling machines, sensitive drilling machines, including radial, wet tool grinder and spring foot press, products of the Taylor & Fenn Co.; for the Hanson-Whitney Machine Co., vertical die shaping machines, centering machines and automatic thread milling machines; for the Whitney Mfg. Co., roller, block, and silent types of chain and Woodruff keys.

The trading department of Asano & Co. has been amalgamated with Asano Bussan Co., New York, importer and exporter. Business will be done in the name of the latter company.

Alfred Herbert, Ltd., machine tool manufacturer, Coventry, England, and representative of many American machine tool companies in the sale of their machines in Great Britain, will close its New York office, Hudson Terminal Building, and E. D. Mitchell, manager, will return to England within a few weeks.

The Defiance Machine Works, Defiance, Ohio, manufacturer of metal and woodworking machinery, has closed its New York office and its manager, R. W. Shore, has returned to the home office in Defiance.

The Kearney & Trecker Co. has removed its New York office from 149 Broadway to 50 Church Street. B. W. Stone is manager.

The R. B. Hayward Co., contractor and engineer, 849-853 West Ohio Street, Chicago, has purchased the business of the Frank Trenkhorst Mfg. Co., 902 Larrabee Street, manufacturer of copper and steel tanks, brass finishing, and special equipment for glucose refiners, paint manufacturers, etc., and will operate the plant along the same lines as under its previous management.

The Metal Sales Co., Detroit, has changed its name to Whaling & Hartman.

The Missouri Iron & Steel Corporation, International Life Building, St. Louis, has filed notice of change of name to the Consolidated Steel & Iron Corporation.

The Dauber-Bell Machine Co., Oshkosh, Wis., has changed its corporate title to the Bell Machine Co. At the same time the capital stock was increased from $75,000 to $100,000. The concern manufactures special machinery, metal and woodworking tools and conducts a jobbing shop.

The Boker Cutlery & Hardware Co., 101 Duane Street, New York, manufacturer and importer of hardware and cutlery, has been consolidated with H. Boker & Co., Inc., thereby again bringing under one name all departments of the old firm of Hermann Boker & Co., which was established in 1837. The personnel of the Boker Hardware & Cutlery Co. remains unchanged, the business continuing under the direction of J. R. Boker and Edward Grafmueller.

Tilley & Brown, engineers in design and construction of furnaces and ovens and layout of oil fuel and gas fuel systems, and Harry E. Gilbert, C.E., Bridgeport, Conn., combustion engineer, have formed a cooperative arrangement. Tilley & Brown specialize on general systems for oil or gas fuel and on the subject of inbuilt furnaces and ovens of standard and special design. Mr. Gilbert has specialized in the development of mechanical atomizing oil burners for metallurgical furnaces and steam power plants.

The American Bosch Magneto Corporation, Springfield, Mass., has just completed the erection of its 10-story Bosch building at 17-19-21-23 West Sixtieth Street, New York, of steel, stone and concrete. The corporation will occupy four floors for its automotive electrical sales and service station.

The Arthur Sachsse Corporation, 6 West Thirty-second Street, New York, has been formed by Arthur Sachsse and Felix F. Wiener to promote the sale of patents, formulas and processes. The corporation will deal principally with the exploitation of inventions and developments made during the war in Germany and will offer manufacturers' rights to American firms. Associated with Mr. Sachsse and Mr. Wiener are some prominent patent attorneys.

The Hurwitz Brothers Iron & Metal Co., Inc., Syracuse, N. Y., has opened a branch office and scrap iron yard at 133-157 Marilla Street, South Buffalo, N. Y., on the B. R. & P. Railroad.

R. M. Belyea, Union Steel Casting Co., formerly with headquarters at 53 Gerard Street, Roxbury, Boston, is now located at 73 Water Street.

Crocker Brothers, Boston, pig iron, formerly located at 24 Milk Street, room 1110, have moved to room 909. Loring Gary Kalkins is manager.

The H. O. Price Co., Oliver Building, Pittsburgh, has been appointed exclusive agent for the sale of its magnesite brick by the Superior Basic Brick Co., Pittsburgh, plant of which is located at Parkerstown, Pa. The H. O. Price Co. also has been appointed by the Mine Lubricants Co., Ltd., Lancaster, England, exclusive agent for the sale of its fluorspar in the Pittsburgh, Youngstown and Cleveland districts.

Grover Brothers & Wood, 428 East Jefferson Avenue, Detroit, manufacturers of pneumatic tube carriers, etc., have filed notice of change of name to the Grover Co.

The Metal Sales Co., General Motors Building, Detroit, has changed its name to Whaling & Hartman. Members of the firm are Montgomery Whaling, for 15 years manager of the American Steel & Wire Co., Detroit, and Walter C. Hartman, president of the National Mfg. Co. The firm is acting as district manager for the Wickwire-Spencer Steel Corporation, La Salle Steel Co. and the American Enameled Magnet Wire Co., the last named of Muskegon, Mich.

W. J. Rainey, Inc., has discontinued its branch office in the Real Estate Trust Building, Philadelphia, this business to be conducted from its general offices, 52 Vanderbilt Avenue, New York. Francis Y. Casey, formerly Philadelphia representative, has been appointed assistant manager of sales and Gilbert S. Sank will be associated in the sales department.

The Wopeco Machine Co., New Haven, Conn., recently incorporated with a capital of $60,000 to manufacture shear grinding machines, can-opening machinery, parts, etc., is having all its work done by contract except assembling and shipping.

The Patton Cement Co., Rotan, Tex., has been incorporated with a capital of $350,000, to manufacture cement. The incorporators are B. F. Reeves, J. E. Durham and A. L. Foy, Rotan.

The Los Angeles Brass Foundry, 2052 East Vernon Avenue, Vernon, has been organized to manufacture brass, bronze and other metal castings. T. J. Morgozewitz, 416 Vernon Avenue, Los Angeles, heads the company.

Galland-Henning Mfg. Co. Plans

In anticipation of improved business conditions, the Galland-Henning Mfg. Co., Milwaukee, Wis., has recently reorganized and increased its sales engineering department. N. W. LeVally and H. C. Norman, Milwaukee; P. H. Arden, Chicago; S. W. West, Cleveland, and John F. Willard, Los Angeles, formerly connected with Logemann Brothers Co., are now affiliated with the Galland-Henning Mfg. Co. Mr. LeVally as general and sales manager and Mr. Norman as assistant sales manager will be located in the general offices in Milwaukee. Mr. Arden will be located in Chicago; Mr. West in Cleveland, and Mr. Willard in Los Angeles, as sales engineers in their respective districts. R. O'Donnell will be located in New York as sales engineer for the New York district.

With this reorganization the Galland-Henning Mfg. Co. will improve and extend its line covering electric and hydraulic baling presses for metals, rags, paper and other waste products, accumulators, pumps, valves and hydraulic production presses.

Expansion of S-P Mfg. Co.

The S-P Mfg. Co., a Cleveland corporation, has purchased the former American Air Chuck Co. of Chicago and has acquired all of the patents, good will, tools, etc., of the latter company. The work of re-establishing the business is already under way and with the aid of J. A. Olson, inventor of the American air chucks, collets, vises, etc., who will be associated with the S-P Mfg. Co., the product will be ready for the market within a very short time.

The regular business of the S-P Mfg. Co. has consisted of the design and manufacture of special machinery, fixtures, jigs, tools, etc., which line will be continued as usual, and as demand increases additional equipment will be installed for the manufacture of the air devices. It is the aim of the company to further develop the use of air power equipment for production work to replace the hand methods of chucking work and similar operations.

Machinery Markets and News of the Works

INQUIRY IS LIGHT

No Marked Change in the Machine-Tool Situation Has Developed

Some Interest on the Part of Railroads, but Purchases Are Small in Comparison with Actual Requirements

Railroads continue to show some interest in new shop machinery, but the amount of their purchases remains very small compared with their probable requirements for complete rehabilitation of their machine-tool equipment. Many of the most active prospects, however, are railroad inquiries, which fact tends to focus attention on what the carriers may buy when their financial condition becomes more prosperous. Recent reports of some of the leading lines show that their profits are approaching the Government guarantee figure.

The Big Four, which recently bought about a dozen tools for its Beech Grove, Ind., shops, will, it is reported, soon issue another list covering requirements of other shops. The Santa Fe Railroad has bought cranes for its Albuquerque, N. M., shops and has added several tools to its outstanding inquiries. The Boston & Albany has bought a steam hammer and drill press and the Maine Central is in the market for a punch and shear. Lists of the New York Central, Rock Island and Chesapeake & Ohio are still pending. The Boston Elevated Railway Co. has bought a few upright drills. The revived inquiry of the Union Railroad, Pittsburgh, is said to be only for the purpose of determining whether present prices are favorable for purchasing. The list has been figured upon three or four times in the last two years.

Inquiry from manufacturers is still very light, but in some markets shows a slight improvement. Most of the inquiries are for single machines, but there are a few exceptions. A Rhode Island company planning to engage in the manufacture of an automobile part is inquiring for 16 tools.

New York

NEW YORK, Oct. 4.

The New York City Board of Education will advertise for bids within two or three weeks on more than 100 metal and wood-working machines for seven vocational training schools. A tentative schedule of the machines required is as follows: Seven universal milling machines, seven 15-in. shapers, seven 12-in. engine lathes, 4 and 5-ft. beds, seven speed lathes, 8 and 11-in. with 4-ft. beds, seven 20-in. drill presses, seven 14-in. sensitive drills, seven power hack saws, 6 x 6 in., seven 14-in. universal grinders, seven small gas annealing furnaces, with blowers, seven tool post grinders, seven small arbor presses, one small planer and all necessary auxiliary equipment, small tools, etc. Wood-working tools: Two band saws, 12 or 14-in. wheels, three 6-in. hand planers or jointers, four 30-in. band saws, five variety bench saws with hollow chiseling, boring and mortising attachments, two 12-in. speed lathes, 6-ft. bed, with hand feeding carriage, six 12-in. speed lathes with 4-ft. bed, five 15-in. disk sanders, seven 8½-in. bench wood trimmers. All of the wood-working machines are to have individual motor drive; other machines to be operated from line shafting. In addition to the above there will probably be seven lathes, seven presses and seven grinders for an automobile mechanics' shop.

Conditions in the local machine-tool trade are unchanged. There is very little business and prospects are not numerous.

The Wilmarth & Morman Co., Grand Rapids, Mich., announce a reduction in prices on its machines, effective Oct. 1.

The past week was marked by considerable activity in the closing and awarding of contracts for electrical cranes that have been pending for some time. New inquiries, however, were scarce, this scarcity being particularly marked in the hand power crane field. Inquiries for locomotive cranes, particularly second-hand, are more numerous, one dealer stating that in the past 10 days he has received more inquiries than the total of the previous three months. The inquiry for 26 7½-ton and 15-ton cranes that appeared in the market some time ago, has been dropped by the prospective purchaser, the American Bridge Co., which intended purchasing only in the event it was awarded the contract for the installation of the 80,000 tons of pipe in Bombay, India. The inquiry of the Porcupine Co., Bridgeport, Conn., for a list of cranes is still pending, although previously reported placed with the Shepard Electric Crane & Hoist Co. The Erie Railroad, which recently inquired for an 8-ton hand power crane for the Forest City Colliery, Forest City, Pa., has purchased from an unnamed builder. There still remains one 10-ton hand power crane to be purchased by the Erie Railroad for Colliery No. 5, Pittstown, Pa.

Among the recent sales are: Cleveland Crane & Engineering Co., one 40-ton double hook, 30-ft. span and one 10-ton, 15-ft. 6-in. span overhead traveling cranes to Stone & Webster, Boston, for the Ford plant at Green Island; Shepard Electric Crane & Hoist Co., three 2-ton electric hoists to the Morrow Mfg. Co., Wellston, Ohio; Northern Engineering Works, a 7½-ton, 55-ft. span overhead traveling crane to the Central Cut Stone Co., Detroit; Reading Chain & Block Corporation a 16-ton, 27-ft. span hand power crane to the New York & Pennsylvania Co.; Industrial Works, a 160-ton wrecking crane to the Delaware & Hudson Railroad, Albany, N. Y.; Shaw Electric Crane Co., a 35-ton gantry crane to the Philadelphia & Reading Railroad; Chesapeake Iron Works, a 15-ton overhead traveling crane to the Virginian Railway, Norfolk, Va.; Philip T. King, 30 Church Street, New York, two 15-ton, 70-ft. boom second-hand Brownhoist locomotive cranes to the Balling Contracting Co., Utica, N. Y.

At the opening of bids for the 34 2½-ton gantry cranes for the New York city docks at Stapleton, S. I., Oct. 4, at noon, 12 crane builders quoted. Complete quotations included five propositions. Proposition E, which was a straight bid for the building and erection of 34 2½-ton gantry cranes and accessories, resulted as follows: Heyl & Patterson, $8,862 each, a total of $301,308; Wellman-Seaver-Morgan Co., $9,996.26 each, total of $339,873; Niles-Bement-Pond Co., $10,230 each, total of $347,820. Other bids totaled as follows: Dravo Contracting Co., Pittsburgh, $350,710; Maine Electric Co., Portland, Me., $386,818; McMyler Interstate Co., $388,688; Pawling & Harnischfeger Co., $400,350; Manning, Maxwell & Moore, $413,916; Exeter Machine Works, Pittston, Pa., $421,940; Lakeside Bridge & Steel Co., North Milwaukee, Wis., $450,568; Brown Hoisting Machinery Co., $491,980; Industrial Works, $577,357.

The Archer Automobile Development Co., recently incorporated, will soon install equipment in a factory at Saratoga Springs, N. Y., to manufacture automobile specialties, the invention of Mr. Archer. He has designed several automobile improvements, including an automatic cut-out clutch, an improved type of transmission and a puncture proof tire. In addition the company plans to bring out a new automobile with an air-cooled engine.

The Finkel Umbrella Frame Co., East 177th Street, New York, has filed plans for a new one-story building, 26 x 50 ft.

The Pittsburgh Plate Glass Co., Pittsburgh, has awarded a contract to Bame & Cardell, Central Avenue, Albany, N. Y., for a new two-story plant on Tivoli Street, Albany, 103 x 180 ft. Eastern headquarters of the company are at 103 Hunters Point Avenue, Long Island City.

The Central Train Control Co., Albany, N. Y., has been incorporated with a capital of $200,000 by A. H., C., and N. Hawley, 69 Eagle Street, to manufacture mechanical safety equipment and controlling devices. It is represented by A. M. Higgins, 55 Liberty Street, New York.

The Motors Accessories Corporation, New York, has been incorporated under Delaware laws with capital of $200,000 by Chester Clark, Jr., and Werner Howard, New York, to manufacture automobile equipment and parts. It is represented by Woodburn Martin, Georgetown, Del.

The George Haiss Mfg. Co., Canal Place near 141st Street, New York, manufacturer of coal-handling machinery, has filed plans for a one-story addition, 34 x 100 ft.

The Napier Saw Works, Inc., Middletown, N. Y., has been incorporated with a capital of $100,000 by W. P. Jeffery, W. E. Cross and J. H. Greene, Middletown, to manufacture saws and similar products. It is represented by Cornell, Lockwood & Jeffery, 2 Rector Street, New York. The same incorporators recently formed the Victor Saw Works, with like capitalization, to manufacture similar products.

The Wisner Mfg. Co., 230 Greenwich Street, New York, manufacturer of dairy machinery, has acquired the six-story and basement building at 241-43 West Broadway, 38 x 100 ft., for a new plant. Improvements and alterations will be made and occupancy effected at an early date.

The Guaranteed Battery Mfg. Co., New York, has been incorporated with a capital of $150,000 by P. Probst, D. Smith and E. Harris to manufacture electric batteries and parts. It is represented by Sidney Nordlinger, 489 Fifth Avenue.

Horrigan & Payne, Brooklyn, have leased a floor in the building at 65 Fourth Street for the manufacture of cement shingles, etc.

The Treco Metal Products Corporation, New York, has been chartered under State laws to manufacture metal goods, including engine parts, etc. The incorporators are D. W. Van Keuren, C. and A. Gulotta. It is represented by M. B. Gluck, 97 Warren Street.

A new one-story automobile service and repair plant will be erected by Simon Garber & Sons, 1876 Pitkin Avenue, Brooklyn, manufacturers of oils, in connection with a new warehouse at Junius Street and Sutter Avenue, with total cost estimated at $200,000.

The Mulcott Belting Co., New York, has been incorporated with a capital of $200,000 by W. M. Smith, M. Lippman and L. C. Stern to manufacture mechanical belting. McLaughlin & Stern, 15 William Street, represent the company.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, is arranging for a bond issue of $3,000,000, the proceeds to be used for general operations and financing, extensions, improvements, etc.

The Service Auto Repair Works, Inc., Brooklyn, has been chartered under State laws to operate a local machine and repair works and to manufacture automobile parts, etc. The incorporators are J. H. and C. E. Bladin and F. R. Petry. The company is represented by Smith, Reiher & Griffin, 44 Court Street, Brooklyn.

The Rapid Meat Cutter, Inc., Brooklyn, has been incorporated under Delaware laws with capital of $250,000 by Cornelius A. Cole and William E. Schiels, Jr., Brooklyn, to manufacture meat-cutting machines and similar equipment. It is represented by the Registrar & Transfer Co., 900 Market Street, Wilmington, Del.

The Sanitary Equipment & Mfg. Co., New York, has been incorporated with a capital of $100,000 by C. D. Klauber, T. A. Stopford and Harry Dubinsky, 302 Broadway, to manufacture sanitary appliances and equipment.

The Phillips Petroleum Co., 115 Broadway, New York, operating oil refineries, has disposed of a bond issue of $3,500,000, the proceeds to be used for general operations, financing, extensions, etc.

The Chelsea Garage, 157 West Eighteenth Street, New York, has leased a two-story building under construction at Little West Twelfth Street and Ninth Avenue, 125 x 129 ft., for the establishment of a new automobile service and repair works. Abraham Solter heads the company.

The Forbes Aluminum Products Corporation, recently organized under Delaware laws with capital of $4,500,000, and now planning the erection of works at Easton, Pa., has established headquarters in the building at the Northeast corner of Thirty-eighth Street and Fifth Avenue.

The New York Edison Co., Irving Place and Fifteenth Street, New York, has made application to the Public Service Commission for permission to issue bonds for $30,000,000, and for permission for its subsidiary, the United Electric Light & Power Co., same address, to issue a similar amount. The proceeds will be used for general operations, plant and system extensions.

The Water Power Commission, Albany, N. Y., has tentative plans under way for a number of power plants on the Barge Canal. It is proposed to develop a total capacity of about 40,000- hp., with distribution and sale in the districts along the route.

The Airship Construction & Navigation Co., New York, has been incorporated with a capital of $5,000,000 to manufacture airplanes and parts. It is represented by Arthur W. Britton, 65 Cedar Street.

The Save Electric Corporation, 254 Thirty-sixth Street, Brooklyn, manufacturer of incandescent electric lamps and other electrical products, has acquired property at Toledo, Ohio, for a new plant, estimated to cost about $300,000 with equipment. Construction will commence at an early date.

The Hudson Skylight & Roofing Works, Inc., Bayonne, N. J., has been incorporated with a capital of $50,000 by John Shea, Samuel Bachner and Emil Dannacher, 8 West Twenty-seventh Street, Bayonne, to manufacture sheet metal products.

The Stowell Mfg. Co., Mallory and Culver avenues, Jersey City, N. J., manufacturer of roofing products, is planning for the immediate rebuilding of its plant, destroyed by fire Sept. 27, with total loss estimated at $500,000.

Walter Butterfield, Wildwood, N. J., is completing plans for a new one-story machine shop, 45 x 80 ft.

The Pennsylvania Railroad Co., Pennsylvania Terminal, New York, will erect a new one-story, reinforced-concrete coaling and coal-heating building at South Amboy, N. J., estimated to cost about $100,000, with equipment.

The Lozier Mfg. Co., 142 Pine Street, Montclair, N. J., manufacturer of metal products, will build a one-story addition, to be equipped as a plating works.

The Fulton Lumber Terminal Co., 120 West Forty-fourth Street, New York, will commence the immediate erection of its new plant on the Hackensack River. It will consist of a planing mill, sash and door factory, box-manufacturing and other wood-working buildings, with cold storage plant for foodstuffs. In addition to power plant equipment and general operating machinery, loading and unloading machinery, conveying equipment, etc., will be installed. It is also planned to build a number of piers in the Hackensack River, provided with mechanical lumber-handling apparatus. E. P. Eckles, formerly superintendent of transportation of the Erie Railroad, is president, and E. R. Shaw, general manager.

The Rafter Machine Co., 579 Grove Street, Irvington, N. J., manufacturer of machinery and parts, has awarded a contract to the United Construction Co., Grove Street, Irvington, for its new one-story machine shop at Belleville, N. J., estimated to cost about $12,000. John Rafter is president.

The Automatic Wrench Co., Newark, has been chartered under State laws by Frank N. Smyth and John J. McAndrews, 8 Orleans Street, to manufacture wrenches and other mechanical products.

Arthur Delapierre, Inc., 19 Warren Street, New York, manufacturer of tool handles and kindred products, has acquired 4 acres and a number of concrete buildings at South Orange, N. J. The company will equip the plant for the manufacture of its regular products, and will utilize about 20,000 sq. ft. of space for the shops.

Jacob Steinberg, Newark, N. J., operating a factory at 275 Belmont Avenue, for the manufacture of metal cornices, etc., will establish a new plant at an early date. The present works are located in restricted property district and vacation has been ordered by the City Zoning Commission within six months.

A new one-story power house will be erected by the General Leather Co., 420 Frelinghuysen Avenue, Newark. Plans have been completed.

The Kelsey Motor Co., 25 Branford Place, Newark, N. J., has purchased about 6 acres on Washington Avenue, Belleville, N. J., as a site for its proposed new works for the manufacture of friction-drive automobiles and parts. Plans have been completed for the initial works and bids for

construction are being asked. The Industrial Engineering Co., 30 Church Street, New York, is engineer.

The Cyclone Fence Co., Waukegan, Ill., manufacturer of wire fencing, has leased a portion of one of the buildings at the plant of the Carrier Engineering Co., 750 Frelinghuysen Avenue, Newark, for the establishment of a branch works.

The Board of Education, Newark, is planning to open part of the new Seymour Vocational School, now in course of erection, early in January, and proposes to install equipment at an early date. Shops will be arranged for instruction in automobile construction and repair work; electrical construction and repair; general machine work; pattern-making, and other lines.

The Angster-Strigner Co., Newark, N. J., has been incorporated with a capital of $100,000 by Edward L. Angster, John H. and William A. Strigner, 224 Badger Avenue, to manufacture heating equipment and supplies.

Philadelphia

PHILADELPHIA, Oct. 3.

William Lewis, Philadelphia, has awarded a contract to H. Rowen, 1232 East Columbia Avenue, for the erection of a one-story machine shop at 1411 Frankford Street, estimated to cost about $12,000.

John Evans' Sons, Inc., Philadelphia, has been incorporated with a capital of $51,000, to manufacture machinery and parts. J. H. Evans, Oak Lane, is treasurer.

Horace T. Potts & Co., 316 North Third Street, Philadelphia, manufacturers of iron and steel products, have awarded a contract to the William Steele & Sons Co., Sixteenth and Arch streets, for the erection of a new plant to cost about $450,000, including equipment.

The Philadelphia Electrical & Mfg. Co., 1206-1220 North Thirtieth Street, Philadelphia, manufacturer of electrical products, has acquired an adjoining one-story building, 62 x 157 ft., for extensions.

The Adem Devices, Inc., Philadelphia, has been incorporated in Delaware with capital of $55,000 to manufacture adding and calculating machines and parts. It is represented by the Corporation Guarantee & Trust Co., Land Title Building, Philadelphia.

The Public Works Department, Philadelphia, has awarded contract to the Robbins Construction Co., 1137 North Front Street, for its one-story machine and repair works, 160 x 220 ft., estimated to cost about $115,000, including machinery.

The Vallette Machine Co., Philadelphia, is being organized to manufacture tools, fixtures, machine parts and automobile equipment and devices. Application for a State charter will be made on Oct. 24. It is represented by Sundheim, Folz & Sundheim, Real Estate Trust Building.

The Van Bierck Motor Service Co., Philadelphia, is being organized by Theodore Wiedemann, George Levene and Herbert L. Howard to manufacture and repair gasoline engines. Application for a State charter will be made Oct. 19. The company is represented by Harry M. McCaughey, 1011 Chestnut Street.

The Union Transfer Co., 1004 Spring Garden Street, Philadelphia, is having plans prepared for a one-story automobile service and repair works, 105 x 105 ft., with extensions, 60 x 150 ft., at Atlantic City, N. J., for company trucks and cars, estimated to cost in excess of $75,000. C. J. Mitchell, 129 South Fifteenth Street, Philadelphia, is architect.

The Board of Education, City Hall, Camden, N. J., has arranged for the erection of a one-story machine shop and manual training building at the city high school, to cost about $60,000.

The Pennsylvania Power & Light Co., Allentown, Pa., is disposing of a bond issue of $8,000,000, the proceeds to be used for general operations, plant and system extensions and improvements.

The plant and property of the Rittenhouse Iron Co., Rittenhouse Gap, Pa., has been acquired by the Southern Coal & Iron Corporation. The new owner has taken possession and plans for immediate operations.

Herre Brothers, Harrisburg, Pa., manufacturers of heating specialties, etc., have acquired property at Seventh and Emerald streets as a site for a new factory to manufacture sheet metal products. Plans are being prepared. Paul F. Herre will be in charge.

The Dombach & Bissinger Motor Co., 113 North Prince Street, Lancaster, Pa., is taking bids for the erection of a new machine shop and automobile service and repair works, estimated to cost close to $150,000. Grover C. Snyder, 28 North Mary Street, is architect and engineer.

The State Highway Department, Harrisburg, Pa., has awarded a contract to the Hughes-Foulkrod Co., Commonwealth Building, Philadelphia, for the new two-story automobile service and repair building, 100 x 200 ft., and estimated to cost about $150,000.

In connection with extensions and improvements to the waterworks system, S. F. Hassler, superintendent of the water department, Harrisburg, Pa., will take bids up to Oct. 13 for a new 15,000,000-gal. low-lift, pumping unit to be installed at the filtration plant, with boiler and auxiliary power equipment; and for a 15,000,000-gal. high-lift, centrifugal pumping unit, new power house, boiler and miscellaneous power equipment at the main pumping station.

New England

BOSTON, Oct. 3.

Improvement is noted in the machine-tool business and sentiment appears to have undergone a decided change regarding the outlook. Sales the past week cover a variety of machines and are about equally divided between new and used equipment. Prices at which some new tools sold run well into four figures and in at least one instance higher. The largest new inquiry totals 16 tools, including lathes, shapers, grinders, milling machines and drill presses, and comes from a Rhode Island concern about to engage in the manufacture of an automobile part. The Maine Central Railroad is in the market for a fairly large punch and shear, while a textile machinery interest is inquiring for a special design planer. The Boston Insulated Wire Cable Co. wants a used 30-in. planer and a Lowell company is inquiring for used No. 2 Brown & Sharpe automatic screw machine equipment. A Cleveland representative of an automobile accessory manufacturer is in this market for the purpose of closing on vertical milling, 18 x 24-in. plain milling, thread milling, power hack saw and other equipment, while a Milwaukee concern wants used Brown & Sharpe automatic machines.

Among sales the past week are a 2500-lb. steam hammer and a 28-in. drill to the Boston & Albany Railroad. One large New England electrical equipment maker purchased two jig boring machines, costing more than $10,000, and a number of gages. Stone & Webster have awarded one 40-ton and one 10-ton crane for the Ford Green Island plant to the Cleveland Crane & Engineering Co. The Boston Elevated Railway Co. has taken additional upright drilling equipment and a manufacturer of washing machines has closed on a universal miller, a four-spindle drill and other used machines. One dealer in the past 10 days sold 14 turning tools for piston ring and pin work, in addition to a heavy tapping machine, all used equipment. Another sold a 2-in. screw machine and drill grinder, two large power presses and a Van Norman milling machine. The Boston Navy Yard will receive bids until 10 a. m., Oct. 11, for electric rivet heating equipment.

Manufacturers of bushings, particularly oilless, report increased business. The demand for motors, on the other hand, is limited mostly to the textile field. A large percentage of machine tools being moved to-day are belt driven. This applies to new as well as used tools.

Contract has been awarded for the erection of a workshop, 50 x 90 ft., for Louis W. Kiefer, 191 John Street, Bridgeport, Conn.

Plans are in progress for a one-story welding shop, 53 x 92 ft., for the Auto Welding Co., Lawrence, Mass.

A Massachusetts charter has been granted the Massachusetts Pressed Steel Co., Worcester, capitalized for $50,000, of which Thomas H. Pearsall is president and treasurer.

Potter Brothers, Inc., 341 Main Street, Malden, Mass., will erect a one and two-story garage and service station to cost approximately $50,000.

The Tileston & Hollingsworth Co., 892 River Street, Hdye Park, Boston, paper manufacturer, is erecting an addition to its plant.

The David Brown Bobbin Co., Market and Foster streets, Lawrence, Mass., is building a two-story addition, 40 x 104 ft.

James F. Quest, 176 Huntington Avenue, Boston, is president, and Frederick L. MacDonald, 10 Spruce Street, Waltham, treasurer of the Flostik Co., Waltham, captalized for $50,000, recently granted a Massachusetts charter to manufacture surgical instruments, equipment and novelties.

J. E. Conant & Co., Lowell, Mass., on Oct. 13 will sell at public auction the plant and equipment of the Chapman Mfg. Co., Winchester, Mass., leather machinery. A large list of machine tools is included.

The Atmospheric Heat & Power Co., Biddeford, Me., has been incorporated with a capital of $1,000,000 to manufacture heating and power apparatus, etc. George B. Gordon, Biddeford, is president.

The Edison Electric Illuminating Co., Boston, is arranging to proceed with the enlargement of its electric generating

plant to be ready for service during the coming year. The work will include the installation of a new 30,000-kw. turbo-generator, new boilers and auxiliary operating equipment. Charles L. Edgar is president.

The G. F. Wright Steel & Wire Co., Worcester, Mass., recently organized by George F. Wright, formerly head of the Wright Wire Co., has acquired the former plant of the Standard Plunger Elevator Co., Jamesville, Mass., for the establishment of new works. The buildings will be remodeled.

The Noyes Buick Co., Springfield, Mass., has awarded contract to Edward Radding, 158½ Main Street, for its new one-story automobile service and repair works at Main and Gardner streets, 100 x 185 ft., to cost $100,000.

The Richard French Iron Works, Worcester, Mass., has acquired property at Millbury, Mass., for the erection of its new plant. The first unit will be one-story, 65 x 150 ft. Raymond Tracy is president.

The Verto Products Co., Pawtucket, R. I., has been incorporated with a capital of $200,000 by Warren F. Stanton, William E. White and Darius Goff, 1 Homestead Avenue, to manufacture machinery and parts.

Fire, Sept. 27, destroyed the one-story building at 1566 River Street, Hyde Park, Boston, occupied by the Pluff Mfg. Co., manufacturer of gages, etc., with loss estimated at about $25,000.

The Lash Motor Co., Lincoln Street, New Britain, Conn., is planning for the erection of a three-story service and repair works to cost $50,000.

Fire, Sept. 26, destroyed the plant and machinery of the Calais Cabinet & Veneer Co., Calais, Me., with loss estimated at about $40,000. It will be rebuilt.

The Universal Stamping Machine Co., Pacific Street, Stamford, Conn., has filed plans for a one-story addition, 49 x 50 ft.

The Central Maine Power Co., Augusta, Me., has disposed of a bond issue of $3,000,000, the proceeds to be used for general operations, plant extensions, improvements, etc.

Pittsburgh

PITTSBURGH, Oct. 3.

Machine-tool inquiries the past week have been fewer than in the previous week and sentiment is not as cheerful. The revival of the list of the Union Railroad, a subsidiary of the Steel Corporation, originally issued more than a year ago, is chiefly for ascertaining present prices. This is the third or fourth time the list has been put out and unless quotations now are favorable purchases again will be deferred. Tools for the shops of the Western Penitentiary, Pittsburgh, have not yet been placed, although contract for the buildings recently was awarded. It is probable that the Salmon Creek Lumber Co., Kellettville, Pa., will be in the market shortly for wood-working machinery to replace that destroyed in a fire Sept. 26. The Bessemer Gas Engine Co., Grove City, Pa., has awarded a 10-ton crane to the Cleveland Crane & Engineering Co., Wickliffe, Ohio. Inquiries of the National Radiator Co., Johnstown, Pa., for a crane for its New Castle, Pa., works, and of the National Tube Co. for a couple of cranes for its Christy Park works, McKeesport, are dormant. Bids are being received for two hoists, inquired for by the American Steel & Wire Co. for its Trenton, N. J., works and the Pittsburgh Steel Co. has an inquiry out for a 1½ to 2-ton trolley. The Frank B. Ward Co., Park Building, Pittsburgh, has an inquiry for a 25-ton steam locomotive crane to run on standard gage track, and having a boom of approximately 75-ft.

The United States Lock-Nut Corporation, 400 North Michigan Avenue, Chicago, is considering the erection of a new plant in the vicinity of Pittsburgh, to manufacture special lock-nuts, etc., estimated to cost in excess of $250,000. Mr. Erickson, address noted, is in charge.

The Superb Radiator Co., Youngsville, Pa., has been incorporated with a capital of $50,000, to manufacture radiators and other heating equipment. C. P. Cloak, Youngsville, is treasurer.

The Aluminum Co. of America, Oliver Building, Pittsburgh, has arranged for a bond issue of $18,000,000, the proceeds to be used for general operations, plant extensions, etc.

The Marvel Lamp Co., Pittsburgh, has been incorporated under Delaware laws with a capital of $50,000 by C. V. Brown, H. Nickum and Wallace H. Nickum, Pittsburgh, to manufacture electric lamps and other electrical products. It is represented by the Capital Trust Co., Dover, Del.

The Salmon Creek Lumber Co., Kellettville, Forest County, Pa., is planning to rebuild its saw mill, power house and other buildings, destroyed by fire Sept. 26, with loss estimated at about $100,000, including machinery.

The Standard Specialty Co., Pittsburgh, has been chartered under State laws to manufacture metal products. J. K. Bazukna, 1434 Sheffield Street, is treasurer.

The Air Reduction Co., 120 Broadway, New York, has filed plans for the first unit of its new plant at 1106-16 Ridge Avenue, Northside, Pittsburgh, for the manufacture of commercial oxygen, etc., estimated to cost about $60,000.

The W. L. Singer Ice Co., McKees Rocks, Pa., is having plans prepared for a new one-story ice-manufacturing plant, 50 x 60 ft., estimated to cost about $60,000. A. C. Bishop & Co., 427 Guardian Building, Cleveland, are architects and engineers.

Chicago

CHICAGO, Oct. 3.

The Santa Fe last week placed orders for a 250-ton, one 5-ton and six 15-ton overhead cranes with the Shaw Electric Crane Co. for its new Albuquerque, N. M., shops. This road has also added to its outstanding inquiries as follows: One 36-in. x 36-in. x 8-ft. belt-driven horizontal slab miller (alternate figures on motor-driven machine also asked for); two motor-driven single wet grinders with 20-in. x 2½-in. wheel, Whitney or equivalent; two No. 7 Sturtevant pressure blowers; one 2000-lb. single-frame steam hammer and one jib crane.

No other railroad business is in prospect outside of a few machines recently inquired for by the Rock Island, and demand from industrial companies is light. Dealers report inquiries far more numerous than sales, which probably indicates that prospective buyers are shopping extensively. Actual business booked by local machinery houses in September was disappointing. The month's total sales were generally below those of August and, in a number of cases, were the smallest of the year.

A manufacturer of universal cutter and tool grinders, surface grinders and twist drill grinders has announced a reduction of about 15 per cent on most of its products.

Building permits issued in Chicago for the week ended Sept. 29, as compared with the same week last year, show heavy increases in number, frontage and total values listed. In that week 265 permits were issued, involving 7468 ft. of frontage and a total value of $3,341,800, as against 61 permits, 2439 ft. of frontage and $1,706,900 for the same week a year ago.

The Kaestner & Hecht Co., manufacturer of elevators, 500 Throop Street, Chicago, has commenced the erection of a one-story plant at 1108 Blackhawk Street. Adjoining the new factory are a number of buildings owned by the company, which will be remodeled. Upon completion the Throop Street plant will be abandoned and manufacturing operations will be concentrated at the Blackhawk Street works. Frank D. Chase, Inc., Chicago, is engineer in charge of construction.

The Waterway Paper Products Co. is building a plant at 3201 South Kedzie Avenue, Chicago, to cost $150,000. Frank D. Chase, Inc., 645 North Michigan Avenue, is in charge of the work. The building will contain a machine repair shop.

The Lawrence Heat Distributor Co., 3522 Vincennes Avenue, Chicago, has been incorporated with $3,000 capital stock to manufacture a heat saving device for gas ranges. It has a small plant at the address given. The incorporators are N. H. Cancie, Frank G. Lawrence and L. N. Lindskog.

The Universal Automobile Accessory Co., 7355 Exchange Avenue, Chicago, has been incorporated with $5,000 capital stock to manufacture locks, burglar alarms and other patented devices for automobiles. The incorporators are Charles L. Gerds, Martin G. Hausler, Jr., and William A. Schaar. At present its offices are care of Charles L. Gerds, 6355 Exchange Avenue, but it expects to secure factory space.

The Universal Chain Co., First National Bank Building, Chicago, has been incorporated with $50,000 capital stock by Herman A. Robey, Jesse W. Scott and Dwight W. Coults to manufacture a patented automobile tire chain designed for automatic attachment and release. At present the company is subletting its work, but is investigating the matter of securing its own factory facilities.

The Triangle Appliance Mfg. Co. has been incorporated with $10,000 capital stock by M. H. Silverstein, Roy Silverman and G. Litka to manufacture electric toasters, curling irons, lamps and other electrical devices. It has secured factory space at 160 North Wells Street, Chicago.

The Niagara Radiator & Boiler Co., North Tonawanda, N. Y., has been granted a permit to construct a foundry at East Eighty-third Street and Woodlawn Avenue, Chicago.

W. H. Snow, 4718 Forrestville Avenue, Chicago, has let

contract for a one-story garage, 95 x 200 ft., at 4510-30 North Clark Street, to cost $50,000.

The Miller Plating Co., 1530 Monroe Avenue, Grand Rapids, Mich., has been taken over by the Grand Rapids Metal Products Co. The change means the addition of the manufacture of furniture hardware at this plant to the present business of plating nickel, brass, copper, zinc, silver and gold. J. C. Miller, for 17 years with the Wolverine Brass Co., is president of the new company. A. William Honecker, formerly purchasing agent for the Grand Rapids Brass Co. and the Wilmarth Show Case Co., is secretary-treasurer.

An industrial annex to the Rockford, Ill., high school is rapidly nearing completion. The building contains four floors, the second of which will be a machine shop. School authorities have been negotiating for the purchase of machine tools at Camp Grant. The first floor will contain an automobile repair shop, an electrical shop, and a foundry with cupola. The third floor will be devoted to woodworking and the fourth floor will be equipped with three drafting rooms.

The Public Service Co. of Northern Illinois, 72 West Adams Street, Chicago, will reconstruct as soon as possible the power plant which was destroyed by lightning, Sept. 24, at Barrington, Ill.

The Peoria Sheet Metal Works, Peoria, Ill., has purchased the former Elks' clubhouse at 110 Seventh Avenue and is tearing it down to make room for a new plant to cost $35,000.

J. P. Heath & Co., Waukegan, Ill., manufacturer of architectural iron and bronze products, has awarded contract to the Manufacturers' Terminal Co., Waukegan, for a new two-story foundry and machine shop, 100 x 108 ft., estimated to cost $100,000 including machinery.

The R. Hardesty Mfg. Co., 1833 Market Street, Denver, Colo., manufacturer of metal products, cans, etc., is completing plans for two additions, both one-story, 100 x 160 ft. and 120 x 160 ft. respectively, estimated to cost $90,000, including machinery. C. S. Lambie, Tramway Building, is architect and engineer.

The Western Body Mfg. Co., 763 Third Street, North, Minneapolis, Minn., manufacturer of automobile bodies, is considering the erection of a new three-story and basement factory. Plans will be prepared in the near future. E. F. Gross is president.

The Ekco Engineering Co., 910 West Washington Boulevard, Chicago, has been incorporated with a capital of $200,000 by Benjamin E. Jaffe and Harry Blitzsten to manufacture bakers' tools, ovens and kindred equipment.

Baltimore

BALTIMORE, Oct. 3.

The Barclay Petroleum Corporation, 35 Wall Street, New York, is considering tentative plans for a new oil refinery in the vicinity of Baltimore.

The Avon Specialties Co., Inc., 44-46 Market Place, Baltimore, has been incorporated with a capital of $150,000 by William L. Thaxton, C. A. Creidler and George H. North to manufacture automobile equipment, parts, etc.

The Metaloy Co. of Baltimore, 1728 Mulliken Street, Baltimore, has been chartered under State laws to manufacture metal and metal-alloy products. The incorporators are John L. Brown, William B. Rearick and Louis S. Houghton.

The Maryland Vegetable Oil Co., Fifteenth Street and Eighth Avenue, Canton, Baltimore, manufacturer of refined cottonseed oils, and other oil products, has arranged for an immediate sale of stock to total $780,000. Its plant in this section is nearing completion, and it is said, will represent an investment of $950,000. Machinery and equipment will be installed at once and it is proposed to be ready for operation early in the year. John F. Nissly is president, and C. D. Pruden, vice-president and treasurer.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has arranged for a new bond issue of $9,000,000, the proceeds to be used for general operations, plant expansion and improvements, etc.

The Voluma Corporation, 2826 Huntingdon Avenue, Baltimore, has been incorporated with a capital of $100,000 by Charles J. and L. M. Cook, and Edward H. Wertz to manufacture talking machines, spring motors, parts, etc.

Richard K. Meade, 11 East Fayette Street, Baltimore, chemical engineer, has preliminary plans under way for a new lime plant at the pulp mill of the Bathrust Co., Ltd., Bathrust, New Brunswick, N. S., consisting of two kilns, power house equipment, automatic stokers, etc. A reinforced-concrete coal pocket, with coal-handling and conveying apparatus will be constructed. Bids will be asked at an early date.

The Qualitoy Mfg. Co., Wilmington, Del., has been incorporated under State laws with capital of $50,000 to manufacture toys. It is represented by the Colonial Charter Co., Ford Building, Wilmington.

The Electric Foundry & Engineering Co., Wilmington, Del., has been incorporated under State laws with a capital of $100,000 to manufacture steel and iron castings, machinery and parts. It is represented by the Capital Trust Co. of Delaware, Dover, Del.

The Automatic Safety Car Step Co., Kenney Building, Charlotte, N. C., has secured a building, one-story, 40 x 300 ft. for new works to manufacture metal safety steps. Machinery will be installed at once. The company is headed by John S. and Frederick Blake.

A. L. Flint, general purchasing officer, the Panama Canal, Washington, will take bids up to Oct. 18, for mechanical and other equipment for the Canal Zone, including wire and cable; gasoline engine; aero lighting switches; receptacles; reflectors and other electrical equipment. Office of the assistant purchasing agent is at 24 State Street, New York.

The Luray Ice Co., Luray, Va., is planning for the construction of a new power plant. E. C. Harnsberher is president.

Fire, Sept. 24, destroyed the plant of the Bowie Foundry Co., East Rome, Rome, Ga., with loss reported at about $100,000, including machinery. It will be rebuilt at once.

The Universal Roller Bearing Co., Norfolk, Va., recently organized with a capital of $500,000 is planning for the erection of a factory to manufacture roller and ball bearings. Charles I. Lott, Norfolk, is vice-president in charge.

The Acme Mfg. Association, Wilmington, Del., has been incorporated in Delaware with capital of $2,000,000 to manufacture refrigerating machinery and ice equipment. It is represented by the Capital Trust Co., Dover, Del.

The Virginia Railway & Power Co., Richmond, Va., has completed plans for the immediate erection of a new hydro-electric power plant at Petersburg, Va., to cost about $100,000.

Buffalo

BUFFALO, Oct. 3.

The National Lamp Works of the General Electric Co., Nela Park, Cleveland, is planning for the early occupancy and operation of its new plant on East Ferry Street, Buffalo, now in course of construction. The factory will be three stories and basement, 80 x 320 ft., and with machinery will represent an investment of about $750,000.

The Everice Holding Corporation, Buffalo, has been incorporated with a capital of $500,000 by Maxwell and Edward Karge, Phoenix, N. Y., and William W. Weigel, Buffalo, to manufacture refrigerating machinery, heating equipment, etc. It is represented by Charles J. Deckop, Brisbane Building, Buffalo.

The Berglof Rotary Gas Engine Patents, Inc., Buffalo, has been incorporated with a capital of $50,000 by K. Berglof, and W. C. Vincent, Buffalo, to manufacture gas engines and parts. It is represented by Raymond C. Voght, Morgan Building.

John J. Halt, 552-54 Genesee Street, Buffalo, has plans under way for a one-story machine and repair building for automobile service, 32 x 50 ft.

The Corning Brick, Terra Cotta & Tile Co., Corning, N. Y., will commence the immediate rebuilding of the portion of its plant, recently destroyed by fire with loss in excess of $50,000, including machinery. M. E. Gregory is head.

The Niagara Falls Felt & Paper Co., Niagara Falls, N. Y., soon to break ground on Sugar Street for a new plant to cost about $300,000, will comprise a reorganization of the Kingston Paper Co., Little Falls, N. Y. The latter company name will be discontinued.

Fire, Sept. 29, destroyed power equipment and general machinery at the plant of the Douglas Packing Co., Fairport, with loss, including five buildings, estimated at close to $1,000,000. It specialized in the production of foodstuffs. John Clingen is general manager.

The Niagara Gorge Power Co., Ellicott Square, Buffalo, an affiliated organization of the Niagara Gorge Railway Co., same address, has made application for permission to erect a generating plant to utilize waters from the gorge section of Niagara Falls for the development of 300,000-hp.

The Carthage Sulphite Pulp & Paper Co., Carthage, N. Y., has arranged for a bond issue of $600,000, the proceeds to be used for general operations, extensions, etc.

The Syracuse Oil Burner Co., Syracuse, N. Y., has been incorporated with a capital of $600,000 by F. W. J. McKib-

bin, A. H. Mallory and R. H. Carhart, 623 Oneida Street, to manufacture oil burners and oil-burning, electric and gas appliances.

The Standard Oil Co., Rochester, N. Y., will build a new one-story automobile service and repair works, 51 x 62 ft., at Geneseo, N. Y., for company trucks. Foundation work is under way.

Fire, Sept. 22, destroyed a portion of the plant of the Syracuse Twist Drill Co., 934-38 Grape Street, Syracuse, with loss reported at $10,000.

The Rate Reduction & Service Corporation, Syracuse, has been chartered under State laws by B. E. Taylor, B. E. Galloway and Thomas W. Dixson, Gurney Building, to manufacture fire extinguishers and appliances for fire-fighting.

Indianapolis

INDIANAPOLIS, Oct. 3.

The Coats Steamers, Inc., 511 Bankers' Trust Building, Indianapolis, recently organized under Delaware laws with capital of $5,000,000, is perfecting plans for the erection of its new plant in the vicinity of Terre Haute, Ind., to manufacture steam-driven pleasure automobiles. The company has been conducting production at a plant at Indianapolis, and the initial cars will be placed on the market in a few weeks. The new plant is expected to cost about $200,000, including machinery. George G. Rowland is president, and C. A. Coats, general manager.

The Modern Die & Tool Co., Indianapolis, has been incorporated with a capital of $75,000, to take over and operate the company of similar name with plant at Georgia and Pennsylvania streets. The new organization will be operated in conjunction with the Victor Bearings Co., recently organized by the same officials, with capital of $300,000. William L. Sandage and Roger G. Wolcott head the company.

The Parker Tire & Rubber Co., 264 Allen Avenue, Indianapolis, will hold in abeyance the erection of the second unit of its tire plant, on an adjoining site. Foundation work has been completed and part of the superstructure. The new plant will be two stories, 100 x 600 ft., and is estimated to cost about $300,000, including machinery. Paul P. Parker is president.

The Pendergast Fence Co., Stillwater, Minn., manufacturer of wire fencing, is planning to call for bids early in November for the erection of its new branch factory at Elkhart, Ind., to be one-story and basement, and estimated to cost about $25,000. It also operates a plant at Fort Madison, Iowa. M. R. Pendergast is president.

Machine tools and other mechanical equipment will be installed in the new vocational school to be erected by the Board of Education, Angola, Ind., estimated to cost about $125,000. A. H. Elwood & Sons, Haynes Building, Elkhart, Ind., are architects.

The Board of Education, Fort Wayne, Ind., is completing plans and will soon take bids for new vocational shops at the Central High School. The structure, to house a gymnasium as well, will be two stories and basement, and estimated to cost about $200,000. Charles R. Weatherhogg, 405 Citizens' Trust Building, is architect.

Ohio

The past week has brought out more inquiry for single machines in the Cleveland market and the outlook is more promising. Dealers' September sales were about equal to those in August. Standard used tools are in fair demand, but the call for machinery is largely from existing small plants or for equipment for small machine shops. There are signs of some demand from the Akron rubber plants for equipment used in making products other than tires, and one inquiry is for six special profiling machines. Up to the present time practically no machinery has been placed this year by Akron tire manufacturers.

The equipment of the Smolensh Mfg. Co., 2108 Superior Avenue, Cleveland, has been purchased by the Hess-Schenk Co., machinery dealers, and will be sold either as a whole or in single machines. It includes about 40 machine tools.

Toledo, Ohio, has asked for bids for a waterworks pumping station which will require a 10-ton, three-motor crane with a 33-ft. 11-in. span.

The demand for small hand-operated cranes and chain hoists has improved.

In Cincinnati, September with most manufacturers will show a slight improvement in orders booked compared with July and August. Machinery dealers also report business as improving, but the fact that a number of buyers are prolonging their vacations is holding up some prospective purchases. The tone of the inquiries is distinctly better and several manufacturers are contemplating installing new equipment to more efficiently turn out their products. While inquiries are mostly for single machines a few are calling for from two to six tools. It is reported that the Big Four Railroad, which recently purchased a number of tools for its Beech Grove shops, will shortly issue a list for various other shops. The list recently issued by the General Motors Corporation for Dayton plants will not be acted upon at present. A safe and lock company recently bought a $20,000 machine from a manufacturer in this section and a dealer reports an order for three tools from a maker in the northern part of the State. It is stated that the city of Tokio, Japan, will purchase fire fighting equipment in this country, the chief of the department now being in the United States on an inspection trip. An encouraging feature to the machine-tool trade is the number of men returning to work in various railroad shops. Most of these men had been idle since last winter, but are coming back gradually.

The Missouri Chain Co., Moberly, Mo., will establish its plant in Cleveland and has secured quarters at 1293 East Ninth Street. It will shortly begin the manufacture of automobile chain. Harry Whiteside is manager.

The plants of the International Metal Hose Co., Buckeye Forging Co. and Ames Bag Machine Co., occupying a factory at 10206 Harvard Avenue, Cleveland, were badly damaged by fire a few days ago.

The American Mine & Door Co., Canton, Ohio, contemplates the erection of a new plant to cost about $100,000.

The Vapo Stove Co., recently organized in Lima, Ohio, has decided to locate its plant in that city and will occupy a building formerly used by the Lima Sheet Metal Products Co., which is moving into new quarters. Fred H. Ash, previously connected with the A. & B. Stove Co., Battle Creek, Mich., is manager.

The Schory & Schellhase Coal & Ice Co., Canton, Ohio, will erect a new ice-manufacturing plant with a daily capacity of 65 tons. Contract for the equipment has been placed with the Arctic Ice Machine Co., Canton.

The Bryan Pattern & Machine Co., Bryan, Ohio, which will shortly begin to manufacture pistons for automobile engines, will purchase a number of single purpose machines for making this new product.

Detroit

DETROIT, Oct. 3.

The Kess-Line Motors, M. C. Kessler, president, has obtained possession of the former Detroit plant of the Liberty Motors Car Co. and will manufacture the Kess-Line 8-cylinder automobile.

The Motor Wheel Corporation, Lansing, Mich., has announced its expansion plans for the immediate future. The oldest of the Prudden Wheel Co. buildings will be demolished to make room for a new rim unit and office space. The present hub shops of the Prudden and Auto wheel plants will be consolidated into one shop of increased capacity, for which considerable machinery has been ordered.

The Allegan Casket Co., Allegan, Mich., organized recently by William E. Schmitz, has purchased a site and will build a factory, 100 x 110 ft., U-shaped, each wing 30 ft. wide. Work on the foundation will be started within a few days.

Hickler Brothers & Co., Sault Ste. Marie, Mich., have let contract for a one-story building, 50 x 150 ft., to repair and rebuild automobile and marine gas engines and regrind cylinders, pistons and crankshafts.

The newly organized Rickenbacher Motor Co., Detroit, has obtained possession of the Michigan Avenue plant of the Detroit Pressed Steel Co., formerly occupied by the Disteel Wheel Corporation division of the latter company. It consists of 27½ acres, with a one-story building, with 12½ acres of floor space, and a foundation for a building with 250,000 sq. ft. of floor space. The property was originally used by the Government for shell manufacture. The Rickenbacher company expects to get into production by January, with a schedule of 200 cars a day.

The Auto Accessories Mfg. Co., Detroit, has been organized with a capital of $25,000 to manufacture automobile and air plane accessories and parts, machinery, etc. It is headed by Svend Raasted, 1637 Seneca Avenue, Detroit. Associated with him are John B. and John B. Corliss, Jr., 68 West Canfield Avenue, Detroit.

The Michigan Engineering & Mfg. Co., Bay City, Mich., has been organized by Zenas E. Colby, John E. Olsen, Harry A. Wescott and George R. Lawton, Bay City, with a capital of $20,000. It will manufacture machinery and parts and do a general factory construction business.

The Detroit Starter Co., Inc., has been incorporated by Clement F. Krueger, 2644 West Grand Boulevard, Detroit;

Kenneth Greenleaf and Frank C. Sibley, Detroit, to manufacture automobile units, parts and accessories. It is capitalized at $25,000.

The Britton Motor Axle Co. has been organized in Saginaw by William M. Britton, formerly chief engineer Republic Motor Truck Co., Alma. It is capitalized with $500,000 preferred and 30,000 shares no par value common stock.

Officials of the Atlas Drop Forge Co., Lansing, are contemplating an addition to their plant.

The Wales Co., Kalamazoo, has been organized with a capital of 100,000 shares no par value common stock and $10,000 in preferred stock to manufacture the Wales gas heater.

The Cameron Motors Corporation, Greenville, is planning to erect a foundry, 80 x 150 ft.

Campbell, Wyant & Cameron, Muskegon, are completing the first of eight units of a foundry to manufacture automobile castings. Each unit will have a daily production of 250 tons.

The City Engineering Department, Lansing, Mich., will take bids early in October for its new municipal hydroelectric generating plant, estimated to cost $1,600,000. Woodwell & Resler, 501 Fifth Avenue, New York, are architects and engineers. J. A. Parsons is city clerk.

George E. Paul, receiver for the Jackson Stove & Stamping Co., Jackson, Mich., is arranging for the early sale of property of the company, including machinery, tools, dies, etc. The plant is designed to manufacture oil cook stoves, oil heating stoves, ovens, etc.

The Automotive Utilities Corporation, Detroit, has been incorporated with a capital of $25,000 by Arthur R. Thomas, Ralph H. and Thomas T. Hollinger, 408 Detroit Savings Bank Building, to manufacture automobile equipment and parts.

The H. M. Reynolds Shingle Co., 640 Chestnut Street, Grand Rapids, Mich., has commenced excavations for its new three-story and basement plant, 60 x 350 ft., estimated to cost about $100,000. It will replace the works recently destroyed by fire and will be provided with new equipment to manufacture roofing products.

The Haynes Wire Wheel Works, Inc., Jackson, Mich., will commence the immediate erection of a one-story shop addition, 80 x 190 ft., estimated to cost about $25,000. Stanley Porter is manager.

The Laboratory Apparatus Co., Ann Arbor, Mich., has been incorporated with a capital of $25,000 by Frank Schaefer, Burt F. Schumacher and Fred T. Stowe, Ann Arbor, to manufacture laboratory equipment, precision apparatus, etc.

A power house, machine shop and other buildings will be constructed by Ruggles & Rademaker, 381 River Street, Manistee, Mich., in connection with their proposed new salt plant, now being erected and estimated to cost about $1,000,000, including machinery. F. W. Perkins, company address, is architect and engineer.

Milwaukee

MILWAUKEE, Oct. 3.

The general situation in the local metal-working industry appears fundamentally more hopeful. One outstanding feature is that established concerns are figuring more definitely on plant improvements and extensions, while new capital is entering the industry, on at least a small scale, after a lack of interest for a long time. New plant construction now in progress and definitely projected is more prominent than at any time this year. The reflection of this improvement on the machine-tool trade as yet is negligible, but it is confidently believed it will become clearer from now on. September sales were slightly in excess of August, although in the previous month the volume was probably the lowest of the year. The slow development of railroad buying is the most disappointing feature of the situation.

The Waukesha Steel Products Co., Waukesha, Wis., which represents the reincorporation of Henry Bryant & Co., Inc., 85 Oneida Street, Milwaukee, dealer in iron and steel products and waste materials, scrap metals, etc., intends to engage in the manufacture of pipe, railings, barn columns, posts, post braces and similar steel products for the agricultural trade. At the head of the concern is Henry Bryant of Waukesha, who founded the original company and served as its president until the change was made. It is the intention to establish a plant in Waukesha, to which city the general offices have been transferred. Details, however, have not been arranged.

The equipment for which the Department of Public Works, City Hall, Milwaukee, is asking sealed bids for the new Riverside pumping station, now under construction at the foot of Chambers Street, includes one 25,000,000-gal. and two 22,000,000-gal. vertical triple expansion, crank and flywheel type of engines, with auxiliaries, to be ready for operation within 18 months after the work has started. Bids close Oct. 24. Bidders are required to furnish a bond of $210,000 or certified check for $105,000. Percy Braman is commissioner of public works.

The Board of Education, Merrill, Wis., is taking sealed bids until Oct. 12 for the construction of a new high school and grammar school, designed by Parkinson & Dockendorff, architects, LaCrosse, Wis., and estimated to cost $250,000. The high school will contain a manual training department. Harry R. Allen is secretary of the board.

The Standard Sheet Metal Works, 1184 Twenty-fourth Street, Milwaukee, has awarded contract for a new shop, 32 x 120 ft., at Thirtieth and Townsend streets, to cost about $20,000, including equipment. John Madis is president and general manager.

The John G. Wollaeger Co., 417-421 Wells Street, Milwaukee, distributor of Peerless and Studebaker automobiles, has purchased a site at Grand Avenue and Twenty-eighth Street, and engaged Max Fernekes, architect, 97 Wisconsin Street, to design a four-story garage and service building, 90 x 120 ft., estimated to cost $120,000 complete. Work will start about Nov. 1.

The Bergstrom Paper Co., Neenah, Wis., will build a two-story addition, 40 x 80 ft., to its machine and millwright shop, at a cost of $25,000, including a small list of equipment.

The Biever Casting Co., Slinger, formerly Schlesingerville, Wis., has been incorporated with a capital stock of $10,000 to take over and operate a gray iron foundry which has been idle for several months. The principals are Joseph and Edmund Biever and Frank Burke.

The Knox Refrigeration Co., Milwaukee, has filed articles of incorporation with capital stock of $400,000 to engage in refrigeration engineering, manufacture of refrigerating systems, etc. The incorporators are J. F. Knox, George E. Page and Alfred O. Wilmot, 606 Forty-eighth Street, Milwaukee.

Peter Pirsch & Co., Kenosha, Wis., manufacturers of fire apparatus, motor-propelled and horsedrawn, has let the general contract to George Lindemann & Co., local contractors, for a $50,000 shop addition, which will require a small list of equipment. Charles O. Augustine, Kenosha, is architect.

The Luick Ice Cream Co., Ogden Avenue and Jackson Street, Milwaukee, has engaged Brust & Philipp, architects, 506 Free Press Building, to design a new ice cream factory and cold storage building, using the present plant as a nucleus. It will cost about $100,000, including new engines, boilers, refrigerating machinery, etc. William F. Luick is president.

The Aluminum Flux Co., Rhinelander, Wis., has been incorporated with a capital stock of $15,000 to manufacture metal specialties, solder, fluxes, etc. The incorporators are William Bolus, F. H. Piehl and F. E. Wood.

The V. Krefi Co., Eagle River, Wis., will start work Oct. 10 on a one-story brick and concrete machine shop, 60 x 75 ft., for manufacturing automotive equipment. It formerly was located at Two Rivers, Wis., and has been reincorporated with $75,000 capital.

The Brewer Mfg. Co., Manitowoc, Wis., manufacturer of piano benches, optical office supplies, cabinets, etc., has purchased a new site and will build a factory and power plant, 60 x 120 ft., to cost about $40,000.

Seattle

SEATTLE, Sept. 27.

The Ellis-Myiroie Lumber Co., Seattle, is planning to immediately rebuild its wood-working plant, recently destroyed by fire with loss estimated at $125,000, including machinery.

The Columbia Tire Co., 1401 Northwest Bank Building, Portland, Ore., will soon call for bids for a new two-story, reinforced-concrete plant. It will have a frontage of 350 ft., with four wings, each 90 ft. long, and is estimated to cost about $100,000. R. A. Wurzburg heads the company.

The Standard Stoneware Co., Chester, Wash., is planning the erection of a new factory to manufacture sanitary stoneware products, estimated to cost in excess of $75,000, including machinery. Paul Seidel is president.

The Oergon Pulp & Paper Co., Salem, Ore., has plans under way for a new hydroelectric power plant on North Mill creek, with initial capacity of about 1000-hp. It is estimated to cost about $100,000, including machinery.

The Tillamook County Box & Mfg. Co., Tillamook, Ore., recently organized, has plans under way for the erection of a new plant at Twin Rocks, Ore., estimated to cost $50,000. Frank Readon and I. A. Dubois head the company.

The Northwestern Electric Co., Portland, Ore., has ar-

ranged an appropriation of $5,000,000 for extensions and improvements in plants and system. It is proposed to expend about $1,250,000 a year.

The Koster Products Co., Vancouver, Wash., manufacturer of furniture, is planning for the erection of works on a 100-acre site in the vicinity of the Standifer Shipyards. It is estimated to cost in excess of $500,000 and will give employment to about 2500.

The Rainier Mfg. Co., Rainier, Wash., recently organized as a co-operative company, capitalized at $1,000,000, to manufacture sash, doors, etc., has broken ground for the first unit of its new six-unit plant, estimated to cost in excess of $500,000.

California

LOS ANGELES Sept. 27.

The Winton Engine Works, 2116 West 106th Street, Cleveland, Ohio, is said to be planning the erection of new works at Wilmington, Los Angeles, to manufacture Diesel engines and parts. It will comprise a foundry, machine shop, assembling works, pattern shop, etc. J. H. Kain, Los Angeles, is local representative.

The Barnhart Aircraft Co., Inc., Pasadena, Cal., has been incorporated with a capital of $1,000,000 by G. E. Barnhart, C. R. Little and M. S. Elton, all of Pasadena, to manufacture airplanes and parts.

The Los Angeles Gas & Electric Corporation, Los Angeles, has arranged for a bond issue of $1,500,000, the proceeds to be used for general operations, extensions and improvements.

The Sierra Clay Products Co., Sparks, Nev., H. O. Lague, president, has acquired property in the Truckee River canyon, near Vista, Cal., for the erection of a new plant to manufacture brick, tile, etc. It is estimated to cost in excess of $75,000.

Henry Rosenfeld, 130 Montgomery Street, San Francisco, has awarded a contract to Macdonald & Kahn for two one-story brick machine shops on North Pine Street estimated to cost about $30,000.

The Occidental Furniture Mfg. Co., 1062 Folsom Street, San Francisco, is planning to rebuild the portion of its plant destroyed by fire, Sept. 17, with loss estimated at about $75,000, including equipment.

The California-Mexican Oil & Refining Co., Los Angeles, is planning the erection of a new refinery at Long Beach, Cal., estimated to cost close to $500,000, including machinery. Vernon Dumas is one of the heads of the company.

The Imperial Ice & Development Co., El Centro, Cal., will soon commence the erection of a new ice-manufacturing and refrigerating plant, estimated to cost about $250,000 with machinery.

G. M. Roy, San Jose, Cal., is organizing a company with $4,000,000 capital stock to build a plant to manufacture patent washers for locking nuts to bolts, the invention of B. F. Hildebrand, San Jose, who will be an official of the new organization. It is said that the initial plant will cost in excess of $150,000.

The Gulf States

BIRMINGHAM, Oct. 3.

The Chicago, Rock Island & Pacific Railroad Co., La Salle Street Station, Chicago, has awarded contract to the Joseph E. Nelson Co., 3240 South Michigan Avenue, for a new engine house and repair shops at Amarillo, Tex. Construction will be placed under way at once.

Fire, Sept. 19, destroyed a portion of the car shops of the Missouri, Kansas & Texas Railroad Co., North Wichita Falls, Tex., including machine shops and equipment, woodworking mill and other structures with loss of about $75,000. Headquarters are in the Railway Exchange Building, St. Louis.

The Key West Electric Co., Key West, Fla., has awarded contract to Stone & Webster, Inc., 147 Milk Street, Boston, Mass., for extensions and improvements in its generating plant, estimated to cost about $150,000. B. L. Grooms is general manager.

J. T. and J. H. Jones, 2401 Travis Street, Dallas, Tex., have completed plans for a two-story automobile service building, 100 x 100 ft., to include machine and repair shop, estimated to cost about $75,000. Construction will commence at once.

The Magnolia Petroleum Co., Dallas, Tex., is planning for extensions and improvements in its oil plant at Groesbeck, Tex., estimated to cost about $750,000, including equipment.

Fire, Sept. 17, destroyed a portion of the plant of the Texas Oil Refining Co., Wichita Falls, Tex., with loss estimated at about $30,000.

The Planters, & Merchants' Mill Co., New Braunfels, Tex., is planning for the immediate erection of a new hydroelectric power plant, estimated to cost close to $90,000.

The Louisiana Celotex Co., New Orleans, has tentative plans under way for additional units at its new plant for the manufacture of insulating board products from waste sugar cane stalks. The present works, recently placed in operation, represent an investment of about $500,000, including power house, mechanical dryer building, etc., and additional units are expected to cost close to a like amount. J. H. Shaw is vice-president and general manager.

The Royal Palm Ice & Refrigerating Co., Miami, Fla., recently organized with a capital of $125,000, is completing plans for a new ice-manufacturing and refrigerating plant, 100 x 130 ft. J. C. Pereno is president.

The Patton Cement Plaster Co., Rotan, Tex., recently incorporated with a capital of $350,000, has plans under way for the construction of a new factory, estimated to cost in excess of $100,000, with machinery. J. W. Patton is president, and E. W. Maben, secretary and treasurer.

The Central South

ST. LOUIS, Oct. 3.

The demand for machine tools in this market is exceedingly light. Manufacturers of piston rings are busy, but have no machine-tool requirements for the present.

The Eagle Motor Truck Co., 6156 Barmer Avenue, St. Louis, has just completed an addition to its factory.

The Missouri, Kansas & Texas Railroad Co., Railway Exchange Building, St. Louis, has completed plans and is taking bids for a new one-story machine shop, 30 x 50 ft., at its repair works at Houston, Tex. It is reported to be planning to rebuild its forge shop and other structures at Parsons, Kan., destroyed by fire, Sept. 17, with loss estimated at about $160,000, including equipment.

F. R. Lawson, Nowata, Okla., and associates are having plans prepared for a two-story ice-manufacturing plant at Coffeyville, Kan., estimated to cost about $100,000.

The Vetter Machine Shop, Inc., Jefferson City, Mo., has been chartered under State laws to operate a general machine construction and repair works. Henry J. Vetter, 212 East Main Street, heads the company.

The Unit Motor Co., 115 West Thirteenth Street, Kansas City, Mo., manufacturer of automobile equipment and parts, is planning for the installation of additional machinery at its factory. The company recently increased its capital from $2,000,000 to $5,000,000 for expansion.

The Michael's Art Bronze Co., 230 Scott Street, Covington, Ky., has awarded contract to George Scheper, 52 John Street, for a four-story addition to its plant, 45 x 65 ft., estimated to cost about $45,000. Construction will commence at once. F. I. Michael is head.

The Lost River Cave Co., Bowling Green, Ky., recently organized, is planning the erection of a new hydroelectric power plant in this vicinity. Construction will start at an early date. Henry L. Underwood is president, and James K. Barr, treasurer and manager.

The Henryetta Glass & Mfg. Co., Henryetta, Okla., will break ground at once for its new plant to manufacture globes, auto lens and kindred products. A list of equipment has been arranged, to include molds, spraying machines, mechanical fans, air compressor, blow pipes, with gas engine and other power equipment. H. L. Chambers is secretary and treasurer.

W. J. Barnhill & Son, Madisonville, Ky., will install a complete machine and repair shop in the new two-story automobile service building, 65 x 160 ft. Bids will be asked at an early date. John T. Waller, Hopkinsville, Ky., is architect.

The Bridges Wheel Corporation, Texarkana, Ark., recently organized with a capital of $100,000, is arranging for the establishment of a plant to manufacture wheels for steam and electric railroads. A. J. Kizer, Texarkana, is president.

The Union Electric Light & Power Co., Twelfth and Locust streets, St. Louis, is planning for additions and improvements in its electric generating plants and system to cost about $1,000,000.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅝ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.75c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex.	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	4.10c.
No. 16	4.25c.
Nos. 18 and 20	4.40c.
Nos. 22 and 24	4.55c.
No. 26	4.70c.
No. 27	4.85c.
No. 28	5.00c.
No. 30	5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—55	—40	¾ in. Butt	—30	—13
¾ in. Butt	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt	—62	—49	2 in. Lap	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap	—55	—41	7-12 in. Lap	—23	— 7
9-12 in. Lap	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High brass sheet	15¼c. to 18¼c.
High brass wire	16¼c. to 20¾c.
Brass rod	13¼c. to 19¾c.
Brass tube, brazed	26½c. to 30½c.
Brass tube, seamless	18 c. to 19½c.
Copper tube, seamless	19½c. to 21¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 22½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.80	$6.55
		90 lb.	6.90	6.65
		100 lb.	7.00	6.75
IC	$10.75	$9.25	IC	7.15	6.90
IX	12.00	10.75	IX	8.15	7.90
IXX	13.75	12.25	IXX	9.15	8.90
IXXX	15.50	14.00	IXXX	10.15	9.90
IXXXX	17.00	15.75	IXXXX	11.15	10.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits, pig	29c.
Bar	36c. to 40c.

Copper

Lake ingot	15½c.
Electrolytic	15¼c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	20c.
No. 1 solder	18c.
Refined solder	15½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 29c. to 31c.

Old Metals

The market continues strong with an upward tendency. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.25
Copper, heavy and wire	9.25
Copper, light and bottoms	7.75
Brass, heavy	4.75
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	4.00
Lead, tea	2.50
Zinc	2.25

THE IRON AGE

New York, October 13, 1921

ESTABLISHED 1855 VOL. 108: No. 15

Improved Core Output from Smaller Space

By Providing Improved Working Conditions for Girl Core-Makers, Better Product and a Higher Type of Employee Have Been Secured

BY moving the core room from the north end of the plant to the extreme south end, and building an addition for girl workers, the capacity of the General Electric Co. foundry at Pittsfield, Mass., was recently increased from 50 to 60 tons daily. The original core room, immediately in the rear of two large continuous melting Whiting cupolas, has been converted into a machine molding department. Added benefits derived from this rearrangement are the minimizing of losses in temperature and a reduction in the time necessary in handling molten metal.

Approximately 13,000 sq. ft. floor space was devoted formerly to core making. The new girl core-making department involved 2530 sq. ft. additional plant floor space, but by the rearrangement of the general core-making layout the total space now devoted to core-making, including the new addition, is reduced to 9880 sq. ft., or more than 3000 sq. ft. less than before. The relation of added core-making floor space to increased output capacity, therefore, is all the more striking, and at once suggests, as is the case, improved manufacturing practise based on new production principles and modern equipment.

This plant is given over largely to the manufacture of transformer iron castings, necessitating accurate and high grade core work. Previously, cores were largely made by male help. An elaborate system of rails on which drying cars ran to and from the ovens occupied much valuable space, and necessitated larger handling and other core charges than desired. In planning the new core department, the number of women employees was increased, while the number of male core makers was diminished. And the question of Americanization as related to the problem took a new angle, due to the character of the foundry employees.

Effect of Comfort on Efficiency

Previous core-room standards, as related to working surroundings, are practically ignored in the construction of the new department. The utmost consideration has been given details looking to the comfort of girl employees, and its bearing on efficiency. The investment represented in this plant addition and its equipment, amounting to between $40,000 and $50,000, bears out this statement. Here, exceptional construction and arrangement features are to be found. Quality of work, volume of output, and elimination of core breakage are largely founded on the concentration of the girl's mind on what she is doing, by eliminating excess operations, on sanitation and on privacy.

The new department consists of the core room, and locker, wash and rest quarters. It adjoins the larger core room, four exits, 5½ ft. wide by 7 ft. high, con-



Tile Walls, Convenient Work Benches, Everything at Hand and No Outside Disturbances All Contribute to the Efficiency with Which This Core Room Force Functions. At extreme right, a corner of the metal containers for core sand may be seen, with two outlets near the floor

necting the old and the new rooms. These exits have quick-acting roll-type metal doors. The new core room is 72 x 28 ft. and finished in white. The walls are of glazed white tile, extending 6 ft. from the floor, and of smooth brick, painted with cream white enamel, from the top of the tiling to the roof. The roof and steel trusses are finished in cream white enamel. The flooring is of dark gray cement, which does not show stains, and is tapered to drains.

Dust proof corners are provided everywhere, and the tiled walls are washed down and the floors flushed off every night. Water connections are available at regular intervals along the outside wall of the room, which serve girls working at benches as well as the night cleaners. All working equipment in this room is raised several inches from the floor, to facilitate cleaning operations. The place is heated by steam, thus is quickly dried after being washed in fall and winter months. There are two large skylights, with generous ventilators, on the roof. These skylights and numerous large windows insure an abundance of light and fresh air. Artificial light is furnished by large candlepower drop lights inclosed in attractive glass shades.

Privacy a Large Factor

Girls enter and leave their core room by a private stairway located between their locker, wash and rest quarters and the large core room. Their doorway is 700 ft. away from the nearest point where male employees enter and leave the plant, and has quick access to a highway outside the jurisdiction of the company. The girls have their own time clock, located where they naturally pass to and from the stairway and the locker and wash quarters.

Bench accommodation is provided for thirty-two girls, who are under the supervision of a forewoman. The benches are made of hard wood with metal coverings and have cylindrical metal supports. Each girl is provided with a jolt machine, air operated, of the large shockless type, fitted into the bench so that, when not in operation, its top serves as part of the table, a compressed air system for cleaning core boxes and tables, and a heavy metal core stand, designed with a substantial base, to insure against tipping over and allowing finished work to drop to the floor. On one end of each bench is an auxiliary table containing a metal pail for holding cutting fluids.

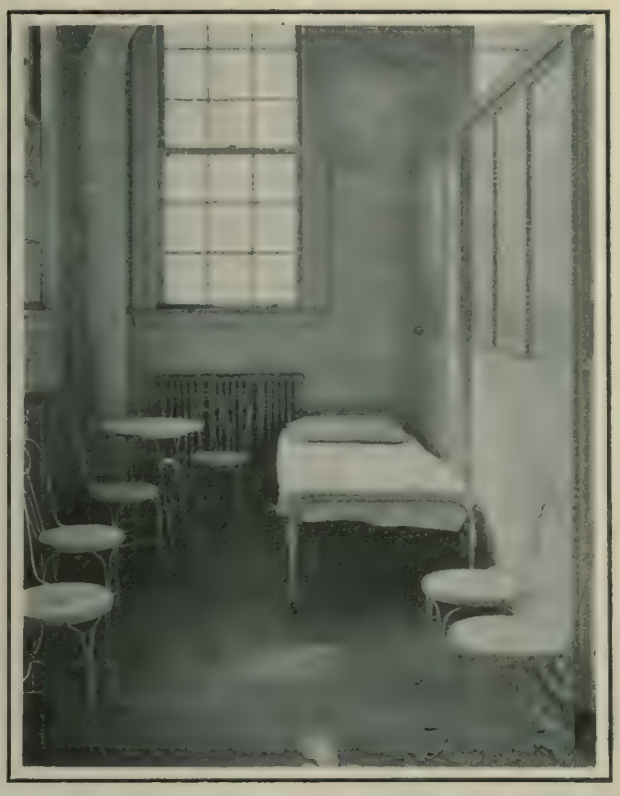
Because of the character of the core work required, great care is used in the selection and treatment of sands. These are mechanically mixed by machines two stories below, and conveyed to the core making floors by bucket and chain hoists. For the new core room, the sand is delivered by metal chutes from the hoists to two containers 9 ft. long, 4 ft. deep and 6 ft. high. These containers are covered by glazed tile and located between exits to the large core room, and within easy access of girls working at the benches. They are divided into two equal sections for the different mixtures of sand. The outlets, on a level with the flooring, have protective metal pieces which prevent sand from running out on the floor.

For holding nails and brads, two series of bins, constructed of heavy wood and supported by iron legs, are stationed between two exits, within easy reach of the girls. Practically all core box equipment is of aluminum and made in multiples, hence the operator has a complete plate of cores with which to work. The weight of the core boxes, sand and drying plates governs the number of cores made in one plate. Core rods are shaped by men in the large core room, and then delivered to the girls. It therefore is apparent that each girl is furnished with everything needed for her work, either at or in close proximity to her bench. Time required to obtain sand and nails is minimized, and there is no other excuse for her leaving the bench to complete her work.



Section of the Main Core Room, with One of the Doorways at Left (White) Leading into the Women's Core Room. In front of the door is a core rack on the electric truck which carries the racks to and from the ovens





In the Women's Rest Room Are a Regular Hospital Bed and Plenty of Chairs. Each girl has her own white sanitary locker, and the washing facilities are attractive

Core racks, 4 ft. 3 in. wide, 5 ft. 6 in. high and 5 ft. 6 in. long, with adjustable shelves, are run from the large into the new core room and stationed in spaces between benches. These racks are picked up, set down and transferred by Baker R. & L. Co., (Cleveland) type C electric trucks, operated by one man. Stations in the new core room are in direct line with exits, consequently a truck does not have to twist or turn while placing racks between benches, and little time is thus consumed in the operation. After a girl rams up her core box, she lifts it from the stand and places it on the drying rack, this operation necessitating but one or two steps.

Cores Not Handled Between Making and Using

From the core room, the racks are run into ovens having a capacity for two racks. There are six of these ovens and one draw type on the end of the battery, all oil fired and well insulated, each having a recording thermometer. After the cores are dried, the racks are delivered to the storage department by the electric trucks, where each remains until all cores it carries have been used by the molders. In this practice the cores remain in the same position, from the time they are placed on the racks by the girls in the core room until they are lifted from the racks by the molders. Excess handling therefore is eliminated, and breakage reduced to practically nothing.

All girl core makers are on a piece work basis. The only other help used in connection with the new core department is the man who operates the electric trucks, and the two men employed at the sand mixing machines. As their time is devoted equally with mixing sands for the large core room, costs involved here are very small. In addition, piece work charges for shaping core rods by men must be figured into the operations. Increased production and the better quality of the work turned out have more than compensated the General Electric Co. for the investment, however.

The locker, wash and rest room, which is 24 x 28 ft., leads out of the core room. It is finished in glazed tile throughout and has a dark colored cement floor tapering to drains. A large skylight, with the same style of ventilation as in the core room, is provided, and there is plenty of natural and artificial light, which, with washing down every night, keeps the quarters clean and refreshing. In the locker and wash room there are two toilets and a battery of wash stands with hot and cold water, everything being of porcelain and having nickeled fixtures. Two mirrors are provided, and each girl has her own white sanitary locker.

Partitioned off from the wash and locker quarters is the rest room, which contains a regular hospital bed, chairs, tables, wash stand and an electric heater to allow the girls to prepare something hot for their lunch. Here the same color scheme is carried out as elsewhere. The company furnishes a victrola and a certain number of dance records, which are kept in the core room and used only during noon hours. A large number of the girls employed in the new core room are taking a lively interest in the various company classes, with a view to bettering themselves educationally.

The management has proved to itself, and to girl workers, that the core room of a foundry can be made one of the most satisfactory departments of such a plant, from the standpoint of both employer and employee. Since this core room first was placed in operation, the personal character of the individual girl employed there has steadily improved, due to a higher and still higher class of workers being attracted by working conditions and surroundings, and to the influence of surroundings and conditions in molding the social standing of the individual, especially those born in foreign lands or of foreign parentage. Naturally, the standard of cores produced progressively improves, as the character and educational qualifications of the individual girl worker improve.

A meeting on engineering financing is to be held at the Engineering Societies Building, New York, on the evening of Oct. 19. It will be a joint meeting participated in by the New York sections of the mechanical, electrical, civil and mining and metallurgical engineering societies.

The Hyatt Roller Bearing Co., New York, has obtained the contract for furnishing Hyatt roller bearings on the mill tables required for the new mills at the International Nickel Co. and the Mansfield Sheet & Tin Plate Co.

Two Principles in Hot Drawing

In his paper before the Iron and Steel Institute, on the subject of Hot Drawing on the Mandril, Eugène Schneider brought out forcibly two principles relating to practise in that work. Extracts follow:

Under like conditions of temperature, and with dies whose surfaces of contact are in the same state, the resistance to displacement increases as the angle of contact decreases.

In other words, for a given pass, the greater the angle of contact, or the smaller the connecting radius, the less becomes the power necessary for drawing. If the angle of contact θ is very small (Fig. 1) the value of cot $\frac{\theta}{2}$ is very great, consequently the friction increases, and, due to the normal reaction, the metal tends to wedge instead of to be displaced.

If, on the contrary, assuming always the same reduction of section, the angle of contact θ is very great (Fig. 2), cot $\frac{\theta}{2}$ decreases and the friction becomes negligible. The power necessary then becomes in the neighborhood of the minimum. The section of the metal to be displaced works at this moment under shear, and the effort of drawing can create tears on this section.

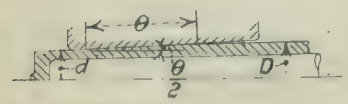


Fig. 1.

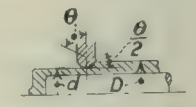


Fig. 2.

From this it appears that it is advantageous to employ dies of small connecting radius. However, to avoid tearing the metal, which would result from a very short cone, it is necessary to find a normal section, and experience has enabled us to determine this. The angle of attack $\frac{\theta}{2}$, which seems to be the limit of the opening of the cone, is about 15 deg. For a larger inclination there is the risk of tearing the metal to be displaced.

For a diminution of thickness of sides $\frac{D-d}{2}$, *the die which permits working under the best conditions is that where the connecting radius is equal to about seven and a half times the diminution of the thickness of sides.*

This condition of efficiency of the die does not always occur in practise, especially where different passes must frequently be made on very different blanks. The following table gives the ideal values of the connecting radius r in relation to the pass of drawing:

Reduction of Thickness of Walls $\frac{D-d}{2}$		$r = 7.5 \frac{D-d}{2}$	
Mm.	In.	Mm.	In.
2	0.08	15	0.59
4	0.16	30	1.18
6	0.24	45	1.77
8	0.32	60	2.36
10	0.39	75	2.95
12	0.47	90	3.54
14	0.55	105	4.13
16	0.63	120	4.72
18	0.71	135	5.32
20	0.79	150	5.91

The relation of engineering and management is to be discussed by Walter Rautenstrauch of the J. G. White Management Corporation, New York, at a meeting of the Bridgeport section of the American Society of Mechanical Engineers at the Stratfield Hotel, Bridgeport, Conn., on Oct. 20.

The Maine Central Railroad Co. has placed a $500,000 equipment order with the Laconia Car Co., Laconia, N. H. The plants at Laconia will reopen at once and will be run on full time for several months.

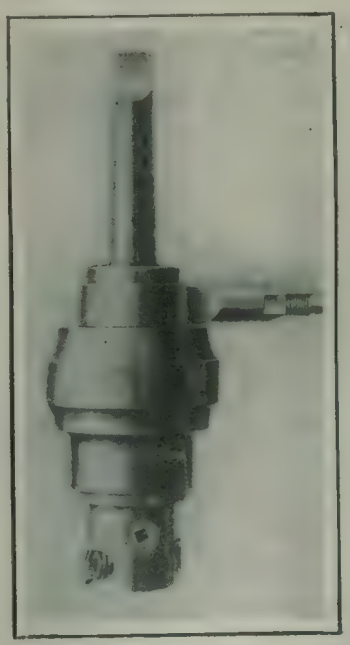
Exports of Metal Working Machinery

WASHINGTON, Oct. 10.—Exports of metal working machinery during August, 1921, were valued at $931,563, according to the Bureau of Foreign and Domestic Commerce. The value of exports of lathes was $51,569; of sharpening and grinding machines, $61,711; of other machine tools, $209,630, leaving a remainder of $608,653 for the other types. Brazil was the largest buyer of lathes, shipments to the value of $9,081 having been made to this country. England ranks second in this commodity, with purchases amounting to $8,712, and Colombia third, taking $5,983.

Canada led as to sharpening and grinding machines, the value of exports to that country being $22,844; France was second, $7,550, and Japan third, $6,346. Under the classification of "other machine tools," among the leading countries of exportation were British India, $40,358; France, $32,119; Brazil, $22,244, and Canada, $21,233. Under the classification of all other, France took more than one-half of the entire total, exports to that country being valued at $325,734. British India came next, the exports to that country being valued at $76,325, and then followed England with $37,399; Japan, $36,787; Canada, $23,987, and Hongkong, $20,130.

Friction Tapping Device

A friction tapping device, known as the Jarvis, style FD, said to be capable of tapping holes in the toughest metal, with minimum breakage of taps, has been placed


The Dotted Lines Indicate Size of Friction Cone

on the market by the Geometric Tool Co., New Haven, Conn.

The outstanding feature is the cone friction drive, controlled by directing greater or less pressure on the spindle that runs the device. The dotted lines in the illustration indicate the size of the friction cone. Little pressure is needed to drive the tool and the chuck, which is of standard design, yields easily. Starting and stopping the tap while rotating is under free control. It is made in one size only, with a tapping range from 0 to ¼ in.

The Harrisburg Bar Mill Co., Harrisburg, Pa., has been chartered under State laws to operate a plant on North Sixth Street, near the city limits, for the manufacture of iron and steel bars, etc. J. K. White, formerly general sales manager of the Harrisburg Pipe & Pipe Bending Co., is president, and A. L. Ensinger, also previously connected with the same company, is secretary.

Figuring the Charges for Foundry Irons

Iron Mixtures and How to Figure Them Chemically—Classification of Castings and Suggested Analyses

BY Y. A. DYER*

IF the chemical analysis of a pig iron shows that it contains 92.60 units of iron, 3.85 units of carbon, 2.00 units of silicon, 0.05 unit of sulphur, 0.50 unit of phosphorus, and 1.00 unit of manganese, then it is equivalent to stating that 100 pounds of such an iron contains:

92.60 lb. iron	92.60 per cent
3.85 lb. carbon	3.85 per cent
2.00 lb. silicon	2.00 per cent
0.05 lb. sulphur	0.05 per cent
0.50 lb. phosphorus	0.50 per cent
1.00 lb. manganese	1.00 per cent
100.00 lb.	100.00 per cent

Therefore, in figuring mixtures of metal these points should be borne in mind from the fact that the elemental units in iron are figured on the percentage basis. Thus, if a 3,000-lb. charge of metal consists of pig iron 1,200 lb., scrap 1,200 lb. and steel 600 lb., then the charge percentages will be:

$$\frac{1200 \times 100}{3000} = 40.00 \text{ per cent pig iron,}$$

$$\frac{1200 \times 100}{3000} = 40.00 \text{ per cent scrap iron,}$$

$$\frac{600 \times 100}{3000} = 20.00 \text{ per cent steel scrap.}$$

100.00 per cent total charge.

As the iron units are not taken into consideration in figuring analyses, only the carbon, silicon, sulphur, phosphorus and manganese are figured. The carbon is usually omitted, from the fact that any losses which may occur during remelt will be adjusted by absorption of carbon from the coke bed. The factors which tend to reduce the total carbon in a mixture are low tuyeres and the use of comparatively large quantities of low-carbon material—preferably steel scrap. Suppose the following mixture of metals be used:

	Si	S	P	Mn
40 per cent pig	2.00	0.05	0.50	1.00
40 per cent scrap	1.80	0.08	0.70	0.60
20 per cent steel	0.20	0.06	0.06	0.60
100 per cent				

Then the following element units, per 100 lb. of metal, will compose the average mixture:

$$\frac{2.00 \times 40}{100} = 0.80$$

$$\frac{1.80 \times 40}{100} = 0.72$$

$$\frac{0.20 \times 20}{100} = 0.04$$

1.56 units of silicon

$$\frac{0.50 \times 40}{100} = 0.20$$

$$\frac{0.70 \times 40}{100} = 0.28$$

$$\frac{0.06 \times 20}{100} = 0.012$$

0.492 unit of phosphorus

$$\frac{0.05 \times 40}{100} = 0.02$$

$$\frac{0.08 \times 40}{100} = 0.032$$

$$\frac{0.06 \times 20}{100} = 0.012$$

0.064 unit of sulphur

$$\frac{1.00 \times 40}{100} = 0.40$$

$$\frac{0.60 \times 40}{100} = 0.24$$

$$\frac{0.60 \times 20}{100} = 0.12$$

0.76 unit of manganese

Figuring Mixtures

Two essential points to be borne in mind in figuring and making mixtures are the analysis desired or necessary for a certain kind of casting, and the purchase by analysis of the proper kind of pig iron to be used as a base or controlling metal in the mixture.

To illustrate the process of figuring a mixture, suppose a pipe foundry desires metal of the following analysis: Silicon 2.25 per cent, sulphur 0.08 per cent, phosphorus 0.85 per cent, and manganese 0.65 per cent. Because of partial oxidation in the cupola, the mixture will require average silicon $(2.25 + 0.10) = 2.35$ per cent and average manganese $(0.65 + 0.10) = 0.75$ per cent. Thus, in a 4,000-lb. metal charge there will be needed:

$$\frac{2.35 \times 4000}{100} = 94.00 \text{ lb. silicon}$$

$$\frac{0.08 \times 4000}{100} = 3.20 \text{ lb. sulphur}$$

$$\frac{0.85 \times 4000}{100} = 34.00 \text{ lb. phosphorus}$$

$$\frac{0.75 \times 4000}{100} = 30.00 \text{ lb. manganese}$$

Then, assume that the pipe shop has the following materials on hand with which to make the mixture, and it is desired to use 25 per cent scrap and 40 per cent "4" foundry iron—what other grade of iron (silicon analysis) will be required to balance the mixture?

	Si	S	P	Mn
Foundry scrap	2.25	0.08	0.85	0.65
"4" foundry iron	1.75	0.06	0.85	0.60

Figuring the silicon content, the charges would be apportioned as follows:

Materials	Per Cent	Charge, Lb.	Silicon, Per Cent			Silicon, Lb.
Foundry scrap	25	1000	× 2.25	÷ 100	=	22.50
"4" foundry iron	40	1600	× 1.75	÷ 100	=	28.00
Needed iron	35	1400	× x	÷ 100	=	43.50
	100	4000				94.00

$$x = \frac{43.50 \times 100}{1400} = 3.10 \text{ per cent silicon iron needed}$$

Other elements, sulphur, phosphorus and manganese, are figured on the same basis; deficiencies or excesses in elements being cared for by the use of desirable pig irons or alloys, as explained in the following examples:

Suppose the shop should not have available the necessary "2" soft iron, silicon 3.10 per cent, but had on hand the "4" foundry iron, silicon 1.75 per cent, and the melter desired to purchase a high silicon or silvery iron to use with 25 per cent scrap and 60 per cent "4" foundry iron—what percentage of silicon will be necessary to balance the mixture? The assumed charge (designated as "X iron") will be figured as follows:

Materials	Per Cent	Charge, Lb.	Silicon, Per Cent			Silicon, Lb.
Pig, Si. 1.75	60	2400	× 1.75	÷ 100	=	42.00
Foundry scrap	25	1000	× 2.25	÷ 100	=	22.50
X iron	15	600	× x	÷ 100	=	29.50
	100	4000				94.00

$$x = \frac{29.50 \times 100}{600} = 4.92 \text{ per cent silicon iron needed}$$

Therefore, it will require a 600-lb. charge of iron with silicon 4.92 per cent to balance the silicon in the pipe mixture and care for the oxidation loss. Otherwise, 73.6 per cent (2935 lb.) of "4" foundry iron; 25 per cent (1000 lb.) foundry scrap, and 1.4 per cent (65 lb.) of 50 per cent ferrosilicon would answer the purpose.

If a foundry has on hand scrap iron containing 1.80 per cent silicon, 0.70 per cent phosphorus, and 0.70 per

*Birmingham, Ala.

cent manganese, and the melter desires to make castings with silicon 2.00 per cent, phosphorus 0.60 per cent, and manganese 0.80 per cent, with the use of 40 per cent scrap—what pig iron analysis will be necessary to balance the mixture? The mixture will require an average silicon content of $(2.00 + 0.20) = 2.20$ per cent; manganese $(0.80 + 0.16) = 0.96$ per cent, and phosphorus 0.60 per cent. Assume 2000-lb. charges are to be used—then there will be required $\left(\frac{2.20 \times 2000}{100}\right)$ = 44 lb. silicon; $\left(\frac{0.60 \times 2000}{100}\right) = 12$ lb. phosphorus, and $\left(\frac{0.96 \times 2000}{100}\right) = 19.20$ lb. manganese. The mixture is computed as follows:

Materials	Per Cent	Charge, Lb.	Silicon, Per Cent				Silicon, Lb.
Scrap	40	800	× 1.80	÷	100	=	14.40
X iron	60	1200	× x	÷	100	=	29.60
	100	2000					44.00

$$x = \frac{29.60 \times 100}{1200} = 2.47 \text{ per cent silicon iron needed}$$

Materials	Per Cent	Charge, Lb.	Phosphorus, Per Cent				Phosphorus, Lb.
Scrap	40	800	× 0.70	÷	100	=	5.60
X iron	60	1200	× x	÷	100	=	6.40
	100	2000					12.00

$$x = \frac{6.40 \times 100}{1200} = 0.53 \text{ per cent phosphorus iron needed}$$

Materials	Per Cent	Charge, Lb.	Manganese, Per Cent				Manganese, Lb.
Scrap	40	800	× 0.70	÷	100	=	5.60
X iron	60	1200	× x	÷	100	=	13.60
	100	2000					19.20

$$x = \frac{13.60 \times 100}{1200} = 1.13 \text{ per cent manganese iron needed}$$

Therefore, it will require 1200 lb. for charge of an iron containing silicon 2.47 per cent, phosphorus 0.53 per cent and manganese 1.13 per cent, to balance the mixture and meet the required specifications.

Probably a more simple method for some foundrymen to figure mixtures would be on the basis of unit percentage of each element in the metal used, instead of total pounds of elements—which would be computed as follows for the mixture given above: 800 lb. of scrap iron to a total mixture of 2000 lb. is $(800 \div 2000) = 0.40$ per cent, and 1200 lb. of "X iron" to total mixture is $(1200 \div 2000) = 0.60$ per cent—hence unit percentages of metal mixture are stated as follows:

	Per Cent	Si	P	Mn
Scrap iron	0.40	1.80	0.70	0.70
X iron	0.60	2.47	0.53	1.13

Analysis of casting from above mixture will be computed as follows:

	Silicon	Phosphorus	Manganese
Scrap iron	$(1.80 \times 0.40) = 0.72$	$(0.70 \times 0.40) = 0.28$	$(0.70 \times 0.40) = 0.28$
X iron	$(2.47 \times 0.60) = 1.48$	$(0.53 \times 0.60) = 0.32$	$(1.13 \times 0.60) = 0.68$
	2.20	0.60	0.96
Losses and gains	0.20	0.00	0.16
Metal analysis..	2.00	0.60	0.80

Both computing methods produce the same net results; the matter of choice lies with the foundryman to adopt the method which is simplest to his "turn of mind." Computation by both methods will serve as a check on the mixture, and prevent errors.

Varying mixtures may be melted in a cupola during a single heat period by the exercise of certain precautions. To avoid the possible mixing of the separate charges in the hearth of the cupola, it is advisable to separate iron charges by using blank coke charge of about 4 in. in depth. Such practice will hold the upper charge off until the excess coke burns to the melting zone, thus permitting the tapping of the metal in the meantime. By knowing the rate at which the cupola "drives" or works its charges through the melting zone, and timing the operations accordingly, the problem may be solved accurately. The rate at which coke is consumed per minute per square foot of cupola area will solve the problem of burning away the blank coke charge.

Classification of Castings

The range of analyses for different castings is necessarily more or less varying; for that reason, in the following list of suggested analyses for various castings, the medium weight work will be considered the base. Heavier castings will admit of higher sulphur, higher manganese, lower silicon, lower combined and total carbon—hence steel scrap, low silicon scrap or low silicon pig iron may be used more freely in such mixtures. Lighter castings, as a rule, require lower sulphur, medium manganese, higher silicon, higher graphitic carbon to promote fluidity and minimize brittleness. The phosphorus in all cases should be kept as low as possible, consistent with fluidity and other necessary factors of safety. Steel scrap in quantities may be used to advantage, as it will materially lower total carbon, phosphorus and silicon and add some manganese. The author would strongly suggest steel mixtures where strength, toughness, homogeneity and smoothness are essential factors.

In addition to the analyses of special castings, the characteristics of which were explained in detail Sept. 8, under gray iron and chilled iron, the following general classification is given alphabetically as a convenient reference:

	Si	S	P	Mn	Total Carbon
Agricultural machinery:					
Heavy	2.00	0.09	0.60	0.80	3.35
Medium ...	2.30	0.07	0.65	0.70	3.45
Light	2.60	0.06	0.75	0.60	3.55
Very light.	2.80	0.05	0.85	0.50	3.60
Acid resisting castings:*					
Anvil blocks:*					
Armor (chilled):*					
Automobile castings:*					
Base plates:					
Heavy	1.30	0.10	0.50	0.70	3.15
Medium ...	1.80	0.08	0.60	0.60	3.35
Light	2.25	0.06	0.70	0.50	3.45
Balls—grinding and polishing:*					
Boiler castings—fronts, doors, headers:					
Heavy	2.00	0.08	0.50	0.75	3.40
Medium ...	2.25	0.06	0.60	0.50	3.45
Brake shoes:*					
Carwheels:*					
Columns: (Same as base plates.)					
Chilled castings:*					
Crusher jaws:*					
Cylinders—air and ammonia:					
Heavy	1.25	0.08	0.30	0.80	3.15
Medium ...	1.65	0.06	0.40	0.70	3.25
Light	2.00	0.05	0.50	0.60	3.40
Cylinders—steam and water:					
Heavy	1.25	0.08	0.30	1.00	3.15
Medium ...	1.50	0.06	0.40	0.80	3.25
Light	2.25	0.05	0.50	0.60	3.45
Dies:*					
Dynamo castings—frames and spiders:					
Heavy	2.00	0.06	0.60	0.60	3.40
Light	2.50	0.06	0.60	0.60	3.50
Electrical castings—magneto parts and armature cores:					
Medium ...	2.75	0.05	0.50	0.50	3.50
Light	3.00	0.05	0.60	0.50	3.60
Engine frames:					
Heavy	1.80	0.09	0.50	1.00	3.35
Medium ...	2.25	0.07	0.60	0.60	3.45
Enamelware, bathtubs, sinks:					
Heavy	2.25	0.08	0.80	0.50	3.45
Light	2.50	0.06	0.80	0.50	3.50
Flywheels:					
Heavy	1.25	0.09	0.40	0.75	3.15
Medium ...	1.75	0.06	0.50	0.65	3.25
Light	2.25	0.05	0.60	0.50	3.40
Friction clutches:					
Medium ...	2.25	0.10	0.60	0.75	3.45
Light	2.50	0.08	0.70	0.50	3.50
Gears and pinions:					
Heavy	1.75	0.09	0.50	1.00	3.30
Medium ...	2.25	0.08	0.60	0.70	3.45
Light	2.50	0.06	0.70	0.60	3.50
Grate bars:	1.50–2.25	0.05–0.08	0.30–0.50	0.50–0.60	3.40

*See THE IRON AGE, Sept. 8, pages 585-8.

	Si	S	P	Mn	Total Carbon
Gun iron:*					
Hollow-ware:	2.25–2.50	0.06–0.08	0.60–0.80	0.50–0.60	3.50
Heat resistant—grates, furnaces, etc.:					
Heavy	1.75	0.08	0.30	0.90	3.30
Medium ...	2.00	0.06	0.40	0.70	3.40
Light	2.25	0.06	0.50	0.60	3.45
Ingot molds:*					
Machinery castings—general:					
Heavy	1.50	0.10	0.50	1.00	3.20
Medium ...	2.00	0.08	0.60	0.70	3.40
Light	2.50	0.06	0.70	0.60	3.50
Molds—permanent:	1.50	0.08–0.10	0.40–0.50	0.75	3.25
Molds—glass:	2.50	0.05	0.25	0.60	3.35
Municipal castings—manholes, meter boxes, etc.:	1.75–2.00	0.08–0.10	0.60	0.50	3.35
Ornamental castings—and white-ware:					
Medium ...	2.25	0.08	0.80	0.70	3.45
Light	2.50	0.06	1.00	0.60	3.50
Thin	2.75	0.05	1.25	0.50	3.55
Pipe and fittings—soil:	1.80–2.25	0.08–0.12	0.80–0.90	0.40–0.50	3.40
Piano plates:	2.15	0.05	0.45	0.75	3.35
Plow points:*					
Pipe—water and gas:					
Heavy	1.75	0.09	0.80	0.70	3.30
Medium ...	2.25	0.06	0.85	0.60	3.45
Plow points:*					
Piston rings:*					
Pistons:*					
Projectiles:*					
Pulleys:					
Heavy	1.80	0.08	0.50	0.70	3.30
Medium ...	2.00	0.06	0.60	0.60	3.40
Light	2.50	0.05	0.75	0.50	3.50
Propeller blades:*					
Rolls—chilled:*					
Railroad castings:					
Heavy	1.50	0.09	0.60	0.60	3.20
Light	2.00	0.07	0.70	0.50	3.40
Sewing machine castings:	2.75–3.00	0.06–0.08	0.70	0.55	3.50
Stove plate:					
Medium ...	2.25	0.08	0.80	0.60	3.45
Light	2.50	0.06	0.90	0.50	3.50
Typewriter castings: (Same as sewing machine.)					
Valves:					
Heavy	1.50	0.08	0.35	1.00	3.20
Medium ...	1.75	0.07	0.40	0.80	3.30
Light	2.25	0.06	0.50	0.70	3.45
Welding rods:*					
White iron—sash weights, etc:	0.50–0.75	0.15–0.20	0.80	0.20–0.30	2.80–3.00

*See THE IRON AGE, Sept. 8, pages 585-8.

Care of the Eyes in Industry

Eye accidents are revealed as a chief source of avoidable national waste in a report of the Committee on Elimination of Waste in Industry of the American Engineering Council, following an investigation in many States, started by Herbert Hoover.

The total number of industrial blind in the United States is put at 15,000, or 13.5 per cent of the total blind population. The eye is involved in 10.6 per cent of all permanently disabling accidents.

Present protective methods applied in large plants have greatly reduced the number of injuries. The use of goggles is one of the chief protective devices. At the American Car & Foundry Co.'s plants there has been a reduction of more than 75 per cent through the use of goggles and the percentage of reduction would be much higher if the men would wear goggles more conscientiously. Experience has proved the falsity of the theory that the wearing of goggles by industrial workers only jeopardizes sight the more, on account of the liability of injury to the eyes from the broken glass of the goggles.

Not an injury to the eyes from broken glass has been recorded since goggles were introduced into the shops of the New York Central Railroad. All employees of the Union Pacific Railroad Co. are now required to wear goggles on eye-dangerous work.

The Bethlehem Steel Co. management is very rigid in demanding that protection be complete, supplying goggles according to a code.

Striking reduction in eye accidents is shown by the American Locomotive Co. The number of accidents requiring medical attention in the company's plants was 52 in 1915, while during 1910-13 it was 448. In 1915 only two eyes were lost, while during 1910-13 the loss was 10.5. The number of injuries per 1000 full-time men per year was 15.7 in 1915, while in the 1910-13 period it was 38.9. In the American Steel Foundries the number of eye accidents has been reduced 85 per cent.

That correction of sub-standard vision produces an increase in return that will pay for its cost is the conclusion of the management in plants where several years of trial has provided a basis for judgment.

Excess eye fatigue results in conditions which must produce a time labor loss from reduction in quantity and quality production. Sub-standard vision was found to be of great frequency. An examination of more than 10,000 employees in factories and commercial houses found 53 per cent with uncorrected faulty vision. Of 675 employees in a typewriter company, 58 per cent were found to be in need of correction by glasses. Of the rejections in the army, 21.7 per cent were because of eye trouble.

One estimate placed the production loss due to faulty conditions in this country as above the entire cost of illumination. In 446 plants investigated only 8.7 per cent were found to be in excellent condition, the other ratings being: Good, 32 per cent; fair, 29.1 per cent; poor, 18.8 per cent; very poor, 3.5 per cent; partly good, partly poor, 7.8 per cent.

Improved lighting systems have increased output 2 per cent in steel plants and as much as 10 per cent in shoe factories where work is more exacting. The cost for providing adequate illumination for the entire industry of the country would amount to 0.5 per cent to 1 per cent of wages. The cost per capita of correcting vision, instituting and carrying out measures of protection against hazards and bringing the lighting up to good standards, is definitely greater in the small plant than in those employing 2000 workers or more—and the small plants are in the large majority.

These smaller plants are therefore less ready to take up any of these measures unless the early returns of a dividend can be clearly shown. Reports of more study, the example of the earlier ones to take the steps, must be brought before them constantly so that efforts to check preventable loss along these lines may become more nearly universal.

The committee is composed of J. Parke Channing, chairman; L. W. Wallace, vice-chairman; L. P. Alford, George D. Babcock, William R. Basset, F. G. Coburn, Morris L. Cooke, Harrington Emerson, Ira N. Hollis, Edward Eyre Hunt, C. E. Knoeppel, Robert Linton, Fred J. Miller, H. V. R. Scheel, Sanford E. Thompson, John H. Williams and Robert B. Wolf. Headquarters are at 29 West Thirty-ninth Street, New York.

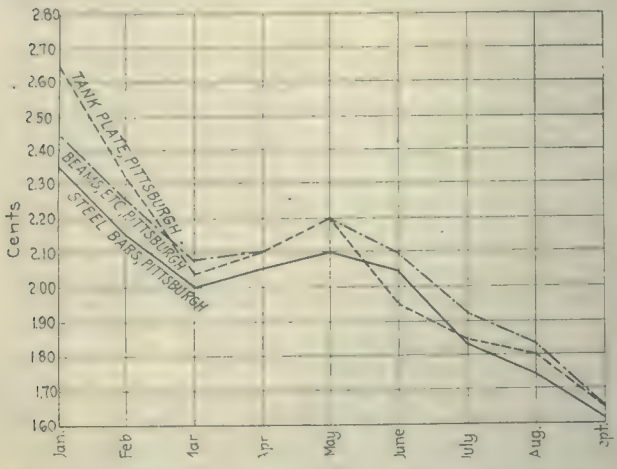
Makers of Electric Steel Castings Meet

The operating officials of several companies specializing in the manufacture of small electric steel castings recently held a four-day meeting at Wernersville, Pa. These companies for more than a year have been closely co-operating along technical lines through R. A. Bull, their research director, whose time is exclusively given to the operating problems of these companies. The foundries co-operating in the work are those owned by the Electric Steel Co., Chicago; the Fort Pitt Steel Casting Co., McKeesport, Pa.; the Lebanon Steel Foundry, Lebanon, Pa.; Michigan Steel Casting Co., Detroit, and the Sivyer Steel Casting Co., Milwaukee. Frequent meetings of the representatives of these companies are held. At the Wernersville meeting uniform inspection standards, which the group had voluntarily put in force, were revised as the result of a year's experience in their application. Those present at the meeting report entire satisfaction on the part of all with the results of the first year's co-operative work in attacking the problems which face steel foundrymen.

TREND OF PRICES

Decline About $10 Per Ton Since Jan. 1—Upward Turn of Some Products Recently

In the third quarter of this year, pig iron and steel prices have dropped to the lowest points since 1915-1916 and within the same period some commodities, including pig iron, sheets and wire, have shown the first decided upward turn since the price decline began in the fall of 1920.



This Chart Illustrates the Decline in Principal Steel Products During the Nine Months of 1921 Ending Sept. 30

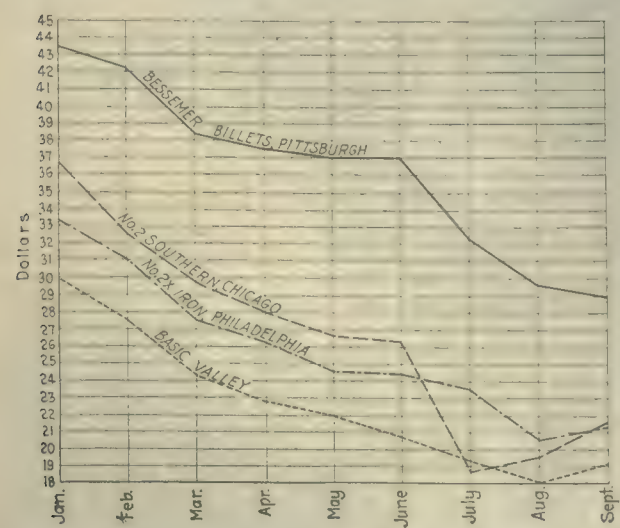
Although pig iron prices have shown an upward tendency in nearly all markets within the past few months, the net decline on all grades averages more than $10 a ton since the first of the year. No. 2 X iron, delivered at Philadelphia, declined from $33.34, its January average, to $21.22, its September average, a drop of $12.12. No. 2 foundry, delivered at Cincinnati, declined from its January average of $36.75 to a September average of $23.50, a net drop of $13.25. No. 2 foundry at Chicago declined $9.75 per ton, basic iron in the Valley dropped from $30 to a September average of $19.12, or $10.88 and Bessemer iron at Pittsburgh declined $12, from $33.96 in January to $21.96 in September.

The decline in steel prices in the third quarter was greater than during the first half. For example, the January average for steel bars was 2.35c., Pittsburgh, and the June average, 2.05c., a drop of $6 a net ton. From the end of June to the first of October, there was a drop of about $9 a net ton. Steel plates have dropped $21 a ton and structural shapes $17 a ton.

Accompanying charts and monthly averages of principal products, compiled from THE IRON AGE quotations, illustrate the steady decline which has taken place within the nine months' period.

Prices of Leading Products for Nine Months of 1921

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.
No. 2X pig iron, Philadelphia	$33.34	$31.09	$27.59	$26.26	$25.71	$25.50	$23.55	$20.64	$21.22
No. 2 Southern, Cincinnati	36.75	32.65	29.80	28.00	26.70	26.37	24.75	23.50	23.50
No. 2 Chicago	31.50	29.00	25.60	24.00	22.80	20.75	18.87	19.55	21.75
Basic, Valley furnace	30.00	27.50	24.25	22.88	22.00	20.75	19.37	18.00	19.12
Bessemer iron, Pittsburgh	33.96	31.46	28.16	26.96	25.96	24.71	22.83	21.96	21.96
Bessemer billets, Pittsburgh	43.50	42.25	38.40	37.50	37.00	37.00	32.25	29.75	29.00
Wire rods, Pittsburgh	57.00	54.50	52.00	49.00	48.00	48.00	42.75	42.00	39.50
Steel bars, Pittsburgh	2.35c.	2.15c.	2.00c.	2.05c.	2.10c.	2.05c.	1.83c.	1.75c.	1.62c.
Tank plates, Pittsburgh	2.65c.	2.33c.	2.04c.	2.10c.	2.20c.	1.95c.	1.85c.	1.80c.	1.64c.
Beams, etc., Pittsburgh	2.45c.	2.26c.	2.08c.	2.10c.	2.20c.	2.10c.	1.92c.	1.83c.	1.64c.
Wire nails, Pittsburgh (per 100-lb. keg)	$3.25	$3.21	$3.02	$3.13	$3.05	$3.00	$2.81	$2.75	$2.86



The Course of Prices During the First Nine Months of the Year on Bessemer Billets and Pig Iron Is Shown in This Chart

Recent British Developments in Stainless Iron

The extent to which stainless steel has revolutionized the Sheffield cutlery trade is well known, but it is not so generally appreciated, the *London Times Trade Supplement* points out, that stainless iron is of equal importance. Both materials, says the *Times*, were discovered seven or eight years ago. Stainless steel was first manufactured, and soon after it was found that stainless iron could be produced by much the same process, with the exception that a smaller quantity of carbon-free ferrochrome was required.

Stainless iron has been largely used for the production of golf clubs; it has attracted the attention of makers of stove grates and is being used for kitchen ranges, grates, and fenders. An important and useful direction in which the material has been applied is in the fitting of motor cars; it is supplied in sheets for making hoods, and there is in contemplation its greater use for bodies, and since it does not tarnish, for replacing nickel-plated parts. It is made up into a wide variety of kitchen utensils and is used for shop signs and door plates. One British firm is producing the material in wire form, to be made up into door mats, and it is also being used for spring mattresses.

Another important development in contemplation is the use of stainless iron for the furnishing of railway carriages, engines, and rolling stock generally. The proposal is that it should replace brass for door handles, brackets, and many other fittings.

Stockholders of the Commercial Shearing & Stamping Co., Youngstown, Ohio, have authorized an increase in the capital stock from $350,000 common to $1,500,000, consisting of $400,000 preferred and $750,000 common. Proceeds will be devoted to enlarging the company's plant and will also be used as working capital. A plant addition to cost between $125,000 and $150,000, exclusive of equipment, is to be built and is to be completed by spring. Of the increased capital, only the preferred will be marketed at this time. Robert Carnick is president of the company.

The B. Greening Wire Co., Hamilton, Ont., commenced Monday, September 26, to operate its plant at full time, whereas previously only three days a week had been worked by the 350 employees of the company. Increased orders made the full time shift possible, and the company expects to keep going at full time from now on, although there is no assurance that this can be done.

Crane Operating Costs at Blast Furnaces

Locomotive and Ore Bridge Cranes Shown to Save Much Money, Compared with Hand Methods Formerly in Vogue—Analyses of Costs

BY GEORGE L. COLLORD*

TWO of our three blast furnaces at Sharpsville, Pa., are equipped with Brownhoist equipment, consisting of all the machinery necessary for filling the blast furnaces and handling the finished pig iron. Practically all the machinery was manufactured and installed by the Brown Hoisting Machinery Co., and the system has proved itself a great labor saving device.

Consisting primarily of a Brownhoist ore bridge equipped with a 5-ton grab bucket, the span covered is 170 ft. 9 in., and the bridge is arranged to travel back and forth on a stretch of track 890 ft. long. When the yard which this bridge covers is filled to capacity, it has a cross sectional area of 6480 sq. ft. This is equivalent to a capacity of 432 tons per lineal foot; and since the yard is 890 ft. long, the total capacity is 384,480 tons.

Railroad cars come in along one side of this yard on an elevated trestle, from which they dump ore, coke and limestone into bins beneath. One track runs over the ore and limestone bins and another over the coke bins. A third track is overhung above the storage pile, and is used for delivering ore and limestone into the stock pile, from which it can be handled by the grab bucket on the bridge.

If the bins become empty, and there are no full cars available for filling them, the grab bucket picks up a load, travels across the bridge and deposits it in the bin. While the bridge is able to dump into any one of the bins, it is usually inadvisable to move so large a mass as this bridge any great distance, so a transfer car of 30 tons capacity runs back and forth along the track above the bins, thus saving the bridge a great deal of travel.

Running on tracks below the bins are two electrically operated larry cars of 75 cu. ft. capacity. Each car is designed with a universal joint to engage with mechanism for opening the bin gate, after which the gate is operated by a motor on the larry car. The larry hoppers are set, by the official in charge, to receive a certain weight of ore, coke and limestone. After receiving this load, the larry runs to a point opposite one of the furnaces, and dumps into a skip car of 110 cu. ft. capacity. This car is hoisted by a 100-hp. engine, and upon reaching the blast furnace top its load is discharged into the receiving hopper.

The entire equipment cost around $300,000, when it was installed, in 1909. Since it is in good condition after twelve years' operation, we are certainly safe in estimating its minimum life at fifteen years.

Repairs to bins are not heavy, considering the amount of material handled and passed through. This does not exceed $2,500 a year. The hoisting apparatus and three larry cars (including one spare) require $1,000 worth of repairs a year per furnace. Repairs and maintenance on the bridge do not exceed $2,500 a year. Including repairs to minor equipment, this makes the total annual repair cost about $8,500.



Though This Ore Bridge Is in Operation Only 50 Per Cent of the Time, It Has Been Estimated That It Saves More Than $73,000 Per Year, as Compared with the Cost Under the Previous Method of Handling the Same Material Manually

The principal motors which consume large quantities of power are the 200-hp. bucket hoisting motor, which runs approximately 50 per cent of the time; and the 50-hp. motor which drives the cab back and forth across the bridge, and which operates approximately one-third of the time. The bridge proper operates only 12 hr. out of the 24, but the other equipment operates 24 hr.

Each larry car has a 15-hp. motor, which is running about 18 hr. out of the 24. The skip hoists require 100 hp. and operate about 9 hr. a day. The total annual power consumption is approximately 587,650 kw. hr., which, at 1c. per kw. hr., makes $5,876.50 a year. Our power rate is low, because of the fact that we use blast furnace gas for generating.

The bridge requires one operator, who works 12 hr. a day at 50c. an hr., and an oiler at 40c. an hr.

*General manager of operation, Shenango Furnace Co., Oliver Building, Pittsburgh.

Each larry car requires an operator, and as there are two turns per 24 hr., this means a total of four operators at 50c. an hr. Four men are also required to run the skip hoists. The transfer car is not used a great deal, so the charge for labor and power does not exceed $1,500 per year.

Our total annual labor costs are $18,834. The total cost for maintenance and repair is $8,500 a year. Adding average yearly interest, taxes and insurance, brings the total annual operating cost to $73,410.50.

One furnace averages 550 tons per day, the other 400 tons per day, making a total of 346,750 tons per year. This makes the cost per ton 21.17 cents. This figure is low compared with the cost when this work was done by hand.

With the hand system the materials were dumped from a trestle and loaded into buggies by hand. Each man ran his loaded buggy over a scale and then up into an elevator to a platform at the top of the furnace, where the load was dumped by hand. This old method required a number of men, who are expensive, hard to handle and sometimes difficult to get.

We formerly employed 21 stock men per turn on each furnace. Since there are two furnaces and two turns every 24 hours, this meant 84 men for the two furnaces now fed and manipulated by machinery. At 40c. an hr., which is the present scale, this is a labor item of $147,168 per year.

Deducting the annual cost of operating the Brownhoist bridge, bins and scale cars, gives us a net annual saving of $73,757.50, or a net saving of 21.27c. per ton of pig iron produced. Therefore this system has cut our cost to practically one-half of what it formerly was.

The mechanical equipment has the additional advantage of operating so much more rapidly that it increases production, and one furnace which used to produce 300 tons per day when fed by hand, now produces 550 tons per day. Naturally, other factors have influenced this increase, but the fact remains that our two furnaces now produce as much as the three hand operated furnaces formerly produced.

Annual Cost of Operation—Ore Bridge, Bins and Scale Cars

Depreciation, $300,000 (over 15 yr.)		$20,000.00
Average yearly interest at 7 per cent, $\frac{16}{15} \times \frac{\$300{,}000 \times 0.07}{2}$		11,200.00
Repairs and maintenance, estimated		8,500.00
Power: Bridge motors, larry cars, transfer car and skip hoists, total 587,650 kw. hr. at 1c.		5,876.50
Labor:		
1 ore bridge operator, 12 (hr.) × 50c. × 365 (days)	$2,190.00	
1 bridge oiler, 12 (hr.) × 40c. × 365 (days)	1,752.00	
4 larry operators, 12 (hr.) × 42½c. × 365 (days)	7,446.00	
4 skip hoist operators, 12 (hr.) × 42½c. × 365 (days)	7,446.00	
Total annual labor		18,834.00
Taxes and insurance at 3 per cent		9,000.00
Total annual operating cost		$73,410.50
Tons of pig iron produced, (550 + 400) × 365 (days)		346,750 tons
Cost per ton, $\frac{\$73{,}410.50}{346{,}750}$		$0.2117

Cost Comparison—Hand Labor for Charging Furnaces

Hand labor per furnace per turn = 21 men. Number of furnaces, 2; number of turns, 2. Total hand labor—21 (men) × 2 × 2 = 84 (men) × 12 (hr.) × 40c. × 365 (days)	$147,168.00
Total operating cost of Brownhoist bridge	73,410.50
Net annual saving	$73,757.50
Net saving per ton of pig iron produced	$0.2127

Locomotive Cranes in Blast Furnace Work

There have been times when our locomotive cranes have saved us from shutting down our furnaces for lack of labor. At such times a locomotive crane has been worth almost any amount of money, but even in its daily work a crane is a profitable investment in work such as ours.

In 1909 we purchased for our plant at Sharpsville a 15-ton Brownhoist locomotive crane. Its work proved so satisfactory that we bought a 40-ton crane of the same make in 1913. Our locomotive cranes were bought for two reasons:—first, to cut down operating costs; second, to assure us a continual supply of raw material, regardless of labor conditions. In both respects they have proved satisfactory.

Using a magnet, the 15-ton crane loads and unloads pig iron from cars to storage, and adjusts the car weights. In normal times it handles 25,000 tons of pig iron a year, half of this amount being loaded into cars and half unloaded from cars. Our other crane handles an equal tonnage. We often equip the crane with a ¾-yd. grab bucket for handling coal, sand, gravel and fire clay.

These two cranes together average five 40-ton cars of coal per week, unloading from the cars into the boiler house. Each month they handle ten 40-ton cars of sand, in addition to small quantities of fire clay and gravel for use in making concrete.

Annual Cost of Operation—15-Ton Locomotive Cranes

Depreciation, $8,500 (over 15 yr.)		$566.67
Average yearly interest at 7 per cent, $\frac{16}{15} \times \frac{\$8{,}500 \times 0.07}{2}$		317.33
Repairs and maintenance, estimated		5,000.00
Coal, ¾ (ton per day) × 180 (days) × $4 per ton	$540.00	
Labor: Operator, 180 (days) × 12 (hr.) × 48c.	1,036.80	
Fireman, 180 (days) × 12 (hr.) × 37c.	799.20	
		2,376.00
Total annual operating cost		$8,260.00
Tons handled: Pig iron.... 50,000 tons; Coal ..... 10,400 tons; Sand, etc... 4,800 tons		
65,200 tons × ½ = 32,600		
Average cost per ton		$0.2534

Calculation of Saving

Labor handling pig iron: 12 (men) × 12 (hr.) × 365 (days) × 37c.	$19,447.20
Cost of spotting cars: 10 (cars per day) × 365 (days) × $2 × ½	3,650.00
Total former cost (excluding coal and sand)	$23,097.20
Cost of operating crane	8,260.00
Net annual saving	$14,837.20

They have also solved a very expensive and troublesome problem by their ability to spot cars. The railroad will spot a car once, but if any re-spotting is required we have to pay for it. Since the charge is $2 a car, and we re-spot an average of 10 cars a day, our former cost for this work was $7,300 a year.

Typical operating costs are best shown by the 15-ton crane, which has been longest in regular service. This crane is doing one-half the work at our plant, though it averages only 180 full working days per year. The two cranes are necessary in order to take care of peak loads and insure uniform production.

Depreciation, repairs and maintenance are based upon our crane expense. The 15-ton crane consumes approximately ¾ ton of coal per day, at $4 a ton, making the annual power cost $540. The labor required includes an operator at 48c. an hr. and a fireman at 37c., making the total labor cost $1,836. The charge for maintenance and repairs is $5,000 a year. This, with the figures for depreciation and interest, gives a total annual operating cost of $8,260.

Two cranes handle 50,000 tons of pig iron, 10,400 tons of coal and 4800 tons of sand, or a total of 65,200 tons a year. Crediting half of this, or 32,600 tons, to the 15-ton crane, makes its average cost per ton 25.34c. Doing the same work formerly cost us $19,447.20 a year for handling pig iron, and $3,650 a year for spotting cars. This gives us a saving of $14,837.20 a year, or an annual return of 175 per cent on our investment.

Declaring that 33,000 breadwinners are out of work in Rhode Island, Gov. San Souci has declared his intention of calling a State Unemployment Conference to alleviate conditions, upon the termination of the National Unemployment Conference at Washington. The Governor accredited the overseer of the poor of Providence with the statement that such conditions as now exist in that city are unparalleled within his official recollection.

Making Dump Bodies for Motor Trucks

Specialized Factory Unit of Van Dorn Iron Works Co. Is Arranged for Convenience and Economy in Handling Materials—Shipping Room Abolished

ONE development of the automotive industry that has come with the increase in the use of motor trucks for heavy work is the demand for truck bodies of special design, which are now being made in numerous types for handling various kinds of material. Specializing on this line of equipment, the Van Dorn Iron Works Co., Cleveland, recently erected a factory building for the manufacture of truck and tractor equipment. This highly specialized factory unit is designed for convenience and economy in handling the bulky and heavy dump truck bodies, during the manufacturing and assembling operations.

Truck bodies in ten standard types and in various sizes, as well as many special types, are made in the plant, and also mechanical dump hoists for them. The bodies are built of steel plates, without bending, forming or pressing of the metal that forms the bottom, side and end members. The plate sections are sheared to size, fabricated and assembled, with standard structural channels, I-beams and angles riveted together.

This department occupies a building of brick and steel construction three stories high, 264 x 120 ft., with floors of creosoted wood blocks. The predominating feature of the plant is the center court, or well, for handling raw material and the finished product from one floor to another. Over the well is a cage-operated 5-ton electric traveling crane which serves the three floors and does away with the necessity of a material elevator. The monitor over the well has continuous glass in the roof and side walls. This, with continuous window sections in the side walls of the building, provides unusually good light throughout the plant.

On both sides of the well the first floor is used for shearing, forming and bending materials required in the construction of bodies and frames. One side of the second floor is used for assembling bodies and the other side for assembling and testing the mechanical hoists with which the dump bodies are equipped. On the third floor, frames are manufactured for the White Company's line of trucks. All floors are provided with 2-ton floor-operated electric traveling cranes, used in handling material and bodies in process of manufacture.

Building columns divide the two lower floors into two bays on each side of the well, the four bays on each floor being served by cranes. On the third floor the center building columns are omitted, making a bay 40 ft. wide on each side of the well, and allowing ample room for handling long truck frames with the overhead crane. The wide span permits moving the frames about the floor in the position in which they happen to be, without necessity for swinging them into a lengthwise position.



Bodies Are Built on the Second Floor, at Left, and Elevating Devices at Right. The bodies are shipped from the lower floor on their own trucks, as shown near the end, when those trucks are available. Otherwise, they are taken to the yard by a tractor and there loaded into railroad cars by a locomotive crane

The pit construction provides an open area 30 ft. 6 in. wide and 165 ft. long on the third floor and 20 ft. 6 in. wide and 125 ft. long on the second floor. The second floor, extending out into the pit from the building columns 6½ ft. on each side, forms a balcony around the pit, which facilitates handling material between the second and the first floor, with the crane above the pit.

Some of the material taken to the third floor is handled over the sides of the pit, being raised to the proper height by the crane, and then swung out to the floor by guide ropes. But much of the heavy handling, including the lowering of finished bodies to the first floor, is done at the ends of the building. As the pit is 20 ft. longer at each end of the third floor than at the second, an open area of that extent is provided at each end of the second floor under the crane runway for handling bodies. As the crane runs the entire length of the building, ample room is provided for handling material under the runway at both ends of the third floor.

Both the balcony and the third floor are inclosed

along the sides of the well by pipe rail, along the lower part of which, for a distance of 18 in. from the floor, is a fine mesh wire screen, to prevent small pieces of metal from falling to the lower floors.

For trucks built in Cleveland, the bodies are mounted in the pit on the first floor. The truck chassis is run onto this floor under its own power, and the body and body-operating hoist are lowered onto it from the floor above, by the crane. Bodies for rail shipment, lowered onto trucks, are hauled out into the yard by a gasoline tractor of the Towmotor type. A locomotive crane loads them onto cars. The same tractor brings raw stock into the body department. This plan of moving the finished product eliminates a shipping room.

For handling work in progress in the manufacturing bays, there are three electric traveling cranes with 40-ft. 3-in. span on the third floor, and ten cranes with 18-ft. 4-in. span on the first and second floors. These



Another View of the Pit, Showing How Material Is Handled from Each Floor. The extent of monitor lighting is apparent

are all 2-ton floor-operated 3-motor double girder cranes. Cranes were selected to get the maximum lift with a limited amount of head room. The distance from the floor to the top of the crane runway is 12 ft., and from the runway to the roof truss, 3 ft. The 5-ton cage-operated 3-motor crane over the well has a 31-ft. span and a 52-ft. lift; the hook travels to within 16 in. of the runway rail at each end. The cranes, supplied by the Barber-Foster Engineering Co., Cleveland, are equipped with Crocker-Wheeler motors, Electric Controller & Mfg. Co. controllers, and with Hyatt roller bearings throughout.

One feature of the manufacturing operations is the arc welding of seams in making water-tight bodies, this method having been substituted for calking in making a water-tight joint. The arc welding process is also used for welding the gusset plates that reinforce the corners and edges of bodies. Oxy-acetylene equipment is used largely for cutting off work.

The Southern Coal & Iron Corporation has purchased the properties, plants, machinery and equipment of the Rittenhouse Iron Co., Rittenhouse Gap, Pa. The plant will be put into operation at once for shipping iron concentrates to the furnaces in that district, including the Bethlehem Steel Co. and the Eastern Steel Co. The properties contain 700,000 tons of blocked out iron, with 5,000,000 tons of potential ore, estimated to contain 56 per cent iron.

Increase in Employment in Steel Industry

WASHINGTON, Oct. 11.—An increase of 6226 employees, amounting to 2.2 per cent, was made by the iron and steel industry in September, when compared with August, according to the industrial survey of the Employment Service. The increase in the number of workmen in the iron and steel industry was greater than that of any of the other industries which showed a gain.

The net increase in employment in September in the 1428 firms reporting was 18,050 over August, a gain of 1.2 per cent. Of the 65 cities reporting, 38 reflected increases and 26 showed decreases. Most of the more important iron and steel centers showed increases, among them being Pittsburgh, 8 per cent; Birmingham, Ala., 4.4 per cent; Cleveland, 4 per cent; Youngstown, Ohio, 7.9 per cent; Buffalo, 7.3 per cent; Johnstown, Pa., 6.7 per cent; Chicago, 1.15 per cent, and Philadelphia, 0.007 per cent. A decrease of 2.2 per cent was reported by New York.

A gain of 1699 employees, or 2.6 per cent, was made by railroad repair shops and 854 employees, or 1.1 per cent, by metal and metal production, other than iron and steel.

Director General Francis I. Jones, pointing out that the continued increase in employment confirms the indications observed in August that the industrial pendulum is definitely on the upward trend, says that these favorable trends should not obstruct the fact that within the next 30 days thousands of agricultural seasonal workers will return to the industrial centers and join the multitude of unemployed, unless buffer employment is furnished them until they can be absorbed in their previous occupations.

The Graphitic Corrosion of Cast Iron.

As a "suggested research," the Engineering Foundation, 29 West Thirty-ninth Street, New York, has issued a statement emphasizing the desirability of investigating the so-called graphitic corrosion of cast iron. It has been known for years, says the statement, that some iron castings, when long in contact with seawater, were so changed that they could readily be cut with a knife. Recently similar change has been observed in castings buried in soils impregnated with certain salts, especially in northern central United States and adjacent portions of Canada. Damage and danger result. Apparently this change has often been attributed to the action of stray electric currents from railways. Possibly the two kinds of corrosion have proceeded simultaneously in some places, and this fact has led to failure to separate the two causes.

A prominent engineer, who has studied the problem for several years with the assistance of experts, states that there is but little real knowledge concerning this phenomenon and has recently suggested a thorough research by Engineering Foundation because of the widespread interest in the problem to owners of water, gas and oil pipes, sea-going vessels, power plants and other industrial and engineering structures having iron objects exposed to salt or brackish water, or buried in impregnated soils. Lead is reported to have been similarly affected in some places. Engineering Foundation is making a preliminary examination of the subject, but "needs a special fund of several thousand dollars to prosecute the research effectively."

A. E. Blake, Pittsburgh district manager, United Gas Improvement Contracting Co., Philadelphia, will be the speaker at the regular monthly meeting of the Pittsburgh Foundrymen's Association at the General Forbes Hotel, Monday evening, Oct. 17. His subject will be "Blue Gas, Coal Gas and Producer Gas for Replacing Natural Gas in Foundries and Steel Works."

The LaBelle Iron Works, on Oct. 3, started up 71 of the 94 coke ovens at East Steubenville. No. 2 furnace at Steubenville was blown in Oct. 6, and it was officially announced that the Top furnace of the Wheeling Steel Corporation will be blown in Oct. 12.

Progress in Iron and Steel Metallurgy

Electrolytic Iron Malleable Castings and Metallographic Research Discussed by Mining and Metallurgical Engineers

THE meeting of the New York section of the American Institute of Metallurgical Engineers, held at the Machinery Club in New York, Wednesday evening, Oct. 5, made an unusual contribution to current literature of iron and steel. The topic of the evening was "Problems and Progress of Iron and Steel Metallurgy." Papers were presented by Prof. J. Cavalier, professor of metallurgy, University of Toulouse, France; Bradley Stoughton, consulting metallurgist, New York; Prof. William Campbell, Columbia University, and advisory metallurgist of the Navy Yard, New York, and John Vipond Davies, of Jacobs & Davies, New York, who is president of the United Engineering Society.

Professor Cavalier reviewed the war effort of the French steel industry and summarized the work of reconstruction in France, devoting the latter half of his paper to recent advances in steel testing and in operating methods at French works. Quite full synopses of the four papers are given below:

Improvements in the Metallurgy of Iron and Steel

BY BRADLEY STOUGHTON*

THE most important recent development of the world's iron ore resources is the opening up for mining and exportation of the Itabira iron ores of Brazil. According to published reports in the *Journal* of the Iron and Steel Institute (London), Brazil has more than two billion tons of iron ore higher than 50 per cent iron and at least one billion tons better than 60 per cent iron. The Itabira ore deposit contains several hundred million tons, approximately 69 per cent iron, less than 0.01 per cent phosphorus, less than 0.02 per cent sulphur and less than one per cent silicon.

Blast Furnaces

The most important progress in respect to blast furnace design and operation is the use of a hearth 20 ft. 9 in. in diameter. With a bosh of only 22 ft. it will be evident how steep the bosh walls are in this design, which was originally decided upon because one of the furnaces of the United States Steel Corporation upon being blown out was discovered to have automatically prepared a hearth of its own more than 20 ft. in diameter.

A new record has been established in the life of a lining since the famous campaign of No. 3 furnace of the Tennessee Coal, Iron & Railroad Co., which made 1,429,707 tons on one lining. This record was equaled on Aug. 6, 1921, by No. 2 furnace of the Inland Steel Co. On Aug. 17 it had made 1,435,000 tons. As far as I know this furnace is still in blast and we all hope that it may make one and one-half million tons before being blown out, especially as it was making an average of 581 tons of iron per day, and occasionally made over 600 tons per day.

A new electrostatic process for the rough cleaning of blast furnace gas, invented by Sir Oliver Lodge and differing only in minor details from the Cottrell process, has been installed at a British blast furnace. The gas is cleaned only to approximately 1 gr. per cubic meter of gas, so that it is suitable for stoves but not for use in gas engines.

Malleable Castings

As members of the institute we may be very proud of the record made by our fellow member, Prof. Enrique Touceda, of Troy, in a research covering four years' work for improving the quality of malleable iron castings. The manufacturers found themselves under pressure from cast iron castings on the one hand and steel castings on the other, the first because of lower cost and the second because of higher quality. Several of them very wisely joined forces under the name American Malleable Castings Association, and employed Professor Touceda to direct the research to improve the quality of the product. The result is striking and admirable. While the average strength of malleable castings in 1911 was less than 40,000 lb. per sq. in. and the elongation less than 5 per cent, the quality had been so improved that in 1919 many of the plants represented in the association were averaging better than 50,000 lb. tensile strength and 14.67 per cent elongation. Castings have been made as strong as 60,000 lb. tensile strength with an elongation of 33 per cent, and Professor Touceda thinks that what is now a singular achievement may become a matter of common practice in the course of time. The advance has been made not by means of revolutionary discoveries and inventions, but by gradual improvements and regularities in the process of manufacture.

Electrolytic Iron

Electrolytic iron has been made in the laboratory and in sporadic attempts on a commercial scale for 50 or 60 years, but it was not until 1915, at Grenoble, France, that the process was made both a technical and a commercial success. At the plant of Bouchayer and Viallet electrolytic boiler tubes are being made running about 99.97 per cent pure, using scrap as raw material and cast iron anodes, using ferrous chloride as an electrolyte and a rapidly rotating mandrel as a cathode. The deposited iron is annealed to rid it of the embrittling hydrogen and is ready for use as a boiler tube after a few drafts through a die, without a mandrel, to increase its strength. Mr. Bouchayer announces that he can compete commercially in the manufacture of thin tubes.

Charles P. Perin and F. A. Eustis, both members of this institute, have extended the process still further by using iron ore as the raw material. This is leached with ferric chloride, the solution reduced to ferrous chloride, and then this solution used hot as the electrolyte, having an insoluble anode and a rotating mandrel as a cathode. Electrolysis deposits iron on the cathode about 99.99 per cent pure and produces ferric chloride which is used over again for leaching. A characteristic of electrolysis is that a unit of electricity produces two or three times as much iron as can be produced by the same amount of electricity in the smelting processes.

Electric Furnaces

Electric iron ore smelting furnaces have been employed in North America but have never been commercially successful in competition, because of the cost of electricity. It is only in Sweden, where electricity is very cheap, in northern Italy and in Japan that electric smelting furnaces are now used in industrial operation.

*Address at meeting of New York section of American Institute of Mining & Metallurgical Engineers, Oct. 5, 1921.

Synthetic cast iron is being made on the Pacific Coast by melting steel scrap in electric furnaces and carburizing it. Last April I saw one of these furnaces and a few tons of the product. Just as Professor Cavalier has indicated in respect to the conditions in France, the manufacture of synthetic cast iron in this way is commercially advantageous where steel scrap is cheap and pig iron more expensive.

At the present time there are nearly 400 electric furnaces in the United States in iron and steel works. Where hot iron or steel is required for castings and where high grade steel is manufactured, the cost of electric furnaces is justified, and we find them now not only in the steel casting plants, but also in iron foundries and in malleable cast iron foundries. They are also used in heating furnaces for rolling, and especially in heat treating furnaces for automobile manufacturers and others. The possibility of exact control is also employed with advantage in at least one instance in the use of an electric core oven.

Problems of Iron and Steel Metallurgy in France

BY PROF. J. CAVALIER

[In the early portion of his paper Professor Cavalier gives again the familiar facts concerning the iron and steel production of the French territory invaded by the German army; the extent of the French effort in the production of shells in 1917; the new iron and steel works built in France during the war; the destruction of French works by the Germans and the reconstruction that has been in progress in the past three years. Much of this ground was covered by papers read at the recent Paris meeting of the Iron and Steel Institute, as reported in THE IRON AGE of September 22 and 29.—Editor.]

The work of reconstruction of the destroyed plants is being pursued; and it will take several years more, especially for the collieries. On the other hand numerous plants in the interior of the country have grown and have put in new installations and more modern and better equipment. This work has been in general held up for a year or so by the rise in prices and by the industrial crisis common in all industrial countries.

At the end of the period of which I have attempted to show some essential characteristics, the dominant aim has been to produce at a maximum by the usual methods without seeking new ones. At the same time it is necessary to point out several things relating to the progress of the iron and steel industry.

Hydro-Electric Development

First, the development of the electric furnace. Among the European nations France is one of the richest in hydraulic power. One can put the total that can be put to use at 8,000,000 to 10,000,000 h.p., but it is not all available. At the beginning of the war they had equipped a little more than 1,000,000 h.p. of which 750,000 is in the Alps and 150,000 in the Pyrenees. The Pyrenees are certainly less rich than the Alps, but proportionately the hydro-electric industry was less developed there. This is about to be corrected. The equipment of a water system requires generally many months, often several years; also we hesitated to undertake this work as long as it was believed that the war would not last long.

It was only about 1916 that undertakings of long duration were begun. They have thus been able to equip in addition to what they already had about 400,000 h.p. while 400,000 h.p. more is actually in process of installation. It is necessary to take into consideration also the projects which are now being studied for the harnessing of the Rhone and the Rhine. Only a part of this new energy has been applied to the steel industry. The electric furnace has above all been reserved for high grade or special steels, to the preparation of ferroalloys and silicon-alloys, for which it is indispensable. The greater part of the electric energy was destined for purely chemical manufacture—electrolytic chlorine, chlorates and perchlorates and above all synthetic nitric acid—for which we had laid out and had begun to realize a vast program, when the development of torpedoing caused serious fear for the continuation of the supply of nitrate of soda from Chile.

The Electric Furnace in Iron and Steel

With the ending of the war these latter needs have almost disappeared. The plants equipped or in the process of installation have become available for other uses, namely electric haulage for railroads, metallurgy, etc. I can cite in the neighborhood of Toulouse two plants, that of Pamiers and the Societe du Saut du Tarn a St. Jeury near to Albi which actually equipped important electric furnaces for the manufacture of steel.

Another plant in the Pyrenees region proposes to install a closed furnace for the direct treatment of ore and particularly for pyrite cinder. Although the electric furnace adapts itself well to the treatment of sulphide residues, it is nevertheless questionable whether the direct production of cast iron can be done advantageously in a country where electric energy finds so many remunerative uses.

Second, the electric furnace is used for the manufacture of synthetic cast iron according to the process outlined by Keller long before the war and which was used during the war. An electric furnace is charged with turnings and small scrap of iron and steel, with a given quantity of coal, in the presence of a slag which makes the operation more regular and in addition can bring about desulphurization. If it is necessary to increase the silicon content silica and the corresponding quantity of coke are added. The castings thus obtained are according to specifications and besides are very pure, particularly in regard to the sulphur content. The process has the advantage of permitting the easy utilization of turnings of which there was a great abundance during the war. It has furnished large quantities of cast iron for the manufacture of projectiles. It is always in use and gives to the foundry valuable products.

I have lately seen in the Pyrenees a plant making normally silicomanganese and which not being able to get rid of its stock on account of the industrial crisis utilizes part of its electric furnaces for the manufacture of synthetic cast iron. At the present prices of good cast iron and of scrap and turnings it is actually a paying operation. It is a matter of discussion whether it will be so when conditions have become normal once more.

Advances in Practice

Third, the development of the use of scientific methods. The progress realized by systematic study in the laboratory penetrates usually with slowness into industrial practice. Producers in the average industry are apt to consider the laboratory as a luxury which does not pay.

The war in bringing together for the national defense the industrialists and the men of science in the intensive production of metal has contributed powerfully to the employment and to the diffusion of new and precise methods of work and of control. The measurement of high temperatures has become very general, especially for the heat treatment of shells.

Microscopic examination was carried out systematically, as in the manufacture of cartridge cases, where the brass undergoes successive annealings. A simple and rapid microscopic examination shows whether annealing has been done at the right temperature and under the right conditions or if it is necessary to reanneal before further mechanical working.

In regard to the mechanical tests which are commonly used it is necessary to stress the Brinell test and the shock test on nicked bars. The Brinell

test has been used particularly to control the heat treatment of shells; they are "balled" before any treatment, after quenching and at the end of the treatment after drawing. Special schemes have been studied and put in practice for eliminating the influence of time in this test in order to allow great rapidity of execution without affecting the precision. On a series of pieces, 600 impressions an hour have been easily obtained. During the period when the manufacture of shells reached its maximum, say 300 to 400,000 a day, we can figure that there were 800,000 Brinell tests made each day.

The shock test on nicking bars, which measures the resilience, made its appearance before the war but it was introduced very timidly. It met with much opposition on the part of the producers. During the war the aeronautical branch, which had need of exceptional guarantees, found the introduction of this test indispensable in the inspection of crank shafts and connecting rods for aviation motors. All these rods had to undergo the shock test. They had to reach a number corresponding to 9 to 10 kg. m. on a test bar having a section of 10 x 10 mm. with a nick of 2 x 2 mm. with a round base.

These different methods were doubtless employed before the war in a small measure. They rapidly became common even in the most old fashioned workshops. By a constant and accurate control they caused large reduction of rejections and, in this way speeded up production. The manufacturers have accepted in specifications clauses which they would have nothing to do with previously.

The good habits which were taken on under the force of circumstances will continue without doubt. And thus the war will have contributed to the progress of our metallurgical industry in a measure which only compensates to a slight extent for the great losses resulting from the destruction of our works.

Problems in Metallography

BY WILLIAM CAMPBELL

In looking over the work of the last three years there are several points which stand out above others as worthy of notice. The first that I should like to mention is the determination of non-metallic impurities in both carbon and alloy steels. In the old days it was easy to call all black inclusions silicate and all gray ones manganese sulphide. But in using metallography as a means of testing you cannot say that a section of steel analyzing 0.004 per cent or less sulphur, which is full of gray inclusions, is full of manganese sulphide unless you assume that the chemist is wrong. We now know that most of these gray inclusions are oxides and we are hopeful that in the future we may be able to determine their variations between oxide of iron and oxide of manganese, etc. The slag inclusions found in steels, especially alloy steels, are not always simple and in many cases are very complex, showing three or more constituents.

Study of Non-Metallic Impurities

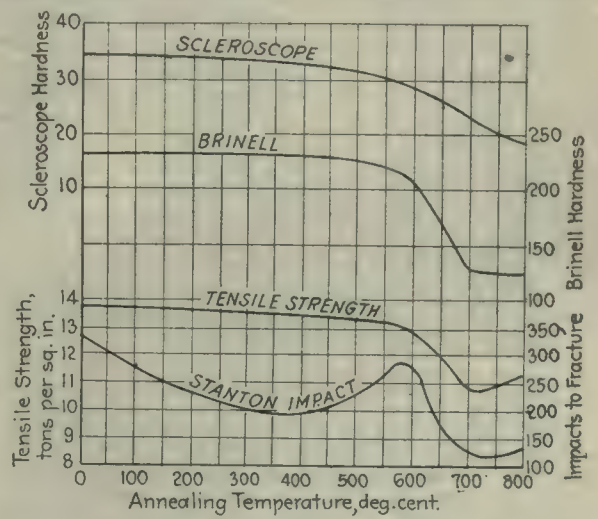
Some time ago we took up this work once more in our laboratory at Columbia and after examining a number of typical slags set out to examine non-metallic impurities. We had not got far when our attention was called to the fact that many inclusions were a combination of furnace slag, ladle lining, etc. One typical case may be mentioned. A piece of wrought iron was found which could not be cut with a saw and which resisted the drill. It was nicked and broken and in the center there was found a comparatively thick layer, a non-metallic impurity of black color extremely hard resembling a piece of well-made china.

We have all heard of pieces of brick found in the interior of ingots and have wondered how the brick ever got through the ladle stopper, and so here we wonder how this strange non-metallic impurity got into the wrought iron. Committee E-4 of the American Society for Testing Materials at the June meeting of the society presented a report in which a discussion of the determination of these non-metallic impurities was begun and it is hoped that by next year a definite scheme for their identification can be worked out.

Tempering Effects

The effect of tempering on plain carbon and alloy steels has received considerable attention. Most of the published work refers to tensile tests and there is a wonderful concordance between drawing temperature and tensile strength, elastic limit, ductility and hardness. On the other hand, shock tests do not show this same concordance and some of the recent work published abroad would seem to show that a medium drawing temperature while all right for tensile tests is absolutely fatal for shock tests. If this is so it will certainly explain many mysterious failures which may be attributed to too low a drawing temperature.

Improvements in cast iron have been particularly in the direction of obtaining high tensile strength. Such metal is often called semi-steel. The effect of annealing of semi-steel and gray iron castings and its usefulness is often questioned. From work done during the past three years in the Navy Yard we have



Effect of Annealing Temperature on Hardness and Tensile Strength of Cast Iron Pistons

reached definite conclusions. It has been found that by annealing at 1000 deg. Fahr., while all stresses and casting strains are eliminated, the tensile strength is in no wise affected. On the other hand, if the metal is heated to the neighborhood of the critical point the tensile strength falls off very sharply. This is in agreement with the work of Rolfe published in the *Aeronautical Journal*, 1917, page 349. Rolfe gives curves, which are reproduced herewith, showing effect of annealing temperature on the hardness and tensile strength of cast iron pistons. He also shows a curve for Stanton impact which is worthy of notice as there is a minimum at 350 deg. C. and a maximum about 575 deg. C. followed by a rapid decrease. Under the microscope we have found a very marked change which occurs at the point where the tensile strength falls and explains it. All of the pearlite disappears and the matrix consists entirely of fine grained ferrite.

Investigation of Hardness and Grain Growth

In the past we have had many theories of hardening. Most of these are now well known but most of them are far from convincing. The latest theory is that of Jeffries and Archer, the slip interference theory, which was published in *Metallurgical and Chemical Engineering*. This theory applies both to the strain hardening of metals and to the hardening of

steel and to my mind fits into the experimental facts better than any other.

Another subject of great interest is what used to be called Stead's brittleness in low carbon steel which has been widened to embrace all abnormal grain growth in metals. Many writers have attempted to explain this. The recent work of Carpenter and Elam in the British Institute of Metals has thrown much light on the subject. They distinguish between grain growth and recrystallization and show that with a small amount of strain grain growth occurs, whereas when the strain is increased we get recrystallization on heating. They show that grain growth and recrystallization are two entirely distinct phenomena.

Lastly, the recent work on the structure of crystals especially applied to metals is of great interest and promises to modify many of our ideas. The work of examination by *X*-rays and the determination of the changes brought about by strain in the space lattice is yielding remarkable results and it is hoped that in the near future that the work of Jeffries and his associate will be available.

Graphitic Corrosion of Cast Iron

BY J. VIPOND DAVIES

IN all engineering structures the question of deterioration and life is second only in importance to that of original manufacture and construction. This particular subject is one of considerable importance in the life of a large class of engineering structures. The engineer is always looking for better materials and it is the duty and function of metallurgists to produce materials suited to the needs of the engineer and to the requirements and functions of the structures produced.

About 100 years ago the subject of deterioration of cast iron when exposed to the influence of salt and other impure waters exercised engineers very seriously and various facts were recorded and theories advanced, but apparently without any more serious attention. The reason for this was easy of understanding. Cast iron as a material of construction was replaced by the stronger and more reliable alloys of steel. Cast iron as a material of construction has not, however, been entirely replaced by steel, as much continues to be used in marine and underground construction. Then followed the introduction of electric power for railroads and lighting purposes and some 30 or 40 years ago, when the installation of electric power was in its infancy, the design was crude, and there was a lack of understanding that the return currents must be led back to their power stations. The result of this was that we learned a great deal about electrolysis of pipes and other underground structures.

Not All Electrolysis

Now, I claim that an immense amount of what has been classed as electrolysis in these underground structures was not electrolysis at all in the ordinary meaning of the term. Electric currents may produce an accelerated condition of corrosion in cast iron, but the same process is going on continuously, under conditions of impure water and suitable character of metal, where no electric currents exist and where the action is purely a chemical process.

I have carried on a good deal of investigation during the last 12 years and have subjected many hundreds of specimens of cast iron to different waters and under different conditions, and I feel that I have proved to complete satisfaction that the passage of electric currents in the soil is not the usual cause of corrosion, although if there should be such currents, unquestionably the action would be accelerated. I have proved this by subjecting many samples to the same water and to the same test conditions—some samples carefully insulated from any possibility of transmitting currents and other samples exposed in position where such currents if present might be transmitted. Many other samples subjected to the same water under the same conditions and for the same periods show most variable results. Some of these samples will be deeply affected by graphitic corrosion, while others may show no trace.

A Complete Molecular Change

What is the character of this graphitic corrosion? It indicates itself by a complete molecular change in the structure. A polished and weighed specimen of gray foundry cast iron, exposed in soil saturated with ground water high in sulphates or chlorides or with free CO_2 present, will, in the course of from one to five years, change its character. The volume of the sample remains constant. File or tool marks on the original sample will remain and appear in the changed sample when removed. The color, however, from a metallic character has become dull black. The edges and angles remain sharp. With a penknife it can now be whittled away like cheese. The fragments whittled off the samples, dropping on a paper, will char or ignite the paper, due presumably to rapid oxidization on exposure to the air.

The records of guns and cannon balls, which were submerged from 100 to 200 years in the sea and then recovered, indicate that when they were removed from the water and the attempt was made to saw them they have ignited and even exploded, notwithstanding that the samples had just been removed from the water. When the samples were allowed to remain out of the water for a month there was no apparent change in the external appearance, except perhaps a little reddening of the surface by apparent oxidization of metallic particles; but the material, having dried out, again became hard, so that it was difficult even to scratch the surface with a knife. Presumably the action which has proceeded in the metallic iron during its exposure has been that of dissolving the iron by soluble salts which have leached out. At the same time it can be borne in mind that the external dimensions and volume of the sample have not appreciably or measurably changed.

We cannot attribute such action to the passage of electric currents in the ordinary understanding of these terms, for the reason that electric currents do not run around aimlessly in the soil but on a path of least resistance to get back to their source of origin. Whatever change there is must come from internal action in the metallic mass.

Varying Chemical Conditions

The process of this graphitic corrosion has been noted in great numbers of cases in the following:

(*a*) Clear normal sea water, although the records indicate that the action is more rapid in warm sea water than in cold climates.
(*b*) In water having salts in solution and showing acid reaction.
(*c*) In water having salts in solution and showing alkaline reaction.

The period of time in which this condition appears is quite short. In a soil impregnated with salt and other impure waters, particularly those high in acid sulphates, a sample ⅝-in. rectangular section will have graphitized completely in from two to three years. I have noticed recently a case of a water pipe, which had been subjected to clear sea water, where large blisters of hard scale, about ⅜ in. thick, have been removed and found the graphitic action proceeding into the metal underneath, and to all intents and purposes protected by the corroded scale blisters.

Coming to the chemistry of the subject, the following table indicates the averages of a number of samples

of actual cast iron metal subjected to experiment and of the graphitic substance resulting from corrosion:

	Average of Cast Iron Samples Per Cent	Graphitic Substance Per Cent
Total carbon	3.29	10.82
Graphitic carbon	3.08	9.68
Combined carbon	0.21	1.14
Silicon	2.79	8.41
Phosphorus	0.745	1.920
Sulphur	0.087	0.870

Analysis of Graphitic Substance

Again the chemistry of the graphitic substance resulting from the corrosion is as follows:

Total carbon	10.82
Graphite	9.68
Phosphorus	1.92
Sulphur (total as S)	1.30
Sulphur (H_2S as S)	0.87
Sulphur (SO_4 as S)	0.43
Silicon	8.41
Manganese	0.68
Iron (total as Fe)	43.70
Iron (free as Fe)	7.54
Iron (combined as Fe)	36.16
Moisture (loss at 110 deg. C.)	5.92
Water of hydration and oxygen	Remainder
Calcium, magnesium and aluminum	None
Chlorides	Some
Carbonates	None
Water soluble iron	Some

From this analysis it will be noted that all the metallic iron which remains in the sample unoxidized is 7.54 per cent of the mass, and the total iron remaining in the mass combined in the form of oxides is a comparatively small percentage of the original metallic iron in the original sample. It is evident, therefore, that a large portion of the iron itself has been leached out into the waters of the soil.

It is apparent from this that whatever action is going on is within the mass of the sample exposed. In view of the conflicting evidence obtained from the results of experiments in respect of impurities in the water, and in view of the failure to account for these conflicting results by differences in the chemistry of the original iron, it may possibly be indicated that the action producing the change is closely related, not simply to the graphite contents in the cast iron subjected to these impure waters, but in part or in large measure to the physical characteristics and molecular structure of the alloy itself.

From my study of this subject, which affects many lines of engineering work, I find in its history and bibliography very little information. It appears to be one of those matters which have been assumed to exist and have not been followed up to scientific conclusions.

Questions Yet to Be Answered

In presenting this, therefore, to you, as metallurgists, responsible for the production of suitable materials of construction, I propound to you the following questions, which represent the problem which we as engineers are investigating and which you as metallurgists should endeavor to solve:

As similar conditions of graphitization have been noted in cast iron placed in soils both acid and alkaline, what is the chemical process which converts cast iron in such salt or foul water from iron into graphite and other substances?

Is the process the same in acid or alkaline waters and what salts produce these results?

To what extent and what is the process under which such conversion extends into and through the mass of cast iron? (Note that cannon balls immersed 100 or more years have been recorded as completely converted.)

Is the chemical action or change a progressive one proceeding indefinitely, and what is the relation between chemical composition of the bath and rapidity of the change?

Is there anything in the suggestion, made as far back as 1840, that iron immersed in chemically impure waters constitutes a "voltaic cell," causing electric or galvanic circuits between the water and the iron which accelerate or produce the process of graphitization; or, going further, may it not possibly be an internal process of electrolysis?

What chemical alloys of cast iron might be expected to be immune? It has commonly been stated, with doubtful proof, that white irons are immune.

What coating to cast iron might protect it when immersed in impure water?

What material in the surrounding bed (lime or other substances) might, by neutralizing the injurious effects of ground water, protect the metal? Similarly in marine construction what means can be adopted to protect exposed metal?

What is the condition existing in the graphite removed from its bath whereby it spontaneously ignites or explodes?

What are the causes which produce re-hardening of graphitic material after drying out?

If the presence of carbon in graphitic form is shown to be the primary cause of corrosion, may it be possible, by subjection of castings to heat treatment either in the liquid state before pouring molds or after casting, by an annealing process to so change the graphite into a combined form of carbon content as to lessen the danger of this form of corrosion without thereby reducing the strength or durability of the castings or increasing appreciably the cost?

Further Gain in Steel Ingot Output

The steel ingot output in September shows a smaller relative increase over that of August than was made in pig iron. According to the statistics of the American Iron and Steel Institute, 30 companies which in 1920 produced 84.20 per cent of the total had an output in September of 1,174,740 gross tons. This compares with 1,138,071 tons in August, and the increase is about 3 per cent, whereas pig iron increased 7 per cent. Estimating the production of the other companies on the basis of those reporting, the total output of ingots in September would figure out 1,395,178 tons. There were four Sundays in September and the Labor Day holiday. A good many plants made a half day's output of ingots on Labor Day. Therefore, reckoning 25.5 operating days, the daily output in September may be put at 54,713 tons, whereas that of August was estimated at 50,060 tons per operating day. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920	26,197,843	8,112,753	121,656	34,432,252
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740

The September ingot production was at the yearly rate of nearly 17,000,000 tons, counting 311 operating days to the year. This compares with a rate in August of 15,568,660 tons and in July of 11,857.186 tons. The greatest year in ingot production was 1917, when the total was 43,619,200 tons.

It will be noticed in the above table that the output of open-hearth steel was actually less in September than in August, the increase being contributed by Bessemer steel. This comes from the fact that sheet and tin plate works were more fully operated in the latter part of the month.

Permission to Reduce Ore Rates Granted

Move is Regarded as Entering Wedge of General Rate Lowering—Will Not Probably Affect Large Tonnage as Furnaces Are Well Supplied

BY L. W. MOFFETT

WASHINGTON, Oct. 11.—Reduction of 28 per cent in freight rates on iron ore in official classification territory, which will take place on or about Oct. 16, marks only one of the moves now definitely determined upon by the railroads to bring about a general lowering of transportation costs throughout the country. Responsive to a prolonged and insistent demand the railroad executives, after conferences with President Harding, Secretary of Commerce Hoover, members of the Interstate Commerce Commission and Chairman Cummins of the Senate Committee on Interstate Commerce, have finally yielded to the contention of iron and steel manufacturers and others of the industrial world that this move is essential in order to bring about a return to normal business conditions. For the past few weeks there have been distinct evidences that the railroad executives of the country were becoming reconciled to this conviction and were preparing to accept it. While rates have been reduced gradually in numerous lines from time to time, including those on iron and steel products for export through Atlantic and Gulf ports, the demand for a general reduction still persisted and increased in force. The final decision reached by the railroads to meet it therefore has been a source of gratification and belief that when effected it will be a highly important element in stimulating business because it naturally will carry with it a revision of railroad wages as an offset to the lower rates.

Result of Pressure

The voluntary action of the railroad in making application to cut rates on iron ore in official classification territory undoubtedly was the result of strong pressure brought by the iron and steel trade, and may or may not have been calculated as a preliminary to a general cut of freight rates, involving the general iron and steel lines along with others, but in any event it is looked upon as being a step that will expedite the general movement to establish lower rates. Permission to reduce the iron ore rates on five days' notice was granted yesterday by the Interstate Commerce Commission after examination of the application made for this purpose on behalf of the carriers by R. H. Collyer. By the terms of the application the lower rates are to expire Dec. 31, though this is largely a formality. Further conferences are to be held between the railroads and the iron and steel trade before the new rates expire and it is confidently expected that they will be made permanent if not further reduced. In themselves the lowered rates are not taken to mean a great deal, but rather it is the significance they convey that finds importance because a general cut in all iron ore rates, as well as iron and steel and commodities of other kinds, is being looked for.

Effect of Cut in Rates

The cut in the ore rates, confined as it is to official classification territory—bounded on the west by the Mississippi river, on the north by the Canadian border, on the south by the Ohio and Potomac rivers and extending to and, including the Atlantic seaboard—comes at a time when the bulk of direct shipments originating in the upper mines of the Lake Superior region has been moved for the present season. To a large extent, therefore, the reductions will apply only to dock ore at Lake Erie ports, a relatively small tonnage, together with movements from the East, also relatively small. Blast furnaces along the Lake Erie front will not be affected because no change has been made in rates from Lake Superior mines to Lake Erie ports, rates which now are the object of protest, and which it is believed will be lowered, either by voluntary action or by order of the Interstate Commerce Commission. The navigation season being near to a close, however, the advantage to the iron and steel industry will not be reflected so far as this important ore movement is concerned until next year, regardless of how soon the rail-and-lake rates may be reduced.

Reason for Action

The reason assigned for lowering the ore rates in official classification territory is a desire to stimulate the iron and steel industry and give it an opportunity to accumulate ore stocks before the close of navigation on the great lakes. While it is thought this will be done to some extent, it is doubted that, at this late period in ore shipping from the upper mines, especially in view of restricted operations of the steel mills, the stimulation will be of a marked nature, though the significance back of the move, it is held, will unquestionably have a decidedly good effect in the future.

The First Move

It is interesting to observe that the first move toward lowering ore rates was made by the Lehigh Valley railroad, which filed a tariff on Sept. 28, to become effective Oct. 29, reducing the ore rate from Perth Amboy, N. J., to Bethlehem, Pa., from $1.40 to $1 per gross ton, a reduction of a little more than 28 per cent, or practically the same as that determined upon later by all carriers in official classification territory. There is a question as to whether this action of the Lehigh Valley was a factor in bringing about the general reduction in this territory which returns the ore rates in the territory affected almost to the level they were established on before the general rate advance of last August. At the time the Lehigh Valley tariff was filed, it did not create much interest, but was looked upon as being a local matter entirely and this was heightened by reason of the fact that Perth Amboy is not a port of origin of iron ore. However, it was apparent that if the Lehigh Valley were allowed to establish a rate of $1 per ton from Perth Amboy while other railroads kept up their rates from other ports, import business would come through that port to the disadvantage of other ports and other carriers.

Revenues of Railroads

While there is talk about the lower ore rates adversely affecting the revenues of the railroads, it is pointed out that, on the contrary, it may easily increase their financial returns through a much greater volume of ore and other raw materials and iron and steel traffic, once satisfactory levels are established on

(*Continued on page* 976)

Gear-Tooth Grinding Machine

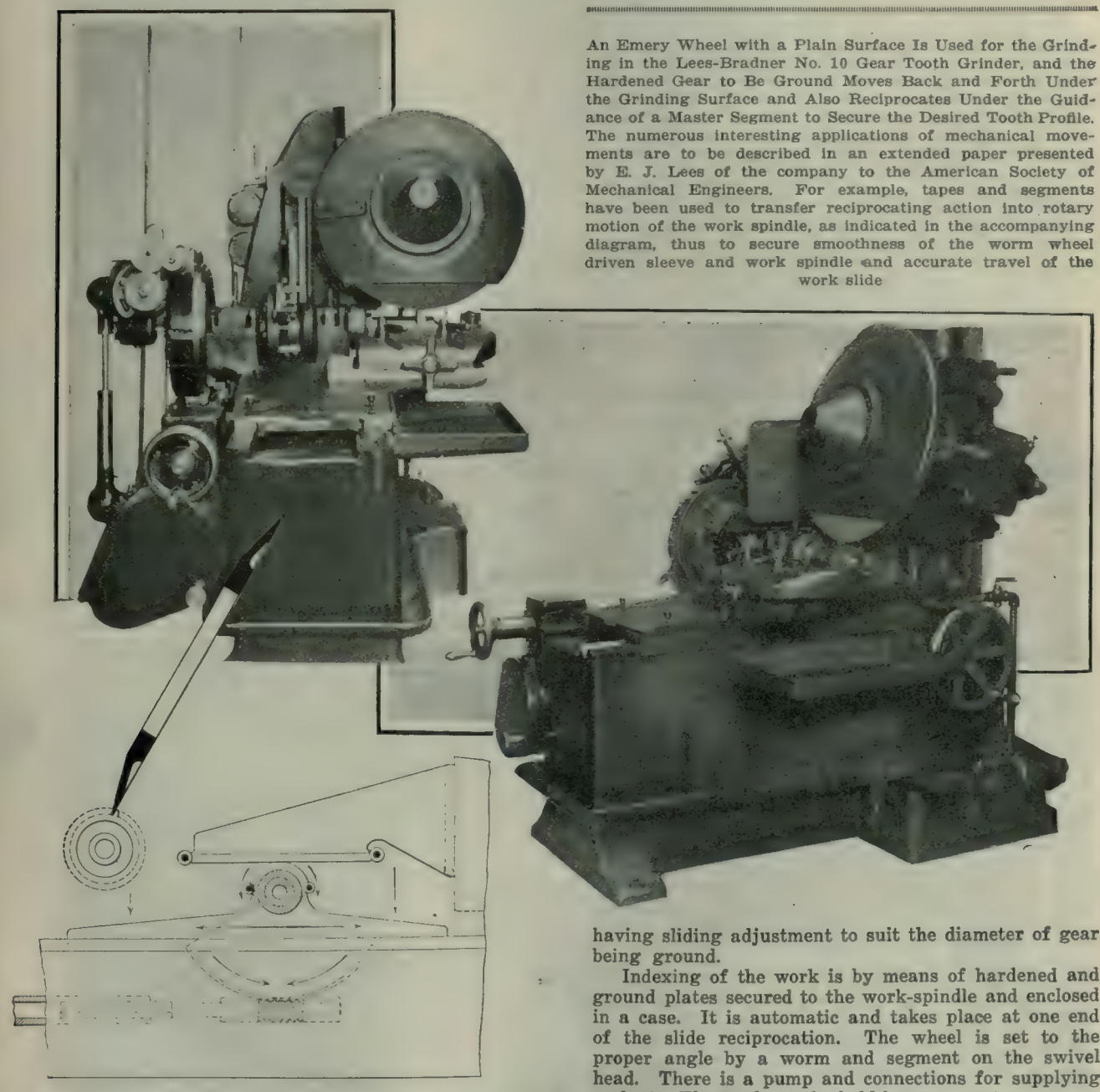
The production of hardened gears, accurate as to profile and spacing of teeth and with the bore accurately concentric with the pitch circle, is the purpose of a machine recently developed by the Lees-Bradner Co., Cleveland. It is designated as the No. 10 gear-tooth grinding machine, photographic reproductions of which are given herewith.

The machine is adaptable to the grinding of involute spur gears having angles of pressure from 14½ to 24 deg.; diametral pitch from 12 to 3; and pitch diameter from 2 to 12 in. After hardening, the bore is ground first and all grinding operations on the teeth are controlled from the bore. The teeth are thus ground concentric with respect to the bore.

An emery wheel 30 in. in diameter is used, the wheel being supported on a stationary column and the work traverses past it back and forth on a slide. The work is given a rotary as well as the sliding motion in order to obtain the desired profile action. A segment equal to the pitch diameter of the gear is used in conjunction with tapes or bands to obtain the combined sliding and rolling action. These segments are modified in various ways to give the changes in tooth profile.

A diamond that is both lever and screw controlled is provided for truing the face of the wheel and is used in conjunction with the wheel spindle micrometer feed. It is mounted in a ball socket container which can be swivelled to any angle, permitting using the diamond face on all its edges. The container is locked into the arm, which is both worm and wheel and hand controlled, so that either a fast spiral cut or a slow continuous cut may be taken on the wheel face. The dresser is carried by the main swivel head casting, locating the diamond point in one plane. Adjustment is made endwise of the wheel when taking a dressing cut.

The machine is driven by belt from the lineshaft or by motor. The drive to the wheel is by endless belt guided by two idlers which are carried in a bracket having sliding adjustment to suit the diameter of gear being ground.



An Emery Wheel with a Plain Surface Is Used for the Grinding in the Lees-Bradner No. 10 Gear Tooth Grinder, and the Hardened Gear to Be Ground Moves Back and Forth Under the Grinding Surface and Also Reciprocates Under the Guidance of a Master Segment to Secure the Desired Tooth Profile. The numerous interesting applications of mechanical movements are to be described in an extended paper presented by E. J. Lees of the company to the American Society of Mechanical Engineers. For example, tapes and segments have been used to transfer reciprocating action into rotary motion of the work spindle, as indicated in the accompanying diagram, thus to secure smoothness of the worm wheel driven sleeve and work spindle and accurate travel of the work slide

Indexing of the work is by means of hardened and ground plates secured to the work-spindle and enclosed in a case. It is automatic and takes place at one end of the slide reciprocation. The wheel is set to the proper angle by a worm and segment on the swivel head. There is a pump and connections for supplying coolant. The work can be held between centers or supported on a mandrel having a taper shank to fit the spindle and supported at the outer end by the tailstock.

Power is not applied to the work slide but to a sleeve through which the work spindle rotates when indexing. When the machine is grinding, the sleeve and work spindle rotate together as one unit. The sleeve carries the segment to which one end of each of the tapes is fastened, the other ends being attached to a bracket on the column. When the sleeve is rotated first in one direction and then in the reverse, the tapes wind on and unwind from the segment, thus through their pulling action on the bracket causing the work slide to reciprocate. This arrangement provides a uniform torque load to the work spindle by a worm and wheel that rotates the sleeve in reversed directions. There is also uniform load on the tapes due to the fact

that the frictional resistance of the work slide on the ways is maintained constant by gravity only.

Using an emery wheel with a plane surface when generating does away with the problem of centering the tool and blank, the relation of the wheel to tooth being shown in the illustration. The plane face also has a continuity of action with profile of the gear tooth.

The main pulley shaft drives the gearing in the reverse feed box shown on the right hand end of the machine and speed change gears are used to vary the strokes per minute of the work slide. The length of travel of the slide is regulated by a trip dog inside the gear case.

In operating the machine a segment equal to the pitch diameter of the gear to be ground is located on the work spindle. The emery wheel is then set at the pressure angle of the tooth to be ground and the head carrying the wheel raised to the height necessary to cover the working depth of the tooth. The wheel is dressed, using the micrometer adjustment, and then moved to the starting position by the handwheel. There are two positive stop pins in a circular T-slot which are used in conjunction with a positive stop to locate the wheel in a start and finish position. There is also an intermediate spring stop for roughing out. The starting stop is usually set to grind 0.004 in. from the tooth.

The work is locked on the arbor, with a tooth in contact with the wheel face, after which a roughing cut is taken, the wheel being located by the spring stop to cut 0.003 in. from each tooth. Then the micrometer is fed up 0.001 in. more to the finish stop, making the 0.004 in. allowed for grinding. This brings the wheel back into the generating plane and into the position in which it was dressed. When the wheel needs redressing which is usually for every other gear, 0.0004 in. is taken off the face, and this is done by using an independent feed to the micrometer, a disturbing of the stops for starting and finishing being unnecessary.

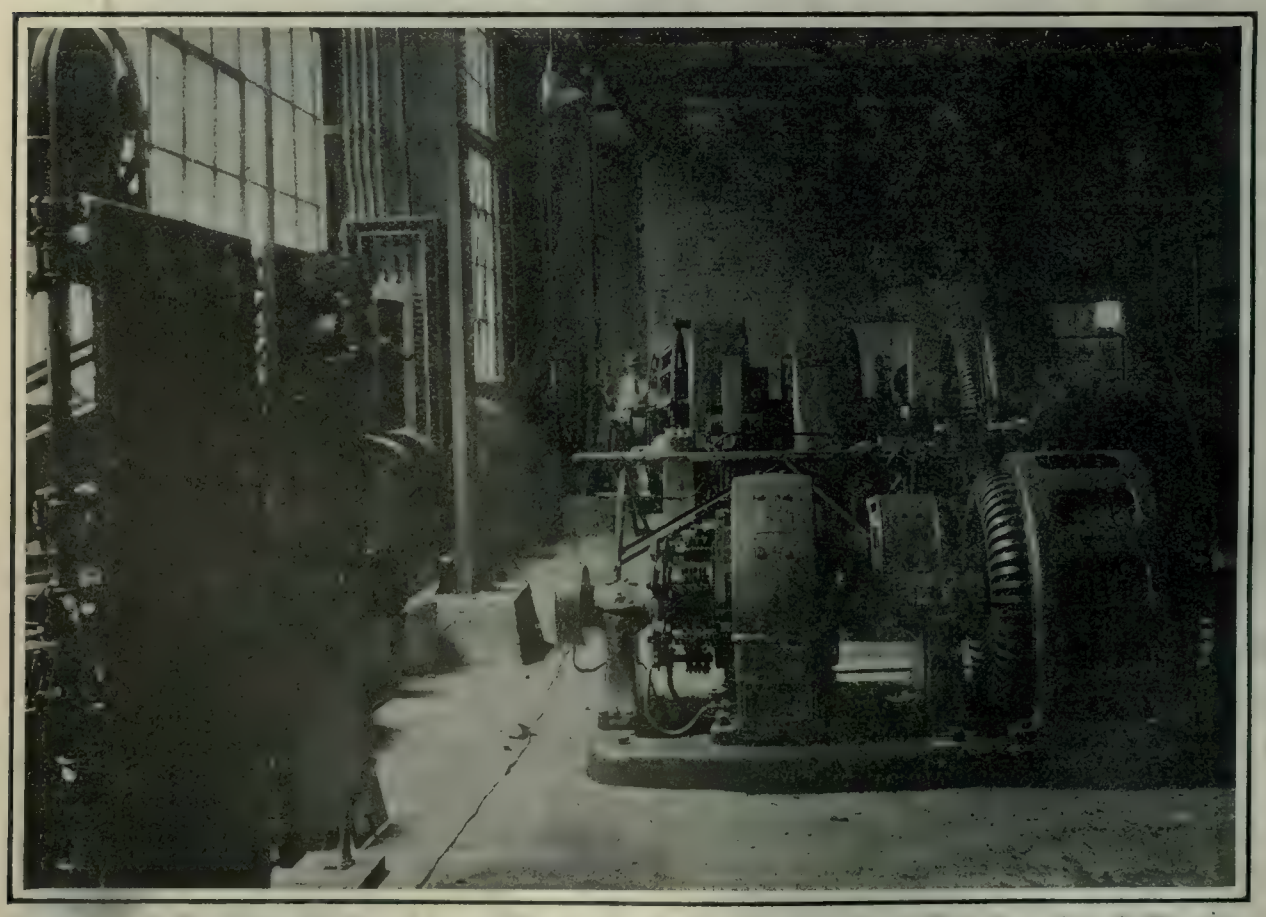
For roughing cuts a gear hobber is said to be the most suitable inasmuch as that method uses the same principle as the grinder with the plane face. Other types of machines can be used, however, with modification in the cutter outline. As to production, it is claimed that on a 6 pitch gear having 31 teeth the actual grinding time consumed is 10 sec. per tooth or a little over 5 min. around the gear, removing 0.003 in., on the rough grind and 0.001 in. on the finish grind. A total time of 11 min., with loading and unloading time of 2 min., averaging 30 gears per day of nine hours is said to be accomplished. It is further claimed that 2500 gears of the size under consideration can be ground without renewal of the wheel.

Motor Drives Featured on Rolls and Run-Out Table

Special Methods Adopted in New Mill to Co-Ordinate Roll Trains and Run-Out Table—Three-Phase Motors and Frequency Changers Used

SOME of the powering features of the new merchant mill of the Interstate Iron & Steel Co., at South Chicago, which was described in last week's issue, are of more than ordinary interest.

Electric current is furnished by the Commonwealth Edison Co., Chicago, and stepped down from 12,000 to 2300 volts for use in the mill motors. All of the transformers were built and installed by the General Electric Co. Three 1667-kva. single-phase transformers, a total of 5000 kva., step down the current for the mill motors, while three 37½-kva. transformers step down current from 2300 volts to 110 volts for lighting purposes. In addition, there are two General Electric motor-generator sets, which furnish 230-volt direct current for use in



Ninety-three ½-Hp. Alternating Current Motors Driving the Runout Table Rollers Receive Their Power from the Frequency Changer in the Foreground. This consists of a 110-hp. adjustable speed direct current motor, with speed range from 780 to 420 r.p.m., and an alternating current generator rated at 110 kva.



Belt Drums Driving the Finishing Mills. These have since been inclosed in a cage, for protection of employees. The belt drive is said to give smoother operation of the rolls than gear drive

the auxiliary motors, in the traveling cranes, and for miscellaneous purposes. These sets will be tied up with three others now being installed in the former power station of the Interstate company, making five motor-generator sets, which in common will furnish direct current for general service in the entire plant.

As the six 16-in. roughing stands of the mill are all in line (continuous), they are driven from a line shaft by gears. The shaft is operated by a constant speed 3-phase, 60-cycle, a. c. 1500-hp. Allis-Chalmers induction motor, which runs at 78 r. p. m.

The 14-in. and 12-in. stands are driven by a 3-phase 60-cycle a. c. 2000-hp. Kraemer type variable speed Allis-Chalmers induction motor. The power of the motor is distributed by belt drums to three shafts, one shaft operating the two 14-in. stands, and the other shafts two 12-in. stands each.. Although engineers are not entirely agreed on the relative merits of gear and belt drive, it is urged on behalf of the latter that it insures smoother operation than propulsion by gears. There is always a certain amount of backlash in gears, and when steel is entering intermediate stands, vibrations are sometimes set up in the finishing stands, which often prove serious when light material is being rolled.

Each of the 93 rollers of the run-out table is driven individually by its own alternating current motor of ½ hp. The motor speeds can be varied from 370 to 210 r.p.m., with a frequency range from 26 to 14 cycles.

The motors receive their power from a special frequency changer built by the General Electric Co., which consists of a 110-hp. adjustable speed d. c. motor, having a speed range of 780 to 420 r. p. m., and an a. c. generator rated at 110 kva. The operator of the set adjusts his speed in accordance with the speed changes in an adjustable speed Kraemer-type a. c. induction motor, which drives the finishing mills. Thus the speed of the motors driving the run-out table rollers is regulated to the delivery speed of the finishing mills.

Course of Instruction in Safety Methods

A course of instruction in Safety First methods and Accident Prevention for the superintendents, foremen, and gang leaders of all the industrial plants in the Braddock, Rankin and North Braddock, Pa., district will be inaugurated at the Braddock Carnegie Free Library auditorium Thursday evening, Oct. 13. The course is sponsored by O. J. H. Hartsuff, general superintendent, Edgar Thomson Works, Carnegie Steel Co., and will be conducted along the same lines as the safety school held by the National Safety Council last spring in the Pittsburgh Chamber of Commerce.

The Edgar Thomson Works has made a remarkable record in safety and accident prevention this year. Not a single injured employee at present is listed as a "hospital case," and it was to maintain this record and prevent future accidents that the school was inaugurated. Originally intended for Edgar Thomson foremen, at Mr. Hartsuff's suggestion, the scope of the instructions school was widened to include all foremen of industrial plants in the district. Those completing the course will receive diplomas from the National Safety Council.

Six lectures, on six successive Thursday evenings, are planned. The program is:

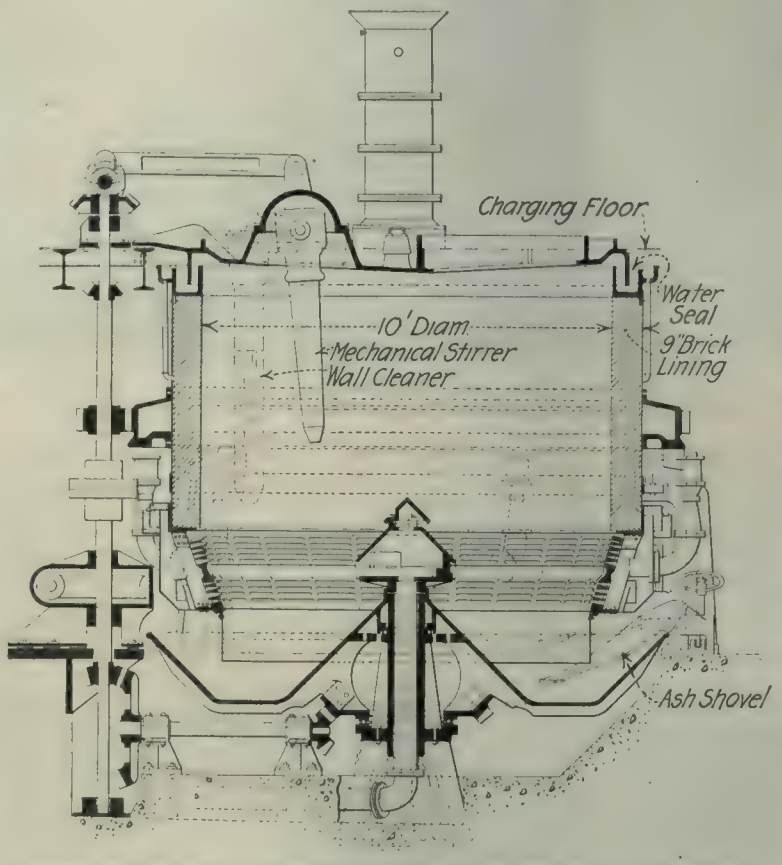
Oct. 13—"The Spirit of Industry," Dr. R. M. Little, of the New York State Industrial Commission.
Oct. 20—"The Foreman's Place in Accident Prevention," J. A. Oertel, Chief of Safety Bureau of the Carnegie Steel Co.
Oct. 27—"The Workman's Place in Accident Prevention," by Mr. Martin, an employee in the Union Mills Machine Shop, Youngstown, Ohio.
Nov. 3—"Eye Protection and Safe Clothing," F. H. Trego, formerly of the Mine Safety Appliance Co., Pittsburgh.
Nov. 10—"Electrical Hazards," E. Friedlaender, of J. A. Morgan, of Edgar Thomson Works, Carnegie Steel Co., electrical department.
Nov. 17—Graduation Exercises, to be addressed by Dr. William T. Dorward, Milwaukee, Wis.

The following general committee has been appointed to make all arrangements: John B. Trusel, chairman, safety director, Edgar Thomson Works; John A. Oertel, safety director, Carnegie Steel Co.; J. E. Lose, Carrie Furnaces; Thomas Crombie, McClintic-Marshall Co.; S. Baum, Columbia Steel & Shafting Co.; John D. Price, Wilson Snyder Centrifugal Pump Co.; Peter Toner, American Chain Co.; A. R. Blainer, Consolidated Expanded Metal Co.; A. M. Kremkau, Copper Clad Steel Co.; John Hockenberger, Benner Tool Co.; E. M. Patterson, Duquesne Light Co.; L. H. Lesimore, Nicholson Chain Co.; James Weeks, Pittsburgh Machine Tool Co.; Joseph Tronsberg, Jr., Acheson Mfg. Co.; B. D. Peters, Rankin Works, American Steel & Wire Co.; George Garver, Braddock Works, American Steel & Wire Co.; Joseph Conner, Sterling Steel Foundry Co.; D. R. Ferguson, J. A. Morgan, David Scott, F. A. Power, F. H. N. Gerwig, Joseph A. Lawler, John Lloyd, and F. F. Slick, of Edgar Thomson Steel Works; W. Milroy of the Union Railroad and F. R. Wilhelm, Rankin Car Barn.

New Mechanical Gas Producer

A number of new features are embodied in the gas producer recently put upon the market by the W. R. Miller Co., Pittsburgh. It differs chiefly from others in having the principal blast distributor on the exterior. It is pointed out that a distributor located in the interior of the producer will be necessarily of large dimensions, or built with arms or branches, to secure sufficient distribution of the blast to gasify the coal thoroughly. Moreover, interior distributors impede the free discharge of ash or clinkers. Clogging of the distributor, and even its destruction from heat, may well result from interference with the discharge of refuse; and, since considerable time is required to replace it there is danger that the producer may be rendered non-continuous.

It is further claimed for the Miller gas producer that since it permits the free discharge of ash, the regular lowering of the fuel bed is possible without disintegration, and the formation of rivers or channels, through which hot gases escape, is prevented. A small distributor is located in the interior, but, if this clogs or burns out, it can be replaced without interruption to operations, since the blast from the exterior distributor may be maintained. The ashes are removed from a water-sealed revolving ash pan by lowering the stationary shovel, and then discharged into a can or bucket, or onto a conveyor.



Section of the New Gas Producer Showing, in Dotted Lines, the New Rotating Wall Cleaner. The blast distributor, with its scores of narrow slots for entering air, appears above the ash pan

Another feature is the easy accessibility of the grate sections through the sealed doors outside the windbox. A blank space in each section, it is claimed, prevents the blast from cutting channels through the interior. The grate sections being protected by the blast, their life is lengthened.

The producer has a double feed, designed to prevent the escape of gas, and since it operates automatically, the flow of fuel into it is regulated. Another important feature is a rotary wall cleaner, intended to keep the producer walls free from clinker. This cleaner, which is water cooled, rotates within itself in close proximity to the revolving walls.

The working force of the Gilbert & Barker Mfg. Co., West Springfield, Mass., will be increased by 200 men within the next two weeks coincident with the completion of its new foundry. As a result of the recommendations of the unemployment conference at Washington, a 4-day basis supplanted its regular 6-day basis on Oct. 10.

Cement shipments in September of the Bessemer Limestone & Cement Co., Youngstown, Ohio, totaled about 97,000 bbl., slightly less than the preceding month. An official of the company predicts that October shipments will be about the same as those in September.

Weldability of Low Carbon Steel

While the oxy-autogenous welding process is steadily extending its scope, experience has shown that by no means are all grades of iron and steel suited for it. Writing in a German contemporary, C. Diegel states that certain impurities are having rather deteriorating effects. This refers especially to sulphur and silicon, the percentages of which should be kept as low as possible while carbon should also be below 0.3 per cent. Manganese the author considers to be an advantage; a high percentage of this element is even held to compensate the harmful effects of sulphur and silicon but the raising beyond a certain mark offsets all the initial advantages owing to the fact that sheets having a high percentage are difficult to work. Phosphorus, a low content of finely distributed aluminum (originating from the reduction) as well as chromium and tungsten originating from scrap, were found to have virtually no influence at all.

The foregoing shows that the material of the pieces to be welded determines the efficiency of the joint, but experiments have proved that the raw material of the wire used for welding plays an even more important rôle. In this connection it is interesting to note that the chemical composition of the wire is by no means always determining the quality of the joint, so that for the time being there appears to be no absolutely reliable criterion in this respect. In view of this fact the writer recommends trial weldings with subsequent testing of the joint, preferably by the bending test. It would appear that the slag contained in puddled iron has a rather beneficial influence; the wire must furthermore be free from impurities, especially sulphur. Charcoal puddled iron and electric iron are considered the best suited materials for wire.

An 8c. an hour cut in wages has been accepted under protest by the 2000 working members of the Metal Trades Council at Seattle. The men have been receiving 80c. per hr., but complaints of investors in hesitating about undertaking new commitments is not due to the price of iron and steel essentials but to the high wage scale in the trades, which in many instances are still on a war footing. About 200 machinists are affected by the reduction.

Many letters have been received by President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, Ohio, one of the four Ohio members of the national unemployment conference, from corporations and individuals pledging their support in helping to solve the problem. According to Mr. Campbell, iron ore producers centering about Duluth are preparing plans for operation of mines.

Prospects for Foreign Trade in Machine Tools

Experience of Recent Years—Superior Position of the United States Compared with United Kingdom and Other Countries—Favorable Indications

By W. H. RASTALL.*

SUGGESTIONS as to the prospects for foreign trade in machine tools, the strength and trend of foreign competition, and the markets that are now active are provided in the following analysis of the experience of recent years. This industry has been most strongly affected by the war and reconstruction and in America is feeling acutely the depression that has spread over the entire world during recent months while, in contrast to this position, the latest returns indicate that British manufacturers are enjoying a constantly increasing foreign business.

In considering this subject, due allowance must constantly be made for the fluctuations in prices. The abnormal demand during the war raised quotations to high levels, so that the results, as expressed in dollars, do not accurately represent the quantities or tonnage actually shipped. Also variations in exchange confuse the situation where foreign currencies are employed.

The only nation that occupies a position of importance as a competitor in this trade is the United Kingdom, and the superior position of the United States is indicated in the following tables, the first of which

Table I

	*Exports from United Kingdom	†Exports from United States
1909	$3,734,837	$3,640,034
1910	3,473,072	5,975,503
1911	3,691,121	9,626,965
1912	4,543,813	12,151,819
1913	4,922,208	16,097,315
1914	4,958,108	14,011,359
1915	3,744,552	28,162,968
1916	5,427,930	61,315,032
1917	10,262,750	84,935,410
1918	6,222,433	51,620,297
1919	‡	58,507,942
1920	‡	44,312,233

*Converted at $4.86 per pound.
†Fiscal year to 1917—calendar year 1918 and after.
‡Detailed figures not yet received.

shows the volume of the exports from each of these countries and the vast expansion of the business from both during the last few years.

It is scarcely accurate to speak of the above countries as competing in this trade, for as is well known the differences in design are so great as to constitute two distinct classes of equipment. Generally speaking, the British tendency in design is toward "universality," that is to say tools, each of which may perform a variety of services as contrasted with the American tendency toward "specialization," the production of single-purpose machines. To a certain extent, Table I also expresses the comparative demand in the world markets for these two types of equipment, and from the nature of the services rendered, neither could expect to exclude the other, as the single purpose machine is the type suited for manufacturing, while the other type has advantages, for example, in the small repair shop. This is illustrated in another way by Table II, and it will be further noted that this table also emphasizes the pre-eminent position of American manufacturers in the machine tool trade of the entire world, for even before the war the United Kingdom would import machine tools from the United States to a value of from a quarter to a third of her own total exports.

It will be noted that entirely apart from war influences there has been a strong tendency in Great Britain toward the adoption of American style machines. The high percentage that has so long been purchased from the United States and the steady increase in this volume since 1910 indicate a genuine appreciation of our methods, and it seems probable that a reasonable demand for our tools will persist indefinitely even though the experience of recent months shows a serious reduction in these exports for the time being. On the other hand, there seems to be very little to recommend the British type of equipment as the volume of shipments to the United States is not large enough to be given separate mention in the British returns.

With the foregoing as a brief statement of the position of American equipment in the world machine tool trade and its history during the last decade, with an estimate of its trend and nature during that time, it is desirable to give closer attention to the present situation, for American exports seem to have fallen to very low levels. This, of course, is but an incident of reconstruction, the depression following the feverish business of recent months, and there are signs that we are already beyond the most severe stages of this collapse. The changes in our exports are shown in detail in Table III, it being remembered from Table I that 1920 represents more or less faithfully the experience of the years since 1916.

British experience is in very sharp contrast with this and it seems that the industry there has readjusted itself pretty well and is practically on a peace basis

Table II—British Exports and Imports of Machine Tools

	Exports from U. K.	British Imports from All Sources	British Imports from U. S.	Per-centage from U. S.
	£	£	£	
1909	768,485	81,155	68,293	84
1910	714,604	81,978	66,078	81
1911	759,490	214,219	192,863	93
1912	934,941	282,643	260,100	92
1913	1,012,800	361,440	324,832	90
1914	1,020,187	427,049	376,605	88
1915	770,484	2,128,383	2,099,076	99
1916	1,116,858	2,911,746	2,849,281	98
1917	2,111,677	2,654,825	2,616,286	98
1918	1,280,336	3,858,264	3,771,994	98

once more. Data given in the preceding paragraphs indicate the situation there during the earlier years of the decade. The following report of Wilbur J. Page, American Trade Commissioner in London, shows the more recent experience:

"The July returns show a fall in both imports and exports in tonnage and total value, though there is a slight rise in the value per ton. The imported tonnage has been settled at a low level for five running months,

British Imports and Exports of Machine Tools

Periods: Seven Months January to July	Total Weight, Tons	Total Value, £	Value per Ton, £
Imports of Machine Tools			
1911-14 (pre-war average)	1,930	187,447	97
1915-18 (war average)	11,370	1,681,927	148
1919	11,120	2,660,040	239
1920	8,221	1,805,432	220
1921	2,379	532,199	224
Exports of Machine Tools			
1911-14 (pre-war average)	8,927	543,583	61
1915-18 (war average)	8,037	771,218	96
1919	7,175	1,024,110	143
1920	11,675	1,604,639	137
1921	14,629	2,124,309	145
Exports of Engineers' Tools, Milling Cutters, Etc.			
1920		915,779	
1921		611,005	

*Chief Industrial Machinery Division, Bureau of Foreign and Domestic Commerce, Washington.

and it seems unlikely that Great Britain will import more machine tools than before the war.

"The usual comparative table shows that on all points the present year is turning out very favorably. The decline in imports is too heavy and prolonged to be regarded as a mere fluctuation. The exports are very much above any previous record in deadweight of machinery—about double the level of 1919—and this high level is the result of a fairly steady increase over two and a half years. It is remarkable that the price of exported machine tools did not rise in step with the general inflation of values, and that the price is now being maintained against the general falling tendency; also that this comparative steadiness of value is accompanied by an increasing trade."

Table III

	Lathes		Other Machine Tools	
	1920	1921	1920	1921
Jan.	$631,271	$818,068	$816,773	$1,222,731
Feb.	587,348	442,491	895,675	778,250
Mar.	1,079,793	337,856	1,943,230	528,563
Apr.	560,008	335,614	1,229,819	379,320
May	829,434	269,835	1,318,478	254,326
June	846,583	131,140	1,127,297	267,344
July	542,175	191,983	915,074	281,936
Aug.	414,604	51,569	972,247	209,630
Sept.	506,781		1,176,175	
Oct.	358,088		1,170,075	
Nov.	589,444		1,131,461	
Dec.	629,594		1,264,939	
Total	$7,575,123		$13,961,243	
1919	10,136,877		12,490,600	
1918	9,853,507		11,626,360	

	Sharpening and Grinding Machinery		Other Metal Working Machinery	
	1920	1921	1920	1921
Jan.	$394,374	$296,385	$1,611,528	$1,956,879
Feb.	261,209	148,210	2,024,929	1,412,630
Mar.	475,248	95,645	1,652,604	1,359,489
Apr.	334,269	84,946	1,489,625	1,255,542
May	276,057	82,183	1,919,421	669,627
June	395,903	60,499	1,134,940	1,029,230
July	396,246	105,293	1,823,097	1,155,283
Aug.	278,864	61,711	1,242,778	608,653
Sept.	333,844		1,190,343	
Oct.	247,788		1,556,908	
Nov.	237,395		1,373,323	
Dec.	314,293		1,557,881	
Total	$3,945,490		$18,830,377	
1918	5,494,060		30,386,405	
1919	6,161,876		23,978,554	

Returns showing the countries to which this equipment has been shipped have not yet been received, but so far as may be judged from American and earlier experience, the heaviest demands are from Europe. It is not at all certain that it is good policy to concentrate too strongly on these markets because of the abnormal conditions. The demand there for American type of equipment seems to have fallen to very low levels and it may be anticipated that British manufacturers will soon feel the same influences or else there will be a revival here.

The markets of Asia rank next in importance and Japan, British India, China, the Dutch East Indies and some of the smaller markets show signs of absorbing an increasing quantity of our equipment. Asia is being industrialized far more rapidly than many of us realize. The next group in order of importance is that including Cuba, Mexico and South America, and although these countries are having serious financial problems, their markets deserve careful attention. The business from even the smallest countries as, for instance, in Central America, is increasing nicely. Australia, New Zealand, and the various countries in Africa give similar promise.

Plans are being considered at Youngstown, Ohio, whereby private interests may finance and erect a locomotive repair plant for the Erie Railroad, similar to that operated at Marion, Ohio. Officials report that the Erie is much in need of additional repair facilities for its locomotives and that Youngstown is among the most important freight centers which it taps. The Erie has assured interested parties that sufficient repair work would be given such a plant to keep it in steady operation.

Walter Sanborn on Industrial Conditions

G. Walter Sanborn, purchasing agent of the United Engineering & Foundry Co., Pittsburgh, and president of the Purchasing Agents' Association of Pittsburgh, made some timely observations anent present day economic and industrial conditions, in a talk at the Pittsburgh Chamber of Commerce on Oct. 4. He laid special emphasis upon the necessity of lower freight rates as a means toward a healthy recovery in business. "Business can't go along in a healthy condition until freight rates are reduced," Mr. Sanborn said, "and until we have a further liquidation on certain basic commodities and wages. Thus far the 12½ per cent reduction in railroad wages is entirely inadequate to place railroads in a position where they can meet the just demands of shippers for lower rates. The wage-earner claims he can accept no decrease in wages until living costs come down. Wages must follow instead of lead decline in cost of living, for so long as the workman has abundance to live on, just so long will he pay any price for necessities of life.

"The slogan from the Government down is 'practice economy.' Our Government could do far more for the unemployed by fighting the high transportation rates than by merely talking over unemployment. Reduction in excessive freight rates will mean more business activity and more business means more work for the unemployed. The Government is urging economy, which means curtailed production of necessities, and on the other hand is urging industry to employ labor, which is impossible under the forced policy of retrenchment and curtailed operation. It is like a dog chasing his tail in a circle.

"We now have indications of more business activity. We hear that if it wasn't for the buyers' strike we would have a healthy condition. Don't misconstrue this as meaning the purchasing agent precipitated the depression. Such is not the case. This period of readjustment had to come. It is a natural condition in the business circle.

"Purchasing agents are like a lot of sheep. Once the trend changes they switch from heavy buying to drastic curtailment. The successful purchasing agent must be a keen student of economics in order to exercise good judgment as to fluctuating markets. A friendly man-to-man transaction will accomplish greater results than a disgruntled, antagonistic discourse. Salesmen often are in a position to tip off the buyer to contemplated changes in market conditions and the salesman isn't going to hand such tips to the hard-shell crab."

Advantages of Consolidation

YOUNGSTOWN, OHIO, Oct. 11.—Commenting on reports of a proposed consolidation of independent iron and steel producers, which have periodically appeared within the past five years, an independent executive in the Mahoning Valley states that such an amalgamation is possible. "In fact, it seems the only logical thing for the independents to do, in order successfully to compete with the Steel Corporation. A strong consolidation, with plants in the East and West, would permit operation on a competitive basis with the leading interest, and would reduce operating, sales and executive expenses to a minimum. Mahoning Valley plants would unquestionably form the nucleus for such a merger."

The Youngstown Sheet & Tube Co., Youngstown, Ohio, which has contracted to supply the Mattie furnace at Girard, Ohio, of the A. M. Byers Co., Pittsburgh, with 60,000 tons of coke, has added a fourth battery of by-product coke ovens to the active list. Delivery of the coke is to cover a period of four months. The price is reported to net the producer approximately $5 at its ovens, which figures back to $3.12½ Connellsville. The Sheet & Tube company is also supplying coke for Mary furnace at Lowellville of the Sharon Steel Hoop Co., Sharon, Pa., in addition to two of its own furnaces in the East Youngstown group.

Cutting Cast Iron by Oxyacetylene Torch

A 5-ton cast iron propeller hub was recently successfully cut in half with an oxyacetylene torch. The thickness of the casting ranged from 7 to 10 in. Two cuts were made, each 40 in. long. No attempt was made to clean the casting, although it had been lying in the open for months and was covered with rust. Nor did the operator preheat the hub preparatory to cutting. The photographs reproduced herewith show how the job looked after successful completion. The work was performed at the shop of a large manufacturer of propellers, as a test of the cast iron cutting qualities of the torch.

The cost of cutting cast iron with the oxyacetylene torch is about five times that of steel, and, in this connection, the following data prepared by A. S. Kinsey, professor of shop practice, Stevens Institute of Technology, and advisory service engineer of the Air Reduction Sales Co., will be of interest.



How Oxyacetylene Cuts of a Cast-Iron Propeller Hub Looked, Thickness Being 7 to 10 In.

"Steel 12 in. thick can be cut with oxygen and acetylene at the rate of about 30 sq. in. per min., costing, say, 1.5c. for labor, 10c. for oxygen and 2c. for acetylene, a total of 13.5c. to cut 30 sq. in. per min.

"Twelve inch cast iron" (used in Professor Kinsey's experiments) "was cut at the rate of 7 sq. in. per min., costing 1.5c. for labor, 13c. for oxygen and 4c. for acetylene, a total of 18.5c. to cut 7 sq. in. per min.

"We may therefore calculate the following approximate figures on a basis of 100 sq. in. of metal cut:

To Cut by Hand Torch 100 Sq. In. of Cast Iron and Steel with Oxygen and Acetylene

		Consumption		Cost			
Material	Time, Min.	Oxygen Cu. Ft.	Acetylene Cu. Ft.	Time	Oxygen	Acetylene	Total
Cast iron	15	123	21	$.22	$1.84	$.56	$2.62
Steel ...	3.5	25	2	.06	.37	.05	.48

"While the above figures show the relative cost of cutting cast iron and steel with the oxyacetylene torch to be high for cast iron, it is fair to note that the only other way to cut cast iron, i.e., by machinery, would cost at least twice as much as cutting it with the torch. For example, a slab of cast iron costing $2.62 per 100 sq. in. to cut off with the torch would cost if cut by machinery at least $5 for labor and power if the casting were of convenient size to handle. However, the cost might be double that amount for machining a big, unwieldy casting."

Fay & Scott, Dexter, Me., lathe manufacturers, started Oct. 3 on full time, a 52-hr. week. This is the first time for nine months that this concern has operated on full time. With the slight upward trend in business it hopes to maintain this schedule with its present crew of approximately 100 men, representing one-fourth of the normal crew.

Hearings on Metric System Bill

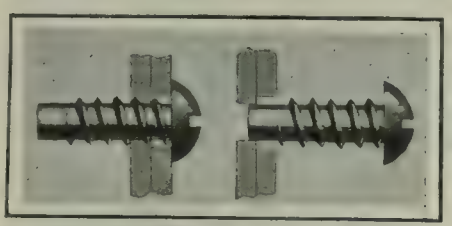
WASHINGTON, Oct. 11.—Hearings on the Ladd metric system bill are scheduled to begin to-day before a subcommittee of the Senate Committee on Manufactures, consisting of Senator McNary, of Oregon, chairman; Senator Weller of Maryland and Senator Jones of New Mexico. The first witnesses to appear will give testimony in support of the measure. Among those listed to present this side of the case are Dr. Harvey W. Wiley, former chief of the Bureau of Chemistry; Dr. Charles L. Parsons, secretary of the American Chemical Society; Howard Richards, Jr., secretary of the American Metric Association; S. L. Hilton, president of the American Pharmaceutical Association; William J. Scheffelin, a drug manufacturer of New York and Theodore H. Miller of the De Laval Separator Co. The names of those to appear in opposition to the measure have not been announced and it is not expected that they will be heard this week, but will be given an opportunity to be heard later. The bill provides for the compulsory adoption of the metric system throughout the country after 10 years.

Tapping Operation Eliminated in Assembly of Die-Cast Parts.

A novel design of screw for use in assembling die-cast parts, recently put on the market, requires no tapping of the hole in which it is inserted. It has a V-thread of fairly steep pitch, and a cylindrical point or pilot, which steadies the thread while it is seating itself in the metal.

A hole is first drilled in the piece which would ordinarily be tapped, a few thousandths larger than the cylindrical pilot, and the piece to be fastened to it is drilled for clearance over the threads. The pilot is inserted in the hole, and by a few turns with a screwdriver the screw is driven to its seat. The screw is hardened and heat-treated, so that the thread cuts into the metal like a tap.

It is claimed for this screw that it will cut its own thread in die-cast or sand-cast parts of gray iron or softer metals, and that its use in such metals will not injure the thread. Its special advantage lies in the fact that it eliminates tapping and skilled labor. It is manufactured by the Parker Supply Co., Inc., New York.



Screw for Assembling Metal Parts Without Requiring Tapping of Hole

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The Todd Shipyards Corporation, New York, has begun work on the reconditioning of the steamer St. Louis for the Anderson Overseas Corporation. Five hundred men were started on the task of making the liner ready, early in January, for the world trade cruise. The actual cost of the conditioning of the vessel has not been stated, but it is reported to be around $1,000,000. Work on the St. Louis will be done at the Robins Dry Dock & Repair Co.'s plant, in Erie Basin. The contract calls for completion shortly after the first of the year, when the steamer will be prepared to carry the exhibits of 300 to 350 American manufacturers on a world voyage lasting until December, 1922. The St. Louis will be converted into an oil burner and will be equipped with every modern device known for the comfort and safety of her passengers.

The new reheating furnace at the steel plant of the Dominion Steel Corp., Sydney, N. S., is now in operation. The installation, which cost $125,000, was completed in 12 weeks. Double shifts were used in the construction work, for the furnace was required quickly in order to complete a large rail order.

Alleviating Industrial Instability

Keynote of Fall Convention Last Week at Springfield, Mass., of Society of Industrial Engineers—Government Efforts

OUTLINING the present industrial depression and contrasting it with the prosperity of a relatively short time ago, pointing out the regularity of such cycles, L. W. Wallace, executive secretary American Engineering Council, in his address opening the fall convention of the Society of Industrial Engineers, of which he is president, sounded the keynote in invoking thought and discussion on industrial instability. He directed attention not only to the recurring cyclic instability but also to that which is always present, saying in part, "It would be most unfortunate if no consideration were given to methods to be invoked constantly in order to reduce the great amount of seasonal fluctuation that is always present. The great seasonal fluctuations in some of our industries are not recognized and their evils not appreciated. In the correction, or at least the material reduction of this evil lies a large possibility for materially lessening the disastrous results of the more general and far-reaching lapse of activity that comes in fairly regular cycles." Mr. Wallace advocated a mental attitude of courage on the part of both the leaders of industry and the workers, saying that during a decline there is often a retreat rather than a fight, an attitude which results in a more rapid decline and is therefore a marked influence in industrial instability. He gave as the consensus of opinion that some of the fundamental reasons for depressions are fluctuations in the purchasing power of the dollar and the many misrepresentations that follow, and also gross expansion of currency and credit.

Other factors contributing to the same end, while not so far-reaching, yet more apparent and tangible, are the many practices and policies of long standing in industry, disclosed in the waste report of the Federated American Engineering Societies. Among these, speculation in raw material, faulty and extravagant sales policies, lack of standardization and more thoroughness in illness and accident prevention, were emphasized. Foreign trade he said is an important factor in stabilizing our industries, although we cannot get our share of this trade, he added, without giving quality and service.

The convention which was held in the Auditorium, Springfield, Mass., Oct. 5, 6 and 7, brought out numerous viewpoints which were intended through better methods of manufacturing, selling, accounting and better industrial relations to contribute in some degree to the solution of the problem of industrial instability.

Efforts of Department of Commerce

F. M. Feiker, assistant to Secretary of Commerce Hoover, in his address on the subject of industrial instability said that the first step in an attempted solution is to devise a plan for getting at facts. He called attention to the weather report as the most widely read, the shortest and most complete report issued by the Government. "What every business man of the country is waiting for," he continued, "is someone to give him at about the same length and with the same authority a statement with regard to business. Similar reports giving in three or four lines 'a picture of business conditions of the fair and warmer variety,' appearing in every newspaper, would," he said, "tend largely to iron out the peaks and fill up the valleys in the ups and downs of our business life."

Regarding the usual attitude toward industrial instability Mr. Feiker said in part: "Few of us get down to brass tacks. We hate to talk about gloomy things. If the steel companies know five months ahead that there is going to be a depression, we do not know it. As Americans we like to think that everything is coming out all right, and therefore when we see the wolf, instead of facing it and trying to hold it up, we just talk about how good business is going to be, instead of taking the experience of the past and making that a background for our action." Mr. Feiker referred to the monthly publication of the Department of Commerce, *Survey of Current Business*, as a step in the direction of presenting statistics in a form to indicate trend of business. In the intimate use of statistics, however, he pointed out, consideration of local conditions as well as the general national situation is needed and there is a wide opportunity for the further localizing of statistics as a factor in stabilization.

In speaking of elimination of waste as a factor in stability, he said that in the manufacturing industries it involves standardization of dimension and elimination of variety. The Department of Commerce it appears is working out a systematic plan of co-operation between the industries and the Bureau of Standards. He named co-operation as the final factor in the stabilization of industry.

Synchronizing Sales and Production

A topic that evoked a great deal of interest was that of the synchronization of sales and production. It was discussed at an informal dinner meeting of the sales and production groups under the chairmanship of W. G. Sheehan, Crystal Washing Machine Co., Detroit. That more sales were lost due to a lack of consistency than to any one thing was a view expressed by Myron E. Ream, industrial engineer, Leffingwell-Ream Co., Chicago. He said that in general there is too much material in the product and pointed out that on the whole management had been neglected in sales, due perhaps to the fact that selling has long been regarded as an art and not subject to scientific method. Gilbert V. White, Chalmers Knitting Co., Amsterdam, N. Y., speaking for the production end stressed the idea of frequent meetings between sales and production departments as leading to the synchronizing of minds that is likely to effect the desirable co-operation.

An interesting viewpoint was given by Ralph Barstow, sales manager, Greenfield Tap & Die Corporation, Springfield, Mass., who said that in his company the sales department was regarded as a customer of the production department, and that the latter had its requirements determined by the investigations of the sales department. The sales department he said is active in investigating new markets and in bringing in new ideas. He argued for a sales representative on the production force to act as liaison officer. Forecasts as to requirements are made on a three months' basis rather than longer he said, both production and sales quotas being revised as often as changed conditions make necessary. Col. Benjamin A. Franklin, vice-president Strathmore Paper Co., Mittineague, Mass., acted as judge and in commenting on the discussion, said that there was need for selection and training of salesmen, stating that too many men merely drift into selling. He pointed out that the two departments should feel a mutual responsibility to each other. Quality, volume, delivery and economy of price was the responsibility of production to sales department; and specification as to goods and volume was the responsibility of sales to the production department.

Scientific territorial analysis as the basis of quotas to individual salesmen was advocated by E. St. Elmo Lewis, New York, in his paper "Setting Sales Standards" given at an Auditorium meeting, of which Benjamin A. Franklin was chairman. An address by F. L. Willis, sales manager Lewis A. Crossett Co., North Abington, Mass., on "Securing the Factory's Co-operation on Quality and Delivery," analyzed the weaknesses in the points of contact between the sales and factory departments. Making the sale, he said, is only

one step in the problem of marketing; we still have the problem of maintaining the good will of the buyer. Quality below standard, delay in delivery, broken or short shipments cause dissatisfaction.

Every sales department, Mr. Willis said, should know at all times what materials are being used and how they compare with previous standards. Mistakes and undue promises are frequently due to the sales department not understanding the limitations of the factory. In connection with the effect of delayed delivery on sales effort, he said that a salesman who is not told by his house when goods can be delivered is at a serious disadvantage. He advocated discussion by department heads of problems arising in production and selling and advocated also intelligent, exact and impartial inspection for control of quality details. In conclusion he said that "industry in this country spends vast sums in merchandising, advertising and sales promotion of its various products. A large part of this is wasted because of a lack of thorough knowledge of what sales promises can be made safely and a lack of effort to see that every individual understands and carries out his part in fulfilling agreements."

Arthur T. Davenport, general manager, Sweet, Orr & Co., New York, at an Auditorium meeting of which Dr. Ira N. Hollis, president of the Worcester Polytechnic Institute, Worcester, Mass., was chairman, addressed the convention on "The Importance to the Factory of Constant Output." Mr. Davenport argued for planning and co-ordination between the production and distributing agencies and indicated the need for engineering method in distribution and advertising. He said that our present selling methods were wasteful and advocated that idle time of salesmen, which he said was very great, be spent investigating extension of the market.

Salary Standardization

A paper that evoked a great deal of interest was that on "Salary Standardization as an Aid to Industrial Stability" read by H. A. Hopf, industrial engineer and organization counsel Federal Reserve Bank of New York. It dealt specifically with the standardization of the salaries of administrative employees, "the white collar brigade," as Mr. Hopf expressed it. "Some more systematic and scientific way of handling office workers is needed, with definition of jobs, a definition of duties and rating according to performance, standardization of salaries and assurance of continuous employment for faithful service," he said. "The question of wage as an incentive," he continued, "has been handled far from properly. There has been no attempt to relate wage to job and in a great many instances executives have deliberately ducked this troublesome problem." Unless there is fairness, quality and uniformity, he declared, there will be no chance to offer a financial incentive. He reviewed conditions as they exist in many business establishments where there is a large administrative force, pointing out how, by standardizing the wage justice is done the employee, and the employer may know with greater accuracy what his salary costs will be. During his talk Mr. Hopf showed slides illustrating by various charts and curves, methods used in standardizing administrative salaries.

White Paint to Reduce Fatigue

A luncheon meeting of the Committee on the Elimination of Unnecessary Fatigue, with Dr. Frank B. Gilbreth, consulting engineer, Montclair, N. J., as chairman, considered the subject of "White Paint as a Reducer of Unnecessary Fatigue." Mr. Gilbreth exhibited photographs showing a tool room so treated, and in this connection said: "White paint not only reduces accidents, and fatigue in general, through reducing eye fatigue, but it directly increases visual acuity. The more general use of white paint as illustrated by this tool room may some day be extended even to stairways in factories, where a much larger proportion of people are killed yearly than of passengers on railways."

A progress report of certain activities of the committee was given by its chairman and the announcement that A. Russell Bond, of the Federated Engineers Development Corporation had recently accepted the secretaryship of the committee was made. A paper on the "Pioneer Work of George F. Blessing in Fatigue Elimination in the Colleges," by Frank B. and L. M. Gilbreth, was read by Mr. Bond. Brief discussion followed on the various phases of fatigue elimination and the use of white paint as one of the standards connected therewith.

Phases of Standardization

The problem of eliminating waste in industry by standardization was discussed in three particulars at an afternoon Auditorium meeting, the chairman of which was Lee Galloway, vice-president Ronald Press Co., New York. Dr. H. C. Emerson, Emerson Laboratories, Springfield, Mass., in his paper on "Material Standardization" pointed out the place of the chemist in standardizing raw material and finished product and also in the development of standards by research. E. E. Hunt, Washington, D. C., secretary of the National Unemployment Conference and member of the Committee on Elimination of Waste in Industry, asked Dr. Emerson what industry had advanced most in research work. He referred the matter to Miss J. E. Minor, one of his associates, who said that it was her impression that in the matter of research the steel industry had gone further than any other.

Machine standardization was taken up in a paper on the subject by L. P. Alford, editor *Management Engineering*. Standardization, he cautioned, is not a rigid fixing of something that cannot be changed; "it does not carry the idea of the ultimate, but of progress—a progressive standard." Standardization of machinery, he said, includes the items of proportionality, direction of certain motions, and standardization of elementary times. Of the latter he remarked that the buyer should be given an instruction card giving time and motion study of its elementary operations, showing the opportunity for production from a given machine. Controls, he said, such as hand wheels and pilot wheels, if standardized, would bring about important advantages.

Dr. Gilbreth dealt comprehensively with standardization of the task in his paper on that subject. Any one class of standardization affects every other, he stated. For best results "the machines, the materials and the decisions and motions relating to the human element must be considered in the greatest detail. Failure to consider all classes along such broad lines, he said, has been the reason for failure of many attempts at standardization. "No task," he pointed out, "can be set properly unless all features and conditions beyond the control of the individual are controlled within reasonable tolerances for him." The task must be achievable. Another principle emphasized by Dr. Gilbreth was that "the extra high pay or bonus paid for the accomplishment of a task must come in the final analysis, from the savings that result, or again the whole plan of task management will fail." All three phases of the subject of standardization brought out considerable discussion.

Banquet Closes Convention

At the informal banquet which closed the convention, held at the Hotel Kimball, Reuben A. Lundquist, chief of electrical division, Department of Commerce, Washington, addressed the members on "The Influence of Foreign Trade Upon Industrial Stability." "It has been pointed out by Mr. Hoover," he said, "that while the exports of the United States are not a great percentage of our total production, 25 per cent of our wheat, 60 per cent of our cotton and 75 per cent of our copper and an important percentage of other commodities go abroad. These exports are the normal surplus production of such commodities which must find a market overseas in order that the West and South may prosper." Mr. Lundquist then pointed out that the prosperity of those sections doing an export trade results in trade opportunities for other sections that are not exporting, in supplying the former's needs. In that way an indirect influence for stabilization of industry is effected.

In connection with the direct results of export trade as a stabilizer he said: "Two years ago a little over 50

per cent of the motorcycles went abroad. Last year the percentage was 55 and that in the face of a decreasing domestic demand."

E. E. Hunt described the preliminary work in the organizing of the National Unemployment Conference, and Floyd W. Parsons of the *Saturday Evening Post*, Philadelphia, outlined in general the status of scientific development, saying that "the foundation of industrial stability is the intelligent understanding and practical application of science in business."

Attendance and Plant Visits

There were 318 registrations at the convention. Besides general meetings, sectional luncheon and dinner meetings were held. Active interchange of experience was as usual a feature of the intervals between sessions. The mornings of each day were devoted to plant inspection trips, among which were National Equipment Co., American Bosch Magneto Corporation, Rolls-Royce of America, Inc., Hendee Mfg. Co., Moore Drop Forging Co., all of Springfield, Mass., and Gilbert & Barker Mfg. Co., West Springfield, and the Greenfield Tap & Die Corporation, Greenfield, Mass. An exhibition of organization charts, standardization charts, charts of course and control of manufacture, etc., was made by various industrial engineering companies in the lobby of the auditorium.

New President and Secretary

At a meeting of the board of directors Joseph W. Roe, professor of industrial engineering, New York University, was elected to take the place of L. W. Wallace as president of the society. W. G. Sheehan, vice-president, Crystal Washing Machine Co., Detroit, was elected secretary in place of Edward L. Ryerson, Jr., Joseph T. Ryerson & Son, Chicago.

The place and subject of the next national conference of the society have not as yet been determined.

HIGHER SHEET PRICES

Buyers Notified That an Advance of $5 Will Be Made Oct. 15—Plates for Tank Car Interests

YOUNGSTOWN, OHIO, Oct. 11.—Independent sheet interests throughout the Middle West are notifying their customers that prices on all grades of sheets will be uniformly advanced $5 per ton on Oct. 15, establishing the new prices at 2.75c. for No. 10 gage blue annealed, 3.25c. for black and 4.25c. for galvanized. The principal producers are joining in this action, contending that sheet production costs have heretofore been in excess of prices. Tonnage placed with such makers prior to Oct. 15 will be accepted at the current levels of 2.50c., 3c. and 4c. for the respective grades. It is considered unlikely that this advance will force the volume of business to the mills which preceded the previous increase. Substantial sheet orders are being booked, however, and though makers have been cautious in accepting future commitments, a number of interests are scheduled ahead well into November and in some cases beyond.

Buying by jobbing interests is an important factor in the current movement, aiding to offset in some measure loss from automobile builders. The Ford Motor Co., for instance, due to its reduced schedules at Detroit, has held up specifications against both sheet and strip contracts.

Inquiries for Plates

Inquiries for plates during the past week before district interests aggregated in excess of 10,000 tons, principally from tank car interests. One such concern in the Shenango Valley, for instance, has been inquiring for 2500 tons of plates. An oil distributing agency at Youngstown has placed an order with the Standard Tank Car Co., Sharon, Pa., for a number of tanks for lubricating oil storage whose capacity will aggregate 120,000 gal.

Though the independent plate market is still somewhat difficult to gage, there is full expectation among this class of producers that quotations will be shortly advanced $2 per ton.

An advance in sheet bars from $32 to $34 and possibly $35 is almost certain to follow higher sheet prices, inasmuch as self-contained sheet interests are not likely to give non-integrated makers any advantage in costs. The previous sheet price increase was followed by an advance in open-hearth sheet bars from $30 to $32, affecting other semi-finished products in a proportionate measure.

The full-finished sheet market continues at 4.35c. for No. 22 gage auto body stock, in face of reduced demand.

More Demand for Strips

The week has witnessed an upward turn in strip steel placements, affecting both hot and cold-rolled, but this market is not affected by the sustained buying which has prevailed in sheets, for instance. One Valley strip interest has completed rolling 1000 tons of hot strip, including several "sample" orders. Among the orders rolled were 350 tons for a tube interest in Michigan, a tonnage for a fabricator at Youngstown, material for Dodge Bros., auto makers, and a number of small miscellaneous requirements.

A recent heavy sheet order rolled by a Valley mill included a substantial tonnage for conversion into running-boards for Ford cars.

Various independent sheet makers claim that a careful survey throughout mid-West mills reveals that production costs on common sheets range from 3.10c. to 3.40c. with various interests. They point to their inability to continue long to sell black sheets at 2.75c. or even 3c. on such a cost basis.

As a general rule, September bookings in virtually all steel lines, especially the lighter products, exceeded business placed in August, which marked a definite turn for the better in this district. Whether October will maintain this rate of inflow is questioned in some quarters.

Steel Pipe Stronger

Standard steel pipe has shown more strength since the recent attempt to stabilize the market, but all producers are evidently not subscribing to the new discounts owing to claims of price considerations advanced by some buyers. The smaller sizes continue in more active demand, while moderate requirements for line pipe continue to come to the mills.

Inquiry for tinplate for 1922 delivery has made its appearance and district producers believe that next year will prove much more favorable in this branch of the industry.

The buying movement in scrap metals appears to be losing ground, though the aggregate tonnage purchased the past month represents an increase over the combined purchases during several of the summer months. Heavy melting is nominal at $14 to $14.50, while hydraulically compressed scrap is quoted from $13 to $13.50. Minimums rule on going business.

Prime Western spelter has been purchased at 4.50c., f.o.b. St. Louis, as compared with a recent low of 4.10c. Consumers in this territory have been buying more or less freely in anticipation of continued demand for galvanized sheets.

Due to absence of demand from the railroads and agricultural implement makers, demand for steel bars continues exceptionally light. The price range on cold strip is from 3.75c. to 4.25c., with the minimum price easily obtainable on certain classes of tonnage, while hot strip ranges from 2c. to 2.25c.

It is significant that tonnage is not coming into the mills in proportion to current shipments, especially in sheets and wire products. Specifications on standard pipe continue at 40 per cent. Tin plate is unchanged at $5.25 for production plate, though some current production is reported to be going into makers' warehouses. Skelp is more active and rules at 1.60c. base, Pittsburgh.

CONTENTS

Improved Core Output from Smaller Space 927
By Improved Working Conditions for Girl Core-Makers, Better Product and Higher Type of Employee Secured

Figuring the Charges for Foundry Irons 931
Iron Mixtures and How to Figure Them Chemically—Classification of Castings and Suggested Analyses

Crane Operating Costs at Blast Furnaces 935
Locomotive and Ore Bridge Cranes Save Much Money Compared with Hand Methods—Analyses of Costs

Making Dump Bodies for Motor Trucks 937
Specialized Factory Unit of Van Dorn Iron Works Arranged for Convenience and Economy in Handling Materials

Progress in Iron and Steel Metallurgy 939
Electrolytic Iron Malleable Castings and Metallographic Research Discussed by Mining and Metallurgical Engineers

Permission to Reduce Ore Rates Granted 944
Move Is Regarded as Entering Wedge of General Rate Lowering—Will Probably Not Affect Large Tonnage

Motor Drives on Rolls and Run-Out Table 946
Features Adopted in New Mill to Co-ordinate Roll Trains and Run-Out Table—Three-Phase Motors and Frequency Changers

Prospects for Foreign Trade in Machine Tools 949
Superior Position of United States Compared with United Kingdom and Other Countries

Alleviating Industrial Instability 952
Keynote of Fall Convention of Society of Industrial Engineers at Springfield, Mass.—Government Efforts

Casting and Working Non-Ferrous Metals 961
British Institute of Metals Meets in Birmingham—Steel Casting Methods Applied to Brass—Progressive Cold Drawing

Two Principles in Hot Drawing 930
Exports of Metal Working Machinery 930
Friction Tapping Device 930
Care of the Eyes in Industry 933
Makers of Electric Steel Castings Meet ... 933
Trend of Prices 934
British Developments in Stainless Iron ... 934
Employment in Steel Industry 938
Graphitic Corrosion of Cast Iron 938
Steel Ingot Output 943
Gear-Tooth Grinding Machine 945
Course of Instruction in Safety Methods .. 947
Mechanical Gas Producer 948
Weldability of Low Carbon Steel 948
Present Industrial Conditions 950
Cutting Cast Iron by Oxyacetylene 951
Hearings on Metric System Bill 951
Screw for Assembling Die Castings 951

Editorials 956
Freight Rate Reductions—Coal Out of Line—Washington Conference.
Correspondence 958
Effect of Hourly Rate Reduction—Application of Time Study in Foundry—Economic Status of Dollar.
Foreign Trade Conditions 959
Newark Foundrymen Meet 960
Coming Conventions 960
National Hardware Association Meeting .. 960
Engineering Meetings in New York 960
Labor Notes 963
Iron Ore Shipments in September 967
Ore Hearing Postponed 976
Steel Corporation's Orders 976
Export Meeting 977
Refractories Market 979
Confusion as to Revenue Legislation 981
Trade Paper Quotations on Ferromanganese 981
Light Duty Francke Couplings 981

Iron and Steel Markets 964
Comparison of Prices 965
Prices Finished Iron and Steel, f.o.b. Pittsburgh 978
Non-Ferrous Metal Markets 979
Personal Notes 980
Obituary Notes 981
Machinery Markets and News of the Works 982
New York Jobbers' Prices 990

ESTABLISHED 1855

THE IRON AGE

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Freight Rate Reductions

It is much easier to assert that the transaction of business is interfered with by the existence of a given condition than it is to produce revival in business by removing that condition. In many quarters the opinion has been expressed that freight rates ought to be reduced in the interest of revival in business, and the opinion is well supported by the argument that practically everything else has been liquidated, so why not freight rates? That is different from predicting that a revival in business would immediately follow a reduction in rates. Since business began to fall off last year we have had from time to time various lists of the things that were needed to put business on a firm foundation. Not a few of these things have been granted, without business responding.

The announcement that iron ore rates are being reduced by 28 per cent—which is the arithmetical converse of the 40 per cent advance in August of last year—and that other reductions are to follow, will certainly not have the effect of stimulating business. Rather it may encourage buyers to wait for those reductions that will benefit them. It may, and probably will, cause more active planning, so that the benefits when offered can be reaped. Pig iron producers will not reduce their selling prices by reason of ore rates being reduced, one reason being that they have large piles of ore, which are not affected, while another reason is that they feel they need all they can get, the declines in pig iron earlier in the year having in a measure anticipated rate reductions. As to an actual reduction in the cost of producing pig iron, reductions in coal and coke freight rates would be much more to the point, since day by day by-product ovens are receiving coal and blast furnaces are receiving coke.

Even if rates on all blast furnace materials, ore, coke and limestone, were reduced, the pig iron consumer would have something more to ask. He pays freight on pig iron, and has been counting on the rates being reduced. He may even feel that he is entitled to reduced rates on his finished products.

The sooner the rate structure is put on a level from which substantial further reductions need not be expected the better it will be for business. Stability is all important.

The railroads are not in position to make large reductions in freight rates in general, though on coarse freight it is conceded that the injustice of last year's 40 per cent increase should be righted. Too much stress has been laid on the recent increase in earnings, for the rate is not yet satisfactory and the roads have a large deficiency to make up. In the first six months of this year the earnings were at the rate of only 1.8 per cent. July showed a rate of 4.5 per cent, but that involved a deficiency of 1.5 per cent, to be added to the deficiency of the first six months. It is quite impossible for the earnings in the remainder of the year to make up any large part of the deficiency. For the seven months through July the average was 2.2 per cent a year, so that at best there will be a large deficiency for the year.

The volume of freight movement has not been as small as might be inferred from the claims made in so many quarters that industrial activity is impeded by the high rates. The last three months for which statistics are available, May, June and July, each showed a freight ton-mileage of more than 28 billions, representing a rate well above that in any year prior to 1916 and only 25 per cent below that in the record year, which was 1920.

Coal Out of Line

The fact that the bituminous wage scales with the United Mine Workers run to April 1, 1922, seems to discourage discussion of the subject of coal prices in connection with the readjustment in industry. The scales are extremely high and it seems to be inferred that as a matter of course they will be adjusted at the next biennial settlement. For a time there was some expectation that on account of the altogether unusual condition a mutual agreement would be reached reopening the subject. For this there was sufficient precedent in the upward revisions that were made last year, after the scales had been settled for two years from April 1, 1920. If the matter could be opened for the benefit of the miners, why not for the benefit of the public?

It is altogether idle to assume that as a mat-

ter of course the bituminous wage scales will be revised to a harmonious relation with the general wage level of industry. On the contrary, there are plain evidences that the United Mine Workers intend to hold out for a full renewal of the existing scales, irrational as they are. Report has it that the present plan is to demand an advance and bring on a strike. It is even rumored that a deal is being arranged between the miners and the railroad brotherhoods whereby the latter will endeavor to help the miners by refusing to fire or haul non-union coal.

The high cost of coal is undoubtedly a great impediment to industry. If cost has anything to do with consumption, and that is an accepted argument as to most commodities and as to freight rates, the high cost of union bituminous coal is certainly a great drag upon industry. The price of coal f.o.b. mine is a serious concern to the whole public, as an economic matter, while it is of direct concern to practically every one, for all are consumers of coal. There is no other article of commerce whose cost is so widely felt. Nor is this a cost that is important in percentage and not in dollars, for a dollar a ton on coal is, on an average, more than half a billion dollars a year in the nation's coal bill.

The cost of non-union coal at the present time is much below the cost of union coal, and yet wages in the non-union fields are high as compared with pre-war rates. When made into coke the cost to the consumer is not particularly high. Thus Connellsville coke, made with wage rates that compare favorably with wages in the industries generally, has been quotable lately at $3.25 per net ton. That is hardly an inflated price. It has been customary of late to take 1913 average prices as a basis for measuring present levels. In its annual summary the Connellsville *Courier* set the average value of merchant coke shipped by the Connellsville region in 1913 at $2.95, only a small percentage of this being foundry grade. The present price is only about 10 per cent higher. The average in the ten years, 1904 to 1913 inclusive, was $2.22, and $3.25 is only 47 per cent above that.

Union bituminous coal can make no such comparisons. One may compare coal prices if he likes or he may consider simply the altogether uneconomical conditions under which coal is mined, with miners expecting to make a living by working very much less than full time. At present the ambition of the union miners seems to be to charge the public, after April 1, 1922, with back pay for the time they have been idle of late as well as the time they may lose in a strike. This is a matter of the greatest concern to the public.

Leaders in the British iron and allied trades have taken a pessimistic view on other occasions of the outlook for industry in their country, but it is doubtful if they have been more depressed at any previous time than they are to-day over business and political conditions. From published expressions and from what is imparted to Americans visiting the British Isles, many manufacturers there see no way out. Trade is in a low state and unemployment is general, while the workers are in a defiant mood, refusing to co-operate either with employers or with the Government in finding and applying remedies for the situation. Many continue to choose to take "doles" from the Government rather than work, even at a considerably larger wage. Some slight reductions in iron and steel wages have resulted from recent conferences based on sliding scale agreements, but fuel costs beyond reason and wage scales generally two and a half times those prevailing before the war leave British works still exposed to severe competition not only from Germany, but from Belgium and France. Recently the filling up of German order books seemed to promise relief, but at best it can be but temporary.

The Washington Conference

Naturally the largest results of the unemployment conference will be in the emergency measures it causes to be set on foot throughout the country to increase the number of the employed. It is encouraging to find that mayors' emergency committees have been created and are actively at work in 31 cities and that eight cities have taken steps for the immediate prosecution of local public work and for the advancement of construction. Unquestionably the conference has done much also to avert the sagging of industry on the verge of winter. There had been many predictions of a winter crisis, and the prevalent view that real improvement—the beginning of a period of profitable employment in industry—cannot be looked for before the spring of 1922 had begotten an expectation that the situation would drift, with little or no concerted effort apart from that directed to the relief of suffering. That feeling the conference has definitely changed.

One accomplishment of the conference that was not set down among the agenda, and that therefore may be reckoned as a by-product, is setting before the people projects for the general good in the carrying out of which they can unite their effort and drop their differences. It was high time the nation had something put before it on which the people could make common cause. For nearly three years now, or almost from the day of the armistice, the changes have been rung on things about which opinions and interests are divided. The rent profiteers; the retailer profiteers; the grudging workers whose performance has been far out of proportion to their pay; the employers who, according to the heated charges of labor leaders, were combining to destroy unions and put down wages; the friends and foes of the League of Nations who were reciprocally accused as responsible for world-wide stagnation in industry—all have been arraigned in the flood of charge and countercharge. The Hoover conference, for the first time since the splendid effort in the Liberty Loan campaigns, has given the whole people an opportunity to pull together for the common welfare.

Another important result already achieved is in furnishing evidence that the unemployment situation was not as grave as some reports, and commonly accepted reports, had indicated. With-

out taking on the aspects of the sunshine movements of other periods of depression, the conference has given business a measure of assurance it did not have hitherto, and impressed upon leaders in all industries a sense of responsibility that in some cases has not been as much in evidence as it should have been.

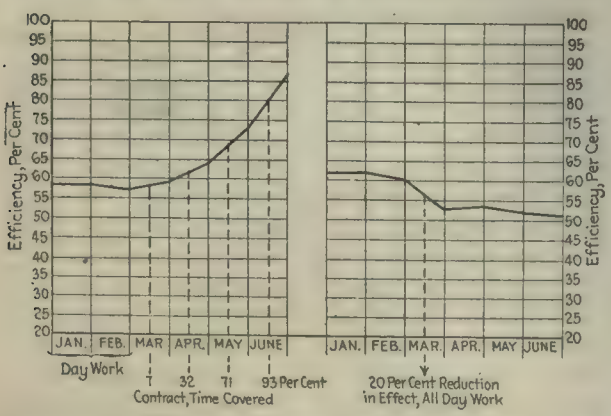
It may have been too much to expect that subjects on which differences would develop would be kept out of the sub-committee sessions dealing with the causes of present unemployment and with more slowly working remedies. Secretary Hoover sought to prevent the wage question from taking a leading place in the discussions. Comment on some developments in this connection may well be deferred until final action is taken within the coming week. Whatever the outcome on these larger questions of permanent policy, it can be said now that the conference was carried through, as it was conceived, on the high plane of service to the community, and already has taken its place as a constructive force of large possibilities.

CORRESPONDENCE

Effect of Hourly Rate Reductions

To the Editor: Reducing wages to decrease the cost of production is just as far wrong as demanding more wages and less hours. With no standards as a basis to work from, one does not know whether he has reduced costs by decreasing the payroll, unless he also knows that production is the same as before.

Some firms with a system can say "we have our standards," and can reduce the hourly wage rate 20 per cent and insist that the flow of production remains the same; but the majority of manufacturers have nothing to work from except the payroll, expenditures for material and receipts for finished product. They know the payroll has been reduced 20 per cent, but don't know what percentage of saving was effected by making the wage reduction.



Comparative Effects of Different Methods of Cutting Costs

It has been proved that it is not necessary to reduce wages to decrease costs. The better way is to increase the efficiency of the plant by installing standards, and to pay the producer according to his efficiency. Then, if a man earns $10 in 8 hr., no one can say his wages are too high, as it is not alone the length of time he works but what he produces in that time.

No workman's wages were ever too high if the standards are correct. We cannot get away from the "law of compensation" and run a business from its own momentum. The elements of power to keep it going are "profits," and an incentive to the workman for more and better production decreases manufacturing costs.

The accompanying charts show in graphic form the six months' record of two manufacturers who had no production standards, but had an hourly rate standard. Both realized that manufacturing costs must be decreased somehow. Time studies were made in both cases, to determine the possible production and the per cent efficiency at which they were working on the hourly basis. Although both were in the same business, one was equipped a little better than the other, working at 62 per cent, while the other plant's efficiency was 58 per cent.

No. 1 chart shows the manufacturer who used the information gained from time studies in setting standards and installing a contract system. He paid his employees according to these standards, increasing the average wages 4 per cent over the old day work rate, increasing productive efficiency from 58 to 87 per cent, and decreasing the unit cost nearly 40 per cent.

No. 2 chart shows the manufacturer who did not use to advantage the information gained from time studies, but deliberately reduced the payroll by cutting the hourly rate of employees 20 per cent, foremen included, thinking he was reducing the unit cost 20 per cent. He soon found that this reduced production from 62 to 51 per cent, in addition to increasing the unit cost 9.5 per cent; and every man who remained on the job was dissatisfied. This plant had to close down entirely, four months after the reduction in wages went into effect. The comparative record shows a difference from 87 to 51 per cent in efficiency, and goes no further than the quitting point of the one in June. The other, since then, has made steady improvement, and made further gains in efficiency and reduction of unit costs by fair scientific reward methods.

To decrease manufacturing costs, labor must be encouraged; cutting a man's wages takes the "pep" out of him.

H. M. FITZ,
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McVicker Engineering Co.
Metropolitan Life Building,
Minneapolis, Minn.

Application of Time Study in the Foundry

To the Editor: For various reasons the time study element of modern or so-called scientific management has been slower in finding its way into the foundry than into the machine shop. If we stopped to analyze we would probably find that the average foundry is run on a looser basis than the average machine shop, which condition is hardly justifiable, especially in our foundries doing repetitive work. Of course, founding or molding may be considered as an art and was in use long before science developed the machine, and this may be one reason why the old methods have clung to foundrymen to some extent. Again it is a natural trait; and we are fortunate that such is the case—to tackle the easier job first.

The writer believes that it is easier to establish a standard time on a machine operation or to standardize machine work, which depends more on the machine than on the human element, than it is to establish standard time on most foundry operations where the human element is a large factor and some of the conditions seem practically beyond control. Too much credit cannot be given the machine shop man for the advance he has made in this respect and it certainly looks as if the time will soon come when those foundries which insist upon guessing at the time required and costs on various jobs will find themselves in an embarrassing position.

The real benefits that are to be derived from applying time study are to be had when the foundryman applies it for himself and by this it is not meant that the foundry superintendent or foreman should attempt to make time studies but that they should be made by some one thoroughly familiar with foundry practice and by one who also understands thoroughly the elementary principles of time study.

Co-operation by the supervisory force is absolutely essential and this can only be obtained when this force

has confidence in those elements of time study which are being applied. Even after it is applied there are a hundred and one things that may turn up. The foremen usually debit them against time study and they begin to think that it is all wrong. At this point the part which they think is wrong must be carefully straightened out in their minds, and if encouraged they keep applying time study, and at the end of six months or more the results will be surprising, for even the most obstinate will be proud of the wonders brought about.

The time element is being applied in the foundry daily but there are many who do not realize they are using it. When the superintendent or foreman sets a piece work price, he considers how many pieces can be done per day or per hour; and when he estimates his equipment requirements, he takes into consideration the number of flasks, etc., required per day, thus using a time unit; and he goes further, he considers how long it will require to dispose of a ladle of iron and get the ladle back to the cupola again and so from this estimate, he arrives at the number of ladles required. And so if we will stop and consider practically everything we plan, or estimate, or consider, we bring in the element of time and it usually is a very important factor.

There is an old maxim which states that a thing worth doing is worth doing well, and this maxim certainly applies to the accurate application of the time element which we take into consideration so much, and of which we are many times unaware. Now there are many ways in which time can be measured correctly or perhaps we had better say the operations, movements, jobs, etc., but the one which seems the most practical and perhaps the cheapest, is the decimal stop watch in the hands of some one who can record or make an analytic or elementary time study and observation.

This will give quite an accurate record of all the movements entering into the particular proposition under consideration and likewise the time required in performing each. This is surely a big improvement over any person's estimate of the time required to perform work, or even the actual round or total time taken, or previous production records. We know from experience that many unnecessary movements have existed for years and likewise some times movements necessary to produce a high quality porduct have been omitted.

The writer believes that the time will soon come, if it is not already here, when foundries will not be able to afford to pay for unnecessary movements or in other words to waste human and mechanical energy. Nor will they be able to afford unnecessary equipment, but will have to apply time study or some other efficient method that will eliminate the waste movements and will route the equipment so that only the smallest amount of equipment will be purchased.

J. F. BLANK,
Foundry industrial engineer.

Greensburg, Pa., Oct. 4.

The Economic Status of the Dollar

To the Editor: What makes the dollar worth less than one hundred cents when we spend it is the fact that we have given less than one hundred cents worth of service when we have received it.

This is an economic truth which is so evident to some of us that we take it for granted that everyone understands it. As a matter of fact, however, it is little or not at all understood by the rank and file of employees, and now, while the pay envelopes are thinner, is a good time for employers to do a little educating in as elementary terms as possible.

Those to whom labor has hitherto listened have made it appear that the reason for the purchasing power of the dollar being so small is because the manufacturer or some intermediary keeps the most of it. There is no need at this time to review the figures which have been published from time to time showing how production has shrunk as wages have increased.

The idea I wish to convey is that the employee is loath to accept fewer dollars per week unless he can be convinced that those fewer dollars will constitute in reality a larger income. This will be the case if he will do his part by bringing his output per day up to the old standard; in other words, by doing one hundred cents worth of work for every dollar received.

The workman lost his golden opportunity when he lent such a willing ear to the doctrine of restricted output with higher pay, for it is possible that but little wage adjustment would have been necessary if quality and quantity had at least been maintained. He would have comprehended the principle involved if on going to the corner grocery he had been informed that not only was a given article advanced in price but hereafter twelve ounces would constitute a pound. On the other hand, management lost its golden opportunity when it failed, or in many cases did not try, to convince labor of the unsoundness of such a doctrine and of inevitably resulting unemployment.

It seems as if employers would have to go on year after year confessing their inability to sell ideas to the employees as successfully as do the labor leaders. The latter retain the confidence of the workmen even when reducing their incomes by calling strikes. Employers do not gain that confidence even when increasing wages. What is the reason?

H. D. MURPHY.

Medford Hillside, Mass.

JAPAN CONTINUES BUYING

Purchases of Rails, Tin Plate and Sheets—Government Inquiry for 5000 Tons of Rails—German Competition

NEW YORK, Oct. 10.—Japanese purchases are continuing in fair volume, government and private railroad buying, tin plate and black sheets leading other products. Some of the gradual increase in buying from this market may be attributed to the feeling among the Japanese branches in New York that the bottom has been reached in the American market, for they are now advising home offices that the price trend is upward.

In rail purchases one Japanese export house has booked an order for 500 tons of 60-lb. rails for a railroad in Otaru, northern Japan, while an order totaling 1400 tons of 30-lb. rails for this district was placed with British interests. This same export house has sold 1000 tons of 90-lb. T rails to a Tokio municipal trolley line. A little more than 2000 tons of 30-lb. rails, A. S. C. E. sections, recently went to a German mill at a reported price of $40 per ton, c.i.f. Japanese port. The Imperial Government Railways in Japan have issued a new inquiry calling for about 5000 tons of 60-lb., 75-lb. and 100-lb. rails. German quotations are in many instances low, compared with the American prices, c.i.f. port. Tank plates are reported to have been delivered, c.i.f. port, at $39.50 per ton on a fairly large tonnage, while a price of £10 5s. ($38.76) per ton, c.i.f. port, is said to have been made by German sellers on mild steel bars.

Tin plate has been active of late in Japanese purchases. One New York exporter reports having booked his third order in about three weeks for between 6000 and 7000 base boxes of oil can size tin plate. Other exporters report having received various sized orders totaling several thousand boxes. The present wave of tin plate buying is attributed by one Japanese house to the lower prevailing prices on that product in this country and the unsatisfactory conditions and prices in the Welsh tin plate industry, which generally receives a large portion of these purchases.

A Japanese inquiry for steel gas pipe that has been in the market for several months, calling for a total of 300 tons of pipe ranging through all sizes from ⅛ in. to 12 in., has been placed with a large Japanese export company. This company also reports booking an order for 240 tons of flat bars and heavy bookings of black sheets, besides the sale of several hundred Arco heaters of the American Radiator Co. The transmission tower inquiry calling for 610 towers for the Tokio Electric Light Co. and a smaller number for the Kehein Electric Light Co. in Japan, will be placed with a Japanese fabricating shop, but the steel will be purchased abroad—either in the United States or on the Continent, probably the latter because of price.

NEWARK FOUNDRYMEN MEET

Addressed by Dr. Richard Moldenke, Who Told of His Observations in Germany

"Something must be done by the United States to help the people across the water to pay for the material they need in work," said Dr. Richard Moldenke, consulting engineer, Watchung, N. J., who addressed the first fall meeting of the Newark Foundrymen's Association at the Down Town Club, Newark, Wednesday evening, Oct. 5. In his address, Dr. Moldenke recounted many of his experiences while in Germany in the spring of this year on a financial mission of semi-offical character. "There are 400,000,000 persons in Europe who want goods but cannot pay for them except in work," he said. "Credits must be arranged so that purchases can be made and Europe pay in this way."

Little German Competition Except in Chemicals

Only two nations in Europe, he said, are really working—Belgium and Germany. In both countries, with the exception of the occupied districts of Germany, it is not unusual at night to see the lights of many plants which are operating on an extra shift. As to German competition, there will be no serious attempts along this line, except in chemicals. This was the great German product prior to the war and this, the Germans believe, should be Germany's greatest product now. Eventually, Germany and Russia will be even closer than they are now, for the bond between the two countries is greater today than before the war. Russia needs German engineers, technical men and German products, and Germany, which is today only 20 per cent agricultural and 80 per cent industrial, needs Russian food.

Dr. Moldenke said that the least work is being done in the occupied districts largely because of the tax of 50 per cent on all goods exported. In the collection of this tax, he said, the French are the most exacting, requiring a license to ship for even a small parcel and as only about 200 applications a day can be handled, there were more than 300,000 applications piled up when he was in Germany in the spring. This situation has created the impression in Germany that France is determined to throttle German industry. The British and Americans are inclined to be more lenient. Dr. Moldenke explained this situation to show one of the reasons why the popular feeling in Germany against the English, which was so great during the war, is now turning against the French and a far more friendly attitude prevails toward the English.

New Method of Briquetting Borings

In the briquetting of borings by one of the new methods, the borings are put into a large drum, heated with gas and when red hot are transferred to a case of the proper size, where under a steam hammer and with a single blow a briquette is formed. These briquettes are being made notably thin for facility in melting. Another interesting new method noticed by Dr. Moldenke was in desulphurizing iron in the ladle. When the iron started to boil a compound considerably stronger than soda ash—probably potash—was added to the top of the ladle. By the use of this compound it was possible to start with as high as 0.12 per cent sulphur and reduce to 0.06 per cent.

He reported considerable activity in the Krupp plants in the production of high silicon acid resisting castings. For use in the manufacture of nitric acid the Krupps have perfected a stainless, acid-resisting steel. Another new development by German metallurgists is a high silicon iron.

In concluding Dr. Moldenke pointed out that despite her present poverty and bad financial condition Germany has appropriated money for the establishment of two new institutions for investigation and research in metallurgy and will undoubtedly continue to progress along these lines.

The meeting of the association was well attended.

Accessions to membership were as follows: The F. & H. Foundry Co., Franklin Williams, Inc., Phoenix Brass Foundry, all brass foundries of Newark and the American Foundry Equipment Co., New York.

COMING MEETINGS

October

National Implement and Vehicle Association. Oct. 12 to 14. Congress Hotel, Chicago. Secretary, H. J. Sameit, 72 West Adams Street, Chicago.

American Society of Lubrication Engineers. Oct. 13 and 14. First annual convention, Chicago. Secretary, J. L. Overholt, Monadnock Block, Chicago.

American Gear Manufacturers' Association. Oct. 13 to 15. Fall meeting, Powers Hotel, Rochester, N. Y. Secretary, F. D. Hamlin, 4401 Germantown Avenue, Philadelphia.

National Hardware Association. Oct. 18. Meeting of metal branch, Marlborough-Blenheim Hotel, Atlantic City, N. J. Secretary, George A. Fernley, 505 Arch Street, Philadelphia.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

National Supply and Machinery Dealers' Association. Oct. 19. Meeting of machine tool section, Hotel Astor, New York. Secretary, Thomas A. Fernley, 505 Arch Street, Philadelphia.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

Industrial Cost Association. Nov. 2, 3 and 4. National Cost Conference, Pittsburgh. Secretary, A. A. Alles, Jr., Peoples Bank Building, Pittsburgh.

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

National Hardware Association Convention

During the week Oct. 17 to 22 the National Hardware Association will hold, at the Marlborough-Blenheim, Atlantic City, N. J., its twenty-seventh annual convention. The two auxiliary branches—the Metal Branch and the Automobile Accessories Branch—will have special programs, the former on Oct. 18, the latter on Oct. 20 and 21 in connection with the fourth annual exhibition of automobile accessories, to be held on Young's "million-dollar pier." Besides these two branches, there will be held, on Oct. 18, separate meetings of the Small Tool Group, the House Furnishing Hardware Group and the Builders' Hardware Group.

Following is the program for the meeting of the Metal Branch:

Opening Remarks—W. H. Donlevy, chairman of the Metal Branch.

"World Readjustment and the American Steel Industry"—George M. Verity, president American Rolling Mill Co., Middletown, Ohio.

"Iron and Steel Prices Compared with Other Products"—Sidney G. Koon, THE IRON AGE, New York.

Report of the Sheet Copper Committee—J. George Fuchs, Bruce & Cook, New York.

"Our Trade Development Work"—Paul F. Brandstedt, chairman Trade Development Committee, National Association of Sheet Metal Contractors, Washington.

"Co-operation in the Copper Industry"—W. B. Price, Scovill Mfg. Co., Waterbury, Conn.

Report of the Publicity Conference Committee—F. O. Schoedinger, Columbus, Ohio.

Discussion on "Sheet Metal Market Conditions for the Balance of 1921 and the First Quarter of 1922," participated in by representatives of the mills and distributers from different sections of the country.

Engineering Meetings in New York Metropolitan District

A meeting on pulverized fuel is to be held under the auspices of the Metropolitan section of the American Society of Mechanical Engineers on Dec. 16 at Bayonne, N. J. Among other meetings scheduled are the following: Industrial fuel gases, Oct. 28, at Newark, N. J.; factory production methods, Jan. 13, at Elizabeth, N. J.; industrial power requirements, Jan. 27, at New York; die castings, March 10, at Newark, N. J., and on material handling, April 28, at New York.

Casting and Working Non-Ferrous Metals

British Institute of Metals Meets in Birmingham—Steel Casting Methods Applied to Brass—Progressive Cold Drawing Discussed

(*Special Correspondence*)

LONDON, Sept. 26.—The autumn meeting of the Institute of Metals was held in Birmingham from Sept. 21 to 23, the attendance being exceptionally large, owing to the considerable number of local members. At the business sessions the time for discussion of the papers was limited, but a commendable effort was made to afford an opportunity for discussing every paper presented to the meeting. In retrospect, one is inclined to wonder if, after all, it would not have been better to allow fuller discussions on some of the papers and let the others take their chance. Interesting observations are apt, when the time-rationing system is too strictly applied, to be cut short to make way for the presentation of another paper which may evoke merely polite compliments, or that almost unanimous silence which is often the polite reverse. A happy medium between the inexorable guillotine and *laissez faire* is difficult to obtain, and the problem of the ideal conduct of a scientific discussion remains insoluble. The time-rationing system could not have been applied with greater success and tact than it was by the president, Engineer Vice-Admiral Sir George Goodwin, who occupied the chair at the business sessions. These were held in the Municipal Technical School.

The first session opened on Sept. 21. R. H. Greaves of Woolwich introduced the following paper, written in collaboration with Prof. A. A. Read of Cardiff:

The Properties of Some Nickel-Aluminum-Copper Alloys

In the course of a previous investigation on the nickel-aluminum-copper alloys, the authors observed a type of alloy which, while extremely soft and ductile on quenching from 900 deg. C., was considerably hardened by slow cooling. The present paper records the results of a further investigation of these properties, which are summarized as follows:

In some of the copper-rich nickel-aluminum-copper alloys the α solution will retain much more nickel and aluminium at 900 deg. C. than at ordinary temperatures. Alloys typical of the region comprised between the limits of composition of the α solution at 900 deg. and at ordinary temperatures have been examined. These alloys, while relatively soft on quenching from 900 deg., are hardened by slow cooling from that temperature or by reheating to lower temperatures. This change in properties is the result of the appearance of a new constituent (probably a nickel-aluminum-copper solid solution), the separation of which is accompanied by changes in the density and electrical conductivity of the alloy in addition to its effect on tensile, hardness, notched bar, and other tests.

The separation of this special constituent takes place somewhat slowly, so that chill-cast alloys and hot-rolled rods of small section consist almost wholly of the α constituent. In this condition the alloys can be cold-rolled, though if cold-rolling of the slowly cooled alloys is attempted they crack badly. If annealing is required during cold-rolling the alloy must be treated to 900 deg. and cooled rapidly in air or water.

The cold-rolled rod, obtained by hot-rolling followed by a few passes in the cold, thus consists almost wholly of the α constituent, and its behaviour on low temperature annealing presents some features of interest. For complete restoration of the elastic limit in tension annealing for ½ hour at 300 to 500 deg. C. is required. This may or may not be accompanied by an increase in the maximum tensile strength according to the degree of cold-work to which the alloy has been subjected. In any case, softening proceeds very slowly up to 500 deg., at which temperature precipitation of the nickel-aluminium rich constituent begins to take place at an appreciable rate, with the result that with some compositions a progressive increase of hardness is obtained by holding the alloy at 500 deg. C. If the separation is sufficient this may more than counterbalance the previous softening, giving an alloy of high elastic limit and tensile strength, and good elongation (*e. g.* a maximum load of over 50 tons per sq. in. with an elongation of 20 per cent.).

The rate of cooling from a temperature above that at which the α solution begins to deposit the special constituent has a great influence on the mechanical properties of the heat-treated alloys. The hardest product is, however, obtained by reheating the quenched alloy for some time at 600 to 700 deg. C. (say, two hours at 600 deg. or ½ hour at 700 deg.). The alloys so treated generally give better properties than are obtained by any uniform rate of slow cooling (*e. g.* yield point over 20 tons per sq. in., maximum load over 40 tons per sq. in., elongation about 15 to 25 per cent.).

The fatigue limits to alternating stress are much higher than the tensile elastic limits in the quenched alloys, but in the quenched and tempered alloys they are approximately the same as the elastic limit in tension. The heat-treated alloys show considerable endurance under alternating stresses above their true fatigue limit, the determination of which involves a number of prolonged tests.

Discussion

Dr. Rosenhain pointed out the interest attaching to this research in establishing analogies between the behavior of these non-ferrous alloys and steels. Miss M. L. V. Gayler of Teddington asked a number of detail questions, while Dr. W. H. Hatfield of Sheffield challenged the authors' conclusions regarding the fatigue limit, and thought the experimental evidence should be very carefully reconsidered. Dr. G. D. Bengough of London discussed details and Mr. Greaves in reply referred Dr. Hatfield to the evidence set forth in the paper.

Lead in Gun Metal

R. T. Rolfe of Bedford then presented a paper, entitled, "The Effect of Increasing Proportions of Lead Upon the Properties of Admiralty Gun Metal, with an Appendix, Dealing with the Effect of Lead on Gun Metal Containing Copper, 85, Tin, 5, and Zinc, 10 Per Cent." The author concludes:

In sand-cast Admiralty gun metal, the addition of lead up to a certain proportion progressively increases the strength and ductility and decreases the hardness. At a point corresponding to the presence of about 1.5 per cent of lead, the strength and ductility begin to fall away and the hardness increases. Maximum resistance to repeated impact is obtained from the alloy containing about 1 per cent of lead, larger quantities causing a progressive falling away in this respect. There is no apparent effect on the soundness of sand-cast gun metal containing up to 1.68 per cent of lead. Lead is readily detectable in the microstructure.

In chill-cast gun metal these effects are somewhat masked. The effect of increasing lead on the hardness is well correlated with that of the sand-cast material, with a change-point at about 1.5 per cent of lead, but associated with a minimum rather than a maximum strength figure. The ductility shows a progressive falling away as the proportion of lead increases. The same remark applies to the impact figure in the case of the metal melted twice, the results from the metal melted once being much more irregular. There is no apparent effect on the soundness of chill-cast gun metal containing up to 1.68 per cent of lead. Lead is not so readily observable in the etched material, but can be quite well detected on the plain polished surface.

Apart from the effect of lead on the mechanical test results, the general considerations regarding the effect of lead are also discussed, including the question of liquation, machinability of leaded gun metal, corrosion, and behavior as a bearing metal.

It is suggested that in sand-cast gun metal, the proportion of lead permitted by the Admiralty specification might with advantage be increased from 0.5 to 1 per cent.

Discussion

Dr. F. Johnson, Birmingham, said that with regard to the effect of arsenic the author's attitude in

the last few years had completely changed, and he pointed out a number of differences between observations in the author's present and previous papers.

J. S. G. Primrose, Ipswich, said he had always thought the improvement was due to the liquation of lead into cavities in the metal, but the author had shown that there was distinct improvement in the alloy itself. H. L. Reason, Birmingham, confirmed the statement that sand-cast alloys were considerably improved by remelting. Sir George Goodwin, referring to the admiralty limit for lead in gun metal, said that there was very good reason for keeping within 0.5 per cent, seeing that the strength falls off so much at the higher temperatures to which the metal was now more and more exposed in practice.

The Casting of Brass Ingots

A paper with the above title, by R. Genders, Woolwich, was read in abstract by the author, but is here reproduced in full, only the figures being omitted.

During the examination of large numbers of specimens of hollow-drawn articles made from 70:30 brass rod which were subjected to expansion of the walls in manufacture, and later in service, it was found that where failures occurred, whether during manufacture or in service, they were due almost exclusively to the presence of inclusions of non-metallic matter which must have originated in the casting of the ingot. The surface of the burst or split in the wall was generally discolored or black, and transverse sections through portions below the split invariably disclosed the responsible defect.

It has been found that defects similar to those in articles made from rod by drawing very seldom cause failure in tubes and similar articles, such as cartridge cases, which are drawn from a disc. This would not be unexpected. In the rolling of an ingot to rod any defects, such as inclusions of non-metallic matter, would be elongated to an extent depending on the relative cross-sections of the ingot and the rod. Laterally, the defects may have their largest dimension in any direction, depending on the original position in the ingot and the manner in which the rolling has been done, but there is no doubt that a large proportion of defects are approximately radial in the finished rod and remain so throughout manufacture. Non-metallic inclusions have no useful strength and, in their effect on the mechanical properties of the metal, amount practically to areas of discontinuity. Thus an inclusion, radial in the wall of a tube, reduces the effective thickness of the wall by an amount equal to its radial length, and further, probably acts as a notch from which a crack may start on expansion of the tube. When the ingot is made into strip by rolling, any defects present are elongated in the form of plates in planes parallel to the surfaces of the strip. In the cupping operations such defects would be also distorted into cup form and finally drawn into the walls of the tube as thin plates running circumferentially and concentrically with the inside and outside surfaces. A defect running in this direction would be of little consequence as regards reduction of the effective thickness of the wall, and would be much less likely to serve as a nucleus for the starting of a crack.

The methods used in casting ingots of brass vary considerably in detail. Much consideration is given to the saving of rolling, and ingots are made in a correspondingly suitable form, those used for the making of rod commonly being very long and narrow.

Such forms are not particularly undesirable when the finished product is solid, but where a hollow article, subject to expanding stresses in use, is to be made, the avoidance of inclusions of foreign matter is vital, and the form of ingot requires considerable modification. The long narrow ingot mold leads to splashing, and the solidification of the metal is very rapid, leaving no time for the rising of trapped dross, etc. The pipe forms rapidly and is steep and narrow, and the intermittent replenishment with molten metal during solidification results in the inclosing of the foreign matter on the surface of the previous depression. The solidification of the metal inward from the sides of a rapidly filled parallel mold is practically uniform along the length, and shrinkage cavities are formed in the central region, due to lack of fluid metal to take up contraction when the metal below solidifies.

In experiments which were carried out to minimize the occurrence of non-metallic inclusions, the first step taken was to adopt a form of ingot whose length was not great in proportion to the cross-sectional area. The ingots made were 3 in. square and 30 in. in length, as compared with the ingots 6 to 7 ft. in length and 1½ in. square section in common use. Steel-making practice was followed in introducing a hot sinking head or "dozzle." The dozzle (a short fireclay sleeve) is heated to the melting furnace temperature and inserted in the top of the mould, resting on a small ledge. The molten brass is poured through the dozzle, which is filled to the top. No pipe is formed in the ingot proper, the metal in the dozzle remaining quite fluid and sinking gradually, with level surface, to feed the contraction of the ingot below. Additions of metal may be made at any time to the metal in the dozzle without risk of introducing defects into the ingot, any dross rising to the top of the sill fluid head. The dozzle is thus an automatic feeder, insuring that the top portion of the ingot is free from piping defects. There is no need to discard any of the top end of the ingot beyond the metal which has finally solidified in the dozzle. It was found later that these experiments were undertaken at about the same time as the introduction of dozzle feeding for flat cartridge case ingots by Barclay.*

Central shrinkage cavities were avoided by regulating the rate of pouring so that the ingot, when just completely poured, had a fair temperature gradient from bottom to top. This necessitated a rate of pouring much below that for the normal foundry practice, and where two ingots were poured from one pot the cooling in the crucible of the metal for the second ingot was appreciable. To overcome this difficulty the molds were tapered, the top being enlarged by increasing amounts in successive experiments, and ingots were cast at the usual foundry speed. It was found that with a mold 3½ in. square at the top, tapering to 3 in. at the bottom, no shrinkage cavities were formed and the ingot appeared to be practically perfect as regards soundness. The use of a tapered ingot results in either a tapered strip or the necessity for a certain amount of edge rolling. Its adoption, however, appears to be justified by the greater certainty with which sound ingots can be produced.

By these methods, failures which previously reached large percentages were reduced to practically nil. Wastage during manufacture was reduced from about 25 per cent to a negligible figure.

A further refinement which the author would like to see adopted in non-ferrous foundries is the use of a ladle and bottom pouring. This method has been adopted with considerable success in one particular works, for the manufacture of articles in which non-metallic inclusions are to be avoided. It is fully recognized that in a great many cases economic considerations would render such methods as the use of short broad tapered ingots with dozzle feed beyond reach, but cases have come under the author's notice where, had it been recognized that the avoidance of non-metallic inclusions was of primary importance and the costlier methods adopted, such methods would undoubtedly have proved more economical than the endless replacement of wasters in manufacture and rejections.

Discussion

Dr. Rosenhain said that in nearly every case troubles in manufacture could be traced back to defects in the original ingot. The rate of pouring required careful attention to avoid shrinkage cavities and non-metallic impurities. It was necessary to regulate both the rate of flow and also the path of flow. It was very difficult to get good results in long, narrow molds. Harold Moore, Woolwich, confirmed the difficulty of casting sound ingots in long molds. R. J. Redding, Birmingham, said trouble would be avoided if the pouring were carefully done and continuous. The author gave five remedies for solid inclusions, but he (the speaker) distrusted a doctor who had more than one remedy for the same disease. His remedy was to sack the caster and engage another, and train him to cast his metal at the right temperature and speed. With the present sizes and methods of work, he saw no necessity for the dozzle, and useless work was done on a larger scale he did not favor the adoption of steel-casting methods. The author, in his reply, made it clear that he was not condemning the long, narrow ingot, but pointing out the difficulties met with and the means of overcoming them.

Density of the Copper-Zinc Alloys

This paper, by T. G. Bamford, Birmingham, gives the results of a number of careful density determinations made at Birmingham University. It was introduced by the author and the discussion was opened by Professor Turner with some words of appreciation. Dr. Rosenhain, referring to the work of Professor Bragg and others on molecular structure, said one of the critical data required was an exact knowledge of the density. Dr. F. Johnson drew attention to the difference in density of chill and sand castings and

Metal Industry, May 2, 1919.

suggested that this was due to porosity in the sand castings. The author in reply said that no porosity could be found in the sand castings even under the microscope.

A paper by Dr. F. Johnson on "Experiments in the Working and Annealing of Copper," was then presented by the author. It does not claim to represent more than "an exploratory incursion into the subject," and evoked no discussion beyond a few amiable platitudes from Professor Turner, who, no doubt, wished to convey to the author that his past sins have been forgiven even if there was nothing to say about his present paper.

Cold-Drawing Effects

W. Cartwright introduced a paper on "The Effect of Progressive Cold-Drawing Upon Some of the Physical Properties of Low-Tin Bronze," written jointly with W. E. Alkins, whose pioneer investigations on progressive cold-drawing created something like a sensation. It was found that the changes in physical properties were not continuous, but took place in "critical ranges." The present paper is on the same lines and records the variation during cold-drawing of the tensile strength, specific volume, and scleroscope hardness of low-tin bronze. Dr. F. Johnson opened the discussion by pointing out the general similarity of the curves to those obtained by himself under different conditions.

Professor Desch, Sheffield, said the results of the authors must be accepted as accurate, as no fault could be found with their experimental methods. He thought overdrawing at the later stages of reduction might account for the results. Dr. Rosenhain questioned if the alloy were really in a state of equilibrium. If not, anomalous changes of density might occur at certain stages of cold drawing.

Dr. F. C. Thompson, Manchester, thought a more irregular curve would be obtained if the results were due to overdrawing. He could not agree with Dr. Rosenhain regarding lack of equilibrium because these effects had been found in practically every other material investigated. He suggested that in cold-drawing cones of maximum stress were produced, which met at a certain stage of the drawing, and at these points the effects recorded were obtained. The author briefly replied and the meeting adjourned.

Inland Steel Co. Resumes Work on Rail Mill

The Inland Steel Co. has resumed work on the installation of equipment for the rolling of rails at its Indiana Harbor plant. This work was first started about a year ago, and was then indefinitely postponed. The 28-in. structural mill will be used to roll the rails and the necessary rolls are now being turned. Straightening presses, ending machines, the necessary tables and the inspection bed are now being installed. A mill building extension, 100 by 400 ft., is now being erected, and beyond it a yard served by overhead crane of the same dimensions. The covered portion will contain the drilling, straightening and ending equipment and the uncovered part, the inspection beds. It is estimated that the mill will have a capacity of 2000 tons of rails per day.

Farm Machinery Reduction

The Emerson-Brantingham Co., Rockford, Ill., has announced a 10 to 20 per cent reduction in prices on its entire line of farm machinery, including tillage implements, harvesters, tractors and threshers. This is the second substantial reduction made by the company in 1921.

Since the regular date for the meeting of the New England Foundrymen's Association was on Wednesday, Oct. 12, which was Columbus Day, a legal holiday, postponement was made until the evening of Oct. 19.

The Electrical Alloy Co., Morristown, N. J., has recently taken an order for 50,000 lb. of electrode wire from the Champion Spark Plug Co., Toledo, Ohio.

SHEET MILL ACTIVITY

Slight Decrease in Mahoning Valley—Other Operations Well Sustained

YOUNGSTOWN, OHIO, Oct. 11.—Denoting decrease in full-finished sheet requirements from the automobile industry, the first break in the continuous capacity operating record of the Newton Steel Co. since April 1 was made this week, when the company reduced the number of its active hot mills at its Newton Falls plant from 10 to six. It started six mills March 1 and broadened to 10 shortly thereafter, maintaining full production ever since. Repairs will be made to the idle units following their protracted rolling.

With exception of a slight break in sheet mill activity, steel production is well sustained this week in the Mahoning and Shenango Valleys. The most notable single advance is made at the Girard works of the A. M. Byers Co., Pittsburgh, which is in full operation with the exception of two skelp mills. All of the 88 puddle furnaces at this plant are on the active list this week.

Finishing departments of the Carnegie Steel Co. in the Youngstown district are operating at 60 per cent. But 75 of the 105 sheet mills in the Valley are rolling, as compared with 81 the week before. Of the 66 open-hearth furnaces, 42 are charged, including 30 of the 51 independent units. Two of three Bessemer plants are making steel, while eight of 17 pipe furnaces are fired.

Sheet mills are being operated on the following basis: Youngstown Sheet & Tube Co., 15; Brier Hill Steel Co., 19; Trumbull Steel Co., 13; Republic Iron & Steel Co., 9; Sharon Steel Hoop Co., 5; Falcon Steel Co., 8 and Newton Steel Co., 6. Mahoning Valley Steel Co., which is idle, will partially resume next week.

Trumbull Steel Co. is operating all of its 19 tin mills at its Trumbull works in Warren this week.

Wage Reduction at Cincinnati

The building trades employees of Cincinnati, through the report of the umpire of the wage board, Rabbi David Phillipson, will have their wages reduced 12½c. per hr., commencing Nov. 8. The decision of the umpire is binding on both sides, the employers as well as the union members. The average wages paid in the building industry in Cincinnati has been 94c. per hr., which will be reduced to 81½c. The reduction is exactly one-half of the cut demanded by the Building Construction Employers' Association. The unions represented on the wage board had declined to accept any reduction; so the matter was referred to the umpire, with the above result. In his report fixing the new scale, Rabbi Phillipson said: "The laborer is a human being and worthy of all the considerations of humanity, but he is also a member of the larger community of which he forms a part. He must take his share of the weal or woe of that community; he has shared in the prosperity of the war period; his wages advanced greatly; he can not expect to be altogether exempt from the reaction which has set in."

Will Keep Car Shops Busy

According to D. T. Murray, general agent at Youngstown, Ohio, of the New York Central Railroad, car shops owned by private concerns accepting repair work from the railroads will be kept busy during the next two years. He bases his estimate on the capacity of existing plants and the known number of bad-order cars. Under Federal control many cars deteriorated through failure to paint them and the bodies often became completely honey-combed. Many cars, it is also pointed out, which were shopped, had become so thin in the bodies that they buckled in heavy trains and were discarded as junk or sent to sidings as unfit for service. Thousands of these cars will likely be sent to the scrap pile. Inspections are being made of side-tracked cars to determine which can be repaired.

Iron and Steel Markets

LOWER FREIGHTS ON ORE

Little Effect on Pig Iron and Steel

Steel Corporation Running at 40 Per Cent—Further Release of Pennsylvania Rails

The reduction of 28 per cent in freight rates on iron ore from both lower Lake ports and the seaboard, effective Oct. 20, means little to the steel trade except as it may point to lower freights on coal, coke and possibly finished materials.

While there has been much call from iron and steel producers for lower freights as a stimulant to business, fear is now expressed in the same quarters that buyers may be encouraged by the reduction on ore to wait for similar action on pig iron and rolled steel and then to look for lower market prices. Producers contend that any saving on freights would merely act to reduce their losses. It is pointed out also that nearly all blast furnaces have on hand enough ore moved on high freights to last until spring. On all ore shipped after Oct. 20 the saving would be 75 cents per ton of pig iron at Pittsburgh and 56 cents at Youngstown.

The week's figures confirm recent reports of improvement, but in moderate terms. Steel ingot production in September was 1,174,000 tons for the 30 companies reporting, against 1,138,000 tons in August, an apparent increase of 3 per cent. But counting out Labor Day, the daily rate in September was nearly 10 per cent greater than in August.

The Steel Corporation's unfilled orders on Sept. 30 showed the first increase (28,000 tons) in 13 months. But shipments in September on the large bookings of wire and sheets were less than the common estimate.

Lake Superior iron ore shipments last month were 3,913,000 tons, against 8,923,000 tons in September, 1920. To Oct. 1 the total was 18,661,000 tons, against 44,273,000 to that date last year, a falling off of 58 per cent.

The recent effort to get business in the heavier steel products by announcements of prospective advances to 1.65c. for bars and 1.75c. for plates and shapes has not had large results. In general the volume of new business fell off in the last week. Bars have been sold $1 to $2 per ton below the 1.60c. level, though that is the usual minimum. Plate and structural mill schedules continue quite unsatisfactory.

The Steel Corporation's operation this week is a fraction above 40 per cent. The average of independent companies is somewhat less.

The Pennsylvania Railroad has called for additional rollings on its 1921 rail contract, bringing the total up to 35,000 or 40,000 tons.

An Ohio sheet mill names Oct. 15 as the date of a $5 advance on lighter gages. Meanwhile it is selling heavier gages of blue annealed at 2.25c., or $5 per ton below the general market.

The purchase of 1500 hopper cars by the Lackawanna Railroad calls for 18,000 tons of steel.

For a new pipe line for New York's water supply system 20,000 tons of plates will shortly be bought.

General structural lettings of the week do not appear to exceed 5000 tons.

Foreign pig iron is being sold on the Pacific Coast at several dollars per ton below American iron, about 1500 tons from Alsace-Lorraine having been disposed of at $29 to $31. All domestic pig iron markets are very dull with no important tonnages pending.

Japan's activity in rails is noteworthy. A late inquiry covers 5000 tons of heavy sections, following recent buying of 1500 tons of heavy rails and 3400 tons of light rails, the latter divided between British and German mills. The price basis was close to $40 per ton at Japanese port.

In tin plate and sheets Japanese business continues to be a factor. A third order in three weeks has been placed for 6000 boxes. Pacific Coast exports of tin plate have moved at $5.90, Seattle, for some 16,000 boxes.

Pittsburgh

PITTSBURGH, Oct. 11.

The possibility of an early reduction in railroad freight rates now enters into the picture of the iron and steel situation. Already the railroads have obtained permission to make a 28 per cent reduction in the rates on ore, or to virtually restore the tariffs in effect prior to Aug. 26, 1920, to go into effect on Oct. 20, and to hold until Dec. 31. Little good will result from this reduction for the reason that there are only a few producers of iron who have not about all the ore in their furnace yards that will be required during the remainder of the year. The belief is common, however, that the ore-rate reduction is the first of a general cut in rates on basic or raw materials.

Railroads already are figuring on lower rates on coal and this probably will include coke. It has apparently dawned upon railroad managements that upon them depends, to a large degree, how soon the recovery in business will get under way. It also is evident that the railroads cannot continue to pay present wages, which are so materially above those now common in industry. A reduction in wages would find public support if preceded by substantial cuts in freight and pas-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 11, 1921	Oct. 4, 1921	Sept. 13, 1921	Oct. 12, 1920
No. 2X, Philadelphia‡	$21.84	$21.84	$20.84	$53.51
No. 2, Valley furnace†	21.00	21.00	21.00	47.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2 foundry, Chicago*	21.00	21.00	22.00	46.00
Basic, del'd, eastern Pa	20.50	20.50	19.25	51.26
Basic, Valley furnace	19.25	19.25	19.00	46.00
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	21.00	21.00	22.00	46.50
Malleable, Valley	20.50	20.50	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.96	47.96
L. S. charcoal, Chicago	31.50	31.50	33.50	58.50
Ferromanganese, del'd	60.00	60.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. sheet bars, P'gh	*30.00*	32.00	30.00	62.50
Forging billets, base, P'gh.	35.00	35.00	34.00	70.00
O.-h. billets, Phila	35.74	35.74	35.74	60.74
Wire rods, Pittsburgh	41.00	41.00	38.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.60	1.60	1.70	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.60	1.60	1.65	3.25
Steel bars, Chicago	1.75	1.75	1.85	2.73
Steel bars, New York	1.98	1.98	2.03	3.63
Tank plates, Pittsburgh	1.60	1.60	1.65	3.25
Tank plates, Chicago	**1.75**	1.65	1.75	3.03
Tank plates, New York	1.98	1.98	2.03	3.63
Beams, Pittsburgh	1.60	1.60	1.65	3.10
Beams, Chicago	1.75	1.75	1.80	2.83
Beams, New York	1.98	1.98	2.03	3.48
Steel hoops, Pittsburgh	2.25	2.25	2.15	5.00

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Oct. 11, 1921 Cents	Oct. 4, 1921 Cents	Sept. 13, 1921 Cents	Oct. 12, 1920 Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	2.75	6.75
Sheets, galv., No. 28, P'gh.	4.00	4.00	3.75	8.25
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.20	5.00
Wire nails, Pittsburgh	2.90	2.90	2.90	4.25
Plain wire, P'gh	2.60	2.60	2.60	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.55	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$8.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	$16.50	$16.00	$13.50	$36.00
Carwheels, Philadelphia	17.00	17.00	17.00	41.00
Heavy steel scrap, P'gh	14.00	14.00	13.50	28.00
Heavy steel scrap, Phila.	**12.00**	11.75	11.50	23.00
Heavy steel scrap, Ch'go	12.25	12.25	11.00	22.00
No. 1 cast, Pittsburgh	17.50	17.50	17.00	40.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	39.00
No. 1 cast, Ch'go (net ton)	13.50	13.50	13.25	29.00
No. 1 RR. wrot, Phila	**16.00**	15.50	15.00	31.00
No. 1 RR. wrot, Ch'go (net)	**13.00**	12.50	11.50	20.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.35	$3.25	$3.25	$17.00
Foundry coke, prompt	4.50	4.25	4.25	18.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.12½	12.62½	12.25	17.50
Electrolytic copper, N. Y.	12.82½	12.37½	12.00	17.50
Zinc, St. Louis	4.60	4.55	4.20	7.37½
Zinc, New York	5.10	5.05	4.70	7.50
Lead, St. Louis	4.50	4.50	4.40	7.37½
Lead, New York	4.70	4.70	4.60	7.50
Tin, New York	27.00	26.75	26.75	41.50
Antimony (Asiatic), N. Y.	5.00	5.00	4.45	7.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Oct. 11, 1921, Finished Steel, 2.236c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Oct. 4, 1921,	2.236c.
Sept. 13, 1921,	2.279c.
Oct. 12, 1920,	3.867c
10-year pre-war average,	1.684c.

Composite Price, Oct. 11, 1921, Pig Iron, $19.93 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 4, 1921,	$19.93
Sept. 13, 1921,	19.81
Oct. 12, 1920,	46.59
10-year pre-war average,	15.72

senger rates. The likelihood of lower freight rates, however, constitutes a problem for the iron and steel industry, in that consumers will immediately seek to have any such savings as the producers may be able to effect passed along to them. Steel manufacturers declare that there is no room for further concessions from the prices which lately have been common, because at 1.50c., at which plates, shapes and bars recently have been sold, and which probably can be done again against desirable orders, the market is back to the pre-war levels, plus the difference between 1914 and present-day labor costs, while even the wiping out of the last freight rate increase still would leave rates about 60 per cent above the pre-war levels. The recent effort to drive in business in the heavier lines by increasing the prices does not seem to have been successful and now that there is some promise of lower costs through lower freight charges, it is probable that the effort of manufacturers will be to hold the market at the basis at which it has been possible to get business.

Business of the week as a whole has been quieter than it was in September. Some sheet tonnages have been booked, both by the American Sheet & Tin Plate Co. and the independents, on a basis of 3c. for black sheets, 4c. for galvanized and 2.50c. for blue annealed, but buyers no longer are hungry for tonnages and the announced intention of some of the Youngstown makers of advancing prices $5 per ton next Saturday has failed to appreciably stimulate business. The leading interest gives no indication of departing immediately from its present prices.

An Ohio maker of tin plate, in an effort to secure sufficient business upon which to resume operation, is reported to have gone as low as $4.65 per base box, Pittsburgh, on production plate.

The dealers' boom in scrap seems to have collapsed for want of support in the shape of consumptive buying and the coke market, though slightly higher, does not act very strong at the advance.

Pig Iron.—The past week has been even quieter than the one before, with sales almost entirely of carload lots and inquiries few and unimportant. It is impossible to make any change in prices, and there is considerable doubt that the prospective freight rate reduc-

tion on ore will have any effect upon prices. Theoretically, Valley furnace would save 50c. per ton on pig iron and Pittsburgh district furnaces 70c. on the proposed freight reduction, but actually there will be no saving, except for one or two furnaces, because practically all of the ore that will be needed the rest of the year already has moved down from the Lake Erie docks. It was estimated, when freight rates were advanced, Aug. 26, 1920, that the cost of making a ton of pig iron was increased from $1.50 to $2 per ton, and if rates on coke and limestone were put back to where they were prior to Aug. 26, 1920, the saving would merely reduce the losses of the furnaces and still make iron unprofitable at the new costs and selling prices. Adrian furnace, Dubois, Pa., goes into blast next Saturday.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.25 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.50

Ferroalloys.—A fair amount of interest still is noted in 50 per cent ferrosilicon and sales of about 500 tons, mostly in carload lots, recently have been made. The market on this material, however, is weaker than it was and while one or two carloads have been moved at $60 furnace, freight allowed, a more attractive price has been named against the bulk of the business. The quotable range now is $57 to $60, delivered into the Pittsburgh and nearby districts. The market on foreign ferromanganese seems to have settled definitely to a basis of $60, delivered to Pittsburgh and nearby districts. Besides the recent sales at that price, material now is being offered at $60, delivered Youngstown. That price means $53.28 at the Atlantic seaboard since the freight and tax is $6.72. The freight from the seaboard, plus tax, to Pittsburgh is $5.40 and on a basis of $60 delivered the seaboard price would be $54.60. A quotation of $55 at seaboard, on English material, has been made by agents of one maker. Interest still is small in spiegeleisen.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $65 delivered; 78 to 82 per cent foreign ferromanganese, $53.28 to $55, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Youngstown makers of sheet bars have announced a further advance of $2 a ton, effective Oct. 15, to $34, coincident with an advance of $5 a ton in finished sheets. There is a fairly good business in sheet bars, but the bulk of the shipments carry a price of $29 or $30 and the advance to be made Oct. 15, generally is regarded as an attempt to drive in business at the recently established price of $32. All makers lately have been quoting that price, but not getting much business. Demand for soft and forging billets and slabs remains extremely limited and current quotations find little basis in sales.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30 to $32; Bessemer and open-hearth sheet bars, $30 to $32; slabs, $30 to $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The price of $41 for the base size of soft rods still remains an asking, rather than a selling, price. Most manufacturers of wire products have rod mills and can make rods cheaper than $41, while other consumers appear to be covered by contracts placed at a lower figure. That price has been materially shaded on export business and it is probable that a new domestic order of attractive proportions could be placed for less. Prices are given on page 978.

Structural Material.—Structural awards to the shops in this district, outside of small jobs, have been nil the past week. However, the numerous awards of the previous week are bringing some business in plain material, due to the fact that the fabricating companies have used up practically all of their reserve stocks. The quotation of 1.75c. on structural steel is merely an asking price and the quotable market is right around 1.60c. Prices given on page 978.

Plates.—The effort to establish a base of 1.75c. so far has not been successful. The mills have been trying to accumulate a backlog and are known to have gone as low as 1.55c. on lots as small as 300 tons. The market, as far as sales are concerned, is quotable from 1.55c. to 1.60c. on plates of tank quality and for structural projects it is reported that together with shapes and bars, business has been booked as low as 1.50c.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.65c. f.o.b. Pittsburgh.

Wire Products.—Specifications against orders are reported to be coming along satisfactorily, but new business is not keeping pace with completed orders and the prices established several weeks ago do not find very much basis in sales.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Steel Rails.—The railroads served with rails from mills in this district are making a fair number of releases. Edgar Thomson works of the Carnegie Steel Co. is operating about 50 per cent of capacity and is reported to have sufficient specifications to keep going at this gait for the next six weeks. The Midvale Steel & Ordnance Co. has received a release on a fair-sized tonnage from the Pennsylvania Railroad and started up its rail mill at Johnstown, Pa., this week. Activity still is lacking in light sections. Makers of standard sections have a considerable advantage on costs in turning out light rails over those who roll them from cold billets. It is possible for the former to convey standard rail crops to light rail mills and roll without reheating and this is being done by some makers. The regular quotation on light rails rolled from billets is 1.75c., base, for 25 to 45-lb. sections, but demand is so light and competition for business so keen that 1.70c. rarely is exceeded. Rails rolled from old sections can be bought at 1.60c., base.

We quote 25 to 45-lb. sections, rolled from new steel, 1.70c. to 1.75c. base; rolled from old rails, 1.60c. base; standard rails, $45 per gross ton mill for Bessemer and $47 for open-hearth sections.

Spikes and Track Bolts.—The Big Four Railroad is seeking bids on 5000 kegs of standard spikes. This constitutes the only important inquiry now before makers, although the railroads are buying small lots fairly frequently. As a sales price, $2.50 per 100 lb. base, has disappeared, and $2.30 to $2.40 is more representative of the present market. Small spikes can be bought as low as $2.50 per 100 lb., base, and $2.75, still quoted by some makers, is merely an asking price. Makers of track bolts in this district are not getting many orders. Prices are given on page 978.

Hot-rolled and Cold-rolled Strips.—Business with most makers is better than it has been, but there still remains considerable room for improvement. The common range on hot-rolled strips is 2.15c. to 2.25c., but on some sizes where the extras run large, a base price of 2c. has been accepted. Cold-rolled strips are quotable from 3.75c. to 4c. base, but the higher figure is obtainable only on small lots.

Iron and Steel Bars.—There are admissions now that some business in merchant steel bars has been taken as low as 1.50c., base, Pittsburgh, and the impression is common among buyers that this price can be done again. This price is not being made on small lots, against which most mills are holding out firmly for 1.60c. and 1.65c. The quotation of 1.65c. finds little, if any, basis in sales. No big orders are coming out for reinforcing bars and demand for iron bars is limited.

We quote steel bars rolled from billets at 1.50c. to 1.65c.; reinforcing bars, rolled from billets, 1.50c. to 1.65c. base; reinforcing bars, rolled from old rails, 1.50c.; refined iron bars, 2.15c. to 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Iron and Steel Pipe.—Steady demand is noted for merchant pipe, but interest in oil country goods still is lacking and few makers expect improvement in the latter direction during the remainder of the year. The fact that there has been a substantial rebound in crude oil prices from the extreme low point, however, is expected to stimulate drilling next year. Some line

pipe inquiries are coming out and since such business is highly desirable, the mills are not paying much attention to established quotations to get orders. Discounts are given on page 978.

Steel Skelp.—There still are more sellers than buyers and such business as is going upon the books of makers is at prices ranging from 1.60c. to 1.65c for pipe skelp. Plate-making capacity so far exceeds present demands for that product that those companies with idle mills are seeking business in other fields.

Sheets.—Some of the Youngstown independents have notified their customers that, effective Oct. 15, there would be another advance of $5 per ton in prices; but since this move is generally regarded as an effort to give basis to present prices, the response has been poor. There is no indication that all makers will advance prices while the American Sheet & Tin Plate Co. is selling at 3c. base for black, 4c. base for galvanized and 2.50c. base for blue annealed. These prices are finding some basis in sales but buyers are not placing big tonnages at these figures and the bulk of the shipments are moving at $5 per ton less. The American Sheet & Tin Plate Co. this week is scheduling about 93 per cent of its sheet mills, but there has been a slight decrease in the number of active independent units. Prices are given on page 978.

Tin Plate.—A fairly good business still is coming out in tin plate for other than perishable food containers and mill operations are well up to the recent average. The schedule of the American Sheet & Tin Plate Co. has been cut 3 per cent to 62 per cent, but the Standard Tinplate Co., Canonsburg, Pa., has put on three additional mills, now having 19 of its 24 mills in operation. The market still is quotable at $5.25 per base box for production plate, although this figure was materially shaded for a brief period recently by an Ohio maker who, in endeavoring to secure enough business to start up his plant, took orders at prices ranging from $5.10 down to $4.65. Stock tin plate is quotable from $4.50 to $4.75.

Hoops and Bands.—Demand is small and prices rather poorly defined. Almost all makers are quoting hoops at 2.25c. and some are naming that price on bands also. On the heavier gages of bands, some are basing prices on the bar card and this results in a price of around 2c. for this kind of material.

Cold-Finished Steel Bars and Shafting.—Business in these products still is laggard and buyers have a good deal to say as to prices. The old base of 2.40c. for cold-rolled or drawn screw stock and shafting has disappeared and most makers now are trying to maintain a base of 2.25c., Pittsburgh, since hot-rolled bars do not seem available much below 1.60c., base Pittsburgh, and this leaves a differential of only $13 per ton, as compared with $25 during the war and even more during the early part of 1920. The market is quotable at 2.20c. to 2.25c., as some makers have gone to the former figure to get carload orders. Ground shafting still is quoted at 2.75c., base mill, for carload lots.

Nuts, Bolts and Rivets.—The situation has not improved materially as to business, but manufacturers have found that sales are not to be developed by constantly cutting prices and there is more stability to quotations because of the decrease in selling pressure. Manufacturers in this district, largely dependent upon the railroads for business, feel that large orders are not far off. This is due to the belief that the railroads would not have asked permission to reduce freight rates on ore and other basic materials, if their condition, with regard to finances, was not looking upward. Prices and discounts are given on page 978.

Coke and Coal.—Contracts for furnace coke for last quarter delivery, aggregating about 30,000 tons per month, recently have been closed, and since this business, together with that previously booked, about absorbs present production, the market has a fairly firm tone. Producers generally are asking $3.50 for either spot or future shipments, but this is 10c. to 15c. per ton above what actually is being done. The market is quotable from $3.35 to $3.40 per net ton oven. Such blast furnaces as are in operation are covered by contracts and the spot market consequently is a very limited one, with most of the lots which are coming on the market going to other than blast furnaces. There seems to be no excess supply of foundry coke and strictly standard grade no longer is available at less than $4.50, while some business is being done at $4.75. There are reports of $5 foundry coke, but such prices are being done in markets ordinarily served from by-product plants, or other coke districts than Connellsville, and $5, Connellsville, is low by comparison. Not much activity is noted in coal and prices do not change much. Mine run steam coal of the best grade is quotable at $1.75 to $1.85, by-product $1.90 to $2.10, and gas coal from $2.25 to $2.75. The fuel interests are beginning to talk car shortages and the possibility of a miners' strike next spring, in an effort to stimulate business. Here and there car shortages have developed, but it is because the railroads are not using the cars they have in stock and the shortages are not important.

Old Material.—The most recent advances in prices appear to have largely snuffed out such demand as lately existed, and while dealers are holding rather firmly to the advance, they have not succeeded in doing much business. It is learned that some consignments of heavy melting steel recently rejected on the ground of quality by one steel maker in this district, and then reconsigned to another melter, also have been rejected by the latter. A dealer here who recently secured some railroad steel of high grade at around $14.75 delivered, Pittsburgh, was unable to turn it over within the time allowed by the railroad to move it and was obliged to throw the tonnage down on his yards. It looks as though the recent advance was a little too rapid, for melters and dealers who paid the high prices now find it necessary to sit back and wait for melters' price ideas to move upward.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast cupola size	17.50 to 18.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.00 to 17.00
Compressed sheet steel	12.00 to 12.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	10.50 to 11.00
Railroad knuckles and couplers	15.00 to 15.25
Railroad coil and leaf springs	15.00 to 15.25
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.50 to 18.00
Railroad malleable	13.00 to 13.50
Iron car axles	20.00 to 21.00
Locomotive axles, steel	19.50 to 20.00
Steel car axles	15.00 to 15.50
Cast iron wheels	16.00 to 16.50
Rolled steel wheels	15.00 to 15.50
Machine shop turnings	9.50 to 10.00
Sheet bar crop ends at origin	13.50 to 14.00
Heavy steel axle turnings	11.50 to 12.00
Short shoveling turnings	10.50 to 11.00
Heavy breakable cast	15.00 to 15.50
Stove plate	13.00 to 13.50
Cast iron borings	10.00 to 10.50
No. 1 railroad wrought	13.00 to 13.50

Iron Ore Shipments in September

The gap between the iron ore movement from Lake Superior in 1921 and that of 1920 was widened in September. Shipments down the Lakes last month amounted to 3,913,122 gross tons, whereas in September, 1920, the total was 8,923,482 tons. The falling off was thus 56 per cent. The total by ports, the season's shipments, and a comparison with 1920 are given below:

	September		To Oct. 1	
	1921	1920	1921	1920
Escanaba	556,158	1,088,806	1,314,331	5,483,644
Marquette	196,697	493,311	459,802	2,634,602
Ashland	418,620	1,253,633	1,847,928	6,187,035
Superior	668,570	2,330,512	4,177,498	11,291,936
Duluth	1,503,237	2,304,726	7,975,877	11,656,866
Two Harbors	569,840	1,452,494	2,885,758	7,019,273
Total	3,913,122	8,923,482	18,661,194	44,273,356

To Oct. 1 the season's movement was 18,661,194 tons, as against 44,273,356 tons to Oct. 1, 1920, the falling off being 25,612,162 tons, or about 58 per cent.

The Burt Mfg. Co., Akron, Ohio, has just made shipment of 21 Burt ball bearing revolving ventilators and bases made of cold rolled copper for use of the Navy Department at Pearl Harbor, H. I.

New York

NEW YORK, Oct. 10.

Pig Iron.—Following recent sales of considerable size, the foundry iron market is very dull, but there are no indications of weakness except perhaps in the Buffalo district where it is apparent that the $20 base can be shaded. Furnaces in the East are not greatly interested in the reduction of 28 per cent in ore carrying rates, as they are well supplied with ore. The action may have the effect of causing more hesitation on the part of buyers of pig iron on account of the possibility of lower pig iron prices due to reduction in costs. No material reductions, however, will be brought about unless the reduction in ore carrying rates is followed by similar reductions on other materials and also on ore for delivery after Jan. 1, 1922.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25..	23.02
Buffalo, sil. 1.75 to 2.25.....	25.46
No. 2 Virginia, sil. 1.75 to 2.25.....	29.16

Ferroalloys.—The market continues quiet. Domestic producers are meeting foreign competition as may be necessarry in individual cases, but have no definite selling price. Foreign ferromanganese is available at about $60, delivered, to steel plants as far West as the Pittsburgh district. Spiegeleisen is quoted from $25 to $26, furnace.

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.....	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Finished Iron and Steel.—Business as a whole has kept up on the plane of recent weeks and is, therefore, better than it was in the summer months, but is not yet in sufficient volume to keep mills well engaged. The result is that prices for the heavier tonnage products have not stiffened and intense competition follows on attractive offerings. For example, one price on a round tonnage of concrete reinforcing bars is equivalent to about 1.45c., Pittsburgh. On 1900 tons of plates a price is claimed of 1.70c., Philadelphia. It remains that 1.60c., Pittsburgh, is still a possible price on a sizable lot. One of the biggest new projects involves 20,000 tons of plates for a pipe line for New York. Bids on twin 108 ft. stand pipes for New Braunfels, Tex., either two of 500,000 gal. capacity or one of 1,000,000 and the other of 800,000 gal., are to be received on Nov. 10; M. L. Diver, consulting engineer, San Antonio, Tex., has the plans and specifications. For the new roadway on the Manhattan Bridge involving 1500 tons, mostly plates, the Vulcan Rail & Construction Co., Maspeth, L. I., is low bidder at $259,600. The Delaware, Lackawanna & Western Railroad, which recently informed car builders that it would place orders for freight cars to aid in the recovery of business if sufficiently attractive prices were quoted, has bought 1500 50-ton steel hopper cars at prices said to be just about enough to cover costs of labor and material. The cars were divided equally among the Cambria Steel Co., Standard Steel Car Co. and the American Car & Foundry Co. About 17,500 tons of steel will be required. Other railroad orders mostly involve repairs on wood cars. The Lehigh Valley has contracted with the American Car & Foundry Co. for the repair of 1000 wood box cars and the Pittsburgh & Lake Erie has placed 500 wood box cars for repairs with the Pressed Steel Car Co. A moderate volume of new structural steel work is coming up for bids, the following projects having become active during the week: 500 tons for Terre Haute, Ind., plant of American Car & Foundry Co.; 300 tons for a warehouse for a casket company in Brooklyn; 400 tons for an office building in Syracuse, N. Y.; 500 tons for cranes at Staten Island city piers. The American Bridge Co. has taken the following work: 300 tons for a power house at Scranton, Pa.; 500 tons for a bridge across the Delaware River. The Belmont Iron Works, Philadelphia, has been awarded 150 tons for a pier for the Philadelphia & Reading Railroad.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.98c. to 2.03c.; plates, 1.98c. to 2.13c.; structural shapes, 1.98c. to 2.13c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—There is a continued increase in volume of business, the tendency of buyers being to place heavier tonnages than formerly. In sheets, galvanized are extremely stiff and although 5c. per lb. base is still the prevailing price some dealers in small lots are quoting as high as 5.25c. per lb. Cold rolled shafting, which is now on a 4.03c. per lb. base, is generally expected to show a decline of about 50c. per lb. before long. Copper quotations are up ⅛c. per lb. and dealers report a slight improvement in buying. The new schedule of warehouses on lapwelded and seamless steel boiler tubes runs as follows:

Lapwelded: 1¾ in., —3; 2 in. and 2¼ in., —22; 2½ in. to 3 in., —35; 3¼ in. to 4½ in., —42.
Seamless: 1½ in., —35; 1¾ in., —12; 2 in. and 2¼ in., —19; 2½ in. to 2¾ in., —24; 3 in., —29; 3¼ in. to 4 in., —35.

We quote other prices on page 990.

High Speed Steel.—The market continues dull with the few orders that appear confined to a few pounds. Producers quote 90c. to $1 per lb. for 18 per cent tungsten high speed steel.

Old Material.—More activity is reported by most dealers and there is an upward tendency to prices. Buying prices per gross ton on heavy melting steel, New York, are now about $8. A holiday last week and another one this week have been the cause of some dullness in the market. Slightly more activity is noted in the Pittsburgh district.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.50 to $8.00
Steel rails, short lengths, or equivalent	9.00 to 9.50
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	11.50 to 12.00
Iron car axles	19.00 to 20.00
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track	9.50 to 10.00
Forge fire	6.00 to 6.50
No. 1 yard wrought, long	10.50 to 11.00
Light iron	4.50 to 5.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	4.00 to 4.50
Mixed borings and turnings	3.50 to 4.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	9.00 to 9.50
Stove plate	10.00 to 10.50
Locomotive grate bars	10.00 to 10.50
Malleable cast (railroad)	8.50 to 9.00
Car wheels	12.00 to 12.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Boston

BOSTON, Oct. 11.

Pig Iron.—The feature of the week was the inquiry of a large textile machinery manufacturer in eastern Massachusetts for from 1000 to 3000 tons of 2.25 to 2.75 silicon iron, bids for which were opened Oct. 10. It has been a year and a half since this concern has bought iron and it is expected that shortly it will purchase as much as 5000 tons. A factor of interest in two recent large purchases, one of 8000 tons by a textile machinery maker and another of about 10,000 tons by a radiator manufacturer, was the low prices made by a northern furnace, whose freight is 70c. lower than that of eastern Pennsylvania. It is reported that its

price was lower than $19, base, furnace. The stack is not in blast, but is accumulating enough orders to make blowing in worth while. Its price is now raised to $19.50 furnace base. Eastern Pennsylvania furnaces continue to dominate the New England market and from this district it is difficult to get quotations less than $20.50, base. There have been several sales during the week of lots of 100, 200 and 300 tons. An American agent for Belgian iron has been making a few sales in this territory at prices under the local market. The rumor that foreign iron is on a Boston dock was investigated thoroughly by a local house, the searchers finding no trace of such iron. The stove and radiator foundries appear the most active. The radiator concern which recently purchased about 10,000 tons intimates that it will need more iron in January. The more conservative pig iron authorities believe that the recent spell of buying was only a flurry and that a marked and steady improvement has not yet set in.

East. Penn., silicon 2.25 to 2.75	$24.56 to $26.06
East. Penn., silicon 1.75 to 2.25	24.06 to 25.56
Buffalo, silicon 2.25 to 2.75	25.96 to 26.49
Buffalo, silicon 1.75 to 2.25	25.46 to 25.96
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Finished Material.—The price of 1.50c., Pittsburgh, on bars being made by one of the independent mill representatives here, has brought out considerable business within the past ten days from a variety of buyers, including makers of drop forgings, marine hardware, automobile accessories and jobbers. Consumers are evidently taking advantage of this low price, as 1.60c. is the more generally quoted figure. Generally, business improved in September over August, but the demand was not greater than would normally be expected for the first fall month. No big structural lettings took place during the week, all being under 100 tons. Structural steel can be obtained for 1.60c. and possibly 1.55c.

Warehouse Business.—Jobbers are still cutting down stocks and in many instances are not keeping a full assortment of sizes. For instance, they would shear sheets to desired width and take the waste incident thereto rather than keep exact sizes. Sheets and plates are more in demand. The call for structural material is better than it was a few weeks ago, but even now is slight. Reductions of 15c. per 100 lb. have been made on cold-rolled steel. September improved on August from the standpoint of volume of sales and material shipped.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $3.90 to $4.30; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.25; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $6.50; Norway iron round, ¼-in. to 2½-in., 5.75c. to 6.75c. per lb. net; other sizes, 7.75c. base.

Coke.—The long-expected increase in demand is upon the coke trade and, though not spectacular, is fairly satisfactory. Local producers of by-product coke state that an increasing of prices on Nov. 1 is rather expected in view of the increasing prices in the Connellsville district. Present buying is chiefly to insure a sufficient supply when the snow flies, though at the same time the foundries have generally increased their melt. The present price is $10.66, delivered where the local freight does not exceed $3.40.

Cast-Iron Pipe.—The public bidding on pipe for West Springfield and Malden, Mass., last week has established lower market prices on the larger sizes. We are reducing our quotations below, therefore, by $1 a ton on 6-in. to 10-in. inclusive. An interesting feature was the bids submitted by an Alabama pipe maker, which were close to the lowest bidder in spite of the high freight rates. The city of West Springfield, which originally asked for 1100 tons of 16-in. pipe, revised bids to 435 tons of the same size. The Donaldson Iron Co., Emos, Pa., was low bidder at $43.70 delivered, the highest bid having been $48. J. B. Clow & Sons, Springfield, Ill., caused surprise because of the long distance to its plant by being low bidder for 60 tons of 6-in. and 8-in. pipe for Malden, Mass., with a delivered price of $49.50. The highest bid was $50.20. Turners Falls, Mass., which originally was planning to extend a 16-in. water main a mile and a quarter, will postpone buying on this until next year. However, it is planning to purchase this fall 800 ft. of 8-in. pipe and 600 ft. of 6-in. pipe (about 50 tons total). Lawrence, Mass., will open bids Oct. 13 for 800 ft. of 8-in. pipe. Norwood, Mass., has bought 125 tons of 18-in. pipe for a new sewer line. We quote per net ton in carload lots, f.o.b. Boston and district, as follows: 3-in., $66.70; 4-in., $56.70; 6-in., $50.70; 10-in. and larger, $49.70.

Old Material.—The better feeling is the result of more activity on the part of brokers buying from dealers than from interest shown by mills for scrap. Local dealers have been offered $15 for heavy melting steel, delivered, by mills in the Pittsburgh district, but the high freight and the danger of rejections prevent much from being shipped from here. Borings and turnings have advanced in price because of more demand in the eastern Pennsylvania district. Local foundries are getting bargains in cast scrap, at prices which are really below the present market.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.50 to $20.00
No. 2 machinery cast	16.50 to 17.50
Stove plate	15.50 to 16.50
Railroad malleable	13.50 to 14.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.00 to $7.75
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.00 to 8.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	3.00 to 3.50
Machine shop turnings	3.50 to 4.00
Cast iron borings, rolling mill	4.00 to 4.75
Cast iron borings, chemical	4.50 to 5.00
Blast furnace borings and turnings	2.50 to 2.75
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	12.00 to 13.00
Car wheels	13.00 to 14.00
Rerolling rails	9.00 to 10.00

Buffalo

BUFFALO, Oct. 12.

Pig Iron.—With two pig iron producers out of the market and likely to be for the remainder of the year, sales in this district will show a decided slump. Less than 5000 tons of new business was booked last week. An interest which has a furnace blowing on foundry iron will blow in another on basic Oct. 15, but none of this production will be offered for sale; the entire turnout will be used in steelmaking. The $21 base prevails more generally. One interest sold 400 tons at this figure. The interest which sold 2000 tons booked the foundry iron at $20 and malleable lots at $21. They have inquiries for 6000 tons on which they quoted the same scale. The furnace which has sold its entire estimated capacity of foundry iron for the rest of the year turned down about 6000 tons within a few days.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.00 to $22.00
No. 2X foundry, 2.25 to 2.75 sil.	20.50 to 21.50
No. 2 plain, 1.75 to 2.25 sil.	20.00 to 21.00
Basic (nominal)	21.00
Malleable	21.00 to 22.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—The margin of improvement is not great, but the increase in the number of orders with betterment in quantities asked for is satisfactory. Tin plate and pipe continue to be the best-moving commodities and some slight increase in structural business is noted, but it is generally conceded that whatever awards are made in this field will not be for this year's delivery. Plans are under way for the construction of a six-story structure in Buffalo by D. H. Coplon wherein the structural requirements will be 1600 tons and reinforced bars 300 tons. The Kellogg Structural Steel Co. will fabricate 300 tons for an addition to the J. N. Adam hospital at Perrysburg, N. Y. Increased railroad shop operation here and in nearby railroad centers has not developed any unusual demand. The Pennsylvania shops at Olean, N. Y., and the New York Central shops at Depew, N. Y., are now approaching normal capacity. In some quarters a belief is expressed that stronger prices will follow the sheet

advance. Tin plate is now quoted at $5.25 per base box. Plates are quiet, but bars show an increase in demand. Mill operation with one interest which never exceeded 15 per cent at any time this year is now at 30 per cent.

Warehouse Business.—Some new business is noticed in the general improvement. Some shops have been in the market and while no large buying has resulted, the pick-up is definite and from a constantly increasing circle of buyers. Improved railroad shop operation has not been felt in warehouse circles to any marked extent and jobbers generally feel that railroad wants in connection with car building and repairing have been handled at mills.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 3.95c.

Coke.—Some fair sales have been made and best grades are now quoted at $4.50 to $5.50. Inquiry has also shown improvement.

Old Material.—An advance in prices with particular reference to heavy melting steel is anticipated by a number of dealers who are now reluctant to accept business at $13. Considerable trading is going on between dealers and a number of mills have made purchases of steel. No large tonnage has moved and orders call for less than 500 tons. Generally demand for all grades has improved.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.004 and under	16.00 to 17.00
No. 1 railroad wrought	13.00 to 14.00
Car wheels	14.00 to 15.00
Machine shop turnings	6.00 to 7.00
Cast iron borings	6.00 to 7.00
Heavy axle turnings	9.00 to 10.00
Grate bars	10.50 to 11.00
No. 1 busheling	10.00 to 11.00
Stove plate	13.00 to 14.00
Bundled sheet stampings	7.00 to 8.00
No 1 machinery cast	16.00 to 17.00
Hydraulic compressed	10.00 to 10.50
Railroad malleable	12.00 to 13.00

Cleveland

CLEVELAND, Oct. 11.

Iron Ore.—Rail freight rates on ore from both lower lake ports and the seaboard will be reduced 28 per cent Oct. 20, the reduction to remain in effect until Jan. 1. Ore firms to-day were advised by the ore carrying railroads that the Interstate Commerce Commission had approved their application for the reduction and that the new tariffs are now being prepared, making the reduction effective on the date named. The reduction will result in the saving of 75c. per ton in the cost of making pig iron in the Pittsburgh district and 56c. in the Youngstown district, figuring two tons of ore for a ton of pig iron. While ore men regard the reduction in freight rates a move in the right direction, they are of the opinion that the lower rates will have little effect in the way of reducing the cost of making pig iron for some time, in view of the fact that the ore shipping season is almost over and furnaces generally, having bought sparingly, have taken nearly all the ore they have purchased directly to their furnace yards and now have in their stock piles nearly all the ore they will require until next spring. The rate cut will work to the earlier advantage of some furnaces that have gone in blast recently and will take considerable ore off the docks and it is expected to stimulate the dock movement in the next few weeks, as consumers will probably take shipments from docks instead of waiting until during the severe winter weather when the handling of ore is more expensive. The immediate effect of the announcement of the rate reduction is numerous requests from consumers that shipments be held up so that they can take advantage of the lower rail rates. Shippers are finding it impossible to grant many of these requests, although where it can be done they are diverting cargoes from inland furnaces to lake front furnaces which will not be benefited by the lower rail rates. One or two Eastern consumers have asked that their ore be placed on docks instead of being shipped direct as the greater saving in the reduced freight rates on ore for Eastern points as compared with the Pittsburgh and Valley districts results in a substantial saving for the consumer even after paying the dock handling charge. The rail rate reduction is not expected to stimulate the market to any extent, although it has caused one consumer to revive an inquiry which had become inactive.

Ore Receipts.—Ore receipts at Lake Erie ports during September were 2,670,172 gross tons as compared with 7,455,979 tons during September, 1920. Receipts at these ports for the season to Oct. 1 were 13,078,054 tons as compared with 31,959,201 tons during the same month last year. Shipments from Lake Erie docks to inland furnaces during September were 1,727,391 tons as compared with 5,596,554 tons during September last year, and the shipments from these docks for the season until Oct. 1 were 9,569,727 tons, as compared with 23,222,770 tons during the same period a year ago. During September the amount of ore on Lake Erie docks increased 375,657 tons, being 9,661,365 tons on Oct. 1, as compared with 9,203,206 tons on the same date last year.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Sales were lighter during the week than for several previous weeks. One interest sold 4100 tons, practically all in foundry grades, and including one 1000-ton lot placed by an Ohio jobbing foundry. Sales by other producers were in small lots. Shipments are holding up well, being about the same as during September. No change has developed in the price situation. Lake furnaces still quote foundry iron at $20 to $21 for No. 2, the former price being the more general quotation except for nearby points where the furnace has a freight advantage. While the usual minimum quotation for foundry iron for Cleveland delivery is $20.50, the sale of a 200-ton lot at $20 is reported. The only inquiry of any size is for 1000 tons of 2.75c. to 3.25c. silicon iron from an Elwood City, Pa., consumer. Prospects of reduction in freight rates are not expected to have any effect on pig iron sales and shipments, as consumers are taking iron only as fast as they need it.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$21.21
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	35.00

Finished Iron and Steel.—The volume of new business fell off the past week and orders generally were for small lots. On steel bars, a 1.50c. price which was in evidence a few weeks ago has again appeared, but 1.60c. is the most common minimum quotation. On plates and structural material, 1.65c. is the ruling quotation by some of the mills, while others are adhering to 1.75c. Some consumers have taken protections on plates and shapes at 1.65c. and some are closing contracts at this price for the remainder of the year. A lake shipyard has placed 1400 tons of plates for repairing lake boats and Ohio shops are figuring on oil storage tanks and refinery work that will require considerable plate tonnage. Cleveland will re-advertise for bids for the Baldwin Reservoir, requiring 1700 tons of reinforcing bars, this work having been held up some time by court proceedings. Quotations on hard steel bars range from 1.55c. to 1.60c. A Detroit automobile manufacturer is inquiring for 600 tons of cold-rolled steel. Light rails are weak. One sale is reported at 1.65c. with the extras waived. A lull has developed in the building field, no new work having come out during the week.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—One valley mill has advised its trade that it will advance sheets $5 a ton Oct. 15, or earlier, and is taking some orders for October and November delivery at present prices. This advance will not apply to the heavier gages of blue annealed sheets, which it will continue to quote at 2.25c., or $5 a ton lower than the present regular price on the lighter gages. Prices seem well maintained at 3c. for black and 4c. for galvanized sheets. Sales include 1000 tons of blue annealed sheets to a Detroit automobile manufacturer.

Warehouse Business.—Warehouse orders show some improvement, but irregularities in prices appear to have become more numerous.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is gaining and the market has stiffened up, makers claiming that concessions from regular prices have about disappeared. Manufacturers are declining to make contracts at present prices, which they say are below the cost of production and some are talking of on advance. The demand for rivets is slow and the market is still weak. While 2.40c. for structural and 2.50c. for boiler rivets are the more common quotations, these prices are being shaded $2 a ton.

Coke.—Foundry coke in small lots is in fair demand and the market is firm at $4.50 to $4.75 for standard Connellsville makes for prompt shipment. Some producers are asking $5 for November and December shipments. Sales of West Virginia foundry coke are reported at $6.

Old Material.—There is a fair volume of activity on the part of dealers who are buying scrap to fill orders recently taken from Youngstown mills. Prices are firm and some grades are higher, particularly cast iron borings. As the local market is lifeless, prices on active grades are still based on the Youngstown market. Sales of machine shop turnings to dealers for Youngstown delivery are reported at $8.50 to $9, cast, iron borings at $10.50 to $10.75 and heavy melting steel at $14 to $14.25.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.00 to $12.50
Steel rails, under 3 ft.	12.75 to 13.25
Steel rails, rerolling	15.00 to 15.50
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	8.40 to 8.65
Machine shop turnings	6.50 to 7.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	9.25 to 9.75
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	6.00 to 6.50
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	7.00 to 7.50
Drop forge flashings, under 10 in.	7.00 to 7.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	7.50 to 8.00

St. Louis

ST. LOUIS, Oct. 11.

Pig Iron.—The melt of pig iron in this district is still on the increase and there is more buying. However, during the last week there was no outstanding sale of consequence, but the run of carload orders showed an improvement. The largest inquiry put out was for 800 tons, made up of 550 tons of foundry iron and the remainder off Bessemer. A central Illinois implement manufacturer bought 200 tons. A car of 50 per cent ferrosilicon was purchased by a manufacturer in this district. The market is firm and prices are being well maintained.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$24.88
Northern malleable, sil. 1.75 to 2.25	24.88
Basic	24.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—Local fabricators, who last week saw the order for 3600 tons of structural steel for the hangar at Belleville, Ill., go to a Pittsburgh concern, lost another contract this week, the 2000-ton structural job for the Scottish Rite Cathedral going to the American Bridge Co., which was the lowest of three bidders. The letting of the contract for the Federal Reserve Building, about 3000 tons of structural steel, will be delayed about two months. Railroad purchases are being confined to wheels, axles and other material needed for car repairs, but in small quantities. There is a lull in the buying of sheets, most jobbers having protected themselves by purchases before the recent advance became effective. Warehouse prices are unchanged, and only a fair volume of business is being done.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The market for coke is firm at $4.75 to $5.50 for Connellsville brands, which is being met by local by-product producers. The tendency is toward the higher levels. An inquiry for 7500 tons of foundry coke, mentioned in THE IRON AGE last week is still pending, but no new inquiry of any considerable tonnage has developed. Sales of Granite City by-product coke during the week totaled 6000 to 8000 tons.

Old Material.—The market for old iron and steel continues strong and is very active. Some substantial purchases by consumers have been made at advanced quotations. Prices are higher by 50c. to $1 per ton on nearly all grades. Dealers are anxiously covering their short sales and all railroad offerings were disposed of at good margins over the previous week's sales. Relaying rails are marked up about $2 per ton and inquiries are lively, although offerings are scarce, especially in the heavier sections. The following railroad lists are before the market this week: Great Northern, 3000 tons; Missouri, Kansas & Texas, 1000 tons; Wabash, 300 tons; Pullman Co., 250 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$15.50 to $16.00
Steel rails, rerolling	13.50 to 14.00
Steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard section	30.00 to 32.00
Cast iron car wheels	15.50 to 16.00
No. 1 heavy railroad melting steel	12.00 to 12.50
No. 1 heavy shoveling steel	11.50 to 12.00
Ordinary shoveling steel	11.00 to 11.50
Frogs, switches and guards, cut apart	12.00 to 12.50
Ordinary bundle sheet	7.00 to 7.50

Per Net Ton

Heavy axles and tire turnings	$7.50 to $8.00
Iron angle bars	13.00 to 13.50
Steel angle bars	11.00 to 11.50
Iron car axles	20.00 to 20 50
Steel car axles	15.50 to 16.00
Wrought iron arch bars and transoms	15.50 to 16.00
No. 1 railroad wrot.	12.00 to 12.50
No. 2 railroad wrot.	11.00 to 11.50
Railroad springs	13.00 to 13.50
Steel couplers and knuckles	13.00 to 13.50
Locomotive tire, 42-in. and over, smooth inside	10.00 to 10.50
No. 1 dealers' forge	10.00 to 10.50
Cast iron borings	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 1 borings cut in sheets and rings	8.00 to 8.50
No. 1 railroad cast	15.00 to 15.50
Stove plate and light cast	12.00 to 12.50
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.50 to 11.00
Pipes and flues	8.50 to 9.00
Heavy railroad sheet and tank	8.00 to 8.50
Light railroad sheet	5.50 to 6.00
Railroad grate bars	10.50 to 11.00
Machine shop turnings	6.00 to 6.50
Country mixed iron	8.00 to 8.50
Uncut railroad mixed	9.00 to 9.50
Horseshoes	11.00 to 11.50
Railroad brake shoes	10.50 to 11.00

Owing to better movements of steel and tinplate, the "Tinplate Special," operated by the Erie railroad between the Youngstown district and Chicago, has been revived. Third-morning delivery at Chicago from producing points in the Valleys is assured under the new service.

Philadelphia

PHILADELPHIA, Oct. 10.

The interest of the trade centers rather on price fluctuations than upon volume or tonnage of orders. Price tendency is upward in all lines from raw to finished material, being noted most markedly in old material, in which a general advance has taken place. Generally speaking, the tonnages placed the past week have been very small. Steel sales managers are showing more determination than ever not only to maintain present prices but to raise them gradually to more nearly the cost of manufacture. They have found that lower than cost prices have not stimulated business, and so conclude they might as well raise levels. Pig iron salesmen are more and more showing buyers that their quoted prices are final. It seems as though a campaign to educate the buyer as to the economics of the present situation had set in in earnest.

Features of the week's developments are: The 28 per cent freight reduction on iron ore by all trunk lines; the statement by several sheet makers that another $5 a ton advance is due Oct. 15; the $5 price being made by some on foundry coke, both spot and contract.

The present freight rate on iron ore from Buffalo to eastern Pennsylvania is $2.24 a ton; a 28 per cent reduction would bring this price to $1.61 a ton. The 63c. reduction would theoretically mean a reduction of $1.20 a ton on the cost of making a ton of pig iron. The pig iron trade looks upon the proposed reduction with indifference; some even say it will prove an embarrassment, as buyers will use the freight reduction as a lever to wedge down prices. Practically all of the furnaces in this district have their ore in stock, on which they have paid the present high freight. It is expected that the reduced freight schedule will be placed in effect Oct. 20. The pig iron interests had asked for a 25 per cent reduction on ore, coke and limestone, and it is said by some that this recent action is a "sop" to compensate for the failure to comply with the original request. One interesting theory is that the railroads expect to buy steel before long and feel that they can more legitimately ask for reductions on what they buy, if they themselves take the first step.

Two or three sheet makers have announced the coming advance in sheets and seem confident that it will be maintained.

There is only one large pig iron inquiry before the trade: that of a New England textile interest for up to 3000 tons of No. 2X. A 3000-ton inquiry for gray forge, announced two weeks ago, has been withdrawn. The Pennsylvania Railroad recently bought 4500 kegs of spikes and 70,000 heat-treated track bolts.

Ferroalloys.—The Brier Hill Steel Co. is in the market for 100 tons of ferromanganese. The British price is $58.35, seaboard, and domestic producers are meeting it. There is virtually no demand for spiegeleisen. It is quoted at $25 to $27.

Pig Iron.—A Massachusetts manufacturer of textile machinery has spread broadcast an inquiry for 1000 to 3000 tons of No. 2X. As eastern Pennsylvania furnaces are dominating the New England market because of advantageous freight rates, they are interested particularly in this inquiry. An informal inquiry for 3000 tons of gray forge from a skelp manufacturer has been withdrawn because a pipe maker in turn withdrew its skelp inquiry. A lull has set in following the recent buying flurry. At the same time, prices are becoming stiffer. It is more difficult to obtain 1.75 to 2.25 per cent silicon iron for $20.50 furnace. One prominent seller who last week quoted $21, base, has raised this price 50c. It is understood that the following furnaces are considering blowing in: Brooke, Carbon and Reading. It is officially announced that the Hellertown furnace of the Thomas Iron Co. will be blown in by Oct. 15. Where favorite brands are desired, high prices have been paid in some instances. No. 2 plain has sold for $23, furnace; 2X Virginia iron has sold at $25, the same seller later asking 50c. more. One eastern Pennsylvania furnace advises it would not sell malleable at less than $24, furnace, whereas Buffalo malleable is purchaseable at $20.50.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.34 to $22.04
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.84 to 22.54
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	20.50
Gray forge	20.50 to 21.50
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Plates.—The most demand comes from tank makers. The Baltimore & Ohio is receiving bids Oct. 13 on car repair material. It is said on good authority that this railroad will repair 20,000 or more cars within the next few months. The price of 1.75c., Pittsburgh, is most generally named, though admission is made that concessions would be made. One company quotes 1.65c.

Structural Shapes.—The same prices are quoted as on plates, though the market on structural steel is a trifle stronger. Though bids are in, contracts have not been awarded for the 1000 tons for the school at Atlantic City nor for the 500 tons for the swing span for the Philadelphia & Reading.

Railroad Supplies.—The Pennsylvania Railroad recently purchased 4500 kegs of spikes and 70,000 heat-treated track bolts. Prices on machine bolts are stronger, makers having abandoned the 70 and 10 per cent off list price in favor of the 65, 10 and 5 per cent.

Bars.—The price of 1.65c. is generally quoted on steel bars, two makers quoting 1.60c. The price tendency is upward.

Wire Nails.—Several sales have been made by independents at the new prices of 2.90c.

Sheets.—Some business has been placed at the new prices, and the announcement has been made by several companies that another $5 a ton advance will be made Oct. 15. The theory is that just as buyers hastened to cover before the former recent advance, so will they repeat covering for the next. Present prices are 2.50c. for blue-annealed, 3c. for black and 4c. for galvanized.

Old Material.—Three eastern Pennsylvania mills are buying heavy melting steel, one paying to its special broker $13 and to others $12.50; another mill paying $12 and a third paying $11.50 for what little is offered it at these low prices. One prominent broker and dealer reports better business than at any time in the past six months. Prices have advanced almost uniformly in all items. Though $15 is being paid for steel by brokers who are short in the Pittsburgh district, no material is being sent there from here. Cast scrap is strong in spite of the small demand, the strength being based on scarcity.

No. 1 heavy melting steel	$12.00 to $12.50
Scrap rail	12.00 to 12.50
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	16.50 to 17.50
Car wheels	17.00 to 17.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.50 to 15.00
No. 1 forge fire	10.50 to 11.00
Bundled sheets (for steel works)	9.00 to 9.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turning (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	10.00 to 10.50
Cast borings (for chemical plants)	10.50 to 11.00
No. 1 cast	17.00 to 18.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	13.50 to 14.00
Railroad malleable	12.00 to 13.00
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Iron car axles	No market
Steel car axles	No market

Semi-Finished Steel.—There is almost no demand for this material. Many of the users of billets in this district are either shut down or well stocked. A consumer who said he could get $34 on forging quality finally bought at the regular price of $35. Rerolling quality is quoted at $30.

Coke.—Though most of the guaranteed foundry coke in this district is on a $4.75 Connellsville base, recent sales have been made at $5 for both spot and contract. Furnace coke is about $3.50.

Warehouse Business.—Sales are reported as starting out this month at the rate of 10 per cent better than a month ago. Jobbers are keeping their stocks reduced, at the same time being careful to keep complete assortments.

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage, 3.75c.; galvanized sheets, No. 28 gage, 4.75c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16 in., 4.785c.; ⅜-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.75c.; squares and hexagons, cold-rolled steel, 4.25c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Cincinnati

CINCINNATI, Oct. 11.

Pig Iron.—Last week was unusually quiet in the pig iron market and few sales of any consequence were reported. An Indiana melter took 400 tons of Southern iron for delivery during the first quarter at $19, base, Birmingham. Two other sales, each of 100 tons, were made to melters in this territory at a price reported to be $21, Chicago. It is persistently reported that several Lake furnaces are quoting on a $20, base, and at least one sale of 100 tons was made at this figure. There are no inquiries of any size, the largest being for approximately 300 tons from the National Cash Register Co. at Dayton. While the past week has been quiet, it is expected that the latter half of the month will show increased activity, as stocks on foundry yards are being steadily cleared up. Quotations from the various districts show no change, Ironton producers holding to $21, base, and Southern furnaces being firm at $19.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	32.86
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	24.02

Finished Material.—While the individual tonnages booked were not heavy, the aggregate is regarded as very satisfactory. An Ohio fabricator placed an order for 350 tons of structural material and an Indiana fabricator for 250 tons. Other orders ranging from carloads to 150 tons were also booked in the various finished materials. Pipe orders were also fairly numerous and one jobber placed 200 tons with an independent mill. The sheet market is rather quiet, following the comparatively heavy business booked during the previous three weeks. It is reported that some independent companies are considering a further advance of $5 a ton on sheets and one company is already reported to have advanced its prices to that extent. A fairly good volume of business is reported in tin plate. It is reported that prices are being shaded, in one instance it being said that a price of 4.50c. had been quoted on production plate. The wire business is holding up nicely and an order for 2500 kegs of nails was placed during the week. The Indiana Bridge Co. will fabricate 125 tons for the American Building at Dayton, Ohio, and an independent fabricator is understood to have secured 250 tons for a theater in Indianapolis. The Big Four Railroad is inquiring for several girder spans involving 150 tons. A highway bridge over the Warrior River in Alabama taking 750 tons will be closed on Oct. 19. A high school building for Middletown, Ohio, plans for which are now nearing completion, will likely be up for bids within the next 30 days.

Warehouse Business.—A gradual improvement is still shown in the number and size of orders placed and jobbers report the prospects as most encouraging. Prices are being firmly maintained, with the exception of wire nails, which have dropped back to the old base of $3.25 per keg from $3.40, which was in effect for a few days following the recent advances made by the mills.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.10c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—Some activity is reported in the coke market, with carload sales predominating. The price situation is firmer, and $4.50, Connellsville, now appears to be the minimum on foundry coke. Quotations on Wise County and New River fuel are unchanged.

Old Material.—The scrap market has again dropped back into quiet after a short period of fair activity. Dealers report, however, some inquiries from other districts, particularly in the Valley. Prices are inclined to be weaker, but are quotably unchanged in the absence of trading.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$4.50 to	$5.50
Iron rails	12.50 to	13.00
Relaying rails, 50 lb. and up	25.50 to	26.50
Rerolling steel rails	11.00 to	12.00
Heavy melting steel	9.50 to	10.00
Steel rails for melting	9.50 to	10.50
Car wheels	12.50 to	13.50
Per Net Ton		
No. 1 railroad wrought	9.00 to	10.00
Cast borings	3.50 to	4.00
Steel turnings	2.50 to	3.00
Railroad cast	12.50 to	13.00
No. 1 machinery	14.00 to	15.00
Burnt scrap	8.00 to	9.00
Iron axles	16.00 to	17.00
Locomotive tires (smooth inside)	10.00 to	10.50
Pipes and flues	4.50 to	5.50

San Francisco

SAN FRANCISCO, Oct. 5.

Pig Iron.—Although the Coast market continues rather quiet, there seems to be a little better feeling gradually developing, some slight improvement in foundry business being reported in some quarters with the somewhat better demand for castings. A perceptible increase in tonnage volume is also noted, principally in small lots so far. Distinctly the largest single sale of pig iron within the last two weeks is that involving approximately 1500 tons of Alsace-Lorraine material, which was taken by a prominent manufacturer of sanitary supplies at prices ranging from about $29 to $31, according to the silicon content, delivered San Francisco. Foreign iron continues to occupy the main interest, prices generally being sharply below domestic offerings, some low phosphorous Belgian basic being offered from $6 to $9 under.

Finished Iron and Steel.—It appears to be the general impression that a better condition has developed, and is developing, in the steel situation here. While activity is not uniformly more spirited, certain lines are in good demand. This applies particularly to sheets, whose movement seems to have been stimulated by the recent price advances. Galvanized sheets are now being offered at a steady price of 4c., Pittsburgh. Individual inquiries, for the most part, have not been for large quantities, perhaps one of the best prospects being the 300-ton inquiry by the General Petroleum Co. Jobbers report a more active call for sheets from a larger area. The Columbia Steel Co. announces the new base price of reinforcing bars of $2.85, f.o.b. cars, San Francisco, for this quarter, against the former price of $2.35. This increase was said to be the result of the lack of demand elicited by the $2.35 basis, which in itself did not cover costs of production adequately. The Pacific Coast Steel Co. has followed this lead. It is rather too early to expect a change in the volume of business, which in bars has not been great. The jobbers' new price on bars is $3, warehouse. Some export inquiry has been received lately, perhaps for 1000 tons. Plates are moving well and seem to be steadying. Between 16,000 and 18,000 tin plate boxes have been sold on the basis of $5.90, delivered Seattle, which means a price below

the market. The State Board of Harbor Commissioners has taken 100 tons of 9-in. girder rails at $77, delivered, rail and water shipment; 100 tons of standard section T rails, 85 lb., and a large quantity of track special work. Besides this, there are prospects for considerable tonnage on State construction at Sacramento, highway work and schools. Owing to having a sufficient supply of ingots on hand, Judson Mfg. Co. announces closing down one furnace temporarily.

Cast Iron Pipe.—The expected advance of $4 a ton in the water rate from Mobile to Pacific Coast points, effective Oct. 13, has caused a considerable buying demand on the part of plumbing supply jobbers, who are anticipating their future needs at this time. Business in pipe in California continues steady, although prices have slipped considerably of late. The present market is around $33 to $35, shop, for 6-in. pipe, but some lower figures occasionally are heard. Fullerton, Cal., has closed for 2500 tons of the average sizes; San Diego has been asking for 600 tons of from 2 to 8-in. pipe; Madera is in the market for 150 tons of 4 to 8-in., contractors' letting; and Glendale is inquiring for 50 tons of 4-in. pipe.

Coke.—The Southern Pacific Co. appears to be the largest taker of coke, since the general demand remains limited, and confined chiefly to carload lots. Recently this railroad closed for 600 tons of No. 1 foundry at very favorable figures. A large smelting interest is bringing in a quantity of Australian coke.

Old Material.—An increased tonnage of heavy melting steel is reported, a weekly average of probably around 1000 tons being contracted. Large buyers are in the market for material, and it is said holders are firm at $10 a gross ton, delivered. Freight rates are considered not to warrant a lower figure. Business is more routine in cast iron scrap, with prices nominal at about $20 or a little better.

Chicago

CHICAGO, Oct. 11.

The mills continue to report a slight increase in bookings, but on the whole the situation has not changed materially during the past week. The Illinois Steel Co. remains on a 39 per cent basis so far as finished steel output is concerned, while the Inland Steel Co. is maintaining a 40 per cent rate. Having blown out one blast furnace in need of repairs and blown in another to take its place, the former company has the same number of active stacks as a week ago. It expects to put in another furnace at Joliet early this week, however, which will give it a total of 11 active stacks out of its 29.

Although further expansion in business is proceeding slowly, the mills are showing less disposition to name low prices than during weeks past. Plates, which have been the weakest commodity in the finished steel market, are firmer. Except on large tonnages of attractive specifications, such as are being sought by car builders, it is extremely doubtful whether less than 1.75c., Chicago, can be done.

The pig iron market is very quiet and additional speculative tonnage has been unloaded at $21 base local furnace, indicating that buyers are showing resistance to the advancing tendency of prices.

Ferroalloys.—Sales of 700 tons and 50 tons of 14 to 16 per cent ferrosilicon, respectively, have been made locally at less than $32, delivered. A carload of 50 per cent ferrosilicon has been sold at about $60, freight allowed. The Scullin Steel Co., St. Louis, is also in the market for a carload. Ferromanganese has been moved here at as low as $66, delivered.

We quote 78 to 82 per cent ferromanganese, $66 to $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Pig Iron.—The only sales of consequence reported were closed at $21 base, furnace, among them 700 tons of foundry and 400 tons of malleable for local delivery and 100 tons of resale malleable for Milwaukee delivery. Producers, however, are still holding firmly to $22, base, furnace, and as the stocks in second hands available at a lower price have practically all been disposed of, the $21 market is expected to be a thing of the past within a week or two. Foundry operations in this territory are still spotty and the aggregate melt is increasing very slowly. Jackson County silvery is not finding much of a market here, as a Tennessee 8 per cent has been offered at as low as $32, delivered, and electrolytic material in some cases has been quoted at even lower prices.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	$21.50 to 22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00 to 22.00
Northern high phos	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	21.00 to 22.00
Basic	22.00
Low phos., Eastern furnace, sil. 1 to 2 per cent copper free	32.00
Silvery, sil. 8 per cent	32.00 to 34.82

Railroad Equipment.—The Chicago, Milwaukee & St. Paul has let 1374 tons for steel center sills to A. M. Castle & Co. The Baltimore & Ohio is inquiring for 1000 50-ton steel hopper cars and 1000 70-ton steel coal cars. The Delaware, Lackawanna & Western has let 500 50-ton all-steel hopper cars each to the American Car & Foundry Co., The Cambria Steel Co., and the Standard Steel Car Co. The Delaware & Hudson is asking for prices on from one to ten high-powered Mikado-type engines. The Union Pacific is reported to be contemplating the purchase of from 35 to 65 locomotives.

Structural Material.—The carpenters and a few other crafts have refused to return to work despite the unanimous vote of the Chicago Building Trades Council, noted in last week's issue. The local building situation is therefore as unsettled as ever, and there seems to be little hope of a real revival in construction work in Chicago this year. In other parts of the West, however, a steady increase in projects is to be noted. Plain material prices are on about the same level as heretofore and fabricating work continues to be taken at extremely low figures. Recent lettings include:

Inland Steel Co., Rail finishing department, 700 tons, to Morava Construction Co.

First Methodist Episcopal Church, Los Angeles, 847 tons, to Baker Iron Works.

Sauk City bridge, Sauk City, Wis., 626 tons, to Wausau Bridge & Iron Co.

Great Northern Railway, 500 tons for bridges, to Wisconsin Bridge & Iron Co.

St. Paul, Minn., addition to purification and filtration plant, 116 tons, to St. Paul Foundry Co.

Niagara Radiator & Boiler Co., plant, Chicago, 375 tons, to Kenwood Bridge Co.

U. S. Gypsum Co., block plant, Ft. Dodge, Iowa, 145 tons. to Lackawanna Bridge Co.

Prospective work includes:

Wisconsin Steel Works, South Chicago, trestle, 325 tons.

Wabash Railroad, bridge, Attica, Ind., 325 tons.

The mill quotation on plain material ranges from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—The purchase of 12,000 tons of rails noted two weeks ago has been followed by an order from another road for 7000 tons. The Cotton Belt, as noted in the St. Louis market last week, is inquiring for 10,000 tons of rails for 1922 delivery. Light rails are weak, owing to keen competition from rerolling mills, and prices appear to range from 1.70c. to 1.75c., mill. There continues to be a fair amount of spike and bolt business, but prices are unsteady. There is better demand for steel wheels and the local wheel plant is running full, single turn.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—This commodity, which has been the weakest on the list of finished products, is showing signs of firmness. A company which is reputed to be a very close buyer has placed an order for 2100 tons of plates, structural steel and bars at a flat price of 1.75c., Chicago. It appears that this price is now the minimum except on unusually attractive tonnages of desirable specifications, such as are being placed now and then by car builders. Twenty-five hundred tons of steel for New York Central Lines car repairs has been placed with a local mill. This is in addition to the 2250 tons previously placed, as noted a week ago.

The ruling mill quotations range from 1.75c. to 1.85c. Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Just as sheet mills permitted their customers to place orders at the old prices at the time of the recent advance, bolt and nut makers have closed a fair amount of business at the old discounts. How firmly the new quotations will hold when these orders have been taken care of, is still an open question. In this connection, it is perhaps significant that a number of jobbers have taken advantage of the protections offered them and have closed contracts for their needs for two months ahead. For mill prices, see finished iron and steel, f.o.b Pittsburgh, page 978.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Sheets.—A number of mills have given notice that they will again advance their prices $5 a ton, effective Oct. 15. The local independent, however, has taken no such action. Ruling prices are about the same as heretofore and buying is not particularly active.

Mill quotations are 3c. for No. 28 black, 2.25c. to 2.50c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Cast-Iron Pipe.—Ruling prices are about the same as heretofore, but extreme concessions are no longer reported. Recent lettings include: Forest, Ohio, 275 tons to James B. Clow & Sons; St. Paul, 140 tons of specials to Great Lakes Engineering Co., River Rouge, Mich.

Pending business includes: Springfield, Ohio, rejected bids on 1000 tons and will readvertise; Kenmore, Ohio, 500 tons, bids in Oct. 12; Highland Park, Mich., 150 tons, Oct. 10; Bay City, Mich., 200 tons, Oct. 11; Ashland, Ky., 175 tons, Oct. 26.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Wire Products.—Bookings of mills have been satisfactory, although not so heavy as in weeks past. Most orders from jobbers call for quick shipment, indicating that the warehouse turnover is rapid. Railroads continue to buy in moderate quantities, an outstanding recent order being one from a Northwestern line calling for 1600 kegs of nails. Prices appear to be firm. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 978.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Bars.—The demand for mild steel bars is holding its own, but is not increasing perceptibly above the rate attained last week. Buying, although considerably better than it was in August, is still below normal. In this connection it is to be noted that the agricultural implement industry, one of the largest sources of business in this territory, is buying nothing. Purchases of bar iron are spasmodic, and on the whole unsatisfactory, and there is no material change in the demand for hard steel bars.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Old Material.—Speculation by dealers is pushing quotations upward and while consumers are largely out of the market and are resisting the attempts to force the market to a higher level, they find it necessary to pay more for material every time they cover for imperative needs. The advanced quotations below, however, represent to a large extent what might be termed a dealers' market. These prices, and in some instances, higher figures, are being paid by them for railroad offerings. Railroad lists include: The Great Northern, 3000 tons; the Northern Pacific, 1200 tons; the Santa Fe, 1000 tons, and the Wabash, 200 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$17.00 to $17.50
Relaying rails	27.50 to 30.00
Car wheels	16.50 to 17.00
Steel rails, rerolling	14.00 to 14.50
Steel rails, less than 3 ft.	14.00 to 14.50
Heavy melting steel	12.50 to 13.00
Frogs, switches and guards cut apart	12.50 to 13.00
Shoveling steel	12.00 to 12.50
Los phos., heavy melting steel	15.50 to 16.00
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.00 to 8.50
Axle turnings	8.50 to 9.00

Per Net Ton

Iron angles and splice bars	14.50 to 15.00
Steel angle bars	11.50 to 12.00
Iron arch bars and transoms	15.50 to 16.00
Iron car axles	20.00 to 20.50
Steel car axles	14.50 to 15.00
No. 1 busheling	10.00 to 10.50
No. 2 busheling	7.25 to 7.75
Cut forge	11.25 to 11.75
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	11.50 to 12.00
Steel knuckles and couplers	13.50 to 14.00
Coil springs	14.50 to 15.00
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	13.25 to 13.75
Low phos. punchings	12.00 to 12.50
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	6.00 to 6.50
Stove plate	12.75 to 13.25
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00
Railroad malleable	13.50 to 14.00
Agricultural malleable	13.50 to 14.00
Country mixed	9.00 to 9.50

German Market Less Active

(By Aerial Mail to London)

BERLIN, GERMANY, Sept. 27.—Business during the past week has been active, although it was generally noted that the tone of the market was somewhat less feverish. The reasons for this may partly be found in the fact that a sudden, though only temporary, rise of the mark introduced an element of insecurity and, for a time, served to curb the activity of jobbers. That this was but temporary was plainly evident toward the close of the week, when a renewed drop of the mark automatically stimulated buying activity. Prices have ceased to show extreme advances compared with the rate at which they were increasing during recent weeks, but quotations are largely nominal and hardly warrant consideration as a barometer of the present boom.

Mills have their hands tied with orders up to the spring of 1922, and the prices quoted on new inquiries are frequently ridiculous, intended to discourage further orders. Although some mills are now arranging to increase their output, supplies are still moving slowly and in some districts there is a genuine scarcity of material. This applies particularly to sheets, wire rods and wire products. Numerous complaints are coming from consumers at the dearth of wire rods, of which every available ounce, it is stated, is being shipped abroad, forcing domestic customers to purchase at high prices from jobbers.

In the pig iron market there is a brisk demand for Luxemburg foundry iron No. 3, particularly for export. Quotations range from 1330 to 1450 m. per ton. Because of the depreciation of the mark, the Pig Iron Syndicate has agreed upon a price increase of 150 m. per ton, from Oct. 1. Prices for other grades of pig iron remain unchanged for October. No important changes are reported in the semi-finished material market. Luxemburg works have increased their quotations for sheet bars and basic billets to 2250 m. and for cogged blooms to 2200 m.

Permission to Reduce Ore Rates Granted

(*Continued from page* 944)

the entire rate structure and the industry has been given an opportunity to benefit from them.

The conferences between railroad executives and the Government officials were held at the suggestion of the latter who share the opinion of industrial interests that high freight rates are one of the chief obstacles in the way of active resumption of business. Cuts were recommended by the Interstate Commerce Commission some time ago for some of the leading basic commodities, including iron and steel, it is said, and the Administration is understood to have been aware that the suggestions were to be made to the carriers and had approved them in advance.

Some of the railroad executives are asking that the Railroad Labor Board be abolished, while others want its activities either restricted or merged with the Interstate Commerce Commission and desire that there be a substantial cut immediately in the wages of the higher paid employees. They also are insisting on quick action regarding the funding bill so as to be able to obtain money to proceed with payment of debts and purchase of requirements for maintenance of way, etc. The Senate Committee on Interstate Commerce is about ready to report the bill with amendments said to be of an advantageous nature to the railroads, which some think, are the result of the favorable attitude of the railroads toward a cut in rates, a subject that will be taken up in Chicago on Oct. 14 between railroad executives. The chief amendment, which remains to be acted upon finally by the committee, would give the railroads the right to sue the Government for claims based on the alleged inefficiency of labor. There is serious doubt that the amendment, if it comes to the floor of the Senate, can pass, not only because of strong opposition in Congress to such legislation, but it is also said that some Administration officials oppose it, although others are said to have no objection to it.

As Viewed at Pittsburgh

PITTSBURGH, Oct. 11.—The temporary restoration of the freight rates on iron ore, in effect prior to Aug. 26, 1920, is 28 per cent, and this applied to rates now in effect amounts to practically the same as the 40 per cent advance made Aug. 26, 1920, applied to rates then in effect. The effect of the reduction, which is to expire Dec. 31, is somewhat questionable. It is generally believed that merchant furnaces have practically all the ore down from the lower lake docks that they are likely to consume over the remainder of the year and consequently the reduction will not be of much assistance to them. The steel companies, however, are carrying stocks of considerable proportions on the lower lake docks and they will benefit by a reduction in the freight charges. Assuming that two tons of ore are used in the making of a ton of pig iron, the saving in freight charges for furnaces in the Valley district is 50 cents, as the new rate is 66 cents per gross ton, as against 91 cents per gross ton, the rate which has been in effect since Aug. 26, 1920. The saving for the Pittsburgh district furnaces runs even higher because the new rate is 92 cents per ton, as compared with $1.27½, a difference per ton of 35½ cents or 71 cents per ton of pig iron.

The long campaign, having for its object the reduction on rates on ore, coke, limestone, pig iron and steel, finally is bearing fruit. It is believed that the reduction in ore freights will be followed by a cut in tariffs on coke and limestone and possibly on pig iron itself. To date only ore has been mentioned and we present, herewith, a table giving the new rates, those which became effective Aug. 26, 1920, and those in effect prior to the latter date:

	New Rate	Aug. 26, 1920	Old Rate
Valley	$0.66	$0.91	$0.65
Dover, Ohio	0.71	0.98	0.70
Midland, Ohio	0.80	1.105	0.79
Pittsburgh	0.92	1.275	0.91
*Jackson, Ohio	0.72	1.00	0.715
†Jackson, Ohio	0.90	1.245	0.89
Hamilton, Ohio	0.995	1.385	0.99
Ironton, Ohio	0.995	1.385	0.99
Johnstown	1.048	1.44	1.03
Lehigh Valley	1.54	2.55	1.54
Sparrows Point	1.60	2.225	1.59

*From Cleveland. †From Toledo.

On dock ore, in addition to the line haul, there is a charge of 22½ cents per gross ton for handling from rail or vessel to the dock pile, of 14 cents from the dock pile to car and a storage charge of 1½ cents per ton per month. These charges, established following the increase in freight rates of Aug. 26, 1920, it is understood, will not be changed as a result of the latest developments in connection with ore freight charges.

Ore Hearing Postponed

WASHINGTON, Oct. 11.—Owing to the illness of one attorney and engagements of others in the case relating to iron ore rates from Lake Superior mines to Lake Erie ports, the hearing which was to have been resumed yesterday in Chicago has been postponed to an indefinite date. Ore shippers who are protesting against both the old and new rates on these shipments say that the application of carriers to make a reduction of 28 per cent in ore rail rates from Lake Erie docks to interior furnaces in official classification territory and from Eastern points to furnaces will not affect their position in the least. They are hopeful, however, that the carriers in their further conferences with iron and steel and ore interests will voluntarily withdraw existing tariffs on shipments from the upper mines and cut these rates instead of merely confining them to shipments from Atlantic and Lake Erie ports. The proposed 28 per cent reduction, it is pointed out, would largely affect dock ore only from Lake Erie ports, inasmuch as direct shipments for this season are nearing an end, and consequently would apply to a comparatively small tonnage and, as now proposed, the shipments at the 28 per cent reduction would last only until the end of the year, though the period might be extended.

Steel Corporation's Orders Increase

Unfilled orders of the United States Steel Corporation, after having declined every month for 13 months, made a gain in September. Unfilled orders Sept. 30 were 4,560,670 tons, an increase of 28,744 tons over the tonnage of Aug. 31.

The unfilled tonnage a year ago was 10,374,804 tons, or 5,814,134 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28	6,933,867	9,502,081	6,010,787	9,288,443
Mar. 31	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30	5,845,224	10,359,747	4,800,865	8,741,882
May 31	5,482,487	10,940,465	4,282,310	8,337,623
June 30	5,117,868	10,978,817	4,892,855	8,918,866
July 31	4,830,324	11,118,468	5,578,661	8,883,801
Aug. 31	4,531,926	10,805,038	6,109,103	8,759,042
Sept. 30	4,560,670	10,374,804	6,284,638	8,297,905
Oct. 31	.....	9,836,852	6,472,668	8,353,293
Nov. 30	.....	9,021,481	7,128,330	8,124,663
Dec. 31	.....	8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

A new plant housed in one building 100 x 350 ft. is being completed for the Heltzel Steel Form & Iron Co., Warren, Ohio, to replace structures destroyed by a fire June 2. The new building is of brick and steel construction and of the monitor type.

EXPORT MEETING

American Manufacturers' Association Opposes American Valuation Plan in Tariff

A slight note of pessimism pervaded the discussions of European market conditions at the twelfth annual convention of the American Manufacturers' Export Association, Oct. 5 and 6, at the Waldorf-Astoria Hotel, New York. The keynote of the convention was "How to Retain and Increase Export Trade." Both the tariff as a whole and the American valuation plan as a part of the tariff were criticized. On the question of the proposed tariff a resolution calling upon Congress to consider the effect of an undue increase in the tariff with Cuba was passed. Pointing out that Cuba is tied to the United States both politically and economically, that our trade there in 1920 amounted to more than the total of our trade with all the Spanish-speaking South American countries, and that growing German competition in this market necessitates more than ever before the preferential agreements between the two countries, the resolution concluded:

> Therefore, Be it hereby resolved by the members of the American Manufacturers' Export Association to recommend to Congress a most careful consideration of the effect that an undue increase in the tariff would have upon the trade between the two countries, the large American investments in Cuba, and the prosperity of the island, and further recommend to the Secretary of State the advantages that would follow favorable consideration of the petition of the Cuban Commercial Mission now in the United States for a rearrangement of the existing treaty between the United States and Cuba, by which the present differential of 20 per cent would be substantially increased.

George Weston, general manager for South America of the American Express Co., spoke on "Some Present Day Conditions in Argentina, Brazil and Uruguay." "The Problems of Exchange" were discussed with Allen Walker, Guaranty Trust Co., in charge, and "Foreign Credits and Investments" were considered following an address by William S. Kies, chairman of the board First Federal Foreign Banking Association. "Our Relation to the Present European Situation" from an economic, industrial and banking point of view was held under a general discussion following short addresses by W. F. H. Koelsch, president New Netherland Bank of New York; John S. Lawrence, Lawrence & Co., Boston; and Benjamin M. Anderson, Jr., Chase National Bank, New York.

Opposed to American Valuation Plan

A rather heated discussion arose at the final afternoon session over the American valuation plan, which was the subject of an address by Thomas J. Doherty of the National Council of American Importers and Traders, Mr. Doherty opposing the introduction of this system of valuation in the new tariff. He pointed out that although a somewhat similar system was in force on June 30, 1842, it lasted only about two months, a new law going into effect on Aug. 30 of the same year. Consequently this is not only an untried plan but it means "scrapping" practically all the knowledge and experience gained under the method that has prevailed for more than 100 years. "The language of this section of the tariff was so ambiguous," said Mr. Doherty, "and the terms as used were so susceptible of different and conflicting meanings, and the whole plan was so utterly unworkable, that the Senate finance committee, after hearing some of the critics, threw it out of the bill and tentatively adopted a substitute." Although this substitute has eliminated some of the absurdities and ambiguities of the House bill, it nevertheless makes the same revolutionary change in the entire customs system and is still impracticable, according to Mr. Doherty.

Judge John F. Zoller, General Electric Co., spoke in refutation of Mr. Doherty's assertions. Immediately upon conclusion of Judge Zoller's address it was moved by David Schwab, Krower & Tynberg Co., that the convention go on record as opposed to the American valuation plan, and following a short but heated discussion, chiefly by members opposing the introduction of this system, the resolution of opposition was adopted by a large majority, stating that "in view of the confusion which a new system like the American valuation plan would add to an already greatly unsettled world condition, this meeting goes on record as being opposed to the American valuation and excessive import duty."

The retiring president of the association, William C. Redfield, reviewed the past year's activities of the organization and introduced the theme of "How to Retain and Increase Export Trade." He concluded: "Whether our financial forces can so far recover vision as to take the leadership to which they are called and which the industrial world would welcome is a question whose answer lies in the lap of the gods. I cannot believe that leaders of finance will longer delay. But if they do, with what gladness would be heard in our industrial life the news that 25 or 50 great industries had undertaken to create, manage and direct a great financing company whose high purpose it should be to promote and support American industry in its outreach into the foreign field."

New Officers

Officers for the coming year were elected as follows:

President, Myron W. Robinson, president Crex Carpet Co., New York.

Vice-presidents, H. S. Demarest, Greene, Tweed & Co., New York; J. S. Lawrence, Lawrence & Co., Boston; E. M. Heinz, Fort Dearborn National Bank, Chicago; Frank H. Taylor, S. S. White Dental Mfg. Co., Philadelphia; Julius Goslin, Jubert & Goslin Machine & Foundry Co., Birmingham; V. H. Pinckney, California Packing Co., San Francisco.

Treasurer—Philip B. Kennedy, vice-president First Federal Foreign Banking Association, New York.

Directors for a period of three years were: W. S. Gavan, E. I. du Pont de Nemours Export Co., New York; J. Walter Drake, Hupp Motor Car Corporation, Detroit; M. A. Oudin, International General Electric Co., Schenectady, N. Y.; F. K. Rhines, General Fireproofing Co., New York; E. W. Droosten, Robbins & Myers Co., New York.

Some Improvement in Foundry Work

Rogers, Brown & Co., Cincinnati, in their latest pig iron market review refer to some betterment in foundry operations: "For the first time in months, foundries quite generally throughout the country have noticed an encouraging increase in new business. Those shops which are specializing in the manufacture of some particular product, such as washing machines, printing presses or the like, have felt the improvement more than those doing a jobbing business. This is natural. A large part of the work normally secured by the jobbing foundries is overflow and the manufacturing plants see to it that their own floors are full before placing any business outside. Foundrymen report that the prices received on the new orders are cost or slightly better, but they are glad of an opportunity to operate and break even. This exchange of goods may be expected to start the sluggish circulation of business and lead to better things."

Unemployed in Pennsylvania

PITTSBURGH, Oct. 10.—There are 298,625 men out of work in Pennsylvania, Clifford B. Connelley, State Commissioner of Labor and Industry, told a meeting of the Co-operative Welfare Federation at the Pittsburgh Chamber of Commerce last Friday. Of that number 60,800 are in Pittsburgh. Mr. Connelley spoke on the unemployment situation and said that prominent men have confidence in an early resumption of business and a decrease in the army of unemployed. He also explained the system of his department in gathering unemployment statistics.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.60c. to 1.75c.

Sheared plates, ¼ in. and heavier, tank quality, 1.60c. to 1.75c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.40 case
Large boiler rivets.....$2.50 case
Small rivets .....70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, rolled threads, 70, 10 and 5 per cent off list
Machine bolts, small, cut threads, 70 and 5 per cent off list
Machine bolts, larger and longer..65, 10 and 5 per cent off list
Carriage bolts, ⅝ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....65 and 10 per cent off list
Lag bolts .....70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Square and Hex. Head Cap Screws

¼ in. and under.....75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in.....75 and 10 to 80 and 10 per cent off list

Set Screws

¼ in. and under.....80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.
All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $41; chain rods, $41; screw stock rods, $46; rivet and bolt rods and other rods of that character, $41; high carbon rods, $49 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.35 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅜-in. and 7/16-in., $2.60 to $2.75 base; 5/16-in., $2.60 to $2.75 base. Boat and barge spikes, $2.60 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.15c. to 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.45	Nos. 13 and 14	2.60
Nos. 9 and 10 (base)	2.50	Nos. 15 and 16	2.70
Nos. 11 and 12	2.55		

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Oct.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
5	12.75	12.50	27.00	4.70	4.50	5.05	4.55
6	12.82½	12.62½	27.00	4.70	4.50	5.05	4.55
7	13.00	12.75	27.00	4.70	4.50	5.07½	4.57½
8	13.00	12.75	....	4.70	4.50	5.10	4.60
10	13.12½	12.82½	27.00	4.70	4.50	5.10	4.60

New York

NEW YORK, Oct. 10.

The strength noted in copper, lead and zinc in recent weeks has been maintained during the past week, with additional firmness in copper and zinc. There has been little or no change in lead and tin prices, but prices of copper and zinc are higher. Business is fairly active, particularly in copper.

Copper.—A steady, firm tone has prevailed during the week in copper, with a slight tendency toward higher prices. Some producers are now declining to accept any business in electrolytic at less than 13.25c., delivered, though the regular market is quoted a shade under this price, about 13.12½c., delivered. A good demand continues, there being inquiries for several million pounds, in addition to about 10,000,000 lb. for one brass interest mentioned last week. The presence in New York this week of leading brass manufacturers in attendance at a trade meeting was expected to bring negotiations for copper from some who hitherto have not made inquiry. Export trade has broadened. There have been fairly large exports to Germany and the price now quoted is 13.25c., delivered Hamburg. The same price is quoted to England, but the English have not been disposed to buy at this price. The recovery in sterling exchange, however, is expected to make it possible for British buyers to accept the American price. The market is generally strong with producers selling only a limited quantity at each fractional rise in price.

Tin.—Moderate sales of tin were made during the past week. A little was done each day, but at no time was there any marked activity. The bulk of the business done was for November and December shipment from the Far East, and there was a little better demand for spot, but interest in the intermediate position was negligible. Spot supplies are concentrated in few hands, hence the market presents a somewhat firmer tone, which is in contrast to the weakness prevailing in London, where prices are slightly below those quoted on Tuesday of last week. To-day's (Monday) London prices were £155 15s. for spot standard, £157 15s. for standard future and £156 5s. for spot Straits. Spot business has been done during the week at 27c., but for the later shipments prices were ½ to ⅜c. higher.

Lead.—A moderate degree of activity is noted in the lead market, but the demand is of small proportions and is not insistent. Prices are unchanged. The American Smelting & Refining Co. continues to quote 4.70c. for both New York and St. Louis, but other producers are selling at St. Louis at 4.50c. The outside market in New York is fully $1 a ton above the American Smelting & Refining Co.'s price.

Zinc.—Further stiffening in zinc prices has occurred within the past few days, 4.60c., St. Louis, now being generally quoted, with an occasional quotation up to 4.65c., St. Louis. A fairly large order for zinc is said to have been placed Saturday at 4.60c. Sales of zinc are in excess of production and this is causing producers to adopt a more conservative selling policy as most of them do not want to withdraw from their surplus stocks at present prices.

Antimony.—We quote antimony at 5c., New York. The market is without feature.

Aluminum.—There is no change in aluminum prices, the leading American producer continuing to quote 24.50c. per lb., f.o.b. plant, for 98-99 per cent virgin metal, while importers quote 18c. to 19c., New York, on a similar grade of foreign aluminum.

Old Metals.—Prices are higher and business is fairly active. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.25
Copper, heavy and wire	11.25
Copper, light and bottoms	9.50
Heavy machine composition	9.75
Brass, heavy	7.00
Brass, light	5.50
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.50
Lead, heavy	4.25
Zinc	3.25
Lead, tea	3.00

Chicago

OCT. 11.—Copper has advanced, but no great activity is reported. Numerous inquiries for copper have appeared in the market, but buyers are reluctant to pay the prices at which producers are holding the material. Zinc has declined slightly. The market as a whole is quiet. Old material prices have advanced rather generally. We quote in carload lots: Lake copper, 13.25c. to 13.50c.; tin, 28.50c.; lead, 4.65c.; spelter, 4.60c.; antimony, 7c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 8.50c.; copper bottoms, 7c.; red brass, 7c.; yellow brass, 5c.; lead pipe, 3c; zinc, 2,25c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Oct. 11.—The lead market is steady and unchanged at 4.50c. carlots, while slab zinc is quiet and steady at 4.55c. to 4.60c. We quote Lake copper at 12.74⅜c. to 13.73½c., carlots; tin, 27.61c., and antimony, 5.73½c. to 5.73¾c. In old metals, we quote: light brass, 3.50c.; heavy red brass, 7c.; light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; lead, 3c.; pewter, 15c.; tinfoil, 16c.; tea lead, 2c.; aluminum, 9c.

Mild Improvement in Refractories

PITTSBURGH, Oct. 10.—Although business in fire clay brick and other refractories still leaves much to be desired, there has been some improvement in the demand as compared with last month. Orders rarely exceed 100,000 brick, but the fact that numerous small orders are coming out from widely scattered sources is taken to mean that the steel manufacturers have pretty well exhausted their reserves and feel the necessity of replenishing them. Ordinarily, there is a lapse of about six months between improvement in the steel business and a corresponding gain in refractories sales. In view of the fact that only here and there among the steel companies of the country has there been a complete suspension of operations for any considerable length of time, manufacturers of refractories believe that steel plant stocks of brick are pretty well used up and consequently expect a better business much sooner after definite betterment in the steel business than usually is the case. There is fairly good adherence to quotations on the part of makers and the claim still is set forth that, pending the liquidation of freight and fuel costs, no further reduction is possible. Some weakness is apparent, however, in Pennsylvania silica brick, due to one or two makers cutting prices.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $37.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 40.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		65.00
Chrome Brick:		
Standard size, per net ton		52.00

PERSONAL

E. E. Barto has been appointed production manager of the Warren Iron & Steel Co., Warren, Ohio. Mr. Barto, for the past three years, has been connected with the Indiana Rolling Mill Co., Newcastle, Ind., in the capacity of production manager. Fifteen years previous to that, Mr. Barto was connected with the Jessop Steel Co., Washington, Pa., as rolling mill superintendent. He has had experience in rolling high carbon and alloy open-hearth, electric furnace, and crucible steels.

Abner U. Howard has been appointed sales manager for N. & G. Taylor Co., Inc., general offices 300 Chestnut Street, Philadelphia. Mr. Howard was for many years connected with the National Conduit & Cable Co., New York, and recently with the Stamford Rolling Mill Co., Stamford, Conn., as sales manager.

Frank H. Landon, 140 South Dearborn Street, Chicago, has been appointed district representative for the Falcon Steel Co., Niles, Ohio, in the Chicago territory. Mr. Landon will represent the company in the sale of black, blue annealed and galvanized steel sheets.

J. M. Ross, auditor of Wheeling Steel Corporation since its formation, recently was elected secretary of the corporation, succeeding G. W. Hocking, who resigned early in August. Prior to joining the Wheeling Steel Corporation, Mr. Ross was identified with Price, Waterhouse & Co. and gained considerable familiarity with the steel business through auditing the accounts of steel companies. He will act for the present as both secretary and auditor.

Henry Chalmers, of Brooklyn and Albany, N. Y., has been appointed chief of the Division of Foreign Tariffs of the Bureau of Foreign and Domestic Commerce, succeeding Louis Domeratzky, who has been advanced to the position of assistant director of the Bureau. Mr. Chalmers was formerly connected with a textile exporting house in New York and since 1919 has been on the staff of the United States Tariff Commission as special expert, investigating industrial and commercial conditions here and abroad. He is a graduate of Cornell University (M. A. 1914), and the author of a number of reports bearing on foreign trade, published by the Tariff Commission.

Charles M. Sullivan, since Jan. 1, 1919, Pittsburgh district manager of sales of the Milwaukee Electric Crane & Mfg. Co., Milwaukee, has resigned, effective Oct. 15, to become affiliated with Manning, Maxwell & Moore, Inc. Mr. Sullivan will be in the Pittsburgh office in the Shaw crane sales department. Byron B. Evans succeeds Mr. Sullivan in charge of the Pittsburgh office of the Milwaukee Electric Crane & Mfg. Co. He was formerly associated with the Pittsburgh Perforating Co., Pittsburgh.

Hector W. Fielden, who resigned recently as assistant treasurer Penn Seaboard Steel Corporation and comptroller Tacony Steel Co., has resumed the practice of accountancy. Fielden & Co. with offices in the Flanders Building, Philadelphia, will specialize in the accounting of iron, steel and allied industries, a field in which Mr. Fielden and his associates have a wide knowledge and experience.

Charles D. Conklin, Jr., formerly New York and Philadelphia district engineer for the Austin Co., has become associated with the W. P. Cameron Engineering Co., Philadelphia, as chief engineer in charge of construction.

Dr. Ernest Fox Nichols, inaugurated last spring as president of Massachusetts Institute of Technology, was prevented by illness from assuming his duties at the opening of the academic year. He is expected to return about Jan. 1. His ill health was brought about by overwork previous to his election to the presidency. Meanwhile the institute will be governed by an administrative committee.

Franklin D. Warren, resident engineer American Mutual Liability Insurance Co., spoke on safety appliances before the management section of the Providence Engineering Society, Providence, R. I., on Oct. 4. He outlined the progress of the safety movement from its employment in large steel mills and similar plants, where the more serious accidents are apt to occur, to the present almost universal consideration of safety welfare in industrial establishments. The talk was illustrated by slides and moving pictures.

Charles M. Schwab, chairman Bethlehem Steel Corporation, is scheduled to address the American Mining Congress, which meets Oct. 17 to 22, at Chicago, on "Co-operative Effort in Industry."

John L. Taylor has resigned his position with L. F. Seyfert Sons, Inc., and has established himself as a dealer in machinery at 6315 Torresdale Avenue, Philadelphia.

F. Paul Anderson, dean of the college of engineering, University of Kentucky, has been appointed director of the research laboratory of the committee on research of the American Society of Heating and Ventilating Engineers, to succeed the late John R. Allen. L. A. Scipio, who has been acting director since Dr. Allen's death in October, 1920, has been recalled to his position as dean of Robert College, Constantinople. Following his graduation from Purdue University in 1890, Dean Anderson spent some months as designer of special machinery with the Studebaker Co. at South Bend, after which he devoted a year to experimental engineering at Purdue University. For 30 years he has served respectively as professor of mechanical engineering, director of experimental laboratories, and dean of the college of engineering of the University of Kentucky, formerly the State College of Kentucky. He was for 25 years engineer of tests for the Southern Railway Company, and at the same time carried on a consulting engineering and architectural business.

William Hill, president Collins Co., Hartford, Conn., agricultural implements, has resigned and has been succeeded by Charles L. Taylor, Taylor & Fenn Co., castings. Mr. Taylor is already a director and member of the executive committee of the Collins Co. He spent his early manhood in machine shops and later acquired interests in the Phoenix Iron Works, which later became the Taylor & Fenn Co.

K. E. Wagner has been appointed general sales manager with offices at 534 Bulkley Building, Cleveland, of the Massillon Reinforcing Bar Co., main offices and works at Massillon, Ohio.

H. O. Davidson, for the past eight years affiliated with the Hydraulic Steelcraft Co., latterly in the capacity of general manager, has severed that connection to become general manager in Baltimore of the C. D. Pruden plant of the Blaw-Knox Co., Pittsburgh.

T. A. Jones, for many years secretary and treasurer of the W. A. Jones Foundry & Machine Co., Chicago, has been elected president to succeed William A. Jones, who died recently. W. G. Jones, manager, continues in that position and has also been elected vice-president and treasurer. J. A. Sizer has been elected secretary, and G. W. Page assistant secretary. Robert B. Moir has been appointed manager of the New York branch of the company. He will make his headquarters at the present sales office and transmission warehouse at 20 Murray Street, New York.

W. F. Abel has been appointed assistant general manager of sales of the Electric Alloy Steel Co., Youngstown, Ohio. For thirteen years he was in charge of sales for the Halcomb Steel Co.

Herbert R. Hyman, for seven years advertising manager of the Cole Motor Car Co., Indianapolis, has become associated with the Charles H. Fuller Co., advertising agency of Chicago.

J. M. Willis, formerly vice-president and general manager of the Baltimore Dry Docks & Shipbuilding Co., Baltimore, which plant was recently acquired by the Bethlehem Shipbuilding Corporation, has been appointed general manager of the plant, which is known as the Baltimore Dry Docks plant of the Bethlehem Shipbuilding Corporation.

W. S. Pilling, of Pilling & Co., Philadelphia, returned this week from a European trip.

OBITUARY

DEWITT C. CLAPP, one of the founders of the Black Diamond Steel Works, Pittsburgh, the plant of which is now one of the works of the Crucible Steel Co. of America, and later an official of the steel making firm of Park Bros. & Co., died at his home in Pittsburgh, Oct. 5. He was born in Martinsburg, N. Y., July 13, 1827. He went to Pittsburgh in 1853. He became identified with the steel industry in 1882 when he helped organize the Black Diamond Steel Works. He retired from active business in 1900, following the absorption of Park Bros. & Co. by the Crucible Steel Co.

CHARLES F. BRAGG, former mayor of Bangor Me., and president of the firm of N. H. Bragg & Sons, heavy hardware, iron and steel, that city, died Sept. 12, in his seventy-second year. His father founded the business 50 years ago and upon his death Charles F. Bragg succeeded him.

HENRY B. BARNHART, 59, superintendent of the open-hearth department of the Brier Hill Steel Co., Youngstown, Ohio, died on the evening of Oct. 3 from paralysis. Mr. Barnhart had been identified with the Brier Hill company for the past five years, after resigning as department superintendent of the Illinois Steel Co., Chicago, where he had served for eight years.

RANDOLPH S. WARNER, Columbus, Ohio, died at Geneva, Ohio, Oct. 4, aged 68 years. Mr. Warner, who went to Columbus in 1877, was one of the founders of the Warner Steel Co. at Middletown, Ohio. In 1880 the company moved to Columbus and became the old Carnegie Steel plant, which was later sold to the Federal Steel Company. Mr. Warner was also a former president of the Republic Iron & Steel Co., when the head offices were located in Chicago. Upon the removal of the company's offices to Youngstown, Mr. Warner retired from active participation in its affairs. He returned to Columbus in 1911, and since then his business activities have been mostly in connection with the Hayden-Clinton Bank, the Buckeye Steel Castings Co., and the Hocking Valley Railroad.

HARRY G. HAMILTON, 56, identified with a number of important industrial enterprises at Youngstown, Ohio, died Oct. 8 following an illness of many months. In 1892 Mr. Hamilton became superintendent of one of the mills of the Ontario Rolling Mill Co., now known as the Canada Steel Co., Ltd. The following year he obtained an interest in a rolling mill at Burlington, Ia., and later moved the business to Tacoma, Wash. He subsequently projected a number of water development enterprises in the Mahoning and Shenango Valleys.

L. E. PURNELL, manager of the Cleveland office of the Ajax Metal Co., Philadelphia, died suddenly Oct. 6. His death was due to heart disease.

ALEXANDRE GOUVY, who made an extended tour of the United States in 1919 and who died suddenly several months ago in Germany, is the subject of an appreciation by L. Guillet, published in the transactions of the Société des Ingènieurs Civils de France. He was born at Hombourg-Haut (Moselle), Nov. 14, 1856, was graduated in 1879 from Ecole Centrale and became identified with the Austro-Hungarian railroads, where he remained nine years, specializing in metallurgical work at the Resicza works in Hungary and then taking charge of the maintenance and construction of the Hutabankowa works, his jurisdiction covering blast furnaces, open-hearth furnaces and rolling mills. In 1893 he returned to France to take charge of the Forges d'Alais at Tamaris, but from 1896 he spent a number of years in Russia to establish in the Urals a plant for making pig iron with wood as fuel. He built two plants, including all the equipment with facilities which he had on the spot, working under the difficulties of unskilled labor and in a country 150 miles from the Trans-Siberian Railroad. After other notable achievements in Russia in respect to the reorganization and building of new plants, he established himself at Düsseldorf, in Germany, in 1901, wtih a number of missions, which included consultation for a large number of metallurgical firms. The transactions of the Society of Civil Engineers of France contain many contributions from Mr. Gouvy, chiefly on metallurgical matters, and he performed several services for France in the war, including technical artillery missions in Russia in 1915 and metallurgical services to the Minister of Armament in 1917 and 1918.

Trade Paper Quotations in the Ferromanganese Dumping Case

The reliability or unreliability of trade paper quotations is proving to be one of the chief issues in the so-called ferromanganese dumping case before the Federal Trade Commission, final arguments on which are to be held Oct. 21. This is made evident by the brief prepared by Davies & Jones, attorneys for Crocker Bros., New York, who, with Frank Samuel and C. W. Leavitt, constitute the respondents. The Crocker brief, seeking to disprove the claim of Special Attorney I. E. Lambert that the respondents, as importers, representing English makers of ferromanganese, dumped that product in the United States market in 1919, quotes evidence and maintains that "trade paper quotations are not accurate evidence of market price and that on a falling market actual sales are always below the trade paper quotations or nominal price."

As denoted at the hearings, Attorney Lambert upheld the trade paper quotations as being reliable, and it is believed that he will give strong supporting evidence to this contention in his brief and show that such quotations are not only accepted for their accuracy by the higher courts in the United States, but are preferred to quotations coming from either seller or buyer because of the impartiality of trade paper quotations.

The Crocker brief, however, aside from this issue, states that the record shows conclusively that Crocker Bros. made no sales for their English principals in 1919 until after the American makers had reduced the price on ferromanganese "to very near the low level for 1919," which is taken to be the answer to the contention of Attorney Lambert in his exceptions to the findings of Examiner Averill, the attorney for the commission maintaining that the importers were the first to reduce prices in the American market and that they sold at figures "substantially less" than the home market.

Increased Production of Coal and Coke

UNIONTOWN, PA., Oct. 10.—Increase in coal and coke production in the Connellsville region is consistent. Output last week, it is estimated, will show an increase of approximately 10 per cent in both coal and coke over the production of a week ago. There is a decidedly firmer tone in the price of furnace coke, $3.50, ovens, now being the minimum quotation. Considerable interest was shown this week in inquires for 15,000 tons a month from the Lackawanna Steel Co. So far as is known here today, no contract has yet been closed.

Independent operations in the region in both coal and coke are increasing. The Frick Coke Co. is increasing its coal production and there are indications that ovens will be put in blast before very long.

Coal prices also are firmer, Pittsburgh quotations now being in excess of $2. There is every indication now of sharp price advances during the ensuing month in both coal and coke.

Freight shipments on the Pennsylvania railroad alone out of the Connellsville district have shown gains of 150 cars a day over shipments of July and August. About 90 per cent of this traffic is coal and coke.

Light Duty Francke Couplings

A new line of light duty Francke couplings for small motor work is announced by Smith & Serrell, Central Avenue at Halsey Street, Newark, N. J. They range from a size of 5/8 in. bore upward and a power transmitting capacity of 2/3 hp. per 100 r.p.m. They are identical with the heavier duty Francke flexible couplings in comprising two flanges connected by flexible laminated steel pins distributed around the periphery of the flange.

Machinery Markets and News of the Works

LARGE RAILROAD LIST

Delaware, Lackawanna & Western Inquires for About 40 Tools

Other Lists Expected Within Next 60 Days—Prospects Are More Encouraging

The issuance of an inquiry for about 40 machine tools, which will cost about $200,000, by the Delaware, Lackawanna & Western Railroad is one of several developments of the first 10 days of October that give more encouragement to the machine-tool trade than it has had in many months. The Lackawanna inquiry is said to cover the road's 1922 requirements. A survey of the railroad field which some of the Cincinnati machine-tool builders have made discloses that several other large railroad lists will be issued within the next 60 days.

Railroad buying is in relatively small volume, but a greater number of roads are coming into the market and, if the improvement continues, a fair volume of railroad buying may be expected within the next three to six months. The Toledo & Ohio Central Railroad has bought about $50,000 worth of shop tools, of which the greater part was woodworking machinery. The Virginian Railroad and the Seaboard Air Line are about ready to close on several tools which were negotiated for recently and the Santa Fe is expected to buy five lathes shortly and has added a 52-in. boring mill to the tools for which it is still negotiating. The Missouri, Kansas & Texas is expected to come into the market shortly for equipment for a new machine shop now being constructed. The Ulster & Delaware has bought a car wheel press and the New York Central a radial drill, the latter road still has several additional tools under consideration.

The Cincinnati machine-tool builders report a healthy improvement during the early part of October. Prospects of a moderate volume of buying during the fall and winter grow more encouraging, they report. An especially encouraging feature is the receipt of a number of export orders and inquiries. One Cincinnati manufacturer received orders totaling $20,000 from Cuba and South America, the purchasers being the United Fruit Co. and the Colombian Railways. An inquiry for five lathes for shipment to Brazil is active and the order may be placed this week.

School buying continues to show promise. The Manchester, N. H., schools have practically closed on 14 metalworking tools and a number of woodworking machines and the Buffalo schools have bought several tools from a Cincinnati builder. The New York Board of Education will shortly issue formal request for bids on about 100 tools for seven schools, in five of which all machines will be motor driven.

The East Jersey Pipe Co., New York, has inquired for about 10 large fabricating machines and three cranes and the Harrisburg Machine Co., Harrisburg, Texas, will shortly buy three tools.

Prices on a number of open lines have been reduced, details being given in the Chicago market report.

New York

NEW YORK, Oct. 11.

The oustanding development of the week in the local machine-tool trade was the issuance of a list of about 40 machines by the Delaware, Lackawanna & Western Railroad, the first railroad list of this size to be figured on in the East in a considerable time. These tools are understood to cover the 1922 requirements of the road, but it is not known whether purchases will be made this fall. It is intimated, however, that if prices are favorable the purchase may go through. The equipment, with installations, would total about $200,000. The following are the tools on which prices are requested:

For East Buffalo Shops

One vertical punch and shear, double end, 18-in. throat.
One 44-in. vertical turret lathe.
One 500-ton car wheel press.
One 20-in. vertical drilling machine.

For Elmira Shops

One 30-in. vertical drilling machine.

For Keyser Valley Shops

One 500-ton double-end car wheel press.
One 48-in. vertical car wheel boring machine.

For Scranton Locomotive Shops

One 54-in. engine lathe.
One 30-in. engine lathe.
Two 20-in. engine lathes.
Three 18-in. engine lathes.
One Morton new type heavy duty draw shaper, 36-in. stroke.
One Morton new type heavy duty draw cut shaper, 30-in. stroke.
One 24-in. Dill slotter.
One Gould & Eberhardt heavy duty 32-in. shaper.
One 60-in. heavy duty radial drill.
One Sellers vertical special driving box boring machine.
One horizontal boring and drilling machine, 4½-in. spindle.
One Bullard 42-in. vertical turret lathe, new era type.
One universal grinder, 12-in. swing.
One plain horizontal heavy duty milling machine.
One Bullard 54-in. vertical turret lathe, new era type.
One Morton 60-in. combination cylinder planing and boring machine.
One McCabe pneumatic cold flanging machine.
Two centering machines, 4-in. capacity, Whiton preferred.
One power hack saw, motor driven.
One reverse motor drive for Sellers planer, 48 x 48 in.
Two reverse motor drives for Niles-Bement-Pond planers, 42 x 42 in.
One reverse motor drive for Sellers planers, 36 x 36 in.

For Kingsland Shops

Two 18-in. engine lathes.
One 26-in. engine lathe.
One Morton improved type heavy duty draw cut shaper, 36-in. stroke.

For Secaucus Shops

One gap engine lathe, 25 to 29 in. swing.
One Bullard 42-in. vertical turret lathe, new era type.

For Secaucus Repair Tracks

One No. 1 J. A. Fay & Egan improved variety saw.
One vertical punch and shear, double end, with 18-in. throat.

In addition to the above there is electrical equipment for operating the machines, many of which are to be motor driven.

Quotations are being received by C. C. Hubbell, purchasing agent, 90 West Street, New York.

The East Jersey Pipe Co., 7 Dey Street, is inquiring for equipment, new or second hand, for a fabricating shop. Its requirements include three cranes, a 30-ft. bending roll, 12-ft. bending roll, 12-ft. hydraulic riveter, 30-ft. plate planer, 12-ft. plate planer, three 18-in. punches and shears and a few other machines.

These inquiries are larger than any that the Eastern machine tool trade has figured upon in some time. Otherwise

business continues rather dull, buying being confined very largely to single tools. The New York Central has purchased a 6-ft. radial drill and the Ulster & Delaware Railroad has bought a car wheel press, but no other railroad buying is reported.

THE IRON AGE has received an inquiry from the Harrisburg Machine Co., Inc., Harrisburg, Tex., for a 3-ft. radial drill, 250 or 300-lb. trip hammer and one bolt cutting machine, capacity up to 1½ in. F. D. French is general manager.

A New York company has purchased the following used machines from the Donahue Steel Products Co., People's Gas Building, Chicago: One 1-in. Ajax upsetter, one 2-in. Acme upsetter, one No. 4 Williams-White bulldozer, one No. 2 Williams-White eye bender, one 3-spindle 1-in. Landis threading machine, one single-spindle 3-in. Acme threading machine, one 200-lb. Bradley upright helve hammer, one Long & Alstatter multiple punch and one Pawtucket heading machine.

Activity continues in the locomotive crane field, particularly in inquiries for second hand cranes, while electric overhead and hand power cranes continue consistenly dull. So great is the confidence of dealers in second-hand locomotive cranes in the immediate future of this field, that they are beginning to purchase outright instead of selling on a commission basis, the prevailing method for some time. The East Jersey Pipe Corporation, 7 Dey Street, New York, which has an inquiry out for machine tools, includes three electric cranes in the list. The American Locomotive Co., has revised its inquiry for a 3-ton, 47-ft. span electric crane, which was of somewhat special design, to call for a standard overhead traveling crane. This company also is negotiating for about 14 electric hoists. The Batavia Car works has purchased a 16-ton, 20-ft. span hand power crane. The Power Construction Co., Worcester, Mass., has revived its old inquiry for a 15-ton, one motor crane. Perin & Marshall, consulting engineers, New York, will close this week on a 5-ton, 38-ft. span hand power crane for Calcutta, India. The Erie Railroad's 8-ton hand-power crane for the Forest City colliery was purchased from the Roeper Crane & Hoist Works.

Recent sales include: Shaw Electric Crane Co., one 10-ton, four 5-ton and three 3-ton electric overhead cranes to the Porcupine Co., Bridgeport, Conn.; Shepard Electric Crane & Hoist Co., a 4-ton, 70-ft. span, grab bucket crane to the Knoxville Fertilizer Co., Knoxville, Tenn.; Northern Engineering Works, a 5-ton, 38-ft. span overhead traveling crane to the city of Des Moines, Iowa; Reading Chain & Block Corporation a 10-ton, 36-ft. span hand power crane to the International Paper Co., 30 Broad Street, New York.

The Martin-Parry Corporation, 560 Jackson Avenue, Long Island City, N. Y., manufacturer of automobile bodies, with headquarters at York, Pa., has leased a section of the former works of the United States Engineering Corp., recently acquired by the Schwab Industrial Terminal Co., at Kearny, N. J., for the establishment of a new plant.

The Recordophone Co., New York, has been incorporated with a capital of $70,000 by A. M. Frost, C. H. Hussey and J. F. O'Brien, to manufacture sound-recording instruments, talking machines, etc. It is represented by Randolph & O'Brien, 320 Broadway.

The Standard Boiler Mfg. Co., Brooklyn, has been incorporated with a capital of $100,000 by N. Cooper, I. J. Durkore and P. Kaplan, to manufacture boilers, tanks and other plate products. It is represented by Samuel Rabinowitz, 149 Broadway, New York.

The American Railway Appliance Co., New York, has been incorporated with a capital of $250,000 by P. J. Linnekin, A. K. Porter and W. A. Bergen to manufacture railroad equipment and appliances. W. Stuart Symington, Maryland Trust Building, Baltimore, represents the company.

The Queensboro Gas & Electric Co., 347 Central Avenue, Far Rockaway, L. I., has plans under way for remodeling the two three-story building on Clinton Street, 93 x 95 ft., for a service and repair works for company automobiles and trucks; a machine shop will be installed.

The O. & R. Electrical Supply Co., Monroe, N. Y., has been incorporated with a capital of $100,000 by A. J. Crane, R. W. Smith and F. Durland, Monroe to manufacture electrical equipment and supplies. It is represented by E. C. Smith, Newburgh, N. Y.

The Fibre Tire & Rubber Corporation, New York, has been incorporated under Delaware laws with capital of $3,000,000 to manufacture automobile tires and other rubber goods, fibre products, etc. It is represented by the United States Corporation Co., 65 Cedar Street.

The American Cork Specialty Co. and the Compressed Cork Co., 461 Eighth Avenue, New York, manufacturers of insulation and cork products, have been merged with L. Mundet & Son, same address, manufacturer of kindred specialties, under the latter name.

A one-story machine and repair shop will be installed in the new automobile service building, 112 x 115 ft., to be erected by the Gretch Engineering Corporation, 101 Park Avenue, New York, for Lewis Stevenson, Borden and Van Dam Avenues, Long Island City, estimated to cost about $65,000. John M. Baker and Charles L. Koester, 9 Jackson Avenue, Long Island City, are architects.

The Truck Grip Chain Co., New York, has been incorporated with a capital of $50,000 by R. I. Brons, L. Mockridge and E. W. Searing to manufacture skid chains and other chain products for automotive series. Hills & Hills, 154 Nassau Street, represent the company.

The Carbondale Mfg. Co., Inc., New York, has been incorporated with a capital of $200,000 to manufacture abrasives and affiliated products. It is represented by J. F. McDavitt, 149 Broadway.

The Wyoming Valley Coal Co., 163 Sixth Street Brooklyn, has acquired adjoining property at Sixth Street and Second Avenue, and plans the immediate installation of new coal-handling machinery and other equipment, in connection with a series of coal pockets to be constructed.

The Able Auto Lock Mfg. Co., New York, has been incorporated with a capital of $150,000 by J. F. Hennessy, R. Coleman and F. J. Gannon, to manufacture locks and locking devices for automobile and other service. It is represented by F. L. Hackenburg, 261 Broadway.

The Pardee Steel Corporation, Perth Amboy, N. J., has filed notice of incorporation under Delaware laws with capital of $4,000,000 at New York for local operations. R. H. Dana, 16 East Fortieth Street, represents the company.

Fraser Brace & Co., 32 Pearl Street, New York, have taken a contract for a new hydroelectric generating plant at Great Falls, Winnipeg River, Man., estimated to cost excess of $5,000,000, with machinery. It will be owned and operated by the Manitoba Power Co., Ltd., Winnipeg. Work will commence at once.

Freight-handling machinery will be installed on the proposed new dock to be constructed by the Department of Docks, New York, on the Hudson River, north of Spuyten Duyvil Creek, estimated to cost about $75,000. Murray Hulbert, Pier A, North River, is dock commissioner.

The Atlas Alloy Steel Corporation, New York, has been incorporated under Delaware laws with capital of $100,000 to manufacture iron and steel products. It is represented by the Corporation Trust Co. of America, du Pont Building, Wilmington, Del.

The Davis Transportation Co., Mamaroneck, N. Y., has had plans prepared for a one-story automobile service and repair works for company cars and trucks, 54 x 100 ft.

The Bolinders Co., New York, has been incorporated under State laws to manufacture internal combustion engines and parts, etc. The incorporators are A. S. Warner and S. Clausen, both of New York. The company is represented by M. E. De Aguero, 52 William Street.

Peter A. H. Jackson, 106 Lexington Avenue, New York, has filed plans for a one-story forge shop, 20 x 45 ft., at 343 East Thirty-fourth Street.

Officials of the Save Electric Corporation, 254 Thirty-sixth Street, Brooklyn, are organizing a new company to operate the new plant to be erected at Toledo, Ohio. The first unit will be two stories, 70 x 390 ft., providing about 50,000 sq. ft. of manufacturing space for the production of incandescent lamps and other electrical specialties. The initial plant will be extended with other units at an early date. The machinery installation is estimated to cost about $200,000 and considerable special equipment will be installed. Employment will be given to about 250. Max Ettinger is president.

George White & Co., Inc., Jersey City, N. J., has been incorporated with a capital of $200,000 by Edward R. Kressy, Arthur R. Dunn, and George White, 18 Morris Street, to manufacture machinery and tools.

The M. W. Kellogg Co., 117 West Side Avenue, Jersey City, N. J., manufacturer of pipe, fittings, power equipment, etc., is completing plans for a new three-story building.

Freight-handling equipment and other mechanical apparatus will be installed on the new steel pier to be constructed by the Erie Railroad Co., Jersey City, N. J., at the foot of Twelfth Street, estimated to cost in excess of $500,000. The structure will replace a wooden pier, destroyed by fire, Oct. 1.

The Vulcan Iron Works, Hudson Street, Jersey City, N. J., is taking bids for the erection of a new power plant to replace a structure recently destroyed by fire. It will cost about $40,000.

The Dalite Lamp Co. of New Jersey, Jersey City, N. J., has been incorporated with a capital of $50,000 by A. Carell and Warren Dixon, 665 Newark Avenue, to manufacture electric lamps.

A new one-story power house will be erected by the Brunswick Laundry, 222 Tonnelle Avenue, Jersey City, N. J.

W. A. Jones, Mount Holly N. J., is taking bids through Folsom & Stanton, 10 South Eighteenth Street, Philadelphia, architects, until Oct. 20, for a one and two-story service and automobile repair building, 100 x 200 ft., estimated to cost about $75,000. A list of tools for installation has been prepared.

The Common Council, Salem, N. J., will receive bids until Oct. 24 for high and low pressure pumping machinery for the municipal water-works plant. W. B. Dunn, city recorder, is in charge. W. H. Boardman, 426 Walnut Street, Philadelphia, is engineer.

The American Stamping Co., 238 Third Street, Elizabeth, N. J., manufacturer of metal toys, has leased space in the building at Pine and Third streets, totaling about 50,000 sq. ft., for a new plant.

The Patent Spring Bed Co., Newark, has been incorporated with a capital of $60,000 by V. E. Husbands, Nathan and Isaac M. Shaw, 203 Norfolk Street, to manufacture spring bedsteads, bed springs, etc.

The Witherbee Storage Battery Co., 649 West Forty-third Street, New York, manufacturer of electric storage batteries, has acquired the former plant of the United Filters Corporation, 355-73 Cortlandt Street, Belleville, N. J., which recently moved its works to Hazleton, Pa. The property consists of a two-story factory and several one-story buildings on site 150 x 200 ft., and will be improved by the new owner for early occupancy.

The Traf-O-Lite Sales Co., Newark, has been incorporated with a capital of $100,000 by Minor P. Wetmore, Grover C. Kayhart and Cleveland Quackenbush, Newark, to manufacture mechanical devices for automobile service. The company is represented by Samuel M. Hollander, 790 Broad Street.

Igoe Brothers, Poinier Street, Newark, manufacturers of wire nails and other wire products, have completed plans for a one-story addition, and will take bids at once. A new power house will also be constructed.

Philadelphia

PHILADELPHIA, Oct. 10.

The Department of Public Works, City Hall, Philadelphia, is having plans prepared for a new one-story service and repair building for municipal automobiles and trucks.

John P. Smith, Inc., Philadelphia, has been incorporated with a capital of $50,000 to manufacture heating equipment, heating systems, etc. John P. Smith, 632 South Fifth-sixth Street, is treasurer.

B. Bernheim & Sons, Inc., 1401 Germantown Avenue, Philadelphia, manufacturer of show cases, store fixtures, etc., has awarded contract to Potts Brothers & Cooperson, 129 North Eleventh Street, for a four-story and basement addition, 58 x 60 ft.

The Penn Rubber Ball Corporation, Philadelphia, has been incorporated under Delaware laws with capital of $5,000,000 to manufacture rubber products. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

A one-story power house will be erected by the Forrest Laundry Co., 1225 Columbia Street, Philadelphia.

The Frank Pettit Ornamental Iron Works, 805-9 Master Street, Philadelphia, has awarded contract to Harry Kuehnlein, 2046 Trenton Avenue, for a two-story addition, 99 x 108 ft.

The Niagara Mfg. Co., 1042 Ridge Street, Philadelphia, manufacturer of pipe, heating and plumbing specialties, etc., has leased property at 3827 Pearl Street, for extensions.

The Metropolitan Body Co., Philadelphia, has been chartered under State laws to manufacture automobile bodies. Rush H. Hartman, 4712 North Hutchinson Street, is treasurer.

The Police Bureau, Philadelphia, has plans under way for a new machine and wood-working repair shop, in connection with a new traffic truck and vehicle building, estimated to cost close to $200,000, with equipment. F. C. Dunlap, City Hall, is engineer.

The Frank C. Millner Co., Trenton, N. J., has been incorporated with a capital of $250,000 by R. Millner, Jacob Vine and A. S. Lewis to manufacture iron and steel products. It is represented by Alexander Budson, 137 East State Street.

J. H. Dickinson, Chester, Pa., has acquired a building at Third and Tilghman streets for the establishment of a new plant to manufacture small steel products. A new company will be organized and it is proposed to have the building ready for operation by the close of the year.

The Travelers' Rubber Co., Bethlehem, Pa., will install new machinery and equipment at its plant to cost about $25,000.

The Williamsport School District, Williamsport, Pa., will receive bids until Oct. 19 for three motor-driven engine lathes for the local manual training school. H. A. Sterner, 229 West Third Street, is secretary.

Dittmar Brothers, 618 Day Street, Williamsport, Pa., manufacturers of composition tile and kindred products, have perfected plans for a new two-story factory, 57 x 185 ft., estimated to cost about $40,000.

The Union Ice & Coal Co., Forster Street, Harrisburg, Pa., will complete plans at once for a new ice-manufacturing plant with capacity of about 100 tons a day, with machinery, estimated to cost about $200,000. A new cold storage plant, with capacity of about 5000 tons, will also be constructed.

The Pennsylvania Power & Light Co., Allentown, Pa., has acquired the property of the Wilkes-Barre Electric Light Co., Wilkes-Barre, Pa., and contemplates extensions and improvements in the plant and system.

The Ohio Generating Co., Red Lion, Pa., recently organized, has plans under way for a new factory to manufacture farm lighting plants and systems. C. S. LaMotte is president and Charles C. Meads, secretary, both of Red Lion.

The Harrisburg Railways Co., Harrisburg, Pa., is completing plans for an addition to its power plant, estimated to cost about $75,000.

A two-story machine shop and service works for company trucks will be erected by the M. & G. Ice Cream Co., Allentown, Pa., 54 x 88 ft., in connection with a new three-story factory. The building contract has been let to the William Steele & Sons Co., Sixteenth and Arch streets, Philadelphia.

New England

BOSTON, Oct. 10.

September sales were better than August, one dealer having doubled its volume over the preceding months. The manual training schools of Manchester, N. H., including the practical arts high school and the west side high school, have about closed on wood-working and 14 metal-working machines, including two 20-in. Sibley upright drills; one Sipp sensitive drill; one Milwaukee No. 1B milling machine; one Flathery 14 in. x 6 ft. geared head lathe; two Monarch lathes, 12 in. x 6 ft. and 14 in. x 8 ft.; two Le Blond 11 in. x 5 ft. speed lathes; one Cincinnati double-head grinder; one Wells No. 190 cutter and reamer grinder; one Hendey 16-in. shaper; two Star engine lathes, 9 in. x 5 ft. The Delaware, Lackawanna & Western Railroad has a list of 35 tools in this market and will buy if prices are low enough. The list is published in full in the New York market.

An auction sale which is expected to bring forth considerable interest is that of the plant and equipment of the Chapman Mfg. Co., Winchester, Mass., ball-bearing spindles, on Oct. 13 and 14. The machine tools include universal, automatic, plain, cylindrical, internal, hand grinding and milling machines; Gridley and Acme automatic screw machines; floor and bench screw cutting engine and turret lathes; upright and sensitive and multiple spindle bench and floor drills; bench and floor tapping machines and arbor presses; bench polishing machines; Bradley hammers; gas furnaces and blacksmith's equipments; electric motors; also 149 tons of steel; leather belting and lots of mechanical small equipment.

The Bush Mfg. Co., airplane, tractor and truck radiators, Hartford, Conn., has bought the property of the Ellison Construction Co., occupied by the American Machine Co. on Wellington Street. It comprises three acres with a 300-ft. frontage, containing a factory, storage house and other buildings.

R. S. Peck & Co., 26 High Street, Hartford, Conn., have had plans drawn by Buck & Sheldon, architects and engineers, Hartford, for a new one-story brick plant, 100x104 ft., at the corner of Franklin Avenue and Bolton Street.

The Easthampton Foundry Co., Railroad Street, Easthampton, Mass., has filed plans for a new one-story foundry, 40 x 50 ft., with extensions, 16 x 20 ft., estimated to cost about $30,000. L. A. Moackel is president.

The Brass Products Foundry Co., 341 Eddy Street, Providence, R. I., has filed notice of organization to manufacture brass, bronze and other metal castings. Benjamin T. Peck, 249 Eddy Street, heads the company.

The Crocker Tool Co., Stockton Springs, Me., has been chartered under state laws to manufacture tools and other products. James M. Crocker, Stockton Springs, is president and treasurer.

The Crane Co., Bridgeport, Conn., manufacturer of valves, steam fittings, etc., with headquarters at Chicago, will discontinue the manufacture of brass valves and other brass

goods at its local plant, transferring this branch of production to Chicago. The Bridgeport works will concentrate on the manufacture of iron products.

The Richard French Iron Works, Muskego Street, Worcester, Mass., has awarded a contract to the E. D. Ward Co., 32 Foster Street, for the initial buildings for its new plant at Millbury, Mass., 65 x 120 ft., and a one-story structure, 25 x 25 ft. Raymond Tracy is president.

The Gibby Foundry Co., Wakefield, Mass., is planning to immediately rebuild the portion of its plant destroyed by fire, Oct. 4. It has been giving employment to about 50 operatives.

The New England Tire & Rubber Co., South Main Street, Holyoke, Mass., is planning for the installation of new equipment in its machine shop. E. Kerns is vice-president.

The Revere Rubber Co., Chelsea, Mass., manufacturer of mechanical rubber goods, has awarded contract to the Tredenick Co., 10 High Street, Boston, for a one-story addition to cost about $20,000.

The Locomobile Co., Bridgeport, Conn., has withdrawn from its affiliation with Hare's Motors, Inc., Trenton, N. J., and in the future will operate independently its local plant. New officers include: Elmer H. Havens, president; F. R. Hickman, vice-president and treasurer, and E. A. Travis, general sales manager, all of Bridgeport.

The Files Engineering Co., Inc., Bridgeport, Conn., will establish a department for the manufacture of a new type of temperature controller for use at rubber plants and other mechanical drying works.

Potter Brothers, Malden, Mass., have completed plans for a two-story automobile repair and service building, 80 x 115 ft., estimated to cost $100,000 with equipment.

Pittsburgh

PITTSBURGH, Oct. 10.

The machine-tool market remains extremely quiet. The National Radiator Co. has placed the 3-ton crane for its New Castle, Pa., plant with the Cleveland Crane & Engineering Co., Wickliffe, Ohio. This still reduces the live crane prospects to that of the National Tube Co. for its Christy Park Works, McKeesport, Pa. Bids on these cranes have not yet been tabulated and an award is still some time off. New inquiries are few.

The Clearfield Machine shops, Clearfield, Pa., have placed a 5-ton 29-ft. 5-in. span one motor electric traveling crane with the Roeper Crane & Hoist Works, Reading, Pa.

The North Pole Ice Co., Twelfth and West Carson Streets, Pittsburgh, has awarded a contract to Joseph F. Love & Co., Pittsburgh, for its seven-story addition, 100 x 192 ft., estimated to cost about $400,000 with machinery.

The Moorhead Electric Machinery Co., Pittsburgh, has been chartered under State laws to manufacture electrical machinery and parts. I. R. Moorhead, 3417 Kedzie Avenue, is treasurer.

The West Penn Power Co., Pittsburgh, has arranged for a bond issue of $1,500,000, for its subsidiary organization the Allegheny Pittsburgh Coal Co., and whose entire production is used by the parent organization, for general operations, extensions, etc.

The Dungan & Coe Welding Co., Pittsburgh, has been incorporated under Delaware laws with capital of $50,000 by R. G. Dungan, George C. Neidhart and Joseph Harris, Pittsburgh, to establish a local machine and welding works. It is represented by the Capital Trust Co. of Delaware, Wilmington, Del.

The Stonecrete Corporation, Pittsburgh, has acquired property at Cheswick, with frontage of about 1100 ft. along the Allegheny River, as a site for a new plant to manufacture concrete forms and similar products. Plans will be prepared and construction commenced at an early date.

The Senior Mfg. Co., Pittsburgh, has been chartered under State laws to manufacture hardware and other metal products. C. C. Kohne, 216 Tennyson Avenue, is treasurer.

McLean & McGinness, 366 Stratford Avenue, Pittsburgh, manufacturers of wagon parts, etc., have taken bids for the extension and improvement of their five-story plant, 40 x 100 ft., estimated to cost about $45,000. John L. Beatty, Jackson Building, is architect. James H. McLean heads the company.

The Kanawha White Ash Collieries Co., Dorfee, W. Va., is planning for the installation of new electrical and other machinery at its properties. E. M. Burns, Ebensburg, Pa., is president.

The Waugh Foundry & Machine Co., Williamson, W. Va., has commenced the erection of a new plant which it expects to have ready for service early in November.

The Ferres Motors Co., Parkersburg, W. Va., has completed plans for a new two-story service and repair works, 50 x 140 ft., on Seventh Street. D. P. Ferres heads the company.

C. B. Hawley, 450 Munsey Building, Washington, and associates, have made application for permission to construct a new hydroelectric generating plant at Sandstone Falls, on the New River, at Fayetteville, W. Va. The initial capacity will aggregate about 4000-h.p.

C. A. Werble, Charleston, W. Va., and associates are planning the establishment of a new factory at Huntington, W. Va., for the manufacture of plated ware products.

Chicago

CHICAGO, Oct. 10.

One prominent dealer reports a fair number of sales of individual machines the past week, but other local houses find the market as quiet as ever. The Santa Fe has added a 52-in. motor-driven boring mill to its outstanding list. The purchase of these machines, however, is not expected to be consummated until the close of the year Two other large Western lines are known to be surveying their tool requirements, and while one may issue an inquiry in the near future, the other will probably defer action until early next year. Business from large industrial companies is entirely lacking and such orders as are being booked by local dealers come principally from automobile repair shops and other small users.

Prices on a number of open lines have been reduced. The Canedy-Otto Mfg. Co., Chicago Heights, Ill., maker of radial drills, engine lathes, portable forges, etc., has announced a reduction of 10 per cent. The Silver Mfg. Co., Salem, Ohio, has marked down its upright drilling machines from 5 to 10 per cent. The J. N. La Pointe Co., New London, Conn., has published a new list on broaching machines which, it states, brings prices down to the 1915 level. The Hendley & Whittemore Co., Beloit, Wis., has reduced its line of punches and shears and bending rolls 20 per cent. Reductions of from 10 to 15 per cent on grinding machines have been made by the Safety Emery Wheel Co., Springfield, Ohio, and a cut of 10 per cent on bolt cutters is announced by the Universal Machine Co., Bowling Green, Ohio.

The Niagara Radiator & Boiler Co., North Tonawanda, N. Y., has let contract for a foundry and shop, 132 x 400 ft., at 1101-13 Eighty-third Street, Chicago, to cost $100,000.

The Prudential Theatre Co., 806 West North Avenue, Chicago, has been incorporated with $100,000 capital stock by C. B. White, Jacob Binger and Leo J. Kramer to manufacture moving picture machines. At present the company is subletting its manufacturing work, but expects to do its own work eventually.

T. L. Robinson & Co., Inc., 1458 West Kinzie Street, Chicago, has been organized with $5,000 capital stock by Robert J. Pyne, Richard C. Luhman and John Stresser to manufacture metal specialties.

The Perfection Battery Mfg. Corporation, Room 1130, 134 South La Salle Street, Chicago, has been organized with $25,000 capital stock to manufacture storage batteries. The incorporators include William C. Boyden, Jr., William K. Otis and Laird Ball. The company has not yet acquired factory space.

The Franklin Light Co., care Weil & Chaiken, 127 North Dearborn Street, Chicago, has been incorporated with $10,000 capital stock by Harvey Adams, Benjamin J. Kanne and Genevieve Litka to manufacture electrical fixtures. It has not yet acquired factory space.

The F. L. Klein Noodle Co., 3713 Wentworth Avenue, Chicago, has let contract for a one-story factory, 4561-5 State Street, to cost $40,000.

A controlling interest in the La Salle Tool Co., La Salle, Ill., has been acquired by the Western Clock Co. The La Salle company will continue to manufacture grinders and to do repair and job work, as in the past.

The city of Lincoln, Neb., has awarded contract for a pumping station to cost $100,000.

The New Owatonna Mfg. Co., manufacturer of drills, seeders and ensilage cutters, has laid the foundations for a $200,000 plant on West Fifth Street, Winona, Minn. Frank D. Chase, Inc., Chicago, is architect and engineer.

The Duty Motor Truck Corporation, 19 North Spring Street, Elgin, Ill., will break ground at once for a new one-story plant, 125 x 250 ft., estimated to cost about $75,000. W. H. Reuther is president.

The Charter Gas Engine Co., 9 Wallace Street, Sterling, Ill., has been incorporated with a capital of $107,800 by William S. McCloy, Arthur L. Haglund and William A. Robinson, to manufacture gas and gasoline engines.

The G. A. Ball Bearing Co., 3051 West Lake Street, Chicago, is having revised plans prepared for its new one-story plant at Albany Avenue and West Lake Street, 200 x

230 ft., estimated to cost about $70,000. Burrett H. Stephens, 37 West Van Buren Street, is architect.

The Penokee Iron Co., Duluth, Minn., has been incorporated under Delaware laws with capital of $1,000,000 by Walter B., and Edward C. Congdon, and Harry C. Dudley, Duluth, to manufacture iron products. It is represented by the Corporation Service Co., Wilmington, Del.

A. J. Clark, 833 Mulford Street, Evanston, Ill., will take bids at once for a new one-story machine shop and automobile service works, 32 x 213 ft., at Sixty-ninth Street and Stony Island Avenue, Chicago, estimated to cost about $45,000.

Baltimore

BALTIMORE, Oct. 10.

The Paragon Motor Co., First National Bank Building, Cumberland, Md., has awarded a general contract to William J. Morley, Cumberland, for the superstructure of its new plant, foundations for which have been laid. The main building will be one-story, 168 x 480 ft. Philip W. Blake is president.

The Tin Decorating Co. of Baltimore, Boston Street, Baltimore, manufacturer of tinware products, has leased a building at 2407-9 Eastern Avenue for extensions.

The Herculo Lock Guard Co., 500 Lobe Building, Baltimore, has been incorporated with a capital of $100,000 by William C. Jones, Frederick J. Sampson and George M. Donaldson, to manufacture metal lock guards, etc.

The Cyl-Lap Products Co., Baltimore, has been incorporated with a capital of $1,500,000 by Michael S. Coan, David L. Schiller and Robert F. Leach, Jr., Central Savings Bank Building, to manufacture abrasive products.

The Franklin Motor Car Co., Charles and Biddle streets, Baltimore, will install a machine and repair department in its new building, 40 x 150 ft., contract for which has been awarded to the Consolidated Engineering Co., Calvert Building, estimated to cost about $100,000. Otto G. Simonson, Maryland Casualty Tower Building, is architect.

The Avon Specialties Co., 44 Market Place, Baltimore, recently organized with a capital of $150,000, is arranging for the early operation of a plant for the manufacture of gasoline measuring devices. William L. Thaxton is president and Clarence A. Creidler, secretary and manager.

The Red "C" Oil Mfg. Co., Keyser Building, Baltimore, has tentative plans under way for new works at Key Highway and Lawrence Street. It is now operating at Highlandtown. William H. Fehsenfeld is president.

The Leavitt-Newton Co., Wilmington, Del., has been incorporated under State laws with capital of $160,000 to manufacture machinery and tools. It is represented by the Corporation Trust Co. of America, du Pont Building, Wilmington.

The Keystone Refractories Co., Wilmington, Del., has been incorporated under State laws with capital of $600,000 to manufacture firebrick, furnace linings, fire blocks and other refractories. It is represented by the Corporation Service Co., Wilmington.

The Ellicott Machine Corporation, 1111 Bush Street, Baltimore, will dispose of its surplus war plant, including machinery. Bids are being taken until Oct. 28 for machine tools, traveling cranes, power house equipment, etc.

The Auto Parts Co., 104 North Front Street, Baltimore, recently organized with a capital of $100,000, is planning for the installation of machinery in a local building to manufacture automobile parts and other products. John and George Beck head the company.

Transmission and power equipment and other apparatus will be installed by the Western Maryland Dairy Co., 1111 Linden Avenue, Baltimore, at its new plant estimated to cost about $500,000, including machinery. Construction will commence at once.

The Acme Mfg. Association, Wilmington, Del., has been incorporated with a capital of $2,000,000 to manufacture refrigerating and ice-making machinery. It is represented by the Capital Trust Co. of Delaware, Dover, Del.

A one-story service and repair building, 50 x 80 ft., for company trucks will be erected by the Clover Dairy Co., Twelfth and Orange streets, Wilmington, Del.

The Chapman Self-Locking Nut Co., 721 Equitable Building, Baltimore, has plans under way for its new works to manufacture special lock-nuts. The company is organized with a capital of $1,000,000 and headed by H. D. Chapman.

The Vicama Mica Co., 3 Hamilton Row, Hagerstown, Md., is planning for the installation of new equipment at its properties in Virginia, including crushing and pulverizing machinery and general quarrying equipment.

The Bureau of Yards and Docks, Navy Department, Washington, is having revised plans prepared for additions to the power plant at Yorktown, Va., including the installation of new equipment, and will call for new bids at an early date.

The Savannah Electric & Power Co., Savannah, Ga., has been incorporated under State laws with a capital of $4,800,000 to take over and operate the power plants and property of the Savannah Electric Co. Arrangements have been made for a bond issue of $1,750,000, the proceeds to be used for general operations, extensions, etc. A. A. Lawrence is president.

Haines, Jones & Cadbury, Inc., 1136 Ridge Avenue, Philadelphia, manufacturer of steam fittings, plumbing supplies, etc., has preliminary plans under way for a new three-story and basement building, 60 x 150 ft., at Charlotte, N. C., for branch works, estimated to cost about $100,000.

The Common Council, Pilot Mountain, N. C., is arranging for a bond issue of $50,000 for a new municipal hydroelectric power plant on the Ararat River.

The American Elementary Electric Co., 20 East Lexington Street, Baltimore, recently organized with a capital of $250,000, proposes to operate a local plant for the manufacture of electric storage batteries of special type. George S. Engle is president and general manager, and Theodore C. Lewis, secretary.

The Asheville Power & Light Co., Asheville, N. C., will commence the immediate erection of a new generating plant to cost about $200,000.

The Trail Blazers Association, Asheville, recently organized under State laws, proposes to operate a plant for the manufacture of automobile tires and tubes. It is headed by L. L. Rose and M. K. Thomas, Asheville.

The Southern Gypsum Co., North Holston, Va., is planning for the installation of new crushing machinery and other equipment at its plant. The company recently increased its capital to $750,000 for expansion. Frank A. Wilder is president.

The Atamantex Brick Co., Baltimore, has acquired 25 acres on Sulphur Springs Road, upon which it is planned to erect works. Louis F. Ducker is president.

Buffalo

BUFFALO, Oct. 10.

The Ferguson-Allan Co., Buffalo, recently organized, has acquired the property of the Progressive Structural Steel Co., Bailey Avenue, and will begin operations at an early date for the manufacture of structural steel products. A complete fabricating works will be conducted. James E. Ferguson, formerly head of the Ferguson Steel & Iron Co., 1399 Bailey Avenue, heads the company.

Henry Landsheft, 1202 Jefferson Street, Buffalo, manufacturer of automobile bodies, has awarded contract to the Lackawanna Bridge Co. for a one-story addition, 35 x 100 ft., to cost about $25,000.

The Loveland-Buffalo Corporation, Buffalo, has been incorporated with a capital of $1,050,000 under Delaware laws to manufacture automobile engines and parts. It is represented by the United States Corporation Co., 65 Cedar Street, New York.

Fire, Oct. 4, destroyed the plant of the Precision Engineering Co., Jamestown, N. Y., manufacturer of tools and engineering appliances, with loss estimated at about $55,000.

The Parcel Delivery Co., 220 Franklin Street, Rochester, N. Y., will build a new one-story repair and service works, 44 x 125 ft., for company automobiles and trucks, estimated to cost about $30,000.

The Adams Basin Electric Light & Power Co., Adams Basin, N. Y., has been organized to operate a local electric light and power plant. It is headed by J. J. Ginther and G. R. Ward, Adams Basin.

The Harder Mfg. Co., Ryder Avenue, Cobleskill, N. Y., manufacturer of silo fillers and other farm implements, has completed plans for a new two-story building, 60 x 200 ft.

The Lamson Co., Lowell, Mass., manufacturer of pneumatic tubes, merchandise carriers and other conveying equipment, is taking new bids for its new plant at Syracuse, N. Y., estimated to cost in excess of $500,000.

The Wallington Cold Storage & Ice Co., Sodus, N. Y., has been chartered under State laws to operate a local ice-manufacturing and cold storage plant. It is headed by J. J. Appel, B. B. and M. M. Kelly, all of Sodus.

The E-Z-E Spring Tape Co., Rochester, has been incorporated with a capital of $50,000 by J. L. Hill, J. W. Fulreader and C. S. Owen, Rochester, to manufacture metal tape, etc. It is represented by Wilcox & Van Allen, Ellicott Square, Buffalo.

Indianapolis

INDIANAPOLIS, Oct. 10.

The Chevrolet Brothers Mfg. Co., Indianapolis, is arranging for the early removal to its new two-story plant, 80 x 100 ft., at Tenth and Fayette streets. It will be used for the manufacture of cylinder heads and other automobile equipment, and will be provided with a large machine repair department. The company was recently incorporated with a capital of $100,000. Arthur Chevrolet is president.

The Victor Bearings Co., Georgia and Pennsylvania streets, Indianapolis, recently organized with a capital of $300,000, will take bids at once for its new one and two-story plant, 120 x 150 ft., estimated to cost about $55,000. W. L. Sandage is president.

The Pence Mfg. Co., Warsaw, Ind., has been incorporated with a capital of $25,000 by H. O. Pence, I. R. Klinger and G. W. Polk, all of Warsaw, to manufacture metal products and electrical specialties.

The Board of School Trustees, Lebanon, Ind., has completed plans for the erection of an electric lighting plant for public school service in Perry Township. Adolphus Smith is chairman of the board.

The Tarpenning & La Follette Co., Indianapolis, manufacturer of sheet metal products, has acquired the one-story building on the Canal, between Tenth and Eleventh Streets, for a local plant.

Cincinnati

CINCINNATI, Oct. 10.

The machinery market the first week in October showed a very healthy improvement in new bookings. Some manufacturers report the receipt of orders each day and prospects for the future are very encouraging. Railroad business in particular is improving and a canvass of this field by a manufacturer indicates that within the next 60 days lists for equipment will be issued by a number of roads. At present the Virginian Railroad and the Seaboard Air Line are about ready to close for a number of tools recently negotiated for. The Santa Fe is expected to buy at least five lathes in the immediate future and the Missouri, Kansas & Texas will, it is expected, be in the market shortly for a number of tools for a machine shop now in course of construction. An encouraging feature of the week was the receipt of several orders for export. One manufacturer booked about $20,000 worth of tools for export to Cuba and South America, the United Fruit Co. and the Colombian Railways being the purchasers. Another manufacturer booked an order for a lathe for South America and also one for Japan. There is also an export inquiry for five lathes for shipment to Brazil, which will probably be closed this week. The Buffalo vocational school has placed an order with a local manufacturer for a number of small tools. Altogether, the situation in the machinery market is more encouraging than for many months. Local dealers also report more inquiries and more sales are being made. Used tools are moving fairly well, the largest order placed being for a radial drill and a huge planer from a manufacturer in this district.

The Randle Machinery Co., 1723 Powers Street, Cincinnati, is in the market for a 10-ft. used boring mill, with draw back housings, capable of taking work up to 16 ft., direct current motor drive preferred, but a belt-driven machine will be considered.

The Lancaster Asphalt Mfg. Co., Lancaster, Ohio, has been organized with $100,000 capital to manufacture asphalt roofing and shingles. It has taken over the plant of the Asphalt Mfg. Co. and will occupy 50,000 sq. ft. of floor space. Edward Hettinger is president and general manager.

Detroit

DETROIT, Oct. 10.

The Mac Sim Bar Paper Co., Otsego, Mich., is having plans prepared for a new one-story power plant, 80 x 140 ft., estimated to cost about $300,000 with machinery. Billingham & Cobb, Press Building, Kalamazoo, Mich., are architects. A. B. Thomas is president and general manager.

The Michigan Fire Door Co., Detroit, has been chartered under State laws to manufacture metallic doors, sash, etc. The incorporators are Wilbert H. Meagher, George F. Nordman, and Clarence W. Meagher, 4218 Eighteenth Street.

The Hercules Steel Post Co., Niles, Mich., will defer the erection of its new factory until early in the spring. It will be one-story, 50 x 250 ft., and is estimated to cost about $30,000.

The Ray Battery Co., Detroit, has been incorporated under Delaware laws with a capital of $1,000,000 by Joseph S. McDowell and M. J. Holliday, Detroit, to manufacture electric batteries and other electrical products. It is represented by the Corporation Trust Co. of Delaware, Equitable Building, Wilmington, Del.

The Briscoe Motor Co., Jackson, Mich., has been reorganized under the name of the Earl Motors, Inc., with Clarence A. Earl, formerly first vice-president Willys-Overland Co., Toledo, Ohio, as president. It has arranged for a bond issue of $5,000,000, a portion of the proceeds to be used for plant enlargements and the installation of additional machinery. Production will soon commence on a new automobile, to be known as the Earl.

The French Paper Co., Niles, Mich., has commenced the erection of a new power house at its plant to cost about $75,000 with equipment. J. Parker is manager.

Ireland & Matthews, Inc., Detroit, manufacturer of parts for motors, stove parts and plumbing products, is offering a block of stock at $11 a share to provide working capital to add to its line. William Knudsen, for 10 years with the Ford Motor Car Co. is general manager.

The Wales Co., Kalamazoo, manufacturer of the Wales gas heating system and appliances, is located in its new plant and is under production.

The Grand Rapids Metal Products Co., Grand Rapids, Mich., has been organized to manufacture furniture, refrigerator, phonograph and automobile hardware, specialties, etc., as well as to job several kindred lines of well known manufacturers. The complete plating plant of the Miller Plating Co. has been taken over. John C. Miller for 17 years with the Wolverine Brass Co., is president; E. R. Freeman, vice president, and A. William Honecker, until just recently purchasing agent for the Grand Rapids Brass Co. and Wilmarth Show Case Co., is secretary and treasurer.

Cleveland

CLEVELAND, Oct. 10.

The Toledo & Ohio Central Railroad the past week purchased about $50,000 worth of shop equipment, which included a Chambersburg 600-ton driving wheel press, nearly all the remainder being wood-working machinery. The local market shows no signs of improvement and most of the orders placed are for single machines. Some dealers are diverting their attention from standard lines to machinery of a more special character, particularly tools designed to reduce production costs. The demand for wood-working machinery is better than for metal-working tools. Manufacturers of electrical equipment report a better volume of inquiry, particularly from coal mining companies. A Cleveland engineering and construction company has taken a contract for a foundry extension for the Standard Sanitary Mfg. Co., New Brighton, Pa.

Local manufacturers in some metal-working lines report an improvement in orders and inquiries. As a result a few plants are operating at a little better capacity than for some time, and while there has been no increase in the number of men employed, some employees have been transferred from non-productive to productive labor and others have been given more hours of work per week. Some malleable foundries have increased operations largely as a result of orders for car repair work, but the local foundry situation shows no improvement, the average operation being about 20 per cent.

Building activity in Cleveland shows an improvement, the amount involved in permits issued in September exceeding August by over $1,000,000. Permits issued during the month aggregate $3,965,090, as compared with $2,761,815 in August and with $3,364,975 in September, 1920.

The Austin Co., Cleveland, has been awarded an engineering and construction contract for a new foundry for the Standard Sanitary Mfg. Co. at New Brighton, Pa. It will have 30,000 sq. ft. of floor space and roof of the inverted type. The Austin contract also includes the demolition of existing buildings, the designing and construction of special platform features and foundations for sand blast equipment.

Joseph L. Skeldon, president the Joseph L. Skeldon Engineering Co., Toledo, Ohio, has purchased the plant and business of the McNaull Boiler Mfg. Co., manufacturer of water tube boilers.

The Marion Metallic Vault Co., Marion, Ohio, has purchased a site and will erect a plant for the manufacture of metallic vaults.

The Burns Products Co., Bluffton, Ohio, recently incorporated with a capital stock of $5,000, will establish a plant for the manufacture of an automobile accessory. M. M. Bogart is president and C. E. Burns is secretary and treasurer.

The Tilter Co., Bucyrus, Ohio, has been organized by Ira J. Hooks and others to manufacture equipment for lifting motor cars for convenience in doing repair work. The company has placed a contract with the Young & Wheeler

Machine Shop, Bucyrus, for the manufacture of the machines.

The General Electric Co. through its Cleveland office has taken an order for electrical equipment for the Columbus Railways Power & Light Co., Columbus, Ohio. It includes rotary converters and a switchboard.

The Mt. Eagle Feldspar Co., Ltd., a Canadian corporation owning mining properties having large deposits of feldspar and fluorspar, has purchased the plant formerly occupied by the Meech Foundry Co., Cleveland, which it will convert for grinding these minerals. The plant will have a capacity of 150 tons a day. The company will also manufacture porcelain parts, especially those used in the electrical industry. J. O. Brown is president, M. B. Gordon, vice president and Curtis C. Burkett, secretary-treasurer.

The Chicago Roller Co., 554 West Harrison Street, Chicago, and 1297 East Sixth Street, Cleveland, manufacturer of printers' rollers, etc., has awarded contract to W. I. Thompson, 5103 Euclid Avenue, Cleveland, for a new two-story and basement plant at 1432-38 Hamilton Avenue, estimated to cost about $40,000.

The American Mine Door Co., Canton, Ohio, is having plans prepared by the Austin Co., 16122 Euclid Avenue, Cleveland, for its new one and two-story plant, estimated to cost about $100,000 with machinery.

The Studebaker-Wulff Co., Zanesville, Ohio, is negotiating for the purchase of the plant of the Rotary Tire & Rubber Co., Zanesville, now operating under a receivership.

The City Ice & Fuel Co., East Twenty-second Street, Cleveland, has perfected plans for a new one-story ice-manufacturing plant at Fisher and Warren roads, Lakewood, Ohio, to cost about $100,000.

The plant and property of the Peerless Motor & Truck Co., Quincy Avenue, Cleveland, has been acquired by Richard Collins, former president Cadillac Motor Car Co., Detroit, and vice-president General Motors Corporation, for $4,500,000. Mr. Collins is now associated with W. C. Durant, president Durant Motors, Inc., 1819 Broadway, New York, and has been elected president and general manager of the Peerless company.

Milwaukee

MILWAUKEE, Oct. 10.

With the exception of orders from scattering sources, usually for single machines, the machine-tool trade remains quiet and featureless. At the same time activity in inquiries is growing, but buyers are slow in closing and do an unusually large amount of shopping to get satisfactory prices. There seems to be still much used equipment in good condition available at such low cost that many times it is accepted in favor of new tools. Machine shop operations, while slowly increasing, are still of small scope.

The P. B. Yates Machine Co., Beloit, Wis., formerly the Berlin Machine Works, manufacturer of heavy wood-working equipment, will melt iron for the first time in its new foundry early this week. The building and equipment represents an investment of more than $125,000.

The Manitowoc Church Furniture Co., Waukesha, Wis., is inquiring for steam generating equipment for a new power plant under construction. It will cost about $30,000 complete.

The Stearns Sales Agency, 156 Farwell Avenue, Milwaukee, has purchased a site adjoining its garage and service building and will build a two-story brick and concrete addition, 55 x 120 ft., to be used as a machine and repair shop. Work on foundations will start in about two weeks. N. A. Winslow is general manager.

The Northern Wisconsin Power Co., Gillett, Wis., has been incorporated with a capital stock of $75,000 and intends to build and operate hydroelectric generating plants. Definite information will be issued later. J. A. Read, A. L. Kreutzer and W. C. Smith are the principals.

The Board of Education, Beaver Dam, Wis., has engaged Parkinson & Dockendorff, architects, LaCross, Wis., to prepare plans for a new high school with manual training department, the cost not to exceed $200,000. Work probably will not be undertaken until early in the spring. A. W. Lueck is secretary of the board.

Otto Rauchschwalbe & Co., 1017-1019 Tenth Street, Milwaukee, will break ground at once for a new wood-working, cabinet and millwork factory, 45 x 120 ft., on Thirtieth Street. It will cost about $25,000, including equipment.

The Foute & Slater Co., Oshkosh, Wis., will build a two-story garage and sales building, 61 x 87 ft., at 261-263 Main Street. A machine and repair shop, newly equipped will be established on the second floor. Green & Negendank, machinists, Nebraska Street, will operate the shop department.

The Milwaukee Board of School Directors, Tenth and Prairie streets, Milwaukee, has commissioned Van Ryn & DeGelleke, architects, 115 Grand Avenue, to prepare plans for new public school buildings and additions to cost $850,000 and be constructed during the winter and spring. The work includes a new boiler room costing $75,000 for the Second Avenue graded school and a boiler house for the Hanover Street school, costing $65,000. Frank M. Harbach is secretary and business manager.

Thor Rosten & Co., Madison, Wis., manufacturers of tools, dies, jigs, fixtures, etc., have started work on a new building, 40 x 100 ft., at 613 Williamson Street. Some new equipment will be required. The total investment at present will be about $20,000.

The Luick Ice Cream Co., 177 Ogden Avenue, Milwaukee, has awarded the general contract to Theo. Stark & Co., 425 East Water Street, Milwaukee, for a five-story brick and concrete addition, 60 ft. sq. It will require additional generating equipment, refrigeration, tanks, motors, etc. The improvement will cost about $100,000, complete. Brust & Philipp, 405 Broadway, are the architects in charge.

The Schaub-Bradford Electric Co., Madison, Wis., has been incorporated with a capital stock of $25,000 by F. J. Schaub, O. M. Bradford and A. J. Schaub to manufacture electrical devices and appliances and do contracting and general electrical repairing.

The Gulf States

BIRMINGHAM, Oct. 10.

The American Collapsible Box Co., High Point, N. C., is perfecting plans for its new plant at Jacksonville, Fla., to manufacture corrugated folding boxes. The machinery installation will cost about $75,000.

The H. & A. Wood Products Co., St. Petersburg, Fla., manufacturer of toys, kindergarten furniture, etc., is making inquiries for a new one-story factory, 60 x 250 ft. William E. Hooker is president and H. J. Albright, secretary and treasurer.

The Magnolia Petroleum Co., Dallas, Tex., is planning the erection of a new gasoline manufacturing plant in the vicinity of Ardmore, Okla. An electric power house will also be constructed. J. A. Nicholson, Heraldton, Okla., is engineer.

The DeLand Electro Plating & Art Metal Works, DeLand, Fla., has been organized to operate a local plant for the manufacture of metal products. P. J. Thompson is president and C. A. J. Springthorpe, secretary.

The Vero Ice Co., Fort Pierce, Fla., is planning for the immediate installation of new machinery to increase the capacity of its plant to about 40 tons per day.

The Southern Furniture Co., Oldsmar, Fla., recently organized with a capital of $50,000, is perfecting plans for the establishment of a new plant. G. A. McNally is president.

The St. Lucie Ice Co., Jacksonville, Fla., will build an addition to increase the capacity about 40 tons per day.

The Common Council, Cameron, Tex., has plans under way for a new municipal electric light and power plant, estimated to cost in excess of $75,000. The Engineering Service Co., Sumpter Building, Dallas, Tex., is engineer.

The Town Council, Timpson, Tex., is arranging for the immediate installation of a new municipal electric lighting plant, estimated to cost about $30,000.

The Central South

ST. LOUIS, Oct. 10.

The St. Louis & San Francisco Railway Co., Frisco Building, St. Louis, is taking bids for a one-story machine shop, 40 x 100 ft., on Chouteau Avenue, to cost about $30,000. R. C. Stephens, company address, is architect.

The Ferro Enamel Supply Co., 1101 Swetland Building, Cleveland, manufacturer of enameling ovens and other equipment, is considering tentative plans for a branch plant at St. Louis. R. A. Weaver is president.

The Superior Ice Co., Lee Building, Kansas City, Mo., is having plans prepared for a new three-story plant at Second and Main streets, estimated to cost about $145,000, including machinery. A. L. Williams heads the company. B. B. Ryan, company address, is architect and engineer.

The United Railways Co., Thirty-ninth and Park streets, St. Louis, will establish a new car repair works at Taylor Street and Broadway, in connection with the erection of a new office building at this location. It is estimated to cost about $100,000. Colonel Perkins, general manager, is in charge.

The Nashville Pulp & Paper Co., Nashville, Tenn., has been incorporated under Delaware laws with capital of $1,250,000 to manufacture paper products. It is proposed to build a local mill. The company is represented by the Corporation Trust Co. of America, du Pont Building, Wilmington, Del.

The Liberty Electric & Mfg. Co., 95 North Third Street, Memphis, Tenn., is having plans prepared for a new one-story factory. Bids will be asked at an early date. Regan & Weller, Bank of Commerce Building, are architects.

The Signal Mountain Portland Cement Co., James Building, Chattanooga, Tenn., is planning to call for bids during November for its proposed new plant, estimated to cost in excess of $500,000, including machinery. Ralph Dow is head.

The North American Electric Lamp Co., 1008 North Twenty-second Street, St. Louis, has construction under way on an addition for the manufacture of carbon electric lamps. It will provide about 20,000 sq. ft. of space.

The Polar Wave Ice & Fuel Co., Grand and Olive streets, St. Louis, is arranging for a new ice manufacturing and refrigerating plant to cost about $500,000, including machinery. H. G. Clymer, Wainwright Building, is architect.

The Common Council, Pawhuska, Okla., will proceed at once with plans for extensions and improvements in the municipal electric power plant, estimated to cost about $113,000.

The Dixie Power Co., Title Guarantee Building, St. Louis, has made application for permission to build a new hydroelectric generating plant on the Buffalo River in the vicinity of Little Rock, Ark., with initial capacity of about 20,000 hp.

The Louisiana & Arkansas Railroad Co., Stamps, Ark., will soon take bids for its new locomotive repair plant, estimated to cost about $150,000 with equipment. Harrington, Howland & Ash, Orear-Leslie Building, Kansas City, Mo., are architects.

Seattle

SEATTLE, Oct. 4.

The Ersted Machinery Mfg. Co., Portland, Ore., has purchased the plant of the Pacific Iron Works, comprising machine shop, foundry, pattern shop, etc., and will immediately occupy the premises. An adjoining site of about two acres has been leased for the erection of a two-story building to cost about $22,000.

The Meskill Lumber Co., Chehalis, Wash., is said to be perfecting plans for rebuilding the portion of its mill, recently destroyed by fire with loss estimated at about $75,000, including machinery. W. F. Downs heads the company.

The Portland Railway, Light & Power Co., Portland, Ore., is arranging for a bond issue of $10,000,000, a portion of the proceeds to be used for additions and improvements to include the erection of a new hydroelectric generating plant on the Clackamas River, with initial capacity of about 75,000 hp. The authorized capital of the company has been increased from $35,000,000 to $47,500,000.

Fire, Oct. 3, destroyed the mill of the Canadian Lumber & Timber Co., Vancouver, B. C., operated in the name of the Vancouver Export Lumber Co., with loss estimated at about $125,000, including machinery and power equipment.

The Klamath Iron & Steel Works, Klamath Falls, Ore., is planning to rebuild the portion of its foundry, recently destroyed by fire with loss of about $20,000. B. M. Hall is general manager.

L. A. Murray, Portland, Ore., has filed plans for a new one-story metal-working plant on Hawthorne Avenue.

The Rattlesnake Lumber Co., Yakima, Wash., is planning to rebuild its mill, recently destroyed by fire with loss estimated at about $60,000, including machinery. E. D. Evans, Naches, Wash., heads the company.

California

SAN FRANCISCO, Oct. 4.

The United States Metal Products Co., 330 Tenth Street, San Francisco, is having plans prepared for an addition, to be either two or four-stories and estimated to cost in excess of $50,000.

The I X L Battery Corporation, Los Angeles, has been incorporated with a capital of $25,000 by F. V. Alden, A. M. and M. H. Moore to manufacture electric batteries, etc. It is represented by A. S. De Santis, 610 Title Insurance Building.

The Keystone Iron & Steel Works, Los Angeles, has removed to its new plant at 2931-3641 Santa Fe Avenue. It will specialize largely in the manufacture of steel castings.

The Great Western Meter Co., 105 Montgomery Street, San Francisco, manufacturer of gas and other meters, has plans under way for a one and two-story factory at Powell and Beaudry streets, Emeryville, 30 x 170 ft., and estimated to cost $25,000. This will comprise an initial plant unit and other extensions will be built later. R. J. Lyman is president.

Fire, Sept. 29, destroyed a section of the plant of the Frank Graves Sash & Door Co., Los Angeles, with loss estimated at about $200,000, including machinery. It will be rebuilt. F. T. Haward is vice-president.

The Republic Steel Package Co., 7930 Jones Road, Cleveland, has completed plans for its new works at Richmond, Cal., one-story, 60 x 300 ft., and expect to commence construction at an early date. Spur railroad tracks to serve the plant have been laid. L. F. Hyde, Oakland, Cal., is architect.

The Paramount Automobile Co., represented by Charles Hollingsworth, Oakland, Cal., is negotiating with the Chamber of Commerce at Vallejo, Cal., for a site for a new plant to manufacture pleasure automobiles and parts.

The California-Curtis Co., American and Willow avenues, Long Beach, Cal., is contemplating the erection of a new aviation plant, to include a complete mechanical department for airplane construction and repairs. Earl S. Daugherty is local representative.

The generally better tone of the Pacific Coast steel market seems to be reflected in machine tools to some extent, for the 10 days have witnessed a larger volume of business. Inquiries are increasing and many result in actual sales. Business thus far, however, is largely confined to the smaller types of machine tools. Second-hand machinery is still occupying the major interest of buyers.

Canada

TORONTO, Oct. 10.

A much better feeling is slowly making its appearance in the machine-tool markets and many interests are looking for increased business in the immediate future. The larger railroads are making arrangements to enter the market and also do a fairly large amount of construction work. The demand for equipment for replacement purposes is improving and sales of one or two machines are increasing. Woodworking machinery is also more active. Inquiries continue in larger numbers, but many of these appear to be sent out for the purpose of sounding the market. While prices on some lines of Canadian tools have recently been reduced, it is stated that quotations are about as low as they possibly can go for some time.

W. H. Johnson, Barrie, Ont., is in the market for a 20-in. drill, either new or second-hand, with automatic feed, for boring cylinders.

The Link Mfg. Co., Portage la Prairie, Man., is asking for prices on a 6-ft. shear, small punch press, key-seating machine, 6-ft. power brake, power drill, 14-in. lathe, a set of 4-ft. rolls, also an 8 or 10-hp. motor.

The Parker Motor Car Co., recently incorporated with a capital stock of $10,000,000 has leased space in the plant of Caron Brothers, Longue Pointe, Montreal, for assembling cars.

The Anglo American Motors, Ltd., has secured a site at Trenton, Ont., and proposes to erect a manufacturing plant.

J. H. Bennett, of the Light & Power Commission, Barrie, Ont., states that the town will shortly install a 500-gal. De Laval electrically-driven centrifugal pump to supplement the present equipment in the waterworks plant.

The Hydro Appliances, Ltd., is establishing a plant at Port Robinson, Ont., to manufacture washing machines, etc.

The General Motors Corporation, recently announced that the manufacture of its entire line of export models, with the exception of the Cadillac and General Motors truck, will be concentrated at the Oshawa, Ont. plant. The reason for the change is that with all export trade under one head there should result a better realization of the necessities of the business and the production of a line of cars better fitted for export trade.

The Bay Mac Tire Co., Grimsby, Ont., is having plans prepared for a factory to cost $15,000.

W. Taylor, 2454 Chabot Street, Montreal, is contemplating the erection of a foundry.

Albert Frances, Dunnville, Ont., is contemplating erecting a foundry at Port Colborne, Ont.

990

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ⅛ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅝ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.75c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	4.03c. to 4.53c.
Squares, flats and hex.	4.53c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	4.10c.
No. 16	4.25c.
Nos. 18 and 20	4.40c.
Nos. 22 and 24	4.55c.
No. 26	4.70c.
No. 27	4.85c.
No. 28	5.00c.
No. 30	5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¼ in. Butt...	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap..	—23	— 7
9-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High brass sheet	15¼c. to 18¼c.
High brass wire	16¼c. to 20¾c.
Brass rod	13¼c. to 19¾c.
Brass tube, brazed	26½c. to 30½c.
Brass tube, seamless	18 c. to 19½c.
Copper tube, seamless	20½c. to 21¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20½c. to 22½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb...	$6.80	$6.55
			90 lb...	6.90	6.65
			100 lb...	7.00	6.75
IC..	$10.75	$9.25	IC...	7.15	6.90
IX..	12.00	10.75	IX...	8.15	7.90
IXX..	13.75	12.25	IXX...	9.15	8.90
IXXX..	15.50	14.00	IXXX...	10.15	9.90
IXXXX..	17.00	15.75	IXXXX...	11.15	10.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits, pig	30c.
Bar	36c. to 40c.

Copper

Lake ingot	15½c.
Electrolytic	15¼c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6⅛c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	20c.
No. 1 solder	18c.
Refined solder	15½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	29c. to 31c.

Old Metals

Dealers report business more active with prices steadily moving upward. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.25
Copper, heavy and wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.00
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	4.00
Lead, tea	2.50
Zinc	2.25

THE IRON AGE

New York, October 20, 1921

ESTABLISHED 1855 VOL. 108: No. 16

Steel Foundry Has Special Operating Features

National Steel Foundries Add Two Tilting Open-Hearth Furnaces with Removable Ports —Oven for Drying Molds Opens at Both Ends

NEW devices included in the new addition to the plant of the National Steel Foundries, Milwaukee, Wis., include removable ports for the two 25-ton tilting open-hearth steel furnaces, special ladle and stopper drying devices, a new type of core drying oven, new method of handling shake-out sand and a novel arrangement for handling the furnace ports. The plant is located in the north-eastern part of Milwaukee, between the Milwaukee River and the Ashland division of the Chicago & Northwestern Railway, occupies a tract of 15 acres, and now has a total floor space of 219,885 sq. ft., with a capacity of 200 tons per day.

The buildings, which are all of brick and steel construction, have the pond, saw-tooth and monitor types of roofs, and are exceptionally well lighted and ventilated. The two new open-hearth furnaces, which have also just been completed, are of the tilting types, and were designed by James H. Swindell.

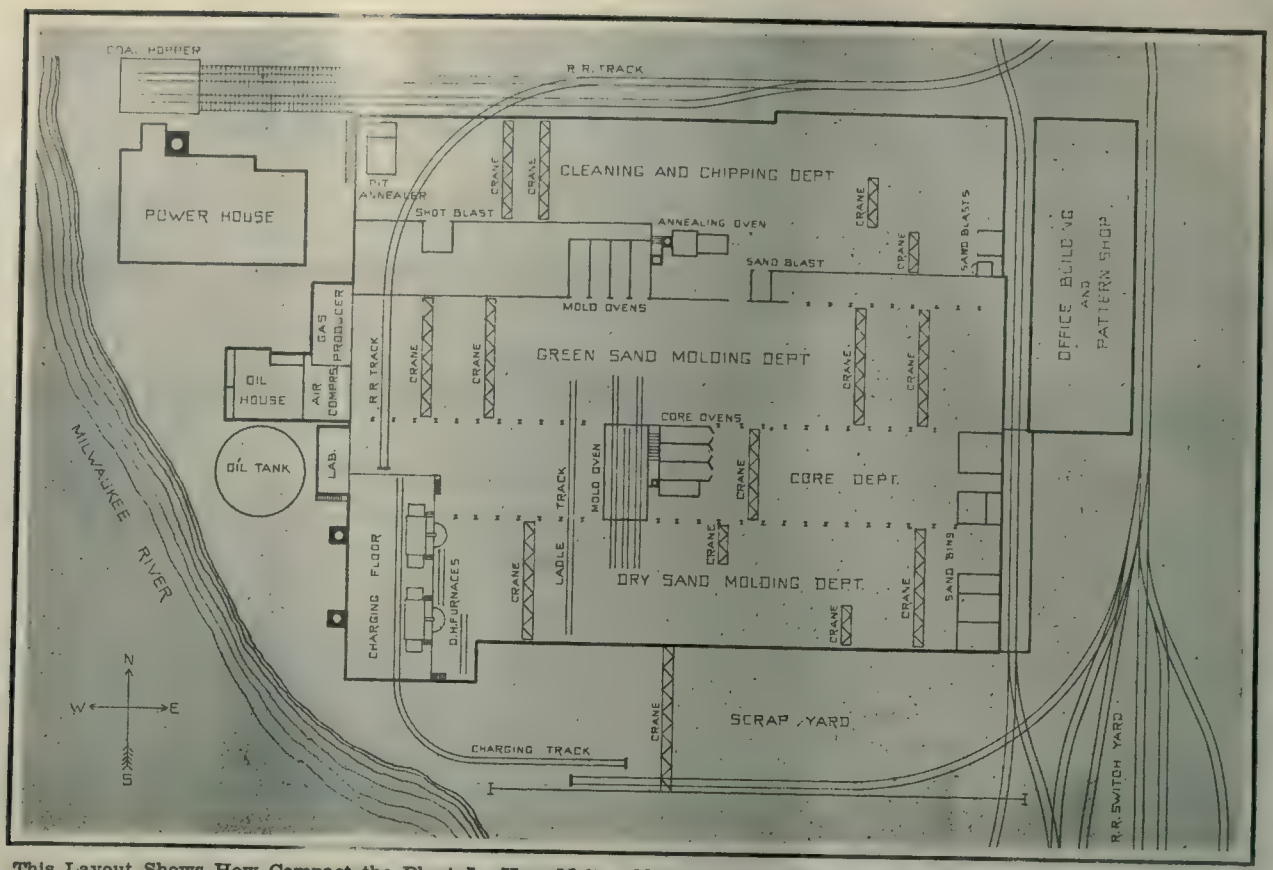
These furnaces are tilted by hydraulic pressure, and are designed for operation on either oil or producer gas. Levers for operating the tilting mechanism are located both in front and back of the furnaces, permitting operation from either side. The charging doors and ports are likewise hydraulically operated, Critchlow hydraulic valves being employed. All door frames and port castings are water cooled, the end ports being water sealed by the overflow water from the ports and door frames.

These furnaces are provided with removable end ports, which can be quickly removed for relining and replaced with spare ports, two of which are always kept ready for immediate use. The end ports are mounted on wheels and travel on a track. They are raised from the water-sealed pan, on the uptake, by means of hydraulic cylinders located on the sides of the ports, and operated by levers on the charging floor.

The two "outside" end ports, which extend beyond the span of the cranes, travel on rails to the



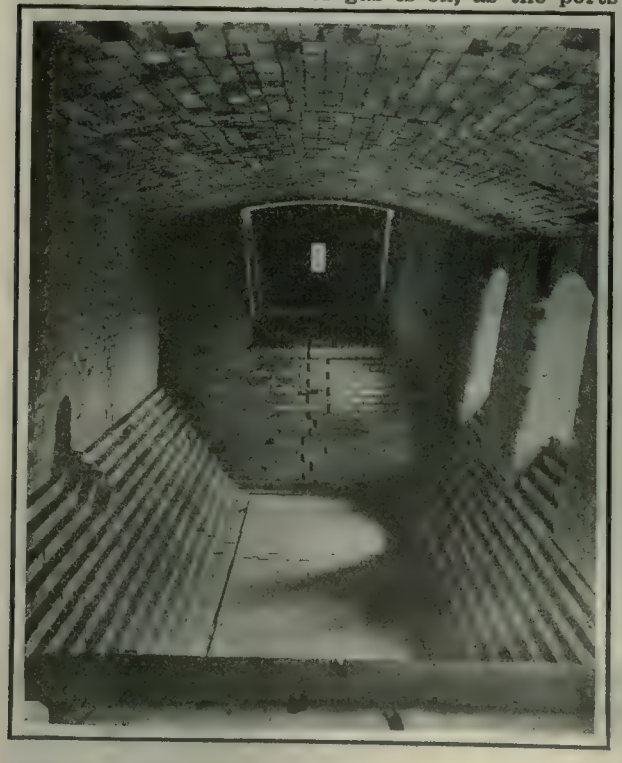
When the Furnace Is Tilted It Automatically Raises a Section of the Flooring. Beyond, at the right, stands the charging machine, with its trolley frame extending back to the conductor shown near extreme edge of cut



This Layout Shows How Compact the Plant Is, How Molten Metal Is Transferred from the Open-Hearth Furnaces in the Dry Sand Molding Department to the Green Sand Molding Department, How the Mold Drying and Core Drying Ovens Are Conveniently Located Between the Two Molding Areas

ends of the charging floor onto a transfer conveyor, which carries them out of line of the furnaces and in line with another track, over which they are moved "in" to a point underneath the crane, for removal and replacement.

The furnace proper tilts on roller bearings of large dimensions, and can be rolled over for discharging a heat, or when making a new bottom or back wall, while the oil or gas is on, as the ports remain in the center line or axis, irrespective of the position of the furnace. The extreme angle to which this type of furnace can be tilted brings the tap hole to the very bottom, and permits complete draining of the slag.



Interior of One of the Open-Hearth Furnaces, Showing Port Construction. Three expansion joints are plainly to be seen, one under the port, the other two running across the furnace

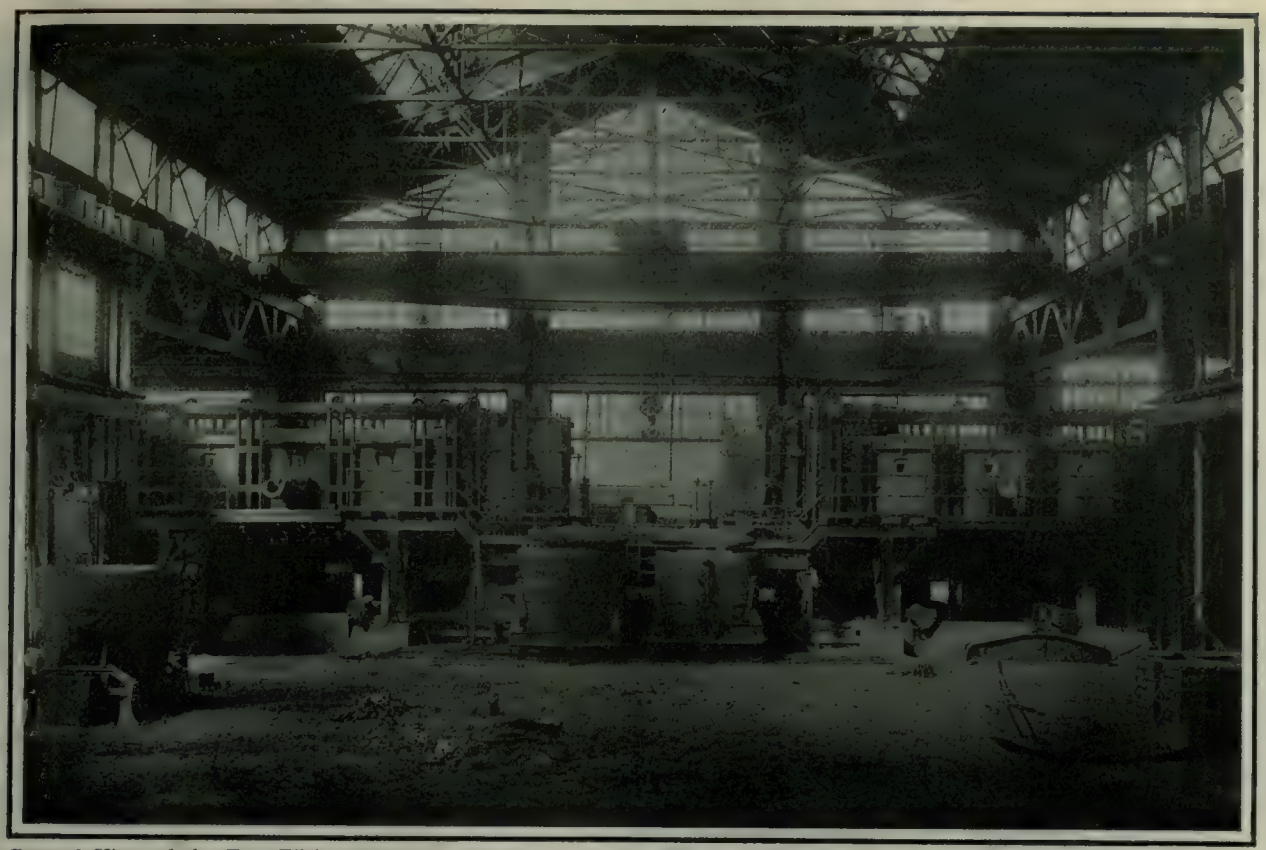
Each furnace has four slag pockets, two underneath each end port. Four regenerators for each furnace (two air and two gas) are located under the charging floor, and are connected to the slag pockets by flues. Tate Jones Company's circulating oil system, and Kirkwood types of burners, are used.

The butterfly valves are located under the charging floor and are of the Siemens type, manufactured by the Velte Foundry & Machine Co. They are operated by compressed air from the charging floor. The spacious charging floor is of brick and steel construction, very cool, and has excellent light and ventilation.

Standard 25-ton bottom pour ladles are used, the oil-fired ladle drier being of a new and special design. Ladle trucks, which run on a track, are used to convey the ladles from the dry sand to the green sand molding floors. The stopper drier, which is also of a special design, has a capacity of eight stoppers, the heat being so controlled that no direct flame comes in contact with the stopper heads.

The furnaces are charged by a 5-ton Wellman-Seaver-Morgan electrically operated charging machine, the charging boxes and cars being of standard design. The loaded charging cars are hauled up a curved incline trestle, from the scrap yard to the charging floor, by means of a steel cable and electric winch.

Two 40-ton ladle cranes travel the full length of this building and over the tops of the furnaces, for the removing and replacing of the end ports, etc., which arrangement also permits the pouring of two heats in quick succession (one from each furnace) or the use of the farther crane in case the near one is laid up for repairs. A new 3-track



General View of the Two Tilting Furnaces, Showing Ladles on Buggies; Showing Also How the Same Cranes May Be Used on Either Side of the Furnaces. The ends of the hydraulic tilting cylinders appear beneath the furnaces

mold drying oven of special design has also been installed, and is so located as to receive the dry sand molds at either end.

The green sand molding department has a reinforced concrete and brick floor, with a basement and a sub-basement underneath. The first basement is used for pattern storage; the sub-basement contains the sand storage bins and sand mills. Shake-out sand is handled in a unique manner. It is conveyed by clam shell buckets to chutes in the molding floors, passes through revolving screens into hoppers above the sand mills in the sub-basement, and is returned to hoppers on the molding floors by means of a bucket conveyor.



While the Port Ends Between the Two Furnaces May Be Lifted from Their Water Seals by the Crane, and Thus Replaced by Spares When Repairs Are Needed, the Two at the Outer Ends Are Beyond the Crane Runway. Hence these two are handled on special tracks, by which they are brought within reach of the crane



Two Types of Annealing Furnaces Are in Use in the Plant. This is the car-type furnace, located in the cleaning and chipping department

Molding machines installed consist of two 30 x 28 in. and two 30 x 36 in. International turn-over draw machines with conveying racks, and three 60 x 72 in. plain jolt machines. The chipping and cleaning department has both dirt and creosote block floors, and is equipped with one shot-blast and two sand-blast machines of the Pangborn type, and two sand-blast machines of the Hoevel type.

The welding department, in which both electric and acetylene welding are done, is equipped with one 1000-ampere Westinghouse electric generator, and two 300-lb. Davis-Bournonville acetylene generators. The cleaning department is fitted throughout with improved types of automatic chippers, cut-off saws, portable and stationary grinders, etc.



In This Special Type of Stopper Drier Space Is Provided for Eight Stoppers, Hung as Shown

Two annealing furnaces are located in this department, one being of the "car" type for the smaller castings, and the other of the "pit" type for the larger castings.

Fourteen electric traveling cranes are used in this plant. This equipment consists of two 40-ton Niles; two 20-ton, four 10-ton and two 5-ton Pawling & Harnischfeger; one 20-ton and one 15-ton Shaw; one 10-ton Waukesha and one 5-ton Cleveland. This makes an aggregate nominal lifting capacity of 220 tons.

The pattern shop, which in normal times employs a force of about thirty men, and in which both wood and metal patterns are made, occupies a floor space of 12,669 sq. ft. A modern laboratory is most conveniently located directly back of the charging floor of the furnaces.

Fuel oil storage is provided back of the foundry buildings. The tanks consist of a battery of five 10,000-gal. steel tanks and one 260,000-gal. concrete tank, giving a total storage capacity of 310,000 gal., or approximately thirty-eight carloads. The location and elevation of the unloading track, in relation to the storage tanks, are such that the oil from the tank cars is discharged by gravity directly into the tanks.

The air-compressor equipment consists of five National Brake & Electric Co. type 3-VD 550 cu. ft. and one 3VS-23-300 cu. ft. automatically controlled compressors.

The relief department, of which about 95 per cent of the employees are members, is operated on a plan which not only provides sick and death benefits for its members at nominal cost, but also pensions the widows and dependent children of mem-



Butterfly Valves for Handling Air and Gas Flow Are Located, as Usual, Beneath the Charging Floor

bers who have been in the employ of the company continuously for a period of two years or more.

A completely outfitted modern dispensary, in charge of a registered nurse, is also maintained, where first aid is administered to accident cases. The plant is well equipped with safety appliances, the safety work being in charge of a committee composed of employees of the various departments. This committee makes monthly inspections of all departments, and recommends the installation of safety devices where necessary.

The National Steel Foundries also operate a brass foundry and a large modern gray iron foundry, located directly south of the steel foundry buildings. When operating under normal conditions (before the completion of the new addition) about 500 men were employed. This number will now be considerably augmented.



These Three Core Ovens Lie Between the Green Sand Molding Area, Behind the Scenes at the Right, and the Dry Sand Molding Area, Located Similarly at the Left. Cores are made in this room and passed directly into the ovens

Investigation of Defects in Extruded Metals

Origin and Remedy Discussed by British Institute of Metals—Testing Light Specimens with the Scleroscope—Age-hardening of Aluminum Alloys

(Special Correspondence.)

LONDON, Sept. 26.—The opening session of the autumn meeting of the British Institute of Metals at Birmingham has already been reported in THE IRON AGE. The present report deals with the second day's session on Sept. 22.

At a lunch given the members by the Metal Trades Associations, Sir George Goodwin, in responding to a toast, observed that there had been a good deal of standardization in the metal industries in recent years, especially in the United States. There was no doubt that this did cheapen manufacture, but it also introduced a tendency to stagnation. On his various visits to Birmingham he had found a good deal of standardization, but he had also found that the works were adaptable to meet all the exacting requirements of the Royal Navy. He then referred to the necessity for continued research work and for adequate remuneration for those who undertook it. The recently-formed Non-Ferrous Metals Research Association would provide a useful link between the institute and the non-ferrous metal trades.

The question of industrial research was also raised later in the day when Principal C. Grant Robertson welcomed the institute on a visit of inspection to Birmingham University. Principal Robertson said the university meant business, and in two senses. It provided professional training for industrial careers and it provided for research. It had recently set up a standing joint committee on research (and he believed this was the first of its kind) to co-ordinate the research work of the university in relation to the local industries, which would have representatives on the committee.

At the second business session on Sept. 22, the following papers were taken:

The Extrusion Defect

Under this title, R. Geuders presented a communication from the Research Department, Woolwich. He observed:

Although the possibility of extruding soft metals such as lead and tin had been established as early as about 1800, the process was not successfully applied to copper alloy until it was shown by Alexander Dick, during the 'eighties, that delta metal could be extruded in a heated state. The hot extrusion process, as is well known, consists in the pressing of metal heated to a plastic state, through a die, so that a continuous bar of the cross-section of the die is produced. In the process, as generally carried out, a cast billet, reheated, in the case of 60:40 brass, to a temperature of about 800 deg. C., is placed in a receiver having a fixed die at one end. A plunger actuated by a hydraulic press is inserted. As the plunger moves forward the brass is extruded through the die. The advantages of the process are well recognized. The available literature on the subject is scanty and mainly devoted to the design of the apparatus rather than to the behavior of the metal during the process.

It is found that when solid rod is extruded from a central die, the last 25 or 30 per cent of rod to leave the die contains a characteristic defect peculiar to extruded rod. Transverse sections show a more or less complete circle, varying in diameter at different positions along the rod, consisting of oxide and foreign matter inclosed in partially dezincified brass. The core inside the circle has generally the same structure as the sound metal outside. When a defective rod is broken across, the core frequently breaks at a different point from the outer ring and projects, and is sometimes quite loose. The defect may not be completely continuous either longitudinally or circumferentially, and it is possible for a badly defective rod to show an end fracture which is not visibly unsound. The defect is commonly known by the misleading term "piping," and has often been ascribed to ingot defects. The sole fact that it occurs regularly in the same form in each rod produced by central extrusion is sufficient, however, to discount this assumption.

The mode of formation of the defect was investigated by the examination of billets extruded to various stages. The specimens were sectioned axially and pickled in 50 per cent nitric acid. It is found in such specimens that the foreign matter and dezincified metal similar to that dividing the core from the outer ring in the bar is present in the partially extruded billet in the form of a funnel. The mouth of the funnel is the edge of the rear end of the billet, and the neck of the funnel is continuous with the tubular defect in the extruded rod, while the metal within the funnel is sound. The occurrence of the defect in this form can be explained as follows: When the heated billet is placed in the relatively cool receiver and expanded into close contact by the first pressure of the ram, the outer surface is chilled and becomes less plastic than the interior. The plastic interior flows easily through the die, but the stiffer outer shell cannot flow so readily, and the friction between the bore of the receiver and the surface of the billet also tends to prevent the skin of the billet from flowing. Consequently the cylindrical skin of the billet, which must shorten as the billet becomes smaller, is bent over inward to be carried forward by the flow of the metal toward the die. The actual defect, thus appears to consist of the dirty, oxidized skin of the original billet, and, if formed in the manner suggested above, would be expected to take a path identical with the outline of the defect found in the sectioned billets.

The formation of the defect in this manner explains its occurrence in the rear-most portion of the extruded rod. It is clear that the skin of the billet at its extreme rear end could not enter the die before the reduction in length of the billet well exceeded 50 per cent. It would appear that the defect is present in the rear portion of all rod centrally extruded by the usual methods, but in rod of smaller diameter the foreign matter may be distributed over such a great length as to render it discontinuous and invisible in the fracture. In many cases the section of a partially extruded billet shows much more foreign matter on one side of the funnel formation than on the other, and in many sections of bar the circle of defective material is incomplete. This can be accounted for by assuming that the ram has not been concentric with the receiver, moving along nearer to one side than the other and thus largely missing the billet skin for a portion of the circumference. The author's explanation of the formation of the defect agrees with the conclusion arrived at by A. E. and P. A. Tucker,* in a paper read before the Birmingham Metallurgical Society on March 13, 1919, that the defect was a mechanical issue of extrusion, but gives no support to their suggestion that segregation and the crystalline structure of the billet are factors affecting the occurrence of the defect.

The author then considered various possible remedial methods. Regarding the suggestion to avoid relative movement of the receiver and billet, he observed that this is based on the theory that the skin of the billet refuses to flow along the bore of the receiver, and is bent inward by the forward motion of the ram. It could only be put into operation by substantial modification of the usual type of plant. By inverting the process so that the die is pushed into the metal on the end of the ram, the flow of metal would take place near the die and the skin of the billet at the end farthest away would not be affected, the relative movement being solely between the die and the receiver. It might be possible to extrude both ends at once. This method was patented several years ago, but was devised with the object of obtaining more regular properties in the rod by extruding the middle portion of the billet (which is away from the cooling influence of the die and ram) last. A somewhat more practicable method, however, is to carry the die on the end of a hollow ram or to allow the receiver to move

**Iron and Coal Trades Review*, March 21, 1919.

forward with the ram, the die being held on a fixed hollow shaft.

It might be objected, however, that the effect of pushing the die into the container, which with the billet remains stationary, would be to turn over the skin of the billet at the die end and allow it to flow into the extruded rod from another point. The turning inward of the skin at the external edge of the die would undoubtedly occur, but the defective material would accumulate in a region from which smooth flow through the die would be difficult. The author's experiments confirm this view.

Experiments were carried out in small scale apparatus. (1) with solid ram and relative movement between billet and container, as in present practice, and, (2) with hollow ram, and no relative movement between billet and container. The results obtained on a small scale with the first apparatus appeared comparable in every respect with those obtained in manufacturing practice, while with the second apparatus the crystalline structure of the billet shows the effects of work only in the region just forward of the die, and the dirty skin of the billet is gathered on the underface of the die, where the metal appears to remain practically "dead" until the rest of the billet has been extruded. In complete extrusions the rod produced was sound from end to end. In some cases a little of the foreign matter was extruded on the outer surface of the last 4 or 5 per cent of rod.

The method has not so far, to the author's knowledge, been used for the hot extrusion of copper alloys, and it is suggested that its undoubted advantages merit some consideration in this respect. The power required is less than with the method at present in use, and thus the process would require a lighter receiver or would be less likely to bulge those of the present type. The necessary modifications of the plant would probably be fully justified by the saving of the very large amount of metal, which by the present method is extruded only to be ultimately scrapped.

Discussion

R. J. Redding, Birmingham, speaking as a user of extruded bars, said the subject was most important. During the war the amount of the defects increased, possibly due to using larger billets, working at higher speed, and using more of the bar. He had conducted extrusion experiments with wax models dyed red on the outside which had given practically the same results as those recorded in the paper.

Dr. Rosenhain said they had found at the National Physical Laboratory that some alloys could only be worked after extrusion. They had soon come across the same defect, and had experimented with model billets of plasticine made up of alternate layers differently colored, as a result of which they had to a great extent got over the difficulties. He did not agree that the central defect was due to the external skin, and thought the author had too lightly ignored the question of defects in the ingot.

Harold Moore, Woolwich, agreed entirely with the paper and disagreed with Dr. Rosenhain's suggestion regarding ingot defects. Earlier researches at Woolwich in 1914-15 had shown that this was out of the question. It was very difficult to extract information from the makers of extruded rod. The defect did not occur to anything like the same extent when the multiple die was used.

Sir George Goodwin asked representatives of the manufacturers to give their views, but there was no response, and the author then observed that it was regretable that no manufacturers had come forward. This made the meetings seem one-sided. Research workers carried out experiments and published information, but could get neither criticism nor opinions from the manufacturers to whom the work was presumably of value. He thought Dr. Rosenhain's experiments did not illustrate the effect of flow as it actually took place in brass. Sir George Goodwin then added that, in the case of a paper like the present, the manufacturers owed a duty to the institute to take part in the discussion.

Fred S. Tritton, of the National Physical Laboratory, introduced a paper entitled "The Use of the Scleroscope on Light Specimens of Metals."

The author referred to the doubt as to whether the real hardness values of small samples were obtained, although the usual precautions were taken to support the specimens in an apparently rigid manner. Various tests confirmed these doubts, and new means of support for the specimen were tried. Success was obtained by using pitch between the specimen and support but the usual clamp was found unsatisfactory. A new clamp designed by Dr. Rosenhain overcame the disadvantages and is described in the paper. A later improvement was the use of glucose in place of pitch, the ordinary liquid commercial variety being used, with a specific gravity of 1.425.

Discussion

Sir T. K. Rose commended the method, and referred to his own experiences with light samples at the Royal Mint. Capt. John Cartland, Ashton-on-Mersey, asked why a higher value was obtained with copper grips than with steel grips. Dr. W. H. Hatfield, Sheffield, said he regarded the Brinell test as the most reliable where it was applicable, but in other cases the scleroscope was very useful. In some of his own experiments he had found that with a support one inch thick he got a scleroscope hardness of 96, whereas with a support only 0.1 in. thick he got 76. He supported the author's results and statements, especially as regards unreliable scleroscope results given in some scientific papers.

H. L. Heathcote, Birmingham, related some experiments on steel balls at the Rudge-Whitworth. Research Laboratory, as a result of which he obtained a curve of every irregular shape, something like a Greek letter, the name of which he had forgotten. Dr. A. G. C. Gwyer said that in testing thin sheet the value for the same temper was greatly dependent on the thickness of the sheet. He had several scleroscopes, and none of them read the same on the same material. He had recently bought two new hammers, which differed in weight by 10 per cent, and in readings by 100. Mr. Tritton, in the course of his reply, said that the higher values obtained with the copper grips were due to their giving a higher rebound.

Age-Hardening

An exhaustive research, of considerable value, by Dr. D. Hanson and Miss Marie L. V. Gayler, M.Sc., of the National Physical Laboratory, bears the title "The Constitution and Age-Hardening of the Alloys of Aluminum With Magnesium and Silicon." It was introduced and very clearly summarized by Miss Gayler and, in the discussion, Professor Desch said it was quite a pleasure to see photo-micrographs which do really represent what they are intended to represent and do not require the exercise of faith. H. B. Weeks said the work was of more than academic interest, and important developments should follow the correlation of age-hardening properties and constitution.

Other papers presented to the meeting were: "The Relation Between the Mechanical Properties and Microstructure in Pure Rolled Zinc," by D. H. Ingall, Birmingham; "The Electrolytic Etching of Metals," by Frank Adcock, Ipswich, and "The Magnesium Alloy Electron," by S. Beckinsale, Woolwich.

On page 793 of THE IRON AGE, Sept. 29, in the description of the new Ford foundry at River Rouge, Mich., the 3-ton electric furnace is stated to have been of the single-phase type, with two electrodes. We are now informed by the Electric Furnace Construction Co., Philadelphia, which supplied the furnace, that it is a 3-phase 4-electrode Greaves-Etchells furnace.

The Youngstown Steel Car Co., Niles, Ohio, has booked an additional order from the New York Central Railroad for the repair of 500 freight cars, and now has 1900 cars on its books. An official states that business definitely in hand insures capacity operations until April 1 next. In addition, other important business is being negotiated.

Cost of Rolling Steel in Blooming Mills*

Discussion of Electric Drive Compared with Steam-Driven Units—Cost Comparisons on Basis of Tonnage Rolled Favor Electric Operation

BY G. E. STOLTZ†

ENGINEERS to-day are vitally interested in the economy to be obtained by replacing the existing steam units of rolling mills by electric drive. The field of motor application has been divided into two parts; the auxiliaries and the main drive, and the advantages which apply to either of these fields apply to the other, but not in the same degree.

Experience has shown that a greater saving is to be obtained by replacing the steam units on the auxiliaries than on the main rolls. The economy of small engines is relatively poor when compared with that obtained on the large engines. In addition to this, the losses incidental to a network of small steam lines contributed to the replacement of engine drives in this field.

Development of Mill Type Motors

Electric drive was adopted, even before motors were developed which might be considered entirely suitable for such applications. The advantages were so greatly in favor of electric drive that motors which had been designed for railroad work were adopted, but the demand soon became large enough to warrant the manufacture of the mill type motor, which is just as special for steel mill work as the railroad motor is for railroad work. The elimination of engine drive on auxiliaries might be considered as the completion of the first step in steel mill electrification, and the fact that this movement has been so rapid and universal must signify there were other important results gained in addition to economy.

Power for the auxiliary motors was generated by engine-driven units in sizes comparable to the engines driving the main rolls. These engines were usually located near a boiler room, so that the losses in the steam line were considerably less than would be obtained in a network of lines to small engines, and the engines driving the generators were naturally larger than those which would be used for the auxiliaries, so that much better economies were obtained. In addition to this, the engine driving the electric generator took advantage of the diversity of demand on the individual units, so that its load varied over the small range in capacity where its best economy is obtained.

The engines on the main rolls were quite often placed near the boiler plant, and being of the same general capacity as the prime movers then used to generate electric power, no great difference in economy existed. Improvements were made on the main roll drives by installing compound condensing engines, and later in some cases low pressure turbines were installed, to utilize the exhaust steam and obtain a greater vacuum than is possible with an engine.

New Power Units Favor Motor Drive

In the decade of 1900 to 1910 two new methods of generating electric power in steel plants came into prominence; the gas engine and the high pressure steam turbine. This greatly changed the situation, as an improvement in economy could now be obtained by electrifying the main rolls, just as was formerly obtained by placing motors on the auxiliaries. Some very extensive main roll electrifications were made on the basis of producing power, in some cases with gas engine driven generators, and in others with high pressure turbo-generators.

Even if the gas engine and the high pressure turbine had not been improved since the installation of the first units, the growth of electrification would, I believe, have been substantial, but would by no means be as rapid as it has been during the intervening years. However, both gas engines and steam turbines are now being built in increasing sizes and better economies are being obtained. The steam turbine has led in the race, and the economies now obtained have contributed more to electrification in steel plants than any other one item.

Operating engineers to-day are interested in the question of replacing the steam units now in operation. Much interest has been aroused by the fact that already a number of important electric installations have been made to replace the steam engine. While in some cases the engine has been replaced, due to the fact that it was worn out, there are several cases where the change was made to obtain better economy, and to be able to produce the steel cheaper than was possible with the steam unit.

Effect of Motor Drive on Cost

While there are a number of factors to be considered, the cost of rolling steel must first be disposed of. It is therefore necessary to determine first the cost of rolling steel on the steam unit in operation, and then estimate the cost of rolling steel if a motor were installed. Mr. Jefferies* has published costs of rolling steel on his 34-in. reversing blooming mill, first in an article in the 1916 volume of the Proceedings of this association, and later in the February, 1920, monthly proceedings of the association, with the discussion of "Steam vs. Electric Drive." At the same time, Mr. Siebert presented some valuable data on this same subject.

In his discussion, Mr. Siebert compares the effective work of the various types of engines, and shows that what the compound engines gain in engine economy is partially lost in greater acceleration and friction losses. In Fig. 9 of his discussion he plots a curve, giving the kw.hr. consumption per ton of steel rolled for various elongations. The curve here appended has been taken from this data, the points establishing the upper curve being taken from Fig. 11, and the lower curve from Fig. 9, of Mr. Siebert's paper.

Mr. Siebert plotted the latter curve in kw.hr. per ton, but we have expressed the same values in lb. of steam per ton, assuming that 16 lb. of steam are required to generate a kw.hr. At this same meeting Mr. Eppelsheimer† presented a discussion giving test results on a 40-in. mill engine. This test lasted 17 hr. and certain boilers were set aside to serve the engine alone. The upper point taken from Mr. Eppelsheimer's data represents the total steam per ton rolled and the lower point the net steam charged to the engine after it is given credit for exhaust steam to a low pressure turbine. The data submitted by Mr. Siebert indicates that the steam-driven mill requires 2½ times the steam that would be required for electric drive, and the net steam from Mr. Eppelsheimer's test is 3½ times that required by electric drive.

Practical Operation the Only Criterion

These values, of course, represent results obtained from tests of relative short periods, while the requirements for electric drive are taken over monthly periods, which include incidental losses that become particularly prominent on steam engine drive when small tonnages are rolled. When these mills operate at a re-

*Abstract of paper read before Association of Iron and Steel Electrical Engineers, Philadelphia and Youngstown meetings.

†General engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

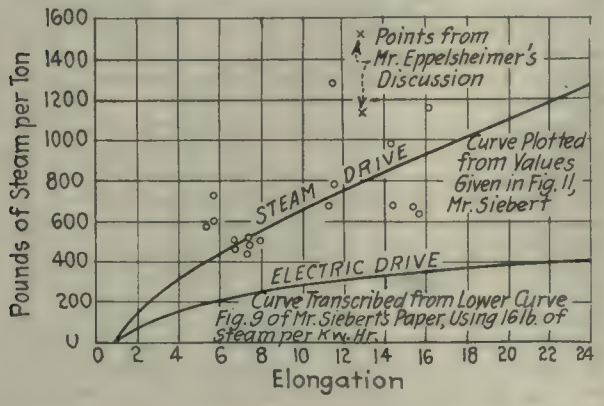
*Electrical superintendent, Steel Co. of Canada, Hamilton, Can.

†Chief engineer, American Rolling Mill Co., Middletown, Ohio.

duced tonnage, the ratio of steam consumption would be still larger, as the standby losses of the electric drive are not so great as those obtained with steam units.

The data referred to above as given by Mr. Jefferies cover seven years' record on his mill, and naturally are of more value than results obtained over short periods when the mill is operating at a fair tonnage. His figures include those incidental losses and costs which cannot be figured from test values, and for this reason are of great value to engineers making a study of this subject.

We believe if data of this character were submitted from various mills it would be easier to determine the time when an engine should be replaced by an electric motor, and for this reason we are submitting figures taken from several reversing blooming mills, both steam driven and electric driven. Naturally, the costs will vary somewhat with the product rolled and with the tonnage output, but an approximate indication of the



steel rolled is being given with the cost figures, so as to make it possible to compare the results with that on other mills.

The mills represented by items III and V in the table roll approximately the same product and are subject to the same method of accounting. The two mills have rolled the same maximum tonnage, although the demand for the product rolled on the electric driven mill has not been so regular as that of the steam driven mill. The difference in cost on these two mills is 50c. per ton, which, on the basis of 30,000 tons per month, would result in an annual saving of $180,000. This would be, for steam drive, $8,750 per month, and for electric drive, $13,875 per month, or a difference of $5,125 per month, in favor of the steam drive. Assuming a monthly tonnage of 25,000 on either type

*Bethlehem Steel Co., Sparrow's Point, Md.

Reversing Blooming Mills	Electric Drive I	Electric Drive II	Electric Drive III	Steam Drive IV	Steam Drive V	Steam Drive VI
Size of mill	34-in.	35-in.	40-in.	35-in.	36-in.	40-in.
Size of ingots rolled	15x17 in.	20x20 in.	22x24 in.	18x20 in.	22x24 in.	18x20 in.
Weight of ingot	4200 lb.	6800 lb.	9600 lb.*	5500 lb.	9600 lb.	5000 lb.
Size of blooms rolled	8x8 in. 6x6 in. 4x4 in.	8x8 in. 4x4 in. 5½x22 in.	6x6 in. 8x10 in.	4x4 in.	8x8 in.	7x4 in.
Size of engine used†	.....	.....	.....	42x60 in. geared	50x66 in.	55x60 in.
Years covered by figures	7	2	2	3	2	2
Months in operation	73	21	12	35	24	24
Average monthly tonnage‡	18,600	26,700	27,000	23,900	32,930	18,075
Average cost of operation:						
Kw.hr. per ton	21.2	21.3	19.6	.....	.....	.....
Lb. steam per ton	.....	.....	.....	1040	1690	2870
Cost for power	14.45c.	23.20c.	20.20c.	53.50c.	63.50c.	107.00c.
Repairs and maintenance	0.58c.	0.07c.	0.35c.	3.94c.	4.27c.	5.47c.
Miscellaneous supplies	0.30c.	0.14c.				0.72c.
Operating labor	1.32c.	1.86c.	1.88c.	3.97c.	3.39c.	4.62c.
Total cost	16.65c.	25.27c.	22.43c.	61.41c.	71.16c.	117.81c.
Weighted averages:		Electric			Steam	
Cost for power		19.83c.			70.81c.	
Upkeep and supplies		0.43c.			4.63c.	
Operating labor		1.73c.			3.87c.	
Total		21.99c.			79.31c.	

*Also 25 x 25 in., 11,500 lb., and 25 x 30 in., 13,500 lb.
†All twin simple engines, exhausting into low-pressure turbines.
‡Tonnages and costs based on 2240-lb. per ton of finished product.

Discussion by R. B. Gebhardt*

At Sparrow's Point we have a 40-in. electric-driven blooming mill, which, I understand, is about second on tonnage record to any electric-driven mill in this country. Its record is 57,616 tons for a single month's operation, rolling partly slabs and partly 8 x 8-in. blooms. The following table gives figures, similar to those submitted by Mr. Stoltz, for this mill:

Months in operation	11
Average monthly tonnage	43,950
Average cost of operation:	
Electric power for roll drive	16.6c.
Repairs and maintenance	0.8c.
Miscellaneous supplies	0.1c.
Labor	0.2c.
All other cost	0.4c.
Total cost	18.1c.

In the figures presented by Mr. Stoltz there is no doubt left in our minds that, of the mills from which these were obtained, the electric drive shows an appreciable economy over the steam drive. However, someone might argue that these figures do not tell the whole story, as no fixed charges against the original investment are included, and it is the purpose of this discussion to approximate such charges for the benefit of any skeptical ones who need further convincing.

Referring back then to our proposed mill, the first costs with either method of drive would be about as follows:

	Steam Drive	Electric Drive
Boiler plant including connections up to engine	$500,000	
Electric power plant including boilers, turbo units, wiring, etc., complete.		$660,000
Engine drive, twin tandem compound, with condenser	200,000	
Motor drive complete		450,000
Total	$700,000	$1,110,000

The fixed items chargeable against the above investment in either case may be taken as follows:

Interest on investment	6 per cent
Depreciation	6 per cent
Insurance, taxes and miscellaneous	3 per cent
Total	15 per cent

of mill, then fixed costs per ton would be $0.35 on the steam driven mill and $0.555 per ton on the electric driven mill. Adding these fixed charges, then, to the highest average electric costs given by Mr. Stoltz, and the lowest average steam costs, in order to be sure we are on the safe side, we have $0.808 per ton for electric operation as against $0.964 per ton for steam operation.

Discussion by B. A. Cornwell*

A few of the more important advantages of the large motor when compared with the steam engine for driving the main rolls are as follows:

1. More constant and regular torque.
2. Greater flexibility—meaning less breakage of pinions, couplings, etc.
3. Reduced space—due to the absence of boilers, steam piping, etc.
4. Reduced labor costs.
5. A lower fuel cost—due to the use of large blast furnace gas engines and to the good economies obtained by high pressure steam turbines.

Discussion by G. S. Warren†

The Sharon Steel Hoop Company has a 35-in. electric-driven blooming mill at its Lowellville plant, which has been in operation about two years. The operation has been very irregular, due to several causes, but we have found that, without any special tests, our kw.hr. will run from 20 to 22 per ton of steel rolled. We have been rolling 20 x 22-in. ingots to a maximum section of 15 x 4 in. and a minimum of 4 x 4 in. Our costs run somewhat higher than Mr. Stoltz shows in his tables, and are about 30c. per ton.

This mill has made 675 tons in a single 8-hr. turn. The mill has operated only 16 hr. any day, and this would tend to make our costs higher. We are limited by our heating capacity, having only four soaking pits to take care of this mill.

*Engineer, Electrical Department, Carnegie Steel Co., Ohio Works, Youngstown.

†Sharon Steel Hoop Co., Sharon, Pa.

Chicago Foundry Conditions

CHICAGO, Oct. 17.—In view of the varying opinions on the melt of foundries, it is refreshing to secure accurate statistics. In the month of August, 29 representative foundries in the Chicago district consumed 5956 tons of pig iron as against a normal monthly consumption of 14,630 tons. This would indicate an operating rate of about 41 per cent during the month. On Sept. 1, these melters had 22,372 tons of pig iron on hand, as compared with 23,996 tons on Aug. 1, or a reduction of 7 per cent. On the other hand, they still had 9924 tons due on contracts, as of Sept. 1, and this tonnage plus that in their yards on that date was equal to 220 per cent of their normal monthly consumption and 544 per cent of their August consumption. Iron purchased in August amounted to 5708 tons, or 96 per cent of the consumption during that month. Iron received totaled 3013 tons, or slightly more than one-half the melt in August.

Mahoning Valley Operations

YOUNGSTOWN, OHIO, Oct. 18.—There is as yet no perceptible decline in steel mill operations in the Mahoning Valley. Sheet production is well sustained, 77 units being under power this week, as compared with 76 last week. Nine pipe furnaces are fired as against eight the previous week. The Brier Hill Steel Co. is operating 18 sheet mills, Youngstown Sheet & Tube Co. 15 and Trumbull Steel Co. 13. Forty-one of the Valley's 66 open hearth furnaces are charged, including 31 independent furnaces.

The A. M. Byers Co., Pittsburgh, is operating its blast furnace, 72 puddle furnaces and skelp and bar mills at its Girard works.

At New Castle, Pa., the Carnegie Steel Co. has two furnaces in blast, and is operating its bessemer department and blooming and bar mills.

MORE ACTIVE STACKS

Jones & Laughlin Steel Co. Now Has Five Furnaces in Operation—Gains Elsewhere

The Jones & Laughlin Steel Co. recently turned on the blast at two furnaces, one at its Pittsburgh plant and one at its Woodlawn, Pa., works. The company now has 5 of its 12 furnaces making iron. Of the 140 blast furnaces, steel works and merchant in the territory bounded by Johnstown, Pa., Wheeling, W. Va., and Warren, Ohio, 42 now are in blast, or 30 per cent numerically figured. This is a gain of 16 furnaces from the low point reached around July 1, when only 25 stacks were blowing. Only four merchant stacks of a total of 21 are in blast. These are one furnace, American Manganese Mfg. Co., Dunbar, Pa.; the Mattie furnace, A. M. Byers Co., Girard, Ohio; Cherry Valley furnace, Hanna Furnace Co., Leetonia, Ohio, and No. 3 furnace, Shenango Furnace Co., Sharpsville, Pa. Active steel works stacks include one each at the Schoenberger Works, Pittsburgh, and the Donora Works, Donora, Pa., of the American Steel & Wire Co.; 1 furnace, Brier Hill Steel Co., Youngstown, Ohio; 17 furnaces, Carnegie Steel Co., Pittsburgh; 3 furnaces, Midvale Steel & Ordnance Co., Johnstown, Pa.; 5 furnaces, Jones & Laughlin Steel Co., Pittsburgh; 1 furnace, LaBelle Iron Works, Steubenville, Ohio; 1 furnace, Pittsburgh Steel Co., Monessen, Pa.; 2 furnaces, National Tube Co., Pittsburgh, one furnace, Republic Iron & Steel Co., Youngstown, Ohio; 1 furnace, Sharon Steel Hoop Co., Lowellville, Ohio; 1 furnace, Weirton Steel Co., Weirton, W. Va.; 1 furnace, Wheeling Steel & Iron Co., Wheeling, W. Va., and 2 furnaces, Youngstown Sheet & Tube Co., Youngstown, Ohio, a total of 37. It is reported that the Trumbull Cliffs Furnace Co., stack at Warren, Ohio, which will provide hot metal for the Trumbull Steel Co., will be blown in either Nov. 1 or Nov. 15. This is a new furnace and is jointly owned by the Cleveland-Cliffs Iron Co., Cleveland, and the Trumbull Steel Co., Warren, Ohio.

Inland Looks for 1922 Rail Demand

The decision of the Inland Steel Co. to install rail finishing equipment, as announced in THE IRON AGE of Oct. 13, was prompted by the belief that the demand for rails next year will be of large proportions. The company expects to be able to offer rails for delivery beginning in March, 1922. The 28-in. structural mill on which the rails will be rolled, has heretofore been used chiefly in the manufacture of heavy structural material, the demand for which in Chicago territory does not under present conditions engage the full capacity of the mill. The mill is three-high and has three stands of rolls and is served by a 32-in. roughing mill, which in turn is served by a 40-in. blooming mill, all motor driven. These mills were fully described in these columns on July 10 and 17, 1919. The rail finishing equipment will be housed in a large addition, referred to a week ago, which will be served by two 15-ton overhead traveling cranes. The work undertaken also involves the construction of four large heating furnaces in which the blooms will be reheated before rolling the rails, it being believed that a much better rail will thereby be produced than by the methods heretofore employed. With an estimated capacity of 2000 tons of finished rails per day, the Inland mill will stand second in output in the United States. The Inland company has been equipped for some time to furnish the fastenings that go with the rails, such as angle bars, tie plates, track spikes and track bolts.

Production and sales activities of the Pierce-Arrow Motor Car Co., Buffalo, which have been accelerating gradually during the last three months, have reached a schedule which is rapidly approaching normal. As a result, the factory is running full time with a force of 4230 workers. There is every prospect, according to company officials, that this force will be maintained, if not increased, during the next six months.

Gear Standardization at Rochester

Substantial Progress Featured Meeting Last Week of American Gear Manufacturers' Association—Several Design and Material Standards Approved

MEASURABLE progress in standardization marked the semi-annual meeting last week of the American Gear Manufacturers' Association. Specialized investigations had been carried on in the interval since the annual meeting in the spring in Cincinnati by numerous committees, and most of the reports of these committees bore evidence of the gradual formulation of standards which will have broad acceptance. Some standards were adopted as recommended practice.

Outstanding in the meeting were the definite steps taken by committees to work as the cases warrant with corresponding bodies of such organizations as the American Society for Testing Materials, the American Society of Mechanical Engineers, the Society of Automotive Engineers and the American Engineering Standards Committee. Also noteworthy was the degree of concentration given by the average participant to the questions under discussion, indicated in part by continued attendance; and though an association of manufacturers, the discussions were almost exclusively technical. Engineering topics necessarily were involved in considering the standards but, as it was emphasized, the association while working from a theoretical basis does not lose sight of the commercial. A departure was a printed program for each committee offered for modification or extension by the meeting and calculated not merely to get definite action from each committee but to correlate their work where there is overlapping or a classification or division under more than one head. The spirit of camaraderie among men who are more or less business competitors was as characteristic of the meeting as it has been of those from the beginning of the organization.

The meeting was held at the Powers Hotel, Rochester, N. Y. The deliberations were chiefly over the committee reports, requiring sessions on the afternoon and evening of Oct. 13, and the mornings of Oct. 14 and Oct. 15. Each session, however, was opened with the reading of a paper. One of these, by S. O. White, chief engineer Warner Gear Co., Muncie, Ind., described experiments on "Gear Tooth Wear." Another, by R. W. Daniels, Baush Machine Tool Co., Springfield, Mass., dealt with "Duralumin, as a Material for Worm and Other Gearing" and a third was by E. W. Miller, chief engineer Fellows Gear Shaper Co., Springfield, Vt., on "Tooth Forms." E. S. Sawtelle, assistant general manager Tool Steel Gear & Pinion Co., Cincinnati, on the evening session of Oct. 13, told of his experiences and observations in a recent trip through England, France, Switzerland, Holland and Germany. The meeting might in part be called a Gleason meeting, Rochester being the home of the Gleason Works and of the Gleason gear generators and James E. and Andrew C. Gleason acting as hosts on a number of occasions as told later in this account.

Business and Government Matters

Practically nothing was said of present general business conditions. In opening the meeting President F. W. Sinram, Van Dorn & Dutton Co., Cleveland, expressed himself as firmly of the belief that "We have reached the up-grade." The tariff matter was reviewed by S. L. Nicholson, Westinghouse Electric & Mfg. Co., and subsequently a resolution was passed to the effect that the tariff should be written to provide sufficient protection to cover the present conditions of business, of unemployment and of relations to other countries and also to incorporate in it the American valuation plan. It was ordered that copies of the resolution be put into the hands of the proper authorities in Washington. Incidentally it was pointed out that no longer is the tariff commission considered a joke and men of large caliber are being sought for it.

The Department of Commerce came in for commendation in respect to its efforts to get frequent reliable production statistics from industrial groups and Secretary of Commerce Hoover was referred to as helping materially in fulfilling the Administration's promise to put more business in government and not the reverse. Those interested in the monthly analyses of the Department were referred to the Superintendent of Public Documents, Washington.

The burden of what was said on the labor factor was that hourly wage reductions must not be carried too far seeing that men are not working full time and their weekly incomes are thus commensurately out of line with the cost of living factor—thus impairing general purchasing power—and that employers need always to provide conditions which will kill the appeals of the unions. In short they must make the American plan attractive. The general belief in the prevalence of high wage rates, it was added, is so great that the buying public is waiting in part for the labor bubble to be punctured, and this fact complicates the situation.

The reports of Secretary-Treasurer Frank D. Hamlin, Earle Gear & Machine Co., Philadelphia, showed the association to be in a notably good condition financially and to have a membership of 92 member companies, with two more about to be added, 110 executive members and 59 associate members. President Sinram commented on the showing as reflecting the stability of the gear industry. Mention was made of the death of J. L. Larson, Foote Brothers Gear & Machine Co., the first death to occur in the ranks of the association, now five years old. It was also noted that the association is to have a foreign membership clause.

New members elected were the Central Products Co., Detroit, with J. W. Wilson, the executive member and H. B. Shoemaker, the associate; Harris Engineering Co., Bridgeport, Conn., with H. E. Harris the executive member; A. F. Boissoneau, William Ganschow Co., Chicago.

Differences in Cost Accounting

The first committee reports read had to do with the more general matters. Some reference has already been made to the reports on the tariff and industrial relations. For the publicity committee Chairman J. C. McQuiston, Westinghouse Electric & Mfg. Co., who was represented by F. B. Davis of the same company at Buffalo, emphasized the lack of use of the gear association emblem by a number of the members. The committee on uniform cost accounting, J. H. Dunn, R. D. Nuttall Co., chairman, reported on the results of a questionnaire sent to the membership.

Of 44 companies replying, 24 have adopted or favored the committee's classification of accounts but 18 had not. The machine hour rate of distributing the factory overhead expenses is used by 16 and one percentage of direct labor for the entire plant is used by 14. For distributing the administrative, general and selling expenses to costs 22 apply a percentage of the factory cost, while seven combine these expenses with the shop overhead and make the distribution as a percentage of the direct labor; seven did not answer the question. One company charges factory expenses with interest on investment in equipment at 6 per cent. Special tools and patterns are handled very irregularly; such expenses are going variously into capital accounts, factory overhead and direct to job.

The committee agreed that one inflexible system of cost distribution will not meet the requirements of all member companies. "The shops that are using one percentage of direct labor for their entire plants are securing very inaccurate costs unless their factory



MEMBERS OF AMERICAN GEAR MANUFACTURERS' ASSOCIATION ASSEMBLED IN

1—President F. W. Sinram, Van Dorn & Dutton Co., Cleveland. 2—Secretary-Treasurer Frank D. Hamlin, Earle Gear & Machine Co., Philadelphia. 3—First Vice-president R. P. Johnson, Warner Gear Co., Muncie, Ind. 4—Second Vice-President B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, chairman general standardization committee. 5—Henry E. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., member of executive committee and chairman of public policy committee. 6—F. B. Davis, Westinghouse Electric & Mfg. Co., Buffalo, in charge of publicity. 7—J. H. Dunn, R. D. Nuttall Co., Pittsburgh, chairman uniform cost accounting committee. 8—C. F. Goedke, William Ganschow Co., Chicago, chairman of entertainment committee. 9—W. H. Diefendorf, Diefendorf Gear Corporation, Syracuse, N. Y., member of executive committee. 10—John B. Foote, Foote Brothers Gear & Machine Co., Chicago, member of executive committee and chairman industrial relations committee. 11—A. F. Cooke, Fawcus Machine Co., Pittsburgh, member of executive committee and chairman herringbone gear committee. 12—James E. Gleason, Gleason Works, Rochester, N. Y., chairman of the legal and metric committees. 13—George L. Markland, Jr., Philadelphia Gear Works, Philadelphia, member of executive committee and chairman membership committee. 14—F. E. McMullen, Gleason Works, chairman bevel gear committee. 15—Andrew C. Gleason, Gleason Works. 16—C. E. Crofoot, Crofoot Gear Works, Inc., Boston, member of executive committee and chairman commercial standardization committee. 17—C. B. Hamilton, Jr.,

equipment consists of units that are equally expensive to operate or else all the production goes over the same machines; that is also true when one machine rate for the entire plant is used. The shop overhead expenses should be distributed to machines, groups of machines or manufacturing departments." There is apparently no reason, the report continues, "why such expenses as special tools and patterns should not be charged direct to the job for which they are made or purchased.

"The basis for distributing commercial expenses is also a matter that should readily be standardized. Your committee recommended that such expenses be distributed on a percentage of factory cost basis. The various methods now in use produce important differences in the commercial cost arrived at by different plants, even if the manufacturing cost were actually the same in each plant." The committee is considering the appointment of sub-committees for different classes of manufacturers, such as automotive gears, railroad gears and general industrial gears.

As explaining the relatively small percentage of replies received by the committee, President Sinram suggested that many concerns are running as light as possible, minimizing overhead expenses and that as industry approaches more nearly the normal the need of considering cost accounting more closely will become apparent.

Programs for Standardization Committees

The formulation of programs for steering the numerous technical standardization committees and their presentation to the meeting for discussion was a feature of the convention. These were practically all printed in advance and offered in pamphlet form. The object was explained as affording a means of co-operation between members of several committees and of securing aid from members of the association. The association emphatically placed itself on record that it it not an engineering society but that research is proper and will be pushed as far as may be for the benefit of the members as manufacturers.

An idea of the form and substance of the standardization programs may be gained from the reprinting below of that of the spur gear committee, and a further idea of the interdependence of committee actions in relation to the general standardization committee, of which each is in reality a sub-committee, may be obtained from the following, "foreword to sub-committees."

> The various committee programs are, in some points, peculiar to the type of gear; at the same time many of the items listed are applicable to each and every type, and each committee should bear in mind, in offering a recommended practice, or a standard, that its relation to other types must have been considered, and nothing inimical to the other type should be offered. Also, all methods of manufacture should be considered; otherwise manufacturing difficulties will hinder the adoption by all makers or users. Co-operation between the different committees will prevent this, and also repetition of efforts. Committees will find it helpful to co-operate with other engineering organizations having committees working on similar subjects.

Standardization Program of the Spur Gear Committee

1. Nomenclature and symbols in conjunction with the nomenclature committee.
2. Preparation of a standard spur gear for general industrial use, by means of a diagrammatic illustration of various types of spur gears, including a spoked wheel, a webbed wheel and a solid pinion, with proper formulas covering width of face, rim, arm proportions, hub proportions in conjunction with the other committees.
3. Develop general horsepower formulas with the view to developing tables for horsepowers.
4. Investigate allowable stresses for A. G. M. A. materials in connection with the metallurgical committee.
5. Arrange means for communication with general membership for the purpose of gear installations (using standart chart for the purpose) with investigation as to causes and effects, and classify the results of such investigations, to determine the proper design of gear sets and gear mountings under various conditions.
6. Standardize automotive spur gears, as to tooth forms, form of blank, horsepower, wear of teeth, method of mounting, stiffness of shafts, clearance, materials, tolerances, lubrication, etc.



FRONT OF THE PLANT OF THE GLEASON WORKS, ROCHESTER, N. Y., OCT. 14

Hamilton Gear & Machine Co., Toronto, Ont., chairman of metallurgical committee. 18—S. L. Nicholson, Westinghouse Electric & Mfg. Co., Pittsburgh, chairman of tariff committee. 19—F. G. Eppley, Albaugh-Dover Co., Chicago, chairman of inspection committee. 20—E. J. Frost, Frost Gear & Forge Co., Jackson, Mich., member of executive committee. 21—C. R. Weiss, Link-Belt Co., Philadelphia, chairman of sprocket committee. 22—S. O. White, Warner Gear Co., Muncie, Ind., author of paper on tooth gear wear and chairman of differential gear committee. 23—Frank Burgess, Boston Gear Works, Boston, former member of executive committee. 24—E. W. Miller, Fellows Gear Shaper Co., Springfield, Vt., author of paper on tooth forms. 25—Frank E. Eberhardt, Newark Gear Cutting Machine Co., chairman of spur gear and nomenclature committees. 26—Frank Horsburgh, Horsburgh & Scott Co., Cleveland, first treasurer of the association. 27—A. W. Copland, Detroit Gear & Machine Co., Detroit, chairman of transmission committee. 28—Henry J. Eberhardt, Newark Gear Cutting Machine Co., chairman of tooth form committee. 29—W. H. Phillips, R. D. Nuttall Co., Pittsburgh, chairman of electric railroad and mine gears committee. 30—R. W. Daniels, Baush Machine Tool Co., Springfield, Mass., author of paper on duralumin. 31—L. G. Nilson, Nilson-Miller Co., Hoboken, N. J., chairman of keyway committee. 32—J. C. O'Brien, Pittsburgh Gear & Machine Co., Pittsburgh, chairman of worm gear committee. 33—E. W. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati, who addressed the meeting on European conditions.

7. Work with committee on tooth form to standardize spur gear tooth forms.
8. Inspection in conjunction with the inspection committee.

Work With American Standards Committee

The technical standardization work was taken up committee by committee. The first report was on the co-operation with the American Engineering Standards Committee made by B. F. Waterman, Brown & Sharpe Mfg. Co., Providence, chairman of the gear association's general standardization committee. The gear makers and the American Society of Mechanical Engineers are sponsors under the workings of the A. E. S. C., and an organization was effected for the promulgation of American gear standards at a meeting in New York with Mr. Waterman as chairman, Earle Buckingham, Pratt & Whitney Co., vice-chairman, and John P. Kottcamp, Pratt Institute, Brooklyn, as secretary. A survey is being made of the standardization work in progress all over the industrial world and the Canadian Engineering Standards Committee was invited to attend the meetings of the super or central body.

The sub-committees reporting progress included the following: Spur gears, Frank E. Eberhardt, Newark Gear Cutting Machine Co., Newark, N. J., chairman; nomenclature, Frank E. Eberhardt, chairman; worms and worm gears, J. C. O'Brien, Pittsburgh Gear & Machine Co., Pittsburgh, chairman; Keyways, L. G. Nilson, Nilson-Miller Co., Hoboken, N. J., chairman; differential gearing, S. O. White, Warner Gear Co., Muncie, Ind., chairman; transmission gears, A. W. Copland, Detroit Gear & Machine Co., Detroit, chairman, and tooth forms, Henry J. Eberhardt, Newark Gear Cutting Machine Co., chairman.

Railroad Gear Standards Recommended

The sub-committee on gearing for electric railroads and mines, W. H. Phillips, R. D. Nuttall Co., Pittsburgh, chairman, obtained acceptance by the meeting of specifications conforming to those of the American Electric Railway Association and covering case hardened forged steel gears, quenched and tempered forged carbon steel gears, case hardened forged steel pinions and quenched and tempered forged carbon steel pinions.

To Measure Gear Noises

The sub-committee on inspection, F. G. Eppley, Albaugh-Dover Co., Chicago, chairman, advised members to study the report of the National Screw Thread Commission, now obtainable as bulletin 42 of the Bureau of Standards. Mr. Eppley has addressed a letter to manufacturers of hobs and gear cutters asking for aid in the matter of inspection methods and information on the degree of accuracy maintained and commercial considerations in that connection. His committee is also attempting to calibrate gear noises and is seeking to find among makers of such instruments as phonographs if practical devices for sound measurement are available.

The sprocket sub-committee, through its chairman, C. R. Weiss, Link-Belt Co., Philadelphia, referred to the recommended practices growing out of mutual agreement with committees of the automotive and mechanical engineering societies and published in the September journal of the American Society of Mechanical Engineers. Maximum speeds of chains, sprocket, etc., have had the attention of the committee.

The report of the bevel and spiral gear committee, F. E. McMullen, Gleason Works, Rochester, N. Y., chairman, covered the preliminary description of a standard with a shortened tooth, involving reduced time for manufacture, increased rolling action and minimum sliding action.

Advance in Herringbone Gear Design

The herringbone gear sub-committee, A. F. Cooke, Fawcus Machine Co., Pittsburgh, chairman, obtained acceptance by the association of a recommended practice providing for tooth calculation on the basis of diametral pitch in the plane of rotation. Considerable discussion marked the reception of the report and it was brought out that the committee has yet to submit recommendations to make it possible for gear makers to use certain standard stock hobs in cutting according to the new standard. Accordingly the herringbone practice voted appears as something not

likely to be broadly followed until remaining portions of the committee's standardization program are completed, but it was approved as "a step in the right direction."

Gear Material Standards

Besides offering its program of future activity, the metallurgical standardization sub-committee, C. B. Hamilton, Jr., Hamilton Gear & Machine Co., Toronto, Ont., chairman, made suggestions for recommended practice which were accepted by the association after minor changes in the case of gear steels. Briefly put the practices harmonize with those of the Society of Automotive Engineers and the American Society for Testing Materials. For example, the first item accepted was that for screw stock, to be the standard of the S. A. E. or the A. S. T. M., explained as substantially identical. Certain S. A. E. specifications for bronze and brass were likewise accepted. These included what is known as S. A. E. No. 62 for hard cast bronze spur and bevel gears, Nos. 65 and 63 for worm gears and No. 64 for phosphor bronze for bushings. For steel castings the A. S. T. M. specification A-27-21 was adopted with the modification that "all gear castings must be properly annealed" and with, of course, the elimination of paragraphs applying only to ship and railroad castings.

In respect to specifications for rolled forged steel for gears, the report of the committee and the ensuing discussion developed a positive intention of working with the iron and steel division of the Society of Automotive Engineers and it brought out also the imminence of some revamping of S. A. E. specifications which the A. G. M. A. specifications have anticipated to some extent. For example A. G. M. A. 1030 steel, calling for 0.25 to 0.35 per cent carbon is now to conform with S. A. E. 1030 with a phosphorus limit of 0.045 per cent if the steel is to have heat treatment, but provision is to be made for higher sulphur and phosphorus limits, to agree with the A. S. T. M. steel castings specification, if no heat treatment is to be given to the steel. Such a steel is of course cheaper. Steel No. 2350 of the gear manufacturers' standards was eliminated as no such steel is ordinarily made and no one expressed a need for it.

Demand of 0.18 to 0.23 Carbon Gear Steel

Much of the discussion arose over the 1020 steel, calling among other things for 0.15 to 0.25 per cent carbon and 0.30 to 0.60 per cent manganese. E. J. Frost, Frost Gear & Forge Co., Jackson, Mich., pointed out the possibility of trouble in treating a steel running toward the upper limits in both elements and he felt that perhaps the carbon limits should be narrowed to 0.18 to 0.23 per cent. W. H. Diefendorf, Diefendorf Gear Corporation, Syracuse, N. Y., after the belief had been expressed that steel makers had undoubtedly dominated when the S. A. E. specification was adopted, told how one need merely "select the billets you wish to use in buying" and the necessary protection follows. Mr. Frost added that where, as in his case, he has the protection of material analyses at his own plant, the point is not necessarily important but many gear makers have no facilities for making analyses, and a suggestion he then made was approved that the association's chart of steels should contain a footnote warning of the danger of the simultaneous extremes in carbon and manganese. C. E. Crofoot, Crofoot Gear Works, Inc., Hyde Park, Boston, advanced the argument against changing the limits, or attempting a new standard providing for a smaller range in percentages, that the steel makers have learned to keep the sulphur and phosphorus low in the 1020 steel. Finally it was agreed that a 0.10 to 0.20 per cent carbon steel be provided for to take care of gears of the smaller sections, this to be No. 1015 and identical except for the carbon content with No. 1020.

As illustrating the sentiment that the gear association should work closely with the automotive engineers, the meeting favored a suggestion offered by W. C. Peterson, Packard Motor Car Co., that two members of the association's metallurgical committee be members of the iron and steel division of the Society of Automotive Engineers.

The standardization program of the metallurgical committee as offered to the meeting is here reprinted. It was extended at the meeting to include the determination of carbon by the spark test, Chairman Hamilton saying that the subject would likely be covered by a paper. Item 24 was the subject of the paper by S. O. White, reviewed elsewhere in this account, and the chairman added that a paper was in progress on the topic of item 19. It was agreed to consider under item 4 the specification of a special analysis gray iron or semi-steel for worm gear service and to study what is known as steel No. 2115 made, for example, by the Central Steel Co. and analyzing 0.12 to 0.17 per cent carbon, 0.40 to 0.60 per cent nickel, 0.30 to 0.50 manganese and 0.04 per cent sulphur and oil quenched.

Standardization Program of the Metallurgical Committee

1. Carbon and alloy steel specifications—Chemical and physical.
2. Non-ferrous alloy specifications for the following purposes:
   - Bronze for spur and bevel gears.
   - Bronze for worm gears.
   - Bronze for bushings.
   - Brass for flanges of composition gears.
3. Steel casting specifications—Chemical and physical in several carbon ranges for steels, for use in case hardened, heat-treated or untreated state.
4. Gray iron casting specifications—For gears only.
5. Specifications of hardness limits which will be acceptable when purchasing bars, forgings or castings of various chemical specifications.
6. Consideration of burnt or badly overheated forgings.
7. Recommended practice as to the hardening of hubs and bores to take ball and roller bearings.
8. Recommended practice as to the combining of two gears or a gear and a clutch, in one piece.
9. Recommended practice as to under-cuts and reliefs to clear grinding wheels, and on the use of fillets and elimination of sharp corners; on the prevention of hardening trouble arising from keyways and oil holes; and on obtaining clean threaded holes in hardened work.
10. Recommended practice as to the hardening of bores and fork grooves of gears which slide on splined shafts.
11. Recommended practice as to the prevention or control of shrinkage and warping in hardening.
12. A report on methods of preventing scale, especially hard and adherent scale.
13. A report on the economic factors governing the choice of:
    1. Bar stock.
    2. Open hammer forgings.
    3. Drop forgings.
    4. Upsetter forgings.
14. Recommended practice for the inspection of forgings and castings; consideration of defects which call for rejection and those which call for a rebate.
15. Recommended practice as to recording of heat numbers and the stamping of same on gears to give the maximum of information without excessive complexity; proposal of standard A. G. M. A. system.
16. A report on the design, construction and operation of furnaces for the heat treatment of gears.
17. A report on pyrometry as applied to the gear industry, with recommendations.
18. A report on microscopic examination of metals, as applied to the gear industry, with recommendations.
19. A report on the testing of hardness.
20. Recommended practice on the selection, test and use of carbonizing materials, and the design and use of carbonizing pots.
21. Recommended practice on "local" hardening as applied to gear work:
    - (*a*) Local carbonizing.
    - (*b*) Local heating.
    - (*c*) Local quenching.
22. A report on quenching mediums and quenching apparatus.
23. Recommended practice as to depth of case hardening for different classes of gear work, giving consideration to the kind of steel, the tooth dimensions and the hardness.
24. A report on researches on the relation of durability and wear of gears to hardness and other factors.
25. Recommendations for a standard nomenclature.

Conditions of Contracts

The report of the commercial standardization committee, C. E. Crofoot, Crofoot Gear Works, Inc., Hyde Park, Boston, chairman, was presented beyond the time for the scheduled close of the convention. Some question arose as to whether or not members were using in contracts or acknowledgments of orders the committee's stipulations covering the contractual conditions, and President Sinram said that through the executive

committee an effort would be made to ascertain what are the reasons for not using them.

The report of the meeting would perhaps not be complete without a reference to the spirit of levity which was now and then unexpectedly injected into the meeting at times of more or less intense concentration on a technical topic. These periods of momentary relaxation seemed to be thoroughly enjoyed and suggest the need of other associations' educating a President Sinram, a Secretary Hamlin, a George Markland or a W. H. Diefendorf to provide the means of meeting the fatigue factor. Commonly the interruptions began as an apparently serious contribution to the subject under discussion but sometimes they were without such finesse.

Tests of Gear Wear

The paper presented by S. O. White, chief engineer Warner Gear Co., Muncie, Ind., was prepared by E. R. Ross, experimental engineer of the company. It covered in part the description of the testing rig at the Warner plant as utilized to measure gear tooth wear, affording an opportunity to compare wearing qualities of various steels as well as the efficiency of gear power transmission. The wear tests reported on were made of the second speed gears of automobile transmissions and the testing equipment included a Sprague dynamometer for measuring input and another one for measuring the load transmitted, the difference being the friction loss. On the tests forming the subject of the paper 50 hp. was applied continuously for 6 hr. and the transmission being that used in passenger automobiles or light trucks, the conditions were severe and purposely so to secure wear that would be measurable. In a car having 32-in. wheels, the test might be likened to running in intermediate at a speed of 19 miles an hour for 114 miles.

The method of ascertaining tooth wear was to plot the outlines or contour of a tooth before and after the test. For this purpose a tooth profile indicator shown in the accompanying illustration was developed. Drawing the profiles at a scale of 25 diameters showed the amount of wear and its location. One conclusion drawn from the tests was that steel for gears to be oil treated should possess at least 0.45 per cent carbon, should show 0.75 or over scleroscope hardness without brittleness, should be as clean as it is commercially practical to make it and that the specification limits of the analysis should be of close enough range to insure uniform results from a standard heat treatment. It is interesting to add that the average maximum efficiencies of the power transmission were 98.7 per cent with a maximum of 98.9 per cent, or a power loss of 1.1 per cent or 0.55 hp. for the 50 hp. load.

An Interchangeable Gear System

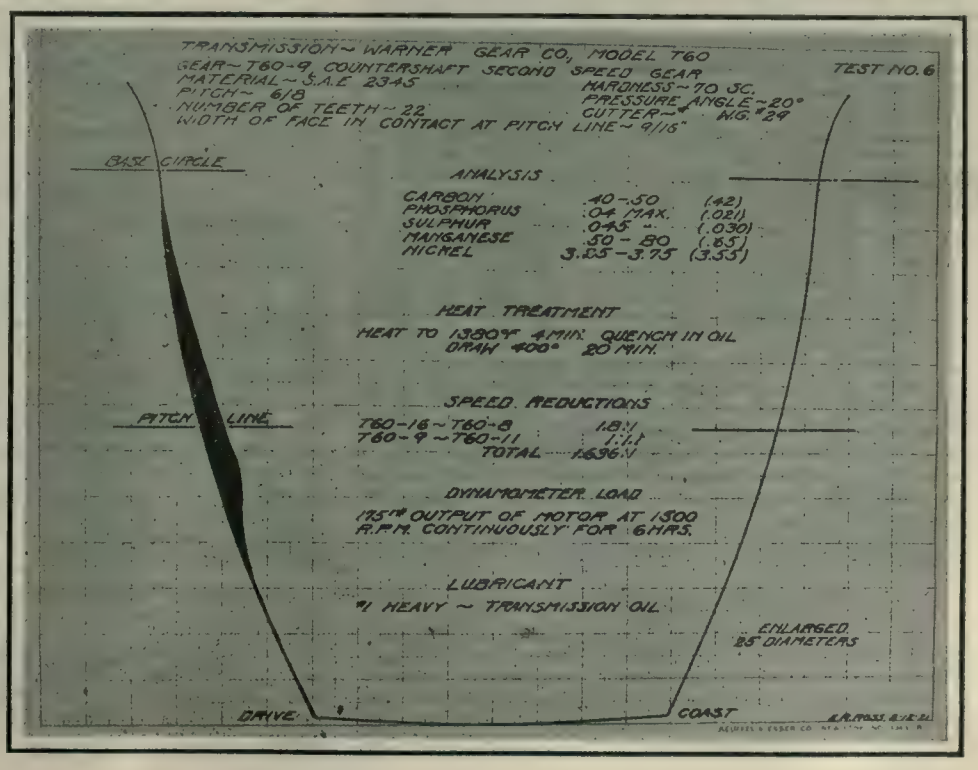
Under the title "Tooth Forms," E. W. Miller, chief engineer Fellows Gear Shaper Co., Springfield, Vt., contributed a paper devoted to a basis for constructing a system of interchangeable gears from the rack to a 12-tooth pinion. So well received was it that a blanket resolution was passed that papers of this caliber should be separately available to the membership in printed form and accordingly it was voted that the papers of the meeting should be published, and made generally obtainable at some nominal price. Mr. Miller, by means of remarkably clear diagrams, traced the development of the involute curve and arrived at a system involving a pressure angle of 24 deg. 4 min.

Gleason Achievements

The Rochester meeting was undeniably closely linked with the name Gleason. Whenever the association was not in regular session, it was the guest of James E. and Andrew C. Gleason. Besides providing for an enjoyable close of the three days' meeting by entertaining members and guests at a clambake reached by a 17-mile motor car trip out of Rochester on Saturday afternoon, Oct. 15, they provided luncheon for all at the Gleason works on Friday, followed first by a musicale and then by an introduction to a number of new machines in actual operation, some of them of more than ordinary economic importance. Andrew C. Gleason made the address of welcome at the opening of the convention on



Instrument Developed by Warner Gear Co. to Ascertain a Gear Tooth Profile. Two fingers carrying knife edge points lie on opposite sides of the tooth. Two of the dial indicators give the readings of the positions of the knife points in respect to the tooth center line, while the third measures the corresponding positions or distance from the point of the tooth



Plotting the Tooth Contour on a 7½ x 10-In. Cross-section Paper Gives an Enlargement of the Tooth by 25 Diameters

Thursday afternoon, and James E. was toastmaster at the banquet held Friday night. The Gleason arrangements included also special provisions for visiting ladies. Just before the close of the convention a resolution of sympathy for the founder of the Gleason works, William Gleason, was voted, expressing hope for a speedy recovery from his present illness, and briefly recounting his accomplishments in advancing the art of gear cutting.

A list of the new Gleason machines with some explanation of their scope of application is given in the following tabulation. Besides, a new electric hardening furnace designed by the Gleason works, under the direction of Leon Slade, was shown; this furnace, constructed for the plant by the General Electric Co., employs direct radiating electric resistance units or grids but has a positively driven roller table on which the product is passed automatically from end to end and at the speed necessary.

New Gleason Machines Shown in Operation

Four-in. spiral bevel gear generator, which uses cutters 1.1 in. to 3½ in. in diameter. Cuts miter gears up to 3-in. pitch diameter and flat gears up to 4-in. pitch diameter, 10 diametral pitch. Specially for sewing machine gears, motion picture machine gears, etc. Finish cut from the solid in one operation. Time per tooth 4.7 to 26 sec. Shown finish cutting 18 tooth 18 pitch miters from solid cast iron in 10 sec. per tooth.

Four-in. spiral bevel gear cutter grinder for sharpening cutters used on the 4-in. spiral bevel gear generator.

Eight-in. spiral bevel gear generator. Cuts miter gears up to 7¼-in. pitch diameter, flat gears up to 10½-in. pitch diameter. 4 D. P. uses 6-in. and 9-in. cutters. Suitable for overhead cam shaft gears, motor reduction gears, small automobile drive gears and gears used on machine tools. Has quick return constant speed down roll. Time per tool 10 to 47 sec. Shown finish cutting 41 (12) tooth 6 pitch 3½ per cent nickel steel motor reduction gears; 23 sec. per tooth using 6-in. cutter.

Nine-in. bevel gear generator for miters up to 9-in. pitch diam. and flat gears up to 11-in. pitch diam., 3 D. P. 2-in. face. Double roll with gear connection and spiral bevel gear drive on the crank plate. Time per tooth 15 sec. to 2 min. Shown finish cutting 15-27 combination 5 pitch 3½ per cent nickel steel gears in 34 sec. per tooth.

Two tool 38-in. bevel gear planer. Cuts miters up to 38 pitch diameter and flat gears up to 52 pitch diameter, 10 D. P., 10-in. face. Upper and lower tool blocks are interchangeable to cut forward or backward. Claimed to save 45 to 50 per cent on cutting time compared to the single tool planer. Spiral bevel gear for crank plate drive. Shown cutting 50 tooth 2¼-in. C. P. cast steel gear.

Three spindle bevel gear rougher for rough cutting bevel gears up to 16-in. pitch diameter, 3 D. P., 2-in. face. Rate of feed independent on all 3 heads. Different jobs can be cut on the 3-in. heads at one time depending only upon the pitch. Spiral bevel gear used for drive on cutter spindle. Time per tooth 5 to 45 sec. Shown rough cutting differential gear and pinion 12-24 tooth 6-8 pitch 3½ per cent nickel steel; two heads on gears at 8 sec. per tooth, other head on pinions at 8 sec. per tooth.

Three spindle bevel gear generator. Finishes both sides of a tooth space at once. Up and down jigging motion of cutter, controlled by a cam to produce straight cut tooth with proper taper. Has capacity for miter gears up to 5½ pitch diameter and gear of 2-1 combination up to 6½ pitch diameter, 5 D. P. Time per tooth 5 to 45 sec. Special purpose machine for differential side gears and pinions and similar large quantity work. Spiral bevel gears used for motor reduction. Shown finish cutting differential side gears of 24 teeth, 6-8 pitch, 3½ per cent nickel steel.

Chamfering machine for trimming the tooth ends on spiral bevel ring gears. Eliminates chipping of tooth ends after hardening. Shown trimming 60 and 65 tooth gears at ⅝ sec. per tooth.

Burnishing machine for burnishing the profiles of bevel pinions. A soft pinion is run with a hard gear and crowded in by the automatic motion of the machine. No abrasives are used. Tooth contour remains unchanged. Specially for automobile rear axle drive pinions.

Equipment shown in Gleason hardening department as follows:

Carbonizing furnaces, 4 ft. wide and 6 ft. long inside. One heat of 4000 lb. total weight each day requires 60 gal. of fuel oil. Operating one 10-hr. heat after another requires 35 gal. of fuel oil per heat. Before insulating, these furnaces were using 100 gal. and 70 gal. for the same weight of charge.

Electric reheating furnace, 11 ft. long and 17 in. width of working floor. Requires 72 kw. per hour to bring to heat. If furnace is cold it takes from 5 to 6 hr.; if used every day, from 1½ to 2 hr. This furnace heats 350 to 400 lb. of steel per hour to 1500 deg. Fahr.

Electric drawing furnace, 2 ft. wide and 3 ft. long inside. Requires 27 kw. per hour to bring to temperature. If furnace is cold it takes ½ hr. to bring to 450 deg. Fahr. Will draw 300 lb. of high speed steel per hour to 1050 deg. Fahr.

Cost of Living Stationary

Figures from the Bureau of Labor Statistics show no change in the general average of the wholesale prices of "all commodities" in September, as compared with August, both standing at 52 per cent above 1913. Farm products, cloths and clothing, chemicals and drugs, advanced during the month. Food products, fuel and lighting, building materials, housefurnishing goods and miscellaneous items dropped slightly.

Metals and metal products, at 20 per cent above 1913, are now nearer to pre-war prices than any other item listed. Iron and steel products, of course, dominate this group.

Commodity Prices
(1913 = 100)

	Peak Price 1920	Aug., 1921	Sept., 1921	Extent of Liquidation*
Farm products	246	118	122	84.9 per cent
Food, etc.	287	152	146	75.4 per cent
Cloths and clothing	356	179	187	66.0 per cent
Fuel and lighting	284	182	178	57.6 per cent
Metals and metal products	195	120	120	73.9 per cent
Building materials	341	198	198	61.4 per cent
Chemicals and drugs	222	161	162	49.2 per cent
Housefurnishing goods	371	230	223	54.6 per cent
Miscellaneous	247	147	146	68.7 per cent
All commodities	272	152	152	69.8 per cent

*Percentage by which the 1920 peak advance over 1913 has been wiped out.

To Relieve Unemployment

YOUNGSTOWN, OHIO, Oct. 18.—Progressive measures have been adopted to relieve unemployment and alleviate distress during the winter. October 20 has been designated as Registration Day for unemployed, who have been requested to register at the fire stations and other designated places.

Influential citizens are back of a campaign to raise a fund of $200,000, of which the first $100,000 will be devoted to relieving the needy. The rest will be used to afford employment to men out of work.

A number of large contracting interests are preparing to use two shifts of common labor, working them every other week, thus providing employment for twice as many men.

The Youngstown Emergency Relief Association has been formed to especially deal with the current situation. All steel companies are virtually on an 8-hr. basis in most departments, in order to provide work for the largest number of men.

Welfare and employment departments of all industrial establishments are co-operating with municipal authorities to find work for all men with families.

Strike Called Off

ST. LOUIS, Oct. 17.—The strike of 550 union boilermakers, which had been on since May 1, has been called off by a vote of the striking workers. The strike has been against the open shop, and the men will be compelled to accept employment under open shop conditions at the plants of seven of the boiler manufacturers of St. Louis.

The question of wages was not involved in the strike, although in a previous controversy, which began in June, 1920, an increase from 75c. an hr. to 90c. for boilermakers, and from 55c. to 70c. for helpers. It was announced by the Boiler Manufacturers' Association that boilermakers from now on will receive 77c. an hr. and helpers will get a sliding scale of from 40c. to 60c.

Owing to a buying strike among the farmers of the country, the New Britain Machine Co., New Britain, Conn., will temporarily suspend the manufacture of the N. B. tractors. The closing down of the plant will affect about 50 men. A small force will be retained to assemble those tractors which have already been ordered.

Practical Plans to Relieve Unemployment

Individual Opinions Subordinated and Conference Agrees Upon Important Recommendations Which Are Being Carried Out by Various Agencies

BY L. W. MOFFETT

WASHINGTON, Oct. 18.—With the President's unemployment conference arriving at a unanimous agreement regarding principles looking to the relief of economic and labor conditions throughout the country and plans made to follow the proposals adopted to a successful conclusion both as to emergency and permanent measures, Administration officials consider that a memorable achievement has been accomplished. President Harding has said the conference has already "borne rich rewards." It is maintained that the greatest object in view, that of determining upon a definite program without a dissenting vote, has set a standard which will be used as a guide to develop the stimulation of business. The detailed methods to be adopted will have to be worked out because, as was to be expected, there was a wide diversity of views on this point. Evidences of this arose in a number of committees and were reflected in majority and minority reports and were particularly marked as they relate to the Committee on Manufactures, of which President James A. Campbell of the Youngstown Sheet & Tube Co. was chairman, having been named head of the committee upon the resignation of W. H. Stackhouse, made necessary because of the desire of the latter to attend the convention of the National Implement and Vehicle Association, of which he is president. By a ruling of the conference, however, it accepted formally as its recommendations only those on which there was unanimous agreement, and the differing reports were received "as information, but not the recommendations of the conference" with the idea of making them public for study by the country upon their merits and signed by those participating in them.

The Recommendations

General recommendations adopted unanimously by the conference call for readjustment of railroad rates, speedy completion of the tax bill, definite settlement of tariff legislation, settlement of the financial relationships between the Government and the railroads, limitation of world armament, steps looking to the minimizing of fluctuations in exchange, definite programs of action that will lead to elimination of waste and more regular employment in seasonal and intermittent industries, and proportionate adjustment of the inequalities in deflation, one of the principal purposes being to bring about a recovery in agriculture.

Primarily, the outstanding work of the conference throughout was the leaving of details of solution to local communities, with the leadership placed upon the mayors of the cities and towns, and co-ordination and continuation of this work is in charge of a committee of which Col. Arthur Woods is head, while a standing committee will have a similar object in mind as to the permanent measures adopted. The conference adjourned *sine die* last Thursday, and it is not known that it will again be called into session, but it was considered that this might be necessary and for that reason it has been held subject to further meetings.

The Majority Report

By reason of its importance, especial interest was shown in the majority and minority reports of the Committee on Manufactures. The majority report recommended the prompt passage of the measure funding obligations of the railroads for advances made by the Government; expeditious payment of Government obligations owing the railroads; transfer of the functions of the Railroad Labor Board to the Interstate Commerce Commission; repeal of the Adamson act and the elimination of "every discoverable waste and inefficiency from production, transportation, and distribution which is practically removable. This recommendation adds that "every element in our citizenship should frankly set its face against any group, whether in agriculture, business, labor or transportation that selfishly undertakes to resist necessary economic adjustment in any narrow endeavor to protect its personal interests at the expense of the permanent betterment of our national life." This report was signed by Mr. Campbell, William M. Butler, president of the Butler Mills of New England; President John E. Edgerton of the National Association of Manufacturers; A. L. Himphrey, president of the Westinghouse Air Brake Co., Pittsburgh; Mr. Stackhouse, J. A. Penton, secretary of the American Pig Iron Association and T. P. Hinman, president of the Hand Trading Co., Pelham, Ga. Chairman Charles M. Schwab of the Bethlehem Steel Corporation, a member of the committee, was not present at the conference sessions last week and did not sign the report.

The Minority Report

Strong opposition to some of these recommendations was made in a long minority report signed by President Samuel Gompers of the American Federation of Labor; Mrs. Sarah Convoy, New York, secretary of the United Textile Workers of America and Roy Dickinson, a magazine editor of Orange, N. J., who constituted the so-called labor group. Apparently they construed the majority report as meaning a reduction in wages, against which they protested, and they also went on record against transfer of authority now resting in the Railroad Labor Board and repeal of the Adamson act. Labor also is at odds with the purposes to which money that would be paid to the railroads under the so-called funding bill would be put, desiring that it be used in paying labor and that there be no outside contract work by the railroads. Passage of the $500,000,000 so-called funding bill was urged by the Committee on Transportation and the suggestion made that the railroads which are in a condition to do so should increase their maintenance, construction and other kinds of work to the fullest possible extent. William S. Carter, president of the Brotherhood of Locomotive Firemen, a member of this committee, concurred in the report with the exception that he inserted a paragraph recommending that the conference endorse the funding bill with the provision that the money advanced to the railroads be used solely in assuring the employment of railroad labor.

Statement for Employers

Ernest Trigg, vice-president and general manager of John Lucas & Co., Philadelphia, read a statement on behalf of employer members of the conference, urging all interests in the nation to join in a normal

adjustment of wages and prices and Mr. Gompers pledged the support of labor to constructive policies approved by the conference and expressed pleasure at the harmony in the conference itself. It was upon his motion that a vote of thanks was tendered to Secretary of Commerce Hoover as chairman of conference for the fair way in which he conducted the proceedings and for bringing about constructive work.

Other Recommendations

Other recommendations made called for American participation in the decisions of the reparations committee, $400,000 for expansion of the activities of the United States Employment Service, a loan through Congressional appropriation for the prosecution of work now under way, settlement of construction problems by the communities themselves and adoption of a policy to upbuild and maintain an American merchant marine. The committee on construction industries made an exhaustive report and numerous recommendations which are reflected in the general recommendations unanimously agreed upon. Among other things it urged community action for improvement in the building industry and results already have been obtained along this line as shown by reports from various cities of the country. The report also held that long term bank deposits and savings accounts should be used primarily for long-term purposes for local action by mayors and governors and that the outstanding factors in the building and construction industry at present are financing, material costs and the labor costs. It reported that while there had been substantial reductions in costs of many construction materials, lower prices for some still are necessary. A table it prepared showed that iron and steel products, together with nonferrous metals have been greatly reduced, some of them below cost of production. Secretary Hoover considers that construction is the key to the whole situation, claiming that every 200 men employed in actual construction sets to work from 500 to 700 in other basic industries.

Mining Conditions

The committee on mining made a report as to conditions in the production of iron ore, coal, copper, zinc ore, and lead ore and recommendations made. One suggestion favors discontinuance of the practice of preferential assignment of freight cars in the coal industry, but in a previous discussion on this subject a paragraph in the report of the committee on construction industries criticising the Interstate Commerce Commission for its policy in issuing priority orders for the use of open-top equipment for coal shipments was eliminated. The mining committee urged payment to the railroads of all funds owing them, accumulation by the railroads of at least five months' supply of coal and encouragement of building to stimulate building, especially the metal mining industry. The committee on Emergency Measures for Reclamation recommended a loan of $90,000,000 to the reclamation funds for the prosecution of reclamation and irrigation projects in Western States, estimating this would provide employment for 44,000 men. The Committee on Agriculture suggested that all prices and all wages should be adjusted so that a normal reasonable ratio may be maintained between the income of farmers, laborers, manufactures and merchants in order that the purchasing power of the farmer may be restored. The committee also urged a reduction in freight rates.

Steel Corporation's Action

Concrete results from the conference in the way of increasing business and industrial activities and thus relieving the grave labor situation are being reported from time to time and have been the source of considerable gratification. One of the leaders in the movement to provide relief is the United States Steel Corporation, which has announced its purpose to spend $10,000,000 in the extension of its manufacturing plants and improvements. The Finance Committee of the United States Steel Corporation adopted the following resolution:

Resolved, That our subsidiary companies be requested to proceed as promptly as circumstances will permit to expend up to $10,000,000 in the extension of their manufacturing plants, the same to be done under the immediate direction of the chairman and president of the Corporation, with the understanding that, so far as practicable, the extensions be made where the services of their own employees, now idle in consequence of diminished operations, can be utilized, and where costs will be fair and reasonable.

Railroads Add Men

The railroads have added about 25,000 men to their rolls and public utilities in many sections are increasing employment. Aid in dealing locally with the unemployment problem is promised by commercial organizations in 35 States as a result of the request of Joseph H. Defrees, president of the Chamber of Commerce of the United States, that members of the chamber cooperate with mayors in carrying out the emergency program of the unemployment conference. Up to last Friday, responses had been received from 119 chambers, commercial clubs and boards of trade to the effect that the situation was well in hand or that immediate steps would be taken looking toward relief of workers. A considerable number of organizations in centers indicating more or less unemployment said that manufacturers, where demand for their goods is slight, are keeping their entire forces at work by limiting the number of hours of plant operation. From a number of cities came word that building operations and municipal improvements projected or under way will mean that there will be no suffering. A decided improvement, it is stated, in the industrial situation generally, as compared with the summer period, is shown in most of the reports. The Associated General Contractors of America also has begun a campaign to stimulate construction.

It is the emergency situation that is naturally causing the most concern and it is felt that, with the 10 or 20 per cent of the workers who now are idle given employment so as to pass through the winter without suffering, conditions will be restored where permanent employment will be assured. The accurate number of idle workers never has been ascertained and no machinery exists for gaging it properly. This is one of the problems that it is hoped to solve by setting up an organization in the Government which will be able to gather complete and comprehensive reports on which the actual condition of employment can be thoroughly established.

Unemployment and Cycles

In this connection, there is an interesting report on unemployment and business cycles, recommending the necessity of exhaustive investigation into causes and remedies of periodic business depressions.

The report points out that it is fundamental that an accurate statistical service be organized for determining the volume of production of stocks and consumption of commodities, and the volume of construction in progress through the nation, and an accurate return of the actual and not theoretical unemployment. These services, it is stated, are now partially carried on in the different Government departments.

"Such statistical service," it is added, "would in itself contribute to minimizing the peaks and valleys in the economic curve. The same warnings that would enable intelligent action on the part of public authorities and those who control large enterprises in guidance as to the periods in which construction should be de-

ferred or should be initiated would also serve as a warning to the commercial public and would tend in themselves to effect the ends desired. As a first step in such a program, statistical services adequate to this purpose should be immediately authorized and carried out by the Federal Government.

Follow Up Work

"The committee charged with following up the work of the Unemployment Conference will have to consider other plans that have been put before the conference with the endorsement of various bodies, such, for example, as the Huber unemployment prevention bill now pending in the Wisconsin Legislature, the schemes for insuring a minimum return in lean years to both capital and labor with which certain corporations are experimenting, and the out-of-work benefits of trade unions. Various reforms of the banking and monetary systems also have warm advocates—centralized banking, stabilizing the dollar, raising discount rates earlier or more rapidly in periods of prosperity, and the like.

"All these topics and perhaps others unknown to the conference might be taken up by the proposed Committee on the Prevention of Unemployment or left alone, according as the committee saw or did not see a prospect of rendering service by an investigation. Certainly the committee should not be burdened with the duty of investigating every proposal that has been or may be made for the accomplishment of its object. On the contrary, the committee should have power to limit its investigations strictly to those plans whose merits and defects it is able to determine with the means in hand.

"A report from such a committee, prepared after due deliberation is necessary to follow out and render effective the emergency work of the President's unemployment conference. For no constructive program of preventing the recurrence of periods of widespread unemployment is likely to succeed unless it is based upon thorough investigation of the underlying facts and a matured judgment on the merits and defects of the proposals submitted to the conference."

ANNUAL STATISTICS

Steel Corporation Shows Decrease as Compared with that of the Independents

The annual statistical report of the American Iron and Steel Institute for 1920 has just come from the press. As usual, the work of compilation of the data contained in the report has been in charge of William G. Gray. Most of the statistics have been published in four bulletins in THE IRON AGE. One compilation of special interest is reproduced on this page, it being a table showing production of all kinds of finished rolled iron and steel from 1905 to 1920, inclusive. In past years, a number of products, such as hoops and bands, cotton ties, splice bars, tie plate bars, rolled sheet piling, railroad ties, rolled forging blooms, forging billets, etc., have been included under the heading, "all other finished rolled products," but in the accompanying table it will be noted that these products are listed separately for the first time, so that the total under all other finished rolled products is only 2,089,912 tons.

The production of leading iron and steel products by the United States Steel Corporation shows a decrease in the percentage of total production of the country. In 1920 the Steel Corporation produced 39.4 per cent of the pig iron, compared with 44 per cent in 1919, this percentage being smaller in 1920 than in any year of its existence. In 1920 the Steel Corporation produced 45.8 per cent of the steel ingots and steel castings, compared with 49.6 per cent in 1919. Only twice before since it was organized has the Steel Corporation produced a smaller percentage of these products than in 1920. Last year the Steel Corporation produced 41.6 per cent of all kinds of finished rolled products, which was also the smallest relative percentage of production in its history, the next lowest being 41.7 per cent in 1918.

PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, GROSS TONS, 1905–1920.

Year.	Iron and steel rails.	Plates and sheets.	Nail and spike plate.	Wire rods.	Structural shapes.	Merchant bars.*	Skelp, flue, and pipe iron or steel.	Hoops.	Bands and cotton-ties.	Long angle splice bars, tie-plate bars, etc.†	Rolled sheet piling, not including fabricated.‡	Railroad ties.‡	Rolled forging blooms, forging billets, etc.	Blooms, slabs, billets, and sheet bars for export.†	All other finished rolled products.	Total. Gross tons.
1905.	3,375,929	3,532,230	64,542	1,808,688	1,660,519	3,593,601	1,435,995	...	445,527	...	.....	.....	.....	41,754	.....	881,230	16,840,015
1906.	3,977,887	4,182,156	54,211	1,871,614	2,118,772	3,992,200	1,528,585	172,332	408,018	.....	.....	.....	206,110	.....	1,076,583	19,588,468
1907.	3,633,654	4,248,832	52,027	2,017,583	1,940,352	3,970,988	1,802,627	200,168	474,179	.....	.....	.....	227,782	.....	1,296,630	19,864,822
1908.	1,921,015	2,649,693	45,747	1,816,949	1,083,181	1,986,638	1,150,583	170,860	238,441	.....	.....	.....	121,321	.....	643,765	11,828,193
1909.	3,023,845	4,234,346	63,746	2,335,685	2,275,562	3,422,883	2,033,381	250,179	395,333	.....	.....	.....	341,773	.....	1,267,957	19,644,690
1910.	3,636,031	4,955,484	45,294	2,241,830	2,266,890	4,026,840	1,828,194	262,214	424,979	.....	26,598	49,048	459,933	.....	1,397,944	21,621,279
1911.	2,822,790	4,488,049	48,522	2,450,453	1,912,367	3,306,103	1,980,673	225,074	342,810	.....	22,827	39,197	231,115	.....	1,169,191	19,039,171
1912.	3,327,915	5,875,080	45,331	2,653,553	2,846,487	3,971,446	2,446,816	270,007	587,395	571,772	22,276	41,396	462,476	347,783	1,187,108	24,656,841
1913.	3,502,780	5,751,037	37,503	2,464,807	3,004,972	4,277,279	2,501,964	280,886	499,660	686,390	46,289	44,244	537,210	88,778	1,067,444	24,791,243
1914.	1,945,095	4,719,246	38,573	2,431,714	2,031,124	2,812,102	1,982,431	211,028	345,919	423,052	35,314	33,249	331,524	91,907	937,918	18,370,196
1915.	2,204,203	6,077,694	31,929	3,095,907	2,437,003	4,484,650	2,299,464	281,759	437,987	535,615	24,026	42,269	650,545	562,418	1,227,455	24,392,924
1916.	2,854,518	7,453,980	30,088	3,518,746	3,029,964	6,691,702	2,927,674	368,164	562,555	691,820	19,196	34,311	2,015,960	512,483	1,669,228	32,380,389
1917.	2,944,161	8,267,616	22,864	3,137,138	3,110,000	6,681,141	2,674,231	347,186	490,893	606,824	18,606	9,103	1,801,708	1,158,427	1,797,802	33,067,700
1918.	2,540,892	8,799,135	18,310	2,562,390	2,849,969	6,587,369	2,564,011	262,281	250,767	416,905	11,689	6,438	1,659,118	832,746	1,793,734	31,155,754
1919.	2,203,843	7,372,814	12,832	2,538,476	2,614,036	4,810,645	2,555,778	233,336	352,172	434,008	17,811	16,645	359,582	92,143	1,487,423	25,101,544
1920.	2,604,116	9,337,680	20,577	3,136,907	3,306,748	6,702,685	3,220,289	333,440	388,862	575,830	20,716	26,310	447,334	136,457	2,089,912	32,347,863

* Including concrete reinforcing bars. † Not ascertained prior to 1912. ‡ Not ascertained prior to 1910.

METRIC SYSTEM FAVORED

Ladd Bill Has Little Prospect of Passage—Hearings Are Started

WASHINGTON, Oct. 18.—The openly expressed doubt that the people of the United States would willingly accept the metric system was stated by Senator McNary, of Oregon, chairman of the subcommittee of the Senate Committee on Manufactures, during hearings on the Ladd bill last week, and has emphasized the belief that this measure will fail of passage in Congress, if it is actually taken up. Present indications are that it will not be favorably reported and that even if such action should be taken, it will not be for a long time. Senator Ladd, author of the bill, which is identical to that introduced in the House by Representative Britten of Illinois, has said that it is proposed to hear proponents and opponents of the measure and then make a report which could be sent to the country in order to ascertain its attitude on the suggested legislation.

Senator McNary, in making his doubts known, declared that he had an open mind on the measure, but implied that he thought there might be strong opposition to compulsory legislation to establish the metric system in the United States, and that, if it is to be adopted at all, it should be by a gradual growth developed through the public schools, so that the next generation would be schooled in and prepared for it. The measure would compel adoption of the system after 10 years, but Senator McNary was inclined to the view that the people would not begin to prepare for it until that period had almost expired and consequently would not understand it sufficiently at the time it actually would become operative. Proponents of the measures have maintained that in such an eventuality as suggested by Senator McNary the fault would lie with the people, but Senator McNary did not consider that this would overcome the situation. It is their belief that compulsory legislation is necessary and that the system could not be expected to be adopted by voluntary action.

Provisions of the Bill

The measure as drawn would apply only to the sale of any goods, wares or merchandise, except for export, and to charges or collections for their transportation. It would exempt contracts made before it became effective, and the construction or use in the arts, manufacture, or industry of any specification or drawing, tool, machine, or other appliance or implement designed, constructed or graduated in any desired system.

Opponents, however, claim that if the system were put into effect partially, it would sooner or later have to be made applicable to all industries and sciences, because a widespread dual system could not endure. Moreover, they say that, even if the measure were restricted so as to apply only to the Government, this would compel the industrial interests and others doing business with the Government to do so on a metric system basis, and that this would be an entering wedge to universal application of that system, enforced either by new business methods or by amendatory legislation.

Hearings were begun on Tuesday of last week, and have consisted of short morning sessions. So far only the proponents of the measure have given testimony, but statements in opposition to the proposed legislation are to be prepared, among them being those of Secretary C. C. Stutz, secretary of the American Institute of Weights and Measures, New York, and Samuel S. Dale, editor of *Textiles*, Boston.

The substance of claims in favor of adoption of the metric system has been based on its so-called simplicity, accuracy, and the desire to establish a uniform system of weights and measures. This has been coupled with the statement that change from one method to another can be made without any great cost.

The formula of the metric system was explained in detail by Elwood Haynes, president of the Haynes Automobile Co., Kokomo, Ind., to denote what he termed its simplicity when compared with the English system, which was declared to be cumbersome and lacking in definiteness in terms used, as, for instance, he said there are different sizes of barrels and varying weights in tons, pounds, etc. He was not speaking for adoption of the metric system particularly as an automobile manufacturer, but urged a change to this plan for general use and as the most efficient method.

Senator McNary asked him what effect the change would have on his foreign trade as an automobile manufacturer. Mr. Haynes replied automobiles are made in assembled units and that the metric system is not called for, except as to repairs.

Objections Referred To

Referring to the objection that has been made by machine tool manufacturers and other industrial interests that a change in measurements would require much trouble and expense, Mr. Haynes said that there is no reason why lathes could not readily be changed, and asserted the same is true of a large number of machines. He said it was not true as to such tools as jigs and templets, but that they have to be thrown away anyhow after a certain time in order to keep them standardized.

Arthur B. Smith, chief research engineer of the Automatic Electric Co., Chicago, said his company is preparing to operate on the metric system exclusively, and that he uses it in his laboratory work. He declared the advantages for measurements and calculations are so great that the company can afford to make the necessary transformations when outside measurements are involved. It was stated that there will be no changes in the plant in the usual measurements now being used. But, Mr. Smith said, when stocks run low the purchasing department will be requested to buy what is necessary, and if the United States is still on the English system the orders will be filled by it if proper specifications are given, but stock will be carried by one system. The first step in the change, it was declared, will be to add metric dimensions to the drawings as they come up for correction. Secondly, he said, all new drawings will be in the metric system, with the English system added so that it can be easily erased. Machines will then be changed when physical changes are necessary.

The committee was told by Theodore H. Miller, works manager of the De Laval Separator Co., that in his plants where there are 1700 people employed during the busiest periods, the metric system is used exclusively, and asserted that advantages gained have been worth more than 10 times the slight initial cost required to make the change.

Col. William Jay Schieffelin maintained that two years are being wasted in the school life of every child by the use of the present "cumbersome" system of weights and measures.

Henry D. Hubbard, secretary of the Bureau of Standards, gave a personal explanation of the operations of the metric system, and expressed strong approval of the proposed legislation. Howard Richards, secretary of the American Metric System, in speaking for the bill, said that adoption of the metric system by this country is needed in order to develop foreign trade adequately.

The hearings are to be resumed next Monday, when Dr. Harvey W. Wiley will appear at the request of the subcommittee, it is stated, and present an amendment so as to make introduction of the metric system more gradual than is now proposed by the bill. It is stated that this has been determined upon at the suggestion of sponsors of the measure who think extension of time for adoption of the system would lessen opposition to it, but opponents have said this will not be the result and that the measure has no chance of being passed.

The number of freight cars idle because of business conditions totaled 375,370 on Oct. 1 compared with 414,698 on Sept. 23, or a reduction of 39,328 according to reports just received by the Car Service Division from the railroads of the United States. Of the total, 172,420 were freight cars in good condition which could be placed in immediate service if traffic conditions demanded, while 202,950 were in need of repairs.

Implement Association Urges Rate Cut

No General Business Revival Without Prosperity Among Farmers Now Crippled by Low Prices and High Freight Charges

"THERE never has been general prosperity in this country without the farmer sharing in it, and there never will be," said William Black, president B. F. Avery & Sons, Louisville, Ky., in an address on the "Business Outlook for 1922" delivered before the annual convention of the National Implement and Vehicle Association at Chicago, Oct. 13. This meeting and this address in particular were of especial interest to the iron and steel trade in the West because normally the implement industry is one of the largest consumers of the products of the blast furnace and the mill. The fortunes of implement manufacturers and iron and steel makers are closely allied, and any signs of improvement in the situation of the former mean better business for the latter. During the past year, purchases by the implement industry have been practically nil and until buying can be resumed, iron and steel makers will be deprived of an important outlet for their products.

What the Farmer Buys

Continuing, Mr. Black stated that the farmer buys not only farm machinery but approximately one-third of all goods manufactured. The farmer was the first to suffer the effects of readjustment and his purchasing power is now about 75 per cent of normal. To better illustrate what has happened, Mr. Black cited remote sections where barter is still practiced. The farmer goes to the country store with his corn, eggs and chickens and finds that he can get much less in exchange than was formerly the case. He has nothing to sell but the products of his farm, and his ability to consume manufactured goods is limited by the exchange value of the things he takes to market. "The relative values which were built up through many decades prior to the war were generally fair," declared Mr. Black, "and until we can get back somewhere near that basis either by prices of farm products coming up, or by the prices of manufactured articles going down, our best customer will not be able to consume the old-time quantities. Progress is being made in the right direction, but it is slow, and we are not justified in expecting any great increase in the farmer's purchasing power until another crop is harvested.

A Striking Illustration

"The one great retarding factor in the readjustment of business," asserted Mr. Black, "is the high freight rates which burden all classes of society and particularly the farmer, who suffers most, because his products make heavy tonnage. A recent example is cited in the case of a complaining farmer from central Nebraska, who furnished this comparison. In 1921 the price of corn in Chicago was 55c. per bushel and the freight to get that bushel to Chicago is 26c., leaving for the farmer at his station a net return of 29c. In 1914 the price of corn in Chicago was 70c. per bushel, and freight was 14c., or 56c. net at the shipping point. How can it be possible for the farmer to buy in the usual quantities when his selling price of corn is 29c. compared with 56c. in 1914? The difference is 27c., of which 12c. is in freight.

"The ultimate consumer pays all the accumulated transportation on the raw materials and semi-finished materials, which are used to build the finished product, also he pays the freight on the finished product. It required six tons of iron ore, coal, coke and other materials to make a ton of steel. It requires about three tons of steel, pig iron, coal, coke, fuel, oil, lumber, etc., to build one ton of finished farm implements, and it has been previously shown by carefully worked-out tables that the increase in freight rates on certain farm implements delivered to Missouri River points is 40 per cent of their pre-war costs. Remember that this 40 per cent represents not total freights but only the increase between pre-war and present rates.

"We talk most about freight rates. We must not overlook passenger fares, which add so greatly to the cost of selling, and which must also be paid by the ultimate consumer.

"It is not fair to lay this charge to the railroad officials and not look further into the reason of high rates. Many of us believe that if the railroad executives were allowed to operate their property without hindrance of Government boards and were free to pay their labor wages in harmony with wages now paid by industry for equal skill under similar working conditions, we would soon see reduction in freight and transportation rates. Statisticians of the Interstate Commerce Commission have prepared an exhibit which shows that while the average wage of farm labor is 15c. per hr., the average wage of railroad employees is 61½c. per hr. And there are 14,000,000 people employed in agriculture in this country."

Association Favors Rate Reduction

A resolution adopted at the convention of the implement association calls for an immediate reduction in freight rates and a number of corollary changes regarded as necessary to the solution of the transportation problem including settlements with the railroads of the amount due as rentals during Government operation; passage of the present bill pending in Congress, permitting the railroads to fund their indebtedness to the Federal Government, and the early repeal of the Adamson act.

World's Developed Iron Ore Resources

From a monograph published by the mining and metallurgical section of the East Europe Institute, Breslau, Germany, in the interest of German retention of Upper Silesia, some figures are given of the developed iron ore resources of the world. From these has been compiled the subjoined table. Poland's interests have been pooled with those of France in this tabulation, as have those of Austria with Germany, and special emphasis is placed on the large share of control over iron ore now exercised by the French. The tabulation covers the German resources without Upper Silesia and gives to Poland Upper Silesia.

European Groupings of Iron Ore Resources

	Iron Ore (Million Tons)		Percentage of the World
France	3,300.0		
Lorraine	2,330.0		
Poland	17.8		
Upper Silesia	16.6		
France-Poland		5,664.4	25.2
Germany (without Upper Silesia)	1,262.0		
German Austria	213.2		
Germany-Austria		1,475.2	6.6
Great Britain		1,300.0	5.8
Scandinavian countries	1,525.0		
Spain	711.0		
Luxemburg	270.0		
Larger European neutrals		2,506.0	11.1
Russia		830.9	3.7
Other European countries		254.5	2.1
United States		4,250.0	19.0
Newfoundland		3,630.0	16.2
Other countries		2,780.9	12.4
Approximate total		22,400.00	

The Roxbury Steel Casting Co., 53 Gerard Street, Boston, does not expect to build a foundry and is not in the market at the present time for any equipment, as it has made purchases of the necessary machinery to start operations.

BRITAIN IN DEPRESSION

Comment by W. S. Pilling on Conditions as He Found Them

W. S. Pilling, of Pilling & Co., Philadelphia, returned last week from a stay of several weeks in Europe, the greater part of the time being spent in England. In response to a request from THE IRON AGE for an expression on the present industrial situation in Great Britain, particularly as affecting the iron and steel trades, Mr. Pilling has written the following:

"I hesitate to express my views regarding the European situation, inasmuch as I really did not have the time to study and digest the conditions. In fact, I am more perplexed now than before I sailed.

"The rapidly declining exchange has brought about an unparalleled situation in Europe. From what I could gather, the Belgian and German iron and steel works are doing by far the largest proportion of business in Europe, especially considering the capacity for output. I gathered that the German works that are producing pig iron and many grades of steel are fully sold up for many months ahead, and in view of the rapidly declining value of the mark it is a mystery how they can purchase raw materials and sell their products in marks at the prices at which the goods are sold. In fact, the whole German situation is so clouded that I do not attempt to understand it.

"Belgium, from all accounts, is also busy, and offering products in England and the foreign markets at such low prices that the British manufacturer has apparently abandoned efforts to compete. I did not meet a single man in the trade who was not despondent as to conditions, especially as to the labor situation. Workmen are resisting changes which it would seem are so obviously necessary that no man of intelligence could fail to see their necessity. The labor leaders appear to be blind to all signs of the times, and are striving to hold their supremacy and leadership by temporizing with the situation. It is a matter of general information that practically all grades of iron and steel can be shipped into England at considerably less than the British costs of production, and the result, of course, is a great reduction in output and consequent increase of unemployment in this line. Most blast furnaces which are running are operating at a loss, and some of them would be idle excepting that collateral conditions seem to make it necessary to run. With the present British laws regarding unemployment remuneration, there seems to be a willingness on the part of workmen to remain idle, even at a very moderate income, rather than to endeavor to secure work which would yield more.

"What struck me quite forcibly in all my conversations with men of means or influence, was the bitter criticism of many of the present laws which seem to discourage industry, and many hints of sinister motives on the part of Government officials are heard. Great Britain appears to be floundering and adrift, but those who know the history of the British people are sanguine that she will come out all right, without any one apparently knowing how it will be done. There are as many remedies being suggested as there are phases of the trouble, but with no precedent on which to build an intelligent opinion. The views expressed are widely different and have the appearance of guesswork.

"Businss men appear to be more fearful of political and financial breakdowns, both in their own and other countries, than they are of the immediate future of business. In other words, they are more distressed about underlying conditions than about the present unfavorable situation. They feel that the latter could be tided over, as has been done in the past, but that there may be no substantial ground on which to build a permanent improvement. There appears to be a decreasing animosity between Great Britain and Germany and trade between the two countries is growing in volume.

"The shipping interests are in deplorable condition, many hundreds of thousands of tonnage being tied up and dismantled for lack of employment. The whole country appears to be suffering from a lethargy, with a general feeling of discontent as to conditions, and a hopelessness as to a speedy favorable change.

British Steel Exports Still Low in August —Imports Heavier

British steel exports in August, this year, excluding iron ore and including scrap, were only 79,163 gross tons as compared with 183,373 tons per month for the first quarter and 279,256 tons in August, 1920. The June and July exports this year were 66,301 and 64,001 tons respectively. The average per month in 1913 was 420,757 tons. The August outgo is much less than even the 1919 monthly average and smaller than any month in the war years. Imports in August were 149,231 tons which contrast with 103,561 in July, with 88,083 tons in June, and with 186,040 tons per month in the first quarter. The 1913 imports were 195,264 tons per month and in 1920 they were 128,685 tons per month. The following table shows comparative data:

British Steel Exports and Imports

Gross Tons	Exports	Imports
Aver. per mo. first quarter 1921	183,373	186,040
July, 1921	64,001	103,561
August, 1921	79,163	149,231
Aver. per mo. second quarter 1921	109,670	96,320
Aver. per mo. 1919	188,519	50,801
Aver. per mo. 1920	274,881	128,685
Aver. per mo. 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data in gross tons:

Principal British Exports

	Average per Month 1913	1920	August, 1920	August, 1921
Pig iron	78,771	38,505	26,070	3,336
Steel rails	41,676	11,213	8,731	4,848
Steel plates	11,162	16,571	15,602	6,174
Galvanized sheets	63,506	34,244	40,042	10,153
Steel bars	20,921	30,322	37,998	4,074
Tin plates	41,208	29,418	31,880	8,787
Black plates	5,679	3,026	3,299	388
Steel sheets	....	....	10,338	1,093

Iron ore imports in August were only 36,997 tons as compared with 541,742 tons per month in 1920. In August, 1920, they were 605,979 tons. The total for the first eight months was 1,295,927 tons, as compared with 4,653,626 tons in the first eight months in 1920.

Manganese ore imports were only 6039 tons in August against 37,717 tons per month in 1920 and 50,098 tons per month in 1913. The total to Sept. 1, this year, was 152,866 tons against 276,163 tons for the same eight months last year.

American Exports of Machine Tools

The decreased American exports of machine tools are but an incident of reconstruction, the depression following the business of the last year or two, and there are signs that we are already beyond the most severe stages of this depression, says *Commerce Reports*. The value of American exports of machine tools for 1920 and the first eight months of 1921 is shown by months in the following table:

Value of Lathes and Other Machine Tools Exported from United States in 1920 and Eight Months of 1921

Months	Lathes 1920	Lathes 1921	Other Machine Tools 1920	Other Machine Tools 1921
January	$631,271	$818,068	$816,773	$1,222,731
February	587,348	442,491	895,675	778,250
March	1,079,793	337,856	1,943,230	528,563
April	560,008	335,614	1,229,819	379,320
May	829,434	269,835	1,318,478	254,326
June	846,583	131,140	1,127,297	267,344
July	542,175	191,983	915,074	281,936
August	414,604	51,569	972,247	209,630
September	506,781	.....	1,176,175	.....
October	358,088	.....	1,170,075	.....
November	589,444	.....	1,131,461	.....
December	629,594	.....	1,264,939	.....
Total	7,575,123	.....	13,961,243	.....

In 1919 the value of lathes exported was $10,136,877, while in the same year the exports of all other machine tools totaled $12,490,600. The lathes exported

in 1918, however, amounted in value to only $9,853,507, while all other machine tools exported in 1918 totaled $11,626,360 in value.

Decrease in Metal-Working Machinery

The value of sharpening and grinding machinery exported in 1920 was $3,945,490, as compared with exports of this machinery valued at $5,494,060 in 1919 and $6,161,876 in 1918. Exports of other metal-working machinery also showed a decrease in value in 1920 as compared with 1919 and 1918. In 1920 the value of this machinery was $18,830,377, while it amounted to $30,386,405 in 1919 and $23,978,554 in 1918. Exports of sharpening and grinding and other metal-working machinery for the 12 months of 1920 and the first 8 months of 1921 are shown in the following table:

Value of American Exports of Sharpening and Grinding and Other Metal-Working Machinery in 1920 and Eight Months of 1921

	Sharpening and Grinding Machinery		Other Metal-Working Machinery	
Months	1920	1921	1920	1921
January	$394,374	$296,385	$1,611,528	$1,956,879
February	261,209	148,210	2,024,929	1,412,630
March	475,248	95,645	1,652,604	1,359,489
April	334,269	84,946	1,489,625	1,255,542
May	276,057	82,183	2,142,421	669,627
June	395,903	60,499	1,164,940	1,029,230
July	396,246	105,293	1,823,097	1,155,283
August	278,864	61,711	1,242,778	608,653
September	333,844	.....	1,190,343	.....
October	247,788	.....	1,556,908	.....
November	237,395	.....	1,373,323	.....
December	314,293	.....	1,557,881	.....
Total	3,945,490	.....	18,830,377	.....

Plates for the Navy

WASHINGTON, Oct. 18.—The Bureau of Supplies and Accounts, Navy Department, has issued its schedule asking for approximately 3000 tons of plates, bids on which will be opened on Nov. 1, together with bids for about 1600 tons of shapes, 2100 tons of bars, and 1200 tons of black sheets.

The Engineer Corps, War Department, last week sold approximately 10,000 gross tons of railroad track material to the Bethlehem Steel Co., and Hyman-Michaels Co., Chicago, the bid of the former which took 3470 tons being $9.80, while the remainder was bought by the Hyman-Michaels Co. at $9.11. The prices are f.o.b. cars, the material purchased by the Bethlehem Steel Co. being at Kearny, N. J., and that bought by the Hyman-Michaels Co., being at Norfolk, Va., Schenectady, N. Y., and Chicago. The tonnage includes turnouts, crossing switches, wrecking frogs, etc.

Agreed to Extend Emergency Tariff

WASHINGTON, Oct. 18.—Agreement has been made between Chairman Penrose of the Senate Committee on Finance and Chairman Fordney of the House Committee on Ways and Means to extend the emergency tariff law until Feb. 1 with the expectation that the permanent tariff act will be passed by that date, although there is considerable skepticism that this can be done. This doubt is based on the many influences at work against the permanent tariff program and some of it comes from within the Republican ranks. Notices that hearings on the tariff bill will be resumed Nov. 1 have been sent out to agricultural interests.

British Pig Iron and Steel Output in September

LONDON, ENGLAND, Oct. 14 (*By Cable*)

The production of pig iron in Great Britain in September was 158,300 gross tons and that of steel ingots and castings, 429,300 tons. These compare with an output of 93,600 tons of pig iron and 432,600 tons of steel in August. The average monthly output of pig iron in 1920 was 667,300 tons and of steel ingots and castings 754,700 tons.

STRONGLY DEFENDED

Attorney Lambert Quotes Justice Hughes on Reliability of Trade Paper Quotations

WASHINGTON, Oct. 18.—Strong defense of the accuracy and reliability of trade journal quotations is made by Attorney I. E. Lambert, of the Federal Trade Commission, in the brief he has filed with the commission in the so-called ferromanganese dumping case, in which he charges that sufficient evidence has been adduced to prove that the respondents, importers of British ferromanganese, had made sales in the United States at substantially less than the English or home prices. It is stated that the facts show conclusively that each respondent during the latter part of the year "dumped ferromanganese on the American market and that the said dumping was a flagrant violation of the act of Sept. 8, 1916," and constituted an unfair method of competition. Final arguments in the case are to be made on Friday of the present week.

Support of the reliability of trade paper quotations is made by Attorney Lambert to combat a contrary view which has been expressed by attorneys for the respondents. In proving the market value of ferromanganese in England during the year 1919, when it is alleged the dumping took place, copies of reliable and trustworthy English journals were offered in evidence, Attorney Lambert says, the competency of which was vigorously challenged by the respondents.

Attorney Lambert quotes a number of authorities to establish the competency of trade paper quotations. Among them was the opinion of Justice Hughes of the Supreme Court, now Secretary of State, who in speaking for the court in the case of Virginia vs. West Virginia, said:

> It is unquestioned that in proving the fact of market value, accredited price, current lists, and market reports, including those published in trade journals or newspapers which are accepted as trustworthy, are admissible in evidence.
>
> Prices current and report of the state of the market published in newspapers or otherwise in general circulation and relied upon by the commercial world are held admissible on an issue as to the value. (22 C. J. 929.)

He also quotes the following:

> Such reports which are based upon a general survey of the whole market and are constantly received and acted upon by dealers are far more satisfactory and reliable than individual entrance or individual sales or inquiries. (Sisson v. Cleveland Ry. Co., Mich. 489.)

In supporting his charge that dumping constitutes an unfair method of competition and has been condemned by different governments, Attorney Lambert quotes laws of Canada, the Union of South Africa and Australia, the latter dealing directly with dumping as an unfair method of competition. He also quotes an extract from "Commercial Policy in War-time and After," by Hon. William Culbertson, a member of the U. S. Tariff Commission and a former member of the Federal Trade Commission:

> The facts clearly show that there has been a systematic price cutting by the English manufacturers for the purpose of putting the American out of business and of obtaining a monopoly of the American market.

Attorney Lambert said that the importers made cuts at $8 to $10 a ton under the actual market value in England in sales made in the American market. Dealing with the purpose of the alleged dumping, Major Lambert says in brief:

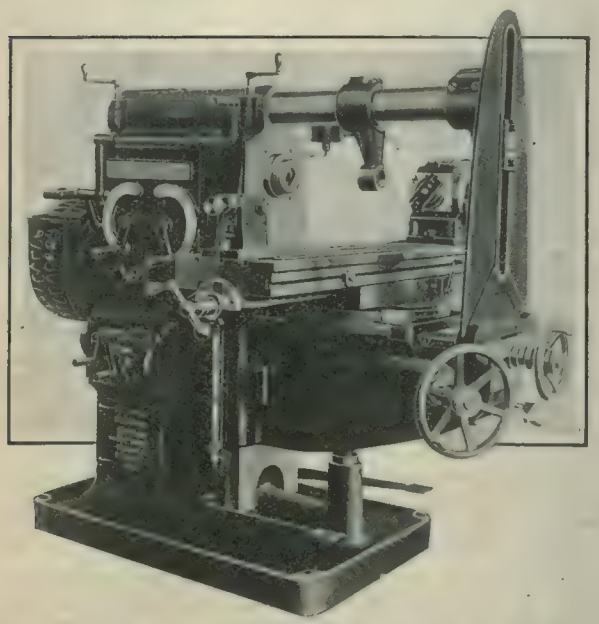
> Intent to injure the American ferromanganese industry is the only logical and natural inference to be drawn from the facts proved: Knowledge of the baby American industry, the vicious dumping, the underselling of the Americans and the drive for business which resulted in many large sales amounting to thousands and thousands of dollars. Surely it is not necessary for your attorney to argue the effect that all this would have upon a young, struggling industry.

New Constant Speed Milling Machines

The Oesterlein Machine Co., Cincinnati, has introduced a line of milling machines of the constant speed or "all geared" type. The line consists of No. 1, No. 2, No. 2 Heavy, No. 3, No. 3 Heavy and No. 4 sizes, each size being made in plain and universal types.

The speed mechanism consists of no more than 15 gears from which 16 geometric speeds are obtained. Only one shaft is employed in addition to the spindle and the pulley shaft. In obtaining 8 of the 16 spindle speeds, power is transmitted through a three or four gear train. It has been found unnecessary to secure any of the 16 speeds by means of quadrants or similar mechanisms.

The power consumption of the machine, as exemplifying the simplification of the speed mechanism, is given as follows: The no load power loss of a No. 2 machine varies from 0.18 to 0.30 hp. between the extreme spindle speeds of 16 to 384 r.p.m. This power



One of the New Oesterlein Milling Machines Is the No. 3 Heavy Universal Type Here Shown. A feature of the line is the arrangement for automatic lubrication involving three superposed reservoirs, into the top one of which oil is poured perhaps once every two months

loss included the feed box at the highest rate of feed and feed mechanism within the knee and may therefore be regarded as practically the entire no load power loss of the entire machine. The speed changes are secured by means of two "two position" levers and a "four position" knob. The four position knob controls the selection of four adjacent spindle speeds. All speed changes may be made without stopping the machine. The gears are of low carbon forgings and hardened and finally sandblasted to remove furnace scale and the wire edge of machining operations, thus to protect the bearings from such destructive refuse.

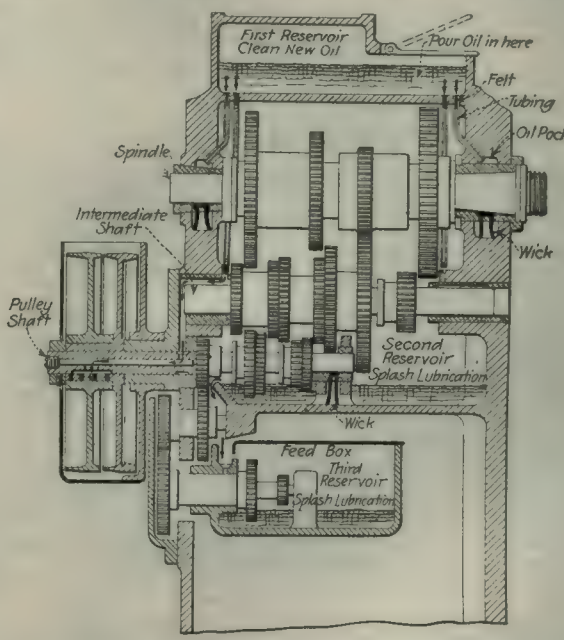
The automatic lubrication of the machine is effected without pumps or any extra moving parts. This is accomplished by a system of three reservoirs. The first reservoir is cast in the top of the column, beside the overarm. Into this reservoir fresh oil is poured. This oil seeps through felt and down tubing to cavities cast under the main spindle bearings and to the intermediate shaft bearings and to the driving pulley. Wicks dip into the cavities under the spindle and carry oil to the spindle bearings proper. Thus it will be seen that only new oil is admitted to the bearings that are heavily loaded. The oil that passes through these bearings collects in the second reservoir, where it is distributed to the speed gears and minor bearings by splash lubrication. The overflow from the second reservoir passes to the third reservoir, which is the feed box. The feed box is oiled by splash lubrication. The capacity of the first reservoir is sufficient to supply the machine for about two months of ordinary service. Provision is made for correcting the level of oil in the third reservoir should this reservoir level decrease. This is accomplished by adding new oil and is necessary, say, twice a year. There are no oil holes within the machine.

The driving pulleys are 14 in. in diameter and run at 400 r.p.m. Practical use is made of the high belt velocity by controlling the operation of the machine by tight and loose pulley, thus avoiding a clutch. A brake for quick stopping of the spindle is designed into the belt shifter in such a way that the belt is partially carried to the loose pulley and the brake applied to the tight pulley by a spring plunger release. The feed box is driven off of the pulley shaft, producing feeds in inches per minute.

A phosphor bronze of 28 to 32 scleroscope hardness is used for bearings and feed nuts throughout the machine. Cumberland ground steel of 0.45 to 0.50 per cent carbon is used for table, cross and vertical screws. The feed box, knee and table are similar to the design developed by the company and used in their cone type milling machines.

Increased Efficiency of Labor

One of the encouraging signs of the times is the increased efficiency employers are beginning to obtain from their workers in all branches of industry throughout the country, says Clarence Samuel King, secretary of the Atlantic Coast Shipbuilders' Association, in an article published in the current issue of the association bulletin. Mr. King states that the improvement in



output per man at the present time as compared with what it was during and shortly after the war has been so noticeable that some of our industrial leaders are beginning to see their way toward a solution of the output problem and, furthermore, it seems that we are approaching a period in our industrial progress when a fair day's work for a fair day's wage is within the range of possibility. Mr. King says there are many instances that could be cited in support of this gratifying change for the better and points out a few outstanding cases that have come under his personal observation which serve to indicate the present trend among workmen to give full measure for value received.

The conclusions deduced by Mr. King from these widely separated reports is that a solution of the problem of production will rest more and more upon the selection of workers who agree with progressive employers that it pays to give the best that is in them and who are willing to meet the altered conditions of the times with unrestricted output.

The October meeting of the Cincinnati chapter of the American Society for Steel Treating will be held at the Ohio Mechanics' Institute on Oct. 21. The program calls for a round table discussion of the Indianapolis convention.

CONTENTS

Steel Foundry Has Special Operating Features 991

National Steel Foundries Add Two Tilting Open-Hearth Furnaces with Removable Ports—Mold Drying Oven Opens at Both Ends

Investigation of Defects in Extruded Metals 996

Origin and Remedy Discussed by British Institute of Metals—Testing with Scleroscope—Age-hardening of Aluminum Alloys

Cost of Rolling Steel in Blooming Mills 998

Electric Drive Compared with Steam-Driven Units—Cost Comparisons on Basis of Tonnage Favor Electric Operation

Gear Standardization at Rochester 1001

Substantial Progress Featured Meeting of American Gear Manufacturers' Association—Design and Material Standards Approved

Practical Plans to Relieve Unemployment 1007

Individual Opinions Subordinated and Conference Agrees Upon Recommendations Which Are Being Carried Out

Threat of Railroad Strike Calmly Received 1022

Iron and Steel Manufacturers Show No Excitement on Account of Threats—General Belief That Employees Could Not Succeed

Machine Tool Builders in Convention 1026

Cost Accounting, Standardization and Statistical Service for the Industry Chief Topics at New York Meeting

Chicago Foundry Conditions 1000
Plant Operations 1000
Blast Furnace Operations 1000
The 1922 Rail Demand 1000
Cost of Living 1006
Labor Notes 1006, 1014
Steel Production Statistics 1009
Metric System Favored 1010
Implement Association Urges Rate Cut 1011
World's Developed Iron Ore Resources 1011
Britain in Depression 1012
British Steel Exports and Imports 1012
American Exports of Machine Tools 1012
To Extend Emergency Tariff 1013
British Pig Iron and Steel Output 1013
Trade Paper Quotations 1013
New Milling Machines 1014
Editorials 1016
A Strike Against the People—Distortions of Market Facts—Liquidation in Steel Prices—Greasing Standardization Ways.

Correspondence 1018
Industrial and Technical Photography.
Industrial Relations Conference 1019
International Engineering Dinner 1019
New York Steel Treaters 1019
Pittsburgh Foundrymen's Association 1019
Duralumin for Gears 1020
Safety Gage Glass Valve 1021
New Grinding Wheel Dresser 1021
Engineering Meetings 1028
Plan Pig Iron Contract 1029
New Schedule for Manufacturers 1029
Marked Improvement in Fabricated Steel 1045
Coke Rate Reduced 1045
Foreign Market Conditions 1043, 1048, 1049
New Ore Tariffs Filed 1048
Pittsburgh Plus Case 1048
Cost Association Conference in Pittsburgh 1049

Iron and Steel Markets 1030
Comparison of Prices 1031
Prices Finished Iron and Steel, f.o.b. Pittsburgh 1044
Non-Ferrous Metal Markets 1045
Personal Notes 1046
Obituary Notes 1047
Machinery Markets and News of the Works 1050
New York Jobbers' Prices 1060

ESTABLISHED 1855

THE IRON AGE

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A Strike Against the People

The railroad labor unions, in deciding on a nation-wide strike beginning Oct. 30, have chosen to make war on 100,000,000 people rather than accept any share in the economic readjustment through which the country is passing. Developments of the week have been fairly startling. First the railroad executives signified their intention of asking for a 10 per cent wage reduction beyond that of 12½ per cent that went into effect on July 1, the expectation being to pass the reduction to the public in lower charges. The union officials countered by calling the strike. The third move was made by the so-called "public group" of the Railroad Labor Board, which took the astonishing course of calling upon the railroads to reduce their charges by an amount equal to the July wage reduction and the subsequent adjustments.

There has been much criticism of the Railroad Labor Board on the ground that it has not been deflating railroad wages as rapidly as circumstances required. At the recent unemployment conference at Washington there was a strong majority in favor of abolishing the Railroad Labor Board on this account. There has been criticism of the so-called "public group" of the board, on the basis that it has not been neutral but has leaned to the side of the unions.

Now the public is confronted with some very clear cut issues. The Transportation act was expected to avert strikes. It makes it the duty of railroad officials and employees "to exert every reasonable effort and adopt every available means to avoid any interruption to the operation of any carrier growing out of any dispute between the carriers and the employees." Yet even the great wage advance of July, 1920, made retroactive to May 1, was the subject of not a little strike talk, and the strike now called is based on a "strike vote" on the subject of the first reduction ordered by the board, the 12½ per cent adjustment of last July. Of what avail are the labor provisions of the Transportation act?

A second clear cut issue is whether the so-called "public group" in the Railroad Labor Board is moved by consideration of the instructions the Transportation act gives the board or is filled with the same kind of fear that actuated official Washington at the time of the passage of the Adamson act five years ago. The instructions are that the board shall be governed by "the scales of wages paid for similar kinds of work in other industries," "the relation between wages and the cost of living" and certain other points not particularly important in this connection. There is not a word in the act suggesting that there be a connection between wage rates and freight and other charges, yet the so-called "public group" now calls upon the railroads not to reduce rates in connection with further wage reductions, which the railroad executives have undertaken to do, but to reduce them in connection with the first wage reduction.

What the act does do is to require that rates be fixed to yield a certain return upon the railroad valuation after wages and other expenses have been met. The railroads will do well, as matters now stand, if they show 3 per cent for the present year instead of the intended 6 per cent, and should they have greater earnings next year only one-half the excess could be used to make up the deficiency, the other half going to the Interstate Commerce Commission's contingent fund.

The third clear cut issue is the attitude of the union officials toward railroad earnings. In nothing were they more emphatic at the hearings preceding the wage reduction of last July than in their contention that the board could not associate wage rates with railroad charges and earnings. Now the union officials insist that charges be reduced on account of the wage reduction of last July. The Plumb plan air castle remains in their minds. They wish to keep the railroads impoverished, so that they cannot save themselves. The strike itself, the leaders hope, will cause the taking over of the roads by the Government. The head of the locomotive engineers said Monday that "that must come eventually," showing plainly the purpose to get back to the plunderbund days of politico-union control.

The railroad unions have set themselves to block what in the thought of the entire people is the readjustment most necessary to industrial revival—reductions in freight rates through reductions in the excessively high wages of rail-

road employees. Asked to accept a fraction of the reductions from war-time wages that have been made in all industrial lines, the railroad unions have defied the Government agency created by law to decide the question and set out to have their way at whatever cost of loss and suffering to the public. The strike, if it comes, will be a calamity. Yet a greater calamity would be the success of the strike or any yielding to men who have set themselves against the people and the law.

Distortions of Market Facts

When anything unfavorable happens in the industrial world someone can generally be found to blame the steel business, and it was hardly to be expected that it would escape in the case of the threatened railroad strike. W. G. Lee, president of the Brotherhood of Railroad Trainmen, comes to the front as the accuser. In the classic language of Mr. Lee, "Executives are pulling the same old stuff," and then he adds: "They think they can hoodwink the people again. They're trying to do just as the steel manufacturers did during the war, when steel jumped from $25 and $28 to $47 a ton. The steel workers took four cuts in pay on the employers' promise that steel was coming down, but it's still at the war price. This situation is parallel."

Mr. Lee, by selecting one product on which the price to-day is nominally the same as it was for the greater part of 1919 (though there has been practically no rail market for months), seeks to give the impression that all steel prices are the same as they were during the war. Even in the case of steel rails, to which evidently he refers, the price is lower by $10 than it was in 1918, and during the war standard sections went to $85 both at home and abroad. But if Mr. Lee had wished to make a fair comparison he would have taken a number of leading iron and steel prices and had he done so he would have found that these prices are now only about 34 per cent higher than they were in 1913, and that the increased cost of producing these products is more than 34 per cent, the increase being due almost entirely to the high wages paid to railroad employees. A glance at the figures printed last week in THE IRON AGE marking the trend of prices of the leading products since Jan. 1, shows how false the assertion is that resistance to reasonable reduction of freight rates and wages of railroad employees can be justified by the history of the steel market.

One of the results of the present depression is the return to graduate work of young men who have spent some time in the industrial world. It is reported that at many American universities, particularly at Columbia and Cornell, the influx this month of students into the post-graduate schools has been beyond precedent. A large proportion of the increase is said to be made up of professional men out of employment who find this a profitable and opportune time to increase their knowledge. In some institutions the percentage of increase in this class of students has never been equaled. It is fortunate that so many are not only able financially to pursue this course but are eager to add to their professional equipment. It is a testimonial to the value of such training, and there will be large benefit to industry when these men are called back to their various fields.

Liquidation in Steel Prices

If men generally were in the habit of memorizing the pronouncements of the self-appointed economists who from time to time undertake to tell business men how to conduct their affairs these pronouncements would soon fail to attract any attention, since experience shows that they do not work out. Usually they sound well at the moment, and they are forgotten before the passage of time proves that they were not well founded.

There was, for instance, the criticism early this year of the steel makers in general and of the United States Steel Corporation in particular, that steel prices were not being "deflated" and that the refusal of the steel makers to do the right thing was preventing the revival of business activity. The criticism reached its warmest stage in March, when the actual circumstances were that the Steel Corporation was holding its prices up to the level to which it had held them down in 1920, and was doing so chiefly by the desire of its customers, while the independents were cutting those prices and were operating at lower rates than the corporation.

Meanwhile there has been more than a thorough deflation in steel prices, for they have made a nearer approach to the prices of 1913 than has been made by commodity prices in general. THE IRON AGE composite of finished steel prices stood at 2.20 cents on Sept, 20, this including the advanced price of 2.60 cents on wire. With wire at its former price, the composite would be 2.19 cents. The composite of the average of 1913 prices stands at 1.66 cents. Thus, using 1913 average prices as 100, or base, the recent low in finished steel stands at 132. The Department of Labor, using this system, found commodity prices at wholesale at 148 for last July and at 152 for August, showing an advancing tendency. Steel prices at 132, therefore, had been deflated more than commodity prices in general. The strain upon producers was even greater than is indicated by this comparison, on account of high freight rates, which are not deflated at all, having a greater influence upon steel production costs than upon commodity costs generally.

The contention early in the year was that steel was not doing its duty and that if steel prices were deflated a large demand would be created. What has occurred? Even at this late date the consumption of steel has not been stimulated by the price deflation. It is true demand upon the mills has been increasing in the past three months, but that is chiefly because three months ago consumers were drawing upon stocks. There is no reason to suppose that this increase in demand would not have occurred if steel prices had been left several dollars a ton higher. The steel

producers know, and outsiders could learn if they would inquire and heed what they are told, that men buy steel when they need steel and will not buy when they do not need it, no matter how low the price.

In the past few weeks there has been a stiffening tendency in steel prices. That is attributable, not to demand outrunning the supply, but to mills realizing that their experiment in deflating prices to a level below the actual cost of production did them no good, so that now they wish to secure cost at least in their sales. The experiment was particularly crucial. If the price decline had stopped at the cost level it might have been urged that a little further decline was needed.

The unfortunate thing is that men do not remember what the critics of the steel industry were saying last spring. Application of the test of time in a few such cases would put the public on its guard when critics arise to assert that business men do not know their business.

Greasing Standardization Ways

Several impressions worth mentioning are left by the meeting of gear makers in Rochester last week. One not altogether new is that a high degree of camaraderie may be established and maintained among business competitors even in a movement looking toward standardization of product and therefore toward writing off from the assets account of the materials and equipment not suited to the standardized article. It is recognized that the trend of a standardizing development and the time required to put it into full effect provide for getting the maufacturer's house in order, but compromise in some cases and the relinquishment of cherished ideas in others do not usually follow without a straining of harmonious relations.

Five years of working show how slow relatively is the achievement of standardization, but the numerous detail matters and the complexity of some of them are not realized by the user of the product. What appear to be going on at present in the gear association are various parallel investigations which are calculated to reach completion more or less simultaneously rather than one at a time, as would be the case were there less general planning and less correlation of effort. The laying down of programs for these parallel activities is one of the noteworthy lessons carried from the meeting; general committee headship steering each committee along specific paths which are only followed after acquiescence by vote of the meeting.

As was to be expected of a body concerned with technology, but at the same time commercial, agreement is sought wherever possible with other associations having to do with engineering standards. Not merely is cognizance taken of what these associations have done, but it is sought to work with them through conference committees or through direct representation. Finally the association has learned to relieve the strain of concentration on a technical controversy by occasional pleasantries. Engineering bodies actually might get results more quickly if they numbered in their ranks a few diplomatic wits who know just when to give the welcome twist to the surcharged discussion.

CORRESPONDENCE

Industrial and Technical Photography

To the Editor: During the last few years photography has more and more developed to be an important factor in industry, commerce and science, and a number of large concerns have established permanent photographic departments of their own as an aid to better efficiency in administration, engineering, research, buying, selling, advertising, education, co-operation, and for many special purposes peculiar to the individual needs of the concerns.

All have been striving for the same result—to make photography a help and not merely an added overhead expense. As industrial and technical photography not only has come to stay, but will get a much larger application in the future than heretofore, it would seem wise if all organizations which use photography in one form or another could put their experiences together for the benefit of all.

It is, therefore, the purpose of this article to ask all who use photography in their plants or organizations to assist the writer in making a survey of industrial and technical photography by sending him samples of different types of photographs used; a short statement of how and why photography is being used, as in field, office, plant or research; information as to how far an outside photographer is employed; or if the users have photographic departments of their own, together with a history of the development of the same. Methods of mounting, filing and reference are important; also statements of the costs and upkeeps of the departments and the value and importance of them.

In case one has a photographic department of his own, would it be advisable to recruit his help from the photographic profession, or develop some of his men for this work? Should our technical schools train men to meet the growing demand for practical industrial photographers?

The writer will compile all such data and information, and in line with his experience of eight years in industrial photography, will make a complete history of its development and uses, to be published in one of our leading technical magazines. The more each individual contributes to an article of this kind the more valuable it becomes.

Would a convention of the users of industrial and technical photography be of any value? If so, will interested readers pledge their presence and support to a convention of this kind, and where would they suggest that it be held?

If enough interest is shown and a large enough attendance could be secured, the plan would be to arrange a conference, with an exhibition of all forms of technical and industrial photographs, and lectures on different photographic subjects in relation to industry, science, research and commerce.

JOHN H. GRAFF,
Industrial Photographer and Photomicroscopist,
Brown Co., Berlin, N. H.

The Weirton Steel Co. now is operating at practically 100 per cent, having recently put on the five tin mills which had been down at its Steubenville, Ohio, works, while it is operating all seven of its open-hearth furnaces. The company has 50 tin mills at its three plants. The average operation is reduced slightly by the fact that the company is running only 25 to 30 per cent of capacity on its strip mills.

Industrial Relations Conference at Harrisburg from Oct. 24 to 27

The Industrial Relations Conference to be held at Harrisburg, Pa., under the auspices of the Department of Labor and Industry of Pennsylvania will begin with an evening session on Monday, Oct. 24. Clifford B. Connelley, commissioner of the department, will preside, and addresses are scheduled by Governor William C. Sproul of Pennsylvania and Secretary of Labor J. J. Davis.

A session on Tuesday morning, Oct. 25, is to be devoted to "Industrial Co-operation," with addresses on the so-called four factors in industry: the employer, the employee, the public and the State. An address is also to be given by Dr. Frederick Willson, Reading, Pa., on the foreign outlook. For the afternoon the subject is "Women and Children in Industry" and for the evening "Stabilizing Industry and Employment" with speeches by two publicists.

For Wednesday morning, Oct. 26, the subject is "Industrial Waste" and among those scheduled to speak are L. W. Wallace, executive secretary Federated American Engineering Societies, Washington, on unemployment and Magnus W. Alexander, managing director National Industrial Conference Board, on hiring and firing. Industrial education is the subject for the afternoon of that day, and in the evening Secretary of Commerce Herbert Hoover is scheduled for an address on "Industrial Waste."

The subject for the Thursday morning session, Oct. 27, is "Industrial Publicity," with papers on industrial publicity from the standpoint of the daily newspaper, the industrial plant magazine, the technical journal and the trade journal. John Frey, editor of the *Iron Molders' Journal*, has been asked to present the case of the trade journal and W. W. Macon, managing editor THE IRON AGE, the case of the technical journal. For the afternoon the subject is "Medical Supervision in Industry," and for the evening "Workmen's Compensation."

International Engineering Dinner

Nearly two hundred engineers attended the dinner to the delegation from the American Engineering Societies to Great Britain and France at the Hotel Pennsylvania, Monday evening, Oct. 10. Representatives of the British and French governments and of foreign engineering societies gave to the event an international aspect unique in gatherings of engineers. Messages from men distinguished in science, statesmanship and diplomacy were read. Medals struck by the French Government were presented to the general chairman of the deputation, to the chairman of each individual delegation and to the presidents of the four so-called founder societies.

J. Vipon Davis, president United Engineering Society, acted as toastmaster. The speakers were Ambrose Swasey, Charles F. Rend, F. B. Jewett, A. S. Dwight, John R. Freeman, all members of the deputation; and M. Gaston Liebert, French Consul General; Capt. C. H. Armstrong, British Consul General; C. G. Clapperton, representing the British Institute of Electrical Engineers, and Prof. Jacques Cavalier, spokesman for the French universities. Among the engineers from other cities was Governor James Hartness of Vermont.

Captain Armstrong, the first speaker, thanked the assembled engineers on behalf of his government for the honor bestowed upon Sir Robert Hadfield, who with Eugene Schneider of Paris received the John Fritz gold medal at the hands of the deputation. Mr. Davies in a glowing eulogy presented Ambrose Swasey, past president of the American Society of Mechanical Engineers and sponsor of the Eugineering Foundation, as the "dean of American engineers." M. Liebert told of the greater water power resources of France in the development of which French engineers had sought guidance in America.

Prof. Jacques Cavalier, rector at Toulouse and a widely known authority on metallurgical chemistry, comes to American as the result of arrangements for an annual exchange of professors of engineering and applied science between French and American universities. He will divide his time during the academic year among the co-operating institutions, Columbia, Harvard, Yale, Cornell, Johns Hopkins, Massachusetts Institute of Technology and the University of Pennsylvania. The American universities have selected as their representative for the first year, Dr. A. E. Kennelly, professor of electrical engineering at Harvard.

Cable messages were read from Sir Robert Hadfield, London, Dr.; Eugene Schneider, head of the Creusot Works, Paris; the Institute of Civil Engineers, the British Institute of Mining and Metallurgy and Mining Engineers, Capt. Riall E. Shankey, president British Institute of Mechanical Engineers; Magnus Mowett, secretary British Institute of Mechanical Engineers; the Iron and Steel Institute, London; the Engineers Club of London, the Faraday Society, Viscount Bryce, Arthur Neal, member of Parliament from Sheffiield, and A. E. Kennelly, Harvard, American exchange professor in France.

New York Steel Treaters

The first meeting of the New York Chapter of the American Society for Steel Treating, in the regular series of monthly sessions for the 1921-1922 season, was held Wednesday evening, Oct. 19, at the Bush Terminal Sales Building, 132 West Forty-second Street, New York. The chief speaker was Dr. John A. Mathews, president Crucible Steel Co. of America, who delivered a lecture on "Characteristics of Tool Steel, Mild Steel and Alloy Steel," illustrated with lantern slides.

For each monthly meeting the program committee of the chapter has selected a definite subject on which some well-known authority will speak. Besides the one for the October meeting, the following have been selected: November, "How Tool Steel Is Made; Comparison of Foreign and American Methods"; December, "What Happens to Steel When You Heat and Quench It?"; January, "Annealing and Tempering Machine and Tool Steels"; February, "Case Hardening, Ways of Doing It and What Happens"; March, "Treatment of High-Speed Steel"; April, "Hardening Room Troubles, Shrinkage, Warpage and Sealing"; May, "Up-to-Date Hardening Room Equipment Furnaces, etc."; June, "Spotting the Reason for Failures in Service." At each meeting there will be ten-minute talks on current events in the metallurgical world as published in the technical press.

Pittsburgh Foundrymen's Association

A. E. Blake, Pittsburgh manager of the United Gas Improvement Co., Philadelphia, who was the speaker at the regular monthly meeting of the Pittsburgh Foundrymen's Association at the General Forbes Hotel, Oct. 17, could see no good in the present day gas producers, which he declared were relatively as wasteful of coal and heat as the beehive ovens were of coal and useful by-products, while admitting that the coal reserves of the country were ample for centuries to come, it was not too soon to begin to think of the conservation, he declared, and strongly urged the use of other means of gasification than the producer. He asserted that producer gas contained so much nitrogen as to decrease very materially its efficiency and also pointed out that since it could not be sent great distances the furnaces had to be nested close to the producers. The gas must be low in sulphur, he insisted, to avoid the spoiling of heats, claiming that on an average one per cent of open hearth heats were being spoiled by the use of poor producer gas. Coal and water gas installations were advocated by the speaker.

The association adopted a resolution co-operating with other foundry associations in requesting the Interstate Commerce Commission to grant a reduction in the freight rates on pig and scrap iron and sand and gravel.

The net profits of the Pittsburgh Steel Co. for the year ended June 30 last were $1,722,527, compared with $1,961,459 in the previous year.

DURALUMIN FOR GEARS*

Considered As a Material for Worm and Other Gearing

Duralumin is an aluminum alloy combining the lightness of aluminum with the strength and toughness associated with ferrous metals. This metal was first made in Germany and was developed by A. Wilm and associates during the years 1903 to 1914. The principal and unusual feature of this alloy is that after it has been hot, or hot and cold worked, it may be further strengthened and toughened from 40 to 50 per cent by heat treatment. This heat treatment is somewhat analogous to that of the heat treating alloy steels and consists of quenching from temperatures below its melting point followed by an aging process. The increased physical properties are not all produced immediately on quenching but increase during the subsequent aging. In addition to being made in Germany the manufacture of duralumin was taken up in England by Vickers, Ltd., prior to the late war. During that conflict its use for structural purposes in connection with aviation brought the material before the eyes of the engineering world. To-day duralumin is recognized as occupying the same relative position to ordinary aluminum sheet or bar that heat treated alloy steel does to ordinary carbon steel.

Duralumin is an aluminum alloy containing copper, manganese and magnesium. Its strength and toughness are comparable with mild steel and are obtained with a specific gravity of 2.81 as against 7.8 for steel. The melting point is approximately 655 deg. C., the recalescence point is 520 deg. C., the annealing temperature is approximately 360 deg. C., and the co-efficient of expansion is 0.00003237 per degree of temperature centigrade. The chemical composition of the alloy varies within the following limits, copper 3 per cent to 5 per cent, magnesium 0.3 to 0.6, manganese 0.4 to 1 per cent, remainder aluminum, plus impurities. Small quantities of other metals are sometimes added for certain specific reasons, as for instance, chromium may be added to increase the burnishing qualities of the metal.

Navy specifications require in the heat treated condition: Yield point in tension, 25,000 lb. per sq. in., and tensile strength 55,000 lb. Also a quenched elongation per cent in 2 in., of 18 per cent in sheets or strips; quenched specimens not to be tested within four days after completion of heat treatment.

It might be noted in passing that in duralumin forgings where the sections are heavy it is advisable to lower the minimum tensile requirements to 50,000 lb., and a proportional increase in elongation will be found.

Duralumin is the only light metal that can replace steel in forgings, with a two-thirds saving in weight. Heat treated duralumin forgings approximate mild steel forgings in strength. Wherever weight is a deciding factor, duralumin is the most satisfactory metal for most shapes made by hot working or forging. Naturally duralumin forgings are especially desirable for reciprocating or moving parts where inertia, due to their own weight, forms a large part of the total stress.

Manufacture of Duralumin

The manufacture of duralumin is somewhat analogous to that of steel and in brief is as follows:

1. Manufacture of the alloy from its aluminum base.
2. Casting the ingot.
3. Hot rolling or cogging in blooms, billets or slab.
4. Hot or cold working to final shape.
5. Heat treating.

The ingots are poured at as low a temperature as is practicable, that is to say, just enough above the melting point to fill the mold and prevent cold shuts.

The ingots are then either hot rolled or cogged into slabs, blooms or billets, similar to the manner of working steel. This hot working is done at a temperature of 450 to 480 deg. C. and care must be used not to perform any work on the metal above these temperatures as there is a danger of hot-shortness if the material is rolled or forged at higher temperatures. It is readily seen that such low temperatures cannot be judged by color, and it is therefore necessary to use accurate pryometers in heating the metal, previous to working.

The final rolling or forging may be done hot or cold according to the character of the work being handled or the nature of the shape it is desired to produce.

The hot or cold worked metal in its final shape shows greatly improved physical properties over the cast ingot but the full development of its qualities is only obtained by a specific heat treatment. To obtain this heat treatment the metal is heated to a temperature of 500 to 520 deg. C., for a period of time, depending upon the section of the piece, and immediately quenched. The heating and quenching immediately start to improve the physical qualities of the metal, but the maximum results are obtained only by the subsequent aging. During the aging period which takes from one to five days, the alloy markedly increases in tensile strength, hardness and elongation. Aging is sometimes accelerated by placing the metal in a hot water bath up to 100 deg. C. or in a hot room.

Physical Properties

The various stages of manufacture as related, increase the physical properties of duralumin by distinct steps and are shown as follows:

The cast ingot shows a tensile strength of from 28,000 to 32,000 lb. per square inch, with an elongation of 1 to 3 per cent.

The hot or cold worked metal shows a tensile strength of 40,000 to 50,000 lb. per square in. with an elongation of 6 to 12 per cent. These last figures are quite variable depending upon the amount of working in the cold state. Upon subsequent heat treatment and aging, the physical properties of duralumin show a marked increase, namely, 55,000 to 65,000 lb. tensile strength per sq. in. and an elongation of 18 to 25 per cent.

When it is required to put a considerable amount of work upon duralumin in its finished state it is often found necessary to anneal sheets between operations in precisely the same manner as other metals. This annealing should be done at 350 deg. C. If several drawing operations are to be performed it may be necessary to anneal the metal between such operations. Annealed duralumin can be heat treated.

Duralumin may be cold worked after heat treatment and aging. This operation produces a hard, smooth finish, and materially increases the tensile strength of the metal at the expense of elongation. That is, the tensile strength will increase 6000 to 10,000 lb. per square inch over the tensile strength of the heat treated metal, but the elongation may drop as low as 3 to 4 per cent.

In the annealed form it can be drawn, spun, stamped and formed into a great variety of shapes, similar to brass and mild steel. The physical properties in this state average:

Ult. tensile strength per sq. in., lb.	25,000 to 35,000
Yield point per sq. in., lb.	22,000 to 24,000
Elongation in 2 in., per cent.	12 to 15
Brinell hardness	57
Scleroscope hardness	11

Duralumin in its heat treated form may be slightly shaped or formed and may be bent cold to 180 deg. over a mandrel four times the thickness of the sheet. Its remarkable tensile strength is here combined with its maximum elongation as follows:

Ultimate tensile strength per sq. in., lb.	55,000 to 62,000
Yield point per sq. in., lb.	30,000 to 36,000
Elongation in 2 in., per cent.	18 to 25
Brinell hardness	93 to 100
Scleroscope hardness	23 to 27

Heat treated duralumin forgings have similar physical properties.

Heat treated and hard rolled duralumin is used where no bending or forming is required. It is a very hard,

*From a paper by Robert W. Daniels, metals division, Baush Machine Tool Co., Springfield, Mass., read before American Gear Manufacturers' Association, Oct. 14.

strong, springy metal in this state, and takes a polish. Its physical properties in this form average:

Ultimate tensile strength per sq. in., lb....	67,000 to 72,000
Yield point per sq. in., lb.....	58,000 to 65,000
Elongation in 2 in., per cent.....	3 to 8
Brinell hardness	130 to 140
Scleroscope hardness	39 to 42

As a Material for Worm Wheels

From the general description of duralumin it will be readily seen that it is an ideal material for worm wheels provided the bearing or wearing qualities are satisfactory. For a given section the weight is one-third that of the conventional bronze. The tensile strength and relative high elastic limit ensure superior tooth strength. The homogeneous structure and uniform hardness of heat treated duralumin forgings ensure entire freedom from hard spots, porosity and spongy areas.

Comparative tests of bearings made from duralumin against bearings made of genuine babbitt show that for shaft speeds exceeding 700 r.p.m. and loads over 200 lb. per sq. in., duralumin bearings develop less friction, remain cooler and show practically no loss in weight under most severe conditions. It is needless to say that for lower bearing pressure and slower speeds, babbitt metal is superior.

A considerable number of duralumin worm wheels are now actually in regular service in trucks ranging from 1 ton to 3½ tons capacity. These wheels have been in service from a few weeks to over two years without any failure.

For General Gearing Purposes

The same qualities that make duralumin a desirable material for automotive worm wheels also make this material valuable for plain spur and other gearing. It is suitable for this class of work where the pressures are sufficiently within its elastic limit of 30,000 lb. Where this condition is met, the weight and quietness are desirable, it replaces iron, steel, brass, fiber, fabric, etc. Where duralumin can be run with steel rather than against itself the best results are obtained. An example of this application is found in the timing gear trains of automobile motors where both long life and quietness are essential.

Helical cut spur gears of duralumin alternated with steel gears have been successful in service. Detailed test reports are not especially interesting as the gear design varies with every motor, but the fact that upward of 60,000 durâlumin camshaft and idler gears are now in use, is conclusive.

That duralumin gears when meshed with steel gears are quiet may seem somewhat paradoxical since when struck, all duralumin forgings are resonant. The explanation is undoubtedly due to the difference in pitch of the sound vibrations of steel and duralumin. This, of course, is only true when the mass and section of the duralumin gear is properly proportioned to the steel gear.

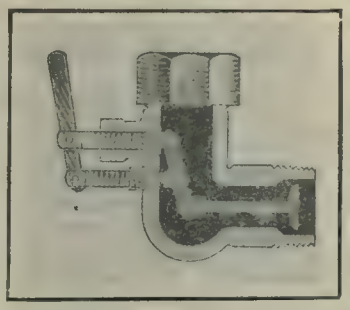
Discussion

The discussion revolved largely about questions put to the author. He pointed out that as duralumin in cast form required dies, it would be necessary to have quantity enter into a contract to compete in price with bronze. It has no great advantage, he added, as a casting metal. Under a welding torch, the material behaved like alloy steel—that when it is possible both to work the metal and heat treat it, the original structural condition can be regained after the welding. He did not recommend using heat treated duralumin forgings much above 450 to 475 deg. Fahr. In machining, the material behaves much better when heat treated than when annealed, the latter tending to pile up on the cutting tooth being tough rather than brittle. Duralumin should not be used on mild steel shafts as a bearing metal but on hard shafts, it is satisfactory. It does not compare with babbitt metal but with bronze.

The Wisconsin Steel Works, South Chicago, Ill., has commenced the construction of a coal storage dock of from 75,000 to 100,000 tons capacity to serve its by-product coke ovens.

Safety Gage Glass Valve

An automatic valve for use with gage glasses of steam boilers and for use in piping systems as a safety in the event of a breakage in the line has been put on the market by the Mattingly Automatic Valve Co., Inc., St. Louis. The accompanying sectional drawing will indicate its construction and method of operation. The main and auxiliary valves travel in opposite directions and cannot both be seated at the same time. The operating lever is for manual operation and its position indicates if the valve is open or closed. Movement of the operating lever may cause the main valve to move from its seat and the auxiliary valve to be seated. The pressure exerts itself against the auxiliary valve, holding it to its seat, and then should the gage glass be broken and the pressure be no longer confined, the auxiliary valve is relieved and the main valve is driven to its seat. No packing is used around the stem of the auxiliary valve.

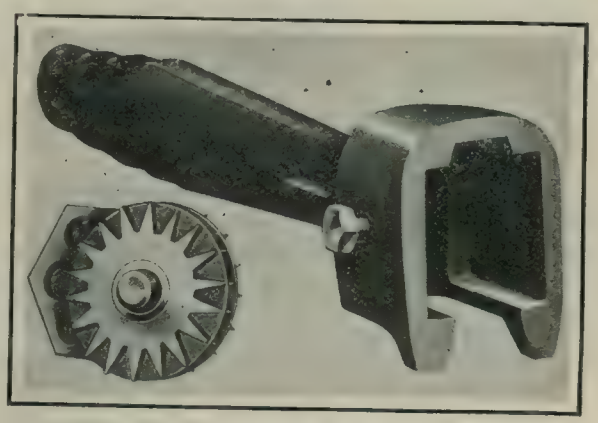


Automatic Valve for Safety

New Grinding Wheel Dresser

A grinding wheel dresser, designed to avoid troubles arising from the wearing of bushings by the use of a new contrivance, is now made by the Desmond-Stephen Mfg. Co., Urbana, Ohio. The inner side of the jaws of the dresser, which is known as the Desmond-Hex, is channeled to receive a removable hardened hexagon nut in which are drilled six holes. These holes act as bearings for the spindle carrying the cutters.

When wear is shown in the hole the nut is removed by loosening the screw holding it in the handle. It is then given a sixth turn and replaced. This presents a new pair of holes for the spindle, and the process is continued until all the holes have been employed as bearings. Meanwhile the handle has received no wear and the hexagon nuts may be replaced.



The Desmond-Hex Grinding Wheel Dresser Employs a Hexagon Nut Containing Six Holes for the Cutter Spindle, One to Be Used After the Other as Wear Requires a Change

The dressers are made in two sizes, one for use on ordinary wheels and the other for use on large and coarse wheels.

Criticism of Congress for its dilatory tactics in regard to taxation problems, was voiced at a luncheon given by John E. Edgerton, president National Association of Manufacturers, to the Cincinnati members on Oct. 14. Mr. Edgerton said that what the country needs most of all is to be told by Congress just what its taxes are going to be. James A. Emery, chief counsel of the association, also spoke at the luncheon, which was attended by approximately 400 manufacturers.

Threat of Railroad Strike Calmly Received

Iron and Steel Manufacturers Show No Excitement on Account of Threats—General Belief That Employees Could Not Succeed

THE announcement made in the Sunday newspapers that the leaders of the five large union organizations of railroad employees had ordered strikes of these employees to commence Oct. 30 to Nov. 3, so as to attempt to paralyze the whole railroad transportation of the country came as a distinct surprise. While it was known that strikes had been authorized, it was not deemed at all probable that the union leaders would take any radical step at this time, when large numbers of men are out of employment.

The feeling of surprise has not been accompanied by any excitement so far as the iron and steel interests of the country are concerned. In fact, telegraphic reports to THE IRON AGE from the leading manufacturing centers indicate that the possibility of a nation-wide strike is viewed calmly and there is a general feeling that if there must be a strike, no better time than the present could be selected. In some circles there is a fear that a compromise which will not be satisfactory or enduring will be agreed upon.

The rapid increase in the use of motor trucks and the possibilities of using them to relieve conditions are frequently cited by those who believe that the strike would not be of long duration and would end in an early victory for the employers.

Perhaps the most gratifying news is that which comes from Washington indicating that the National Administration will take a firm stand back of the Railroad Labor Board. It is recognized that at the time Congress obeyed the demands of the labor unions in 1916 and passed the Adamson act to prevent a strike there was no labor board to which such controversies could be referred.

Some Increase in Demand Expected in Philadelphia

PHILADELPHIA, Oct. 18.—Some stimulation in the demand for pig iron, steel, coke and coal is expected this week if President Harding's efforts to prevent the strike of railroad workers do not promise success. The purchasing agent of one of the country's largest consumers of steel was here yesterday in an effort to speed up shipments of steel and to place other orders to forestall any stoppage of work at his plant by reason of a shortage of raw material. Generally, however, there has up to this time been little increased demand because of expectation of a railroad tie-up.

Almost everyone expects that the strike will in some manner be averted, though there are many who declare frankly that a culmination in a strike of existing differences between railroad executives and workmen would not be such a calamity as it is pictured in the daily press. The feeling is general that railroad employees are now a favored class and their wages must be liquidated to a point in harmony with what men engaged in similar activities are paid to-day, this feeling being based largely on the premise that railroad freight rates must come down as a prelude to a return of prosperity and that liquidation of wages is an essential corrollary of freight rate reductions.

Pittsburgh Not Excited About Strike Prospect

PITTSBURGH, Oct. 17.—It would be exaggeration to say that the possibility of a railroad tie-up, as threatened by the railroad labor unions, is viewed with only academic interest in the iron and steel and allied industries, but if there is real concern over this eventuality, it is not yet apparent. Uneasiness would be sure to crop out, if anywhere, in the fuel market; for it would be necessary for blast furnace interests to accumulate a reserve supply of coke, if for no other reason than to be able to bank the furnaces and thus escape the expense of blowing out and in, while coal obviously would have to be stocked if boilers and by-product plants were to be kept warm, even assuming temporary plant suspensions. It is the experience of important coal and coke interests here that as yet consumers are not seeking additional tonnages, and efforts to induce purchases on the basis of the possible transportation tie-up have not been successful. Pittsburgh would suffer little from a railroad strike in the matter of coal supplies for the reason that enough could be moved in by water to at least keep the plants going.

There is no scramble on the part of melters of iron to speed up shipments or to make fresh purchases to meet the possible exigency. Rather, the pig iron producers are finding melters more concerned in trying to get prices down because of the recent ore freight reduction. What is true of pig iron is largely true of scrap, in which there is a notable lack of any nervousness on the part of consumers. There is no rush of orders with the steel makers because there may be a suspension of railroad operation. The explanation is simple. If the steel works and foundries cannot get raw materials in, they cannot, of course, get the finished products out. Moreover, jobbers and consumers feel that if there is no strike, freight rates will be cut and they will benefit, while manufacturers hesitate about filling up their customers at current prices and freight rates because of the reaction against them in case there proved to be no occasion for the loading up. The dilemma is two-horned.

The industry, by and large, is taking the strike prospect calmly. It is generally the opinion of the trade that if the railroad union leaders are so blind to the best interests of the country as a whole as to order the strike, the worst that could happen would be a tie-up of only brief duration, and this is regarded a better time to settle the issue of whether less than 1,500,000 men shall dictate to the other 105,000,000 people of the country than if business were normal and it were very essential that materials be moved quickly. It is no secret that railroad officials are indifferent to the strike and some actually would welcome it, firm in the belief that the men would be beaten and thus hasten

the end of present conditions, which give the unions the whiphand in the operation of the transportation arteries.

Another reason for the apparent calmness is a belief that there will be no strike. Presidential interference means that the union and railroad officials will be brought together and many observers are confident that an amicable settlement will be reached. The railroad officials are not entirely free from responsibility in the development of this crisis, for instead of first reducing rates and then wages, they have sought to cut wages first. The steel industry cut prices before it cut wages, and the railroads could well take a leaf from the steel companies' book.

Thousands of Motor Trucks Available at Detroit

DETROIT, Oct. 18.—Although the feeling in Detroit is decidedly sceptical as regards the probability of a railroad strike on the scale that is announced, nevertheless the city is marshaling its forces against the possibility of a general tie-up.

Between 4000 and 5000 motor trucks owned by members of the Detroit Transportation Association stand ready to haul foodstuffs and other necessary freight in and out of the city over a radius of at least 300 miles. Besides this there are nearly 40,000 commercial vehicles of all kinds in the city that will be available to some extent for intercity hauling.

The Detroit, Toledo and Ironton Railroad, Henry Ford's line, will not be affected by the strike and is preparing to handle Detroit's coal supply during the period of strike.

The Detroit United Railway electric lines are preparing to handle the city's milk supply. An additional resource in this respect is the Canadian railroads which terminate in Windsor, Ont. According to competent authorities, the city has at least two weeks' food supply in storage and also two weeks' coal supply, for all purposes. It is estimated that the price of coal in Detroit would probably reach $30 a ton if the strike should be a protracted one.

According to industrial authorities of the Detroit Employers' Association and the Board of Commerce, the factories would be forced to close down in three or four days after the walk-out, this because of lack of materials. While a majority of the Great Lakes boats are now laying up, a railroad strike would cause the return of most of them for a period as long as good weather lasts. The only class in Detroit which appears to believe that a railroad strike is imminent is that of the railroad officials. It is stated that until last Saturday they scouted the idea of a strike, but to-day found them mostly inclined to believe that it would take place, although perhaps not on as great a scale as the employees announce. The general public appears to feel that the strike would be so unpopular that the rail employees would lose more by it than they would gain.

All agencies within the city, such as the Board of Commerce, Transportation Association, Employers' Association, etc., are preparing to do everything in their power to help break the strike. According to transportation men, it may prove desirable to establish a centralized truck transportation directorate. This work would probably be handled through the Detroit Board of Commerce.

Out in the State, the general feeling is much the same as in Detroit, according to newspaper dispatches. Nearly all of the industrial cities report that industries for the most part have at least a ten day supply of coal, and in some towns even a month's supply. The wide growth of truck transportation in Michigan is taken as an indication that the situation will be handled without the dfficulties that the rail employees predict.

St. Louis Preparing for Emergencies

ST. LOUIS, Oct. 18.—The furnaces of the St. Louis Coke & Chemical Co., the only producer of pig iron in the St. Louis industrial district, are banked, but they are preparing for any emergency by taking in as much coal as possible, adding to a very liberal stock already on hand. The National Enameling & Stamping Co. is going right ahead with its operations, which are now within 40 per cent of normal, and will be prepared to continue operations at least two weeks after a strike is called. It has ample storage capacity. It has its own locomotives, and is preparing to use motor trucks to make delivery to its two other plants in the district and to nearby customers. The Commonwealth Steel Co.'s business is confined to railroad work, and it does not expect to be affected.

Believe Suspension Not Unmixed Evil

YOUNGSTOWN, OHIO, Oct. 18.—While steel manufacturers of the Mahoning Valley do not view with anxiety the threatened strike of railroad workers, they say a tie-up of the country's transportation would compel them to close their plants. They believe the probability of the strike taking effect is not so great as would appear, and if it should materialize, it will be of short duration. Members of the brotherhoods will be slow to act in a movement that will deprive them of seniority rights, which they have worked years to establish, it is declared; furthermore, they will be deterred by the fact that many unemployed are waiting to step into their places.

"A strike would undoubtedly cripple the district," states a leading independent executive. "We would be paralyzed in the matter of getting in fuel and rail materials and shipping finished products. There would be but one thing to do, suspend."

"It might be a good thing for the steel industry to suspend for a time. While suspension would not reduce our overhead losses, it would cut down operating losses which most steel companies have been sustaining for the past few months at prevailing price levels. Financial reports show that most steel producers have been losing heavily.

"Maintenance of steel operations for any period whatsoever is largely dependent upon transportation and any interference with transportation and especially with the movement of fuel will halt production. Some finished steel could, of course, be moved in motor trucks, but this has not proved practicable for long hauls.

"There is no question that the railroads should re-

duce their rates. If the railroad employee is compelled to accept a cut in wages, the railroads should respond with a reduction in freight charges, and that at once. Readjustment of business and industry demands such changes and the consumer should get the benefit in cheaper hauling charges. There is little we can do to protect ourselves against a railroad strike because transportation is so vitally essential to steel plant operations. But I hardly believe the railroad brotherhoods will throw the country into a turmoil, when public sentiment is so strongly for readjusted levels in all lines of activity."

Barge State Canal Would Help

BUFFALO, Oct. 18.—Buffalo district producers of pig iron and steel products are facing the railroad strike prospect with less worry than interests in some other centers. The availability of the New York State barge canal as a shipping medium to the East and convenient lake transportation to points west would do much to relieve the situation until freezing weather prevented. Central and eastern New York buyers would be served by the canal. Difficulties growing out of the use of the canal by virtue of the fact that consumers are not in close proximity to the State waterway would be met by the use of trucks. Use of the canal has not been popular this year because of the availability of cars and the switching necessities lacking where boats are used, but in general the district will not suffer complete idleness.

Shipping of pig iron and some other products was accelerated on receipt of instructions to furnaces today. One interest was advised by two of its heaviest buyers of pig iron to double quantities placed in transit daily. Sufficient time has not elapsed in the opinion of selling interests for buyers to have taken action. For that reason and also because of a general belief that the strike will be averted, there has been no rush of orders for material. With the majority of interests there is sufficient raw material on hand to permit operation without interruption for a number of weeks. One pig iron producer found it expedient to defer shipment of ore by water pending the new rate becoming effective. This is taken to indicate that this interest would not be embarrassed by a long drawn struggle involving a tieup of the roads. Lake navigation is open until December at least and weather conditions at that time becomes the governing factor.

Alabama Well Prepared for the Strike

BIRMINGHAM, ALA., Oct. 18.—Iron and steel producers display no special uneasiness over the threatened railroad strike and are doing little in the way of anticipation. Furnace interests are well provided with stock of ore and coal accumulated during the non-production period. These stocks were greatest on record Oct. 1. A prominent producer said to-day: "The railroad workers could not have chosen a time to strike better suited to Alabama iron and steel interests. The furnaces least advantageously situated can operate six weeks without taking on new raw material. One large iron interest assembles all its material on its own property with its own motive power. This and another iron producer can exchange raw material with their two connecting lines. As for us, I see no occasion for unusual process other than to increase coal output."

A large iron operator said he has not given the matter a thought because it was not a pressing matter. Local iron and steel consumers are not worried over operations, because they also have large stocks. As a rule, they can get steel direct from mills by truck, if necessary.

A protracted strike would have injurious effects, they admit, but no interest seems afraid of the first month or six weeks of the strike. The Atlanta, Birmingham & Atlantic will not be affected by the strike and that will help. A canvass of commercial producers and consumers failed to elicit any note of special anxiety. The only nervousness extant was among coke consumers who are ordering shipments anticipated. A few small iron consumers are doing the same. They are from a distance.

Administration Will Take Firm Stand

WASHINGTON, Oct. 18.—While making no attempt to minimize the effect of the railroad strike should it actually come, there is a growing conviction that it will be avoided. An undertone of confidence prevails among Government circles that preparations through co-ordination of departments already made give assurance that even if the strike orders stand, transportation can be maintained on a basis that will practically meet demands. Attention will be given primarily to the movement of mails, foodstuffs, fuel and clothing, but also will be directed to shipments of raw materials and manufactured products of industries. This belief in the ability of the Government to handle the situation is heightened by claims of railroad operators that service can be maintained and the latter apparently reach this conclusion through the impression that if the strike comes, 40 per cent of the workers will decline to go out, among them skilled employees, such as many enginemen, who, it is argued, would be unwilling to forgo seniority and pensión rights that would be lost if they threw up their jobs under the circumstances.

In view of the present condition of unemployment, it is claimed that those going on strike could be replaced in large part and added aid given by motor service by use of 33,000 Government trucks now available and airplanes, which would be employed most extensively in carrying necessities of life and mails. There can be no doubt that any attempt to interfere with transportation in any form would be dealt with sternly by the Government. It is equally as certain that the Administration is solidly back of the Railroad Labor Board. It is felt that the test may be at hand as to whether this agency, created by the transportation act, is a helpless organization whose findings may be disregarded at will by either labor or railroad interests. Aside from authority to cite either side for refusing to abide by its decision, the board has no arbitrary power, but rests its strength in public opinion and organized society. Because of the threat of the railroad brotherhoods to strike by reason of the 12 per cent

reduction in wages authorized by the board last July, labor has put itself in an untenable position and lacks public sympathy. The declaration of a strike merely on the announcement of the railroad executives to apply immediately to the board for a further reduction of 10 per cent in wages and to pass the benefit to the public in the way of a cut in rail rates, is accepted as ignoring the board by proposing action before it has an opportunity to pass on the application.

At the same time, irritation is felt toward the railroads for taking the adverse attitude toward the proposal of the public group of the board that the rate reduction be effected immediately and further wage reductions be subject of review. However, readiness of the brotherhoods to meet the Labor Board in Chicago Thursday had a favorable effect in Administration circles and increased the hope that the strike would be averted. But regardless of the attitude of either brotherhoods or railroads, strong reason exists for the belief that this procedure will be adopted.

Reports have come from authoritative sources that a rate reduction of a widespread, if not general character, is about to be ordered by the Interstate Commerce Commission. This would mean that transportation costs would be lowered more than those made before the labor board had passed on the application of the railroads for a further cut in wages. It is claimed that this proposal, reflecting the opinion of the public group of the Labor Board, was approved by the Interstate Commerce Commission at conferences here and was recommended to the President and received his sanction. What the prospective rate cut would amount to is not known definitely, but it is reported to range between 10 and 15 per cent. Because of the financial condition of carriers, it is thought this would eventually mean further wage reduction. With the wage cut of 12 per cent in July and with the proposal of the railroads to make a further cut of 10 per cent, this would wipe out 22 per cent of the wage increase in 1920, should the 10 per cent cut be effected.

Cincinnati Views the Situation Calmly

CINCINNATI, Oct. 18.—The possibility of a railroad strike on Oct. 30 is being received calmly by the business interests of Cincinnati. Official recognition of the possibilities is being given, however, and steps are being taken to organize to meet any eventualities. According to fuel dealers, the city is well supplied with coal and coke to meet any conditions, and with the Ohio River transportation facilities available, there is little danger of a food shortage.

The iron and steel industry will be little affected. The metal working industries are running only approximately 20 per cent of normal, and stocks of iron, coke and steel products are sufficient to take care of all needs for some weeks in the event that a strike becomes effective. A canvass is being made of the possibilities of shipping by motor truck to inland towns and steamboats to points along the river, and if necessary, transshipment by motor vehicles. No figures are available as to the quantity of gasoline in storage, but estimates made are that with conservation measures effective, there will be sufficient to keep the wheels of industry turning at their present rate at least.

The feeling is general, however, that a strike will in some way be avoided, and for that reason no actual preparations are being made as yet to meet the situation. Steel mills operating in the territory report that no steps will be taken to move their products in case of a strike, though consumers within a radius of 50 miles will probably be kept fully supplied by the aid of motor trucks.

Not Taken Very Seriously at Chicago

CHICAGO, Oct. 18.—The strike threat of the railroad brotherhoods has not been taken seriously by producers and consumers of iron and steel in the Chicago district and no especial preparations are being made to meet any situations which might arise in the event of a walkout. It is not believed that the unions actually expect to carry out their program, but that in some way they will find a valid excuse for changing their plans. It is felt that they are cognizant of the fact that public sentiment would not be behind them and that many shippers would actually welcome any inconvenience and loss which might result from a transportation tie-up for the sake of having a decisive settlement of the issues involved. It is pointed out that, if a strike comes, it will take place at a time when it will do the least harm to industry, as current business is still far below normal.

Producers are well stocked with materials so that they will be able to operate if they find that they can continue to ship some of their finished products. Users likewise are not worrying about supplies. Forty foundries in Chicago and immediate vicinity are well stocked with coke and have sufficient iron to keep them running at the present rate of operations for several months. They are not worrying about deliveries of castings, as they all have motor trucks which they can use to move their products to customers in Chicago and surrounding territory.

In railroad circles, opinion is divided as to the probability of a strike. It is generally agreed that the unions do not want a strike, but at the same time it is believed that neither the men nor the managements will alter their positions, unless the Government interferes. It is no secret that the railroads hope that the strike will come so that they can free themselves once and for all from the incubus of a heavy wage burden and a maze of working agreements which blocks all their efforts in the direction of greater operating efficiency. That the Government will probably use every influence to forestall a strike, as anticipated in railroad circles, is indicated by the fact that the Railroad Wage Board has invited the brotherhood heads to a conference at Chicago on Oct. 20.

In some quarters the possibilities of a coal strike are regarded as less remote than those of a transportation tie-up. On Oct. 28 Federal Judge Anderson at Indianapolis will render a decision which will definitely determine the status of both operators and mine union executives who were indicted about a year and a half ago. The indictments not only bring into question the legality of the wage agreement between operators and miners but challenge the check-off system without which it is believed the unions could not exist. A walkout by the miners in the event of an unfavorable decision is expected by the operators. On the other hand, industrial users of coal feel that conditions are not right for a successful strike and that the union executives are well aware of the fact.

Machine Tool Builders in Convention

Cost Accounting, Standardization and Statistical Service for the Industry Are Chief Topics at the New York Meeting

THE National Machine Tool Builders' Association opened its twentieth annual convention at Hotel Astor, New York, Tuesday morning. Only a partial report of the opening sessions can be given in this issue.

There was a fairly large attendance.

August H. Tuechter, president of the association, in his opening address, said in part:

"In welcoming you to this convention, I do so with the solemn feeling that I am called on to preside at the most important annual meeting the association has yet held. Since last year we have been passing through a period of dullness that is the worst we have had since 1893, and in proportion to the present capacity of the industry is very much worse than any we have ever had. We had four years of false prosperity, due to the war, when our industry was called on to increase its capacity and output far more than we ever dreamed possible. How well it met the call is a record to which we can point with pride.

After the armistice we had a slackening in business which we rather expected, but to our surprise another period of false prosperity began in 1919. However, this did not last long because new orders fell off from January, 1920, and kept slipping down until July, 1921, after which August developed a slight up-turn which however did not continue during September.

"As this depression came on us, I believe that most of us felt that it couldn't last long nor be very bad. An industry that has had seven slumps in 21 years ought to have its eyes open and be ready for one almost any old time.

"Now, then, let us not make this same mistake again. We have a thoroughly competent observer on watch [the new general manager of the association] who will warn us of shoals ahead and of clear sailing, of the rise and fall of our business barometer. Let us now do the things necessary to help him correct and revise our barometer. It is ours—for all of us—but some don't know it even exists. Some prefer to sail without it. Some will not help, either through lack of knowledge or fear of damage to their own craft.

Waste in Industry

"As the members know, before his selection as Secretary of Commerce, Mr. Herbert Hoover, as chairman of the American Engineering Federation, asked a committee of distinguished engineers to estimate the amount of waste in industry, the object being to call the public's attention to the sources of waste and to arouse industry to the necessity and profit of eliminating waste.

"Fred J. Miller, former editor of the *American Machinist*, was active in this committee and asked the association's assistance in making some studies of the machine tool industry. This assistance was given, and the investigation seemed to show a probable waste of about 40 to 45 per cent. The report of the committee is very interesting, and it shows that in the machinery industry not a large proportion of this waste can be chargeable directly to labor restrictions; therefore, the responsibility for elimination of waste in the machinery business rests largely on the shoulders of management.

"There is a very large excess of facilities that are not used to the fullest extent. There is badly planned management. Efficient planning and guidance of production is the duty of management. Better employment service and policies lie within the power of management, and not of the employees.

"The old proverb says that a dollar saved is a dollar earned, and I recommend to our members that we ourselves look to every opportunity to save waste in our own shops—wastes of every kind in plants, in time, material, organization, and costs.

Work in Cost Accounting

"Since our Cleveland meeting, Scovell, Wellington & Co. have made cost surveys for a number of our members. The cost work of the association should be continued until the members are all found to be figuring the proper elements of cost. Unless they do so they have a false basis on which to base their prices. The man who does not charge enough into his costs is very prone to make mistakes in his prices, and his cost system should automatically provide for the proper charges. Most of our men can easily get their labor and material, but the burden distribution is the part of cost-keeping that presents the most difficulties, and many people are inclined to neglect it just because it seems too difficult.

"Those members who have not yet had the survey made of their plant should do so, and should consult with the accountants as to what parts seem to be deficient in their system to bring it in line with the uniform plan adopted by the Cleveland convention.

"If all of us had used the device of calculating a normal burden, and putting away cash reserves in boom times to carry over depressions, our industry would be in a much healthier position than it now seems to be. Several members have written that they could not spare the money it would cost to attend this convention. Is that not evidence that there is a necessity for some of this cost accounting work?

Statistical Service

"The most promising, the most necessary activity which the association has undertaken this year is the organization of statistical service for each group of tools for which it is possible to render such service.

"The chart displayed here shows the very great irregularity to which this whole industry is subject, and this excessively high war peak certainly is significant. If the law of action and reaction applies in business as in physics, the industry seems due for a very long reaction to compensate for the excessively lively action that we had during the war.

None of us can judge our wisest course merely from our own experiences with anything like the soundness we could have by pooling our information through a statistical service. Other trade associations find this to be the most valuable service they can render their members, and I personally am fully convinced of that fact. The whole world gains much from the monthly reports of output that the iron industry has published for many years. All industry is closely related, and by proper study and interpretation of conditions, it will be possible to better stabilize industry, to have ready for the consumer all the goods that he needs, and not to have an excess of goods when the consumer is not likely to need them. The lone manufacturer confronted with such a business situation as we have now is groping blindly if guided only by his own knowledge. He is much more subject to losses than if he had full information as to the total current output and sales of his particular product, together with reliable information as to finished stock on hand, the amount in process, and the rate at which this stock is moving out. It is very valuable when these items are compiled, to compare one's own experience with the consolidated figures for the whole group. Each can determine how his own sales compared to those of all other producers as a group, and how far he is justified or not justified in making special sales efforts.

"It is of the greatest value at this time for each group to take its shipments for the last 20 years, as some groups have done. We are thus able to form a pretty fair conclusion as to the pre-war trend, and in the light of that, to plan intelligently our policies in the future. This composite curve before you is significant, but is not as valuable as the group curve showing your own products. Then with the monthly reports and charts for each group, the actual flow of business in the group is very well seen, whether it be good or bad. Without it, you can only guess; with it, you can reasonably estimate.

"Our own statistics of this sort can be made of great value to the country because indications are that our own slump in any period of depression precedes a general business slump by some months at least, perhaps by a year. In exchange for this information from us we can hope to secure similar information from other industries whose activity precedes ours on the rise. Then we will know the right time to make stock and to get ready for the prosperity that will occur during the following cycle.

"Such co-operation between industries depends on co-operation between individuals in each industry. Such work cannot be done by any individual alone. In such co-operation lie great possibilities of benefit to all members of a group.

Regional Meetings

"A promising innovation in the association's work has begun this year by holding two series of regional meetings. One series, conducted by Mr. Scovell of the Scovell Wellington & Co., discussed our uniform cost plan, and the second, conducted by our general manager, discussed general conditions in the industry. Letters that came into the office commend the work in these meetings in the highest terms.

"The work of an association must necessarily be informational—that is, it must gather and spread information. Regional meetings should be a part of our program from now on. At these meetings not only should the heads of the concerns be present, but they could well have present the men known as junior executives, who are in responsible positions, and who gradually grow up to be heads of concerns. The education of such men in the broader aspects of this business can have only a good effect. The principles and the difficulties underlying the development of this industry might well be laid even before the workmen, who are prone to think that the bosses never have any troubles.

"There are many possibilities in these regional meetings and they can well be developed.

Standardization of Tools

"For many years this association has talked about the possibilities of standardization. The time now has come to stop talking and go to work. The American Society of Mechanical Engineers has taken up a number of subjects that directly concern the machine tool builder, and we shall have to be represented on committees on these subjects.

"A recent letter from Sol Einstein, chief engineer of the Cincinnati Milling Machine Co., who is now in Germany, says that the German machine tool builders are very busy with standardization work. I do not need to go into this in detail. You know it is needed, for many reasons, and each committee should seriously and promptly formulate opinions as to what things can be standardized and then go into the work of standardization itself.

"The general plan could be to have a general committee of the association which can make recommendations to the Engineering Standards Committee. Each machine group should have a special committee on standardization which would report its findings to our general committee, for transmittal as above mentioned. This is the practice of other organizations. We should take our proper position on these matters. If we do not do this work ourselves as affecting our own interests, we will have no just cause for complaint if some others attempt to do it for us and then do it badly, for lack of understanding of our problems.

"We should not let the matter lie as we have heretofore, but we should make this a very vital and active part of our association program. It will finally be a very profitable undertaking, as has been demonstrated with standardization work in other fields.

The New National Office

"I consider it necessary that I at this meeting of the association make some reference to the National Association office which has been open in Cincinnati since Jan. 1, 1921. To get the office into shape, properly equipped and running, was naturally the first task which confronted Mr. DuBrul, and with this accomplished he went to work with a vim and vigor which must be seen to be appreciated."

Ernest F. Du Brul, the new general manager of the association, commented as follows on the work which the organization is doing and can do to make its work of the greatest effectiveness for the members:

"In the 20 years of its existence the National Machine Tool Builders' Association has done good work, but compared to much younger associations, its activities have been limited. Many activities now successfully pursued by other organizations can well be followed by this association. The necessity of other work besides good fellowship and acquaintance among competitors, has led many trade organizations into much more active work.

"The Machine Tool Builders' Association has done extremely well, in the matter of cultivating good fellowship and confident knowledge that the word of one's competitor was good. When the association was organized a machine tool price list meant nothing except the salesman's maximum limit; to-day, in spite of the depression that exists in the business, a machine tool price list means just what it says, in the vast majority of cases. The ethical standard of the machine tool business on that one account is vastly improved over what it was 20 years ago. Such a betterment of ethics would not have been possible without the good fellowship and confidence that this association has brought about among competitors.

"The association's co-operative work of the past should not be minimized, but now the conditions are such that unless co-operative work of a much higher type be undertaken in more and newer ways, the association will fail of reading its highest value to the membership, who are paying for its operation.

"I have tried to make it plain in bulletins, in the regional meetings, and in the Cleveland convention, that association work should be regarded by the members as a strictly business proposition. The association will be more and more successful the more the members do so consider it. They should weigh its worth to them against the dollars they pay out for it. Unless they do so look upon it, they will not co-operate in the things that they are asked to do. Those who seriously regard the association office as just as much a part of their every-day organization as though the association office were under their own roof, will co-operate to the fullest extent, and will be repaid many times over.

"The economic upset the world has been going through and the present depression in the machine tool industry require real service along economic lines. This is no time for puttering with business problems. On the other hand, it requires of every man the deepest thought, and most serious study, if he would keep his own business and his industry in a healthy condition.

Statistical Work for the Various Groups

"It is well demonstrated by many trade associations that the most valuable service that can be rendered is to gather and distribute statistics of production, shipments, stocks and sales. Without information of this sort, each manufacturer must simply grope blindly in the dark, making the wildest kind of guesses as to conditions that he must meet. The poorer his information of a general situation, the worse his guess is likely to be.

"Every man wants to know and should know whether he is getting a fair share of what business is going at any time. He can tell this only if he knows

the total volume in his line being sold in a month. If he knows that the present state of demand is only 50 machines a month, and if he knows that he is getting his share of that limited demand, he will not be tempted to do things that compel his competitors to enter cut-throat fights for business. But if he is ignorant of the true facts he is pretty sure to do something that will work against his own pocketbook, and everyone else's, including the consumers'.

"In no other way can he know, except by joining with his competitors in compiling a composite report of the conditions. When he has that report he can then set his own conditions up alongside not only of the condition of the group as a whole, but of his competitors as a whole with himself excluded.

"To develop that sort of information for each group, we are organizing monthly statistical services by groups, of orders, cancellations, production, shipments, factory stocks and dealers' stocks. The shaper, radial drill and upright drill groups have already put this regular service into operation.

"One reporting group found that of certain sizes of machines the factory and dealers' stock is sufficient to supply demand, at the current rate, for something like 36 months. Can any man think that to be a healthy condition? Remember that those stocks were accumulated at high costs, and now have to be liquidated in the face of much lower replacement costs. The difference in cost went to the workers and the material men, but it will never come back into the bank accounts of the men who accumulated those stocks in over-anticipation of their demand. If they had had this sort of service in the last two years they would have real money in good, select investments bearing high rates of interest and increasing in value. Instead, they have it tied up in stock that not only earns no interest, but costs interest to carry, and besides creates loss and demoralization, as overstocking always will do in every industry.

"Is it not plain that when an industry as a whole provides far more production capacity than the demand of its customers justifies, that industry is not going to pay a reasonable rate of return on the investment so made? True, some individuals in a group might generally be able to earn a fair return on their own capital, but when demoralization of price occurs, because of blind guessing on the operation of economic forces, even sound, well-managed concerns cannot hope to make the earnings that their efforts and capital at risk really justify. This does not mean that there shall be any conspiracy or agreement among competitors, but it does mean that each competitor, individually, can know the true condition, and knowing it will be able to keep his own business in sound condition. Naturally, if all, or a great majority are doing the right thing, the industry as a whole will be healthy; but if a majority are doing the wrong thing, all will suffer.

Barometer of Trade

"The barometer chart figures that we have been issuing every month are far from being as satisfactory as they can be made. As I have said at the group meetings, a feather thrown into the air will indicate the wind's direction better than nothing at all, but it would hardly serve the weather bureau, to measure and record wind velocity and direction accurately enough to predict the general course of the weather.

"From various curves drawn to show shipments of the past twenty years of different sizes of various tools, we can now say that this industry can construct a first-class barometer for itself, if it wants to. This can be done, and at slight cost, but it will require co-operation by the members. Such a barometer can and should be made for each group if the group statistics are better organized and better appreciated. In addition, a general barometer can and should be constructed for the industry as a whole, and it can be done very easily.

"Our member, Mr. Oesterlein, made a suggestion that I believe will greatly improve the general barometer. That suggestion is, that each member report unit orders received each month, giving the number of machines ordered and canceled, and the balance of unfilled orders, the report blank being arranged to show the value of machines sold in classes according to a scale of values to be decided upon.

"It is fairly evident that the lighter machines are most sensitive to rising demand because they do not require buyers to make much cash outlay, and such types naturally are the greatest in numbers sold every month. We have now sufficient evidence on which to base a fair presumption that as the lighter machines precede the heavier ones in activity on a rising market, the heavier ones show a slump coming long before the lighter ones do. Therefore the interests of builders of heavy and light machines are mutual in having information as to the course of the general market from month to month.

"As a basis of discussion, it is suggested that reports be taken, as follows:

(a)	Machines sold to the consumer at	$300.00 or less	
(b)	Machines sold to the consumer at	300.00 up to	$800.00
(c)	Machines sold to the consumer at	800.00 up to	1,500.00
(d)	Machines sold to the consumer at	1,500.00 up to	2,500.00
(e)	Machines sold to the consumer at	2,500.00 up to	4,000.00
(f)	Machines sold to the consumer at	4,000.00 up to	6,000.00
(g)	Machines sold to the consumer at	6,000.00 up to	10,000.00
(h)	Machines sold to the consumer at	over $10,000	

"Curves of each of these classes would clearly show the trend of business. Low interest rates precede activity in pig iron production, with which we now know the machine tool demand to be closely correlated. With such curves we will then be in a fair position to forecast the movement of machine tool demand.

"If we find the small machines becoming active, we can send out to the whole industry the glad tidings that the clouds are breaking. We know that long before a general boom is at its height interest rates go up and the heavy types of tool fall off in demand, for very well known reasons. When we find this to be showing up, we can hoist a storm signal for the industry, so that all can reef sail.

"If the members will take the very little trouble required to make the reports, the association can easily give all a fine service, at a cost that is negligible compared to the benefit. I strongly recommend that some action be taken along this line, the change to be effective beginning with January next. This would give the members time to get their records in such shape as to enable them to report on whatever basis is adopted."

[Report to be concluded in the issue of Oct. 27.]

Engineering Meetings

Clean cold producer gas from bituminous coal is to be discussed by C. F. Kaufman, gas engineer, Atha Works, Crucible Steel Co. of America, at a meeting of the Metropolitan Section of the American Society of Mechanical Engineers at the Public Service Terminal Building, Newark, Oct. 28. At 3 p. m. in the afternoon an inspection trip is to be made through the Harrison, N. J., works of the Crucible Steel Co., followed by a dinner at 6 p. m. at the Downtown Club, Kinney Building, Newark.

The Indianapolis section of the American Society of Mechanical Engineers is to hold a two days' meeting on Oct. 28 and 29. Among the papers announced are the following: "Stellite Metal and Its Application to the Arts," by Elwood Haynes, Kokomo, Ind.; "Steam as a Motive Power for Commercial Vehicles," by Fred Hamilton, Indianapolis, and "Acid Resisting Alloys—Research Work Covering Non-Ferrous Metals in Its Application to Their Acid Resisting Properties," by George A. Drysdale, Indianapolis. On the second day the engineering buildings and equipment of Purdue University are to be inspected.

The Cleveland section of the society will hold a meeting on Nov. 1 at the Hotel Winton, at which an address is to be made on "Die and Mold Making" by James K. Keller, Keller Mechanical Engraving Co., Brooklyn, N. Y.

The Buffalo section of the society will hold a meeting at the Lafayette Hotel, Buffalo, Nov. 2, at which an address on "Progress in Mechanical Engineering Research" will be made by Prof. Arthur M. Greene, Rensselaer Polytechnic Institute.

PLAN PIG IRON CONTRACT

Purchasing Agents' Association Draws Up Model Form Now Under Consideration

A standardized form of pig iron contract was presented at the annual meeting of the National Association of Purchasing Agents held in Indianapolis last week and will be submitted to producers with a view of securing their approval of the new form. The standard contract form was presented during a conference on iron and steel, the session being presided over by S. L. Plimpton, purchasing agent Wellman-Seaman-Morgan Co., Cleveland, chairman of the steel committee of the association and chairman of the pig iron contract committee of the Ohio State Foundrymen's Association. The Ohio association, together with the Chicago District Foundry Operators' Association, Foundrymen's Association of Chicago, Foundrymen's Association of Wisconsin, Foundrymen's Association of Michigan and Foundrymen's Association of Connecticut are co-operating in efforts to secure a standard form of pig iron contract. Pig iron consumers claim that in contracts used by some producers the buyers' rights are not protected to the same extent as those of sellers in respect to cancellations and to rights to delay in accepting shipments, and the standard form submitted is intended to better protect the buyers' rights.

1. *Terms of Payment:*

Invoices shall be paid on or before the ..... day of each month for all shipments made during the preceding calendar month. Noncompliance with said terms of payment shall give the seller the right to suspend further shipments until all previous shipments are paid for, and if in the judgment of the seller the financial responsibility of the buyer shall at any time become impaired and written notice thereof be given by the seller to the buyer, the seller shall have the right to suspend further shipments until adequate security for payment hereunder is furnished by the buyer. If such security is not furnished within 30 days from such notice, the seller shall have the right to cancel this agreement.

Unless otherwise written in this contract, or point of delivery is f.o.b. cars at destination, all freights are for the account of the buyer, including all revenue taxes which have now or may be hereafter imposed upon transportation facilities and service by Federal or State Government.

2. *Weights:*

All settlements shall be governed by track scales at point of shipment. Buyer shall have access to scales, and the right at all times to inspect and examine them. Any errors in such scale weights when ascertained shall be promptly adjusted. In case scales of buyer should show a material difference, and the buyer proves within a reasonable time that the difference has been due to an error in the track scale at point of shipment, allowance shall be made for such difference; otherwise all claims for shortage shall be made by the buyer upon the transportation company, unless by terms of this contract seller has agreed to deliver to buyer f.o.b. cars at destination.

3. *Contingencies:*

Strikes, fires or accidents at the furnace or furnaces where iron sold hereunder is produced, embargoes, or other similar occurrences beyond the control of the seller (or his principal) which prevent or interrupt the shipment of such iron, shall excuse seller's failure to ship hereunder during the continuance of such occurrence, provided:

(*a*) The seller is the owner or exclusive sales agent of the furnace or furnaces at which the iron sold hereunder is produced, or prior to or simultaneously with the execution of this agreement has entered into a written contract for the purchase of a sufficient quantity of iron from such furnace or furnaces to fulfill the obligation of the seller under this agreement:

(*b*) The name of the owners and location of such furnace or furnaces are stated in this agreement:

(*c*) The seller gives the buyer written notice within five days after such occurrence of the exact nature, extent and probable duration thereof with sufficient detail to enable the buyer to verify the same:

(*d*) The total available tonnage of said furnace or furnaces during prevention or interruption of shipments as aforesaid is applied pro rata on all contracts then in force or any renewals thereof for the output of such furnace or furnaces exclusive of contracts or sales made after such occurrence.

Likewise, in case of strikes, fires, accidents or causes beyond the control of the buyer which wholly or partially stop the works of the buyer, shipments contracted for shall be suspended or partially suspended as the case may require upon written or telegraphic notice to the seller.

4. Waiver by either party of any default by the other hereunder shall not be deemed a waiver by such party of any default by the other which may thereafter occur.

5. Notice sent by telegram or registered mail, addressed to the party to whom such notice is given, at the address of such party stated in this agreement, shall be deemed sufficient written notice in any case arising under this agreement.

6. No understanding, agreements or trade customs not expressly stated herein shall be binding on the parties in the interpretation or fulfillment hereof unless such understanding, agreements, or trade customs are reduced to writing and signed by the respective parties.

Terms and conditions in the contract now in common use read as follows: :

Sellers shall not be responsible for delays caused by strikes, differences with workmen, accidents at works, delays in transportation, car shortage, or any causes not under his control.

Each month's delivery to be treated as a separate contract independent of contracts for deliveries during other months.

In case of any default whatsoever of the seller in regards to installments herein mentioned, the buyer shall not by reason thereof be excused or released from any obligation in regard to other installments.

If the buyer fails to make any payment when due, the seller shall have the right to cancel the contract or at seller's option to postpone shipment of future installments until prior shipments are paid for.

Railroad scale weights nearest the point of shipment shall govern settlement.

The material bought and sold hereunder is for consumption at buyer's works specified.

Resolution Adopted

A resolution was adopted asking that producers and sellers of semi-finished and finished steel show in their invoices, the factors going to make up the total of the invoices, meaning particularly the various extras that are charged. Other resolutions urged reduction in freight rates and requested trade publications not now doing so to quote current prices on most widely used alloy steels and ferroalloys.

Rochester, N. Y., was chosen as the place of the next meeting, which will be held in May, 1922.

New Schedule for Manufacturers

WASHINGTON, Oct. 18.—Director of the Census William M. Steuart has issued the general schedule for manufactures for the census of 1921 which was prepared in co-operation with the committee created at the July conference in Washington of trade and craft associations with Secretary of Commerce Herbert Hoover and officials of the census bureau. The schedule carries several revisions of the tentative schedule which had been sent out for study by manufacturers through the committee of trade and crafts organizations, of which Attorney Nathan B. Williams of the National Association of Manufacturers is chairman, and adopted changes suggested by it as well as by Secretary Hoover. Among the changes is the inclusion of the total salaries paid "salaried employees" and the total wages paid to "wage earners," which the committee had sought.

Because of its simplicity the new schedule differs from past schedules and also varies with regard to the amount of information called for. As outlined, the new schedule covers the following items: Names and particulars of establishments as to location and lines of products; persons employed as salaried employees, including managers, clerks, etc., and total salaries paid; wage earners, including piece workers, and total wages paid; time and operation and products which will be detailed for the particular industries.

The Caucasian manganese ore producers are understood to be holding a meeting in Constantinople, with a view of arriving at a method for the resumption of their export business but, owing to the many conflicting interests, the outlook is not particularly hopeful, says the *Metal Bulletin*, London, England.

Iron and Steel Markets

NO STRIKE FLURRY

Iron and Steel Markets Show Little Signs of Preparation

Weakness in Tonnage Products—Some Rail Releases—Expected Lower Freights a Factor

Producers and consumers of steel appear little disturbed by whatever prospect exists of a general railroad strike. On the one hand there has been no flurry of orders for prompt shipment; on the other hand the strike threat has not stopped buying for other than immediate delivery. Generally, the market has been quieter than in the past two weeks.

Some manufacturing consumers of pig iron and steel who could deliver their own product by trucks, in case of strike, have made an effort to insure raw material supplies. Perhaps in sheets more than in other rolled products mills have been asked to expedite deliveries. Wire nails, in which the final distribution is local, have also been called for in the same way.

In Chicago, Cleveland and some other foundry centers makers of castings are prepared to get iron by truck from local furnaces as well as to deliver castings to local customers. But such expedients would be temporary, as blast furnaces would soon be forced to stop for lack of coke.

The belief that in some way a strike will be averted accounts in part for the generally even tenor of the market. A greater influence than the strike threat itself is the practical certainty of freight rate reductions. Its effect is seen in some withholding of shipping orders.

On the side of operations developments are still favorable. In the Pittsburgh district steel plants are averaging about 40 per cent. At Chicago the largest producer has come up to 44 per cent this week. Two blast furnaces have been blown in this month by an independent producer at Pittsburgh; another has gone in at Youngstown, two at Buffalo and one in eastern New York.

In respect to prices the situation is little changed, plates and bars still tending to yield when a fairly good rolling is in sight. Where important tonnage is offered, bars can be had at 1.50c., Pittsburgh. The tin plate market is weaker and there is not the strictest adherence to the Sept. 12 schedule on all wire products. Price cutting on line pipe has been particularly sharp.

On the other hand two or three more independent sheet mills have quoted the $5 advance announced recently by one maker, and manufacturers of hot-rolled strips, hoops and bands who have taken business at as low as 2c. advanced to 2.25c. on Oct. 15, customers being allowed first to enter orders on the old basis.

A Southwestern railroad which had held up shipments on a rail contract for nine months released 20,000 tons this week. Other releases include 8000 tons and 18,000 tons of rails and fastenings from two Western lines terminating in Chicago. Otherwise railroads have had little to do with the steel market.

Fresh fabricated steel projects of size aggregate 10,500 tons and the awards of the week approximate 10,000 tons. September's rate of business, corresponding to 48 per cent of the capacity of the bridge and structural shops of the country, is being fairly well sustained to the gratification of the fabricating trade, seeing that the volume of business over the last twelve months has engaged less than 30 per cent of capacity.

The prospect of considerable buying by railroad shops is a more hopeful feature of the machine tool market. A list of 75 machines wanted by the Missouri, Kansas & Texas is a leading item and 40 machines are about to be closed for the Lackawanna. New York Central requirements of early 1922 are also being made up and other lines are about to come into the market.

Some foundries have requested that shipments of pig iron be hastened on account of the threatened railroad strike, but they are showing little anxiety. Sales amounting to 10,000 tons have been made at Cleveland and there has been fair activity at Boston and some other centers, but for the most part the market is extremely quiet. Only a few sales for prompt shipment are attributed to the strike situation. Several Southern furnaces are preparing to blow in on accumulated orders, including fair amounts from cast iron pipe foundries.

Dealers in steel scrap thus far have transferred to users little of the material accumulated in the recent speculative advance. In the Chicago district one substantial purchase has been made by a steel company, but generally steel works operations have not been on a scale pointing to heavy purchases of raw materials.

Pittsburgh

PITTSBURGH, Oct. 18.

The effect of the threatened railroad strike upon the demand for iron and steel has been contrary to what ordinarily might have been expected. Here and there foundries have sought to have shipments of iron, due them on orders, speeded up somewhat, and there also have been a few calls upon the coke producers for extra tonnages of foundry coke. These demands, however, have been from foundries not entirely dependent upon the railroads for the movement of their finished products. Generally the strike prospect has dampened the ardor of buyers and business as a whole has been quieter in the past week than it was in the two preceding weeks. The explanation is that very few people expect the strike to take place and if by some possibility it does occur, it would not avail buyers much to have material on hand when it could not be moved out. Producers have been loath to press supplies upon buyers because of the strike possibilities, in the fear that if there is no suspension of railroad operations, buyers would hold it up against them for having loaded them up.

No matter how the matter finally is adjusted, the belief is common here that freight rates are coming down, and to a degree this expectation is responsible for somewhat less willingness on the part of distributors and consumers to specify against orders they have with the mills.

Plant operations on the whole are better right now

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 18, 1921	Oct. 11, 1921	Sept. 20, 1921	Oct. 19, 1920
No. 2X, Philadelphia‡	**$22.40**	$21.84	$21.34	$51.54
No. 2, Valley furnace†	21.00	21.00	21.00	47.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2 foundry, Chicago*	21.00	21.00	22.00	43.00
Basic, del'd, eastern Pa.	20.50	20.50	19.25	51.26
Basic, Valley furnace	19.25	19.25	19.25	43.00
Bessemer, Pittsburgh	21.96	21.96	21.96	48.96
Malleable, Chicago*	21.00	21.00	22.00	46.50
Malleable, Valley	20.50	20.50	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.96	47.96
L. S. charcoal, Chicago	31.50	31.50	33.50	58.50
Ferromanganese, del'd	60.00	60.00	60.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. sheet bars, P'gh	30.00	30.00	30.00	62.50
Forging billets, base, P'gh.	35.00	35.00	34.00	70.00
O.-h. billets, Phila.	35.74	35.74	35.74	60.74
Wire rods, Pittsburgh	*40.00*	41.00	41.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.60	1.60	1.65	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	*1.50*	1.60	1.60	3.00
Steel bars, Chicago	1.75	1.75	1.75	2.73
Steel bars, New York	*1.88*	1.98	1.98	3.63
Tank plates, Pittsburgh	1.60	1.60	1.60	3.00
Tank plates, Chicago	1.75	1.75	1.75	3.03
Tank plates, New York	1.98	1.98	1.98	3.38
Beams, Pittsburgh	1.60	1.60	1.60	3.00
Beams, Chicago	1.75	1.75	1.80	2.83
Beams, New York	1.98	1.98	1.98	3.48
Steel hoops, Pittsburgh	2.25	2.25	2.15	5.00

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Oct. 18, 1921 Cents	Oct. 11, 1921 Cents	Sept. 20, 1921 Cents	Oct. 19, 1920 Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	2.75	6.75
Sheets, galv., No. 28, P'gh.	4.00	4.00	3.75	8.25
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.20	5.00
Wire nails, Pittsburgh	2.90	2.90	2.90	4.25
Plain wire, P'gh	2.60	2.60	2.60	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.55	4.45
Tin plate, 100-lb. box, P'gh.	*$5.00*	$5.25	$5.25	$8.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$17.00**	$16.50	$14.50	$36.00
Carwheels, Philadelphia	17.00	17.00	17.00	40.00
Heavy steel scrap, P'gh	14.00	14.00	14.00	28.00
Heavy steel scrap, Phila.	**$12.50**	12.00	11.50	23.00
Heavy steel scrap, Ch'go	**13.00**	12.50	11.50	20.50
No. 1 cast, Pittsburgh	17.50	17.50	17.00	40.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	39.00
No. 1 cast, Ch'go (net ton)	**14.50**	13.50	13.25	28.00
No. 1 RR. wrot, Phila.	16.00	16.00	15.00	28.00
No. 1 RR. wrot, Ch'go (net)	**13.50**	13.00	11.50	20.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$3.25*	$3.35	$3.25	$15.50
Foundry coke, prompt	4.50	4.50	4.25	16.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*13.00*	13.12½	12.25	16.00
Electrolytic copper, N. Y.	*12.75*	12.82½	12.12½	16.00
Zinc, St. Louis	**4.67½**	4.60	4.17½	7.25
Zinc, New York	**5.17½**	5.10	4.67½	7.50
Lead, St. Louis	4.50	4.50	4.45	7.00
Lead, New York	4.70	4.70	4.65	7.25
Tin, New York	**28.00**	27.00	26.50	38.25
Antimony (Asiatic), N. Y.	5.00	5.00	4.45	6.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Oct. 18, 1921, Finished Steel, 2.221c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Oct. 11, 1921,	2.236c.
Sept. 20, 1921,	2.200c.
Oct. 19, 1920,	3.781c.
10-year pre-war average,	1.684c.

Composite Price, Oct. 18, 1921, Pig Iron, $20.03 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 11, 1921,	$19.93
Sept. 20, 1921,	20.01
Oct. 19, 1920,	44.26
10-year pre-war average,	15.72

than they have been before since early in the year. Possibly there has been a slight decrease in finishing mill activities, but this is more than counterbalanced by larger blast furnace and steel works operations. As noted elsewhere, 42 of 140 blast furnaces in this and nearby districts now are making iron, this being a numerical rate of exactly 30 per cent and a gain of about 11 per cent from the low point of the summer. Steel plant operations in the Wheeling district still are low, but in Pittsburgh they average about 40 per cent. That is also the gait at Johnstown, Pa., and equally as good a showing is noted in the Mahoning and Shenango valleys. The Carnegie Steel Co. has put on an additional blast furnace at its Ohio works at Youngstown, Ohio, giving it three active of six at that point, while the Jones & Laughlin Steel Co. has turned on the blast in two furnaces since Oct. 1. The general showing is fairly satisfactory and the only question now is as to whether the present rate can be maintained, in view of the fact that new orders are not coming in as fast as old ones are being completed.

Prices still show much irregularity. The past week has brought advances of $5 a ton in the quotations of a number of independent makers of sheets, and manufacturers of hot-rolled strips, hoops and bands, who hitherto have been taking business in these products as low as 2c., base, last Saturday advanced to 2.25c., base, but as is the common practice in such advances, customers were allowed to enter probable needs over a fairly long period at the old base. On the other hand, steel bars definitely seem to have settled to 1.50c., base, on such important tonnages as have been offered, as against a nominal asking quotation of 1.65c., while the tin plate market is weakening and the intimation is more frequent that adherence to the Sept. 12 wire products schedule is not especially rigid. Price cutting in line pipe is extremely sharp.

Little is being done in pig iron because consumers think producers should pass along the more or less fictitious benefit to be derived from the lower ore freight rates. The coke market has grown softer and dealers in scrap still are finding it difficult to interest consumers at the prices they ask.

Pig Iron.—It has been the experience of a number of furnace interests here that since the announcement of the reduction in ore freight rates, buyers have lost interest in the market. The Westinghouse Electric & Mfg. Co. is reported to have closed with a western Pennsylvania furnace for about 1300 tons of foundry iron on a basis of $20.50 for No. 3, $21 for No. 2, and $22 for No. 1. The delivered prices on this iron were about 50c. per ton below what they would have been if the iron had come from the Valley. The Standard Engineering Works, Ellwood City, Pa., is reported to have bought 300 tons of No. 1 iron at $22, Valley furnace. A sale is noted of 500 tons of gray forge to a Pittsburgh district melter at $20, Valley furnace basis, the iron to be shipped from a Cleveland district furnace.

The American Steel Foundries is in the market for 350 tons of standard Bessemer, and the Duquesne Steel Foundry Co. wants 250 tons of the same grade. Some effort is being made to put up the price of Bessemer, but to date $20, Valley furnace, is as high as it has been possible to make sales. Interest in basic iron is low, although the American Rolling Mill Co., Middletown, Ohio, has put out an inquiry for 2000 tons. The inquiry, however, specifies iron with silicon not under 0.90 nor above 1.10 in silicon, a rather difficult analysis for any furnace except one running on that grade.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.25 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.50

Ferroalloys.—Some demand still exists for 50 per cent ferrosilicon, but interest in other ferroalloys is extremely limited and sales of the former usually are single carloads. Prices still lean in buyers' favor. English makers of ferromanganese evidently are meeting the quotations recently made on German material, a Youngstown steel company reporting that it has been offered English material at $60 delivered. The quotation of American makers of $65 delivered has been shaded, a price of $64.35 delivered, Youngstown, having recently been made. Most makers of 50 per cent ferrosilicon are endeavoring to hold the market at $60 furnace, freight allowed, but such business as has been done recently in this district has been at $57. An Eastern maker of spiegeleisen now is quoting $26 furnace for 19 to 21 per cent material and $25 for that of 16 to 19 per cent manganese content. The latter grade is offered at $24 to $25 by a furnace in western Pennsylvania having a freight rate into Pittsburgh of $1.96. The last business reported in this material was 200 tons of 20 per cent at $30 delivered Youngstown.

We quote 78 to 82 per cent domestc ferromanganese at $60 to $65 delivered; 78 to 82 per cent foreign ferromanganese, $53.28 to $55, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $57 to $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Activity still is lacking and nothing more than an appraisal of prices is possible. Accompanying the recent advance of $5 in black and galvanized sheets, some of the Youngstown integrated companies advanced sheet bars to $34. This price has not yet found any basis in sales; indeed, only moderate tonnages have been booked at the former quotation of $32. Not enough demand is coming out for billets and slabs to provide a real line on prices.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30 to $32; Bessemer and open-hearth sheet bars, $30 to $32; slabs, $30 to $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Makers still are asking $41 for base size of soft rods, but they are not getting it. As a matter of fact, $40 represents the maximum as far as sales are concerned and it is reported that less has been done in special cases and under special conditions. Prices are given on page 1044.

Structural Material.—Awards have increased again and include one of 1300 tons, but the complaint still is that competition for work is severe, and very low prices prevail. It is reported that in one of the largest awards a price of $57 per ton, erected, was made. The Jones & Laughlin Steel Co. has taken 150 tons for a cleaning building for the Standard Sanitary Mfg. Co., New Brighton, Pa., while the Memphis Steel Construction Co. has taken 100 tons for a factory building for the Seyler Mfg. Co., Etna, Pa. The McClintic-Marshall Co. has taken 1312 tons for a new building for the Standard Underground Cable Co., Pittsburgh; 650 tons for roof supports for the Liberty tunnels, Pittsburgh; 300 tons for an extension to the skelp mill of the Central Tube Co., Economy, Pa.; 125 tons for a new building for the Air Reduction Co., Pittsburgh, and 100 tons of duck plate girder spans for the Chicago, Burlington & Quincy Railroad. Bids are being taken by the Wheeling Steel Corporation for the building to house its new rod and wire plant at its Portsmouth, Ohio, works. This project involves about 2500 tons, and an award is expected shortly. The market in plain material is only moderately active, and competition for passing orders keeps prices in buyers' favor. The general asking price on structural beams is 1.65c., base, but protection has been given on sizable projects down to 1.50c. by some makers. Prices are given on page 1044.

Plates.—Real activity still is absent, but order books of some makers are larger as a result of an accumulation of a moderate-sized booking. There is not enough real buying to give prices much stability, and mills holding to 1.65c. are steadily losing orders to others anxious for business and willing to go lower to get it. On attractive orders the market is quoted from 1.50c. to 1.55c, and on small tonnages from 1.60c. to 1.65c. Prices are given on page 1044.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.65c. f.o.b. Pittsburgh.

Wire Products.—Very little new business is developing and the prices established as of Sept. 12 are finding little, if any, basis in sales, and indeed are being shaded. Jobbers are thoroughly protected against their requirements by contracts until Nov. 15, and are specifying fairly well against them. If anything, the market is quieter both as regards specifications and orders, as buyers generally are expecting lower freight rates to develop out of the railroad dispute and want to be in a position to benefit by any such change. Agricultural demands still are limited, but as manufacturers quite generally are guaranteeing prices against a decline through to the spring, it is confidently expected there will be a substantial increase in the demand from this source later in the year. Typical of the lack of agricultural demand is the present operating rate of one large company, which shows full engagement of nail machines, but only about 20 per cent operation of barbed wire capacity.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Steel Rails.—Regular makers of light rails report no special difficulty in doing business at 1.75c. base for 25 to 45-lb. sections, but this is not the experience of those makers who roll these rails only at intervals and consequently are not rated as regular producers. The latter are said to have gone as low as 1.70c. and even 1.65c. to secure orders. Re-rolled light rails are held at about 1.60c. base. General demand still is moderate.

We quote 25 to 45-lb. sections, rolled from new steel, 1.70c. to 1.75c. base; rolled from old rails, 1.60c. base; standard rails, $45 per gross ton mill for Bessemer and $47 for open-hearth sections.

Spikes and Track Bolts.—Demand is purely hand-to-mouth and since there is not enough business to give all makers a share, prices favor buyers. The largest inquiry in spikes before makers is that of 5000 kegs for the Big Four Railroad, bids against which were opened in Cincinnati late last week. The award has not yet been made public, but it is believed that it will be placed at around $2.30 base, Pittsburgh. Quotations on track bolts are being shaded on attractive business. Prices are given on page 1044.

Hot-Rolled and Cold-Rolled Strips.—Effective Oct. 15, several makers of hot-rolled strips who had been taking business at 2c. base advanced the quotation to 2.25c. base, and this now is the quotation of all makers. The advance has served to strengthen the position of those who had adhered to a base of 2.25c. Customers of the mills which advanced the price were allowed to cover against their requirements for a period at the old quotation. Cold-rolled strips are at 3.75c. base for large tonnages and 4c. for small lots. A fair proportion of recent bookings has been at the higher figure.

Iron and Steel Bars.—There is a quantity price spread on soft steel bars, with 1.50c. the base on large tonnages and 1.60c. to 1.65c. on small lots. Reinforcing bars, rolled from new steel, are quotable at the same range, with quantity and attractiveness of the business governing the price. Not much inquiry is originating in this immediate territory, but there is before makers a good-sized tonnage for the Jamaica Parkway, Ja-

maica, L. I. The 740 tons of bars for the Coney Island boardwalk has been placed with a Buffalo maker at a price somewhat below 1.40c., Pittsburgh. Iron bars are doing better, but the improvement is in the number rather than the size of the orders.

We quote steel bars rolled from billets at 1.50c. to 1.65c.; reinforcing bars, rolled from billets, 1.50c. to 1.65c. base; reinforcing bars, rolled from old rails, 1.50c.; refined iron bars, 2.15c. to 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Iron and Steel Pipe.—Activity still is lacking in oil country pipe, but there is a steady gradual increase in orders for standard pipe. Few makers, however, have any considerable amount of forward business on their books and since there is no doubt as to deliveries, the current demand is not marked by much urgency. Competition for orders for line pipe is extremely sharp and it is reported that less than $45 per ton Pittsburgh, recently was done on 4-in. pipe. There is fairly good observance of the last card in other respects. It is reported that the Magnolia Petroleum Co. and the Humble Oil Co. are negotiating for a joint pipe line of 125 miles involving about 7000 tons. Discounts are given on page 1044.

Steel Skelp.—Demand at best is limited and actual sales are few and small. The quotable market remains at 1.60c. to 1.65c. for pipe skelp. Competition for business is sharp.

Sheets.—A recent advance of $5 per ton in black and galvanized sheets, announced by some of the independents, still lacks the support of the American Sheet & Tin Plate Co., which is holding at 3c., 4c. and 2.50c., base respectively, for black, galvanized and blue annealed. A fair amount of business has been taken at these prices by all makers, but it is safe to say that the average prices of current shipments are nearer 2.75c. for black, 3.75c. for galvanized and 2.25c. for blue annealed. The latter grade still can be bought at 2.25c., base, even from some of the makers now quoting 4.25c. for galvanized and 3.25c. for black sheets. Light plates or heavy-gage blue-annealed sheets recently were included in some plate business taken at 1.70c., base. Sheet mill operations generally are a little lighter this week than they were recently. Prices are given on page 1044.

Tin Plate.—Interest in the market on the part of consumers still is pronounced for this time of the year, but apparently there is not enough business to go around, as production plate has been taken recently by some makers as low as $5 per base box, Pittsburgh. Some makers still are holding to $5.25 per base box, but are meeting competition. Stock tin plate is not plentiful and is quotable at $4.50 to $4.75 per base box. Some can makers are inquiring for first quarter and first half tonnages, but as makers have not yet decided upon prices, no business of this sort yet has been entered.

Hoops and Bands.—Effective Oct. 15, the Sharon Steel Hoop Co. announced an advance of $5 per ton, to a base of 2.25c., on these products. Other makers who had been quoting less than 2.25c. have restored that price. Business remains light although it is better now than it was a short time ago. Very little demand is developing from cooperage interests which, as a result of prohibition, now are dependent to a large degree upon oil and turpentine industries for business. The oil industry rapidly is moving away from the use of wooden barrels to all steel containers, particularly for export business.

Cotton Ties.—The season has practically ended, as the cotton crop is a small one and rollings and shipments were completed more promptly than usual. The October price was 1.33c. per bundle of 45-lb.

Boiler Tubes.—The market is still extremely quiet in both steel and iron tubes and buyers are not having much trouble either in covering their requirements or in getting some concessions from quoted discounts. Discounts are given on page 1044.

Cold Finished Steel Bars and Shafting.—These products, notably in the smaller sizes, still are laggard in feeling such improvement as has developed in steel products generally. The explanation, as far as screw stock is concerned, is found in the fact that some of the larger automotive units have surplus supplies which they have written down to well below current mill prices, and manufacturers in trying to secure orders not infrequently are obliged to compete with these resale tonnages. Makers quite generally are endeavoring to maintain a base of 2.25c. Pittsburgh, on the ground that soft steel bars of the analysis suitable for cold finishing are not obtainable at much less than 1.60c. base, Pittsburgh, while on some recent purchases as high as 1.65c. Pittsburgh, was paid. Business, however, has been lost in cold finished bars at 2.25c., and it is evident that some makers are meeting the resale competitive prices. Ground shafting holds at 2.75c., base, mill for carloads.

Nuts, Bolts and Rivets.—Makers in this district have experienced no material improvement in business. Possibly, competition for orders for bolts and nuts is not quite as keen as it was recently and prices of these products are more stable. Prices of rivets, however, are being shaded by as much as $3 per ton. Prices and discounts are given on page 1044.

Coke and Coal.—Offerings of furnace coke are ample for current needs and the market has lost much of its recent firmness. While some sales of spot coke have been made at $3.35 per net ton oven, sales also have been at $3.25, and more coke is available at that price. The spot market, therefore, is quotable from $3.25 to $3.35. A few contracts for the remainder of the year involving moderate tonnages have been closed at $3.35. Producers generally are asking $3.50 against such business, but usually yield 10c. or 15c. per ton rather than lose an order. Foundry coke is in good demand, with some extra requirements being sought on account of the possibility of a railroad tieup. Since production of this grade is moderate, prices are firm at $4.50 to $4.75 per net ton oven, for standard grade. Demand for coal is disappearing and prices, notably on slack, are inclined lower. Steam slack recently has sold as low as $1 at mines for No. 8 Ohio coal, while as low as $1.50 has been done on gas slack. Mine run steam coal is quotable from $1.65 to $1.75, by-product from $1.90 to $2.15, and gas from $2.25 to $2.65.

Old Material.—The possibility of a railroad tieup is not changing the attitude of melters with regard to purchases, because it is quite generally realized that if the steel companies and foundries cannot get finished materials out, there will not be much reason for uneasiness about getting raw materials in. Recent prices are well maintained on all grades of old material, but dealers are having a hard time to get consumers to pay what they ask. The situation has simmered down to a campaign of attrition and the immediate course of prices hinges on whether melters or dealers will weaken first. Floating supplies are moderate and the large dealers, who hold most of the supply, appear financially able to hold. On the other hand, consumers feel that prices are too high and are buying sparingly. If such a buying policy is sustained, it cannot fail to develop weak spots among dealers, but if purchases become necessary, it is hard to see how higher prices can be prevented. Small tonnages which must be moved can be bought at quotations, but dealers will not go short of the market at these prices.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast cupola size	17.50 to 18.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.00 to 17.00
Compressed sheet steel	12.00 to 12.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	10.50 to 11.00
Railroad knuckles and couplers	15.00 to 15.25
Railroad coil and leaf springs	15.00 to 15.25
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.50 to 18.00
Railroad malleable	13.00 to 13.50
Iron car axles	22.00 to 23.00
Locomotive axles, steel	21.00 to 22.00
Steel car axles	15.50 to 16.00
Cast iron wheels	16.00 to 16.50
Rolled steel wheels	15.00 to 15.50
Machine shop turnings	9.75 to 10.25
Sheet bar crop ends at origin	13.50 to 14.00
Heavy steel axle turnings	12.00 to 12.50
Short shoveling turnings	11.00 to 11.50
Heavy breakable cast	15.50 to 16.00
Stove plate	13.00 to 13.50
Cast iron borings	10.50 to 11.00
No. 1 railroad wrought	13.00 to 13.50

Chicago

CHICAGO, Oct. 18.

The threatened railroad strike has neither hastened purchases for prompt shipment nor discouraged the placing of orders for less immediate delivery. So far as can be ascertained, it has had no perceptible effect on the market. Bookings of mills and furnaces are about the same rate as in recent weeks, possibly slightly smaller in a number of commodities. Improvement in the operation of some producers is balanced by contraction in the output of others. The Illinois Steel Co. continues to blow 10 of its blast furnaces, but has increased its ingot production 5 per cent, its present output being on a 44 per cent basis. The Inland Steel Co.'s operations, on the other hand, have declined to 35 per cent of normal. Merchant pig iron production is unchanged.

The scrap market is notable as the one department of the industry in which a rather pronounced bullish sentiment prevails. Although buying is still largely in the hands of the dealers, one rather substantial purchase by a consumer has been made at advanced levels. On the other hand, a persistent report that the leading steel interest has bought a large tonnage of open-hearth grades is emphatically denied by both of the supposed parties to the transaction. For some months past scrap dealers have been stocking their yards at steadily advancing prices and it is believed that the time is close at hand when it will become apparent whether or not their judgment was well founded. Operations of users have certainly not increased in such a degree as to forecast heavy scrap buying in the immediate future. On the other hand, there are those who believe that the end of the present depression is in sight and that an early reduction in freight rates would remove the last obstacle to a resumption of industrial activity on a normal scale. The uninterrupted increase in freight car loadings even under present rates is cited in support of the view that lower transportation costs alone are required to usher in a period of rapid industrial recovery.

Pig Iron.—There continues to be some small sales of foundry and malleable at $22, base, local furnace, but the predominant price at which material is moving is $21. Brokers still have some tonnage which they are offering at this price and in a number of cases a producer has met this competition. The threat of a railroad strike has had no noticeable effect on the market. No requests for the hastening of shipments and no orders calling for rush delivery have been received. The market is still rather quiet, but inquiry is somewhat more active. The Link-Belt Co. wants 300 to 500 tons of malleable for delivery over the rest of the month at its Indianapolis plant. A freight car manufacturer is in the market for 500 tons of malleable and the St. Paul Railroad for 800 tons of the same grade. The American Rolling Mill Co. is asking for prices on 2000 tons of basic and an inquiry for 300 tons of charcoal is current. Carload sales of charcoal have been made at both $28 and $30, base furnace, and an order for 200 tons was recently placed at the latter price. An idle charcoal furnace is expected to blow in soon. A Milwaukee melter has sent out an inquiry for 1500 tons of Southern foundry for first quarter delivery. Few sales of Southern iron are reported in this territory, the heavy freight disadvantage being an effective barrier to such business. For the purpose of securing an adjustment in rates from Birmingham which will permit the Southern product to enter this section, Southern furnace representatives last week conferred with railroad officials in this city. Even now sales of Southern iron are occasionally made because special material is wanted. Thus a sale of 100 tons of high phosphorous foundry, 3.25 to 3.75 per cent silicon, was made by a local office to a Canadian foundry at $19, base Birmingham, plus the Redfield differentials, which brought the price up to $25, Birmingham. Notwithstanding the fact that Southern producers are getting little business in this vicinity, reports indicate that their bookings are steadily mounting and that five idle furnaces are about to blow in. It is intimated that much of their tonnage is from cast-iron pipe foundries. A sale of a carload of low phosphorous was recently made at $40.02, delivered Chicago, or $34, furnace. Tennessee 8 per cent silvery has been sold at $30.54, delivered Chicago.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50 to $33.50
Northern coke, No. 1, sil. 2.25 to 2.75	21.50 to 22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00 to 22.00
Northern high phos.	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil.	21.00 to 22.00
Basic	22.00
Low phos., Eastern furnace, sil. 1 to 2 per cent copper free	34.00
Silvery, sil. 8 per cent	30.54 to 34.82

Ferroalloys.—Ferromanganese has been sold locally at as low as $53, seaboard, or $61.60, delivered. There is little activity in spiegeleisen because ferromanganese is relatively much cheaper. In the St. Louis district the Scullin Steel Co. is reported to have bought a carload of 50 per cent ferrosilicon at $62, freight allowed.

We quote 78 to 82 per cent ferromanganese, $61.60, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Railroad Equipment.—The Chicago, Rock Island & Pacific has bought 14 mikado type locomotives from the American Locomotive Co. The Mississippi Central and a subsidiary have each bought a locomotive from the same builder.

Cast-Iron Pipe.—Prices are steady and business is still developing. Detroit is contemplating the purchase of 9000 tons of 6- to 24-in. and 8000 tons of 30- to 48-in., but has not yet advertised. For a subdivision at Dearborn, Mich., private parties are negotiating for 500 tons of 6-in. Recent lettings include: Kenmore, Ohio, 500 tons to United States Cast Iron Pipe & Foundry Co.; Highland Park, Mich., 150 tons, to American Cast Iron Pipe Co.; Bay City, Mich., 200 tons, to National Cast Iron Pipe Co. Pending business includes: Lima, Ohio, 100 tons, bids in Oct. 21; West Allis, Wis., 726 tons of 24-in., Oct. 22, to be sublet by contractor; Edgerton, Wis., 85 tons of 10-in., Oct. 15; Wauwatosa, Wis., 75 tons; Sturgis, Mich., 85 tons, bids taken, Oct. 12.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Rails and Track Supplies.—A Southwestern road which had held up shipments for nine months has released 20,000 tons of rails and necessary fastenings. Other releases against contracts include 8000 tons and 18,000 tons of rails and complementary fastenings respectively from the two Western lines terminating in Chicago. Specifications for tie plates, angle bars, track bolts and spikes are coming in in encouraging tonnages, and some new business in spikes and bolts is being placed, usually in 500 or 1000 keg lots. Competition for this business is keen and some concessions are being made, particularly on spikes.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—It is too early to ascertain the effect of threatening transportation difficulties on steel bookings. Although it is no secret that railroad executives would welcome a strike as an opportunity to settle their differences with organized labor once and for all, there are few who believe that the unions will actually carry out their announced program. The railroads themselves have not postponed action on contemplated purchases. The Chicago, Burlington & Quincy takes bids on 1500 tons of plates today. As will be noted in the rails and track supplies paragraph, a South-western line which had held up shipments against a rail contract for nine months released 20,000 tons yesterday. The situation in the plate market is substantially unchanged. Orders and specifications are a little more liberal every week, but there is not yet enough tonnage to keep the mills busy. So far as the general run of business is concerned, sellers are maintaining a firmer attitude on prices, realizing the futility of

competition which brings in orders at heavy losses. At the same time, the exceptional buyer who enters the market for a large tonnage of desirable specifications can still place his business at concessions under the prices quoted below. This is, of course, to be expected at a time when such a tonnage may tide a mill over until a backlog of smaller orders has been accumulated. Among recent orders taken by local mills is one for 1700 tons from a Milwaukee purchaser and one for 1000 tons from an Illinois boiler manufacturer.

The ruling mill quotations range from 1.75c. to 1.85c. Chicago. Jobbers quote 2.88c. for plates out of stock.

Bars.—Demand for mild steel bars is still subnormal, and while sellers are less disposed to sharp price cutting such as prevailed some weeks ago, attractive inquiries are still bringing out concessions. No reinforcing jobs of size have been let recently, but several are being figured on. The Katzinger Building, Chicago, will require 2500 tons. Between 250 and 300 tons for the Illinois Merchants' Bank Building, Chicago, are expected to be placed this week. At Grand Rapids, Mich., a filtration plant will require 350 tons and a bridge 300 tons. Local bar iron mills continue to adhere to a base of 1.75c., Chicago, but without booking much business. Orders for rail carbon steel bars have been sufficient to keep mills running single turn an average of three weeks out of four. The ruling price on hard steel remains at 1.75c., Chicago, with some concessions reported. Warehouse prices on deformed steel bars are weak and do not exceed 2.10c., base. Jobbers have reduced cold-rolled steel bars and shafting 35c. per 100 lb. for rounds and 15c. for flats, squares and hexagons.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.85c. for rounds and 4.35c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.10c. base.

Sheets.—The advance of $5 a ton announced by a number of mills as effective Oct. 15 has not been followed by the local independent. Demand is still fairly active, but in the opinion of some observers not sufficiently strong to warrant another advance so soon. The move is regarded as an attempt to drive in business at the former quotations. The local warehouses have advanced iron sheets $5 a ton, the new quotations being 4.39c. for No. 10 blue annealed and 6.54c. for No. 28 galvanized. Jobbers have not altered their steel sheet prices.

Mill quotations are 3c. for No. 28 black, 2.25c. to 2.50c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Bolts and Nuts.—Operations of automobile makers are falling off with a corresponding effect on bolt and nut purchases. The principal current demand is from jobbers and railroads. The Louisville & Nashville is inquiring for 1500 kegs of hot-pressed nuts. Most makers are trying to maintain the discounts recently announced, but some concessions are still reported, particularly on attractive inquiries. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1037.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Wire Products.—Jobbers continue to buy freely for prompt shipment, but are not piling stocks. The threatened railroad strike has had the effect of bringing in a number of requests to hurry up deliveries. Fair orders continue to come from the railroads, but business from manufacturing users is still unsatisfactory. Operations of the leading producer are estimated well over 60 per cent. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1037.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Structural Material.—There continues to be a fair amount of fabricating work on the books and in prospect. One representative Western fabricator reports that he is figuring on eight jobs involving 8000 tons. On the other hand, the mills report that the demand for plain material has fallen off, but it is possible that this is merely a temporary dip in buying and has no real significance. If anything, prices of plain material are firmer, although attractive tonnages are still bringing out some concessions by the mills. Fabricating awards include:

Wisconsin Steel Works, trestle, South Chicago, 363 tons, to American Bridge Co.

Masonic Temple, Blue Island, Ill., 109 tons, to Duffin Iron Works.

Great Northern Railway, draw bridge, Delta, Wash., 485 tons, to Milwaukee Bridge Co. instead of Wisconsin Bridge & Iron Co. as reported last week.

Chicago & Alton Railroad, approaches to freight house, Chicago, 201 tons, to American Bridge Co.

Gallup-American Mining Co., power house and breeching, Gallup, N. M., 300 tons, to Worden-Allen Co.

American Car & Foundry Co., blacksmith shop, Terre Haute, Ind., 365 tons, to American Bridge Co.

Chicago, Burlington & Quincy Railroad, three 55-ft. deck plate girder spans, 100 tons, to McClintic-Marshall Co.

Pending business includes:

Filtration plant, Detroit, 2500 tons.

Blum Building addition, Chicago, 600 tons, bids to be in to-day.

Catholic Club, Memphis, Tenn., 660 tons.

The mill quotation on plain material ranges from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Old Material.—Notwithstanding the fact that an important iron and steel mill has shut off all shipments, dealers continue to bid up prices in buying railroad material, thereby evincing their confidence in a market for their purchases later on. While the market is still largely in the hands of sellers, some consumptive buying has developed, notably 1500 tons of No. 1 wrought which brought $13.50 delivered and a round tonnage of No. 1 busheling which sold at $10.50 per net ton delivered. There are unconfirmed reports of a substantial sale of open-hearth grades to a local steel mill, which seem to be substantiated by heavy coverings by sellers. One dealer paid a railroad $13.16 per gross ton tracks for 100 tons of heavy melting. This is equivalent to $13.86 delivered if the destination was in the Chicago, switching district. Railroad offerings include: The Illinois Central, 4000 tons; the Rock Island, 3700 tons; and the Soo Line 20 lists of 1000 tons and 220 tons each.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$17.00 to	$17.50
Relaying rails	27.50 to	30.00
Car wheels	17.00 to	17.50
Steel rails, rerolling	14.00 to	14.50
Steel rails, less than 3 ft	14.00 to	14.50
Heavy melting steel	13.00 to	13.50
Frogs, switches and guards cut apart	13.00 to	13.50
Shoveling steel	12.50 to	13.00
Low phos., heavy melting steel	15.50 to	16.00
Drop forge flashings	8.00 to	8.50
Hydraulic compressed sheet	8.50 to	9.00
Axle turnings	9.00 to	9.50

Per Net Ton

Iron angles and splice bars	15.00 to	15.50
Steel angle bars	12.00 to	12.50
Iron arch bars and transoms	15.50 to	16.00
Iron car axles	20.00 to	20.50
Steel car axles	14.50 to	15.00
No. 1 busheling	10.50 to	11.00
No. 2 busheling	7.25 to	7.75
Cut forge	11.75 to	12.25
Pipes and flues	8.50 to	9.00
No. 1 railroad wrought	13.50 to	14.00
No. 2 railroad wrought	12.00 to	12.50
Steel knuckles and couplers	13.50 to	14.00
Coil springs	14.50 to	15.00
No. 1 machinery cast	14.50 to	15.00
No. 1 railroad cast	14.00 to	14.50
Low. phos. punchings	12.50 to	13.00
Locomotive tires, smooth	11.50 to	12.00
Machine shop turnings	4.00 to	4.50
Cast borings	6.00 to	6.50
Stove plate	12.75 to	13.25
Grate bars	11.50 to	12.00
Brake shoes	11.50 to	12.00
Railroad malleable	13.75 to	14.25
Agricultural malleable	13.75 to	14.25
Country mixed	9.00 to	9.50

Cleveland

CLEVELAND, Oct. 18.

The threatened nation-wide strike of the railroads is causing some anxiety among consumers of steel who fear they will run short of needed material and has brought many requests to the mills that shipments on existing orders be rushed. The crowding of mills for delivery seems more in evidence in respect to sheets than to other forms of finished material. Stocks of most consumers are low and should there be a prolonged strike, many plants would be in danger of running short of material. The requests to hurry shipments are coming from the most part from plants that are fairly busy making standard lines of products and which wish to avoid a curtailment of operations. However, the danger of a strike has brought out virtually no new orders, as consumers have under contract enough steel to care for their early needs. The situation is far less serious than it would be were manufacturing plants running near normal capacity and with their own customers crowding them for delivery. Mills are endeavoring to comply with the requests to hurry shipments and some of the sheet mill plants may find it necessary to place more mills in operation in order to make delivery and before the date set for the strike. Foundries as a rule do not appear to be greatly disturbed by the threatened strike. A few consumers have wired in requests to furnaces that pig iron shipments be rushed, but in only one or two cases have foundries rushed into the market and made purchases in order to get iron into their yards before the scheduled date of the strike. While stocks in foundry yards are generally low, as a result of the policy of buying from hand to mouth, the possibility of lower freight rates is evidently causing some consumers to withhold shipping orders. In case railroad shipments of pig iron are cut off, many foundries will use trucks to haul pig iron from nearby furnaces and for delivering castings to their customers. Some of the Cleveland foundries now operated at very limited capacity will shut down in case of a strike. Many foundries have been stocking up on coke recently and will not be inconvenienced by the cutting off of the coke supply. As the ore shipping season will be virtually over Nov. 1, with traffic conditions normal there would be little ore moved to the interior furnaces during November.

Iron Ore.—The 28 per cent reduction in freight rates from Lake Erie ports to interior furnaces was placed in effect to-day, Tuesday, by most of the railroads and will become effective Thursday on the remaining ore carrying roads. As was expected, the reduced freight rate has not stimulated the market and has had virtually no effect in bringing out orders for shipment from the docks. Not a new inquiry for ore or sale is reported since the announcement of the rate reduction. Only one new shipping order is reported, that being for only 8000 tons and coming from a consumer who stated that he would take that amount of ore this fall instead of waiting until spring. Consumers have large stocks in their furnace yards, many of them enough to last until spring, so the lower railroad rates are not expected to bring out many shipping orders during the early winter. While the railroads announce that the new rates are to remain in effect only until Jan. 1, ore people and consumers are confident that the railroads will not restore the old rates at the latter date. The amount of lake ore in interior furnace yards, including both those in the central district and at Eastern furnaces, was slightly under 16,000,000 tons Sept. 1, when the last figures were compiled, but is now considerably in excess of that amount, which indicates that little ore need be shipped off the docks before next spring. The announcement of the lower rail rates has resulted in the holding back of some shipments until the new rates become effective. The lake movement is slowing up, as all shippers are cleaning up on their contracts. However, a little ore will be moved in November unless the threatened railroad strike goes into effect. The Steel Corporation is planning to finish shipping ore Oct. 29. After the 40 per cent freight advance on ore in 1920, a corresponding advance was made in dock charges for handling ore. A reduction in these charges is not included in the 28 per cent reduction in rail rates and ore shippers and consumers have taken steps to attempt to bring out a corresponding reduction in handling charges. The ore shippers are interested in bringing about a reduction in the rate of handling ore from the hold to the rail of the vessel, as that charge, now amounting to 14c. per ton, is borne by the ore sellers. The cost of handling from the rail to the stock pile, now 22c. a ton, is paid by the consumer. Joint committees of the representatives of the ore firms and of the consuming interests in the Pittsburgh and Youngstown districts will take this matter up with the railroads and request that these rates be correspondingly reduced. These rates are under the supervision of a committee of the ore and coal handling railroads, which meets in Pittsburgh.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market was somewhat more active during the past week than in the previous week, but quieted down the last day or two, evidently being affected by the threatened railroad strike. On the other hand, the danger of the strike brought out a little business from consumers who want to get iron in their yards. The total sales during the week aggregated approximately 10,000 tons. A local interest sold two lots of gray forge iron, one 1200 tons and the other 500 tons, to Pittsburgh consumers at $20 Valley furnace. As this iron will be shipped from Cleveland, the price figures back to about $19.25 furnace. One local interest sold 4200 tons and another 2500 tons, practically all in foundry grades, in lots of 500 tons and under. Prices quoted by lake furnaces are unchanged at from $20 to $21 for No. 2 foundry, the former being the more general quotation. The $21 price that has been generally quoted recently by Valley furnaces is evidently being shaded and there are reports of Valley quotations as low as $20 on foundry iron. However, a 1000-ton lot for central Ohio delivery was taken by a Cleveland furnace at $20.50. Two inquiries for basic iron have come out, one from Pittsburgh and the other from Middletown, Ohio, each for 2000 tons. A northern Ohio foundry is about to close for 2000 tons of foundry iron. We note the sale of 100 tons of malleable at $20.50. Low phosphorous iron is a little firmer, two or three sales in lots up to 300 tons being reported at $35. Shipments show a slight gain over September. Stocks in furnace yards are being gradually reduced. Reports indicate that the total shipments of iron by merchant furnaces throughout the country during September were double the amount produced and that the stocks on hand in furnace yards Oct. 1 were about 750,000 tons, or less than one month's production at full operation.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic		$21.21
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to	21.00
Southern fdy., sil. 2.25 to 2.75		26.17
Ohio silvery, sil. 8 per cent		32.86
Standard low phos., Valley furnace		35.00

Semi-Finished Steel.—An inquiry is pending for 2000 tons of sheet bars on which prices seem to be firmly held at $32. Slabs are being offered at $30, but small lot sales of surplus mill stock are reported at $28.

Finished Iron and Steel.—Orders for all finished lines were light during the week and involved only small lots. Prices on most lines are unchanged, the market lacking firmness in spite of efforts of some mills to get higher prices. Steel bars are selling in small lots of 1.60c. On plates and structural material quotations range from 1.60c. to 1.65c. Two or three independent mills that are quoting to 1.75c. for plates find themselves out of line with the market. However, in spite of this situation, one Valley mill has advanced its price on plates

to 1.85c. The building field shows little life, the only new inquiry being for 275 tons of structural steel for the South High School, Toledo. Hard steel reinforcing bars are in fair demand in lots up to 100 tons, but prices have further weakened, sales being made at 1.50c, although the usual minimum quotation is 1.55c. Light rails are weak, quotations as low as 1.55c. being reported. Hot-rolled strip steel is a little firmer, one Valley mill now holding to 2.25c. A local inquiry has come out for 500 tons of sheet steel piling.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Sheet mills are rather slow in falling in line in the $5 a ton price advance made Oct. 15 by a few of the independent mills. Several mills are still quoting the old prices of 3c. for black and 4c. for galvanized. The advance was not put on blue annealed sheets, which are still quoted at 2.50c. for the lighter and 2.25c. for the heavier gages. The advance seems to have accomplished its purpose of bringing out considerable tonnage in small lots at the old prices.

Warehouse Business.—Jobbers report some improvement in warehouse business. All prices are unchanged.

Coke.—There is a little activity in foundry coke for prompt shipment and prices are firm. Some sales of standard Connellsville foundry coke are being made at $4.75 for prompt shipment, the same producers asking $5 for contracts.

Bolts, Nuts and Rivets.—Bolt and nut manufacturers report a fair volume of orders with sales somewhat in excess of those during September. Business is coming from jobbers and from various classes of consumers, with the exception of the implement trade. Prices appear to be holding fairly firm. The demand for rivets shows a little improvement and prices are well maintained at 2.40c. for structural and 2.50c. for boiler rivets. The improved demand is mostly from the car companies. Makers are asking $2 a ton advance over regular quotations for contracts for the remainder of the year.

Old Material.—The market stiffened up somewhat during the week and prices were marked up on a few grades. However, evidently as a result of the threatened railroad strike, a weaker tendency has developed during the past day or two, although as a rule recently prevailing prices are being maintained. Activity is still confined to outlying districts and the transactions reported are purchases by dealers to cover recent mill orders. Compressed steel sold as high as $12.25 for Youngstown delivery, but later small lots were sold at $11.75 for the same consuming point. Sales of heavy melting steel at $14, cast borings at $10.75 to $11 and machine shop turnings at $8.75 to $9 to dealers in the Youngstown district are reported.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$12.00 to $12.50
Steel rails, under 3 ft	12.75 to 13.25
Steel rails, rerolling	15.00 to 15.50
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	8.65 to 8.85
Machine shop turnings	6.60 to 7.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	9.50 to 9.75
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	6.25 to 6.60
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in	8.00 to 8.50
Drop forge flashings, under 10 in	8.00 to 8.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

The National Sheet & Tin Plate Manufacturers' Association is the latest addition to the list of organizations affiliating with the National Industrial Conference Board, whose headquarters are at 10 East Thirty-ninth Street, New York.

Buffalo

BUFFALO, Oct. 18.

Little evidence exists that the prospective railroad strike scheduled for Oct. 30 has brought about an unusual condition in this district. Sufficient time has not elapsed to show any effect on shipping instructions or sales and the general impression is that the strike will be averted or, if it does occur, it will be of short duration. None of the mills have taken any action and will operate on the present scale without change. Warehouse business is expected to show some improvement as Oct. 30 approaches if the strike still appears inevitable. Orders for material would be more than likely to be offered warehouses in preference to mills, as the margin of time is too short to permit mill activity on new business and have shipment completed within the time allotted. In few instances have producers found anxiety. Two large pig iron buyers found it advisable to urge a furnace to accelerate shipment and double quantities placed in transit daily.

Pig Iron.—The unusual situation wherein two producers are out of the market is already reflected in the small volume of sales. About 4000 tons have been booked as new business. The Donner Steel Co. will have another furnace in blast within the week; the one furnace now blowing on foundry iron will be changed to basic production and the one going in will be used for foundry iron to fill orders now on file. One producer sold 2000 tons—scattered, and at $20 base. The same interest has inquired for 6500 tons and is quoting $20.50 for malleable and maintaining the 50c. differential for each 50 point advance in silicon. A few hundred tons, taken to mean less than 1000 tons, has been sold by one interest which has done little this year but has not diminished production and is storing the greater part of the output of one furnace. Pig iron made by a combined steel and iron interest has not moved in keeping with previous sales records this fall. Seven stacks are now blowing in this district, including a second Susquehanna just blown in.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$21.00 to $22.00
No. 2X foundry, 2.25 to 2.75 sil	20.50 to 21.50
No. 2 plain, 1.75 to 2.25 sil	20.00 to 21.00
Basic (nominal)	21.00
Malleable	21.00 to 22.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—A firmer market on bars and sheets, the latter due to expected increase in prices, is seen. There is reluctance on the part of sellers to quote less than 1.65c. on bars whereas a week ago buyers were frank in stating they could buy without difficulty at 1.60c. A number of prospective purchasers of reinforcing bars have sought to cover for next year's delivery on the basis of the present market, but one mill has rejected terms of this kind. Sheet prices are quoted for immediate acceptance only and are withdrawn if the order is not forthcoming on receipt of the quotation. The sheet situation is firmer and a local mill which has seven sheet mills in operation on a 50 per cent basis, has sufficient business booked to warrant the same scale of operation the rest of the year. Pipe orders for small sizes hold to the same satisfactory average as previously reported. A bar maker has picked up a few small orders, but no sizable tonnage has appeared. A satisfactory increase in the wire department of the Steel Corporation's Buffalo branch is reported.

Warehouse Business.—Better demand for bars and an improvement in orders for car materials are new developments. Generally the demand for all products is increasing. There is some inconsistency in automobile work. Buffalo auto plants are fairly active, but at points west of Buffalo there has been a curtailment which is felt in certain warehouse business. Sheet prices are quoted only for immediate acceptance, as

a further advance is expected. A reduction in the price of cold-rolled strip steel is announced.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 5.90c.

Coke.—Interest in coke purchases has waned to some extent and the activity recently noticed has abated. Prices are firm and best grades are quoted at $4.50 to $5.50, ovens.

Old Material.—A number of sales of heavy melting steel have been made and the total movement is about 5000 tons. The highest price ascertained is $13.50. Most of the mills have participated in this movement and on the whole the market is freer. None of the sales exceeded 500 tons.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.004 and under	16.00 to 17.00
No. 1 railroad wrought	13.00 to 14.00
Car wheels	14.00 to 15.00
Machine shop turnings	6.00 to 7.00
Cast iron borings	6.00 to 7.00
Heavy axle turnings	9.00 to 10 00
Grate bars	10.50 to 11.00
No. 1 busheling	10.00 to 11.00
Stove plate	13.00 to 14.00
Bundled sheet stampings	7.00 to 8.00
No. 1 machinery cast	16.00 to 17.00
Hydraulic compressed	10.00 to 10.50
Railroad malleable	12.00 to 13.00

St. Louis

ST. LOUIS, Oct. 18.

The threatened railroad strike has not produced any increased demand so far for iron or steel in the St. Louis industrial district. There has been no greater buying of pig iron, although some consumers have increased their shipping specifications for orders already placed. Producers in the district could take care of some of their trade by means of motor truck transportation. The fabricators and other users of steel seem little interested in the strike or its effects, as they have some stock on hand and are not well booked with orders. Prompt shipment of orders already placed has been asked in a few instances. Warehouse stocks are fairly large and they are well able to take care of their trade for some time. Railroads themselves continue to buy. Ore could be transported by the Mississippi River barge line.

Pig Iron.—The price of $21 Chicago, a drop of $1 a ton, announced last week, has been met by the St. Louis Coke & Chemical Co., and sales were made on that basis. Some of the Chicago furnaces are maintaining the old price, however, because of being well booked ahead with orders. The lower prices are in anticipation of lower assembling costs. The Granite City producer sold 300 tons of foundry iron on the basis of the lower price. A Kansas melter has an inquiry out for 500 tons of foundry iron, and there is another inquiry out for 400 tons for a foundry making railroad castings. There was a fairly good run of inquiries for a carload up to 100 tons. The melt in the St. Louis industrial district is steadily increasing. The National Stamping & Enameling Co. is now operating five furnaces. It is understood that it had on hand about 19,000 tons of iron, a melt of about 45 days. Prices on a car each of ferromanganese and ferrosilicon for prompt shipment have been asked.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$23.88
Northern malleable, sil. 1.75 to 2.25	23.88
Basic	23.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—Plans for Hotel Cecil, involving 400 tons of reinforcing bars, and the Christian Brothers College, between 40 and 50 tons of bars, are now in the hands of contractors. Both jobs call for re-rolled bars, giving local manufacturers an advantage. B. F. Bush, president of the Missouri Pacific, has announced that surveys have begun for double tracking the line between St. Louis and Jefferson City, a distance of 106 miles, involving the expenditure of $2,000,000, but so far no inquiries have been made covering the rails and other steel necessary. That road is buying more freely, however, than any other line in this district. Last week it bought 75 tons of plates, and a small quantity of sheets. The Union Pacific has an inquiry out for a carload of axles, and the Missouri, Kansas & Texas Railroad is in the market for a carload of plates. An unusual inquiry, in that one of that size should come from a jobber, was for 600 tons of reinforcing bars from a Dallas, Tex., concern. The demand for sheets is active and a fair volume of sales was made during the week to railroads, wholesale hardware houses and manufacturers. Sales during September were the best in many months, being largely roofing stock. A Western concern bought 200 tons of wire rods. There is no change in the warehouse situation.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The coke situation is much better. The St. Louis Coke & Chemical Co, reports the sale of 15,000 tons of furnace coke to a Western smelter, it being understood that the order was placed at a price figured on the market quotations on Connellsville foundry, $3.50 to $3.75. Illinois interests have an inquiry out for 60,000 tons of furnace coke for shipment within 12 months, and it is expected that this deal will be closed during the week. There is more buying for stove manufacturers, foundries doing railroad work and steel mills. Standard Connellsville foundry coke is firm at $4.75 to $5.50.

Old Material.—There is no change in the prices of old materials this week. Dealers have not been so eager to boost prices, as was the case the previous week, for the reason that consumers will not meet the advances and are virtually out of the market at prevailing prices. While there has been no reduction from previous quotations, the market is, if anything, a little softer. The mills report a better volume of business, but say that the prices they are receiving for their product does not warrant them in paying the prices asked for old material by the dealers. Current railroad offerings include: Chicago, Cleveland, Cincinnati & St. Louis, 1250 tons; Chicago, Rock Island & Pacific, 5000 tons; Nashville, Chattanooga & St. Louis, 600 tons; Mobile & Ohio, 800 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$15.50 to $16.00
Steel rails, rerolling	13.50 to 14.00
Steel rails, less than 3 ft	13.00 to 13.50
Relaying rails, standard section	30.00 to 32.00
Cast iron car wheels	15.50 to 16.00
No. 1 heavy railroad melting steel	12.00 to 12.50
No. 1 heavy shoveling steel	11.50 to 12.00
Ordinary shoveling steel	11.00 to 11.50
Frogs, switches and guards, cut apart	12.00 to 12.50
Ordinary bundle sheet	7.00 to 7.50

Per Net Ton

Heavy axles and tire turnings	$7.50 to $8.00
Iron angle bars	13.00 to 13.50
Steel angle bars	11.00 to 11.50
Iron car axles	20.00 to 20.50
Steel car axles	15.50 to 16.00
Wrought iron arch bars and transoms	15.50 to 16.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
Railroad springs	13.00 to 13.50
Steel couplers and knuckles	13.00 to 13.50
Locomotive tire, 42-in. and over, smooth inside	10.00 to 10.50
No. 1 dealers' forge	10.00 to 10.50
Cast iron borings	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 1 borings cut in sheets and rings	8.00 to 8.50
No. 1 railroad cast	15.00 to 15.50
Stove plate and light cast	12.00 to 12.50
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.50 to 11.00
Pipes and flues	8.50 to 9.00
Heavy railroad sheet and tank	8.00 to 8.50
Light railroad sheet	5.50 to 6.00
Railroad grate bars	10.50 to 11.00
Machine shop turnings	6.00 to 6.50
Country mixed iron	8.00 to 8.50
Uncut railroad mixed	9.00 to 9.50
Horseshoes	11.00 to 11.50
Railroad brake shoes	10.50 to 11.00

Birmingham

BIRMINGHAM, ALA., Oct. 18.

The only effect of the railroad strike on the Birmingham iron market has been the receipt of orders from scattering customers to anticipate shipments. These, as a rule, are from far away and small consumers. Large pipe interests lately purchased large tonnages. These are now moving to yards and the companies seem generally well supplied for some time ahead.

The Birmingham iron makers report a brisk influx of new orders but little has developed pointing to anxiety as to deliveries. The most apparent anxiety is with regard to foundry coke. Rush orders have come in asking anticipation of shipments, but there is no marked feeling of anxiety.

Pig Iron.—After active selling during two weeks, Birmingham iron makers settled down to a steady influx of 100 to 500-ton lots, all bringing $19 and the differentials. Among the largest transactions of the ten days preceding the past week was the placing of orders for approximately 20,000 tons by the leading pipe interest. Three different interests are known to have gotten 5000 to 7000 tons each. Another considerable order was 1200 tons placed by the American Radiator Co. One maker is now fully booked for the remainder of the year and has as much first quarter business as it cares to take. The other interests have done very little 1921 business, but all have taken some. The base is the same as for prompt iron. Furnace resumption that was scheduled took place, the Alabama Co., Woodward Iron Co. and Republic Iron & Steel Co. blowing in a stack each and the Shelby Iron Co. and the Bass Iron Co. blowing in a charcoal iron stack each. Total active stacks in Alabama have grown from five on Aug. 1 to 12, the active ones being four of the Tennessee company on basic, three of the Woodward Iron Co. on foundry, one each of the Alabama Co., Republic Iron & Steel Co. and Central Iron & Coal Co. on merchant iron and one each of the Shelby Iron Co. and the Bass Iron Co. on charcoal iron. The strategic situation was strengthened by reduction of foundry stocks from 88,000 to 68,000 tons in the month of September and reduction of total stocks from 188,000 to 165,000. Only one maker has well-assorted stocks. Five, including one large maker, had none at the beginning of the month. Several Indiana and Ohio foundries have purchased 200 to 500 tons for first quarter delivery. The melt in the South increases week by week and there is no apparent danger of overproduction.

Cast Iron Pipe.—J. R. McWane, president American Cast Iron Pipe Co., is organizing the McWane Iron Pipe Co., which will manufacture special designs of cast iron pipe. He has leased a plant and will later build. John F. Eagan, of Atlanta, chairman of the board of the American Cast Iron Pipe Co., will become president Jan. 1, Mr. McWane remaining on the board as advisory director. Both high pressure and sanitary pipe are active with all the high pressure plants in operation and most of the others. The Iron City Pipe & Foundry Co. announces full turn and shipment of heavy tonnages of sanitary pipe to New York City. High pressure base is $35 and sanitary pipe base $40 with as low as $30 for extra heavy and $45 for fittings.

Finishing Mills.—The Tennessee company is on double turn this week in the Fairfield structural mill and the blooming and rail mills at Ensley. The plate mill at Bessemer, car works at Fairfield, tie-plate plant at Fairfield and bar and guide mills at Bessemer are also operating. The fifth of the six open-hearth furnaces at Ensley went on this week. That indicates 75 to 80 per cent of operations in the finishing mills. The Gulf States Steel Co. is at 70 per cent of capacity with nails leading on the order sheets.

Coal and Coke.—There is good demand for steam and domestic coal and production has gotten to 235,000 tons per week compared with a low of 165,000 tons. Much coke is going to Mexican smelters at Monterey with some shipments to the Pacific Coast. A consignment of 5000 tons for export is moving to New Orleans. Alabama By-Products Co. is on full turn and Semet-Solvay has resumed at 60 ovens to make coke for the Alabama Co. Woodward Iron Co. has brought in additional by-product batteries.

Old Material.—Cast scrap is moving in good quantities and the market is fairly active, but steel scrap is slow to issue from yards owing to the limited demand incident to the few customers capable of being reached by local dealers.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$19.00
Basic	18.00
Charcoal warmblast	35.00

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Oct. 18.

Pig Iron.—Owing to the threat of strikes Nov. 2, 3 and 4 on the New England railroads, buyers who have contracts for iron are asking furnaces to rush shipments. It seems that some buyers have had inside strike information for two or three weeks past and have been especially active in getting material on the way. The textile interest which opened bids on Oct. 10 for 3000 tons of No. 2 X iron has bought its requirements at approximately $25, delivered eastern Massachusetts. This would mean $19.50, furnace, on its Buffalo purchases, and $21, furnace, for eastern Pennsylvania. The sale illustrates that an attractive inquiry will bring out quotations $1 a ton less than the theoretical market. Otherwise, $20, furnace base, Buffalo, and $20.50, eastern Pennsylvania, prevail here. The week has been exceptionally quiet from the standpoint of inquiries and sales. The Walworth Mfg. Co. asks for 250 tons of No. 2 X and a carload of malleable. Buyers are urging the speeding of shipments before the winter sets in and a railroad strike develops. In referring to sales by a Northern furnace at a "price lower than $19, base furnace," in these columns last week, the statement should have read: "Equivalent to lower than $19, furnace base, eastern Pennsylvania." It is understood the price was about $19.50, furnace.

East. Penn., silicon 2.25 to 2.75	$24.56 to $26.06
East. Penn., silicon 1.75 to 2.25	24.06 to 25.56
Buffalo, silicon, 2.25 to 2.75	25.96 to 26.49
Buffalo, silicon 1.75 to 2.25	25.46 to 25.96
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Cast-Iron Pipe.—Business is slowing down because of the season of the year. There is considerable buying, however, by water departments and companies which are short of pipe and who wish stocks to tide over the winter. Some municipalities have been securing lower prices by negotiating directly and quietly with individual makers, rather than inviting public bids. We quote per net ton in carload lots, f.o.b. Boston and district, as follows: 3-in., $66.70; 4-in., $56.70; 6-in., $50.70; 10-in. and larger, $49.70.

Finished Steel.—A group of building contracts, either just awarded, or about to be, will call for about 20,000 tons of structural steel. On Oct. 13 the building of a new high school for Springfield, Mass., was awarded to Fred T. Ley & Co. for $461,750. Other constructions to be awarded soon are: Harris Forbes building, Boston; Back Bay telephone building, Boston; high school, Providence. Shapes are quoted from 1.60c. to 1.75c. Though bars are still sold as low as 1.50c., the more frequent quotation is 1.60c. Awards to fabricators have been light, the largest being a 4-story building in Concord, N. H., requiring 75 tons.

Warehouse Business.—Reflecting the mill raise of $5 a ton on sheets, the local jobbers have raised their prices accordingly, No. 28 black being changed from

$4.25 to $4.50; No. 28 galvanized from $5.25 to $5.50. Sales are improving slowly. The best demand is for sheets, plates and bars.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $3.90 to $4.30; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $6.50; Norway iron, round, ¼-in. to 2½-in., 5.75c. to 6.75c. per lb. net; other sizes, 7.75c. base.

Coke.—The statement is accredited to an official of a local coke producer that last month was the best from the standpoint of volume of sales of any month in its history. In general the situation is improving. The price stiffening in the Connellsville district makes the status of the New England producers more favorable. The delivered in New England price is $10.66, where the local freight is $3.40.

Old Material.—Better business is still in the sentimental stage only. Better sentiment keeps the price tendency upward. It develops that the $15 offered for heavy melting steel in the Pittsburgh district is for brokers short of material, rather than the mills. Brokers are not doing much business in cast scrap here because the little demanded can be supplied to foundries by local producers shipping in trucks. One broker has offered $19 delivered for No. 1 machinery cast, which he would sell to foundries at $19.50. Offers for more than $7.50 have been made for heavy melting steel.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.50 to $20.00
No. 2 machinery cast	16.50 to 17.50
Stove plate	16.50 to 17.00
Railroad malleable	13.50 to 14.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.00 to $7.75
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.00 to 8.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	3.50 to 4.00
Cast iron borings, rolling mill	4.00 to 4.75
Cast iron borings, chemical	5.00 to 5.25
Blast furnace borings and turnings	2.75 to 3.25
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	12.00 to 13.00
Car wheels	13.00 to 14.00
Rerolling rails	9.00 to 10.00

Philadelphia

PHILADELPHIA, Oct. 18.

The prospective railroad strike is naturally the chief subject of interest this week in the local pig iron and steel trade. Consumers are apparently not fully convinced that the threatened strike will really take place, for there has been very little effort so far to anticipate a railroad tie-up by the placing of rush orders for material. There is not the fear of a railroad strike that might be if the steel and iron industry was working at full capacity; few believe that with millions of men unemployed the railroads could be seriously crippled for long. Moreover, there is a majority who believe that a railroad strike would not be wholly a calamity and that an early settlement of the fundamental differences between railroad executives and workmen is better than a mere postponement of the issue. A victory for the railroads is freely predicted.

The local market has been quiet during the past week, there being no outstanding developments.

Pig Iron.—A further decline in the volume of pig iron business has occurred in the past week. Many consumers have covered their requirements for the remainder of the year and little activity is expected until the furnaces open their books for first quarter, unless the threatened railroad strike should scare some consumers into the market for spot shipments to prevent stoppage of work at their plants in the event the railroads are seriously crippled. There have been several informal inquiries regarding first quarter iron, but the furnaces now in blast are not disposed to consider business for that period at this time. The active furnaces are comfortably well off for the remainder of the year and prefer a policy of awaiting developments before fixing upon a selling policy for first quarter. Prices of foundry iron continue firm. At least two sellers are offering No. 2 plain iron at $20.50, furnace, with freight rates of $1.40 and $1.54 to Philadelphia, while others quote a base price of $21. The extra for No. 2X iron is 50c. in some instances and $1 in others. There are no developments in other grades of iron. The Hellertown furnace of the Thomas Iron Co. was to have been put in blast Sunday, but the threatened railroad strike caused a postponement. It is reported that an Eastern cast iron pipe manufacturer has bought 2000 tons of Belgian iron.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.90 to $22.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.40 to 23.26
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	20.50
Gray forge	20.50 to 21.50
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—A British selling agent has been attempting to execute a pool order for about 10,000 tons of ferromanganese at $50, seaboard, declaring that with this sale consummated the price would immediately be advanced. So far as known, the attempt has not met with success. Meanwhile, quotations continue at $58.35, seaboard, for both imported and domestic. Talk of German sales of ferromanganese in this country continues, but with the exception of one sale of 100 tons reported a few weeks ago there is no definite information that sales have been made. Spiegeleisen is not in demand and is quoted from $25 to $27, furnace.

Semi-Finished Steel.—A few small sales of billets have been made in the past week. Though the usual quotation is $30 for rerolling and $35 for forging billets, these prices have been shaded $1 a ton on some transactions.

Plates.—While the plate market is still very inactive, there is a slight gain in orders, but the best that any of the Eastern plate mills are able to do is 20 to 25 per cent operation. Through the determination of makers to cut down their losses, there has been a slight stiffening in the price, the regular quotation now being 1.65c., Pittsburgh, with some mills quoting 1.75c. on small lots. However, it is still possible to do 1.60c. on desirable specifications and some buyers intimate that they can shade 1.60c. The Baldwin Locomotive Works has received an order from the Argentine for 75 locomotives, requiring about 2000 tons of plates. Domestic inquiries for locomotives now being figured upon total 125 to 150.

Structural Shapes.—No change has taken place in the demand for shapes, which continues only fair and far from the capacity of plants. Prices quoted range from 1.60c. to 1.65c., Pittsburgh, with the latter figure in most quotations.

Bars.—The demand for steel bars is light. Sales are being made generally at 1.60c., Pittsburgh, though there are still reports of an occasional sale as low as 1.50c. Bar iron is quoted at 1.60c., Pittsburgh, but this is being shaded at least $1 a ton by one or two small mills.

Sheets.—It is evident that the efforts of the sheet manufacturers to raise prices have not been wholly successful. The advance of some weeks ago to 2.50c. for blue annealed, 3c. for black and 4c. for galvanized had not become universal up to last week, and the further advance of $5 a ton, which was put into effect Saturday last by some makers, has not been confirmed by sales. Up to the middle of last week, at least, it was possible to procure sheets at 2.25c. for blue annealed, 2.75c. for black and 3.75c. for galvanized. The latest advance may have the effect, it is believed, of bringing up the prices of the low sellers to 2.50c., 3c. and 4c., but these quotations will still be $5 a ton below the newly announced levels of 2.75c., 3.25c. and 4.25c.

Spikes.—A fair demand exists for railroad spikes. The Norfolk & Western has issued an inquiry for 700

kegs for prompt shipment and 7000 kegs for first half of next year. Railroad spikes are quoted at 2.50c., Pittsburgh, per lb.

Bolts.—Makers assert that bolt prices are firm on the basis of 65, 10 and 5 per cent off for large machine bolts.

Rivets.—Prices are firmer, with structural rivets quoted at 2.50c. and boiler quality at 2.60c., Pittsburgh.

Warehouse Business.—A moderate improvement in buying steel out of stock continues. Prices for Philadelphia are given, the quotations on sheets being the minimum, some houses asking more:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ⅛ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage, 3.75c.; galvanized sheets, No. 28 gage, 4.75c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.75c.; squares and hexagons, cold-rolled steel, 4.25c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Old Material.—A slight activity began early last week, but had dwindled almost to nothing by the end of the week. Heavy melting steel is higher in price, $12.50 having been paid by one Eastern mill and $13 by another. A western Pennsylvania mill has paid $10.50 for blast furnace borings and turnings, and while they can be obtained somewhat cheaper in the eastern Pennsylvania district, due to freight rate advantage, they are higher here than a week ago. Car wheels have been sold at $17 and $17.50, delivered, during the week. Railroad grate bars have been sold at $14.25, delivered. We quote prices for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$12.50 to $13.00
Scrap rail	12.50 to 13.00
Steel rails, rerolling	16.00 to 16.50
No. 1 low phos., heavy 0.04 and under	16.50 to 17.50
Car wheels	17.00 to 17.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.50 to 15.00
No. 1 forge fire	10.50 to 11.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.50 to 9.00
Mixed borings and turnings (for blast furnace use)	8.50 to 9.00
Machine-shop turnings (for rolling mill and steel works use)	8.50 to 9.00
Heavy axle turning (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	10.00 to 10.50
Cast borings (for chemical plants)	10.50 to 11.00
No. 1 cast	17.00 to 18.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	12.00 to 13.00
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Iron car axles	No market
Steel car axles	No market

Cincinnati

CINCINNATI, Oct. 18.

Pig Iron.—The market continues unusually quiet, carload sales being the only indication of activity. The largest sale reported was 500 tons of Chicago iron to a northern Indiana melter, the price being $21, furnace. A sale of 200 tons to a central Ohio melter was reported on the basis of $20, lake furnace. The only inquiry of consequence comes from a Chattanooga melter, for 1000 tons of malleable for first half delivery. A tentative inquiry for 500 tons of foundry is out, but the placing of the order is contingent on a casting order being received. The Lenoir Car Works is inquiring for 200 tons. The price situation remains unchanged, lake furnaces quoting $20 to $21 furnace in this territory and Chicago iron being offered at the higher figure. Ironton producers are holding firmly to $21 for the base grade, and Southern furnaces are quoting $19, Birmingham, for last and first quarters. Shipment of iron from furnaces during the first half of October showed a substantial gain over the same period in September, and with the possibility of a railroad strike on Oct. 30, some melters are already asking furnaces to anticipate shipments.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silver, 8 per cent sil.	32.86
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	24.02

Finished Material.—A number of carload inquiries are being received for finished materials and in some instances orders for bars, shapes and plates totaling 100 to 200 tons have been placed. The greater part of this business is coming from jobbers who are balancing up their stocks. The sheet market is quiet and an advance of $5.00 a ton made by several independent companies has not as yet brought out much business. It was expected that most of the independent companies would follow the lead of the Brier-Hill Steel Co. in moving up, but so far only three or four companies are quoting at the higher level. Prices on all finished materials are inclined to be firmer and while the 1.60c. price on bars has not entirely disappeared, 1.65c. was the figure at which most of the business was booked during the past week. There is still some activity in wire products and carload orders are reported as fairly numerous. In the structural field, the Big Four Railroad placed a number of bridge spans involving approximately 50 tons. The Dayton Steel Co. was low bidder on two airplane hangars at McCook Field, Dayton, Ohio, involving 180 tons. Bids closed Oct. 15 for the Catholic Club at Memphis, taking 600 tons, and 750 tons for a bridge over the Warrior River at Tuscaloosa, Ala., will likely be awarded on Oct. 19. The City of Cincinnati has awarded to the National Cast Iron Pipe Co. 200 tons of pipe. There will be little change in plant operations this week. The American Rolling Mill Co., Middletown, is operating its East Side plant on full time and the Whitaker-Glessner Co., Portsmouth, has eight sheet mills on. It is expected that the Andrews Steel Co. and the Newport Rolling Mill Co. will shortly resume as an open shop proposition. The Amalgamated Association has called a strike at the two latter plants, giving as the reason the company's refusal to negotiate and sign the local wage scales.

Warehouse Business.—No change is reported in warehouse business, which, on the whole, is regarded as fairly satisfactory. Small orders for immediate delivery constitute the bulk of the activity, although occasionally an order for 50 tons of material is booked. Jobbers' quotations are unchanged.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.10c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—The coke market shows only occasional activity. A sale of 10,000 tons of Pocahontas furnace coke is reported, delivery to cover the next two months. The price was not divulged. Business in general, however, is confined to carload lots. Prices are firm at recent levels, though some operators are now asking 50c. above the market even for immediate shipment.

Old Material.—There is very little activity in the scrap market, though occasional inquiries for machinery cast and borings and turnings are received. Consumers in this district are out of the market, and what little business is offered comes from the Valleys. Prices are inclined to weakness without, however, any changes being quotable.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$4.50 to $5.50
Iron rails	12.50 to 13.00
Relaying rails, 50 lb. and up	25.50 to 26.50
Rerolling steel rails	11.00 to 12.00
Heavy melting steel	9.50 to 10.00
Steel rails for melting	9.50 to 10.50
Car wheels	12.50 to 13.50
Per Net Ton	
No. 1 railroad wrought	9.00 to 10.00
Cast borings	3.50 to 4.00
Steel turnings	2.50 to 3.00
Railroad cast	12.50 to 13.00
No. 1 machinery	14.00 to 15.00
Burnt scrap	8.00 to 9.00
Iron axles	16.00 to 17.00
Locomotive tires (smooth inside)	10.00 to 10.50
Pipes and flues	4.50 to 5.50

New York

NEW YORK, Oct. 18.

Pig Iron.—Except for an occasional request for anticipation of shipments of pig iron and coke, there is little indication of any effect upon the market of the threatened strike of railroad employees. Aside from this slight acceleration of shipping, the market is duller than it has been. No seller reports more than 1500 booked during the past week for delivery in the metropolitan district. Probably the largest sale was one for 700 tons of foundry iron for early delivery to a New Jersey melter. Prices show little, if any, change. While it is understood that some sales of Buffalo iron have been made at $19.50, furnace, for No. 2X, in New England, the lowest price reported in this district is $20. The market seems to be fairly firm at that figure. Melters of pig iron have been canvassed in the interests of French, Belgian and German pig iron. So far as known, no orders for foreign iron have been placed.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25..	23.02
Buffalo, sil 1.75 to 2.25.....	25.46
No. 2 Virginia, sil. 1.75 to 2.25.....	29.16

Ferroalloys.—There is no demand for ferromanganese but there has been one interesting development. The American representative of one British producer is reported to have approached certain American consumers with a proposition to take British alloy for early shipment in order to anticipate any duty and it is also said that in the event of a sufficient amount being thus sold, the price would be on a basis of $50, seaboard, which compares with the present quotation of $58.35. It is stated that this plan has not been successful thus far and it is also stated that domestic producers have expressed a willingness to meet a $50 seaboard price should it be established. This development has had a tendency to hold up whatever business might have been put through. About 400 tons of spiegeleisen has changed hands at prevailing quotations. The 50 per cent ferrosilicon market has been steady with sales confined to a few carload lots. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal.	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered...	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude per net ton, Atlantic seabboard....	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude per net ton, Atlantic seaboard.....	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York.....	55c. to 60c.

Warehouse Business.—Prices are unchanged and order books as a rule look the same for the first two weeks of the current month as for the month of September. Although there is a strong effort being made in most lines to stock up from the mills in anticipation of the prospective railroad strike, few warehouses expect that any large amount of business will be stimulated by a transportation tie-up, as at present there is no business to be stimulated. The best results expected are a few larger orders from hand-to-mouth buyers, who have been purchasing for a week or two weeks at a time, and who will probably lay in stocks for a month or two. Shafting and screw stock was reduced, effective Oct. 13, to 3.88c. per lb. for rounds and 4.38c. per lb. for squares by most warehouses in this district. The situation in pipe is unchanged. Brass products have been advanced 1c. per lb. by most warehouses in the city and some have applied this increase to copper also. The large surplus of brass scrap that has been in the market in the past has kept prices low, but there is now evidence that this scrap surplus has been considerably reduced. It is rumored that British brass scrap has been delivered at New York for as low as 4c. per lb. Just what grade of scrap it was is not known. We quote prices on page 1060.

High Speed Steel.—The market continues dull. In anticipation of the railroad strike producers are replenishing their stocks in New York district warehouses by shipments from mill stocks. Prices continue unchanged at 90c. to $1 per lb. for 18 per cent tungsten high speed steel.

Finished Iron and Steel.—No appreciable increase in the volume of business is to be noted. If any change has occurred it is a weakness in prices. Moderate-sized tonnages are being booked at current quotations, but competition is so keen in the case of the large offerings that prices $2 and $3 a ton below the 1.60c. basis on the tonnage products appear to be the basis of these sales. Very commonly quotations seem to be delivered prices without regard to the Pittsburgh basis, though comparisons are still commonly made by considering the Pittsburgh freight rate to destination. A round lot of plates appears to have been sold at a mill price corresponding to 1.35c., Pittsburgh, and about 750 tons of steel bars at less than 1.40c., Pittsburgh. In some quarters these sporadic cuts are regarded as marking the end of the price decline. A fair run of fabricated steel business is noted, but no new railroad car business. The Standard Steel Car Co. is credited with 2000 cars for Argentina and the Baldwin Locomotive Co. with 85 from the same source, and the American Locomotive Co. is in the market for a round tonnage of plates for 14 locomotives for the Rock Island and others for the Missouri Pacific. New structural work includes the following: 400 tons for the Glen Alden Coal Co. office building, Scranton; 300 tons for a factory at Providence for the Textile Finishing Machine Co.; 2000 tons for nine bridges for the Philadelphia & Reading; 600 tons for a high school in the District of Columbia; 500 tons for a bridge span in the Jamaica Bay Boulevard. Recent awards include 1100 tons for the Newark Athletic Club to the Hedden Iron Construction Co.; 800 tons for the Hackensack Hospital to the Hay Foundry & Iron Works; 300 tons for a bath house at Rockaway to the Levering & Garrigues Co.; 250 tons for the French & Co. apartment; 400 tons for the J. E. Carpenter apartment, Fifth Avenue, and 2400 tons for three schools in Brooklyn, all to the McClintic-Marshall Co.; and the following to the American Bridge Co.: 350 tons for the American Car & Foundry Co. at Terre Haute, Ind.; 2800 tons for the vehicular roadway of the Manhattan bridge (for the Vulcan Rail & Construction Co.); 1100 tons for an addition to Haddon Hall, Atlantic City; 500 tons for a highway bridge over the Delaware River at Trenton, and 250 tons for a power house addition at Scranton for the Scranton Electric Co.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c. to 2.03c.; plates, 1.98c. to 2.13c.; structural shapes, 1.98c. to 2.13c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Cast-Iron Pipe.—The only municipal inquiry in this district is that of Washington for 100 tons of 12-in. pipe, bids to be opened on Nov. 7. The demand for the smaller sizes keeps up well. Plants in the Northeastern States are operating at from 50 to 70 per cent. We quote per net ton, f.o.b. carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—Both grades of heavy melting steel have advanced 50c. in price. A local broker is now offering $12.75, delivered eastern Pennsylvania, for good material. It is reported that as high as $16 has been offered for steel by Pittsburgh brokers, who were short. It grows more difficult to secure material from dealers at present prices, as they stocked up at higher prices and believe that in a few months they will be able to sell at a profit. Pipe and borings and turnings have

been active the past week. Buying by mills has not shown much improvement.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$8.00 to $8.50
Steel rails, short lengths, or equivalent	9.50 to 10.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	11.50 to 12.00
Iron car axles	19.00 to 20.00
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track	9.50 to 10.00
Forge fire	6.00 to 6.50
No. 1 yard wrought, long	10.50 to 11.00
Light iron	4.50 to 5.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	4.00 to 4.50
Mixed borings and turnings	3.50 to 4.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	9.00 to 9.50
Stove plate	10.00 to 10.50
Locomotive grate bars	10.00 to 10.50
Malleable cast (railroad)	8.50 to 9.00
Car wheels	12.00 to 12.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	15.00 to 15.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

British Iron and Steel Market

Steel Reduced to Enable Competition With Continent—Pig Iron Stagnant—Tin Plate Firmer

(*By Cable*)

LONDON, ENGLAND, Oct. 18.

Railroad freight rates on ore are to be reduced Nov. 1. The pig iron market is stagnant, consumers waiting for price stabilization. The foreign ore market is slightly more active with Bibao rubio quoted at 28s 6d ($5.68), ex-ship Tees. There have been further reductions in steel enabling sellers to compete with the Continent for home business. Continental pig iron prices are stiffening with Luxemburg and French basic iron quoted at 83s to 88s ($16.26 to $17.24), f.o.b.

German 8-gage wire has sold at £19 (3.32c. per lb.) for January shipment and German bars at £10 (1.75c. per lb.), cost and freight to Japan, and at £9 2s 6d (1.60c. per lb.), c.i.f. India. Belgian merchant bars are held at £9 10s (1.21c. per lb.), c.i.f. India, with German wire nails at 24s (2.10c. per lb.), cost and freight to Japan. Quotations on Belgian sheets, 3/16-in., are £8 10s (1.48c. per lb.), f.o.b., delivery in three to four weeks, and those on German sheets £7 15s (3.03c. per lb.), f.o.b., with shipment in 12 weeks. Belgian billets are offered at £7 15s ($30.38), c.i.f. Liverpool. Belgian sheet bars are held at £6 10s, f.o.b., with blooms at £6 5s ($25.48), f.o.b.

The recent placing of the substantial order of oil size tin plates has imparted a firmer tone to the market and there are buyers for forward delivery at 22s ($4.31), basis f.o.b., with option contracts for November-December delivery sold at 21s ($4.11), basis f.o.b. There is a better export business, including orders from Portugual. The Welsh output is about 55 per cent of capacity, but some makers are rolling for stock. The Montmouthshire Steel Works are selling tin plate bars at £7 ($27.44) for Welsh makers with the price unaltered.

Galvanized sheets to Japanese specifications have been sold at £27 (4.72c. per lb.), f.o.b., December shipment, and Welsh works have sold black sheets to Japanese specifications at £18 10s for December shipment, but few are now obtainable before January.

Coke prices are falling. Pig iron producers are realizing the necessity to compete for orders. The lower grades have been reduced but there has been few sales. Germany is buying cheap grades of foreign ore.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.92 per £1 as follows:

Durham coke, delivered	£1	10				$5.88	
Cleveland basic	7	7½	& £7	10*		28.90 to	$29.40
Cleveland No. 1 foundry	7	0				27.44	
Cleveland No. 3 foundry	6	0				23.52	
Cleveland No. 4 foundry	5	14				22.34	
Cleveland No. 4 forge	5	12½				22.05	
Hematite	7	0*				27.44	
East Coast mixed	6	10	& 6	5*		25.48 &	24.50
Ferromanganese	16	0	& 14	0*		62.72 &	54.88
Rails, 60 lb. and up	9	10	to 12	10		37.24 to	49.00
Billets	7	0	to 7	10		27.44 to	29.40
Sheet and tin plate bars, Welsh	8	0	to 8	5		31.36 to	33.32
Tin plate base box	1	1	to 1	2½		4.11 to	4.31
						C. per Lb.	
Ship plates	10	10				1.83	
Boiler plates	16	0				2.80	
Tees	11	10				2.01	
Channels	10	5	to 10	15		1.78 to	1.88
Beams	10	10				1.75	
Round bars, ¾ to 3 in.	12	0				2.10	
Galvanized sheets, 24 g.	18	0	to 18	10		3.15 to	3.26
Black sheets	15	0	to 16	0		2.62	
Steel hoops	14	5	& 14	0*		2.49 &	2.10
Cold rolled steel strip, 20 g.	24	10				4.24	

*Export price.

Pig Iron Still Coming from the Continent—Production Costs Still High

LONDON, England, Oct. 5.—The Government is still engaged in discussing plans for the relief of unemployment and the revival of trade, but so far as the iron and steel trade is concerned, the whole question is one of costs of production. The position was well put by Mr. Hichens, chairman of Cammel, Laird & Co., when addressing the quarterly meeting of the London iron and steel exchange on Tuesday. He urged the reducing of steel prices to the level of that of the continent as the only means of getting business, and to do this, he said, production must be cheapened by gradual reductions in wages. Instead of, as hitherto, an official minimum wage ruling for every specified branch of trade, wages must depend entirely upon the prices which can be obtained for the commodities manufactured and trade union restrictions must be abolished entirely.

In the meantime business still goes to the continent where supplies can be obtained at very much lower prices in spite of the fact that such producers are already getting behind in shipments. British pig iron prices show no change, the ironmasters asserting that they cannot reduce quotations until costs of production are down and consumers refrain from placing business until they can buy at cheaper rates. There are now 18 furnaces blowing in the Cleveland district out of a total number of 72, and of these 9 are working on hematite iron. The demand for this latter iron is, however, improving, buyers having been encouraged to place orders by the recent cuts in prices, and it is anticipated that the end of this month will see still more furnaces operating.

In finished steel, however, business does not expand. In Scotland two large steel works have been forced to close down within the last few days, thus adding to the number of unemployed, while two North Eastern steel works have also ceased operations and practically all the others are only working on part time. The one bright spot in the trade is the sheet market and some fair orders are being taken at current prices, mainly owing to the fact that continental makers cannot give sufficiently early delivery.

Increase in Coal and Coke Production

UNIONTOWN, PA., Oct. 17.—The week just closed has witnessed a still further increase in production of both coal and coke in the Fayette bituminous district. Increased output of coke over the preceding week was approximately 1000 tons. Coal output showed a still more substantial gain. Market quotations continue firm with coke quoted not lower than $3.50, although one spot sale of considerable magnitude was reported during the week at $3.30. Foundry coke is quoted at $4.50 and $4.75. The week was lacking in any special features.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.65c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.65c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.40 case
Large boiler rivets.....$2.50 case
Small rivets .....70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, rolled threads, 70, 10 and 5 per cent off list
Machine bolts, small, cut threads, 70 and 5 per cent off list
Machine bolts, larger and longer..65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....65 and 10 per cent off list
Lag bolts .....70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Square and Hex. Head Cap Screws

½ in. and under.....75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in.....75 and 10 to 80 and 10 per cent off list

Set Screws

½ in. and under.....80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $40 to $41; chain rods, $40 to $41; screw stock rods, $45 to $46; rivet and bolt rods and other rods of that character, $40 to $41; high carbon rods, $48 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.30 to $2.40 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.50 to $2.75 base; 5/16-in., $2.50 to $2.75 base. Boat and barge spikes, $2.50 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.30; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.15c. to 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.45	Nos. 13 and 14	2.60
Nos. 9 and 10 (base)	2.50	Nos. 15 and 16	2.70
Nos. 11 and 12	2.55		

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Oct.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
11.....	13.00	12.87½	27.15	4.70	4.50	5.10	4.60
13.....	13.00	12.75	27.25	4.70	4.50	5.12½	4.62½
14.....	13.00	12.75	27.37½	4.70	4.50	5.12½	4.62½
15.....	13.00	12.75	....	4.70	4.50	5.12½	4.62½
17.....	13.00	12.75	28.25	4.70	4.50	5.15	4.65
18.....	13.00	12.75	28.00	4.70	4.50	5.17½	4.67½

New York

NEW YORK, Oct. 17.

Most of the markets turned quiet toward the end of last week and have continued so since. Demand for copper is moderate with prices steady, and the same is true of lead. The tin market has advanced and so has the zinc market, due to conditions distinctly different in each case. Wednesday, Oct. 12, was observed as a holiday in this market.

Copper.—The buying movement in electrolytic copper, which characterized the past two or three weeks, has placed the producers in a firm position and has apparently taken care of a substantial part of the needs of large consumers. At any rate sales and inquiries are less at the present time, but a strong latent demand is reported to exist according to the reports of several large sellers. As soon as something is decided regarding the prospective railroad strike this business is expected to materialize. While quotations for electrolytic copper are a shade less than a week ago, the market may not be considered as weaker. For early or 30-day delivery electrolytic copper can be obtained at 12.75c., New York, or 13c. delivered, although some sellers are asking ⅛c. to ¼c. more. Moderate sales are being made at these prices both for domestic and foreign account, the latter demand being reported as very good.

Tin.—Sales of Straits tin, both spot and future, continue to be made in moderate amounts. This movement has been the feature of the market for the greater part of six weeks to two months, and in all cases consumers have been liberal buyers. In the past week the market has been quiet with business confined to one or two days. On Oct. 13 there was a good demand for spot Straits tin from consumers and at least 100 tons was sold by one seller at 26.25c., New York. On that day there were also buyers of distant future at 27.62½c. to 27.75c., but no business was done because of a lack of sellers. Some tin, ex-steamer at dock, was also sold at 27.12½c. London houses have been ready buyers of parcels of tin for future delivery and as a result this position has been difficult to purchase. On Oct. 14 at least 150 tons of future shipment Straits tin was sold at 27.75c. to 28c., mostly to consumers. Since then the market has been quiet and largely nominal. Total shipments from the East of Straits metal to all countries for the first half of October are returned as 2235 tons. Spot Straits tin is quoted to-day at 28c., New York. The London market is strong with spot standard quoted at £157 5s, future standard at £159 10s, and spot Straits at £157 15s. Arrivals thus far this month have been 1635 tons with 3500 tons reported afloat.

Lead.—The market continues quiet and firm and characterized by no particular features. A steady business is reported by most sellers. The leading interest continues to quote early delivery metal at 4.70c., New York and St. Louis, but independent sellers are exacting a slight premium upon this price in the New York market. Their St. Louis quotation is 4.50c.

Zinc.—The market for prime Western zinc continues to stiffen and prices are higher. For delivery in 30 days quotations range from 4.67½c. to 4.70c., St. Louis, and 5.17½c. to 5.20c., New York. Business has been done at the lower levels and demand continues good. The strength of the market, however, is due more to the policy of producers to sell only their output, which is limited, and not to draw upon reserve stocks made at higher levels. An interesting inquiry is one for about 3000 tons of brass special zinc, delivery to be spread over a considerable period.

Antimony.—Wholesale lots for early delivery are quoted at 5c., New York, duty paid, but it is possible that this could be shaded.

Aluminum.—The leading American producer continues to quote 24.50c. per lb. f.o.b. plant, for the virgin metal, but the same grade from importers is obtainable as low as 17c. to 18c., New York, duty paid.

Old Metals.—The activity of the past few weeks has stopped and the market has settled down to a quiet basis awaiting the result of the railway strike situation. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	$12.25
Copper, heavy and wire	11.25
Copper, light and bottoms	9.50
Heavy machine composition	9.75
Brass, heavy	7.00
Brass, light	5.50
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.50
Lead, heavy	4.00
Lead, tea	3.00
Zinc	3.00

Chicago

Chicago, Oct. 19—Price tendencies are mixed, copper and lead having declined slightly and tin and spelter having advanced. The recession in copper is regarded as the forerunner of rather a substantial recovery, as considerable business is in prospect. Zinc and tin have been fairly active, while lead is very quiet. Old metal prices are unchanged. We quote in carload lots: Lake copper, 13c. to 13.25c.; tin, 29.00c.; lead, 4.60c.; spelter, 4.75c.; antimony, 7c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 8.50c.; copper bottoms, 7c.; red brass, 7c.; yellow brass, 5c.; lead pipe, 3c.; zinc, 2.25c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

St. Louis, Oct. 18.—The lead market is steady, but slightly lower at 4.47 1/2c. carlots, while slab zinc is quiet and slightly higher at 4.62 1/2c. We quote Lake Copper at 13.73 1/2c. to 13.74c., carlots; tin, 28.11c., and antimony, 5.73 1/2c. to 5.74c. In old metals, we quote: light brass, 3.50c.; heavy red brass, 7c.; light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tinfoil, 16c.; tea lead, 2c.; aluminum, 9c.

Marked Improvement in Fabricated Steel

The volume of business done in fabricated structural steel work in September totaled about 86,000 tons, according to the records collected by George E. Gifford, secretary Bridge Builders and Structural Society, New York. This compares with 59,300 tons in August and is the largest month's total since June and July of 1920, when slightly over 90,000 tons was put under contract in each of these months. The September business corresponds to about 48 per cent of the capacity of the bridge and structural shops of the country.

The volume of business for the nine months of the year makes a total of 489,000 tons, which represents 30 per cent of the theoretical capacity of the fabricating trade. The leanest two years of the last ten, 1913 and 1914, had a total of 1,078,000 tons each. For 1921 to approach these lean years in total volume would require a rate of contracting in the third quarter of this year of over 100 per cent of the capacity of the shops.

Coke Rate Reduced

WASHINGTON, Oct. 18.—Effective last Friday, the Philadelphia & Reading and the Pennsylvania railroads have filed tariffs with the Interstate Commerce Commission reducing the rate on by-product coke from Swedeland, Pa., to Philadelphia and intermediate points from $1.26 to $1.12 per gross ton.

PERSONAL

L. J. Hoy, for several years with the Eastern Machinery & Equipment Co., Philadelphia, as sales manager, has severed his connection with that company and has been appointed manager of the used machinery department of Sherritt & Stoer Co., 2006-2008 Market Street, Philadelphia. Mr. Hoy has been connected with the used machinery business in New York, Cleveland and Philadelphia.

Joseph Michaels, vice-president Hyman-Michaels Co., Chicago, has returned from a four months' tour of England, France, Germany and other European countries.

Lyle W. Orr, for the past 10 years general manager of Modern Tool Co., Erie, Pa., has resigned. He has no immediate plans.

Frank W. Trabold, 30 Church Street, New York, after 20 years with J. H. Williams & Co., has severed his connection with the company of which he has been vice-president. Since 1909 he has been successively sales manager, works manager, general manager and vice-president and general manager.

Announcement has been made by the Bureau of Foreign and Domestic Commerce of the arrival of Walter S. Tower, formerly in charge of the iron and steel division, in London, where he took charge of the office this week as commercial attaché. Alfred P. Dennis, whom Mr. Tower succeeded, has been assigned as a special representative of the Department of Commerce to undertake an investigation of agricultural products in Europe. Mr. Tower has been succeeded by Luther Becker as chief of the iron and steel division.

Frank S. Spencer, 1265 Boylston Street, Boston, has been appointed New England sales agent of the Marf Machine & Die Casting Co., Brooklyn, the Peerless Drawn Steel Co., Massillon, Ohio; Topping Brothers, New York; the Witherow Steel Co., Pittsburgh.

William K. Bixby, who will spend the winter in India and South America, has resigned from the board of directors of the Wagner Electric Mfg. Co., St. Louis, and has been succeeded by James M. Buick, vice-president and general manager of the American Car & Foundry Co. Walter W. Smith, vice-president of the First National Bank, St. Louis, has succeeded E. A. Potter, Jr, vice-president of the Guaranty Co. of New York on the Wagner board.

Chester E. Sinclair, who has been with the Betz-Pierce Co., Cleveland, jobber in iron and steel, since the organization of that company, and for several years a city salesman for the company in Cleveland, has tendered his resignation, to become effective Nov. 1, and will organize a sales company for handling the washing machine equipment in Cleveland and vicinity of the Laundryette Mfg. Co., Cleveland.

William M. Sweet, a director and vice-president Klaxon Co., has relinquished his duties with the General Motors Corporation to devote his entire time to the Klaxon interests. Mr. Sweet is also a vice-president, director and member of the executive committee of the Bearings Service Co., Detroit.

William C. Wolfe has been appointed manager of sales of the Highland Iron & Steel Co., Terre Haute, Ind., with headquarters at 208 South La Salle Street, Chicago.

C. C. Boyden, who has been in charge of pig iron sales in the general sales department of the Alan Wood Iron & Steel Co., Philadelphia, has resigned. Mr. Boyden was for many years with B. Nicoll & Co., 149 Broadway, New York, pig iron merchants.

Louis J. Campbell, president Electric Alloy Steel Co., Youngstown, Ohio, and son of President James A. Campbell of the Youngstown Sheet & Tube Co., is recovering from a serious attack of pneumonia.

Gerald H. Moses, since July, 1917, in charge of the Pittsburgh office of Oliver Bros., Inc., Peoples Bank Building, has resigned, to become general purchasing agent of the American Window Glass Co., Pittsburgh. Mr. Moses will be succeeded by Oliver A. Lanchantin, who has been manager of the New York office of Oliver Bros., Inc.

Frank P. Jones, has been appointed president of the Canada Cement Co., Montreal. He has been with the Canada Cement Co. since the beginning of 1910, as general manager, later being made a director and still later a vice-president. He was previously associated with the Dominion Iron & Steel Co., starting as sales manager and rising to be general sales agent, and from 1905 to 1910, general manager. Besides his connections with the Cement company, Mr. Jones is president of the Consumers Gas Co., director of the Canadian Bank of Commerce, Montreal Trust Co., and the Ontario Steel Products Co.

G. V. Ziv, formerly manager of the Chicago branch of A. Milne & Co., announces that he has entered business for himself as president and treasurer of the Ziv Steel & Wire Co., 4423 West Kinzie Street, Chicago. The new company will handle tool steel and solid drill and hollow drill steel. Norman J. Hyslip is general sales manager.

S. E. Eby, for several years with the American Steel Foundries as master mechanic and later as works engineer, recently became sales manager of the Lutz Co., Philadelphia, manufacturer of machinery, tools and special machine work.

Sidney G. Down, for 10 years Pacific district manager, Westinghouse Air Brake Co., and president Westinghouse Pacific Coast Brake Co., with headquarters in San Francisco, has been appointed general sales manager of the company, with offices in Wilmerding, Pa. Mr. Down has been with the company for about 20 years and previously had been airbrake inspector and instructor for the Michigan Central Railroad.

W. H. Snedaker, formerly in the Tacoma, Wash., office of the Griffin Wheel Co., Chicago, has been appointed manager of the sales office established by the company in the Rialto Building, San Francisco.

E. F. S. Mattice, B.A.Sc., M.E.T.C., has been appointed manager of the Phoenix Bridge & Iron Works, Ltd., Montreal. Mr. Mattice is a graduate in the Faculty of Applied Science, McGill University, and for most of his professional career has been with the Dominion Bridge Co., latterly as its general contracting engineer. He was for several years president of the Structural Engineering Co., and has supervised the steel design of many of the largest buildings in Canada.

Prof. John H. Nelson, Wyman & Gordon Co., Worcester, Mass., was the principal speaker at the meeting of the Hartford Steel Treating Society, Thursday, Oct. 13, at Jewell Hall in the Y. M. C. A., Hartford, Conn. Professor Nelson's subject was the drop forging and heat treatment of steel, on which he is a widely recognized authority. There was a large attendance.

Charles H. Chubbuck, chief engineer McClintic-Marshall Co., who recently returned from China where he was identified with bridge and other construction work, was scheduled to address the Engineers' Club of Philadelphia at a luncheon meeting on Oct. 18.

M. A. Green, for ten years superintendent of branches and agencies of the Crucible Steel Co. of America, has become associated with John Hy Andrew & Co., Ltd., Sheffield, England, as manager of its tool steel department at 26 Cortlandt Street, New York.

Jacob M. Schaefer, formerly secretary of the Michigan Smelting & Refining Co., Detroit, has been elected president of the Wolverine Storage Co., Detroit, recently organized with a capital of $500,000.

George L. Sawyer, formerly sales manager of material handling machinery for Barber-Greene Co., Aurora, Ill., has been appointed to represent Universal Crane Co., Elyria, Ohio, in the New York field in the sale of cranes. His offices are at Allied Machinery Center, 141 Center Street, New York.

B. Stevenson, formerly superintendent for the Winton Co., Cleveland, has joined the King Motor Car Co., Detroit, as factory manager.

M. T. Conklin, Detroit, has been elected president of the Gale Mfg. Co., Albion, Mich., engaged in the

foundry business. H. L. Stanton, Detroit, has been elected secretary. Other officers elected were vice-president and treasurer, L. E. White, Albion, and assistant secretary and factory manager, W. C. Sackett, Albion.

Frederick Best, a director of Thos. Firth & Sons, Ltd., Sheffield, England, arrived on the Adriatic and will spend a few weeks on a business trip in this country, and in connection with the new sales arrangements for Firths. He is accompanied by his son, F. Arnold Best.

Charles F. Hauss left New York Oct. 16 to go to China, where he will represent the American Radiator Co. in a territory which comprises China, Japan, Manchuria and Korea. Latterly he has been identified with the exporting and importing business, largely with Italian connections, and previous to that was located in Milan. For a considerable number of years he was connected with the American Radiator Co., largely in France and Italy. His professional and commercial career has been largely linked with the heating business, beginning first in the United States. For the time being his headquarters will be care of the American consul, Shanghai.

M. A. Green, for ten years superintendent of branches and agencies of the Crucible Steel Co. of America, has become associated with the Newman-Andrew Co., 26 Cortlandt Street, New York, as manager of its tool steel department. The Newman-Andrew Co. is the United States end of Jno. Hy. Andrew & Co., Ltd., the Toledo Steel Works, Sheffield, England. Mr. Green has been identified with the tool steel business for a period of some twenty years.

O. K. Davis, secretary National Foreign Trade Council, New York, returned recently from a South American trip. He was the appointee of the Postoffice Department at Washington to represent the United States in the International Postal Congress held recently at Buenos Aires.

F. E. Neitzel, superintendent of construction at the Alameda plant of the Bethlehem Shipbuilding Corporation, returned to San Francisco recently from a five months' tour in Europe, during which he visited various plants in England, Scotland, France, Switzerland, Germany, Italy and Denmark in which Diesel engines are manufactured. It is expected that Diesel engines will be a considerable part of the output of the Alameda shops and both stationary and marine types will be manufactured.

Dr. Walter E. Boveri, of the well-known Swiss electrical engineering firm of Brown, Boveri & Cie., arrived in New York on Oct. 7 and will make his headquarters with the Scintilla Magneto Co., 225 West Fifty-seventh Street, New York.

Charles R. Hook, vice-president American Rolling Mill Co., Middletown, Ohio, will make an address at the annual meeting of the Academy of Political Science at the Hotel Astor, New York, Nov. 4, on "Winning the Confidence of Employees by Taking the Mystery Out of Business." Harold A. Hatch, of Deering, Milliken & Co., New York, will speak on "Insurance Against Unemployment in a Plant."

Dr. Henry M. Howe, Bedford Hills, N. Y., has been confined to his room for a number of weeks by illness.

Maurice de Wendel, of the famous French firm of de Wendel & Co., which has 16 blast furnaces and a basic Bessemer steel plant in Lorraine and eight blast furnaces and a steel plant in eastern France, is making a tour of the iron and steel centers of the United States.

J. L. Neely, for the past eight years assistant traffic manager American Sheet & Tin Plate Co., has been promoted to the position of traffic manager, in place of the late Andrew G. Young. Mr. Neely has been in the traffic department, American Sheet & Tin Plate Co., for the past 20 years.

W. Vernon Phillips, president F. R. Phillips & Sons Co., steel exporters, and the Ettenger-Phillips Co., railroad construction and engineering, Pennsylvania Building, Philadelphia, accompanied by George W. Ettenger, vice-president of the latter company, will sail Oct. 27 for Rio de Janeiro on business.

OBITUARY

DR. JOSEPH W. RICHARDS, professor of metallurgy at Lehigh University, Bethlehem, Pa., died suddenly of heart disease at his home in Bethlehem on Oct. 13.



DR. JOSEPH W. RICHARDS

Dr. Richards was born in Oldbury, England, 57 years ago and came to the United States in his very early youth. He went to Lehigh University as a student after being graduated from the Central High School in Philadelphia. Later he became a professor at Lehigh, ultimately occupying the chair of metallurgy. He was a teacher in the university for over 30 years. Professor Richards was recognized as one of the foremost chemical engineers and metallurgists of the country and he enjoyed an international reputation. He was regarded as particularly an authority on aluminum and wrote extensively on this and other technical subjects. He was the representative of the Franklin Institute, Philadelphia, at the International Geological Congress in Russia in 1897 and two years later he was one of the judges of the department of chemistry at the National Export Exhibition in Philadelphia, serving also in a similar capacity at the Panama-Pacific Exposition in 1915. During the last three years of the war, he was a member of the United States Naval Consulting Board. In 1902, when the American Electrochemical Society was formed, he was active in its organization and became its first president. At his death, he was secretary of this society, which office he had held for several years. He was also a member of the American Institute of Mining and Metallurgical Engineers in whose activities he was always prominent; he was an honorary member of the American Society for Steel Treating and a member of other technical organizations.

ROBERT LAWRENCE AHLES, president Sweet's Steel Co., Williamsport, Pa., died at Westbury, L. I., Oct. 17. He was 43 years old, the son of the late Mr. and Mrs. John William Ahles, formerly of Bayside, L. I. He has been for many years active and prominent in the iron and steel industry of this country, at the time of his death being president of the Sweet's Steel Co. He was formerly identified with the Hewitt interests in northern New Jersey in the operation of blast furnaces. Mr. Ahles was married in 1902 to Helen Kemper, of Virginia. He is survived by Mrs. Ahles and one daughter, Lydia Bell, 12 years old. During the late war Mr. Ahles was in France many months in connection with Red Cross work. At the time of his death he was a member of the Union, Racquet and Tennis, Turf and Field, and Engineers Clubs, New York, and a director of the Trust Co. of New Jersey, Hoboken, and West Branch National Bank, Williamsport, Pa. His illness was comparatively brief. He divided his time between the New York office at 2 Rector Street and that at Williamsport. His home was at the latter place. He was a member of the American Iron and Steel Institute.



ROBERT LAWRENCE AHLES

GERMAN MOOD SPECULATIVE

Mills Without Stocks Operate at Capacity—Warehouses and Speculators Force Prices Up—Buying Heavy

*(Special Correspondence)**

BERLIN, GERMANY, Oct. 4.—Heavy fluctuations in foreign exchange and the possibility of a recovery of the mark caused jobbers to move cautiously during the past week. With still further depreciation of the mark, however, heavy buying set in again, clearly reflecting the speculative character of the present demand. As mills are operating to capacity, extended terms of delivery are being stipulated if orders are accepted at all. A number of mills are discontinuing sales temporarily. It is indicative of present conditions that, while mills have practically no stocks to offer and the scarcity in some lines is acute, there is no real shortage of materials, strikingly revealed by the fairly large offerings of warehouses and speculators. Hoarding and profiteering are much deprecated by the legitimate trade but it is difficult to stop this practice and a demand for introducing restrictive and controlling legislation would probably find but weak support.

In the pig iron market, since the renewed decline of the mark, prices for Saar and Luxemburg irons are higher, holding at about 1600 m. per ton. Quotations for German pig iron are unchanged with demand particularly by the small works, active in anticipation of an official price increase by Nov. 1. The Association of German Malleable Iron Foundries has advanced prices by 140 m. per 100 kg. Conditions in Upper Silesia are steadily improving but blast furnaces are rather slow in returning to production as in certain quarters only short life is predicted for the present boom.

Pending further developments only a few of the 15 furnaces, idle at present, will be blown in. It is noted that England is again appearing as a buyer of Silesian pig iron, and is also showing an interest in finished material.

The quiet tone in semi-finished material during the past fortnight seems to have been caused by overstocks of both jobbers and consumers at the beginning of the present buying period. In sympathy with the general upward tendency of other prices, however, quotations showed slight advances toward the end of the week, billets, basic, and sheet bars being quoted at 2300 to 2400 m. per ton.

A feature of the finished material market is the improved conditions in sheets. The strikes in the Siegerland district having been settled, mills are once more operating at capacity. Heavy sheets are one of the few items on which mills offer early delivery, but the scarcity of light plates is still unrelieved. Wire rods are somewhat softer with average quotations around 3000 m. Rails for mines have been in good demand but only limited tonnages are available. The pipe and tube market is quieter with demand centered chiefly on boiler tubes.

The advance of prices during recent weeks has naturally reacted on the manufacturing industry. Announcements of increases and additions to base prices by the various syndicates and associations are of almost daily occurrence, the new prices frequently becoming obsolete before customers have noted a change. The latest list of price increases includes car springs, bolts and nuts, and enamel ware.

During the past week, the following average prices prevailed per metric ton:

	Marks
Bar iron	3,250
Structural shapes	3,000
Beams	2,900
Tees and channels	2,700
Squares and rounds	2,900
Flats and angles	2,950
Concrete bars	3,100
Hoops	3,300
Wire rods	3,000
Rails	2,950
Rails for mines	2,650
Sheets, heavy	2,700
Sheets, medium	3,100
Sheets, black	4,000
Sheets, planished	5,000
Plates, light	3,900
Wire nails, per 100 kg	475

The following are the prices of a large Rhenish tin plate works:

Boxes of 112 plates:	Marks
No. 35 U. S. standard gage	704.60
No. 33 gage	766.50
No. 31 gage	859.05

*Aerial mail service from Berlin to London discontinued from Oct. 1 until spring of 1922.

New Ore Tariffs Filed

WASHINGTON, Oct. 18.—Tariffs reducing rates on iron ore in official classification territory by 28 per cent were filed yesterday with the Interstate Commerce Commission. The reduction on the more important lines, particularly as it affects ex-lake rates, became operative today, while on a number of lines it does not become effective until Thursday of the present week. On some of the larger lines, however, both dates are applied for different sections, an instance of which is the Baltimore & Ohio. It has named Oct. 18 as the effective date for shipments from the Lake Erie ports and Oct. 20 from other areas on its lines. This is said to be due to the fact that it never had time to make the change as it applies to the latter points after it had been determined to move the date up to Oct. 18.

New Member of Commission and the Pittsburgh Plus Case

WASHINGTON, Oct. 18.—The iron and steel trade is interested in the nomination of Attorney George W. Upham, Warren, Ohio, as a member of the Federal Trade Commission, chiefly because he may be the deciding factor as to the attitude of the commission toward the so-called Pittsburgh case. The present four members of the commission were evenly divided as to the issuance of a complaint which was made possible by the vote of John Garland Pollard, whom Mr. Upham will succeed after confirmation by the Senate. Mr. Upham was formerly secretary and treasurer of the Redifor Rod & Reel Co., Warren. His nomination was a surprise, for it is known that Judge Vernon Van Fleet, of Indiana, now associated with the Department of Justice, had been determined upon as a member of the Federal Trade Commission. It is reported, however, that Judge Van Fleet will continue with the Department of Justice. There are also reports that the work of the Federal Trade Commission is to be transferred, when Government departments are reorganized, to the Department of Justice and that the commission as a body will be abolished. While this report cannot be verified, it has created considerable interest.

Decrease Demand for Steel for Automobile Industry

PITTSBURGH, Oct. 18.—The demand for steel from the automotive industry is on such a moderate scale as to lend support to the assertion that the industry is at least at a temporary saturation point. A prominent steel man, whose business is largely with the automobile makers, subscribes to this idea, although he looks for the industry to make a good recovery. He does not expect the general automotive demand for steel to reach the heavy tonnage in the coming year it did during 1919 and 1920. This man, who is a close student of conditions, says that the buying power of the people of the country has had such a serious contraction in the past year that to all intents and purposes the saturation point has been reached. With more employment which must follow better business, there must come a rise in earning and buying power and hence more people who can afford an automobile. What probably will make for a lighter consumption of steel, he says, is the fact that the demand for the next year at least will be for a light car which will be possible of economical operation. The lighter the car, of course, the less steel will be required.

JAPAN ONLY ACTIVE MARKET

Leading Purchases Black Sheets and Tin Plate —Chinese Inquiries—Galvanized Channels for South Africa

NEW YORK, Oct. 18.—Export trade continues to show improvement, but largely because of the activity of the Japanese market. Other world markets point to little change from the dullness that has prevailed for many months. Japan, however, is reported to have reduced to a considerable extent the heavy stocks of canceled material, acquired through speculation, and in addition is buying at a rate approaching normal. Orders for black sheets of light gages continue to lead, but business in oil can sizes of tin plate has also been large during the past two months.

In August one American exporter booked a total of 20,000 boxes, of which one order was for 12,000 boxes, in September slightly less and in two weeks of October one order for 1000 boxes. In black sheets exporters list heavy orders during the past two months. One house reports a total of about 4000 tons, while another is reported to have accepted a total tonnage of about 8000 tons for shipment to Japanese purchasers. Practically all of these sheets are purchased to be galvanized in the Japanese galvanizing plants erected during the war, but so heavy has been the demands on these plants that in a few instances orders are coming through to American exporters for galvanized sheets, purchasers evidently being unable to obtain sufficiently early delivery from their own plants. The continued excessive buying of sheets has led to the impression that speculation is again rife in Japan, but all reports from agents there state that the financial situation is essentially sound.

Considerable buying is being done for the hydroelectric projects and power houses being established in Japan, and there is fair activity noted in purchases of light rails in addition to the recent purchases and new inquiries for heavy rails made by the Imperial Government Railways. One exporter in New York dealing in both American and German material to the Far East reports the sale of about 2000 tons of 30-lb. and 60-lb. rails of German origin to Japanese industrial enterprises. A large portion of the present plate and bar purchases of Japan are reported being placed in Germany and other Continental countries. German quotations, delivered in Japan, however, are reported increasing, bars recently having risen to 128 yen (about $70) per ton.

Chinese buying is less active at present. Inquiries are being issued by the Universal Steel Export Co., 26 Cortlandt Street, New York, which received the contract from the Chinese Government for 37 locomotives and 400 steel cars. The locomotives, it is stated, will probably be placed with the Baldwin Locomotive Works and the cars may go to an independent car builder. Some independent car builders have submitted quotations based on American constructed steel cars equipped with Belgian wheels and axles, the use of foreign material in this respect having reduced their quotations by about $150 per car.

Despite difficulties of trade with Mexico, a New York exporter has booked an order for 200 tons of T rails for a trolley line at a west coast port. An inquiry for a South African railroad electrification project has appeared in the American market through London, calling for 3000 pieces of galvanized channels about 36 in. long for cross arms on telegraph poles. This order is reported to have been rejected by British makers because of the galvanizing specification.

Imports of foreign foundry iron for Eastern United States consumers are at present not profitable, as the Belgian pig iron market recently developed an upward trend in prices, at about the same time prices increased slightly in the United States. This led to a Belgian seller in New York refusing to quote on a fair-sized inquiry for foundry iron and rejecting a 1500 ton order for a consumer in the vicinity of Philadelphia. At the new prices in Belgium, representing about a $2 per ton increase, he was forced to quote $19.50 to $20 per ton c.i.f., port, which was too high to interest American consumers.

German Briquetting Plant for Australia

The Zeitzer Eisengiesserei & Maschinenfabrik Aktien Gesellschaft (Zeitz Iron Foundries & Engineering Works, at Zeitz) has secured an order for a lignite briquetting plant for the State of Victoria. Part of the plant is to be erected at Morwell, about 100 miles east of Melbourne, where there are rich lignite deposits. This order, which is valued at 30,000,000 m., probably represents the first big post-bellum transaction between Australia and German industry.

Cost Association Conference in Pittsburgh

Below is the program of the second national cost conference which the Industrial Cost Association is to hold on Nov. 2, 3 and 4 at the William Penn Hotel, Pittsburgh.

Wednesday, Nov. 2.

10:30 a.m.—Address by Horace S. Peck, comptroller S-K-F Industries, Inc., New York, and national president Industrial Cost Association.

2:15 p.m.—"What the Sales Manager Should Have from the Accounting Department," by S. B. Taylor, general sales manager S-K-F Industries, Inc., New York.

4:15 p.m.—"Inventories: Methods of Completing the Physical Count," by E. C. Grimley, Victor Talking Machine Co., Camden, N. J. Discussion led by Christopher Haigh, supervisor of costs, General Electric Co., West Lynn, Mass.

8:00 p.m.—"Responsibility of the Comptroller or Accountant in Times of Business Depression," by F. S. Willett, comptroller Dodge Mfg. Co., Mishawaka, Ind. Discussion led by F. C. Poag, analysist Allied Chemical & Dye Corporation, New York.

9:30 p.m.—"Idleness and Its Relation to Industry, in Retrospect," by T. W. Dinlocker, assistant comptroller S-K-F Industries, Inc., New York, and A. W. Wainwright, works auditor Skayef Ball Bearing Co., Hartford, Conn.

Thursday, Nov. 3.

9:00 a.m.—"Terminology," by Addison Boren, Yale & Towne Mfg. Co., Stamford, Conn., chairman national terminology committee, Industrial Cost Association.

10:00 a.m.—"Budgeting the Plant and Office," by H. S. Breitenstein, chief accountant, bureau of accounting revision, department of controller, Pittsburgh. Discussion led by Weston J. Hibbs, treasurer U. G. I. Contracting Co., Philadelphia.

2:00 p.m.—"Sanitation and Safety," by J. B. Ayres, sanitation and safety engineer, National Tube Co., McKeesport, Pa.
"Cost and Profits of Welfare, Sanitation and Safety," by Major William Hogg, assistant to vice-president National Tube Co., Pittsburgh.

7:00 p.m.—Informal banquet, President Peck, toastmaster.
"Looking into the Future," by Newcomb Carlton, president Western Union Telegraph Co., New York.
"Federal Taxation," by Sanford Robinson, New York.

Friday, Nov. 4

9:00 a.m.—"How Can a Cost System, Although Efficient, Demoralize an Organization," by J. M. Howell, supervisor of costs General Electric Co., Schenectady, N. Y. Discussion led by Ernest J. Wessen, cost engineer W. T. Rawleigh Co., Freeport, Ill.

10:30 a.m.—Reports of committees on "Distribution of Burden in Abnormal Times," "Trade Association Uniform Cost Systems," etc.

2:00 p.m.—Plant visits.

Invitation to attend is extended to executives and department heads of industrial plants, and those interested are asked to notify the national secretary, A. A. Alles, Jr., 2828 Smallman Street, Pittsburgh.

The general chairman of committees having the conference in charge is James P. McLean, Pittsburgh Forge & Iron Co., Pittsburgh. The chairmen of the various sub-committees are as follows: Hotel reservations, Jay Chapin, James H. Matthews & Co., Pittsburgh; railroad reservations, George W. Sheridan, West Leechburg Steel Co., Pittsburgh; credentials, E. R. Brown, National Tube Co., Pittsburgh; registration, A. W. Conley, Armstrong Cork Co., Oakdale, Pa.; acquaintance, Evan L. Moberg, Vanadium Alloy Steel Co., Latrobe, Pa.; entertainment, A. W. Bendig, Mackintosh-Hemphill Co., Pittsburgh; plant visits, Morgan B. Schiller, American Foundry & Construction Co., Pittsburgh; publicity, F. L. Dudgeon, Standard Underground Cable Co., Pittsburgh; exhibits, T. L. Maurado, Macbeth-Evans Glass Co., Pittsburgh.

The War Department received 3.125c. per lb., f.o.b. cars, New Cumberland, Pa., for 255 net tons of miscellaneous lots and sizes of tin plate which were sold at auction at that place on Oct. 6. The material, which was of prime quality, was distributed among several buyers.

Machinery Markets and News of the Works

ANOTHER RAILROAD LIST

Missouri, Kansas & Texas Inquires for 75 Machines at St. Louis

Camden, N. J., Schools Buy 40 Machines—New York School List of 100 Tools Will Be Out Soon

Prospects of important railroad buying of machine tools and other shop equipment grow more promising, the latest development of interest being the issuance of a list of 75 wanted by the Missouri, Kansas & Texas Railroad from its purchasing department in St. Louis. The complete list is published under the St. Louis heading. Favorable action is expected on the list of about 40 machines inquired for two weeks ago by the Delaware, Lackawanna & Western Railroad. The New York Central is expected to issue a list soon covering its 1922 requirements and other roads are also on the point of entering the market, though the prospective railroad strike may cause temporary postponements.

Of minor importance but indicating the more widespread interest by railroads in new shop equipment are inquiries from the Chicago & Northwestern, for a few tools and from the Santa Fe, which has added two or three more tools to its recent inquiries, while the Illinois Central is reported at Chicago to be considering the purchase of additional tools. The Erie Railroad will soon come into the New York market for replacement of machines destroyed by fire in its roundhouse in New Jersey. The Chesapeake & Ohio is expected to close shortly for three tools.

About 40 miscellaneous tools have been purchased for the manual training departments of Camden, N. J., schools, the largest single order being for 15 Flather lathes. The business was split up among several Philadelphia dealers. The New York Board of Education will issue a list probably this week for about 100 tools for seven vocational training schools and the Brooklyn schools will advertise for bids soon on 50 to 70 machines.

Altogether there is a good deal of inquiry before the machine-tool trade, but there is very little, if any, improvement in the volume of orders. In the past week, some tool builders and dealers have experienced a better demand for single machines and a few lists from industrial plants are being figured upon. The Adams Axle Co., Findlay, Ohio, has a fairly good-sized inquiry out for manufacturing axles for Durant motor cars. The Inland Steel Co., Chicago, will buy a number of rail drills and other equipment required in connection with new rail mills to be installed. A Mexican dealer has placed orders at Chicago, including one for 20 South Bend lathes.

New York

NEW YORK, Oct. 18.

There is very little, if any improvement, in machine-tool trade in this market, though the inquiry for 40 tools by the Delaware, Lackawanna & Western Railroad, mentioned last week, has created an expectation that railroad buying may become more of a factor during the next few months than had generally been expected. It is believed that some, if not all, of these machines will be bought soon. The road's inquiry stated frankly that the purchases would be made if prices were favorable. The Erie Railroad is in need of new equipment for a roundhouse in New Jersey recently destroyed by fire and its formal inquiry is said to be in preparation, but may not be issued for a month or two.

School business continues to look promising. The list of the New York City board of education, asking bids on about 100 metal working and woodworking machines for seven vocational training schools, will be sent out within a week or 10 days and the Brooklyn schools will soon ask bids on 50 or 60 tools for manual training departments in that borough. The Camden, N. J., schools have bought the tools for which they recently inquired. One purchase was 15 Flather lathes.

The New York City fire department is advertising for a boring mill and lathe, bids closing Oct. 21.

Activity in this district in inquiries and orders for electric overhead and locomotive cranes is livelier. An inqury recently issued by the Kelric Co., Inc., 165 Broadway, New York, for a 2-ton or 4-ton electric crane for export, to be used in handling lumber, contained insufficient information for bidding and the foreign purchaser has been asked to forward further details. The Levant-American Co., New York, has changed its inquiry for a 3-ton crane for export to hand power specifications. The American Car & Foundry Co., which purchased a 5-ton overhead traveling crane from the Shepard Electric Crane & Hoist Co., will close shortly on two 5-ton, 47-ft. and 60-ft. span electric cranes. The East Jersey Pipe Co., 7 Dey Street, New York, mentioned as being in the market for electric cranes in THE IRON AGE, Oct. 13, has asked for five 3-ton, 60-ft. span and three 10-ton cranes with alternate on a 15-ton, all second-hand. Starr & Ansell, 50 Church Street, New York, have requested bids on a 10,000-lb. electric hoist for Japan, speed of 420 ft. per minute, equipped for a 150-hp. motor, but without the motor. Moore & Moore, Reading, Pa., are in the market for a 40-ton and a 15-ton locomotive crane for export. An export inquiry being handled by several exporters, among them Okura & Co., 30 Church Street, New York, calls for a 15-ton, 30-ft. boom locomotive crane.

Among recent sales are: Shepard Electric Crane & Hoist Co., a 5-ton, 43-ft. 6-in. span overhead traveling crane to the Endicott-Johnson Shoe Co., Endicott, N. Y.; 17 1-ton and one ½-ton electric hoists to the Baltimore Car & Foundry Co., Baltimore, Md., and a 5-ton, 85-ft. span overhead traveling crane to the American Car & Foundry Co. for Buffalo; Industrial Works, a 20-ton, 50-ft. boom locomotive crane to Perry, Buxton & Doane, Modena, Pa., iron and steel scrap; Niles-Bement-Pond Co., a 15-ton, 28-ft. span, 1-motor, overhead traveling crane to the Power Construction Co., Worcester, Mass., for plant at Mountain Mills, Vt.; Alfred Box & Co., a 10-ton, 45-ft. span hand power crane to Thomas F. Kelly, 251 Green Street, Brooklyn, N. Y.

The Standard Oil Co. of New Jersey, 26 Broadway, New York, has arranged an appropriation of $2,000,000 for extensions and improvements at its oil refineries at Bayonne, Jersey City and Elizabeth. New equipment will be installed and about 5000 men will be employed.

The American Gauge Co., New York, has been incorporated at $100,000 by J. F. Harwood, A. Destamps and J. J. Lawrence, 3 East Forty-fourth Street, to manufacture gages, tools, etc.

The Selso Co., Ogdensburg, N. Y., has been incorporated at $50,000 by H. J. Parker, M. H. Stevenson and R. C. Sanford, all of Ogdensburg, to manufacture electrically-operated water heaters and parts.

The Adirondack Power & Light Corporation, Amsterdam, N. Y., has made application to the Public Service Commis-

sion for permission to build an addition to its electric power plant at Princeton, Schenectady County.

The Eastern Signal & Supply Co., 50 Church Street, New York, has filed notice of dissolution.

The Unity Utilities Corporation, New York, has been incorporated at $100,000 by H. A. Jacobson, W. B. Sorrelle and L. J. Annen to manufacture rubber products. The company is represented by H. P. Freese, 27 William Street.

The State Hospital Commission, Capitol Building, Albany, N. Y., will soon take bids for the erection of a new two-story cold storage plant at the Marcy Division State Hospital, Utica, N. Y., 70 x 110 ft., estimated to cost about $130,000. L. F. Pilcher, Capitol Building, is architect.

The W. A. Crook & Brothers Co. has filed notice of incorporation under New Jersey laws, with capital of $100,000, to operate in New York for the manufacture of machinery and parts. F. D. Field, 30 Church Street, represents the company.

Fire, Oct. 10, destroyed a portion of the ship chandlery works of William H. Swan & Sons, 45 South Street, New York, including steel cable, chains, anchors, etc., with loss estimated at about $50,000.

The Enco Electric Novelty Co., New York, has been incorporated at $24,000 by F. David, M. H. Cohen and M. Smiley, to manufacture electrical specialties. The company is represented by Frederick Lese, 277 Broadway.

The Universal Wire Co., New York, has been chartered under State laws to manufacture wire products. The incorporators are T. H. Hay, L. Hudson and F. W. Wilson. The company is represented by B. L. Brandner, 15 William Street.

The Brooklyn Edison Co, 360 Pearl Street, Brooklyn, is arranging for a bond issue of $10,000,000, increasing a recently proposed amount of $3,000,000 to this sum, the proceeds, for the most part, to be used for extensions and improvements in electric generating plants and systems.

The board of managers, Letchworth Village, Thiells, N. Y., M. B. Patterson, 7 Wall Street, New York, president, will receive bids until noon, Oct. 27, for coal-handling equipment for installation at the local power house, and new central heating plant. L. F. Pilcher, Capitol Building, Albany, N. Y., is architect.

The Walker Lubricating Oil & Refining Co., New York, has been incorporated at $2,000,000 under Delaware laws to construct and operate an oil refinery. The incorporators are T. B. and W. D. Walker and John J. Ford, New York. The company is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Cosmopolitan Metal Weather Strip Co., New York, has been chartered to manufacture metal weather strips and other kindred specialties. The incorporators are M. Korman, S. Spaiser and Maurice Hotchner, 72 Wall Street.

The Inter City Fuel Co., 17 Battery Place, New York, is taking new bids on revised plans for the erection of an automobile service and repair building, 50 x 100 ft., for company motor trucks and cars, at 423-25 East Twentieth Street, estimated to cost about $40,000.

Reorganization plans are being perfected by the Willys-Overland Co., 1631 Broadway, New York, automobiles, with plant at Toledo, Ohio, and it is expected to consummate details within about 60 days. A bond issue of $25,000,000 will be arranged for general financing, operations, improvements, etc.

Following a merger of Canadian and English interests by the Diamond Match Co., 111 Broadway, New York, plans are being perfected for the establishment of a large manufacturing plant at Pembroke, Ont., reported to be estimated to cost in excess of $500,000, with machinery. The affiliated companies include the Maguire, Patterson & Palmer Co., Pembroke, Ont.; and Bryand & May, Ltd., London, Eng.

The Sheldon Roofing Co., New York, has been incorporated at $75,000 to manufacture roofing products. The incorporators are F. H. Sheldon, H. S. Stenenson and M. H. Elvidge. The company is represented by Douglass, Armitage & McCann, Woolworth Building

The Phillipstown Electric Corporation, Phillipstown (Putnam County), N. Y., has been organized under State laws to operate a local electric light and power plant. The company is headed by H. C. Derham and W. M. Benjamin, Phillipstown. It is represented by Osborn, Fleming & Whittlesey, 170 Broadway, New York.

The General Electric Co., 120 Broadway, New York, has acquired an interest in a number of local electrical companies and is perfecting plans for a consolidation under one management. The different companies include E. B. Latham & Co., Royal Eastern Electrical Supply Co., and the Sibley-Pitman Electric Corporation, all of New York, and the Tri-City Electric Co., Newark, N. J. It is said that the new organization will be headed by E. B. Latham as president.

The International Accounting Machine Co., New York, has been incorporated under Delaware laws at $12,500,000 to manufacture tabulating machines, registers, etc. The company is represented by the United States Corporation Co., 65 Cedar Street.

The Boker-Buttler Hardware Co., New York, has been merged with H. Boker & Co., 101 Duane Street, steel products, under the latter name.

The Brooklyn Burnall Fuel Saver Corporation, Brooklyn, has been incorporated at $50,000 by G. H. and G. M. Jackson and L. Reimer, Brooklyn, to manufacture fuel-saving equipment and appliances. The company is represented by Benjamin Krauss, 233 Broadway, New York.

The Duffney Brick Co., Mechanicsville, N. Y., has plans under way for the erection of a new two-story plant to replace its works recently destroyed by fire with loss of about $200,000, including machinery. Bayard & Massey, 75½ North Main Street, are architects.

The Diamonite Co., Brooklyn, has been incorporated at $100,000 by W. W. Weese, G. L. Pinkham and W. G. Bushnell, 67 Wall Street, New York, to manufacture fire brick and other refractory products.

Fire, Oct. 5, destroyed a portion of the plant of the Gold Coin Foundry Co., 20 Dewitt Street, Albany, N. Y., stoves and stove castings, with loss of about $22,000.

The St. Lawrence Boat Works, Ogdensburg, N. Y., has been chartered under State laws to operate a local ship and boat-building plant. The incorporators are G. C. Madill, T. H. Huff and T. S. Spratt, all of Ogdensburg.

The Ansonia No-Fuel System, Inc., New York, has been incorporated under Delaware laws at $2,000,000 to manufacture machinery and appliances for fuel-saving service. The company is represented by Arthur W. Britton, 65 Cedar Street.

The Norman Iron & Steel Works, Inc., 247 Norman Avenue, Brooklyn, has arranged for the operation of a fabricating plant for the production of structural steel and ornamental iron specialties. D. D. Terker heads the company.

The Millville Iron Works, Inc., Millville, N. J., has been incorporated at $100,000 by Samuel and Daniel E. Campbell and Lester Fleetwood, Sixth Street and Florence Avenue, to manufacture iron and steel products.

The Richelieu Motor Corporation, 649 Mattison Avenue, Asbury Park, N. J., has plans under way for the erection of a plant on property recently acquired on Asbury Avenue, for the manufacture of automobiles and parts. The initial building will be one and two-story, 80 x 200 ft., with power plant, and is estimated to cost about $200,000 with machinery. Samuel A. Reeves is president.

Toft & Freyer, Perth Amboy, N. J., will build a new one-story wheelwright and forge shop on East Avenue, estimated to cost about $15,000.

The Paterson Iron Fence Co., Paterson, N. J., has been chartered under State laws by William C. Mickel, Francis Dalmotte and Peter J. Meyer, to manufacture iron fencing and kindred iron products.

C. E. and I. Cuneo, 23 Fulton Avenue, Jersey City, N. J., will build a one-story automobile repair and service works, 100 x 100 ft., on Hudson Avenue, near Eighth Street, to cost about $60,000.

The Acme Handle Co., 228 Orient Avenue, Jersey City, N. J., has been incorporated with a capital of $70,000 by Charles L. Vondreele and I. H. Brand to manufacture wire and wood handles and kindred specialties.

The United Railway Signal Co., Providence, R. I., has filed plans for the erection of a new plant at Edgar, near New Brunswick, N. J., comprising three one-story buildings. Construction will start at once.

The J. W. Kirkbride Body & Storage Co., Pleasantville, N. J., has been incorporated at $50,000 by Alexis D. Whitson and John W. Kirkbride, Pleasantville, to manufacture automobile bodies.

The B. M. & T. Auto Repair Co., 2828 Boulevard, Jersey City, N. J., has filed notice of organization to operate a general machine and repair works and manufacture automobile parts. Robert J. Mitchell, 193 Madison Avenue, heads the company.

The Federal Carbonic Gas Co., Jersey City, N. J., has been incorporated at $500,000 by Frank E. Taylor, Thomas J. Burke and Emmett Sullivan, 57 Randolph Avenue, to manufacture carbonic and other gas for industrial service.

The Kelsey Motor Co., 25 Branford Avenue, Newark, N. J., has awarded a contract to Enstice Brothers, 40 Clinton Street, for the erection of an automobile manufacturing plant on Washington Avenue, Belleville, N. J. The initial building will be one and two-story, with one-story portion, 100 x 275 ft., to be used for manufacturing service. The two-story section will be employed for offices. It is proposed to develop a capacity of about 3000 cars per year.

The Adlanco Industrial Products Co., Newark, N. J., has

been incorporated at $100,000 by Frank D. Ross, Harry A. and George V. Hanley, 810 Broad Street, to manufacture tools and other mechanical specialties.

The National Light & Electric Co., Newark, N. J., has been incorporated at $100,000 by George Ollendorf, Albert R. Hamerslag and Harry Hirsch, Newark, to manufacture electric lights, electrical fixtures and kindred equipment. The company is represented by Harry A. Friedman, 9 Clinton Street.

The Four Chime Auto Whistle Co., 23 Marshall Street, Newark, N. J., has filed notice of organization to manufacture metal automobile horns, etc. Roland J. Hines, 212 Washington Street, heads the company.

The American Metal & Cornice Works, Elizabeth, N. J., has been chartered under State laws by Harry Lasser and Jacob Addelstein, 6 South Street, to manufacture metal building products.

The Hendricks Brass & Copper Co., 130 Market Street, Newark, N. J., has filed notice of organization to manufacture copper, brass and other metal products. Elwood Hendricks, 645 Springdale Avenue, East Orange, N. J., heads the company.

The Sun Machinery Co., Newark, N. J., has purchased the building, No. 28 Mechanic Street, and has been located there since Oct. 15. It has also taken a long lease on the two-story brick building, No. 4 Campfield Place, Newark, N. J.

Philadelphia

PHILADELPHIA, Oct. 18.

The Bureau of Highways, City Hall, Philadelphia, has taken bids for the erection of a new one-story machine shop at Delaware and Fairmount avenues, to be constructed in conjunction with a new service building for municipal motor trucks and automobiles at this location.

The Bradley Mfg. Co., Philadelphia, is being organized by John H. Bradley, William Storch and Walter L. Kalbach, to manufacture metal furniture and equipment for hospital and kindred service. Application for a State charter will be made on Nov. 7. Scott, Van Dusen, Archbald & Johnson, Stephen Girard Building, represent the company.

The new plant of Horace T. Potts & Co., 316 North Third Street, Philadelphia, manufacturers of iron and steel products, will be located on the southeast corner of D Street and Erie Avenue, and will consist of a number of buildings of various sizes, comprising main iron-working plant, foundry, power house and office building. It is estimated to cost about $450,000. Construction will be commenced at once.

William H. Robinson, Philadelphia, has leased property at 1823 Ludlow Street for the establishment of a steel stamping works, with department for electro-plating and kindred operations.

The Ace Motor Corporation, Philadelphia, has been incorporated under Delaware laws at $2,340,000, as a reorganization of the company of similar name, for the manufacture of automobiles and parts, with plant at Erie Avenue and Sepviva Street. Officials of the Haverford Cycle Co., 503 Market Street, who recently acquired the former Ace company and plant, head the new organization. The incorporators are Abraham S. Buchman and Harry O. Boreth. The company is represented by the Corporation Trust Co. of America, du Pont Building, Wilmington, Del.

A new one-story power house will be constructed by the Consolidated Ice Co., 2331 Bodine Street, Philadelphia, at 2335 Bodine Street. Plans have been completed.

The Standard Tin Foil Corporation, Philadelphia, a subsidiary of the Conley Tin Foil Co., 521 West Twenty-fifth Street, New York, has disposed of its plant at Torresdale Avenue and Church Street to Herbert Newton, for a consideration stated to be $150,000. The new owner will occupy the property for a different line of manufacture.

Thomas J. Clark, 2728 North Second Street, Philadelphia, has filed plans for the erection of a one-story addition to his machine and wagon repair shop at 2732 North Second Street.

The Cutter Electrical & Mfg. Co., Nineteenth and Hamilton streets, Philadelphia, manufacturer of circuit breakers, switches, etc., has acquired the four-story factory at location noted, heretofore held by the estate of John W. Graham, for about $150,000.

The Philadelphia Ship Repair Co., Philadelphia, has disposed of its four-story factory at the northeast corner of Thirty-seventh and Sansom streets to J. S. Ware, who will use the property for other industrial service.

The McFarland Foundry & Machine Co., Inc., Willow Street, Trenton, N. J., will build a new two-story addition to its foundry on New York Avenue, 50 x 52 ft., to cost about $12,000.

The Forbes Aluminum Products Co., Steele Building, Easton, Pa., has awarded a contract to the R. T. & C. D. Stewart Construction Co., 26 Centre Square, for the erection of its proposed new plant in the South Side district for the manufacture of cooking utensils and other aluminum products. The works will consist of a number of buildings, with initial units to cost about $150,000, and ultimate plant, as projected, close to $500,000. The company was recently incorporated under Delaware laws with capital of $4,500,000 and has established New York offices at Thirty-eighth Street and Fifth Avenue. Ewing M. Forbes is president. A. D. Chidsey, Jr., 341 Northampton Street, Easton, is architect and engineer.

The Metropolitan Edison Co., Reading, Pa., has arranged for a bond issue of $216,500 and stock issue of $100,000, the proceeds to be used for general operations, extensions, etc.

The York Castings Co., York, Pa., has been incorporated under Delaware laws at $100,000, to manufacture iron, steel and other metal castings. The incorporators are Elmer Workman, Abraham and H. C. Trattner, York. The company is represented by the Colonial Charter Co., Ford Building, Wilmington, Del.

The Raleigh Motors Corporation, Reading, Pa., will install equipment at its local plant, recently acquired, for the manufacture of automobiles.

The Dunlap & Jones Co., Pottsville, Pa., is planning for the rebuilding of its foundry, destroyed by fire Oct. 7.

The Oakland Service Co., 24 South River Street, Harrisburg, Pa., is taking bids for the erection of a new automobile repair and service works, one-story, 60 x 120 ft., estimated to cost about $30,000. A. Allen heads the company. W. W. Johnston, 7 North Front Street, is architect.

John H. Ware, Jr., Oxford, Pa., and associates have organized the Penn-Oxford Electric Co. and the New London Electric Co., under State laws, to operate electric light and power plants in this section.

Fire, Oct. 9, destroyed a portion of the plant of the Memphis Steel Construction Co., South Greensburg, Pa.

Plans for a new one-story power house are being prepared by John J. Hawley, Traders' Bank Building, Scranton, Pa., architect, to be erected by the Mount St. Mary's Convent, 2300 Adams Avenue. Bids will be asked at an early date.

The Lackawanna Railroad Co., 90 West Street, New York, is developing plans for the electrification of a portion of its Scranton, Pa., division, and estimates of cost, including power plants, electric locomotives and other equipment are being prepared. The completion of the project will be followed by the electrification of other divisions of the railroad, particularly in New Jersey.

Fire, Oct. 6, destroyed a portion of the flour mill and elevator of the Hanover Milling Co., Hanover, Pa., with loss, including machinery, of $75,000.

The Greenville Steel Car Works, Sharon, Pa., has closed a contract with the Erie Railroad for the repair of 1000 steel cars at its local plant.

The new Standard Hardware Works, Harrisburg, Pa., has filed notice of change of name to the New Standard Corporation.

New England

BOSTON, Oct. 17.

A few sales of single tools constitute the week's chief business. The auction sale of the machine tools of the Chapman Mfg. Co., Winchester, Mass., was attended largely by second-hand machinery dealers and they were the chief purchasers. Extremely low prices prevailed. For instance, standard automatic machines that once sold for about $3,000 were knocked down at $350. A group of five wood-tilted lathes sold for $300 for the lot.

Optimistic developments are reported in spots. Large orders have been placed with brass plants in the district containing Ansonia, Waterbury and Torrington, Conn., thereby causing the working forces to be increased considerably. The Westfield Mfg. Co., Westfield, Mass., maker of Pope bicycles, has just secured the American rights for manufacturing the Gibson pedal, a Canadian product that has met with much success. A new industry is getting under way, the Spencer Thermostat Co., Cambridge, Mass., which just bought a 12-in. Hendey lathe and will need more equipment.

The Machinery Co. of America, Big Rapids, Mich., is making a substantial reduction in the price of filing room and knife grinding machinery. Some of the week's sales have been: Fluting planer to a textile interest; a 5-ton, 28-ft. span Niles crane to the Power Construction Co., Worcester, Mass.; a double punch and shear for the Portland terminal shops of the Maine Central Railroad.

There are intimations of price raising by certain machine tool builders.

The Connery Machine Co., 56 Harrison Avenue, Spring-

field, Mass., is planning for the construction of a new one-story machine shop.

The Rhode Island Crucible Steel Co., Providence, R. I., has been incorporated at $100,000 by Albert B. Benson, George C. and Carl A. Hagstrom, 185 Oakhill Avenue, Pawtucket, R. I., to manufacture steel and iron products.

The Crandall-Johnson Co., Stamford, Conn., has been incorporated at $50,000 by A. L. Crandall, Stamford, and associates to manufacture machinery and other mechanical equipment.

Fire, Oct. 5, destroyed the paper mill of the G. A. Robertson Co., Hinsdale, N. H., with loss estimated at about $100,000, including machinery.

The Standard Machinery Co., Mystic, Conn., has filed notice of withdrawal of its recent intention of dissolution and will be continued in operation.

Mechanical and electrical equipment will be installed in the new one-story industrial school to be erected at the Connecticut State Reformatory, Cheshire, Conn., estimated to cost close to $50,000.

The Standard Metalwork Co., Thompsonville, Conn., has filed final notice of dissolution under State laws.

Charles R. Scott and W. E. Currier, Amesbury, Mass., have formed a partnership under the name of the Amesbury Auto Body Co. for the manufacture and repair of automobile bodies and tops.

Dragat & Traubman, 340 Windsor Avenue, Hartford, Conn., have rejected bids recently received for the erection of a three-story automobile repair and service works on Windsor Avenue, 100 x 100 ft., estimated to cost about $100,000, and will hold the project in abeyance until early in the coming year. G. A. Zunner, 182 High Street, is architect.

The Reeves Vacuum Cleaner Co., Milford, Conn., manufacturer of vacuum cleaners, parts, etc., has filed notice of change of name to the Reeves Co.

A new one-story power house will be erected at the plant of the Portland Silk Co., Middletown, Conn.

The board of education, Pawtucket, R. I., will install machine tools, electrical equipment and other mechanical apparatus in its proposed new manual training and industrial arts school on Fountain Street, estimated to cost in excess of $1,000,000 complete.

The Massachusetts Pressed Steel Co., 72 Commercial Street, Worcester, Mass., has been formed to manufacture metal stampings and will be in the market for new tools or good second-hand tools within the near future. At present its requirements are a 16-in. used American lathe, 6-ft. bed, and a 4 or 6-in. Pratt & Whitney die slotter.

Buffalo

BUFFALO, Oct. 18.

The Atlas Crucible Steel Co., Dunkirk, N. Y., is arranging for a bond issue of $4,000,000, of which $2,000,000 will comprise an initial sale, the proceeds to be used for general operations, improvements, etc.

The Merger Tire & Tube Corporation, Buffalo, has been incorporated at $500,000 by C. J. Allen, J. S. Knibloe and E. H. Sturgeon, 40 East Mohawk Street, to manufacture automobile tires and tubes.

A new gas filtration, purifying and pressure plant, estimated to cost about $400,000, with machinery, will be constructed by the Niagara Gas Corporation, 186 Main Street, Buffalo, near the works of the Donner Union Coke Co.

The Lock-in-Pin Products Corporation, Buffalo, has been incorporated at $200,000 by M. J. Williams, J. Latchford and M. Carey, Buffalo, to manufacture metal pins and kindred products. The company is represented by George B. Burd, Erie County Bank Building.

The plant of the M. L. Oberdorfer Brass Corporation, East Water Street, Syracuse, N. Y., has been acquired by the Way-Cleanse Corporation, manufacturer of mechanical specialties, same city. It will be occupied and equipped at once by the new owner and machinery now located at Sandusky, Ohio, will be removed to this location. The Way-Cleanse company is capitalized at $5,000,000, and plans extensive operations.

The Lamson Co., Lowell, Mass., manufacturer of merchandise conveyors, pneumatic tube systems, etc., has awarded a contract to the Aberthaw Construction Co., Boston, for the erection of four buildings at Syracuse, N. Y., for its proposed new local works. The structures will be one-story and aggregate about 150 x 300 ft.; with equipment, the plant is estimated to represent an investment of over $500,000. Monks & Johnson, Boston, are architects.

The Smith-Hall-Cortright Co., Owego, N. Y., has been incorporated at $50,000 by E. Cortright, W. Hall and E. L. Smith, Owego, to manufacture automotive appliances, lens, etc. The company is represented by J. S. Truman, Owego.

The Achilles Tire & Rubber Co., Floral Avenue, Binghamton, N. Y., has had plans prepared for the rebuilding of the portion of its plant recently destroyed by fire, estimated to cost about $16,000.

The Chapin & Baker Mfg. Co. and the Skelton Tool Co., Syracuse, N. Y., manufacturers of special tools and mechanical specialties, have been merged under the name of the Baker-Skelton Co. and will continue the operation of the local plants.

The Lockport Dry Dock Co., Lockport, N. Y., has been chartered under State laws to operate a dry dock and shipbuilding works. The incorporators are B. L. and L. L. Cowles, Lockport. The company is represented by J. W. Stone, attorney, Buffalo.

The Rochester Rolling Mills, Inc., Rochester, N. Y., has been incorporated at $100,000 by F. Christman and J. H. Farrell to manufacture iron and steel products. The company is represented by F. I. Stoker, attorney, Rochester.

The plant of the Precision Engineering Co., Hopkins Avenue, Jamestown, suffered a $20,000 damage by fire Oct. 4.

Fire, Oct. 12, caused a loss of $50,000 to the plant of the Buffalo Specialty Co., Bridgeburg, Ont.

Chicago

CHICAGO, Oct. 17.

The decision of the Inland Steel Co. to roll standard-section rails at its Indiana Harbor plant has resulted in the reopening of negotiations, broken off over a year ago, for rail-finishing equipment. One rail ending machine has already been purchased and orders for a half-dozen multiple-spindle rail drills and a number of straighteners and saws will be placed in the near future. The plant addition which will house the rail finishing equipment will be served by two 15-ton overhead traveling cranes, the purchase of which has not yet been consummated.

Railroads continue to show interest in the machine tool market. The Santa Fe has added an 18-in. x 10-ft. engine lathe and a 36-in. draw-cut shaper to its outstanding list, a substantial portion of which it is expected to purchase within the next few weeks. The Chicago & North Western has asked for prices on a number of tools which are to be included in its 1922 budget. The Illinois Central is said to be contemplating entering the market for additional requirements. From St. Louis comes word that the Missouri, Kansas & Texas has sent out an inquiry for 75 machines.

Actual bookings of local dealers are still unsatisfactory. Considerable interest was aroused last week by the arrival in Chicago of Jose Sanchez, machinery dealer of Mexico City, Mex., who is in the United States to purchase equipment suitable for his trade. Among the orders which he has placed, one calls for 20 South Bend engine lathes and another for a Marvel hack saw and a Dumore grinder.

Only one price reduction is reported since a week ago—a 10 per cent cut on bolt cutters by the Landis Machine Co.

Liquidation of the equipment of companies which have gone bankrupt continues to put second-hand machines in the market. To-day all of the assets of the American Metal Products Co., 1331 West Washington Street, Chicago, are being sold at public auction. Included are seven engine lathes, 19 punch presses, three milling machines, a turret lathe, a shaper, 11 drill presses, besides a considerable quantity of miscellaneous equipment and supplies.

The crane market is quiet. Among the few recent purchases is a five-ton three-motor overhead traveling crane bought from the Whiting Corporation for the new warehouse at Western Avenue and Forty-second Street, Chicago, of Whitney & Ford, dealers in plumbing supplies.

Mandel Brothers, Chicago, have had plans drawn by I. S. Stern, 35 South Dearborn Street, for a one-story and balcony, with basement for boiler and coal room, garage, 125 x 193 ft., North Crawford and Schubert avenues, to cost $75,000.

J. Dooley is receiving bids through Halperin & Braun, 19 South La Salle Street, Chicago, for a one-story garage, 75 x 125 ft., Loomis Street near Adams Street, to cost $25,000.

The J. S. Heath Co., manufacturer of structural and ornamental bronze products, 306 West Ontario Street, Chicago, has let a contract for the erection of a foundry and machine shop, 100 x 108 ft., Waukegan, Ill., to cost $100,000.

The Waukegan Foundry Co., a recently organized concern, commenced operations in the Manufacturers' Terminal, Waukegan, Ill., Oct. 4. Officers of the company include A. K. Barr, formerly with the Barr Pattern Co., North Chicago, and Elmer Skidmore, former credit man for the Chicago Hardware Foundry Co.

P. W. Kempster, Sterling, Ill., is having plans prepared

for the construction of a one-story garage, 50 x 142 ft., to cost $40,000.

The Grand Rapids Show Case Co., Grand Rapids, Mich., has had plans prepared for a five-story show case factory, 102 x 132 ft., to cost $75,000.

The Central Illinois Light Co., Peoria, Ill., has arranged for a bond issue of $1,053,000, the proceeds to be used for general operations, extensions and improvements in plant and system. R. S. Wallace is vice-president and general manager.

The Benton Cold Storage Co., 29 Ward Building, Benton, Ill., has been incorporated at $100,000 to operate a cold storage and refrigerating plant. The incorporators are Robert R. Ward, R. C. Cluster and William C. Ludwig.

The Quartermaster Department, United States Army, Washington, D. C., has broken ground for a large hangar at the Scott Field, near Belleville, Ill., estimated to cost about $1,000,000, including shops for construction and repair work, electrical equipment and other mechanical apparatus. Major Frank Kennedy is in charge.

The Moline Plow Co., Moline, Ill., following reorganization by a creditors' committee, is arranging for the resumption of operations at its plant at Rock Island, Ill., at an early date. The plant will be used for the manufacture of six-cylinder motors for the "Stephens" automobile, and necessary facilities will be provided for this branch of production. It is expected to employ about 100.

A power plant, 33 x 60 ft., will be constructed by the Waterway Paper Products Co., Kedzie Avenue and Thirty-second Street, Chicago, in connection with the erection of a new one-story manufacturing plant, 80 x 180 ft., estimated to cost close to $200,000, including machinery. Frank D. Chase, 645 North Michigan Avenue, is architect and engineer.

The common council, Adrian, Minn., has completed plans for the construction of a municipal electric light and power plant to cost about $40,000. M. J. Farrager is clerk.

The Repeating Devices Corporation, 670 West Randolph Street, Chicago, has been incorporated at $50,000 by E. M. Sinnott, Martin J. Isaacs and A. J. Johnson to manufacture sound-producing instruments and mechanical mechanisms for operation.

The Edward Katzinger Co., 910 West Washington Boulevard, Chicago, has organized the Ekco Engineering Co., which will specialize in the manufacture of a high-speed dough-mixing machine. It is ready to negotiate with makers of special machinery to produce these machines on a contract basis.

C. W. Marthens & Co., Chicago, have purchased a 20-ton, 3-motor overhead traveling crane from the Northern Engineering Works, Detroit.

Pittsburgh

PITTSBURGH, Oct. 17.

Announcement by the United States Steel Corporation that it had recommended to its subsidiaries the expenditure of $10,000,000 for plant betterments does not occasion much optimism in the machinery trade here. The common belief is that this sum will be spent to provide employment for as many men as possible and only for equipment involving small expenditures. The inquiry for four cranes put out some time ago by Boviard & Seyfang Co., Bradford, Pa., again is showing life and it is expected that an award will be made shortly for two 7½-ton cranes and one 5-ton crane. New crane inquiries are few, but requests for revised prices against some old inquiries are being received. Machine-tool activities still are limited. A sale of one large face grinder involving about $6,000 is noted, but individual transactions rarely amount to as much as $1,000.

The Clarion River Power Co., Foxburg, Pa., has surveys under way for the erection of a new hydroelectric generating plant on the Clarion River, near Foxburg, estimated to cost over $2,000,000. The project is being financed by H. D. Walbridge & Co., 14 Wall Street, New York, and plans will be prepared under the direction of this organization.

The Monarch Flux & Metal Co., Tarentum, Pa., has been incorporated under Delaware laws at $100,000 to manufacture metal products and other specialties. The incorporators are Thomas H. and Howard Reighard and John Tasick, Tarentum. The company is represented by the Capital Trust Co. of Delaware, Dover, Del.

The Penn Public Service Corporation, Johnstown, Pa., has arranged for a bond issue of $1,082,000, the proceeds to be used for general operations, extensions and improvements in electric power plants and system.

The Pittsburgh Engineering, Foundry & Construction Co., Pittsburgh, has been chartered under State laws to manufacture machinery, iron and steel castings, etc. J. B. Orr, Farmers' Bank Building, is treasurer.

The Duquesne Light Co., Chamber of Commerce Building, Pittsburgh, has completed plans for the erection of a new one-story power house in Mt. Lebanon Township for electric service in this district.

The H. T. Lambert Co., Huntington, W. Va., recently organized with a capital of $200,000, is perfecting plans for the erection of a plant for the manufacture of frogs, switches, and kindred railroad equipment. H. T. Lambert is president and E. A. Thomas, secretary and treasurer.

The Auto Motor Mfg. Co., Dunbar, W. Va., manufacturer of automobile motors and other equipment, will remove its plant to Point Pleasant, near Gallipolis, Ohio, where increased facilities will be provided. It is proposed to give employment to about 250 at the new location. The company is operating with a capital of $2,000,000.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, an interest of the American Gas & Electric Co., same address, has acquired the power plant of the Grafton Power & Electric Co., Grafton, W. Va., bankrupt. The company will extend and improve the generating plant, with the installation of new equipment, and will operate the plant in conjunction with the new generating station at Logan, W. Va., to cost about $1,500,000, as well as with the proposed new hydroelectric plant on the Cheat River at Caddell, near Kingwood, W. Va. Ground for this latter station is now being cleared. N. M. Argabrite is vice-president and general manager.

A. B. Knight, Fairmont, W. Va., has awarded a contract to J. M. Kisner & Brother, Fairmont, for the erection of a new two-story machine shop on East Park Avenue. A special department will be installed for automobile work, including cylinder grinding, etc.

The Bonita Art Glass Co., Wheeling, W. Va., is completing plans for the erection of a new one-story shop building at its works, 60 x 80 ft., estimated to cost about $35,000, including another structure to be built at the same time. George E. House is president.

The Ferres Motors Co., 615 Seventh Street, Parkersburg, W. Va., has plans under way for the erection of a two-story repair and service works, 50 x 140 ft. D. P. Ferres is president.

Detroit

DETROIT, Oct. 18.

The Detroit Trailer Co. has just shipped the first 50 trailers on an order for 500 from the Brazilian Government. The trailers, equipped with steel platform bodies, are to be used for the construction of a dam 250 miles in the interior.

Manning, Maxwell & Moore, Inc., Muskegon, Mich., have booked an order from the Santa Fe Co. for eight cranes, of which one will be of 250-ton capacity, six of 15-ton and one of 5-ton.

The S. C. McLouth Foundry Co., Marine City, Mich., is building an addition to its plant and has orders on hand that will keep the plant busy for a year. This company recently began work on an order for 500,000 pistons for motor car engines.

The American Bushings Corporation, Marysville, Mich., is now working three full shifts, day and night. October production will total 1,300,000 bushings, and the daily output has been increased from 50,000 to 60,000. New orders have been received that will make possible an output of 1,500,000 bushings in November. This company is reported to be in the market for additional equipment to take care of the prospective increases in production.

The Ithaca Washing Machine Co., Ithaca, Mich., has been organized to manufacture washing and ironing equipment for laundries. The company is headed by Chester and William Swartz, Ithaca.

A shoe manufacturing concern has been organized in White Cloud, Mich., by F. H. Welch, Coldwater, Mich. Mr. Welch owns a majority of the $10,000 capital stock of the company. It is planned to start production soon with a force sufficient to make 100 pairs of shoes a day.

The Reynolds Spring Co., Jackson, Mich., has let to the H. G. Christman Co., Detroit, the contract for construction of its factory addition, to cost about $125,000 and to be a two-story building, reinforced concrete, 130 x 201 ft.

Plans have been made by C. H. Freeland, Lansing, Mich., for a $600,000 labor temple in that city, the building to be six stories high.

An eight-story store and office building will be constructed at Woodward and Horton avenues, Detroit, by M. Basso, Detroit.

The Gem Foundry Co., Muskegon, Mich., has been incorporated by Harry J. Pangburn, Samuel Feltman and Jacob A. Poupstra, of that city, to do a general foundry and machine

shop business and to make castings and articles of brass, aluminum, etc. The capital stock is $10,000.

The Detroit Hexagon Drill Co., capitalized at $300,000, has filed notice of dissolution with the Michigan Secretary of State.

The voters of Flushing, Mich., have voted in favor of bonding the village for $60,000 to be spent in improvements to the waterworks.

Hamtramck, Mich., a suburb of Detroit, has voted to bond the city for $25,000 for an additional unit for the municipal incinerating plant.

The Iron River Water, Light & Telephone Co., Iron River, Mich., has let the contract for a new power plant.

It has been announced that the Standard Sanitary Mfg. Co. will locate a branch plant in Detroit.

The recently organized Grand Rapids Metal Products Co., 1530 Monroe Avenue, Grand Rapids, Mich., has taken over the plating plant of the Miller Plating Co. of Grand Rapids. The new company is preparing to manufacture automobile hardware specialties, metal furniture, phonographs and refrigerators. The plating plant will give the company a complete department for plating and polishing gold, silver, copper, brass, nickel and zinc.

The Wright Plow Works, Greenville, Mich., which was recently purchased by the Cameron Motors Corporation, New York, will be expanded and equipped to produce castings for a new tractor to be produced by the Cameron company.

The Gier Pressed Steel Co., Lansing, Mich., has started shipments of its new Gier Tuarc steel wheels, a solid carload having been sent to the Steel Wheel Co., New York, last week.

The Transue-Williams Steel Forge Co., Marysville, Mich., will hold in temporary abeyance the erection of its proposed new plant addition on West Ely Street, estimated to cost about $45,000. R. H. Gordon is engineer. O. F. Transue is president and general manager.

Officials of the Champion Spark Plug Co, Toledo, Ohio, have organized a subsidiary, the Champion Porcelain Co., capitalized at $750,000, to take over and operate the plant of the Jeffrey-Dewitt Co., Detroit, manufacturer of spark plug porcelains, etc. J. A. Jeffrey is president.

The Leafless Spring Co., Grand Rapids, Mich., has been incorporated at $300,000 by A. D. Swain and John Austin, Grand Rapids, and Walter S. Kilbourne, Stephensville, Mich., to manufacture springs for automobile service and kindred steel products.

The Root Spring Scraper Co., Kalamazoo, Mich., has been incorporated at $40,000 by Fred N., J. M. and Newton Root, all of Kalamazoo, to manufacture ice scrapers for attaching to street cars, road scrapers and kindred products.

The John Widdecomb Co., Fifth and Muskegon streets, Grand Rapids, Mich., is building a new machine shop, in conjunction with an automobile service works, two-story, 50 x 75 ft., at address noted.

The Detroit Sand, Lime & Brick Co., 507 Vinton Building, Detroit, plans to construct a brick plant, with departments for the production of other clay products. Bids will be asked early in November.

R. L. Blackman, Martlette, Mich., is completing plans for the erection of a local power plant for increased light and power service. Bids for construction will be asked early in 1922.

The Jennison Hardware Co., 901 North Water Street, Bay City, Mich., has preliminary plans under way for the erection of a plant on Second Avenue, comprising three units, estimated to cost about $400,000. H. W. Jennison is president.

The Wolverine Truck-Trailer Co., 3931 Greeley Street, Detroit, will place on the market shortly a semi-trailer for attachment to one-ton Ford trucks. The company is equipping for production.

The Atlas Drop Forge Co., Lansing, Mich., is preparing for the erection of an additional plant unit.

Construction on a plant for the Michigan Sheet Metal Works, Lansing, Mich., is to be completed in about 30 days. It will be one story, 45 x 75 ft., and will cost about $5,000.

The new Pere Marquette Railroad engine terminal at Saginaw, Mich., will be opened soon. The new work comprises a 30-stall engine house, machine shop, power house of 1000 hp. capacity, 100-ft. turntable, 500-ton coal dock, modern cinder pit, electrically operated ash-handling outfit, storehouse and general service building. The engine house is equipped with the latest improved hot washout equipment.

The Jeffrey-Dewitt Co., Detroit, manufacturer of spark plug insulators, has been taken over by the Champion Porcelain Co., a new concern capitalized at $750,000 and controlled by the Champion Spark Plug Co., Toledo. J. A. Jeffrey is president of the new company and M. C. Dewitt vice-president.

The Detroit Edison Co. will soon start the construction of a new sub-station at Webberville, Mich., to supply current for towns in the vicinity.

The Haynes Wire Wheel Works, Jackson, Mich., will soon start work on the erection of a one-story tool room building, 80 x 190 ft., to cost about $25,000.

The Hill-Curtis Co., Kalamazoo, Mich., has purchased the grinding and polishing stand and accessory business of the Webster & Parks Tool Co.

The Leafless Spring Co., Grand Rapids, Mich., has been incorporated with capital of $300,000 to manufacture automotive springs and parts and accessories. The incorporators are A. D. Swain and John Austin, Grand Rapids, Mich., and Walter S. Kilbourne, Stephensville, Mich.

The Root Spring Scraper Co., Kalamazoo, Mich., has been incorporated to manufacture snow and ice scrapers for attachment to street cars, life guards and fenders for street cars, road scrapers, floaters and scrapers for use on highways. The capital is $40,000. The incorporators are Fred N., Josephine M., Marie J. and Newton Root, all of Kalamazoo. Production will be started as soon as plant and equipment can be secured.

The Root Spring Scraper Co., Kalamazoo, has been reorganized with a paid in capital of $40,000.

The S. C. McLouth foundry, Marine City, has contracts for 500,000 pistons for gasoline engines and is erecting an addition.

Baltimore

BALTIMORE, Oct. 18.

The Wizard Check Indorser & Printing Machine Co., Calvert Building, Baltimore, will defer a call for bids for the erection of a plant at Highlandtown, near Baltimore, until early next year. The plant will be one-story, 90 x 150 ft., and, with power plant, is estimated to cost over $200,000. F. S. Weise is president. E. A. Fletcher, 407 North Charles Street, is architect.

The Maryland Car Wheel Works, Curtis Bay, Baltimore, manufacturer of car wheels, organized under West Virginia laws, is arranging for a dissolution of the company. The action was approved at a meeting of stockholders on Sept. 29. A. G. Wellington is president.

The Carter Motor Car Co., Bond Building, Washington, D. C., organized under the laws of South Dakota, with capital of $2,000,000, has acquired the plant of the Washington Motor Car Co., Hyattsville, Md., for a new works for the manufacture of automobiles and parts. The present plant will be extended and new equipment installed.

The Industrial Mechanical Equipment Co., Wilmington, Del., has been incorporated at $200,000 to manufacture mechanical products. The company is represented by the Corporation Service Co., Wilmington.

The Atlas Alloy Corporation, Wilmington, Del., has been incorporated at $100,000 to manufacture iron, steel and other metal products. The company is represented by the Corporation Trust Co. of America, du Pont Building, Wilmington.

The Big Savage Fire Brick Co., Frostburg, Md., has commenced the erection of a new dryer plant at its works and will follow this structure with other plant buildings of various sizes. The extensions are estimated to cost about $85,000. D. A. Benson is manager.

The Cumberland Foundry & Supply Co., Cumberland, Md., has leased the foundry of the Union Mining Co., Mount Savage, near Frostburg, Md., for a new plant. It is proposed to inaugurate operations at once for the production of aluminum and other metal castings. Frank Snyder is manager.

The Tru-Matic Tube Co., Wilmington, Del., has been incorporated under State laws at $1,000,000, to manufacture automobile tires and tubes. Mark W. Cole, North State Street, Dover, Del., represents the company.

Property of the Delaware City Light & Water Co., Delaware City, Del., including plant, equipment, etc., will be offered at public sale on Nov. 1, by Chester E. Baum, receiver for the company.

The Cloutier Harrow Co., Ltd., Wilmington, Del., has been incorporated at $250,000, to manufacture plows, harrows and other agricultural implements. The company is represented by the Colonial Charter Co., Ford Building, Wilmington.

The Phillipp-Kell Co., Inc., Holliday and Centre streets, Baltimore, manufacturer of sheet metal products, will hold in temporary abeyance the erection of its proposed new one- and two-story plant on Hanover Street, 70 x 165 ft., and expects to call for bids early in 1922. It is estimated to cost about $50,000.

Ford & Manion, Inc., Wilmington, Del., has been in-

corporated at $100,000 by Joseph J. Ford and Francis T. Manion, Wilmington, to manufacture electrical heating equipment and appliances. The company is represented by Henry R. Isaacs, Equitable Building.

The Joy Mfg. Co., Wilmington, Del., has been incorporated at $1,500,000 under State laws, to manufacture coal mining machinery, including equipment for cutting, loading, etc. The company is represented by the Corporation Trust Co. of America, du Pont Building, Wilmington.

The W. J. Westbrook Elevator Co., Greensboro, N. C., is planning for the erection of a new foundry, to be used for the production of semi-steel and iron castings.

W. G. Martin, Leesburg, Ga., and associates, are planning a new hydroelectric generating plant on the Broad River, near Mt. Airy, Ga.

The Bureau of Yards and Docks, Navy Department, Washington, D. C., has foundation work under way for its proposed new one-story machine shop at Hampton Roads, Va., estimated to cost $104,800, including equipment.

The Roanoke River Development Co., 317 Mutual Building, Richmond, Va., has been granted permission by the Federal Power Commission, Washington, D. C., to proceed with the erection of its proposed new hydroelectric generating plant on the Roanoke River, near Clarksville, Va. It is proposed to construct two power stations, one with a capacity of 50,000 hp. and the other of 10,000 hp.

The Lynchburg Iron & Metal Co., Lynchburg, Va., has been reorganized and the new company of the same name has taken over the plant and property of the former organization.

Fire, Oct. 14, destroyed a large portion of the docks of the Charleston Terminal Co., Charleston, S. C., Columbus Street, including cargo-handling machinery and equipment, with loss estimated at close to $1,000,000.

The common council, Rockymount, Va., is planning for the immediate installation of new machinery for the municipal waterworks, to include engines, pumping equipment and auxiliary apparatus. M. B. Hutcherson is mayor.

The board of directors, State Hospital for the Insane, Goldsboro, N. C., is planning to erect a new power plant to cost about $100,000. H. A. Underwood, 227 Forest Road, Raleigh, N. C., is engineer.

Following a merger of the Enterprise Lumber Co. and Whiteville Lumber Co., Goldsboro, N. C., including other smaller local interests, plans are under way for the erection of a large central lumber mill in this section. Nathan O. Berry is in charge.

The Blue Ridge Power Co., Spartanburg, N. C., is considering the erection of a new power plant in the vicinity of Hendersonville, N. C. J. A. Law is head.

Fire, Oct. 6, destroyed the lumber plant of Wright Brothers, Johnston, S. C., with loss estimated at about $40,000, including machinery.

The Columbia Railway, Gas & Electric Co., Columbia, S. C., has tentative plans under way for the construction of a new hydroelectric generating plant at the terminus of a canal to be built, in accordance with permission received from the Federal Power Commission, Washington, D. C., diverting waters from the Santee and Cooper rivers.

The plant of the Bowie Stove Co., Rome, Ga., formerly the Rome Stove Works, which was recently destroyed by fire, will be rebuilt. H. E. Henson is superintendent.

J. H. Roberts, Charleston, S. C., is making plans for the establishment of a plant for the manufacture of geometric squares.

The W. J. Westbrook Elevator Co., Greensboro, N. C., plans to build a foundry.

The Herculo Lock Guard Co., 15 South Gay Street, Baltimore, manufacturer of a guard which is said to make locks "jimmy" proof, has placed an order for an initial quantity of its product, but a little later on will equip a plant for manufacturing. The company will probably be in the market for shop equipment early next year. William C. Jones is president and general manager, George M. Donaldson is vice-president, Henry M. Sorrell, treasurer, and Oscar H. Wurzbacher, secretary.

Milwaukee

MILWAUKEE, Oct. 17.

An increase in sales which ordinarily would be regarded as negligible, but at present is conspicuous, is reported by machine tool manufacturers in the past week to ten days. At the same time there have been developments, particularly in the railroad situation, that are accepted as indicative of a much better prospect for business in the coming few months than that of six months ago. A great deal of hope of demand in the immediate future is pinned upon the possibilities of a real resumption of buying by the railroads. This, of course, was hoped for immediately after Aug. 1, but without realization. The feeling now, however, is that there is substance in the anticipation.

The Milwaukee Public Sewerage Commission, City Hall, Milwaukee, is asking sealed bids until Nov. 11, at 1.30 p. m., for furnishing and installing all of the coal and ash-handling machinery, consisting of track hoppers, crushers, elevator, conveyors, skip hoist, motors and controllers, storage bins, spouts, automatic scales, ash cars and track, for the power plant and boiler house of the new Jones Island sewage disposal unit. The contractor will be given twelve months to complete the installation. The cost of the power plant unit complete is estimated at $750,000. Contracts for generators, boilers, etc., have been let, as noted in THE IRON AGE some time ago. T. C. Hatton is chief engineer, and John H. Fowles, secretary of the sewerage commission.

The United States Gypsum Co., Chicago, will build a new block plant at Fort Dodge, Iowa, and has let the contract for the steel works to the Worden-Allen Co., Milwaukee. It will require 150 tons.

The Biever Casting Co., Slinger, Wis., a new $10,000 corporation organized to take over and resume the operation of the Slinger gray iron foundry, is making changes and generally overhauling the shop and intends to start production Nov. 1. Joseph H. Biever, Port Washington, Wis., has been elected president and general manager; Frank J. Buche, attorney, Milwaukee, vice-president; Edmund J. Biever, Oconto, Wis., secretary and treasurer. J. H. Biever was connected for many years with the foundry department of the Gilson Mfg. Co., Port Washington, and E. J. Biever with the Montana Tractor Co., Oconto. Light and medium gray iron castings will be manufactured at Slinger.

The American National Mfg. Co., St. Louis, manufacturer of a combination parlor lamp and phonograph consisting mainly of bronze castings, has purchased the real estate and shop buildings of the Slater & Tuck Co., founder and machinist, at Beloit, Wis., for $60,000. The property includes two and one-half acres and five buildings. The new owner will install brass foundry equipment and retool several buildings. It is planned to start operations within 60 days with 80 to 100 employees, producing from 25 to 30 units daily at the start. Martin Wiegand has been appointed works manager of the new Beloit plant. It is capitalized at $1,000,000.

The Runnels-Cummins-Emery Corporation of Milwaukee, recently incorporated with a capital stock of $100,000, has acquired the factory of the Folsom-Miller Co. at Merkesan, Wis., and will resume the manufacture of electric-motored washing machines, wringers and ironers for domestic, hotel and industrial purposes. Some changes will be made in the plant and a small list of new tools installed. Charles Cummins is vice-president and general manager.

The board of education, West Bend, Wis., will select an architect soon to design a new high school and vocational training institute, for which a bond issue of $255,000 was authorized at a special election. It is hoped to begin work on foundations this fall and complete and equip the building in the spring of 1922. E. W. Bucklin is secretary of the board.

The Gallup-American Mining Co., Gallup, N. M., will build a new power plant, boiler house, stack, etc., requiring 300 tons of structural steel, which will be fabricated and erected by the Worden-Allen Co., Milwaukee.

Andrew Nelson and Christian Hansen, Racine, Wis., have formed a partnership to manufacture automobile bodies. A site at 944-948 Washington Avenue has been purchased and work will start at once on the construction of a one-story factory, 60 x 120 ft. Mr. Nelson formerly was superintendent of the body department of the Mitchell Motors Co., Racine.

Nels Thorbus, Brantwood, Wis., manufacturer of cutlery, surgical instruments, etc., contemplates the erection of a new shop at Ladysmith, Wis., to cost about $10,000.

The Lake Laboratories, Inc., Elkhart Lake, Wis., a new corporation organized with 250 shares of common stock having no par value, will engage in the manufacture of electrical and mechanical devices, experimenting and testing the value of inventions and discoveries before patenting, and dealing in machinery, appliances, patents, etc. The incorporators are William C. Burk, E. C. Trotter and George C. Trotter, all of Sheboygan, Wis.

The V. Krefl Co., Eagle River, Wis., has let the general contract to Hugo V. Hertling, Inc., Manitowoc, Wis., for its new machine shop, 60 x 75 ft., to be equipped for manufacturing automobile equipment. It is to be ready Nov. 15 or Dec. 1. The equipment of the original factory at Two Rivers, Wis., is now being transferred to Eagle River and will be supplemented by some new tools.

The board of education, Merrill, Wis., probably will accept the lowest bids, entered by C. G. Torkelson, local contractor, to build a new high and vocational training school for $172,000.

The American Hide & Leather Co., Chicago, which suffered a $1,750,000 loss by the destruction of its Milwaukee tannery by fire on Sept. 28, has notified the building inspector of Milwaukee that it is having plans prepared for a new plant estimated to cost $500,000 as the first unit of reconstruction. It is stated that work on foundations will be started this year.

The Atley Peterson Estate, Soldiers Grove, Wis., is taking bids until Oct. 20 through E. E. Dillon, consulting engineer, Madison, Wis., for the construction of a concrete dam and hydroelectric plant to cost about $65,000. New water wheels, generator, switchboards, etc., will be purchased at once.

The board of education, Janesville, Wis., has accepted the bid of the J. P. Cullen Co., general contractor, local, to erect a new high school with manual training department, estimated to cost $375,000 complete. The architects are Van Ryn & DeGelleke, Caswell Block, Milwaukee.

Cleveland

CLEVELAND, Oct. 17.

The market shows little change in the volume of orders, but the sentiment is better and dealers report that quite a few users are taking more interest in machinery than they have for the past few months, but are not likely to make purchases until their own operations improve so they will have use for additional equipment. The largest inquiry is from the Adams Axle Co., Findlay, Ohio, which is planning the purchase of equipment for the making of axles for the Durant motor cars. According to present plans, this company will equip four units for making axles, and it has prepared a list of equipment required for the first. Instead of sending out a general list, the company has taken up with individual manufacturers and dealers certain lines of equipment. While the early purchase of this machinery was expected, it is now understood that the buying will be deferred until January.

The General Motors Corporation has been figuring on the purchase of machinery for its Dayton, Ohio, plant for the manufacture of a new design of automobile with an air-cooled motor. However, it is understood that the company has changed its plans to build 1000 of these cars at once and will first make a very limited number for test purposes. Consequently, this purchase of machinery has been deferred. The machinery for the McKinley High School, Canton, Ohio, for which bids were received recently, has not been purchased, and is not likely to be placed for some time. Local sales are mostly in single tool orders, although one Cleveland manufacturer placed an order with a local machinery house during the week for six new machines and expects to purchase two or three additional tools.

One of the largest orders for hydroelectric equipment placed for some time has been given by the Alabama Power Co., Birmingham, Ala., for three 22,800 hp. single-runner vertical turbines for the Mitchell dam plant in Alabama. The order went to the Allis-Chalmers Co., Milwaukee, and amounts to approximately $250,000.

The Alliance Machine Co., Alliance, Ohio, at a recent meeting of its board of directors decided to erect a forge shop 50 x 250 ft., and a large pattern shop on which work will be started at once. An expenditure of $100,000 was authorized. The company as far as possible will furnish work for its own employees in building the plant extensions.

The Donahey Power & Products Co., recently incorporated with a capital stock of $2,000,000, will build a plant near New Philadelphia, Ohio, for the manufacture of building material. Later, the company expects to make sewer pipe.

The Lima Sheet Metal Products Co., Lima, Ohio, has completed a new modern plant to which it is moving from its old quarters. The company manufactures sheet metal parts for automobiles, devoting particular attention to parts for trucks. C. L. Ackerman is president. Its capital stock was increased some time ago from $50,000 to $300,000 to provide for the expansion.

The Canton Oxygen Co., Canton, Ohio, plans the erection of a one-story factory building, 47 x 87 ft.

The Waukon Rubber Co., Elyria, Ohio, will soon take bids for the erection of its proposed new two-story and basement plant for the manufacture of general rubber goods, estimated to cost about $75,000. The Akron Engineering Co., 92 East Mill Street, Akron, Ohio, is engineer. W. R. Huntington is president.

The Electric Alloy Steel Co., Youngstown, Ohio, is arranging for a preferred stock issue of $750,000, of which $500,000 will be issued at once, for general operations, improvements, etc. L. J. Campbell is president.

The Toledo Railways & Light Co., Toledo, Ohio, has been reorganized under the name of the Toledo Edison Co. The new organization has arranged for an increase in capital from $15,000,000 to $25,000,000, the proceeds to be used for the purchase of the plant of the Acme Power Co., and for other extensions and improvements in plants and system.

The Distilled Water Ice Co., 522 West Federal Street, Youngstown, Ohio, will build a one-story ice plant, 70 x 160 ft., estimated to cost about $100,000, with equipment.

The S. H. Vehicle Co., East Sixty-fifth and Morgan streets, Cleveland, manufacturer of wagons and parts, has commenced the erection of a three-story plant, 90 x 200 ft. and 90 x 100 ft., estimated to cost over $150,000, including machinery. J. Kleinman is president.

The Schory & Schellhase Co., Sixth Street and Harrison Avenue, S. W., Canton, Ohio, will soon take bids for the erection of a two-story ice-manufacturing plant, 60 x 200 ft., estimated to cost close to $200,000, with machinery.

Cincinnati

CINCINNATI, Oct. 17.

The month of October bids fair to be the best this year with the machine-tool manufacturers. Last week quite a number of orders for single machines were booked and some encouragement was given the trade by the receipt of a list from the Missouri, Kansas & Texas Railroad for approximately 75 items. A number of other railroads are said to be preparing lists which will likely be issued shortly. The Chesapeake & Ohio Railroad is expected to close shortly for three tools for its Huntington, W. Va., shops. The New York Central was a purchaser in the local market during the week and it is said will shortly issue a list covering its requirements for next year. A safe and lock company was also in the market for a number of tools and has already purchased a large radial drill. Dealers and manufacturers report the complexion of the inquiries as notably improved. Buyers are in some cases asking for price guarantees against decline for the balance of the year and in one instance a manufacturer has guaranteed his present prices until Jan. 1.

The Cincinnati Chemical Works, St. Bernard, Ohio, has let contracts for an addition to its plant, the general contract going to the J. R. Stevens Co., Odd Fellows Temple, Cincinnati. Work will commence immediately.

The Oldroyd Mining Machine Co., Cincinnati, on the petition of C. S. Oldroyd, president, has been placed in the hands of a receiver, Henry Neal Smith. The company has an authorized capital of $500,000 of which $200,000 is paid in, and manufactures coal mining machinery.

Indianapolis

INDIANAPOLIS, Oct. 17.

The Crane Co., 836 South Michigan Avenue, Chicago, will build a one-story machine shop at its branch works at East Chicago, Ind., in conjunction with a new warehouse at this location, estimated to cost about $30,000. The company manufactures valves, steam fittings, etc. Bids will be taken at once.

Fire, Oct. 8, destroyed the power plant of the Interstate Public Service Co., Indianapolis, at Bedford, Ind., with loss estimated at about $70,000. It will be rebuilt.

The American Car & Foundry Co., 165 Broadway, New York, is taking bids for the erection of a one-story building at its plant at Terre Haute, Ind., 125 x 290 ft., to be equipped as a machine and forge shop, costing $60,000.

Fire, Oct. 11, destroyed the power house and other buildings and machinery at the flour mills of the Atlas Mills Co., Vincennes, Ind., with loss estimated at close to $200,000. Plans are being considered for rebuilding.

The Ansted Engineering Co., Connersville, Ind., has closed arrangements with the Durant Motors, Inc., 1819 Broadway, New York, for the manufacture of six-cylinder motors for use in the Durant automobile. It is said that the contract covers the exclusive use of the Ansted motor, and will take the plant output for some time to come.

The Central South

ST. LOUIS, Oct. 17.

The Missouri, Kansas & Texas Railroad, George Scott, purchasing agent, has an inquiry out for 75 items for machine tool and foundry requirements, which is the largest list sent out by any railroad this year, being second in size to the list of the Southern Pacific of last year. The inquiries follow:

Three 36-in. motor-driven rip saws, including motors with suitable control apparatus.

Six 18-in. double back-geared quick-change gear engine lathes, 4 ft. between centers, automatic motor control, apron motor control and taper attachment.

Three 36-in. upright drills with sliding head back gear, positive gear, feed automatic stop and depth gage, hole in spindle to fit Morse taper No. 5.

Five floor-type motor-driven tool grinders, each with two grinding wheels, 12 x 1½ x 1 in.

Two 42-in. heavy duty hand saws, complete with a. c. motor.

One motor-driven bench tool grinder, with two 10 x 1 x ¾-in. grinding wheels.

One motor-driven forge blower, suitable for three blacksmith fires; one motor-driven forge blower, suitable for five blacksmith fires.

Three 26-in. selective all-geared head engine lathes, 6 ft. between centers, to be equipped with taper attachment, direct motor drive and apron motor control.

Two 36-in. x 36-in. x 10-ft. heavy duty planers.

One 44-in. vertical boring and turning mill.

One only 4-ft. semi-radial drill.

One 1100-lb. single-frame steam hammer with complete equipment.

One motor-driven forge blower suitable for five blacksmith fires.

One Buckeye, type F, or equivalent thereto, tire heater, complete with two sets of burner rings for 51-in. and 63-in. tires.

Two 32-in. back-geared heavy duty type crank shapers.

One horizontal punching machine.

One horizontal boring and drilling machine with steel spindle 4¼-in. diam.

Two portable electric grinders.

One only 36-in. vertical turret lathe, with one vertical and one side head.

Two electric rivet heaters.

Two double emery grinders, motor driven.

One only 2000-lb. single frame steam hammer.

One 20-in. slotter, with 220-volt d. c. motor.

One only 1½-in. double-head bolt cutter.

Two only 600 cu. ft. displacement motor-driven air compressers.

Two only 200-hp. cast-iron feed water heaters; four only 4½ x 3 x 4-in. duplex boiler feed pumps.

Two only 15-kw. motor generator sets, with switchboard for d. c. generator; four only 10 kva. high efficiency transformers.

One only electric tool grinder, double end, with capacity for 3 x 18-in. wheels.

One guillotine bar shear with capacity to shear rounds up to 2 in. or flats 7 x 1¼ in.

One automatic feed combination band and rip saw.

One iron frame automatic cutting off saw.

One only Osborn No. 405 or equivalent roll-over jolt machine.

One Berkshire Model "E" or equivalent air squeezer, portable type.

One only Simpson intensive foundry mixer No. 0.

One heavy single end punch and shear.

One 150-lb. Bradley upright helve hammer, complete.

One only belt-driven 150-lb. hammer, with motor attached to frame.

One only all-steel frame high knife alligator shear.

One only three-spindle automatic ball-bearing drilling machine.

One single spindle heavy pattern, high-speed vertical drilling and boring machine.

One only No. 3 Ferguson forging furnace; one only Ferguson rivet furnace; one only No. 5 Ferguson forging furnace; two only No. 4 Ferguson forging furnace; one only Ferguson double-door hammer furnace; one only No. 2 Ferguson forging furnace; one only No. 2 Ferguson forging furnace for Bradley hammer.

One only 5-ft. plain radial drill, motor driven.

Two only double emery wheel stands, motor driven.

One only plain drilling machine, Baker type, size 2½ in., motor driven.

One only plain drilling machine, Baker type, size 2 in., motor driven.

One only plain drilling machine, Baker type, size 1½ in., motor driven.

Two only 30-hp. a. c. 440 volts, 60 cycles, 3-phase induction motors, complete with starters.

One only 48-in. frog and switch planer.

One only quadruple 2-in. bolt cutter.

One only 40-hp., 230-volt d. c. current reversible motor, with flexible flange coupling and appliances, for direct connection to 36-in. x 14-ft. frog and switch planer.

One only motor-generating set, 125-kw. motor to be 60 cycles, 440 volts, 3 phase, alternating current.

One only 32-in. back geared heavy-duty shaper, fitted with 3-phase, 60-cycle, 220-volt motor.

One only 36-in. engine lathe.

One only forge blower, motor driven, suitable for 4 to 6 blacksmith fires.

One only motor-driven tool grinder.

One only single-end motor-driven punch and shear.

One only 24-in. engine lathe, 6 ft. between centers.

One only 20-hp., 900-r.p.m., 3-phase, 60-cycle, 220-volt induction motor.

One only 18-in. engine lathe, 4 ft. between centers.

One only 4-ft. semi-radial drill.

One only 300-lb. blacksmith anvil.

The Rogers Foundry Co., Eleventh and Pearl streets, Joplin, Mo., has completed plans for the erection of a one-story foundry on West Tenth Street, to cost about $35,000.

The Unit Motor Co., 115 West Thirteenth Street, Kansas City, Mo., has leased additional property totaling about 8000 sq. ft. for the manufacture of gasoline engines. A complete machine shop will be installed. Samuel McCubbin is president.

The St. Louis Lead & Oil Works, International Life Building, St. Louis, will commence the immediate erection of a one-story power house at its plant at Manchester and Sublette streets.

The City Ice Co., Twenty-first and Campbell streets, Kansas City, Mo., will build a new ice-manufacturing plant, 42 x 80 ft., at Twentieth and Washington streets, to cost about $75,000.

The Forshaw Stove & Heating Co., 111 North Twelfth Street, St. Louis, is planning for the erection of a plant, 25 x 100 ft., adjoining its present works, estimated to cost about $75,000. Joseph Forshaw is president.

The Safety Semaphore Co., 724 South Fourth Street, Louisville, recently organized, will operate a local plant for the manufacture of automobile signal devices. W. H. Hinton is president, and R. E. Davis, secretary and treasurer.

The El Dorado Oil Refining Co., 828 Mayo Building, Tulsa, Okla., is planning for the installation of machinery in a local building for the establishment of a new oil refining plant. The refinery will develop a capacity of about 2000 barrels a day, with equipment estimated to cost close to $200,000. F. L. Severson heads the company.

Fire, Oct. 3, destroyed the main building at the plant of the Yukon Mill & Elevator Co., Yukon, Okla., with loss, including machinery, estimated at $200,000.

The St. Louis and San Francisco Railroad has an inquiry out for one 100-ton hydraulic bushing press belt drive and one 42-in. vertical-type side bead turret lathe motor drive.

The Ruth Boiler Works, Tulsa, Okla., has been organized to operate a local plant for the manufacture of boilers, tanks and other plate products. The company is headed by H. C. Ruth and P. A. Wilson, Tulsa.

V. L. Hesterly, Miami, Okla., and associates are planning to erect a plant at Henryetta, Okla., for the manufacture of electrical equipment and devices.

The Peerless Wire Fence Co., Adrian, Mich., has acquired the plant of the Bosworth Bag Co., Memphis, Tenn., for the establishment of a new branch works for the manufacture of ornamental and other wire fencing. Operations will be inaugurated at an early date.

The Missouri, Kansas & Texas Railway Co., Railway Exchange Building, St. Louis, plans to erect a new car and locomotive reclamation plant at Parsons, Kan., to cost about $150,000, with machinery. A. L. Sparks, company address, is engineer.

The Central Missouri Coal Mining Co., Central Trust Building, Jefferson City, Mo., plans to install a steam shovel, electrical equipment and other machinery at coal properties to be developed at Holts Summit, Mo. John McManus is secretary and treasurer.

Fire, Oct. 2, destroyed the plant of the Downs Ice & Light Co., Downs, Kan., with loss of $90,000. It will be rebuilt immediately.

The Stryker Kot-N-Wood Products Co., Memphis., Tenn., has plans in progress for the erection of the first unit of a new plant for the manufacture of wallboard products. It will be 60 x 200 ft., with power house adjoining. The machinery will include an hydraulic press, mixing equipment, etc. George B. Stryker is president.

The Commercial Mining Co., Connellsville, Pa., is planning for the installation of new electrical equipment and other machinery at its coal properties at Sergent, Ky. The company recently increased its capital to $500,000.

The Morrillton Compress Co., Morrillton, Ark., is planning to rebuild its cotton compressing plant, recently destroyed by fire with loss of about $200,000, including equipment.

The Camden Oil & Refining Co., Camden, Ark., plans to erect an oil refinery in the vicinity of Pine Bluff, Ark., with daily output of about 500 barrels, estimated to cost about $50,000. H. M. Jones is president.

California

SAN FRANCISCO, Oct. 11.

The Angelus Sanitary Can Machine Co., 282 San Fernando Building, Los Angeles, has awarded a contract to the Austin Co., Los Angeles, for the erection of a one-story plant, 90 x 160 ft., estimated to cost about $55,000.

The Fresno Tire & Rubber Co., Fresno, Cal., plans to erect a plant at Selma, Fresno County, estimated to cost about $200,000, with machinery.

The Santa Fe Railroad Co., engineering department, Kerckhoff Building, Los Angeles, has plans under way for the erection of a new machine shop, 65 x 500 ft., at its car and locomotive shops at San Bernardino, Cal. An electric traveling crane will be installed, with runway extending 180 ft. beyond one end and 100 ft. beyond the other.

The Monolithic Hollow Concrete Form Corporation, 326 Pacific Finance Building, Los Angeles, is considering the erection of a plant on Porter Street for the manufacture of concrete forms.

The Carpinteria Clay Products Co., Carpinteria, near Santa Barbara, Cal., recently organized at $150,000, has arranged for the establishment of a local plant for the manufacture of bricks and other burned clay products. The initial equipment installation will be for brick production, with other machinery to be installed later for the manufacture of tile, etc. The company is headed by Lyman T. Gage and B. C. Sutton.

Fire, Oct. 5, destroyed a portion of the oil refinery of the Associated Oil Co., Martinez, Cal., with loss estimated at about $50,000. It will be rebuilt immediately.

The Imperial Valley Gypsum & Oil Co., Spreckles Building, San Diego, Cal., has acquired property at Maria, Imperial County, for the erection of a plant for the manufacture of gypsum products. The company has land, about 25 miles distant, for raw material supply. The new works are estimated to cost about $150,000, with machinery.

The San Joaquin Light & Power Corporation, Fresno, Cal., has arranged for a bond issue of $1,500,000, the proceeds to be used for general operations, extensions, etc.

The Gulf States

BIRMINGHAM, Oct. 17.

The Marine Service Corporation, Miami, Fla., has been chartered under State laws to operate a local shipbuilding and repair plant. The company is headed by C. T. Roberts and J. E. Sheldon, Miami.

The Alexandria Cotton Oil Co., Alexandria, La., is planning to rebuild the portion of its plant recently destroyed by fire, with loss estimated at about $100,000, including equipment.

Fire, Oct. 8, destroyed the repair and service plant of the Franklin Motor Car Co., 1601 South Ervay Street, Dallas, Tex., with loss estimated at about $50,000.

The Alabama Power Co., Birmingham, Ala., has work under way for the construction of a generating plant on the Coosa River, near Verbena, Ala., estimated to cost over $5,000,000, complete.

The Earlington Ice Co., Earlington, Ky., recently organized, has completed plans for the erection of a new plant, 60 x 80 ft., to be equipped as an ice-manufacturing and cold storage works. It is proposed to install ice-making machinery to cost $30,000, with capacity of about 40 tons per day. Frank D. Nash is president, and Charles W. Francis, manager.

The Travis Wire Co., San Antonio, Tex., has been chartered under State laws to manufacture wire goods. The incorporators are J. W. Wharton and W. B. Moss, San Antonio.

The Dallas Oil Refinery Co., 3131 Oak Lane, Dallas, Tex., plans to erect a local oil refining plant.

The Trinity Oil Corporation, Dallas, Tex., has acquired the local plant of the Eastland Oil & Refining Co. The works, heretofore used for skimming, will be remodeled into a complete oil refinery and necessary machinery installed. The plant will have a capacity of about 4000 barrels per day. A plant for the manufacture of lubricating oils is also planned.

The Gulf Coast Power & Light Co., Corpus Christi, Tex., recently organized, plans to erect a new central electric generating plant for service in this section. R. W. Morrison is head.

The Sarasota Ice & Cold Storage Co., Sarsota, Fla., is planning for extensions and improvements in its plant to cost close to $25,000. It is proposed to double the present capacity. H. W. Lind, Bradentown, Fla., is president.

The Harrisburg Machine Co., Harrisburg, Tex., recently organized, will operate a local machine and repair works, 38 x 125 ft. R. A. Fenzi, Harrisburg, is vice-president and manager.

Fire, Oct. 5, destroyed a portion of the plant of the Howe Grain & Elevator Co., near Sherman, Tex., with loss estimated at about $75,000, including equipment.

The Illinois Central Railroad Co., Central Station, Chicago, plans to erect a number of new buildings at its car repair works at McComb, Miss., to replace the structures recently destroyed by fire.

Seattle

SEATTLE, Oct. 11.

The Bellingham Steel Corporation, Bellingham, Wash., has acquired 10 acres of land in the Happy Valley section and plans to erect an iron and steel works.

The Okanogan Valley Power Co., Brewster, Wash., has tentative plans for the installation of a second generating plant unit at its hydroelectric plant on the Similkameen River. Eugene Enloe is president.

The common council, Cottage Grove, Ore., plans the installation of a municipal lighting plant, to cost about $50,000, bonds having been voted.

The Puget Sound Power & Light Co., Seattle, Wash., is planning for a note issue of $1,000,000, the proceeds to be used for general operations, extensions and improvements in power plants and system.

The Concrete Pipe Co., Portland, Ore., plans to erect a new plant in the Albina industrial section, to cost about $30,000.

The Freeland Furniture Co., 970 Macadam Street, Portland, Ore., has plans for enlargements in its plant to double the present capacity.

The Prouty Timber Co., Timber, near Astoria, Ore., is considering the rebuilding of its plant, recently destroyed by fire with loss estimated at about $150,000, including machinery. The mill has been employing 200 men.

The Northern Radio & Electric Co., Seattle, Wash., has been chartered under State laws to manufacture wireless equipment, instruments, etc. The incorporators are R. W. W. Bell and H. S. Tenny, Seattle. The company is represented by McClure & McClure, Hoge Building.

The Western Spar Co., Portland, Ore., will commence the immediate erection of a new sawmill and veneer plant on the former shipyard property at Columbia City, near St. Helens, Ore., estimated to cost about $100,000, including machinery.

Canada

TORONTO, Oct. 17.

Inquiries for machine tools are steadily increasing from nearly all centers of the Dominion and at the present time many of these are turning into sales. Business generally is on the upgrade and sales of dealers for the past month have exceeded those of any month this year. Industrial plants have now reached the stage in their operations where further delay may prove fatal. Several concerns have announced their intention of locating plants in the Dominion and of having these ready for operation by next spring, so it will be necessary for those interested to enter the market almost immediately for the required machinery and tools for equipping these. The demand for equipment for municipal plants continues steady and a number of cities have announced their intention of increasing the capacity of water works, sewage plants, electric plants and various other municipal works for which equipment will be required. The outlook at the present time appears brighter than it has at any time this year and Canadian machinery and tool dealers are quite optimistic with regard to their future business.

Knight Bros. Co., Ltd., Burk's Falls, Ont., is in the market for an engine lathe, 12-ft. bed, 24 to 30-in. swing, back gear screw-cutting compound rest; iron planer, 30 x 30 in., with 8-ft. bed; power hack saw, 6 x 6 in.

The board of education, Fort William, Ont., is in the market for tools for a technical school.

The Canadian Automatic Carbureter Co. has secured a site and intends establishing a plant at the corner of Royce Avenue and Dundas Street, Toronto.

Albert Frances, Dunnville, Ont., has secured a three-acre site at Port Colborne, Ont., where he proposes to establish a foundry in the immediate future.

Prince Rupert, B. C., will spend $75,000 on improvements to waterworks plant and system. F. S. Clements is engineer.

Bids will be received by F. L. Heath, town clerk, Georgetown, Ont., until Oct. 25 for pumping machinery consisting of two units, 400 gal. each.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
9-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16¼c. to 19¼c.
High brass wire	17¼c. to 21¾c.
Brass rod	14¼c. to 20¾c.
Brass tube, brazed	27½c. to 31½c.
Brass tube, seamless	19 c. to 20½c.
Copper tube, seamless	20½c. to 22¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$6.80	$6.55
		90 lb...	6.90	6.65
		100 lb...	7.00	6.75
IC..	$10.75	$9.25	IC...	7.15	6.90
IX..	12.00	10.75	IX...	8.15	7.90
IXX..	13.75	12.25	IXX...	9.15	8.90
IXXX..	15.50	14.00	IXXX...	10.15	9.90
IXXXX..	17.00	15.75	IXXXX...	11.15	10.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits, pig	30c.
Bar	36c. to 40c.

Copper

Lake ingot	15½c.
Electrolytic	15¼c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	20c.
No. 1 solder	18c.
Refined solder	15½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	29c. to 31c.

Old Metals

Business has quieted down in sympathy with the new metal market. Values generally are about the same. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.25
Copper, heavy and wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.00
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.25

THE IRON AGE

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Features of Electric Tool Steel Practice

Standardized Shop Practice Necessary—Large Ingots Recommended—Top Pouring Preferred for Tool Steel—Skilled Operators Abundant

BY W. J. AND S. STUART GREEN*

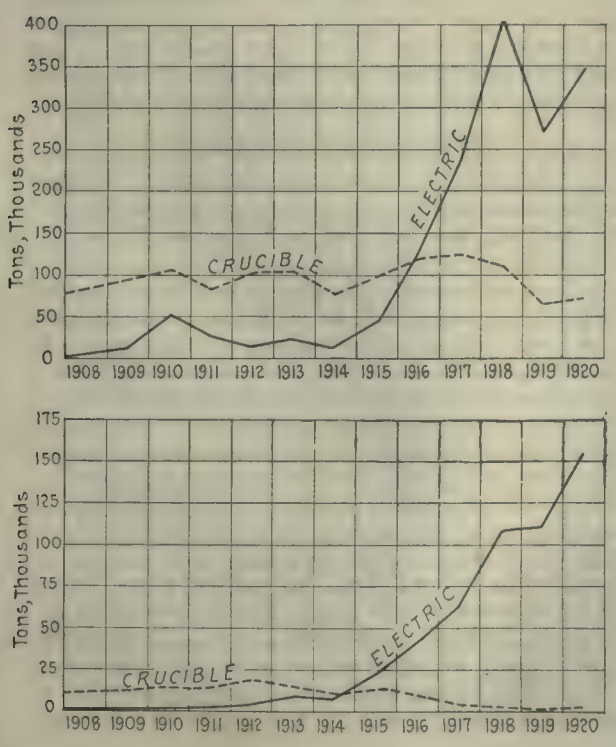
IN the article "Electric Furnace Tool Steel Qualities," published in THE IRON AGE Sept. 15, the writers dealt almost entirely with the proper selection of melting stock, the necessity of mixture designing and the standardization of melting practice. It carefully showed the way to "mixtures with a character," and, we believe for the first time in print, definitely outlined the grades of electric carbon tool steel. The necessity for establishing these grades has long been felt in the trade, competing as it does so closely with the crucible, which latter has had firmly defined qualities or grades from its early history. This is indeed an essential and, sooner or later, standard grading must be accomplished, if the trade is to be adequately cared for. It is apparent to all that there is a distinct demand for steels of the same analysis at at least three different prices, the quality being largely determined by the degree of severity the particular steel is desired to meet. The writers are aware that in some plants this demand has been appreciated and catered to with very considerable success, but there has not been a general standardization of electric furnace grades, and our paper was intended to outline the course which in our opinion was best suited to accomplish such a purpose. Subsequent events indicate a general agreement with the foregoing and with the principles outlined for satisfactorily meeting the demand.

*Pittsburgh.

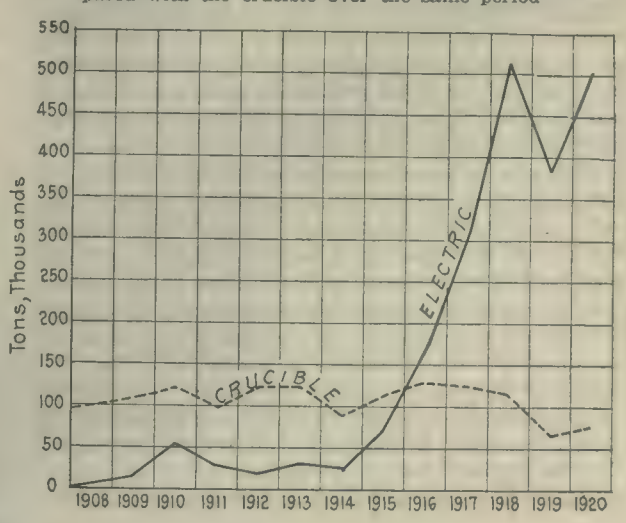
Standardized Shop Practice

While well-designed mixtures, suitable melting stock and certain well-defined principles of melting practice are the foundation of "steels with a reputation," it is only in conjunction with carefully thought-out shop practice that the full benefit of these can be reaped; indeed, it may be wholly undone by negligence in such important matters as properly designed ingot molds, casting temperatures, etc. Unfortunately these features of shop practice are not so amenable to standardization as are the subjects before discussed; each shop will have different, even widely different, types of ingots to make, different grades of steels with their altered problems, and, of course, the very shops themselves will offer varied facilities for handling, casting, etc.

It has been the experience of the writers that even the shops of the same company vary considerably in meeting those conditions peculiar to their particular plant. Some shops cast almost entirely slab ingots catering to a tool steel sheet trade and have, therefore, only such ingots to cast; others have only small ingots to make, due to lack of blooming mill or hammer capacity to take care of larger ingots; or, what is worse



Charts at the Left Show the Relative Increase of Electric and Crucible Steel Ingots (Upper) and Castings (Lower) Over a Period of Years. The larger chart represents graphically the growth of the total electric steel output as compared with the crucible over the same period



in our opinion, is the shop that is called on to make anything from 400 to 4000-lb. ingots, their particular plant being equipped to handle any general-sized ingot. This latter condition has fallen to our lot as well as the foregoing conditions and we have therefore personal experience of the widely different problems offered.

Size of Ingots

We have said that shop practice is not as amenable to standardization as is furnace practice, varying as it does with each different shop; but we do say emphatically that it is of the first importance that each individual shop should definitely and positively standardize its own practice. It is not our opinion that the practice of casting 4000-lb. ingots one heat and 400-lb. ingots the next is sound, for we have not found the way to economically accomplish this; it is either a hardship or a picnic for the pit crews, depending on whether you are casting 25 ingots to the heat or four. It destroys shop organization, which is the keynote of economy, it necessitates awkward casting pits, hot-top furnaces, etc., and sometimes expensive handling apparatus, but, above all, it is a labor waster. We repeat, standardize your shop within fairly narrow limits as to size and type of ingots to be cast. A shop with one, or two at the most, of sizes of ingots to make has a tremendous advantage over the shop that is doing a jobbing trade casting perhaps 57 varieties. Pit changes, mold changes, the handling and assembling of molds not only costs considerable money, but ties considerable money up in equipment and, lastly, largely tends to produce slovenly pit practice and so undo those virtues so carefully sought after at the furnaces.

The ideal shop must be a specialized shop, casting not more than three sizes of ingots and these not widely different, such as 4000 is to 600 lb., but rather as 600 is to 800 lb., or 3500 is to 4000 lb.

It is definitely our opinion that after having carefully weighed the questions as to what should be the standard ingot or ingots and having finally accepted them, they should be absolutely adhered to. Orders calling for sizes not within that range should be obtained from cogging the nearest suitable ingot, not by casting ingots to suit that casual purpose. The writers have had experience with order clerks who would have cast 30 different sizes of ingots, some without any real purpose and the balance without sufficient purpose to warrant departures from a carefully decided standard ingot. This casual trade would be very expensive indeed were it allowed to change and derange valuable shop organization.

Growth of Electric Steel Output

A glance at the accompanying graphs, drawn from figures taken from the American Iron and Steel Institute statistics, make clear the very important position the electric furnace has secured in the tool steel market. Its economic value and the excellence of its product have been causes of its gratifying position. It will be noted how far it has outstripped its natural competitor the crucible, and there are no signs of its relinquishing its hold, but rather signs are not wanting that it will take in the near future an even bigger share of the world's high-grade tonnage. Already it has badly crippled the crucible, many houses heretofore entirely crucible are now largely and in some cases entirely electric. Apart from this deflection of trade, it has also a field peculiarly its own and one that has by a coincidence grown with it, that is, the automobile trade.

The automobile world has tried and accepted for almost general use electric steel and, to reach this point, the electric furnace has had to pass through a severe experimental stage as to general furnace design, equipment and operation, but it has now settled down to a largely accepted standard and, while further modifications and improvements will undoubtedly arise as to details of equipment, etc., it seems to us that the basic principles and design will undergo no further radical change.

Disadvantages of Experimenting

We therefore would counsel strongly against continual experimenting and the carrying out of shop tests to determine this and that, which we have observed so frequently in many plants. We have seen a shop superintendent so distracted by the various investigations and tests as to be left absolutely no time for the proper operation of the plant and its executive and metallurgical problems. Graphite versus carbon electrodes, various regulators, roof heights, electrode spacing, refractories of new and untried virtues, holders of many types, bottom materials of several kinds, etc., etc., are all questions that we resolutely decline to permit to interfere with our operation of the shop and its resultant production. We have found it well to place the onus on the other fellow, that is to say, requiring sufficient evidence from the company making the new commodity warranting a change and not ourselves obtaining same by costly trial, costly rather in the disturbance of routine and organization it carries with it than the actual cost of materials. We are not opposed to development or new things if they have anything to offer, but we are opposed, in the absence of a special fund and staff to investigate, to the trial of all commodities that are offered.

As we see it, attention should be concentrated on the production of quality steel with the means available, being slow to carry on test campaigns, for when anything really good comes along it is soon general property and can then be adopted when it has won its spurs. The metallurgical departments of the various universities might be better fitted for such development, and when run on lines anything like the applied science department at Sheffield, the Pittsburgh of England, they will be; for this branch of that university has at all times been able and willing to focus its resources on any problems of the steel trade submitted to it, to the lasting good of that fine old city of steel, thanks to Dr. J. O. Arnold, the pioneer and organizer, who held the chair of metallurgy for many years. In closing this thought, let us say, concentrate on shop organization and steady production rather than have the shop in a furore by various investigations, and adopt new things only when they have demonstrated their efficacy in a very definite manner elsewhere.

Skilled and Other Operators

In reaching the remarkably satisfactory position in the industry before described, the electric furnace has also had to pass through a trying period in so far as skilled operators are concerned. It was started largely by electricians, who later called in steel makers when they got out of their depth, and unfortunately these steel makers had, of course, no experience with the white fuel to guide them. The year 1911 found the industry, therefore, with a limited and to a certain extent struggling personnel manning the electric furnaces. Men were made melters with six months' experience in the steel game, coal miners, farmers and almost every conceivable trade furnishing recruits. Youth was largely pressed into service, owing to its ability to adapt itself readily, and, by reason of its faculty to accept responsibility lightly, a responsibility that would have daunted an older man. This branch of the industry was, therefore, in the hands, to a large extent, of youth, with its drawback of immature knowledge.

However, 10 years has had a softening action on this problem and we have now the stabilizing influence

of men of more mature years and experience. We have to-day a body of men easily equal, and probably in some cases superior, to that of any other melting branch of the industry. The crews of 10 years ago, with their necessarily limited experience, made possible the efficient crews of to-day but they also left some little prejudice to live down, for it must be admitted that their early product was erratic as to quality, sometimes hardly equalling open-hearth work. Happily time has alleviated this situation, and the electric furnace industry stands firmly on its own feet unchallenged as the equal of the crucible.

The full equality, both as to excellence of product and operating personnel, the electric furnace shares with the crucible, but it possesses also superior economic values in the direction of utilization of fuel energy, much lower labor costs, etc. These are attractive indeed to the trade and are resulting in many new and repeat installations, while no new crucible installation comes to our mind. Electric steel is specified in repeat orders now, quite as much as ever the crucible product was, and the prejudice of steel consumers, where there was any, has completely disappeared, for never did steel of any class enjoy a more open market.

Large Ingots Recommended

An important feature of electric furnace operation, still further adding to its desirability, is the casting of fairly large ingots for everyday work as dealt with as follows: The writers favor the casting of ingots of as large a size as can be conveniently handled by the mills available. In well-made electric steel little is to be feared from segregation, which might be advanced as an argument against casting fairly large tool steel ingots, careful investigation having confirmed this; in general tool steel, a 3000-lb. ingot has not proven too large. Casting this type of ingot provides minimum ingot surface, with its attendant advantages, permits careful temperature control practically equal in all ingots as against casting 24 ingots in which case the first four may be too hot with the heat cool toward the end, at the same time causing a wide variation in temperature from the first to the last ingot. It also permits well-regulated central pouring speeds and adequate feeding, provides beneficial work on the ingot when being cogged or bloomed, say to a 4-in. billet. Blooming has proven very satisfactory when performed on a quality mill under quality conditions, not, of course, on a rail blooming mill with its attendant roll-ragging, heavy drafts, etc.; in fact, this work on a 3000-lb. ingot down to a 4-in. billet has proved a very excellent process, at least equalling the hammer cogging which a 6-in. crucible ingot would get. Of course, this blooming has to be done in a tool steel fashion with tool steel heating, and unless these conditions are available, it had best not be attempted, as no advantages could be hoped for. However, these conditions are possible, as the writers know from personal experience, and form, where found, a very valuable asset in the production of sound economic steel. Casting this size ingot reduces to an appreciable degree mold cost and pit labor cost. The ingot should, of course, be a big-end-up type used with an efficient sink head, preferably of the loam variety, and should give a yield of not less than 80 per cent in blooms.

The ability to handle large ingots is not, however, very general among the average tool steel houses, who have nothing like the tonnage that is needed to profitably employ a blooming mill. It seems to us, however, that those shops having a fairly large plate mill, in some cases with electric reversing drive, could install a set of cogging rolls and the necessary manipulators without interfering with the original function of the mill and so enjoy the very large advantages of casting fairly large ingots in the melting shop. In this event the mill would bloom one or two days a week as required, and so would very nicely fill out, as is often required on tool steel plate mills, which, by the way, are already equipped for tool steel heating.

Bottom Versus Top Casting

The electric furnace is sometimes called on for bottom cast work, but unless there are very urgent and important reasons, the writers would favor top casting. Bottom casting high carbon or alloy work, such as the electric furnace generally makes, carries with it certain drawbacks which are not easily offset. We argue that top casting through a tun dish or pouring pot makes for the best work in general tool steel. This system of pouring takes up all ladle swing, eliminates undue ladle pressure, insures central stream, eliminates that amount of slag that comes through the nozzle and lends absolute control over pouring speeds, inasmuch as pots of varying size nozzles are employed as the temperature of the heat may dictate.

The foregoing remarks as to casting practice have in certain cases to be modified as in the case of high-speed steel, in which latter case no advantages would accrue from casting so large an ingot, but for general work the above will serve very well indeed, and has proved to possess distinct advantages over the practice of casting small work.

Summary of Status of the Electric Furnace

Summing up the status of the electric furnace of to-day, so far as tool steel production therein is concerned, it is wonderful to view in retrospect the rapid strides made by this youngest of existing methods of steel making, for already there is not a quality or class made in the crucible which this process has not duplicated, with the exception perhaps of combined iron and steel lumps, a trade not cultivated in this country for some reason, but which has a very respectable tonnage made in Sheffield. Not that this trade cannot be developed through the electric furnace; the writers have no doubt that it will be, at all events in Sheffield, but this apart for it is negligible here. Excepting this and no other, the electric furnace has already traversed the entire field ever covered commercially by the crucible, way back to the days when railroad tires were made therein, and, of course, anterior to the introduction of Bessemer or open-hearth steels. In addition to this it is making the most of the new steels that have come into vogue in the recent years and it has come to stay. It is safe to say it can be relied upon to handle any others that evolution in such matters may render necessary. Meanwhile the old crucible, alive and well since 1740, is passing, dying maybe of senile decay; it has already far and away surpassed in longevity any other process of steel manufacture save the cementation process.

As is well known, or may be now forgotten, the Bessemer at its advent was thought by many to seriously threaten the crucible process; the most it ever did, however, was to make some inroads into its third-grade steel but it failed ignominously to reach the quality part of it represented by its first and second grades, while the open-hearth process, following close upon its heels, found its limits practically the same in competition therewith. The crucible successfully stood the brunt of both these for more than half a century, but it has at last in the electric furnace found a foeman worthy of its steel. The arrival of the electric furnace was very much emphasized by the necessities of the late war for it was during that period it demonstrated its all-round possibilities as a melting medium; we use the term melting medium advisedly, for the electric furnace is not in itself a steel maker, as

some people imagine, and should not be regarded as such, for the personal and human factor obtains and controls in its successful operation, far more than is at present realized; but as progress continues this will be recognized and appreciated as the most vital adjunct to the practice.

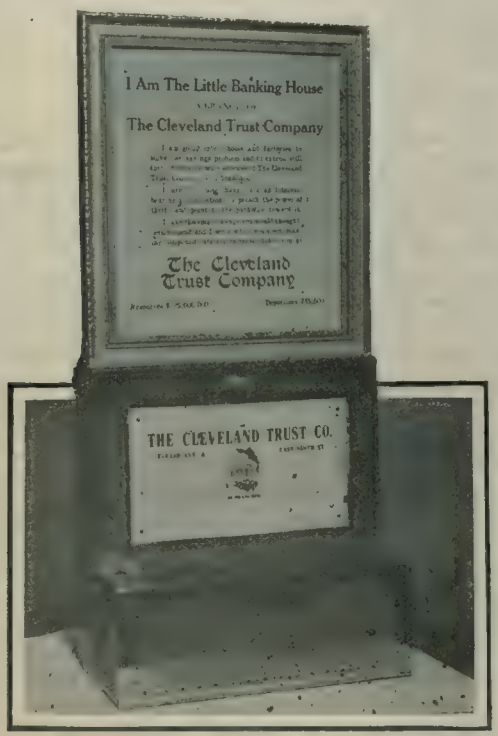
The term crucible steel will always remain a designation of quality, and deservedly so, and it remains for the electric furnace to build on such, as it is well able, in the hands of competent management, and carry further its good work to a point even beyond that reached by any melting process.

INDUSTRIAL SAVINGS SCHEME

Automatic Stamp Selling Device Installed in Cleveland Factories

Sales of savings stamps through slot machines as a means to encourage thrift among employees has been inaugurated by several Cleveland manufacturers in the metal working field. The promoter of this plan of savings is the Cleveland Trust Co., which conducts it through its thrift extension department, and which naturally benefits by reason of the increased number of depositors and the increase in deposits in its savings department.

The slot machines, known as automatic receiving tellers, are provided with two 25c. slots, a 5c. and a



This "Automatic Receiving Teller" Issues Savings Stamps in Return for Coins Inserted

10c. slot. They deliver stamps in those denominations, when a coin is placed in the proper slide and the latter is pushed in. Previously the bank had placed the machines in a number of Cleveland schools, with slots for pennies as well as for the larger coins, and the plan worked out so satisfactorily that it was decided to extend the installation of the slot machines to industrial plants.

About the size of postage stamps, the stamps are numbered, and the machines are so arranged that, should a counterfeit coin be used, the person who passed it can be identified when the stamp is turned in for redemption.

The stamps are pasted in thrift stamp folders similar to the war savings stamp folders issued by the Government during the war. When one dollar or more in stamps has accumulated in the folder, the owner takes it to the bank, gets credit for the amount in his savings deposit book, and draws 4 per cent interest on the deposit. The slot machines are taken care of by the bank, which collects the coins every two weeks. Above the machine is a frame holding a poster bearing a picture of some historical event, that occurred during the same week of a past year as the week the poster is displayed. The poster also bears an appropriate thrift message.

Machines are placed in convenient locations in the plants, either near the pay windows, in the cafeterias or near the factory entrances. They were supplied by the Banking Machinery Corporation, Saginaw, Mich.

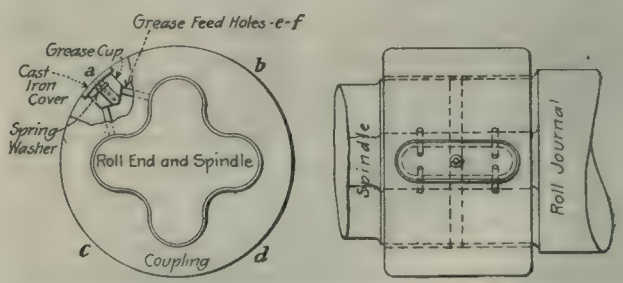
Among the factories in which the machines are installed are the two plants of the National Acme Co. and the two plants of the Cleveland Hardware Co. In one plant the deposits in the machine have averaged $44.71 per week for the period of nine weeks since it was installed. This is regarded as highly satisfactory, considering present limited plant operations.

Lubricating Roll Spindle Couplings

BY M. E. DUGGAN*

The accompanying sketch shows a coupling for a 20 x 48-in. roll equipped with a grease lubricating system of the writer's design. Grease is put into the grease cups at points *a*, *b*, *c* and *d* and feeds to the driving contact surfaces through opening, as at *e* and *f*. The grease cup has a cover flush with the periphery of the coupling and is securely fastened in place with a spring lock washer, which also makes it proof against outward leakage of the grease.

A coupling with spindle installed in a workmanlike manner and with a little attention to the lubrication will stay in service ten times as long as if run dry in the old way. Thirty-five years ago, at a time when the writer was employed at the old Bridgeport rolling mills,



Four Grease Cups with Flush Fastened Covers Are Used for Lubricating the Couplings of Mill Rolls

a thick heavy grease lubricant was used and was applied with a shovel. It has been proved that grease sufficient to cover the machine, floor and the operator can be applied with a shingle, and this is the way the lubrication is done in some mills to-day. About a year ago the writer introduced the new design for driving what is known as baby rolls. The first pairs installed remained in service 86 days of 22 hr. each under continuous operation, as compared with one, two or three days with the old or original system.

*Foreman pattern maker, American Brass Rolling Mills, Kenosha, Wis.

Some years ago, O. Barth claimed to have improved the mechanical properties of aluminum by the addition of cerium, used in percentages up to 11. The further investigations of Josef Schulte, also conducted at the technical high school, Aachen (*Metall und Erz*), only partly confirm Barth's observations. Schulte found the elongation of aluminum was raised to 34 per cent by the addition of 0.20 per cent of cerium; the tensile strength was not increased, and larger additions of cerium were almost useless.

Leaves from a Steel Melter's Notebook—1

An Experience in the Making of Hollow Ingots for Seamless Pipe—Effervescing and "Killed" Steel in an Acid Furnace

BY HENRY D. HIBBARD

ONE day when I was a free lance, some 30 years ago, two business men came into my office and engaged me to start them making hollow steel ingots for the manufacture of seamless pipe. They had a plant designed and built for the purpose but in other hands it had never succeeded in making any merchantable product. Nevertheless they had raised a little more money to make another trial. They also engaged a rolling mill man of wide experience and I hired two furnacemen to help me. We ordered a few cars of pig iron and scrap steel.

The plant was in the neighboring State of Ohio. I found a good steel frame building with two bays, one for steel-making and the other for the rolling mill and small machine shop, each served by a 10-ton traveling crane driven by a square shaft, as it was before the introduction of electric cranes. There was a small office building as well, with a little adjoining room to serve as a laboratory, in which were some chemicals and apparatus. The steel-making plant comprised a 5-ton acid open-hearth furnace with a circular hearth and horizontal regenerators—not a good form. The trouble with such a type comes chiefly from the insufficient difference in level between the regenerators and the hearth. This should be considerable, say 12 ft. in a 5-ton furnace, so that the column of heated and rarefied air rising through the regenerators flows by its lightness into the hearth, tending to maintain there a plenum or slight outward pressure of the furnace gases, which a good-working furnace always has. By the proper use of the chimney draft through adjustment of the chimney damper this plenum is kept under control, so that the furnace does not "blow" too much through the cracks between the doors and their jambs.

When the hearth is not high enough above the air entrance to the regenerators the air moves to the hearth too sluggishly, and cold air is liable to flow into the furnace through cracks in the brickwork and around the doors. Such cold air cools the laboratory of the furnace, lowering its melting efficiency and wasting the iron of the charge by undue oxidation, giving a low ingot yield. The circular hearth, while cheap to construct, is too wide at the middle section of the furnace, so that parts of the charge lie too far away from the flame and melt only after the central portions have done so. Nevertheless the furnace worked well enough to melt one heat per day.

Advantages of Natural Gas

The fuel was natural gas from a well on the company's property, a mighty fine thing in every way. Melters who have never used natural gas for melting steel will perhaps not appreciate the advantages from its use. No gas-makers to annoy one by their laxity. A full supply of high grade fuel with ample pressure on tap, and controlled by simple valves, always on hand. Natural gas has a heating power of about 1000 B.t.u. per cu. ft., compared with 125 to 175 units for producer gas and producer gas having 175 units is exceptionally fine. With natural gas one man on a turn can heat up a furnace to the point where bottom is to be made or repaired. The flame may be made white and soft, which it should be, or thin and cutting, which it should not be, by regulating the quantities and relative proportions of gas and air. It is under complete control. Having such fuel helped greatly to make up for the shortcomings of the furnace design and we made our daily heat in an average of about 7½ hrs. per heat from beginning of charging to tapping.

A few heats of steel, ten in all, had been made previously, a large part of which was in the form of heavy pit scrap and ladle skulls piled up at the far end of the melting shop, a little being in the form of hollow ingots, none of which had been successfully rolled. Looking over these ingots, I saw that they had been made of effervescing or "rimming in" steel, which is the kind that evolves gas (probably CO) freely during solidification in the molds, causing the metal to "churn" and throwing up in the air two or three feet a myriad of small sparks. Ingots made by this method always contain gas holes, but when the steel has been properly treated in the melting furnace the gas holes will be so deep-seated as not to give trouble or injure the quality of the steel for most purposes.

Before leaving home on this work I had formed the opinion that killed steel would be better for the purpose, but nevertheless decided to try first one heat of effervescing steel to see what sort of ingots it would make, not being satisfied with the results I saw of previous efforts. Killed steel always tends to settle and form a pipe during solidification, but in small, thin cylindrical ingots such as these the pipe, which is a ring cavity around the top, is small and not deep, so that the ordinary crop to give a square clean and is likely to remove it all.

Before starting I crawled through the flues and interior of the furance to see what repairs if any were needed and particularly if the valves and checkers were all right. The slight repairs needed were quickly made and we started to get the furnace hot. There were two helpers, good men, who had worked on the furnace during the previous run, so with those I brought with me I had a good furnace crew. There was a good ladleman, too, who was also an iron molder.

Cylindrical Ingot Molds With Cores

The ingot molds were cast iron cylinders for ingots about 8 in. in diameter by 3 ft. 8 in. long, with cores 5½ in. in diameter, giving ingot walls about 1¼ in. thick and ingots weighing about 140 lb. each. The cores were of a patented collapsible type but the patented features were of doubtful value. They were made of core sand built up on and supported by a perforated pipe barrel. This pipe barrel was slit on one side its whole length and was sprung open or outward before the core was made by collars on a central shaft which bore against projections on the inside of the slit pipe. After the mold was filled with steel and partly solidified, the central shaft (which supported the core) was driven down about an inch, by striking with a hammer on its projecting upper end, which carried its collars out of engagement with

the projections on the slit pipe barrel, allowing it to collapse. It was patented about 1890.

Low carbon steel was manifestly the suitable grade for pipe and comprised all that I made. Having brought the furnace up to a melting temperature, I charged 1000 lb. of pig iron to melt out some of the metal which had remained in the furnace from the previous run. This was tapped out and the bottom repaired with sand, the taphole being opened occasionally to drain the furnace of molten material and to keep the sand plug in the hole from setting too hard. I then made a heat (No. 11) of effervescing steel without any undue circumstances.

Conditions for Effervescing Steel

Effervescing steel, made on acid bottom as this was, demands quite different furnace treatment from that intended to be killed and solid, as for castings and high carbon steels. It must have a proper "boil" in the furnace in order to boil or effervesce correctly in the molds, and to insure that action the slag must contain enough free oxide of iron to supply oxygen to oxidize the carbon at the right rate, for the boil (so-called) is chiefly or almost wholly the escape of carbonic oxide (C O) gas bubbles from the bath. That gas is the product of oxidizing the carbon in the metal by oxide of iron. To insure the proper boil, the temperature of the bath must not be too high and the slag must not be all glassy, but must be black and partly crystalline when in a small cake one quarter of an inch thick poured on the iron floor. If the total carbon in the charge is such that the residual carbon after the charge is melted is more than but near that desired in the finished steel, the slag and rate of boiling may be correct when the proper casting temperature has been reached. If, however, the carbon content is much too high when the charge is melted and the charge must be held in the furnace to permit the excess of carbon to be oxidized, for which purpose ore, preferably in lumps, is added to the bath, there is danger, first, that the metal may become hotter than the proper casting temperature, and second, that the slag may become too silicious and glassy by accretions of silica from the furnace bottom, so that it will have too little free oxide of iron to act on the carbon. The boil is then too quiet and gas holes too near the surface of the ingot. In this heat I provided for a small excess of carbon to be oxidized after melting, used therefore but little ore, and got a good action in the furnace and molds.

The charges were made up of from 2300 to 2800 lb. of low phosphorus pig iron, with steel scrap to make up 11,000 lb. which was about the capacity of the furnace. In my first heat, No. 11, 100 lb. of ferromanganese was charged in the furnace at the end, which added 0.72 per cent of metallic managanese. This heat was of a grade suitable for boiler plate and it was cast cleanly into the molds. My employers were delighted and all who had been there during the previous run said that it was the best heat that had been made there, though none of them were qualified to express an opinion on such a matter. The point they could see, however, was that the steel was all in the molds with no slopping, pit scrap or large ladle skull. To me, however, the heat demonstrated that such steel was not the thing for the purpose. The ingots were bottom cast, a group of six standing on a bottom plate around a central runner. The metal flowed to each mold through brick runners located in channels in the bottom plate in the usual manner in bottom casting. Many of the ingots cracked or split lengthwise in the molds, in spite of the collapsible cores, due in part probably to the relatively quick contraction of the steel because of its higher freezing point than that of killed steel such as we made later. The cores needed further study and experimentation. We melted only in the day time, the furnace being kept hot over night by one of the helpers.

Killed Steel

The next heat I made dead steel and to that end worked it out more cleanly in the furnace as killed steel should be treated. In making killed steel in an acid furnace the boil cannot be too gentle at the end nor the slag too acid and vitreous. These conditions insure that the rate of oxidation is low and the work for the gas solvents in preventing gas holes moderate and well within their power. The charge must be held in the furnace without ore additions, to allow the metal and slag to complete their inter-actions and clean themselves of oxides and gases to a proper degree. To this heat, No. 12, I added 4 lb. of aluminum, or 13 oz. per ton for the 5-ton heat, equal to about 0.04 per cent of aluminum, probably more than was needed. The metal was perfectly killed and laid dead in the molds. The ingots were nice and smooth. Nevertheless, some of the ingots cracked, but those which did not rolled well. All subsequent heats were killed either by the addition of silicon metal or aluminum or both. Modern ferrosilicon was not then known, the best we had being ferrosilicon made in the blast furnace containing from 14 to 16 per cent of silicon.

The next heat, No. 13, was held while waiting for aluminum to be brought and got too hot (although some pig iron was added to keep up the carbon content) and did not roll well. Heat No. 14 rolled perfectly. It had 4½ lb. of aluminum and 90 lb. of ferromanganese at the end. This heat gave merchantable thick-walled pipe and was the first shipped on order. From this on the steel rolled well as a rule.

Use of Silicon and Aluminum

We had no chemist, but in the laboratory I found all the requisites for determining carbon and manganese by color and made determinations of those elements. Carbons ran from 0.15 to 0.23 per cent and the manganese from 0.45 to 0.60 per cent. One heat, No. 17, was killed with silicon alone and the ingots were not as clean and smooth on the surface as those killed with aluminum alone. They rolled well nevertheless. Probably a mixture of the two gas solvents, silicon and aluminum, would be best and cheapest, an ideal composition for the steel being: carbon, 0.16 to 0.18; manganese, 0.50 to 0.60; silicon 0.15 to 0.20 per cent, with 0.02 per cent of aluminum added in the ladle, the sulphur and phosphorus to be as low as called for by the particular service for which the steel is to be used.

Steel, to be good and solid with this composition, should have no ore added after the carbon has fallen to 0.25 or 0.30 per cent according to the activity of the "boil," which indicates the proportion of free oxide of iron in the slag. After ore additions have ceased the bath should be well "worked out" by holding it in the furnace until the excess of carbon has been eliminated, during which time the slag will take more silica from the bottom and become consequently more vitreous with less oxidizing power, as the silicate of iron formed will not freely oxidize carbon. Care must be exercised at this stage lest the charge should become too hot, to prevent which less gas and air should be supplied to the furnace and the chimney damper be proportionately closed. A little residual manganese, 0.01 or 0.02 per cent, is desirable in the metal before the final additions, as evidence that the bath has not been over-oxidized.

All the final additions except the alminum were

made to the charge in the furnace, which is advisable when high quality of product is wanted. Such a course affords time in which the chemical reactions are completed and the resulting silicates and sulphides (sonims) may separate from the metal and join the slag as fully as may be. The alminum, being used merely as a gas solvent, does not require time for such purposes and should be added to the steel after it has left the furnace; that is, in the ladle or molds.

Projectile Pipe

The order we had was for pipe or what amounted to hollow forgings of about 4 in. outside diameter, with walls ⅝ in. thick. It was to form the bodies or projectiles for field artillery, the nose and breech pieces to be attached by electric welding. This now seems an odd way to accomplish such a purpose but at that time cast steel projectiles had not been fully developed in this country and forged ones were not thought to be needed. It was before face hardened solid steel armor plate had been invented.

As nothing had ever been shipped out from the works, there was no organization for attending to it, so I volunteered for the work. With the laboring gang I weighed up and loaded carloads of 24,000 lb. and made out the bills of lading myself. The office man made out the invoices.

As we had but a scant supply of melting stock it was desirable that the pile of pit and ladle scrap on hand be made available for use. Accordingly with the laboring crew I broke up a large part of it into pieces we could charge by hand into the steel furnace. A ball weighing about a ton had been provided by our predecessors but never used. With the traveling crane we lifted this ball in order to drop it and made fair progress, using the scrap in our charges. Some of the pieces were too massive to be broken by such a fall of such a ball, but may have been made usable later through the agency of a more powerful drop.

The rolling mill was quite unique and had been invented, designed and built for the particular purpose of rolling seamless pipe from hollow ingots. It was of the continuous type, with two sets of rolls, each set consisting of five pairs of rolls set tandem, with the driving mechanism between the two sets. A long strong rod carrying five balls, one to stand in the pass between each pair of rolls, was passed through the heated hollow ingot when it was in position in front of the first pass. The ingot was then passed through the five pairs of rolls in a few seconds, being compressed at each pass between the ball and rolls. Thinner pipe called for a second or even third heating and rolling, so that it was easier and cheaper per pound to make thick than thin-walled pipe, quite opposite to the case with welded pipe. The rolled pipe were cut off to multiple lengths of that required for making one projectile and were then weighed up and shipped.

Cast Iron Heat in a Steel Furnace

One day during this engagement I melted a cast iron heat for making some iron castings which were needed about the plant. This was a new undertaking for me and I had never heard of melting iron for castings in a steel furnace. Ordinarily I would not have advised it, as the conditions in a steel furnace are as a rule so much more oxidizing than those of the cupola which, as is well known, is the furnace used for melting iron for nearly all castings made. Still, having natural gas and not needing a high temperature to melt the iron, a soft flame only slightly oxidizing could be maintained, and I faced the job without much apprehension of trouble. The iron at hand was rather higher in silicon than that desired in the castings, which was about 1.50 per cent. That allowed for some waste of silicon, which was sure to take place. In fact, the great danger I feared was that the silicon might be so far oxidized to silica as to make the iron white when cast, which of course would have made the castings unmachinable and worthless.

This fear proved groundless. The charge was readily melted, of course, but then it looked so dark through my melter's glasses that its appearance gave no adequate idea of the temperature. I took numerous tests, however, with the steel test ladle, pouring them into the ordinary steel test mold and the length of time they took to solidify gave me a fair idea as to when the temperature was about right. The charge was tapped out into the regular steel ladle and the iron run from the ladle to the molds through the nozzle in its bottom as in teeming a heat of steel. The results were good; the castings poured cleanly, and proved to be of nice, soft gray iron which was easily machined.

As soon as we made some good salable pipe, the word went out and the directors and stockholders came swarming in from all points of the compass. They had nearly reached the point of considering their investments in the venture as worthless and they found encouragement in looking at and gloating over a pile of good-looking merchantable pipe. They, perhaps naturally, wanted me to stay and continue the work which they considered successfully inaugurated; but I had already made other plans for the future and all I could do was to get a capable man I knew and instruct him in the work as I had conceived its requirements, after six weeks stay.

In this engagement the work that fell to me embraced that of foreman, melter, chemist, shipper, drop runner and labor boss, a variety of effort rarely found in one place, perhaps never in these times where the large plants afford little opportunity for any one youngster to learn all parts of the shop practice, to say nothing of the whole business.

German Aluminum Making Capacity

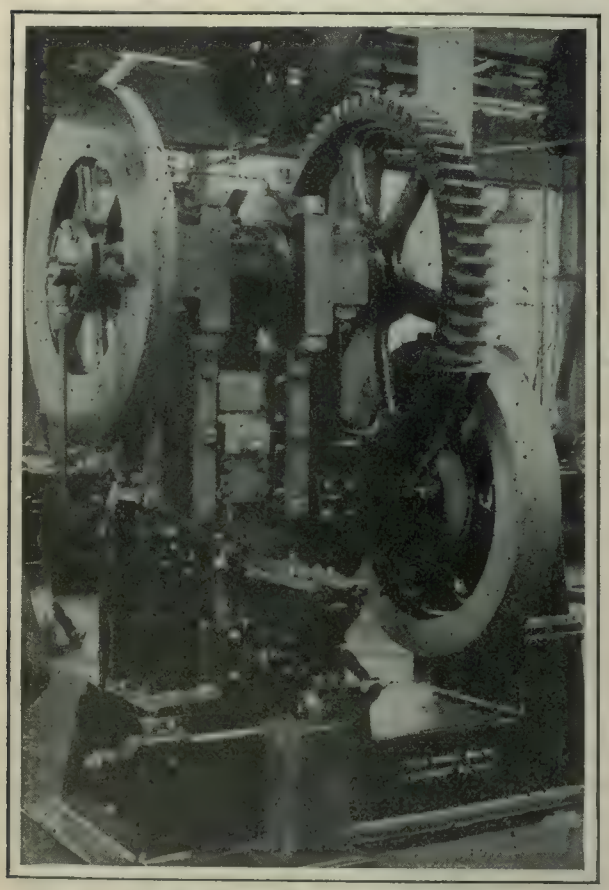
At the recent annual general meeting of the German Metallographical Society, Dr. R. Sterner-Rainer gave an interesting account of the development of the German aluminum industry. While the only works in operation in Germany prior to the war was the Rheinfelden works in Baden with an annual capacity of 800 tons, the exigencies of the war rendered the establishment of a number of additional works imperative. These works are located at Rummelsburg (near Berlin), Horrem (Cologne), Bitterfeld, Grevenbroich; there is also the Lauta works at Hoyerswerda (in the Lower Lausitz) and the Steeg works at Goisern. The Inn works at Mühldorf are in the course of construction but will not be in operation until a few years hence. The Rummelsburg and Horrem plants, being largely in the nature of war emergency measures, have meanwhile been closed down so that production, aside from the Rheinfelden works, is restricted to the Bitterfeld, Grevenbroich and Lauta plants, the former producing 4000 tons annually while the output capacity of the last named two plants is 14,000 tons each. It is interesting to know that all works established during the war are supplied with current from lignite-fired power centrales, with the sole exception of the Inn works, for which a hydro-electric scheme has been projected.

Regarding the future aspects of the German aluminum producing industry, Dr. Sterner-Rainer holds that the outlook is rather obscure in view of the more favorable position of foreign industries, particularly in regard to the supply of raw material. In the discussion the urgent need for a radical change in present obsolete production methods was elaborated upon.

The Russell & Erwin Mfg. Co., American Hardware Corporation, New Britain, Conn., is operating on an 8-hr. per day, five days per week schedule, contrasted with eight hours, four days, heretofore.

Chamfering Machine for Cold Punched Nuts

An improved design of nut chamfering machine, which is being built in two sizes, is offered by the William H. Haskell Mfg. Co., Pawtucket, R. I. These machines are equally adapted for flattening operations within their capacity. The No. 2 machine is for chamfering cold punched square and hexagon nuts from ¾-in. to 1⅛-in. bolt. The No. 3 machine will chamfer nuts from 1 in. up to and including 2 in. bolt diameter. Speed of operation is fifty nuts per minute on the No. 2 machine and 25 nuts per minute on the No. 3 machine. A No. 1 machine, when completed, will chamfer nuts from ¼-in. up to and including ¾-in. bolt diameter.



Nuts Fed into the Angle Chute at Left Are Placed by the Feed Finger on the Die, Where They Are Chamfered and Ejected at the Rate of 50 Per Minute

The machine body is made up of three castings, the main upright and two eccentric shaft caps, each being fastened to the main upright by four large studs made of a special steel. The eccentric shaft is a hammered steel forging of ample proportions, accurately machined and scraped into hammered and bored babbitted bearings.

Gears are all machine molded, the pinion gears being made from gun iron. The large gear has three keyways and is fitted with a special size slip key, which can be drawn out from time to time and driven back into the next keyway, thus distributing the strain of chamfering to a different place on large gear teeth.

The balance wheel is a friction slip wheel, a notable feature in this type of machine, which eliminates breakdowns and sometimes serious accidents. The balance wheel shaft is of ample proportions, of spindle steel, and runs in bushed and babbited bearings.

The semi-automatic feed is very simple in design, and should a nut which is about to be carried to the chamfering die become caugth in the nut slide, the feed will stop until the next stroke of the eccentric shaft.

The box type plunger is of large proportions and holds the socket or top tool by means of a steel clamp. The top tool is adjusted by a tool steel taper wedge, which projects out in the center of the plunger at front of machine.

In operation, nuts are placed in an angle chute, shown at front of machine, from which the feed finger takes them one at a time at every revolution of the eccentric shaft, and places them on the hardened steel die, where in turn they are chamfered and ejected, sliding into a truck or receptacle. So simple is the operation that a boy is usually capable of operating the machine.

Employment in September

WASHINGTON, Oct. 24.—Further increase in the number of workmen engaged in the iron and steel industry, reflected in August for the first time since the depression started last fall, was made in September, according to the monthly report of the Bureau of Labor Statistics. The gain in September was 2492 workers when compared with August, as here tabulated. The payroll, however, showed a decline of 5.4 per cent in September. When compared with September of last year, the decrease in the number of workmen amounted to 42 per cent.

The following table shows the changes in the number of employees and in wages paid in the iron and steel, automobile and car-building industries:

Iron and Steel	Number of Establishments	Men	Half Month Payroll	Average Pay Envelope
August, 1921	106	103,688	$4,353,663	$41.99
September, 1921	106	106,690	4,131,241	38.73
September, 1920	106	183,873	14,288,398	77.70
Automobiles				
August, 1921	53	98,050	3,214,712	*32.79
September, 1921	54	98,445	3,084,932	*31.33
September, 1920	54	141,518	4,778,078	*33.77
Car Building and Repairing				
August, 1921	65	47,140	2,871,704	60.92
September, 1921	64	48,868	2,858,063	58.49
September, 1920	64	75,199	5,336,288	70.96

*Weekly.

Cost of Living Slowly Falling

Figures compiled by the Bureau of Labor Statistics, Washington, for 32 leading cities, includng all of the 12 cities of over 500,000 population, show the cost of living in September to be 1.7 per cent lower than in May, 1921, and 18.1 per cent lower than in June, 1920. The cost in September is placed at 77.3 per cent above 1913, while in June, 1920, the excess over 1913 was 116.5 per cent. The present excess is the same as in June, 1919, when costs were steadily rising.

Furniture and furnishings, 124.7 per cent above 1913, continue to be the furthest out of line. Shortage of housing accounts for much of the 60 per cent advance in rentals. Clothing is up 92.1 per cent; fuel and light, 80.7 per cent; food, 53.1 per cent.

Finished steel is 33.5 per cent above 1913.

Slight Increase in Coke Production

WASHINGTON, Oct. 24.—The production of by-product coke remained practically unchanged during September, according to the Geological Survey. The total output is placed at 1,423,000 net tons, an increase over August of 21,000 tons. These figures are based on reports from 69 of the 70 by-product plants in the country, and include an estimate for the plant not reporting. Production during the month was 40.2 per cent of the rated monthly capacity of approximately 3,543,000 tons. The number of active plants increased to 55, the remaining 15 being idle the entire month.

The September output of beehive coke was 289,000 net tons, a slight increase, making the total production of all coke in September 1,712,000 tons, against 1,650,000 tons in August. Compared with the average monthly production in 1920, the September output was 60.3 per cent behind.

The Ford Motor Co. has placed an order with the Electric Furnace Construction Co., Philadelphia, for two Greaves-Etchells electric furnaces for the new plant at the Rouge Works, Dearborn, Mich. The furnaces will be basic lined and are to be used either for melting up accumulation of scrap or for treating hot metal.

New Vertical Automatic Chucking Machine

The Jackson vertical automatic chucking machine, shown in the accompanying illustration, is a machine for doing such work as the following:

A series of operations (from three to five operations on a piece at one setting) on the same point, as spotting, sizing, facing, threading and tapping, etc. The machine is credited with an output of one finished article every 5 sec.

A series of operations (as many as five operations on a piece at one setting) not at the same point. In other words, it does the work that is usually done with a jig on a drill press, such as spot, drill, tap, face, etc., at different points, on the same plate and produces one finished article at each pass and without the use of a jig.

Two operations at a given point or at two different points; the man feeding two chucks each time the machine indexes, therefore doubling the production that can be secured on the same machine on work requiring four or five operations.

The foregoing covers type A machine. The type B machine does work requiring two or three operations at a given point or at different points. This machine has four double chucks and three pairs of spindles (there being no spindles at the loading station). The operator places two pieces into each chuck every time it indexes. The work in the three other chucks is being machined during the time the operator is replacing the work in the idle chuck at the loading station.

The construction of type B machine is identical to that of type A excepting that A has six chucks and five active spindles which allow it to do five operations at the same time.

A type C machine is for jobs requiring a single operation only, or two operations combined in one tool, such as facing and tapping nuts, etc., or pointing and threading bolts at one setting, etc. It will do any operation that the other types will do, doing as many as 4000 operations per hour and besides it will mill slots of many kinds by adding a set of short milling arbors on a special fixture. It will mill slots in wrist pins, screw heads, or other small parts and castellate nuts, etc.

Types A and B are indexing machines on which the spindles (which can operate at various speeds as desired) are mounted in a stationary position and the geared clutches (which operate at any speed desired) operate the feeding cams which are under the chucks thereby feeding the chucks upward to the tools independently of each other and at the desired speed and the desired height to accommodate the operation being done. When the operation is completed the cams allow the chucks to drop and the reverse clutch indexes the chuck turret to the next working position and locks it ready for the next operation.

Type C has no clutch nor indexing mechanism and each spindle is mated to a certain chuck to operate on this chuck only. The work is placed into the chuck at the loading station and the chuck turret and spindle turret which are in this case locked to each other are rotated in one direction at the speed desired, and as soon as the chucks pass the loading station, the chucks run up on a single continuous cam which raises the chuck to the tool in the spindle and the operation is performed while the turret is rotating and while the other five chucks are being loaded. The job is finished and ejected as it again reaches the loading station.

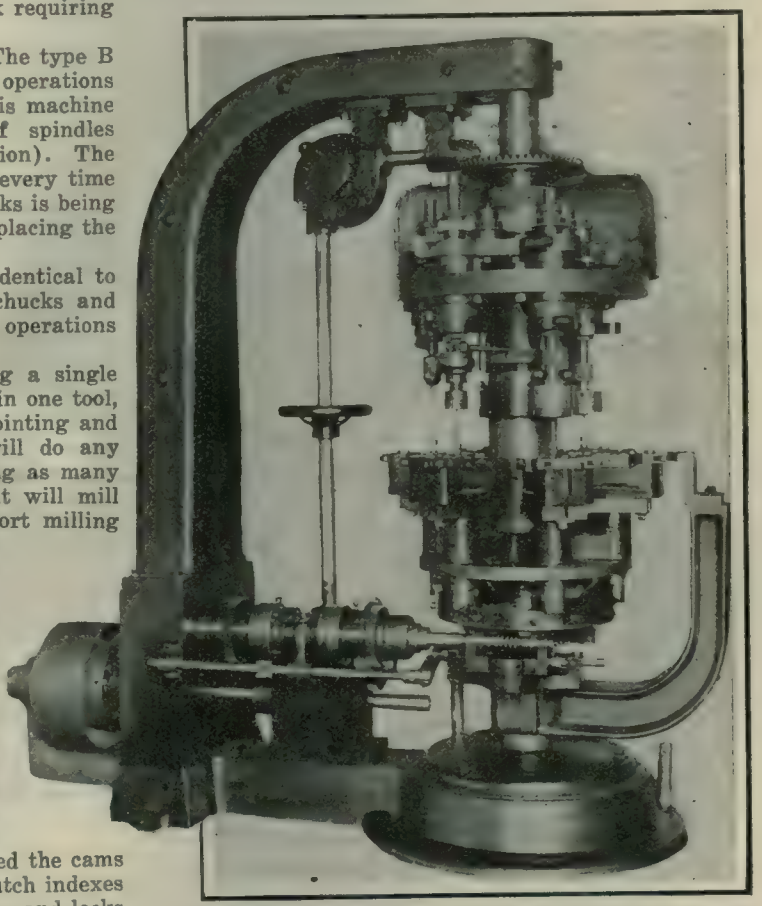
These machines are automatic throughout, even to the opening and closing of the chucks, and where quantities and the shape of the goods warrant it, a self-feeding mechanism is advocated, so that the matter of labor is for the greater part eliminated. The machines are built by the Vertomatic Mfg. Co., Reading, Pa.

The Goodell-Pratt Co., Greenfield, Mass., small tools, has reopened its Shelburne Falls, Mass., shop, which has been closed since July. Production has been started with a small number of employees.

Contracts for Bridge and Ship Work

SEATTLE, Oct. 18.—The Union Bridge Co., Seattle, has been awarded the contract for building the steel bridge across the Columbia River between Kennewick and Pasco, Wash., on its bid of $426,000. Chas. G. Huber, president of the organization, states that the company is prepared to work from both ends so as to complete the structure by June or July. This bridge, which has long been in contemplation as uniting two important agricultural and fruit sections of the State on opposite sides of the river was financed by stock subscriptions. The bridge will be a toll structure. It will be 3260 feet long on six piers of reinforced concrete and will require 995 tons of steel, 550 yards of concrete and 2,000,000 feet of lumber. Other bidders included A. Guthrie & Co., Portland, $430,000; Illinois Steel Bridge Co., $438,000; R. J. Cameron, Seattle, $437,000.

On a bid of $42,900 the contract for repairing the American-Hawaiian steamship Arizonan, which struck a ledge in the islands in northern Puget Sound Oct. 4,



Jackson Automatic Machine for Drilling, Reaming, Tapping, Threading, Milling, Facing and Other Operations, Designed to Extend the Automatic Features Even to Self-Feeding

the Todd Drydocks Co., Seattle, has been given the work. Other tenders were the Yarrows, Ltd., Victoria, B. C., with $55,000 and 20 days for completion and the Victoria Machinery Depot, Victoria, $53,957, same time limit. The Todd company bid in American money and the Victoria companies in Canadian money, so that allowing for the difference in exchange the disparity is less than appears on the surface.

Complete plans and estimates for a new bridge across the Wishkah River at Aberdeen, Wash., are being prepared by the State Highway Commission.

The Carnegie Steel Co. has decided upon the names of two steamers now under construction at the Ambridge, Pa., works of the American Bridge Co. One is to be the William G. Clyde, in honor of the vice-president and general sales manager of the company, and the other the A. O. Ackard, in honor of the general superintendent of river transportation of the company.

Building Machine Tools in a New Plant

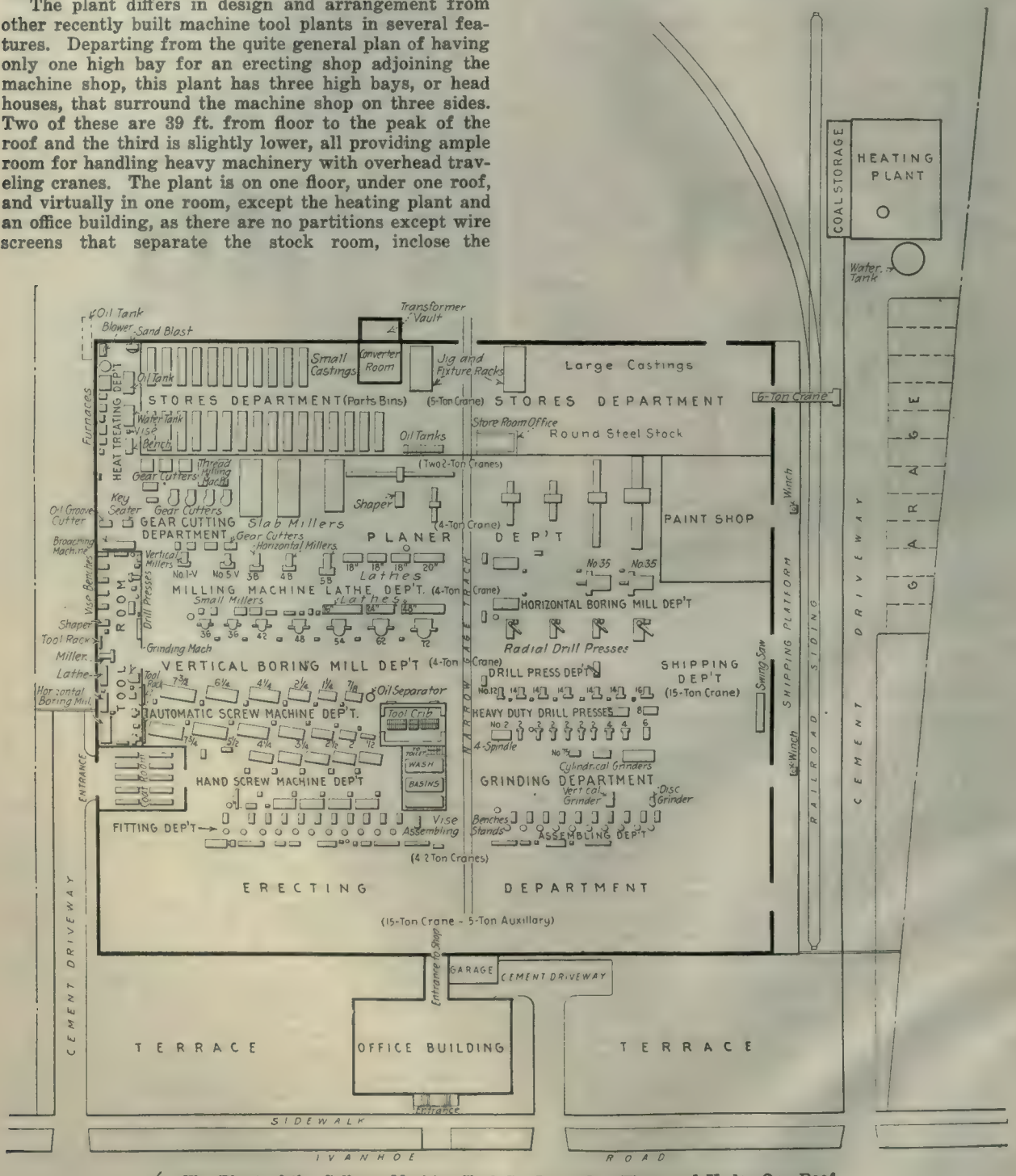
Arrangement, Transportation System, Routing of Material and Lighting Are Features of Colburn Machine Tool Co., Cleveland

BY F. L. PRENTISS

A RECENT addition to the list of machine tool plants of modern design, and a most interesting example of a well-arranged, well-equipped and well-lighted shop, is the new plant of the Colburn Machine Tool Co., Cleveland. The removal of this company from Franklin, Pa., to Cleveland afforded it an opportunity to build a new plant suited to the special requirements for the manufacture of boring and turning machines and heavy-duty drilling machines. The plant layout and building design were given a great deal of study before plans were finally adopted.

The plant differs in design and arrangement from other recently built machine tool plants in several features. Departing from the quite general plan of having only one high bay for an erecting shop adjoining the machine shop, this plant has three high bays, or head houses, that surround the machine shop on three sides. Two of these are 39 ft. from floor to the peak of the roof and the third is slightly lower, all providing ample room for handling heavy machinery with overhead traveling cranes. The plant is on one floor, under one roof, and virtually in one room, except the heating plant and an office building, as there are no partitions except wire screens that separate the stock room, inclose the tool room, tool crib and coat room. With the elimination of power transmission equipment, space above the machines is clear and the superintendent has a good view throughout the shop.

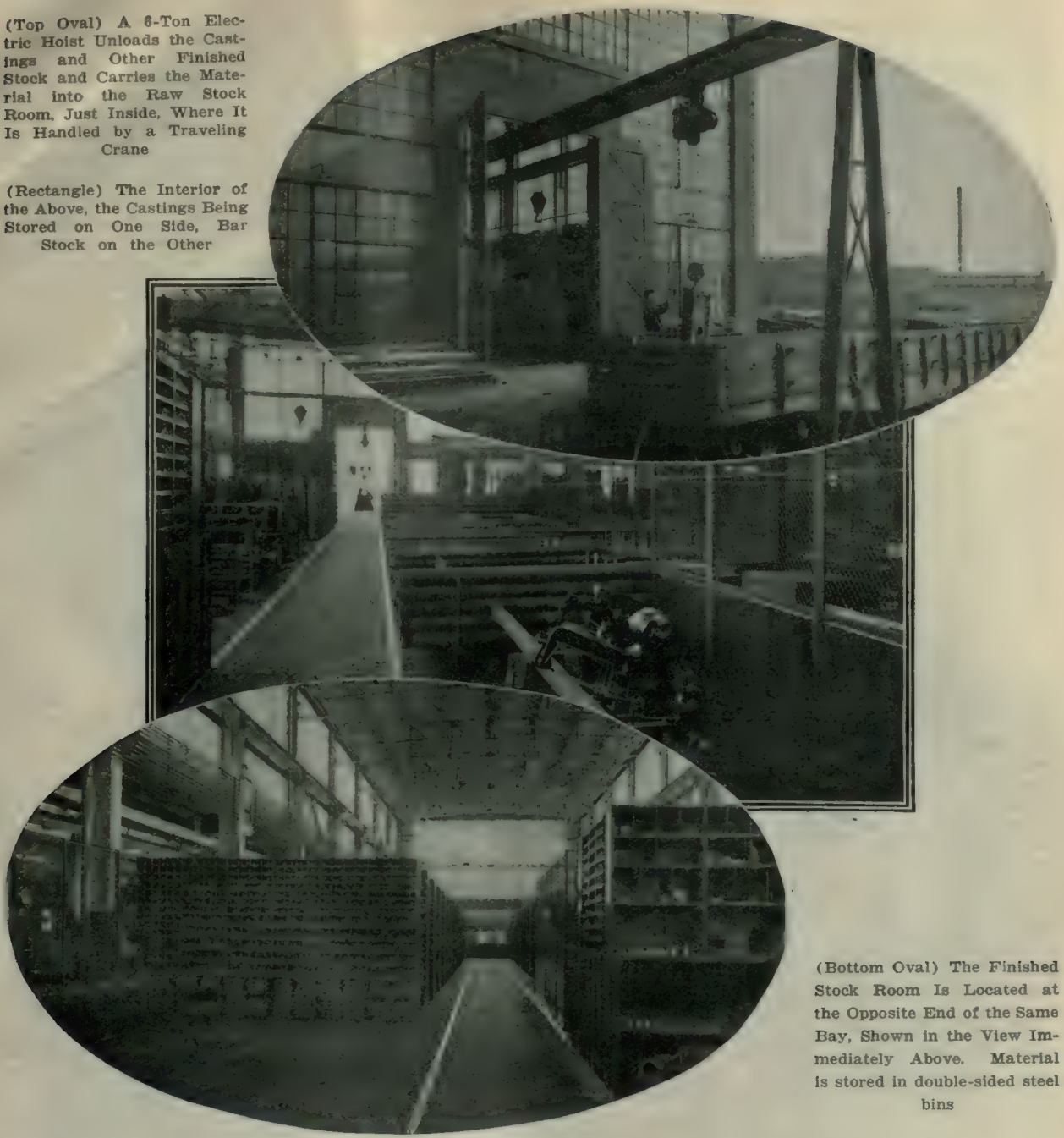
The plant is 280 x 310 ft. Across both the front and rear is a high bay, 50 ft. wide, extending the length of the plant, these two building sections being duplicates. The bay at the front contains the assembling department and that at the rear is used for storage of both rough and finished stock, except a small section



The Plant of the Colburn Machine Tool Co. Is on One Floor and Under One Roof

(Top Oval) A 6-Ton Electric Hoist Unloads the Castings and Other Finished Stock and Carries the Material into the Raw Stock Room, Just Inside, Where It Is Handled by a Traveling Crane

(Rectangle) The Interior of the Above, the Castings Being Stored on One Side, Bar Stock on the Other



(Bottom Oval) The Finished Stock Room Is Located at the Opposite End of the Same Bay, Shown in the View Immediately Above. Material is stored in double-sided steel bins

at the lower end, where the heat-treating department is located. The plant is laid out with a view of future expansion in the rear, and should extensions make a rearrangement desirable the bay used as the stock room can be converted into an assembling or manufacturing department.

Between the front and rear high bays is a machine shop, 194 x 260 ft., sawtooth type. On the north side of the machine shop and connecting with the other two high bays is the third high bay, 50 x 180 ft., containing the shipping department.

The plant is of brick, steel, concrete and glass, with continuous window sections in steel sash. The lighting facilities are so good that no artificial lights are required on an ordinarily dark day.

Nearly all the outside of the building is of glass, the surface being divided into two sections by a horizontal strip of concrete wall, about 3 ft. wide, along the inner side of which the radiator pipes are located. In the machine shop the steam heating pipes under the roof do not shut off the light from the sawtooth roof. The three lower window sections in the side walls have clear glass and the sections above, extending up to the roof, factory ribbed glass. Wired glass is used in the sawtooth roof.

The plant is arranged for convenience in handling material and routing parts in the process of manufacture. Three principal means of transportation are provided—electric traveling cranes and hand-operated cranes with electric hoists, a handcar on an industrial track and an electric storage battery truck. Crane service is provided everywhere that it can be used to advantage. The stock room is served by a 5-ton electric traveling crane with a runway its entire length, the assembly shop by a 15-ton crane with a 5-ton auxiliary, the shipping department by a 15-ton crane, and nearly all the bays in the machine shop by hand-operated overhead cranes equipped with 4-ton electric hoists, except in the two outer bays, which have 2-ton hoists. The crane runway in the stock and assembly departments is 25 ft. 9 in. above the floor. The crane runway in the shipping department underlaps the crane runways in both the stock and assembly departments so that, if desired, continuous crane service can be had around the three high bays.

An industrial track extends down an aisle through the machine shop near its center, from the stock room on the one side to the assembly shop on the opposite side. The stock room crane places the large, rough castings and other large parts on the flat car on this track which carries the material to the section in the machine shop where it is wanted, and from the car a

hoist in the machine shop bay delivers it to the machine on which the operations are to be performed. If operations are required in different sections the crane brings the part back to the industrial car, which serves as a transfer, taking the part to another section in the machine shop where it is handled by the crane and hoist in that bay. The electric truck conveys the smaller parts from the stock room, the truck unloading the parts in front of the machine and taking the finished parts back to the stock room. The truck has an electric-operated hoist for handling the heavier parts.

Aisles, 6 ft. wide, are marked off on the floor throughout all departments where they are needed, and these are always kept clear for the operation of the electric truck. The piling of material is confined to certain locations and consequently the plant has an unusually orderly appearance.

The plant is conveniently arranged for bringing in raw stock and for loading the finished machines on cars. Extending the length of the north side, accommodating the shipping bay, the receiving end of the stock room and one end of the assembly department, is a shipping platform, 12 ft. wide. This is covered, except over the receiving department. A switch track from the Nickel Plate Railroad runs along this platform. A monorail extends over and at right angles to this track. Castings and other raw material are unloaded from cars with a 6-ton electric hoist operating on the monorail. This hoist carries the material inside the building, where it is handled by the overhead crane.

Machines Placed on Cars with Winches

Winches on the loading platform load on cars the heavier types of boring and drilling machines, which weigh up to 65,000 lb. The machines are placed on skids and rollers and a winch pulls them either from the assembly floor or shipping department to the loading platform and from the platform to the cars. Before loading, the car wheels are blocked to prevent the car from moving. A large steel plate forms a runway from the loading platform to the car floor, which is almost on a level with the platform. Machines for export are partly torn down and crated in three boxes and then loaded on cars with a winch in the same way. The winch is operated by a motor beneath the platform, having push button control along the wall. Racks for the rollers and a reel for the rope used with the winch are located along the walls. The winch is also used for moving heavy machine tools around the shop.

The machine shop is divided by building columns, placed on 20 x 30-ft. centers, into seven bays, 30 ft. wide, except the two outer bays adjoining the stock room on the one side and assembly department on the other, which are 15 ft. wide. The runway to the small cranes in the sawtooth bays is 13 ft. 3 in. above the floor. The machine shop and other departments have creosoted wood block floors.

The machinery is arranged for direct routing of parts for successive operations as far as is possible in the manufacture of two lines of machinery in various sizes, which in drilling machines include both small and large heavy-duty types. Consequently, the course of the movement of the larger parts is from the raw stock room through the machinery departments and on into the assembly department on the opposite side. The machines for heavy work are in the bays close to the stock room and nearly all the heavier machine work is done in the north half of the shop. In one of the bays on the south side of the center aisle are several of the company's boring mills, but with this exception the south half of the shop is used for small work, most of which goes to the finished stock room.

On the north side, starting at the stock room end, are located in the various bays in the order named, the planing, horizontal boring mill, large radial drill and small Colburn drilling machine and the grinding machine departments. With this arrangement a machine bed passes directly from one bay to the next bay for the successive operations of planing, boring and drilling. On the south side of the center aisle, starting at the stock room end, are the thread cutting machine, gear cutting machine, milling machine and lathe, vertical boring mill, automatic machinery and hand screw machine and turret lathe departments in the various aisles, in the order named.

Individual motors drive all machinery. On nearly every building column there is a panel for making an electrical connection for motors up to 30 hp. At the side of the 6-ft. radial drilling machine is a concrete pit, 4 ft. wide, 6 ft. long and 5 ft. deep, that is used for drilling heavy columns, beds, housings, etc., that are too large to be handled on the base of the machine. When the casting is placed in the pit it is clamped to the table setting on the base of the machine, and with the use of the pit the operator is able to use the full travel of the drill on the column. In the automatic machine department there are 13 Cleveland automatic machines in all sizes from ⅜ to 7¾ in.

These machines are all driven by Reliance variable speed motors with Electrical Controller & Mfg. Co. control. The automatic machinery department, instead of having a crane extend across the bay as in other departments, has a 2-ton hoist on either side, operating on a monorail over the row of machines. A rack, made of a short section of I-beam with each end turned up, is provided at the end of each machine. This keeps the stock off the floor so that it can be handled more readily with a hoist. Small parts are moved in the drilling machine department and from one department to another in large cans with lugs on the sides for gripping with a hand lift truck.

A portable tool crib is located centrally in the automatic machinery bay. Along the center aisle, located centrally and adjoining the tool crib, is the uninclosed wash room, above which is the toilet room.

The tool room is on the south side of the machine shop. It is provided with complete tool room equipment and in it are built many of the tools and all the jigs and fixtures used in the plant.

The plan of progressive assembly is followed in assembling various parts of the three types of drilling machines. This assembling is done in the narrow machine shop bay adjoining the assembly department. Gear boxes and other separate units are assembled at one end of this bay and the heads that are built up of these units are assembled at the opposite end. This bay is provided with benches for assembling the units and at the side of each bench is a working pedestal on which the heads are assembled. When the head is completely assembly it is placed on one of two stationary test columns in the same bay. After the head is tested on one of these columns it goes to the main assembly bay where it is placed on the column on which it is to go, and the only test required there is to show whether the head is in alignment with the columns.

The larger, or heavy duty types of drill presses and the boring mills are assembled and tested on the assembling floor. Here a portable motor is provided and there is a panel on every building column with plug connection for supplying 220 volt current for testing the machines after assembling. Movable work stands of extra heavy construction are used on the erecting floor.

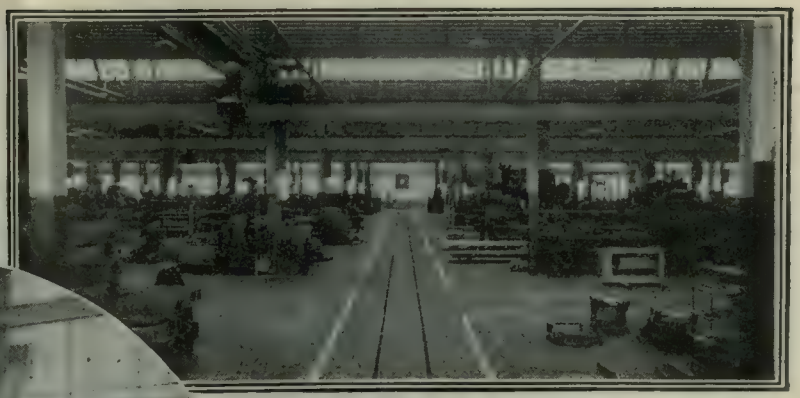
It is the intention to extend the unit assembly of various units that are common to different machines, such as boring mill heads, feed cases and driving mechanism, and to place these in the finished stock room to be used as needed.

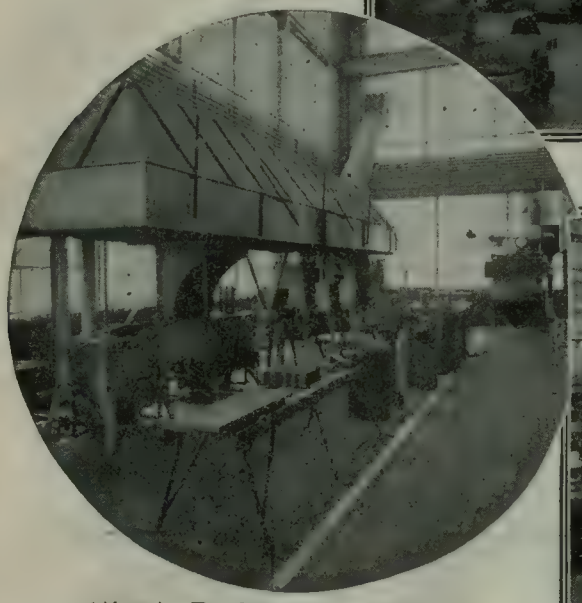
A Hood Removes All Furnace Fumes

The heat-treating department is equipped with a carbon tool, high speed tool, forging, drawing, lead and cyanide furnace. The high speed and carbon steel heat-treating furnaces are connected with a Wilson-Maulein pyrometer. A large hood covers all the furnaces that are arranged in a row and the fumes are exhausted through a pipe that extends through the side of the building. The oil quenching tank is equipped with a Viking pump which circulates the oil through cooling pipes. All gears are heat treated. After hardening, the scale is removed on a Pangborn sand blast machine located at the end of the heat treating department.

Each foreman has a sheet steel desk and automatic telephone connected with other parts of the plant and the office and the Stromberg time recording system. The time of starting and finishing every operation is

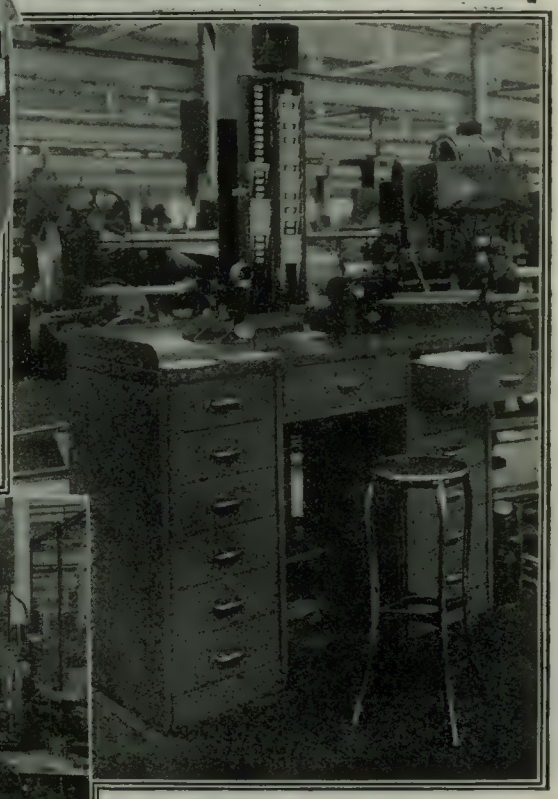
(At the Right) The Main Transportation Artery Is an Industrial Track Down the Center of the Machine Shop, on Which Runs a Flat Car. It extends from the stock room to the assembly department





(Above) Freedom from Smoke Is Attained by a Large Hood in the Heat-Treating Department

Each Foreman Has a Steel Desk, Automatic Telephone, Time Recorder and Card Filing Case





(Above) The Tool Room Contains Complete Equipment and Benches for Making Tools, Jigs and Fixtures





(Oval) The Small Drill Press Department Contains Gang and Single Spindle Drills of Different Types for Drilling Small Parts

(At Left) Motors, Equipped with Electric Controllers, Drive All the Machines in the Automatic Department

recorded on cards, one of which is provided for each job, on which is the clock number, man's number, production order number, part number, name of piece, name of operation and the number of machine on which the work is to be done. The cards are kept in convenient filing cases above the desk until the operation is completed.

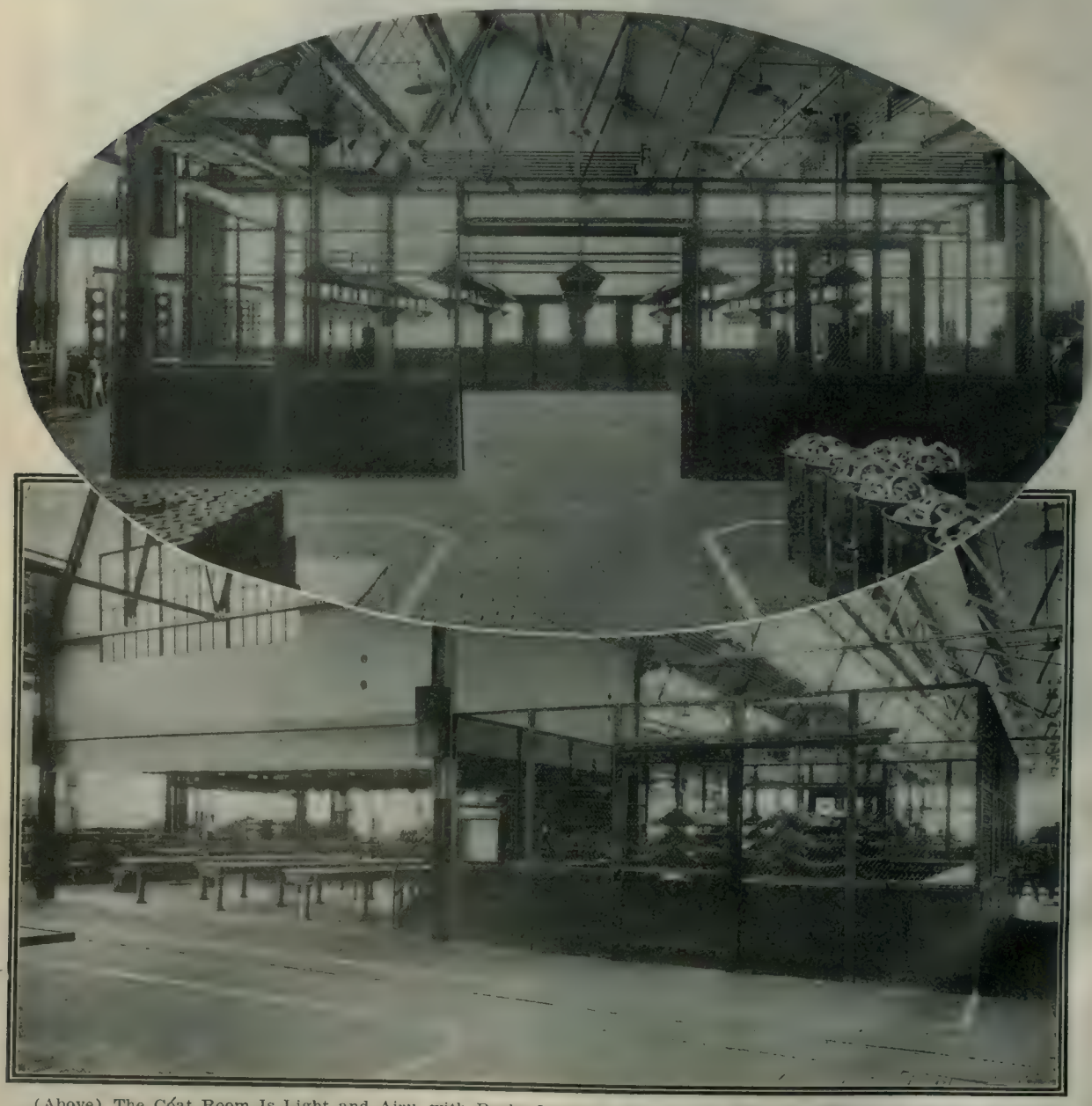
At one side of the plant, in one end of a machine shop bay, there is a conveniently arranged coat room in which stationary racks are suspended from the ceiling, these taking the place of lockers. Each employee has a double hook, above which is a shelf for his lunch.

In the stock room unfinished stock is stored near the receiving end and finished stock in the remainder of the room. The stock room is divided by a 6 ft. aisle, on one side of which bar stock is kept and on the other, rough stock. The racks for bar stock are built of three rows of 12-in. I-beams and steel bar uprights that extend down into holes drilled on 8-in. centers, about 8 in. into the center of the beams. For larger stock a double rack space is provided by omitting the upright supports from alternate holes.

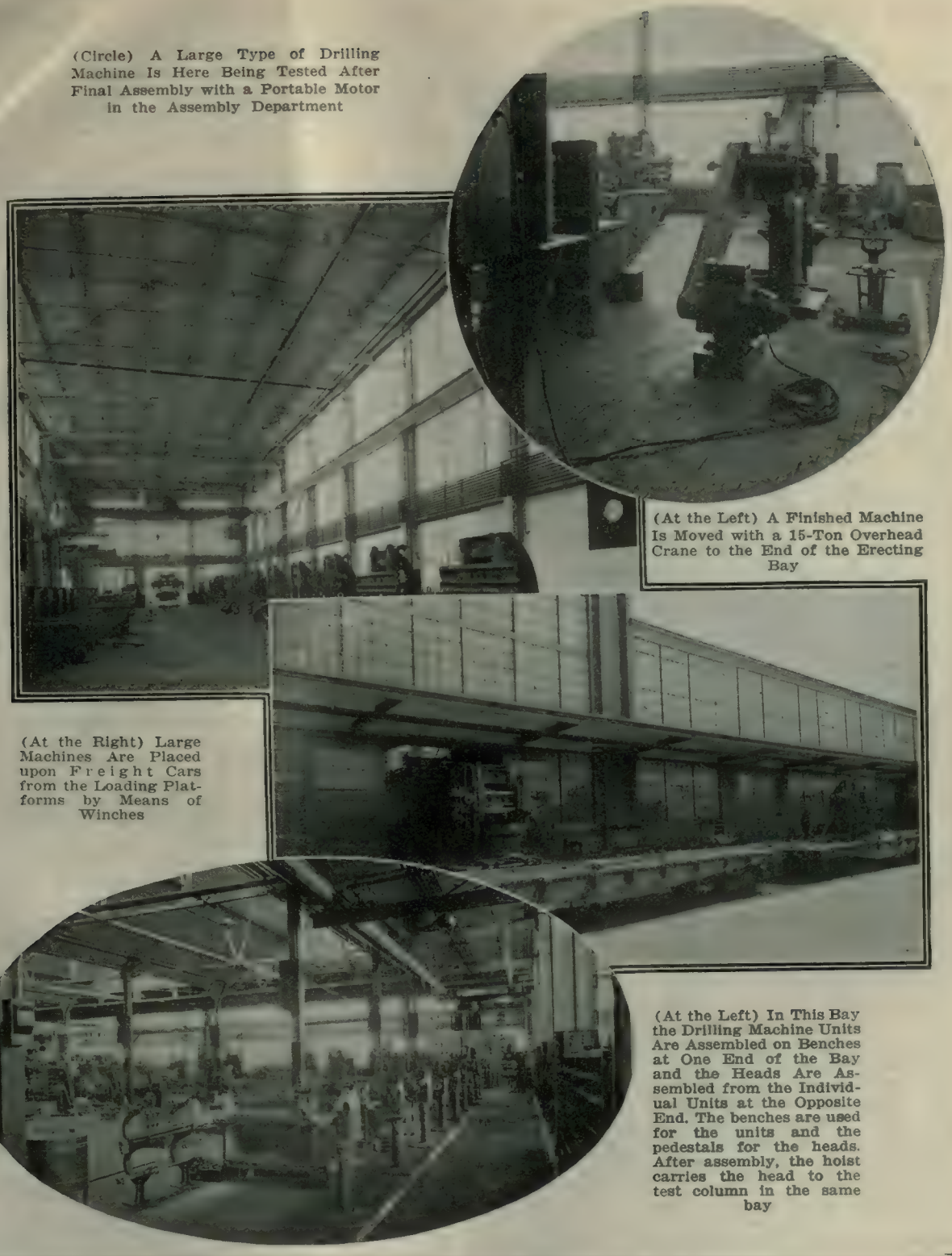
In the finished stock room are two rows of double-sided steel bins, one row being on each side of the aisle. These 29 bins are of various sizes and are of an adjustable type. They are numbered at the end and each bin is divided into several sections, which are lettered. Above each compartment is the number of the part that it contains. Compartments holding standard parts as bolts, screws, etc., not having part numbers, are labeled with the name and size of the part. Such finished parts as screws for boring mills, shafts and spindles for drilling machines that are too large to be put in bins are placed in an upright position along the wall at the lower end of the finished stock room, spaces for these being partitioned off by means of steel pins fastened into a steel rail along the wall. These parts are designated by a number that is placed above each section. The finished stock is recorded on cards in the main office, where a perpetual inventory is kept of all parts.

The plant is lighted artificially by two rows of lamps in each machine shop bay and three rows in each high bay, all located in a high position. The offices are in a two-story brick building connected to the plant by an inclosed corridor. The offices are quiet, there being little noise in the adjoining erection department and the machine shop being comparatively far away.

The plant was designed by George S. Rider & Co., architects and engineers, Cleveland, and erected by the Hunkin-Conkey Construction Co. The overhead traveling cranes were supplied by the Cleveland Crane & Engineering Co., Yale electric hoists are used and the Automatic Transportation Co. type of electric truck. The E. F. Hauserman Co., Cleveland, supplied the sheet metal stock bins, foremen's desks, coat room racks and other sheet metal equipment. The Wayne system of lubrication is used.



(Above) The Coat Room Is Light and Airy, with Racks Instead of Lockers for Coats and Lunch Pails. The Tool Room Is Enclosed by Wire Netting. At the right is the wash room and immediately above the latter, the toilet room



(Circle) A Large Type of Drilling Machine Is Here Being Tested After Final Assembly with a Portable Motor in the Assembly Department

(At the Left) A Finished Machine Is Moved with a 15-Ton Overhead Crane to the End of the Erecting Bay

(At the Right) Large Machines Are Placed upon Freight Cars from the Loading Platforms by Means of Winches

(At the Left) In This Bay the Drilling Machine Units Are Assembled on Benches at One End of the Bay and the Heads Are Assembled from the Individual Units at the Opposite End. The benches are used for the units and the pedestals for the heads. After assembly, the hoist carries the head to the test column in the same bay

Appointments by National Safety Council

B. F. Tillson, New Jersey Zinc Co., Franklin, N. J., has been elected vice-president for industrial safety of the National Safety Council.

W. H. Cameron, formerly secretary-treasurer of the National Workmen's Compensation Service Bureau, New York, was elected executive secretary of the National Safety Council. Mr. Cameron, who on Nov. 1 will assume charge of the headquarters of the National Safety Council at Chicago, returns to a post which he held from the creation of the council in 1912 to 1919.

Sidney J. Williams was re-elected chief engineer of the council. C. W. Price, formerly general manager, will assist the council as a special consultant in public safety.

The executive committee has approved the organization of a drop forge section and a petroleum section by the companies in its membership interested in more intensive accident prevention activities in those two groups of industries.

Meeting of Makers of Malleable Chains

A group of manufacturers of malleable chains met in annual conference at Indianapolis, Oct. 19. Sessions were held at the Country Club. The delegates were the guests of Alfred Kauffman, vice-president Link-Belt Co., Indianapolis, at breakfast at the Hotel Severin. Among them were C. R. Messenger, vice-president Chain Belt Co., Milwaukee; R. R. Fauntleroy, secretary Moline Malleable Iron Co.; Felix Weller, president Weller Mfg. Co., Chicago; R. W. Yerkes, assistant manager Link-Belt Co., Philadelphia; A. J. Ricker, Badger Malleable Iron Co., Milwaukee, and R. A. Nourse, vice-president Stowell Mfg. Co.

Hand Propelled Sand Cutting Machine for Small Foundries

For the smaller foundries, which have regarded the machines for mechanically tempering sand as too large for their spaces, or have considered the investment too great for the limited use they could make of it, the American Foundry Equipment Co., New York, has developed a small, light type of sand cutting machine weighing less than 700 lb., and employing power only for rotating the cutting cylinder. This machine is propelled and guided by hand like a pushcart by taking



Sand Cutting Machine for Needs of Small Foundry

hold of the front frame member. While cutting, the cylinder blades have sufficient traction in the sand to force the machine along as well.

Some stove molding shops and others whose floors are too narrow for the machines heretofore available will, it is contended, find the type H machine, as it is called, a profitable substitute for shovel tempering. The over all width is 55 in.

Other dimensions and particulars are as follows: Length over all, 7 ft. 4 in.; weight, approximately 680 lb.; frame, Shelby seamless steel tubing; clearance above floor, 20 in.; cutting cylinder, 36 in. in width; motor, 2 hp. (for cutting cylinder only).

As indicated in the accompanying illustration the front wheels are of the caster type and mounted in inclined forks and the machine is steered without mechanism and can make short turns. The cutting cylinder with its shield, and the motor and transmission, are carried in approximate balance upon a tilting frame which has its fulcrum above and just forward of the center of the rear wheels. By tilting this frame backward the steel cutting cylinder is lowered into the sand, and vice versa. This raising and lowering is done by a hand wheel at the front end of the machine acting through a bell crank and threaded connecting rod.

Power is brought to the motor by a flexible cable which plugs into receptacles located at convenient points in the foundry. The cable may be of any length necessary, and the motor of any desired voltage, alternating or direct current.

Witherbee, Sherman & Co. blew in their Port Henry, N. Y., blast furnace on Oct. 14. Foundry iron will be made. The furnace had been idle for six months. The giving of employment to company workers at Mineville and Port Henry was an important consideration in the decision to start up.

Wheeling Steel Corporation Extensions

WHEELING, W. VA., Oct. 24.—Plans for the improvements and extensions at the Steubenville, Ohio, plant of Wheeling Steel Corporation are definitely taking shape. The 11 open-hearth furnaces now having a rated capacity of 60 tons to the heat, will be enlarged 10 per cent. The plant as it now stands has an annual capacity of 420,000 tons of ingots. The gain in output will be much more than 10 per cent, however, because improved methods of burning coke oven gas will permit the material shortening of the time of the heats. The changes involve the replacement of much of the present open hearth equipment.

The Wheeling Steel Corporation now is taking bids on the building to house the rod mill and wire products plant at the Portsmouth, Ohio, works. This addition was projected early this year to take care of the surplus steel produced at the Portsmouth works, but because of the unsettled labor situation and high materials costs, it has been dormant until recently. This extension now may be built at a considerable saving as compared with cost earlier this year.

New Records in Portland Cement

Portland cement produced in September, 10,027,000 bbl., fell short of the August total, 10,244,000 bbl., but was otherwise the highest of the year, according to figures of the United States Geological Survey. Shipments for September, 11,329,000 bbl., were also second only to the August shipments of 12,340,000 bbl. Stocks at end of September have been drawn down to 6,953,000 bbl., compared with 12,600,000 bbl. April 30.

Production and shipments for both third quarter and the nine months exceed all previous records, the shipments having been 33,970,000 and 74,045,000 bbl., and the production 29,839,000 and 72,307,000 bbl. These exceed the 1920 figures, which were the previous record.

Future of Powdered Coal for Boilers

That powdered coal as a boiler fuel is here and here to stay, few will question, writes Edwin B. Ricketts, New York Edison Co., New York, in the monthly journal of the American Society of Mechanical Engineers, but that it will eliminate other means of burning coal is hardly possible. He comments on the subject in part as follows:

There is undoubtedly a field where this fuel will prove the best, as there are others where stokers, oil or gas will reign supreme. When only very low-grade coal which is burned with great difficulty on stokers is available and where coal is very high in price, powdered coal would seem to have a decided advantage over stokers.

Where good stoker coal is available at a low price, the advantage is with the stokers. With eastern seaboard conditions—a good grade of coal available at a medium price—the best method of burning fuel becomes a matter for very close calculation. The extent of the place which powdered coal will occupy in the future none can foresee, but the problem of the engineer in considering this fuel is the same as that with all other types of fuel, namely, the careful balancing of efficiency against the cost of obtaining that efficiency.

Cook Spring Co. Located at Ann Arbor

The Cook Spring Co., for a quarter of a century manufacturing springs for mechanical purposes in New York, has completed at Ann Arbor, Mich., a new spring making plant which is now being operated under the same management. The center of its trade, the company finds, has been moving steadily westward, and the Ann Arbor location is regarded as nearer the company's trade center as well as its sources of supply. The Eastern plant and office are closed for the present, and communications should be addressed to Ann Arbor.

The Central Vermont Railroad Co.'s St. Albans, Vt., terminal shops, employing 300, have closed for an indefinite period.

Danger in Readjustment Legislation

Excess Governmental Overhead a Burden—Meddling by Public Bodies to Be Avoided—"Supply and Demand" Surest Road Back to Normal

"THOSE twin brethren, supply and demand, have in the long run fixed prices fairer to the consumer than could the wisest commission sitting in Washington, and they have imposed heavier penalties for errors in judgment than would a bolshevist court," declared Charles M. Schwab in an address at the banquet of the American Mining Congress at Chicago on Oct. 21. "I need only point to the terrific losses in silks, in leather, in sugar, within the past year, to indicate the severity of the penalties to those who guess wrong, or who fail to observe economic laws."

Government interference with industry is not only superfluous and harmful, in his opinion, but also a needless expense. He said: "We suffer to-day from an excess of national, state and municipal overhead. There are too many people employed by our various governments, and too few in productive industry in normal times." Mr. Schwab's remarks, substantially in full, are given below:

To my mind, there is nothing in the present business situation which time, and the laws of trade and economics, will not straighten out. The danger lies in the effort to force an adjustment through legislation.

Unequal Distribution of Burdens

We are in difficulties; there is no doubt about that. Prices have dropped irregularly. Wages have gone down in some lines and are maintained in others. Short time has reduced the earnings of many workmen, and unemployment has put a heavy burden on many more.

The products of the farm have dropped to about prewar levels, and the high cost of transportation invades deeply the farmer's narrow margin. Yet the railroad workers resent any reduction in wages which will make a lowering of freight rates possible. The building trades are resisting reductions in rates and changes in rules provided in the very wise award handed down by Judge Landis.

Everywhere the process of readjustment is creating discord and discontent. Everywhere our people want to hold on to what the war brought in the matter of increase in income, and want to lay the sacrifice of deflation on some other back.

Paternalism Will Not Answer

We have tried legislation on some things and it hasn't worked well. We have tried putting directive control of our railroad systems into a single hand, and the memory of that experiment is still vividly with us. Russia embarked on the plan of centralizing the control of all industry in government hands, and no one is anxious to take another chance at that experiment.

Yet many of our people clamor for relief through legislation whenever, after an orgy of prosperity, economic laws insist on re-asserting themselves. And our legislators are altogether too prone to yield to those clamors, with the result that inelastic, repressive legislation checks initiative and thwarts enterprise.

I know of no better stimulus for creative ambition than the hope of personal reward. Intelligent self-interest, not selfishness, cannot be equalled in securing results in business. It surpasses any form of communal co-operative effort. And when competition has free rein, there is ample restraint and ample protection to the public interest.

How the Coal Business Is Affected

At the very time when the Government is trying most desperately to get out of the shipping business, it seems to be headed straight for the coal business. The high prices prevailing for coal during the past year are generally supposed to be due to a combination of the great coal producers, who, by the power of monopoly, have raised prices to extortionate heights. It is also supposed that the coal deposits are approaching exhaustion, and that for both reasons, Government control, or at least regulation of the industry, is imperative.

Yet the testimony given some months ago before the Senate Committee on Manufactures showed that there are in the United States proper some 11,000 coal mines, controlled by 7000 operators. The greatly increased demand for coal incident to the European war, as revealed before the same committee, almost doubled the number of mines, so that the 5776 operations existing in 1913 increased to 11,000 in 1920.

Can there be monopoly in an industry so widely distributed, so widely owned? The very fact that so many new operations started, as the result of increased demands, shows that there is no monopoly in the ownership of coal deposits, for believe me, a monopoly has altogether too much sense to spread itself in this fashion.

Too Heavy Overhead Charges

I have been in competitive industry so long that I am constantly on guard against an increase in overhead, and I am opposed to the creation of new methods that transfer men from the producing column to the overhead column. I have to be shown that the transfer will bring returns, that it is in reality helpful to production, before I give consent. No manufacturing plant would thrive very long if it continued to increase the personnel of its office by reducing the number of workers in its shops.

Yet we have witnessed, for some years, a constant increase in our national and state overhead expenses. The creation of new departments for supervising this, regulating that, or controlling the other, has been going on merrily; and, with each additional function assumed by the state or nation, some person, or group of persons, has been transferred from the producing group to the overhead group.

Intermittent Operation of Mines

The productive capacity of your mines in normal times is 50 per cent greater than your demand, and it follows therefore that your mines, even in fairly prosperous times, must shut down a third of the time. It means that 700,000 men must be idle one-third of the time and that their wages must be increased so that they can live for twelve months on the earnings of eight.

It means that two billions of capital invested in the industry is profitably employed during only two-thirds of the time, that deterioration of timbers and machinery during the idle time must be paid for, that pumping and ventilating machinery must be kept going, whether there is coal output or not. And all these adverse factors which add so materially to the cost of coal must inevitably be passed on to the consumer.

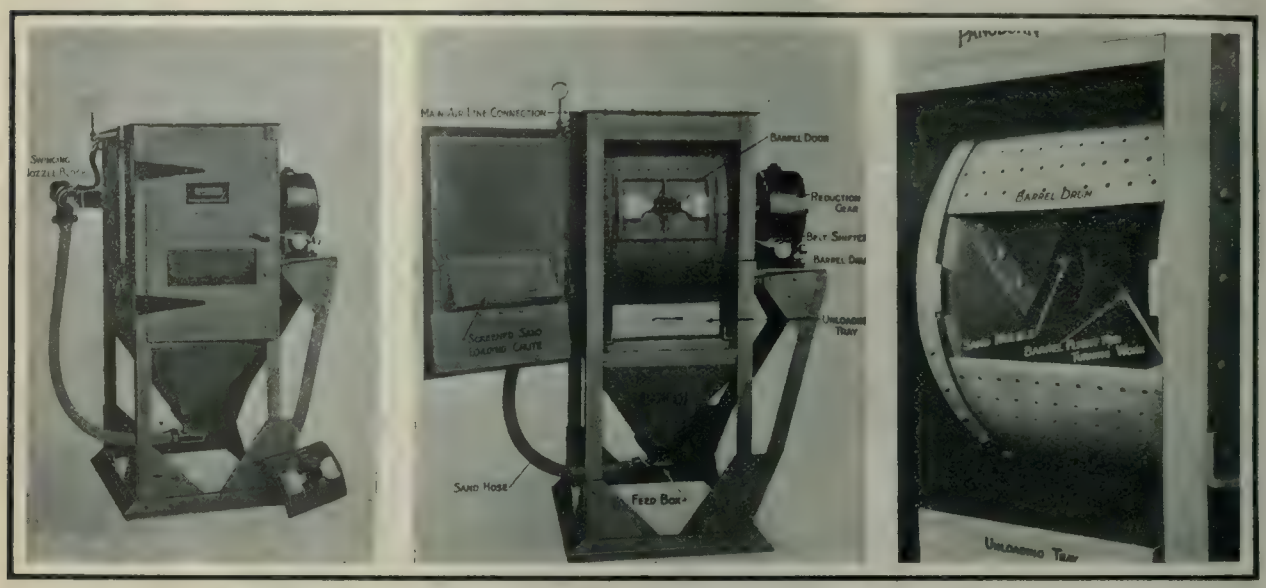
Your problem is to distribute your demand more uniformly over the twelve months, and this can be done only by such a concession in price as will induce large consumers to undertake the expense and suffer the deterioration of heat values incident to storage, and to pay the interest on the investment.

"Heating Furnaces—Design and Practice," was the subject of a paper presented by C. M. Stein, engineer, Paris, France, at the bi-monthly meeting of the steel works section of the Engineers' Society of Western Pennsylvania, at the William Penn Hotel, Pittsburgh, Tuesday evening, Oct. 25.

Sand Blast Barrel for Small Shops

A sand-blast barrel has been put on the market by the Pangborn Corporation, Hagerstown, Md., to meet the problems of the small plant. For the small brass foundry, for small heat treated parts, pieces to be galvanized, plated or enameled, work to be machined or ground it provides for securing quality of cleaning and finish commonly requiring relatively extensive plants.

The device includes a sheet metal dust tight cabinet or housing on a structural steel frame, the bottom being hopper shape to receive the abrasive and equipped with a feed box to which is attached a hose that conveys the sand to the nozzle. The barrel drum mounted within this cabinet or housing is 24 in. in diameter by 16 in. long, and is constructed of perforated sheet metal, mounted at one end on a shaft supported in bearings of large size. This shaft is equipped with a gear, engaging a worm (in reduction) on the main driving shaft, which is equipped with tight and loose pulleys and belt shifts. The driving mechanism is contained in a cast housing, all outside the cabinet or barrel housing, being integral with the structural frame.



Sand Blast Barrel Developed for Use in Small Shops or for Small Volume Work

An opening in the cabinet receives the nozzle, which is mounted on a swinging bracket to permit of easy access. Dust tight doors close the barrel housing and opening for the nozzle. The interior of the barrel drum is fitted with baffles which turn the load as it rotates slowly, thus to bring all pieces and all faces under the blast action. The spent abrasive drops through the perforations of the drum, into a screen tote box beneath the drum and through into the hopper for re-use. The tote box receives the load when the barrel is dumped.

A door the full length of the drum is held in place by a double spring latch. An opening is provided in the top of the cabinet for attaching to an exhaust system. The barrel occupies a floor space of 2 ft. 7 in. x 3 ft. 6 in. and is 5 ft. 6 in. high.

Strength of Manila Rope

For three-strand regular lay manila rope from ½ to 4½ in. in diameter, the following computation will give the breaking load of the rope, according to the Bureau of Standards, Department of Commerce, Washington. The average breaking load in pounds is equal to 5,000 multiplied by the diameter of the rope in inches, multiplied by the diameter of the rope increased by one.

This will give, of course, the average maximum weight that the rope will hold, but the working load or the load that a contractor or safe-hauler may apply with proper safety and precaution would be considerably less than the load given by the formula. Other data on rope are contained in technologic paper of the Bureau of Standards No. 198, by A. H. Stang and L. R. Strickenberg, which has just been issued.

Program of National Founders' Convention at New York

The program of the annual convention of the National Founders' Association, to be held at Hotel Astor, New York, Nov. 16 and 17, is as follows:

Wednesday, 10:30 a. m.—Reports of President William H. Barr, Commissioner A. E. McClintock and Secretary J. M. Taylor. "Industry and Public Affairs," by James A. Emery, counsel National Founders' Association.

Wednesday Afternoon.—"Wage Liquidation in American Industry Already Secured and to Be Accomplished," by M. W. Alexander, managing director National Industrial Conference Board. "The Present Railway Situation," by A. C. Davis, vice-president Gurney Ball Bearing Co. "Causes of the Troubles in the West Virginia Coal Fields," by E. L. Greever, counsel for the coal operators.

Thursday Morning.—"Foreman Training," by L. V. Hartley, department of vocational education, State of Nebraska. "Foundry Costs," by Robert E. Belt, secretary American Malleable Castings Association.

Convention Dinner, Nov. 16, 7 p. m.—Address by Hon. Richard H. Lee, president Associated Advertising Clubs of the World.

The meeting of the administrative council of the association will be held on Nov. 15, and the dinner of the so-called alumni, comprising past and present members of the administrative council, will take place on the evening of the same day.

Extent of Export Shipments

In the report, to the Conference on Unemployment, of the committee on foreign trade, attention was directed to the fact that "a small surplus of production over demand for consumption fixes the price of the entire amount produced. Therefore the problem is to maintain the existing volume of export trade. With production 10 per cent in excess of domestic requirements, this surplus must either be marketed abroad, or reduction of prices will result, causing reduction in the amount produced and resulting in further unemployment."

Figures given for the proportion exported of the 1920 production of American farms and mines included a number of items exceeding 10 per cent, as follows:

Copper	51.5 per cent	Hops	72.5 per cent
Zinc spelter	19.1 per cent	Cotton	61.5 per cent
Tin plate	17.8 per cent	Rice	53.2 per cent
		Rye	46.5 per cent
Barley	16.5 per cent	Tobacco	44.5 per cent
Dressed meat	13.8 per cent	Wheat	23.5 per cent

The Ideal Electric & Mfg. Co., Mansfield, Ohio, which has recently developed a new high-speed synchronous motor, has engaged E. R. Johnson, Minneapolis, to take entire charge of all synchronous motor sales.

Steel Tank Work Installed in France

Completion of Orders by the McClintic-Marshall Products Co.—Review of Conditions in Europe as Seen by Robert A. McKean During a Sojourn of Over Two Years

THE McClintic-Marshall Products Co., the export subsidiary of the McClintic-Marshall Co. and Riter-Conley Co., reports the completion of a large amount of steel tank work in France. The orders received during 1919 and early 1920 amounted to approximately $1,750,000, consisting of 74 large tanks with a total storage capacity of 3,200,000 barrels and required 14,000 tons of steel, all of which was shipped abroad during 1920. The company also did the erecting, taking a number of American workmen and the necessary machinery to France for this purpose. Many of the tanks were larger than any previously built in that country and the purchasers insisted that the selling company should be responsible for the erection. The McClintic-Marshall Products Co. also furnished a large tonnage of fabricated structural steel for mill buildings for the firm of Société John Cockerill at Liege, Belgium.

Robert A. McKean, general manager of Riter-Conley Co., had charge of this work, and has just returned home after spending two and one-half years in Europe, during which time he visited the main business centers of Continental Europe, investigating business conditions and future prospects. Having travelled through England, France, Belgium, Italy, Holland, Germany, Czecho-Slovakia, Austria, Hungary and Roumania, Mr. McKean states that, from personal observation and contact with various business men, he cannot see prospects of any new steel business in the near future—nor, in fact, for several years. In France, the various steel industries now are in condition to take care of all their own requirements as well as of those of other French industries requiring steel construction. While only a few of the destroyed plants in northern France have been rebuilt, the furnaces and mills of Alsace and Lorraine have added largely to the capacity of the country, and while ship building is going ahead at a good rate, the French mills are able to supply all the steel plates and shapes required for this class of work as fast as needed.

Duty on American Steel

The duty on American steel amounts to 27 francs per 100 kilos on tank material, fabricated, and 36 francs per 100 kilos on fabricated steel for buildings, bridges, etc. This alone would be sufficient to prevent exporting such material to France, but in addition the French steel companies need all this class of work to keep their labor engaged, and also, the rate of exchange is such that the French investors cannot afford to buy from us. At present the rate is 14 francs to the dollar; normally, it is 5.45 francs to the dollar. That is to say, the franc to-day is worth only about 7½c. in our money while normally it is worth 19½c. This drop in the value of the franc is not so badly balanced as these figures indicate, as labor has increased, as has also the cost of goods, food, living, railroad fares, etc. Rents, for instance, have more than doubled and labor costs are two and one-half times what they were before the war. Mechanics employed in the erection of steel tanks are receiving 30 francs per day of 8 hours. This equals $2.25 per day in our money. The same class of mechanics here receive $8 per day of eight hours. But as an offset to this difference in wages, it has been demonstrated that American workmen accomplish three times as much as the French workmen in a given time, when supplied with the same tools and equipment on construction work. French workmen in established plants, however, are more nearly equal to our American workmen in producing capacity and steel therefore is manufactured at a cost which prohibits our exporting to France, even without thought of the duty imposed by that country.

Little Unemployment in France

There appears to be less unemployment in France than in any other European country, except Germany. Living conditions have improved very much, but a good deal of complaint is heard about high rents and living costs. Reports indicate poor crops during the present season, due to dry weather, which will probably necessitate importing foodstuffs, particularly wheat. This, together with needful raw materials to be imported, is expected to affect adversely the rate of exchange for the remainder of the present year. The hope of the country for return to real prosperity is for exchange rates to get back again near normal. In the meantime, France is not buying anything it can possibly get along without.

Belgium has been suffering from high labor costs and refusal of the workmen to accept reductions. As a result, the large steel plants have been idle or are operating on only a very small percentage of capacity. The complaint of German competition is general. Nevertheless, Belgian steel mills are making a strong bid for export work and are reported having made shipments into England and are trying hard to get their products into the United States.

Germany Working Hard and Well

Germany is working hard and efficiently. The low value of the mark affords an advantage in cost of manufacture which cannot be overcome by any other country. In August the average rate of labor, skilled and unskilled, in the steel industries, averaged 50c. to 60c. per day of eight hours. This compared with $4 to $5 per day in the United States. So long, therefore, as Germany does not have to import a large percentage of its raw materials, it can compete in any market. In the case of a highly fabricated work, where a large percentage of the cost is labor, Germany can even import the raw material and still compete. The steel mills in Germany were reported to be working on an average of about 70 per cent of capacity with from 58,000 to 60,000 men out of employment. The Government pays 8 marks per day for those out of employment. The serious question to-day with Germany is the rapidly depreciating value of the mark ond no one seems able to predict the ultimate outcome. The impression abroad is that if Germany is able to stabilize its money value, there will not be much question that it will lead all others in competition for world trade.

Conditions in Czecho-Slovakia were reported generally good with men industrious and willing to work, and steel mills operating on a fair percentage of capacity. Some 28,000 were reported not employed and being paid 8 kronen per day out of the "Unemployment Fund." The wages for skilled men in iron works, foundries, machine shops, textiles, joiners, linen mills and building industries average from 45 to 84 kronen per day, which at the rate of exchange prevailing in August, meant about 62½c. per day.

In Hungary conditions were somewhat similar to Czecho-Slovakia, the Hungarian workmen being reported as competent and willing to work, with rate of wages averaging from 40c. to 50c. per day of eight hours. Some of the plants in Hungary are producing

work for shipment to Czecho-Slovakia and adjoining countries, but in many cases payment was arranged for in coal or other raw materials.

Roumania's Sad Plight

Roumania is probably in the worst condition of any of the countries in eastern Europe. Its rate of exchange has depreciated in line with all the others and in addition the Roumanian workman is not credited with being as competent as the Hungarian or German workman. One of the greatest needs of Roumania was reported to be the repairs of locomotives and cars. One of the first things to be noticed when travelling in Roumania is the large number of broken down locomotives on sidings, where they have apparently been since the war and with no prospects of being repaired and put in service. The Government was reported as buying new locomotives on credit, but without facilities and without competent mechanics to repair the existing locomotives, and with the prospect of not being able to properly take care of the new locomotives being delivered when they need repairs. The Government at present is constructing a very large bridge over the Danube River to connect the railway line from Bucharest to Constanza. This is a bridge which that country attempted to buy in the United States two years ago, but was not able to contract for it on account of the high prices and lack of credit. It is now being built from material rolled and fabricated in Transylvania, in a plant subsidized by the Government, and is being erected by the Government, so the investment remains entirely within the country. This bridge is expected to be ready for trains by January, 1922, and when completed will be of great service as an outlet to the shipping port of Constanza.

The oil industry of Roumania is receiving considerable attention at the present time, the production being between 20,000 and 25,000 barrels per day. Most of the wells and many of the refineries were destroyed during the war, but the rebuilding of the refineries and the opening of the wells have been carried on steadily and now the production is approaching what it was before the war. As there has been considerable talk in regard to the oil fields of Roumania, it might be interesting to note that the total production of the country is only about 1 per cent of the total production of the world. There still remains a great amount of work to be done in Roumania, in rebuilding bridges and replacing destroyed plants, but the present situation is such that American concerns cannot get the work unless they are in position to extend a great many years' credit. The Government and private concerns do not have the money to buy.

Italy is well provided with mills and labor for taking care of its own needs in this time of depression; so nothing need be expected from that country. Conditions in England are well known. The labor domination of Government, the coal strikes, payments to the unemployed, etc., have given the country a big set-back, but the nation is coming out of its troubles.

LEIPZIG FAIR A SUCCESS

Stimulates Export Buying—Heavy Purchases of Textile and Paper Mill Machinery and Typewriters

(Special Correspondence)

BERLIN, GERMANY, Sept. 29.—The recent Leipzig fall fair illustrates the increasing importance of this fair as an export agency. Heavy machinery, which in former years has been but sparsely represented, this year was a large factor at the technical fair. As far as bulky machinery, plant equipment, etc., was concerned, exhibits were generally confined to drawings or miniature models to save transportation costs.

The collective exposition of the Association of German Machine Tool Manufacturers, which has always attracted widest attention at the fair, did not take place as the association, by way of experiment, wished to ascertain whether business resulting from the annual exhibit warranted discontinuing the semi-annual exhibit. Judging by the large demand for machine tools, it appears that the experiment was not a success and will probably not be repeated next year.

Interest was primarily in the expositions of the Krupp works and the government works, the latter represented by the Deutsche Werke Aktien Gesellschaft. For the first time in the history of the fair, the Krupp interests exhibited and the exhibits were indicative of the vast changes in the production schedule since the war. Aside from the products of the Krupp works proper, special lines of allied firms and subsidiaries were on show. The full range of samples and models of products included agricultural machinery and implements, ore and coal crushing and dressing machinery, counting and weighing devices, electric radiators, magnetic chucks, switch gear, rail and truck supplies, various products of the new foundries erected after the war, cinematographs, etc. Divers specimens of a new stainless steel were shown with practical demonstrations of its serviceableness and application, while a new brand of cast iron called "Thermisilid" was claimed to be acid-proof and especially adapted for use by the chemical industry.

The Deutsche Werke was represented with a full line of samples of its products which include: sporting rifles, stoves, ovens, bone crushers, motors, fittings, baking machinery, office furniture, etc. The design and construction of many machines and implements shown were based on the principle of utilizing surplus war material. The workmanship of exhibits was generally good and the quality showed that appreciable progress has been made in eradicating the bad impression abroad caused by German products of the war and post-armistice period.

Business at the fair was highly satisfactory, export sales in particular being heavy. There was large buying of agricultural machinery and implements. Fair business was done with the Balkan countries. Roumania, Jugo-Slavia and Bulgaria are stated to have placed substantial orders. Russia is still a poor market and next to no business was done with that country. Textile machinery was much in demand by Switzerland and Holland, obviously for re-export. Domestic mills, however, were equally keen buyers as the textile industry is at present enjoying an almost unprecedented period of prosperity, with shortage of machinery and skilled labor being the only obstacles in the way of a hundred per cent operation.

The Scandinavian countries and Switzerland were the principal buyers of typewriters and manufacturers and exporters are rather sanguine regarding the recapturing of foreign markets, lost during the war to American competition. The boiler and ship's machinery manufacturers report active domestic buying but little interest is shown by foreign customers. In the locomotive industry, a slight decrease in activity is registered. Although orders on hand will keep the works busy until spring, the volume of new orders is causing some disappointment. There is decided improvement in the machine tool industry. Turret lathes and vises head the list of inquiries. There is also an increasing demand for various paper mill machinery.

The position of the automobile industry has been steadily improving of late and the automobile show and races, held this week, have been very successful. A large number of Americans, Englishmen, Belgians and other foreigners visited the show and while details of sales are yet lacking, it is reported from a reliable source that orders on hand will keep the industry employed until next fall. There were many new departures in design and construction, including a car whose design is based on flying machine principles with the motor in the rear. The car, which has been given the "drop" form, with the front part hemispheroidal in shape and the rear part pointed, was designed by Dr. Rumpler, designer of the Rumpler flying machine. Reports from the Frankfurt International Fair comment favorably on the inquiries for machinery and tools by Holland, Switzerland, Luxemburg, the Scandinavian and Near Eastern countries.

Rapid Increase of Exports to Far East

Machine Tool Builders' Association Receives Encouraging Reports as to What Has Been Done and as to Prospects in Foreign Fields

THAT the possibilities for export of American machine tools are not so hopeless as might appear on the surface, despite present German competition, was made clear by two speakers on foreign trade conditions at the annual convention of the National Machine Tool Builders' Association last week at the Hotel Astor, New York.

J. H. Drury, treasurer Union Twist Drill Co., Athol, Mass., who had just returned from a European trip, which included a stay in Germany, said that costs of living and costs of production are advancing in Germany, and that the low prices which the Germans are now making cannot continue on the present basis for long.

At present the Germans with their low prices are flooding Europe with their machinery. Production of tools in Norway and Sweden has been stopped because these plants cannot compete with Germany, and the latter country has also made considerable headway in Italy and other European countries.

Many of the European dealers who have for years represented American machine-tool manufacturers, seeing their trade slip away from them through inability to compete, have appealed to American manufacturers without success for reductions in prices, which would make it possible for European buyers to produce American tools. These European dealers require no financial help, he said, but want American tool builders to fix prices for their machines in foreign money and to arrange terms of payment based on the money exchange values at the time of sale.

Mr. Drury said it had cost less to secure markets in Europe for American machinery than it had cost other manufacturers to establish markets there, but that the American machine-tool trade would have all this work to do over again at considerable cost unless steps were taken to protect that trade.

The speaker concluded by saying that American machine-tool builders should help their foreign agents by reducing their costs and reducing their selling prices.

The Orient as a Machine-Tool Market

Another excellent talk on foreign trade in machine tools was delivered by W. H. Rastall, chief of the industrial machinery division, Bureau of Foreign and Domestic Commerce, who spent nine years in selling machinery in Asia. Mr. Rastall's subject was "The Orient as a Machine Tool Market." He presented interesting statistics on the growth of our machine-tool trade abroad, showing that since the war our European trade has declined while our trade with the Orient has increased. He painted a promising picture of the possibilities of an increasing trade in the Far East, particularly with India and China, because of the awakening there to the need for industrialization.

"Don't concentrate so closely on your domestic problems as to forget the foreign field," Mr. Rastall urged. He showed the enormous growth in the export of machine tools from the United States in the five-year period from 1909 to 1913, inclusive, in which time there was an increase of about 340 per cent. In 1909 our exports were valued at $3,600,000; in 1910, $6,000,000; 1911, $9,600,000; 1912, $12,100,000; 1913, $16,000,000. During this same period, neither British nor German exports showed corresponding growth. British exports in 1909 were (in dollars), $3,700,000; 1910, $3,500,000; 1911, $3,700,000; 1912, $4,500,000; 1913, $4,900,000. German figures for 1909 were unobtainable, but for 1910 were $12,368,000; 1911, $12,323,000; 1912, $15,318,000; 1913, $19,494,000. German figures include some forms of machinery such as stone cutting and woodworking not so classified in American and British customs returns.

Mr. Rastall made the point that American machine tool sales abroad in that five-year period had outdistanced greatly the two leading competitors and that this prestige should not be lost through lack of proper efforts now at a time when competition is keener.

Growth Since 1913

Since 1913 American exports have grown with even greater rapidity, due in part, of course, to the war demand. In 1914, exports were $14,000,000; 1915, $28,000,000; 1916, $61,000,000; 1917, $85,000,000; 1918, $58,000,000; 1919, $58,000,000; 1920, $44,000,000; 1921 (estimated), $20,000,000.

Europe's share of our total exports has decreased steadily since 1910, with the exception of the year 1915. Percentages follow: 1910, 81 per cent of all of machine tools exported went to Europe; 1913, 76 per cent; 1915, 89 per cent; 1918, 74 per cent; 1919, 69 per cent; 1920, 57 per cent.

Europe is a market that must not be neglected, said Mr. Rastall, but other machine-tool markets should also be given their due share of attention. Asia has imported from the United States within a few years as many tools as she could have imported in a century at the rate she was buying some years before the war. Asia's commercial rejuvenation, excepting Japan, was coincident with the war. For several years Japan has been buying large quantities of American machinery. There is a growing feeling, said Mr. Rastall, that China as a market for machine tools is worthy of more attention. Of our Asiatic shipments of machine tools last year, Japan took 50 per cent and China 15 per cent.

Asiatic Business Has Grown

Shipments to Asia over a period of 10 years were valued as follows: 1910, $156,000; 1913, $200,000; 1915, $534,000; 1918, $5,900,000; 1919, $8,800,000; 1920, $7,400,000. Exports for 1921 were estimated at $6,000,000.

Australian business has grown from $153,000 in 1910 to $1,100,000 in 1920, while Latin America, which took only $476,000 worth of American machine tools in 1910, took $4,000,000 worth in 1920.

American shipments of machine tools to Asia in 1910 were only 3 per cent of the whole; in 1913, 1 per cent; 1915, 2 per cent; 1918, 11 per cent; 1919, 15 per cent; 1920, 17 per cent, while it is estimated that the 1921 percentage is 25.

Asia is now developing very rapidly in an industrial way, said Mr. Rastall, and the most significant growth is that of British India. The previous policy of the British Government was to take India's raw materials and manufacture them into finished products in Great Britain, but for some reason there was a change in this policy a few years ago, and now the British are working toward the industrialization of that country.

Citing the enormous natural advantages which India possesses, Mr. Rastall said it is possible to manufacture pig iron there from native ores and lay it down in San Francisco, on a basis to compete with American iron. The plant of the Tata Iron & Steel Co., recently completed, was mentioned and Mr. Rastall stated that this plant would become the center of a large group of allied manufacturing enterprises. It is impossible, he said, to predict how far this movement toward India's industrialization will go, but it has immense possibilities. The sugar industry, for example, is to be de-

veloped along more modern lines, and the necessary machinery may be built in that country.

India's Railroad Problem

He said America's great opportunity was to supply American engineers for the various developments. He added that American engineers are very highly thought of, and that they have procured successful results when British and Germans have failed. He cited the railroad problem of India as a concrete example of how India needs American genius. The Indian railroads were patterned along European lines and have proved inadequate for the traffic of that country, which needs American railroad methods.

The potentialities of the India market are indicated by the growth of our machine-tool exports to that country in a decade. The figures follow: 1910, $45,765; 1913, $43,717; 1915, $23,700; 1918, $1,251,662; 1919, $900,429; 1920, $1,374,068. India is taking 18 per cent of our tool exports to Asia.

As an indication of the interest being taken by British investors in Indian development, Mr. Rastall stated that in the six months ended June, 1921, capital issues totaling £14,600,000 sterling were floated in Great Britain for Indian enterprises, as compared with £1,500,000 in the six months ended June, 1920, and £3,500,000 in the last half of 1920.

Another market not to be neglected is the Dutch East Indies, whose American tool imports have grown from $4,365 in 1910 to $326,086 in 1920. Java is the most important island of the group because of its immense sugar, rubber and tea industries. Java has a population of 39,000,000 and its length is equivalent to the distance from New York to Chicago.

Sales Made Through Merchants

Mr. Rastall said that 100 per cent of the machinery sales in Asia are made through local merchants. He said that the Bureau of Foreign and Domestic Commerce has reasonably complete lists of the machinery merchants in all cities of the world and he invited members to visit Washington, a visit being recommended rather than letter writing, assuring the machinery manufacturers of the greatest co-operation of the bureau in fostering foreign trade. Not only are names of merchants abroad on file, but data concerning them, such as the lines in which they specialize, their attitude toward American products, etc. He suggested the appointment of merchants abroad as agents, coupled with intensive mail work, and the co-operation of the machine-tool builder's own representative if this is practical.

Congressman Underhill Speaks

At Tuesday afternoon's meeting Charles L. Underhill, representative in Congress from Haverhill, Mass., discussed interestingly various phases of current problems, including the railroad situation, legislative matters, taxation, etc. He strongly advocated the sales tax, which, he declared, would distribute the burden of taxation more equitably.

David F. Jordan, professor of finance in the School of Commerce, New York University, talked on "Business Cycles," showing the signs which in good times point out the danger of approaching depression and in times of depression point the way to economic and business revival. As a practical means of determining the progress of recovery in a time like the present, Professor Jordan suggested a close watching of the commodity markets, such as pig iron, copper, corn, wheat and cotton. He explained the significance of bank statements, showing how this information can be utilized in determining the business situation.

The meeting Tuesday afternoon was concluded with talks by C. L. Cameron of Gould & Eberhardt and Ernest F. Du Brul, general manager of the association, on "What things should machine-tool builders do and what should they avoid at various stages of the cycle?" These talks were illustrated with charts showing curves of machine-tool business in previous periods of prosperity and depression.

Wednesday was devoted to group meetings of manufacturers of the various types of machine tools. A new group to meet in this way was the manufacturers of sheet metal working machines.

The addresses by Mr. Drury and Mr. Rastall, already referred to, were delivered at the Thursday morning session and members of the association also contributed to discussions on subjects of interest. H. L. Flather, treasurer Flather & Co., Nashua, N. H., discussed the question, "What can be made in idle machine-tool plants during times of slack demand for regular product?" Mr. Flather took the negative side of this question, relating various attempts his company had made in previous times of depression to do work outside of machine-tool manufacture. Generally, he said, these efforts were financially unsuccessful. He advised strongly sticking to one's own specialized branch of work. Special machinery manufacture, being somewhat in line with the machine-tool builder's regular efforts, he commended as the best "side line" for dull times, but sometimes the construction of special machinery, he added, has resulted in large losses for the manufacturer.

"What reductions in prime costs may be expected in the machine-tool industry during 1922?" was the subject assigned to Percy M. Brotherhood, vice-president Manning, Maxwell & Moore, Inc., New York, who stated that his investigations all led him back to the question of freight rate reductions. He argued that the extent of reduction in costs of manufacturing machine tools next year will be governed to a considerable extent by the amount of saving that is effected by lower freight rates.

J. E. Andress, secretary Barnes Drill Co., Rockford, Ill., discussed credit insurance in foreign trade, relating efforts that have been made to persuade the Government to provide some form of foreign trade credit insurance. Secretary of Commerce Hoover was appealed to, but said such a plan would be equivalent to Government subsidy of business. No great deal of success has been achieved with the banks, although some efforts along this line are being made by specialized banks.

Committee Reports

The catalog committee, Stanley H. Bullard, chairman, reported that the association's foreign trade catalog has been completed and 10,000 copies are now being sent abroad.

The safety committee reported that its report cannot be made until the report of the committee on power transmission has been completed.

The committee on cancellations and contracts has completed a standard contract form which has been sent to members for their suggestions and criticisms.

The committee on standardization has been able to get a few standards started within the past year, but generally the work has not progressed far. The association is co-operating in this work with the machine-tool section of the American Society of Mechanical Engineers.

Old Officers Re-elected

Officers were elected at the final session, no changes being made except in the office of secretary, to which Howard W. Dunbar, Norton Co., Worcester, Mass., was elected, succeeding Carl F. Dietz, formerly of that company, who resigned from membership in the association because of leaving the machine-tool business. August H. Tuechter, president Cincinnati-Bickford Tool Co., Cincinnati, was re-elected president; E. J. Kearney, Kearney & Trecker Corporation, Milwaukee, first vice-president; C. Wood Walter, Cincinnati Milling Machine Co., Cincinnati, vice-president, and Winslow Blanchard, Blanchard Machine Co., Cambridge, Mass., treasurer.

Atlantic City was selected for the spring meeting, the exact dates to be fixed by the executive committee.

Directors of the Alliance Machine Co., Alliance, Ohio, have authorized expenditure of $100,000 for improvements to the plant, the work to be carried forward by the company's own organization.

Selling Machine Tools During Depression

National Supply and Machinery Dealers' Association Considers War Taxes, Surplus Tools and Better Salesmanship at Convention

ONE year ago the members of the machine tool section of the National Supply and Machinery Dealers' Association devoted much time to speculation as to when the genuine revival of business would take place. All predictions then were that the date would be long before now. At the fall meeting in the Hotel Astor, New York, on Oct. 19, a different note was struck. On this date, a year later, all had become reconciled to a low level of business and the keynote of the convention was expressed by one speaker who declared: "We must learn how we can best trim our sails to weather the present long stretch of stormy weather."

The following thoughts were uppermost in the minds of those present: The excess profits taxes of 1918 were severe to machine tool dealers in a measure out of proportion to many other industries and steps should be taken to secure a refund of certain taxes from the Government; this association should publish a monthly bulletin to serve as a clearing house of ideas of the dealers and to circulate among buyers and educate them as to real conditions; better salesmanship must be evolved to cope with the large supply of second-hand machinery, to point out the benefits of improved features in design of the newer tools and to convince manufacturers and repair plants that for most thorough economies the best tools are needed; the history of the machine tool business has shown that for every depression of the past some new manufacturing development has rescued the industry—take the sewing machine, the typewriter, the bicycle and the automobile—and "history repeats itself."

Address of Chairman Swind

There was an attendance of 40, including three from California, and all machine tool centers were well represented. In his opening remarks, L. H. Swind, Swind Machinery Co., Philadelphia, chairman of the machine tool section, stated that the membership of the organization now totals 155; of these 21 deal in machine tools alone and the remainder in tools and supplies, or the latter only. Eighty per cent of the membership is east of the Mississippi River. The capital rating of the membership represents $30,000,000. He suggested that this branch confer with Ernest F. DuBrul, general manager National Machine Tool Builders' Association, with regard to forming a committee to deal with the problems of mutual interest to both the builders and the dealers. He compared the machinery builders and dealers to the United States; the buying public to the European countries; the United States has the materials and finished products, but Europe hasn't the money with which to buy. He advised some scheme for uniform appraising of second hand tools (the employment, for instance, of the American Appraisal Co.) so that when used machines are taken in partial payment for new machines, some standard values would be on record. He said that the machine tool interests had been too hard hit by the excess profit taxes; that the corporations fared worse than the partnerships and that concerted efforts should be made to rectify these conditions. Present and immediate prospects offer but little encouragement, he said, about business in general. The unemployment in the metal-working trades in Philadelphia during other periods of depression were as follows: 1908, 34½ per cent; 1914, 27 per cent; on Sept. 1, 1921, it was 48.8 per cent.

"A Message from the Coast" was delivered by H. G. Mitchell, president Harron, Rickard & McCone Co., San Francisco. Using the year, October, 1920, to October, 1921, industrial operations in his State were from 50 to 80 per cent of those the year before. California has suffered comparatively slightly from the depression. There machine tool sales are normally of single machines and these have held up well. Los Angeles is perhaps the only spot in the United States not hit by the depression. Most of the sales from this center have been to the newly developed interior of the State. There is the report that a large machine tool manufacturing plant will be built in Los Angeles.

Plea for High Ethics

August H. Tuechter, president of the builders' association, remarked that he had been in this business for 35 years, had witnessed many depressions, but none just like the present one. He pleaded for high ethics in business and co-operation between builders and dealers, because as the German proverb goes: "One hand washes the other." "In 21 years we have had seven periods of depression," he said. "We don't want the times to come back when a price list meant nothing except as a guide to general price levels."

W. A. Viall, Brown & Sharpe Mfg. Co., Providence, R. I., admitted that he is a pessimist, but said pessimists were good for a community as a check to illogical optimism. He classed pig iron salesmen as habitual optimists, invariably saying that prices were not going to fall and that supplies are not plentiful. He told how the sewing machine, typewriter, bicycle and automobile had promoted business in machine tools and said that some new development in the future might prove as effective a stimulant as these had been. At present we are looking to the railroads, which must be made to realize that economical machine shops are better money-makers and savers than fancy dining car equipment. He said that much responsibility rests upon the dealers, for they are the ones who come most directly in touch with prospective purchasers and can best feel the pulse of the people.

Machine Tools for Schools

Special concessions on sales of machine tools to schools should not be made, according to E. J. Kearney, Kearney & Trecker Corporation, Milwaukee, Wis., first vice-president of the builders' organization. He wondered if the equipment of vocational training schools had not been overdone—if efforts weren't being duplicated in schools that were more properly being carried on at factories. What is the use, for instance, he asked, of putting mining equipment and machines in a school adjacent to a mine, when knowledge could be gained at first hand? There should be taught in the school what cannot be taught in the factory, and vice versa. In Wisconsin, continuation schools which have part time courses for those employed in industry, supplement rather than take the place of factory training. Typewriter manufacturers sometimes sell their machines to schools at half price for the reason that pupils learn to use their machines and will continue to do so later professionally. Not so with machine tools, however; so the advertising factor of price concessions to schools is lost. The speaker said that in his district the industries paid 85 per cent of the taxes. Machine tool builders pay enough taxes so they do not need to make price concessions to schools for charitable reasons.

Percy M. Brotherhood, first vice-president Manning, Maxwell & Moore, Inc., New York, discussed the following: "In order to best serve the manufacturers' interest, what percentage of the dealers' resources should be kept liquid in order to constructively finance sales promotion during periods of low tide business?" It was agreed by the speaker and others who followed on this subject that the dealer cannot perform the functions of a banker and that the builder must call upon the banker where heavy financing is involved.

The late forenoon and all afternoon were devoted to impromptu discussions of various subjects on the printed program. Action taken by dealers in guaranteeing against price declines must depend on what action the builders take, it was agreed.

Announcement of Price Changes

The question as to whether price changes could be announced in advance, together with reasons for the same, and published in the trade papers, was talked over thoroughly. It was concluded that the most helpful publicity would be the setting forth of reasons for price advances at the time of the advance. In case of price declines, not much could be said for fear the buyer might read between the lines reasons for further declines. It was suggested that the proposed monthly bulletin of the dealers' association might be a useful instrument in educational propaganda. Mr. Swind told of an incident in Philadelphia when one of the city departments recently received bids on a group of tools. It was ready to buy when someone hinted that tools would go lower after the builders' and dealers' conventions. Accordingly, the city department decided to readvertise later. Had the right educational matter been prepared, this would not have happened, in the opinion of Mr. Swind.

The surplus tool situation brought forth lively discussion. From all centers, it was reported that used tools are more in demand than new. Even some of the production plants, which normally never consider a second hand machine, have been investigating them. A Pittsburgh delegate told of the substitution of new machines at used machine prices when old machines are asked for. A member from Detroit related how exporters, whose orders had been canceled, have sold new machines at exactly half price. Comment was made on the large number of second hand dealers who had sprung up in New England, one of whom in Boston recently went bankrupt. The observation was made that the prices for used machines are now on the level with the prices for new before the war. The lowest prices on used equipment are being made by the newer dealers who have not yet gained the confidence of the trade and who make the extremely low prices to get business. No estimate was made of the number of used machines for sale, but it was agreed that they will give serious competition with new machines for many months to come.

Better Salesmanship Needed

The need of better salesmanship in view of depressed conditions was unanimously admitted. Several explained how their young salesmen were made to visit machine tool builders periodically to go through the plants and in some cases work with the machines in order to get better knowledge about the things they are selling. Plant executives must be made to see that to produce at minimum cost they must have the newest and best tools; salesmen must be able to help keep the machines they sell in repair; the advantages of new machinery over second hand must be pointed out; the meaning of the word, "work," in the old-fashioned sense must be understood as never before.

It was suggested that this and other organizations get together to try to recover from the Government money paid for excess profit taxes where these had been heavier than was just. Instances were related where such refunds had already been made by the Government.

Cost of Freight Last Year and in 1914

In making a comparison of the freight cost of one ton of pig iron in 1914 and 1921, an independent steelworks interest at Youngstown, Ohio, finds that the assembly charges in 1914 amounted to $4.481 per ton of iron, and $9.406 in 1921.

The company has compiled the accompanying comparative table.

Material	1921 Lb. Used for Ton of Iron	1921 Freight Rate and Tax	1921 Freight Cost per Ton of Iron	1914 Freight Rate	1914 Freight Cost per Ton of Iron
Gogebic ore	213 (Direct)	$3.02	$ .287	$1.41	$ .134
Mesabi ore	3,708 (Direct)	3.02	4.999	1.66	2.748
Coke	2,204 (By-prod.)	2.808	3.094 Bee Hive	1.20	1.322
Limestone	843	.865	.326 Aver.	.36	.136
Dolomite	272	1.586	.193	.75	.091
Miscellaneous	...	....	.101	...	.05 Est.
Slag and ashes produced	1,280	.71	.406	Free	...
Total			$9.406		$4.481

If one-half of the ore used is placed on dock, approximately 46c. per ton should be added to cover handling and storage.

The table is followed by a special bulletin of the Industrial Commission of Wisconsin on the state labor market in September, based on an analysis of reports from 211 establishments with 58,000 employees, or about one-third of all factory workers in the state now employed, and a weekly payroll of $1,250,000. Weekly wages in iron and steel mills have fallen from an average of $39.78 in July, 1920, to $25.87 in September, 1921. Most of the other wage rates have fallen less rapidly, but all have felt the hand of deflation.

Canned Goods Unit Established by Department of Commerce

WASHINGTON, Oct. 25.—Established to develop foreign markets for American canned goods, assisting the canners as well as producers of tin plate and other materials, the canned foods industry has been created as a unit of the Bureau of Foreign and Domestic Commerce, with B. R. Hart, Lexington, Ky., named as special agent of this section, which comes under the foodstuff division. Mr. Hart was for 15 years in official charge of food and drug inspection in important districts for the bureau of chemistry, United States Department of Agriculture.

Revival in Demand for Castings

MILWAUKEE, Oct. 24.—A revival of demand for castings has enabled a majority of foundries in Milwaukee and vicinity to extend operations in the last 10 days to two weeks. Steel, gray and malleable iron and brass casting shops shared in the resumption of greater buying activity. In the last six months foundry operations have been on an average of 30 per cent of capacity. It is estimated that the present rate is between 45 and 50 per cent. Recovery in iron and steel works during the past month has been notable.

Interesting statistics are provided by a special bul-

The Yale & Towne Co-operatives, Inc., Stamford, Conn., has dissolved. Originally the organization included 1100 members, employees of the Yale & Towne Mfg. Co., locks, hoists, etc., but membership dwindled to 700 and patronage from these was too small to warrant continuing the venture. In its most flourishing days the company did $3,500 to $4,000 business weekly.

The Chamber of Commerce of Westfield, Mass., is planning for a permanent industrial exhibit of local products. The chamber also has in mind a monthly get-together of factory and mill foremen. At such a conference subjects of interest to foremen will be discussed by competent and successful foremen from various lines of industry.

CONTENTS

Features of Electric Tool Steel Practice 1061
Standardized Shop Practice Necessary—Large Ingots Recommended—Top Pouring Preferred for Tool Steel

Leaves from a Steel Melter's Notebook—I 1065
Experience in the Making of Hollow Ingots for Seamless Pipe—Effervescing and Killed Steel in an Acid Furnace

Building Machine Tools in a New Plant 1070
Arrangement, Transportation System, Routing of Material and Lighting Features of Colburn Machine Tool Co.

Rapid Increase of Exports to Far East 1081
Machine Tool Builders' Association Receives Encouraging Reports as to What Has Been Done and as to Prospects

Selling Machine Tools During Depression 1083
National Supply and Machinery Dealers' Association Considers War Taxes, Surplus Tools and Better Salesmanship

Likens United States to England Century Ago 1090
Methods of Developing Foreign Trade Pursued by British Then an Excellent Precedent for America To-day

Iron and Steel Exports Show Improvement 1092
First Up-turn of Year Leaves Total Still Under Half of Pre-War Average—Steel Rails Furnish Bulk of Gain in Tonnage

Conditions in Basic Industries 1094
Business Paper Editors Give Résumé of Progress of Deflation in Important Lines

Industrial Savings Scheme.....1064
Lubricating Roll Spindle Couplings.....1064
German Aluminum Making Capacity.....1067
Chamfering Machine for Cold Punched Nuts 1068
Labor Notes 1068, 1084
Vertical Automatic Chucking Machine....1069
Appointments by National Safety Council.1075
Sand Cutting Machine for Small Foundries 1076
Future of Powdered Coal for Boilers.....1076
Danger in Readjustment Legislation.....1077
Sand Blast Barrel.....1078
Strength of Manila Rope.....1078
National Founders' Convention Program..1078
Export Shipments 1078
Steel Tank Work in France.....1079
Leipzig Fair 1080
Cost of Freight Last Year and in 1914..1084
Industrial Cost Association Meeting.....1088
Rail Price Reduced to $40.....1089
Editorials 1086
Lines of Steel Consumption—Steel Wages Have Been Liquidated—Conservatism in Industry—Solving the Titanium Problem—Export Trade in Pipes and Fittings
Ferromanganese Dumping Case 1091
Demand for Refractories.....1091
Surplus Material for Sale.....1093, 1111
Secretary Hoover on Forward Movement in Industry 1095
Industrial Promise of India.....1095
Foreign Market Conditions 1108, 1109
Steel Corporation's Earnings.....1109
Institute Meeting Program.....1109
Inquiry Into Production Costs.....1111
Liquidation of Steel Prices.....1113
Lower Freight Rates Asked.....1113
Trade Publications 1114
New Books Received.....1114
Industrial Finance 1115

Iron and Steel Markets 1096
Comparison of Prices 1097
Prices Finished Iron and Steel, f.o.b. Pittsburgh 1110
Non-Ferrous Metal Markets 1111
Personal Notes 1112
Obituary Notes 1112
Machinery Markets and News of the Works 1118
New York Jobbers' Prices 1126

ESTABLISHED 1855

THE IRON AGE

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Lines of Steel Consumption

There has been in recent months, and still is, a great disparity between the volume of business in the steel industry and the volume of business or commercial activity in general. This disparity has not been as generally recognized, or at least its extent has not been as fully appreciated, as one might expect. Perhaps one reason for this lack of true appraisal has been the influence, not consciously felt, of the old adage that "iron is the barometer of trade."

This recognized prophetic nature of steel lay in the fact that steel is bought for construction purposes, usually before the construction is actively engaged in, and construction work is undertaken when investors expect business conditions to improve. On many occasions that has made steel activity prophetic.

The production of steel ingots as reported by the American Iron and Steel Institute was 38 per cent as great in the six months, April to September, of this year as in the corresponding months of 1920, so that there was, so to speak, a "lag" of 62 per cent. In the month of July alone there was a lag of 71 per cent. This is in tonnage, not in money value of turnover. For April to July inclusive (later statistics not being available) the freight ton-mileage of the railroads showed a lag of 24 per cent, against the 62 per cent lag in steel production. For the six-months period debits to individual accounts at banks showed a lag of about 18 per cent. These bank debits measure with considerable closeness the volume of money turnover, and in view of the deflation of most prices the physical volume of trade thus indicated may be taken as having actually increased.

Thus it is evident that there has been much commercial activity, but plainly it has not been of the character that produces much demand upon the steel mills. One factor has been the existence of stocks of steel and of manufactures of steel. Steel production had to be curtailed while the stocks were being liquidated, but during that period food, clothing and many commodities were moved and consumed, producing ton-mileage on the railroads and the issuing of checks on banks.

So much for external conditions. The steel industry exhibits internal conditions that show there has been an abnormal or unusual condition. The steel industry has always studied carefully the assortment of demand for its various finished products and in the past was fairly successful in alining its finishing capacity. In times of heavy demand before the war the shape, plate, bar, wire, pipe, sheet and tin plate mills generally exhibited approximately the same degree of activity. Now there are wide disparities between the different branches of the finished steel trade, and the mere fact of disparities, no matter of what sort, would show that there is an unusual condition existing. The nature of the disparities explains in considerable measure why the total demand for steel has been light when in general there is a very fair volume of commercial activity. Articles of common, every-day use like sheets, tin plate, wire, nails and pipe have been in very fair demand, relative to the total tonnage of steel orders, and this is in keeping with the fact that the every-day, hand-to-mouth commercial activity of the country is at a fair stage. On the other hand, the production of rails, structural shapes and plates has been very light, quite in keeping with the situation that there is little new construction in the form of large undertakings and that the railroads are in very impoverished condition. In line pipe and tubular goods generally for the oil fields there has been very little activity, for the oil industry has had little occasion to expand.

Steel Wages Have Been Liquidated

One outstanding feature of the September report on employment and wages, issued by the Bureau of Labor Statistics, Washington, is the heavy drop in average pay envelopes of men in the iron and steel group, compared with automobile workers and those engaged in building and repairing railroad cars. The steel worker's average pay has fallen 50.2 per cent since last year; the automobile worker's envelope has shrunk only 7.2 per cent, and the car man's 17.6 per cent.

Not only has the steel worker been called upon to stand a far heavier cut than those in the other

two metal-working groups, but he is also at a heavy disadvantage when compared with the textile and clothing worker. In the eight groups reported under this latter head, including leather and boots and shoes, the average pay envelope decreased only 8.4 per cent from September, 1920, to September, 1921. As a direct result, the textile and clothing operator now has an average of $21.69 per week, compared with $17.87 for the steel worker. Last year the steel worker received $35.86, compared with $23.69 for the textile and clothing hand.

Official 1920 figures give the average pay of railroad employees as $1,820 for the year, or $35 per week. Assuming the present existence of the 12 per cent cut scheduled for last July, the figure would now be $30.80 per week, or 72.3 per cent above the average steel worker's pay. Reflecting on this, the steel man may well be pardoned if he does not enthuse over the present attitude of the railroad man in blocking the return to normalcy. The steel worker has already done his share; why should others be exempted?

Conservatism in Industry

One does not need to be a pessimist in order to be conservative. A pessimistic philosophy regards all things as more or less evil. A conservative policy picks out the things that are good and makes sure that a thing picked out as good really is good.

At the present stage in the development of commerce two ways appear to lie open for the improvement of the business of a firm or corporation. One way is by "business" in general becoming "good" and pulling the individual concern along with it. The other is by the individual interest making its business good by its own particular effort. The conservative course is to assume that improvement is to come by individual effort, instead of by waiting for something to turn up.

In the making of decisions involved in the development or expansion of a business an appraisal of the future of values is usually necessary. If a new plant is to be built or a new department added, the present cost of construction is to be compared with the cost in future years, when a competitor may undertake the same class of construction. Pessimism would suggest that the new venture would not succeed. Conservatism would suggest that the greatest care be exercised in making the plans and in estimating the prospective returns.

A year ago, when it was seen that prices had passed their peak in the post-war rise, there was no uncertainty as to their future course. It was plain that declines would be the order of the day. Now the prospect is not so clear. There has been a great decline, and the decline has been so irregular, as between different commodities and different classes of service, that some seem marked for advances. There is room now for some uncertainty as to whether the average level of prices will continue to decline or will have a reaction or recovery.

A study of commodity prices in the United States since the great rise at the time of the war of 1812, in the period of the Napoleonic wars, recently made by Dr. Ralph G. Hurlin, statistician of the Russell Sage Foundation, showed that prices declined for about 30 years after that rise and for a like period after the Civil War rise. There were, of course, many fluctuations, but recoveries or reactions did not bring prices to previous high points. This is not proof as to what is to occur after the 1920 peak, but it is very suggestive that one should be conservative. Suggestive along precisely the same line is the experience we have had in the past few years with rising prices. Throughout the period there was recognition everywhere of what was commonly called the "vicious circle," or "the ascending spiral." An advance in price of one commodity brought an advance in another, that in another, and so on around to the first again. In the decline there must necessarily be a spiral also. That is, prices cannot all tumble straight down to a certain level and then all stop.

In the choice between a plan that assumes that prices will react upward and a plan that assumes the general trend will continue downward, the conservative course is to adopt the latter and proceed accordingly. Conservatism does not mean pessimism, a refusal to see any good in a new venture, but dictates planning so that the course will be found safe if values continue to decline.

While the view that values are likely to go on declining dictates conservatism in the making of capital investments, it opens up another vista. The cost of manufacture of the commodity involved is likely to decline. It may be that the commodity does not promise a ready sale at the price that would have to be demanded at present, but would sell better at a lower price. The prospect is that the manufacturer will be able to produce the article more cheaply in the future and thus his market is likely to broaden. An increase in the selling price or a decrease in the cost of production offer equally an increase in the profit. The conservative course is to plan for profit along the latter route.

Solving the Titanium Problem

What appears to be a long step toward a solution of the problem of smelting titaniferous iron ores is found in the results of experiments recently carried on in Canada. The details are published in the October issue of *Iron and Steel of Canada*. Hitherto most attempts to reduce such ores have been based on the assumption that titanium acts as an acid in fluxing. While the results were successful in a measure, the operating difficulties as to slags were many. In the new experiments an entirely different basis was adopted. In Mendelejeff's periodic table, some elements are basic and some acid, while others are neutral or amphoteric, capable of acting either way according to conditions. Titanium is one of the latter. The experimenters, by figuring their burden in such a way that in the resultant slag titanium acts as a base in a high acid mixture, instead of an acid, show that high silica and titanium in iron ores may be a source of profit. In the new method of smelting, silica is added instead of lime. There is thus a saving in raw materials, the inherent titanium replacing lime. The resulting slags are reported to leave little to be desired, and the investigators hope that they have discovered the "germ of a radical yet sound

departure in the commercial smelting of iron." If so, it means much to Canadian owners of iron ores as well as to some in this country.

Export Trade in Pipes and Fittings

To the sharp decline in exports of American iron and steel there is one notable exception. Foreign demand for American pipe and fittings, both cast and wrought, has not only exceeded the movement last year but has been larger than in any other year on record. In wrought pipe and fittings, exports to September, 1921, amounting to 300,000 tons, were not only in excess of the total for all of 1920 but practically equal to the combined exports in 1913 of both wrought and cast pipe and fittings. Mexico is credited with about one-third of these exports this year and British India stands second, whereas last year Japan ranked second to Mexico. In cast pipe and fittings the increase has not been so heavy as in wrought, but to Sept. 1 the movement was 40,000 tons as against 36,000 tons for the same eight months in 1920. Here again Mexico is the leading purchaser this year, whereas last year Cuba had first place. Together cast and wrought pipe and fittings made up nearly 20 per cent of all iron and steel exports to Sept. 1.

The figures are striking proof of the growth of the world's oil industry and a demonstration of what such activity means to steel works as well as to foundries. Of late years a steel foundry here and there has added a special department for this product, providing at the same time a machine shop to prepare the castings for final use. The demand has resulted in the making of a number of products which only a few years ago were not successfully produced.

Two recent developments have called attention to the rôle which duralumin has played or may play in industry. This important non-ferrous alloy of aluminum, copper, manganese and magnesium seems to combine many of the properties of mild steel with the added advantage of lightness. It responds remarkably to heat treatment, being similar to alloy steels, with the added factor of aging to secure maximum properties. Its demonstrated value in aircraft was emphasized last week by the announcement of the successful building of an armored military airplane on Long Island, constructed entirely of duralumin. The plane carries 30 machine guns capable of spraying 3000 shots in four minutes and can attain a cruising speed of 141 miles per hour. The all-metal plane is surely the solution to many problems of present day aeronautics. There were also published last week in THE IRON AGE some facts regarding the use of this alloy for gears in place of steel or iron. The evidence is that this has been successfully accomplished in numerous cases, especially where duralumin gears are meshed with steel. More will doubtless be heard of the value of not only this alloy, but of other combinations with aluminum, magnesium and other metals.

The General Alloys Co., Chicago, has issued a small pamphlet which sets forth the advantages of its various brands of Q-Alloys which are claimed to have special properties as applied to heat treatment conditions.

DEPRECIATION

Practices Followed in Industry Discussed at Meeting of Industrial Cost Association

At the regular monthly meeting of the New York chapter of the Industrial Cost Association at Keen's Chop House, New York, Oct. 20, the principal speaker was C. A. Porter, comptroller of the Hardinge Co., 120 Broadway, New York, who read a paper on "Depreciation." Mr. Porter stated that: "Until the year 1911, there were but very few plants, probably not more than 5 per cent, progressive enough to figure depreciation as a part of the cost of production. Only a portion of this 5 per cent had gone into the matter of depreciation far enough to make a careful study of the expected length of life of their various depreciable assets, particularly the two principal controlling elements—wear and tear and obsolescence.

"Many plants did not take depreciation into account in any way," he continued, "Going so far as to add all new machinery to their plant accounts at cost and crediting the accounts with the sales prices of the machines when discarded or sold. This operation left many plants with accounts which were supposed to show real costs but were actually highly inflated values. Some plants used the 'hit-or-miss' method in taking care of depreciation and wrote off an amount that the business would stand and still show a satisfactory profit.

"One plant did not write off a single cent on anything except buildings during a period of ten years, because earnings would not have been enough to justify dividends if anything else were included. Other plants carried certain physical assets at the same figure year after year, charging all improvements and additions to current expenses. Such charges were never taken into account in cost finding and made a real part of the cost of production, showing that a part of the cost of the plant was absorbed by every single article manufactured. They were charged to profit and loss at the end of the year, were not on a regular basis and did not show actual conditions pertaining to the business."

Taking up the theory of depreciation and the proper methods of preparing depreciation schedules, Mr. Porter stated that there are four main factors to be taken into consideration in making up a schedule—length of life, cost of repairs, obsolescence and inefficiency. The more common classes of depreciation he gave as: Buildings, machinery, tools and implements, patterns, jigs and fixtures, drawings, furniture, patents and patent rights, good will and franchises.

Recommends Perpetual Plant Register

"Every manufacturer should keep a perpetual inventory of the physical assets of his property," said Mr. Porter. "This record is commonly called a 'plant register' and contains an individual sheet for each building, each machine, and each major piece of equipment, though the small tools and implements may be listed on one sheet for each department. Small tools and implements usually include hand trucks, air hoists, pneumatic hammers, cutting torches and articles of like value, but exclude such items as hand hammers, wrenches, small taps and dies and other small tools of low value. This plant register sheet usually shows the following classifications: Number (of machine), date installed, location, description, builder, original cost, cost of installation, total cost, anticipated life, rate of depreciation, depreciation to date and disposition if any. It may also show the book value where the book value and the total cost are not the same and the ledger control figures are not increased to the appraisal values."

In conclusion, Mr. Porter said: "If these suggestions are followed out, a true history of the growth of the plant will be shown, financial statements will be a complete picture; costs will be more nearly true,

so that the greater knowledge of the business will enable the executives to meet competition with certainty and ultimate success."

Discussion

In the discussion following the reading of the paper, considerable interest was shown in the proper method of estimating depreciation on machines and machinery, particularly to-day, with practically an entirely new market value on everything. An example was presented of a machine of a particular type, purchased possibly 10 years ago at a cost of $1,000. Under present conditions with the market price of this machine possibly $2,000 or more, the question arose, as to the advisability of revaluation of the machine as a new basis for calculating depreciation, in order that when the machine had been reduced on the books of the company to its scrap value, theoretically, there would be sufficient cash in the reserve to replace it. In opposition to this method it was argued that the Government will not permit revaluation in the tax returns and that provided the machine is not greatly reduced in its productive possibilities, by the time it is no longer adequate for production in two, three or five years from today, the market may again be at the original $1,000 mark.

Obsolescence of machines and equipment elicited a wide divergence of views. It was rather generally agreed that obsolescence in most instances was a separate item in costs from depreciation, as the latter was a certainty, which could be estimated with a certain degree of accuracy, while obsolescence was largely a guess as to future developments of new methods and machinery in any industry. It was pointed out that here again the Government would not accept a deduction for obsolescence unless it had actually occurred or in some extreme cases where there was great progress in an industry and a small deduction was figured on the actual instances over a long period of time, and pro-rated. One speaker pointed out that obsolescence was really a separate consideration from inadequacy of a machine and should not be confused. While the obsolescence of a machine or machinery rendered the machinery only valuable as scrap and sometimes not worth the carting away, inadequacy, caused by inventions enabling greater production only, could sometimes be temporarily overcome by changes in production methods rather than replacement of machines.

In outlining the various methods employed by industries it was pointed out that depreciation estimates were widely different between companies in an industry manufacturing the same articles. One method employed to a great extent in paper mills was to estimate depreciation of machinery on a basis of total production of paper over a certain period, while Mr. Porter pointed out that in some industries it was on a tonnage basis notably the iron and steel industry where many mills operated on a basis of about 25c. per ton for replacement of rolls and other depreciation of machinery or at furnaces where 25c. per ton would be deducted as a proper estimate of the depreciation in a furnace.

It was agreed quite generally that while separate determination of depreciation on individual units of machinery was the proper method for large machines devoted to a single or multiple process, with small tools, as distinct from drills, cutting tools and other material worn out or used up in production and which should be charged to overhead of a department, a satisfactory method was to charge up the initial cost of each year's purchase, deducting from this as depreciation the value of the first tools becoming no longer useful until the total of the first purchase was reached when the second year's purchase would be used. While it is recognized that in numerous cases some small tools will outlive several times over other tools of the same type and manufacture, for purposes of estimating depreciation in order to have the proper amount in the reserve for replacement, this method is most practicable.

At future meetings the subjects of the principal paper, to be followed by discussion, were voted upon by the members as follows: Predetermined costs; overhead distribution; what should be included in costs; factory reports; costs and statistics; planning systems; distribution of expenses; stock room and physical inventory methods; construction in progress; appraisal methods.

RAIL PRICE REDUCED TO $40

Steel Corporation So Announces in Spite of High Costs of Production

The following statement concerning action that had just been taken by the Steel Corporation relative to the price of steel rails was given out by Chairman Gary on Saturday, Oct. 22:

"We have decided to recommend that our subsidiary companies reduce the selling price of standard rails to $40 per ton base, f.o.b. our mills. The present costs of production do not justify this action, but it is hoped and expected that reductions in freight rates and otherwise, together with larger operations, will soon have a beneficial effect upon our costs."

The Steel Corporation price for open-hearth rails has been $47 per gross ton ever since the Industrial Board announcement of steel prices which became effective March 21, 1919. For most of 1920, independent rail mills were quoting $57 for open-hearth rails. Orders for rails last year, while more than in 1919 (Production of rails over 50 lb. was 2,115,073 tons as against 1,940,040 tons in 1919) were not up to the evident requirements of the railroads. For most of the year the independent rail companies were so busy on forms of finished material on which there was a better profit that their rail operations were a secondary coonsideration. It was also a fact that railroads were disposed to get along with the smallest possible amount of rails at the figures the independent mills felt bound to ask.

The first advance above the $30 basis for open-hearth rails which had prevailed ever since April, 1901, came on May 1, 1916. At that time, after the bulk of the requirements of the year had been contracted for, the makers announced an advance of $5 per ton, which put open-hearth rails at $35 and Bessemer rails at $33. Another advance was made in November, 1916, to $38 and one month later open-hearth rails went to $40 per ton. This was the contract price in 1917, but in line with the advance in other products rail sales in the second half of that year were made at higher prices, ranging up to $57. In the early part of 1918 the $57 price for open-hearth rails was the basis of considerable sales, though at no time during the existence of the conference arrangement between the steel industry and the price fixing committee of the War Industries Board was there a controlled price on rails. Some mills realized considerably higher prices than $57 in the late months of 1917 and on through 1918 on sales both for domestic use and for export. In early 1918 one road paid $73 on a 2500-ton order. As high as $85 was realized on some export business. For the greater part of 1918 Washington named $57 as the settling basis on Army and Navy purchases for the war, but otherwise prices were a matter of negotiation between buyer and seller.

When the Industrial Board announcement of reduced prices on steel products was made on March 21, 1919, a price of $47 for open-hearth rails was included and this was the basis of Steel Corporation contracts for that year, though it was the fact also that the corporation reinstated on its books in the first half of 1919 considerable rail business that had been taken at the lower prices of 1917.

At the $40 price just announced, open-hearth rails are 1.785c. per lb., or several dollars per ton above the recently prevailing market for plates, structural shapes and bars.

Likens United States to England Century Ago

Methods of Developing Foreign Trade Pursued by British Then an Excellent Precedent for America to Follow Today

"NEVER in the world's history has there been a nation with a future so bright as the United States," declared E. M. Herr, president Westinghouse Electric & Mfg. Co., in addressing the American Mining Congress at Chicago, on Oct. 21. Mr. Herr's subject was "The Importance of Developing American Interests Abroad." Asserting that the teachings of history, if properly interpreted, are the best guide to future developments, he called attention to the similarity of the present position of the United States with that of Great Britain at the close of the Napoleonic wars. A résumé of his address follows:

From about 1830 to the beginning of the World war, Great Britain was the acknowledged leader in the commercial and financial world—in fact, after the Napoleonic wars, London became the financial center of the world, and energetic Englishmen rapidly extended their trade relations to the remote corners of the earth. The fact that her bankers had loaned vast sums to all her allies against Napoleon, and that as a nation she was the least injured by these wars, was largely the cause of her financial power and the position she later attained as the world's financial center.

Rapid expansion of England's profitable trade throughout the world caused precious metals to flow into London from the people with whom she traded. With a fairly large accumulation of gold in her banks, England definitely adopted the gold standard in 1818. This was, under the circumstances, a master stroke of policy, for at the time and for a number of years thereafter England was the only country whose money had a fixed value. The United States of America, France, Prussia, Russia and practically every other country in Europe had then little or no metallic circulation.

This situation is closely paralleled to-day, when the United States occupies the position then occupied by England, the countries of Europe, including England, having practically no metallic circulation. We are also now, as England was then, the great creditor nation of the world.

Pushing for Foreign Trade

England's predominant financial and commercial position during the latter part of the nineteenth century was not due entirely, nor even principally, to the adoption of the gold standard; it was due to a much greater extent to the activity of her people in pushing the development of her industries and commerce. Her insular location encouraged the rapid growth of her merchant marine. For some time the United States outstripped her on the sea, but when the change from wooden to steel ships was made, and especially steam-propelled ships, Great Britain rapidly gained on the United States, and from the period just preceding our Civil war until the world war, was decidedly the greatest maritime power on earth.

The history of England's commercial development also shows that, in addition to being the great creditor nation of the world, and mistress of the seas as well, she employed her financial resources to extend credit and to stimulate her foreign trade by making investments in the countries where business was to be done, using her banks to aid in her commercial growth, by requiring those borrowing from them to use a large proportion of their borrowings in purchases from her people.

Europe Now Needs American Help

It is plain that Europe sorely needs all the financial and economic help we can render. Furthermore, because of conditions there, the remainder of the business world, lacking the financial help formerly found in Europe, is turning to the United States for financial aid, especially by the extension of credits.

Under these conditions, why is there a business depression in this country? The fundamental difficulty is the lack of balance in the various parts of our business. There is no lack of capital available, no dearth of facilities or material for production, and no scarcity of plants in which to produce, but there is lack of balance between the prices of our products and the wages paid to produce them. In some commodities pre-war or less than pre-war prices prevail, while in others the inflated war prices still obtain.

Liquidation of Padded Payrolls Essential

Certain classes of labor are resisting any reduction in war wages, while in others almost complete liquidation of wages to nearly pre-war levels is found. The railroad operatives, coal miners and to a large extent the building trades are holding out for the wartime wage. The public generally recognizes that wartime prices must be reduced, and the consumer will not purchase beyond his immediate needs, until he feels that prices have reached or about reached their level. It is principally for this reason that the United States is depressed, and will return to full activity only when the readjustment process is completed.

All resistance to the return to stable prices and costs only delays the return of prosperous times. This statement raises the question, "What are stable prices?" History shows that, after every great war, the inflated prices and wages brought about by the large and unusual demands for all kinds of products during the war are gradually reduced, until they reach a position of stability. This position is found to be never quite so low as before the war, but is only so far above the pre-war price as the progress made in productive efficiency during the period justifies.

In addition to putting our industrial and commercial house in order, we must recognize our obligation as the great creditor nation to take our place in the business world, to which this position not only entitles but obligates us. We have in our vaults the largest supply of gold that was ever accumulated by a nation. . . . Our mines, farms and factories have a normal capacity of approximately 20 per cent beyond our own requirements; therefore, a large part of our output must be sold abroad, if our developed resources are to continue to be actively employed to their full capacity.

Export Business Cannot Be Regarded as Ephemeral

No real progress can be made until we make our export business as permanent and as serious a part of our activities as is our domestic trade. Much study and persistent, painstaking effort are necessary to accomplish this building up of a well-organized and effective export department.

Representatives, to serve our customers properly in the foreign commercial field, must be men of sufficient age and experience to have sound judgment in dealing with the foreigner, and of a bearing and poise to command his confidence and respect. We must send such representatives abroad, not to stay a short time, devoted to securing orders, but to remain permanently in the country to which they are accredited; to become at home with those with whom they would do business, and by continuity of effort and intimate knowledge of their customer's needs, coupled with just and courteous dealing, really merit a fair share of their business, which will in this way readily be secured, and a relationship established of great permanence and profit.

Our Government has a duty to perform in estab-

lishing a well organized commercial department of our diplomatic service, consisting of commercial attachés and other necessary members. . . . Properly developed, nothing our Government can do will be more helpful than such an arm of our diplomatic service, in the stability and welfare of our foreign trade.

As a creditor nation, we must arrange to extend loans in large amounts to the people needing them for legitimate enterprise, and must purchase their securities. Fortunately, under the Edge amendment to the Federal Reserve act, our financiers are now organizing and developing corporations similar to the British investment trusts. Some of the latter have been in operation for nearly a century, during which time they have been very powerful in protecting and furthering Great Britain's trade in foreign lands.

It must be constantly borne in mind that the foreigner must sell as well as buy, and that foreign trade is of necessity reciprocal. Under present conditions the foreign buyer is in great need of credit, and provision for extending it is now of prime importance. . . . Before the war we were obliged to pay to our European creditors an interest charge of about $500,000,000 per annum. To-day they owe us interest in about the same amount. We will, therefore, receive, when the European nations are in shape to pay interest, about $500,000,000 annually in goods from them. Some manufacturers are alarmed at this and overlook the fact that increased imports do not necessarily mean decreased exports.

DUMPING FERROMANGANESE

Case Argued Before Federal Trade Commission —Trade Paper Quotations

WASHINGTON, Oct. 25.—With respondents denying and the attorney for the Federal Trade Commission affirming that that body has jurisdiction, arguments were made before the commission last Friday in the so-called ferromanganese anti-dumping case, the only proceeding of the kind that ever came before it. Contention was made by Joseph E. Davies, of the law firm of Davies & Jones, representing Crocker Brothers, included among the respondents, that authority under Sec. 5 of Sept. 8, 1916, the anti-dumping act specifically provides that the remedy rests in the courts which have the responsibility for its enforcement. Lack of authority by the Federal Trade Commission was assigned by Mr. Davies as one of the reasons why the complaint should be dismissed. Opposing Mr. Davies, I. E. Lambert, attorney for the commission, asserted that enforcement of the act rests with the Federal Trade Commission, which has power to issue a cease and desist order which he sought.

In addition to arguments as to jurisdiction, the interpretation placed on trade paper quotations was brought up. The respondents made strong denial that they had dumped ferromanganese in the United States market in 1919 with intent to injure or destroy the domestic industry. In this connection, significance was placed on the remark of Commissioner Gaskill that the effect of the act would not be unlawful unless intent were proved. Mr. Davies maintained that no intent had been shown, while Mr. Lambert asserted that domestic producers had lost money as a result of the alleged dumping.

Commissioner Murdock asked Raymond N. Beebe if the English manufacturers did not dump ferromanganese in the United States market during the interim between July and November, 1919, as shown by the record. Mr. Beebe, also of the law firm of Davies & Jones, replied in the negative, saying that the English makers sold at whatever prices they could get in the United States, having previously declared that the first cut in prices was made by a domestic producer. He stated also that of the 28,000 tons sold by Crocker Brothers in 1919, only 881 tons had been sold at £2 or more per ton under the home market value. Moreover, he said the English trade paper prices, quoted by Mr. Lambert, were only asking prices and did not represent the actual market.

Attorney Lewis Smith, representing Frank Samuel, Philadelphia, another respondent, declared that there was no evidence to establish the market value at the date of exportation of ferromanganese sold by Frank Samuel, except by two shipments that the respondent submitted as exhibits. One of these shipments was allocated against a 1914 contract at $38 per ton which, while admittedly greatly below the 1919 price, was shipped because Mr. Samuel felt he was honor-bound to do so. The other respondents in the case, C. W. Leavitt & Co., were not represented at the arguments.

In opening his arguments Attorney Lambert cited various quotations to uphold the reliability of trade paper quotations as published in THE IRON AGE, Oct. 20, p. 1013. Mr. Beebe said that prices carried in the English trade papers were not those applying at the time of exportation, but rather at the time of the sales, contending that Mr. Lambert had taken the prices at the time of sales and that prices obtaining at the time of exportation were lower than those at which the sales were made. Mr. Beebe stated also that there was no evidence on which the commission could predicate what the prices were at the time of exportation and asserted that trade paper quotations were only asking prices and were not so low as those at which sales were actually made. He also claimed that court decisions quoted by Mr. Lambert to uphold the reliability of trade paper quotations only referred to their permissibility as evidence. The latter controverted this view by reading actual rulings to show that such quotations are dependable for use in arriving at decisions.

Improved Demand for Refractories

PITTSBURGH, Oct. 24.—The price of magnesite brick has been reduced $5 per ton to $60. The former quotation of $65 was being shaded pretty frequently and this prompted one large maker to cut the quotation last week to $60 and other makers since have followed suit. Dead-burned Austrian magnesite also is lower, being offered by one maker at $30 per net ton, f.o.b. Atlantic seaboard. The market also is weaker on chrome brick, which now are offered as low as $50 per net ton for standard sizes. Silica brick prices still are soft, with Pennsylvania now quoted as low as $30 and Chicago makers going as low as $35 to get business. Fire clay brick prices are holding rather well.

In a general way business has been better in the past week or 10 days than before in a long time. Enlarged steel plant operations largely account for the improvement, but in addition the manufacturers of refractories have used the possibility of a railroad strike as a lever to pry loose new orders and releases against old contracts. Since few of the steel manufacturers expect the strike to materialize, the increase in orders and releases may be ascribed chiefly to the depletion of steel company stocks of brick.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $37.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		30.00 to 35.00
Chicago		35.00 to 40.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		60.00
Chrome Brick:		
Standard size, per net ton		50.00 to 52.00

The Electric Furnace Co., Alliance, Ohio, has exported two of its electric melting furnaces to England. Both of these units are of the rolling mill type, arranged for direct pouring of the metal into molds. Johnson-Matthey & Co., Ltd., London, England, purchased a 50-kw. nose tilting furnace, with hydraulic tilting mechanism. It has a 500-lb. hearth capacity and is to be used for melting silver bullion. Allen Everitt & Sons., Ltd., Birmingham, England, have ordered a 125-kw. nose tilting type furnace which has a 2000-lb. hearth capacity and is tilted by means of a motor-operated mechanism.

Iron and Steel Exports Show Improvement

First Up-turn of the Year Leaves Total Still Under Half of Pre-War Average—Steel Rails Furnish Bulk of Gain in Tonnage

WASHINGTON, Oct. 24.—Making a partial recovery, exports of iron and steel in September totaled 95.169 gross tons, valued at $27,740,228, as compared with the low point in August of 75,827 gross tons, valued at $27,647,816. Imports also reflected an increase, the September total being 12,573 tons valued at $2,130,802, as compared with 9348 tons in August, valued at $1,949,892. Imports of manganese ore in September aggregated 10,402 tons as against 28,939 tons in August. Machinery exports in September showed a decline in value, being $14,173,968, as compared with $15,178,004 in August.

Imports of Iron and Steel—Gross Tons

	September		Nine Months September	
	1920	1921	1920	1921
Ferromanganese	6,524	804	40,039	6,605
Ferrosilicon	1,159	633	11,643	3,883
Pig iron	6,081	2,499	102,130	20,527
Scrap	9,486	5,549	119,872	28,946
Bar iron	382	190	4,048	1,375
Structural steel	89	6	1,114	550
Billets, without alloys	301	2	18,032	3,021
All other billets	249	10	3,539	1,138
Steel rails	6,563	2,850	42,064	17,622
Sheets and plates	144	15	1,321	1,891
Tin and terne plates	9	5	279	313
Wire rods	712	10	3,334	562
Total	31,699	12,573	347,415	86,433
Manganese ore and oxide	88,422	10,402	423,012	336,744

While the export and import movements of iron and steel continue to be greatly below normal, the slight stimulation is looked to with the hope that commerce has become established on an upward turn. As the pre-war average export shipment of iron and steel is placed at 230,000 tons monthly, the outbound movement of September was only about 41 per cent of that average, and approximately 20 per cent of the exports of September, 1920, which amounted to 409,200 tons, valued at $87,554,159.

Exports, January, 1920, to September, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
Nine months	1,846,824	21,626	8,091

Total exports for the nine months ending with September of this year were 1,846,824 tons, valued at $519,769,514, as against 3,544,489 tons valued at $787,151,002, for the corresponding period of 1920.

Steel rails constituted the greatest single item of export in September, amounting to 20,442 tons, of which 12,742 tons went to China, which country was the source of greatest consumption of this product both during September and the nine months. Shipments for the nine-month period to China amounted to 45,018 tons. It is the increase in rail exports that largely represented the gain in total exports made in September over August. Canada took 2539 tons in September, and 14,838 tons for the nine months, while Dutch East Indies during the nine-month period took 23,469 tons.

Steel sheets represented the second largest item of shipment, the September total being 16,560 tons, of which Japan took the bulk, shipments to that country being 13,150 tons. This is taken to indicate that the American mills are holding fast to this Oriental trade, despite the fact that specifications for Japan ordinarily call for a thin sheet whose gage commonly is No. 31.

Exports of Iron and Steel—Gross Tons

	September		Nine Months September	
	1920	1921	1920	1921
Ferromanganese	297	186	1,483	604
Ferrosilicon	64	3	401	221
Pig iron	22,363	2,889	173,720	20,801
Scrap	44,660	1,387	166,585	27,201
Bar iron	4,846	148	30,801	11,694
Wire rods	6,837	794	97,409	11,975
Steel bars	41,542	4,122	459,180	161,999
Billets, ingots, blooms	18,113	1,318	194,563	8,091
Bolts and nuts	2,844	944	27,900	21,417
Hoops and bands	3,920	1,013	38,440	15,793
Horseshoes	290	63	1,413	468
Cut nails	361	55	2,125	650
Wire nails	7,826	797	61,974	19,205
All other nails, including tacks	750	290	7,901	3,751
Cast pipe and fittings	5,104	2,148	41,699	42,893
Welded pipe and fittings	19,667	8,383	195,267	307,598
Radiators and cast house boi'ers	364	636	5,324	2,459
Railroad spikes	836	211	11,836	6,965
Steel rails	31,170	20,442	421,133	282,162
Galvanized sheets and plates	6,213	2,628	80,342	45,569
All other sheets and plates	1,921	347	21,364	10,555
Steel plates	75,612	10,068	635,886	303,360
Steel sheets	13,342	16,560	118,767	101,185
Ship plates, punched and shaped	3,459	770	32,145	8,707
Structural steel	60,315	11,531	333,433	266,008
Tin and terne plates	13,234	4,724	169,700	84,672
Barb wire	6,420	1,193	87,062	22,539
All other wire	16,830	1,519	126,636	58,282
Total	409,200	95,169	3,544,489	1,846,824

Of the 101,185 tons of sheets exported during the nine months, Japan took 49,456 tons and Canada 26,823 tons.

Of the structural steel exports, constituting 11,531 tons for September, and 266,008 tons for the nine-month period, Japan took 3975 and 43,693 tons respectively; British India, 2567 and 29,839 tons respectively, and Canada, 2399 and 47,192 tons respectively. The September shipments to Japan are principally for office buildings in Tokyo.

Exports of welded pipe in September amounted to 8383 tons, and for the nine-month period 307,598 tons. Mexico has been much the largest buyer, taking 405 tons in September and 104,836 tons during the nine months, as against respective totals of 145 tons and 8389 tons for Cuba, and 138 and 3600 tons for Canada. Canada, the greatest foreign market for the American iron and steel industry, took 85,528 tons of the 303,360 tons of steel plates shipped during the nine months,

while the United Kingdom took 47,695 tons and Japan 28,056 tons.

Imports of ferro-manganese and scrap reflected relatively sharp increases over August, these for September being 804 and 5549 tons respectively, as compared with 320 and 2016 tons in August.

Machinery exports of $14,173,968 in September, and $244,188,563 for the nine months, compare with the values $36,008,016 and $333,367,192, for the same periods of last year. Exports of lathes in September

Machinery Exports

	September		Nine Months September	
	1920	1921	1920	1921
Adding machines	$ 437,847	$ 90,776	$ 4,013,868	$ 2,325,498
Air-compressing machinery	254,111	140,486	3,783,986	3,431,129
Brewer's machinery	81,915	7,143	399,146	238,004
Cash registers	276,840	137,621	4,400,286	1,965,907
Parts of	54,224	16,061	365,450	237,606
Concrete mixers	79,185	25,163	562,179	510,802
Cotton gins	17,948	3,645	361,980	105,139
Cream separators	41,928	6,962	852,436	375,417
Elevators and elevator machinery	73,939	122,066	1,025,961	1,772,407
Electric locomotives	.....	59,817	844,130	1,506,877
Gas engines, stationary	91,243	17,305	583,892	268,357
Gasoline engines	3,163,593	302,533	28,013,520	7,889,918
Kerosene engines	977,143	.....	7,897,572	.....
Steam engines	4,444,264	1,529,695	44,910,738	26,876,100
All other engines	310,812	124,824	3,387,216	1,804,985
Boilers	847,447	80,960	5,248,917	4,320,854
Boiler tubes	455,654	173,425	3,674,208	3,149,345
All other parts of engines	1,525,348	698,438	15,247,175	10,222,849
Excavating machinery	240,407	288,696	1,491,917	2,044,264
Milling machinery, flour and grist	262,835	30,566	1,339,876	1,365,832
Laundry machinery	78,698	43,667	860,121	787,213
All other	65,836	25,407	546,971	312,401
Lawn mowers	18,171	20,177	269,581	395,073
Lathes	506,781	65,093	5,997,997	2,643,649
Other machine tools	1,176,175	218,339	10,394,768	4,140,139
Sharpening and grinding machines	333,844	65,886	3,146,014	1,000,958
All other metal working machinery	1,190,343	276,868	14,342,265	9,724,201
Meters, gas and water	36,633	39,700	508,066	629,269
Mining machinery, oil well	531,238	398,619	3,835,856	9,978,887
All other	543,624	385,778	6,425,214	6,583,540
Paper mill machinery	242,682	267,666	1,715,509	2,262,015
Printing presses	820,050	292,232	6,459,767	6,515,123
Pumps and pumping machinery	827,198	492,065	8,803,219	10,690,224
Refrigerating and ice making machinery	314,030	103,646	2,702,779	1,415,789
Road making machinery	67,169	73,108	930,559	765,365
Sewing machines	752,864	588,395	11,625,776	5,764,197
Shoe machinery	224,644	70,895	1,673,306	1,536,644
Sugar mill machinery	2,705,310	692,273	11,532,511	14,135,808
Textile machinery	2,011,879	1,484,026	14,850,268	14,819,255
Typesetting machines	394,838	150,772	3,646,526	2,817,958
Typewriting machines	1,443,474	518,269	19,000,347	9,760,192
Windmills	171,334	52,237	1,408,899	1,574,734
Wood working machinery saw mill	83,175	31,605	811,665	953,948
All other	228,423	111 244	2,623,086	2,290,279
All other machinery and parts of	7,606,439	3,781,358	67,852,208	58,503,723
Total	$36,008,016	$14,173,968	$330,364,301	$244,188,563

amounted to only $65,093, while other machine tools to the value of $218,339 were exported. The greatest single item of export was steam engines, the value of which was $1,529,695, while textile machinery, with a value of $1,484,026, ranked second.

Increased Coke Making Operations

UNIONTOWN, PA., Oct. 24.—More than 1000 idle men are assured employment for an indefinite period by the starting up of 600 coke ovens of the H. C. Frick Coke Co., which resumed to-day after a shutdown since last spring. Half of the ovens to be started are located at Continental No. 1 and the other 300 at York Run. Announcement was also made that within the next 10 days more ovens would be reopened.

Permits were taken out in Chicago in September for 985 buildings fronting 28,427 ft. and involving a cost of $12,256,000—a decrease of 73 permits, 1835 ft. of frontage and $595,910, or 4.64 per cent as compared with August. The record for September, however, was better in terms of frontage than that of any year in the last decade except 1915 and 1912. In value of buildings authorized it was exceeded only in September, 1919. Permits granted in the first nine months of this year cover more frontage than was recorded in the same period since 1916.

TO SELL SURPLUS MATERIAL

What Materials and Supplies Are to Be Disposed of by Emergency Fleet Corporation

WASHINGTON, Oct. 25.—The Emergency Fleet Corporation has completed an inventory of surplus property and is offering it for sale, having authorized the removal of all restrictions regarding the disposal of general materials and supplies. This does not include ships, plant houses, drydocks, housing and transportation projects, each of which is now being carefully analyzed with the view of adopting definite policies looking toward their disposal. Announcement of a definite sales policy was first made by Joseph W. Powell, president Emergency Fleet Corporation, and has been followed by a statement from Sidney Henry, commercial manager of the corporation, showing the classification and general detail of material and supplies to be sold. This includes machinery, machine tools, iron and steel, etc., divided into the following classifications:

Classification 1: Contains machinery, equipment and supplies, with an estimated appraised value of $5,273,912. It includes metal and woodworking machinery and appurtenances; hand and small tools; including pneumatic tools, brushes and all mechanics' tools; machine shop appurtenances, including pulleys and shafting; engines and boilers (not marine) and auxiliaries, including pumps, condensers, compressors, tanks, ice machines (except electric); and fire protection equipment and supplies.

Classification 2: Contains electric equipment and supplies, including motors, generators and appurtenances, including complete units; electric supplies and fixtures; and radio; having an appraised value of $1,447,329.

Classification 3: Pipe, valves, plumbing and heating; includes pipe, valves and fittings; and plumbing and heating equipment and supplies, having an appraised value of $1,895,979.

Classification 4: Rolling stock; floating equipment and handling devices; includes steam rolling stock; electric rolling stock; contractors' equipment and handling devices; and auto equipment; having an appraised value of $1,801,456.

Classification 5: Ship machinery and equipment, including ship propelling machinery, such as marine engines and boilers, shafts and bearings; propellers; deck machinery and equipment, and life saving equipment, etc.; having an appraised value of $12,722,121.

Classification 6: Galley, hotel and hospital equipment and supplies, having an appraised value of $513,229.

Classification 7: General supplies, having an appraised value of $664,887.

Classification 8: Office furniture and supplies, having an appraised value of $211,722.

Classification 9: Metal and metal products, having an appraised value of $6,269,620; includes steel billets, pig iron, copper, babbitt lead; plates, shapes, wire metal sash; bolts, nuts, screws, spikes and nails.

Classification 10: Building material, etc., having an appraised value of $996,247.

Classification 11: Scrap, having an appraised value of $259,228; consists of ferrous and non-ferrous material.

All of the above mentioned surplus material, which cost approximately $125,000,000 and is appraised at $35,000,000, will be sold both at wholesale and retail. The following locations have been designated as headquarters of the districts in which the country has been divided for the purpose of facilitating sales of the surplus property and these storehouses will be organized to make cash sales and to expedite the disposal of the more valuable supplies:

Northeastern District—Headquarters: Wilson Point Warehouse, South Norwalk, Conn. Director of Sales: J. T. Eason.

Eastern District—Headquarters: Hog Island, Pa. Director of Sales: G. S. Watt.

Central District—Headquarters: 1819 West Thirty-ninth Street, Chicago. Director of Sales: W. J. Leonard.

Southern District—Headquarters: U. S. Shipping Board Warehouse, 3901 Carrollton Avenue, New Orleans. Director of Sales: H. R. Dillingham.

Southern District—U. S. Shipping Board Warehouse, Alameda, Cal. Director of Sales: D. H. Meisenbach.

Oregon District—Headquarters: U. S. Shipping Board Warehouse, St. Johns, Portland, Ore. Director of Sales: T. G. Baird.

Northern Pacific District—Headquarters: U. S. Shipping Board Warehouse, Tacoma, Wash. Director of Sales: R. D. Caney.

Each of the district directors of sales will be authorized to make cash sales of property in amounts not exceeding $5,000. Where the materials run into values greater than $5,000, approval by the manager of the material sales division, located in Washington, will be necessary.

Conditions in Basic Industries

Business Paper Editors Give a Résumé of the Progress of Deflation in Important Lines —Some Measure of Improvement Indicated

A RESUME of conditions in basic industries was a feature of the annual meeting at the Congress Hotel, Chicago, Oct. 24, of the National Conference of Business Paper Editors. Ten important fields were represented in the discussion, the reviews being given by editors of business and technical journals in the following lines: Iron and steel railroads, marine, automotive, textile, electrical, construction, mining, leather, agriculture. The substance of five of the reviews is given below. Reference to the others will be made in a following issue.

Iron and Steel

The situation in iron and steel was discussed by A. I. Findley, editor THE IRON AGE. It was stated that the steel trade turned the corner in July and is now on the way to better things; but the improvement in steel does not mean that the industry may look for an uninterrupted advance to full employment and large consumption. There will be hummocks and troughs in the curve of output and demand for some months to come.

It was pointed out that while there has been some comment to the effect that steel had not borne its share in price deflation, the facts show otherwise.

THE IRON AGE'S composite piece of the seven finished steel products making up 88 per cent of the country's output —steel bars, beams, tank plates, plain wire, rails, black pipe and sheets—stood at 2.177c. per lb. on Oct. 24, 1921, as against an average in 1913 of 1.66c. To-day's composite price is therefore 31 per cent above the 1913 average. All commodities, according to the Department of Labor compilation, are 52 per cent above 1913, the cost of living is 62 per cent above 1913, food at retail 55 per cent, building materials 93 per cent, furniture 123 per cent, and building costs, as indicated by the *Engineering News-Record* composite, 83 per cent. Thus finished steel prices to-day are the lowest of all on the list, in relation to the level of 1913. Steel works wages to-day are 40 per cent below the war peak, whereas few other industries show reductions exceeding 25 per cent.

Generally speaking, price liquidation in steel is far advanced. With iron and steel wages still 50 per cent above those of 1913, freight rates 75 to 100 per cent above, and other fundamental items of cost high, any further considerable readjustment is not to be expected, though the fact is that consumers are looking for some recession in prices following the expected reductions in freight rates. Such reductions would mean continued losses for the majority of producers.

The railroads and the building trades will determine largely to what extent the steel industry is to see revival in 1922. In both directions there is promise for the coming spring. There has been more house building even at high costs than is commonly credited. If building wages were brought in line and other building materials were reduced to the extent of steel, 1922 should see a considerable expansion in the volume of new construction. Railroad buying for next year, assuming that the $500,000,000 funding measure passes Congress, should do much to make up for the disappointments of 1921. To-day more than 800,000 tons of rails on which rolling has been deferred are on the books of the rail mills.

High fuel costs, due to high mining wages and high freights, are a handicap to the steel industry. The unwillingness of the coal miners to arbitrate the new wage scale makes the menace of a strike on April 1 no small factor in the outlook.

Prophecy concerning the course of the industry in 1922 may well be cautious, in view of the uncompleted work of readjustment in transportation, fuel and the building trades. From the standpoint of to-day, a prediction of a gradual advance to a 60 per cent operation in 1922 would represent a fair allowance for favorable developments that are not yet in sight.

The Mining Industries

J. E. Spurr, editor *Engineering and Mining Journal*, New York, said that while conditions are irregular in the different mining industries, on the whole they are better than they were six months or a year ago. Iron mining is abnormally depressed, deflation in this industry having lagged behind the other metal mining industries. Iron ore shipments from Lake Superior to Oct. 1 were less than half of those in 1920, and a quiet winter is looked for at iron mines. In copper production has been cut to the lowest point in 24 years. One beneficial result of this abnormal depression has been to force the attention of copper producers to the science of merchandising, which is being taken up by the Copper and Brass Research Association. There has also been a study of more economic methods of production. The future depends largely upon general world conditions and especially on developments in Germany. There is little evidence of a serious condition of unemployment among copper miners. Apparently many of them have been absorbed temporarily by other activities. Due to its dependence on iron and steel, early improvement in zinc is not expected. The price advanced somewhat in September, due to heavier buying. The Zinc Institute is trying to find new uses for the metal. Lead has not been depressed as much as other metals due to its constant demand for paint, also to the benefit to lead-silver ores from the prosperous condition of silver mining. In gold mining there is improvement and indications of increasingly favorable conditions.

The non-metallic mining industries, such as those of talc, magnesite, graphite, mica, fuller's earth, barytes, fluorspar, gypsum, and feldspar, have suffered with the depression of manufacturing in general. In general, they have never been organized on an efficient competitive basis, and, therefore, can ill stand the competition resulting from the resumption of importation. Besides the handicap of high freight rates, they have the disadvantage of putting out in many cases unstandardized or poorly standardized products, and in not having worked out the science of merchandising and of proper utilization.

In general, the mining industries, except iron, seem to have recovered from the greatest depression, and to be started upon the slow climb upward.

Shipbuilding

R. V. Sawhill, editor *Marine Review*, Cleveland, said in part:

In the shipbuilding line, the effect of the phenomenal war boom is practically ended. As a result, a great many shipyards have been closed down permanently and a great many others have shifted over to other lines of industrial effort. Forty yards on the East and South coasts showed a slump in the number of employees from 177,000 at the beginning of 1919 to 136,000 a year later, 95,000 at the beginning of this year and only 50,000 July 1. New orders are sharply limited, repair work furnishing the bulk of the work now in sight. The inevitable corollary of this deflation in shipbuilding is a not unnatural pessimism on the part of many shipbuilders.

On the other hand ship construction now under way is about 500,000 tons, or 25 per cent more than our banner production for an entire year prior to the war. In addition, quantity production during the war gave the enfeebled shipbuilding industry its first real opportunity to put itself on a modern basis of production. Full advantage was taken of the progress along mechanical and organization lines and as a result American shipyards not only produced ships equal in quality to those of competing nations but brought their costs down to a comparative level. At the same time they developed a speed in production far in excess of that shown in other countries.

Certainly a degree of measured optimism is justified by these conditions including as they do a fair amount of business on the order books, an assurance of profitable repair work in a volume never anticipated a few years ago, when American ships were few in number, and best of all a group of modernly equipped, efficiently organized plants.

Construction Industry

W. W. De Berard, Chicago, western editor *Engineering News-Record*, New York, gave index figures for

steel, cement, lumber and common labor, showing that construction cost is now 30 per cent cheaper than one year ago and 34 per cent under the peak, while 80 per cent above the 1913 level.

Comparison of the actual volume of contracts let in 1920 and 1921 with 1913—as differing from a mere comparison of amounts of money—may be made by using the cost index number. By this means the actual volume of construction in the first nine months of 1920, computed from the total of contracts let, was 6 per cent greater than the 1913 volume in the same period. Construction, or contracts let, in 1921 is 23 per cent behind 1920 and 17 per cent less than 1913. This means that the amount of construction this year is 83 per cent of the amount in 1913. . . .

As to contracts let so far this year, street and road work is valued at 258 million dollars, as compared with 230 million for the similar period a year ago. . . .

Total contracts let for similar periods during the two years are 913 and 1,314 millions respectively.

Reducing the 1921 figures for the six spring and summer months to the 1920 basis there has been practically the same amount of construction work carried on, although the cost has been 25 per cent smaller.

The opinion was expressed that uncertainty as to future prices had been a major factor in the falling off of construction. Labor cost probably will continue to decline in 1922 and this will tend to draw certain materials below the present levels.

If prices continue their decline there will remain a measurable uncertainty in the construction industry. However, any future decline in prices will not be from a peak, but from levels that are already satisfactory in a number of instances. Therefore, there should not be anything like the uncertainty that has prevailed since the summer of 1920 to date. Furthermore, the volume of construction of an urgent nature is steadily swelling and a certain proportion of this must be released, irrespective of market conditions. It seems safe to predict that 1922 will be a considerably better construction year than the present, and that the years following will show the construction industry really catching up.

Agriculture

The situation in agriculture was summarized by C. V. Gregory, editor *Prairie Farmer*, Chicago, who presented these among other considerations:

The outstanding feature of the agricultural situation is that the farmer is at work. There are no strikes on the farm, no men out of work, no idle acres. The farmer produced a bumper crop in 1921 while other industries were marking time. He is going ahead with plans to operate his farm plant to full capacity in 1922. . . .

Prices are slowly but surely being adjusted, and that adjustment is working in the farmer's favor. Every increase in the price of farm products, every decrease in the price of other commodities, bring the price level nearer to normal adjustment and bring the farmer back into the market to just that degree.

The farmer was first to be deflated, and he is heading the procession on the way back. He was deflated suddenly and severely, but the agony is over that much sooner. He has taken low prices, but he has moved his goods and kept his plant going and himself in a job. . . .

Reduced production costs, readjustments of prices, more liberal credits, lower railroad rates, and above all else, hard work, will put the farmer at the head of the business procession in 1922. His improved condition will stimulate prosperity in other lines in proportion as other industries follow his example.

This is a time when we must all pull together, forgetting strikes and wartime profits, for steady work and large production form the only basis of real prosperity. That prosperity is surely coming, with the farmer in the lead.

Hoover on Industry's Forward Movement

(*Special Telegram*)

CHICAGO, Oct. 25.—The conventions of the Associated Business Papers, Inc., and of the national Conference of Business Paper Editors in session yesterday and to-day have been well attended. The National Editorial Conference elected the following officers: President, Charles J. Stark, editor *Iron Trade Review*, Cleveland; vice-president, H. C. Parmelee, editor *Chemical and Metallurgical Engineering*, New York; secretary-treasurer, William W. Macon, managing editor THE IRON AGE, New York.

Secretary Hoover sent a telegram from Washington regretting his inability to attend the editorial conference. He expressed his appreciation of the privilege he had enjoyed of meeting the trade paper editors frequently at the Washington conferences, and in conclusion said, referring to the organizations within the Department of Commerce which have been developed and set at work within the past few months: "It is a fine augury of our industrial future that the programs and purposes of these various departmental activities have come from our manufacturers, merchants and engineers themselves. The editors of the business press have shown a fine spirit of service. Your opportunity for leadership is unique and unchallenged. Upon you rests in large measure the responsibility for the control of industrial thought and opinion in the working out of the industrial, economic and technical problems which confront us. I wish your conference every success in carrying forward your high and constructive purposes."

It is expected that the next conference of the business paper editors with Secretary Hoover will be held in Washington in November.

Industrial Promise of India

"India is a young country industrially and is only beginning to develop in this respect since the war," says Capt. R. I. H. Kinloch of the Royal Artillery, head of the Metal & Steel Factory, the British Government works at Ichapur, India. Steel consumption in India, according to Capt. Kinloch, is rapidly increasing and so great have become the possibilities of future use of iron and steel in the manufactures of the country that some British companies have seriously considered establishing Indian plants to supply the trade there. There is an abundance of low priced labor and cheap material and rich deposits of iron ore and coal, but the phosphorus content of the ore is so high that the government works, which included an acid open hearth plant, imports a high grade of hematite from England, which analyzes from 0.02 to 0.025 per cent phosphorus.

While Government specifications necessitate the maintenance of the acid open hearth department, the enlargement of the works and establishment of a basic open hearth plant is being seriously considered.

There are large deposits of magnesite in India, says Capt. Kinloch, and it is because of this that he is in the United States, where he intends investigating the processes used here for the manufacture of refractories, as it is believed that a large and profitable refractory industry could be developed in India. As to labor, while the technical positions in practically all the iron and steel works and manufacturing plants are occupied by white men, either British or Americans, the average native is of a high standard of intelligence and can be quickly trained as a skilled worker. In his own experience, Capt. Kinloch says that he has some tool makers, receiving the equivalent of $1 per day, who turn out as accurate work as a highly skilled tool maker in any country.

Following a short tour of large steel plants and an investigation of the refractory manufacturing methods in this country, Capt. Kinloch will sail Dec. 3, for England on the Carmania.

The world's production of coal during the first six months of 1921, according to reports collected by the United States Geological Survey, was approximately 525,300,000 metric tons. This was at an annual rate much below the output in any year of the preceding decade. The largest factors in this decrease were the British miners' strike. Should the total for the year amount to as much as 1,100,000,000 tons, the world's production will have dropped back to the level of 1909.

The United States Civil Service Commission announces open competitive examinations for metallurgists at from $4,000 to $4,800 a year; associate metallurgists, $3,000 to $3,800; assistant metallurgists, $2,000 to $2,800 and junior metallurgists, $1,500 to $1,800. Rating of papers will begin Nov. 1.

Iron and Steel Markets

LOWER FREIGHTS PENDING

Steel Corporation Reduces Rails to $40

Improvement in Export Trade—German Competition Less a Factor

The general expectation that an early reduction will be made in freight rates on iron and steel is now the controlling influence in the market. Its chief effect in the past week has been to check new business. It is to be credited in part also with the reduction in the price of rails announced by the Steel Corporation on Oct. 22.

In the main the steel trade still proceeds on the belief that there will be no general railroad strike, or that if it comes the outcome will help rather than hurt industry. At the same time there have been efforts that were not in evidence last week, to expedite shipments both of pig iron and finished steel.

The Steel Corporation's statement of earnings in the third quarter of the year, like its predecessor, reflected a larger scale of operations than at most independent works, also the benefits of operations in all producing districts and the importance of certain by-products. Another factor is related to the $95,000,000 fund set up from wartime earnings to absorb reductions in inventory valuations.

That net earnings came within $600,000 of paying the preferred dividend was unexpectedly favorable. Advances in wire and sheet prices applied to little or none of the quarter's shipments; at the same time there were actual recessions in prices of heavy products.

In reducing steel rails from $47 to $40 per gross ton the Steel Corporation directly points to "reductions in freight rates and otherwise, together with larger operations" as its dependence for the repair of its costs. For "larger operations" the railroads must needs release some hundreds of thousands of tons of 1921 rails that have been "frozen" on rail mill books and to which the reduced price will now apply. In addition, free buying of rails for 1922 is confidently looked for.

That independent rail mills will follow the Steel Corporation's reduction is to be expected. However, such mills have relatively much less unspecified tonnage on their books.

Plates, shapes and bars show continued weakness in the presence of any desirable tonnage, and all have sold at 1.50c. to 1.60c., the former price being made on larger business. Fuller operation of mills is the producer's hope of turning present losses into profit. A 25 per cent reduction in freight rates would mean only $3 to $3.50 to the ton of finished steel.

The Steel Corporation's working schedules have improved in the Central West and are stationary at Chicago. As a whole the industry represents 40 to 45 per cent ingot production.

Competition has brought from Buffalo and other mills selling in the East, quotations that disregard the Pittsburgh base, as has been the case in the Chicago district for months.

A noticeable slowing up at automobile works has reduced bolt and nut business from that source, though there have been some fresh sheet orders from the leading maker of low-priced cars. The November program of this interest calls for but 50,000 machines, or less than half the production of recent months.

October is proving one of the best months of the year for export business, meager as that is still. Germany is less of a disturbing factor, prices there having advanced sharply. Some South American wire orders have come to this country from districts recently supplied by Germany.

In rails, 5000 to 6000 tons are under negotiation for Japan and some low bids have been developed.

Fresh construction projects appearing in the week involve 17,000 tons of steel, not including fully 8000 tons of concrete reinforcing bars. Fabricated steel awards approximate 10,000 tons in sizable structures.

Railroad car purchasing includes 1000 for the Erie and repairs for 2500 for the Baltimore & Ohio. The Illinois Central is in the market for 1000 cars, the Lackawanna for 500 and the Burlington for repairs to 500.

Basic pig iron is weaker in the Central West and a $19 Valley price has returned after two months of a $19.25 market. There are evidences of a widening field of Buffalo competition in higher silicon foundry irons, at the expense of Valley furnaces, also of southern Ohio irons going farther afield. In eastern Pennsylvania a sale of 3000 tons of basic iron was made at $20.50 delivered.

Pittsburgh

PITTSBURGH, Oct. 25.

So light does the possibility now appear of an interruption to railroad transportation by a strike, that it is no longer a factor in the iron and steel industry, except indirectly. It is even more generally believed now than it was a week ago that a substantial freight rate reduction will result from the dispute and because of this expectation, business has tapered off considerably. Buyers are interested only in such supplies as will meet their requirements over a few weeks. There is considerable doubt that a reduction in freight rates which would restore the tariffs in effect prior to Aug. 26, 1920, would enable manufacturers to make any further reduction in selling prices, but even if this possibility be forgotten, buyers would derive considerable benefit from a rate cut in the delivered prices. This phase of the matter now is the dominant influence in demand.

Apparently the entire market is in for a quiet period pending the adjustment of freight rates, this matter being referred to in its application to business as the "key log in a jam." Decrease in orders and specifications already has found some reflection in plant operations, but the decline will probably be more pronounced next week than it is this week. There is still fairly high operation of sheet, tin plate, wire and pipe capacity. Makers of tin plate have only limited rollings for next week. Only a small fraction of the heavy ton-

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 25, 1921	Oct. 18, 1921	Sept. 27, 1921	Oct. 26, 1920
No. 2X, Philadelphia†	**$22.84**	$22.40	$21.84	$51.54
No. 2, Valley furnace†	21.00	21.00	21.00	45.00
No. 2, Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2 foundry, Chicago*	21.00	21.00	22.00	43.00
Basic, del'd, eastern Pa.	20.50	20.50	19.25	46.16
Basic, Valley furnace	*19.00*	19.25	19.25	40.00
Bessemer, Pittsburgh	21.96	21.96	21.96	46.96
Malleab'e, Chicago*	21.00	21.00	22.00	43.50
Malleable, Valley	20.50	20.50	20.50	46.00
Gray forge, Pittsburgh	21.96	21.96	21.96	45.96
L. S. charcoal, Chicago	31.50	31.50	31.50	58.50
Ferromanganese, del'd	60.00	60.00	60.00	155.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$47.00	$47.00	$47.00	$57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. sheet bars, P'gh.	30.00	30.00	32.00	62.50
Forging billets, base, P'gh.	35.00	35.00	34.00	65.00
O.-h. billets, Phila.	*34.74*	35.74	35.74	60.74
Wire rods, Pittsburgh	40.00	40.00	41.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.60	1.60	1.60	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.50	1.50	1.60	3.00
Steel bars, Chicago	1.75	1.75	1.75	3.38
Steel bars, New York	*1.80*	1.88	1.98	3.38
Tank plates, Pittsburgh	1.60	1.60	1.60	2.85
Tank plates, Chicago	1.75	1.75	1.65	3.23
Tank plates, New York	*1.88*	1.98	1.98	3.38
Beams, Pittsburgh	1.60	1.60	1.60	3.00
Beams, Chicago	1.75	1.75	1.75	3.38
Beams, New York	*1.88*	1.98	1.98	3.48
Steel hoops, Pittsburgh	2.25	2.25	2.25	5.00

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Oct. 25, 1921 Cents	Oct. 18, 1921 Cents	Sept. 27, 1921 Cents	Oct. 26, 1920 Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	3.00	6.50
Sheets, galv., No. 28, P'gh.	4.00	4.00	4.00	8.00
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.25	4.90
Wire nails, Pittsburgh	2.90	2.90	2.90	4.25
Plain wire, Pittsburgh	2.60	2.60	2.60	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.55	4.45
Tin plate, 100-lb. box, P'gh.	$5.00	$5.00	$5.25	$8.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$16.50*	$17.00	$15.00	$34.00
Carwheels, Philadelphia	17.00	17.00	17.00	40.00
Heavy steel scrap, P'gh.	**14.50**	14.00	14.00	27.00
Heavy steel scrap, Phila.	*12.00*	12.50	11.50	22.00
Heavy steel scrap, Ch'go	*12.00*	13.00	11.75	20.00
No. 1 cast, Pittsburgh	17.50	17.50	17.00	38.00
No. 1 cast, Philadelphia	**17.50**	17.00	17.00	38.00
No. 1 cast, Ch'go (net ton)	*14.00*	14.50	13.50	26.00
No. 1 RR. wrot, Phila.	16.00	16.00	15.50	27.00
No. 1 RR. wrot, Ch'go (net)	*13.00*	13.50	11.50	19.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$3.25	$11.00
Foundry coke, prompt	*4.25*	4.50	4.25	13.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.00	13.00	12.25	15.25
Electrolytic copper, N. Y.	12.75	12.75	12.12½	15.25
Zinc, St. Louis	*4.60*	4.67½	4.35	7.10
Zinc, New York	*5.10*	5.17½	4.85	7.50
Lead, St. Louis	*4.40*	4.50	4.45	6.75
Lead, New York	4.70	4.70	4.70	7.00
Tin, New York	**28.50**	28.00	26.75	40.25
Antimony (Asiatic), N. Y.	*4.85*	5.00	4.60	6.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Oct. 25, 1921, Finished Steel, 2.177c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Oct. 18, 1921,	2.221c.
Sept. 27, 1921,	2.236c.
Oct. 26, 1920,	3.724c.
10-year pre-war average,	1.684c.

Composite Price, Oct. 25, 1921, Pig Iron, $19.97 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 18, 1921,	$20.03
Sept. 27, 1921,	20.10
Oct. 26, 1920,	42.76
10-year pre-war average,	15.72

nage mills is engaged, and while much construction work is in sight, it is hardly likely that much of this business will be placed in time to go forward this winter. The prospects of relatively full employment of the plate, shape and bar mills are somewhat remote.

There is little sign of any immediate increase in the number of active blast furnaces; indeed, the fact that more furnaces are active in the Buffalo district than present requirements necessitate is having some effect, it being reported that high silicon iron from Buffalo has been shipped here, despite the high freight rate, at a lower price than could be made by either Valley or western Pennsylvania furnaces. Moreover, demand for iron in this market is so limited at present that there is an unmistakably softer tendency to prices, which has manifested itself in the sale of a fair-sized tonnage of standard basic at $19, Valley furnace, or 25c. a ton below the recently accepted minimum and $1 a ton below what most makers have been asking.

The fuel market has grown weaker, due to conditions in the iron and steel industry, and also because consumers hope to save on delivered costs through lower freight rates. The scrap market, on the other hand, is slightly stronger because a few melters have found it necessary to have supplies, and dealers have not been slow to take advantage of their necessity. The reduction in standard rail prices announced last Saturday by the Steel Corporation is regarded generally as an overdue adjustment of the price of this product to a level more in keeping with those of other finished steel lines.

Pig Iron.—The market appears to have definitely settled back to $19 for standard basic, as the largest individual sale of that grade made in the past week was at that basis, the order being taken by a Youngstown district steel company. Temporarily, at least, this must be regarded as the regular quotation, and while some makers refuse to consider less than $20, it is quite apparent that this price cannot be done. The American Rolling Mill Co. is reported to have bought 2000 tons of basic in the Ironton, Ohio, district at $22, delivered Middletown. This would mean about $19 at furnace, and is equivalent to about $18, figured back to a Valley basis, the freight from the Valley to Middletown being $4.06 per ton. Only small lots of Bessemer iron are being moved and these generally at $20, Valley furnace. The market on foundry iron is rather uncertain because at the moment there are more sellers than buyers. Small lots of No. 2 plain foundry continue to be sold at $21, Valley, but with Buffalo iron of No. 1 grade coming here at around $23.40, delivered, the structure of Valley prices is threatened. Illustrative of the irregularity of the market is a sale of 300 tons of malleable iron at $21 from a Valley furnace to a consumer whose freight rate is well above $2 per ton.

The monthly meeting of the American Pig Iron Association will be held at the Pittsburgh Country Club tomorrow.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.50

Ferroalloys.—Interest on the part of consumers is negligible. Sales of 50 per cent ferrosilicon, which were fairly numerous, though individually small, recently, have been very few in the past week. The market on this material is quotable at $57 to $60, freight allowed, but the most recent sales were at the lowest figure. Little or no demand is noted for ferromanganese or spiegeleisen, and prices are nominal at $60 delivered for the former and about $30 delivered for the latter. Inquiries for Bessemer ferrosilicon and silveries in this district are few.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $65 delivered; 78 to 82 per cent foreign ferromanganese, $53.28 to $55, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $57 to $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets Sheet Bars and Slabs.—The fact that a fairly good business is coming to all makers of sheets and that business in tin plate is better than it usually is at this time of the year finds reflection in the demand for sheet bars, which are about the only form of semi-finished steel that is showing any life at present. There is no important recognition of the quotation of $34 recently announced by some of the Youngstown district makers, but there is a growing disposition among producers to pass up business at less than $32. Quotations on billets and slabs find little basis in sales and are largely an appraisal of today's possibilities, founded on bid and ask quotations.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30 to $32; Bessemer and open-hearth sheet bars, $30 to $32; slabs, $30 to $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Inquiry is light and efforts to obtain $41, Pittsburgh for common soft rods are unavailing. Consumers were allowed to cover their needs for a considerable period prior to the advance early in September and are largely out of the market. Possibly $40 might be obtained for small lots, but evidently that price is above the ideas of most buyers since export business, carrying a price of $38, has been accepted by some makers. Prices are given on page 1110.

Wire Products.—Manufacturers report fairly satisfactory specifications against the 60- and 90-day contracts entered prior to the advance in prices, effective Sept. 12, or on a base of $2.50 per 100-lb. for wire and $2.75 per keg for bright nails. The higher quotations thus far have been obtained only from the small trade and for small lots. It develops that at least one independent manufacturer never went along with the advance generally made early in September, and this company still is taking business at the old prices.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Structural Material.—The Jones & Laughlin Steel Co. has taken 150 tons for a coal pocket for the Gauley Mountain Coal Co., Ansted, W. Va., and the Pittsburgh-Des Moines Steel Co., reports the award of a high school at Portsmouth, Ohio, which will take 130 tons of steel. These constitute the only important awards with Pittsburgh district shops in the past week, although the Fort Pitt Bridge Co. is low bidder on the filtering plant for Detroit, and probably will be awarded a job which involves 2400 tons of steel. A meeting was held here to-day between the director of public works of Pittsburgh and representatives of the fabrication and contracting companies to discuss plans for a new bridge across the Monongahela River, to replace the present Point Bridge. Between 7000 and 8000 tons will be required for the new structure, but an early letting of the contract is unlikely because there is a wide divergence of views between the city and private engineers over the design. Prices on structural projects are still favorable to buyers because of the intense competition for business. Lately, however, some of the fabricating companies have been raising their bids and giving some thought to overhead costs. It is pointed out that the bids against the Detroit filtering plant were considerably above those submitted against similar projects where the specifications were attractive from the kind of plain material required. There have been no developments yet in connection with the rod and wire mill to be erected by the Wheeling Steel Corporation at Portsmouth, Ohio. On plain material 1.60c. is the common minimum on the bulk of such inquiries as are developing, but it is not disputed that considerably less than this was accepted by the mills which were awarded the steel for the more important projects recently awarded. Prices are given on page 1110.

Plates.—The market still is dull as far as most makers here and in nearby districts are concerned. The reason is that they are trying to maintain a price of 1.75c., Pittsburgh, and this is considerably above what mills in other districts are willing to accept. About 1750 tons of heavy plates and 350 tons of No. 10 gage plates will be wanted for ten 64,000 barrel tanks which a Western tank builder is figuring on. Prices are given on page 1110.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.65c. f.o.b. Pittsburgh.

Steel Rails.—Some confusion exists as to prices of standard rails, but the base price of $40 per ton, referred to in Judge Gary's statement of last Saturday, is commonly accepted as a reduction of $7 per ton, putting Bessemer rails to $38 and open hearth sections to $40. It is figured that the railroads will be making up their requirements for next year within the next five or six weeks. There has been a rather good movement of light sections in the past week, but this is common to this time of the year, when the coal mine operators usually lay in reserves against possible transportation tieups during the winter. The possibility of a railroad strike also has helped the movement. The regular quotation on light sections is $1.75 for 25-lb. to 45-lb. rails but this price has been shaded considerably by mills which are only intermittent producers and also by the rerolling mills.

We quote 25 to 45-lb. sections, rolled from new steel, 1.70c. to 1.75c. base; rolled from old rails, 1.60c. base; standard rails, $38 per gross ton mill for Bessemer and $40 for open-hearth sections.

Iron and Steel Bars.—Makers here and in nearby districts are making an effort to sustain a price of 1.65c., base, and are able to get this figure, or within $1 a ton of it on a few small tonnages. On important projects, however, makers in other districts have gone to as low as 1.50c., Pittsburgh. Demand for iron bars is purely hand to mouth.

We quote steel bars rolled from billets at 1.50c. to 1.65c.; reinforcing bars, rolled from billets, 1.50c. to 1.65c. base; reinforcing bars, rolled from old rails, 1.50c.; refined iron bars, 2.15c. to 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Iron and Steel Pipe.—The slant of demand still is upward in merchant pipe and there is much activity, both actual and prospective, in line pipe. Oil country goods, however, still are slow of sale notwithstanding the recent appreciation in oil prices. All of the pipe plants are busier now than they have been before since early in the year, this being notably the case in the Youngstown district, where 12 of the 17 pipe furnaces are in operation. Observance of the Sept. 16 price card is not especially rigid. Price cutting has been severe in line pipe, cases being noted where as much as 10 per cent in addition to the regular discount has been given to secure orders. There is shading in prices on standard pipe, but the concessions are small by comparison with those in line pipe. Discounts are given on page 1110.

Sheets.—Apparently there is some uneasiness among consumers over the possibility of a railroad strike, as the past week has been a good one in the matter of specifications and orders, notably from jobbers. Last week's business of American Sheet &

Tin Plate Co. is said to have been of proportions which compare favorably with the best week in the history of the company. This company has about 85 per cent of its sheet mills in operation. Independents are averaging slightly above 70 per cent and the industry as a whole probably is going about 75 per cent, largely on orders for early delivery or shipment at the convenience of the manufacturers. Some makers still are taking business in blue annealed sheets at 2.25c. base, but generally the effect of the recent advance of $5 per ton by some of the independent companies has been to stabilize the market at 2.50c. base for blue annealed, 3c. base for black and 4c. base for galvanized. Prices are given on page 1110.

Tin Plate.—The demand is beginning to taper off and in keeping with this condition is a lower rate of operations among the mills. The American Sheet & Tin Plate Co. has about 55 per cent of its tin mills running, as compared with the recent peak of 65 per cent. The chief loss among the independents has been with a Pittsburgh district mill which has dropped from practically full operation to slightly less than 50 per cent. The market is quotable on production plate at $5 to $5.25 per base box on domestic business, but on export sales business has been done anywhere from $4.35 down to $4.15. Consumers are showing some interest in first quarter and first half of 1922 requirements and some business of this sort has been entered, the price to be announced later. The American Sheet & Tin Plate Co. is expected to open its books by Nov. 15.

Bolts, Nuts and Rivets.—Buyers still are taking hold strictly in hand-to-mouth fashion, but their needs are greater than they were a few weeks ago and makers here are consequently liquidating their stocks a little more rapidly. There is good observance of quotations, it being the disposition of most manufacturers to let the other fellow load up with low-priced business. Prices and discounts are given on page 1110.

Spikes and Track Bolts.—Small spikes are in better demand in connection with coal mine operations and development, but the railroads still are juggling their stocks of standard spikes and placing orders only for actual needs. Most orders are priced at $2.30 base for standard spikes and $2.50 for the smaller sizes. Quotations on track bolts are not insisted upon when attractive orders are offered. Prices are given on page 1110.

Steel Chain.—Considerable room for improvement in business still exists, but makers are encouraged by the fact that while the demand is not heavy it is at least steady and orders gradually are increasing. The base price is 5.90c. for 1-in. proof coil and there is not much shading of this figure.

Cold-Finished Steel Bars and Shafting.—Orders are more numerous but they rarely involve more than a carload, and with not enough business to give all makers a share, price cutting is still noted. The regular quotation is 2.75c., base, for carloads but this price has been accepted on less than carloads, and buyers wanting as much as a car of material have been able to cover as low as 2.15c.

Hoops and Bands.—Buyers are specifying fairly well against requirement contracts they were allowed to enter prior to the recent advance of $5 per ton. The general quotation is 2.25c. base, but most of the shipments are priced $2 to $5 per ton below that figure.

Hot-Rolled and Cold-Rolled Strips.—Business is better with all makers, the recent advance to 2.25c. for hot-rolled strips seemingly having stabilized the market. Consumers generally are protected against their requirements over the remainder of the year at 2c. to 2.15c., and the increase in business is explained largely by specifications on the lower costing material. Cold-rolled strips take a range of 3.75c. to 4c., base, the weight of business at the lower figure.

Coke and Coal.—The coke market firmed up slightly during the latter part of last week, due to some fair sized purchases, chiefly from Canada, based upon a fear of a transportation tie-up. Latest indications suggest that the strike is improbable and as the demand has again subsided, prices are back to their recent levels. There were a few sales of spot furnace coke during the flurry at as high as $3.50 per net ton at oven, but in the past day or two $3.35 has become maximum and some good coke has sold down to $3.25. Some contracts are under negotiation, one Valley iron maker seeking 20,000 tons for delivery in equal amounts in November and December and another 10,000 tons a month for three months. Producers still are asking $3.50 against such inquiries but recent business generally has been at $3.30 to $3.40. Demand for foundry coke is not as brisk as it was recently and prices are slightly easier at $4.25 to $4.50 for good brands, with coke of the higher quality fetching $4.75. Not much change is noted in coal. Mine-run steam coal holds around $1.65 to $1.75; by-product from $1.90 to $2.15, and gas from $2.25 to $2.65. Slack is still a drug on the market with steam slack still available as low as $1 per ton at mines.

Old Material.—Prices have resumed their upward march. Demand from steel makers is not particularly heavy, but it exceeds the available supply and they have been obliged to raise their bids at least 50c. per ton to secure even small tonnages. It seems that the Youngstown district steel makers lately have been taking a good deal of heavy melting steel and other open hearth material and paying relatively higher prices than could be obtained here. As this condition still exists, this market effectually is cut off from supplies from the West, due to the lower freight rates to Youngstown, and material cannot be brought from the East and sold profitably at recent local prices. Meanwhile, dealers are holding their yards stocks firmly. We now quote heavy melting steel at $14.50 to $15 per gross ton delivered, and on a sizable tonnage, involving future delivery, dealers will not consider less than $16, with most of them asking even more.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.50 to $15.00
No. 1 cast cupola size	17.50 to 18.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.00 to 17.00
Compressed sheet steel	12.50 to 13.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	10.50 to 11.00
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Low phosphorus melting stock, b'oom and billet ends, heavy plates, ¼-in. and thicker	17.50 to 18.00
Railroad malleable	13.50 to 14.00
Iron car axles	24.00 to 25.00
Locomotive axles, steel	22.00 to 23.00
Steel car axles	15.50 to 16.00
Cast iron wheels	16.00 to 16.50
Rolled steel wheels	15.50 to 16.00
Machine shop turnings	10.00 to 10.50
Sheet bar crop ends at origin	14.00 to 14.50
Heavy steel axle turnings	12.50 to 13.00
Short shoveling turnings	11.50 to 12.00
Heavy breakable cast	15.50 to 16.00
Stove plate	13.00 to 13.50
Cast iron borings	10.50 to 11.00
No. 1 railroad wrought	12.00 to 12.50

American Foreign Steel Corporation Being Liquidated

The affairs of the American Foreign Steel Corporation, Grand Central Terminal, New York, are being liquidated by Henry L. Exstein and Norman W. Korngood. Eli Joseph, president and treasurer, has resigned because of poor health. He has spent most of his time the past few months in Europe in travel in an effort to regain his health. He sailed Tuesday of this week on the Aquitania for Europe.

The scrap yard at Coatesville, Pa., containing about 20,000 tons of old material, chiefly heavy melting steel, has been sold to Luria Brothers & Co., Inc., Reading, Pa. It is equipped with shears, a locomotive crane and other modern machinery. The Luria company now maintains yards at Reading, Lebanon, Pittsburgh, Donora and Coatesville. The Pittsburgh office of the American Foreign Steel Corporation has been discontinued. No announcement is yet made as to the disposition of the Buffalo yard.

Chicago

CHICAGO, Oct. 25.

The railroad strike threat is regarded more seriously than was the case a week ago, and buyers are taking precautionary measures to protect themselves in the event of a tie-up. Spot orders for rush shipments have been placed and the hastening of delivery against previous business has been asked. Although it is true that action of this character is not so general as might be expected in normal times, the seeming indifference of some buyers is probably explained by the inactivity of their plants.

As a whole new buying has fallen off, current purchases being confined to small lots wanted at once. Users are not only cautious because of the possibilities in store if a strike is called, but also because of the belief that lower freight rates are near-at hand. While it is conceded in some quarters that rate reductions will not necessarily lower mill and furnace quotations, which are now admittedly below costs, the transportation charge from producer to buyer will at least be lower in some cases and the reduction may prove a considerable saving to the latter.

It is generally felt that both a reduction in railroad labor and a cut in freight rates must be made before business can get on its feet. If a strike must be gone through to bring this about, the sooner it comes the better. In fact, some feel that a lasting settlement can come only after an actual clash between the railroad managements and their men. That a strike will finally be averted, however, is the general belief of the trade.

Mill and furnace operations are substantially unchanged, the Illinois Steel Co. remaining on a 44 per cent and the Inland Steel Co. on a 35 per cent basis.

Pig Iron.—The threatened railroad strike has brought out some spot carload sales on both iron and coke. In some instances it has resulted in the receipt of calls for rush shipment against previous orders. On the other hand, many buyers do not appear to be at all perturbed for the reason, no doubt, that they have too little business to keep their foundries busy. The Link Belt Co., which entered the market a week ago for 300 to 500 tons of malleable iron for its Indianapolis plant, has bought at a delivered price, which figures back to less than $21, Chicago. However, it is reported that the iron is not from Chicago furnaces, but whether it is resale or from Ohio stacks was not divulged. Other recent sales include 100 tons of foundry iron for local delivery, which brought $21, local furnace, and 100 tons of malleable for a Milwaukee melter. Inquiries include 300 tons of foundry and 100 tons of foundry for western Illinois delivery, 300 tons of low-phosphorus for local shipment and 200 tons of foundry wanted by a local melter in December. Two carload sales of charcoal iron have been made at $28, base, Northern furnace. A few cars of Southern charcoal iron for local and Wisconsin delivery are reported to have been made at $30, base furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50 to $33.50
Northern coke, No. 1, sil. 2.25 to 2.75	21.50 to 22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00 to 22.00
Northern high phos.	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	21.00 to 22.00
Basic	22.00
Low phos., Eastern furnace, sil. 1 to 2 per cent copper free	34.00
Silvery, sil. 8 per cent	30.54 to 34.82

Ferroalloys.—No sales of any of the ferroalloys are reported, but ferromanganese is said to have stiffened, $58.35, seaboard, being named as the present minimum quotation.

We quote 78 to 82 per cent ferromanganese, $61.60, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Railroad Equipment.—The C. B. & Q. is in the market for repair parts for about 500 gondola cars. The Baltimore & Ohio has placed orders for steel gondola car bodies, the distribution being as follows: 1000 to Standard Steel Car Co., 500 to American Car & Foundry Co. and 1000 to the Midvale-Cambria interests. The Virginian has let repairs on 4000 hopper cars to the Virginia Bridge & Iron Co. The Mobile & Ohio is inquiring for repairs on 1000 box cars.

Cast-Iron Pipe.—There is sustained activity in this market and as pipe makers accumulate comfortable backlogs in various sizes their attitude toward prices becomes firmer. In fact, a general advance is predicted in some quarters. On Oct. 31, Detroit takes bids on 17,000 tons of 6 to 48-in. pipe. This inquiry, because of its size, will probably bring out a very close figure notwithstanding the tendency toward firmness in quoting on smaller jobs. Other business in prospect includes:

Columbus, Ohio, 1635 tons of 8 to 20-in., bids to be in Oct. 26.

Ashland, Ky., 200 tons of 12-in., Oct. 26.

Ferndale, Mich., 850 tons of 6 to 8 in., Oct. 24.

Marietta, Ohio, 375 tons, original bids rejected and new figures to be taken Oct. 31.

Recent lettings include:

Cincinnati, 250 tons, to National Cast Iron Pipe Co.

Wawautosa, Wis., 120 tons, divided between United States Cast Iron Pipe & Foundry Co. and James B. Clow & Sons.

Minneapolis, 200 tons, to American Cast Iron Pipe Co., and Fergus Falls, Minn., and Manhattan, Kan., 50 tons each to the same company.

The American Cast-Iron Pipe Co. and James B. Clow & Sons are low bidders on 850 tons for Ferndale, Mich.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Rails and Track Supplies.—The announcement of a reduction of $7 a ton on standard section rails by the Steel Corporation subsidiaries is too recent to beget a response from buyers but it is expected that it will not only release large tonnages against contract but will open up a buying movement for next year. The price of angle bars has not yet been changed, but an announcement is looked forward to this week. New business in track supplies is light, but specifications have been coming in more freely. Demand for light rails continues to be unsatisfactory but competition for this business is sharp, rerolled material being offered at $1 to $2 under billet stock.

Standard Bessemer rails, $38; open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—Conditions in the plate market are substantially unchanged. The Chicago, Burlington & Quincy has placed 1450 tons of plates with a local mill. Considerable tonnage for car repairs is pending and there is business in prospect from the oil industry. The Standard Oil Co. is in the market for 50 stills for Casper, Wyo., involving 900 tons, and 20 stills for Wood River, Ill., requiring 577 tons. A local independent plate mill is idle.

The ruling mill quotations range from 1.75c. to 1.85c. Chicago. Jobbers quote 2.88c. for plates out of stock.

Bars.—Demand for mild steel bars has tapered off, although a fair tonnage continues to come from jobbers, car builders, reinforcing contractors and automobile manufacturers. Operations of automobile makers have slackened noticeably during the past month and, on the other hand, the agricultural implement industry, which has been practically dead all year, has released a few small orders for bars. The reinforcing for the Illinois-Merchants' Bank Building, Chicago, amounting to 240 tons, has been placed, and 110 tons for the Wisconsin Masonic Home, Dousman, Wis., will be furnished by Robertson & Jackson, Inc., Milwaukee. No improvement is to be noted in the demand for bar iron and local makers continue to hold to 1.75c., Chicago. Hard steel bars are moving somewhat more freely and one Chicago district mill expects to operate single turn continuously until the end of the year.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.85c. for rounds and 4.35c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.10c. base.

Sheets.—Sheets continue to be more active than plates, shapes or bars, but no business is moving at the advanced prices announced by certain Eastern independents on Oct. 15.

Mill quotations are 3c. for No. 28 black, 2.25c. to 2.50c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Bolts and Nuts.—A noticeable slowing up in the automobile industry has reduced bolt and nut business coming from that source. The November program of the leading maker of low priced cars is reported to call for only 50,000 machines, or less than half the production of recent months. Demand for bolts and nuts as a whole is very light, so light, in fact, that nominal discounts have undergone no real test. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1110.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Old Material.—Weakness has developed in a number of grades of material and while some dealers attribute this to a growing apprehension of the threatened railroad strike, others regard it as the inevitable reaction of a speculative movement. Whatever be the reason, distress tonnage is making its appearance and sellers who until recently were concentrating on the purchase of railroad material are commencing to unload some of their stocks. Small lots of heavy melting and No. 1 busheling have been bought by users at $12.50 per gross ton and $9.50 per net ton, respectively. Approximately 5000 tons of malleable has been bought by a local consumer at prices ranging from $14.50 to $15.50 per gross ton. A substantial purchase of heavy melting and allied grades amounting to several thousand tons is reported to have been made by a local independent mill, but the terms of the transaction are withheld. Railroad offerings include the Burlington, 7500 tons, and the Chicago Great Western, 300 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$17.00 to $17.50
Relaying rails	25.00 to 30.00
Car wheels	16.50 to 17.00
Steel rails, rerolling	14.00 to 14.50
Steel rails, less than 3 ft.	14.00 to 14.50
Heavy melting steel	12.00 to 12.50
Frogs, switches and guards cut apart	12.00 to 12.50
Shoveling steel	11.50 to 12.00
Low phos. heavy melting steel	15.50 to 16.00
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.50 to 9.00
Axle turnings	8.50 to 9.00

Per Net Ton

Iron angles and splice bars	14.50 to 15.00
Steel angle bars	11.50 to 12.00
Iron arch bars and transoms	15.50 to 16.00
Iron car ax'es	20.00 to 20.50
Steel car axles	14.50 to 15.00
No. 1 busheling	9.50 to 10.50
No. 2 busheling	6.75 to 7.25
Cut forge	11.50 to 12.00
Pipes and flues	8.50 to 9.00
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	12.00 to 12.50
Steel knuckles and couplers	13.00 to 13.50
Coil springs	14.50 to 15.00
No. 1 machinery cast	14 00 to 14.50
No. 1 railroad cast	13.50 to 14.00
Low phos. punchings	12.50 to 13.00
Locomotive tires, smooth	11.50 to 12.00
Machine shop turnings	4.00 to 4.50
Cast borings	5.50 to 6.00
Stove plate	12.75 to 13.25
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00
Railroad malleable	13.25 to 13.75
Agricultural malleable	13.25 to 13.75
Country mixed	9.00 to 9.50

Wire Products.—The rate of buying of recent weeks is being maintained, but orders continue to call for prompt shipment, indicating that material is passing rapidly into the hands of ultimate consumers. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1110.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Structural Material.—The demand for plain material has fallen off slightly, but is somewhat heavier than that for plates. Keen competition for business by both mills and fabricators is still the rule. Revised bids are being submitted on the Omaha Commercial and Technical High School, which will require about 1700 tons of structural shapes and 1000 tons of reinforcing bars. Fabricating awards include:

Elks' Temple, Portland, Ore., 1659 tons, to Western Structural Steel & Tank Co.

Elks' Lodge, Phoenix, Ariz., 831 tons, to Wisconsin Bridge & Iron Co.

South Side Masonic Temple, Chicago, 450 tons, to American Bridge Co.

Pennington County Court House, Rapid City, S. D., 254 tons, to Federal Bridge & Structural Co.

Stupp Bros. Bridge & Iron Co., St. Louis, five roof trusses, 190 tons, to American Bridge Co.

Pending business includes:

Illinois Life Insurance Building, Chicago, 150 tons.

The mill quotation on plain material ranges from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Buffalo

BUFFALO, Oct. 25.

Pig Iron.—Radiator interests have bought considerable iron in this district and the tonnage is said to aggregate about 15,000 tons, but details as to where this business was placed are not available. Part of the rumor refers to 3000 tons for use at a Buffalo plant and the balance to other points. About 3000 tons has been sold in small lots by one producer at $20, but the schedule of differentials has been abandoned and the same price is made without reference to silicon. One furnace sold 140 tons of 2.50 per cent silicon at $21, the only sale in several weeks. A furnace which has sold its output for the balance of the year has turned down about 20,000 tons of new business within two weeks.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.00 to $22.00
No. 2X foundry, 2.25 to 2.75 sil.	20.50 to 21.50
No. 2 plain, 1.75 to 2.25 sil.	20.00 to 21.00
Basic (nominal)	21.00
Malleable	21.00 to 22.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—Sheet and bar business is firmer, with fair business in pipe, particularly butt weld. Structural business in small tonnages has picked up in some quarters, but the admission is general that large jobs will not be placed within the near future. In this connection the bids on the new Coplon building will be refigured, involving 1600 tons of shapes and 300 tons of reinforcing bars. Wire business is unchanged and a healthy increase is apparent from week to week. The Kellogg Structural Steel Co. will fabricate 400 tons for a Syracuse project. One Buffalo maker has withdrawn practically as a selling factor in billets and bars, due to price conditions. Action on the program to build seven elementary schools and one high school in Buffalo is closer to realization after long controversy. Contracts will be awarded on this work in November.

Warehouse Business.—Anticipated trouble on the railroads has served to quicken demand, particularly for sheets, bars and shafting. Warehouse business in this district is handled to a large extent by trucks, as the territorial arrangements are such that a large majority of customers are within driving distance of Buffalo and the larger warehouses are expecting to meet a tie-up in a satisfactory manner. Nevertheless, warehouse customers have found it advisable to speed up shipment requests, with the result in one instance of stimulating business to a marked degree. We quote warehouse prices f.o.b. Buffalo, as follows:

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 5.90c.

Old Material.—Buying of heavy melting steel by several mills and a movement of cast scrap represent the entire activity. Steel is fairly firm at $13.50, but some dealers are not disposed to sell at this price, believing the market will soon advance. Most of the

mills are well stocked with old material and on the average have sufficient stocks to operate two or three weeks without regard to a possible tie-up in the transportation lines.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.004 and under	15.50 to 16.50
No. 1 railroad wrought	13.00 to 14.00
Car wheels	14.00 to 15.00
Machine shop turnings	6.00 to 7.00
Cast iron borings	6.00 to 7.00
Heavy axle turnings	9.00 to 10.00
Grate bars	10.50 to 11.00
No. 1 busheling	10.00 to 11.00
Stove plate	13.00 to 14.00
Bundled sheet stampings	7.00 to 8.00
No. 1 machinery cast	16.50 to 17.50
Hydraulic compressed	10.00 to 10.50
Railroad malleable	12.00 to 13.00

St. Louis

ST. LOUIS, Oct. 25.

Pig Iron.—The impending railroad strike has stimulated some carload orders for pig iron and hastened some shipping instructions on orders already placed, but as a general proposition little heed has been paid to the threatened walk-out. Prices are being well maintained, with the Granite City producers meeting the price of $21, f.o.b. Chicago. This price also is being made on resale iron, although some producers are holding their output for $22, being well booked ahead. Chief interest in inquiries was in one for several thousand tons of basic for a Southern Ohio melter. A Southern melter wants 1000 tons of malleable for first half shipment. One of the car wheel makers in this district has asked for quotations on 500 tons of foundry iron. A nearby user has an inquiry out for 400 tons of foundry iron for quick shipment. Sales for the week were confined largely to carload orders. Two cars of 50 per cent ferrosilicon and two cars of 80 per cent ferromanganese were purchased during the week.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$23.88 to $24.88
Northern malleable, sil. 1.75 to 2.25	23.88 to 24.88
Basic	23.88 to 24.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—The Missouri, Kansas & Texas Railroad, which issued the largest requisition for machine tools of the year, as given in THE IRON AGE last week, gave out a list this week of 11 items to be added to the 75 already listed. This railroad also has asked for first deliveries on its orders already placed for 13,500 tons of 90-lb. rails, all of which are to be delivered within the next two months. The Missouri Pacific continues to buy freely, purchases being confined to smaller items. It has, however, inquired for 2000 kegs of standard spikes. Plans are expected to be put out within the next week for an addition to Hotel Jefferson, which has been delayed for several years, involving considerable structural steel and a small tonnage of reinforcing bars.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—A few users of coke placed some orders for carloads of coke and others speeded up shipping instructions, but the strike threat has made little difference one way or the other. The inquiry for 60,000 tons of furnace coke for shipment within 12 months, mentioned last week, is still pending. A nearby gas plant has closed a contract for from 300 to 800 tons of coke for gas-making purposes. Standard Connellsville foundry coke is firm at $4.75 to $5.50.

Old Material.—Prices of old material are unchanged. The market is somewhat weaker as a result of the threatened railroad strike, although as a rule recently prevailing prices have been maintained. One of the largest consumers in this district is in the market for special heavy melting steel, such as couplers and knuckles, springs and solid steel wheels, but the highest price paid by the consumer was $14 per gross ton, while dealers are bidding the railroads about $2 per ton above this figure for these special grades. This goes to show the wide difference of opinion between the consumers and dealers as to the market value of old iron and steel to-day. There are no railroad offerings of consequence before the market this week.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$15.50 to $16.00
Steel rails, rerolling	13.50 to 14.00
Steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard section	30.00 to 32.00
Cast iron car wheels	15.50 to 16.00
No. 1 heavy railroad melting steel	12.00 to 12.50
No. 1 heavy shoveling steel	11.50 to 12.00
Ordinary shoveling steel	11.00 to 11.50
Frogs, switches and guards, cut apart	12.00 to 12.50
Ordinary bundle sheet	7.00 to 7.50

Per Net Ton

Heavy axles and tire turnings	$7.50 to $8.00
Iron angle bars	13.00 to 13.50
Steel angle bars	11.00 to 11.50
Iron car axles	20.00 to 20.50
Steel car axles	15.50 to 16.00
Wrought iron arch bars and transoms	15.50 to 16.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
Railroad springs	13.00 to 13.50
Steel couplers and knuckles	13.00 to 13.50
Locomotive tire, 42-in. and over, smooth inside	10.00 to 10.50
No. 1 dealers' forge	10.00 to 10.50
Cast iron borings	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 1 borings cut in sheets and rings	8.00 to 8.50
No. 1 railroad cast	15.00 to 15.50
Stove plate and light cast	12.00 to 12.50
Railroad malleable	11.50 to 12.00
Agricultural malleable	10.50 to 11.00
Pipes and flues	8.50 to 9.00
Heavy railroad sheet and tank	8.00 to 8.50
Light railroad sheet	5.50 to 6.00
Railroad grate bars	10.50 to 11.00
Machine shop turnings	6.00 to 6.50
Country mixed iron	8.00 to 8.50
Uncut railroad mixed	9.00 to 9.50
Horseshoes	11.00 to 11.50
Railroad brake shoes	10.50 to 11.00

Cincinnati

CINCINNATI, Oct. 25.

Pig Iron.—Interest in the market was centered in the purchase of approximately 3000 tons of basic iron by a steel plant in this district. This tonnage was divided between a Lake furnace and a southern Ohio furnace and the price is understood to have been close to $22, delivered. A Southern furnace is reported to have offered in the neighborhood of 10,000 tons, now piled against contracts, at $18.50, Birmingham, for No. 2 soft, and $19, Birmingham, for silicon of 2.75 to 3.25 per cent, the iron to be moved before the first of the year. Some of this iron was disposed of in small lots, averaging about 300 tons each, and most of it is destined for points south of the Ohio River. The great majority of the sales being made are for carload lots, though occasionally one for upward of 100 tons is reported. A sale of 1000 tons of Southern foundry iron is reported, and an Ohio melter bought 500 tons of Northern. An Indianapolis melter is reported to have taken 300 to 500 tons of malleable iron, the iron coming from a Lake furnace. A Dayton manufacturer took three cars, and a Louisville melter 100 tons. The market is softer in some districts, and it is reported that Chicago district resale material is available at $25. Lake furnaces are reported to be quoting slightly under $20 in competitive territory, and Southern resale iron is available at $18.50, but the usual asking price of Southern furnaces is $19, base. Ironton producers are holding firm at $21.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silver, 8 per cent sil.	$32.86
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	24.02

Finished Material.—Practically all of the independent sheet manufacturers have now advanced their prices $5 a ton over those prevailing for the past three

or four weeks and with the exception of the leading interest quotations are now at 2.75c. for blue annealed, 3.25c. for black and 4.25c. for galvanized. Quite a little pick-up business in sheets has been noted in the week, and in one case an order for 300 tons of galvanized sheets was booked. The market on bars, shapes and plates has shown only fair activity and the business is confined usually to carload lots, though occasionally an order for 150 tons is placed. Some orders for wire nails and wire products are also being received, but the tonnages are small. There is little activity in the structural field, although the prospects for the future are encouraging. Dayton, Ohio, has approved plans for the elimination of grade crossings in that city, involving an expenditure of approximately $23,000,000, which will likely go ahead as soon as railroad finances permit. A Masonic Temple for Louisville, Ky., costing $500,000, and an 11-story office building for the Provident Bank Building, Cincinnati, are other projects which will likely come up in the near future. The Big Four Railroad is inquiring for two turn tables which will take about 150 tons. The Virginia Bridge Co. will supply the steel for the Catholic Club at Memphis, about 660 tons, and 750 tons for a highway bridge over the Warrior River at Tuscaloosa, Ala. The Insley Mfg. Co., Indianapolis, will fabricate 250 tons for the Terrace Theater, Indianapolis, and the Dayton Structural Steel Co. 180 tons for two aeroplane hangars at Dayton. An addition to the plant of the Miami Woolen Mills Co., Hamilton, Ohio, will require 300 tons of concrete reinforcing bars. The U. S. Engineers office, Cincinnati, will receive bids until Nov. 18 for furnishing and erecting steel lock gates for locks No. 30 and 32 on the Ohio River.

Warehouse Business.—Local jobbers continue to report gradual improvement and while orders are small, they are more numerous. Prices continue to hold at recent levels, though an advance in sheet prices will likely be made within the next week.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.10c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Tool Steel.—A slight improvement is noticed in the demand for tool steel. Quotations are practically unchanged, 18 per cent tungsten high-speed steel being quoted at 90c. per lb. base.

Coke.—Prospects of a railroad strike have given the coke trade a big impetus, and requests to rush coke were very numerous in the week. Some ovens are getting behind on shipments, and are now taking orders subject to delay. The price situation is firm and unchanged.

Old Material.—There is very little inquiry in the scrap market. Prospects of reduced railroad rates in the near future put a damper on other than immediate needs. The price situation is weaker, but in the absence of any trading in this district quotations remain nominally unchanged.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$4.50 to $5.50
Iron rails	12.50 to 13.00
Relaying rails, 50 lb. and up	25.50 to 26.50
Rerolling steel rails	11.00 to 12.00
Heavy melting steel	9.50 to 10.00
Steel rails for melting	9.50 to 10.50
Car wheels	12.50 to 13.50
Per Net Ton	
No. 1 railroad wrought	9.00 to 10.00
Cast borings	3.50 to 4.00
Steel turnings	2.50 to 3.00
Railroad cast	12.50 to 13.00
No. 1 machinery	14.00 to 15.00
Burnt scrap	8.00 to 9.00
Iron axles	16.00 to 17.00
Locomotive tires (smooth inside)	10.00 to 10.50
Pipes and flues	4.50 to 5.50

Investigation of the coking of Utah coals, carried on by Professors S. W. Parr and T. E. Layng of the University of Illinois, has been covered in report No. 2278 of the Bureau of Mines. From this report it appears that good coke was produced from all the coals tested, involving low temperature distillation, among other things.

New York

NEW YORK, Oct. 25.

Pig Iron.—A good many foundries are asking to have pig iron shipments expedited. Otherwise there is little evidence of effort to safeguard against a railroad strike. Buying is meager, with practically none that is recognized as precautionary. Most of the new inquiry is for carload lots. Apparently the anticipation of lower freight rates is holding things back. Two or three important up-State foundries have closed for iron in the week, transactions in these cases making a total of 6000 or 7000 tons. This buying was chiefly by radiator and heating furnace companies, Buffalo producers taking the business. A recent pig iron transaction involving a round tonnage sold by a steel company to a large manufacturer seems to have involved an exchange of products and therefore the price basis is obscured. Perhaps more has been made in market talk of the reported purchase of Luxemburg iron by an Eastern cast iron pipe company. A transaction of 1000 tons is indicated and the price named is $19, c.i.f. Atlantic port. The jobbing foundry situation shows wide variations in the rate of operation. Generally speaking, a slight increase in the melt of foundry iron in the district tributary to New York is noted. The few foundries that are running at a good rate seem to be doing so at the expense of others.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	23.02
Buffalo, sil. 1.75 to 2.25	25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16

Ferroalloys.—Demand for ferromanganese is exceedingly light, the only inquiry noted being one for 100 tons. Both American and British sellers are quoting on a basis of $58.35, seaboard, though the German alloy can be obtained as low as $53, seaboard. The spiegeleisen market is quiet at prevailing quotations, sales being confined to small lots. There is no demand for manganese ore. The 50 per cent ferrosilicon market is lower, due to offerings recently under $60, delivered. One sale is reported as low as $57.50, Pittsburgh, and it is stated $56 can be done. The ferrochromium market has collapsed and the alloy can be obtained for 10c. to 11c. per lb. of contained chromium, whether it be the 4 to 6 per cent or 6 to 8 per cent carbon grade. Quotations are as follows:

Ferroalloys	
Ferromanganese, domestic, delivered, per ton	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton	$56.00 to $60.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	10c. to 11c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ores	
Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Warehouse Business.—Although there is an undercurrent of feeling that the weakness in prices of such materials as bars, plates and structural steel warrants recognition by a revising of prices out of warehouse, no changes of price have been made yet. Sheet prices continue stiff, with a tendency of smaller dealers, selling lots of a few bundles out of stock, to increase prices. Prospects of a railroad strike have apparently had no effect on consumers in this district and warehouses generally are not making any particularly great effort to increase their stocks. The pipe market shows no change for the better. Brass and copper warehouses, however, report a gradually increasing business, consumers beginning to show a tendency toward carrying larger stocks. Prices on all brass and copper products are quite stiff, and the number, if not the size, of orders now being received is encouraging. We quote prices on page 1126.

High Speed Steel.—Sales of high speed steel con-

tinue ridiculously small, but prices are unchanged as producers do not believe that business can be stimulated at any price. Reports are current of importations of German steel at low prices. During the past two weeks there has been some buying by Government departments. Producers quote 18 per cent tungsten high speed steel at 90c. to $1 per lb.

Finished Iron and Steel.—Eastern steel companies are generally disregarding the Pittsburgh basis in quoting on desirable business. Their advantage in geographical location nets them prices at mill somewhat in excess of the Pittsburgh base prices, but the delivered prices are lower in many instances than the corresponding prices of Pittsburgh or other Central Western mills. For example, steel bars have been sold at 1.80c., New York, by Eastern mills, which if figured back to a Pittsburgh basis would mean 1.42c., but which actually net the mills nearer 1.60c. at mill. The same is true on plates, which have been sold at 1.50c., Pittsburgh, or lower by Eastern mills, though by reason of location the mills have been able to net above 1.50c. at mill. The American Locomotive Co. is reported to have placed 800 tons of plates with two or three mills at prices which correspond to 1.50c., Pittsburgh. On structural shapes 1.50c., Pittsburgh, can be done on anything desirable, and even this figure is reported to have been shaded. The lowest bid reported on fabricated work is $44, delivered New York, this being a beam and column job. Business in sheets continues fairly active, but the recent advance of $5 a ton has not generally been recognized and 2.50c. for blue annealed, 3c. for black and 4c. for galvanized represent the market on these three grades, these being Pittsburgh base prices. Bar iron is quoted from 1.60c. to 1.65c., Pittsburgh. Low prices on steel for export are being made. On rails, for example, the new domestic price of $40 per ton is still $10 above the price at which some export business has been taken, while in tin plate for export pronounced weakness continues, orders having been taken at $4.20 per base box, Pittsburgh. Though not much railroad business is expected until the threatened strike is settled, a few new inquiries for cars have come out. The Illinois Central is in the market for 1000 refrigerator cars and the Delaware, Lackawanna & Western for 500 steel underframe box cars. The Erie Railroad has placed 1000 steel hopper cars with the Greenville Steel Car Co. for repairs. Structural inquiry continues fairly active and is in excess of the volume of work being placed, although that, too, shows a slow but steady improvement. The Jamaica Boulevard, mentioned last week as requiring 500 tons of fabricated steel, will also need 5000 tons of reinforcing bars, on which bids are now being received. The Sinclair Refining Co. is inquiring for 16 storage tanks, requiring 2700 tons. New work on some of which bids have gone is as follows: 900 tons for a plant for the Archer-Daniels Co., Edgewater, N. J.; 200 tons for a boiler shop for the Charleston Engineering Co., Charleston, S. C.; 800 tons for an apartment house at Broadway and Eighty-fifth Street, New York; 600 tons for an apartment house in East Eighty-eighth Street, New York; 300 tons for an extension of the electric light plant at Fort Worth, Tex.; 3100 tons for the Public Service Commission for an extension of the Queensboro subway west in Forty-second Street to Eighth Avenue, New York; 1000 tons for a highway bridge over the Neponsit River at Commonwealth, Mass.; 700 tons for the Kaufman department store, Harrisburg, Pa. Contracts include the following: 900 tons for an apartment house at Fifth Avenue and Seventy-third Street, New York, to McClintic-Marshall Co.; 450 tons for an addition to Heyman Brothers' store, Philadelphia, to Belmont Iron Works; 300 tons for the Lehigh & New England Railroad to unnamed fabricator; 300 tons for a head frame for the Hudson Coal Co., Providence, Pa., to unnamed fabricator, and 400 tons for a factory building at Syracuse, N. Y., for the Lamson Co., Boston, to Kellogg Structural Steel Co., Buffalo, N. Y.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.80c. to 1.88c.; plates, 1.88c. to 2.03c.; structural shapes, 1.88c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Cast-Iron Pipe.—On the 1000 tons of 12-in. pipe, bids for which were opened by the city of Yonkers, N. Y., on Monday, the United States Cast-Iron Pipe & Foundry Co. was low bidder with a delivered price of $42.40 a ton. Requests are frequent for the speeding up of shipments in anticipation of a railroad strike. Pipe foundries are busier in the New Jersey and Pennsylvania district than in the Virginia district. The usual periodical slump is being felt. Extremely cold weather would lessen business even more markedly. We quote per net ton, f.o.b New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—By some it is believed that lower freight rates would help the scrap business, as it would enable local brokers and dealers to compete in markets further away; by others it is thought that lower freights would mean lower finished steel, and hence lower prices paid for scrap. Many believe that the railroad strike agitation will hasten the establishment of lower freight rates. Prices remain the same, with the tendency upward. Rerolling rails have declined proportionately to the decrease in the finished rail prices.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$8.00 to $8.50
Steel rails, short lengths, or equivalent	9.50 to 10.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	30.00 to 35.00
Steel car axles	11.50 to 12.00
Iron car axles	20.00 to 20.50
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track	9.50 to 10.00
Forge fire	6.00 to 6.50
No. 1 yard wrought, long	10.50 to 11.00
Light iron	4.50 to 5.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	4.00 to 4.50
Mixed borings and turnings	4.00 to 4.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	9.00 to 9.50
Stove plate	10.00 to 10.50
Locomotive grate bars	10.00 to 10.50
Malleable cast (railroad)	8.50 to 9.00
Car wheels	12.50 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to 17.00
No. 1 heavy cast, not cupola size	15.50 to 16.00
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Birmingham

BIRMINGHAM, Oct. 24.

Pig Iron.—Sales in the past week did not aggregate a large tonnage, but inquiry is good and the market was firm at the end of the week. One maker booked 900 tons in six lots and others in proportion. High silicon irons brought the 50c. differentials. Weakness in Northern markets was not reflected in Birmingham, although it is apparent that the business of the past week was almost entirely in the South where Birmingham iron has no competition. Makers did not receive as many requests for rush shipments of iron prior to Oct. 30 as they expected on the strike threat, but there were sufficient of these rush orders to aid considerably in reduction of stocks. Huge gaps can be seen in the mountains of iron so long on the yards of the one interest having well-assorted stocks. In other instances the iron is moving out as made because there were no yard stocks. Southern melt is still increasing. Numbers of small foundries are on full turn, among them being several stove foundries. Jobbers seem to have gotten very low in stocks during the dull period and some stove makers are unable to supply all demands. Furnace operators discount strike talk, but have taken steps to increase the supply of raw materials. Charcoal iron demand that caused resumption at two charcoal furnaces comes from makers of rolls and not from car wheel plants. Charcoal iron shipments are also from furnace, there being no stocks.

Cast Iron Pipe.—All three Birmingham high pressure pipe makers continue to make regular bookings in the Middle West as well as in the South and South-

west. Demand is better than was expected at this time. Sanitary shops are operating close to normal. More than one interest has advanced price of standard pipe to $45 and extra heavy to $40, fittings to $50. Some of the largest makers remain at the old schedule of $40 for standard, $30 for extra heavy and $45 for fittings. The Pacific Coast took a fair tonnage of sanitary pipe to escape the rise of $4 per ton in ocean rates out of Mobile.

Coal and Coke.—The Barrett Co. is having its coke made of pitch in beehive ovens leased from the Republic Iron & Steel Co. tested in Birmingham foundries and reports are satisfactory. Some has been exported. The Barrett Co. has 25,000 tons of this pitch on its Ensley tarvia works yards. The Tennessee company has shipped 23,000 bags of ammonium sulphate from the Ensley by-product works to China and Japan.

Finishing Mills.—The Tennessee company is operating double turn in the rail and blooming mill and full at the Bessemer plate and guide mills, but the Fairfield plate and structural mills are idle this week. Five of the nine open-hearth furnaces are running. The Gulf States Steel Co. remains at about 75 per cent and structural steel works average 70 per cent.

Old Material.—Steel consumers will not pay more than the quoted price for No. 1 steel and efforts to raise it have not materialized. Scrap is quite active at current prices.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$19.00
Basic	18.00
Charcoal, warm blast	35.00

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

San Francisco

SAN FRANCISCO, Oct. 19.

Pig Iron.—Perhaps the most conspicuous business recently is the sale of approximately 2000 tons of German pig iron to local interests at about $26, ex-ship, San Francisco. Around one-half the tonnage analyzed from 4 to 5 per cent silicon, while the other part contained the normal amount of silicon. This iron ran under 0.05 per cent sulphur, and about 1.00 per cent each of phosphorus and manganese. It is understood that importers are now working on a further tonnage of German material. Lower prices than $26 have been heard lately, and smaller sales have been reported, but are not particularly noteworthy. The Southern Pacific Co. has placed an order for 250 tons of malleable Bessemer, from 1 to 2 per cent silicon, as well as 200 tons of foundry iron, containing from 2.25 to 2.75 silicon.

Coke.—The placing of an order for 600 tons of domestic coke is about the only indication of activity. There is a quantity of English coke being offered around $21 to $22 a ton, ex-ship, San Francisco, but buying interest has not been pronounced.

Old Material.—A routine business is being done, and in a little greater volume than heretofore. Certain mills, such as Pacific Coast Steel, are taking a steady quantity, estimated at about 4000 tons monthly. Prices are nominal. There is the tendency of holders to refrain from selling at current prices. To avoid buying domestic scrap some mills have purchased rather heavily of Belgian billets which are arriving at present, which is reported as being offered at about $28, San Francisco.

Cast Iron Pipe.—The volume of inquiry from municipal sources in California shows an increase and there are several good prospects in sight. On Oct. 20 the city of Glendale is asking for bids on 150 tons of 4-in. pipe, 760 tons of 6 to 12-in., and 30 tons of fittings. An order originates in San Diego for 660 tons of 4 and 6-in. pipe. The Los Angeles Water Dept. will receive bids on Oct. 21 for 650 tons of 4-in., 550 tons of 6-in., 153 tons of 10-in., and 86 tons of 8-in. On Oct. 28 bids close for 3700 tons of 24-in. pipe also from Los Angeles. The city of Taft is inquiring for 10,150 ft. of 4-in. and 42,020 of 6-in. pipe. Private orders are not heavy. The market continues irregular at about $33, base.

Finished Iron and Steel.—The distinctly better tone, which developed two or three weeks ago, still prevails. In certain lines activity and prospects are good, particularly in sheets, plates and shapes. The volume of inquiry and actual business is gratifying. There are several inquiries for considerable quantities of material. One for 900 tons of sheets from a fabricating shop; another for 5000 tons of plates, shapes and rivets, and an oil interest is figuring on 10 65,000-bbl. tanks. An encouraging feature is said to be the good amount of buying for stock by jobbers and handlers. Prices seem to be stabilizing, although at present some fluctuation is found. The bar market is quieter but a fair amount of inquiry is reported.

Boston

BOSTON, Oct. 25.

Pig Iron.—The market is quieter, business being confined mostly to scattered car lots. Strike talk apparently has little influence on demand and shipping instructions. Sales include 400 tons Lake charcoal iron at $30, furnace base; 250 tons Buffalo iron, silicon 2.75 to 3.25, at $20 base, and a car of malleable at $20.50, furnace, to a local melter for prompt shipment; and 200 tons Buffalo No. 2X at $20.50, furnace, to a Framingham, Mass., company. A radiator manufacturer signifies a willingness to purchase 6000 tons No. 2 plain for first quarter at less than the present market and another heater interest is endeavoring to close on 500 tons No. 2 plain and 500 tons No. 2X first quarter iron, but few furnaces have opened their 1922 books. Otherwise prospects are scarce, foundries awaiting freight rate developments. Prices hold steady and, with the exception of eastern Pennsylvania, take a narrow range. Eastern Pennsylvania iron is quoted on a basis of $20 to $23, furnace, for No. 2 plain, or $24.06 to $27.06, delivered, where the rail rate is $4.06. Attractive rail and water rates to Long Island Sound points are offered, however, approximately $3, delivered, being possible. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$24.56 to $27.56
East. Penn., silicon 1.75 to 2.25	24.06 to 27.06
Buffalo, silicon, 2 25 to 2.75	25.96 to 26.49
Buffalo, silicon 1.75 to 2 25	25.46 to 25.96
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Forgings.—Greater activity is noted in both light and heavy steel forgings, especially the latter. Good business was placed this week by mill interests in Worcester, Mass. Prices, due to keen competition, are in favor of the buyer.

Finished Material.—The New England Structural Co. is awarded 700 tons of structural steel by the Federal Street Realty Trust for the Harris, Forbes Co. building, Boston. Bids will be opened this week on 600 to 700 tons for a Neponset River, Quincy, Mass., bridge, and on 200 tons for a local telephone exchange, on 200 tons for a Boston office building and on 600 tons for a Providence, R. I., high school. A northern mill has met competitive bidding by Pennsylvania mills and has booked more business on plates, shapes and bars so far this month than it did in the correspondng days of September. Broadly speaking, the finished steel market is quieter, with bars obtainable in small or large tonnages at 1.50c., Pittsburgh, and plates and shapes at 1.60c. Reinforcing bars are inactive, 200 tons at 1.50c., Pittsburgh, representing the largest sale the past week. One mill is selling bars from local stock, cut to specification, at 2.10c., delivered. The Collins Co., Collinsville, Conn., has closed its steel manufacturing plant for an indefinite period. The company can purchase steel requirements in the open market for less than it can produce them. Rail specifications placed by New England railroads earlier in the year have been cleaned up. The Wickwire-Spencer Steel Corportaion's New England plants are operating at approximately 75 per

cent of capacity and the American Steel & Wire Co.'s plant 50 per cent on the average.

Warehouse Business.—Local warehouse prices on steel ovals, half ovals and bevels have been dropped $1.68½ per 100 lb., on steel half rounds $1.18½, on open hearth spring steel 75c., steel hoops 71½c., steel flats 51½c. to 61½c., deformed bars in stock lengths 35c., toe calk steel 25c., tire steel 20c. to 30c., steel bands 20c., best refined iron 50c., Wayne iron $1, while all siles of refined iron are now $2.81½c., whereas heretofore it was quoted at $2.85 to $4.75, according to size. Norway iron is quoted at $5.50 flat, as against $5.75 to $6.50, according to sizes, heretofore. The demand for iron and steel is more active, some of the warehouses having increased truck deliveries 100 per cent. Demand for bolts and nuts is increasing and prices are reported as firmer but unchanged. A cut of about 5 per cent in Eagle carriage bolts is indicated, however. Small iron rivets are 50 and 10 per cent discount, as contrasted with 50 per cent heretofore, Cap screws are irregular in price while machine are strong and in greater demand.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.31½; concrete bars, $2.15 to $2.81½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.73 to $3.78; steel hoops, $3.46½; toe calk steel, $5; cold rolled steel, $3.75 to $4.25; structural steel, $2.91½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.81½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Coke.—Some foundries, uneasy over strike talk, have ordered November by-products coke shipped immediately. In addition, others are ordering in larger supplies as is natural at this season. The movement of foundry coke from New England producing plants has increased as a result, but the tonnage involved is not sufficient to warrant increased production. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to quote on a delivered basis of $10.66 where the local freight rate does not exceed $3.40. No Connellsville foundry coke is coming into New England except on old contracts.

Old Material.—The general situation is little changed as to scrap used in foundry practice. Most of the foundries are able to supply their machinery cast wants from local dealers at prices slightly under those quoted by the large interests. The latter are holding firmly to prices quoted a week ago, owing to the cost of material on hand. A Massachusetts railroad accessory manufacturer is offering $16, delivered, for stove plate, but the available supply at that figure is apparently small. Dealers' prices on other kinds of material are firmer due to purchases for the account of the Bethlehem Steel Co., but with the exception of borings and turnings, which are 25c. to 50c. stronger, are not quotably higher.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	16.00 to 16.50
Railroad malleable	13.50 to 14.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.50 to $8.00
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	3.75 to 4.00
Cast iron borings, rolling mill	4.50 to 5.00
Cast iron borings, chemical	5.00 to 5.50
Blast furnace borings and turnings	3.75 to 4.00
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	12.50 to 13.00
Car wheels	11.50 to 12.00
Rero'ling rails	10.00 to 10.50

In United States court in Buffalo, the Buffalo Union Furnace Co. is suing the Emergency Fleet Corporation to recover a settlement on 1250 tons of pig iron alleged to have been contracted for by the corporation and refused when delivery was offered after the armistice was signed Nov. 11, 1918. Judge John R. Hazel's decision in the matter is awaited with considerable interest as much litigation is expected to be settled on the basis of the decision. It is claimed a number of corporations have similar claims against the Emergency Fleet growing out of conditions immediately following the close of the war.

Philadelphia

PHILADELPHIA, Oct. 25.

Instead of the prospective railroad strike having brought about an increased demand for steel, pig iron, coke and other allied products, quite the reverse seems to be true. A few of the steel companies report a better business during the past week, but generally the market has been quiet. A widespread impression prevails that the strike will not take place, and if it does that it will not prove serious nor be of long duration. With this factor at least partially eliminated from the calculations of buyers, their hesitant attitude with regard to purchases is credited to the general expectation of freight rate reductions within the near future. A good deal of information has come out of Washington of a so-called "confidential" nature that something is in store in the way of general decrease of transportation charges and this seems to have affected buyers to no small degree. Moreover, steel prices have again weakened.

The steel price situation presents some peculiarities. It is complicated by the fact that some Eastern mills are often disregarding Pittsburgh basing and are quoting on a mill basis. For example, an Eastern plate mill is reported to have recently taken a tonnage of plates at 1.70c., mill, though if figured back to Pittsburgh the price would have been 1.35c. On plates, shapes and bars the usual quoting prices range from 1.60c. to 1.65c., Pittsburgh, and quite a few orders are being booked within this range, but on especially desirable business it has been possible for buyers to obtain quotations of 1.50c., Pittsburgh, on all three products.

In pig iron there is an undertone of strength. One important Eastern maker has advanced its quotations to $21 for No. 2 plain, $22 for No. 2X and $23 for No. 1X, all f.o.b. furnace, so that now all eastern Pennsylvania furnaces are quoting substantially identical prices. Scrap likewise continues firm with an upward trend in prices.

Pig Iron.—The past week has been very quiet. The only sale of importance was about 3000 tons of basic iron to an Eastern consumer at $20.50, delivered, the sale having been made by a furnace which had the iron on its bank. Another Eastern steel maker is in the market for 1500 tons of basic. A sale of 300 tons of No. 2 plain iron to a Norristown, Pa., consumer is reported at $21.75, delivered. An important Eastern maker which has been quoting on the basis of $20.50, furnace, for No. 2 plain has advanced this price to $21 and is quoting $22 for No. 2X and $23 for No. 1X. All of the active Eastern furnaces are now substantially on the same basis, and to this extent the market presents an appearance of firmness, which is borne out further by the fact that most of the active furnaces are fairly well sold up for the remainder of the year and therefore are not attempting to force iron on the market. Two or three furnaces which may go in blast before the end of the year will probably not attempt to sell at concessions in prices, but on the contrary hope to find the market in a stronger position before they begin to sell. The Thomas Iron Co., which will put its Hellertown furnace in blast within a few days, has old contracts which will take the output of the furnace for the next month or two and its prices for prompt foundry iron are about $2 a ton above those of its competitors.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.90 to $22.54
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.84 to 23.54
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	20.50
Gray forge	20.50 to 21.50
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Following the failure of a British selling agent to dispose of a block of 10,000 to 12,000 tons of British ferromanganese at $50, seaboard, a few of the steel companies which had signified their willingness to contract on this basis attempted to buy in the domestic market at the same price, but apparently have not succeeded. The only important sale of the past

week was 100 tons of domestic alloy at $58.35, seaboard. Spiegeleisen is quoted from $25 to $27, furnace. Business is confined to an occasional carload.

Coke.—While the foundry coke market is fairly firm at $4.75 for best Connellsville grades and $5 for Latrobe grades, the furnace coke prices seem slightly weaker. Furnace coke has been offered at $3.35, Connellsville, for prompt shipment or contract for this year.

Rails.—The reduction by the Steel Corporation from $47 to $40, mill, on standard rails has been followed by the independent mills. One Eastern rail mill still has 15,000 tons for the Pennsylvania Railroad unshipped. No intimation has come yet from Eastern railroads as to their 1922 requirements.

Billets.—Sales of open-hearth rerolling billets have been made at $29, Pittsburgh, and forging billets at $34, Pittsburgh, though a majority of sales are still at $1 above these prices.

Plates.—While most of the Eastern plate mills quote 1.60c. to 1.65c., Pittsburgh, for ordinary lots, especially desirable business has been figured at 1.50c., Pittsburgh, or at delivered prices which correspond to that figure. One sale, however, which is reported to have figured back to 1.35c., Pittsburgh, actually netted the mill about 1.70c. Little tonnage of importance is pending, but there is a continuance of small orders that gives the active mills operation ranging from 25 to 35 per cent. We quote sheared plates, ¼ in. and heavier, at 1.50c. to 1.65c., Pittsburgh.

Structural Material.—Shapes share to some extent the weakness of the other major steel products and an attractive specification usually commands a price as low as 1.50c., Pittsburgh, though 1.60c. and 1.65c. are common on the ordinary run of orders.

Bars.—Most of the demand for steel bars is for reinforcing purposes, and as the tonnages on such projects are usually fairly attractive to the mills the buyer has little difficulty in getting quotations of 1.50c., Pittsburgh. On ordinary small lots of merchant bars the usual price is 1.60c., Pittsburgh, or 1.65c. One large maker of bar iron reports the past week the best of any since last March with respect to orders booked. The usual quotation for bar iron is 1.60c., Pittsburgh, but this price is being shaded about $1 a ton by some small mills that do not make a complete range of sizes.

Sheets.—It is difficult to determine to-day's prices on sheets. Very little business has been taken at the recent advance of $5 which some mills put into effect. Most of the makers are quoting 2.50c. on blue annealed, 3c. on black and 4c. on galvanized, f.o.b. Pittsburgh, but these prices have been shaded on attractive lots. On 100 tons of black sheets an extra of 15c. per 100 lb. was waived, making the base price equivalent to 2.85c., Pittsburgh. Business is fairly good, much better, in fact, than that in other steel products.

Warehouse Business.—Demand for steel out of stock continues to show moderate improvement. Prices are virtually unchanged, but sheets are slightly higher. We quote for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.75c.; squares and hexagons, cold-rolled steel, 4.25c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Old Material.—The underlying strength of the scrap market is indicated by the price advances which occur with every transaction of any importance. Scrap dealers have confidence in the ultimate strength of the market and very little material is being pressed for sale. Borings and turnings, No. 1 cast, and stove plate are firm, with prices showing an advancing tendency. The Pennsylvania Railroad has announced reductions approximating 15 per cent in local freight rates on scrap, which become effective Nov. 15. The Philadelphia to Coatesville rate, for example, is reduced from $1.82 to $1.54. Three new rate supplements have been issued covering reductions in the Philadelphia, New Jersey and Schuylkill divisions of the road. We quote for delivery at consuming points in the district as follows:

No. 1 heavy melting steel	$12.00 to $13.00
Scrap rail	12.00 to 13.00
Steel rails, rerolling	16.00 to 16.50
No. 1 low phos., heavy 0.04 and under	16.50 to 17.50
Car wheels	17.00 to 17.50
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.50 to 15.00
No. 1 forge fire	10.50 to 11.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.50 to 10.50
Heavy axle turning (or equivalent)	10.00 to 10.50
Cast borings (for rolling mills)	10.50 to 11.00
Cast borings (for chemical plants)	11.00 to 11.50
No. 1 cast	17.50 to 18.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.25 to 14.75
Railroad malleable	14.50 to 15.00
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Iron car axles	No market
Steel car axles	No market

Cleveland

CLEVELAND, Oct. 25.

Iron Ore.—The lake shipping season will be virtually over this week, although some of the shippers will move a few cargoes next month and probably the last shipments will not be made before Nov. 15. The Pittsburgh Steamship Co. will ship its last cargoes Oct. 29. Quite a number of boats have already been laid up and this week's movement will be very light. Latest estimates are that lake shipments will be slightly less than 22,000,000 tons. The reduction in rail rates from Lake Erie ports to interior furnaces has resulted in a number of shipping orders for dock ore from furnaces that will need some ore before the winter is over. The amount of ore on hand at furnaces and Lake Erie docks increased over 2,000,000 tons in September and was approximately 37,747,000 tons Oct. 1 as compared with 35,787,000 tons on the same date a year ago. Deducting ore on docks there was approximately 28,000,000 tons of ore in furnace yards Oct. 1. Of this, 14,156,000 tons was at interior furnaces in the Central district and 2,413,000 tons in Eastern furnace yards, the remainder being at Lake front furnaces. This makes a total of 16,569,000 tons of ore in interior furnace yards Oct. 1, on which the consumers will not get the benefit of the recent reduction in freight rates. The amount of Lake ore consumed in September was 1,430,000 tons as compared with 1,321,000 tons in August.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—A decided lull has developed. While the threatened railroad strike may have something to do with the falling off in sales it is believed that what is having more effect in holding back purchases is the possibility of lower prices because of the expected reduction in freight rates. However, with lower freight rates the decrease in making pig iron would come mostly in reductions in transportation costs on fuel and limestone, as it will be months before lower rail rates on ore prove much of a factor in pig iron production costs owing to large ore stocks in furnace yards. However, consumers are evidently figuring on some saving in the freight rate on pig iron shipments from furnaces to consumers' yards and seem inclined to defer purchases and deliveries until freight rates are reduced. While buying has fallen off, furnaces have received a large increase in shipping orders on contracts from foundries that are busy and wish to avoid the danger of a shortage of iron in case of a railroad tieup. Many of these foundries which have been taking only enough iron every week to cover their requirements have sent in shipping orders for enough iron to last them two months or more. During the week one interest sold 3800 tons of foundry iron in

small lots and another two 200 ton lots. Other sales were in car lots. These orders were booked at $20 to $21 for No. 2 foundry iron, the former being the usual price for shipments from Lake furnaces to competitive points. A test of the market developed in an inquiry from a Newark, Ohio, stove maker for 500 tons of foundry iron, owing to the fact that the freight rate to Newark is the same from Cleveland, the Mahoning Valley and southern Ohio. A Cleveland furnace quoted $20 on this inquiry but got no part of the order, which is believed to have gone to the southern Ohio producer at a lower price. A Valley furnace has sold one car lot of Bessemer at $21 and another at $22, the buyer paying a premium for sand cast iron as machine cast Bessemer is still quoted at $20. The demand for low phosphorous iron shows a little improvement in car lot sales made at $35.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$21.21
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	35.00

Coke.—The coke market is dull with prices unchanged. Some car lot sales of Connellsville foundry coke are being made at $4.50 to $4.75 for standard brands.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is holding steady. October business with some makers will be about equal to that of September, but with others sales have increased. Prices are fairly firm. Several rivet orders in lots up to 75 tons were placed during the week for car repair work, all at the regular prices of 2.40c. for structural and 2.50c. for boiler rivets. However, some makers are shading these prices.

Semi-Finished Steel.—There is some activity in sheet bars, which are quoted at $30 to $32. Sales of slabs in small lots are reported at about $30, delivered, Cleveland.

Finished Iron and Steel.—The possibility of a strike seems to have had little effect on the market further than to bring out requests for rush shipments on existing orders. The volume of business during the week was light and was confined almost wholly to small orders. Weak spots are still appearing in the market. Steel bars are generally quoted at 1.60c. to 1.65c., but lower prices have appeared on soft steel bars for reinforcing purposes, and 1.50c. is regarded as about the market on these, for a round lot, although this price is not being generally quoted. Prices on hard steel reinforcing bars range from about 1.50c. to 1.60c. An inquiry for 3500 tons of structural material brought out a quotation of 1.50c., although 1.60c. to 1.65c. are more common quotations. Plate prices range from 1.60c. to 1.75c., and a few mills are adhering to the latter price, which virtually puts them out of the market. The building field shows more activity. The American Bridge Co. was low bidder for 1600 tons of structural material for the municipal car barns, Detroit, and that city has taken bids for 2400 tons for a filtration plant. An inquiry is out for steel for the Chester Gardens Apartment Building, Cleveland, which will take 1000 to 1500 tons of structural material. The Donovan Iron & Wire Works, Toledo, has taken 300 tons for the South High School, Toledo. Cleveland will receive new bids, Nov. 4, for the Baldwin reservoir, requiring 1700 tons of reinforcing bars. Prices on light rails are still weak with 1.60c. as the most common quotation.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Business is light, as most consumers placed orders before the recent $5 per ton price advance by some of the mills. No sales are reported at the high prices, as several mills are still quoting 3c. for black, 4c. for galvanized and 2.25c. to 2.50c. for blue annealed sheets. What business is being placed is being taken at these prices. The Ford Motor Co. has placed 1000 tons of No. 9 gage tank steel quality sheets at the 1.75c. plate base price and is also credited with a purchase of 500 tons or more of blue annealed sheets for November requirements. A local mill has taken an export order for 200 tons of black sheets.

Warehouse Business.—The volume of warehouse business has fallen off some, but it is still better than during September. Jobbers are still adhering to the old prices on sheets that were bases on 2.75c. and 3.75c., mill prices for black and galvanized sheets.

Alloy Steels.—Alloy steels are weak and quiet. One sale of 300 tons of chrome vanadium steel is reported, the buyers thinking it a good investment to place the material in stock at present prices. Late quotations are as follows: 3½ per cent nickel steel, 4c. to 4.25c.; chrome vanadium, 4.50c. to 4.75c.; ½ per cent nickel, 3c., all at mill, and chrome nickel, 3.75c., Pittsburgh.

Old Material.—The scrap market has quieted down and dealers attribute the falling off in sales to the threatened railroad strike. One local consumer has purchased a few lots of heavy melting steel aggregating possibly 1000 tons. With this exception the only activity is between dealers, but their purchases have dwindled down to car lots, as they have pretty well covered against orders recently placed by mills in the Youngstown and other districts. The market shows signs of weakness on some grades. However, machine shop turnings are firm. Purchases by dealers for Youngstown shipment are reported at $13.50 to $14 for heavy melting steel, $9 to $9.50 for machine shop turnings and $10.50 to $11 for cast iron borings.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$12.00 to $12.50
Steel rails, under 3 ft	12.75 to 13.25
Steel rails, rerolling	15.00 to 15.50
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorous melting scrap	12.50 to 13.00
Cast borings	8.65 to 8.85
Machine shop turnings	6.60 to 7.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	9.50 to 9.75
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	6.25 to 6.60
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in.	8.00 to 8.50
Drop forge flashings, under 10 in.	8.00 to 8.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

British Iron and Steel Market

Prices Soft, Except in Sheets and Tin Plate—Less Trouble from Continental Competition but Little Business Available

(*By Cable*)

LONDON, ENGLAND, Oct. 25.

Conditions are unchanged. There is a fair home buying of hematite, but the export business is stagnant. Prices are easier. Foreign ore is weak. Bilbao Rubio is quoted at 27½s. ($5.42) ex-ship Tees.

Reductions in steel prices are not creating the desired stimulus to general buying, but beams are being sold at £9 15s. (1.72c. per lb.) f.o.b., less ¼ per cent. Some makers are not accepting the new figures. Scotch steel works are quoting £2 above the English prices.

The Continental position is somewhat obscure. Some German works are guaranteeing early shipment; others are paying penalties to cancel contracts which they cannot fulfil. German 3/16-in. plates have been sold for £7 10s. (1.32c. per lb.) f.o.b., November delivery. German wire nails are selling at 17s. ($3.35) basis f.o.b.; Japan has paid 24s. ($4.73) c.i.f.

Belgian beams are offered below £8 (1.41c. per lb.) f.o.b. Merchants are quoting £9 15s. (1.72c. per lb.) c.i.f. India. Belgian angles are offered by merchants at £10 2½s. (1.83c. per lb.) c.i.f. India, and merchant bars at £9 5s. (1.68c. per lb.) c.i.f. India.

Continental semi-finished steel is scarce. France is quoting up to £8 5s. ($32.51) f.o.b. for 2-in. to 4-in. billets. Continental pig iron is easier. French, Belgian and Luxemburgian foundry irons are held at £4 7½s. ($17.28); basic, at £4 3½s. ($16.45) to £4 5s. ($16.75), both f.o.b.

Tin plate demand is improving, prompt delivery being sold at 22½s. ($4.43) basis f.o.b. Portugal is buying small quantities on the usual specifications. The United States secured a large oil size order for the Far East. Russia is reported to have placed a tin plate order in Czecho-Slovakia.

Baldwins, Ltd., has bought the Eagle Tin Plate Works at Neath, consisting of nine mills with a capacity of 6000 boxes per week.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.94 per £1 as follows:

Durham coke, delivered	£1 10	$5.91	
Cleveland basic	7 7½ & £7 10*	29.06 &	$29.55
Cleveland No. 1 foundry	7 0	27.58	
Cleveland No. 3 foundry	6 0	23.64	
Cleveland No. 4 foundry	5 14	22.50	
Cleveland No. 4 forge	5 12½	22.16	
Hematite	7 0*	27.58	
East Coast mixed	6 2½ & 6 5*	24.13 &	24.63
Ferromanganese	16 0 & 14 0*	63.04 &	55.16
Rails, 60 lb. and up	9 10 to 10 10	37.43 to	41.37
Billets	7 0 to 7 5	27.58 to	28.57
Sheet and tin plate bars, Welsh	7 0 to 8 5	27.58 to	32.51
Tin plate base box	1 1¼ to 1 2½	4.19 to	4.43
		C. per Lb.	
Ship plates	10 10	1.85	
Boiler plates	15 0 to 16 0	2.64 to	2.81
Tees	10 15 to 11 10	1.89 to	2.02
Channels	10 0 to 10 15	1.76 to	1.89
Beams	10 0 to 10 10	1.76 to	1.85
Round bars, ¾ to 3 in.	11 10 to 12 0	2.02 to	2.11
Galvanized sheets, 24 g.	18 5 to 18 10	3.21 to	3.25
Black sheets	15 0 to 16 0	2.64 to	2.81
Steel hoops	14 5 & 14 0*	2.51 &	2.46
Cold rolled steel strip, 20 g.	24 10	4.31	

*Export price.

Steel Corporation Again Shows Deficit

United States Steel Corporation net earnings for the third quarter of 1921 fall nearly $3,000,000 below those for the second quarter, each being the smallest since the first quarter of 1915. Third quarter net earnings were $18,918,058, compared with $21,892,016 in the second quarter, $48,051,540 in the third quarter of 1920, $12,457,809 in the first quarter of 1915 and $10,933,174 in the last quarter of 1914, the lowest on record.

Usual dividends were declared of 1¾ per cent on preferred stock and 1¼ per cent on common stock, taking $12,658,700. Charges and allowances for depreciation and sinking funds on bonds took $8,143,796. Interest on bonds and premiums on bonds redeemed took $5,081,066, these three items amounting to $25,883,562, and leaving a net deficit, to be supplied from undivided surplus of $6,965,504.

Details and comparisons follow:

Quarters	1921	1920	1919	1918
First	$32,286,722	$42,089,019	$33,513,384	$56,961,424
Second	21,892,016	43,155,705	34,331,301	62,557,391
Third	18,918,058	48,051,540	40,177,232	42,961,589
Fourth		43,877,862	35,791,302	36,354,165
Net earnings each year		$177,174,126	$143,813,219	$198,834,569
First nine months	$73,096,796	133,296,264	108,021,917	162,480,404

The statement of earnings for the quarter ending Sept. 30 was as follows:

Earnings

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
July, 1921	$5,824,438	$667,043	$5,157,395
August, 1921	7,168,145	665,169	6,502,976
Sept., 1921	7,923,915	666,228	7,257,687
	$20,916,498	$1,998,440	
Net earnings			$18,918,058
Less charges and allowances for depreciation and sinking funds on bonds			8,143,796
Net income			$10,774,262
Deduct:			
Interest for the quarter on U. S. Steel Corporation bonds outstanding		$4,891,066	
Premium on bonds redeemed		190,000	
			5,081,066
Balance			$5,693,196
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent		$6,304,919	
Common, 1¼ per cent		6,353,781	
			12,658,700
Deficit			$6,965,504

INSTITUTE MEETING PROGRAM

Six Papers for American Iron and Steel Gathering in New York, Nov. 18

Six papers are announced for the meeting of the American Iron and Steel Institute to be held at the Hotel Commodore, New York, Nov. 18. There will be the usual sessions in the morning and afternoon of the day and the banquet in the evening. At this, as has already been mentioned, it is expected that the guest of honor will be Marshal Foch, of France.

The reduced number of papers is calculated to give plenty of time for more or less free discussion from the floor. The papers are as follows:

"Welding," by S. W. Miller, president American Welding Society.

"Steel Lumber," by Thomas J. Foster, chairman National Bridge Works, Long Island City, N. Y.

"The Relations of the Iron and Steel Industries to the Chemical Industries," by J. M. Camp, director bureau of technical instruction Carnegie Steel Co., Pittsburgh.

"Direct Process for Steel Manufacture," by A. E. Bourcoud, metallurgist, 200 Fifth Avenue, New York.

"Refractories in the Steel Plant," by W. A. Hull, Bureau of Standards, Washington.

"Improvements in Port Construction in Open-Hearth Steel Furnaces," by J. W. Kagarise, Edgar Thomson open-hearth department, Carnegie Steel Co., Braddock, Pa.

German Recovery Believed Permanent

(Special Correspondence)

BERLIN, GERMANY, Oct. 10.—When the recent boom started there was an inclination to consider the revival but a "scheinkonjunctur," or temporary change, but subsequent events apparently show that this view was not correct. In this connection at a recent general meeting of the "Lothringer Hüttenund Bergwerksverein," the president, Privy Councillor Klöckner, said that "the international wave of rising economic life reveals an enormous demand for all kinds of iron and steel products, and is now gradually spreading to the victor states as well. It is very gratifying to note that neutral countries, especially South America, are again placing substantial orders with the German industry. Even in the countries of our late enemies, as England and Belgium, an atmosphere is developing that renders co-operation possible."

Director Klöckner holds that a rapid recovery of the mark would result in a catastrophe of hitherto unknown dimensions with appalling unemployment in its wake. "So long as the present indemnity is still in force and Germany has to bear the heavy burden of the occupation, it is idle to expect the mark to rise, since the sums Germany has to pay are beyond her capacity.

The buoyant tone in finished iron and steel has spread to semi-finished material, basic billets and sheet bars advancing to 2800 to 2900 m. per ton, while open-hearth stock brought slightly higher prices. A feature of the finished material market was stabilization of pipe and tube prices despite a rather lively demand, but the coming week will show higher quotations as the Pipe and Tube Association has just announced an increase of about 20 per cent in prices for black gas pipes, 30 per cent for galvanized gas pipes and 20 to 30 per cent for boiler tubes, according to gage. Advances in heavy sheets, which have been moderate throughout the past few weeks, are now increasing. The dearth of light plates and mine rails has not been relieved as yet.

Average prices per metric ton, with the exchange at 0.60c. per mark, are as follows:

	Marks	
Bar iron	3200-3400	$19.20 to $20.40
Structural shapes	3000-3200	18.00 to 19.20
Concrete bars	3250-3300	19.50 to 19.80
Rails, standard sections	3000	18.00
Rails for mines	2900	17.40
Wire rods	3500-3600	21.00 to 21.60
Sheets, heavy	2800-2850	16.80 to 17.10
Sheets, medium	3500-3600	21.00 to 21.60
Plates, light	4000	24.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is $6,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.65c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.65c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.25 to $2.40 case
Large boiler rivets.....2.35 to 2.50 case
Small rivets .....70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, rolled threads, 70, 10 and 5 per cent off list
Machine bolts, small, cut threads, 70 and 5 per cent off list
Machine bolts, larger and longer..65, 10 and 5 per cent off list
Carriage bolts, ⅝ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....65 and 10 per cent off list
Lag bolts .....70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Square and Hex. Head Cap Screws

½ in. and under.....75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in.....75 and 10 to 80 and 10 per cent off list

Set Screws

½ in. and under.....80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $40 to $41; chain rods, $40 to $41; screw stock rods, $45 to $46; rivet and bolt rods and other rods of that character, $40 to $41; high carbon rods, $48 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.30 to $2.40 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.50 to $2.75 base; 5/16-in., $2.50 to $2.75 base. Boat and barge spikes, $2.50 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.15c. to 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20–2.45	Nos. 11 and 12	2.30–2.55
Nos. 9 and 10 (base)	2.25–2.50	Nos. 13 and 14	2.35–2.60
		Nos. 15 and 16	2.45–2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Oct.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
19	.....13.00	12.75	28.00	4.70	4.50	5.17½	4.67½
20	.....13.00	12.75	28.50	4.70	4.45	5.15	4.65
21	.....13.00	12.62½	28.50	4.70	4.45	5.15	4.65
22	.....13.00	12.62½	....	4.70	4.40	5.15	4.65
24	.....13.00	12.75	28.50	4.70	4.40	5.10	4.60
25	.....13.00	12.75	28.50	4.70	4.40	5.10	4.60

New York

NEW YORK, Oct. 25.

All the markets are quiet and prices in most cases are firm. Copper demand is moderate and values steady. Tin is higher. The lead market is quiet and steady while demand for zinc has eased off as have also prices.

Copper.—There is not the life to the market that there has been but the situation is regarded by sellers as satisfactory. The price for electrolytic copper is holding steady at 13c., delivered, or 12.75c., New York. Sales are light for domestic consumption with inquiries in fair volume. From most countries except Germany buying is reported as very good, particularly by France, England and the Far East. The fact that prices on the recent buying movement did not advance too high is pointed to as a good sign. There were a few sales last week at ⅛c. under the present levels but the amount was limited.

Tin.—Moderate sales of Straits tin have been made with dealers and consumers the buyers. A feature of this buying has been the absence of demand for the intermediate positions, the bulk of the purchasing involving not only spot delivery but November-December and December-January shipment from the East. The week's sales were made at a range of 28c. for spot to close to 29c. for far future shipments. Spot Straits to-day is quoted at 28.50c., New York. The London market is to-day close to last week's levels at £156 10s. for spot standard, at £158 15s. for future standard and £157 per ton for spot Straits. Arrivals thus far this month have been 1900 tons with 3150 tons reported afloat.

Lead.—The market at New York is quiet, steady and firm with a fair demand reported at 4.70c. At St. Louis, there has been an easing in values among independent sellers from whom the metal can be obtained around 4.40c. to 4.45c., St. Louis, as against 4.70c., the quotation of the leading producer.

Zinc.—There is a lull in demand, due perhaps to less fear of a railroad strike as well as to a satisfaction of galvanizers' early needs caused by the recent buying. The market is easier at 4.60c., St. Louis, or 5.10c., New York, for prime Western from one or two sellers, able apparently to supply the lighter demand. Most sellers are either out of the market or refuse to quote, their October output being disposed of.

Old Metals.—Business has settled down to the point where little is doing. Values, however, are fairly firm. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	$12.25
Copper, heavy and wire	11.25
Copper, light and bottoms	9.50
Heavy machine composition	9.75
Brass, heavy	7.00
Brass, light	5.50
No. 1 red brass or composition turnings	7.75
No 1 yellow rod brass turnings	5.75
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Antimony.—The market is softer at 4.85c., New York, duty paid, for wholesale lots for early delivery.

Aluminum.—There is no demand for either the domestic or imported virgin metal. Wholesale lots of the former are quoted at 24.50c. f.o.b. plant, while for the latter 17c. to 18c. per lb., New York, duty paid, is the prevailing asking price.

Chicago

OCT. 25.—Tin has advanced principally because of a stiffening in sterling exchange, and lead has declined. Other prices are unchanged. Inquiry for copper is not resulting in purchases, because buyers are unwilling to pay the prices at which sellers are holding. Some spot buying of zinc has resulted from the railroad strike scare. Old metal prices are unchanged. We quote in carload lots: Lake copper, 13c. to 13.25c.; tin, 29.50c.; lead, 4.50c.; spelter, 4.75c.; antimony, 7c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 8.50c.; copper bottoms, 7c.; red brass, 7c.; yellow brass, 5c.; lead pipe, 3c.; zinc, 2.25c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

OCT. 25.—Both lead and zinc are higher and strong. We quote lead at 4.47c. to 4.50c., car lots; slab zinc at 4.67½c. to 4.70c. We quote Lake Copper at 13.73½c., car lots; tin, 29.86c., and antimony, 5.25c. to 6.11c. In old metals, we quote: Light brass, 3.50c.; heavy red brass, 7c.; light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tinfoil, 15c.; tea lead, 2c.; aluminum, 9c.

Movements of Government Surplus Material

WASHINGTON, Oct. 25.—Detailed inventory of iron, steel, scrap and non-ferrous surplus material held by Emergency Fleet Corporation reveals that it has 170,511 tons in Eastern and Northeastern districts, which constitutes slightly more than half of total held in all seven districts. At the Hog Island plant is located the largest single amount of tonnage, including 103,000 tons of fabricated steel. The Hog Island district embraces the Middle West as far as Milwaukee and as far south as St. Louis. Headquarters of the Northeastern district are at Norwalk, Conn. The surplus in these two districts is divided as follows: 20,472 tons of plates, 5456 tons of bars, 16,370 tons of shapes, 110,530 tons of fabricated steel, 6991 tons of scrap steel, 1481 tons of scrap iron and 9079 tons of miscellaneous steel and small lots of non-ferrous metal.

Army surplus material costing the Government $209,620,147 has been transferred to other Government departments. Of this amount nearly 66 per cent was transferred to the Department of Agriculture. The value of machinery and equipment transferred was $13,983,704, while the value of ferrous and non-ferrous metals transferred was $1,739,217.

Injunction Case Over Seeking Production Costs

WASHINGTON, Oct. 25.—Justice Bailey, Supreme Court of District of Columbia, to-day announced he was unable, on account of the crowded condition of the court calendar, to set a date to begin the hearings in the case of the Claire Furnace Co. and twenty other prominent iron and steel producers. Proceedings involve efforts of the legal department of the Federal Trade Commission to have the court dissolve a temporary injunction restraining the commission from inspecting the books of the respondents to learn their costs of production. The latter are seeking to make the injunction permanent. The commission has been seeking to have the court begin the hearing at an early date.

PERSONAL

W. K. Kenly and George L. Mayer have formed a copartnership under the style of W. K. Kenly & Co., with offices in the Continental & Commercial National Bank Building, 208 South La Salle Street, Chicago. The firm has been appointed district manager of the Vanadium Corporation of America, manufacturer of ferrovanadium, cupro-vanadium, ferrotungsten, molybdenum, tungsten, etc., and in addition will handle ferroalloys, finished and raw iron and steel products, iron and steel scrap and new and relaying rails. Among the ferroalloy manufacturers which the firm will represent is the U. S. Ferroalloys Corporation, New York, maker of ferrochrome and ferrosilicon. Mr. Kenly has had extended experience in the iron and steel trade in Chicago. In 1901 he participated in the organization of Templeton, Kenly & Co., Ltd., manufacturer of Simplex jacks and railroad supplies. He was identified with this company as vice-president and treasurer until 1910 when in conjunction with W. H. McDoel, formerly president of the Chicago, Indianapolis & Louisville Railway, he incorporated the Merchants' Steel & Supply Co. He sold his interests in that company in the latter part of 1916 and became purchasing agent of the Interstate Iron & Steel Co., Chicago. He resigned on May 1, 1920, when he was elected vice-president of the James S. Miller Co., Chicago, with which company he remained until Sept. 1, 1921. Mr. Mayer has been associated with the James S. Miller Co. for the past three years and previously was for five years purchasing agent of the Ohio Electric Railway Co., Springfield, Ohio.

Harry E. Witham, for the past eight years general western sales manager Warner & Swasey Co., with headquarters at Chicago, and for twenty-two years identified with that organization in various capacities, has resigned on account of the ill health of his wife and will remove his family to Denver, Col.

J. J. Wilson, pioneer foundryman in automobile work, has severed his connection with the General Motors Corporation and taken charge of the foundry division of the Hiram Walker & Sons Metal Products, Ltd., Walkerville, Ont. This new company will engage in making a general line of motor castings. He was with H. M. Leland in the early operations of the Cadillac foundry when it was known as the Leland-Faulkner Co., and remained with the company through its various stages until it became a part of the General Motors Corporation. Subsequently he was in charge of all General Motors foundries and developed their large new plants such as the Buick and Motor Products Co. in Saginaw.

Alan A. Wood, for a number of years connected in engineering and sales capacity with the Providence plant of the Builders' Iron Foundry and the Diamond Machine Co., associated companies, is now sales manager of the Philadelphia district, having office at 419 Widener Building, Philadelphia.

Marmaduke Wardlow, J. P., Sheffield, England, and 278 Pearl Street, New York, has been elected head of the Cutlers' Co., of Hallamshire, an ancient trade guild, legally incorporated by act of Parliament in 1624. The Cutlers' Co. controls the granting and registering of trade marks in the district of Hallamshire.

C. J. Morrison, for the past two and a half years executive assistant to the president of the Atlas Tack Corporation, Fairhaven, Mass., has resigned.

J. Edgar Lee, Grand Haven, president Michigan State Foundrymen's Association, addressed that body on the "Benefits of Co-operation" at a meeting at Grand Rapids on Oct. 11. The next meeting will be at Kalamazoo on Dec. 13.

Peter C. Spence, civil and mechanical engineer, has been appointed manager of the construction department of the National Lime Association, 918 G Street, Washington, D. C. At one time he was president of the Consolidated Iron League.

James A. Campbell, president Youngstown Sheet & Tube Co., is to address the Engineers Club of Youngstown on "The Present Railroad Situation as it Affects Business."

President E. A. S. Clarke of the Consolidated Steel Corporation, New York, has returned from a trip to Mexico.

Ralph D. Mock, formally vice-president and comptroller Hydraulic Steel Co., Cleveland, has been appointed vice-president in charge of sales. Harry W. Kranz, former superintendent of the Chicago Welding & Mfg. Co., now one of the subsidiaries of the Hydraulic Steel Co., becomes manager of the company's welding plant. Charles S. Holden, formerly in the sales department of the Cleveland Welding & Mfg. Co., has been appointed sales manager of the welding plant.

W. W. Lukens, who recently resigned from the presidency of the Alan Wood Iron & Steel Co., will sail Nov. 3 for an extended stay in Europe. Tuesday morning the employees of the general offices of the company in Philadelphia presented Mr. Lukens with a silver loving cup.

OBITUARY

CLINTON BOWEN, president and general manager Logan Husker Co., Bellefontaine, Ohio, died suddenly Oct. 12. He was for several years Ohio sales manager of the American Seeding Machine Co., Springfield, and later was associated with the Kauffman Metal Products Co., Bellefontaine, as manager and treasurer.

MATTHEW T. DENHAM, Boston, long identified with iron and steel interests, died Oct. 20, at the age of 63. He was a native of Barre, Mass., and was educated in the Boston schools. During his business career he represented several New England iron and steel concerns, including the East Boston Forge Co., Cape Ann Anchor Works and the Eastern Forge Co., Portland, Me. Owing to ill health, Mr. Denham was forced to retire from business last spring.

FRANK FITZROY BULLARD, Worcester, Mass., prominently identified with the wire industry of that city, died at his home Oct. 20, aged 64. He was general manager for the Washburn & Moen Co. from 1872 to 1882, general manager for the Worcester Wire Co., which later consolidated with the American Steel & Wire Co., from 1882 to 1899, becoming general manager for the Morgan Spring Co. in 1908. During the latter part of his life, Mr. Bullard was in the insurance business.

FREDERICK H. DROWNE, Dorchester, Mass., for many years Boston representative of John Kroder & Henry Reubel Co., New York, brass goods, died Oct. 20 in Middletown, Conn, aged 66 years. He was a native of Brooklyn, but received most of his education in Boston schools. Early in life he was connected with Turner & Seymour, Torrington, Conn., brass goods.

JOHN F. ROBERTSON, head of John F. Robertson Co., steam specialties, Park Building, Pittsburgh, died at the Suburban hospital, Bellevue, Pa., Oct. 19, following a surgical operation. He also was president of the Lawrenceville Bronze Co., and president of the Neville Lubricator Co., and was the inventor of several steam appliances, among them the Robertson turbo-steam trap and the Robertson blow-off sentinel, an automatic safety and fuel saving valve. He was born in Forneth, Perthshire, Scotland, Nov. 18, 1873, coming to this country as a boy and had been a resident of Pittsburgh for the past 33 years.

CHARLES W. WHITLEY, vice-president American Smelting & Refining Co., and in charge of the company's plants in the United States, died in a New York hospital Oct. 9. He returned from Mexico a short time ago. He was a native of Chicago.

JOEL NODINE, a retired pump manufacturer, died at his home in Torrington, Conn., Oct. 9 at the age of 85.

JULIUS J. D. MCNAMAR, proprietor and manager of the McNamar Machine Works, Newark, Ohio, died Oct. 9, aged 66 years. He had been in poor health for some time but had active charge of his business up to the time of his death.

LIQUIDATION OF STEEL PRICES

Greater Deflation Already Than for Most Other Products

"In my opinion, we have at least 80 per cent of our necessary readjustment safely behind us, and we now face a future of untold possibilities such as was never offered to any nation in the history of the world," declared George M. Verity, president American Rolling Mill Co., before the Metal Section of the National Hardware Association at Atlantic City, Oct. 18. "We can be profoundly thankful that in one short year our nation could accomplish such tremendous liquidation.

"There are those who have insisted that the steel industry was so great and so strong, in the period immediately following the war, that it could and should continue to operate to full capacity—orders or no orders—and that prices, irrespective of cost of production, should be immediately lowered to a level that would insure a continuation of buying.

"Unfortunately, this is not a day of miracles. Quick assets have always had their limit, and payrolls cannot be made from bricks and mortar."

Mr. Verity then showed that the additional cost since 1913 of three items only—labor, raw materials and freight—has added $22.05 per net ton to the cost of producing steel sheets; the addition to the price is $20 only.

This address was followed by one by Sidney G. Koon of THE IRON AGE on "Prices of Iron and Steel, Compared with Other Prices," in which, by means of charts, it was shown graphically that iron and steel prices are lower than those of other manufactured products, and lower than those of most of the important raw materials.

In a comparison, with finished steel, of the prices of 52 items and 12 groups of items other than steel, it was shown that only 8 of the 64 are now below the present relative price of steel bars. Of the others, 36 are more than 50 per cent above bars, while six are more than double the bar price, as compared with 1913. Three of these six are labor costs. In conclusion Mr. Koon said:

"I hope that I have made three things stand out clearly:

"First, that steel is to-day lower, after we account for the rise in certain inescapable production costs, such as fuel, freight and labor, than it was before the war.

"Second, that steel is now below the total cost of production. It is still selling, probably, above the actual direct costs of materials, fuel, labor and freights, but the margin is less than the millstone of fixed charges for plant and equipment.

"Third, that steel is far lower than other manufactured articles, and is lower than the great bulk of raw materials making up the principal items of our vast internal commerce."

Lower Freight Rates Asked on Coal and Coke

Action on Grain Freights Is Believed to Point the Way for Reductions in Steel and Other Commodities—An Effort to Increase Fuel Shipments Before the Strike

WASHINGTON, Oct. 25.—The American Wholesale Coal Association has filed two petitions with the Interstate Commerce Commission, one of them asking for a reduction of all rates on bituminous coal and coke, and of charges for the reconsignment and diversion of coal cars as well as for their detention. The other refers to the threatened railroad strike and asks that the commission at once suspend on one day's notice existing rules and regulations as to demurrage, reconsigning and other charges assessed against shipments of coal and coke. It is pointed out that relief in the existing emergency can be obtained if, in the interval between the present time and the effective date of the proposed strike, shipments of coal are materially and immediately increased to various markets. The application of the present demurrage and reconsigning charges, it is claimed, would be more than sufficient to wipe out entirely the ordinary gross margin in the sale of coal and coke which it is hoped to stock in anticipation of a tie-up of transportation.

The petition asking for lower rates on coal and coke shipments expresses the conviction that the commission should work toward a restoration of charges and differential relationships which existed in 1917. It is further suggested that a reduction in the freight rates on coal would reduce costs in nearly every line of industry and would stimulate and encourage industry to a larger extent than would a reduction in rates on any other commodity.

Reduction on Grain Freights a Precursor

The formal decision of the commission last Saturday, making a sweeping reduction in freight rates on grains, grain products and hay in the territory west of the Mississippi River, has led to the hope of shippers that reductions in other lines, including steel, will be forthcoming soon. It also is looked to as being an element in partly restoring the purchasing power of the farmer by quickening demand for his products. The finding, which is held to be unusual in several respects as to interpretation of the Transportation act proviso for a revenue of 5½ per cent to the railroads, is associated with the threatened railroad strike. It is apparent that it is sought, among other things, to stimulate traffic and increase revenue by this means, and to lower costs of living; in turn this result, it is believed, would be assigned as a reason for reducing railroad wages. With this accomplished, it is felt chances of a railroad strike will be lessened. The reduction in rates on the agricultural products affected amounts to one-half of the increases made in 1920, which were 35 per cent in the western group territory, 25 per cent in the mountain Pacific group and 33 1/3 per cent between divisions. The commission also ordered rates on coarse grains, such as corn and oats, fixed at 10 per cent below the level on wheat in the new scale and rates on grain products are to be adjusted to this basis. The new rates are ordered established by Nov. 20 at the latest.

Chicago Hearing on the Strike Order

Meanwhile interest centers in the outcome of the hearing to begin in Chicago before the Railroad Labor Board which has cited the heads of the five railroad brotherhoods to appear before it. Despite the statements of the union men, the belief grows that the strike will be averted and the board itself has expressed such an opinion. It is also shared in administration circles in Washington. Even should the five brotherhoods strike, it is felt the effort to paralyze transportation would be more or less abortive, both by reason of work done by the railroads and the Government to prepare to meet such a situation and by weakening of the position of the brotherhood unions through the refusal of other unions aside from the railroad telegraphers to join in a strike. The hearings, it is believed, will operate in any event to delay a strike, as they will probably last well past Oct. 30, the date set for the strike.

NEW TRADE PUBLICATIONS

Cylinder Regrinding.—Heald Machine Co., Worcester, Mass. Covers the cylinder regrinding field not only from the standpoint of the advantages in regrinding, together with the necessary equipment, but also the problems confronted by every concern going into this business. The book is liberally illustrated and contains a list of the manufacturers of cylinders used in pleasure and commercial automobiles. Size 9 x 6 in., 116 pages.

Metals Fabricated.—The Everett Co., 261 Franklin Street, Boston, engineers. Catalog No. 1. Deals with fabricated parts from the non-ferrous metals and contains complete price tables, etc., together with useful information. Illustrated. Size 11 x 8½ in., 8 pages.

Auto Starters.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Reprinted leaflet 1610-C, detailing type A auto-starters. The auto-transformer, switching mechanism, contacts, overload relays, and other features of this apparatus are described in detail.

Storage Battery Mine Locomotives.—Westinghouse Electric & Mfg. Co., East Pittsburgh. Leaflet 1888-A. Describes the applications of storage battery mine locomotives and illustrating and treating the Baldwin-Westinghouse type of apparatus in detail.

Dump Cars.—Atlas Car & Mfg. Co., Cleveland. Bulletin No. 1211. Illustrates and describes line of rocker side and end dumping cars, giving capacities and dimensions of the various types illustrated. Size 8½ x 11 in. 12 pages.

Fire Pumps.—Dayton-Dowd Co., Quincy, Ill. Bulletin No. 246. Describes centrifugal fire pumps, motor, turbine and gasoline engine driven. The illustrations include typical installations and sectional and elevation line drawings. The company's tank filling pumps, type C S T, motor driven, are also described. Size 7½ x 10½ in., 16 pages.

Pumps.—Nash Engineering Co., South Norwalk, Conn. Bulletins No. 16 and No. 17, the first of which describes the Jennings Hytor condensation pump, the illustrations being large and in natural color. Bulletin No. 17 describes the Jennings Hytor air line vacuum heating pumps, electric motor driven, the illustrations being also attractively done in natural color. Each bulletin is 7½ x 10½ in., 4 pages.

Valves.—Pierce, Butler & Pierce Mfg. Corporation, New York. Catalog No. 50. Describes Pierce packless valves, including radiator valves with wood-wheel, with lever hand and graduated dial and with lockshield and key equipment. Valves for pressures up to 200 lb. are also given space and roughing-in dimensions given. The packless idea is discussed in detail. Size 4½ x 9 in., 31 pages.

Wagon Loaders.—N. P. Nelson Iron Works, 212 Fortieth Street, Brooklyn, N. Y. Booklet No. 621, 4 pages. Describes the Nelson wagon loader, the illustrations showing its various applications. Dimensional sketches are given and also schedule of advantages.

Industrial Furnaces.—W. S. Rockwell Co., 50 Church Street, New York. Bulletin No. 232. Size 8½ x 11 in., 20 pages. A series of papers illustrating the variety of design of industrial furnaces for all uses. The illustrations consist of line drawings and include the following furnaces: heating, annealing and heat treating; car and ball and car types; continuous annealing and heat treating; automatic conveyor; muffle retort and pot; rotary cylindrical; automatic heat treating; melting and regenerative. The relation of type and arrangement of furnaces to cost of production is discussed. A chart detailing the factors governing the selection of furnaces for industrial heating operations is included.

Industrial Tractors and Trucks.—Baker, R. & L., Co., Cleveland. Catalog No. 11 and Bulletins 12 to 15, 66 pages. Describe and illustrate the company's regular line of trucks and tractors, giving specifications for various types and emphasizing their inter-standardization features. Several pages in Bulletin No. 12 are devoted to special models, including portable stacking crane, carrying crane, tractors equipped with portable swivel hoist and with portable jib crane, side dump and end dump trucks, charging trucks for annealing ovens and ram trucks.

Tool Steel.—Kinite Co., 1338 St. Paul Avenue, Milwaukee, Wis. Twenty-four page booklet describing and illustrating use of Kinite alloy steel for shear blades, re-drawing tools, blanking dies, draw dies, embossing and forming dies, broaches and other tools. Size 3½ x 6¼ inches.

Heat Treating Furnaces.—George J. Hagan, Pittsburgh. Bulletin L F 105. Describes the company's standardized furnaces of the combustion type, burning oil or gas, for steel hardening, carbonizing, annealing and similar heat treating operations. Line drawings of construction layouts are given and also a table of dimensions for the various sizes. A section is devoted to burners and another to fuel consumption, the latter including useful charts for determining fuel requirements, etc. Size 8½ x 11 inches, 10 pages.

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The fourteenth edition of "Data Concerning Platinum," a catalog of Baker & Co., Inc., Newark, N. J., contains new tables, illustrations and matter descriptive of various appliances made of platinum. A historical summary is given; a page is devoted to the occurrence of the ores and another to a brief description of the various platinum metals. The company's products are illustrated. Size 6 x 9 inches, 83 pages.

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A booklet, "Short Cuts to Power Transmission," size 4⅛ x 5¾ in., 64 pages, has been issued by the Flexible Steel Lacing Co., 4607 Lexington Street, Chicago. Successive chapters include: Considerations in belt buying; fabric, rubber, balata, rope and metal belts; leather belting; belts and their uses; care of belts; making endless belts; belt calculations and jack shafts. More than one-third of the booklet is devoted to the making of belt joints. The object of the manual is stated to be the simplified presentation of standard belting practice.

New Books Received

Mining Physics and Chemistry. By J. W. Whitaker. Pages xi+268, 5 x 7½ in.; illustrations 94. Published by Longmans, Green & Co., London, England, and 443 Fourth Avenue, New York.

Activities of the Bureau of Yards and Docks, Navy Department. World War 1917-1918. Pages 522, 6 x 9 in. Published by the Government Printing Office, Washington.

Walzen und Walzenkalibrieren. By Wilhelm Tafel, professor Technische Hochschule, Breslau. Pages 228, 6 x 9 in.; illustrations 161. Printed in German. Published by Verlag von Fr. Wilh. Ruhfus, Dortmund, Germany.

Book of Standards of the American Society for Testing Materials; 1921 edition, issued triennially. Pages 890, 6 x 9 in.; containing 160 standards. Published by the Society, 1315 Spruce Street, Philadelphia.

Chemical and Metallographic Examination of Iron, Steel and Brass. By William T. Hall and Robert S. Williams. Pages 501, 5½ x 8½ in.; 183 illustrations. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Special Libraries in Industry

The Special Libraries Association, Dorsey W. Hyde, Jr., president, 3363 Sixteenth Street, Washington, D. C., has published recently a national directory of special libraries, which is an impressive list of reference libraries conducted under the auspices of the Government, of various industrial and other companies and of engineering and trade organizations. It gives an annotated list of various libraries, arranged by subjects, and this is followed by a geographical list of all special libraries. Descriptive notes are given for over 400 libraries out of the total of 1300. There are 110 Government and 105 historical libraries. Those classified under industries and manufacturing number 95; in engineering there are 66, in chemistry 32, among publishers 32, railroads 22, on industrial management 14, business research 15. The directory indicates that the business librarian or service specialist is taking an important part in present-day activities in industry and trade. Many of the industrial libraries have interesting features. In several cases bibliographical or news bulletins are issued. One library reports special collections of data on apprenticeship, mutual benefit societies and stock subscription plans. During six months 1790 reference questions were answered by another library. The library of a motor truck company has a complete collection of motor truck operating cost records, and another library, established in 1872, maintains a trade mark bureau which registers all trade names related to textiles, piece goods and clothing.

IRON AND INDUSTRIAL STOCKS

Prices Continue Within Narrow Limits—Strike Not a Large Factor

The reduction in prices for open-hearth rails together with unfavorable quarterly earnings statements recently issued by steel companies have brought about some liquidation in steel and allied stocks but, generally speaking, prices for iron and industrial issues continue to move within narrow limits and within striking distance of 1921 high levels. Selling of railroad securities, occasioned by the initial railroad strike talk, has largely subsided, presumably due to the public attitude regarding such a labor disturbance. Were it not for the fact that money is available in larger amounts and at lower rates than have prevailed in months, that the federal reserve system's ratio is higher than it has been before in four years and that a turn for the better has come in many lines of industry, it is generally conceded the market for securities might be weaker. Constructive developments largely outweigh destructive.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chal. com..	33⅛- 34⅜	Int. Har. pf....	100⅜- —
Allis-Chal. pf....	75 - 76	Lack. Steel	38 - 39⅛
Am. Can com....	25⅝- 26½	Midvale Steel ..	23 - 23¾
Am. Can pf.....	83¾- 85	Nat.-Acme	13½- 14⅛
Am. C. & F. com.	125½-130	Nat. E. & S. com.	39 - 40½
Am. C. & F. pf.	110⅞- —	N. Y. Air. Brake	52 - —
Am. Loco. com..	88 - 91⅞	Nova Scotia Steel	23 - 23¾
Am. Rad. com...	70 - 70½	Press. Steel com.	54¼- 56
Am. Ship. com..	5½- 6	Press. Steel pf...	85⅛- —
Am. S. F. com..	23¼- 24⅛	Ry. Stl. S. com.	80 - 84
Am. S. F. pf...	81 - 82	Ry Stl. S. pf....	103 - —
Bald. Loco. com.	83¼- 89¼	Replogle Steel...	20⅛- 20⅞
Beth. Stl. com..	49¼- 50¾	Republic com....	44¼- 47½
Beth Stl. Cl. B.	51 - 54½	Republic pf.....	75¼- 81¼
Beth. Stl. 8% pf.	98 - 99	Sloss com.	37 - —
Colo. Fuel	24 - 24½	Superior Steel ..	27 - 28½
Cruc. Steel com.	57½- 60⅞	Trans.-Williams.	31½- —
Cruc. Steel pf...	82⅛- 83⅛	Un. Alloy Steel.	24¼- 25½
Gen. Electric ...	123½-129	U. S. Steel com.	77¼- 78⅞
Gt. No. Ore Cert.	28⅝- 30½	U. S. Steel pf...	109⅞-110½
Gulf States Steel	35¾- 37	Vanadium Steel.	29¼- 30½
Int. Har. com...	74⅛- 78	Va. I. C. & C...	80 - 85

Industrial Finances

The net income of the Otis Elevator Co. for the nine months ended Sept. 30, last, after all charges and federal taxes, amounted to $1,945,615, contrasted with $2,400,893 for the corresponding period last year. The net income, after allowing for preferred dividends, is equal to $11.62 a share on the company's $14,227,800 common stock. For the like period last year the company earned $22.23 a share on $9,482,000 common stock.

Net profits for dividends of the Allis-Chalmers Mfg. Co. in July and August amounted to $319,832, compared with $595,532 in the corresponding two months of 1920. For the eight months, ended Aug. 31 last, the net profits were $1,729,901, contrasted with $2,195,163 in the same period of last year.

At a meeting Nov. 1 at Roanoke, Va., the stockholders of the Virginia Iron, Coal & Coke Co. will be asked to authorize an issue of $5,000,000 5 per cent cumulative preferred stock, in which event the capitalization will be $15,000,000, including $10,000,000 common stock. The new stock is to be subject to call after three years on 60 days' notice at 105, and issued with the proviso that no further lien may be placed on the company's properties without the consent of 75 per cent of the preferred stockholders. Reasons for the issue of preferred shares have not been stated by company officials other than the company has earned a surplus, charged out through real estate and plant and other accounts, but recognized by state and federal authorities as invested capital, of approximately $5,000,000. A circular issued in connection with the proposed stockholders' meeting states none of the company's six blast furnaces is now in blast, and only its coal mines are operating.

The Zenith Foundry Co., Detroit, has increased its capitalization from $125,000 to $200,000.

The Brown-Hutchinson Iron Works, Detroit, has increased its capitalization from $150,000 to $300,000.

The Atlas Machine Works, Detroit, has increased its capitalization from $5,000 to $150,000. A plant expansion is in prospect.

The Black & Decker Mfg. Co., Towson Heights, Baltimore, Md., builder of portable electric tools, has declared a dividend on outstanding preferred stock for the third quarter this year amounting to 2 per cent, or 8 per cent per annum.

The directors of the Roxbury Steel Casting Co., Boston, have authorized an issue of 500 shares of 8 per cent preferred stock, bringing the total capitalization up to $100,000, as contrasted with $50,000 heretofore. Isaac E. Sexton is president and Perley C. Rogers, treasurer. The company recently purchased the fixed assets and inventories of the Union Steel Casting Co., 53 Gerard Street, Roxbury.

Directors of the Winchester Co., New Haven, Conn., fire arms and hardware, in explaining the passing of the preferred dividend due Oct. 15, state that export sales for the nine months ended Sept. 30, last, were about 17 per cent of those for the corresponding period last year, while domestic sales were approximately 80 per cent. Business conditions have made it difficult to reduce large inventories of raw materials. By passing the preferred dividend the company will conserve some $170,000.

A receivership has been authorized for the Davis Machine Tool Co., Rochester, N. Y., Morton H. Anderson, vice-president, Symington-Anderson Corporation, having been appointed receiver. The company lists assets of $1,130,000 and liabilities of $283,300. Though the assets exceed the liabilities, the company has no cash on hand nor any means of raising money without sacrifice of finished machines or raw materials. Upon its incorporation in 1915 the company acquired the stock and business of the W. P. Davis Machine Co. During the war the company was engaged in the manufacture of lathes, shapers, drills and other tool-room equipment. The company has on hand about $150,000 worth of finished machines and $75,000 worth in process of construction.

Federal Judge W. E. Baker, Martinsburg, W. Va., has granted a motion of attorneys for several minority stockholders in the Connellsville Coke Co., Connellsville, Pa., for the appointment of a receiver.

Herbert W. Roya has been appointed receiver for the Federal Tool & Machine Co., 24 Scott Street, Newark, N. J.

The Scovill Mfg. Co., Waterbury, Conn., brass goods, has arranged for an increase in capital from $5,000,000 to $20,000,000.

Israel B. Greene has been appointed receiver for the Standard Tool & Machine Co., Newark, N. J.

The Pattern & Foundry Equipment Corporation, 28 Warren Street, New York, has been placed in receivership, with Susan Brandeis appointed as receiver by the Federal Court.

The Art Metal Radiator Cover Co., 175 West Jackson Boulevard, Chicago, has filed notice of increase in capital from $30,000 to $230,000.

The Allegheny Steel Co., 2332 Oliver Building, Pittsburgh, has called a special meeting of stockholders on Dec. 28, to arrange for an increase in capitalization from $3,500,000 to $10,500,000. Frank H. Stephens is secretary.

A petition in bankruptcy has been filed against the H. & L. Ignition Parts Mfg. Co., 306 West Broadway, New York.

John C. Burnhard and Willis J. Desoyers have been appointed receivers for the Regina Co., Cherry Street, Rahway, N.J., talking machines. The liabilities are $825,000, and the assets, $500,000. Mr. Desoyers is president. The American Steel & Iron Co., is among the creditors asking for the receivership.

The regular quarterly dividend of 1¾ per cent on the outstanding preferred stock of the Taylor-Wharton Iron & Steel Co. for the three months ended Sept. 30, has been declared payable Nov. 1, to stockholders of record at the closing of the books at 3 p.m. on Oct. 25. The preferred stock books will remain closed until 3 p.m., on Nov. 1.

The Hydraulic Pressed Steel Co. in the year ended June 30, last, operated at a loss of $383,901. In addition, there was a loss from inventory adjustment amounting to $1,500,000, bringing the total deficit for the year up to $1,883,901. In the previous year the company operated at a profit of $1,020,182. J. H. Foster, president, states the company is now operating at a profit. In July, the company's business amounted to $247,000, in August $440,000 and in September $480,000. Indications are it will be still larger this month.

Birmingham Corporation Bankrupt

BIRMINGHAM, ALA., Oct. 22.—The Birmingham Steel Corporation filed a voluntary petition in bankruptcy Oct. 15, listing liabilities and assets at about $250,000 each. H. L. Brittain, president, says this action was forced by inability to effect settlement with the Shipping Board and Emergency Fleet Corporation, and believes this drastic proceeding will result in the corporation's effecting its severance and coming into a position to successfully operate as an independent structural steel concern. Of the liabilities, $101,000 are owing to the Mobile Shipbuilding Co., of which Mr. Brittain is also president. The Birmingham Steel Corporation was organized during the war, built a plant in Birmingham and

fabricated steel for a dozen ships put together by the Mobile concern. After that it engaged successfully in the building of office structures, business buildings and bridges.

Pittsburgh Steel Co.'s Report

The pamphlet report of the Pittsburgh Steel Co. for the year ended June 30, 1921, shows net income of $1,722,527, as against $1,961,459 for the previous year and a final surplus after common and preferred stock dividends of $147,527, as compared with $666,459 in 1920. The shipments of raw and finished materials during the year were valued at $23,230,028 as against $27,752,221 in the year ended June 30, 1920. The company made expenditures during the year, chargeable to the capital account, of $1,015,387, of $51,329, charged to operations and wrote off $350,466 on account of its ore properties, making net increase in the capital account of $664,921. The writing off of the account of the ore property represents the balance which remained on the books of the company for expenditures and was charged off because of the surrender of the leases and the disposal of the property. The average number of employees at the steel works during the year was 3311, against 4158 in the previous year; at the coal properties, 718 against 858 in the previous year, and total of salaries and wages $9,241,336, against $10,454,007 in 1920. Unfilled orders of the company as of June 30 last were 18,639 tons against 186,692 tons a year ago.

The comparative income account statement follows:

	1921	1920	Decrease
Net earnings after deducting all charges for operation and idle plant expenses, including repairs and maintenance	$3,817,029	$3,930,645	$113,616
Interest and income from investments	238,870	165,886	*72,984
Miscellaneous revenue	108,600	69,665	*38,935
Transfer of part reserve of 1920 set up to cover depreciation in price of Liberty Bonds not now required	69,729	.....	69,729
Total earnings	$4,234,228	$4,166,196	*$68,032
Less:			
Reserve for depreciation of plants	884,825	1,000,280	115,455
Reserve for depletion of mine property	101,065	126,026	24,962
Reserve for income and profits taxes	143,182	604,690	461,509
Interest on unmatured installments of purchase price of Alicia properties	103,125	134,455	31,330
Loss on sale of Liberty bonds	60,362	250,597	190,235
Loss on sale of capital assets—Rowe mine	123,824	.....	*123,824
Reduction of inventory values, less adjustment of reserves	1,095,320	.....	*1,095,320
Reserve to cover depreciation of Liberty bonds in treasury, written down to market price, June 30, 1920	.....	88,690	88,690
	$2,511,701	$2,204,738	*$306,964
Net income for the year	$1,722,527	$1,961,459	$238,932
Deduct:			
Dividends on preferred stock	735,000	735,000	.....
Dividends on common stock	840,000	560,000	$280,000
	$1,575,000	$1,295,000	*$280,000
Surplus for the year	$147,527	$666,459	$518,932

*Increase.

The directors, in explaining the depression which developed in November, 1920, gave these reasons: The severe decline in the prices of agricultural products, which had been produced at a high cost, so curtailed the purchasing power of the farmer, who consumes a large part of the company's output, that this source of demand practically ended; the sudden recession of general business found the manufacturer and dealer with considerable stocks on hand, and the liquidation of these stocks, together with the instability of prices, caused these customers to limit purchases to their immediate requirements; the general unsatisfactory financial situation, combined with the unprecedented and exceptional exchange conditions in the various countries purchasing the company's commodities, became so acute that cancellations of contracts for export material were freely and insistently made, and the receipt of new orders practically ceased.

The amount expended on maintenance and repairs during the year was $2,675,279, which was charged to operation cost.

The system of fuel transportation by water referred to in last year's report was completed during the year and has fulfilled the expectations of the officers of the company both from a mechanical and economical standpoint.

The second annual installment of $550,000 on the Alicia properties was paid March 31, 1921, the balance remaining to be paid during the next three years being $1,650,000. Considering the difficult times under review, it is satisfactory to report that this is the only outstanding obligation of the company, apart from current operating liabilities.

The operation of the Rowe mine was discontinued at the close of the mining season of 1920. The marked decrease in the available reserves of merchantable ore, the poor quality of the ore being extracted and its relatively high cost forced the directors to their decision.

To further fortify the company in its supply of coal, various purchases of the Upper Freeport vein of coal aggregating approximately 5,000 acres have been made during the year under properties contiguous to the Monessen plant. Also, for the better operation of Alicia Mine, No. 2, approximately 340 acres were purchased in fee where the company already owned the Pittsburgh vein of coal.

On March 31, 1921, the company acquired the entire capital stock of the National Steel Fabric Co., a corporation engaged in the sale of reinforced wire fabric for road and building construction purposes. This company is now being conducted as a part of the sales department.

As stated in the preceding annual report, the common stock of the company was increased on July 26, 1920, from $7,000,000 to $14,000,00 by a stock dividend of 100 per cent. Quarterly dividends of 2 per cent were paid on the outstanding stock to and including Jan. 1, 1921, subsequent payments being at the rate of 1 per cent quarterly. The regular quarterly dividend payments of 1¾ per cent on the preferred stock were made during the year.

Republic Has Nearly $2,000,000 Deficit

The report of the Republic Iron & Steel Co. for the quarter ended Sept. 30 last clearly reflects steel market conditions during that period when prices for finished products and going business declined rapidly. During that period the company operated at a loss of $1,398,410, as against a loss of $883,673 in the preceding three months, and a profit of $3,306,873 during the quarter ended Sept. 30, 1920. After providing for preferred stock dividends there was a deficit of $1,835,910, whereas in the corresponding quarter last year, after $450,000 for common stock as well as the regular preferred stock dividend disbursements, there was a surplus of $2,419,373. The surplus on Dec. 31, 1920, was $37,441,571. The deficit for the first nine months of 1921 was $3,939,972, bringing this surplus down to $33,501,599.

Reflecting the falling off in business, the amount of unfilled orders on the books of the company, as of Sept. 30, was down to 69,577 tons, as contrasted to 97,265 tons on June 30, 121,498 tons on March 31, 198,678 tons on Dec. 31, 1920, and 333,889 tons a year ago.

The income account for the September quarter compares with that for the June period and the three months ended Sept. 30, 1920, as follows:

	Sept. 30, 1921	June 30, 1921	Sept. 30, 1920
Net loss	$1,060,747	$508,447	*$3,960,902
Other income	23,004	54,873	77,791
Loss	1,037,743	453,574	*4,038,693
Depreciation and renewals	137,779	175,675	394,488
Exhaustion of minerals	28,569	30,155	154,387
Bond interest	194,319	224,269	182,945
Deficit	1,398,410	883,674	†3,306,873
Preferred dividends	437,500	437,500	437,500
Common dividends	.....	.....	.....
Deficit	1,835,910	1,321,174	†2,419,373

*Profit. †Surplus.

Earnings for nine month periods, as compiled from quarterly reports issued by the company, compare as follows:

	1921	1920	1919
Net income	*$1,098,952	$9,107,609	$4,265,652
Other income	129,132	358,204	506,265
Profit	*969,820	9,465,813	4,771,917
Depreciation and renewals	491,251	1,157,609	1,136,095
Exhaustion of minerals	113,569	366,407	260,690
Bond interest	602,832	552,107	539,113
Operating profit	*2,177,472	7,389,690	2,836,019
Preferred dividends	1,312,500	1,312,500	1,312,500
Common dividends	450,000	1,350,000	1,223,595
Surplus	†3,939,972	4,727,190	299,924

*Loss. †Deficit.

Lackawanna Steel Co.'s Large Loss

The Lackawanna Steel Co., Buffalo, N. Y., in its report for the first nine months of the year shows a total deficit of $2,182,667.88, the third quarter alone showing a loss of $1,208,275.88. This loss compares with a profit of $4,714,370.26 during the first nine months of 1920.

After providing for all taxes and all ordinary expenses, the company shows a deficit of $580,936.63 in third quarter. Interest on bonds and other obligations and appropriations for extinguishment of mines and mining investments and for depreciation and accruing renewals bring up the total deficit to the amount above named.

To Provide Working Capital

To provide additional working capital, directors of the Electric Alloy Steel Co., Youngstown, Ohio, have recommended an increase in the capital stock of $750,000 of 8 per cent

cumulative, convertible preferred stock. To act on the proposal, a stockholders' meeting will be held within 30 days. It is planned to issue $500,000 of the proposed authorization, and interests identified with the company have signified their intention of taking about a quarter million of the stock. The company is required to carry a diversified inventory of high-priced finished product owing to the demands of the alloy steel trade, which involves a heavy investment.

Leading steel interests are identified with the company, the presidents of several independent steel companies being members of its board of directors.

Bridge Company Fails

MILWAUKEE, WIS., Oct. 22.—The Northwestern Bridge & Iron Co., Milwaukee, Wis., which was made defendant in involuntary bankruptcy proceedings on Oct. 6, has filed a voluntary petition accompanied by schedules admitting liabilities of $462,822 and claiming assets of $685,266. Of the liabilities, $159,873 is secured, the principal items being a mortgage to Christopher Schroeder & Son Co., Milwaukee, for $124,200, and a debt to Joseph T. Ryerson & Sons, Chicago, amounting to $21,847. Unsecured creditors include the following: Bethlehem Steel Co., $79,792; Christopher Schroeder & Son Co., $25,046.

SHORT TRADE ITEMS

The Chain Belt Co., Milwaukee, has opened offices at 735 Ellicott Square, Buffalo, and appointed T. E. Cocker as district manager of that territory. He will handle the Rex line, including chain, sprocket wheels, traveling water screens, elevators and conveyors. For the past five years he has been handling elevating and conveying equipment. He is a civil engineering graduate of the Rensselaer Polytechnic Institute, Troy, N. Y., class of 1907. From 1907 to 1917 he was connected with the New York Central Railroad at Buffalo, and at the time he left this company was assistant engineer.

Effective Oct. 19, the Reilly-Peabody Fuel Co., Pittsburgh, was dissolved and succeeded by the Peabody Fuel Co. Eugene S. Reilly, president, L. P. Monahan, vice-president and L. A. Quinlivan, secretary, withdrew from the Reilly-Peabody Fuel Co., and its subsidiary, the American Coke Corporation, while F. E. Peabody resigns as treasurer of the Eastern Fuel Co. and severs all connection with it and its subsidiary, the Georges Creek Coal Mining Co. Officers of the Peabody Fuel Co. and the American Coke Corporation are: President, F. E. Peabody; vice-presidents R. E. Peabody and W. Russell Carr; secretary and treasurer, C. M. Rhoads. T. J. Atkinson is sales manager. Eugene S. Reilly remains president of the Eastern Fuel Co. and L. A. Quinlivan becomes vice-president and secretary.

Barbour, Love & Woodward, Inc., 45 East Eighteenth Street, New York, dealer in new and used machine tools, has purchased the interest of R. L. Woodward, who has entirely severed his connection with the business, which will be conducted henceforth under the same name by J. W. Barbour and L. S. Love.

After Nov. 1, the firm name of the Arthur C. Harris Co. will be changed to the Harris-Drew Co., Inc., 61-65 Cliff Street, New York. This is a change in name only and does not represent a change in personnel or management.

The Chesapeake & Ohio Railway Co., the Chesapeake & Ohio Railway Co. of Indiana and the Chesapeake & Ohio Northern Railway Co., Richmond, Va., will abolish the position of general purchasing agent on Nov. 1. B. T. Jellison is appointed special agent, handling special matters assigned.

The Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, has appointed the Maynard French Steel Co., 516 Mercantile Library Building, Cincinnati, representative for Cincinnati, Southern Ohio, Southern Indiana, Kentucky and Tennessee. Mr. French has had much experience in the steel business.

A company has been incorporated and is now in operation in Toronto to manufacture Gary motor trucks, with a capital of $4,500,000. The company has purchased the Chase tractor plant on Atlantic Avenue, Toronto, which contains 75,000 sq. ft. of floor space. The president and general manager is Theodore B. W. Zumstein, who has been vice-president of the American Gary Co. The sales department is under A. S. Holleyhead, who is also a director of the company. The board of directors includes some of the leading financial men of Canada. R. J. Cluff, the vice-president, is president of the Galt Brass Co. and vice-president of the Port Hope Sanitary Co. Hon. Senator Curry is a director of the Bank of Nova Scotia and chairman of the board of directors of the Canadian Car & Foundry Co. Roy M. Wolvin is president of the Dominion Iron & Steel Co., director of the Canadian Steamship Co., and president of the Montreal Transportation Co. W. J. Cluff is president of the Cluff Bros. Co., president of the National Electric Products Co. of Toronto, vice-president of the Mount Royal Hotel Co. of Montreal, and president of the Canada Pipe & Steel Co. James Whelan is vice-president of the Whelan Pulp & Paper Co. The company will immediately begin manufacturing as many parts of the different units as is possible in Canada. The motors are Buda, the transmission is Fuller & Brown-Lipe, and the axles are Timken.

Barnhart Aircraft, Inc., Pasadena, Cal., recently capitalized to manufacture airplanes especially adapted to commercial and load-carrying work. Two years have already been spent in development work. The company has a factory and expects to build, but does not contemplate making its own engines. C. Robert Little is president and G. Edward Barnhart is vice-president and consulting engineer.

The Fibre Tire & Rubber Co., Inc., 1819 Broadway, New York, has been incorporated at $3,000,000 to build fibre tread tires, tubes and other rubber and fibre products. The company has purchased two acres and a factory at Babylon, Long Island. Work will start at once upon the erection of two new buildings. The company expects to be making tires in its present plant by Jan. 1. Edwin F. Stoeckle is president and Michael N. Salamon, secretary and treasurer.

The Rusfal Mfg. Co., 132 North Seventh Street, Philadelphia, has purchased the good will and complete equipment of the James Carr Co., general machinist, Philadelphia. The company thus acquires a machine shop that has been established for 30 years and will continue to manufacture grinding lathes and tools for manufacturing opticians, and will make its "Quickbak" gage and drill holder, build special machinery and tools and do general machine business. The business is at present a partnership, but will be incorporated.

The O. & R. Electrical Supply Co., Inc., Monroe, N. Y., has been formed to take over the electrical wiring and supply business of Orange & Rockland Electric Co. of Monroe. The corporation will do electric wiring and furnish and install electric apparatus of all kinds.

The Austin Machinery Corporation, Chicago, announces that the Canadian Austin Machinery, Ltd., Woodstock, Ont., incorporated under the laws of Canada, will henceforth act as sole manufacturer and distributor in Canada of the complete Austin line. This expansion, coming as a logical result of the demand for earth-moving and concrete-mixing machinery needed for Canada's new highway and general construction program, makes it possible for the corporation to give its Canadian customers prompt and adequate service.

The Triumph Lock Co., Jersey City, N. J., successor to J. O. & W. W. Wilson, expects to build locks itself, but will contract for certain parts of the work in connection with their application.

The Pittsburgh office of the American Foreign Steel Corporation has been taken over by the David J. Joseph Co., Cincinnati.

The Swivel Joint & Shaft Co., Plymouth, Ind., has purchased through the Federal Court the assets of the Ogden Mfg. Co., bankrupt, of that city, securing the building which was formerly occupied by it. The company has ample equipment at this time.

Berglof Rotary Gas Engine Patents, Inc., will not improve and develop the Berglof reversible rotary gas engine and sell licenses to manufacture such engines under the patents covering it. The entire capital stock of $50,000 has been issued.

A new district office has been opened in the Greenwood Building, Cincinnati, by the Railway & Industrial Engineering Co., Greensburg, Pa., in charge of C. H. Mackelfresh, a graduate of the University of Cincinnati, '09, who has been connected with the supply department of the Westinghouse Electric & Mfg. Co.

The Standard Thermometer Corporation, Cleveland, Oswego Co., N. Y., has been organized to continue the old established business operated by Eugene Morenus under the trade name of E. Morenus & Co., and will continue to manufacture temperature instruments in the plant already equipped by Mr. Morenus, adding thereto such improved devices as will be necessary to manufacture a guaranteed product. In addition the corporation has engaged men who have had a lifelong experience in manufacturing these goods. The corporation is capitalized at $25,000.

The Traf-O-Lite Sales Co., Newark, N. J., recently incorporated to manufacture mechanical devices for automobile service, is having its manufacturing done by the Hygrade Engineering Co., Newark, N. J.

The Calodial Co., New York, has been incorporated with a capital of $50,000 by A. W. Newberry, R. P. Nichols and A. F. Upson, 30 Church Street, to manufacture electrical and steam measuring instruments and devices.

Machinery Markets and News of the Works

MORE ACTIVITY

Both Orders and Inquiries More Numerous for Machine Tools

Several Fair Lots Bought in Cleveland District—M. K. & T. Issues Additional List

Slightly more activity in machine-tool trade is indicated by developments of the past week. Inquiries are more numerous and a few more orders are being placed. In the Cleveland district several fair-sized lots of tools were bought, including five special turret lathes by the Ford Motor Co., Detroit, four turret lathes by the Muncie Wheel Co., Muncie, Ind., several miscellaneous tools by the American Steel & Wire Co., which is negotiating for other machine-shop equipment, and the Franklin Co., Canton, Ohio, and the Differential Car Co., Findlay, Ohio, have each purchased several tools. From Cincinnati it is reported that one company has bought 16 machines, mostly for gear work.

The Missouri, Kansas & Texas Railroad has issued from its purchasing office at St. Louis an additional inquiry covering 11 machines. This makes a total of 87 items on the road's list. It is reported that the Chesapeake & Ohio will soon be in the market for tools. A list which this road issued recently is still pending.

In general the machinery markets show more life, though the volume of business is far from satisfactory. The trend, however, is decidedly one of improvement and gives promise of a fair resumption of buying within a few months.

The equipping of vocational training schools with machine tools is developing as a rather important feature of present trade activities. The New York Board of Education has a list on which bids will be received up to Oct. 31, and an additional list of about 100 tools will be issued shortly.

General price reductions of 12½ per cent have been made by manufacturers of radial drills and lathes, while manufacturers of upright drills have made price reductions approximating 15 per cent. Two or three manufacturers of shapers have announced a 10 per cent reduction. Miscellaneous reductions include 10 per cent on arbor presses, by one maker, 20 per cent on hack saws by one maker and 10 per cent on heat treating furnaces by a Chicago manufacturer.

New York

NEW YORK, Oct. 25.

The Board of Education of the School District of New York has issued a request for bids by Oct. 31 on nearly 3000 items, of which the major part are small tools, supplies, steel in very small lots, with some metal-working machine tools and wood-working machines. The largest single item among the machine tools listed is 41 12-in. x 5-ft. Pratt & Whitney engine lathes. Other items include four 1-in. x 4-ft. speed lathes, 17 x 20-in. x 9-ft. Whitcomb-Blaisdell planer, one 24-in. sliding-head drill press, one Bilton or Becker No. 25 plain milling machine, one production surface grinder, 8-ft. table x 6-ft. cross x 9-in. vertical feeds, one No. 1 Kempsmith universal milling machine, one 16-in. Hendey shaper, two 14-in. sensitive drill presses, one Brown & Sharpe No. 1 universal grinder, two Greenerd arbor presses, No. 2 and No. 3, 48 bench lathes, Rivett or equivalent, four hand milling machines, four 3 x 3-ft. power hack saws, eight 11-in. x 4-ft. speed lathes, eight 14-in. sensitive drills, No. 1 Roots-Acme blower, one 14-in. United States sensitive drill press, one 20-in. drill press, one Hendey screw-cutting lathe, cone type, one Reed-Prentice engine lathe, 14 in. x 6 ft., one Marvel cylinder reboring machine, 2½ to 8 in. capacity. There are also a considerable number of wood-working machines and foundry equipment.

This list will be supplemented within a week or so by another list calling for bids on about 100 machine tools and wood-working machines.

No orders have been placed yet by the Delaware, Lackawanna & Western Railroad on its recent list, but the trade expects some of this business will go through, despite the degree of pessimism regarding general railroad buying.

The meeting of the National Machine Tool Builders' Association last week was well attended and many of the out-of-town tool builders took this occasion for conferences with their local representatives on the business situation. Despite the absence of orders, many of the tool builders were encouraged by the increasing number of inquiries and expressed the belief that next year will bring about a gradual resumption in machine-tool buying.

The Lovejoy Tool Co., Springfield, Vt., announces a 25 per cent reduction in prices on its high-speed inserted cutters for Lovejoy holders.

Few new inquiries for cranes are reported and those now in the market are not active. The demand for locomotive cranes, however, is still fairly good, particularly in the Middle West, where one manufacturer of a crawl-tread locomotive crane reports about 30 cranes sold during the past few months, largely for irrigation and dredging work. An inquiry is reported in the market from a malleable iron works near Providence, R. I., for five electric cranes. The Canadian Engineering Co., 115 Broadway, New York, has requested quotations on a 45-ton, 34-ft. span overhead traveling crane for export to Mexico. The American Sugar Refining Co. has purchased four electric winches.

Among recent sales are: Bedford Foundry & Machine Co., a 5-ton, 46-ft. 10-in. span overhead traveling crane to Rudolf Seus, 406 East 109th Street, New York; Shepard Electric Crane & Hoist Co., a 2-ton, single I-beam crane to Gloninger & Co., Vanport, Pa.; Shaw Electric Crane Co. a 2½-ton electric crane to the American Locomotive Co., 50 Church Street, New York, and the Pawling & Harnischfeger Co., 17 electric hoists of 1, 2 and 4-ton capacity. The Northwest Crane Co. has recently sold crawl tread locomotive cranes to the Equitable Coal & Coke Co., Chicago, a 35-ft. boom crane with 1 cu. yd. bucket; E. D. Barr, Lake Crystal, Minn., a crane with 40-ft. boom and 1 cu. yd. bucket; W. F. Sternberg Co., Piper City, Ill., two crawl tread cranes with 1 cu. yd. buckets and Cole Bros., Neola, Iowa, a crawl tread crane with 40-ft. boom and 1 cu. yd. bucket.

The H. P. Snyder Mfg. Co., Sixth and West Main streets, Little Falls, N. Y., bicycles and parts, is completing plans for the erection of a building at its plant, to cost $110,000. Carl Haug & Sons, Main Street, are architects.

A reorganization committee formed of creditors of the Stanwood Rubber Co., Newark Avenue, Elizabeth, N. J., has acquired the plant and property of the company from the receiver, operating since Nov. 30, 1920, for $360,000. The company will be reorganized and the plant, equipped for the manufacture of tires, placed in operation. It is proposed to arrange immediately for a bond issue of $175,000, and stock issue of $651,000.

The Knickerbocker Ice Co., 1480 Broadway, New York, will build a one-story addition to its plant on Thirty-sixth Street, Brooklyn, to cost $75,000. Plans have been completed.

The board of estimate, New York, has approved a report on the construction of a belt line railway by the city, under the direction of Grover A. Whalen, Commissioner of Plant and Structures, Municipal Building, to cost $141,000,000, and authorized preparation of plans and application to the

Federal authorities for permission covering certain sections of the line. The new road is projected to run from Haworth, N. J., to Brooklyn, by way of Staten Island. It will include complete facilities for freight handling and machinery.

The New York Steam Corporation, 280 Madison Avenue, New York, has filed plans for extensions and improvements in its power house at 507-19 East Fifty-ninth Street, to cost $300,000, with equipment.

The Annheuser-Busch Co., 979 Brook Avenue, New York, will build a new addition to its ice-manufacturing and cold storage plant, with improvements in the present works, estimated to cost about $200,000. Ophuls, Hill & McCreery, 112 West Forty-Second Street, are engineers.

Grover A. Whalen, Commissioner of Plant and Structures, Municipal Building, New York, has made application to the Board of Estimate for an appropriation of $177,700, for equipment for a trackless trolley system between Richmond and Tottenville, S. I. The installation will include a new electric generator and auxiliary power equipment at the Sea View power plant; automatic electric substation; cables and wires for transmission lines, feeder lines and overhead trolley system.

The Claremont Iron Works, 10 West 143rd Street, New York, has filed plans for a one-story plant at Barry and Worthen streets, 100 x 118 ft. M. Breyer is president.

The board of aldermen, Perth Amboy, N. J., has approved a tentative project for the improvement of the city waterfront at a cost of $1,000,000, including piers, with freight-handling machinery. Morgan F. Larson is city engineer.

The Metallurgic Products Corporation, 15 Broad Street, New York, has filed notice of dissolution under state laws.

The Cerro de Pasco Copper Corporation, 15 Broad Street, New York, will build a new plant at Craya, Peru, to cost $9,000,000, with machinery, housing development for employees and other subsidiary work. The plant will have a capacity of about 2500 tons of ore per day. It is expected to be ready for operation late in 1922.

Garfinkel & Steinberg, 2562 Third Avenue, New York, manufacturers of store fixtures, have plans under way for the erection of a four-story plant addition, 25 x 90 ft., to cost about $25,000. Philip Bardes, 230 Grand Street, is architect.

W. C. Bower, purchasing agent New York Central Railroad, Grand Central Terminal, New York, will receive bids until noon, Nov. 4, for an electric arc welding set; wire nails and staples; steel bars, shapes and plates; steel billets; manganese frogs; black, galvanized and blue annealed sheets; seamless steel tubes for repairs to locomotives and boilers; axles for car and locomotive repairs; and steel wheels for locomotive, passenger car and tender repairs.

The Duplex Channel Pin Co., 30 Church Street, New York, has filed notice of dissolution under state laws.

The Celluloid Co., 290 Ferry Street, Newark, N. J., has awarded a contract to Enstice Brothers, 40 Clinton Street, for a one-story and basement building at its plant, Niagara and Westcott streets, 73 x 210 ft., to cost $200,000.

The ordnance plant at Morgan Station, near South Amboy, N. J., will be offered for sale by the Government.

Buffalo

BUFFALO, Oct. 24.

The American Body Co., 1200 Niagara Street, Buffalo, manufacturer of automobile bodies, is taking bids for a three-story addition, 50 x 50 ft.

William C. Jacobs and J. Jay Schlund, Buffalo, have leased the building at 55 Walnut Street, 32 x 100 ft., for the establishment of a machine and repair shop in connection with an automobile service works.

The American Motorists' Refining Co., Niagara Falls, N. Y., has acquired about 30 acres in the northern section of the city to be used in connection with its new lubricating oil refining plant, ground for which recently was broken.

Elevating machinery, conveying equipment and other mechanical and electrical equipment will be installed in the new grain elevator and feed milling plant to be erected by the American Grain & Feed Corporation, 303 Chamber of Commerce Building, Buffalo, on the waterfront, to cost $400,000. Plans are being prepared by L. R. Veatch, 528 Pratt Street, engineer.

A new machine shop will be installed at the plant of the Fisher Knitting Co., 1043 Jefferson Street, Buffalo. M. J. Fisher is head.

The Foote Mfg. Co., State Street, Nunda, N. Y., manufacturer of concrete-mixing machinery, etc., is planning a one-story building.

The Niagara, Lockport & Ontario Power Co., Marine Bank Building, Buffalo, is arranging for a bond issue of $374,000 for plant extensions and improvements. The company proposes to acquire the Jamestown Lighting & Power Co., Jamestown, N. Y., and the Western New York Electric Co., Jamestown.

Brunner Brothers, 110 Montclair Avenue, Buffalo, are planning for the establishment of a machine and repair shop for automotive work in a building, 59 x 60 ft., at Liberty and Shawnee avenues.

A permit has been granted the Pennsylvania Glass Sand Co., Rochester, N. Y., to build a feldspar grinding mill at a cost of $50,000. It will be brick, 45 x 105 ft.

The Oxweld R. R. Service Co. has filed plans for the erection of a building in Dingens Street, Buffalo, to house generators, costing $6,000, 51 x 156 x 15 ft.

The Co-Operative Grange League Federation will remodel its warehouse at 1096 Niagara Street, Buffalo, at a cost of $11,000.

The Independent Sanitary Mfg. Co. has filed plans for the erection of a storage building, 23 x 25 x 50 ft.

Philadelphia

PHILADELPHIA, Oct. 24.

The Ellwood Ivins Tube Works, Oak Lane Station, Philadelphia, manufacturer of seamless steel tubing, has commenced the erection of four buildings to replace those destroyed by fire. Other buildings have been completed. The entire plant will cost $250,000. Ellwood Ivins is head.

The Philadelphia Paper Mfg. Co., Nixon Street, Manayunk, Philadelphia, has filed plans for an addition to cost $30,000.

M. A. Hanna & Co., Leader-News Building, Cleveland, pig iron, will commence the immediate erection of a new pulverizing plant at its properties at Lykens, Pa. H. C. Pefver is superintendent.

The Reading Hardware Co., Reading, Pa., hardware and other metal products, has work under way on a new addition forming a double annex, to cost $175,000.

The Apperson Brothers Automobile Co., Philadelphia, has leased the building at 1525-33 North Stillman Street for an automobile service and repair works.

The J. W. Paxson Co., 1021 North Delaware Avenue, Philadelphia, manufacturer of foundry equipment and supplies, has filed plans for a one-story shop building at D Street and Nicetown Lane. An adjoining building will also be constructed.

The Susquehanna Stone Co., Dalmatia, Pa., plans to rebuild a portion of its stone crushing plant, destroyed by fire Oct. 19 with loss of $12,000.

The West Shore Lumber Co., Lemoyne, Pa., recently organized, plans the erection of a one-story mill, 50 x 100 ft., to cost $20,000. W. E. Bushey is president and Alvin Bushey, secretary.

Power equipment, ovens, conveying machinery and other mechanical equipment will be installed in the new three-story baking plant to be erected by the Mayer Baking Co., Sixtieth and Cedar streets, Philadelphia, at Fifty-fifth and Thomas streets, to be 93 x 115 ft., to cost $130,000. Plans have been completed.

The Niagara Mfg. Co., 1042 Ridge Avenue, Philadelphia, pipe, plumbers' supplies, fittings, etc., has leased the building at 3825-29 Pearl Street for a main manufacturing plant.

The Neel-Cadillac Co., 142 North Broad Street, Philadelphia, will concentrate all manufacturing operations at its new six-story automobile building at Twenty-fifth and Locust streets, recently completed. These will include the body and top departments, general machine and repair shop, and used-car repair shop, with other mechanical branches. J. B. Dickson is in charge of the mechanical departments.

Fire, Oct. 21, destroyed a part of the plant of the Enterprise Rubber Co., Enterprise Avenue, Trenton, N. J., with loss of $25,000. John McCue heads the company.

The Crescent Insulated Wire & Cable Co., Olden and Taylor streets, Trenton, N. J., has arranged a list of new equipment and tools for installation at its plant.

Fire, Oct. 19, destroyed part of the plant of the Camden Copper Works, Second and Royden streets, Camden, N. J., with loss of $12,000. Bernard Ahlberg is head.

The plant and property of the Owen Magnetic Motor Car Corporation, Forty-Fort, near Wilkes-Barre, Pa., manufacturer of automobiles, will be offered at a receiver's sale, Nov. 5. The plant consists of one-story buildings, fully equipped with machine tools and other machinery. Robert Penington and James P. Harris, Wilkes-Barre, are receivers.

Chicago

CHICAGO, Oct. 24.

Machine tool trade continues to drag bottom with little to interest the seller except pending railroad business. From St. Louis comes word that the large list issued by the Missouri, Kansas & Texas last week has been augmented by an inquiry calling for 11 machines. Here and there a few purchases are made for public schools. The Gary, Ind., Board of Education recently purchased a cutter grinder and a few 14-in. x 4-ft. engine lathes, and is now in the market for a 14-in. shaper, a 13-in. x 6-ft. engine lathe and a 15-in. x 8-ft. engine lathe.

Rather general reductions in lathe, radial and upright drill prices are reported. Engine lathes have been reduced about 12½ per cent, radial drills 12½ per cent, and upright drills 15 per cent. Two Ohio lines of shapers have been marked down 10 per cent recently. Miscellaneous reductions include 10 per cent on arbor presses by the Arbor Press Co., Evansville, Ind.; 20 per cent on hack saws by the Peerless Machine Co., Racine, Wis.; 10 per cent on heat treating furnaces by the Chicago Flexible Shaft Co., and 10 per cent on flexible shaft outfits by N. A. Strand & Co., Chicago.

The Chicago Board of Education is inquiring for a 7-in. x 16-in. bench lathe for the Bowen High School and a 7-in. x 30-in. bench lathe for the Senn High School.

E. W. Sproul & Co., 2001 West Thirty-ninth Street, Chicago, have obtained a permit to construct a one-story machine shop, 50 x 115 ft., 4905-7 Shields Avenue, to cost $8,700.

The Kelly & Jones Co., Pittsburgh, manufacturer of valves, pipe fittings and pipe trade supplies, has purchased a two-story warehouse, containing 50,000 sq. ft. of floor space at 2436 West Fifteenth Street, Chicago. An addition, 70 x 200 ft., will be built. The property purchased will be used as a Western distributing point for the company's products.

The Morand Cushion Wheel Co., Chicago, has purchased 20 acres on the northwest corner of Western Avenue and Seventy-seventh Street and contemplates the erection of a plant to cover the entire tract. No architect has been selected. Joseph Morand is president.

The Murphy-McEuen Co., recently organized to manufacture roofing, has let a contract for a one and two-story factory, West Sixty-fifth Street, 480 ft. west of Austin Avenue, Clearing, Ill., to cost $100,000. Foundations have been completed.

William Frank & Co., manufacturer of band instruments, 2033 Clybourn Avenue, Chicago, will erect a one-story addition, 65 x 75 ft., to cost $6,000.

A. D. Cronstedt, 111 West Washington Street, Chicago, has let a contract for a one-story factory, 50 x 125 ft., 3737-9 North Clark Street, to cost $10,000. The plant will be occupied by Smith & Co., manufacturer of automobile bodies and tops.

The P. H. Magirl Foundry & Furnace Works, East Oakland Avenue, Bloomington, Ill., was recently damaged by fire, but operation has been resumed.

The Cabirange Mfg. Co., stove manufacturer, has purchased a site at Granite City, Ill., and will remove its plant to that city from Taylorville, Ill.

The American Car & Foundry Co. is constructing machine and blacksmith shops at Terre Haute, Ind., to replace buildings partially destroyed by fire some time ago.

The plant of the Armstrong Machine & Tool Co., 1001-7 South Washington Street, Peoria, Ill., was recently damaged by fire.

The General Machine Shop, Kewanee, Ill., of which J. W. Connery, E. A. De Witt and George Hadsall are proprietors, is being removed from the H. P. Baker Building to the former Mayhew & Craig garage, on Windsor Court.

The Russell Grader Mfg. Co., Read Building, Minneapolis, Minn., agricultural machinery, will hold in temporary abeyance the erection of its one-story plant in the industrial district, to cost $400,000. Sund & Dunham, 514 Essex Building, are architects.

The Chicago, Burlington & Quincy Railroad Co., 542 West Jackson Boulevard, Chicago, has completed plans for an engine house, coal chute and other mechanical departments at Centralia, Ill., to cost $125,000.

The Middle West Utilities Co., Williams, Ind., with headquarters at 72 West Randolph Street, Chicago, a subsidiary of the Southern Indiana Power Co., Indianapolis, is completing plans for a hydroelectric generating plant at Williams, to cost $80,000. Holland, Ackerman & Holland, Inc., 53 West Jackson Boulevard, Chicago, are engineers.

Edwards & Powell, 2637 North Halsted Street, Chicago, tools, levels, etc., have filed notice of change of name to the Peerless Level & Tool Co.

The Ocean Floating Safe Co., 4520 West Grand Avenue, Chicago, will hold in abeyance the erection of its four-story and basement plant, 60 x 125 ft., on West Grand Avenue. It is expected to call for bids in the early spring. H. K. Holsman, 304 South Wabash Avenue, is architect.

Pittsburgh

PITTSBURGH, Oct. 24.

Actual orders for machine tools still are few in this district and the inquiry could be a whole lot better without being satisfactory. There are no railroad inquiries and the steel industry is doing little at the moment. Several of the steel companies have been considering purchases, but show no anxiety about placing the orders. It is difficult to determine whether the delay is due to present costs or a lack of willingness to spend money at this time. The railroads are not likely to do much, pending a settlement of the labor troubles and action has been taken by Congress with regard to the funding of their obligations. The Kelly & Jones Co., Pittsburgh, will want a small crane for a new fabricating and storage shop which it proposes to build at its recently purchased warehouse property in Chicago. Another live project is the Wheeling Steel Corporation, in connection with the improvements at its Steubenville, Ohio, works, and the new rod and wire mill at its Portsmouth, Ohio, works. The Boviard & Seyfang Co., Bradford, Pa., has closed for two 7½-ton overheads and a 5-ton with the Erie City Iron Works. The National Radiator Co. has closed with the Cleveland Crane & Engineering Co., Wickliffe, Ohio, for another crane for its New Castle, Pa., works, this being a 5-ton overhead with 56 ft. 6 in. span. The Allis-Chalmers Mfg. Co. has taken a 4,000,000-gal. pumping engine through its local office for the Suburban Water Co., Verona, Pa.

Kelly & Jones Co., Pittsburgh, one of the country's largest manufacturers of valves, pipe fittings and plumbing trade supplies, with a large plant at Greensburg, Pa., recently purchased property in the central manufacturing district of Chicago, located at 2436 to 2462 West Fifteenth Street, with an area of 80,000 sq. ft. and containing three two-story buildings of concrete, brick and steel construction, with a floor area of 50,000 sq. ft. A spur track of the Chicago Junction Railroad connects the property with three important railroads and the company also has the service of the Chicago & Northwestern Railroad. The company is going to build a one-story fabricating shop and storage building, 60 x 150 ft., for which a crane will be wanted. The purchase is for distributing and warehouse purposes and is the second the company has made. Early this year property was purchased and a warehouse established at Canal and Sycamore streets, Cincinnati.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, electrical wires and cables, has filed plans for an addition to its plant at Pike and Seventeenth streets, to cost $200,000. The contract has been let to the J. W. Cowper Co., Fidelity Building, Buffalo.

The Rochester & Pittsburgh Coal & Iron Co., Punxsutawney, Pa., has commenced the erection of an electric generating plant at Helvetia, equipped for an initial capacity of 3000 hp.

The Denk Engineering Co., 45 Shannon Building, Pittsburgh, has preliminary plans for a plant. F. J. Denk is head.

The Townsend Co., New Brighton, Pa., manufacturer of bolts, nuts, rivets, wire products, etc., has work under way on a three-story and basement addition on Fallston Street, 120 x 128 ft., a portion to be equipped as a wire mill.

The Cunningham Motor Sales Co., Pittsburgh, has filed plans for a two-story automobile service and repair building at Liberty Avenue and Aspen Street, to cost $100,000.

A new two-story cold storage and refrigerating plant at Thirty-sixth and Butler streets is being planned by the Tech Food Products Co., 3340 Liberty Avenue, Pittsburgh. F. C. Klussman is head.

Freight handling machinery will be installed in the two-story freight terminal, 110 x 178 ft., to be constructed by the Rainbow Lines, Inc., Connellsville, Pa., to cost $100,000. Howard C. Frank, Second National Bank Building, is architect. Otto Stickel is manager.

The new plant of the Auto-Motor Mfg. Co., Charleston and Dunbar, W. Va., to be located at Point Pleasant, W. Va., near Gallipolis, Ohio, will consist of three four-story plant units, to cost $250,000, including machinery. The new works will be used for the most part for the manufacture of motor-driven mine and timber-loading machinery, and the plant at Dunbar will be removed to the new location. Later it is proposed to construct additional units, providing for a total working force of over 1000. Construction will start in November.

The Star Glass Co., Star City, W. Va., has awarded a contract to the Pittsburgh Bridge & Iron Co., Pittsburgh, for a plant, 75,000 sq. ft., to cost $200,000. The J. H. Slate Engineering Co., Morgantown, W. Va., is consulting engineer.

H. J. Wagoner, 93 Washington Street, Morgantown, is secretary.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, will erect a three-story building at Ninth Avenue and Second Street, Huntington, W. Va., about 100 x 100 ft., for a new local branch, to cost $100,000.

The H. T. Lambert Co., Huntington, W. Va., recently organized with a capital of $200,000, has taken bids for the erection of its proposed new local plant for the manufacture of frogs, switches and other rail equipment, to cost $45,000, with machinery. Work will be commenced at an early date; the plant will be located at Fifteenth Street and Jackson Avenue. H. T. Lambert is president and E. A. Thomas, secretary and treasurer.

A one-story machine repair works and automobile service building, 50 x 120 ft., will be erected by E. F. Randolph, Williamson, W. Va. Plans have been completed.

New England

BOSTON, Oct. 25.

More optimism is noted among local machine tool dealers than for many months, being based on increased sales and the development of a comparatively large number of prospects. A large majority of these prospects concern one, two or three pieces of equipment, but, in the aggregate, are impressive. In addition, two or three moderately large blocks of possible business are in the making. For instance, one of the large New England manufacturers has revived a list of two dozen shop machines, which includes about a dozen lathes and a large open-side planer, and one of the railroads is making up a list of about as many tools. Another New England railroad has informed machine tool dealers that it will not be in the market for additional equipment this year, but that early in 1922 it will require machinery. A nearby interest is inquiring on six or seven lathes, shapers and milling machines without competition. In these instances and in a large number of the smaller inquiries, a wide variety of new machine tools is involved, which is an indication that consumers do not expect prices to be much lower.

Sales for the week include six lathes and two shapers to a Connecticut hardware manufacturer, who has just closed on enough business to keep his plant operating at normal capacity for approximately two years. W. H. J. Fitzgerald & Co., Boston, report the sale of riveting machinery to Gray & Davis, Inc., Cambridge, Mass.; a 16-in. shaper with direct gear motor drive to a Boston consumer; a 20-in. upright drill and chucks to a North Weymouth, Mass. manufacturer; and a used South Bend lathe with full equipment, together with considerable woodworking machinery. Another local dealer has sold a 14-in. x 6 ft. lathe, a No. 1 Milwaukee milling machine, a 16-in. shaper and a 13-in. x 6 ft. speed lathe to a Worcester, Mass., concern; an 8-in. pipe machine to a New Hampshire interest; a 16-in. shaper, a drill press and a grinding machine to the city of Boston; a 30-in. x 8 ft. used planer to a local manufacturer and eight other machines to various New England users.

There is a noticeable increase in purchases of chucks, machine parts and gages, which is taken by the machine tool trade as an indication of growing activity in a wide range of New England industries. Comparatively few of the machine tools being sold from day to day are motor-driven.

The Pacific Mills is about to close on a 30-ton crane, and the American Woolen Co. is inquiring for one 25-ton and one 30-ton crane. Negotiations for a 3-ton crane for export to India have practically been abandoned. Lighter lifting equipment will be used temporarily instead, but the question of heavier cranes will come up at some later date. The New Haven, Conn., board of finance has authorized the erection at the city's wharf of a traveling crane, at a cost not to exceed $12,000.

The market on high speed cutters is weaker, leading manufacturers now quoting old catalog prices. Heretofore an additional price was charged. Carbon speed cutters are now 25 per cent off the list, as contrasted with net, heretofore.

Plans are being figured for a one-story, 300 x 400 ft. machine shop to be erected by the Meisel Press Mfg. Co., Boston, in Dorchester near Locust Street.

The Norwalk Lock Co., Norwalk, Conn., will erect a one-story, 50 x 96 ft. addition for general manufacturing purposes.

Estimates are being made on plans for a one-story, 68 x 122 ft. foundry contemplated by the New England Steel Casting Co., East Longmeadow, Mass., to replace a plant destroyed by fire several months ago.

Ansonia, Conn., is erecting a manual training school on Clifton Street, at an estimated cost of $100,000.

The New England Steel Castings Co., East Longmeadow, Mass., is having plans prepared by Architect Morris W. Maloney, 145 Chestnut Street, Springfield, Mass., for a one-story foundry, 70 x 122 ft., to replace its plant recently destroyed by fire.

The Boston & Maine Railroad Co., North Station, Boston, has plans for a coaling plant, with elevating and conveying machinery, to be erected at Concord, N. H. A. B. Corthell, engineer, 300 North Station, will take bids.

Freight-handling machinery, including hoisting, conveying and other equipment, will be installed by the Harbor Terminal Commission, New Haven, Conn., in connection with its proposed new piers, docks and warehouses on the waterfront, to cost $3,000,000. E. S. Nettleton is city engineer. H. McL. Harding, Grand Central Terminal, New York, is associate engineer.

Frank Williams, operating the brass foundry business of Higgins & Co., Holyoke, Mass., with James E. Higgins, has acquired the latter's interest in the company and will continue operations as an individual enterprise.

The board of finance, New Haven, Conn., has approved an appropriation of $12,000 for the installation of a new electrically operated traveling crane at the city wharf.

A power house addition will be constructed by the Douglas Shoe Co., Brockton, Mass. J. Williams Beal Sons, 62 Summer Street, Boston, are architects.

The Woburn Cylinder Grinding Co., Woburn, Mass., recently organized, has established a plant on Prospect Street to specialize in general machine work, cylinder grinding for automobile and marine engines, etc.

Reorganization plans have been perfected by the Fisk Rubber Co., Chicopee Falls, Mass., manufacturer of automobile tires, and increased operations are planned. The capital has been increased to $66,250,000 and new stock issued. H. G. Fisk is vice-president.

Herman A. Persson, Southbridge, Mass., has acquired property at 52 Westford Road for the establishment of a machine shop, equipped for general work, including parts manufacture.

The Whitall Engineering Co., Waterbury, Conn., has filed notice of change of name to the Whitall Electric Co., for the manufacture of electrical specialties.

The Connecticut River Co., Pearl Street, Hartford, Conn., has been granted permission by the Federal Power Commission, Washington, D. C., to develop water power at Windsor Locks, Conn., and the construction of a hydroelectric generating plant at this location. C. H. Tenney, 201 Devonshire Street, Boston, is engineer.

Alterations to the plant of the Shawmut Machine Works, 84 Linden Park Street, Boston, are being figured.

The city of Boston is asking bids on equipment, etc., for a refrigerating plant. Fred J. Kneeland is superintendent.

The Beacon Oil Co., Boston and Everett, Mass., has been given a permit to erect a small waterpump house and a tank pump house, each to be one-story.

Bids are asked on a one-story, 44 x 110 ft. addition for the Mack Motor Truck Co., 185 Massachusetts Avenue, Cambridge, Mass.

Cincinnati

CINCINNATI, Oct. 24.

The machine tool industry continues to show a steady improvement and the orders booked so far this month are far ahead of any previous month this year. There are no heavy lists out other than those mentioned in previous issues, but a larger number of inquiries for one and two machines are being figured on and manufacturers are confident that business will result. Some orders are being received from the automotive industry and it is reported that one company has placed orders for 16 tools, mostly gear cutting machines. A small amount of export business is being negotiated and one or two inquiries from South American countries are expected to develop into orders during the week. Local dealers report conditions throughout this district as steadily improving and a greatly increased demand, particularly for small tools.

The J. A. Fay & Egan Co., Cincinnati, manufacturer of wood-working machinery, is making preparations for the construction of its new plant in the Bond Hill section of the city, commencing shortly after Jan. 1. The new plant will be 300 x 700 ft. and will cost approximately $500,000.

The U. S. Motor Car Specialties Co., Cincinnati, has been organized with a capitalization of $500,000 to place on the market a device known as the "Hour Charger," for charging storage batteries at home. The device will be manufactured by the Automatic Electric Devices Co., West Third

Street, Cincinnati. The head offices of the company will be located in the Bodmann Building, Main Street, Cincinnati. V. R. Shepard, Jr., Richard C. Hill, Wade Shepard and F. O. Valentine are named as the incorporators.

The Dayton Carrier & Mfg. Co., Dayton, Ohio, has been incorporated with a capitalization of $10,000 to manufacture a carrier for automobile tires. The company plans to make its product in Dayton, but has not yet selected a site. Hazen H. Miller heads the company and Edwin A. Sterzer of the Sterzer Co., jewelers, is one of the incorporators.

The Fox Furnace Co., Elyria, Ohio, heating furnaces for domestic service, will commence the immediate erection of a one-story and basement addition, 110 x 140 ft. Henry Wick is head.

The Ohio Public Service Co., Warren, Ohio, has disposed of a bond issue of $5,100,000, for general operations, plant extensions and improvements, etc.

The Save Electric Corporation, 254 Thirty-sixth Street, Brooklyn, has awarded a contract to Z. J. Bergeron, 1940 Lawrence Street, Toledo, Ohio, for the erection of its plant in the latter city, two-story, 70 x 390 ft., to cost $200,000, with machinery. Work will be placed under way at once. Max Ettinger is president.

A complete machine shop for parts production and general repair work will be installed in the four-story service building, 125 x 135 ft., to be constructed by the C. T. Dunkle Motors Co., Fourth and Gay streets, Columbus, Ohio.

The Canton Ice Delivery Co., Massillon, Ohio, W. A. Schuster, general manager, will build a one-story ice plant, 80 x 92 ft., on Naverre Street, Canton, Ohio, to cost $100,000.

The Central Tablet Mfg. Co., Harvard Avenue, Columbus, Ohio, paper specialties, will build an addition. D. A. Heffner is general manager.

Detroit

DETROIT, Oct. 24.

Improvements at the Mt. Elliott Avenue plant of the Detroit Pressed Steel Co. have made available additional space for the Disteel Wheel Division, which was formerly housed in the Cabot Avenue plant recently purchased by the Rickenbacher Motor Car Co. The money obtained by the sale of the Cabot Avenue plant will be used for equipment and improvements at the Mt. Elliott plant.

Plans are being prepared by the Niepolt Engineering Co., Detroit, for a brick and steel factory building for the Detroit Sand, Lime & Brick Co., 507 Vinton Building, Detroit. No site has yet been selected.

The Semet Solvay Co., is planning the construction of a gas and coke oven plant in Hamilton, Ont., in 1922, to cost $3,000,000.

The town of Charlevoix, Mich., has started work on the construction of an electric power plant. John D. Curtis, Charlevoix, is in charge.

The Mac Sim Bar Paper Co., Otsego, Mich., is now having plans prepared for a power plant, one-story, 80 x 140 ft., to cost $300,000, with machinery. Billingham & Cobb, Kalamazoo, Mich., are the architects.

The Hercules Steel Post Co., Niles, Mich., will defer erection of its 50 x 250 ft. building until spring.

The Hollet Carburetor Co., Detroit, has brought out a new carburetor for four-cylinder models.

The Lansing Warehouse Co., Lansing, Mich., which has acquired the old Borden plant, plans to install a cold storage and ice manufacturing plant.

The S. C. McLouth Foundry Co., Marine City, Mich., which recently received a contract for 500,000 motor pistons, is arranging for the installation of new equipment and machinery. Pistons will be turned out at the rate of 1000 a day.

The Cook Standard Tool Co., Kalamazoo, Mich., will increase its production and add to its line as soon as necessary equipment can be purchased and installed. Steel cattle guards and brake shoe parts will be produced in greater numbers. A punch for tin and galvanized and sheet iron work will be added to the line, and also an improved type of service hoist whereby a man may handle a ton.

The Jewett Phonograph Co., Allegan, Mich., has started the erection of a plant addition, 24 x 110 ft.

The newly organized Pontiac Engineering Products Corporation, Pontiac, Mich., has taken over the plant and equipment of the Gaukler Foundry Co., and will make principally a single dry plate clutch.

The Cameron Motors Corporation, New York, which recently took over a plant at Greenville, Mich., is planning to construct a foundry, 80 x 150 ft.

The Ford Motor Co. has purchased two large Greaves-Etchells electric furnaces for its Dearborn tractor plant from the Electric Furnace Construction Co., 908 Chestnut Street, Philadelphia. The furnaces are to be basic lined.

Cleveland

CLEVELAND, Oct. 24.

Machine tool sales have increased and several dealers report that their volume of business in October will show considerable gain over any of the few preceding months. Sales are still for the most part limited to single tools, but several new orders are for lots up to five or six machines. The demand in the Detroit territory among the automotive industries is showing a little more activity, but mostly in single tools. A Cleveland machinery manufacturer took an order from the Ford Motor Co. for five special turret lathes for machining rear axle housings, and also booked an order for four turret lathes for the Muncie Wheel Co., Muncie, Ind. The American Steel & Wire Co., which has had an inquiry out for some time for a fair-sized lot of machinery, purchased a few tools during the week and is negotiating for additional machines. The Franklin Co., Canton, Ohio, maker of gas heating equipment, and the Differential Car Co., Findlay, Ohio, each purchased several machines and the latter company also bought an 800-lb. steam hammer. The Mt. Vernon Bridge Co., Mt. Vernon, Ohio, is inquiring for a bending roll. The demand for small tools has picked up considerably.

In general machinery lines the market shows more life. Steel plants have purchased virtually no equipment for some time, but three inquiries have come from this source, one for manipulating equipment and the other two for charging machines. In foundry equipment lines, which have been inactive, there is now some demand for repair parts.

Crane inquiries show an improvement over the early part of the month and several sales of single cranes are reported. The Cyclone Drill Co., Orrville, Ohio, has revived an inquiry for a 10-ton electric traveling crane.

The Beckman-Vajda Tool Co., Cleveland, has been organized to engage in the manufacture of small tools, gages, etc., and has purchased the machinery equipment of the Cleveland Precision Tool Co. The new company will be located at 412 Franklin Avenue. F. W. Beckman is president.

The Wayne Tire & Rubber Co., Orrville, Ohio, is planning plant extensions with a view to doubling the capacity of its plant.

Extensions to the plant of the Erie Tire & Rubber Co., Sandusky, Ohio, which were started before the company went into the hands of the receivers several months ago, will be completed.

The Garland Rubber Co., Marion, Ohio, has been incorporated with a capital stock of $10,000. The company has been operating for the past few months as a partnership and is engaged in the manufacture of rubber novelties. C. H. Mansfield is president and W. W. McQuate is secretary and treasurer.

The Bail Welding & Bonding Co., Cleveland, is having plans prepared for a $50,000 factory building.

The Standard Sanitary Mfg. Co. of Pittsburgh has placed with the Sly Mfg. Co., Cleveland, what is said to be the largest single order for sand blast equipment ever placed. The equipment will be placed in the Sanitary company's plant extension at New Brighton, Pa. The order is for 15 sand blast rooms in units of from 8 x 10 ft. to 12 x 12 ft., and for a complete dust collecting system to serve these sand blast units.

Indiana

INDIANAPOLIS, Oct. 24.

George W. Baugher, South Bend, Ind., has received a patent on a fire escape and sprinkler system and has organized a company at Milton, Ind., for the manufacture of the equipment.

A building permit has been issued to Robert H. Hassler, Inc., manufacturer of auto parts, Indianapolis, for a one-story brick and steel shop, 60 x 101 ft., to cost $26,000.

The Indianapolis Board of Public Works has awarded the contract for the construction of the Washington Boulevard sanitary sewer to the Columbia Construction Co. on a bid of $107,694. The work is to be completed in 135 days.

The Van Briggle Mfg. Co., 1520 North Capitol Avenue, Indianapolis, automobile equipment, has completed plans for its three story plant at Mooresville, Ind., 50 x 300 ft., with two-story extension, 32 x 65 ft. Erection will be deferred for a short time. Charles E. Bacon, 605 Odd Fellows Building, is architect. L. H. Van Briggle is president.

S. F. Bowser & Co., Fort Wayne, Ind., gasoline and oil pumps, has acquired the plant of the Richardson-Phoenix

Co., Milwaukee, lubricating devices, etc., and will operate the works as a branch. It is valued at $1,000,000.

The Central States Aeronautical Corporation, Indianapolis, has filed notice of change of name to the National Oil Engine Co., to manufacture engines and parts.

The J. M. Leach Mfg. Co., Kokomo, Ind., will build a one-story power house. Thomas McGraw, third floor, Citizens' Trust Building, is architect.

George W. Baugher, South Bend, Ind., is organizing a company to construct and operate a new plant at Milford, Ind., for the manufacture of a patented combination fire-escape and sprinkling system, of which he is the inventor. Plans will be prepared at an early date.

Fire, Oct. 15, destroyed the sherardizing works at the plant of the Bromwell Brush & Wire Goods Co., Greensburg, Ind., with loss of $12,000. Headquarters of the company are at 612 West Sixth Street, Cincinnati.

Robert H. Hassler, Inc., 1536 Naomi Street, Indianapolis, automobile equipment, has filed plans for a one-story addition for general shop and manufacturing service, 60 x 101 ft., to cost $26,000.

Baltimore

BALTIMORE, Oct. 24.

The McHenry-Millhouse Mfg. Co., Inc., roofing and building materials, with plants at South Bend, Ind., and Fulton, N. Y., will establish a plant in Baltimore, according to an announcement made by George C. Smith, director of the Industrial Bureau of the Baltimore Board of Trade.

The Metaloy Co., 1728 Mullikin Street, Baltimore, has been incorporated by W. B. Rearick, J. L. Brown and L. S. Houghton for the manufacture of metal products, etc.

The Maryland Culvert & Metal Co., Ridgely Street, Baltimore, is building a 28 x 36-ft. plant addition.

The Harris Hardwood Co., Inc., Roanoke, Va., will rebuild its planing mill and install machinery. Allen Harris is president.

Plans for the establishment of a plant for the manufacture of dye, etc., are being made by Kerr-Wilson & Co., Roanoke, Va., recently incorporated at $250,000. J. C. Moss is secretary.

The American Foundry Co., Salisbury, N. C., will build a foundry and install equipment. T. G. Shelton is manager.

The H. & H. Wood Products Co., St. Petersburg, Fla., plans to erect a plant for the manufacture of wood products, including toys, etc.

The Patuxent Clay Products Co., 206 Water Street, Baltimore, recently organized at $1,000,000, has plans for the erection of a plant for the manufacture of hollow tile and kindred products, to cost $150,000, with machinery. The company is headed by Harry N. Hanna and Herbert W. Holmes, 32 South Calvert Street.

The Hanover Milling Co., High Street, Frederick, Md., is planning to rebuild its flour mill and elevator, recently destroyed by fire, with loss of $100,000, including machinery. D. W. Dietrich, Bourse Building, Philadelphia, heads the company.

The Maryland Culvert & Metal Co., 1301 Munsey Building, Baltimore, has arranged for the immediate erection of an addition on Ridgely Street, about 30 x 36 ft. William M. Baker is president.

The Central Armature Works, Inc., 635 D Street, N. W., Washington, D. C., manufacturer of electrical equipment, is taking bids for a three-story plant at First and L streets, N. E., 70 x 110 ft., to cost $35,000. Cutler & Moss, Thirteenth Street and New York Avenue, are architects.

Machinery to cost $50,000 will be installed at the Chesapeake Paper Board Co., Key Highway and the Baltimore & Ohio Railroad, Baltimore, to increase the capacity from 50,000 to about 100,000 lb. of material per 24 hr. An addition will be erected to the power house. J. S. Smith is president.

A complete machine shop for parts manufacture, repairs, etc., mechanically operated paint shop and other service departments will be installed in the new five-story, reinforced-concrete automobile building to be erected on the sites of the McCoy and Levering halls at the Johns Hopkins University property, Baltimore, by the Continental Garage & Service Corporation. The company was organized recently by J. Bacon Hyatt, former manager of the Mid-City Garage & Motor Supply Co.; George Lemke and William D. Cromer. It is represented by Tolson & Co., Gunther Building. The new plant will cost $400,000, including equipment.

The American Foundry Co., Salisbury, N. C., plans the erection of a one-story foundry, 60 x 120 ft., to cost $25,000, including equipment. Iron and metal castings will be produced. Thomas G. Shelton is general manager.

J. H. Clemmitt, purchasing agent Norfolk & Western Railway Co., Norfolk & Western Building, Roanoke, Va., will receive bids until noon, Nov. 2, for 300 rods of wire fencing, 90,000 lb. of welding and threading steel, 200 bars of reinforcing steel, 2500 steel ties, and other kindred material.

J. H. Morgan, Greenville, S. C., is having plans prepared for a two-story machine repair and automobile service works, 40 x 100 ft. Beacham & LaGrando, Greenville, are architects.

W. A. Davis, High Point, N. C., and associates plan the construction of an electrically-operated ice-manufacturing plant to cost $75,000. Work will be commenced soon.

The Georgia Railway & Power Co., Atlanta, Ga., has arranged for a bond issue of $4,000,000, the proceeds to be used for general operations, extensions, improvements, etc.

Corneal & Johnston, Chamber of Commerce Building, Richmond, Va., architects, have completed plans for a plant at Seventh and Everett streets, one-story, 100 x 200 ft., to cost $83,000. It will be occupied by Herbert Hopper, Kalamazoo, Mich., and associates, for a paper goods manufacturing plant, with machinery installation estimated to cost about $50,000.

The Westinghouse Storage Battery Co., 308 North Elm Street, Greensboro, N. C., plans the establishment of a local plant for the manufacture of wireless equipment, telegraph apparatus, etc. R. O. Holland is general manager.

Plans have been filed by the Board of Harbor Commissioners, Wilmington, Del., for the erection of a new cargo building, 120 x 400 ft., at the new marine terminal, now in course of construction. The new freight building will be equipped with loading and unloading machinery, conveying apparatus, etc., and is estimated to cost $462,000. A number of pumping plants will also be erected at the site.

Milwaukee

MILWAUKEE, Oct. 24.

The extension of operations in local machine shops, following an appreciable enlargement of production in foundries, is regarded as one of the most favorable developments in the situation with respect to a healthier demand for machine tools. While production is still very small, it is believed here that the industry is now definitely on an upward trend. Tool sales in the past week showed no material gain in volume, although in some quarters it was expected that the prospective railroad strike might develop some business for quick shipment. The Milwaukee metal trades had 10,092 men on their payrolls in August and 9935 in September. Industries supplying automotive parts and accessories did not do quite so well in September as in August. Prices and wages are not settled. Readjustments in these lines will follow closely automobile manufacturing. A large motor truck concern reports a moderate upturn in sales last month. Export business in motorcycles is running better than anticipated.

The Brixius Electric Co., 148 Reed Street, Milwaukee, has changed its corporate style to Golden Electric Mfg. Co. It manufactures and repairs dynamos, motors and electrical appliances. Herman Roth is president and Edward Roth, secretary.

The Parker Pen Co., Janesville, Wis., manufacturer of fountain pens, will on Jan. 1 transfer the entire operation of the American Metals Co., Attleboro, Mass., to Janesville, thus providing its own facilities for producing the metal parts of its pens as well as effecting a large output of metal pencils. The Parker company some time ago acquired ownership of the American Metals Co. When the transfer is made the present equipment of the Attleboro plant will be supplemented by a considerable list of new tools. George S. Parker is president and general manager.

K. O. Muehlberg of Manitowoc, Wis., designer and patentee of a reaming and boring machine for automotive shops, which he is manufacturing on a small scale, intends to organize a corporation to build a new plant.

The Ke No Co., Sheboygan, Wis., manufacturer of furniture novelties and hardwood specialties, has let contracts for the erection of a two-story brick and concrete factory addition, 50 x 100 ft., and will also build a new power house, 25 x 35 ft. W. C. Weeks is architect.

The village board of Taylor, Jackson County, Wis., is taking bids until Oct. 31 for the construction of a municipal water works system, including all equipment, water pipe, hydrants, a 100,000-gal. steel tank mounted on a steel tower, etc. Walter S. Woods, La Crosse, Wis., is consulting engineer.

The Ludolf M. Hansen Co., 113 West Walnut Street, Green Bay, Wis., has been awarded the general contract for erecting and equipping a $100,000 cold storage warehouse and refrigerating plant, three stories, 80 x 240 ft., for a local syndicate. Work on foundations will begin Nov. 1.

The Board of Education, Neenah, Wis., has engaged

Robert A. Messmer & Bro., architects, 221 Grand Avenue, Milwaukee, to design a new junior high and vocational school, for which purpose $400,000 is available. L. J. Pinkerton is secretary of the board.

The Purcell-Wischan Co., Madison, Wis., Hudson and Essex distributor, has purchased a site, 117 x 132 ft., at State and West Gilman streets, and will erect a new fireproof garage, sales and service building occupying the entire area, at an estimated cost of $120,000. Contracts will be awarded immediately. Pierce J. Purcell is president.

The Milwaukee Department of Public Works, City Hall, closes bids to-day for one 25,000,000-gal. and two 22,000,000-gal. vertical triple expansion, crank and flywheel type of engines for the equipment of the new Riverside pumping station at the foot of Chambers Street, now under construction. Percy Braman is commissioner of public works.

The Rundle Mfg. Co., Milwaukee, manufacturer of plumbers' goods, enameled sanitary ware, etc., has plans for a power plant addition at its works at Twenty-seventh and Cleveland avenues, to cost about $25,000. The contract for new boilers has been let to the Wickes Boiler Co., Saginaw, Mich. Cahill & Douglas, 217 West Water Street, local, are the engineers in charge of the work.

The John G. Wollaeger Co., 417-421 Wells Street, Milwaukee, has let the general contract to the Universal Construction Co., 97 Wisconsin Street, for the erection of a four-story brick, concrete and steel garage, sales and service building, 90 x 120 ft., at Grand Avenue and Twenty-eighth Street. It will cost about $100,000 complete. Max Fernekes, Railway Exchange Building, is architect.

Robert Forsyth, Inc., Milwaukee, is the name of a new corporation organized with $5,000 capital to deal in power plant equipment, machinery, tools, etc. The incorporators are Robert Forsyth, 209 Grand Avenue, and H. T. Ferguson and Frank F. Wolfgram, attorneys. Mr. Forsyth has conducted a sales engineering business for several years in Milwaukee.

Hugo M. Schmidt, 1826 North Seventh Street, Sheboygan, Wis., has broken ground for a $22,000 public garage and service shop, 72 x 122 ft., of brick, steel and concrete, one story and part basement.

The West Side Express Co., 2319 Lisbon Avenue, Milwaukee, will close bids Nov. 15 for the construction of a one-story fireproof garage, 100 x 108 ft., and a three-story warehouse, 96 x 121 ft., of brick and mill construction, the whole to cost $80,000. Jacob Tice is president.

The Paradox Battery Mfg. & Service Co., Milwaukee, has been incorporated with $5,000 capital to manufacture, deal in and repair storage batteries. The incorporators are Gust. J. Guse, 2435 Sycamore Street; William A. Wills, 885 Seventh Street, and A. L. Trechsel, all of Milwaukee.

The Gold Medal Camp Furniture Co., Racine, Wis., has resumed production after an interruption of six weeks and re-employed 125 men, its normal force.

The Board of Industrial Education, Green Bay, Wis., has decided to proceed with the construction of a new vocational training institute to cost about $150,000 and is negotiating with local architects for plans and estimates.

The Jacobsen Mfg. Co., Racine, Wis., manufacturer of automotive accessories and equipment, has increased its capital stock from $50,000 to $100,000.

The Central South

ST. LOUIS, Oct. 25.

The purchasing department of the Missouri, Kansas & Texas Railroad here issued a supplemental inquiry for machine tool requirements in addition to the list published in THE IRON AGE last week. The new list comprises 11 items as follows:

One planer, 72 x 72 in. x 24 ft., for cylinders, frames and miscellaneous.

One combined slabbing and vertical milling machine, heavy duty, 42 in. wide between housings, 16 ft. table.

One heavy duty slotter, 24 in., with table not less than 40 in. in diameter. Table to have power feeds in every direction.

One crank planer, 24 in.; extra heavy design. Single head. Power feeds in all directions.

One crank planer, 32 in., extra heavy design. Two heads on cross-rail. Power feeds in all directions.

One universal milling machine, high power. Working surface of table about 78 in. x 20 in. Spindle about 4 in. diameter. Power feed, transverse and reverse.

One plain radial drill, 3 ft., heavy duty. Double back gear.

One universal grinder 12 in. x 48 in. between centers.

One tool lathe, 16 in. x 4 ft.

One electric tool hardening furnace.

One cold cut-off saw, to cut 12 in. x 12 in.

One cold saw No. 17 Cambria type Higley cold saw machine fitted with 21 in. diameter inserted tooth circular saw.

The Chester Iron & Foundry Co., 7800 Vulcan Street, St. Louis, is completing plans for a one-story foundry, 45 x 120 ft., to cost $42,000. L. Haeger, 3834 Utah Street, is architect.

The Kansas City Spiral Pipe Co., 416 Dwight Building, Kansas City, Mo., has acquired a tract at Leeds, Mo., totaling 15 acres, as a site for a plant for the manufacture of special reinforced spiral pipe. The first unit will be one-story, 60 x 300 ft. E. J. Gordan is secretary.

Fire, Oct. 16, destroyed part of the building at 200-14 South Theresa Avenue, St. Louis, occupied jointly by the National Safety Car & Equipment Co. and the Standard Equipment & Machine Co.

The Carthage Superior Spring Bed Mfg. Co., Carthage, Mo., plans to erect a two-story plant to cost $40,000.

The Topeka Steam Boiler Works, Topeka, Kan., will soon commence work on the superstructure for its four-story and basement building, 50 x 85 ft., foundations for which are nearing completion, at Second and Jefferson streets.

The Dixie Power Co., Title Guarantee Building, St. Louis, will soon commence surveys for its new hydroelectric generating plant on the Buffalo River, near Little Rock, Ark., for which a permit has been asked from the Federal Power Commission, Washington, D. C. The new plant will cost $5,000,000. Col. Henry A. Allen, 154 West Randolph Street, Chicago, is engineer.

The St. Louis & San Francisco Railway Co., Frisco Building, St. Louis, has awarded a contract to the Globe Construction Co., Chemical Building, for its one-story machine shop on Choteau Avenue, 40 x 130 ft., to cost $50,000. Work will start at once.

The Plymouth Garage Co., 5909 Plymouth Street, St. Louis, will commence the immediate construction of a one-story automobile repair and service works, 75 x 80 ft., at Hamilton and Plymouth streets, to cost $50,000.

The American Commercial Car Co., Detroit, Mich., manufacturer of automobile trucks, with plant at Gratiot Avenue and the Detroit Terminal Railroad, has acquired a building at Knoxville, Tenn., and will remodel it for the establishment of a branch plant.

The Cities Brick Co., Curtain Pole Road, Chattanooga, Tenn., plans for an addition. C. D. Patterson is manager.

Fire, Oct. 15, destroyed the lumber mill of Alexander Brothers, South Speedway and Menager Street, Memphis, Tenn., with loss of $50,000, including machinery.

F. R. Lawson, Nowata, Okla., and associates have plans under way for a two-story ice-manufacturing plant at Coffeyville, Kan., to cost $90,000, with machinery.

The Morrillton Compress Co., Morrillton, Ark., has awarded a contract to the S. W. Anderson Co., Little Rock, Ark., for the rebuilding of its cotton compress plant, 150 x 320 ft. and 220 x 320 ft., recently destroyed by fire. It will cost $300,000 with machinery. E. F. Wade is manager.

The Ocoee Copper Co., 1133 Volunteer Life Building, Chattanooga, Tenn., has plans under way for a plant at Ducktown, Tenn., to cost $200,000, with equipment. J. I. Carter is president.

Fire, Oct. 13, destroyed part of the plant of the Osage Cotton Oil Co., Fort Smith, Ark., with loss of $100,000, including machinery.

The Grant Motor Car Co., Ninth and Felix streets, St. Louis, is having plans prepared for a one-story machine repair and service works at Tenth and Francis streets, to cost $60,000.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, is considering the erection of a power plant in the Big Sandy district, near Pikeville, Ky., in conjunction with its other power development and generating plant construction in West Virginia. Francis R. Weller, Hibbs Building, Washington, D. C., is consulting engineer.

G. N. Shepardson, Memphis, Tenn., is planning for the rebuilding of his potash manufacturing plant, partially destroyed by fire, Oct. 4, with loss of $25,000.

The New State Ice Co., Oklahoma City, Okla., has completed plans for an ice-manufacturing plant, with initial capacity of about 250 tons per day, to cost $300,000. Ophuls, Hill & McCreery, 112 West Forty-second Street, New York, are engineers.

Seattle

SEATTLE, Oct. 24.

The Aloha Lumber Co., Aloha, Wash., has plans nearing completion for a shingle mill to replace its works destroyed by fire. It will also construct a large general lumber mill, to cost $100,000.

The Klamath Iron & Steel Works, Klamath Falls, Ore., is arranging a list of machinery and equipment to be installed in its new plant, to replace a works destroyed by fire with loss of $20,000.

The Coeur D'Alene Box & Mfg. Co., Coeur D'Alene, Idaho, has plans under way for the erection of a new plant to cost $65,000, including machinery.

The Lignacite Fuel Co., Portland, Ore., recently organized at $250,000, to manufacture fuel briquettes, has plans for a plant at Marshfield, Ore., on Coos Bay. The initial works, with machinery, will cost $150,000. H. C. Diers is head of the company.

The Kapowsin Lumber Co., Kapowsin, Wash., plans for the rebuilding of its mill, destroyed by fire, with loss of $175,000, including machinery.

Cargo handling machinery will be installed in a plant to be erected by the Portland Produce Terminal Co., Portland, Ore. Plans are being prepared for ten buildings to occupy five blocks of property between East Oak and Alder streets, to cost $1,000,000, with equipment. Sutton & Whitney, Lewis Building, are architects.

The Reedsport Planing Mill, Reedsport, Ore., will build a plant to replace its mill destroyed by fire.

J. T. Gagnon, Medford, Ore., operating a local lumber plant, is organizing a new company to construct and operate a new electric power plant for commercial and industrial service. Preliminary plans for the plant are under way.

The Buffelin Lumber & Mfg. Co., Tacoma, Wash., has work under way on plant additions to cost $350,000, including a veneer factory, planing mill and electric power plant.

The Gulf States

BIRMINGHAM, Oct. 24.

A complete machine shop for parts manufacture, repairs, etc., will be installed in the service building, 75 x 200 ft., to be erected by the McKenzie-Adler Motor Co., LeCompte, La., and bids for which will be asked, including equipment, early in November. S. H. Adler, Alexandria, La., is president.

The Industrial Committee of the Chamber of Commerce, Tuscaloosa, Ala., is perfecting plans for a local paper mill for the manufacture of bond and other papers, to cost $75,000.

The Anderson County Coal Co., P.O. Box 68, Palestine, Tex., recently organized, plans for a tipple at its coal properties. Considerable other machinery will be installed, including steam shovel for lignite handling, steam hoisting apparatus, engines, cars, etc. An electric power plant will be constructed at the mines. J. C. Duncan is president, and J. J. Barry, general manager.

The Houston Light & Power Co., Houston, Tex., will make extensions to its electric generating plant to cost $500,000. S. R. Berton, Jr., is manager.

The Dallas Mfg. Co., East Dallas, Tex., manufacturer of cotton ginning machinery, plans to erect a plant to cost about $125,000. Plans will be prepared at an early date.

The Grass Fiber Pulp & Paper Co., Leesburg, Fla., will build a new power plant for service in connection with its pulp and paper mill, now in course of erection. E. R. Lacy is vice-president and general manager.

The common council, Cameron, Tex., has plans for a municipal electric power plant, to cost $400,000, and proposes to call for bids early in 1922. James D. Fowler, 606 Sumpter Building, Dallas, Tex., is engineer.

Fire, Oct. 14, destroyed the plant of the Peoples' Sugar Refining Co., Rose Hill, near Abbeville, La., with loss of $300,000, including machinery. The plant will be rebuilt.

The Agricola Pipe Co., Gadsden, Ala., iron pipe, plans to rebuild its plant, destroyed by fire, Oct. 4, with loss of $75,000. Otto Agricola is president.

The United States Sheet & Window Glass Co., Shreveport, La., will build a large electric power plant for its plant in course of construction at Jewella, near Shreveport, to cost $2,000,000. H. E. DeVaughn is chief engineer. Headquarters of the company are at Morgantown, W. Va.

Fire, Oct. 4, destroyed the mill of the Woodruff Lumber Co., Red Lick, Miss., with loss of $50,000, including machinery.

The River Falls Power Co., River Falls, Ala., plans an hydroelectric generating plant on the Conecuh River, near Gantt, Ala., with initial generating capacity of about 2500 hp. The Southern Engineering Co., Albany, Ga., is engineer.

The City of Mission, Tex., has just purchased through the Rio Grande Hardware & Machinery Co., Mercedes, Tex., a complete water and electric light plant, consisting of a 100 hp. twin cylinder full Diesel type crude oil engine, with a high pressure pump and a 40 kw. generator.

California

LOS ANGELES, Oct. 24.

The Kimball Motor Truck Co., 1700 East Ninth Street, Los Angeles, is completing plans for a motor truck manufacturing plant at Long Beach, Cal. It will consist of reinforced-concrete buildings, to cost $300,000. M. O. Hull is vice-president.

The Veneer Works, Sacramento, Cal., recently organized, is negotiating for a site near Cedar and First streets, Berkeley, Cal., for a plant to cost $125,000, with machinery. H. B. Thornton heads the company.

The Yuma Ice, Electric & Mfg. Co., Yuma, Cal., will build an ice plant to cost $50,000. Work will be commenced soon.

Power equipment, ovens, mechanical conveying apparatus and other electrical and mechanical equipment will be installed in the baking plant now being planned by the Ward Baking Co., Los Angeles. It will have a daily output of 100,000 loaves, and will cost $2,000,000.

The Arro Plane Co., Los Angeles, is perfecting plans for new plant for the manufacture of airplanes and parts on the site of the Goodyear Flying Field. The first unit will be placed under way at an early date. Oliver K. Jeffery is president, and J. D. Hill, vice-president and engineer.

The Western Basket & Barrel Co., San Francisco, has plans under way for a one-story plant on South Folsom Street, to cost $20,000. Arthur S. Bugbee, 26 Montgomery Street, is architect.

Government Requests for Bids

Bureau of Supplies and Accounts is asking for bids by Nov. 15 on 40,000 lb. corrugated soft sheet steel, 27.5 in. wide, 96 in. long and 25 mils thick, for Mare Island. Schedule 8913. Also bids on three steel tanks for naval torpedo station, Alexandria, Va., by Nov. 8. Schedule 8949. Also 22,000 lb. steel bars, opening Nov. 8, for the Washington Navy Yard. Schedule 8956.

Other miscellaneous Government requirements follow:

Office of the District Engineer, Mississippi River Dredging District, Post Office Box 1017, Memphis, Tenn.—Sealed proposals for furnishing and delivering two water tube boilers for U. S. dredge Beta and three water tube boilers for U. S. dredge Henry Flad will be received here until 3.30 p. m. Nov. 16 and then opened. Further information on application.

Office of the Commissioners of the District of Columbia, Washington, Oct. 15.—Sealed proposals will be received at room 509, District Building, until 2 o'clock p. m. Nov. 7 for furnishing cast iron water pipe and special castings for use by water department. For detailed information apply to room 320, District Building. Cuno H. Rudolph, James F. Oyster, Charles Keller, commissioners, D. C.

Raritan Arsenal, Metuchen, N. J.—Bids are wanted until Oct. 25, circular 55, for 43 twist drills, 6 ball pein hammers, 3 universal chucks, 1 taper shank drill, 18 taps. For information address the commanding officer.

Office of the Constructing Quartermaster, Frankford Arsenal, Philadelphia.—Sealed proposals will be received here until 2 p. m. Oct. 24 and then opened for construction as stated above. Plans and specifications on application.

Treasury Department, Office of the Supervising Architect, Washington, Oct. 11.—Sealed proposals will be opened in this office at 3 p. m. Nov. 8 for a steel tower, wood tank, piping, etc., at the U. S. quarantine station, Cape Fear, N. C., in accordance with specification and drawing, copies of which may be had at this office, in the discretion of the supervising architect. James A. Wetmore, acting supervising architect.

Office of the Chief Signal Officer, U. S. Army, Washington.—The time for opening bids for furnishing 2000 ft. subterranean cable and 6000 ft. submarine cable under circular PR 8723-2CP has been postponed from Oct. 26 to Oct. 31. For information address above.

There are 300,000 unemployed in Massachusetts, according to E. Leroy Sweetser, state commissioner of labor and industries, who met at the conference on unemployment held at Boston Oct. 10 at the instigation of Governor Cox. Mayors of many cities were present. Unskilled labor is hardest hit at present, with clerks next.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ⅛ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅝ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
9-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16¼c. to 19¼c.
High brass wire	17¼c. to 21¾c.
Brass rod	14¼c. to 20¾c.
Brass tube, brazed	27½c. to 31½c.
Brass tube, seamless	19 c. to 20½c.
Copper tube, seamless	20½c. to 22¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$6.80	$6.55
		90 lb...	6.90	6.65
		100 lb...	7.00	6.75
IC..$10.75	$9.25	IC...	7.15	6.90
IX.. 12.00	10.75	IX...	8.15	7.90
IXX.. 13.75	12.25	IXX...	9.15	8.90
IXXX.. 15.50	14.00	IXXX...	10.15	9.90
IXXXX.. 17.00	15.75	IXXXX...	11.15	10.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	10.50

Tin

Straits, pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	15½c.
Electrolytic	15¼c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	21½c.
No. 1 solder	19½c.
Refined solder	16c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....29c. to 31c.

Old Metals

The market is quiet and values are holding fairly firm.

	Cents Per Lb.
Copper, heavy and crucible	10.25
Copper, heavy and wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.00
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.50
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.25

THE IRON AGE

New York, November 3, 1921

ESTABLISHED 1855 VOL. 108: No. 18

Making Dies for Forming Automobile Parts

Design and Construction Explained for the Manufacture of Such Articles as Brake Drums and Step Brackets

BY RICHARD DALE

THERE are three items that may be set down here as being the very first with which the designer of dies should make himself familiar.

They are namely: 1—The stroke of the press and the distance from the bolster plate to the plunger when

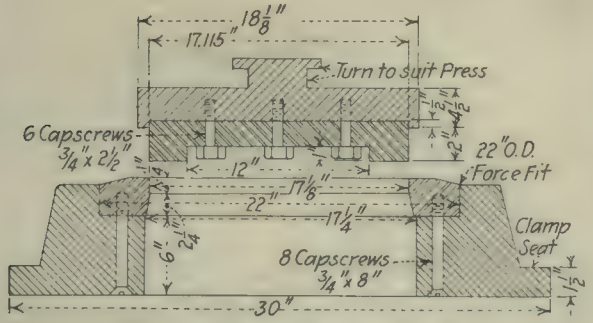


Fig. 1—Brake Drum Blanking Die

the plunger is at the lowest point. 2—The thickness of the metal in thousandths. Then from these he can estimate the best practicable die space or overall height of the punch and die with the punch entered into the die the required distance. 3—The approximate strain on the dies for the different operations. Having these down in his notebook, the designer is now ready to go ahead with the actual drawing up of the dies.

In building brake drum dies, the first one considered here will be the blanking die. Where the blanking diameter is already known this die is built first, but where it is not known the drawing dies are built first and the blanks turned on the lathe and run through the drawing dies, this operation being repeated till the proper size blank is arrived at.

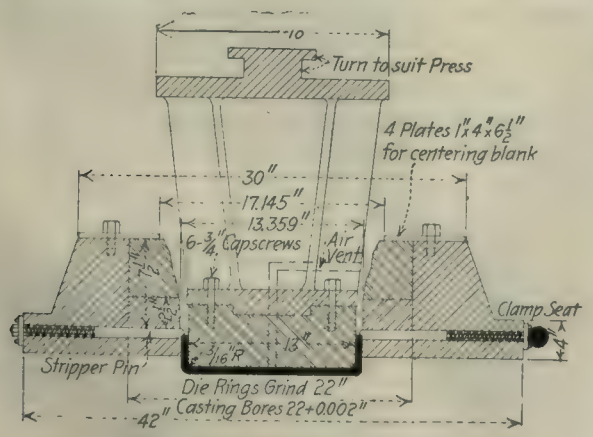


Fig. 2—Brake Drum Drawing Die

In this instance a 13-in. brake drum is to be made and the blank size is known to be 17⅛ in. This leaves a little stock for the edging or trimming die to remove.

The accompanying drawings are working drawings but the dimensions of the castings can be altered to suit the capacity of the press in which they are to be used. Referring to Fig. 1, an iron casting is made and turned up as shown. The tool steel punch should be a force fit in the counter-bore and care should be taken to have this fit not too tight or unnecessary strain will result. One can make a force fit that can be driven

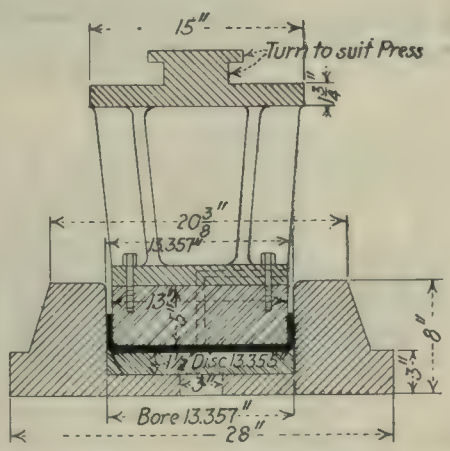


Fig. 3—Brake Drum Flattening Punch and Die

home with a 5-lb. lead hammer and one can also make a force fit that would require 100 tons to force the parts together. The first mentioned is all that is required here.

It will be found convenient and profitable to use the best die steel obtainable for these dies, as the time saved (with the chances for broken dies being practically eliminated) will more than pay the added cost of the better steel. The punch for this die is ground all over except in the counter bore, consequently allowance must be made for grinding. Here is one instance where the better grade of die steel affords a saving that means something in the hurried construction of a die. In using the cheaper grades of die steel, it is found necessary to make considerable of an allowance for shrinkage and warping, this extra stock necessitating much high-priced time to remove on the grinder.

It should not be necessary to allow more than 0.010

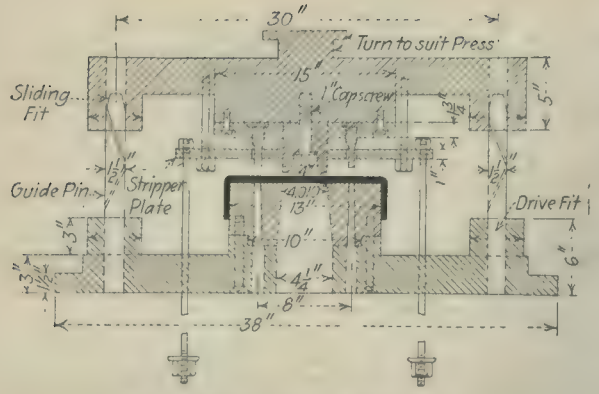


Fig. 4—Brake Drum Piercing Die

in. on the outside diameter and more than 0.005 in. in thickness, as the better grades of die steel will not warp or lose shape to any appreciable extent in hardening. Considerable judgment must be shown, however, in the heating and quenching of the steel, regardless of what kind is used. No sharp corners should be left anywhere they are not necessary, as such have a tendency to increase the chances of cracking in hardening. All holes should be packed tight with asbestos packing before the die is placed in the furnace. This aids considerably in preventing the steel from warping.

In the punch six holes are drilled for ¾-in. diameter cap screws, the counterbore being deep enough to bury the screw heads. The outside diameter of this punch is 0.010 in. smaller than the diameter of the die ring. The diameter of the blank is governed by the

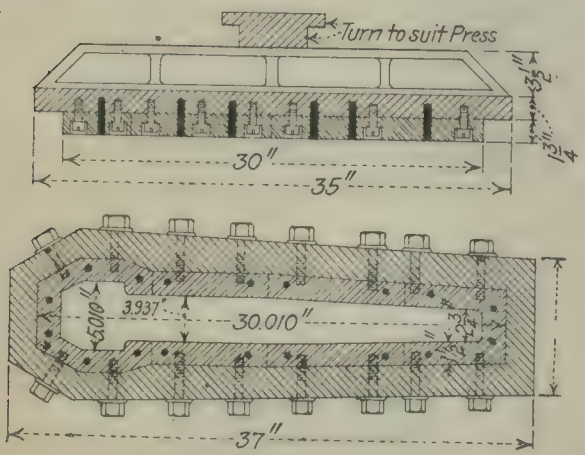


Fig. 5—Step-hanger Blanking Die

diameter of the die ring. The clearance is left on the punch.

The die ring is ground in the bore to ¼ in. straight and then tapered off for clearance about 4 deg. The casting is bored straight but a trifle larger than the largest diameter of the die bore or at the bottom of the taper.

This permits the blank to drop through readily. Provision is made in the casting of the bolster plate (not shown) for removing the blank as it drops.

In hardening—this applies to all dies described, although of course the smaller pieces require less time to heat—the pieces are first heated slowly to a blue and then removed from the furnace and allowed to cool. They are then placed back in the furnace and brought up to about 900 deg. during four hours. After this the temperature is raised a little faster till a temperature of 1450 deg. is reached, this requiring about three more hours. The temperature can be held stationary at this point for an hour and then the dies are dipped flat till they have cooled to about 200 deg. when they are placed in an oil bath which has been heated to 200 deg. After the ring is placed in the oil, the temperature is raised to a degree which will draw the temper to the desired hardness. It is a good practice to allow the die to cool with the oil. The die ring should stand a test on the scleroscope of about 85 or 90. The punch should be somewhat softer, about 75 scleroscopic test.

The Drawing Die

The length of the casting to which the punch for the drawing die is attached is not given in the sketch for the reason that the maximum die space of the punch press on which the die is to be used and the length of the stroke govern this. In examining the brake drum used on the majority of automobiles, one

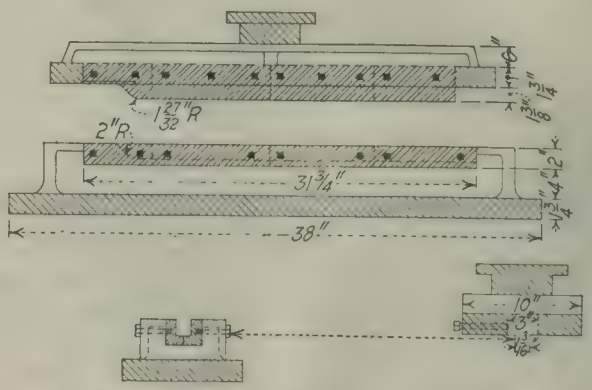


Fig. 6—Step-hanger Forming Die and Punch

will find that the outside of the drum is smooth, as though it had been turned or ground. This finish is obtained in the drawing of the drum.

For instance, it is desired to build a set of drawing dies for a 13-in. drum. The punch is turned, hardened and then ground to the exact size of the drum. The measurement of the drum is inside diameter and height. The metal or stock is 3/16 in. thick. This gives an overall diameter of 13⅜ in. In the operation of drawing, the metal blank is forced through a set of draw rings, the inside diameter of which decreases in size till the bottom ring is reached. This ring gives the diameter to the drum.

In the drawing of the drum, there is what is called the ironing out or squeezing of the blank to give the finish mentioned. This finish is desired only on the outside of the drum. From 0.014 to 0.020 in. is the range of allowances for this ironing out, 0.016 in. being a good average. To get the diameter of the bottom or finishing die ring, from the overall diameter of 13⅜ in. the 0.016 in. allowed for ironing the blank is subtracted which leaves 13.359 in. as the inside diameter of the bottom die ring.

The punch and die rings should be rather hard, testing about 90. The die is made up in this instance of two rings, the top one being 5 in. thick. This ring can be finished to size on the lathe or boring mill and hardened. Instead of grinding, all that is necessary is to polish with emery or polishing cloth. If this ring is hard, it will not wear enough to be replaced till at least 25,000 drums have passed through it. Care must be

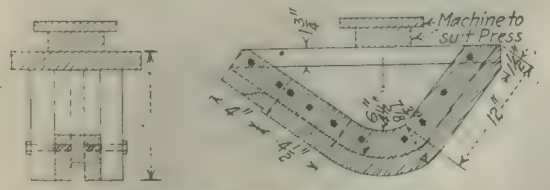


Fig. 7—Punch for Step-hanger Bending Die

taken of course to paint the drum with a good lubricant as it is put in the die.

The clamps shown on top of the drawing die serve two purposes. They act as clamps to hold the die rings

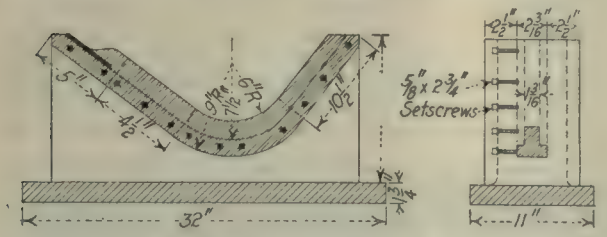


Fig. 8—Step-hanger Bending Die

down (although there is hardly any upward motion) and they serve as gages to center the blank as it is placed over the ring. The degree of slope or angle of these draw rings is not given as one can use his own judgment just so long as the size is reduced gradually to the finished diameter. The radius at the top of the ring is about ¾ in. and the blank extends over this about ¼ in. About the same allowance is made for grinding on the bottom ring as was left on the blanking die. The drum is stripped from the punch by the strip-

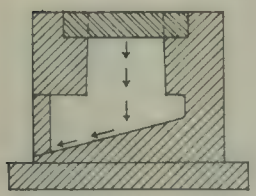


Fig. 9—The Blanking Casting Is Cored to Permit the Blank to Drop to the Sloping Surface and Thence to the Front of the Press

pers which are four in number, permitting it to drop through the bolster plate.

The Flattening Die

When the drum leaves the drawing die, it is bowed considerable across the bottom. This is removed and the drum straightened by the flattening die. The die casting is bored out as shown in Fig. 3 and a tool steel disk ground to a sliding fit is placed in the bottom of the bore. The drum is forced down on this disk and when the punch comes up the drum comes with it and is stripped in the same way as shown in Fig. 4. A beam goes across beneath the press and to this is attached a steel pin turned slightly smaller than the hole in the center of the die casting at the bottom. This beam comes up with the plunger at the same time as the punch and carries the steel disk up with it, thus eliminating any possibility of the drum remaining in the die.

Piercing Die

The drums have a large center hole surrounded by smaller holes. These smaller holes vary in number according to the company for which the drums are being made. Also the requirements vary as to the size of the holes. For that reason no dimensions are given for the small holes shown in Fig. 4. The punches, especially the smaller ones are of high speed steel, as this steel is especially good for punches of the kind when properly hardened.

Step-hanger Blanking Die

The outline of the blank for the step hanger to be made with this die is shown at the bottom of Fig. 5. The punch and die is made up of sections as shown by the dotted lines. The sections are held to the punch casting with dowel pins and fillister head screws and to the die casting with dowels and cap screws. The sections are fitted tight to the castings and the joints are square and fitted tight. The different pieces have allowances for grinding, and the hardening process is practically the same for these pieces as for the brake drum dies, the difference being that the brake drum punches and dies are dipped in a horizontal position and the pieces for the step hanger are dipped endwise. This position in quenching helps to prevent warping.

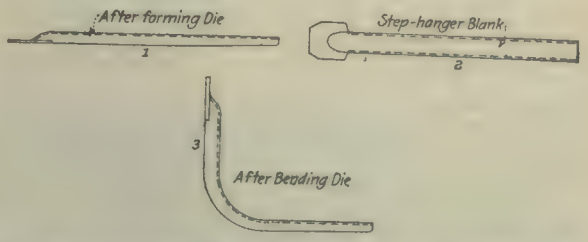


Fig. 10—1, Step-hanger Blank; 2, After Forming Die; 3, After Bending Die

The pieces for the blanking die for the step hanger are drawn to a light straw color and the pieces for the punch are drawn a little softer.

When one piece becomes chipped or otherwise dulled in use, only that piece needs to be taken out and ground. If considerable has to be ground from it, it is brought up to the level of the others by the use of shims. In Fig. 9 the blanking casting is shown cored out underneath to permit the blank to drop on the sloping surface and from there it slides out in front of the press.

The forming die shown at Fig. 6 takes the blank and forms it to the shape shown by No. 2 of Fig. 10. The punch is held in place by set screws on one side only and the die by cap screws on both sides. In the blanking die there are 0.010 in. clearance both ways but in the forming die only the exact thickness of the stock is allowed between the punch and die. The directions given in hardening the blanking die are followed, care being taken not to have the punch hard enough to chip. A hardness test of 75 is hard enough.

The bending die shown in Figs. 7 and 8 bend the

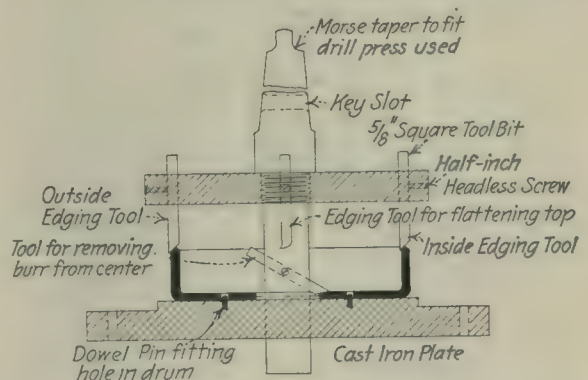


Fig. 11—Brake Drum Edging Die. The brake drum edging die shown above is the last operation on the drums. The drum blank is left large so that any irregularities around the edge can be accurately remedied as the drum must be a specified depth. The cast iron base plate shown above is clamped firmly to the table of the drill press used in this operation

piece as shown at No. 3 in Fig. 10. There must be gages or stops bolted to each of these dies to allow the quick, accurate placing of the piece in the die. As these stops are very simple to attach, space is not taken to describe them.

The Stover Mfg. & Engine Co., Freeport, Ill., has issued a new price list to jobbers and dealers, carrying reductions on wind mills, feed mills, ensilage cutters, pump jacks, engines and hardware, nearly reaching the prewar level. This constitutes the fourth reduction made by the company since Nov. 1, 1920.

HAMMER-WELDED STEEL PIPE

A New Product of the National Tube Co., Which Has Developed the Methods of Manufacture

Much larger in diameter than pipe made by the butt-weld and lap-weld processes, hammer-welded pipe is made by bending a steel plate into tubular form with edges overlapping, and then welding the overlapped edges after they have been heated, by hammer-forging them on an anvil block supported on a horn inside the pipe.

In the manufacture of this pipe, plates of best quality open-hearth steel are used, of a grade to give the best results in welding and other manipulations.

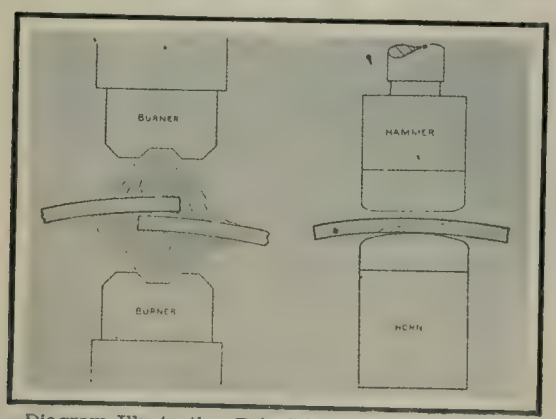
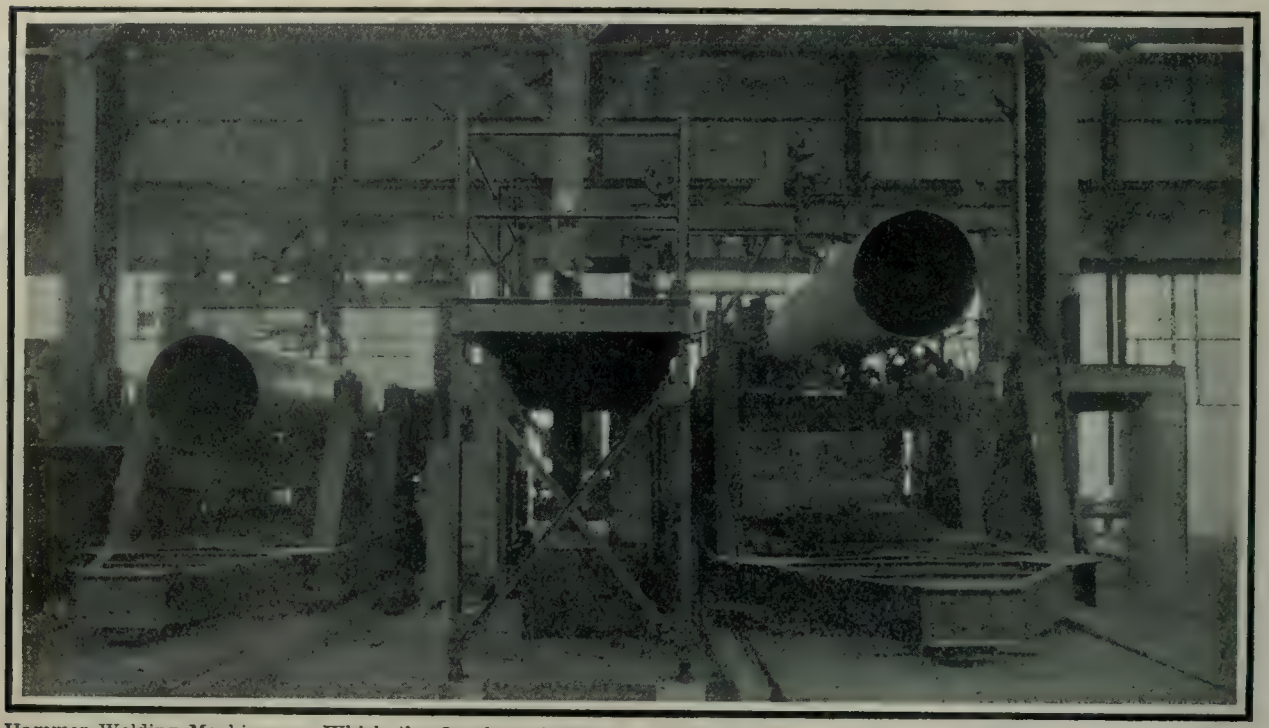


Diagram Illustrating Principle of Hammer-Welding. At left, water gas burners are heating the overlapped edges of the tube, inside and outside. The flame is directed on all surfaces of the portion to be welded, thus insuring uniform temperature. After heating, the hammer, at right, forges the overlapped edges into a strong weld on the anvil block, which is supported by a long beam or horn

The plates may either be bent cold, or heated and bent, depending upon their thickness.

The tubular form is obtained by bending the plate on long horizontal rolls, in much the same manner as plates are bent for boiler shells and tank construction. But they are bent competely around until the edges overlap to the required extent, and the proper diameter of the pipe is obtained. In certain sizes, two or more plates may be used with similar overlapped edges. Sufficient lap is allowed to make sure that the force of the welding hammer will be most effective in welding the edges together.

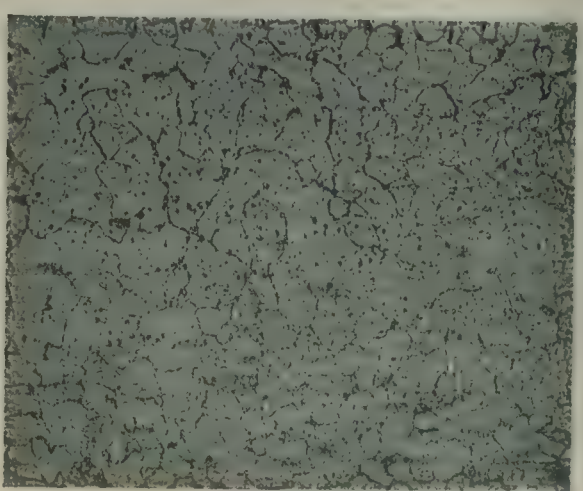
The rough tube is then taken to the welding machine, where a short section of the overlapped edges is heated to a welding temperature by water gas burners, placed opposite—inside and outside the pipe. The heated portion of the seam is hammer-forged on an anvil supported by a long counterbalanced beam, after which the contiguous portion is heated and welded. These alternate heating and hammer-forgings are continued until the entire length of pipe is welded. The



Hammer-Welding Machines on Which the Overlapped Edges of the Rough Tubes Are Heated to Welding Temperature and Hammer Forged

welding machinery is developed to a point which allows the operator to direct every blow with the accuracy of the skilled smith with his sledge. The power hammer can be operated at a high rate of speed, and can be regulated to hit with the varying degrees of force necessary to make a strong weld.

After being welded, the pipe is placed in an annealing furnace and heated, to remove strains and refine the grain. It is then placed on horizontal rolls to round



Microphotograph of a Cross Section of a Hammer Weld, Showing the Appearance of the Crystals After Annealing

up the pipe, straighten it, and remove scale. After a preliminary inspection, the ends are trimmed to any desired angle or length.

Each length of pipe is subjected to an internal hydrostatic pressure test, with pressure varying from 150 to 2000 lb. per sq. in., according to the size and

wall-thickness of the pipe and the service for which it is intended. Then the pipe is given a thorough inspection as to surface finish and dimensions, and a protective coating is applied if required by the customer.

Hammer-weld pipe steel is inherently strong and ductile. The minimum tensile strength, taken in either direction to rolling, is 50,000 lb. per sq. in., and the elastic limit is equal to one-half the tensile strength. Strips cut from the plate will stand bending through 180 deg. on a diameter equal to the metal thickness.

The strength and toughness of this pipe is the result of using a high quality steel, and the annealing of the whole pipe after welding. These characteristics are of great advantage in handling, before and during installation, as well as in resisting strains set up after installation, due to expansion and contraction from temperature changes, settling of supports and anchorages, carelessness in back-filling, or other causes.

Engineers and other users of pipe consider the strength of the weld as synonymous with bursting strength. A chain can be no stronger than its weakest link—a line of pipe no stronger than its weakest weld. Investigation has shown that the method of welding used for this pipe produces a weld of higher bursting strength than any other method.

Hammer-weld pipe is made with a range of wall thicknesses from ¼ to 1½ in. Considering the tensile strength of the material, this range of wall thicknesses gives the engineer a wide working basis for computations on those problems where large safety factors must be provided. Sizes from 24 to 96 in. are listed.

BY WATER ROUTE

Jones & Laughlin Steel Co. Inaugurates Plan for Avoiding High Freight Rates

PITTSBURGH, Oct. 31.—The first organized effort by any of the Pittsburgh district steel companies to make regular use of the inland waterways of the country for the delivery of steel was inaugurated last Thursday when a towboat and fleet of seven steel barges loaded with 3500 tons of steel products left the Woodlawn, Pa., works of the Jones & Laughlin Steel Co. for St. Louis and intermediate points. The purpose of the trip, according to officials of the company, is to make use of the Ohio and Mississippi rivers and their tributaries to avoid the excessively high railroad freight rates, which have added so much to the delivered cost of steel products at distant points. It is the intention of the company to establish regular service by the water route. A. W. Herron, Jr., of the Pittsburgh office of the company, and Edward Hughes of its Chicago office, are making the trip and will supervise the delivery of the steel, as well as investigate terminal facilities for future shipments. Included in the shipment are structural steel, plates, pipe, bars, wire products, fencing material, spikes and practically everything manufactured by the Jones & Laughlin company, except tin plate. Stops for unloading will be made at Huntington, W. Va., Louisville, Ky., Evansville, Ind., and St. Louis.

No goods were consigned to customers in Cincinnati because that city was found to have no adequate wharfage and unloading facilities. Several customers of the company in Cincinnati requested that shipments be made to them by the river. The fleet is expected to consume about 10 days getting to St. Louis. Preparations for this trip have been going on for several weeks and, as a result, river interests all along the Mississippi watershed, other steel companies and the United States Army engineers in charge of river work are watching the results with unusual interest.

Motion Pictures of Milling Machine Operations

For use in 27 vocational schools in the United States 10,000 ft. of films have been produced of operations of milling machines made by the Kempsmith Mfg. Co., Milwaukee. The motion picture photographing was the result of an order to the Society for Visual Education from the Government to take motion pictures of different machine tools. The Kempsmith machinery was selected for the picture taking and the pictures portray the assembly of the units, the unit assembly to the machine, the complete assembly, simple milling operations showing close-ups of how the cutter revolves and how the work is held rigid. The ultra-rapid pictures show how the teeth of the milling cutter performs its functions in reaching into the metal and lifting the chip away, showing simple operations and the various jobs done with the dividing head, operations with the attachments, the cutting of gears and how the teeth are made; also many tool and production jobs.

The work was supervised by Sumter Calvert, manager industrial department, Society of Visual Education, Chicago, and W. Kavel, director Dunwoody Institute, Minneapolis.

Merger of Western Car Companies

The recent unconfirmed report of the merger of the Haskell Barker Car Co. with the Pullman Co., Chicago, is borne out by developments of the past week. The Pullman Co. is negotiating the amalgamation which, if effected, will result in the formation of one of the largest railway equipment companies in the country, with assets aggregating approximately $183,000,000. The plan will probably provide for the exchange of Haskell & Barker stock at 75 for Pullman shares at par. Edward F. Carry, president Haskell & Barker Car Co., is mentioned for the presidency of the consolidated company. J. S. Runnells, president the Pullman Co., is proposed for chairmanship of the board.

Southern Coal and Iron Corporation Enters Pennsylvania Anthracite Fields

The Southern Coal & Iron Corporation, Philadelphia, has taken over, under lease, with the option to purchase, the 600-ton electrically equipped Simpson breaker, the Ainsley anthracite mines, the Tipperary anthracite mines, with the 300-ton breaker, all located near Carbondale, Pa. These properties are estimated to contain at least 2,200,000 tons of anthracite coal and are equipped to ship 600 tons of prepared coal daily.

The corporation intends to put these properties into immediate operation, under the direction of Murray B. Courtright, of Courtright, Dimick & Co., coal operators of Philadelphia and New York.

Its property at Rittenhouse Gap, in the heart of the eastern Pennsylvania furnace district, is now shipping iron concentrates, and the company is at present augmenting its plant and expects to ultimately put it on a basis of shipping 500 tons of iron ore concentrates and 600 tons of sand daily from this property.

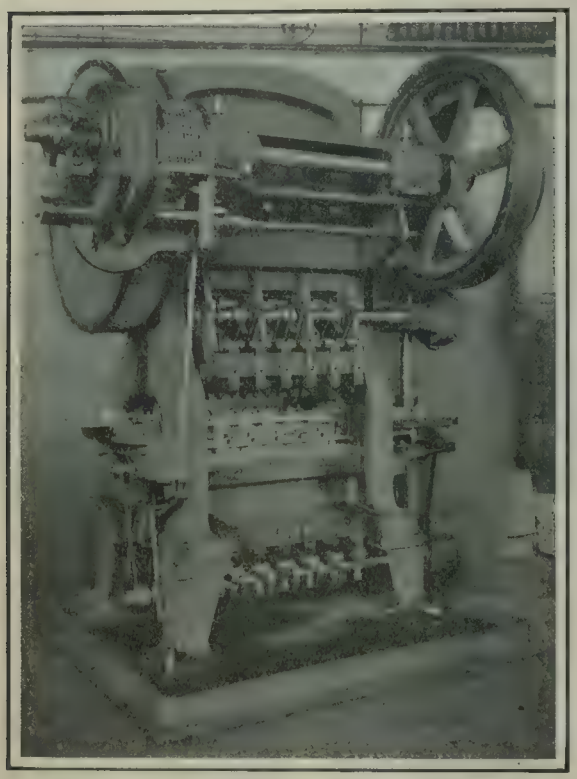
Belief that the new Hudson River vehicular tunnel can be adequately ventilated was strengthened by recent tests at Pittsburgh, conducted by the Bureau of Mines and witnessed by engineers and tunnel commissioners from New York and New Jersey. Eight automobiles, 40 ft. apart, were driven back and forth through the 400-ft. experimental tunnel at speeds of 10 to 15 miles per hr., ventilating apparatus being used to hold the proportion of carbon monoxide below 4 parts in 10,000. Those in the tunnel are reported to have suffered no discomfort.

To fill orders received from the Pittsburgh & Lake Erie and the Erie railroads, the Standard Steel Car Co., New Castle, Pa., has expanded its productive capacity to near normal.

Plunger Press for Multiple Operation

A special plunger press for doing multiple operation work similar to that of an eyelet machine, but capable of heavier stamping and drawing, has been recently developed by the Waterbury Farrel Foundry & Machine Co., Waterbury, Conn. It is shown in the accompanying illustration and is said to be, as far as known, the only machine having separate plungers for each operation that will do heavier work than an eyelet machine excepting the multiple plunger presses of the knuckle-joint type, which because of their construction are relatively expensive.

The machine is built for taking the work already cupped, as in many cases it is preferable to cup and draw the work and then anneal it, as by this method, it is said, the metal can be worked more than without an intermediate annealing. A four-motion feed makes it possible to pierce holes during successive operations



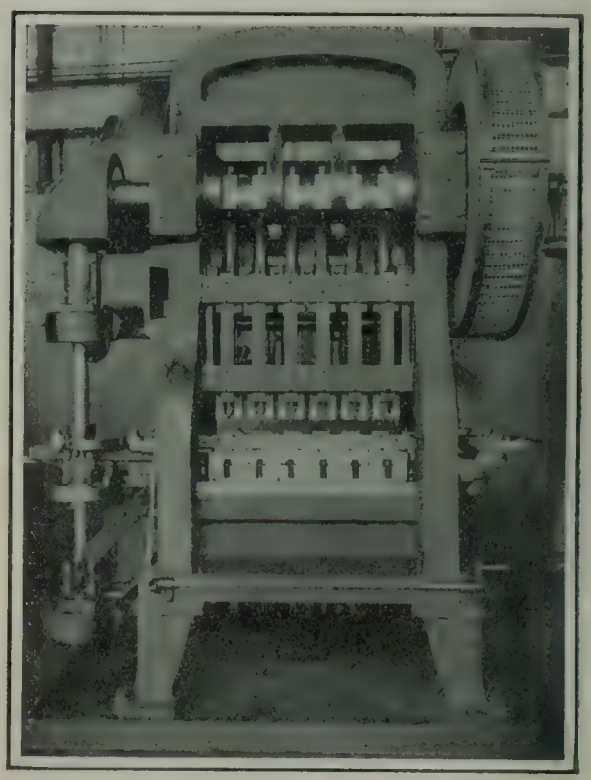
A Four-Motion Feed Enables Piercing of Holes During Successive Operations Which Must Register with Each Other. A system of upper and lower knockouts keeps control of the work

which must register with each other. In connection with the four-motion feed there is a system of upper and lower knockouts that keep control of the work from the first operation until it is dropped out of the machine.

A friction dial feed, mounted on the outside of the right hand upright, delivers the work to the tools through an opening in the upright. The runway on this dial is kept filled with shells while the press is in operation. The shells pass out of the runway and are carried down an incline through an opening in the frame by positive means, to a position in line with the tools, where the main transfer mechanism serving the tools can reach it. A pair of bars parallel to the tools, and having pairs of fingers shaped at their ends to fit the work, is given a motion such that at the beginning of the forward movement of the bars the pair of fingers at the feed-in end of the machine grips a shell and carries it to the first working position under the tools. From this point on, at each advancing movement of the transfer fingers, the shell advances successively to each set of tools and having passed the last set it falls into a chute which conducts it away from the machine. For each finished piece that falls into the chute a shell is carried into the machine; thus all the tools are kept at work continuously and simultaneously.

The gate connections are of the eccentric adjustment type, an eccentric bronze crankpin bushing being so fixed in the connection that a reasonable shortening or lengthening of the connection can be obtained by loosening the clamping screws on the connection cap and rotating the bushing with a pin wrench. Each transfer finger is independently adjustable. The die-bed blocks have a limited amount of adjustment sideways and endways, sufficient to insure the dies lining up with the punches. The strippers and knockouts have independent external adjustments, so that their positions relating to the tools can be changed without disturbing the tools.

The tool spaces and means of holding the tools are generous, considering the work that would be done on the machine. The principle of using independent gates for each set of tools shows to advantage here, it is claimed, in the marked accessibility of the tools, the action of which may at all times be readily observed from every side. The die-bed block, along with the working end of the knockout, can be readily removed by taking out two screws and sliding it out under the



carry bars, the working end of the knockout having a slip joint in line with the bottom of the die-bed block so that as the block is pulled out the knockout disconnects itself. The punch holder is also removable by taking out the two screws holding it to the bottom of the gate.

The machine illustrated has a capacity for shells 2½ in. in diameter by 1¾ in. long. The weight is 21,100 lb. and the floor space occupied 71 x 100 in. Safety devices are provided to prevent damage in case the various mechanisms fail to function properly.

"The Nature of Brass" was the subject of a paper presented by A. E. White, director, Colleges of Engineering and Architecture, University of Michigan, at the regular monthly meeting of the Engineers' Society of Western Pennsylvania, at the William Penn Hotel, Pittsburgh, Tuesday evening, Oct. 18.

The Traf-O-Lite Sales Co., Newark, N. J., recently incorporated to manufacture mechanical devices for automobile service, is having its manufacturing done by the Hygrade Engineering Co., Newark, N. J.

Buffalo Companies Ask Lower Freight Rates

Claim Made That Recent Reduction in Iron Ore Rates Has Brought Some Radical Change in the Competitive Situation, Which Means Disaster if Not Relieved

BY L. W. MOFFETT

WASHINGTON, Nov. 1.—Blast furnace and steel interests in the Buffalo district are seeking lower freight rates on coal and coke. It is urged that they be established to the basis existing prior to June 25, 1918. Making a comparison with ex-lake ore rates to interior furnaces, it is maintained that the rates on coal and coke to the plants of these consumers are disproportionate to those applying on ore to interior consumers and that the spread has been further accentuated by the recent reduction of 28 per cent made on ore shipments from Lake Erie ports to official classification territory through which no benefit is derived by lake front furnaces.

In an effort to arrive at an informal solution of the complaint, Attorney Francis B. James, speaking for the blast furnace and steel interests in the Buffalo district, has addressed a letter to the Interstate Commerce Commission, the Association of Railway Executives and to railroad presidents, proposing a joint conference on Friday of this week or Monday of next. Accompanying the communication from Mr. James is a letter addressed to him by President G. F. Downs of the Lackawanna Steel Co., Vice-President and Treasurer Floyd K. Smith of the Donner Steel Co.; President T. H. Wickwire of the Wickwire-Spencer Steel Corporation; President William A. Rogers of the Rogers-Brown Iron Co., and Vice-President C. A. Collins of the Hanna Furnace Co. They point out the alleged inequities in rates on coal and coke applying to the Buffalo district and ask Mr. James to call them to the attention of those whom he has addressed and "take such steps and institute such proceedings and make such interventions as may be necessary to secure for us the relief to which we are entitled."

Relative Ore and Fuel Rates

It is stated in the letter directed to Mr. James that prior to the late war and down to Federal control, and particularly prior to the general increase of 25 per cent in rates, effective June 25, 1918, the rates as between ore and fuel were fairly well balanced. The effect of that advance, it is stated, was to increase the rate on Superior or Northwestern ore to the head of the lakes 30c. per net ton, equivalent to 33.6c. per gross ton, and equivalent to an average increase of 57 per cent, with no increase in the rates from Lake Erie ports to interior points. The result of this increase is described as throwing an undue proportion of the burden of the increase upon lake front plants. The rate on coal from the Pittsburgh district to Buffalo, it is pointed out, was increased from $1.40 per net ton to $1.70 per net ton, increased on Aug. 15, 1919, to $1.75, while the rate of $2 per net ton on coke from Connellsville, Pa., to Buffalo became $2.60, effective June 25, 1918. A number of competitors, it is stated, at interior points are located close to their fuel supply and their rates were increased much less in the aggregate, while the lake front plants, despite their natural advantage, received no benefit in the way of lowering ore rates. Under the so-called 40 per cent general rate advance of last August, it is set forth, the rate on coal from Pittsburgh to Buffalo and vicinity became $2.51 per net ton and the rate on coke from Connellsville became $3.64 per net ton and the rate on iron ore from Lake Erie ports to Pittsburgh 91c. per gross or 81.3c. per net ton was increased to $1.275 per gross or $1.14 per net ton and the rate of 92c. per gross ton on iron ore from Lake Erie ports to industries in the Connellsville district was increased to $1.44 per gross or $1.29 per net ton and the coal rate from the Reynoldsville district to Buffalo was increased from $1.60 per net ton to $2.36 per net ton, while the ore rate from Buffalo to DuBois and Punxsutawney, in the Reynoldsville coal district, was increased from 70c. per gross ton to 98c. per gross ton, or from 62.5c. per net ton to 87.5c. per net ton. The Buffalo consumers then make a comparison of the recently reduced ore rates with coal rates to Pittsburgh and Buffalo and other points and also show increases they have to pay on Connellsville coke shipments.

Ore and Coal Rates Compared

"Comparing the present rates on iron ore (the recently reduced rates) per net ton with the present per net ton rates on coal, the ore rate from Buffalo to DuBois and Punxsutawney is 26.65 per cent of the coal rate in the reverse direction, the ore rate from Lake Erie ports to Pittsburgh is 39.95 per cent of the coal rate in the reverse direction and the ore rate from Lake Erie ports to the Connellsville district is 43.69 per cent of the coal rate in the reverse direction," it is declared. It is pointed out that this situation obtains despite the fact that the cost of transporting coal and ore is substantially the same and that the present price of ore at Lake Erie ports is practically double the present price of coal at mines.

"The recent reduction of iron ore rates of our competitors at interior points by restoring the iron ore rates to what they were prior to June 25, 1918, without making a corresponding restoration of the rates on our fuel has brought about such a radical change in the competitive situation that same means disaster to our industries," the Buffalo interests declare.

In conclusion they say:

"While the prices of our products have been rapidly declining and are approaching pre-war prices, the rates on our raw materials are at their peak and out of proper adjustment with that of our interior competitors. Competition was never more severe and promises to continue to be severe, and therefore delay in securing the relief to which we are clearly entitled will be a severe blow to our industries and to the city of Buffalo and its vicinity."

In his letter, Mr. James says the 40 per cent increase in rates greatly widened the competitive spreads on fuel, raw materials and finished products between producers who are near from those who are more distant from the sources of fuel and raw materials and the markets for finished products. He declares that the "present exaggerated spread between the long and short hauls is unjust and unreasonable and a reduction of this competitive spread will tend to restore competitive relationships between producers and inure to the benefit of the consumers and the carriers."

Rates Must Come Down

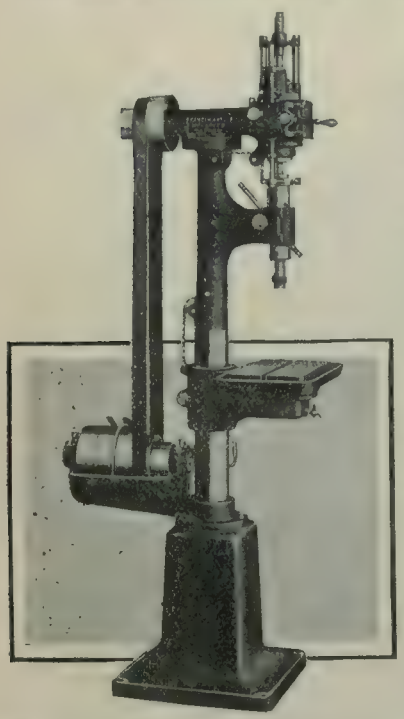
Mr. James quotes Commissioner Potter in connection with the recent decision lowering rates on agricultural products wherein the commissioner, referring to rates generally, says they must be gotten back to the proper relation to other things, and "they must come down, and whatever is necessary to bring them down must be done." Mr. James also quotes from a sworn statement of R. N. Collyer, chairman of the Trunk Line Association, made to the commission in connection with the recent application to lower ore

rates in which Mr. Collyer said that "The iron and steel industry has gone through a period of severe price reduction (comparable, perhaps, to that of agricultural) and its prices are substantially on pre-war basis," and it was added that if the ore is to be moved at rates which recognize the deflated prices obtainable for its products so as to seasonably assist the industry in its efforts toward recovery the rates must be made effective as quickly as possible.

"The reasons given for the restoration of the rates on ore to the interior iron and steel producers are precisely the same that require a restoration of the rates on coal and coke to the producers of iron and steel at Buffalo and vicinity."

New Line of Automatic Tapping Machines

A line of automatic tapping machines of the type illustrated, and including also bench and belted motor drive designs, has been developed recently by the Cincinnati Hy-Speed Machine Co., Cincinnati. They are being marketed under the name of Hy-Speed and are built with from 1 to 3 spindles in two sizes, the maximum capacities being ½ and ⅞ in., respectively, in steel.



When Set at Full Automatic the Spindle Automatically Reverses at Each End of Travel

Among the features are the patented spindle lead and automatic reversing mechanism. With the use of the spindle lead device the tap is said to be brought forward and returned in a positive way entirely free of the operator, tapping holes accurately and without danger of stripping the thread or breaking the tap. A half turn of the stop plunger at side of the control handle changes the machine from semi to full automatic. When set at semi-automatic the spindle travels forward, reverses automatically and stops at the end of the return stroke. To start forward again, the operator pulls down on the control lever. When set at full automatic the stop plunger is withdrawn, the spindle then automatically reversing at each end of its travel. The spindle can be stopped at any point, reversed and again brought forward by the use of the control lever.

The machines are regularly furnished for right hand tapping, although an attachment can be supplied for left hand tapping. Adjustable trip dogs with limit stops on the trip rod regulate depth of tapping. The chuck is driven by a clutched end on the spindle and is locked in position. S. K. F. ball bearings are used throughout. Tables are furnished with a No. 28 B. & S. T-slot, and pump and tank are attached to the base.

Ore Loading and Unloading Record

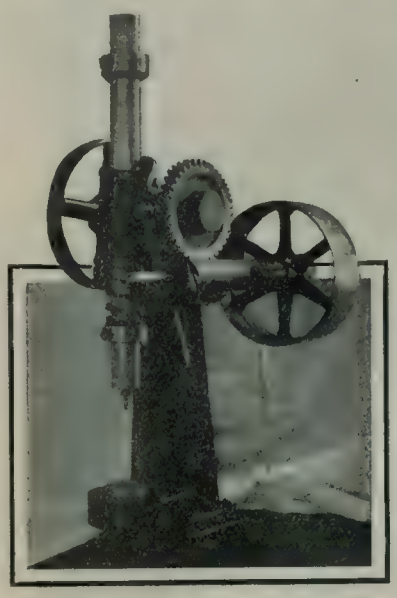
Loading 1000 tons of iron ore at the rate of 1.3 minutes, the Great Lakes steel freighter D. G. Kerr broke all loading records one day last month. The former record, which stood for 10 years, was 1000 tons in 2.7 minutes, made by the steamer Corey. The D. G. Kerr made the recent record by loading 12,382 gross tons in 16½ minutes at the Two Harbors, Minn., docks of the Duluth & Iron Range Railroad. She was at the dock only 19 minutes. The ore cargo was poured into the Kerr through 35 hatches. The steamer is 600 ft. long, 60 ft. wide and belongs to the Pittsburgh Steamship Co., a subsidiary of the United States Steel Corporation. When the cargo reached the company docks at Conneaut, another record was broken in unloading, the 12,382 gross tons having been removed in three hours and five minutes, at the rate of 1000 tons every 14.9 minutes, as compared with the previous record of the P. A. B. Widener in 1912, when the unloading rate was 1000 tons every 16 minutes.

Clean, Cold Producer Gas from Bituminous Coal

Following an inspection of the Atha works of the Crucible Steel Co. of America, at Harrison, N. J., members of the metropolitan section of the American Society of Mechanical Engineers met at dinner at the Downtown Club, Newark, N. J., and then heard a paper, under the above title, read by C. F. Kaufman, gas engineer of the Atha works. The speaker laid great stress upon the necessity for thorough removal of tar from the gas, tracing the development of the successful gas producer from its inception, 60 years ago, through the stages of bituminous gas cleansing through tar removal, 20 years ago, and the more recent production of a cold gas from soft coal.

Bench Type Power Broaching Press

A power broach press of the bench type as shown in the accompanying illustration has been recently placed on the market by the American Broach & Machine Co., Ann Arbor, Mich. The machine is intended for operating push broaches, for pressing mandrels in and out, for pressing bushings and for many operations usually performed by hand.



The Stroke Is Adjustable by Setting the Collar on Top of the Ram

Operation is by a 2½ in. belt on a 10 in. pulley which revolves in one direction continuously. The power is transmitted through a 6 pitch worm and worm gear of 30 to 1 ratio, and thence through a steel pinion and rack. The ram is 2 in. in diameter and has the rack teeth cut on the back of it. The stroke is adjustable, the worm being arranged to disengage automatically at the end of a predetermined stroke by setting a collar on the top of the ram. The return of the ram is automatic and is accomplished by means of a weight and cord, the cord being wound in a groove in the hand wheel. The machine has a stroke of 14 in. The bore in the table is 2½ in. and is central with the ram.

Steel bars imported into France for manufacture into springs now are dutiable at the pre-war rate, provided the conversion is made within a period of six months from the date of importation.

Electrical Development in Steel Mills

Report of Progress During Past Year—Extension of Electric Drive the Main Feature—Advance in Control Equipment

—BY R. B. GERHARDT*—

DUE to the present business depression very little is to be said in regard to new installations of main drive equipment. At the various meetings of our association sections, however, much valuable discussion and data have been submitted with respect to main drive equipments now in operation, which will undoubtedly lead to further application of the electric main roll drive, as conditions warrant the building of additional mill equipment.

The paper on review of costs of rolling steel, with discussions,† gives us actual data showing the benefits to be derived by electric reversing mill drive over steam drive, and this undoubtedly shows that the electric drive is the one for most economical operation. Coupled with the savings as indicated in this paper are the possibilities of a saving in labor for operating the electric driven mill, made possible by the easier manipulation with electric control.

It is entirely possible and perfectly feasible to operate an electric driven blooming mill with two men in the pulpit, against a minimum of three required by steam operation. This has been tried out on the Sparrows Point 40-in. blooming mill and operated successfully since last April, without slowing up the operation of the mill in any respect whatever. Carrying this idea further, in the case of the 60-in. reversing universal plate mill at Sparrows Point, two operators handle this mill in place of a minimum of four required at other plants with steam operation.

Since last year the following new main roll drive equipments have been put into operation or placed on order:

Direct Current Motors with Ward Leonard Control

I—28-in. combination rail and structural mill. Tata Iron & Steel Co., Jamshedpour, India.

Double unit motor rated 6,300 hp., 80 r.p.m. continuously; 15,500 hp., 75 r.p.m. maximum. Maximum speed 120 r.p.m. AC power—3000 volt, 50 cycles; direct current voltage, per armature, 600. Induction motor driving the flywheel set is rated 16 pole, 6500 hp., 375 r.p.m., 3000 volts, 50 cycles.

II—28-in. rail and structural finishing mill, Tata Iron & Steel Co., Jamshedpour, India.

Single unit motor, 1400 hp. continuous capacity, at 80 r.p.m. with speed control to 115 r.p.m. Maximum capacity 3000 hp. at 80 r.p.m. AC power supply, 3 phase, 50 cycle, 3000 volt.

Induction Motors with Speed Regulating Set

(All at Illinois Steel Co., Gary, Ind.)

I—20-in. hot strip mill. 5500, 4400, 3400 hp., 170, 136, 105 r.p.m., 6600 volt, 25 cycles.

II—20-in. hot strip mill. 2070, 1650, 1205 hp., 235, 187.5, 137 r.p.m., 6600 volt, 25 cycles.

III—12-in. hot strip mill. 2750, 2240, 1750 hp., 262, 214, 167 r.p.m., 6600 volt, 25 cycles.

IV—12-in. hot strip mill. 750, 625, 450 hp., 360, 300, 220 r.p.m., 6600 volt, 25 cycles.

V—12-in. hot strip mill. 750, 600, 440 hp., 473, 375, 278 r.p.m., 6600 volt, 25 cycles.

VI—12-in. hot strip mill. 300, 225, 165 hp., 335, 225, 165 r.p.m., 6600 volt, 25 cycles.

Direct Current Motor Drives for Continuous Hot Strip Mills, Trumbull Steel Co., Warren, Ohio

Stands	Hp. (Continuous)	Speed (R.P.M.)
1, 2, 3, 4	1250	175 to 350
5, 6	1250	175 to 350
7	800	200 to 400
8	800	231 to 462
9	800	256 to 512
10	800	275 to 550

This 14-in. mill will consist of 10 stands, all driven by adjustable speed direct current motors as listed above. Power is derived from two 2200-kw. synchronous motor generators. The control requirements for this mill are most exacting. The several stands of the mill are located close together and the steel is rolled at an unusually high speed, making it necessary to provide for very close adjustment of the speeds and for maintaining these speeds with wide fluctuations in load to prevent the development of loops or stretching of the steel between the stands.

Additional Mill Drives

Plant	HP.	R.P.M.	Voltage	Frequency
Kansas City Bolt & Nut Co...	450	440	2200	60
National Pressed Steel Co.....	1000	705	2200	60
Knoxville Iron Co.....	800	880/490	2200	60*
National Enameling & Stamping Co.	2000	235	2200	60
French Co.	300	365	500	50
French Co.	300	365	500	50
Marine et Homecourt, France.	5750	500	3000	50
Marine et Homecourt, France.	3200	500	3000	50
Cia Electro Metallurgica Brasileira, Brazil	500	500	6000	50
Cia Electro Metallurgica Brasileira, Brazil	500	500	6000	50
American Brass Co.....	500	450	2200	60
American Brass Co.....	400	360	2200	60
American Brass Co.....	400	360	2200	60
American Brass Co.....	400	600	2200	60
American Brass Co.....	600	600	2200	60
American Tube & Stamping Co.	400	360	440	60
American Tube & Stamping Co.	300	360	440	60
Harrison Radiator Corporation	350	250	440	25
Cyclops Steel Co.....	400	720	2200	60
Interstate Iron & Steel Co.....	2000	250	2200	60
	2000	150		
Simmons Mfg. Co.....	350	360	440	60
	350	240		
Simmons Mfg. Co.....	750	225	440	60
	750	168		
Weirton Steel Co.....	1500	514	6600	60
	1500	237		
Weirton Steel Co.....	600	720	6600	60
	600	360		

*Rotary converter speed test.

Replacement of Engines by Motors

The installation of the blooming mill motor in place of the engine at Steelton, Pa., is an epoch making event for this country. In 23 days from the time the engine was taken out of service, the electric drive was put into operation. On the third day of electric operation the mill rolled 1006 tons on a turn, which was within 40 tons of being the record for the engine, and since refinements and adjustments have been made to the motor equipment, the turn record now stands at 1520 tons.

A most important event was the replacement of the twin tandem reversing engine, which drove the first finishing stand of the Lackawanna rail mill, by a reversing motor equipment. This equipment was the first main roll electric reversing drive sold in this country to replace an engine. It was sold in 1917 and delivered in 1918, but conditions at the Lackawanna plant were such as to make it inexpedient to install the equipment until this year.

This motor unit has the highest continuous capacity (8000 hp. at 50 deg. Centigrade temperature rise) of any electric reversing drive in the world. It was designed to roll the first four of the last five passes on a 105-lb. rail section at the rate of 240 gross tons per hour. The last pass is made in an adjacent mill driven by a separate engine. The maximum production so far has been at the rate of 198 gross tons per hour of 105-lb. rails, which exceeds all previous tonnage records on this mill. A particularly interesting feature is that this rate of rolling was made with the last finishing stand disconnected from its engine and connected to the first finishing stand, so that the motor was

*Electrical superintendent Bethlehem Steel Co., Sparrows Point, Md. This is the report, substantially in full, submitted by Mr. Gerhardt's committee on electrical development to the Association of Iron and Steel Electrical Engineers, in convention at Chicago.

†THE IRON AGE, Oct. 20, page 998.

driving both stands and rolling five instead of four passes.

Power House Equipment

No steam turbine units of unusual design or larger capacity have been produced during the past year. The present largest units are the 60,000-kw. Westinghouse three-cylinder machines, and 45,000-kw. General Electric single-rotor machine. Of course, this size unit is more popular with the central station company than with the steel plant, for at present the largest units used in steel plants are not over 20,000 kva. The General Electric Co. is still carrying on development on the Lungstrom turbine, and is arranging to install in the near future one of the mercury turbine sets for trial on commercial service. These outfits will be watched with interest.

For the steel plant, the gas engine is still a prime mover to be seriously reckoned with, as thermal efficiencies equal to those of the best steam turbine units are easily attainable with this machine, and the present development makes it possible to obtain in a single unit a capacity of 4000 kw., which is considerably more than with the older units.

It has also been successfully demonstrated that a gas engine installation can be operated from a single furnace in blast by making use of a gas holder and certain automatic regulating valves. At Sparrows Point, since last March, from two to four gas electric units, depending on the load requirements, and two 47 and 84 by 60-in. gas blowers have been operating, with only one 500-ton furnace in blast.

As the development of super-power systems is the tendency of the day, it is to the big advantage of the steel plant to take an active interest in this work. We have long studied the possibilities of increasing the load factor on our power house generating equipment, and those of us who develop electric power from blast furnace gas or waste heat can appreciate the value of inter-connection, where it will be possible to maintain full output on the generating station during week ends and periods when the mills are idle, and the furnace gas and heat are wasted.

Frequency as a Factor

The general question of 25 vs. 60-cycle equipment has been discussed thoroughly at some of our section meetings, and the fact still remains that there is not a clear-cut solution to the question. Present developments show, however, that there is under construction for the Tennessee Coal, Iron & Railroad Co. a 7000-kva. frequency changer which will tie a 25-cycle plant to a 60-cycle turbine operating in conjunction with purchased power from the Alabama Power Co. This, we believe, will be the largest frequency changer used in steel mill service. It would seem rational, however, to assume that, if generators can be built up to 45,000 kw. capacity in a single unit, there is still further development possible on frequency changer sets.

Electric Heating

The use of electric energy for a heating agent is being more and more exploited in the steel plant, and the following are some of the more recent applications:

a. Electric heated tin pots for the tin mills. With these a more uniform heat regulation and very efficient operation are obtained.

b. Electric heated pots for babbitt metal. With such equipment it is more nearly possible to have the steel mill shop duplicate the bearings obtained from the original manufacturer, as this method of heating babbitt metal has been used by the motor manufacturers for some time past.

c. Electric heated ovens for heat treating and annealing result in more uniform and efficient operation.

d. Electric heated core drying ovens for the foundry.

e. The electric heating of stock for the manufacture of bolts, rivets and spikes is being worked out as a refinement of the electric rivet heating principle, which is now a commercial success.

Electric Furnaces

An event of considerable importance to those interested in electric furnace applications was the tapping of the first heats from the two 40-ton, 3-phase Heroult furnaces at the Government armor plant, Charleston, W. Va., on February 2, 1921. These furnaces take molten steel from basic open-hearth furnaces and complete the refining, producing a very high-class steel. The electrical apparatus and, indeed, the whole equipment has functioned very successfully.

Another practical demonstration in electric furnace operation was the recent completion of a run in a 4000-lb. induction furnace at the Pittsfield works of the General Electric Company when the 555th heat was poured. The service is peculiarly hard on the linings, as high silicon steel scrap is melted on a basic lining with excellent results. It is thought that these experiments demonstrate that the solution of the induction furnace lining has been found, and the manufacture of special steels, especially where molten steel can be charged, is an unusual field for this furnace.

Control Equipment

In the control field there has been probably more development in the past year than in any other single line. It is now possible to obtain a steel mill controller with contacts and arc chutes having such life, that it is no longer the regular week-end duty of the repairman to renew those parts on the severe service applications. Some plants have found the life of such parts to be as much as 15 to 20 times that of former designs. The newer design of contactor has several radical departures from the older types, in that all parts as far as possible are made of pressed steel or punchings, which are lighter in weight and very uniform, instead of castings, which were heavier and required considerable machining. The result is a quicker operating switch of better reliability. The development of the voltage drop relay scheme of current limit control results in some advantages as follows:

a. Only one type of relay and only one size of coil required for all sizes of motors designed for the same voltage. This is a great advantage from the user's standpoint, because it simplifies repair parts.

b. The relay possesses a slight time lag, which gives the effect of decreased current limit setting when accelerating light loads.

c. Separate mounting of relay eliminates any possibility of trouble due to failure of insulation between relay and contactor.

d. Relay contacts are vertical and normally closed, so are affected by dirt to the least possible extent.

e. Relay contacts never break a circuit.

f. Relays can readily be protected by an inclosing cover.

g. The scheme provides a means for the elimination of interlocks.

Yard Electrification

Although the electrification of the steel plant railroad yard is in the early stages of development and, as a matter of fact, is hardly beyond the stage of investigation, it would not be advisable to conclude this report without mentioning the fact that these investigations point out that probably the greatest single field for electrical development in the industry at the present time is the electrification of the steel plant railroad yard.

Miscellaneous Developments

The development of the wireless telephone has reached a stage where the commercial possibilities seem to be very great, and the wide-awake steel plant engineers seem to be very keen in their desire to exploit its use, particularly in steel corporations with plants scattered throughout the country, which might be kept in constant touch with each other by its use.

The greatly reduced operations in the steel industry of to-day make it necessary to cut down in every way possible the cost of production, and this factor will be perhaps greater than all other items together for increasing the field of electrical development in our plants. We are making a reputation for ourselves as well as our association, not by resting on our laurels while business is slack, but by putting our best efforts forth on this development work.

Synthetic Foundry Pig Irons in Germany

Methods of Production During the War to Overcome Scarcity of Low Phosphorus Irons—Their Properties—Charcoal Iron

AN article, describing how one German plant overcame the scarcity of low phosphorus pig iron during the war, is published in *Stahl und Eisen*, June 30, 1921. The research department of the Rombacher Hütte in Coblence started with the Lorraine minette ore, which is rich in phosphorus, with the purpose of making foundry iron as low as possible in phosphorus and sulphur to replace hematite, charcoal and low carbon foundry irons. In ordinary basic Bessemer steel there is a source of material that comes very close to the very best foundry iron in regard to phosphorus, sulphur and purity, being usually about 0.08 per cent phosphorus and 0.04 per cent sulphur. The needed amounts of manganese and silicon can be added without difficulty by means of ferroalloys. The question, therefore, is whether there are ways and means of adding the large amounts of carbon needed up to 3 per cent and even 4 per cent with certainty and economy.

Some experiments regarding the carburizing of low carbon steel to such a high degree were carried out at Rombach in 1907 by the author of the articles, J. Bronn, working on open-hearth metal, and endeavoring to carburize and deoxidize the bath by using liquid iron saturated with carbon. The production of the iron-carbon alloy was carried out originally in a 3½-ton electric furnace, which was charged with liquid basic Bessemer metal, and additions made of ground electrodes and lime. Great care was taken that no Bessemer slag entered with the charge, to avoid rephosphorization. The ground electrode carbon was practically free from phosphorus 0.008 per cent, but contained 1.11 per cent sulphur. The metal obtained contained 3 to 4 per cent carbon, and an average slag showed phosphorus, 1.09 per cent; MnO, 3.58 per cent; CaO, 49.46 per cent and sulphur, 0.44 per cent. A photomicrograph of such an iron made in February, 1914, and containing carbon, 3.52 per cent; manganese, 0.56 per cent; phosphorus, 0.079 per cent; sulphur, 0.04 per cent, and silicon, 0.03 per cent, shows normal structure of pearlite and cementite. The metal cast in sand showed close fracture and uniform structure. All the carbon was combined.

Similar metal was also made by melting small scrap in the electric furnace. This naturally took a large amount of power, and for larger plants charging with fluid metal is preferable. These experiments showed one method of carburizing the metal, but as only one small furnace was available, and due to war conditions sufficient power could not always be obtained, other methods of production had to be sought.

According to the current theory of blast furnace practice it is assumed that the metal reduced from the ore falls in drops through the hot glowing column of coke and so becomes saturated with carbon. This also happens if low carbon steel scrap is melted in a cupola. In order to see clearly what would happen a large series of runs was made at Rombach. An ordinary foundry cupola was used of about 37½ in. diameter. It was charged with two tons coke to 7¾ in. above the twyers. After the blast was put on more coke and 350 lb. burnt lime was charged. Then charges were given of 1100 lb. structural steel scrap, 200 lb. coke and 66 lb. lime and, with the first five tons scrap, 900 lb. of 10 per cent ferrosilicon was charged. A great deal of slag was produced, about three times the usual amount, which was acid and gave SiO_2, 44 per cent; CaO, 33 per cent, and 20 per cent alumina and ferric oxide. The first tap of 5 tons had the following analysis and showed a white fracture: C, 2.80; Mn, 0.22; P, 0.21; S, 0.12, and Si, 0.75. Of the added silicon, 95 per cent was found in the metal, and some was found in the next cast, so that the loss was not great. Another run was made with no ferrosilicon in the charge. When tapping 110 lb. of 75 per cent alloy in lump form was added in the ladle. The amount and kind of slag were about the same as before. The metal was cast in three beds, and sampled separately to see whether the metal was homogeneous. The results were:

	Carbon Per Cent	Manganese Per Cent	Phosphorus Per Cent	Sulphur Per Cent	Silicon Per Cent
a	2.90	0.15	0.11	0.12	0.60
b	2.95	0.16	0.16	0.11	0.67
c	2.70	0.22	0.13	0.11	0.70

The run had to be stopped because the shell of the cupola about 20 in. above the twyers was a bright red. The cupola was then lined with foundry ladle brick, the coke charge raised, the throat made smaller, thereby increasing the contact between iron and coke. Also it seemed better to use heavier scrap, which would not melt quite so quickly. The coke used contained 8.74 per cent ash, which in turn had 31 per cent SiO_2 and 0.5 per cent phosphorus. In the newly lined cupola about 25 tons of billet ends were melted in one shift and tapped in eight casts. To taps 1, 2, 7 and 8, 530 lb. of 10 per cent ferrosilicon were charged in the furnace; to taps 3 to 6, 77 lb. of 75 per cent alloy were added in the ladle. The analyses were as follows:

Tap	Carbon Per Cent	Manganese Per Cent	Phosphorus Per Cent	Sulphur Per Cent	Silicon Per Cent
1	2.75	0.22	0.12	0.30	0.82
2	3.20	0.29	0.13	0.27	0.52
3	3.20	0.19	0.13	0.22	0.84
4	2.70	0.17	0.12	0.18	0.84
5	2.90	0.20	0.20	0.24	0.80
6	3.35	0.18	0.14	0.21	0.79
7	3.20	0.25	0.08	0.17	0.53
8	3.15	0.25	0.08	0.17	0.30

The slag was abundant in volume, although not so great as in the previous runs. The slags from the fifth and seventh casts showed:

Cast No.	SiO_2 Per Cent	CaO Per Cent	Fe_2O_3 Per Cent	Al_2O_3 Per Cent
5	35.6	24.0	22.6	18.3
7	40.1	27.8	12.2	18.0

As the iron seemed rather stiff about 1 lb. of aluminum was added in each foundry ladle. The iron ran freely and filled the molds well. The charge was put at the following: 26 tons scrap, 11 tons coke, 2 tons lime, 1 ton 10 per cent ferrosilicon, 300 lb. 75 per cent ferrosilicon, and 9 lb. aluminum. The brick lining was very badly attacked. This factor, together with the high coke consumption, and above all the increase in sulphur, notwithstanding the high lime charge, prevent this process showing much promise. The high coke consumption is due to the difficulty of melting low carbon steel scrap and the high sulphur comes directly from the coke.

If the coke consumption could be considerably reduced then at one blow all these difficulties and disadvantages would be removed. Molten low carbon steel is available from the steel works and, if the cupola could be charged with molten iron, the whole burden of melting would be removed and only the carburizing remain. On these grounds was based the following method of working. The first test was made in a pipe about 6½ ft. long and 3 ft. 3 in. diameter. This was lined with one layer of ladle brick and provided with a bottom and a tap hole. Before each test a fire was made, the whole pipe filled with coke, and the whole heated as hot as possible. Then with the tap hole closed, molten low carbon basic Bessemer steel was poured into the glowing column of coke in the pipe. In order to prevent funnels being formed in the coke the ladle was moved slightly during pouring, and coke thrown continuously into the stream of metal. Either during the pouring or shortly before ferrosilicon and

manganese were added. About five minutes after the end of pouring the 5 to 6 tons molten steel, the tap hole was opened, and the metal poured into molds. The resultant metal was carefully examined, not only chemically but microscopically to be sure the carbon was really combined, and not merely mechanically mixed with the iron. The results on several casts were as follows:

Carbon Per Cent	Manganese Per Cent	Phosphorus Per Cent	Sulphur Per Cent	Silicon Per Cent
1.95	0.24	0.05	0.08	0.07
1.70	0.53	0.15	0.08	0.60
1.70	0.58	0.19	0.09	0.80
2.52	0.53	0.10	0.08	0.36

Similar results have been obtained with the many tests carried out with the apparatus over a space of time of 8 months. Only traces of mechanically included carbon have been found, almost always the carbon is all combined. The iron is remarkably tough, and shows a martensitic structure. It will be noticed the phosphorus is increased. A careful investigation showed this came either from basic Bessemer spittings included with the coke, or slag carried over by the metal.

The lessons of these experiments were that the metal must be as hot and fluid as possible, and the coke column thoroughly heated throughout its whole length. There is then no danger of the metal freezing. This is helped by the fact that with increase in carbon the metal becomes more fluid at a given temperature, due to the freezing point being lowered.

With these points in mind a furnace was built near the foundry ladle track similar to a cupola. At the height of the charging floor the furnace was provided with a large charging door on one side through which the coke was added, and on the other side with a runner for the molten metal. The furnace was arranged with two series of tuyeres and oil burners, through which blast could be blown for heating the coke or tar if necessary. A forehearth was provided of about 25 tons capacity, which could be heated with two tar-burners. In front of the tap hole of the forehearth lay the casting bed, which on account of lack of space could only hold 15 tons.

The method of working is the following: First comes the heating of the forehearth, the hot gases passing up the shaft in which by this time coke has been charged. As soon as the forehearth and column of coke are hot enough the first available ladle of basic Bessemer steel is brought over, raised by the crane and slowly poured down the runner, the charging door being closed. The metal works down into the forehearth where it is mixed. According to the temperature of the metal and condition of the casting bed the metal remains a shorter or longer time in the forehearth. Sometimes the process is worked with the forehearth taphole open, so that the metal simply flows through it. Even in such cases the metal is sufficiently uniform, the difference in carbon between the first and last pigs being only 0.20 per cent. As soon as the metal is cast the refilling of the shaft is commenced and the furnace prepared for the next cast. Metal carburized with coke in this way contains usually 2.6 to 2.8 per cent carbon, and corresponds to the so-called low carbon special iron. Typical analyses show:

Carbon Per Cent	Manganese Per Cent	Phosphorus Per Cent	Sulphur Per Cent	Silicon Per Cent
2.54	0.27	0.08	0.08	0.04
2.74	0.36	0.07	0.08	0.24
2.80	0.37	0.12	0.08	0.14

The remarkable toughness of this material is due to the fact that the metal is carburized at comparatively low temperatures.

This method may also be used for producing an iron similar to the best of all foundry irons, namely, cold blast charcoal iron, by replacing the coke column with charcoal alone, or charcoal with some coke. Tests were first made with the pipe described before working on 4 to 6 tons of metal. In general the metal produced with charcoal contains 3 to 3.5 per cent carbon. Analyses are given below:

Carbon Per Cent	Manganese Per Cent	Phosphorus Per Cent	Sulphur Per Cent	Silicon Per Cent
1.90	0.49	0.11	0.04	0.06
1.95	0.43	0.15	0.04	1.13
2.55	0.45	0.15	0.02	3.54
3.05	0.47	0.14	0.04	1.00
3.56	0.30	0.09	0.06	0.05
3.25	0.75	0.12	0.02	0.19
3.20	0.36	0.07	0.02	0.08
3.30	0.58	0.05	0.03	0.18
3.40	0.41	0.08	0.06	0.08

The resultant pigs were generally blowy and remarkably tough, and similar in every respect to the special charcoal pig iron described by Graham-Otto in their *Handbuch der Chemie*. A careful series of foundry tests was carried out with the Rombacher charcoal iron and Swedish charcoal iron, the results of which are given in detail in the original paper. The Rombach iron proved fully equal in value to the imported Swedish iron, but really conclusive results will have to wait on a long period of working over a period of years.—G. B. W.

MODERATE IMPROVEMENT

Encouraging Volume of Business at Youngstown —Light Pig Iron Buying

YOUNGSTOWN, OHIO, Nov. 1.—Inflow of new steel tonnage to district independents is still in encouraging volume, with sheets, merchant pipe and strip steel leading. There has likewise been some upturn in plate inquiry, chiefly from builders of tanks and tank cars. One plate interest has been rolling a tonnage of marine boiler plate. The new prices of 2.50c. for blue annealed, 3.25c. for black and 4.25c. for galvanized sheets are not firm, and tonnage is still being accepted by a number of important makers on the basis of 3c. for common sheets and 4c. for galvanized.

Though there has been somewhat more activity in the lapweld pipe market, demand for the heavier steel products still continues light. Heavier specifications on standard steel pipe have served to enlarge tube mill capacity the past two weeks.

Pig iron sales have been confined to moderate tonnages, with steel works interests having large accumulations in several cases. One district maker has about 90,000 tons of iron piled at its yards. While sales have been negotiated at $19 for standard basic, a number of the larger producers are still holding out for $20.

Upturn in plates has been of a very moderate nature, and is attributed to demand for oil storage tanks in large measure. A Warren, Ohio, tank builder, for instance, which manufactures tanks and erects them throughout the American and Mexican oil fields, has recently been seeking 4000 tons of plates. A similar interest at Sharon, Pa., has been in the market for 1300 tons of plates. The price range in the Valley is from 1.60c. to 1.75c., producers failing to hold the 1.85c. price to which they had advanced, due to the keen competitive condition of this market.

Automobile interests continue to take the bulk of Valley strip steel production and buyers are covered to the end of the year on their requirements. Makers hope to be able to establish the prices of 2.25c. for hot strip and 4c. for cold-rolled on first quarter business in 1922.

Full finished sheets produced in this territory are still largely taken by automobile builders, the price ranging from 4.35c. to 4.60c. for No. 22 gage auto body stock.

Open-hearth sheet bars are firm at $32, with the higher quotation of $34 still largely nominal. The principal buyers continue to be non-integrated sheet producers. There is still but little demand for slabs or billets.

Most district steel makers have covered their requirements for scrap materials to the end of the year, and while the market is firm, its strength is due to recent, rather than current buying. Heavy melting is quotable from $14.50 to $15. Most Valley interests are covered for the present on their ferroalloy needs.

BUYING RESPONSIBILITY

How Every Department of the Organization Is Vitally Interested in Buying

BY JOHN J. RALPH

Ultimate responsibility of buying is the part of the man who owns the property, whether he is a holder merely of part of the stock or of the entire property. The proof is simple, for the owner profits by it, or foots the bill for the losses. Authority can be delegated—responsibility cannot. If authority be delegated, the owner can hold his employee responsible, but cannot evade his own responsibility or belittle it.

When all is said and done, the buying is done by the management. Decisions may be made by default, as a matter of form confirming those reached by the organization; or arbitrarily, as final authority, whether on information, or through a "hunch." The opportunity to buy passed, or the purchase made, the result is inevitable; and, the action having been taken, events obey laws as fixed and inexorable as those of gravity. The opportunity has either been grasped or lost.

Events take no account of intentions, of personality, of identity. Nor does wisdom displayed in the past, or in another line, have any influence. Only action taken in line with accurate forecasting of the future avails.

This is peculiarly difficult for many to realize. The effect of success, whether as a result of deserts or the vagaries of fortune, lends to the personal ego a radiance and power that is often mistaken for actual ability to influence the future, and to penetrate all mysteries. We thus have incursions of scientific men into the realms of religion, the business man running "peace ships" and the speculator and money man putting ruthless fingers into the delicate mechanism of productive business.

Buying is actually consummated by the purchasing agent, in practically every organization, but it is not here that determination is made. Buying is actually done merely through the various departments having charge of expenditures, whether of materials or labor.

There is usually in each organization some one man who actually controls the buying policy, whether or not he is the purchasing agent. But even he seldom realizes the extent to which his ability to make decisions is circumscribed and defined by the balance of the organization.

Distribution of Buying Responsibility

Fundamental responsibility is that of the design department, for by its work much of the final purchasing problem is decided. Here is specified the materials of which a piece is to be made, their size and weight. Here is made the decision which settles the possibility of using finished material from outside, or the necessity of making everything in the factory, because limits and sizes are so special that standard material cannot be bought to make the part. Here is determined the necessity or desirability of making further additions to the factory equipment, or its alteration.

How closely in touch with the sources of raw supply is the engineering department? How well do the engineers know what is to be had in the market, the cost, the cost of manufacturing in the home plant, and whether it is economically desirable to make or buy? How much do they know of trade practises? Do they know the standard sizes carried in stock, or will their design call for odd sizes that cannot be readily and quickly obtained, and necessitate carrying heavy plant stocks?

There is often a feeling that the engineering department is crossing the line of function when it attempts to obtain these details; hence that department is inclined to take an arbitrary position about the design, maintaining the necessity of strict compliance with its original plans for results.

There are a few cases where necessities of design dictate absolutely the material, size and quality; but engineering design is always a compromise, and it is astonishing how it can be altered and adapted to conform with manufacturing and material restrictions, without injury to the final product.

The Manufacturing Department

Were the factory heads consulted during the time of the design of the product? Were they asked how they would make the part—whether they had sufficient machines to make it that way, or whether it would not be desirable to design for another battery of machines, which did not have enough work to keep them busy, so saving the purchase of additional machinery?

Were they active in the initial stages of the design, so that they might have opportunity to suggest changes and methods which would enable them to cut the manufacturing cost? There have been times when such team work has not only made it possible to pay dividends in poor times as well as good, but has pulled many a concern out of almost sure bankruptcy.

Have they carefully looked over the equipment to see what was not earning its keep, and should be either repaired, altered, stored, scrapped or sold? Do they know what machines are giving so much trouble that it will be wise to get new ones to cut the maintenance cost? Have they analyzed operations to see what ones could be best performed on a newer type or more powerful machine, and when and where it was going to be good business to exchange for the new one?

Have they made tests of supplies to see that the results needed are actually obtained? What else is there in the market that might give them the service they want? Where would a slightly better grade of supplies return dividends through longer service, and where are better qualities being bought than are needed? In case supplies should be held up, what would be the best available substitute?

Are the tools they buy the right ones? Are there enough, or is labor putting in time hunting, altering, adapting them to the job, instead of producing?

What is the relation of the scrap heap to the incoming materials? Are the turnings too heavy? Could materials be bought closer to size? Is the material bought large enough, or has it been bought so economically that it will not "clean up" without excessive labor, to the enrichment of the scrap pile, the labor account, and the discomfort of profits?

How about their stock of information? Does it consist of old and odd numbers of trade journals, piled away in musty corners, partially looked through, unindexed, uncut, unclipped and without a note made? Is it easy for them, when they see a hint of something they would like to know more about, to get it, or are they made to feel that such would be an impertinent movement, out of their sphere?

Sales Department

Concerned with purchasing? Who more so! They have to sell the goods. They come into live and immediate contact with the purchasers. What they sell is but an altered form of what others buy. It certainly does make a difference to them. Sometimes they may be able to suggest a change which will prove acceptable to the customer, yet which will permit decreasing the manufacturing cost. Perhaps they can suggest something that will remove many of the buyer's inhibitions and make the goods sell faster—perhaps for more money, and yet cost no more to make.

Then who is so closely in touch with the market, and has as good facilities for forecasting the output the market will be able to take in the next few months—in the next year?

The Financial Department

This must be considered in every case. To be sure, there are some concerns which for a time purchase regardless of that department, and buy themselves into a mighty big hole.

It is the financial department which knows when money is cheap, and when the times are propitious for making that installation which in a short time will return particularly good profits. It is the financial department which is in a position to know whether or not the big fellows—those who have known in the past

what was coming, and probably will know in the future—are laying aside big cash reserves, curtailing expenditure that is unseasonable, or making provision for coming changes in conditions.

The financial department knows, too, whether or not the concern is in condition to render further investments desirable, and in which direction its money should be used to obtain the maximum profit. It should be in a position to translate engineering and manufacturing efficiencies into dollars.

Its business is buying money and money accommodation. It must work hand in hand with the other departments, for while they must not embarrass it, the whole purpose of the financial department is service to the other departments. It is not a primary producer. If it were, the plant would be a banking institution.

The Recording or Cost Department

How can this be connected with purchases? To know how that stock the owner had to buy, instead of the regular, is going through, expressed in dollars and cents, ask them. They will give him actual information which will enable him to buy with certainty.

If a salesman says that he can cut the sand on the foundry floor for 7c. a cu. yd., the cost department can tell the present cost, the figures the salesman left out, and what the real cost of the operation with the machine would be. They can also tell how many yards of sand there are to cut.

If interested in the efficiency of purchasing methods, they should be able to tell other things. How much did it cost to keep on hand that batch of steel which was bought because it was cheap? What was the worth of the room it occupied, and how much above the standard did handling and re-handling cost?

They are alert to know whether that new machine is delivering in accordance with the predictions, and have the figures to tell whether it will pay to change over the whole battery, or whether it is the proper step to insert in THE IRON AGE "Machinery for Sale" section an "ad," telling about the beautiful little-used machine which is now for sale.

If they cannot get this information promptly without disturbing the entire department, maybe the money invested in this department is not returning proper dividends.

The Purchasing Agent

He is "liaison." He is the contact with the outside world. He meets the visiting expert, the near-expert, the crank, and the plain nuisance. He finds out what they have to offer which is of interest to the concern, classifies and codifies the information. He has catalogs of everything liable to be wanted, and some that are not so likely. He has them, classified and available.

As information comes in that is valuable to this one or that, he passes it along. His information and files are at the disposal of anyone in the plant who needs them. He knows what the conditions are in the stock department, both raw and finished—how the financial department is situated, the progress of the latest selling campaign, the trend of the market, what the designing department is getting out.

He knows, too, who has stocks of material, how long it will take to get it, the sizes stocked, and the chemical and physical characteristics.

A pretty picture, is it not?

Has the P. A., answering an apparently casual inquiry, told how far along the sales department is in its recent campaign, and what they have up their sleeve for their next? Has the production department told what machine will best take up the work that engine lathe has been on steadily for the past three years, now that it is scheduled to raise the output to 400 pieces per day?

Straws show which way the wind blows. If the organization is tied together so that it functions as one, it knows what the next problem will be and the answer to it. Equally important, the organization has figured out what it is going to do after that, if the next move is successful—and if it is not successful.

For successful buying is based on foresight, and cannot be done on the spur of the moment.

Revised Pig Iron Contract Form

The final form of a proposed standard pig iron contract adopted by the National Association of Purchasing Agents in session at Indianapolis recently is given herewith. A preliminary style of contract, which was at first considered, was published in THE IRON AGE of Oct. 20. However, the final draft differs in some fundamentals and in various details from the original. This will be submitted to producers for their approval. It is as follows:

1. *Terms of Payment:*

Invoices shall be paid.....

.....

Noncompliance with said terms of payment shall give the seller the right to suspend further shipments until all previous shipments are paid for, and if in the judgment of the seller the financial responsibility of the buyer shall at any time become impaired and written notice thereof be given by the seller to the buyer, the seller shall have the right to suspend further shipments until adequate security for payment hereunder is furnished by the buyer. If such security is not furnished within 30 days from such notice, the seller shall have the right to cancel this agreement.

Regardless of f.o.b. point, all revenue taxes which have now or may be hereafter imposed upon transportation facilities and service by Federal or State Government, as well as any advance or decline in freight rates existing at the time this contract is executed, are for the account of the buyer.

2. *Weights:*

All settlements are to be governed by track scales at point of shipment, excepting cases where buyer has reason to doubt the accuracy of seller's weights. In such cases seller shall immediately be notified by wire of discrepancy, having the option of either accepting certified weights furnished by the buyer as being correct, or of demanding a check weight on tested track scales nearest to buyer's plant, expense of check weight to be assumed by party found to be in error.

3. *Contingencies:*

Strikes, accidents, fires, floods, wars, interruption to transportation or car supply or to sources of supply of raw material, or other contingencies beyond the reasonable control of the seller to be sufficient excuse for any delay traceable to such causes. Similar conditions affecting the works of the buyer shall be sufficient excuse for any delay in accepting shipments.

(a) Each month's quota shall be considered as a separate and independent contract.

(b) Buyer shall have the privilege of cancelling any shortage of any month's deliveries due to seller's failure to ship when thirty (30) days overdue, by giving notice in writing of such cancellation to the seller within ten (10) days after that time. In case of failure to receive by buyer, seller shall have the privilege of cancelling upon same terms as above. In case neither party exercises the right of cancellation within the stipulated time it is understood and agreed that no cancellation of that month's shortage can be made and that the amount of said shortage shall be delivered and received, the period of the contract being proportionally extended unless otherwise agreed upon between seller and buyer.

4. Waiver by either party of any default by the other hereunder shall not be deemed a waiver by such party of any default by the other which may thereafter occur.

5. Notice sent by telegram or registered mail, addressed to the party to whom such notice is given, at the address of such party stated in this agreement, shall be deemed sufficient written notice in any case arising under this agreement.

6. No understanding, agreements or trade customs not expressly stated herein shall be binding on the parties in the interpretation or fulfillment hereof unless such understanding, agreements or trade customs are reduced to writing and signed by the respective parties.

A booklet on "Platinum" has been issued by Baker & Co., Inc., Newark, N. J. The subject matter is divided into four condensed chapters with the following titles: Historical Summary of Platinum; Occurrence of Platinum Ore; the Platinum Metals, and the Uses of Platinum, Its Allied Metals and Alloys.

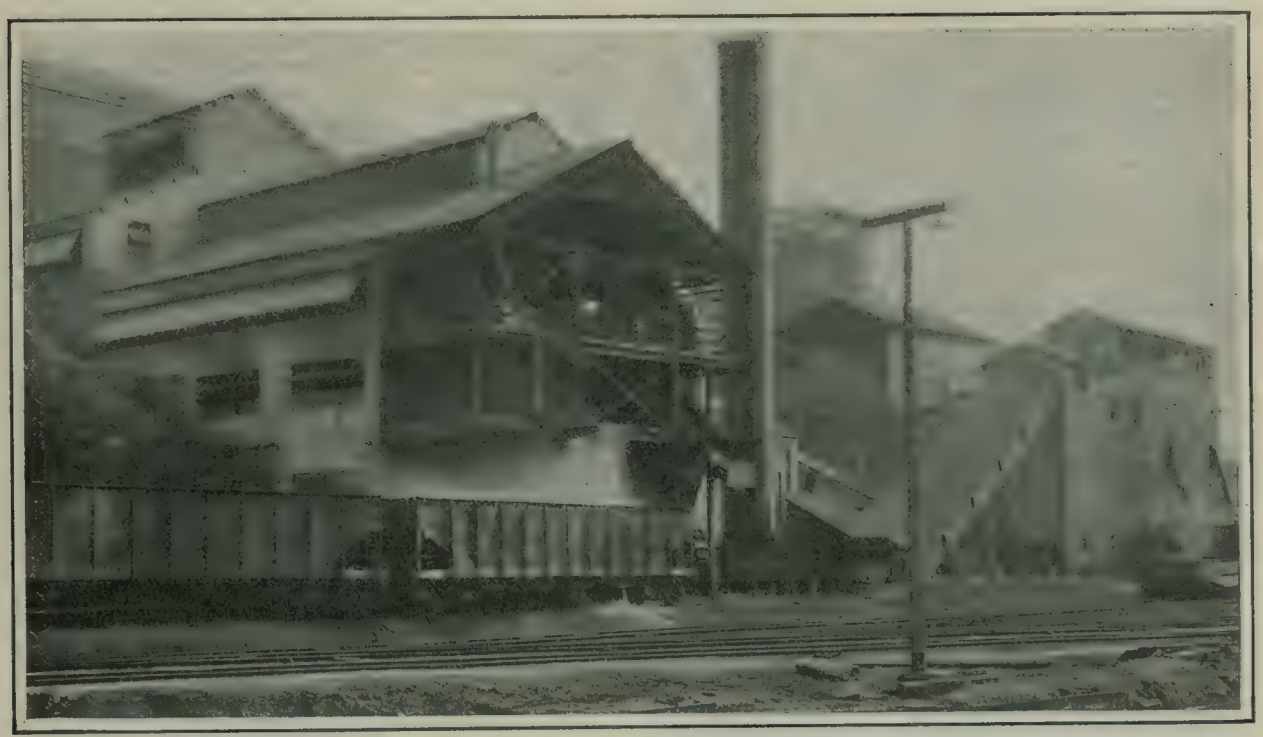
Sintering Flue Dust with Minimum Labor

Twelve Workmen Handle 1000 Tons Daily at Cambria Plant—Ample Storage, Safety and Cleanliness Outstanding

BY H. V. SCHIEFER*

WORKING from preliminary designs of the Cambria Steel Co., Arthur G. McKee & Co., Cleveland, have designed and erected a complete sintering plant at Johnstown, Pa., for the sintering of flue dust, both the large stock on hand and that as produced. The plant embodies two of the large size Dwight & Lloyd sintering machines. Only 12 workmen are needed to handle over 1000 tons of material daily. The plant covers an area, 80 x 300 ft. Advantage is taken of a hillside location to eliminate the installation of an expensive trestle. An area of otherwise useless space is also occupied to advantage.

The plant is designed for the production of 800 tons of sinter per day. Stock pile flue dust, direct flue dust, or a mixture of the two in any proportions, may be used, as well as mill scale and ore. Duplication of machinery is installed in so far as possible so that a shut-down of one piece of equipment will not tie up the plant.



The Discharging End of the Sintering Plant Appears in the Center. To the right is the bin building and back of this and on a higher elevation is the unloading station. Because the plant is located on a hillside, trestle work has been eliminated

Raw material is brought in standard gage railroad cars on two tracks that are about 40 ft. higher than the finished sinter tracks. Two unloading track hoppers are provided. Each has a horizontal area of 30 x 30 ft. and accommodates two cars, making a preliminary storage of eight carloads in and on the hoppers. The unloading tracks extend on a ledge around the hill so that at least 25 loaded cars may be spotted beyond the track hoppers and allowed to coast into position on the hoppers.

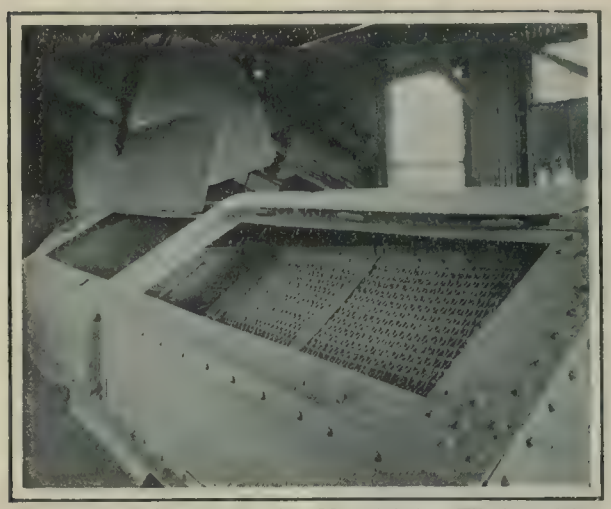
The entire top area of the hoppers is covered by a heavy cast iron safety grillage. The openings are about 4 x 5 in. which eliminate the possibility of a workman falling into the hopper. It also prevents large lumps and foreign objects from dropping into the hopper and plugging the feeders below. The grillage is made heavy enough to allow for the breaking up of frozen flue dust with sledges in the winter. The track hoppers are covered with a sheet steel house. Windows are located high enough to prevent breakage and to allow good lighting.

The track hoppers are of steel plate, at the bottom of each of which is an opening, equipped with a rack and pinion gate for regulating the flow of material. Under each gate a slow-moving conveyor is placed, each consisting of two strands of extra heavy roller chain, between which over-lapping steel pans are attached. At times flue dust is received containing practically no moisture and at other times containing as high as 12 per cent, making the design of a self-feeding conveyor of importance. These conveyors act as feeders as well. They are at an angle of about 25 deg. from the horizontal, are about 60 ft. long and discharge into two revolving screens.

Years of experimenting has been done in trying to successfully screen all kinds of flue dust. The screens as installed are taking the material as it comes and have proven their worth. They are of the revolving center shaft type and are a hexagonal truncated pyramid. The screen cloth, made up of ⅜ in. wire, is mounted on easily-removable frames. Structural steel trolley beams are directly over the screens to expedite repairs. The screens are 4 ft. in diameter at one end, 6 ft. at the other and 12 ft. long and are mounted on 6-in. shafts.

The over-size coke, that is screened out of the flue dust, drops into other bins and thence through chutes to railroad cars, ready to be sent to the furnaces and used as fuel. Each screen is driven by a direct-connected 25 hp. motor. The conveyors are driven through gearing and a clutch from the screen shaft. The gearing

*Until recently with Arthur G. McKee & Co., Cleveland.



Over-sized Coke and Foreign Material Are Eliminated by Two Wire Screens in the Form of a Truncated Pyramid

and screens are enclosed in heavy steel guards to protect workmen and to prevent dusting.

The unloading and screening equipment will handle 1000 tons in 10 hr., thereby cutting the unloading labor to a day turn of 10 hr. only. To permit this four storage bins are provided, with a total capacity of 640 tons, which will supply the sintering machines for the 14 hr. that the unloading gang is not working. There are six storage bins in all, two under each of the two screens for flue dust and two provided for returns, to be described later. These bins are all in a straight line. Each is provided with a standard McKee revolving disk feeder. To eliminate the difficulties encountered in previous feeders for this work, a feeder of new design has been provided that is extremely rugged and designed to take up the wear incident to the material handled. Each bin-bottom is fitted with a cast iron cylinder, open top and bottom, 48 in. in diameter and 30 in. high, with an opening in the side provided with an adjustable slide gate. Directly under the cylinder is a horizontal revolving disk made of ¾ in. boiler plate. This disk is bolted to a spur gear and is driven through a vertical shaft with a bronze thrust bearing. As the



The Cast-Iron Grillage Prevents Workmen and Large Foreign Material from Falling into the Hopper Below

thrust bearing wears, the spur gear slides further along the teeth of the driving pinion. This was not the case in previous designs where a bevel gear and pinion were utilized. As the disk revolves, the material is brought against a scraper which directs it through a 7 x 9 in. opening in the side of the feeder. This opening is fitted with an adjustable sliding door so that the discharge of the material may be regulated. The feeders are all driven from one line shaft and any one, or all, may be cut out by clutches.

The openings from all feeders discharge upon a 30-in. belt conveyor. This conveyor and all feeders are driven by a variabale speed motor. The variable speed is necessary since the speed of the sintering machines is occasionally changed when more or less material is required.

By the manipulation of the gates in the feeders any desired proportion of materials may be obtained and at the same time a preliminary mixing is secured. The 30-in. belt discharges the proportioned material upon an inclined belt conveyer that carries the material to the top of the plant and discharges it into a super hopper, which acts as a reservoir only and would be unnecessary if it were practically possible to run the plant in positive synchronism. The bottom of this hopper is bifurcated and is fitted with two McKee revolving disk feeders that are duplicates of the ones under the storage bins except that they run at a higher speed.

From the point where the material leaves the super hopper the plant is divided into two units, each consisting of a pug mill, a sintering machine, fan, and auxiliaries. The feeders under the super hopper are driven by a counter-shaft of the sintering machines and work with them in positive synchronism so that a speeding up of the sintering machines automatically speeds up the feeders. A change of hearth bed depth is accomplished by an operating lever on the operating floor which raises or lowers the opening in the feeders.

From the feeder the material drops into a pug mill which thoroughly mixes the ingredients. Water is added in the pug mill to give the consistency necessary for sintering. The pug mill is a cast iron trough, about 12 ft. long, in which two square shafts revolve in opposite directions. Manganese steel paddles are mounted on the shafts. Ball-bearings running in oil take the thrust. The shafts have couplings so that they may be removed quickly without disturbing the driving gear. The bottom may be dropped and cleaned while the mill is in operation.

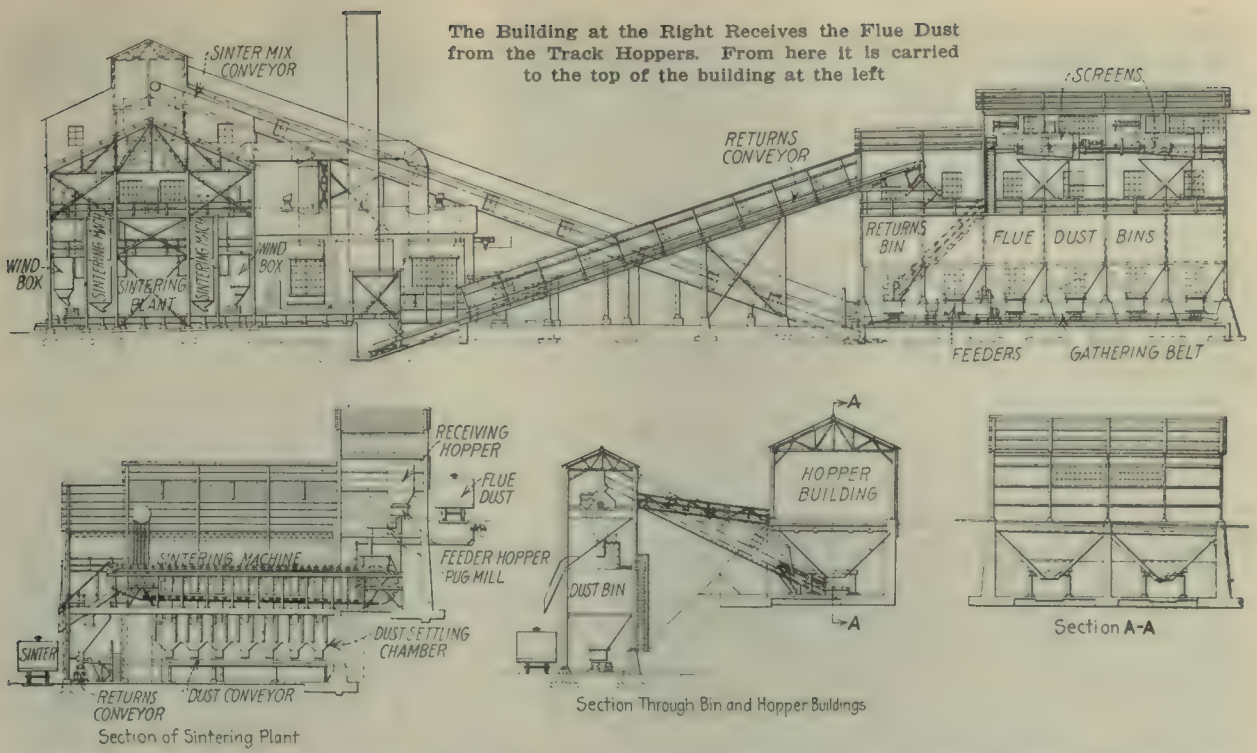
The pug mills are extremely heavy, with an entire cast iron frame, and were designed and built by Arthur G. McKee & Co. Each mill is belt-connected to a 20 hp. motor. The pulley shaft is at right angles to the paddle shafts of the mill and the transmission is effected by bevel gears.

The success of the sintering process depends to a considerable extent on the quality of the mixture as it comes to the hearth of the sintering machine. This factor was given careful attention in designing the plant and as a result the pug mill and sintering machine in each unit are arranged in direct sequence. This insures immediate supervision of the material which is being fed to the hearth of the machine and enables prompt regulation of the content of the mixture in the pug mill.

To maintain a uniform layer of material on the hearth, a swinging spout feeds the sinter mixture from the pug mill. It is pivoted at the discharge chute of the pug mill and by means of a rope and counterweight attached to a crank on a counter-shaft of the sintering machine, it is swung back and forth at right angles to the direction of the travel of the machine. Thus even distribution of the sinter mixture on the moving hearth is assured.

The sintering machines, without any auxiliaries, were furnished by the American Ore Reclamation Co., Chicago. They consist of endless trains of pallets or grates which travel under ignition burners and over wind boxes equipped with downdraft suction fans. These machines have an effective grate area, 42 in. wide and 57 ft., 4 in. long. The old standard Dwight & Lloyd machine was 42 in. wide and 25 ft., 6 in. long, and the lower strand of pallets rolled by gravity along

The Building at the Right Receives the Flue Dust from the Track Hoppers. From here it is carried to the top of the building at the left



At the Extreme Right Is the Unloading Station Where Freight Cars Dump Flue Dust Through Grillage into the Two Hoppers Below. The center diagram represents the track hopper building and the bin building for storage. Sintering operations are performed in the building at the extreme left

an inclined track back to the driving sprocket wheels. The much greater length of these new machines makes the use of a gravity return undesirable and the lower strand of pallets is, therefore, positively driven along the lower track by sprocket wheels at the discharge end. The latter are driven in synchronism with the driving end sprocket wheels. This synchronous drive insures that the empty pallets are returned to the driving sprocket wheels at the same rate of speed as that of the pallets on the upper strand.

On these new machines, sliding friction between the pallets and the wind box tops is eliminated by carrying the weight of the loaded pallets on wheels running on rails. The pallet wheels are fitted with renewable steel bushings and have large oil receptacles. The sprocket wheel teeth drive against tooth surfaces cast in the frame of the pallet and against the pallet wheels. This allows the pallet wheels to properly perform their rolling function around the curved tracks at the drive end.

The gears and the sprocket wheel teeth are made of steel castings. Gears and shaft couplings are enclosed in heavy sheet steel guards. The sprocket wheel



The Raw Material Feeders in the Bin Building Also Serve to Mix the Various Materials Before the Super-hopper Is Reached

teeth are removable and are machined in jigs so that they are interchangeable.

An important feature of the new machine is the use of seal bars on the pallets, which automatically maintain airtight joints between the pallets and the tops of the wind boxes. These seal bars are made very light and by their own weight bear on the finished surfaces of the wind box tops, and also fit against the finished sides of the pallet slots in which the bars are hung.

As the pallets travel under the swinging spout, they receive a layer of sinter mixture. The depth of this layer is variable, depending on the fineness or coarseness of the mixture. There is always some critical thickness for any specific mixture at which the greatest quantity and the best quality of sinter is produced. With any arrangement of bins and feeders the thickness of sinter mixture layer varies considerably from day to day.

According to the principles involved in making sinter under the Dwight & Lloyd patent, there is sufficient carbon in the mixture to support combustion, provided the necessary ignition and oxygen are supplied. Flue dust from its very nature is a homogeneous mixture of fine ore and coke and at this plant the flue dust contains enough coke so that it is not necessary to add any further carbon.

The ignition burner, built by Arthur G. McKee & Co., is 2 x 4 ft. overall and is suspended directly over the pallets. Gas for ignition is taken from the top of a 24 in. main that runs through the plant and supplies the Cambria works from the Cambria Steel Co.'s new Rosedale plant. By taking off the top of the main a very clean gas is obtained. Air is supplied by Roots positive pressure blowers, motor-driven and located on the ground floor. The flame must be of sufficient intensity to positively ignite the entire surface of the charge without completely drying it. If the mixture is prematurely dried, the sintering action is retarded. The pallets travel at a speed of from 30 to 90 in. per min. while combustion is going on. When the combustion is completed, the pallets arrive at the end of the machine where they are dumped by dropping one pallet at a time down a curved track. Each pallet hits the one ahead of it a blow that throws the material against an inclined grizzly screen.

A suction of about 20 in. of water is maintained by means of a fan for each machine which is directly connected to a 350 hp. motor. The fans have 100 in. impellers; they revolve at from 600 to 720 r.p.m. and have a capacity of 30,000 to 60,000 cu. ft. of gases per min. each. The fan is enclosed in a steel casing and the bearings are water-cooled. The fans were manufactured by the Buffalo Forge Co., Buffalo, N. Y. They are located in a separate brick building, 27 x 54 ft. Underground flues lead the gases to a single stack, 90 in. in diameter by 80 ft. high.

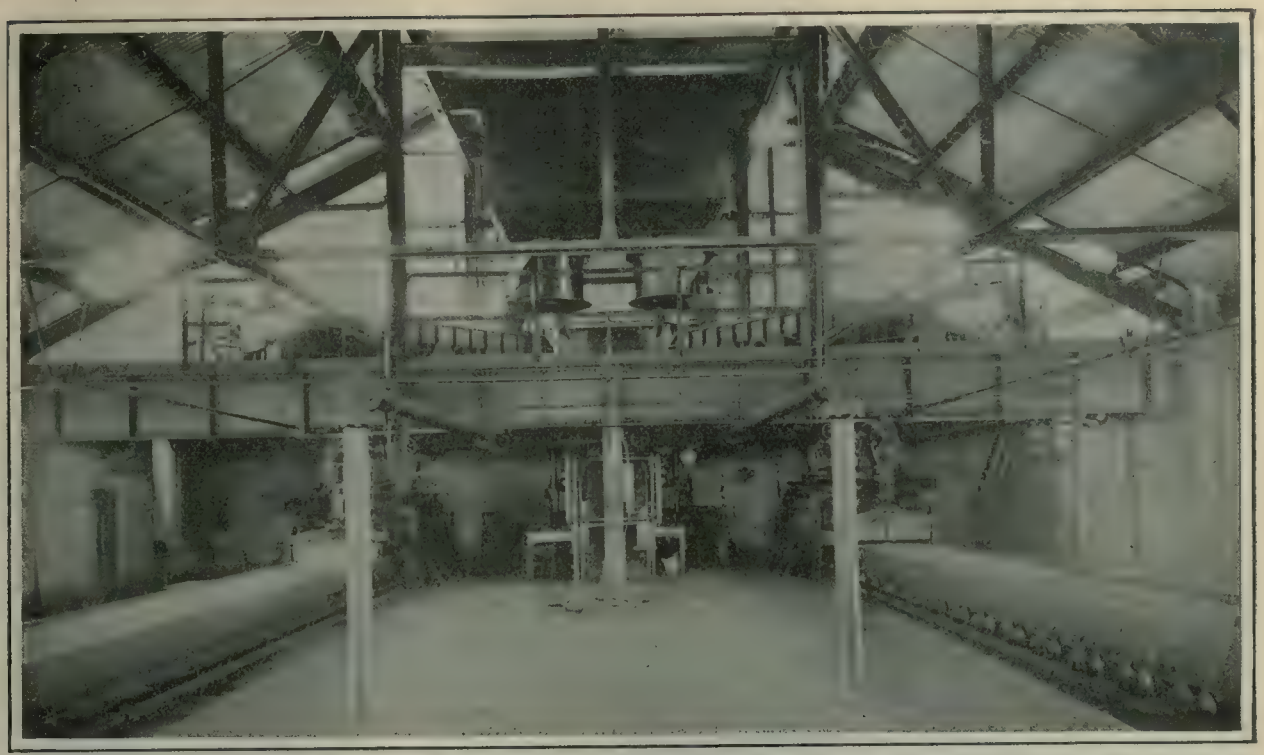
As the sinter leaves the machine it is dumped upon a grizzly screen, 5 ft. wide by 12 ft. long, set at an angle of 32 deg. with the horizontal. The bars of the screen are spaced to give a clear opening of ¾ in. The finished sinter passes over the screen and falls into railroad cars.



The Wind Boxes and the Dust-collecting Belt Are Located on the Ground Floor

The openings in the grizzly screen are designed to give between 20 and 30 per cent screenings, called returns. It is desirable to have this large amount of returns since, when mixed with the raw flue dust, better sintering action results and grate bar breakage decreases. Formerly, the returns were handled in railroad cars, a depressed track being under the sinter screen. With the large percentage of returns this not only requires a number of cars in this service constantly, but requires expensive shifting and unloading. Now the returns are taken back into the system by conveyors.

As the returns drop through the grizzly screen they are caught by a 25-ton hopper, provided with a gate that feeds upon a cast iron pan conveyor. At times the returns are red hot and must be cooled with water. This puts a severe condition upon the conveyor. The conveyor consists of two strands of extra heavy bushed roller chain, between which are hung cast iron overlapping pans. All articulation points of the chain are either chilled iron or case hardened steel. The convevor



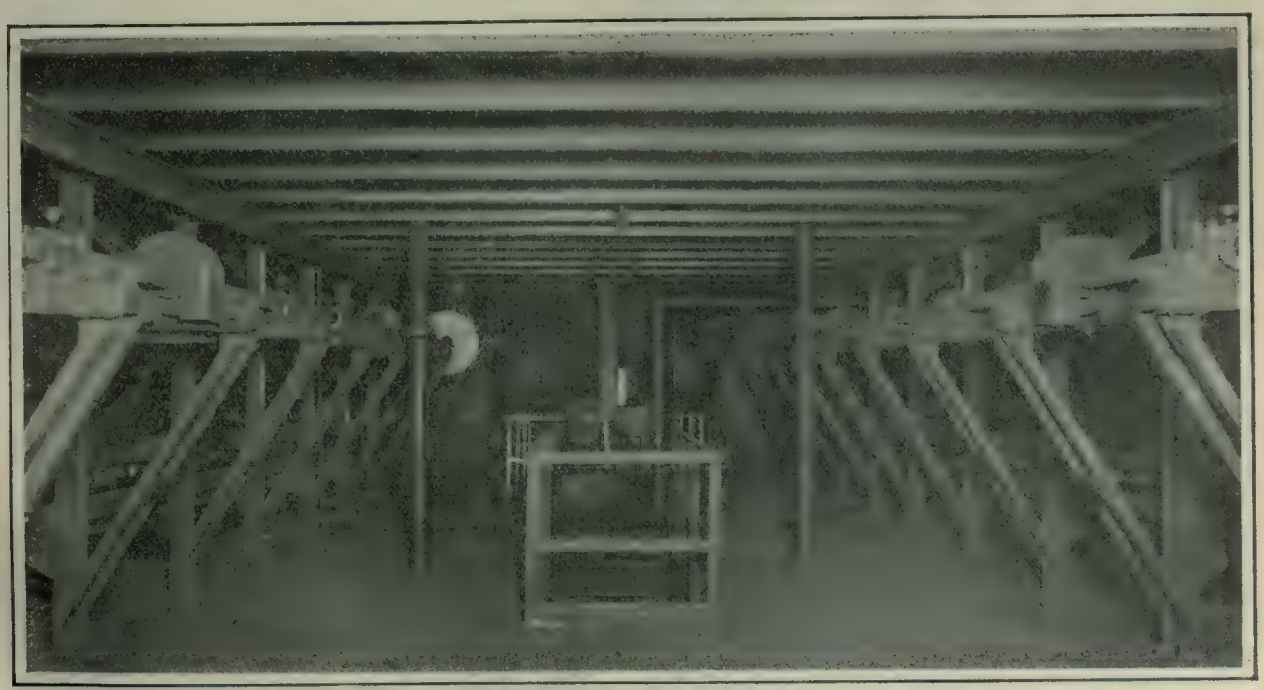
On the Operating Floor Will Be Found the Super-hopper, Pug Mills, Feeders, Ignition Burners and Dwight & Lloyd Sintering Machines

is driven by a 7½ hp. motor through spur gear reductions. The gearing is protected by heavy plate guards. This conveyor extends beyond the building about 30 ft. without a covering, giving the hot material a chance to cool before being discharged upon an inclined belt conveyor which elevates the material into either of two 160-ton storage bins, at the same level and in line with the four stock bins, above mentioned. They are provided with feeders and discharge upon the same belt that receives materials from the other stock bins.

Under each sintering machine there is a dust settling chamber through which the hot gases pass before entering the fans. These are steel bins, each approximately 5 x 10 x 60 ft., and provided with seven cleaning doors each. They must be cleaned every 24 hr. In previous sintering plants the doors have been opened and the accumulated material dropped upon the floor, the material then being removed in wheelbarrows. The hand handling has been eliminated in this plant by a belt conveyor under each dust chamber. These conveyors discharge into the cast iron pan conveyor, above mentioned. The material is mixed with the returns in the returns bins.

The motor equipment was supplied by the Westinghouse Electric & Mfg. Co. Adhering to the general policy of the Cambria Steel Co. the entire plant was designed to make it an absolutely safe plant. All gearing, shafting, belting and all moving parts are enclosed and all platforms, etc., are provided with hand railing and toe boards. All floors and platforms are of concrete to allow for flushing out the entire plant with a hose.

The buildings are all substantial, being either heavy steel framing or brick. A brick office building and service station make the plant complete in itself. All machinery is of heavy design to reduce the wear and renewals to a minimum. By the correct choice of labor-saving machinery and the utilization of centralized



The Sintering Machine Return Track and Machine Drive

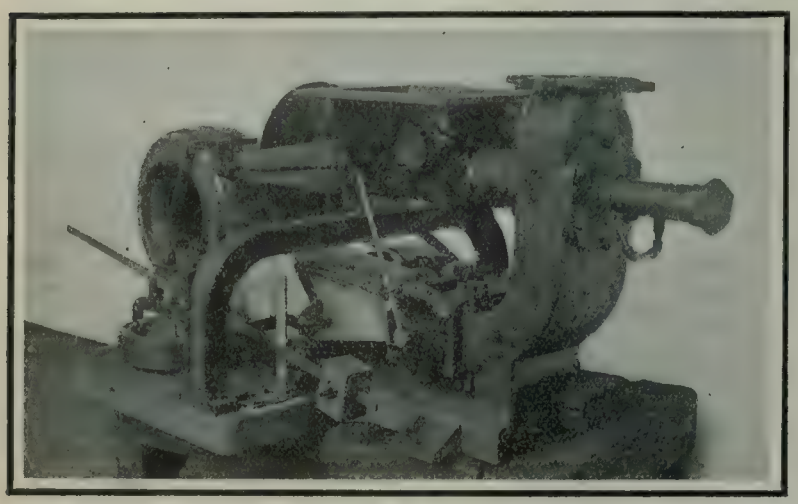
electrical controls and interlocks, the working crew is reduced to twelve men.

The entire plant, with the exception of the electric wiring, was designed and built by Arthur G. McKee & Co., Cleveland, the erection work being under the direction of H. B. Pearson, Jr., general superintendent. The interests of the Cambria Steel Co. were looked after by W. C. Frank, assistant chief engineer, and H. C. Proudfoot, electrical engineer, under the direction of H. A. Berg, assistant general superintendent.

Powdered Coal Under Boilers

Equipment for conveying and burning powdered coal, as manufactured by the Grindle Fuel Equipment Co., Chicago, has been described in THE IRON AGE.* The installations referred to in the exposition of the mechanical features of this equipment were on melting furnaces in malleable foundries. A new application of the equipment was recently made at the plant of Henry E. Pridmore, Inc., molding machine manufacturer, Nineteenth and Rockwell streets, Chicago. Here a 150-hp. boiler, formerly grate-fired, is now operating on powdered fuel with good results.

In its main characteristics, the burning equipment is similar to that previously described. An important innovation, however, is the automatic control of fuel and air supply. The volume of air and the amount of fuel supplied to the mixing chamber for combustion vary according to the boiler pressure. The control is effected through a sylphon air valve, furnished by the Fulton Co., Knoxville, Tenn. As the sylphon valve will not stand over 20 lb. pressure, a reduction valve is interposed.



Equipment without Feed Hopper. The sylphon valve which controls the air and fuel supply is at the extreme left, on base of machine. By connecting levers it regulates the variable speed disk transmission, the rear of which is shown above, and the air gate valve, behind the graduated dial



One Constant Speed Motor Operates Both the Blower and the Variable Speed Disk Transmission, Which Is Connected with the Coal Feed Worm

By means of a variable speed disk transmission, the sylphon valve regulates the speed of the feed worm which carries the pulverized coal to the mixing chamber. The speed of the transmission disk depends on the position of rollers, operated by pulley from a constant speed motor, which are adjusted laterally across the face of the disk by a lever connected with the sylphon valve. Air is supplied by a blower run by the same motor which operates the coal feed worm. A lever from the sylphon valve regulates the air supply by altering the position of an air gate situated between the blower and the mixing chamber.

A graduated dial shows the volume or air passing through the gate, for a given position of the lever. Similarly, a graduated marker on the disk transmission indicates the rate of coal feed. These gages serve as a check on the adjustment of the levers. If it is found that the relative amounts of coal and air supplied to the mixing chamber are not in the proper proportion, necessary adjustments in the levers can be made.

The boiler is now burning from 1200 to 1400 lb. of pulverized fuel per 8-hr. day, whereas its former consumption, when grate-fired, averaged 1.45 tons per day. Very little ash is accumulated in the flues or pan. After three days of operation recently only a shovelful of ash was found in the pan, and none in the flues.

The Grindle company has also prepared designs of equipment for core ovens, in which pressure control is supplanted by automatic temperature control.

*Aug. 14, 1919, page 444, and Dec. 16, 1920, page 1614.

Price Revision on Factory Supplies

The National Supply & Machinery Dealers' Association, through its secretary, Thomas A. Fernley, recently addressed a letter to 300 manufacturers of products handled by the members requesting information as to further price reductions. The request was made that any further downward revision, if contemplated, should be made before Dec. 31 to give ample time for dealers to use the new prices in the depreciation of their inventories for computation of Federal taxes. The association has also issued a bulletin to its members giving the comparative price position of 115 items which comprise a considerable part of their stocks.

In response to the association's letter many manufacturers replied that their prices have already been as fully liquidated as present costs and other conditions will permit; some replied that if further reductions were to be made announcements would be issued in time for this year's inventory; a good many replied that the question of further reductions cannot be determined in advance, but will be dependent upon conditions. A leading independent steel company replied as follows: "The prices of our products have already been very materially reduced and have reached a basis at or below cost of manufacture. In the case of some of our products, prices have been advanced recently. As regards future changes, we, of course, are governed principally by the cost of production and market conditions, so that we are really not in a position to regulate to any extent the time or extent of price changes."

According to figures issued by the Ohio Industrial Commission, more than 50 per cent of the fatal accidents which occur in Ohio industries are those of foreigners, or men who cannot read the English language. While warnings of dangers are printed in many foreign languages, experience shows that the foreigner either does not stop to read them or neglects to follow the advice of experts.

Union Develops Business In Foreign Lands

General Secretary-Treasurer Davidson Explains Operations of Association of Machinists in Mexico and Other Countries—Says Orders Have Been Sent to Open Shops

WASHINGTON, Nov. 1.—Novel in trade union annals, the International Association of Machinists has branched out as an agency to develop business in foreign countries for American manufacturers. That it actually has had success in this direction is made evident from statements, together with supporting facts, coming from General Secretary-Treasurer E. C. Davidson of the Machinists' Union, who discussed the matter with THE IRON AGE. The business done so far through the union has been confined largely to Mexico and has come about through negotiations initiated by Mr. Davidson with both Mexican Government officials and private interests in that country. Business also is being developed through the same manner in South American countries, particularly Argentina and Chile. Up to the present, it has chiefly involved purchases made through the Director General of the Mexican railroads. But the campaign extends to all lines of business, and is not confined to machine tools, railroad supplies or any set of materials.

It is these activities of the union which has led to criticism at the hand of machine-tool builders and other industrial interests in this country. They have maintained that the union has been getting inquiries in foreign countries and seeing to it that the business is placed with union shops exclusively in the United States. Mr. Davidson stated that the claims are entirely unfounded, and set forth the situation in accordance with what he said are the real facts.

Stimulating Industry

Underlying the whole matter, he pointed out, is the desire to stimulate industry in the United States so as to afford employment to American workers. Mr. Davidson stated that naturally from the viewpoint of his organization it would be preferable to see the business go to union shops and union workmen, but said that this was absolutely a secondary consideration. To prove it, he stated that the association has been the medium through which business has been placed with American manufacturers who operate open shops and who, it was declared, have been unfriendly to organized labor. No effort was made by Mr. Davidson to give the impression that the work being done by the association is of a philanthropic character, for it is purely a matter of business.

It is felt that by giving employment to American workmen assistance has been extended in a proper direction, but it goes further and means that by placing any idle man at work the opportunity for other idle men, including union workmen, to obtain employment is increased that much. Mr. Davidson is aware of the fact that there is a feeling that the method being used by the association constitutes a sort of a "peaceful penetration" of unionism in industries of the United States, but holds to his claim that no such purpose is in view. He is of the opinion that, when the work done and being done is clearly understood, it will be realized unjust criticism has been made and that it will give way to appreciation on the part of those getting orders, non-union as well as union manufacturers, of the United States.

Relieving Unemployment

"It was the unemployment situation in this country and the desire to relieve it as much as possible," said Mr. Davidson, "that prompted us primarily to engage on this undertaking. Coupled with this was the fear that European industrial development in export markets in opposition to our own development would set us back. We think we recognized one phase of the situation that was ignored by others. This was the matter of organizations of labor and their influence on the lives of those affiliated with them. In Mexico we found it was a political situation with 87 per cent of the agricultural interests organized. In the Mexican Army we found every soldier was a labor man, associated with the Confederation of Labor, and tradesmen about 100 per cent organized. President Obregon himself is a member of the International Association of Machinists. With this background it was natural that we should expect favorable reaction to our undertaking in Mexico.

"But results cannot be accomplished without a proper understanding of the situation and well directed efforts to develop trade with American industries. The German agents, especially, are busy seeking trade in Mexico and South America and have obtained business there which should have come to this country. The Mexicans prefer to place business in the United States even if they have to pay somewhat more. For instance, an order for steel tires for locomotives recently was delivered in Mexico with Krupps, that might as well have gone to manufacturers in the United States. It is the policy of the Germans to acquaint themselves with American bids and then to submit figures from 20 to 25 per cent or more under them and to accept business on any terms, granting whatever credit is desired. American firms have lost business because of refusal to accept credit, which they could have extended safely, in my opinion.

Rail Business Lost

"Lately the Mexican Government made an inquiry for 15,000 tons of steel rails. A prominent United States interest lost the business because of its refusal to grant the desired credit terms. We now have put the Director General in touch with another American interest in the hope that the latter will obtain the business before it goes to a foreign manufacturer. If the order comes to an American mill, it will put more men to work, not machinists, of course, but it will aid others and that is the idea we have in mind.

"We have been the agency which has placed American manufacturers in touch with Mexican purchasing interests, resulting in business being placed. One order covered fire equipment, and it went to a manufacturer in this country who runs an open shop. That made no difference to us. Other similar cases may be cited, such as orders for lathes, planers, drills and other machinery and engines and box cars for railroads in Mexico, and also cultivators and sugar mill machinery. We have inquiries also from South American countries, such as Argentina, that now are the object of negotiations between Government authorities there and American makers."

Mr. Davidson said that one condition upon which orders are placed is the right reserved by the association to see that orders go to plants that will meet specifications in every particular and pay strictest attention to quality. Delivery of inferior material in Latin-American countries, it was stated, has worked an injury to American exporters, the high-grade concerns which do meet specifications suffering in reputation along with those that have not lived up to their contracts.

It was stated by Mr. Davidson that the association has no financial arrangement of any kind in connection with negotiations it starts and that it does not ask and will not accept commissions.

Reports from 45 metal working shops in Milwaukee for September show a total enrollment of employees during the month slightly under that of August and materially under the number at work in the same shops in September, 1920.

Portable Electric Universal Precision Grinder

A portable electric grinding machine of French manufacture, known as the R. V., for use on any type of machine tool or in a vise, and for a variety of work requiring accurate grinding or the re-touching of hardened parts, is being marketed by Arva Stroud, 327 Broadway, New York. The machine is furnished in two models, one of which has a ½ hp. motor with a round frame, the other a 1 hp. motor with a square frame, as shown in the accompanying illustration.



A Slot in the Base Permits of Fitting the Grinder to Machine Tools

The motor is of the universal commutator type, operating on alternating or direct current. The stator is made up of special steel laminations 0.02 in. thick, insulated with paper and is cast integrally with the aluminum casing, a feature intended to prevent displacement. The armature core is formed by a series of laminations insulated with paper and secured to the shaft by two sleeves, forced on by hydraulic pressure. The shaft is of special steel and the laminations ground to size. The commutator is of patented construction and is composed of 32 segments of high conductivity copper, the radial connections being made in one piece with the segments. These segments are insulated with pure mica and the windings impregnated in vacuum. The brush holders are supported on a ring of molded insulating material and are accessible from the outside of the machine. The tension of the brush springs can be regulated and the brushes conveniently changed.

The grinder frame is of hard aluminum alloy. The front forms the grinding shaft housing, the back forming a base to support the motor, which is secured by stud bolts working in machined slots, the tensions of the driving belt being adjusted by sliding the motor in the slots. In the center of the base, a slot 1 in. wide and 3⅜ in. long is said to permit of a strong and convenient means of fitting the grinder to any machine tool. The grinding spindle runs on two ball bearings of large diameter and the various sleeves and extensions are fastened to it by a conical sleeve and a square thread, a construction intended to give the double advantage of not disturbing the centering of the cone and also of facilitating the removal of sleeves and extensions. A two step pulley on the shaft provides speeds of 4000 r.p.m. and 12,000 r.p.m., the lower speed being for external grinding and the higher for internal work.

The full equipment includes a neat wooden carrying case containing 2 grinding wheels 5 in. in diameter, with sleeves and flanges; 2 spindles for internal grinding, with wheels; 1 adjustable table for hand grinding; 2 endless belts and 1 socket with cord for attachment to lighting fixture. The machine weighs 22 lb. net and 37 lb. with box and accessories.

Accidents in the Steel Industry

That the total steel mill accident rate, per 10,000,000 hr. worked, has fallen 55 per cent since 1907, and that the fatal accident rate has fallen more than 70 per cent, are shown by figures of the Department of Labor. The figures given for 1907, per 10,000,000 hr. worked, show 7 deaths, 13 cases of permanent disability, 788 cases of temporary disability and a total of 808 cases. For 1920 these figures were 2 deaths, 9 permanent disability, 357 temporary disability and 368 cases in all.

Severity rates fell in about the same proportion as frequency rates. Figures for 1907 showed an average of 72 days lost for each 10,000 hr. of exposure. In 1920 the loss was only 27 days.

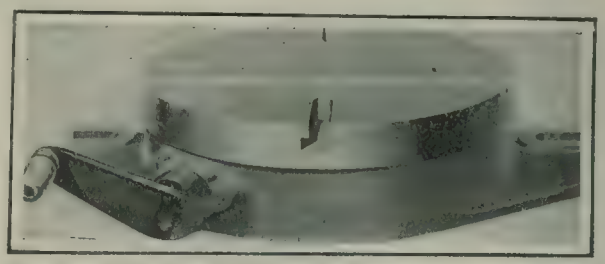
All departments, save the electrical, shared in this gain, the open-hearth and blast furnace plants showing the greatest decreases, and needing to do so, for their rates in 1907 were more than double the average of the other departments.

New Line of Index Bases

In addition to its standard line of two-way index bases the Industrial Engineering Co., Detroit, has recently put out a new line which will index and clamp with one movement of the lever in 3 or 4 positions at 120 deg. or 90 deg. respectively. The mechanism is the same in principle as in the older line of bases and the sizes and table dimensions are identical, viz., 10 and 16 in. in diameter.

The device is made of heavy, solid metal and clamps solidly and accurately into position. There can be no variations, it is claimed, because the design of the base eliminates the chance of leaving the parts out of alignment. All working parts are of special steel hardened and ground. One movement of a hand lever accurately indexes and clamps the table powerfully to the base. The index table is located on its base by bearings of large diameter, which in conjunction with the strong holding-down feature and low height of the base is said to make an exceptionally rigid fixture, permitting heavy cuts to be taken.

Among the advantages claimed for the index base is the elimination of idle machine time due to loading and unloading. Referring to the illustration it will be seen that there is a single slot for accurately locating any fixture and four T-slots for bolting it down. When the pieces in one side of the fixture have been machined,



The New Index Base Will Lock in Three or Four Positions

index the base table 180 deg., bringing the parts in the opposite side in proper position for machining. Then the machined parts are unloaded and the new parts put into position while the cutters are working on the other side.

The indexing is controlled by a lock which automatically takes up its own wear and is said to be positive and fool proof. The height overall is 3⅛ in. and the length overall, 14 in. in the smaller and 20 in. in the larger size. The weight is 45 lb. and 105 lb. for the 10 and 16 in. size respectively.

The flow of water through galvanized spiral riveted steel pipe of 4 to 10 in. in diameter is the subject of an engineering bulletin, No. 8, issued by the Engineering Experiment Station at Purdue University, Lafayette, Ind. The study was made by F. W. Greve, associate professor of hydraulic engineering at Purdue University, and R. R. Martin, research assistant in hydraulics.

Professor S. W. Dudley, Yale University, formerly chief engineer Westinghouse Air Brake Co., talked on "What Stops the Moving Train" at a meeting of the New Britain, Conn., branch of the American Society of Mechanical Engineers held in that city on the evening of Oct. 25. Calvin Rice, secretary of the New York branch of the society, told of the work of the society.

GERMAN PRICE TREND UPWARD

Scarcity of Wire Rods, Wire and Nails—Mills Refuse to Open Books for 1922 With Higher Prices in Prospect

(Special Correspondence)

BERLIN, GERMANY, Oct. 16.—The strong forcing up of prices which has been a feature of the iron and steel market during the past month seemed to have given way to a saner tone at the beginning of the past week. The lull, however, proved to be only temporary, and was quickly followed by higher quotations. When it is considered that the slump in the German mark, largely due to the unfavorable decision on Upper Silesia, has only begun to be reflected in prices, a further rise may be prophesied the moment the ultimate result of the decision is known in detail. Upper Silesia will undoubtedly be the determining factor in the trend of the market during the coming weeks.

Quotations toward the end of the week were about 7 per cent above the level of the forepart, with the exception of pig iron, which has been fairly well stabilized. A further advance of pig iron is, however, a foregone conclusion, and will probably occur by Nov. 1. Details have not been announced, pending a meeting of the pig iron syndicate, Oct. 25, but interested circles predict an increase of 300 to 500 m. ($1.74 to $2.90) per ton. Semi-finished material showed but slight change with quotations around 2900 m. per ton for basic material and 3100 m. per ton for open-hearth material.

In finished material, hoop iron of box band quality stiffened perceptibly as well as rounds. Business in heavy and medium sheets was somewhat lighter, but in the light plate market demand continued strong. There was also a strong tone in the wire market. Rods were practically unobtainable except in resale lots or out of warehouse at high prices. Export quotations on wire rods are from £9 to £9 5s.

Foreign consumers are attempting to place large quantities with mills, particularly galvanized fence and barbed wire, but have not met with any notable success, as makers generally decline to open their books for 1922, besides figuring on higher prices during the coming weeks in view of the improvement in foreign markets. Fair domestic buying of nails is noted, and bright material is greatly in demand. Prices are rather erratic, 430 m., base ($2.50) per 100 kg., being quoted for bright wire by some makers, while a Rhenish works named 470 m. ($2.72). There is a similar discrepancy in galvanized wire prices, which range from 437.50 m. ($2.54) to 510 m. ($2.96) per 100 kg. Jobbers are now stocking up heavily on barbed wire and 551 m. ($3.20) per 100 kg. is willingly paid for close spaced material. Latest export quotations are 33s. per 101.6 kg. Pipe and tube quotations have advanced and a further increase of about 30 per cent is rumored.

At the end of the week quotations were as follows, per metric ton:

	Marks	
Bar iron	3500	$20.30
Structural shapes	3400	19.72
Concrete bars	3500	20.30
Hoop iron, box band quality	5300	30.74
Wire rods (nominal)	3600	20.88
Rails, standard sections	3200	18.56
Rails, for mines	3000	17.40
Sheets, heavy	2700	15.66
Sheets, medium	2800	16.24
Sheets, planished	5700	33.06
Plates, light	4100	23.78

Pipe

	Marks Per Metre	Cents Per Ft.
Boiler tubes, 3½ in.	90.00	12.72
Gas pipe, ⅜ in.	6.20	1.10
Gas pipe, 1 in.	13.50	2.37
Gas pipe, 1 in., galvanized	24.00	4.24

Sharp Increase in British Steel Exports in September

British steel exports took a sharp upward swing in September, according to the official data just made public. The total was 138,248 gross tons, excluding iron ore and including scrap, which is close to twice that for July or August. Compared with September a year ago, the outgo was only a little over 50 per cent of what it was then at 256,280 tons. The average for the third quarter of this year and for the entire nine months is still considerably below the average monthly exports for 1919 or 1920.

Iron and steel imports in September were exceedingly heavy and the largest not only for any month this year but also for any month in many years. The total imports, excluding ore and including scrap, were 229,391 gross tons which compare with 173,838 tons in September, 1920, and with an average per month in 1913 or 195,264 tons. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
Aver. per mo. first quarter 1921	183,373	186,040
Aver. per mo. second quarter 1921	109,670	96,320
Aver. per mo third quarter 1921	93,804	160,727
July, 1921	64,001	103,561
August, 1921	79,163	149,231
September, 1921	138,248	229,391
Aver. per mo., 1919	188,519	50,801
Aver. per mo., 1920	274,881	128,685
Aver. per mo., 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data:

Principal British Exports, Gross Tons

	Average Per Month 1913	1920	Sept., 1920	Sept., 1921
Pig iron	78,771	38,505	29,659	5,108
Steel rails	41,676	11,213	13,969	20,090
Steel plates	11,162	16,571	15,757	6,016
Galvanized sheets	63,506	34,244	29,101	21,670
Steel bars	20,921	30,322	28,401	9,805
Tin plates	41,208	29,418	20,543	19,792
Black plates	5,679	3,026	1,893	1,256
Steel sheets	....	....	9,959	3,729

Exports of steel rails have shown the most marked recovery in the above products with galvanized sheets and tin plates next.

Imports of pig iron in September were beyond precedent at 120,806 tons bringing the total for the third quarter over 224,000 tons.

Iron ore imports in September were only 89,379 tons as compared with 541,742 tons per month in 1920. In September, 1920, they were 487,211 tons. The total for the first nine months of this year was 1,425,399 tons as compared with 5,195,390 tons for the first nine months of 1920.

Manganese ore imports were only 3731 tons in September which makes the total to Oct. 1 this year, 156,597 tons against 327,097 to Oct. 1, 1920.

Foreign Buyers of Iron and Steel

September exports from the United States of iron and steel products were mainly to Canada, Japan and China. Smaller quantities were taken by Mexico, Britain and India, and still smaller by other countries. The list, from figures of the Department of Commerce, follows:

Destination	Tons	Destination	Tons
Canada	22,638	Cuba	2,986
Japan	21,317	Philippines	2,373
China	13,540	Argentina	1,548
Mexico	7,198	Colombia	1,272
British Isles	6,521	Honduras	1,200
India	4,463	Kwantung	728

The Atlas Foundry Co., Cleveland, has turned its attention to the manufacture of welding rod and is now devoting practically its entire capacity to making this rod, which is used for welding cast iron castings by the oxy-acetylene process. C. L. Bennett, formerly district sales manager of the Page Steel & Wire Co., Cleveland, has become sales manager of the foundry company, with his office at 510 Guardian Building.

The Hartford branch American Society of Mechanical Engineers will hold its first meeting of the season at Hotel Bond, Hartford, Conn., Nov. 3.

TRADE ASSOCIATIONS

Secretary Hoover Declares They Are Highly Useful in Solving Business Problems

WASHINGTON, Nov. 1.—Though the Administration has declined to make a formal definition of its attitude regarding trade associations, pending the decision in the Memphis Hardwood case, an informal interpretation of its position is believed to have been expressed by Secretary of Commerce Hoover last Friday night, when he addressed the Synthetic Organic Chemical Manufacturers' Association here.

Secretary Hoover and Attorney General Daugherty have held a number of conferences on this subject and are understood to have reached an agreement on the general principles involved and apparently were on the verge of making a public announcement. At the last moment, however, Mr. Daughtery is said to have come to the conclusion that it would be injudicious to take such action, in view of the litigation now before the Supreme Court. Mr. Hoover, in his talk, reiterated his past position in support of the legitimate activities of the trade association, which he held to be not only "an enormous power in commerce, but that it is a tremendous power for good in industry, and it represents a new step in the whole social and economic development of our business lives."

The various trade associations, Mr. Hoover said, present a point of contact for a department in the Government such as did not exist 10 years ago, and by setting up a friendly relationship between the Department of Commerce and these associations, the Government is able to get in touch with the needs of all of the different branches of industry.

"We have within these United States something over 2000 trade associations," said Mr. Hoover. "I presume that 80 per cent of those associations are the creation of the last 10 or 15 years, and one does not see a great movement of that character in a country unless it expresses something that is vital, and something that is permanent in the economic system."

"I have the feeling," the Secretary continued, "that this coming together of manufacturers in the different trades for the purpose of the advancement of their industry as a whole is a profound step toward cooperation in the entire business world, and that out of it will be gained tremendous benefits to the whole business public."

Mr. Hoover stressed the value of the trade association in handling properly the elimination of waste in industry. He said he knew of no way by which it is possible to undertake the solution of collective questions relating to waste, except by the co-operative organization of the men in an industry; that we cannot go on and hope to make the progress that will maintain this standard of living in the face of the competition that we have in front of us, unless we can make some progress in the collective sense. So far as I know, the only way that we can hope for it is through the organization of associations that will take up the problems that are common to all, that gain inch by inch the efficiency and stability that makes for national efficiency.

"The trade associations throughout the country have been subject to a great deal of criticism because some very small minority of the associations have undertaken practices that were in fact or in suspicion a violation of the restraint of the trade acts. A short time ago a canvass was made of trade associations to find the number that embraced in their category of effort those particular functions that are subject to a suspicion, and it was found that less than 10 per cent of the trade associations of the United States have any functions of that character at all; that there were associations that had been created under the name and cloak of trade associations for the purpose of restraint of trade and of combination; that it had brought the whole world of trade associations into some criticism. But that canvass of the department of the working of the vast majority of trade associations in this country convinces me that the objective of these organizations is not in the remotest sense against the public interest; that in fact a study of the trade associations that we made shows something like 30 different lines of activity in which they were engaged, covering a great range of educational subjects, matters of improvement in fundamental practice in the industry as to trade questions, interest in matters of transportation, elimination of waste, foreign trade, etc.—some 34 different activities; and of all those activities there had been embraced only two that were at all subject to discussion as to whether or not they were against public interest in even a remote sense, and less than a very small fraction of these associations were even engaged in those."

SEEK FOREIGN TRADE

Samuel M. Vauclain's Advice to Manufacturers of Massachusetts—Says Business Is Good

The Associated Industries of Massachusetts held its sixth annual meeting Thursday, Oct. 27, and Friday, Oct. 28, at the Copley-Plaza and Westminster Hotels, Boston. Approximately 600 attended. The following officers were elected for the ensuing year: Charles R. Gow, Charles R. Gow Co., Boston, contractor and engineer, president; J. K. Milliken, president Mt. Hope Finishing Co., North Dighton; George A. Galliver, president American Writing Paper Co., Holyoke, Mass., and Malcolm B. Stone, treasurer and first vice-president Ludlow Manufacturing Associates, Ludlow, Mass., vice-presidents, and William H. Gleason, treasurer.

Many speakers addressed the various group gatherings and the association as a whole. Among them was Samuel M. Vauclain, president Baldwin Locomotive Works, Philadelphia, who talked on the "Present Condition of American Industry and the Outlook Abroad." He said in part:

"We have become the workshop of the world—almost unconsciously and without a knowledge of the procedure necessary to success. The business men of this country must begin right now to send out the youth of their line, and establish by perseverance and close study of the business methods of other nations a world-wide trade. We must forever see that our foreign trade is supported even though financial pressure is resorted to in an effort to absorb here in the United States our total production.

"Our foreign customers have learned how business can be continued even though the currency of their country may be suffering ruinous exchange rates with that of other nations. Credit will be the great means of trade resumption—the great supporter of all building, manufacturing and general trading. If we will proceed upon a basis of building a foundation for trade and be satisfied to await results after that has been accomplished, the future must surely bring to us an ever increasing percentage of the business of the world.

"Immediately after the world war I concluded that our domestic business would soon become unreliable, that we would be confronted by the mountains of prosperity and the canyons of depression—both unprofitable to a manufacturer. Therefore, in order that we could at all times be assured of business remunerative to both employer and employee, an effort should be made to bring to Philadelphia a fair share of the world's work of such kind as could be produced by us. The sales department was divided, and a vice-president put in charge of each section, one domestic and one foreign; and the world in its entirety divided into zones, a man-

ager for each, together with his staff; a molecule of our organization devoting its entire time to the customers to be found in its particular zone. It was surely a departure.

"And to-day, after but a short period of time in which to perfect both domestic and foreign trade on a 50-50 basis, our order books show 60 per cent foreign and 40 per cent domestic—and more orders have been booked so far the month of October than during any month since the spring of 1920, and this notwithstanding the eternal and infernal pessimism that has prevailed in this great United States of America.

"There are oceans of business of all descriptions to be had if you will get it. Establish yourselves the world over. Your business office should be in every metropolis of the world, regardless of the nation in which it is to be found. Your salesmen should be trusted, supported and paid well, not only for their services, but for their isolation from friends, relatives and native land.

"Our business is good—the future promises even better—and if we will only not await business to overtake us but proceed with determination to overtake business, our country will soon be more prosperous than at any time during the past."

Hon. Samuel E. Winslow, chairman House Committee on Interstate and Foreign Commerce, Washington, representative in Congress from the fourth Massachusetts congressional district, and president and treasurer Samuel Winslow Skate Mfg. Co., Worcester, Mass., also spoke.

Taylor Society's Annual Meeting

Sessions devoted to plant executives, sales executives, office managers, labor managers and general sessions will be held by the Taylor Society at its annual meeting Dec. 1, 2 and 3 at the Engineering Societies Building, 29 West Thirty-ninth Street, New York.

The first plant executives' meeting will be held at 10 a. m., Dec. 2, when a paper on "Reflections of a Production Manager" will be delivered by Charles F. O'Connor, production manager Universal Winding Co., Providence, R. I. His theme will be the problem of maintenance of scientific management under the stress of varying operating conditions. A second session devoted to this group of members will be held at 10 a. m., Dec. 3, when D. J. Walsh, Jr., will discuss "Combination Routing—To Meet the Problem of Small Quantities and Short Operations."

"Appraising the Efficiency of an Industry" is the topic of the first general session at 8 p. m., Dec. 1. This will be devoted to an examination of the evaluation sheet devised and used by the engineers of Hoover's Committee on Waste. These questions will be considered: Did these engineers devise an acceptable standard formula? Can it be used by plants for the purpose of self appraisal?

"The Application of the Principles of Scientific Management to the Work of the Treasurer and the Comptroller," will be the topic of the general session at 8 p. m., Dec. 2. A report for a committee by John H. Williams, Day & Zimmerman, Philadelphia, will be presented. Master planning, budget control, etc., will be considered.

The labor managers' session will take place at 10 a. m., Dec. 3, when Boyd Fisher, Lockwood, Greene & Co., Boston, will discuss "The Formula for an Efficient Workman."

Publicity for Drop Forgings

Following the example of other industries, the American Drop Forging Institute, with national headquarters in Cleveland, has entered upon a campaign of publicity and educational promotion of its products, the appeal being directed at this time mainly to farmers, who are among the largest buyers of machines, for work and pleasure.

What is styled in merchandising parlance the "big idea" back of this campaign is an effort to impress upon buyers and the actual users of all types of tools and machines the importance of knowing whether or not all the "strain-bearing" parts are really drop forged.

An easily understood book has been prepared for the layman, entitled "What Is a Drop Forging?" which covers the subject in an authoritative manner. A copy may undoubtedly be obtained by addressing the American Drop Forging Institute, Hanna Building, Cleveland.

COMING MEETINGS

November

Industrial Relations Association of America. Nov. 1 to 4. Annual convention, Waldorf-Astoria Hotel, New York. E. A. Shay, acting executive secretary, 671 Broad Street, Newark, N. J.

Industrial Cost Association. Nov. 2, 3 and 4. National Cost Conference, William Penn Hotel, Pittsburgh. Secretary, A. A. Alles, Jr., Peoples Bank Building, Pittsburgh.

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

American Iron and Steel Institute. Nov. 18. Fall meeting, Commodore Hotel, New York. H. H. Cook, assistant secretary, 61 Broadway, New York.

December

Taylor Society. Dec. 1, 2 and 3. Annual meeting, Engineering Societies Building, New York. Dr. H. S. Person, managing director, 29 West Thirty-ninth Street, New York.

American Society of Mechanical Engineers. Dec. 4 to 9, inc. Annual meeting, Engineering Societies Building, New York. Calvin W. Rice, secretary, 29 West Thirty-ninth Street, New York.

Academy of Political Science to Discuss Industrial Relations

The forty-first annual meeting of the Academy of Political Science will be held Nov. 4 and 5 at the Hotel Astor, New York. There will be five sessions at which will be considered: Personnel work and co-operation within industrial plants, industry-wide co-operation, good-will and co-operation in industry, this in charge of Herbert Hoover, Secretary of Commerce; industrial relations in governmental employment and in financial institutions, and governmental and other organized counsel and information to promote better industrial relations.

Among those scheduled to speak are: Charles R. Hook, vice-president American Rolling Mill Co., Middletown, Ohio; L. K. Comstock, president L. K. Comstock & Co., New York, electrical contractors; A. C. Bedford, chairman board of directors Standard Oil Co. of New Jersey; Thomas V. O'Connor, United States Shipping Board; James J. Davis, Secretary of Labor; Payson Irwin, formerly of industrial branch Army Ordnance; Dexter S. Kimball, dean, College of Engineering, Cornell University; Alexander C. Brown, president, Brown Hoisting Machinery Co., Cleveland, and H. H. Doehler of Doehler Die-Casting Co., Brooklyn, N. Y. Owen D. Young, treasurer, General Electric Co., is among those selected to engage in the discussion.

The Hon. G. D. Robertson, Minister of Labor, Ottawa, Canada, and Will H. Hays, postmaster-general, Washington, are expected to contribute to the discussion of the session devoted to good-will and co-operation in industry. Conditions essential to industrial co-operation from a British employer's point of view will be presented by B. Seebohm Rowntree, president Rowntree & Co., Ltd., cocoa works, York, England.

Engineering Meetings

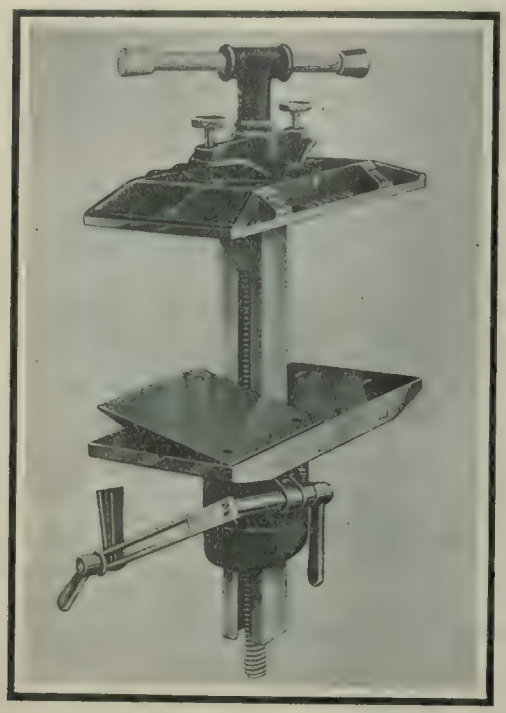
Among sectional meetings of the American Society of Mechanical Engineers to be held in the early future may be mentioned the following:

Nov. 17, Toledo, Ohio, address on the "Industrial Engineer in Business" by Clifton B. Reeves, Willys Overland Co.

Nov. 25, Metropole Hotel, Denver, address on "Properties of Cast Iron and Gray Iron Foundry Methods" by William Lester, Vulcan Iron Works.

New Universal Vise

The accompanying illustration shows one application of a new universal vise brought out by the Oliver Machinery Co., Grand Rapids, Mich. Some idea of its scope of application may be indicated from the reproduced photograph, but the company has issued an illustrated folder showing ten or eleven different positions which the vise may be given, including its use for holding metal parts as in working metal patterns and for holding box forms, or circular work, both vertically and horizontally, as well as including its adaptability to holding irregular shaped pieces.



Oliver Universal Vise in an Upright Position Having the Jaws Horizontal with Detachable Angle Jaw in Position

Screw for Attaching Nameplates to Machinery

The screw shown in the accompanying illustration has been recently brought out by the Parker Supply Co., Inc., New York, to meet the demand for an inexpensive method of permanently attaching nameplates and trade marks to machinery. It is called a "drive screw" and has a thread of steep pitch and a slotless head. In using the screws, holes are drilled a trifle larger in diameter than the cylindrical point, or pilot, and the screw then driven in with a hammer. It is claimed that the entire screw being hardened and heat treated, the steep pitch threads easily cut their way into gray iron or any softer material. The screws cannot be removed except by cutting off, thus making it difficult, it is pointed out, to substitute another nameplate than the one originally fastened to the machine.



To Remove, the Screw Head Must Be Cut Off

Negotiations are in progress for the sale of the Harley Co., Springfield, Mass., drop forgings property. This plant has been idle several months because of loss of patronage due to the general business depression. Persons identified with the Hendee Mfg. Co., Springfield, motorcycles, always have owned a substantial interest in the Harley Co. and recently took over the Harley owned stock. At that time the Harley Co. recorded a mortgage of $725,000 to the Hendee Mfg. Co.

Reviving River Traffic

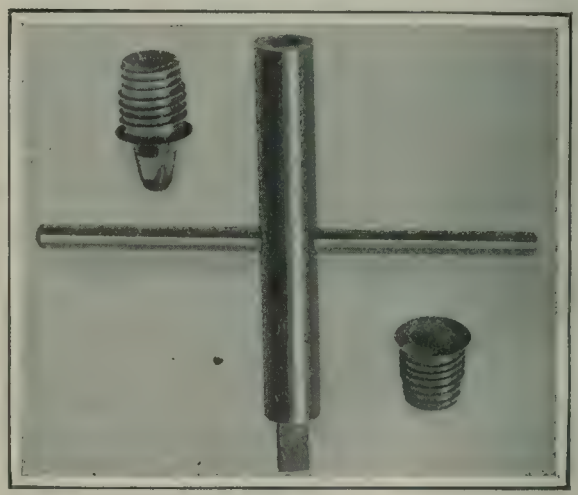
ST. LOUIS, Nov. 1.—The first effort in many years to revive water communication between St. Louis and Pittsburgh is being made by the Water Transport Co. (Anchor Line), whose towboat Transporter, towing 10 barges loaded with 8000 tons for Cincinnati and Louisville and a barge of steel products, including wire and nails for the Simmons Hardware Co., St. Louis, left Pittsburgh on last Wednesday.

The Anchor Line, which has operated towboats and barges on the Ohio River for the last two years, has announced that it will undertake to supply regular service between St. Louis and Pittsburgh, as well as the cities lying between the two on the Ohio River. It also is planning to extend the service South on the Mississippi to New Orleans. If the business justifies it, a regular two-week schedule between St. Louis and Pittsburgh will be maintained.

Screw Dowel for Patterns

A new screw dowel made of steel, and said to be rust proof, is being brought out by the Kindt-Collins Co., Cleveland. An important feature of this dowel is that it has a self-seating flange which seats in the surface of the pattern when the dowel is screwed into position. The dowel has a pilot at the end which is pressed into a bored hole. Above the pilot are deep, thin threads which screw into the wood. Inside the socket are four grooves into which the square end of a socket wrench fits. With the wrench the dowel is screwed in until the thin flange becomes flush with the surface of the wood.

The dowel pin is squared at the end, allowing the hollow end of the socket wrench to fit over the end for screwing the pin into the pattern. An important feature is that the squared shoulders of the pin automatically clean the socket of particles of sand, always allowing the patterns, or core boxes, to come into close contact. The dowel can be easily removed and replaced in a few seconds. Patents for the dowel have been applied for. It is being made in ¼ to 9-16 in., bit sizes.



The Dowel for Patterns Has Thin Threads for Screwing into the Wood and the Pin Has Squared Shoulders Calculated to Minimize the Interference of Sand Particles

The Trunk Line Freight Inspection Bureau, 13 Liberty Street, New York, has issued the following circular in regard to shipment of defective castings: "If shipments are offered for transportation described as 'defective castings having value for remelting purposes only' they should be billed at the specific rating applicable on 'castings' but if evidence is furnished, after arrival at destination that they are actually melted for the scrap content, this committee will raise no objection to the charges being reduced to the scrap iron ratings; per contra, if no such evidence is produced, the ratings for the specific kind of castings will maintain thereon."

CARNEGIE OPERATIONS

More Plants Put on Active List in the Mahoning District—Independents Show Little Change

YOUNGSTOWN, Nov. 1.—Operations are holding their own with the independents, while the Carnegie Steel Co. is enlarging its active capacity. A fifth blast furnace in the Ohio Works group of the Carnegie company is being warmed preparatory to its operation, while the sixth stack in this group will be placed on the active list as soon as repairs now under way are completed. This will give the Carnegie company six active blast furnaces in the Youngstown district, as compared with a low of two during the summer. It will then have but a single inactive furnace in the Mahoning Valley, that at Niles, which has been idle for several years.

It is likely that additional independent iron capacity will get under way before the end of the year, the Republic Iron & Steel Co. and the Brier Hill Steel Co. being prepared to start more furnaces as conditions justify.

Steel production this week is well sustained at 60 per cent, with 46 of 66 open hearth furnaces charged, including 34 of 51 independent units. This is an increase of three independent open hearths over the previous week. Two Bessemer departments, those of the Youngstown Sheet & Tube Co. and the Carnegie company, are active. Of the 113 sheet mills in the Mahoning Valley, 74 are under power, while 12 of the 17 pipe furnaces are fired.

The Carnegie company is pushing operations at its district plants closer to normal than they have been at any time this year, and announces that 5600 out of a normal working force of 6800 will shortly be employed. Its bar mills at the Upper and Lower Union Works and at the McDonald Works are operating on an enlarged scale.

The number of sheet mills in the Valley has been increased from 105 to 113 by the completion of eight mills at the Niles plant of the Republic Iron & Steel Co. Four of these new units were operated last week for the first time and are still engaged. The remaining four mills in the new complement are being completed.

Puddle mill operations continue unchanged, with virtually all of the 136 puddle furnaces in the Valley charged. Sheet mill production has shown slight fluctuations the past two months, the number of active units ranging from 75 to 85. Fabricating plants are on a much larger operating basis than in August, when the first signs of improvement were noted. The General Fireproofing Co., for instance, is reported engaged at 65 to 70 per cent, production being upheld by demand for fireproofing materials.

October shipments from the Sharon, Pa., plant of the National Malleable Castings Co. exceeded those of any month since last February. The company has received a number of substantial releases against coupler contracts.

Tin mills are operating at 60 per cent of normal, with the Liberty works of the Trumbull Steel Co. still idle. The price range is from $5 to $5.25 on production plate, indicating a recession from the higher figure which had been steadily upheld. Consumers are now largely interested in business for 1922. Due to the sparing manner in which orders were placed generally during the last six months, the tin plate market is holding up well during its ordinary slack period, say makers.

Increase in Employment in Chicago

Increases in industrial operations in Chicago in September gave employment to 11,060 more persons than were on the payrolls of 289 Chicago companies on Aug. 31, an increase of 7.9 per cent. During the entire period from May 31 to Aug. 31, the increase in employment amounted to only 8.9 per cent. The statistics are presented in a report issued by the General Advisory Board for Illinois Free Employment offices. The number of employees in the 289 plants which made returns totaled 151,172 on Sept. 30, as against 140,646 on Aug. 31. "Although this improvement," the report states, "is somewhat minimized by the fact that two large firms alone added nearly 10,000 employees, nevertheless a clear upward trend is seen in comparing the number of groups of industries which increased employment with those which reduced."

The statistics on employment conditions in the metal working field are not uniformly favorable. Under the heading "Pig Iron and Rolling Mill Products," 11 companies reported 1520 employees as of Aug. 31, as against 1494 as of Sept. 30, a decrease of 1.7 per cent. On the other hand, manufacturers of machinery (including electrical apparatus) numbering 26 companies, had 44,670 employees on Aug. 31, and 54,229 on Sept. 30, an increase of 21.4 per cent. Five companies manufacturing automobiles, carriages, and airplanes had 1289 on their payrolls on Aug. 31, and 1226 a month later, a decrease of 4.9 per cent. Car, locomotive and railway repair shops, numbering three, had 5001 employees on Aug. 31, and 5587 on Sept. 30, an increase of 11.7 per cent. Sheet metal working shops and hardware manufacturers, numbering 14, had an enrollment of 3233 on Aug. 31, and 3317 on Sept. 30, an increase of 2.6 per cent. Four structural and architectural iron work shops had 447 employees Aug. 31, and 564 a month later, an increase of 26.1 per cent.

Plant Operations

The Hendee Mfg. Co., Springfield, Mass., motorcycles, is operating on full time and with a normal number of workmen on its payroll. The company not only is booking encouraging orders for its new style motorcycles, but is doing a substantial business in last season's models as well and in parts. The company, however, anticipates marketing fewer machines this season than last, due to the general business situation.

The Rolls-Royce of America, Inc., Springfield, Mass., is confining its activities to assembling, exclusively. The number of men employed in assembling is below normal and finished cars are being turned out at 25 per cent of the plant's capacity, inasmuch as employees are working only part of each week. The company's business was good up until July. In August and September it practically was at a standstill, but there was a decided improvement in October, which, if continued, will necessitate a resumption of manufacturing departments within the near future. The company recently reduced wages.

The four hot mills of the Standard Tin Plate Co., Canonsburg, Pa., which have been idle, were started up Sunday night, Oct. 30. The plant now is running full and officials of the company say there is enough business in sight to maintain this gait to Jan. 1.

The Parkersburg Iron & Steel Co., Parkersburg, W Va., has resumed operations after a curtailment of several months. Employment will be given to about 500 men.

The Reading Iron Co., Reading, Pa., has arranged for the immediate resumption of production at its local Keystone furnace, with a weekly capacity of about 2000 tons.

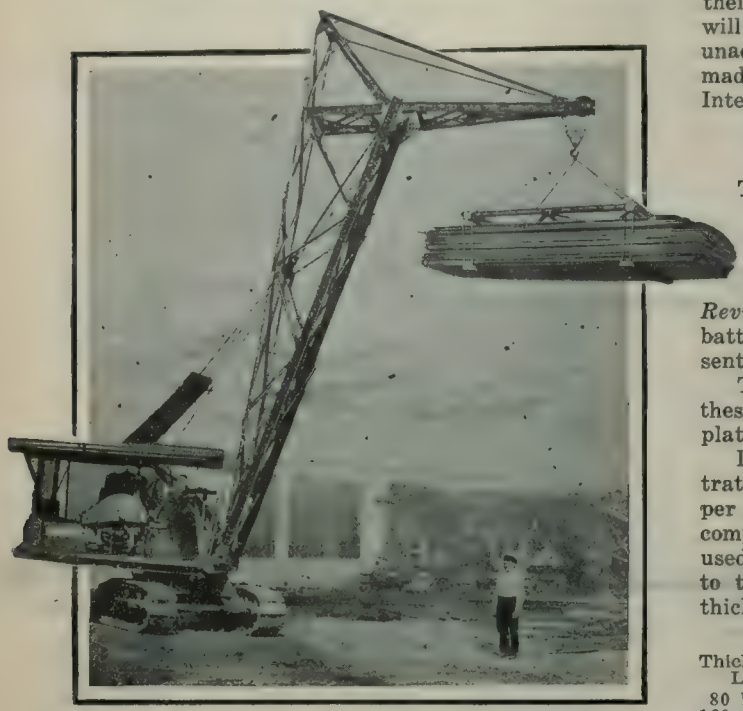
The Cumberland Steel Co., Cumberland, Md., has resumed operations at its plant, after a temporary shutdown due to refusal of employees to work under a new schedule. The company proposed a 50 per cent reduction in working force, 20 per cent reduction in wages, and 10-hr. working day. A compromise was effected by retaining the working force, to be divided into two shifts, each shift to work three 10-hr. days a week, and with 10 per cent wage reduction.

The H. B. Smith Co., Westfield, Mass., heaters and radiators, has converted a large store room at its north side plant into a molding room, and additional workers have been taken on.

The Bangor & Aroostook Railroad has leased its Houlton, Me., freight car repair shop to A. E. Astle, contractor, who began car repair work Nov. 1 for the railroad on a piece work basis. Men formerly employed by the railroad were asked by Mr. Astle to continue in service.

Crane with Goose Neck Boom

In adapting a crane of the type shown in the accompanying illustration to the handling of loads such as unit packages of lumber from high piles, it was found that the lengths of lumber interfered with the straight or standard crane boom. To overcome this and eliminate much of the labor required to handle lengths of lumber, pipe, etc., the Pawling & Harnischfeger Co., Milwaukee, developed the goose-neck boom. As the illustration shows, the boom may be lifted almost straight up without having the load interfere. In other respects this boom is like the standard design and attaches to the gasoline-driven corduroy-traction machine in a similar manner.



Gasoline-Driven, Corduroy-Traction Crane Equipped with a So-Called Goose-Neck Boom for Handling Loads Which Interfere with a Standard Straight Boom. The load shown is 18 ft. x 6 ft. x 31 in. and weighs 3 tons

The first plant using the goose-neck boom operated it for handling lumber in aisle-ways 18 ft. wide, taking lumber in unit packages from 20 ft. piles and placing on wagons or trailers spotted in the aisle-ways. The crane with the new boom requires only 10 laborers, it is explained, instead of 25 previously used, indicating a labor saving of $60 per day.

Lutz Co. Completes New Foundry

The Lutz Co., Morris and Bambrey streets, Philadelphia, has practically completed its new foundry building in Camden, N. J. In building the new plant, which is several times the size of the old one, it was found necessary to handle the work in such a manner as not to conflict with the work in the old building. The new building was therefore built over the top of the old one. The new foundry is 80 x 234 ft., with a clearance of 30 ft. under the crane runway. The Lutz Co. is now able to make castings from 2 to 20,000 lb. It specializes in hydraulic cylinders and hydrostatic equipment of various descriptions, as well as special machinery for steel mills and other industrial plants. One of its products is an acid-resisting casting, which is used by a large number of acid manufacturing companies as well as salt refining companies. The company has been engaged in the foundry business for 20 years.

The quarterly meeting of the Ohio State Foundrymen's Association will be held in Cleveland, on Monday, Nov. 7. This meeting was originally scheduled for Nov. 8, but on account of this being election day, the date was advanced. Samuel Powell, Jr., Hamilton, Ohio, is secretary of the association.

No Rate Reductions Without Wage Cut

The cancellation of the railroad strike orders was closely followed by the initiation of a poll of railroad executives on the question of a wage cut petition. This action is being taken notwithstanding the announcement of the United States Railroad Board that its docket is so crowded that there is no danger of immediate action on a new wage reduction. Railroad officers declare that the decision cancelling the strike order does not change the position of the railroads in their declarations regarding rate reductions. There will be no voluntary reduction in rates by the railroads unaccompanied by wage cuts. If any reductions are made, they state, they will have to come from the Interstate Commerce Commission.

British Versus German Armor Plate

Trials have recently been undertaken to test the quality of various types of German armor plates for the purpose of comparing them with plates of corresponding thickness manufactured in this country, says the London *Iron and Coal Trades Review*. The plates were obtained from the ex-German battleship Baden, and are, therefore, thoroughly representative of the German product.

The following table, setting forth the results of these trials, indicates marked superiority of British plates.

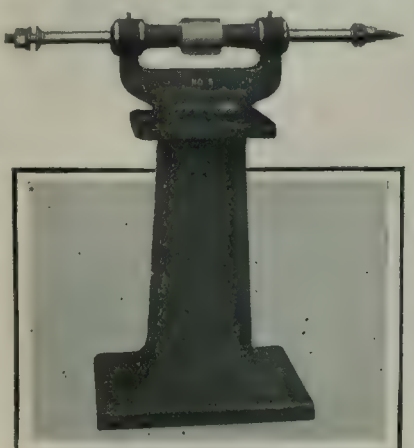
In the table the average limiting velocity of penetration for British plates is taken to be 1000 ft. per sec. in each case, and the third column shows the comparative figures for German plates. The shells used at these trials were of similar mark and quality to those used in testing British plates of the same thickness:

Thickness of Plate in Lb. Per Sq. In.	Index Number Representing Limiting Velocity of Penetration British	German
80 bulkhead plate	1,000	1,000
160 turret roof plate	1,000	Less than 955*
200 turret roof plate	1,000	Less than 935*
320 K. c. armor	1,000	940
400 K. c. armor	1,000	Less than 895*
480 K. c. armor	1,000	Less than 835*
560 K. c. armor	1,000	915

*In these cases owing to the limited space available for attack, the velocities could not be taken low enough to determine the limiting velocity, the shells, at the velocities indicated by the index figures, passing on practically undamaged, except in the case of the 200-lb. roof plate.

Ball-Bearing Buffing Machines

The J. G. Blount Co., Everett, Mass., is offering a new line of buffing machines which are similar to those previously manufactured but are equipped with S K F ball bearings in dustproof mountings. They are built in three sizes, the medium size or No. 5 being shown in the accompanying illustration.



S K F Ball Bearings in Dustproof Mountings Are Used

Bearings are secured to the spindle by a light drive fit and also by locknuts. Spindles are of high-carbon steel, ground to size and are said to be carefully balanced before fitting to the head. A taper point is fitted to the right-hand end for use with small wheels. The head is mounted with the pan on the column, all parts bolting together being planed or milled.

The head can be furnished separately for mounting on a bench, if desired. Counter-shafts of either the regular self-oiling type or with Hyatt roller bearings can be furnished.

CONTENTS

Making Dies for Forming Automobile Parts 1127
Design and Construction for Manufacture of Such Articles as Brake Drums and Step Brackets

Buffalo Companies Urge Lower Freight Rates 1133
Claim That Recent Reduction in Iron Ore Rates Has Brought Radical Change in Competitive Situation, Which Means Disaster if Not Relieved

Electrical Development in Steel Mills 1135
Progress During Past Year—Extension of Electric Drive Main Feature—Advance in Control Equipment

Synthetic Foundry Pig Irons in Germany 1137
Methods of Production During War to Overcome Scarcity of Low Phosphorus Irons—Their Properties—Charcoal Iron

Sintering Flue Dirt with Minimum Labor 1141
Twelve Workmen Handle 1000 Tons Daily at Cambria Plant—Ample Storage, Safety and Cleanliness

Union Develops Business in Foreign Lands 1147
Operations of Association of Machinists in Mexico and Other Countries—Say Orders Have Been Sent to Open Shops

October Pig Iron Production 1160
Daily Output 7155 Tons More a Day Than in September and at an Annual Rate of 14,600,000 Tons

Hammer-Welded Steel Pipe 1130
Inland Shipping by Water 1131
Motion Pictures of Milling Machines 1131
Merger of Western Car Companies 1131
Plunger Press for Multiple Operation 1132
Automatic Tapping Machines 1134
Ore Loading and Unloading Record 1134
Cold Producer Gas from Bituminous Coal 1134
Bench Type Power Broaching Press 1134
Buying Responsibility 1139
Revised Pig Iron Contract Form 1140
Powdered Coal Under Boilers 1146
Price Revision on Factory Supplies 1146
Portable Electric Precision Grinder 1148
New Line of Index Bases 1148
Accidents in the Steel Industry 1148
Foreign Market Conditions 1149, 1164, 1181
Trade Associations 1150
S. M. Vauclain on Business Outlook 1150
Taylor Society's Meeting 1151
Publicity for Drop Forgings 1151
Coming Meetings 1151
Meeting of Academy of Political Science 1151
Engineering Meetings 1151
New Universal Vise 1152
Screw for Attaching Nameplates to Machinery 1152
Reviving River Traffic 1152
Screw Dowel for Patterns 1152
Plant Operations 1153
Crane with Goose Neck Boom 1154
Wage Reductions 1154
British Versus German Armor Plate 1154
Ball-Bearing Buffing Machines 1154
Editorials 1156
Railroad Problem Remains—Alloy Steel for Bridges—Steel Company Earnings —Iron and Steel Rail History.
Labor Notes 1162
Railroad Rates and Wages 1163
Rating on Roller Chain 1164
Views on Industry 1165
Iron and Steel Institute Banquet 1166
Stimulating Machine Tool Sales 1166
Trade Items 1169, 1186
Industrial Finance 1186
Data on Arc Welding 1192
Book Reviews 1197

Iron and Steel Markets 1168
Comparison of Prices 1169
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1182
Non-Ferrous Metal Markets 1183
Personal Notes 1184
Obituary Notes 1185
Machinery Markets and News of the Works 1187
New York Jobbers' Prices 1198

ESTABLISHED 1855

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Railroad Problem Remains

With the help of the Railroad Labor Board, the five railroad labor unions found the way they had been looking for, to call off the strike. Much as every buyer of food, clothing and other commodities has suffered and is still suffering from the excessive cost of transportation, due to excessive railroad labor cost, there is a feeling of relief that the public has been spared the calamity of a general suspension of traffic. Yet nothing has been determined by the so-called settlement of the strike issue, if we except the assurance the union leaders got from the Labor Board that any further effort to reduce railroad wages would be a long time in process, and that even the beginning of a hearing on such a proposal would not be reached until 1922 was well advanced.

Doubtless an important factor in the decision not to strike was the firm stand taken by Attorney General Daugherty, who let it be known that he would exercise his authority to the utmost to prevent any strike order from being carried out. This attitude of the Department of Justice drew an attack on the Attorney General from Samuel Gompers, president of the American Federation, who declared with much fervor that organized labor would call for the abolition of the Railroad Labor Board and the repeal of the transportation act of 1920. It is very likely that the issue will be clearly drawn on this subject, as the general sentiment of the country will be strongly in favor of making it impossible for railroad workers to combine in shutting off food and fuel supplies to impose their will upon the one hundred million people outside their ranks. Public sentiment has been plainly aroused by the happenings of the past two weeks. The strike was regarded as not against the railroads or the railroad executives, but rather as against the Railroad Labor Board, the Government and the public. Whatever opposition to the Labor Board or to the transportation act has developed outside the labor unions has sprung only from a desire to make the transportation act more effective in protecting the public.

As to the course of iron and steel manufacturers in regard to railroad rates, there is no doubt, as is shown in the action of Buffalo companies reported elsewhere in this issue in urging a reduction in rates on fuel. This is only one of many efforts that will be made to obtain more reasonable rates on the raw materials of the iron trade and on iron and steel products. The Association of Railway Executives has called attention to numerous reductions in commodity rates which have been made recently in addition to the reduction on grain and hay ordered by the Interstate Commerce Commission. Some of these reductions are: on live stock, 25 per cent; copper bullion, 25 per cent; lumber from the Pacific Coast, 10 per cent; cotton from the Gulf to New York, 20 to 25 per cent, with numerous reductions on rates from the Pacific Coast on fruit, vegetables and canned goods. It is also pointed out that other reductions are proposed to meet steamship competition through the Panama Canal. Under these circumstances there will be no abatement of the effort of the steel industry for relief from existing high freight rates.

The situation is in some respects parallel to that which existed 18 months ago when the deflation of commodity prices had just begun. It was common to say that prices could not come down until the manufacturer's costs had come down, and the jobber had moved his stocks bought at high prices, and the retailer had emptied his shelves of all that he had bought at high levels. But it was demonstrated over and over, all along the line, that prices could come down without any of the supposedly necessary preliminaries being complied with, and must come down because the buyer would no longer pay them.

The readjustment of freight rates will be no exception to the process that has been working out in commodity markets. Since freight rate reductions are now called for by practically every industry, beginning with agriculture, and are regarded as essential to further progress in the readjustment of prices, other freight rate reductions will come. They may become the cause of further railroad wage reductions, rather than effects of such reductions, as the railroad executives intended; but in that particular they will

not differ from the reductions in prices of steel products (apart from rails) which preceded rather than followed reductions in steel works wages.

Alloy Steel for Bridges

The use of alloy steel for bridges has received some attention in Germany. About nine years ago one was designed and erected to determine the possible savings from the use of nickel-chrome steel instead of mild steel. It is described by the monthly organ of Krupps as a single line railroad bridge thirty meters at the widest span, with a through track and designed for the heaviest loads. The main girders are of nickel-chrome steel and the weight is reported as 35 per cent less than if mild steel had been used. No difficulty in machining developed and the usual trial load on the completed bridge gave deflections in satisfactory agreement with those theoretically calculated, the deflection dropping to zero after the load was removed. It is stated that this bridge has been in use over nine years with entire satisfaction, that no repairs have been necessary and that nickel-chrome steel has proved to be a suitable material giving low weight without loss of safety.

In the United States very little has been done in alloy steel for bridges. The most prominent example is the Williamsburg bridge over the East River at New York, in which there was a large use of nickel steel eyebars. The departure was widely commented on at the time. The expense of fabrication and heat treatment of these alloy eyebars was extremely heavy.

There have been built in the last few years several American bridges of what may be termed silicon steel. This is mild steel with about 0.20 to 0.25 per cent silicon. It can be rolled in sections of lighter weight than straight mild steel and still possess the same strength. Its use is confined, however, to conditions where there is rigidity and but little vibration. It may be recalled that the Lusitania and Mauretania were built of silicon steel. Due to vibration, however, the structures of both had to be reinforced.

It is not improbable that alloy steel bridges will play an important rôle in the future. While the more expensive alloys may not be extensively used in this way, there are indications that others, less expensive and similar to the silicon alloy, may be increasingly employed.

Two facts stand out prominently in Great Britain's foreign trade in iron and steel for September, analyzed elsewhere in this issue: the sharp rise in exports and the large volume of imports. September exports at 138,248 gross tons were nearly twice those for July or August and even exceeded those for the United States in September at 95,169 tons, the first time British exports have led in many months. Steel rails, galvanized sheets and tin plates were the chief items in the British shipments in September. But in the imports are found the most striking data. The total at 229,391 tons exceeded any receipts in many years, even the monthly pre-war rate of 195,264 tons in 1913. The feature of the September imports, however, was the 120,806 tons of pig iron, bringing the pig iron total for the first quarter to over 224,000 tons. In 1907 British exports of pig iron were nearly 2,000,000 tons and just before the war they were about 1,250,000 tons per year, as shown by the London *Iron and Coal Trades Review*. So great has been the reversal, due to the coal strike and high costs, that the September imports were at the rate of nearly 1,500,000 tons per year. These figures illustrate impressively what high fuel and war labor costs can do to a great industry.

Steel Company Earnings

Such widely different showings are made by the earnings reports of various steel producing companies that one is prompted to inquire into the causes, whether there are great differences in methods or economy of operation, or in the volume of business done or in the accounting practices. For instance, one large independent steel company showed an operating loss for the third quarter, before allowance for depreciation or bond interest, while another large independent steel company for the same period showed all stock dividends earned. The Steel Corporation showed earnings equal to depreciation, bond interest, sinking funds and nearly all of the preferred dividend.

There should be a proper regard for perspective in commenting on the advantages or disadvantages of one steel producing interest as compared with another, in analyzing earnings possibilities at this time. The differentials of one time should not be applied to another time which presents very different conditions. Prior to the war a single dollar a ton in a finished steel price was an important thing, while lately prices have been moving by many dollars a ton. In the buying movements of 1909 and 1912, which were important affairs, seeing that they were three years apart, finished steel prices advanced by only $5 to $10 a ton. Since 1913 steel prices have gone up and down by several times $10 a ton.

As a rule the disadvantage or advantage of one large steel producing interest as compared with another before the war was a matter of only a few dollars a ton, and a few dollars a ton nowadays would entirely fail to explain differences in earnings statements. It is conceded, and is indeed more or less insisted upon by the independents, that the Steel Corporation is in the best position. Now in the ten years 1904 to 1913 inclusive the Steel Corporation's production of steel products for sale divided into the total earnings reported after payment of subsidiary company bond interest produced amounts varying from $15.51 in 1907 to $8.65 in 1912. The average for the ten years was $12.61. During the ten years the independents made money, and their disadvantage could be only a relatively small fraction of $12.61.

For last September the Steel Corporation's reported earnings divided by an estimate of the tons shipped gives a quotient of about $15. How many dollars should be deducted from this to

represent the "disadvantage" of the typical independent?

Differences in accounting practices, however, can explain a great deal, even more than the entire $15 a ton. One readily recalls the amazement created in some quarters by the Steel Corporation's heavy and apparently extremely radical allowances in 1920, the great reduction in inventory valuations, the extra lump sum allowance for future inventory shrinkage, and the deductions from profits for excess cost of construction work done under war-time conditions and costs. If an independent steel company did not make corresponding allowances or deductions in 1920 it has been necessary to do so this year. The sums are large in all cases and if any considerable fraction is set against the tons of steel shipped in the September quarter the number of dollars per ton is large. The real operating cost of producing steel is entirely covered.

The way in which the heavy deductions the Steel Corporation made in 1920 have been of help to this year's statements is illustrated in the item of "charges and allowances for depreciation and sinking funds." For the second quarter of this year this amount was $8,665,000; in the corresponding statement of 1920 it was $11,467,000. For the third quarter, as published last week, it was $8,143,000, against $12,312,000 in the third quarter of 1920.

The reports of earnings, or in many cases the reports of "losses," are not to be taken as indicating that the steel companies involved cannot, in the long run, make steel at costs per ton that will enable them to compete in the open market as long as the best positioned producers are making anything like fair profits. It is far from impossible that some steel companies may be unable to weather the competition comfortably, but none should be judged in this matter by any financial statement covering but a short period of time.

The impression prevails in some quarters that the electric furnace has practically supplanted the crucible for the production of fine steels. Many crucible steel makers have displaced crucible with electric melting, wholly or in part. The belief that the crucible has seen its day was expressed in the first article in THE IRON AGE of last week, the two authors making rather summary work of it in saying that this melting medium, "alive and well since 1740, is passing, dying, may be, of senile decay." There are those who do not subscribe to this statement, for at least two or three prominent makers of fine steel still maintain a crucible department supplementing their electric steel operation. While the curve representing electric steel output shot upward steeply during the war period, that of crucible steel by no means declined in proportion, particularly the curve for ingots. A leading American authority on fine steel production is firm in the opinion that, for certain grades of fine steels poured in small ingots, direct pouring from the crucible cannot be equaled by the electric process with its pouring from a ladle, and that for a considerable time there will be a demand for small crucible steel ingots. The belief exists that something besides chemical purity is involved in this question and that there is a mysterious quality or "virtue" in crucible steel. Perhaps the most significant feature of this belief is its emphasis on the fact that the ingot and its pouring are vital factors in the question of quality, no matter what the process.

Iron and Steel Rail History

Announcement last week of a common price of $40 for Bessemer and open-hearth rails recalls the very interesting statistical history of these two products and also that of iron rails. The open-hearth rail was not an important factor for a good many years after the total of open-hearth ingots had become considerable. Until 1877 more iron rails than steel were rolled, and it was not until 1883 that the mileage of steel rails in track exceeded that of iron rails—78,491 miles against 70,692 miles. In 1879 the production of Bessemer rails was 610,682 gross tons, while only 8168 tons of open-hearth rails were rolled, and the production of iron rails was 375,143 tons. In 1883 the production of open-hearth rails was 8202 tons and that of iron rails had declined to 57,994 tons, while the output of Bessemer rails was 1,148,709 tons. In 1890 production of Bessemer rails was 1,867,837, that of iron rails 13,882 tons and that of open-hearth rails 3588 tons. Production of open-hearth rails increased until in 1907 it amounted to 252,704 tons, while 3,380,025 tons of Bessemer rails were rolled and only 925 tons of iron. Open-hearth, with a production of 1,676,923 tons, passed Bessemer in 1911, when the Bessemer output was 1,053,420 tons. The open-hearth output reached its highest point in 1913 with 2,527,710 tons compared with 817,591 tons of Bessemer. Manufacture of iron rails ended with 234 tons in 1911. Bessemer tonnage declined in 1920 to 142,899 compared with 2,334,222 of open-hearth. A considerable part of the Bessemer tonnage now rolled is light rails.

In 1906 the price of open-hearth rails was fixed at $2 higher than that of Bessemer rails. The latter had been selling since 1901 at $28 and the price was not changed until May, 1916, when there was an advance of $5. The differential of $2 was maintained by independent companies until last week, although recently ignored by the Steel Corporation. If the new price of $40 be compared with $30 before the war, it represents very nearly the same percentage above the pre-war price as is now maintained on other steel products.

Holley many years ago predicted that the open-hearth would one day attend the funeral of the Bessemer converter, and more recently the passing of the Bessemer has been predicted on the basis of its diminishing percentage, the production of open-hearth steel in 1920 having been 32,671,895 tons, compared with 8,883,087 tons of Bessemer. As has been pointed out frequently, the employment of the Bessemer process in making steel for certain purposes is likely to continue. The clean threading of Bessemer steel pipe commends it, and British importers of American skelp continue to call for the Bessemer product. The advantage of Bessemer steel in rolling tin plate

and sheets is also well known. And as long as duplexing continues to expand, with its large outputs, its freedom from dependence on scrap and its necessary employment where the only available ores run up silicon beyond the basic limit, there will still be a call for the Bessemer converter.

The American Railway Association's committee on car trucks has made a departure in recommending the use on 50-ton cars of a certain design of springs made of alloy steel, in place of the present coil springs of high carbon steel. The performance of the latter has been unsatisfactory for some time on trucks under 50-ton cars and a chrome-molybdenum steel has been suggested. This action seems to indicate that the prejudice of individual railroads against alloy steels, based on the difficulties of proper heat treatment, has been in a measure overcome. The strides made recently in the art of heat treatment doubtless have had weight, for the popularity and efficiency of alloy steels have been enhanced by the assurance that for each grade of steel a definite heat treatment can be prescribed, assuring dependable results. Not only in railroad but in other lines, engineers are likely to turn more and more to alloy steels, properly heat treated, for the solution of some difficult problems.

CANADA MAKES NEW RULING

Dominion Government Will Use Iron Age Quotations Under Anti-Dumping Act

TORONTO, Nov. 1.—Sir Henry Drayton, the Minister of Finance and Inland Revenue, has promulgated a new regulation affecting shipments of steel from American mills into Canada. The regulation reads substantially as follows:

In view of the refusal of representative exporters in the United States to furnish the department with production costs on basic steel products, you are instructed under the provisions of the amendments of the customs act as to production cost plus a reasonable profit, to appraise importation of basic steel products of the United States at not less than the values given in THE IRON AGE as of dates of shipment plus 10 per cent, with the application of sales tax, ad valorem duty where applicable, and dumping duty on that basis.

To recite the reasons for this action, your readers are referred to the dispatch from Toronto in THE IRON AGE of July 21, 1921 (page 134) which mentioned the adoption of the following amendment to the Canadian customs act:

Provided that the value for duty of new or unused goods shall be in no case less than the actual cost of production of similar goods at date of shipment direct to Canada, plus a reasonable profit thereon, and the Minister of Customs and Inland Revenue shall be the sole judge of what shall constitute a reasonable profit in the circumstances.

This amendment, which was recommended by Sir Henry Drayton, went into effect on June 30, last. Under this ruling American mills have been obliged to make affidavit on each invoice to the following effect:

We certify that the fair market value as shown on this invoice is not less than the cost of production of similar goods on the date of shipment to Canada, plus a reasonable profit thereon.

Some shipments from the United States are alleged to have been made at prices considerably lower than those quoted in the trade papers as representing the United States home consumption market values. In one instance, at least, the disparity on tin plate between the published home consumption price and the price at which the shipment was sold in Canada was so great that the mill was asked to show its production costs, which it is said to have refused to do.

The trade here believes that the new regulation will be very effective in keeping out American steel. If, for example, the published price of steel plates is 1.60c., Pittsburgh, there will be added to this 10 per cent, making 1.76c., Pittsburgh, as the minimum at which sales can be made into Canada, and to this price will be added the sales tax, ad valorem duty where applicable and a dumping duty should one still be necessary. The anti-dumping law requires American goods to be sold here within 5 per cent of the selling price in the United States.

BETHLEHEM EARNS DIVIDENDS

Surplus for Quarter More Than Sufficient to Meet Regular Disbursements

The Bethlehem Steel Corporation in the third quarter of 1921 earned a surplus more than sufficient to pay the 1¼ per cent quarterly dividend on the common stock, which was declared last week, payable Jan. 2, 1922, to stockholders of record Dec. 15, 1921.

Eugene G. Grace, president of the company, stated after the meeting of directors that the earnings for the third quarter, like the first six months, were in excess of the dividend on the common stock, after providing for dividends on both classes of preferred stock.

He said that the value of orders on the corporation's books, as of Sept. 30, was $70,000,000, compared with $84,000,000 on June 30. Although the amount of new business booked during the quarter was $14,000,000 less than billings, this compared with a similar item the preceding quarter of $26,000,000. The orders for the steel plants, Mr. Grace said, were the largest of any quarter to date this year.

Mr. Grace stated that the Bethlehem interests will meet the new rail price of $40 a ton recently established by the United States Steel Corporation.

The Iron Age and Its Readers

THE IRON AGE of Oct. 20, with its report of the American Gear Manufacturers' Rochester meeting, emphasizes again the position of THE IRON AGE as the premier convention paper of the metal-working industries. Gathering the fruits of a convention and making them of lasting use to the trade represented is a service to which THE IRON AGE has devoted itself in a special way.

In the same issue was reported the meeting in Birmingham, England, of the British Institute of Metals, and the first part of the New York meeting of the National Machine Tool Builders' Association, the second part appearing Oct. 27. Leading features in point of commercial, economical and technical information were published in these two issues gained from meetings of the National Implement and Vehicle Association, the American Mining Congress, the National Conference of Business Paper Editors, the National Association of Purchasing Agents, the Industrial Cost Association and the metal section of the National Hardware Association.

IRON OUTPUT UP SHARPLY

October Production 7155 Tons Per Day Larger Than That of September

Net Gain of 14 Furnaces Greatest This Year

Data collected by telegraph covering the output of blast furnaces in October show a decided improvement over the production in September. The gain per day of 7155 tons compares with gains in August and September of 2070 tons and 2891 tons per day respectively. For the first time in over four months the total output has passed the one million mark.

The production of coke and anthracite furnaces for the 31 days in October amounted to 1,240,162 gross tons or 40,005 tons per day as compared with 985,529 tons or 32,850 tons per day in September, a 30-day month. The October output is the fourth largest for the year, exceeding all the months except those of the first quarter.

The total number of furnaces in blast on Nov. 1 was 96 as compared with 82 on Oct. 1, with 70 on Sept. 1 and 69 on Aug. 1, the low point in the recent decline. On Jan. 1 this year there were 201 furnaces in blast. Seventeen furnaces were blown in and only 3 blown out or banked during October, a net gain of 14, which compares with a gain of 12 furnaces in September.

A computation of the capacity in blast Nov. 1 is difficult in view of the compilation of the production figures on the first day of the month. It is roughly estimated that the 96 furnaces in blast Nov. 1 were then producing about 43,500 tons per day.

The October output of manganese-alloy was only 3902 tons, all of it ferromanganese, no spiegeleisen having been made in several months.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from October, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889
August	26,037	4,743	30,780
September	27,189	5,661	32,850
October	33,162	6,843	40,005

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94,473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	39,768
May	73,015	108,422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107,820	110,354	78,340	98,931	27,889
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	30,780
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	32,850
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	40,005
Nov.	101,244	110,394	106,859	111,802	79,745	97,830	.....
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	.....

Among the furnaces blown out or banked during the month were the following:

One Buffalo furnace of M. A. Hanna Co. in the Buffalo district; G furnace of the Bethlehem Steel Co. in the Lehigh Valley; and No. 4 Joliet furnace of the Illinois Steel Co. in Illinois.

Among the furnaces blown in during the month were the following:

One Donner furnace, one Susquehanna furnace and the Northern furnace in New York State; D furnace of the Bethlehem Steel Co. and the Saucon furnace of the Thomas Iron Co. in the Lehigh Valley; one Aliquippa and one Eliza furnace of the Jones & Laughlin Steel Co. in the Pittsburgh district; one LaBelle furnace in the Wheeling district; one Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; Nos. 5 and 9 South Chicago (new) furnaces of the Illinois Steel Co. in Illinois and the Mark furnace in Indiana; one furnace of the Woodward Iron Co. and one furnace of the Alabama Co. as well as one Pioneer furnace of the Republic Iron & Steel Co. in Alabama and the Rockdale furnace in Tennessee. The Keystone furnace in the Schuylkill Valley blew in Oct. 31.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,430,022	2,232,455	1,932,159	32,787	23,957	22,228
Feb.	2,209,470	2,181,679	1,625,695	28,105	28,038	29,013
Mar.	2,277,507	2,480,668	1,323,443	26,644	35,275	41,294
Apr.	1,838,677	1,968,542	1,015,621	17,308	27,628	24,310
May	1,586,805	1,128,720	1,024,678	14,604	33,407	9,232
June	1,655,944	2,209,770	883,312	14,254	34,751	4,536
July	1,906,604	2,230,567	715,664	14,805	36,789	5,524
Aug.	2,108,566	2,254,943	807,144	17,419	36,985	3,878
Sept.	1,828,613	2,247,250	815,692	20,631	39,546	3,289
Oct.	1,295,690	2,393,644	1,028,044	20,238	34,786	3,902
Nov.	1,727,656	2,150,075	.....	19,964	26,944	....
Dec.	1,916,249	2,047,167	.....	15,718	28,023	....

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for October, and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	October (31 days)	September (30 days)	August (31 days)	July (31 days)
New York	65,487	50,970	44,948	34,407
New Jersey	4,745	4,370	4,689	5,554
Lehigh Valley	27,614	27,566	33,014	24,059
Schuylkill Valley	28,176	23,126	20,735	19,210
Lower Susquehanna and Lebanon Valleys	20,581	21,903	23,939	20,401
Pittsburgh district	295,741	250,128	255,274	185,643
Shenango Valley	35,410	8,649	none	none
Western Penna.	61,794	60,073	47,565	47,680
Maryland, Virginia and Kentucky	15,827	16,046	15,470	14,201
Wheeling district	31,265	18,706	18,076	16,167
Mahoning Valley	157,501	125,705	111,722	92,305
Central and Northern Ohio	140,731	110,327	83,552	80,150
Southern Ohio	14,400	8,200	3,548	6,266
Illinois and Indiana	228,028	171,380	191,658	201,175
Mich., Minn., Mo., Wis., Colo. and Wash.	11,940	14,641	27,304	50,764
Alabama	99,932	73,739	72,699	66,573
Tennessee	990	none	none	none
Total	1,240,162	985,529	954,193	864,555

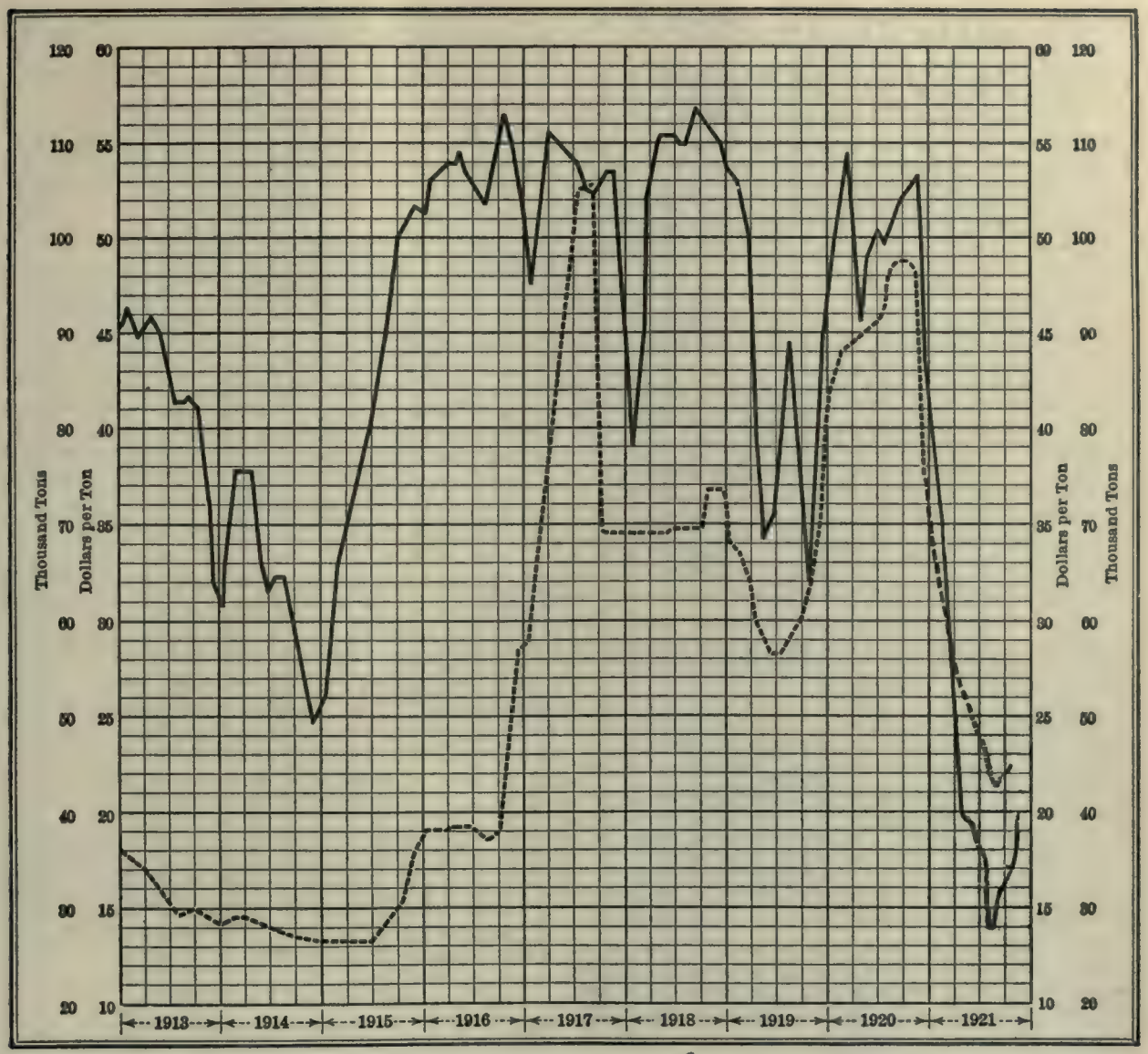
Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302,260	3,015,181	2,416,292
Feb.	2,656,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
Apr.	3,334 960	3,288,211	2,478,218	2,739,797	1,193,041
May	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
June	3,270,055	3,323,791	2,114,863	3,043,540	1,064,833
July	3,342,438	3,420,988	2,428,541	3,067,043	864,555
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	954,193
Sept.	3,133,954	3,418,270	2,457,965	3,129,323	985,529
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	1,240,162
10 mos.	32,097,269	31,718,356	25,557,260	30,775,351	13,472,605
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Ttl. yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1920 production of this iron was 323,396 tons.



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

REDUCING LOSSES

Some Improvement in the Valleys, but Conditions Far from Satisfactory

YOUNGSTOWN, Nov. 1.—Indications are that the final quarter of 1921 will be more profitable for iron and steel interests from an operating standpoint than either the second or third quarters. All of the larger independent companies will close the year with substantial operating losses. Enlargement of active capacity and strengthening of some finished steel prices, especially all grades of sheets, of which the Valley is a heavy producer, will serve in the fourth quarter to reduce losses. It is hardly likely, though, in view of the present state of the market, that any of the larger steel makers will register a profit on the last three months' operation of 1921.

Independent capacity in the Mahoning Valley is engaged to the extent of between 50 and 60 per cent, as the industry enters November. October business and shipments exceeded expectations of several large producers. To offset operating losses, a determined effort is being made to bolster prices, though this is not meeting with universal support. This is notably true in sheets.

Naturally, the likelihood of a general freight rate reduction overshadows all other considerations. Both producers and buyers are figuring what effect an expected 25 per cent reduction in freight charges would have upon costs and the market. Undoubtedly producers will endeavor to hold prices as firm as possible in view of their contention that operating losses have been encountered for the past eight to nine months, but their success in this respect will be largely measured by competitive conditions.

Delivered prices will be immediately affected, the buyer getting the benefit any rate reduction may entail. Leading executives are cautious in predicting what effect a general freight rate cut may have upon the steel structure, and prefer to feel their way. In this as in many other problems, they are largely guided by day-to-day developments.

In the Youngstown district, the steel industry is operating from 25 to 30 per cent better than during the low point reached in July. Employment is consequently better distributed. The total of those wholly unemployed is much below the estimates of employment bureau managers.

In view of uncertainties created by the railroad situation, however, managers are not certain that the current operating rate will be maintained. An encouraging feature, from producers' standpoint, is the depletion of stocks of jobbers and manufacturing consumers. Another is the fact that the railroads will enter the market more actively when some of the immediate problems affecting transportation are solved.

While 1921 has therefore been a year of disappointments, it is expected that 1922 will definitely mark the beginning of a prosperous era for the industry.

An index to the situation may be found in the action of the Carnegie Steel Co. in preparing the fifth blast furnace at the Ohio Works for resumption. Repairs are being made to the sixth stack, which will likewise be operated as soon as they are completed. During the summer the Carnegie company operated but two blast furnaces in this group.

Puddlers' Wages Reduced

Shipments of bar iron from Mid-West independent mills affiliated with the Western Bar Iron Association for the 60-day period ending Oct. 20 averaged 1.70c. per lb. in price. This is a reduction from 1.85c., the average price for the preceding 60-day period. As a consequence, puddlers' wages will be reduced to $8.48 per ton for the November-December period, from $9.12, the rate paid in September and October. Wages of guide mill workers are reduced from 39½ per cent above base to 32½ per cent.

The decline in price of bar iron on actual shipments is, therefore, $3 per ton. At each succeeding bimonthly settlement this year, to determine the tonnage rate for puddlers and finishing hands, there has been a progressive decline in the selling price of bar iron, and consequently in the tonnage rates paid affected workers.

The examination of sales sheets was conducted Oct. 27 at Youngstown, Ohio, James H. Nutt, secretary of the Western Bar Iron Association, acting for the manufacturers and M. F. Tighe of Pittsburgh, president of the Amalgamated Association of Iron, Steel and Tin Workers, representing the employees. Non-union mills ordinarily adjust their tonnage rates on the basis established by the bimonthly settlements.

Unemployment Committee Organized in Massachusetts

Col. Arthur Woods, acting for the standing committee of the President's unemployment conference, reports that the Governor of Massachusetts has organized an emergency unemployment committee called the Massachusetts Committee to Promote Work, under the chairmanship of Howard Coonley, Walworth Mfg. Co., with James Jackson, State treasurer, as secretary. The committee estimates the total of unemployed in Massachusetts at about 300,000 compared to a normal unemployment of about 70,000.

The Standard Oil Co. of New Jersey has announced that in response to the request of the unemployment conference it is undertaking improvements to its plant and equipment that will enable it to re-employ some 5000 of its former workers who have been laid off entirely or for part time during the last few months.

Extra Helper Laid Off

Independent sheet mill interests which are affiliated with the Western Sheet and Tin Plate Manufacturers' Association and operate their plants under agreement with the Amalgamated Association of Iron, Steel and Tin Workers have laid off the "extra hand" on mill crews, as provided in the annual agreement. One of the obstacles to the signing of the wage contract last summer was the extra helper, added during the war. Employers insisted upon his elimination in their effort to pare operating costs, while representatives of employees contended for his retention. A compromise was finally reached, whereby the helper is retained during the six months from April 1 to Oct. 1, but is dispensed with during the remaining six months.

Urges National Labor Tribunal

"Industrial squabbles are the worst menace which this country faces to-day," said Henry J. Allen, governor of Kansas, in an address before the convention of the Audit Bureau of Circulations at Hotel La Salle, Chicago, on Oct. 28. "Kansas faced the same situation two years ago and met it successfully with an industrial tribunal for the settlement of disputes between capital and labor. Such a tribunal placed on the statute books of the nation to-day would bring industrial peace.

"We are paying too many men to-day to do one man's work," he said; "we have been bound too long by the radical in the labor group who is responsible for the theory under which labor works, namely, 'doing as little as you can for the most you can get.' That is the kind of radical leadership which has killed the goose that laid the golden egg."

In touching upon the advantages of a national industrial tribunal, he said: "We could then say to labor and to the employer, 'if you cannot settle your quarrels without bringing civil war on the helpless public, then this Government will do it for you'."

Less Unemployment in Pennsylvania

The semi-monthly report of the Pennsylvania State Department of Labor and Industry covering unemployment, as of Oct. 15, shows considerable improvement in most districts. In the Pittsburgh district the report shows that almost 6000 persons found employment between Oct. 1 and Oct. 15, this being explained not only by more building and public work but also by the fact that almost all of the steel plants in the district have put on additional workmen. The only districts where increases in unemployment were recorded were Williamsport and Philadelphia. The following table gives the number of unemployed in the various districts on Oct. 15, Oct. 1, and Sept. 15:

	Oct. 15	Oct. 1	Sept. 15
Altoona	15,020	16,310	17,585
Erie	14,150	14,850	15,675
Harrisburg	11,650	12,885	13,300
Johnstown	10,440	12,640	13,640
McKeesport	4,290	4,740	4,915
New Kensington	5,900	6,750	6,050
Philadelphia: Men	130,000	127,000	126,000
Women	12,350	11,950	12,150
Pittsburgh	54,050	60,800	58,800
Scranton	13,575	14,900	15,225
Willliamsport	6,150	5,800	5,600

Employment in St. Louis

ST. LOUIS, Nov. 1.—Replies received from questionnaires addressed by the Eighth Federal Reserve Bank to 210 leading employers in 21 of the largest cities in the district, with an estimated normal complement of 193,720 workers, asking for employment data developed the following results:

Date		Number of Wage Earners	Pay Roll
Sept. 1, 1920	Men	191,285	
	Women	17,940	
	Total	209,225	$17,948,421.81
Sept. 1, 1921	Men	145,163	
	Women	16,742	
	Total	161,905	$12,020,275.96

From the above tabulation it will be noted that the number of employees of the reporting interests decreased 47,320 or 22.6 per cent between the dates Sept. 1, 1920, and Sept. 1, 1921. On Sept. 1, 1920 the number was 15,505 or 8 per cent above normal and on Sept. 1, 1921, the total was 31,815 or 16.4 per cent under normal. Wages figured on a semi-monthly basis decreased $5,928,145.85 or 33 per cent between Sept. 1, 1920 and Sept. 1, 1921.

On July 1, 1921, the total number of wage earners was 27.4 per cent under normal.

Rejected by Union Labor

ST. LOUIS, Nov. 1.—William Sacks, a St. Louis capitalist, and the Selden-Breck Construction Co., offered to build a $5,000,000 hotel in St. Louis, if union labor would agree to reduce wages 30 per cent. The proposal was rejected by the Building Trades Council.

Mills in the Youngstown district of the Carnegie Steel Co. are now operating six days a week, instead of five as during the summer. Steel production is averaging 65 to 70 per cent of maximum. Some of the iron tonnage from the fourth blast furnace in the Ohio works group at Youngstown, recently placed in operation, is required for current use. The company is operating an average of 12 out of 15 open-hearth furnaces at Youngstown, while its Bessemer department is turning out nearly the maximum number of heats per turn.

TROUBLES DEFERRED

Much Uncertainty as to What Will Be Done In Regard to Railroad Rates and Wages

WASHINGTON, Nov. 1.—No assurance having been held out to the railroads that further wage reductions may be considered at an early date as the result of the calling off of the threatened strike, iron and steel and other shippers are showing concern as to what the effect may be with regard to getting reduction in rates. Not only is it felt that inability of the carriers to cut expenses for the present by lowering wages will at least check the tendency toward reduced rates, but that likewise it will delay purchases of supplies, a vastly important matter to the iron and steel industry, and particularly so at this time of light business. It is conceded that the financial condition of the carriers is far from satisfactory and that on account of this they are provided with an argument against making cuts in rates that would further endanger their treasuries.

Encouragement is derived from the fact that they are making somewhat better net returns, though still below sound business requirements, and hope is entertained that they will continue to reflect improvement. This necessarily is a matter of uncertainty. Part of the better showing is due to the cut of 12 per cent made in wages last July as the result of the decision of the Railroad Labor Board, but the full effect one way or the other, it is believed, remains to be determined in view of the fact that increased traffic did not develop until August, and consequently has not yet had time to give a clear idea as to what the effect will be It is plain, however, the railroad returns indicate, that the carriers must be relieved of their present heavy expenses, and the only way to bring this about to the required degree is to reduce wages further, so that railroad labor will have shared with other lines of work in returning to a lower scale.

Necessity of Lower Rates

The necessity of general reduction in rates is firmly fixed in the minds of shippers, including iron and steel interests, and they contend that restoration of normal business conditions cannot possibly be expected until their costs have been lowered through cheaper transportation. While the financial position of the carriers is recognized, there are considerations taken into account by shippers to offset it. For one thing they are of the opinion that they should get greater benefit than so far has been given the industry from the reduction of wages in July and because of lower costs of iron and steel and fuel of which the railroads are such large users. Furthermore, it is maintained that lower rates will increase the volume of traffic and yield greater revenue where the rates are not under the cost of transportation. Present rates on coal, coke, and iron and steel are held to be much higher than are justified.

Settlement Disappointing

It is because of the fact that the question of general rate reductions has been left in the controversial stage that regret has been expressed that the strike situation was not settled definitely. As it is, the opinion prevails that it only has been postponed and will again face the country and the Railroad Labor Board. Hope had been felt that the board would be able to lay down a specific line of permanent settlement which would carry with it assurance that the carriers would be able to get quick action on an application to reduce wages. Instead, however, it was made known that this subject will not come before the board for some time and that the board will take up other pending questions first, such as working rules and regulations, the outcome of which, no matter how favorable it may be to the carriers, cannot possibly have the far reaching effect that would arise from a wage reduction. That a cut in wages is inevitable and practically is implied from the action of the labor board is generally accepted as a fact. The railroad brotherhoods in such a case are expected to again make gestures in the way of threatening to strike, but regardless of this it is contended that the issue has to be faced and settled definitely and cannot much longer be postponed.

No Enforcement Power

One great difficulty is that the labor board is without punitive power, though there is a division of opinion as to how much authority should be vested in it to support its decision. But, it is pointed out, if the board does not have authority to enforce its findings they are of little or no value, except that derived from public opinion. The latter is too often only of a sentimental or nebulous character and is not sufficiently constructive, but in the recent railroad strike situation is held to have been an influence for real good to an extraordinary degree.

It also is a widespread belief that the work of the Railroad Labor Board and the Interstate Commerce Commission should be consolidated and the latter body take over the duties of the former with greater power granted than that now resting with the board. By merging the board's work with the Interstate Commerce Commission, it is contended, the commission would at one and the same time have both labor and rate problems before it and could coordinate them more intelligently than can be done through two separate organizations. Some think that this might be done by continuing the labor board as it now is, but with more authority, if its headquarters were transferred to Washington, so that it could advise and consult with the Interstate Commerce Commission and other Government bodies in the capital. Confidence is expressed that one or the other of the two plans will be undertaken by amending the transportation act.

Sentiment at Pittsburgh

PITTSBURGH, Oct. 31.—Public announcement of the terms of agreement whereby the railroad strike scheduled for this week was called off, rather dampened expectations of lower freight rates in some quarters. This was due to newspaper stories that the settlement had been based upon assurances by the Railroad Labor Board that it would not give immediate consideration to further petitions from the railroads seeking lower wages. However, the expectation of lower freight rates still is strong, and this finds support in the fact that there has not yet been a reduction in freight rates in keeping with the reduction in wages as of July 1, and now that this wage reduction is to be accepted without a strike, it is thought that there is nothing to stand in the way of a rate reduction. The railroads also will benefit undoubtedly by a revision of working conditions and labor classifications upon which the Railroad Labor Board now is working. It is said that if the old time rules were restored the saving to the railroads would be much greater than the 10 per cent reduction in wages which railroad executives recently said in Chciago they would ask for.

The Automatic Machine Co., Cambridge, capitalized for $400,000, has been granted a Massachusetts charter. The new company will take over the business formerly carried on by the Selective Service Co., Cambridge, automatic machinery. Walter E. Hanson, Lakeview Avenue, Wakefield, is president, and Raymond V. Chipman, 24 Hollis Street, East Milton, treasurer.

JAPANESE BUYING VARIED

Inquiries for Wire, Nails and Tin Plate—Activity in Rails—Tank Inquiries from Argentina

NEW YORK, Nov. 1.—Japanese purchases continue to lead by a wide margin in the export transactions of American exporters, and while black sheets of light gage are still being purchased in about the same volume as before, a few inquiries for wire, wire nails, blue annealed sheets and other products are beginning to appear, evidently because German mills are no longer able to give early delivery on these materials. The Japanese purchasers, however, have been educated to the low quotations of Germany and the prices demanded on these products by buyers are generally too low to permit of much business. A few inquiries for galvanized sheets have appeared from Japan. One inquiry calling for 200 tons of galvanized sheets, B. W. G., held by a Philadelphia exporter with an office in New York, was recently turned down by the mills approached because of the B. W. G. specification.

Activity in Medium and Heavy Rails

The Imperial Japanese Railways are again in the market, closing Nov. 4 for about 15,000 tons of medium and light rails, 4700 tons of the total being booked for Otaru in northern Japan, where considerable development work is in progress, both by the Government and private enterprise. About 1400 tons of light rails, of which 1000 tons are 30-lb. sections and 400 tons are 60-lb. section was recently booked by a New York export house for shipment to Otaru. The recent inquiry of the Imperial Japanese Railways for 5000 tons of 75-lb. and 100-lb. rails has been awarded to Suzuki & Co., at a price said to be in the neighborhood of $40 per ton, c.i.f. Japanese port.

One large Japanese export house reports the sale of about 700 tons of structural material for a bank building in Tokio and a pipe line contract has resulted in this company's booking an order for 400 tons of steel tank plates, which will be bent in Japan. One Japanese house recently booked an order for tin plate, which included 24,000 base boxes of oil can specifications and another has received an order for 2000 base boxes. The recent report that the Japanese Government intends purchasing a total of 800,000 tons of rails in the next few years is said by long established exporters to be the periodical appearance of an accurate report of purchases intended for use in Japan, Manchuria, Korea and elsewhere in the Far East, where Japan operates railroads. For development in Korea alone, the Japanese have for several years past intended purchasing about 400,000 tons of light rails, but only when the market has reached what they consider as "rock-bottom."

South American Contracts Awarded

With German mills well filled and generally refusing to open their books for 1922, South American markets are beginning to send through a few small orders to American exporters. Aside from purchases by private interests in these markets, there are several large government contracts that have been awarded to contractors in the United States. Besides the recent Chilean electrification project, the major portion of which went to the Westinghouse International Co. and the American Locomotive Co., and the Bolivian railroad building program now being executed by the Ulen Contracting Co., New York, there is the contract for the building of a large dam in Brazil recently awarded to Dwight P. Robinson, Inc., New York, and the pending contract for the removal of a hill at Rio de Janeiro, Brazil, which is being financed by a firm of New York bankers.

For the purpose of exploiting the oil fields in the Argentine Republic, the Rivadavia Oil Co., Buenos Aires, was organized a short time ago, and about two weeks ago this company appeared in the American market with inquiries for oil tanks, pumps and other oil field material. The tank inquiries numbering six, ranging from a few thousand gallons to 1,000,000 gal. capacity, are being handled by New York companies. The largest of these specify one 1,000,000-gal. and two 600,000-gal. tanks and there is also an inquiry covering six large, high pressure line pumps. The Argentine Government, which is a part owner in this enterprise, recently purchased several oil tankers, in which the oil is transported from the fields by river route, eliminating the necessity of long pipe lines. The Standard Oil Co., which has concessions in Venezuela, began to develop these resources about six months ago and in a few months will have twelve drilling units in operation.

Keen German Competition in Far East

With the exception of agents handling aluminum and special material, German representatives in the United States, still are unable to obtain iron and steel shipments from Germany. Although German sellers of aluminum have generally maintained a price on the imported metal of about 2c. per lb. below the domestic market price, the leading aluminum interest in this country is reported to have met competition regardless of price. The leading American interest is reported to have sold one large order of ingot aluminum as low as 18c. per lb. and to have offered to meet any prices quoted by the German sellers in this country to its customers.

Despite the refusal of German mills to ship material to the United States, long time deliveries continue to other foreign markets. One New York export house recently booked with a German mill for shipment to a customer in Japan, one order for 2000 kegs of wire nails and another order for 2500 kegs and a total of about 240 tons of Nos. 26, 28 and 31 gage black sheets. Another exporter is negotiating on a large tonnage of blue annealed sheets, which it is intended to ship from Germany to the Orient. Exporters to the Dutch East Indies report that competition in that market has been growing more and more severe for some time and to-day British and American sellers have been largely eliminated by the German interests quoting low prices.

Rating on Steel Roller Chain

WASHINGTON, Nov. 1.—The Interstate Commerce Commission has ordered a rating of second class, less-than-carload, and fourth class, carload, established on or before Jan. 9, 1922, on machine finished steel roller chain in bags in official classification territory. The decision was the outcome of a complaint by the Link-Belt Co., et al., vs. P. C. C. & St. L., et al. The condemned ratings are one and one-half times first class, less-than-carload, and first class, carload, on the chain in question. In barrels or boxes the second and fourth class ratings had been in effect since Dec. 30, 1919. There has been no provision for shipment in bags since Sept. 15, 1916. The commission said that contrary to the terms of the classification shipments in bags had been accepted and that under rule 5, section 3 (c) of the classification the ratings assessed on the chain in bags were three classes higher than when shipped in barrels or boxes. The commission said that roller chain could not be damaged except through such rough treatment as would damage any of the several types of chains manufactured by the complainants as well as many other articles which are now accepted for transportation and packed in bags.

The Vanadium-Alloys Steel Co., Latrobe, Pa., has issued a handy reference card, giving a number of practical points to the tool hardener. Its size is 8½ in. x 11 in., and it is made of heavy cardboard, provided with a cord for hanging on the wall of the hardening room or the tool room. On one side are printed 37 tips and on the other side are shown the various grades of tool steel made by the company. The card is entitled "Tips for the Tool Hardener—Suggestions of a Practical Man of Long Experience."

The American Steel & Wire Co., Worcester, Mass., will spend $100,000 on its Worcester works at once to give employment to its men who would be idle otherwise. There are about 1500 idle at this plant now. This is the local share of the $10,000,000 which the United States Steel Corporation has voted to expend in the extension of its manufacturing plants.

VIEWS ON INDUSTRY

Editorial Comment Relative to Railroads, Electrical and Automotive Industries

In THE IRON AGE of Oct. 27 was given the drift of comment on business conditions in five basic industries as presented by a number of editors at the National Conference of Business Paper Editors at Chicago, Oct. 24. The industries then reviewed were iron and steel, mining, shipbuilding, construction and agriculture. Below are given extracts from other statements presented at the same meeting, these relating to the transportation, automotive and electrical industries:

Transportation

In discussing the problems of the railroads, Samuel O. Dunn, Chicago, editor *Railway Age*, referred to the developments following the increase in wages and freight rates last year, "the largest decline in traffic ever known" resulting from the depression. "For months the railroads did not earn enough to pay the interest on their bonds and seemed drifting into bankruptcy." [It is to be considered, in reading the following, that Mr. Dunn spoke several days in advance of the calling off of the strike.]

To save themselves the railroads made retrenchments beyond all precedent. These consisted largely of reductions in purchases of materials and supplies. Their purchases of iron and steel, lumber and many other commodities are normally very large. This reduction in their purchases adversely affected many other industries. The railroads applied to the Railroad Labor Board for changes in the working conditions and wages of their employees which would reduce their excessive payrolls. They laid off over 600,000 employees and the Labor Board granted them in July a reduction in wages which was equal to about one-sixth of the advances which had been made since the adoption of Government control. In the meantime traffic was increasing owing to the gradual recovery of general business. In the first ten months the present rates were in effect the railroads earned a net return of 2½ per cent, or less than one-half of what had been expected. In July they earned at the rate of 4½ per cent; in August at the rate of over 5 per cent.

This improvement inspired optimism, although it was partly nominal as well as partly real, since the increase in net return was largely due to the postponement of maintenance work that needed to be done. Meantime the railroads were being subjected to terrific pressure for reductions in rates, by agricultural and industrial interests and also by Government authorities at Washington. They realized the need for reductions in rates, but in view of the very unsatisfactory financial condition of the railroad industry itself and of the great changes that had taken place in prices and wages in other industries, believed that reductions in rates should be accompanied by further reductions in wages. Their managers, therefore, about two weeks ago, reached and publicly announced a decision to ask the Railroad Labor Board for further reductions in wages and to give to the public in reductions in rates all of the savings in operating expenses thus made.

The reduction of grain rates ordered by the Interstate Commerce Commission Oct. 22 was based by the Interstate Commerce Commission entirely upon economic conditions. The commission specifically held the operating costs of the railroads were too high to justify it, but expressed the opinion that in the near future further substantial reductions of operating costs would and should be made. That seemed to mean that the commission thought the railroads should go ahead and get their wages further reduced. One commissioner in his opinion plainly said so.

With the Interstate Commerce Commission reducing the rates, although it concedes the present operating costs are too high to justify this, the employees getting ready to strike against both past and proposed reductions of wages, and the public members of the Labor Board suggesting that the railroads shall postpone asking for any further reductions of wages, you can see there is some reason for uncertainty in one's mind as to where the railroad industry now stands and as to what its future is going to be. I think, however, that I can make certain statements and prophecies with a reasonable degree of assurance:

First, the railroads are doing better financially at present than they have been at any time during the present year.

Second, if the threatened strike comes the railroads will win it, and this will greatly improve their labor situation.

Third, in any event the railroads will go ahead and ask for further reductions in wages.

Fourth, if the railroads do not get these further reductions in wages they will strongly resist all further substantial reductions of rates, while if they do get further reductions of wages there will be voluntary reductions of rates.

Fifth, aside from any brief interruption that may be due to strikes, the traffic and earnings of the railroads will continue to increase, the purchases made by them will be increased in proportion, and this will tend to improve business of all kinds.

Let me emphasize that in the present labor struggle the railroads are fighting the battle of all the agricultural and business interests of this country and of the employees of these interests. In some industries, including the railroad industry, operating costs are still excessive and must be reduced before the industrial readjustment can be completed and general prosperity can return.

Automotive Industries

David Beecroft, directing editor the Class Journal Co., New York, in dealing with the various automotive industries, said in part:

The automotive industries are composed of eight different but closely related industries, bound together by common engineering, production, merchandising and maintenance problems, comprising the automobile, motor truck, farm tractor, airplane, motorcycle, motor boat, isolated electric lighting, and stationary gas engine.

The automobile industry this calendar year should produce approximately 1,200,000 vehicles, as compared with 1,880,000 in 1920. Ford will produce from 55 to 65 per cent of this total. During this year automobile sales have been to the urban population, the farmers not buying in any part of the country excepting in a small way since the harvesting of crops.

The motor truck industry has passed through the quietest year in its history, many factories having been closed since the fall of 1920. There has been a gradual revival in the last six or eight weeks as many large industrial corporations have in that time lifted the order which entirely prohibited purchases.

The farm tractor industry has had the slowest year in its history and many of the large factories have been closed most of the time since the drop in farm produce prices a year ago. There are heavy stocks of tractors in branch houses and warehouses. Prices have been reduced 25 to 35 per cent. The war advance averaged 75 per cent.

The airplane industry has been in a state of coma during the past year. The war left great quantities of airplane engines in stock, as well as great quantities of planes. The airplane manufacturers are continuing in business and working diligently to create an industry of commercial aviation. With this aim the Wadsworth bill, creating a department of civil aviation, and placing this in the Department of Agriculture, is up for passage.

The manufacture of isolated electric lighting outfits for farm and other service, which developed very rapidly during the war, has been in suspension for a year. A revival is looked for with the return of better crop conditions and prices. The farmer realizes that this equipment is not a luxury but rather an economic investment.

The motor-cycle industry, greatly stimulated by the war, has had a quiet year. Nearly 50 per cent was in the form of export trade which has fallen off very heavily. The industry in America has never developed as expected, due to the fact that Ford prices are so low. In other countries where automobile prices are so much higher, motor-cycle development has been greater.

Export trade in automobile accessories and parts has held up remarkably well, having been approximately 80 per cent, whereas the export of vehicles has fallen to 25 per cent. Throughout the world it is estimated 10,000,000 automobiles have been in use and the buying of parts and accessories for their operation has been kept up to a high degree.

In no other industry has the work of standardization been so persistently advanced. For 10 years this work has been under way, and it is largely responsible for the low price of the American automobile in comparison with European products. Standardization of metal specifications has made it possible for material manufacturers to get away from short runs of special lines and to stock standard grades. This has reduced prices and greatly simplified purchases. The standardization of parts so that those of one manufacturer are interchangeable with another's has made it possible to secure supplies from different factories, and production is not delayed by difficulties of any one parts

maker. One manufacturer of nuts and bolts reports that standardization saves him $500 a day on this product alone.

Electrical Industry

F. E. Watts, editor *Electrical Record*, New York, reviewed conditions in the electrical industry. He noted an increased demand upon manufacturers of power apparatus for transformers and meters. Motor sales, except possibly fractional horsepower motors, are showing a sure but slow increase. The household appliance business fell off sharply in 1920, but now is making a rapid recovery. There is also improvement in wiring supplies, including all the devices entering into construction work, but the improvement is not as great as in appliances. In lighting fixtures sales for 1920 were about $250,000,000. After a great falling off, some betterment is now seen. In general, electrical manufacturers are running 55 to 60 per cent of capacity. Export sales for the year ending June 30, 1921, aggregated $119,000,000, an increase of 37 per cent over 1920.

In the business of the central station light and power companies, the kilowatt output for every month of 1921 has been greater, with the exception of February, than the monthly average for 1919. It is estimated that to finance extensions in this field will require over $1,000,000,000 per year for a number of years. Electrical supply jobbers have been averaging about 50 per cent of their sales of 1920. The business is now much better than in the early months of this year.

Taking the electrical industry as a whole, we can look forward to the future with confidence, and there is a feeling in all branches of the industry that the development in the next few years is going to be the greatest in our history. Undoubtedly, the power of the future is not coal or oil, but electricity, and with the recognition of its many applications in industry, on the farm, and in the home, there will come such a demand that the business which has gone before will seem small in comparison.

The American Iron and Steel Institute Banquet

Checks for tickets for the banquet of the American Iron and Steel Institute, to be held at the Hotel Commodore, Friday night, Nov. 18, at which Marshal Foch will be the guest of honor, have been coming in so rapidly at the institute's offices in New York that it is evident the attendance of members will be larger than at any previous banquet. For this reason the committee has not yet decided how many guests it will be possible to entertain. Members will be duly notified as to whether they will be able to entertain guests whose names have been sent in.

Order for 200 Tank Cars

The Pennsylvania Tank Car Co., Sharon, Pa., has received an order for 200 railroad tank cars, which will be leased to shippers of liquid materials. The work will involve 8000 to 10,000 tons of iron and steel products, principally plates, and will engage capacity of the Pennsylvania company until the early part of 1922.

An appropriation for a library at its north works has been made by the American Steel & Wire Co., Worcester, Mass. Books for employees will be installed in the employment bureau under the direction of R. R. Wallace and assistants, and will be late works dealing principally with mechanical subjects, although there will be many volumes covering a variety of other subjects.

Atmospheric gas burners, particularly those used for the burning of gas for domestic purposes, have been studied by the Bureau of Standards, which has issued as Technologic Paper 193 an exhaustive analysis which is calculated to be of particular value to designers of gas burning apparatus. The pamphlet is obtainable at 15 cents a copy from the superintendent of documents, Government Printing Office, Washington.

Cambria Low Bidder on Steel for Navy

WASHINGTON, Nov. 1.—Bids equivalent to Pittsburgh base prices of 1.50c. for bars and 1.60c. for plates and shapes, submitted by the Cambria Steel Co., were the lowest received by the Bureau of Supplies and Accounts, Navy Department, at the opening to-day for steel for Navy Yard stocks. The call for bids involves approximately 525 tons of bars, 2200 tons of plates and 1400 tons of shapes. The Central Iron & Steel Co. also bid equivalent of 1.60c., base, Pittsburgh, for a portion of the plate tonnage. In all there were 11 bidders on either part or the entire tonnage. Most bids on bars were made at 1.60c. and on plates and shapes at 1.70c.

General Pershing's Tribute to James B. Bonner

General John J. Pershing recently paid a high tribute to James B. Bonner, Washington representative of the Carnegie Steel Co., on account of his valuable services as chairman of the committee on steel distribution of the American Iron and Steel Institute during the war. General Pershing sent a copy of his report on the war to Mr. Bonner with this inscription:

To Mr. James B. Bonner, whose patriotic service as a representative in Washington of the steel and iron industries of our country deserves the praise of all his countrymen.

JOHN J. PERSHING.

The *Army and Navy Register* of Oct. 22, referring to Mr. Bonner's services, says: "The difficulties of the task were enormous and too little has been known of the achievement, outside of the scenes of this important war activity. Some comprehension of the volume of business may be gained from the fact that the amount of material turned out and delivered to the various Government branches requiring it equalled about 17,000,000 tons."

Time to Stimulate Sales of Machine Tools

WASHINGTON, Nov. 1.—The present is considered a favorable time for American manufacturers of labor-saving mining machinery to stimulate the sales of their products in Great Britain, according to a report received from American Consul John R. Bradley, of Cardiff, Wales, who points out that the operators there are overlooking no opportunity to increase production and to decrease costs. Of course, the statement says, it is recognized that for some time British labor has been opposed to the employment of such machinery, despite which it appears more and more equipment is constantly being employed in the various British coal fields. The American consul will furnish the names of the principal colliery companies in his district, together with such other information as he has with regard to these companies.

Pumping Engine Awards

MILWAUKEE, Oct. 24.—The city of Milwaukee awarded a contract to-day to the Allis-Chalmers Mfg. Co. for one 25-million and two 22-million gal. pumping engines at $641,500. The only other bidder was the Worthington Pump & Machinery Corporation at $767,500.

Pittsburgh Steel Co. Earnings

The Pittsburgh Steel Co. reports net profits for the quarter ending Sept. 30 at $13,922 as compared with $1,568,367 in the same period last year. The gross business of the company for the period was $3,428,790 against $10,765,162 in the September quarter last year.

"Mose Martin used a cold rod to break the slag in his ladle," says a poster of the National Safety Council. "Hot iron splashed all over, burning him severely, but his eyes were saved. When you use a rod, heat it first. In any event—wear safety goggles." The photograph accompanying this represents a negro with bandages upon his body, the illustration having been furnished by the Standard Sanitary Mfg. Co.

SHORT TRADE ITEMS

The Wright-Alexander Co., 201 Devonshire Street, Boston, machine tools, has been made New England representative, Connecticut excepted, for the Craftsman Tool Co., Conneaut, Ohio, line of rotary milling machines.

Edward Kronman, Inc., 248 Lafayette Street, New York, manufacturer of coffee urns and other metal products, has leased the building at 211-15 West Nineteenth Street, totaling about 30,000 sq. ft., for a plant and expects to occupy the building at an early date.

The Key-Free Lock Co., New York, has been incorporated with a capital of $400,000 by A. Seibold, I. W. Gunya and J. A. Lindgren to manufacture keyless locks and locking devices. It is represented by M. A. Barney, 154 Nassau Street.

The Perfection Screen & Weather Strip Corporation, New York, has been chartered under State laws to manufacture metal screens, weather-strips, etc. The incorporators are R. Holzman, G. W. Alexander, and L. F. Rayfiel, 189 Montague Street, Brooklyn.

The Columbia Boat Co., Inc., Mount Vernon, N. Y., has been incorporated with a capital of $100,000 to manufacture motorboats, engines, etc. The principal incorporator is H. C. Werdman, 1026 Hudson Street, Hoboken, N. J.

The Zideck Adjustable Radiator Core Co., New York, has been incorporated with a capital of $45,000 by M. E. Kohn, M. Cogin and J. M. Richman, 42 Broadway, to manufacture automobile radiator equipment and other metal products.

E. J. Riggs, Bowling Green, Ky., and associates, are organizing a company to build a new refinery with initial capacity of about 300 bbl. per day, and estimated to cost approximately $100,000.

The Troy File Works, Troy, N. Y., was founded in 1831 and is still located on the same site. In 1895 it was incorporated and new buildings erected. Within the past few months, A. D. Banker, president from the time of incorporation retired entirely from the company so that he might devote himself to his private interests. In the reorganization, Joseph A. Leggett, one of the original incorporators, was elected treasurer and William K. Brown, another stock holder of long standing was elected secretary. Otto J. Swensson, a new stockholder was elected president. Mr. Swensson is a graduate civil engineer of Rensselaer Polytechnic Institute, Troy, N. Y., and has had considerable experience in engineering and manufacturing. Under the reorganization the Troy File Works is discontinuing manufacturing some of its specialties and is manufacturing new specialties. It has discontinued manufacturing rasps and its main business as it has always been is to manufacture the Trojan brand of files and the "Troy-Best" file handles.

M. K. Epstein has changed location from Philadelphia to Hartford, Conn., where he will be engaged in the same line of work as heretofore. He will act as sales agent in the New England district for Wilson-Maeulen Co., maker of pyrometers and the Rockwell hardness tester; also Tate, Jones & Co., furnace engineers.

Loy & Nawrath Co., 21 Runyon Street, Newark, N. J., manufacturers of sheet metal machinery, power brakes, squaring shears, mitre presses, etc., has opened a New York office in room 1922, 30 Church Street, telephone Cortlandt 6297.

J. T. Kelly, for several years with the Keller Pneumatic Tool Co. at Chicago, has left the company and has organized a company to specialize in machinery, power equipment and tools. This company will be known as the Kelly Machinery Co., with headquarters in Monadnock Block, Chicago.

The Richardson-Phenix Co., 118 Reservoir Avenue, Milwaukee, manufacturer of automatic lubrication devices for machinery, tools, automobiles, tractors, etc., and appliances for filtration and reclamation of lubricants, has consolidated with the S. F. Bowser Co., Fort Wayne, Ind., gasoline and oil pumps and storage systems, the combined assets exceeding $10,000,000. The personnel of both concerns is retained, save that Louis E. Strothman, vice-president and general manager of the Milwaukee company, who is seriously ill, retires. He is succeeded by S. B. Bechtal, vice-president of the Bowser company. J. William Peterson, president Richardson-Phenix Co., has been elected vice-president of the Bowser company. Executive headquarters will be located in Fort Wayne, with works and branch offices in Milwaukee.

The Boston office of the Niles-Bement-Pond Co. of Massachusetts, on or about Nov. 1, will be moved from 95 Oliver Street to 125 Purchase Street.

Manning, Maxwell & Moore, Inc., 10 High Street, rooms 811-812, Boston, on Nov. 1 will remove to 99 Chauncey Street, Textile Building, rooms 802-803.

The Truck-Grip Chain Co., Inc., 2 Columbus Circle, New York, will have its truck grip chain manufactured on contract and will sell its product through the jobbers and dealers in the trade.

The Superior Supply Co., Chicago, has been appointed direct factory representative of the Novo Engine Co., Lansing, Mich., and will handle the sale of the Novo line of portable power-driven outfits, including pumps, hoists, compressors, saw rigs, etc.

Andrew C. Perrin has been appointed representative of Herbert Morris, Inc., Buffalo, with headquarters at 550 Washington Boulevard, Chicago, where a stock of hand hoists, hand cranes, electric hoists, and trolleys is carried.

The Fort Wayne Engineering & Mfg. Co., steam engine boilers, air compressors, etc., on or about Nov. 1 will move its Boston office from 195 High Street to 75 Washington Street North.

The Seneca Falls Foundry Co. recently rented the foundry of the Seneca Falls Mfg. Co., Seneca Falls, N. Y.

Domestic Engineering, Chicago, is now located in its commodious new home at 1900 Prairie Avenue.

The American Mutual Liability Insurance Co., Boston, is publishing a periodical called *American Mutual Magazine*. The aim of the new publication is to keep the company in closer touch with its policyholders, and to acquaint them with the company's aims and accomplishments. The first issue is dated September and consists of 24 pages, 6 x 9 in. Contributors to this issue include H. A. Earnshaw and Roger Babson.

A. W. Menkins, engineer and contractor, 321 Broadway, New York, has opened new offices in New York after having completed the construction of the terminal grain elevator at Sydney, Australia. He has been awarded by the Union of South Africa Government all the contracts for the construction of two terminal and 34 country elevators in South Africa.

The Beaubien Ice & Coal Co., 4205 West Jefferson Avenue, Detroit, will build a one-story ice plant at Baker and Porter streets, to cost $45,000.

The Detroit Edison Co., Detroit, has acquired the light and power plants now furnishing service at Williamston and Webberville, Mich., and in the future will operate in this district. Plans are under way for the construction of a new power station at Webberville, with extensions and improvements.

The American Calk Co., Detroit, has filed notice of dissolution under state laws.

B. C. Wetzel & Co., 2317 Dime Bank Building, Detroit, architects, are preparing plans for a two-story metal-working plant and foundry, 75 x 300 ft., at Ecorse, Mich.

The Waukegan Foundry Co., Waukegan, Ill., has been duly organized and incorporated for $60,000 with its main offices and foundry located at Waukegan, with a Chicago sales office at 549 West Jackson Boulevard. The officers are Andrew K. Barr, president, lately of Andover, Mass., who has made a life-long study of engineering, pattern and foundry business and is a McLain graduate on foundry practice; Elmer L. Clavey, vice-president, Highland Park, Ill.; Elmer T. Skidmore, secretary and treasurer, formerly connected with the Chicago Hardware Foundry Co. of North Chicago for 15 years as credit manager. Mr. Barr and Mr. Skidmore will have active management of the business. This foundry will specialize in light gray iron and semi-steel castings. A Whiting cupola has been installed with the latest type of International molding machines and Champion molders' benches; with air lines furnished by two units of air compressors of the National Brake & Electrical Co. and the Union steam pump type of compressors, together with the Pangborn sand blast equipment and modern, up-to-date tumbling barrels and grinders. A large, new, modern foundry building has been erected by the Manufacturers' Terminal Co. according to plans of the Waukegan Foundry Co., which has leased it for a term of years. The plant was put in operation Oct. 3.

The Crystal Fluorspar Co., Cincinnati, has been incorporated with a capitalization of $100,000. The company owns fluorspar deposits in Crittenden County, Ky., and is doing development work in preparation for an output of 50 tons daily, which is expected to be reached by Jan. 1. The head offices of the company will be located at 1522 Union Trust Building, Cincinnati. H. C. Upson, R. B. Short and Edward G. Harper are the incorporators, all located at the above address.

Iron and Steel Markets

FIRST RAILS FOR 1922

Some Increase in Equipment Orders

Further Gain in Pig Iron Output—A New Move in Wire Products

The steel trade is trying to appraise the results of a railroad strike escaped, of rail prices reduced, of pig iron output increased, and of competition sharpened with the approach of the quiet time of the year. New buying in the past week has been relatively small, though steel production is still above 40 per cent, that of the Steel Corporation being close to 50 per cent.

More than one steel company found October bookings better than for any month this year. Chiefly the lighter products, such as wire, pipe and sheets, made the showing.

First among 1922 rail contracts is one for 44,600 tons from the Southern Pacific, placed with the Tennessee company. Rail producers refer hopefully to railroad demand for next year. A survey by several Western and Northwestern roads shows contemplated purchases of 150,000 tons.

The application of the $40 rail price to 1921 rollings dates from Aug. 25 with some producers, according to an announcement of this week.

Pig iron production in October increased beyond expectations, being the largest since March and representing a gain of 43 per cent upon the low figure of July. As wired from all districts on Nov. 1, the returns make a total of 1,240,162 tons, or 40,005 tons per day, against 985,529 tons in September, or 32,850 tons per day. The increase over September is about 22 per cent.

Seventeen furnaces blew in and 3 blew out in October, a net gain of 14, and the 96 furnaces in blast Nov. 1 had an estimated capacity of 43,500 tons per day, as against 35,650 tons per day for 82 furnaces one month previous.

In spite of the weakness in prices of the heavy finished products—plates, shapes and bars—there is an effort to repeat the upward September move in wire products. The Steel Corporation's wire subsidiary is taking orders at $2.90 for wire nails, with the intimation that prices will advance as was done on Sept. 12. Some independent wire companies only lately went to $2.90 and practically all shipments in the past seven weeks have been at the $2.75 level.

Sheet and tin plate prices have indicated keener competition in the past week or two. In spite of the effort to establish a $5 advance in sheets, recent sales show concessions of $1 or more from the former basis. In tin plates $4.75 has been done of late.

Welsh tin plate mills have been displacing the American product in British Columbia, recent contracts amounting to 1,500,000 boxes. A delivered price of $4.90 is named.

The encouraging activity in fabricated steel work is sustained. About 14,000 tons of work was put under contract in the week, nearly all of it in the East, while nearly as much fresh work has appeared, most of this in the Central West. For highway work in New York 5000 tons of reinforcing bars were bought at about 1.80c. delivered.

On approximately 525 tons of bars, 2200 tons of plates and 1400 tons of shapes for the Navy Department, the Cambria Steel Co. on Nov. 1 presented the lowest bid, equivalent to 1.50c., Pittsburgh, for the bars and 1.60c. for the plates and shapes. In all, eleven bidders quoted on either part or the entire tonnage, and most bids on the bars were at a 1.60c. basis and on plates and shapes at 1.70c.

Among fresh railroad equipment inquiries are 3000 cars for the Illinois Central in addition to the 1000 mentioned last week, while the Western Pacific has bought 1000 gondola cars and the St. Paul 2500. The Chesapeake & Ohio is in the market for 1000 hopper cars and is asking for figures on repairs for 1000. Recent orders and inquiries for equipment expected to be placed by Western roads, largely in the Chicago district, will bring 70,000 to 80,000 tons of steel to the mills.

Japanese railroads are expected to buy on Nov. 4 about 15,000 tons of medium and light rails, following the recent award of 5000 tons of 75 and 100-lb. rails at a price of about $40 per ton, c.i.f. Japanese port, and 1400 tons of 30 and 60-lb. rails. Illustrating what is promising in railroad equipment exports is the recent report of Japanese needs of 800,000 tons of rails in the next few years, though this is but a recurring statement of calculated needs for Japan, Manchuria, Korea and elsewhere and made in part to sound out the possibility of low prices.

Because shipments of pig iron increased for two or three weeks, due to fear of a railroad strike, requests to defer shipments are now numerous and there is also less buying. Prices for early delivery are maintained with difficulty and a concession of at least 50c. per ton has been made from the $19 Birmingham price. Pittsburgh inquiries for 3000 to 5000 tons of basic for early 1922 have appeared.

Pittsburgh

PITTSBURGH, Nov. 1.

The reaction in demand for iron and steel continues and the past week has been the quietest the trade has seen in some time. There is a tendency in some quarters to ascribe the dullness to the universal expectation of lower freight rates, since such a change, if it failed to bring about materially lower selling prices, would result in a decrease in the delivered cost to consumers. This may be one reason for decline in buying, but the usual explanation for the demand falling off is that buyers either are filled up or are protected against their requirements over the remainder of the year at lower prices than now are quoted, and for the time being are not vitally interested in the market. It is evident that mill order books are not particularly well filled because the past week has developed fresh weakness in prices, notably in sheets, in which concessions of at least $1 a ton have been made from the prices announced early in September and there is so much anxiety on the part of some producers for business that buyers believe they would not have to go above the August prices to secure tonnages.

The market on tin plate has slipped off $5 per ton to $4.75 per base box, and there is an impression that since this price has been done, the American

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Advances over the previous week in heavy type, declines in italics.
At date, one week, one month, and one year previous.
For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 1, 1921	Oct. 25, 1921	Oct. 4, 1921	Nov. 1, 1920
No. 2X, Philadelphia‡	$22.84	$22.84	$21.84	$48.79
No. 2, Valley furnace†	21.00	21.00	21.00	42.00
No. 2, Southern, Cin'ti†	23.50	23.50	23.50	42.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	38.00
No. 2 foundry, Chicago*	21.00	21.00	21.00	40.00
Basic, del'd, eastern Pa.	20.50	20.50	20.50	44.46
Basic, Valley furnace	19.00	19.00	19.25	38.50
Bessemer, Pittsburgh	21.96	21.96	21.96	43.96
Malleable, Chicago*	21.00	21.00	21.00	40.50
Malleable, Valley	20.50	20.50	20.50	42.00
Gray forge, Pittsburgh	21.96	21.96	21.96	43.96
L. S. charcoal, Chicago	31.50	31.50	31.50	58.50
Ferromanganese, del'd	60.00	60.00	60.00	155.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill.	$40.00	$40.00	$47.00	$57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. sheet bars, P'gh.	30.00	30.00	32.00	62.50
Forging billets, base, P'gh.	35.00	35.00	35.00	65.00
O.-h. billets, Phila.	34.74	34.74	35.74	60.74
Wire rods, Pittsburgh	40.00	40.00	41.00	70.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.60	1.60	1.60	3.25
Light rails at mill	1.65	1.70	1.70	3.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.50	1.50	1.60	3.00
Steel bars, Chicago	1.75	1.75	1.75	3.38
Steel bars, New York	1.80	1.80	1.98	3.38
Tank plates, Pittsburgh	1.60	1.60	1.60	2.85
Tank plates, Chicago	1.75	1.75	1.65	3.23
Tank plates, New York	1.88	1.88	1.98	3.38
Beams, Pittsburgh	1.60	1.60	1.60	3.00
Beams, Chicago	1.75	1.75	1.75	3.38
Beams, New York	1.88	1.88	1.98	3.38
Steel hoops, Pittsburgh	2.25	2.25	2.25	5.00

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Nov. 1, 1921 Cents	Oct. 25, 1921 Cents	Oct. 4, 1921 Cents	Nov. 1, 1920 Cents
Sheets, black, No. 28, P'gh.	2.90	3.00	3.00	6.50
Sheets, galv., No. 28, P'gh.	3.90	4.00	4.00	7.75
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.25	4.90
Wire nails, Pittsburgh	2.90	2.90	2.90	4.25
Plain wire, Pittsburgh	2.60	2.60	2.60	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.55	4.45
Tin plate, 100-lb. box, P'gh	$4.75	$5.00	$5.25	$8.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	$16.50	$16.50	$16.00	$33.00
Carwheels, Philadelphia	17.50	17.00	17.00	39.00
Heavy steel scrap, P'gh.	14.50	14.50	14.00	26.00
Heavy steel scrap, Phila.	12.00	12.00	11.75	21.00
Heavy steel scrap, Ch'go.	12.00	12.00	12.25	19.50
No. 1 cast, Pittsburgh	17.50	17.50	17.50	38.00
No. 1 cast, Philadelphia	17.50	17.50	17.00	37.00
No. 1 cast, Ch'go (net ton)	13.75	14.00	13.50	26.00
No. 1 RR. wrot, Phila.	16.00	16.00	15.50	27.00
No. 1 RR. wrot, Ch'go (net)	12.50	13.00	12.50	19.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.10	$3.25	$3.25	$9.00
Foundry coke, prompt	4.25	4.25	4.25	11.00
Non-Ferrous Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.12½	13.00	12.62½	15.00
Electrolytic copper, N. Y.	12.75	12.75	12.37½	15.00
Zinc, St. Louis	4.55	4.60	4.55	6.90
Zinc, New York	5.05	5.10	5.05	7.35
Lead, St. Louis	4.40	4.40	4.50	6.65
Lead, New York	4.70	4.70	4.70	6.90
Tin, New York	28.00	28.50	26.75	39.50
Antimony (Asiatic), N. Y.	4.75	4.85	5.00	6.37½

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 1, 1921, Finished Steel, 2.163c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Oct. 25, 1921,	2.177c.
Oct. 4, 1921,	2.236c.
Nov. 2, 1920,	3.724c.
10-year pre-war average,	1.684c.

Composite Price, Nov. 1, 1921, Pig Iron, $19.97 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Oct. 25, 1921,	$19.97
Oct. 4, 1921,	19.93
Nov. 2, 1920,	40.38
10-year pre-war average,	15.72

Sheet & Tin Plate Co., which soon will open its books for first quarter and first half of 1922 business, will not name a higher price than that.

The American Steel & Wire Co. apparently is getting ready to announce another advance in prices, as it is actively urging purchase at the Sept. 12 quotations, and intimating the probability of higher prices. It is reported here that this company intends to go to a base of $3.05 for nails. There seems to be no activity among the independents in this direction at present, and it was only yesterday that the Youngstown Sheet & Tube Co. moved its prices up to $2.90 for nails and $2.60 for plain wire. As a matter of fact, the Sept. 12 prices on wire products have found little, if any, basis in sales because most companies allowed their customers to contract liberally at the old figure and those companies which did not follow this course found it necessary to accept the old quotations to compete with contract business. The recent advance in hoops, bands and strips drove in a good many orders at the former prices, but as specifications are not coming along freely, the orders must be regarded to be little more than protection.

Activity in the heavier products still is limited and quotations of more than 1.60c. refer to only small tonnages. The impression is strong that if sizable orders were tendered, the price would not be more than 1.50c, base, on bars, plates and shapes.

The pig iron market is practically dead and again is swinging, as far as prices are concerned, in favor of buyers. The scrap market is less active and dealers are having trouble in maintaining the recent advances. The fuel market is decidedly soft. Some purchases of coke made in anticipation of a possible railroad strike are being canceled, while the coal market suffers from the same cause and feels the effects of a widely circulated report that freight rates on coal were to be reduced immediately, as well as the fact that the railroads are refusing longer to allow cars to be used for storage purposes.

Pig Iron.—The Allegheny Steel Co. has put out an inquiry for from 3000 to 5000 tons of basic iron for delivery over the first quarter or first half of 1922, and the Follansbee Brothers Co. is seeking 3000 tons of the same grade, 1000 for immediate shipment and the remainder for delivery over the rest of the year. The West Penn Steel Co. also is in the market for a moderate sized tonnage of basic. Outside of these inquiries, the market has been utterly devoid of interest. Producers of foundry iron have not succeeded in moving more than a few carloads and while such business has been on a basis of $21, furnace, for No. 2 grade, the market does not show as strong a tone as recently and it is believed that concessions would be developed by the appearance of sizable inquiries. The market is not over and above strong on basic iron either, as the avail-

able supply still exceeds the demand and holdings of middlemen are cropping out to bother the producers. W. P. Snyder & Co. in their monthly report for October on average prices of sales of basic and Bessemer iron show that the former averaged $19 and the latter $20. This is a decline of 25c. per ton from the September average on basic, while the October average on Bessemer is unchanged from that of the previous month. The business meeting of the American Pig Iron Association held at the Pittsburgh Country Club, Oct. 26, was given over largely to a discussion of taxes.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.50

Ferroalloys.—Business remains extremely slack. Prices do not change much, but the drift still is down. On ferromanganese, the market is quotable at $60 delivered, but with no important sales noted. Domestic producers are quoting down to $58.35, seaboard, the nominal quotation of English makers, but consumers express the belief of being able to get the material landed here at that price. In the absence of business, it is difficult to obtain really definite prices. Outside of a sale of 200 tons of 20 per cent spiegeleisen to a Youngstown district steel maker at $30, delivered, there has been no important trading in that material. This price would mean slightly less here, owing to the difference in freight charges. Interest in 50 per cent ferrosilicon again has waned, probably because most consumers recently covered their needs over the remainder of the year. A northern New York maker recently offered a round tonnage of this alloy at $53, furnace, equivalent to slightly more than $56 delivered in this and nearby districts; it was promptly sold and the supposition is that it was taken by another producer for the purpose of holding up the market. No recent sales have been done at more than $57, delivered, and the price idea of most consumers now is $55.

We quote 78 to 82 per cent domestic ferromanganese at $60 delivered; 78 to 82 per cent foreign ferromanganese, $53.28 to $55, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $57, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—A maker of tubular goods is reported to be seeking a round tonnage of slabs for first quarter delivery, while a couple of bolt and spike makers have put out an inquiry for round lots of billets for the same period. The total tonnage involved is 11,000. Generally, there is very little interest in semi-finished steel and prices for the most part are nominal. Small sales of sheet bars are reported to sheet makers without regular sources of supply at $32, mill, but there is reason to suppose that this price would be shaded $1 to $2 per ton on attractive orders. Most consumers were allowed to cover their probable requirements early in September prior to the advance at that time and are now out of the market. Billets generally are held at $30 for soft steel and $35 for forging quality, but attractive orders carrying $1 a ton less would not be rejected. The market is equally uncertain on slabs.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30 to $32; Bessemer and open-hearth sheet bars, $30 to $32; slabs, $30 to $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The attempt to secure $41, Pittsburgh, for common soft rods is quite as futile now as it was when this price first was established. Consumers generally were allowed to cover their requirements at the old prices ranging from $38 to $40 and still are out of the market. Since the Sept. 12 prices on wire products never were established by substantial business and there has been little or no improvement in the bolt and rivet business, these interests naturally are not falling over one another to secure rods. The market is dull and $40, Pittsburgh, represents to-day's maximum price possibility. Rods for export have been sold recently as low as $38. Prices are given on page 1182.

Wire Products.—Interest of the trade centers upon the recently inaugurated drive for business by the American Steel & Wire Co. at the Sept. 12 prices, based upon the probability of another advance. Independent companies are slow to follow in this direction, for while specifications are coming along fairly well against orders and contracts for nails entered prior to Sept. 12, there is not much activity in other wire products and there is also the fear that an advance at this time could not be maintained. Nails have been available right along at $2.75, base, per keg, and plain wire at $2.50, as one independent did not adopt the September advance until yesterday and other companies that failed to make contracts found it impossible to exact the higher prices when so many were covered at the old figure.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Structural Material.—Although the Fort Pitt Bridge Co. was the low bidder for the filtering plant for the City of Detroit, it has not yet been awarded the contract, which calls for 2400 tons of steel, as Detroit trade organizations are agitating to keep the business at home. The McClintic-Marshall Co. has taken several buildings for the Cerro de Pasco Copper Corporation, Peru, amounting to 300 tons; a plate girder bridge for the Philadelphia & Reading Railroad at Douglasville, Pa., taking 170 tons; an apartment house at Ninety-fifth Street and Fifth Avenue, New York, calling for 700 tons, and a mill building for the Delaware Seamless Tube Co., Auburn, Pa., for which 125 tons will be required. Not much activity is noted in plain material and the market is not very well defined. Quotations generally range from 1.60c. to 1.75c., but there still is talk of 1.50c. and this probably could be done on an order of some size. Prices are given on page 1182.

Plates.—Considerable variation still is observed in prices, makers quoting anywhere from 1.60c. to 1.75c., while buyers say they do not have to go above 1.60c. even on small tonnages, and believe they will be able to negotiate large tonnages at around 1.50c. Orders generally are small, although there are a number of promising tank inquiries, especially from the recently opened Mexica oil fields in Texas. Prices are given on page 1182.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.65c. f.o.b. Pittsburgh.

Steel Rails.—The Carnegie Steel Co. has made no change in its price of light rails, still holding to the old base of 1.75c., Pittsburgh, for 25 to 45-lb. sections. Independent makers, however, are publicly quoting 1.65c., and make no claims that this price finds much support in sales. Demand is lighter than it was recently, as so many of the coal companies have covered against their winter requirements. Standard rails are quoted at $40, mill, for either Bessemer or open-hearth steel. It transpires that the Steel Corporation some time ago abandoned the differential of $2 per ton between the two kinds of rails and its recent reduction in the price was $7 per ton. Since there was no public announcement of this step at the time, independent makers continued to quote $45 for Bessemer and $47 for open hearth rails. All companies now are quoting both grades at $40.

We quote 25 to 45-lb. sections, rolled from new steel, 1.65c. to 1.75c. base; rolled from old rails, 1.60c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—Business in merchant steel bars still is unsatisfactory in that buyers are confining purchases closely to actual needs. On such business the effort of makers is to maintain a price of 1.65c., base, but the effort was not entirely successful. If there were any sizable orders, it is doubtful whether buyers would have to go above 1.50c. The Baldwin Reservoir at Cleveland again is up for bids and this creates some interest in reinforcing bars, as the project calls for 1750 tons of these bars. A recent drop in the puddling rate to $8.43 per ton as yet has had no effect

upon local prices of iron bars, which still are quoted at 2.15c. to 2.25c. in carloads.

We quote steel bars rolled from billets at 1.50c. to 1.65c.; reinforcing bars, rolled from billets, 1.50c. to 1.65c. base; reinforcing bars, rolled from old rails, 1.50c.; refined iron bars, 2.15c. to 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Iron and Steel Pipe.—Improvement in the demand for merchant pipe continues, and while manufacturers' stocks have not been entirely liquidated, they are so low that on some sizes the best delivery that can be promised now on new business is two to three weeks. This is a decided change from the conditions of six to eight weeks ago, when shipments were being made as soon as the orders were received. New building throughout the country, apparently has been on a heavier scale than generally supposed; there is no other plausible explanation for the improvement in merchant pipe. Active inquiry still is noted for line pipe, especially from the recently opened Mexia field, situated about 75 miles southwest of Dallas, Texas. Some inquiry is developing for oil-well pipe, but no important business has been placed. Prices still are irregular and while possibly the concessions from card prices are smaller than they were recently, the market still is more favorable to buyers than sellers. Discounts are given on page 1182.

Sheets.—Buyers are specifying fairly well against orders entered some weeks ago, but confident buying, so pleasing to the manufacturers, still is lacking. Mill operations are on a smaller scale than recently, and evidence that there is not enough business to go around is found in concessions from the regular quotations of 3c., base for black, and 4c., base for galvanized. The extent of the concessions is a little uncertain, but it is known that at least $1 per ton less than the regular figures has been accepted and buyers say that some mills would take business at the August base of 2.75c. for black and 3.75c. for galvanized. Independent sheet makers in the Mahoning and Shenango valleys this week have about 65 per cent of their mills in operation and the general independent average is not much higher, due to the fact that two Kentucky plants are down as a result of labor troubles. The American Sheet & Tin Plate Co. has about 85 per cent of its mills running this week. Prices are given on page 1182.

Tin Plate.—Some large export inquiries are coming out, notably from British Columbia, but practically all of the business is going to Welsh makers who have quoted as low as $4.90 per base box delivered, which is well below the price of American producers. Welsh makers recently booked 150,000 boxes of odd sizes in British Columbia. Domestic demand is on a tapering scale and the effort to stimulate interest is resulting in but scant attention being paid to prices. There is no longer much basis in sales for a quotation of $5.25 for production plate, and $5 really is maximum, as some makers recently have gone as low as $4.75 to get business. The American Sheet & Tin Plate Co. is expected to open its books for first quarter and first half of 1922 tonnages before long, and there is an impression that its price will be less than $5 per base box. There is very little change in mill operations, but the tendency is up rather than down, because two large independent units this week are running 100 per cent on standard sizes for stock. One of these companies offered its men the choice of working half time at the old scale of wages or working full time at a reduction of 20 per cent. The latter offer was accepted. Quotations on terne plate are not being strictly observed.

We quote standard production coke tin plate at $4.75 to $5 per base box f.o.b. Pittsburgh, for carload lots.

Cold-Finished Steel Bars and Shafting.—Not much improvement is noted in the demand and prices still are irregular and easy. Makers continue to quote 2.15c. to 2.25c. base, according to the tonnage inquired for, but actual sales have been made at less, a price of 2c. base being mentioned. This figure probably was done on the automobile sizes of screw stock and presumably in competition with resale offerings by the automobile makers having surplus stock. Ground shafting is unchanged at 2.75 base mill.

Hoops and Bands.—Not much activity is noted even upon the part of buyers who were allowed to enter their requirements prior to the recent $5 per ton advance. All makers are quoting 2.25c. base, Pittsburgh, but this is more an asking than a selling price.

Nuts, Bolts and Rivets.—Interest in the market is slightly greater and there has been a moderate gain in orders, but prices still are rather unsatisfactory and there still is considerable difference between what is asked and what is being obtained. Prices and discounts are given on page 1182.

Spikes.—The Big Four Railroad recently closed for the 5000 kegs of standard spikes, the business going to a Pittsburgh district maker at about 2.25c. base. No other important sales recently have been made and inquiries generally are for small lots to meet the pressing requirements of the railroads. Fair demand is coming out for small spikes. Prices still are soft with $2.30 the general maximum on standard spikes and $2.50 the top on small spikes. Prices are given on page 1182.

Hot-Rolled and Cold-Rolled Strips.—Makers of cold-rolled strips have generally advanced the price $5 per ton, to a base of 4c., Pittsburgh. This is in keeping with the recent advance of a like amount in hot-rolled strips to 2.25c. base, Pittsburgh. Some orders have been received as a result of these increases, but they are in almost all cases priced at the old levels and while the bookings of makers to-day are at the highest point in some time, the situation is not entirely satisfactory because specifications are not coming in with real freedom.

Coke and Coal.—The market on both coke and coal has come almost to a standstill as a result of the settlement of the railroad strike. That event also has contributed to a material weakening in prices, as it has resulted in the cancellation of a number of orders placed in anticipation of a strike, this being notably true in foundry coke. Expectation of an early reduction in coal freight rates has made buyers cautious and prices also have been weakened by the fact that the Pennsylvania Railroad, having experienced a shortage of cars, has stopped the use of its cars for storage purposes and this has resulted in a good many loaded cars being thrown upon the market. Spot furnace coke now is hardly quotable even for the best grades, at higher than $3.25 per net ton, oven, and some recent business has been done as low as $3.10. Contract business is almost nil, and while producers are quoting $3.40 against such business as has been up, no sales have been consummated, at least in Connellsville coke. A Valley furnace interest recently closed for 20,000 tons for shipment in equal quantities this month and the next, the business going to a Youngstown steel company at around $5, Youngstown. The other inquiry for 30,000 tons has been withdrawn. A number of Connellsville producers have ovens which they are anxious to keep in, and it is believed would take business for shipment over the remainder of the year at $3.25. Foundry coke still is quoted at $4.25 to $4.75 per net ton, oven, but there have been some resale transactions as low as $4. There is no change in the quotations on coal, but sharp concessions have been made on "distress" tonnages and it would be necessary to shade prices to get business in freshly mined coal.

Steel Skelp.—Demand still is limited despite an improved market in pipe. Evidently the nonintegrated pipe makers have ample supplies. The market is quoted at 1.60c. to 1.65c. on steel pipe skelp, but these prices are nominal in the absence of important sales and are known to have been shaded on small export sales.

Old Material.—Demand from the steel companies has tapered off considerably since last reports and while prices show no appreciable easing, dealers are having much trouble in effecting sales. Youngstown district steel companies are less eager for tonnages and this means larger offerings to the melters in this district. Heavy melting steel still is quotable at from $14.50 to $15.00, but it is impossible for consumers to pick up other than small tonnages at these prices. The prices in primary points still are headed upward, as is evident from the fact that machine shop turnings recently sold by Dodge Bros. brought $6.05, Detroit, equivalent to $10.95, Pittsburgh, while compressed sheets offered by

(*Continued on page* 1181)

Chicago

CHICAGO, Nov. 1.

The settlement of the railroad crisis was an unsatisfactory one in the opinion of the steel trade, inasmuch as it did not clear up any of the uncertainties which stand in the way of business revival. Further reductions in wages are postponed indefinitely and the carriers intimate that a cut in freight rates is likewise deferred. There is no assurance that the brotherhoods will not again threaten a strike when the subject of wage reductions finally comes before the Railroad Labor Board.

Notwithstanding these considerations, sellers of iron and steel still look forward hopefully to a period of liberal buying by the railroads. From no other source, it is felt, can sufficient tonnage come to bring blast furnace and mill operations back to normal conditions. The building industry is still hampered by high labor costs, the agricultural implement manufacturers are not expected to get back on their feet for months, shipbuilding activity is at a low ebb, and automobile production is falling off. Considerable interest is manifested in the possible rail purchases of the carriers in 1922, particularly because a new Western rail mill will be figuring in the market at that time. A recent survey of a number of Western and Northwestern lines indicates that purchases aggregating 150,000 tons are definitely contemplated, as against orders placed by them in 1921 for nearly twice that tonnage. It is possible that their buying programs will be subsequently expanded, although in this connection it is to be remembered that considerable 1921 tonnage is still unspecified. The announcement of a $7 reduction in price, however, is expected to release the tonnage still on mill books. Thus far the most important local release to appear since the reduction is 20,000 tons for a Chicago line. Probably the first order for next year delivery to follow the announcement calls for 44,600 tons, and was placed by the Southern Pacific with the Tennessee Coal, Iron & Railroad Co. An export inquiry for 7000 tons of 60-lb. rails has been received from the Far East.

A favorable development in railroad buying policy is the fact that inquiries for new cars are assuming greater prominence than car repair work on which the carriers have been concentrating for several months. Recent orders and inquiries for new equipment likely to be built in the West will put from 70,000 to 80,000 tons of steel on mill books.

The price situation shows little change. Here and there are signs of reaction upward. Sharp competition brought steel car axles down to the abnormally low figure of 2c., base Pittsburgh, with the result that makers generally are showing a disposition to withdraw from the market rather than to take further orders at that level. Practically the only finished steel commodity which shows decided firmness is wire products, and another advance would not prove a surprise to some observers.

Mill and furnace operations in this district have improved slightly. The Illinois Steel Co. has increased its ingot output to 45 per cent of capacity, while the Inland Steel Co. remains on a 35 per cent basis. The leading producer of merchant iron expects to blow in one of its Iroquois furnaces within a week.

Pig Iron.—The leading merchant reports that orders and specifications are slowly but steadily reducing its stocks on furnace yards and that one of the idle Iroquois furnaces will probably be blown in within a week. The market has been without spectacular features during the past week, but the feeling that business conditions are on the upgrade is gaining ground. Prices are again definitely on a $21 furnace basis, notwithstanding the fact that a steel works stack continues to quote $22. Recent sales include 500 tons of malleable, two lots of 150 tons of malleable, and 200 tons of low phosphorous for Eastern delivery. A Michigan melter is in the market for 300 to 500 tons of malleable for shipment over the remainder of the year. Another current inquiry calls for 500 tons of malleable. An Alabama furnace is quoting $32, Birmingham, on one to two per cent silicon low phosphorous. This is equivalent to $38.67, Chicago, or slightly under the delivered price of Eastern material. Tennessee stocks of silvery have been so reduced that they no longer figure in the market and ruling prices are those of Jackson county producers.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50 to $33.50
Northern coke, No. 1, sil. 2.25 to 2.75	21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00
Northern high phos.	21.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil.	21.00
Basic	21.00
Low phos., Birmingham	32.00
Low phos., Eastern furnace, sil. 1 to 2 per cent copper free	34.00
Silvery, sil. 8 per cent	34.82

Ferroalloys.—A quotation of $58.35, seaboard, has now become firmly established as the minimum market quotation on ferromanganese. There is little activity in any of the ferroalloys.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Railroad Equipment.—The Illinois Central is in the market for 2000 gondola cars, 1000 refrigerator cars, 500 convertible cars, and 500 flat cars. The Western Pacific Corporation has let 1000 70-ton steel gondola cars to the Western Steel Car & Foundry Co. The Chicago, Milwaukee & St. Paul has placed orders for 1500 50-ton gondola cars with the Haskell & Barker Car Co., and 1000 of the same type with the Bettendorf Co. The Chesapeake & Ohio is inquiring for 500 70-ton hopper cars and a like number of 50-ton hopper cars, and is also asking for figures on the repair of 1000 hopper cars. The Missouri, Kansas & Texas is asking for prices on 20 passenger and 10 baggage cars.

Cast Iron Pipe.—The bids on 17,000 tons of 6 to 48-in. for Detroit, as received yesterday, are as follows: Lynchburg Foundry Co., $42.80, delivered; United States Cast Iron Pipe & Foundry Co., $43.20; American Cast Iron Pipe Co., $43.80. The freight to Detroit is $8.80, so that the low bid is equivalent to $34, Birmingham. Columbus, Ohio, has let 1635 tons to the United States Cast Iron Pipe & Foundry Co. Ashland, Ky., has awarded 200 tons to the American Cast Iron Pipe Co., and James B. Clow & Son will furnish 375 tons for Marietta, Ohio. Portsmouth, Ohio, takes bids on 300 tons, Nov. 7.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Rails and Track Supplies.—Although the reduction in rails is expected to release considerable steel on mill books, thus far the only important tonnage on which rolling instructions have been given is 20,000 tons for a Chicago line. No 1922 business has yet been reported, but it is known that the new rail price coincides rather closely with what a number of Western lines regard as a fair figure. As was expected, the announcement on rails has been followed by a reduction in angle bars, the new quotation of the Steel Corporation subsidiaries being 2.40c. f.o.b. mill. Inquiries for spikes and bolts are more numerous and range from 500 to 5000 kegs each. Prices are soft and the ruling market appears to be 2.30c., Pittsburgh, on standard railroad spikes and 3.30c., Pittsburgh, on track bolts.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.30c., Pittsburgh; track bolts with square nuts, 3.30c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Plates.—Railroad car construction and repair work constitute the chief sources of tonnage, although some business continues to come from miscellaneous buyers, such as tank builders, boiler manufacturers and jobbers. The railroads are doing an increasing amount of car repair work in their own shops for which they are buying steel from time to time, ordinarily in moderate tonnages. Some large inquiries for cars are in the

market and considerable car repair work is still pending. The Sinclair Refining Co. has issued an inquiry for 16 oil storage tanks, requiring 2700 tons, for the Oklahoma fields, as noted in our New York market last week. Although the inquiry was made from the New York office of the Sinclair company, it will be figured on by Chicago district fabricators. In the aggregate, current plate bookings are still sub-normal and mill quotations are not so firm as in recent weeks.

The ruling mill quotations range from 1.75c. to 1.85c. Chicago. Jobbers quote 2.88c. for plates out of stock.

Bars.—The market is quiet and no material change in the price situation is to be noted. The Rochester Bridge Co., through a subsidiary, has taken 150 tons of reinforcing for State highways near Bement, Ill. General contracts for a number of other important reinforcing jobs are at the point of closing, but the subletting of the steel to reinforcing bar companies has not yet been effected. The Koss Construction Co., Des Moines, Iowa, has the contract for a bridge at Grand Rapids, Mich., requiring 250 tons. The Owen-Ames-Kimball Co., Grand Rapids, is low bidder on a filtration plant in that city requiring 370 tons. The Ellington Miller Co., Chicago, named the low figure on a waterworks plant, Ashland, Ky., involving 100 tons. The demand for bar iron remains at a low ebb and intermittent mill operations are still the rule. The hard steel bar situation shows no change for the better. One representative rail carbon steel bar mill operated single turn during three-quarters of October and is idle as November opens. The ruling market appears to be 1.75c., Chicago, but in a few cases as low as 1.65c. has been named.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.85c. for rounds and 4.35c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.10c. base.

Sheets.—The attempted advance of certain independents has proved a decided failure in this district. The quotations named below represent the ruling market. A fair amount of business continues to be placed at those prices, proportionately more tonnage than is being booked by plate, structural and bar mills. The hot mills of the local independent are still running full.

Mill quotations are 3c. for No. 28 black, 2.25c. to 2.50c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Bolts and Nuts.—Makers note a slightly better demand from miscellaneous sources, as, for instance, from manufacturers of building hardware. Discounts are soft, but there appears to be a trend towards greater firmness. For nominal prices and discounts, see finished iron and steel, f.o.b. Pittsburgh, page 1182.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ¾ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Warehouse Business.—Local warehouses report business on a slightly improved plane. Significance is attached to the fact that although orders generally taper off at the close of the month, the last week of October showed a sustained demand for material. Track bolts have been reduced to 4.40c. and track spikes to 3.40c. Low carbon open hearth forging billets have been reduced from 2.59c. to 2.48c. and 0.35 to 0.45 carbon billets from 2.63½c. to 2.52c.

Wire Products.—Bookings are of favorable proportions and of the same character as previously noted, except that orders from the railroads are more numerous. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1182.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Structural Material.—The threatened railroad strike tended to halt business last week, but it now seems probable that business will be resumed at the rate which prevailed throughout October. Quotations on plain material are less steady, although it is urged that in view of their present low level there can be no material change in a downward direction. Competition between fabricators is still very keen, and this fact is appreciated by those in a position to go ahead with construction projects. Structural lettings include:

Mead Morrison Mfg. Co., ore bridge for Union Carbide Co., Niagara Falls, N. Y., 250 tons, to Lackawanna Bridge Co.

State of Washington, lift bridge, Kelso, Wash., 632 tons, to American Bridge Co.

Abou Ben Adhem Shrine Temple, Springfield, Mo., 327 tons, to Decatur Bridge Co.

Memorial Community Building, Wakefield, Mich., 147 tons, to Worden-Allen Co.

Chicago, Burlington & Quincy Railroad, girder and I-beam spans, Wichita Falls, Tex., and Denver, Colo., 126 tons, to American Bridge Co.

Theater and business block for Teutonia Avenue Investment Co., Milwaukee, 125 tons, to Worden-Allen Co.

Pauly & Marx, Inc., public garage, sales and service building, Milwaukee, 100 tons, to Milwaukee Bridge Co.

Wisconsin Masonic Home, Dousman, 115 tons, to Milwaukee Structural Steel Co.

Illinois Highway Commission, bridge, Bement, Ill., 350 tons, to Rochester Bridge Co.

Pending business includes:

London Guarantee & Accident Co. building, Chicago, 3000 tons, Alfred S. Alschuler, architect.

State Division of Waterways, aqueduct, Ottawa, Ill., 200 tons.

Oklahoma State Highway Commission, four large bridges, bids to be taken Nov. 15.

The mill quotation on plain material ranges from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Old Material.—The market has been almost devoid of consumptive buying during the past week and further weakness in prices has developed. However, some sellers who participated in the recent speculative movement refuse to offer material at concessions, being confident that demand will revive and force prices upward. It is evident that a few good-sized inquiries from users are needed to clarify the atmosphere. Railroad lists are very large this week and in the minds of consumers do not augur well for a steady market. The Burlington is readvertising 7500 tons; the North Western offers 8000 tons; the Baltimore & Ohio 10,000 tons; the Pennsylvania, Northwestern and Southwestern Regions, 3500 tons each; the Santa Fé 2000 tons; the Monon 875 tons; the Baltimore & Ohio Chicago Terminal, 630 tons; and the Michigan Central and the Erie, blank lists.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$17.00 to $17.50
Relaying rails	25.00 to 30.00
Car wheels	16.50 to 17.00
Steel rails, rerolling	13.50 to 14.00
Steel rails, less than 3 ft.	13.75 to 14.25
Heavy melting steel	12.00 to 12.50
Frogs, switches and guards cut apart	12.00 to 12.50
Shoveling steel	11.50 to 12.00
Low phos. heavy melting steel	15.50 to 16.00
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.50 to 9.00
Axle turnings	8.50 to 9.00
Per Net Ton	
Iron angles and splice bars	14.50 to 15.00
Steel angle bars	11.50 to 12.00
Iron arch bars and transoms	15.50 to 16.00
Iron car axles	20.00 to 20.50
Steel car axles	14.50 to 15.00
No. 1 busheling	9.50 to 10.00
No. 2 busheling	6.25 to 6.75
Cut forge	11.50 to 12.00
Pipes and flues	8.50 to 9.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Steel knuckles and couplers	13.00 to 13.50
Coil springs	14.00 to 14.50
No. 1 machinery cast	13.75 to 14.25
No. 1 railroad cast	13.50 to 14.00
Low phos. punchings	12.00 to 12.50
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	4.00 to 4.50
Cast borings	5.50 to 6.00
Stove plate	12.75 to 13.25
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00
Railroad malleable	13.00 to 13.50
Agricultural malleable	13.00 to 13.50
Country mixed	9.00 to 9.50

St. Louis

ST. LOUIS, Nov. 1.

Pig Iron.—The pig iron market experienced a lull last week. The biggest sale during the week was for about 200 tons, and there were no new inquiries for a larger quantity. The carload business was only fair, and very little interest one way or the other was shown by the trade. News of the calling off of the railroad strike was of little influence. The market is firm. Local producers are meeting the recent cut to $21, Chicago, although several sellers are holding at the old price of $22. Business of stove manufacturers, according to eight reporting interests to the Federal Reserve Bank, indicates sales in September 8 to 19 per cent under a year ago, but 14 to 44 per cent larger than in August. Buying of stoves and ranges continues on an immediate delivery basis, with the size of average orders the smallest in more than a decade. Several cars of ferromanganese were purchased during the week.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$23.88 to $24.88
Northern malleable, sil. 1.75 to 2.25	23.88 to 24.88
Basic	23.88 to 24.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—The calling off of the railroad strike was so generally discounted by the belief that there would be none that the revocation of the order had little effect on the markets. The chief interest in structural steel was the awarding of the contract for the 1700 tons of shapes for the Omaha Commercial and Technical High School to Christopher & Simpson Iron Works, St. Louis. Local fabricators also are after the Shrine Mosque at Springfield, Mo., involving 230 tons of structural steel and 103 tons of bars, the general contractor being J. M. Olsen of Springfield. The low bidder for the extension of the filtration plant at Grand Rapids, Mich., involving 350 tons of bars rolled from billets, was Everett Winters, while Emil Gentz was second low bidder, the latter having built the original plant. The Wabash sent out an inquiry for 500 boiler tubes, but there was nothing else of consequence among the railroads. The Cape Girardeau (Mo.) Street Railroad, E. A. Hart, general manager, is to be improved with new rails and new steel cars. Sheets are showing more life than anything else, jobbers continuing to buy No. 24 gage and lighter. The report of the Eighth Federal Reserve Bank says that the improvement in hardware continues steadily. Nine leading interests report that, measured in tonnage, September sales were 12 per cent less to 9 per cent larger than a year ago, and but with one exception all firms show an increase of sales and shipments in September over August. Warehouse business shows some improvement during October, with prices unchanged.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The market for coke was rather quiet the last week. There were few inquiries and the purchase of 200 tons by a gas-making concern was the only sale of note. The carload business was light. Standard Connellsville foundry coke is still quoted at $4.75 to $5.50, which is being met by local by-product producers.

Old Material.—The market for old material continues weak, and dealers who have railroad material on track are making frantic efforts to dispose of it to brokers—at a loss. The fact that the threatened railroad strike is out of the way did not seem to have any bearing on the situation, due principally to the fact that consumers will not pay the prices demanded by dealers. Cast grades, however, are very scarce, and prices have advanced on No. 1 railroad cast and stove plate. Current railroad offerings include: Pennsylvania, 3500 tons; Atchison, Topeka & Santa Fe, 2500 tons; Cleveland, Cincinnati, Chicago and St. Louis, 2400 tons; Wabash, 500 tons; Chicago, Indianapolis & Louisville, 960 tons; St. Louis Southwestern, 500 tons, and an open list by the New York Central.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$15.50 to	$16.00
Steel rails, rerolling	13.50 to	14.00
Steel rails, less than 3 ft.	13.00 to	13.50
Relaying rails, standard section	30.00 to	32.00
Cast iron car wheels	15.50 to	16.00
No. 1 heavy railroad melting steel	12.00 to	12.50
No. 1 heavy shoveling steel	11.50 to	12.00
Ordinary shoveling steel	11.00 to	11.50
Frogs, switches and guards, cut apart	12.00 to	12.50
Ordinary bundle sheet	7.00 to	7.50
	Per Net Ton	
Heavy axles and tire turnings	$7.50 to	$8.00
Iron angle bars	13.00 to	13.50
Steel angle bars	11.00 to	11.50
Iron car axles	20.00 to	20.50
Steel car axles	15.50 to	16.00
Wrought iron arch bars and transoms	15.50 to	16.00
No. 1 railroad wrought	12.00 to	12.50
No. 2 railroad wrought	11.00 to	11.50
Railroad springs	13.00 to	13.50
Steel couplers and knuckles	13.00 to	13.50
Locomotive tire, 42-in. and over, smooth inside	10.00 to	10.50
No. 1 dealers' forge	10.00 to	10.50
Cast iron borings	7.50 to	8.00
No. 1 busheling	11.00 to	11.50
No. 1 borings cut in sheets and rings	8.00 to	8.50
No. 1 railroad cast	16.00 to	16.50
Stove plate and light cast	13.50 to	14.50
Railroad malleable	11.50 to	12.00
Agricultural malleable	10.50 to	11.00
Pipes and flues	8.50 to	9.00
Heavy railroad sheet and tank	8.00 to	8.50
Light railroad sheet	5.50 to	6.00
Railroad grate bars	10.50 to	11.00
Machine shop turnings	6.00 to	6.50
Country mixed iron	8.00 to	8.50
Uncut railroad mixed	9.00 to	9.50
Horseshoes	11.00 to	11.50
Railroad brake shoes	10.50 to	11.00

Buffalo

BUFFALO, Nov. 1.

Pig Iron.—Quotations of $21 base for foundry iron, generally observed on small tonnages a few weeks ago, are not the rule now. The market has weakened and $20 and even $19.50 has been quoted on such orders as range from 200 to 400 tons. Radiator interests have bought at bargain prices, there is little doubt, but there is nothing authentic in the way of available information and rumored prices as low as $18.50 have not been substantiated; nor is there any specific information as to the tonnage involved in these purchases. One furnace which has announced it has been out of the market because its output has been sold for the remainder of the year has sold several small lots. Inquiry has been received regularly, but there is no disposition to take any new, large tonnages. One interest has sold 4500 tons and in several instances has gone below the $20 price. A furnace which has refrained from entering keen competition for a number of months has become more active and has sold iron at points widely removed from Buffalo. In order to meet competitive conditions at these points and by virtue of an excessive freight rate, the furnace price of this iron has been considerably below $21. It is unlikely that business for the rest of this year will be very heavy. While furnaces are not looking for a slump, they are not expecting any great tonnage to be booked.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.00 to $21.00
No. 2X foundry, 2.25 to 2.75 sil.	20.00 to 20.50
No. 2 plain, 1.75 to 2.25 sil.	19.50 to 20.00
Basic	20.00 to 21.00
Malleable	20.00 to 21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—Further depletion of stocks has served to bring out some business in sheets and pipe. Cancellation of the railroad strike does not seem to have affected the market in the matter of new business. There was some flurry toward expediting shipment of material previously ordered, but, on the whole the prospect was not taken in an alarming way. Pipe business has held up consistently and demand for this product is more or less seasonal and the lull is likely to come early this month. A sheet mill has booked sufficient orders to continue its 50 per cent operation schedule for the remainder of the year. On No. 10 blue annealed sheets $2.25 is now quoted and $3 on No.

28 gage black. Car repair work has brought out an inquiry from a local repair shop for 200 tons of bolts and nuts—the largest in many months. No structural awards of any size have been made. Two new structural enterprises on which figures have been asked are an addition to a factory building of the National Biscuit Co., requiring 2000 tons of shapes and a new 600-room hotel, for which the requirements are not yet announced. Both are Buffalo projects. Bar prices are being shaded and the price of 1.60c. quoted by one mill did not bring business. The conclusion was that a Buffalo mill quoted 1.55c.

Warehouse Business.—While the improvement over the preceding month is being maintained, there is evidence that the cancellation of railroad strike instructions had the effect of slowing down warehouse business. When it became increasingly evident early in the week that the strike would not occur, the demand for warehouse products showed this trend. The volume of inquiry to warehouses is not increasing week by week to any appreciable extent, but there is no question sales have increased over September. Structural business in small sizes shows activity in some building enterprises and bar business is fair. Machine tool orders have likewise shown an increase which is indicative of increased shop operation.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 5.90c.

Old Material.—With the possibility of a railroad strike eliminated, there is a more confident feeling. With the exception of one, all mills are buying steel, but not in large lots. Demand is fairly steady and prices are stronger. No large sales have been made.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.004 and under	16.50 to 17.50
No. 1 railroad wrought	13.00 to 14.00
Car wheels	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.00 to 11.00
Grate bars	11.00 to 12.00
No. 1 busheling	10.00 to 11.00
Stove plate	14.50 to 15.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 17.50
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

Boston

BOSTON, Nov. 1.

Pig Iron.—The market has flattened out, sales in the New England district the past week being confined to a 100-ton lot of Alabama, silicon 2.25 to 2.75, at $19.50, furnace, to a Massachusetts consumer, and possibly a dozen car lots of Buffalo and Pennsylvania No. 2X and higher silicon iron. Most furnaces are quoting on last week's basis with a 50c. differential between No. 2 plain and No. 2X, and between No. 2X and No. 1X. In one instance a Pennsylvania furnace asks $1 differential. Those furnaces, especially in the Buffalo district, having a stock of high silicon iron on hand will moderate the differential, and one Buffalo furnace is asking a flat price of $20, furnace, regardless of silicon. This week it sold a car of iron, silicon 3.75 to 4.25, to a Connecticut foundry at $20, furnace. Foundries, generally speaking, show slightly more activity, but have sufficient iron on hand or on order to last them over the turn of the year. Radiator, stove, textile and piano foundries are extremely busy and unquestionably would place first quarter business at prices under those ruling to-day, were furnaces willing to accept such tonnages. Price cutting on foundry castings is less noticeable than it was a month or so ago, although when a large tonnage is involved melters do not hesitate to quote lower. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$24.56 to $27.56
East. Penn., silicon 1.75 to 2.25	24.06 to 27.06
Buffalo, silicon, 2.25 to 2.75	25.46 to 26.49
Buffalo, silicon 1.75 to 2.25	25.46 to 25.96
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Forgings.—The steel forgings market continues comparatively active, with prices in favor of the buyer. A Massachusetts manufacturer has placed a tonnage of semi-steel light castings at a price representing a drop of 70.68 per cent as contrasted with what was paid for the same kind of a casting in November, 1920.

Cast-Iron Pipe.—The cast-iron pipe market practically was at a standstill the past week. Manufacturers anticipate only scattered buying the rest of the month, but a good business later. Several of the important New England cities have asked for tentative prices on pipe to be delivered in the first quarter of 1922, but foundries, as a rule, are not willing to quote until the freight rate and other questions become more clearly defined. We quote per net ton in carload lots f.o.b. Boston and district on 1921 delivery, as follows: 3-in., $66.70; 4-in., $56.70; 6-in., $50.70; 10-in., and larger, $49.70, with a $4 differential on Class A and gas pipe.

Finished Material.—The Bay State Dredging & Contracting Co. was the low bidder on the proposed Neponsit River, Boston, bridge. Its bid for the steel girder type of bridge, involving 1270 tons of structural steel, was approximately $445,000. Award probably will be made this week. Bids for 900 tons of shapes for the bridge proper, and erection, ranged from $57 to $72. The Levering & Garrigues Co. is awarded 302 tons of shapes for a local telephone exchange building, and the Arthur C. Harvey Co., Boston, sold 100 tons of shapes and plates to the Boston Transit Commission. The following tonnages remain unlet: Bradbury Building, Boston, 200 tons; Providence, R. I., high school, 600 tons; Meisel Press Mfg. Co. plant, 200 tons. The demand for iron and steel products in general is quiet, with the market on plates, shapes and bars 1.60c., Pittsburgh. Cold-rolled steel, screw stock, has sold in this district in carload lots at 2.15c., base Pittsburgh.

Warehouse Business.—Following last week's slight reduction in warehouse prices on iron and steel an improvement in buying is noted. Large consumers, for the first time in months, are beginning to come into the market for small tonnages. Boston & Maine Railroad buying of ⅝-in. bolts and smaller features the bolt and nut market. The company's total purchases will exceed 100,000 bolts. The price has been cut 5 per cent on some of this business placed.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.31½; concrete bars, $2.15 to $2.81½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.73 to $3.78; steel hoops, $3.46½; toe calk steel, $5; cold rolled steel, $3.75 to $4.25; structural steel, $2.91½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.81½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Coke.—With the railroad strike abandoned, New England foundries are less anxious to stock coke other than for winter requirements, consequently a decrease in shipments from by-product ovens is noted. Both the New England Gas & Coke Co. and the Providence Gas Co. continue to quote foundry coke on a basis of $10.66 delivered where the local freight does not exceed $3.40. The Trunk Line Coal and Coke Committee, the Boston & Maine, the Maine Central and the Canadian Pacific railroads have approved a new schedule of freight rates on all grades of coke from Boston to Canadian points, which compares as follows:

	Present Rate	Approved Rate
St. John, N. B.	$8.10	$4.60
Moncton, N. B.	9.20	7.00
Sackville, N. B.	9.20	7.60
Truro, N. B.	9.20	8.20
Amherst, N. S.	9.24	7.60
North Sydney, N. S.	14.40	9.30

These rates apply to shipments via Vanceboro, over the Boston & Maine, Maine Central and Canadian Pacific railroads only. They now go to the Interstate Commerce Commission for its approval. The Trunk Line Coal and Coke Committee and railroads are working on new proposed rates to such points as Charlottetown, P. E. I.; Halifax, N. S.; New Glasgow, N. S.; Windsor, N. S., and Yarmouth, N. S., and it is proposed to work out new rates to the above mentioned places over routes other than via Vanceboro. New freight rates from Boston to Montreal and similar points are under consideration. It is roughly estimated 25,000 to 35,000 tons of foundry coke alone are

exported to the Montreal district annually. At best, the above approved rates to Canada will not become effective until some time in December.

Old Material.—Prices hold strong all along the line, but there appears to have been a slowing up in business since the railroad strike was called off. The demand for borings and turnings is relatively better than that for anything else and the market is about 50c. a ton higher. Several car lots of textile machinery cast have sold this week at $18.50 to $20, delivered, depending on the point of delivery, and some carload inquiries for No. 1 machinery are noted. Pennsylvania steel mills are showing increased interest in heavy melting steel, etc., and dealers here expect to book considerable tonnage this month.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	16.00 to 16.50
Railroad malleable	13.50 to 14.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.50 to $8.00
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	3.75 to 4.00
Cast iron borings, rolling mill	5.00 to 5.50
Cast iron borings, chemical	5.50 to 6.00
Blast furnace borings and turnings	3.75 to 4.00
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	12.50 to 13.00
Car wheels	11.50 to 12.00
Rerolling rails	10.00 to 10.50

Cincinnati

CINCINNATI, Oct. 31.

Pig Iron.—There is very little activity in the market, sales being entirely confined to carload lots and even these being widely scattered. The only live inquiry comes from a central Ohio stove maker for 150 tons of Southern iron. An Illinois melter was in the market last week for 500 tons of high silicon malleable iron, but later decided not to buy. It is understood that the Chattanooga melter who recently inquired for 1000 tons of malleable for first half delivery has decided to wait a while before placing the order. It is reported that the lowest quotation received was on a $21, Ironton, basis. The American Radiator Co. is reported to have bought 1000 tons of Southern iron for its Birmingham plant. There is a softer tone to the market and Chicago iron has been offered by brokers at $20.50. Considerable Southern resale iron is still available at $18.50 and a lake furnace is reported to have quoted $19.75 in the northern part of Ohio. The Ironton producer is holding at $21 and a steel works interested is reported to be taking some carload orders for high manganese iron on a $21.50 base. Shipments from furnaces are fairly satisfactory, and are showing a gradual improvement with each week.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silver, 8 per cent sil.	32.86
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	24.02

Finished Material.—The market slumped off during the past week and carload orders for fill-in purposes were about the only activity. A sale is reported of 80 tons of cold-rolled shafting at 2.25c. and an equal tonnage of bars at 1.65c. This business was placed early in the week. The market to-day on bars, shapes and plates ranges from 1.60c. to 1.65c., and these prices are now generally quoted. Sheet business has also fallen away to very small proportions, fill-in tonnages representing the market activity. There is still a small demand for wire and wire products. The only new project to come up in the structural field was some bridge work for the Big Four Railroad, 360 tons being involved. Plant operations will continue at the same rate as last week. The east side plant of the American Rolling Mill Co. is running at full capacity, with nine mills operating at Zanesville. The Whitaker-Glessner Co. will continue its former rate of operations and the Newport Rolling Mill Co. will again be idle.

Warehouse Business.—Numerous small orders are being received and in view of general conditions orders booked are regarded as satisfactory. There was some activity in cold-rolled products during the week, the orders, however, being for small lots for immediate delivery. Quotations remain unchanged.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.10c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—There was a flurry in the coke market during the week and several good sales were made though the majority of the transactions were in one and two car lots. There is a tendency on the part of melters to store a supply of coke against winter needs as reports of car shortages are being heard. There are no developments to report in the price situation, Connellsville furnace coke being quoted at $3.25 to $3.50 and foundry $4.25 to $5. Wise County foundry coke is quoted at $5.75 to $6.50 and New River $7 to $7.50.

Old Material.—The scrap market is exceedingly dull, as most of the consumers in this market are not running full and have big stocks on hand. Some cast scrap sales are reported, mostly in carload lots. Prices are weaker, but quotably unchanged in the absence of trading.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	$4.50 to $5.50
Iron rails	12.50 to 13.00
Relaying rails, 50 lb. and up	25.50 to 26.50
Rerolling steel rails	11.00 to 12.00
Heavy melting steel	9.50 to 10.00
Steel rails for melting	9.50 to 10.50
Car wheels	12.50 to 13.50
Per Net Ton	
No. 1 railroad wrought	9.00 to 10.00
Cast borings	3.50 to 4.00
Steel turnings	2.50 to 3.00
Railroad cast	12.50 to 13.00
No. 1 machinery	14.00 to 15.00
Burnt scrap	8.00 to 9.00
Iron axles	16.00 to 17.00
Locomotive tires (smooth inside)	10.00 to 10.50
Pipes and flues	4.50 to 5.50

Birmingham

BIRMINGHAM, Nov. 1.

Pig Iron.—The smallest business in pig iron in some time was that of last week. One maker sold 500 tons in small lots for prompt shipment and none laid claim to much business. The tone of the market, however, was not affected and it remained firm at $19. Hope of early reduction in freight rates is credited with the lull in buying. This is especially true with regard to Middle Western takers of Birmingham iron, who were in the market three weeks ago, but are not now and seem to be holding aloof as long as possible pending lower freight rates. Six merchant furnaces in Alabama are active, but none is piling stocks. A prominent operator said: "The situation is well in hand so long as additional stacks do not blow in. The Southern consumers are caring for the present production owing to increased iron consumption in the South." It is noteworthy that numbers of independent shops are doing a lot of railroad car repairing which the trunk lines prefer having them do to operation of their own large plants on account of overhead. Several Alabama shops have all they can do. The mines and furnaces have also begun to send work to machine shops that had not been seen in that quarter in months. The repair shops of all kinds are more and more busy. Movements from yards are heavy, especially from the one really large stock accumulation. Current sales of iron are restricted to the South. Some few export orders of small tonnages for South America have been placed in the past month, but the total is not large. Melt at stove plants and pipe shops is largest of the year.

We quote per gross ton f.o.b, Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$19.00
Basic	18.00
Charcoal, warm blast	35.00

Finishing Mills.—The Tennessee company operations are larger this week, including its structural mill at

Fairfield, plate, guide and bar mills at Bessemer, double turn at Ensley rail mill, five of the nine open-hearth furnaces, four furnaces on basic iron, car works and tie-plate plant at Fairfield. The car works has attained a daily output of 13 pressed steel standard freight cars. The Gulf States Steel Co. is at 70 per cent in finishing mills and operating three of its six open-hearth furnaces. Other steel mills report no change in operations of 50 to 70 per cent.

Cast Iron Pipe.—Many small orders from all over the South and Southwest swell new tonnage of high pressure pipe shops, which reiterate expectation of a good run to the end of the year. Lower freight rates would bring faraway business in the West that still hangs fire. All but one of the dozen Anniston sanitary pipe shops are running. The high pressure base is now $33 to $35 and prevalent base of sanitary remains at $40.

Coal and Coke.—Coal and coke are stronger. Foundry coke is moving all over the South, Southwest and to Pacific Coast. One steam coal producer was forced to decline additional orders this week. Coke base is $5.50 to $6.

Old Material.—Temporary improvement in the scrap market gave way under the threat of strike, but dealers look for improvement in the next ten days and seem confident of price advances, especially as to steel. Dealers are holding to accumulations rather than sell steel at the base offered by consumers. No. 1 cast and stove plate are fairly active.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

New York

NEW YORK, Nov. 1.

Pig Iron.—A decided lull has come and it is attributed to the fact that there was considerable increase in shipments and moderate addition to new buying on account of the fear of a railroad strike. Hence, it is expected that the shipments this month will show a marked decrease compared with those for October, although there is some evidence that the melt of jobbing foundries is increasing. There is no decided change in prices, but reports from Buffalo indicate weakness in that district. Although a cast iron pipe manufacturer stated that he purchased 1000 tons of Luxemburg iron at $19 c.i.f. Atlantic port, it is positively asserted that no quotation within several dollars of $19 can now be obtained and that apparently $24 is the minimum without any guarantee as to delivery. The iron is above 1 per cent in phosphorus. On the whole, the efforts of representatives of foreign irons to place orders in this country are not arousing much interest.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	23.02
Buffalo, sil. 1.75 to 2.25	25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16

Finished Iron and Steel.—Structural steel projects reported in this market for the past week total close to 11,000 tons and quite a number of projects are pending. October has shown an improvement in nearly all steel lines. A large independent steel company which keeps a daily curve record of its orders in the New York district reports that sales since Aug. 1 have shown a steady upward tendency, with October as the best month of the year. This particular company is now operating its mills and furnaces close to 50 per cent. On all sizable steel projects there is keen price competition. Pittsburgh and other mills which have quoted as low as 1.50c., Pittsburgh, in plates, shapes and bars have sometimes lost the business to Eastern mills whose prices are figured f.o.b. mill with lower freight rates than the Pittsburgh-New York rate of 38c. per 100 lb. About 5000 tons of reinforcing bars for the Jamaica Boulevard has been bought at or about 1.80c., delivered. An order was placed a few days ago for 600 tons of plates at a price said to be 1.50c., Pittsburgh. On ordinary lots of steel 1.60c., Pittsburgh, is being frequently obtained for plates, shapes and bars. The market is devoid of important developments, but there is considerable interest in the bidding on 20,000 tons of plates for the Catskill aqueduct water pipe project. Bids will be opened Nov. 10 by the Board of Water Supply, New York. The largest structural steel job of the week is about 5000 tons for the new Saks' department store at Fifth Avenue and Fifty-seventh Street, which was awarded to Post & McCord. Second in importance was 2200 tons for the Beth Israel Hospital, Brooklyn, awarded to the Harris Structural Steel Co. The Bethlehem Steel Bridge Corporation will fabricate 1700 tons for a bridge over the Lehigh River at Bethlehem, Pa. The same company was awarded 260 tons for a high school building at Kearney, N. J. For the Jamaica Boulevard project 600 tons of fabricated steel has been awarded to parties unnamed. Two jobs have been let in Boston, one of 700 tons for the Federal Street Trust Building at the New England Structural Steel Co. and the other amounting to 225 tons for the Bradbury Building to an unnamed fabricator. The American Bridge Co. was awarded 300 tons for the Hancock Building, Syracuse, N. Y. Bids have gone in on a loft building at West Thirty-fourth Street, New York, requiring 400 tons; an apartment house at Seventh Avenue and Fifty-seventh Street, 800 tons; and an apartment building in East Eighty-eighth Street, 350 tons. The threatened railroad strike held back railroad car work last week, and the only inquiry of importance is from the Illinois Central for 2000 50-ton gondolas. The Chicago, Milwaukee & St. Paul is expected to place orders this week for 2500 gondolas and the Denver, Rio Grande and Western may buy 1000 gondolas this week.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.80c. to 1.88c.; plates, 1.88c. to 2.03c.; structural shapes, 1.88c. to 2.03c.; bar iron, 1.98c. to 2.03c On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Ferroalloys.—There is practically no demand for ferromanganese and quotations remain unchanged with the domestic and British alloys on a parity as to delivered price. Demand for spiegeleisen is light. An Ohio steel maker has bought 200 tons of 19 to 21 per cent alloy and there has been a sale also of a carload. The manganese ore market is flat. Sales of about 1800 tons of 50 per cent ferrosilicon are reported at prices ruling very recently. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton.	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$56.00 to $60.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	10c. to 11c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.50 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Warehouse Business.—While no important changes have been made in the quotations of warehouses in this

district, there is an undercurrent of feeling on the part of some jobbers that quotations on bars, plates and structural material should be revised again in accordance with the prevailing mill quotations. The recent mill increase on blue annealed sheets has resulted in practically all warehouses going to a base of 3.53c. per lb. for No. 10 gage, which has been the prevailing price among dealers in small lots of a few sheets for the past two weeks. Dealers in wrought iron and steel pipe note but little change in the dullness of the situation in this line, despite the fact that the fall of the year is generally the most active time for pipe contracts. No further changes of these prices are evidently contemplated at present. Brass and copper warehouses continue to report improved demand and considerable stiffening of the prevailing quotations. We quote prices on page 1198.

High Speed Steel.—The situation is extremely dull, although some demand for tool steel is reported by warehouses. One large producer of high speed steel has reduced his price on 18 per cent tungsten to 90c. per lb. and a special brand to $1.05 per lb. The prevailing quotations are from 90c. to $1 per lb. for 18 per cent tungsten high speed steel.

Cast-Iron Pipe.—October business was very satisfactory considering the season of the year. Prices are holding firm on small tonnages, though sizable inquiries bring lower quotations. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30; with $4 additional for Class A and gas pipe.

Coke.—The coke market is weaker, due largely to the moderate increase in activity and advance in prices on account of a fear of a railroad strike. Prices on Connellsville foundry grades range from $4.25 to $4.75, ovens, and on New Jersey by-product coke the price is $4.50.

Old Material.—The long gradual upswing of prices has been halted and a reaction has set in with a few items, notably pipe, whose tendency is downward. There has been less buying by mills the past week and the prospects of lower freight rates have had the effect of halting business and perhaps lowering prices. It is believed that lower freight rates would increase the volume of sales and work against further raising of prices.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$8.00 to $8.50
Steel rails, short lengths, or equivalent	9.50 to 10.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	30.00 to 35.00
Steel car axles	11.50 to 12.00
Iron car axles	20.00 to 20.50
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track	9.50 to 10.00
Forge fire	6.00 to 6.50
No. 1 yard wrought, long	10.50 to 11.00
Light iron	4.50 to 5.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	4.00 to 4.50
Mixed borings and turnings	4.00 to 4.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.75 to 9.25
Stove plate	10.50 to 11.00
Locomotive grate bars	10.00 to 10.50
Malleable cast (railroad)	8.50 to 9.00
Car wheels	12.50 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to 17.00
No. 1 heavy cast, not cupola size	15.50 to 16.00
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

The Massillon Reinforcing Bar Co., Massillon, Ohio, has completed its new re-rolling mill plant which is equipped with a 15-in. mill. The company will make hard steel bars, re-rolled from rails, both plain and deformed, in all standard sizes, and will install equipment for fabricating its product. The company's general sales office has been opened at 534 Bulkley Building, Cleveland. K. E. Wagner is the general sales manager.

The American Hardware Corporation, New Britain, Conn., on Monday began to operate one of its largest subsidiary plants on a basis of 55-hr. weekly and with practically a full number of employees on its payroll.

Philadelphia

PHILADELPHIA, Nov. 1.

The possibility of freight rate reductions is overhanging the market, causing consumers to withhold orders and creating an atmosphere of uncertainty that will remain as an important market factor until definite information comes from the Interstate Commerce Commission. In some quarters doubt is expressed that a horizontal cut in freight rates will be made, the belief being that reductions will be made in specific instances, such as the recent change in iron ore rates. Consumers seem to take the view that lower freight charges will mean lower prices, but with pig iron and steel products, with few, if any exceptions, now selling at cost or less, producers dissent from this view and declare that any advantage accruing to them because of freight rate reductions will only partially make up for the losses they are now incurring. In steel products, particularly plates, shapes and bars, there is marked weakness in prices, but this is due to keen competition for business and not in anticipation of any savings in costs by reason of lower freight rates. Even in scrap, which is not a manufactured product in the same sense that are pig iron and finished steel, it is stated that there will be no saving to the buyer following freight rate reductions, but that the advantage will go to the producer or shipper, who for a considerable time has been forced to accept very low prices because of the large amount taken up by transportation costs.

Consumers advance another reason for their unwillingness to buy more freely at this time—they are anxious to go through the approaching inventory period with the lowest possible stocks on hand. With these factors as a checkmate to buying, the trade here is not looking for more than hand-to-mouth purchasing of the most careful character until after the first of the year.

While pig iron and old material are firm, with scrap prices advancing slightly each week, the steel situation continues to show weakness. Any attractive specification for plates, shapes or bars can now command a price of 1.50c., Pittsburgh, and in some instances even this figure has not been low enough to take business. A steel pipe fabricator who is figuring on an oil pipe line has inquired for 20,000 tons of narrow plates, with an intimation that better than 1.50c., Pittsburgh, must be quoted.

Pig Iron.—With prices for foundry iron now firmly established at a minimum of $21 for No. 2 plain at furnace, some of the Eastern makers of iron are now considering what policy they shall follow for first quarter contracts, regarding which a few consumers have made inquiry. Up to this time the Eastern furnaces have shown little disposition to quote beyond the first of the year, and if first quarter prices are named soon they will probably be at least $1 or $2 a ton above those prevailing for spot iron. The blowing in of the Reading and Hellertown furnaces will make four active merchant furnaces in eastern Pennsylvania, in addition to those of the Bethlehem Steel Co and one in New Jersey. All of the Virginia furnaces continue out of blast, with no prospects of early resumption. It is reported that a Virginia pipe foundry has purchased 3000 tons of iron in the Birmingham district at $18.50, furnace. No large sales are reported in the Philadelphia district, except one lot of 1500 tons of basic, for which a steel company is reported to have paid $20, furnace, with a freight rate slightly under $1. A sale of 100 tons of gray forge is reported at $21, furnace, with a freight rate of $1.54. There is a fairly good demand for carload lots of high silicon iron, for which $25, furnace, has been paid in some instances for iron analyzing close to 4 per cent silicon.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.90 to $22.54
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.84 to 23.54
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	20.50 to 21.00
Gray forge	22.50 to 23.00
Malleable	24.00 to 25.00
Standard low phos (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Domestic producers of ferromanganese have turned down offers of $50, seaboard, for 78 to 82 per cent alloy and are holding firmly for $58.35, seaboard, which is also the British price. Spiegeleisen is quoted from $25 to $27, furnace.

Billets.—The market is weak and open-hearth rerolling billets have been quoted at $28, Pittsburgh. Some sales have been made at $29. Forging billets are quoted at $34, Pittsburgh.

Plates.—The plate market continues exceedingly weak, with keen competition for any desirable business. It is now comparatively easy for a buyer of a fairly good lot to obtain quotations of 1.50c., Pittsburgh, and even this price does not appear firm. A steel pipe fabricator has inquired for 20,000 tons of universal plates for a 12-in. pipe line, but has named a price so low that one or two mills in this district have declined to quote. Business is made up almost entirely of small orders. The Coatesville mills of the Midvale Steel & Ordnance Co. are rolling about 3000 tons of plates for the 85 locomotives for Argentina recently booked by the Baldwin Locomotive Works. We quote sheared plates at 1.50c. to 1.60c., Pittsburgh, the higher price obtaining on small lots.

Structural Shapes.—Fabricators are figuring so closely on structural steel work that low prices on shapes have naturally followed. Quotations of 1.50c., Pittsburgh, on attractive tonnages have now become common, and higher prices are not effective in getting business except small lots.

Bars.—For reinforcing bars 1.50c., Pittsburgh, is now a general quotation, while 1.55c. and 1.60c., Pittsburgh, is being paid for merchant steel bars. The nominal quotation for bar iron is 1.60c., Pittsburgh, but this is being shaded by some mills.

Sheets.—The top prices at which business is being done are 2.50c. for blue annealed, 3c. for black and 4c. for galvanized, base, Pittsburgh. These prices have been shaded in some instances. Sheet mills are operating fairly well on specifications entered on their books some weeks ago, but new orders are not plentiful.

Rails.—It now appears that a main reason for the recent reduction of $7 a ton on rails was the refusal of some of the railroads to specify against their contracts. The price reduction was made retroactive to Aug. 25, last, applying therefore to some tonnage which had been shipped. One of the large Eastern roads is reported to have refused to accept further shipments this year, even at the reduced price.

Warehouse Business.—Jobbers continue to do a moderate business, but the volume is not growing. Prices for this district are unchanged, local jobbers quoting for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.75c.; squares and hexagons, cold-rolled steel, 4.25c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Old Material.—There is almost a deadlock in trading in scrap. Some of the mills offer prices that dealers will not accept and the mills, unless in urgent need of material, will not buy at the prices which the dealers quote. It remains, however, that each sale of importance brings out a price higher than obtained the week before. Many grades have advanced from 50c. to $1.50 a ton within the past month. Blast furnace borings and turnings are in demand, but are not to be had at the prices which the furnaces seem willing to pay. Among the grades which are higher this week are low phosphorus steel, car wheels, cast borings, railroad grate bars and stove plate. An Eastern steel plant has about 3000 tons of low phosphorus scrap in storage, for which it is asking $20 a ton. Eighteen steel companies in the Pittsburgh, Youngstown and Buffalo districts have petitioned the Interstate Commerce Commission for a reduction in freight rates on scrap from the billet basis to the pig iron basis. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$12.00 to $13.00
Scrap rail	12.00 to 13.00
Steel rails, rerolling	16.00 to 16.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.50 to 18.00
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	14.00 to 14.50
No. 1 forge fire	10.50 to 11.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.50 to 10.50
Heavy axle turnings (or equivalent)	10.00 to 10.50
Cast borings (for rolling mills)	11.00 to 11.50
Cast borings (for chemical plants)	12.50 to 13.00
No. 1 cast	17.50 to 18.00
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	14.50 to 15.00
Railroad malleable	14.50 to 15.00
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Iron car axles	No market
Steel car axles	No market

Cleveland

CLEVELAND, Nov. 1.

Iron Ore.—A reduction in dock charges for handling ore has been virtually assured as a result of a conference between a committee of ore men representing the Lake Superior Iron Ore Association and representatives of consumers in the Pittsburgh, Youngstown and Wheeling districts, and the coal, coke and ore committee of the Central Traffic Association, representing ore carrying railroads, held in Pittsburgh Oct. 27. The committee of railroad men explained that it had been the evident intention to reduce the dock charges correspondingly at the same time as the railroad rates for carrying ore from lower lake docks was reduced 28 per cent, but this readjustment was overlooked. The committee formally approved the request of the ore shippers and consumers that the dock handling charges be reduced and will make a recommendation to that effect to the railroad executives in New York. Action ordering the reduction is expected this week. The new rates will become effective as soon as the tariffs can be prepared and will bring the dock handling charges back to where they were before the 40 per cent advance made in September, 1920. The ore men and furnace interests were given to understand that the reductions would remain in effect through 1922. The reduction in ore carrying charges was made only for the period up to Jan. 1, next, but there is no expectation that the old rates will again be placed in effect. When the new dock charges become effective, the charge for handling from the hold to the rail of the vessel will be reduced from 14c. to 10c. per ton, from the rail to the dock stock pile, from 22½c. to 16c., and from the dock to the car, from 14c. to 10c. It is expected that the dock storage charge will be reduced from 1½c. to the old rate of 1c. per ton per month, but definite announcement of this reduction has not been made. The reduction in dock charges will result in a saving of 10½c. a ton to consumers in the handling of ore that goes on the dock, the present charges for handling from the vessel to the dock and from the dock to the car being reduced from 36½c. to 26c. The hearing on the rail rate case of the Northern railroads involving the carrying charges of ore from the mines to upper lake ports has again been postponed by the Interstate Commerce Commission, this time from Nov. 16 to Dec. 7. Several ore shippers, including the United States Steel Corporation, have finished moving ore, but a few cargoes will be shipped by other firms during November. However, it is not expected that the November movement will exceed 200,000 tons and shipments will probably be wound up by Nov. 15.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51¼ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—October shipments were the best of any month this year, but this was partly due to the fact that many consumers at the time there was danger of a railroad strike anticipated their November requirements in shipping orders. Consequently, November shipments are expected to show considerable falling off as compared with the past month. The market has again become very dull. The only orders of any size reported are 700 tons of foundry iron placed by the American Radiator Co., 400 tons for its Titusville, Pa., plant, and 300 tons for its Springfield, Ohio, plant. One producer sold only 900 tons of iron during the week and another 500 tons, all in small lots of foundry iron. The market is holding firm at $20 lake furnace for No. 2 foundry iron, and this price is enabling lake furnaces to shut out the competition of Valley furnaces, which quote $21, for shipment to points having the same freight rate and to points where the lake furnaces have a disadvantage in freight rate of less than $1 a ton as compared with Valley furnaces. Although the American Rolling Mill Co. was credited with the purchase of 3000 tons of basic iron at $22 delivered, it develops that its purchases were made at $19.50 at furnace, making the delivered price $22.16 for 2000 tons placed with a lake furnace and $22.02 for 1000 tons placed with a southern Ohio producer. Reports indicate that basic iron can be bought from brokers at under $19. M. A. Hanna & Co. blew in one of their Detroit furnaces today, Tuesday. The starting of one of these furnaces was necessitated by the fact that this firm's stock of pig iron in Detroit was running low. The McKinney Steel Co. expects to blow in a second furnace in Cleveland this month.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	35.00

Coke.—The demand for foundry coke is less active than it has been. Prices are unchanged at $4.50 to $4.75 for the better makes of Connellsville foundry coke and $6 for Virginia coke.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is confined to small lots, consumers buying only for their immediate requirements. The volume of October business was about the same as during September. While regular prices, as a rule, seem to be maintained, concessions are still being made by some manufacturers. The demand for rivets is slow and prices are not firm, although the leading local maker is adhering to 2.40c. for structural and 2.50c. for boiler rivets.

Sheets.—The demand is light and mills do not look for much new business this year, as consumers placed contracts before the recent price advance by some of the mills. The market is well established at 3c. for black and 2.25c. to 2.50c. for blue annealed sheets, and mills that are quoting $5 a ton above those prices on blue annealed and galvanized sheets are taking a limited amount of small lot business, but there is evidence that the 4c. price on galvanized sheets can be shaded $1 to $2 a ton on desirable orders.

Cold-Rolled Strips.—Strip steel makers mave stiffened up on cold-rolled strip steel, on which 4c. now appears to be the minimum price. Cold-rolled strip steel is coming into active competition with full finished automobile sheets as material for motor car fenders, and a recent order for 100 tons was for that use.

Finished Iron and Steel.—New business is light and orders are virtually all for small tonnages. The brightest spot at present seems to be in the building field, as fabricators are figuring on considerably more work than they have been for some time. The demand for steel among manufacturers in various metal working lines shows small increase, as plant operations have improved but little while plates are generally quiet. A northern Ohio tank shop has taken oil tank work requiring 4000 tons of plates which will probably be supplied by a Youngstown mill. Plates are generally quoted at 1.60c. to 1.65c., although mills not meeting these prices are booking small lot orders at 1.75c. Soft steel bars are selling in small lots at 1.60c. to 1.65c., and buyers lately have been unable to get lower quotations in this territory. However, it is believed that a round tonnage would bring out a price lower than 1.60c. Soft steel bars are specified for the Baldwin reservoir, Cleveland, for which bids will be opened this week and the 1700 tons required may test the market. Hard steel bars range from 1.50c. to 1.60c. Light rails are still irregular with 1.60c. and 1.65c. as the ruling quotations. In structural work, bids have been taken for the Chester Gardens apartment building, Cleveland, for which the steel requirements will probably be 2500 tons. Bids have also been taken for the Junior High School, Canton, requiring 550 tons and for the Oberlin High School, requiring 200 tons.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Old Material.—The falling off in the activity noted last week continues. Shipments of scrap in some cases have been made faster than wanted, and two mills, one in the Youngstown and the other in the Pittsburgh district, held up shipments during the week. Prices are firm. We note the sale of 1000 tons of bolt and nut scrap by a Cleveland producer at $12.50. Small lot sales of machine shop turnings at $11 and compressed steel scrap at $12.50 delivered at consumers' plants are reported. A small lot sale of machine shop turnings has been made to a dealer at $7.50, which is above the ruling quotation on this grade. One Pittsburgh district mill is in the market for heavy melting steel at $14.50.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$12.00 to $12.50
Steel rails, under 3 ft	12.75 to 13.25
Steel rails, rerolling	15.00 to 15.50
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorous melting scrap	12.50 to 13.00
Cast borings	8.65 to 8.85
Machine shop turnings	6.60 to 7.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	9.50 to 9.75
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	6.25 to 6.60
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in.	8.00 to 8.50
Drop forge flashings, under 10 in.	8.00 to 8.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

New Swedish Prices

STOCKHOLM, SWEDEN, Oct. 14.—The Sweedish Iron Federation has revised current prices. Converted into dollars at a rate of exchange of 4.54 and per ton of 1016 kg., quotations f.o.b. Swedish port, are as follows:

Export pig iron	$38.04
Billets	$95.11 to 117.49
Wire rods	106.30 to 128.68
Open-hearth steel	55.95 to 63.78
Lancashire iron	72.73

The Rosenberg Iron & Metal Co., San Francisco, won in its suit against the Santa Fe Railroad in regard to freight rates on scrap charged by the railroad on old rails, car wheels and grate bars. The railroad first charged $1,352, reducing this to $850. The Rosenberg company paid $400, based on the scrap iron rate. The decision of the Superior Court of San Francisco favored the scrap firm. The case was based on the question of whether the material was usable in present form or was to be remelted as scrap.

The management of the Canonsburg Steel & Iron Works, Canonsburg, Pa., recently reached an agreement with its workmen and on Oct. 17 the plant started up at about 50 per cent of capacity. The company recognizes the Amalgamated Association of Iron, Steel and Tin Workers in the hot mills, but the remainder of the plant is on an open-shop basis, with unskilled labor on a basis of 30c. an hour.

British Iron and Steel Market

Finished Steel Lower in Price—Billets Have Advanced—Tin Plate Market Steady and Galvanized Sheets Firm

(By Cable)

LONDON, ENGLAND, Nov. 1.

Cleveland producers are cutting prices on low grade pig iron, to clear stocks. Otherwise, the position is unchanged. Hematite is weak. Bilbao Rubio is quoted at 27s. ($5.29) ex-ship Tees.

Steel export quotations are lower. Beams and sections are being sold at £9 5s. (1.62c. per lb.) f.o.b., less 1¼ per cent. Crown iron bars are held at £14 (2.45c. per lb.) net f.o.b. for immediate shipment.

The engineers (metal workers) are accepting the withdrawal of war bonuses. The Clyde shipbuilding output during October was fifteen vessels, aggregating 64,099 gross tons register.

Cheap German prices for sections are £7 17½s. (1.38c. per lb.); for plates £7 12½s. (1.33½c. per lb.); for wire rods £8 15s. (1.53c. per lb.); all f.o.b., with shipment in six to eight weeks. Belgian merchant bars are now sold at £8 2½s. (1.42c. per lb.) f.o.b.

Tin plates are steady. Buying option contracts for November, December and January are quoted up to 21½s. ($4.21) basis f.o.b. The order obtained last week by Welsh makers for British Columbia, of 150,000 boxes of odd size tin plates, reported at $4.90 delivered, has caused a disinclination on the part of the makers to enter into forward contracts.

The Far East is still purchasing light weights and wasters, and some merchants have been caught short. Demand for galvanized sheets has slackened, but the price is firm at £18 (3.15c. per lb.) f.o.b. for No. 24 gage.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.92 per £1 as follows:

Durham coke, delivered	£1 10	$5.88
Cleveland basic	7 7½ & £7 10*	28.91 & $29.40
Cleveland No. 1 foundry	7 0	27.44
Cleveland No. 3 foundry	6 0	23.52
Cleveland No. 4 foundry	5 14	22.34
Cleveland No. 4 forge	5 5	20.58
Hematite	7 0*	27.44
East Coast mixed	6 0 & 6 2½*	23.52 & 24.01
Ferromanganese	15 0 & 14 10*	58.80 & 56.84
Rails, 60 lb. and up	9 10 to 10 10	37.24 to 41.16
Billets	7 5 to 8 10	28.42 to 33.32
Sheet and tin plate bars, Welsh	7 0 to 8 5	27.44 to 32.34
Tin plate base box	1 1¼ to 1 2½	4.17 to 4.41
		C. per Lb.
Ship plates	10 10	1.84
Boiler plates	15 0 to 16 0	2.63 to 2.80
Tees	10 15 to 11 10	1.88 to 2.01
Channels	10 0 to 10 15	1.75 to 1.88
Beams	10 0 to 10 10	1.75 to 1.84
Round bars, ¾ to 3 in.	11 10 to 12 0	2.01 to 2.10
Galvanized sheets, 24 g.	18 0 to 18 10	3.15 to 3.24
Black sheets	15 0 to 16 0	2.63 to 2.80
Steel hoops	14 5 & 14 0*	2.49 & 2.45
Cold rolled steel strip, 20 g.	24 10	4.29

*Export price.

The Allen-Sherman-Hoff Co., Philadelphia, has been organized under the laws of Pennsylvania for designing, manufacturing and selling "A-S-H" hoppers of unit standardized cast-iron construction and "A-S-H" gates, both piston and hand operated, of all sizes. The personnel of the company consists of M. C. Sherman of the Sherman Engineering Co., president; L. P. Hoff, formerly of the Baker-Dunbar-Allen Sales Co., Cleveland, vice-president and chief engineer; F. B. Allen, also formerly of the Baker-Dunbar-Allen Sales Co., secretary and treasurer. General offices of the company are at 510 Stock Exchange Building, Philadelphia.

The Republic Iron & Steel Co. is operating four of its eight new sheet mills at its Niles plant, and is preparing the remaining four new mills for production as business warrants.

METRIC SYSTEM

Its Use Not as Extensive as Generally Supposed — Valuable Report

The question involved in the proposed metric system bill legislation to make the use of the system compulsory is an important one, not only to the manufacturer and business man, but to every citizen of the country, says a report by the National Industrial Conference Board which shows the intimate and far-reaching relation of this legislation to the public and to all fields of industry and trade. A report issued by the board entitled "The Metric versus the English System of Weights and Measures," is a comprehensive study of the metric question in all its aspects and should afford timely assistance to manufacturers, officials and all students of the question in determining their attitude on this controversial subject.

All the information presented in the report is of an authoritative nature, most of it having been gathered from first-hand sources. The weights and measures situation in every country of the world is reviewed, as well as the relation of the English and metric systems to specialized fields.

The report indicates that the metric system is in predominant use in 37 countries, with a population of 395,521,000, that the English system is in predominant use in 12 countries, with a population of 343,557,000, and that 28 countries, with a population of 823,700,000 do not use either the English or metric system predominantly. It also points out that in 1919 English countries exported 48.2 per cent of the world's total exports, that metric countries exported 37.5 per cent, and other countries, 14.3 per cent. The use of the metric system the world over, the reports says, is not so widespread as is frequently supposed, and the use of the English standards is quite as common and generally increasing.

The report analyzes such specialized fields as science and engineering, agriculture, mining, transportation and trade, manufacture, and foreign trade.

Pittsburgh Iron and Steel Market

(Continued from page 1171)

that company sold at $8.35, Detroit, equal to $13.25, Pittsburgh. Offerings of compressed sheets for November shipment for the Westinghouse Electric & Mfg. Co. are reported to have sold at $12 East Pittsburgh, turnings at $9.50 and borings at $10.50. The Baltimore & Ohio Railroad will receive bids until Nov. 7, on 21 carloads and 10,125 gross tons of scrap, and 3000 lb. of high-speed steel. Bids will close to-day on about 26,000 tons of old material offered by Pennsylvania Railroad, eastern region.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.50 to $15.00
No. 1 cast cupola size	17.50 to 18.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.00 to 16.50
Compressed sheet steel	12.50 to 13.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	11.00 to 11.50
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Low phosphorus standard bloom and billet ends	20.00 to 21.00
Low phosphorus plates and other grades	17.50 to 18.50
Railroad malleable	13.50 to 14.00
Iron car axles	25.00 to 26.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	16.50 to 17.00
Cast iron wheels	16.50 to 17.00
Rolled steel wheels	15.50 to 16.00
Machine shop turnings	10.00 to 10.50
Sheet bar crop ends	14.50 to 15.00
Heavy steel axle turnings	12.50 to 13.00
Short shoveling turnings	11.50 to 12.00
Heavy breakable cast	15.50 to 16.00
Stove plate	13.00 to 13.50
Cast iron borings	10.50 to 11.00
No. 1 railroad wrought	12.00 to 12.50

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.65c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.65c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.25 to $2.40 base
Large boiler rivets.....2.35 to 2.50 base
Small rivets .....70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, rolled threads,
70, 10 and 5 per cent off list
Machine bolts, small, cut threads....70 and 5 per cent off list
Machine bolts, larger and longer..65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads,
65, 10 and 10 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....65 and 10 per cent off list
Lag bolts .....70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under.....75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in.....75 and 10 to 80 and 10 per cent off list

Upset Set Screws

½ in. and under.....80,10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes .....70 and 10 per cent off list

Milled Set Screws

All sizes .....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $40 to $41; chain rods, $40 to $41; screw stock rods, $45 to $46; rivet and bolt rods and other rods of that character, $40 to $41; high carbon rods, $48 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 to $2.30 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅜-in. and 7/16-in., $2.50 base; 5/16-in., $2.50 base. Boat and barge spikes, $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $10.30 per package; 8-lb. coating, I. C., $10.60; 15-lb. coating, I. C., $13.30; 20-lb. coating, I. C., $14.55; 25-lb. coating, I. C., $15.80; 30-lb. coating, I. C., $16.80; 35-lb. coating, I. C., $17.80; 40-lb. coating, I. C., $18.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.15c. to 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20–2.45	Nos. 11 and 12	2.30–2.55
Nos. 9 and 10 (base)	2.25–2.5c	Nos. 13 and 14	2.35–2.60
		Nos. 15 and 16	2.45–2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Oct.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
26	13.00	12.62½	28.25	4.70	4.40	5.10	4.60
27	13.00	12.62½	28.00	4.70	4.40	5.10	4.60
28	13.00	12.62½	28.00	4.70	4.40	5.05	4.55
29	13.12½	12.75	....	4.70	4.40	5.05	4.55
31	13.12½	12.75	28.25	4.70	4.40	5.05	4.55
Nov. 1	13.12½	12.75	28.00	4.70	4.40	5.05	4.55

New York

NEW YORK, Nov. 1.

The tone of most of the markets is strong and prices in most cases are steady. Inquiries and sales of copper have increased. Demand for lead and tin is steady but moderate. The zinc market is quieter and easier.

Copper.—Since toward the close of last week the electrolytic market has grown stronger until the minimum price for November or November-December delivery is now firm at 13c., delivered, or 12.75c., New York. The metal available at about ⅛c. under these prices last week has evidently been absorbed. One large seller reports domestic sales of substantial quantities in the last few days at 13c., delivered, with some spot delivery at 13.12½c. Inquiries are also larger than in some time. The tone of the market is decidedly optimistic. Deliveries into consumption in October are estimated to have been at least 60,000,000 lb. but export sales for that month are reported to have been less than in September.

Copper Averages.—The average price of Lake copper for the month of October, based on daily quotations in THE IRON AGE, was 12.95c. The average price of electrolytic copper was 12.67c.

Tin.—The removal of the possibility of a railroad strike has caused the market to become quiet with only light sales reported. Consumers removed considerable Straits tin from warehouses when the strike was threatened so that in the last few days there has been very little demand for spot delivery. Strength in sterling exchange has helped to maintain prices at close to 28c., New York, for spot Straits, the quotation to-day having been 28.00c., New York. The London market to-day was about £1 per ton lower than a week ago on all positions with spot standard quoted at £155 10s., future standard at £157 15s. and spot Straits at £156. Total deliveries into consumption for October are returned at 2280 tons with stocks at 1391 tons and metal landing at 650 tons.

Lead.—The market is very quiet with a moderate amount of business reported. Prices are unchanged and firm at 4.70c., New York, or 4.40c., St. Louis, for the outside market with the leading interest still maintaining its quotations at 4.70c., New York and St. Louis.

Zinc.—Because of a lull in demand from galvanizers, buying has declined and prices are a little lower with prime Western for early delivery quoted at 4.55c. to 4.60c., St. Louis, or 5.05c. to 5.10c., New York. The quiet market is due largely to the fact that consumers covered their early future needs in anticipation of a tie-up in transportation. Prospects are good for future demand from the same source. Producers are not pressing the market and very few will quote as low as 4.60c., St. Louis. The present demand is largely being satisfied by second hands.

Antimony.—The market is dull and lower at 4.75c., New York, duty paid, for wholesale lots for early or November delivery.

Aluminum.—Sales are reported of large quantities of aluminum but this is unconfirmed. It is stated that the leading interest is ready or has met any prices offered by importers. Virgin metal, 98 to 99 per cent pure, is quoted at 24.50c. f.o.b. plant, by the leading producer with importers offering at 17c. to 18c., New York, duty paid.

Old Metals.—The outlook appears to be brighter though actual business is still quiet. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	$12.25
Copper, heavy and wire	11.25
Copper, light and bottoms	9.50
Heavy machine composition	9.50
Brass, heavy	7.00
Brass, light	5.50
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.75
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

Nov. 1.—Inquiry has been fair, but sales last week were confined largely to spot orders placed on account of the threatened railroad strike. Copper and tin have advanced and zinc has declined. Old metal prices are unchanged. We quote in carload lots: Lake copper, 13.25c. to 13.50c.; tin, 29.50c. to 30c.; lead, 4.50c.; spelter, 4.65c.; antimony, 7c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 8.50c.; copper bottoms, 7c.; red brass, 7c.; yellow brass, 5c.; lead pipe, 3c.; zinc, 2.25c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

Nov. 1.—Both lead and zinc are unchanged. We quote lead at 4.47½c. to 4.50c., car lots, and slab zinc, 4.67½c. to 4.70c. We quote Lake Copper at 13.73½c., car lots; tin, 28.86c., and antimony, 5.48½c. In old metals, we quote: Light brass, 3.50c.; heavy red brass, 7c.; light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tinfoil, 16c.; tea lead, 2c.; aluminum, 9c.

Youngstown-Inland-Steel & Tube Merger

YOUNGSTOWN, OHIO, Nov. 1.—Though still lacking full confirmation, it appears that negotiations have been brought to a successful conclusion for the merger of the Youngstown Sheet & Tube Co., the Inland Steel Co. of Chicago and the Steel & Tube Co. of America, also of Chicago. Meetings of representatives of other large independents have been held recently to discuss the proposal to join the amalgamation. Partial confirmation of the consolidation of the three companies first mentioned is afforded by Youngstown banking interests, but the financial developments are understood to be in the hands of Kuhn, Loeb & Co., New York. It is believed here that President James A. Campbell, Youngstown Sheet and Tube Co., will be the active head.

Throughout the negotiations for the merger various steel interests have pointed out that the independents could not afford to continue to compete against each other, in face of the advantages enjoyed by the Steel Corporation. The fact that the independent makers have likewise been forced to accept tonnage below actual operating cost in the competitive market has been another impetus toward effecting a closer mutuality of interest. In short, the present conditions of low demand, high operating costs and disadvantageous location of plants in relation to the Steel Corporation in the matter of freight charges are factors which encourage active negotiation for mergers. The present action indicates the operations of a new group, but it is safe to say that it will be some months before details can be settled. It may be mentioned that the three interests named are fully integrated from raw materials to finished product.

PERSONAL

Walter C. Carroll, for the past 13 years assistant general manager of sales, American Sheet & Tin Plate Co., Pittsburgh, has resigned to become vice-president and general manager of sheet sales of the Inland Steel Co., Chicago. Mr. Carroll takes with him to his new position a very complete knowledge of the steel business, particularly of steel sheets, acquired over the 19 years he has been affiliated with the American Sheet Steel Co. and its successor, the American Sheet & Tin Plate Co. He was born in Baltimore in 1876. After attending the elementary public schools and the University School in that city, he entered Princeton University and was graduated in 1900 with the degree Bachelor of Science. He entered Harvard Law School in the fall of 1900 and in 1901 and 1902 divided his work between post-graduate studies and the law school. The opportunity of entering the steel business came in March, 1902, as the result of an introduction to George G. McMurtry, then president of the American Sheet Steel Co. Mr. Carroll was assigned to the Vandergrift, Pa., works of that company, the model steel works located in the model steel town of that time. After becoming thoroughly acquainted with the manufacture of sheets, in January, 1903, he was appointed district sales agent of the company at Detroit, succeeding F. A. Goodrich & Co., which up to that time had represented the American Sheet Steel Co. In January, 1904, with the consolidation of the American Sheet Steel Co. and American Tin Plate Co., Mr. Carroll was transferred to San Francisco, where the offices of the two companies were consolidated, and served there a little more than two years as assistant to the manager of sales. He then was transferred to St. Louis, remaining there until January, 1909, when he was appointed assistant general manager of sales at the general offices in Pittsburgh. Shortly after going to Pittsburgh, Mr. Carroll took a course in metallography at the University of Pittsburgh, and has specialized on the metallurgical problems of the sales department. During the war he was a member of the subcommittee on sheet steel of the American Iron and Steel Institute, working in conjunction with the War Industries Board. Mr. Carroll will join the Inland staff on Nov. 10.



WALTER C. CARROLL

Robert S. Maddocks, formerly in the New York sales department of the Midvale Steel & Ordnance Co., is now with the New York sales office of the Central Iron & Steel Co., Harrisburg, Pa.

C. H. Hobbs, for over 14 years with the Lackawanna Steel Co., has been appointed assistant general manager of sales of the Detroit Seamless Steel Tubes Co., Detroit, a newly created position.

Robert I. Miner has been appointed sales engineer for the pressed steel division of the Motor Wheel Corporation, Lansing, Mich.

Abner U. Howard has been appointed sales manager for N. & G. Taylor Co., Inc., Philadelphia. He was for a number of years connected with the National Conduit & Cable Co.

A. C. Evans, 18 South Seventh Street, Philadelphia, is now an agent in the Philadelphia district for the Edgar Allen Steel Co., Inc.

Theodore Wagner, New Britain, Conn., has been made general superintendent of John D. Crosby Co., Pawtucket, R. I. For 37 years he was a foreman at the Stanley Works, resigning four years ago to accept a position with the Worcester Pressed Steel Co., Milford, Conn.

B. S. Livingston, for the past five years manager of Eastern sales of Viele, Blackwell & Buck, 49 Wall Street, New York, exporters and consulting engineers, recently resigned to become manager of the Far Eastern department of Foreign Traders, Inc., 154 Nassau Street, New York. Foreign Traders, Inc., was organized in 1917 to deal with importers only in all foreign markets, handling iron and steel, machinery, chemicals, etc.

P. C. Sprague has been appointed manager of the traffic department of M. A. Hanna & Co., Cleveland, effective Nov. 15, filling a vacancy caused by the recent death of O. E. Anthony. Mr. Sprague is at present general freight agent of the Southwestern division of the Pennsylvania Railroad at St. Louis.

William Whistler Mills, for five years assistant chief chemist of the Pittsburgh Crucible Steel Co. at its Midland, Pa., works, has been added to the faculty of the College of Wooster, Wooster, Ohio, as instructor in chemistry.

W. E. Kelly, Western representative Central Railway Signal Co., Pittsburgh, has also been appointed representative of the Handlan-Buck Mfg. Co., St. Louis, for Chicago and adjacent territory, with headquarters in the McCormick Building, Chicago.

H. E. Witham, who has been connected with the Warner & Swasey Co., Cleveland, for more than 20 years and who is at present district sales manager for the Chicago territory, has resigned on account of the health of his family, and is being succeeded in Chicago by C. E. Neubert, at present district manager for the Buffalo office of the Warner & Swasey Co. Mr. Neubert was assistant district manager of the Chicago territory for ten years. Mr. Neubert is being succeeded as Buffalo district sales manager by Gerald Kochenderfer, who has been the district representative at the Indianapolis office.

James A. Slater, manager of sales National Malleable Castings Co., Chicago, has been appointed assistant sales manager, with headquarters at the company's general offices at Cleveland, succeeding J. H. Redhead, resigned, to become manager the Reliance Co., Cleveland.

Walter E. Heibel, who for the past two years has been Eastern district manager of the Willmarth & Morman Co., has resigned to accept a position with the B. F. Sturtevant Co., Boston. He will be located at 52 Vanderbilt Avenue, New York.

Edward E. Book has been appointed welfare director of the Youngstown Steel Car Co., Niles, Ohio. For several years he was in the employ of the Pittsburgh & Lake Erie railroad at McKees Rocks, Pa.

A. Clarke Moore, formerly assistant to the president Globe Seamless Tube Co., has been appointed vice-president of the Chicago Railway Equipment Co., Chicago, succeeding the late C. Haines Williams, deceased. He will have general supervision of the manufacturing and selling departments.

Charles L. Anderson, Ann Arbor, Mich., has been added to the directorate of the Hoover Steel Ball Co., Ann Arbor. The other directors were re-elected.

John F. Miller, vice-president Westinghouse Air Brake Co., Pittsburgh, has been elected an alumni trustee of the College of Wooster, Wooster, Ohio.

Charles W. Brainard, secretary-treasurer Union Steam Pump Co., Battle Creek, Mich., has been elected president of the company. Theodore Hattendorf was elected secretary and assistant treasurer. Mr. Brainard will serve as treasurer, as well as president. William J. Smith, president Old National Bank, Battle Creek, and W. D. Baker, president Battle Creek Lumber Co., were elected to fill vacancies in the board of directors.

Leonard W. Kearns has affiliated with the sales organization of the Chicago Belting Co., Chicago. He has been active in the leather belting business for 22 years, 18 of which have been in the service of one company. He has been branch manager at Atlanta, Ga.; Charlotte, N. C., and Chicago, and has sold belting throughout the United States and Cuba.

F. N. Vawter, of the Baker-Vawter Co., Benton Harbor, Mich., manufacturer of metal office equipment, has gone to Toronto, Ont., where he will engage in the manufacture of stationery.

F. E. Badger has been promoted to sales manager of the chassis spring division of the Detroit Steel Products Co., Detroit. For the last ten months he was a member of the sales engineering staff and for eight years previously he was plant manager of the Standard Parts Co., Flint, Mich.

James T. Sullivan, for many years treasurer of the Port Huron Engine & Thresher Co., Port Huron, Mich., has resigned and entered the commercial security business, becoming Michigan representative of the Wendorff-Hess Co., Cleveland, with temporary offices at Port Huron.

D. McCall White, vice-president and chief designing engineer of the Lafayette Motors Co., Indianapolis, has resigned and will soon make a connection with one of the largest automobile companies. Mr. White was formerly chief engineer of the Cadillac Motor Car Co., Detroit.

Max Meltzer joined the Continental Iron & Steel Co., 2 Rector Street, New York, iron and steel scrap, on Nov. 1. He has had several years' experience with scrap brokers in New York and elsewhere.

F. R. Wadleigh, New York, has been appointed to take charge of the coal section of the recently created Fuel Division of the Bureau of Foreign and Domestic Commerce. He has had wide experience in the coal industry, and has investigated problems connected with the production and sale of coal in the United States and foreign countries and has prepared numerous reports on the subject.

Elmer E. Yake has been made works manager of the Gilbert & Barker Mfg. Co., Springfield, Mass., tanks, pumps, etc. In 1904 he began work for the Pennsylvania Steel Co., studying the operation of steel production and having direct charge of employees. In November, 1915, he joined the Gilbert & Barker Mfg. Co., and in April, 1920, associated with the Walworth Mfg. Co., Boston and Kewanee, Ill., wrenches, etc. Then he became eastern manager of C. & G. Cooper Co., New York, steam and gas engines.

Stanton Griffith has just been appointed foundry superintendent of the Gilbert & Barker Mfg. Co., Springfield, Mass., pumps, tanks, etc. His foundry experience has been gained with O. A. & W. T. Thayer, Charlestown, Va.; the Union Works, San Francisco; the Risdon Iron Works, San Francisco; Frazier & Chalmers and the Link Belt Machinery Co., both of Chicago; E. P. Ellis, Milwaukee; Goulds Mfg. Co., Seneca Falls, N. Y.; Taylor & Co., Brooklyn; R. Howe & Co., New York; Fairbanks, Morse & Co., Chicago; Malley Printing Press, and Greenby Brothers, both of Chicago, and the Harley Co., Springfield, Mass.

G. A. Trube sailed for France on the Aquitania on Oct. 27 to join the Paris office of the Equitable Trust Co. at 25 rue de la Paix, where he will have work in relation to industrial companies in France.

George K. Vail, general manager Arthur G. McKee & Co., engineers, Cleveland, has been elected vice-president of the Ohio Steel Foundry Co., Lima, Ohio, and will leave the McKee firm to become affiliated with the Lima company Nov. 15. Previous to joining McKee & Co., Mr. Vail was associated for some time with the Westinghouse Electric & Mfg. Co., first as a salesman in its Cleveland office and later as district sales manager.

J. W. Dickson, who since leaving E. W. Mudge & Co., Pittsburgh, with whom he was associated for many years, has been vice-president of Park & Williams, pig iron, Philadelphia, in charge of this firm's Pittsburgh office, has resigned to enter business for himself.

C. C. Boyden, until recently with the sales department of the Alan Wood Iron & Steel Co., Philadelphia, and formerly with B. Nicoll & Co., New York, has gone to California for the winter.

OBITUARY

HENRY A. BASTIAN, secretary Egyptian Iron Works, Murphysboro, Ill., died on Oct. 8.

CHARLES E. KOLB, president Union Steam Pump Co., Battle Creek, Mich., died Oct. 13, at the age of 65.

HERON K. HIBBEN, secretary-treasurer Hibben & Co., boiler manufacturers, 9376 Ewing Street, South Chicago, died recently.

JOHN WITTMAN, president Atlas Brass Foundry Co., Columbus, Ohio, died at his home in that city recently from neuritis. He was born in Columbus 65 years ago.

GEORGE HENRY COATES, president and treasurer Coates Clipper Mfg. Co., Worcester, Mass., died at his home in that city Oct. 18. He was born in Windsor, Vt., June 23, 1849.

SUMNER O. BUSH, former vice-president and general manager Advance Threshing Machine Co., Battle Creek, Mich., died Oct. 20, in his home in that city of cancer at the age of 73.

FRED J. MEYERS, president Fred J. Meyers Co., Hamilton, Ohio, died at his home in that city recently. He was born in Cincinnati in 1845 and first engaged in business in Covington, Ky., later moving to Hamilton, Ohio.

DAVID J. JONES, for more than 40 years identified with the Cambria Iron Co., and its successor, the Cambria Steel Co., died at his home in Johnstown, Pa., Oct. 28. He was born in Wales, April 30, 1831, and came to the United States with his parents when a child. He entered the employ of the Cambria Iron Co., now known as the Cambria Steel Co., as a bookkeeper in 1870 and after two years was promoted to assistant treasurer, which position he held in 1914 when he retired.

T. W. ROBERTS, superintendent Radford plant, Lynchburg Foundry Co., Lynchburg, Va., died at his home in Radford, Va., Oct. 8, after two weeks' illness. He was born in Albemarle County, Va., July 13, 1847. He entered the old Dabney foundry as an apprentice at 14 years of age, but his apprenticeship was interrupted by his enlistment in the Civil War. Six months after the war ended, he went North where he stayed for about eight years and was connected with a number of foundries in New York and New Jersey as molder. He returned to his native state in 1873 and became connected with the Glamorgan Co., Lynchburg, and later with the Norfolk & Western Railway Co. at Roanoke, Va. Realizing that the cast iron pipe industry held large possibilities in the South, Mr. Roberts entered this line of work. He was one of the founders of the Lynchburg Foundry Co. He was the inventor of a number of improvements in the foundry industry in which he took a very keen interest up to the very last.

Approval of a storage-battery locomotive for use in gaseous mines has been issued by the United States Bureau of Mines to the Jeffrey Mfg. Co., Columbus, Ohio. The approval covers a 6-ton storage battery locomotive, which may be equipped with a battery consisting of either Edison cells or iron-clad exide cells. Caustic potash is specified as the electrolyte for use with the Edison battery. The first official approval of a storage battery locomotive was granted to the George D. Whitcomb Co. a few months ago. Two other locomotives, representing the product of two additional manufacturers, are now under test. The testing of storage battery locomotives for permissibility is in charge of L. C. Ilsley, electrical engineer of the Pittsburgh experiment station of the bureau.

The method for testing railroad and grain hopper scales used by the Bureau of Standards is described in Technologic Paper No. 199 of the Bureau of Standards, obtainable at 5 cents a copy from the superintendent of documents, Government Printing Office, Washington. The bulletin covers the method for making a precision test of large capacity scales.

IRON AND INDUSTRIAL STOCKS

Action of Prices Suggests Disappointment In the Labor Situation

While industrial shares have averaged higher the past week, the advance in quotations for them as well as for railroad securities suggests some disappointment over developments in the railroad labor situation by at least some investors. The market for United States Steel common rules strong, but prices for independent steel companies as a whole have been rather backward, on selling by holders on the showing of quarterly earnings statements. An improved demand for Youngstown Sheet & Tube Co. shares is noted presumably because of talk of that and other companies merging. Further reductions in prices for automobiles and trucks together with the large supply of used cars on the market have caused some selling of automotive securities since last reports. Public investment in securities appears to be on the increase, however, and with money comparatively free and cheap, and with improvement noted in various lines of business, the general trend of values for iron and industrial stocks has been upward.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	33 - 34¼	Int. Har. com...	76⅞ - 79
Allis-Chalm. pf..	76 - 77	Int. Har. pf....	101 - —
Am. Can com...	25⅞ - 29½	Lack. Steel	39 - 42¾
Am. Can pf.....	85¼ - 86	Midvale Steel ...	23 - 26
Am. C. & F. com.	129 -131¼	Nat.-Acme	12¼ - 14
Am. Car. & F. pf.	110⅞ - —	Nat. E. & S. com.	39⅞ - 42⅛
Am. Loco. com..	90½ - 92⅝	N. Y. Air Brake.	60 - —
Am. Rad. com...	70¾ - 76	Nova Scotia Steel	20¾ - 23¾
Am. Ship. com..	5½ - 6¾	Pitts. Steel pf...	81⅜ - 83½
Am. Stl. F. com.	23¾ - 25½	Press. Steel com.	56⅝ - 63½
Am. Stl. F. pf...	82¾ - 83	Ry. Stl. S. com..	83 - 85
Bald. Loco. com.	88⅛ - 91⅞	Replogle Steel ..	20 - 24¾
Bald. Loco. pf...	97 - 98	Republic com. ..	47¼ - 51⅛
Beth. Stl. Cl. B..	52½ - 57	Republic pf.	77½ - 80
Beth. Stl. 8% pf.	98⅜ -101	Sloss. com.	37¼ - 39⅜
Chic. Pneu Tool.	51 - 53	Superior Steel ..	30 - —
Colo. Fuel	23⅝ - 24¾	Un. Alloy Steel..	25 - 26
Cruc. Steel. com.	60¾ - 66¾	U. S. Steel com.	78⅛ - 81⅝
Cruc. Steel. pf...	83¾ - 84	U. S. Steel pf...	110 -110⅝
Gen. Elec.	128¾ -134	Vanadium Steel	30½ - 33⅜
Gt. No. Ore. Cert.	30⅛ - 31⅜	Va. I. C. & Coke	82 - 86
Gulf States Steel	37 - 39⅞	West'ghouse Elec.	45⅛ - 46

Industrial Finances

To conserve the existing assets of Pusey & Jones, Wilmington, Del., attorneys representing Christopher Hannevig, head of the company and who, it is alleged, owns all of the stock, have presented a proposition to interests represented in the litigation against the company, suggesting that all law suits be dropped and that a board of nine directors be appointed to operate the shipbuilding plants at Wilmington and Gloucester, N. J.

The Michigan Securities Commission has before it the petition of the American Transit Co. for permission to sell $4,500,000 bonds and $1,500,000 stock to finance construction of the Detroit-Windsor bridge across the Detroit River. The statement to the commission estimates the cost of the bridge at $15,000,000.

The H. A. May Foundry Co., Sixty-first and Eastwick streets, Philadelphia, has arranged for an increase in capital from $565,000 to $10,500,000.

The Columbia Tool & Machine Co., 738 North Fourth Street, Philadelphia, has been adjudicated bankrupt. Joseph Mellors is referee.

A petition in bankruptcy has been filed against the American Shipbuilding Co., 110 West Fortieth Street, New York. It is stated that the liabilities total $500,000, and assets about $600,000.

A petition in bankruptcy has been filed against the Day Steel Products Co., Chicago.

The Central Steel Co., Massillon, Ohio, is putting out a bond issue of $5,000,000 in 24-year first mortgage 8 per cent gold bonds, which have been sold to a syndicate of Cleveland and New York bankers and are being offered at 98½. The issue will be secured by a first mortgage on the company's plant, appraised at over $16,000,000. A sinking fund will be provided to be used to purchase up to a price of $107.50, 5 per cent of the issue yearly for the 8-year period from July 1, 1923, until July 1, 1931. After the latter date the sinking fund will be sufficient to purchase 10 per cent yearly of the amount of bonds outstanding Oct. 31, 1931. The proceeds of the bonds will be used for working capital and to pay off $3,500,000 current indebtedness.

Pressed Steel Car Co. has declared the regular quarterly dividend of 1¾ per cent on the preferred stock, payable Nov. 30.

Pittsburgh Steel Co. has declared the regular quarterly dividend of 1¾ per cent on the preferred stock, payable Dec. 1.

Shareholders of the Electric Alloy Steel Co., Youngstown, Ohio, will meet Dec. 1 to pass on recommendation of directors that $750,000 of 8 per cent cumulative preferred stock be authorized.

The entire property of the Glove Metal Products Corporation, Sheboygan, Wis., will be offered at public auction by the sheriff of Sheboygan County on Nov. 10, to satisfy an execution in the sum of $67,543.94 held by the Citizens' State Bank of Sheboygan. The Globe corporation was incorporated in September, 1919, with $250,000 capital stock to do a general foundry business and specialize in the production of soil pipe and fittings. A one-story brick plant, 120 x 220 ft., was built at Erie and Wildwood Avenues, and went into operation in September, 1920. After six months work was discontinued and the plant has lain idle since last spring.

The annual meeting of the stockholders of the Crucible Steel Co. of America will be held Nov. 18, in Jersey City. Six directors will be elected to fill the places of Eversley Childs, R. H. Illingsworth, George E. Shaw, John A. Matthews, F. B. Hufnagel, and H. S. Wilkinson, whose terms expire.

Short Trade Items

The plant and equipment of the Anthracite Briquette Co., Ashbridges Bay, Toronto, Ont., has been purchased by the Financial Underwriters, Ltd., 88 Bay Street, Toronto. Under the new management a briquette made by the famous Dutch oil process, similar to Nukol, will be produced. H. F. Slater, president Financial Underwriters, Ltd., states that in all probability the newly acquired plant will be added to the assets of the Nukol Fuel Co., Ltd.

E. D. Giberson & Co., Inc., boiler tubes and steel tubing, will remove their general offices from 121 Broadway, New York, to larger quarters in the new Barrett Building at 40 Rector Street, New York.

Announcement is made by Motor Wheel Corporation, Lansing, Mich., of the formation of the Steel Wheel Co. to handle distribution of Gier Tuarc steel wheels in Greater New York, Newark, Jersey City and surrounding territory. The Steel Wheel Co. is headed by Thomas J. Wetzel. He has long represented the Motor Wheel Corporation in the East, and will continue in this capacity, in addition to his new interests.

The American Chain Co. has transferred its general sales and export department offices to Bridgeport, Conn. There will still remain at the Grand Central Terminal, New York, the Southern district and Metropolitan district sales offices.

The Jenssen Engineering Products, Ltd., Power Building, Craig Street West, Montreal, Que., recently formed, has taken over the business and plant of the Power Equipment & Supply Co. The personnel comprises: L. N. Jenssen, J. J. Corcoran, F. W. Ward and J. A. Smith. The company will analyze industrial problems, make recommendations and supply materials, machinery, equipment, buildings, etc.

The consolidation of the Lamson & Sessions Co., Cleveland, established in 1866, manufacturer of bolts, nuts, rivets, wrenches and wire rope clips, and the Falls Rivet Co., Kent, Ohio, established in 1881, manufacturer of bolts, nuts, rivets and cotters, has been completed. The executive offices, sales and purchasing departments are now consolidated in the Lamson & Sessions office at Cleveland. The directors are: F. C. Case, J. G. Jennings, George S. Case, I. L. Jennings, C. L. Warner, H. L. Judd, T. King, Roy Smith and William S. Kent.

The Raymond Bros. Impact Pulverizer Co., Chicago, has located its permanent eastern office at 50 Church Street, New York. S. B. Kanowitz will be in charge and will give engineering information on grinding.

The Powdered Coal Engineering & Equipment Co. moved its offices and plant from Chicago to Buffalo on Nov. 1. H. B. Pruden has been elected chairman of the board and J. W. Lansing, Buffalo, has been elected president. The new board of directors is as follows: J. W. Lansing, Fenton M. Parke, J. E. Finley, Harry R. Wait, J. C. Trefts, H. B. Pruden, B. W. Wistar, W. M. Faber and Stephen T. Lockwood.

The Powdered Coal Development Corporation has been organized with headquarters at Omaha, Neb. It controls the Pruden patents for the burning of pulverized coal in the western half of the United States. The company is financing and erecting central pulverizing plants and installing equipment for burning pulverized coal. Byron B. Oberst, formerly with the Interstate Oil & Refining Co., is president of the new corporation. The board of directors includes R. M. Robertson, construction engineer, American Smelting & Refining Co.; A. E. Hall, manager, Omaha plant American Smelting & Refining Co.; Jos. C. Weeth, president, Harmon Weeth Coal Co.; J. J. Dodds, president, Dodds Lumber Co.; Bert Phillips, formerly chief engineer, Collis Products Co., Omaha plant; and Irving H. Arey, with the Republic Metal Ware Co.

Machinery Markets and News of the Works

OCTOBER SHOWS GAIN

Sales for Month Exceed Those of Previous Months This Year

Several Large Railroad Lists Expected Soon at Chicago—Erie Buys 10 or 12 Machines

October business in machine tools showed a slight gain. As statistics compiled by the National Machine Tool Builders' Association tend to indicate that in previous depressions sales of small machine tools were the first to improve, it is interesting that a large manufacturer of turret lathes and screw machines sold in October about double the volume of September.

The week has been devoid of important developments, but the calling off of the railroad strike makes more promising the possibility of early buying by the railroads. Several of the Western roads with headquarters in Chicago are preparing lists with a view to purchasing about Jan. 1. The lists will probably be issued soon. The Erie Railroad has bought 10 or 12 used tools in the East and is expected to issue soon a list of its 1922 requirements.

The Board of Education of Canton, Ohio, is distributing orders among Cleveland dealers for $32,000 worth of tools for vocational training schools.

New York

NEW YORK, Nov. 1.

October showed a slight improvement in machine-tool trade, and the month was especially significant because of the greater volume of inquiry. Only a small part of the active projects have been converted into orders, but hopes are rising that the worst of the depression has been passed.

Nothing of importance has developed within the past week except the purchase by the Erie Railroad of about 10 or 12 machines for its New Jersey locomotive repair shop, which was recently destroyed by fire. All of the machines bought were so-called second-hand machines, though some of them were from export or Government stocks and had never been used. The purchases included about eight lathes, a radial drill, crank shaper, air compressor and an emery grinder. It is reported that the mechanical department of the road is working on its 1922 budget and a list of these requirements may be issued soon.

The market in cranes shows slightly more activity than for some time. Although the volume of new inquiries is no larger the interval between inquiry and order is appreciably shorter. Bidding on coal handling apparatus for Letchworth Village, Thiels, N. Y., resulted in a low bid of $11,727 by Royal B. Mansfield, 135 William Street, New York, and a high bid of $19,440 by P. T. Cox Contracting Co., 154 Nassau Street, New York. Bids were opened Oct. 31, by the Passaic Valley Sewage Commission on a contract involving a 15-ton, 15-ft. span, hand power crane. The Worthington Pump & Machinery Corporation, Harrison, N. J., has been receiving bids for some time on a 2-ton electric crane of special design. The American Car & Foundry Co., which recently purchased two 5-ton cranes from the Shaw Electric Crane Co., is in the market for two more 5-ton overhead traveling cranes, of 75-ft. and 90-ft. spans. The Wheeler Condenser & Engineering Co., Carteret, N. J., has requested bids on a 5-ton, 47-ft. span, overhead traveling crane with alternate quotation on a 3-ton crane of the same span. The American Locomotive Co., which has purchased 17 electric hoists, is inquiring for 6 more of 2-ton and 4-ton capacity. Bids are being received by the H. T. Lambert Co., 1018 First National Bank Building, Huntington, W. Va., on a building, 60 x 200 ft., which includes a 15-ton overhead traveling crane.

Among recent sales are: McMyler Interstate Co., a 20-ton locomotive crane to the Niagara Power Co., Niagara Falls, N. Y.; Shaw Electric Crane Co., two 5-ton, 47-ft. and 60-ft. spans, overhead traveling cranes to the American Car & Foundry Co.; Niles-Bement-Pond Co., a 45-ton, 34-ft. span, overhead traveling crane to the Canadian Engineering Agency, Inc., 115 Broadway, New York, for shipment to Mexico; Arthur Appleton, 29 Broadway, two 5-ton, Toledo Crane Co. wall cranes to the Imperial Japanese Navy, 1 Madison Avenue, New York; Wonham, Bates & Goode Trading Co. representing Whiting Corporation, a 10-ton, 43-ft. span hand power crane to the Delaware, Lackawanna & Western Railroad for the Glen Alden Coal Co., Scranton, Pa.

The Central Railroad of New Jersey recently purchased a 300-ton turn-table from the Whiting Corporation through Wonham, Bates & Goode Trading Co., for its Elizabethport, N. J., shops.

The Royal Metal Furniture Co., 125 Eighth Street, Brooklyn, has contracted with E. F. Warwick, 108 South Eighth Street, for a one-story addition, 70 x 75 ft., on Eighth Street. A one-story automobile service building 30 x 75 ft. will also be erected.

The C. W. Chain Co., New York, has been incorporated at $500,000 by O. S. Bowling, M. R. Schneer and G. P. Breckenridge, 7 Dey Street, to manufacture chains for industrial service, wire goods, etc.

The Knickerbocker Ice Co., 1480 Broadway, New York, has plans for a one-story ice-manufacturing plant at Washington, D. C., to cost $250,000, including machinery. C. Leslie Weir, company address, is engineer.

The Port Jefferson Shipyard Corporation, Port Jefferson, L. I., has been incorporated at $1,000,000, to operate a shipbuilding and ship repair plant. The company is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Tiffany Electric Co., Inc., 165 Broadway, New York, electrical machinery and parts, has awarded a contract to the Barney Ahlers Construction Co., 110 West Fortieth Street, for a two-story, concrete machine shop, 40 x 150 ft., on Howell Street, Jersey City, N. J.

The N. O. Devices Co., New York, has been incorporated at $25,000 by A. J. Neumann, L. Ortlieb and G. Scheu, to manufacture mechanical devices, machine parts, etc. The company is represented by Graef & Arnold, 50 Wall Street.

The State Hospital Commission, Capitol Building, Albany, N. Y., is completing plans for a two-story and basement cold storage plant, 70 x 100 ft., at the state hospital, Utica, N. Y., to cost $130,000, with machinery. Lewis F. Pilcher, Capitol Building, is state architect. L. M. Farrington is secretary of the commission.

The Colonial Steel Co., Pittsburgh, tool steels, has leased the two and three-story buildings at 149-51 Varick Street, New York, heretofore occupied and held by the Garvin Machine Co., for a local branch works.

The Lamp Salvage Corporation of America, P. Sergardi, 501 West 145th Street, New York, representative, organized with capital of $500,000, to manufacture electric lamps and kindred products, has filed notice of change of name to the Phoenix Lamp Corporation.

The Radio Specialty Co., New York, has been chartered to manufacture wireless instruments, equipment, etc., by H. Kantro, H. Gernsback and D. M. Salzman. The company is represented by G. A. Hoffman, 100 Broadway.

The Inwood Consumers Ice Mfg. Corporation, 30 Church Street, New York, will commence the immediate erection of a one-story plant, 100 x 134 ft., at Ninth Avenue and 213th Street, to cost $30,000.

The shipbuilding plant on the Industrial Canal, New Orleans, La., owned by the French Government and operated by the Foundation Co., 120 Liberty Street, New York, will be disposed of at a public sale, Nov. 16-19, including machinery and operating equipment.

The Baltic Ice Mfg. Co., Brooklyn, has been incorporated at $750,000 by H. Rosenberg and M. Riech, to operate an ice-manufacturing and refrigerating plant. The company is represented by Louis Rosenberg, 116 Nassau Street.

The Transcontinental Oil Co., 576 Fifth Avenue, New York, will erect an addition to its refining plant at Fort Worth, Tex. A lubricating oil works and wax byproduct plant will also be established.

The Standard Oil Co. of New York, 26 Broadway, New

York, has bought 1,500 acres at Sparkhill, Rockland County, New York, for $2,000,000 for a new oil plant and pipeline.

Daetsch & Woodward, Inc., Brooklyn, has been incorporated at $50,000 by N. L. and M. V. Woodward and J. Daetsch, to manufacture dies, lasts and kindred metal products. The company is represented by M. S. Harris, 15 Park Row, New York.

A bond issue of $50,000,000 has been arranged by the New York Telephone Co., 15 Dey Street, New York, for the purchase of property for the construction of new central plants, extensions and improvements in present plants, new equipment, etc.

The Empire State Ice Co., New York, has been incorporated at $6,500,000, to construct and operate ice-manufacturing and refrigerating plants. The company is represented by the Corporation Trust Co. of America, duPont Building, Wilmington, Del.

The Johnson Co., 500 West 144th Street, New York, has filed plans for a one-story automobile service and repair building, 92 x 125 ft., at La Fontaine Avenue and 179th Street to cost $40,000.

The Emergency Fleet Corporation, Washington, D. C., has completed specifications and will call for bids early in November for proposed repairs to the steamship Leviathan, now docked at Hoboken, N. J., estimated to cost about $5,000,000, with equipment. Bids will be received early in January. The work will include the transforming of the power plant on the vessel from coal to oil operation, to cost $1,200,000.

The R. & D. System, Inc., New York, has been incorporated at $150,000 by R. W. Matthews, J. F. Jacobs and E. M. Souza, to manufacture oil-handling systems and devices. The company is represented by Leventritt, Cook, Nathan & Lehman, Trinity Building.

The Pure Oil Co., 74 Broadway, New York, has acquired a minority interest in the Humphreys-Mexia Co. and the Humphreys-Texas Co., operating at Mexia and Worthan, Tex., for $7,000,000. Plans are under way for the construction of a large central oil-collecting and handling plant near Galveston, Tex., with new pipe line 134 miles long, to cost $3,500,000. A new oil refining plant will also be erected at a Gulf Coast point in Texas to be selected, to cost over $1,000,000.

A new automobile repair works and service plant will be established in the one-story building, 100 x 115 ft., at Sherman Avenue and East 162nd Street, New York, which has been purchased by the Sherman Avenue Garage, Inc., recently organized.

The Messenger Tool Products, Inc., New Brunswick, N. J., has been incorporated at $150,000 by Hiram D. Messenger, Arthur A. McCoy and Raymond P. Wilson, 46 Paterson Street, to manufacture tools and other mechanical products.

The Board of Freeholders of Union County, Court House, Elizabeth, N. J., will make extensions and improvements in the power plant at the county institution at Scotch Plains, to cost about $25,000.

The National Type Foundry & Automatic Printing Co., Bridgeport, Conn., has acquired the former plant of the Blaisdell Machine Works, Vineland, N. J., and will remove its works there. The present plant capacity will be increased.

The Max Sash & Door Co., 660 Grand Street, Jersey City, N. J., has filed plans for a three-story building, to cost $40,000.

The Elizabeth Boiler Repair & Sheet Metal Works, Inc., Elizabeth, N. J., has been incorporated at $40,000 by Walter W. Teuber, Frederick Blessing and John W. Ebbets, 320 Pearl Street, to manufacture sheet metal products and operate a general boiler and plate repair plant.

The Asbestos Materials Corporation has acquired the plant of the Bateman Co., Inc., Millington, N. J., comprising a two-story reinforced-concrete building, heretofore devoted to the manufacture of agricultural implements. The new owner will take immediate possession and equip for the manufacture of asbestos products.

The Ransome Concrete Machinery Co., Dunellen, N. J., concrete mixers, etc., will build an addition 53 x 320 ft., to provide 50 per cent. increase in production. It will be used as a machine works and assembling and erecting department, with installation to include an electric traveling crane, machine tools, and other equipment. Foundation work will be placed under way at once.

A one-story power house will be constructed at the plant of the General Leather Co., 422 Frelinghuysen Avenue, Newark, N. J.

The Moffet Die Casting & Machinery Corporation, Newark, N. J., has been incorporated at $50,000 by Frederic W. Moffet, Oscar W. Nelson and Irving W. Teeple, 207 Market Street, to manufacture die castings, machine parts and other mechanical products.

Property of the Federal Tool & Machine Co., 24 Scott Street, Newark, N. J., consisting of machinery, tools, etc., will be disposed of by Herbert W. Royal, receiver.

The Newark Oil Burning Devices Co., 78 William Street, Newark, N. J., has filed notice of organization to manufacture oil burners and allied equipment. Thomas Tracy heads the company.

Igoe Brothers, Poinier Street, Newark, N. J., wire nails and other wire goods, have filed plans for a one-story addition, 90 x 225 ft., at Avenue A and Poinier Street, to cost $25,000, to be equipped as a wire mill.

The Universal Wire Machinery Co., Newark, N. J., has been incorporated at $125,000 by C. Hubert Derivaux, Joseph G. Wolber and John H. Yauch, Jr., to manufacture wire-working machinery and parts. The company is represented by Wolber & Gilhooly, 786 Broad Street.

A machine and repair shop for automobile work will be established by Hyman Mullman, Newark, in the building at 407-9 Elizabeth Avenue, 80 x 150 ft.

The Cincinnati Hy-Speed Machine Co., Cincinnati, has made an exclusive selling arrangement with the Niles-Bement-Pond Co., covering its full line of "Hy-Speed" drilling machines.

Buffalo

BUFFALO, Oct. 31.

The Jamestown Metal Desk Co., Blackstone Avenue, Jamestown, N. Y., is taking bids for a one-story addition, 80 x 100 ft. Beck & Tinkham, Frick-McGee Building, are architects.

A one-story addition, 12 x 84 ft., will be erected at the ice-manufacturing plant of the Bison Ice & Coal Co., Rapin Street, near Doat Street, Buffalo. Fred Teichert is treasurer.

The New York State Simplex Rim Corporation, Akron, N. Y., has been incorporated at $500,000 by B. W. Welch, G. McCutcheon and H. G. Wilder, Akron, to manufacture metal rims for automobile wheels. The company is represented by Penney, Killeen & Nye, Ellicott Square, Buffalo.

The Crane Machinery Co., 501 Morgan Building, Buffalo, has been appointed exclusive distributer of the Sundstrand manufacturing lathe in the Buffalo territory. The Crane Machinery Co. will also represent the Rockford Milling Machine Company in Buffalo.

The Dexter Folder Co., Pearl River, N. Y., paper folding machinery, is constructing a one-story addition, to cost $100,000, with machinery. Headquarters are at 28 West Twenty-third Street, New York.

The Romanite Products Corporation, Buffalo, has been incorporated at $500,000 by E. A. Willson, A. L. Kink and R. M. Houser, 702 Mutual Life Building, to manufacture cement products.

The Brockway Motor Truck Co., Cortland, N. Y., has awarded a contract to the Edward J. Beard Building Co., 307 Sherman Street, Albany, N. Y., for the erection of a one-story service and repair building, 50 x 100 ft., at Albany, to cost $30,000.

The Ajax Battery Co., Canaseraga, N. Y., storage batteries for automotive and other service, is perfecting plans for a plant unit, to cost $50,000.

Two buildings of the Electro-Refractory Co., Buffalo, crucibles, were destroyed by fire recently, the loss amounting to $200,000. The entire mechanical equipment was ruined, this loss being $50,000.

Philadelphia

PHILADELPHIA, Oct. 31.

The Kruger & Blind Co., 511-13 Master Street, Philadelphia, machinery and parts, has acquired property adjoining its plant at 509 Master Street, and site at 1406 North Fifth Street. Title has also been taken to the buildings now occupied on Master Street.

The Vallette Machine Co., Philadelphia, has been chartered to manufacture machinery and parts. F. H. Vallette, 314 Chestnut Street, is treasurer.

C. K. Guerard, 6422 Oak Avenue, Philadelphia, will build a one-story addition to his machine shop at 1510 Vine Street.

The United States Steel Products Corporation, Philadelphia, has been incorporated at $700,000 by Jules A. Reminger and C. Vincent Dewees, Philadelphia, to manufacture iron and steel products, automobile parts, etc. The company is represented by Amos A. Watson, Dover, Del.

The Dembach & Blissinger Motor Co., 113 North Prince

Street, Lancaster, Pa., will install a machine shop for parts production, repair work, etc., in its new eight-story service building, on North Prince Street, 35 x 65 ft., to cost $150,000. Grove C. Snyder, 28 North Mary Street, is architect. Work will be commenced at once.

Machine tools and other mechanical equipment will be installed in the new one-story vocational school to be erected by the Lower Paxton Township School Board, Paxton Township, Pa., with cost of $50,000. Frank G. Fahnestock, Jr., Patriot Building, Harrisburg, Pa., is architect.

A new power house will be erected by the Lancaster Milk Products Co., Inc., Hollinger, Pa., at its new plant to be constructed at 623 Thirty-second Street, Lancaster, Pa., with cost of $100,000. John Harmon, 48 North Queen Street, Lancaster, is architect.

The Templeton Limestone Co., Kittaning, Pa., will build a crushing plant, 30 x 60 ft., and power house, 25 x 25 ft., at its property at Templeton, near Kittaning, to replace its works recently destroyed by fire. W. L. Snyder is superintendent.

The Robbins & Myers Co., 1418 Walnut Street, Philadelphia, manufacturer of electric fans, motors, etc., with headquarters at Springfield, Ohio, has leased the one-story building at 229-31 North Twenty-third Street, totaling about 6000 sq. ft. of space, for a new local works.

A one-story machine shop will be erected by Michael Pribino, Philadelphia, at 2059 Margaretta Street. H. G. Hammer, Philadelphia, is architect.

The National Automatic Electric Iron Co., Philadelphia, is being organized by Samuel and Lewis H. Dworkin, and Fred Kohn, to manufacture electric irons and other electrical products. Levi & Mandel, North American Building, represent the company.

Fire, Oct. 27, destroyed a portion of the pipe shop and carpenter shop at the plant of the Barrett Mfg. Co., Thirty-sixth Street and Grays Ferry Road, Philadelphia, roofing products, etc., with loss of $11,000.

The Department of City Transit, City Hall, Philadelphia, will take new bids for a power house at Cumberland and Kensington streets.

The J. W. Paxson Co., 1021 North Delaware Avenue, Philadelphia, foundry equipment, has disposed of its property at 1015-21 North Delaware Avenue, to D. C. Folwell, who in turn has transferred the site and buildings to the Pennsylvania Sugar Co., with refinery on adjoining land and which will use the property for expansion. The Paxson company is now building two plant structures at D Street and Nicetown Lane.

The American Ice Co., Sixth and Arch streets, Philadelphia, will soon take bids for a new ice plant at Belmont and Girard avenues.

The Hydro-United Tire Co., Pottstown, Pa., is building an addition costing $250,000, including equipment. The work is well under way and when completed will give the company a plant double its present capacity.

T. Clark, 2728 North Second Street, Philadelphia, has filed plans for an addition to his machine shop, 30 x 60 ft., at 2732 North Second Street.

The Department of Public Works, Bureau of City Property, City Hall, Philadelphia, will build a power house for the buildings comprising Independence Hall, Sixth and Chestnut streets. John P. B. Sinkler, Otis Building, is architect.

The Walton Auto Supplies Co., 754 South Broad Street, Philadelphia, has completed plans for a three-story service and machine repair building, 90 x 100 ft., at Broad and Bainbridge streets. J. E. Fieldstein, 901 Walnut Street, is architect.

The American Type Founders Co., Communipaw Avenue, Jersey City, N. J., has leased property at 1007-11 North Front Street, Philadelphia, for a new local works.

The Penn Seaboard Steel Corporation, Franklin Bank Building, Philadelphia, has arranged for the purchase of the plant and business of the Titusville Forge Co., Titusville, Pa. To finance the acquisition the company has arranged for an increase in capital from 350,000 to 700,000 shares of stock, no par value. J. B. Warren is president.

The State Highway Department, Broad Street Bank Building, Trenton, N. J., has completed plans for a one- and two-story automobile service and repair building, 100 x 400 ft., at Fernwood, N. J., for state motor cars and trucks, to cost $350,000. T. J. Wasser, address noted, is engineer.

The Towanda Electric Illuminating Co., Towanda, Pa., will build a new power house.

The Ohio Generating Co., Red Lion, near York, Pa., recently organized to manufacture isolated power plants for farm and other rural service, is having plans prepared for a local plant, four-story, 65 x 110 ft. Joseph Dise, Glen Rock, Pa., is architect. C. A. LaMotto is president.

The Lansdale Porcelain Enamel Works, Inc., Lansdale, Pa., has been incorporated at $30,000, to manufacture enameled products. Abraham H. Landis, Lansdale, is treasurer.

The Ideal Motor Car Co., 1432-38 Union Street, Allentown, Pa., will build a two-story addition to its service and repair works, 60 x 100 ft. C. W. Hilbert is head.

The Mifflinburg Body Co., Mifflinburg, Pa., automobile bodies, will build a three-story addition, 62 x 90 ft., to cost $75,000. J. C. Sterling is head.

The Fayetteville Electric Light & Power Co., Fayetteville, Pa., recently organized, will operate a local power plant and system. H. G. Sollenberger, Fayetteville, is treasurer.

C. A. Reed & Co., Willow and Laurel streets, Williamsport, Pa., will build a four-story plant, 70 x 100 ft., for the manufacture of paper products, to cost $100,000 with machinery. The company was recently incorporated at $300,000. Harry A. Miller is treasurer. F. Arthur Rianhard, Masonic Temple Building, is architect.

The Keystone Iron Works, Inc., Honesdale, Pa., has been incorporated at $25,000 by Edward Manger, Frederick Parrish and John H. Gumpper, Honesdale, to manufacture iron products, castings, etc. The company is represented by the Colonial Charter Co., Ford Building, Wilmington, Del.

Pittsburgh

PITTSBURGH, Oct. 31.

Actual business shows no appreciable increase, but the trade believes that when something now is asked for there is a real purpose to buy. A number of inquiries have followed the awarding of contracts for new structures, and this means, of course, that the equipment asked for will be placed. Several equipment inquiries, which have long been dormant, have been revived recently and revised prices against them asked for. In the steel making centers the tendency is still to defer purchases until 1922 to conserve cash resources. The Standard Underground Cable Co., Pittsburgh, will want two cranes for each of its plants here and in St. Louis. For the latter plant one 5-ton and one 15-ton will be wanted and for the Pittsburgh plant one 5-ton and one 10-ton, all to be floor-operated. The United Metal & Iron Co. recently closed with the Northern Engineering Works for a 1-ton electric hoist and the West Penn Steel Co. has bought a 5-ton, 47-ft. span, Shaw crane.

The plant and business of the P. Wall Mfg. Co., Preble Avenue, Northside, Pittsburgh, ice cans for refrigerating service, oil cans and tanks, blow torches, etc., has been acquired at $600,000 by Page Brothers & Co., Pittsburgh. The new owner will organize a company at once to continue production at the plant, under the management of Frank T. Page and John M. Irwin.

The West Virginia Armature Co., Bluefield, W. Va., electrical equipment, recently reorganized, has acquired the property of the American Armature & Engineering Co., same city, for expansion. W. A. Bishop is president, and A. L. Smith, vice-president and general manager.

The Cherry River Paper Co., Richwood, W. Va., will build a one-story power plant, 40 x 150 ft., to cost $250,000, with machinery. George Snyder is assistant superintendent.

Machine shop equipment, electrical apparatus and other mechanical equipment will be installed in the new two-story industrial school building to be erected by the Industrial School for Boys, Bruntytown, near Grafton, W. Va., to cost $100,000. H. E. Elesher is superintendent. R. A. Gillis, American Building, Fairmont, W. Va., is architect.

The Marion Motor Co., Fairmont, W. Va., recently organized with headquarters at 304 Jacobs Building, has plans for the erection of a one-story service and automobile machine and repair works. R. A. Johnson is treasurer.

The Roeper Crane & Hoist Co. has taken a 10-ton, 34-ft. 6-in. I-beam crane with chain hoist suspension for Ford City, Pa. The Buckeye Machine Co., Lima, Ohio, was lower bidder for a 120 hp. vertical, heavy duty oil engine for the Ensworth dam, bids for which recently were asked for by the Federal Engineers Office, Pittsburgh district.

The Union Ice Co., 124-126 West Ohio Street, Pittsburgh, has completed plans for a one-story ice plant, 65 x 130 ft., on Beaver Avenue, to cost $75,000.

The Madison Auto & Repair Co., Pittsburgh, is being organized by John Wolf, Robert A. Fisher and William K. MacKay, to operate an automobile parts manufacturing and assembling works, and general machine repair plant. Ap-

plication for a state charter will be made on Nov. 14. W. F. Stadtlander, 415 Frick Building, represents the company.

The Moffit-Sterling Gas Coal Co., Charleroi, Pa., will build a new steel tipple at its coal properties at Dillinger, Greene County, with hoisting capacity of about 2000 tons a day.

The Charleroi Iron Works, Charleroi, Pa., structural shapes and other iron and steel products, will remove its works from McKean Avenue to a new building recently completed in the lower part of the city. Increased production will be provided.

McLean & McGinness, 366 Stratford Avenue, Pittsburgh, wagon parts, etc., have awarded a contract to Henry Shank & Co., Century Building, for an addition, 40 x 100 ft., on Liberty Avenue, to cost $45,000. James H. McLean heads the company.

The United Iron & Steel Co., Pittsburgh, has filed notice of dissolution. It recently disposed of its property to the Hanna Furnace Co., Cleveland.

The United Light & Power Co., Charleston, W. Va., will make extensions and improvements in its electric plant and system in the vicinity of Iaeger, W. Va., to cost $25,000. F. B. Lamb is head.

The Philadelphia Co., 435 Sixth Avenue, Pittsburgh, operating the Duquesne Light Co. and numerous other public utility properties, has arranged for a bond issue of $16,000,000 for general operations, extensions, improvements, etc. A. W. Thompson is president.

The Pittsburgh Japanning Co., Pittsburgh, has been incorporated at $150,000, to manufacture japanned metal products and other metal goods. The company is represented by the Capital Trust Co., Dover, Del.

The Pittsburgh Malleable Iron Co., Thirty-fourth and Smallman streets, Pittsburgh, has filed plans for a one-story building at its works on Spruce Alley.

The Stonecrete Corporation, 6023 Penn Avenue, Pittsburgh, plans a two-story plant at Cheswick, for the manufacture of cement products. Charles B. Lawton is head.

The United States Engineer Office, Pittsburgh, will receive bids until noon, Nov. 23, for the construction of six steel dump scows.

The Clarion River Power Co., Beaver Falls, Pa., has tentative plans for a hydroelectric generating plant on the Clarion River, to cost $2,000,000. Col. Joseph H. Thompson, Beaver Falls, represents the company. Headquarters are at Foxburg, Pa.

The American Natural Gas Co., Park Building, Pittsburgh, will soon commence the erection of a one-story building at Vandergrift, Pa., 30 x 100 ft., to be equipped in part as a machine and repair works.

New England

BOSTON, Nov. 1.

Fewer machine tools were sold in New England the past week than the previous week, but prospects have increased, inquiries cover a wider range of machinery and sentiment among the equipment dealers is even more hopeful than it was. Heretofore, inquiries have run largely to lathes, milling machines and presses. The past week witnessed reviving interest in thread millers, screw machines and other tools. It is now generally conceded August represented the low point in New England machine tool sales for 1921. September saw a slight improvement in business and October bookings, not only in dollars and cents but in individual sales as well, measured up better than in September, while there is enough prospective business practically assured to warrant the belief the November showing will be better than the October. Lack of ready funds has held up small shop owners in purchases of new machinery, and the same is true with large interests.

Among sales reported this week are a 30 x 30 x 8 planer, a 20-in. x 8 ft. lathe, a Greenfield grinder and other smaller used tools to a Plainfield, N. J., manufacturer; a complete line of new equipment, including a No. 54 combination punch and shear, a Blount grinder and a hack saw to a new local iron working concern; a half dozen special lathes, an upright drill, a shaper and a milling machine, all used tools, to a manufacturer of textile machinery; a used 14-in. lathe to a Whitinsville, Mass., interest; a new Sip sensitive drill with an 8-in. overhead and a new 16-in. x 10 ft. lathe to a Massachusetts manufacturer. A middle Massachusetts metal worker has purchased three used Waterbury-Farrel presses and has taken an option on 20 additional used machines offered by a Connecticut dealer, while a local firm is negotiating with a customer on seven fairly large used presses. Other prospective orders, each involving one or more machines and a scarcity of desired makes and sizes have enlivened the market for used presses. Indications are a Pawtucket, R. I., interest will shortly close on a list of more than a dozen tools. Contrary to earlier report, the Manchester, N. H., high school machine tool list has not been closed. Few if any machines have been bought against this list. Some bidders are asked to revise quotations submitted earlier and others are given to understand the business will soon be closed. There is considerable activity in wood working machinery.

An inquiry for a 5-ton crane from a nearby stone cutting concern is the only new development reported in the crane market.

A sale of block gages costing well up in four figures is reported, and the buyer is negotiating on additional sets. C. E. Johansson, Inc., Poughkeepsie, N. Y., has announced a reduction in prices on gages. The company's No. 1 set of combination gages, eighty-one blocks, with accessories, heretofore costing the consumer $800, is now $625. The No. 0 set, with accessories, which formerly sold at $1,500, is now $1,000.

Construction of its new warehouse on Andrew Square, South Boston, is sufficiently progressed to permit the Machineshop Equipment Corporation, 170 Oliver Street, to move some stock.

The American Tube Works, Somerville Avenue and Dane Street, Somerville, Mass., will erect a one-story, 32 x 45 ft. pump house.

L. A. Vachon, Washington Street, Brookline, Mass., is erecting a two-story, 60 x 149 ft. service station and automobile salesroom.

The Williams & Anderson Co., 33 Broad Street, Providence, R. I., jewelry, is erecting a one-story, 60 x 100 ft. manufacturing plant.

The Pittsfield Lime & Stone Co. will quadruple the capacity of its Richmond Summit, Mass., plant. Rolla N. Soper is head.

The Elastoid Fibre Co., Waltham, Mass., is erecting a one-story, 70 x 180 ft. manufacturing plant between Lexington and Beacon streets, that city.

A contract has been let for the rebuilding of a one-story, 100 x 150 ft. section of its plant by the Springfield Ice Co., Springfield, Mass.

Wessell, Nickel & Gross, New York, are planning to open a large plant at Barton, Vt., for the manufacture of piano actions, within the near future. Machinery is being installed.

A Massachusetts charter has been granted the Babson Can Co., Boston, with a capital of 1000 shares, no par value. Stanley W. C. Downey, 50 Stratford Street, West Roxbury, is president, and Harry Sebell, 441 Broadway, Medford, treasurer.

The Essex Sheet Metal Works, Inc., Lynn, has incorporated, with Max Sontz, 25 Prospect Street, Lynn, president, and Esah Garfinkel, same address, treasurer. The company's capital consists of 100 shares, no par value.

Joseph M. Andre, Jr., and Manuel J. Andre, both of South Easton, Mass., are president and treasurer, respectively, of the Andre Mfg. Co., Inc., Boston, which has been granted a charter to manufacture and deal in clocks, phonographs and phonograph novelties. The company is capitalized at $100,000.

The Massachusetts department of public utilities has granted permission to the Edison Electric Illuminating Co. of Boston to issue 45,056 shares of stock, par $100, at $130 a share, to pay notes maturing Jan. 15 next, and two weeks later, the proceeds to be used for further plant expansion.

The George F. Wright Steel & Wire Co., Worcester, Mass., recently organized with a capital of $250,000, is arranging for the early operation of its plant at Jamesville, Mass., comprising the former works of the Standard Plunger Elevator Co., lately acquired. Equipment will be installed for the manufacture of wire cloth, wire netting for fence service, wire lath, wire rope and other kindred products. George F. Wright, formerly vice-president Wickwire-Spencer Steel Corporation, is president; and Herbert N. Wright, former treasurer Wright Wire Co., will act in a like capacity with the new organization.

The New Process Cutlery Co., New Haven, Conn., has been incorporated at $50,000 by W. H. Hurley, B. W. and G. F. Humming, 410 Dixwell Avenue, to manufacture cutlery products.

The estate of Edward Malley, 902 Chapel Street, New Haven, Conn., has filed plans for the erection of a one-story power house, 72 x 80 ft., on Temple Street, to cost $50,000.

A. E. Astle, Houlton, Me., has leased the local machine and repair shops of the Bangor & Aroostock Railroad Co., used heretofore chiefly for freight car work. The plant will be continued in operation, handling railroad and other heavy

repair and construction work. The new management will be operative early in November.

The Springfield Ice Co., 47 Dwight Street, Springfield, Mass., has completed plans for a one-story ice plant, 100 x 150 ft., work to start at once.

Bird & Son, Walpole, Mass., roofing, have completed plans for an addition. Work will be started soon.

Wessell, Nickel & Gross, 457 West Forty-fifth Street, New York, will establish a new plant at Barton, Vt., for the manufacture of player piano mechanisms. A local building has been acquired and machinery will be installed at once.

The Henry Weyand Co., 16 Jefferson Street, Waterbury, Conn., sheet metal products, has awarded a contract to the Lacroix Construction Co., 95 Bank Street, for a three-story addition, 80 x 110 ft.

The Donnelly Brick Co., New Britain, Conn., plans the rebuilding of its plant, destroyed by fire. The work will include a new machine department, dryer department, tunnel kiln building and other structures. Erection will be commenced soon.

The United States Hardware & Mfg. Co., Pawtucket, R. I., has been chartered to manufacture hardware and other metal products by Harry F. Burnham, John D. Sawyer and John R. White, 68 Ogden Street

The Mack Motor Truck Co., Massachusetts Avenue, Cambridge, Mass., has awarded a contract to the Blake & Pope Co., 15 Beacon Street, Boston, for a one-story addition, 44 x 110 ft., on Osborne Street.

The Viscaloid Co., Lancaster Street, Leominster, Mass., celluloid products, has awarded a contract to Wiley & Foss, Central Street, Fitchburg, Mass., for a three-story addition, 40 x 50 ft.

The Worthington Pump & Machinery Co., 265 Third Street, Cambridge, Mass., has awarded a contract to the Canter Construction Co., 6 Beacon Street, Boston, for a one-story addition on Fifth Street.

Chicago

CHICAGO, Oct. 31.

A number of railroads with headquarters in Chicago are preparing large lists on which action may be taken about the first of the year. It is possible that purchases against some pending railroad inquiries will be made before that time.

Reductions of about 12½ per cent on engine lathes, radial drilling machines and upright drills, have become generally effective.

Business during the past week was checked because of the prospect of a railroad strike and with this uncertainty now out of the way there is a more cheerful tone. Dealers report that October was very dull, but nevertheless brought a slight improvement over September. Inquiries are few, but here and there fair purchases are in prospect. One dealer is working on an inquiry from a Middle Western State for a 25-in. x 14-ft. engine lathe, a 20-in. shaper, a No. 2 universal heavy milling machine, a punch and shear with a capacity for a ¾-in. hole in ¾-in. metal, and a 75 to 100-lb. power hammer. J. C. Austerberry, dealer in machine tools and accessories, 684-690 East Congress Street, Detroit, is in the market for the following machine tools, either new or in good second-hand condition: One Norton auto parts grinder, or its equivalent; one No. 55 Heald grinder; one No. 60 Heald grinder; one No. 65 Heald grinder; one Springfield 14-in. x 5-ft. engine lathe, or its equivalent; one American 2-ft. radial drill, or its equivalent; one Etna swaging machine with capacity to take ¾-in. copper tubing.

The Warner Corporation, Muncie, Ind., is in the market for two used No. 12 Barber-Colman gear hobbing machines, and one used No. 13 Natco multi-drill with rectangular head.

The Riechman-Crosby Co., Memphis, Tenn., is in the market for a used keyseating machine, either a Davis or Mitts & Merrill machine, to have a range from ¼-in. to 1-in. inclusive.

The Street & Kent Mfg. Co. plumbers' brass goods, 549 Fulton Street, Chicago, has purchased the two-story and basement factory and the one-story and basement foundry, with a total floor space of 28,558 sq. ft., at the northwest corner of Clybourn and Clifton avenues, from the Alfred O. Blaich Co., case hardening material. The plant was built in 1913 and has been sold because it is believed that an eastern location is a logical place for its operations. The Street & Kent Mfg. Co. has been operating at the Fulton Street address for the past 20 years.

The Atchison, Topeka & Santa Fe Railway Co. will construct several extensions to its machine shops at San Bernardino, Cal., to cost $224,000. It will also install a boiler washing plant in connection with its shops at that place.

The Peterson & Reedy Pattern Works, wood and metal patterns, 4650 Iowa Street, Chicago, have let contracts for a one-story pattern shop, 24 x 100 ft., 4832 West Division Street, to cost $5,000.

Voltz Brothers, 813-15 Gilpin Place, Chicago, have let a contract for a two-story wagon factory, to cost $15,000.

Holton, Seelye & Co., builders, 140 South Dearborn Street, Chicago, have secured a permit to construct a one- and two-story factory, 96 x 159 ft., for a manufacturer of electric light fixtures, at 3322-28 Carroll Avenue, to cost $18,000.

Joseph Spingola 750 West Taylor Street, Chicago, has let a contract for one- and two-story garage and office building, 75 x 119 ft., 918-22 South Morgan Street, to cost $40,000.

The Crane Co., 836 South Michigan Avenue, Chicago, will build a one-story machine shop at its branch works at East Chicago in conjunction with a new warehouse at that location, to cost $30,000.

The Big Four Battery Co., Hammond, Ind., has filed a petition in bankruptcy. Assets are listed at $7,294 and liabilities at $6,533.

Peter Sitzler, Spirit Lake, Iowa, has sold his foundry business to Woods & Woods. O. B. Wilcox will be in charge.

The Muskogee Tool Co., oil well and coal mining tools, Henryetta, Okla., has started excavations for shop and foundry buildings.

The Reynolds Spring Co., Jackson, Mich., has awarded a contract for a two-story factory, 130 x 201 ft., to cost $125,000.

Cleveland

CLEVELAND, Oct. 31.

The machine tool business as a whole showed some gain in October as compared with September and inquiries are coming out in little better volume. One builder of turret lathes and screw machines reports that October sales were double those in September and makers of automatic screw machinery are getting a little better volume of orders, but these are nearly all for single machines. Some local dealers sold more machinery during October than during the previous month, but others report no gain in sales. The lines most active with dealers are upright and vertical drills, planers, shapers and power presses. Most orders are for single machines, and the demand is more active for used than for new machinery. Dealers are working on few inquiries for more than two machines.

The machinery equipment for the McKinley High School, Canton, amounting to about $32,000, which has been held up for several weeks, is now being distributed among several dealers. During the week a Cleveland machinery house secured new orders for four machine tools which had been cancelled some time ago, in the Dayton territory.

The Glenwood Motor Co., Cleveland, has acquired a site in Findlay, Ohio, for an automobile plant. It has been developing a car under the name of the Glenwood Engineering Co., Euclid Avenue and East Seventy-first Street, Cleveland. The proposed plant will provide 90,000 sq. ft. of floor space and will be used for assembling purposes. B. J. Cline is president.

The Billings-Chapin Co., paint, Cleveland, will erect a four-story plant, 80 x 110 ft.

The Union Chain & Mfg. Co., Seville, Ohio, has purchased the former plant of the Sandusky Drop Forge Co., Sandusky, Ohio, and will move to its new quarters when alterations have been made.

A new machine shop has been opened in Jefferson, Ohio, by I. V. Fetch and S. A. Clark for cylinder grinding and general machine shop work.

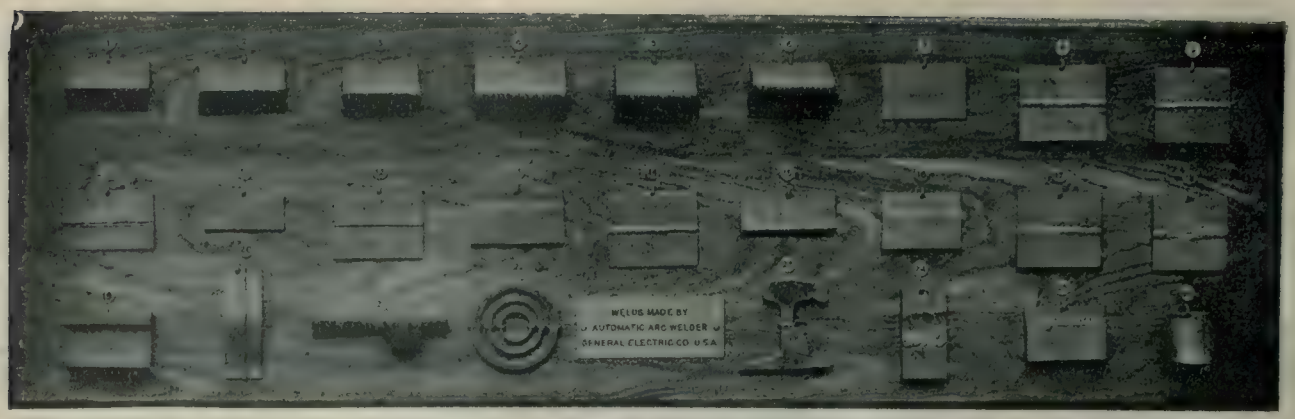
The S. H. Vehicle Co., East 65th Street and Morgan Avenue, Cleveland, has started the erection of a three-story factory, 90 x 200 ft.

The Anderson Piston Co., Bowling Green, Ohio, has purchased the plant formerly occupied by the Vim Motor Mfg. Co., Sandusky, and will shortly move to that site. The company has a capital stock of $500,000. H. H. Elwood is president and C. C. Anderson is manager.

The Hubbell Tire & Rubber Co., 6545 Carnegie Avenue, Cleveland, has acquired the plant of the Trumbull Tire & Rubber Co., Newton Falls, Ohio, the new owner to take immediate possession and to install new machinery.

The Rail Welding & Bonding Co., Woodland Avenue and East Twenty-eighth Street, Cleveland, will commence the early erection of a one-story and basement addition, 90 x 180 ft., to cost $50,000. The Austin Co. is contractor.

The P. R. Morren Foundry Co., 4260 East Ninety-eighth Street, Cleveland, has completed plans for a one-story



AUTOMATIC ARC WELDING SAMPLE BOARD

Combined sample and data board made up by the General Electric Co., on which is mounted a collection of samples representing various types of welds that can be made with the automatic welding equipment. Each sample is numbered, and after the corresponding number in the table below is given the data on the welding speed, the size of electrode, and the current used.

Sample No.	Type of Weld	Gage of Metal	Welding Speed In. Per Min.	Welding Current Amp.	Size of Electrode In.
1	Angle weld	16	14	75	1/16
2	Angle weld	13	10	120	3/32
3	Angle weld	11	9	110	3/32
4	Angle weld	7	5½	130	1/8
5	Angle weld	3	3½	150	1/8
6	Section of bottom of oil switch tank, lap welded	11		120	3/32
7	Lap fillet weld	16	10	60	1/16
8	Butt weld with backing strip	16	11	130	3/32
9	Butt weld	11		140	3/32
10	Lap weld	20	12	65	1/16
11	Edge weld	16	12	60	1/16
12	Butt weld	16	13	70	1/16
13	Lap fillet weld	13	10	105	1/16
14	Butt weld	13	10	100	3/32
15	Edge weld	11	9	110	3/32
16	Lap fillet weld	11	9	140	3/32
17	Butt weld	7	7	180	1/8
18	Butt weld	3	5	175	1/8
19	Fabrication of steel	9	8	150	3/32
20	Automatic will weld over irregular contour	9		150	3/32
21	Quarter section of built up, worn or undersized shafting	..	8	140	3/32
22	Section of welded tubing	1	3	170	1/8
		11	9	120	3/32
		18	20	65	1/16
23	Section of steel faced copper railbond hand welded to steel rail	..		175	3/32
24	Butt weld—three layers	½"		170	1/8
25	Lap fillet weld—one layer	3	5	175	1/8
26	Welded steel tubing	20	25	50	1/16

*Total time to weld bond to rail, 3½ min.

foundry, 40 x 102 ft., and pattern shop, 16 x 72 ft., on Dunlap Avenue, to cost $45,000.

The American Mine Door Co., Canton, Ohio, will defer its plant addition until early spring. Plans have been completed for a one and two-story building, to cost $100,000, with machinery. The Austin Co., Cleveland, is structural engineer.

The Youngstown Ice Co., Stambaugh Building, Youngstown, Ohio, has awarded a contract to the Heller-Murray Co., West Bayen Avenue, for a one-story truck repair shop and service building for company motor trucks, 100 x 113 ft. and 21 x 75 ft., on Hubbard Road.

The Hodes Zinc Co., Fremont, Ohio, automobile accessories, has acquired the former three-story plant of the Shelby Salesbook Co., for a new works.

The Pennsylvania-Ohio Power & Light Co., Lowellville, Ohio, plans the immediate erection of an addition to its local generating plant for the installation of new turbo-generating and auxiliary equipment, with capacity of 20,000 kw.

Detroit

DETROIT, Oct. 31.

The United Engine Co., Lansing, Mich., has arranged to take over the American interests of the Aktiebolaget Pump Separator Co., a Swedish corporation. The deal entails the transfer of properties and accounts valued at approximately $750,000. The Swedish concern has branches throughout the United States. Plans include the removal of the tinning and repair shop from St. Louis, Mo., to Lansing.

The Homer Furnace Co., Coldwater, Mich., recently received an order for 700 furnaces, and production has been brought up to between 50 and 75 furnaces a day. Officials of the company announce that the company has no intention of removing from Coldwater, as previously announced.

Work has been nearly completed on the new plant of the Michigan Sheet Metal Works, Lansing, Mich., and equipment and machinery are being removed from the old plant. The company reports an increase in business and expects to make further improvements and extensions early next year.

The Beach Mfg. Co., Charlotte, Mich., manufacturer of steel bridges and culverts, is erecting a plant addition, one story, 30 x 150 ft.

The Kirchen Machine Co., Lansing, Mich., has received an order for the immediate machining of 5,000,000 rail wedges for the Lansing Forge Co., of Lansing. The Lansing Forge Co. is forging the devices and will deliver them to a railroad company in Mexico. The order represents, according to officials of the Kirchen Machine Co., an investment of approximately $500,000. This contract will keep the Kirchen Machine Co. busy throughout the entire winter.

An addition of 56,000 square feet of floor space will be added to the Lloyd Mfg. Co.'s factory in Menominee, Mich., before the first of the year, giving the plant a total floor space of 300,000 sq. ft. The company manufactures baby carriages.

The Tirrel Mfg. Co., Bridgman, Mich., has been organized, with a capital of $60,000, to manufacture nozzles, pumps, engines, devices and equipment and carriages for spraying of fruit trees, etc. The incorporators are Leslie L. Tirrel, New Troy, Mich., and W. H. Gast and H. E. Howard, Bridgman. It is probable that the company will soon be in the market for manufacturing equipment

The Kalamazoo Motors Corporation, Kalamazoo, Mich., has increased its capitalization from $250,000 to $1,000,000.

The Bennett Oven Co., Battle Creek, Mich., has increased its capitalization from $40,000 to $75,000.

The Gillett Motor Products Co., Howard City, Mich., has increased its capitalization from $100,000 preferred to $100,000 preferred and 75,000 shares, no par value.

The River Foundry Co., Detroit, has been organized with a capitalization of $5,000, to manufacture iron, steel and alloy castings. The incorporators are Joseph C. Arnold, 341 Kitchener Avenue, Detroit, and Robert Baheman and Dobre Yordanescy, Detroit.

The Chevrolet Motor Car Co., Flint, Mich., has ordered 600 starters per day for an indefinite period from the Electric Auto-Lite Co., Toledo, Ohio.

The Sparks-Withington Co., Jackson, Mich., has perfected an adjustable bracket that will permit the use of the standard Sparks-Withington Motor horns and equipment on any of 100 types of cars. The bracket is made to be attached to a cylinder head. This bracket will be put in production as soon as arrangements for so doing can be completed.

The Shaw Brothers Motor Car Co., a recently organized

Detroit concern, will soon announce a four-cylinder motor car in the $700-$800 class. It is expected that this company will soon get into production.

The Waterloo Mill & Ice Co., Monroe, Mich., has been organized, with a capital of $60,000, to operate the Waterloo Mills of that city and to build an artificial ice plant. Work will be started within the next week or so and it is expected to have the plant completed by Feb. 1.

The Angle Steel Tool Co. is preparing to move its plant from Otsego to Plainwell, Mich. This week ground was broken for two new buildings, 70 x 140 ft., and 60 x 80 ft. Recently this concern increased its capital from $15,000 to $85,000. The company makes steel stools, chairs, cabinets and trucks.

Continental Motors, Inc., has closed a contract to supply Durant Motors with between $12,000,000 and $15,000,000 worth of automobile motors. It will add at least 2000 employees to the payroll of the Muskegon plant.

The Belvidere Heating Co., Belvidere, Ill., heating equipment, plans a two-story plant, to cost $50,000. J. Myers heads the company.

The Zonta Tire & Rubber Co., 3100 Floyd Avenue, Sioux City, Ia., has commenced the erection of a three-story and basement plant, 150 x 172 ft., to cost $150,000, with machinery for the manufacture of automobile tires. W. W. Beach & Co., Commerce Building, are architects.

The Minneapolis & St. Louis Railway Co., Transportation Building, Minneapolis, plans a one-story car repair shop at its Cedar Lake shops, Douglas and Kenwood streets. R. C. Kenly is chief engineer.

The Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, air chucks and kindred mechanical products, will defer until early spring the erection of its two-story plant at Wellington and Knox streets, 90 x 160 ft., to cost $150,000. Bids will be asked at that time.

The Paul J. Kalman Co., 22 West Munroe Street, Chicago, steel reinforcing bars and other steel products, plans the erection of a steel fabricating plant at Youngstown, Ohio, one-story, 400 x 420 ft., to cost $200,000, including equipment.

The Keith Heating Co., 200 Court Avenue, Des Moines, Ia., furnaces, heating equipment, etc., has awarded a contract for the foundation work for its plant 100 x 142 ft., to cost $200,000, with machinery. Boyd & Moore. 1024 West Grand Street, are architects.

The Hercules Steel Post Co., Niles, Mich., will erect a one-story factory next spring, 50 x 250 ft., to cost $30,000.

The H. A. Blake Machine & Foundry Co., Cheboygan, Mich., has filed articles of incorporation, with capital of $50,000. The incorporators are Annie A., Jessie P. and John A. Blake.

The Hughes Steel Equipment Co., Allegan, Mich., has purchased the property of the Hensel Battery Co., and will enlarge its output.

The American Bridge Co., Chicago, is erecting a six-story dairy salt plant at Manistee, Mich., for Ruggles & Rademacher. The steel work is progressing rapidly.

The United Engine Co., Lansing, Mich., will take over the American interests of the Aktiebolaget Pump Separator Corporation, according to announcement made by C. L. Sprinkle, president of the Lansing concern. The deal entails the transfer of property and accounts to the value of $750,000.

Cincinnati

CINCINNATI, Oct. 31.

There have been no developments of note in the machinery market during the week. While the first part of October showed increased activity over the preceding months, orders placed during the latter part were fewer. There is, however, a more noticeable feeling of optimism regarding the prospects. The inquiries, while small, are of a tone that promise business in the near future. Local dealers covering the Cincinnati district report a great deal of planning by metal manufacturers on how to increase efficiency in their shops and in many cases new machinery will be installed as soon as plans are completed. The market on used machinery is fairly active and some low prices are being quoted to move this equipment.

The Newman Mfg. Co., Cincinnati, brass and bronze work, has acquired the former plant of the Gibson Art Co. at 416 Elm Street, and will move there early in 1922.

The Lincoln Tractor & Implement Co., Dayton, Ohio, has been incorporated at $1,000,000 to manufacture a moderate-priced tractor. Harrison Craig and O. W. Norton, Urbana, Ohio, and E. H. Rump, John H. Best and Joseph J. Link, Dayton, Ohio, are among the incorporators.

Baltimore

BALTIMORE, Oct. 31.

The Maryland Culvert & Metal Co., 1301 Munsey Building, Baltimore, is constructing a 28 x 36 ft. addition to its Ridgely Street plant. W. M. Baker is president.

The Liberty Tool Co., 1403 Fidelity Building, Baltimore, has been incorporated at $20,000 by Roger Howell, John S. Yost and Helen B. McIlhenney.

The Patuxent Clay Products Co., 206 Water Street, Baltimore, plans a $150,000 plant for the manufacture of hollow tile.

The Aumen Machinery Co., 107 East Lombard Street, Baltimore, has been appointed exclusive distributer for the Rockford Milling Machine Co. and the Rockford Tool Co. in the Baltimore territory.

The Atlas Wheelbarrow Co., 405 South Washington Street, Easton, Md., will erect a two-story building, 50 x 200 ft., to cost $40,000.

The A. B. Sexton Stove & Mfg. Co., 501 West Conway Street, Baltimore, acquired the plant of the Isaac A. Sheppard Co., Excelsior Stove Works, Easton Avenue and Chester Street, at a receiver's sale, Oct. 25, for $101,000. The property totals 187 x 300 ft., and consists of a foundry, 75 x 300 ft., power house, five warehouses and other buildings, with machinery and equipment. It will be used by the new owner for stove and range manufacture.

Fire, Oct. 22, destroyed the power house, consisting of boiler and engine departments, at Mine No. 13, of the Consolidation Coal Co., Consolidation, near Frostburg, Md. The plant will be rebuilt.

The Hancock Steel Co., Martinsburg, W. Va., will call for bids in November for the initial building at its new plant at Brocius, near Hancock, Md. The unit will be one-story, 130 x 200 ft., and equipped as a machine shop and foundry. Ernest McGeorge, 1900 Euclid Building, Cleveland, is engineer. F. Vernon Aler heads the company.

The Sectional Tire Works, Inc., Wilmington, Del., has been incorporated at $60,000, to manufacture automobile tires, being represented by the Corporation Registry Co., 900 Market Street, Wilmington.

The Industrial Service Corporation, Hopewell, Va., has acquired the local power plant and waterworks of the du Pont Chemical Co. Possession will be taken early in November, and operations conducted under the new management, which plans for expansion. J. F. Muhlig is general manager.

The Heaton Coal Co., Tacoma, Va., recently organized at $50,000, plans the installation of electrical machinery and other mining equipment. L. L. Heaton is president and general manager.

The Anheusér-Busch Co., Norfolk, Va., will soon take bids for an ice-manufacturing plant addition to cost $250,000, with machinery. Ophuls, Hill & McCreery, 112 West Forty-second Street, New York, are engineers.

The Georgia Marble Co., Tate, Ga., has plans for a plant at its local properties, 170 x 370 ft., to be equipped for handling rough and finished material. A large sawing department will be installed, polishing department, machine works, with electric traveling cranes and other kindred equipment. Machinery will be electrically driven.

The Chesapeake Mfg. & Creosoting Co., Portsmouth, Va., plans for the rebuilding of the portion of its local plant, recently destroyed by fire.

The Citizens' Ice & Fuel Co., Columbus, Ga., plans for an ice-manufacturing plant to cost $40,000. W. T. Gould, Diamond Court Apartments, heads the company.

The Lock Joint Pipe Co., 1123 Broadway, New York, has tentative plans for a branch plant at Atlanta, Ga., for the manufacture of reinforced-concrete pipe, to cost $50,000.

The Century Plainfield Rubber Co., Mosley, Va., has been chartered by M. B. Kennelley, H. McInerny and A. Grant Armstrong, Mosley, to manufacture automobile tires and other rubber products. The company is represented by Clifford V. Mannering, I. O. O. F. Building, Wilmington, Del.

Fire Oct. 24 destroyed a portion of the plant of the Belle Pre Glass Co., Alexandria, Va., with loss of $50,000.

The Virginia-Carolina Chemical Co., 11 South Twelfth Street, Richmond, Va., has plans for a fertilizer manufacturing plant at Baltimore, to cost $2,000,000, including machinery. S. D. Grenshaw is secretary.

The Williamson-Harris Machine Co., Cordele, Ga., will place an electric furnace in operation at its plant at an early date for the production of steel castings.

The Simmons Plating Works, Atlanta, Ga., metal-plated products, plans the erection of a two-story addition. Improvements will also be made in the present plant and new equipment installed.

The Duke Boltless Rail Joint Co., La Grange, Ga., has plans for a machine shop and foundry, for the manufacture of a boltless rail joint and other steel and iron products. G. W. Duke and J. C. Thomas, La Grange, head the company.

The plant of the Isaac A. Sheppard Co., stoves, Baltimore, has been sold by receivers to the S. B. Sexton Stove & Mfg. Co., Baltimore, for $101,000.

A permit has been granted Lyon, Conklin & Co., Baltimore, roofing, heaters, etc., for the erection of a factory, warehouse, offices, etc., to cost $75,000.

Riggs, Distler & Stringer, Inc., 216 North Calvert Street, Baltimore, has been awarded contracts for a power plant, heating and ventilating systems, etc., for School No. 174, Washington, D. C., for $240,000 and for underground electrical construction at the Charleston Navy Yard at $89,000.

Indiana

INDIANAPOLIS, Oct. 31.

The Durant Motor Co. of Indiana, Muncie, Ind., has been incorporated at $3,000,000, as a subsidiary of Durant Motors, Inc., 1819 Broadway, New York. The company recently acquired the local plant of the Sheridan Motor Co., a subsidiary of the General Motors, and will make changes at the works, with the installation of new equipment, for the manufacture of six-cylinder motor cars. The officers are W. C. Durant, D. A. Burke, C. O. Mininger and T. W. Warner.

The Interstate Public Service Co., Shelbyville, Ind., is arranging the purchase of the Hydro-Electric Co., Connersville, Ind., with local power plant, and will merge it with its lines. Connection will be made with the New Castle plant of the Interstate company, which plans for a number of additions and improvements.

The Zahner-Fowler Co., Laporte, Ind., has been incorporated at $225,000 by E. J. Zahner, G. H. Ashbrook and J. V. Garbett, Laporte, to manufacture metal products.

The Dusenberg Automobile & Motors Co., Indianapolis, operating a local plant for the manufacture of automobile motors, has been incorporated at $5,000,000.

E. E. Dean, head of E. E. Dean & Co., Lemcke Annex, Indianapolis, is negotiating for the purchase of the municipal electric power plant at Mitchell, Ind., for $45,000. It is proposed to operate the plant as a private enterprise, making a number of improvements.

The Gulf States

BIRMINGHAM, Oct. 31.

The St. Louis, Brownsville & Mexico Railroad Co., Houston, Tex., plans to rebuild its shops at Kingsville, Tex., recently destroyed by fire.

The Missouri, Kansas & Texas Railroad Co., Dallas, Tex., has broken ground for a machine shop, 30 x 50 ft., at Houston, Tex.

Fire Oct. 21 destroyed the electrically operated cotton ginning plant of H. C. Noel, Rice (Navarro County), Tex., with loss of $32,000.

The Texas Central Power Co., San Antonio, Tex., recently organized, plans the operation of electric power plants for service at Victoria, Cuero, Bishop, Kingsville and other points in this section. Plans will be prepared at an early date. R. W. Morrison, San Antonio, heads the company.

The McWane Pipe Co., Birmingham, Ala., recently organized by J. R. McWane, head of the American Cast Iron Pipe Co., Birmingham, and associates, has leased property at North Birmingham, and pending the construction of a new plant at a future date, as now proposed, the property will be used for the manufacture of iron pipe, special joints, etc. Mr. McWane has resigned as president of the American company, effective Jan. 1, to become president of the new company, and will retain an interest in the first noted organization.

The Gadsden Clay Products Co., Gadsden, Ala., has perfected plans for additions to its plant, to be equipped for pressed brick manufacture.

The Texas Interurban Railway Co., Dallas, Tex., is completing plans for the power equipment installation on its new line from Dallas to Terrell, and will award the contract for the machinery at an early date. The cost will be $1,600,000.

A portion of the plant of the National Forge Co., Anniston, Ala., was destroyed by fire Oct. 17, with loss of $40,000, including equipment.

The Denny Pottery Co., Denny, near Kosse, Tex., recently organized, has acquired a local building and plans for the installation of machinery for the manufacture of fire brick and other refractory products, sewer pipe, etc. J. W. Pringle is president, and John Lyons, secretary.

The Waco Refining Co., Waco, Tex., plans enlargements in its oil refinery at East Waco. New machinery will be installed. W. A. Rogers is head.

The Beindorf Machine & Supply Co., Kissimmee, Fla., plans the establishment of a new machine shop. Paul Beindorf heads the company.

The Fort Pierce Lumber Co., Fort Pierce, Fla., recently organized, plans the construction of a one-story planing mill in conjunction with a new saw mill, now being erected. Julius Frere is manager.

A complete machine shop for parts manufacture and general repair work will be installed in the new service building to be erected by the Dixon-Buick Co., 119 South Poinsettia Street, West Palm Beach, Fla., 75 x 125 ft., to cost $38,000. E. A. Allen is manager.

The Ross-Wilson Motor Co., Dallas, Tex., plans to rebuild its works, destroyed by fire with loss of $90,000, including equipment.

Milwaukee

MILWAUKEE, Oct. 31.

Informal estimates made by representative machine tool dealers indicate that business in October exceeded that of September by a small percentage. Enlargement of the scope of inquiry is believed to augur well for further increase in buying activity in November and December. Prospects for a moderate call from railroads and manufacturers of railroad equipment are believed to be better than for many months past, especially in view of the fact that the proposed strike was averted.

The Allis-Chalmers Mfg. Co., Milwaukee, has been awarded one of the largest individual contracts for pumping engines ever placed by any municipality. It is from the city of Milwaukee and calls for one 25,000,000 and two 22,000,000 gal. vertical triple expansion, crank and flywheel type of engines, with auxiliaries, for installation in the new Riverside pumping station of the municipal water works system. The price is $641,500. Bids closed Oct. 24.

The Union Mfg. Co., Oconto Falls, Wis., which is the hydroelectric power division of the Continental Paper & Bag Mills of New York, and serves the paper mills at Oconto and Marinette, Wis., will start work shortly on additions to increase the capacity from 1500 hp. to approximately 2750 hp., according to official statements from the headquarters. Details of the improvement are now being completed.

The K. O. Muehlberg Co., Manitowoc, Wis., has been incorporated with a capital stock of $60,000 to take over and develop the business of Karl O. Muehlberg, Sr., manufacturer of boring and reaming tools for automotive shops. A new machine shop estimated to cost $45,000 with equipment will be erected during the winter. Considerable new machinery will be purchased. The incorporators, who are the principal stockholders and officers, are Karl O. Muehlberg, Sr., Michael W. Mrotek and Karl O. Muehlberg, Jr., all of Manitowoc.

The Valley Paper Mills Co., Neenah, Wis., incorporated several months ago with a capital stock of $1,000,000, expects to let contracts by Dec. 1 for the construction and equipment of a new plant estimated to cost $800,000. The main mill will be 80 x 660 ft., two and three stories, with a separate power plant, of the hydroelectric type with steam auxiliary. A filtration plant also will be installed. E. A. Wettengel, architect, Appleton, Wis., is designing the plant. George W. Burnside, Neenah, is secretary and general manager.

The Creamery Package Mfg. Co., 61 West Kinzie Street, Chicago, and Fort Atkinson, Wis., has engaged Martin Tullgren & Sons, architects, 425 East Water Street, Milwaukee, to design a new factory and warehouse, 95 x 168 ft., three stories and basement, fireproof, on Colfax Avenue, in St. Paul, Minn. It will cost about $120,000 and be equipped largely for assembling and distribution. Work will start about Dec. 1.

Pauly & Marx, Inc., 2530 North Avenue, Milwaukee, have awarded principal contracts for a new public garage, sales and service building at North Avenue and Twenty-fourth Street, to cost $45,000. It will require 100 tons of structural steel, to be fabricated and erected by the Milwaukee Bridge Co. Shop equipment and fixtures are now being purchased.

The P. & J. Motor Co., Cudahy, Wis., has been incorporated with a capital stock of $250,000 to engage in the manufacture of a new design of three-cylinder air-cooled rotary internal combustion engine perfected by A. H. Peglow and L. E. Joslin of Cudahy. It has purchased the former Kerlin machine shop property at Squire Avenue and the C. & N. W. R. R. tracks in Cudahy and will spend about

$50,000 in building additions and purchasing additional equipment. Officers are: President, Dr. B. F. Palmer; vice-president, George C. Dutcher; secretary, Albert Dretzka; treasurer, John Rutkowski.

The Michler & Zastrow Welding Co., 51 West Second Street, Fond du Lac, Wis., has been dissolved. Otto F. Michler will continue the business, Albert Zastrow retiring. Mr. Zastrow is establishing a machine and forge shop at 193 Military Street and will install oxy-acetylene welding and cutting apparatus.

The Milwaukee Washing Machine Co., Clinton, Wis., has been incorporated with a capital stock of $50,000 to manufacture manual and motor-driven washing machines. It has purchased the former plant of the Clinton Creamery Supply Co. at Clinton and will retool it for metal and wood-working processes. The incorporators are A. Tlich, C. E. Riemer and Walter Erni, 3928 Vliet Street, Milwaukee.

The General Devices Corporation, New Lisbon, Wis., organized several months ago to manufacture automotive accessories and equipment, will build a one-story brick and concrete factory, 76 x 146 ft., estimated to cost $50,000 with equipment. The company will purchase electric current but will install a boiler house. F. W. Bolzendahl is president and general manager.

The Northern Furniture Co., Sheboygan, Wis., has let the general contract to Frank Geib & Co., 1439 South Ninth Street, local, for the construction of a four-story factory, 100 ft. sq., at South Water Street and New Jersey Avenue. It will be of brick and concrete, with metal sash, fire doors, etc. The cost, including new equipment now being purchased, is estimated at $150,000. Edward Hammett is general manager.

The Fire & Police Alarm Post Co. of Milwaukee, incorporated recently with $25,000 capital stock, will develop the manufacture of patented cast iron and steel posts for fire and police alarm telegraph systems, automatic traffic-handling devices and similar equipment designed by Hugo A. Kleinsteuber, assistant superintendent Milwaukee fire and police telegraph alarm division. Several hundred posts have been manufactured under contract and installed in Milwaukee in the past four years. It is planned to lease or build a factory and manufacture the devices for general municipal distribution. Peter J. Hayes is president; Leopold Weiland, vice-president; Charles J. Harder, secretary, and George J. Carroll, treasurer.

The Modern Auto Parts Grinding Co., Sheboygan, Wis., organized by Henry J. Sievers and Rance P. Loop, has opened a machine shop at 2303 South Eighth Street to handle general automotive repair work, such as grinding crankcases, machining small parts and special, close limit machine and die work. Both partners formerly were expert toolmakers for Dodge Bros., Detroit, and the Falls Motors Corporation, Sheboygan Falls, Wis. Immediate requirements of shop equipment have been filled.

Wilfred Schmidt, Ladysmith, Wis., is erecting a two-story shop building, 30 x 65 ft., to be equipped for general machine and automotive repair work.

The Manitowoc Ship Building Corporation, Manitowoc, Wis., has taken the contract to fabricate a new steel hull for the wooden tug J. H. Meyer, to be 99 ft. overall, with 22-ft. beam and 12 ft. 6 in. depth, designed for heavy duty service. The present machinery and equipment will be used in the new hull, but some replacement work will be necessary.

Jeffery Power, 916 Milwaukee Street, Madison, Wis., is negotiating for the lease of an existing factory building and will install machinery and equipment for the production of motor-driven laundry machinery for industrial and domestic purposes.

The A. H. Rusch Sons Co., Reedsville, Wis., has increased its capital stock from $25,000 to $50,000 and plans to enlarge its woodworking factory during the winter.

Capt. C. H. Hubbard, 424 Federal Building, Milwaukee, superintendent of lighthouses, is taking bids until Nov. 7 for miscellaneous equipment for the new lighthouse at Indiana Harbor, Ind. The items include a 4000-lb. electric derrick, steel construction tower, single drum hoists, 25-hp. gas engine, and a vapor heating system.

The Perfection Hoist & Engine Co., formerly of Milwaukee, has completed the transfer of its operation to Two Rivers, Wis., and is again in regular production on farm light and power units, mechanical hoists for dump trucks and similar appliances. It has purchased a number of tools and expects to place further orders from time to time as demands require.

The Industrial Equipment Co., Milwaukee, is a new corporation organized with $25,000 capital stock to manufacture, buy and sell machinery, tools and other equipment, supplies, etc. The incorporators are W. K. Walthers, A. L. Walthers and F. J. Walthers, 76 Cawker Building, Milwaukee.

W. E. Brooks, chief engineer, and M. R. Harrington, production manager, American Writing Paper Co., Holyoke, Mass., inspected a number of large paper mills in Wisconsin during the past week with a view of obtaining ideas concerning machinery and equipment for the retooling of several mills and new equipment of a new mill to be erected in the East.

The Milwaukee Press & Machinery Co., Milwaukee, now operating in leased quarters at 339-341 First Avenue, contemplates the erection of a new machine shop early in the coming spring. Details have not been completed.

The Wisconsin State Board of Control, M. J. Tappins, secretary, Madison, Wis., is taking bids until Nov. 21 for a new memorial hospital building to be erected on Lake Mendota at Madison at an estimated cost of $750,000. It will be of brick, steel and concrete, 184 x 258 ft., four stories and basement. Arthur Peabody, Madison, is State architect; J. G. D. Mack is State chief engineer.

Seattle

SEATTLE, Oct. 28.

The Central Coal & Coke Co., Kansas City, Mo., plans the construction of a lumber mill plant on property recently acquired from the Oregon-American Lumber Co., Portland, Ore., in the Nehalem district, totaling about 27,000 acres. Charles Keith is president.

Misener Brothers, Fossil, Ore., have completed plans for a one-story automobile repair works and service building, 30 x 70 ft., on a site adjoining their present plant.

The Lewis River Hydro-Electric Power Co., Vancouver, Wash., has plans for a hydroelectric generating plant on the North Fork of the Lewis River, near Kearns, Wash.

The Earl B. Staley Co., Seattle, Wash., recently organized, will operate a machine construction and repair works for automotive service at Tenth Avenue and East Madison Street.

Freight handling machinery, hoisting and conveying equipment, etc., will be installed at the new freight transit shed to be constructed on the water front by the Port Commission, Tacoma, Wash., to cost $500,000.

The Marcella Lumber Co., Cerec, near Chehalis, Wash., plans to rebuild its plant, recently destroyed by fire, with loss, including machinery, of $80,000.

The Central South

ST. LOUIS, Oct. 31.

The Republic Photographic Co., Kansas City, Mo., has acquired six acres at Ferguson, Mo., for a plant for the manufacture of sensitized papers for photographic service. Contract for the initial building has been awarded to the Gamble Construction Co., 620 Chestnut Street, St. Louis, to be one-story, 55 x 328 ft., and 77 x 160 ft., to cost $125,000, including machinery. E. B. Fish is president.

The Algermissen Co., Montgomery City, Mo., plans to rebuild its electric power plant, destroyed by fire. The company's ice plant was also partially destroyed. E. H. Algermissen is head.

The first unit of the new spiral pipe manufacturing plant to be erected at Leeds, Mo., by the Kansas City Spiral Pipe Co., 416 Dwight Building, Kansas City, Mo., will cost $75,000, and will be equipped for a capacity of 10,000 ft. of steel pipe per day. Special machinery will be constructed by the Wheatley Brothers Machinery Co., Kansas City. Erection will be commenced soon. E. J. Gordan is secretary.

The Grant Motor Co., Felix and Ninth streets, St. Joseph, Mo., has plans for a one-story service and repair works 120 x 140 ft., at Tenth and Francis streets, to cost $50,000.

The Wichita Ice & Storage Co., Wichita, Kan., has plans for a five-story ice manufacturing plant at 213 Rock Island Avenue, 75 x 90 ft., to cost $200,000. G. E. Wells, Boatman's Bank Building, St. Louis, is architect. C. W. Southward is president.

G. A. Wisdom, Joplin, Mo., plans a machine shop and foundry at Gravette, Ark., to cost $12,000.

The Little Rock Auto Tow Service Co., 115 West Twentieth Street, Little Rock, Ark., has completed plans for a two-story service and repair works, 50 x 100 ft. A complete machine department will be installed.

The Chester Iron & Foundry Co., 7800 Vulcan Street, St. Louis, has awarded a contract to George Moeller, 3530 Itaska Avenue, for its one-story foundry, 45 x 120 ft., to cost $42,000.

The Fort Smith Body Co., Fort Smith, Ark., recently organized at $100,000, has acquired the property and business of the Johnson Commercial Body Co., and will operate

a local plant for the manufacture of automobile bodies. Benjamin B. Johnson is president and general manager.

The Wichita Visible Pump Co., 701 Gilbert Street, Wichita, Kan., will soon commence the erection of a plant for the manufacture of gasoline pumps, to cost $50,000. E. P. Hayes is head.

The Postal Equipment Co., Covington, Ky., has been incorporated at $1,000,000 by Harry W. Cordes, William Peters and Frederick A. Fisher, Covington, to manufacture machines for stamp cancellation and mail distribution. The company is represented by the Capital Trust Co., Dover, Del.

The White Pine Power & Light Co., White Pine, Tenn., plans the construction of an electric power plant, 60 x 60 ft. G. M. Felmet is head.

S. E. Thompson, city clerk, Anthony, Kan., will receive bids until 2 p. m., Nov. 10, for equipment for a municipal power plant including 250 hp. water-tube boiler; 300 kilowatt steam engine generating unit; jet condenser; triplex pump; spray pond equipment; and auxiliary equipment. Black & Veach, Kansas City, Mo., are consulting engineers.

The White Co., 3442 Lindell Street, St. Louis, is completing plans for a one-story automobile service and machine repair works at Laclede and Vanderventer streets, to cost $75,000. P. J. Bradshaw, International Life Building, is architect.

The Central Missouri Coal Mining Co., 314 Central Trust Building, Jefferson City, Mo., will install at its mining properties at Holts Summit, Mo., engines, boilers, pumps, conveying apparatus and other power equipment, to cost $75,000. John McManus is secretary and treasurer.

Canada

TORONTO, ONT., Oct. 29.

The outlook in the machinery and machine tool market is bright for the future. More activity is reported in the building trades, several large American manufacturers have announced their intention of locating industrial plants in the Dominion, and at the same time Canadian companies are being incorporated in increasing numbers. The demand for equipment for municipal works and for small tools is more active.

The Midwestern Tractor Wheel Co. has purchased 73 acres at Amherstburg, Ont., for a plant. The company is capitalized at $1,000,000. Cuddy & Cox, from whom the site was purchased, have been named vice-presidents.

F. A. Fisher, manager Enterprise Foundry Co., Sackville, N. B., has had plans prepared and will receive bids for a plant, to cost $9,000.

The Peck Rolling Mills, Montreal, Que., are equipping their plant to manufacture angle iron and similar structural shapes.

The Burrard Dry Dock Co., North Vancouver, B. C., recently incorporated, will build a drydock there, to cost $2,500,000.

The Canadian Tool Co. will establish a plant at Bridgeburg, Ont. At present the company is negotiating for a temporary factory, but later plans to construct its own plant.

The concentrating mill of the American Molybdenite Co. has started operation at Wilberforce, Ont. The first unit, which will turn out 200 tons a day, is now in operation. Later the capacity will be increased to 600 tons a day.

The Gary Motor Truck Corporation of Canada, Ltd., Toronto, Ont., has been incorporated at $4,500,000, by Arthur W. Holmstead, Arthur B. Mortimer, William Skelly and others as provisional directors. The company has secured premises on Pacific Avenue, Toronto, and is preparing to establish a plant there.

The Lewis Engineering Co., Ltd., Toronto, Ont., has been incorporated at $500,000 by Thomas N. Phelan, James E. Lawson, John E. Corcoran and others to acquire from the Lewis Draft Appliance Co., Chicago, the benefit of certain Canadian patents for improvements in draft appliances for locomotives, etc., and to manufacture and assemble equipment, machinery, etc.

The Durant Motor Co. of Canada, Ltd., has been incorporated with a capital stock of $2,000,000 by William C. Durant, Deal, N. J.; Charles F. Day, Bronxville, N. Y.; Henry F. Herbermann of New York and others of Toronto, to manufacture and sell automobiles, trucks, motor cars, etc.

The Carr Pattern & Tool Co., Hamilton, Ont., will move into larger premises at 108 Merrick Street about Nov. 1.

The Cyclone Fence Co. of Canada, Ltd., Hamilton, Ont., recently incorporated to manufacture ornamental and industrial wire and iron fencing, will establish a plant at Hamilton. The Canadian concern is a branch of the Cyclone Fence Co., Waukegan, Ill. A short term lease has been taken on a portion of the plant of the Canadian Cartridge Co. The parent company has built special automatic machines at its Waukegan plant for the equipment of the Hamilton, Ont., plant. Operations will start early in November. The Hamilton plant will employ over 100 and will be under the management of R. R. Reaume.

The Eugene F. Phillips Electrical Works, Ltd., Montreal, Que., capitalized at $3,600,000, will erect a plant at Brockville, Ont. Machinery will be transferred to it from the present plant at Mile End, near Montreal. The new plant will cost over $2,500,000. It will cover 15 acres and will consist of 11 units. The first erected will be the copper rolling mill, 125 x 375 ft.

The Garlock-Walker Machinery Co., Ltd., Toronto, Ont., has moved from 32 Front Street West to 163 Dufferin Street.

The Toronto office of the Independent Pneumatic Tool Co. has been moved from 32 Front Street West to 163 Dufferin Street and will remain in charge of William McRae.

The Aqua Electric Heater Co. of Canada, Ltd., St. Hyacinthe, Que., has been incorporated at $500,000 by Louis Augustin, Cornelio A. Morin and Wilfrid Girouard to manufacture electrical appliances, heaters, machinery, etc.

Springs & Auto Parts, Ltd., Toronto, Ont., has been incorporated at $50,000 by Angus C. Heighington, Cecil Finlayson and William J. Dash to manufacture motors, engines, machines, carbureters, etc.

The Burrard Dry Dock Co., Ltd., North Vancouver, B. C., has been incorporated at $1,000,000 by Clarence Wallace, John J. Coughlan and Robert C. Lennie to construct at Vancouver a floating drydock with machine shops.

The Triumph Motor Equipment Co., Ltd., Hamilton, Ont., has been incorporated at $250,000 by Harvey N. Bingham, Frederick J. Sweetlove and Herbert Embress to manufacture motor trucks, engines, parts, etc.

The Canadian Concrete Steel Co., Ltd., Montreal, Que., has been incorporated at $200,000 by Edmund P. D. Harris and Minnie Bradley to manufacture iron, steel, metals, and to carry on a general contracting and construction business.

The Sager Glass Corporation, Ltd., Toronto, Ont., has been incorporated at $500,000 by Arthur W. Holmsted, Arthur B. Mortimer and Leonard V. Sutton to manufacture glassware, etc.

The Peninsular Sugar Co. will erect a sugar plant at Chatham, Ont., to cost $1,000,000. The factory will be in operation in about a year and will have a capacity of 600 tons per day. The factory will be built and the machinery provided by A. Schoen, Detroit.

James Watson, Kincardine, Ont., plans an addition to his factory to cost $50,000, including equipment.

The general contract for the principal construction of the power plant at Great Falls, Man., to cost $5,500,000 for the Manitoba Power Co., Ltd., Winnipeg, Man., has been awarded to Fraser, Brace & Co., Ltd., 83 Craig Street West, Montreal, Que. Separate tenders will be called for machinery and equipment. F. H. Martin is engineer and F. J. Pratt is purchasing agent, both of whom are located in the Electric Railway Chambers, Winnipeg, Man.

The lumber mill of the Canada Lumber & Timber Co., Vancouver, B. C., was recently destroyed by fire with a loss of $100,000.

The Canadian Boat & Engine Exchange, Ltd., 43 Yonge Street, Toronto, Ont., is in the market for a 20- to 24-in. lathe.

A large match factory is being established in Pemboke, Ont., by British, Canadian and American interests. The factory buildings have been practically completed and the machinery is now being installed.

The addition to the Northwestern Elevator Co.'s plant at Fort William, Ont., will be completed next spring, and will be ready for operation by September. It will cost $700,000. Machinery valued at $180,000 will be installed.

The general contract for erecting a pumping station for Halifax, N. S., has been awarded to the Standard Construction Co., Metropole Building, Halifax.

The Chatham Crystal Ice Co., Chatham, Ont., contemplates the erection of an artificial ice plant there, to cost $50,000. J. W. Leighton, Bartlett Building, Windsor, Ont., is architect.

The Ontario Diamond Drilling Co., Sudbury, Ont., has been incorporated at $40,000 by Thomas H. Hale, Albert Carlson and George M. Miller to manufacture diamond drills, machinery, tools, etc.

The Eastern Townships Smelting & Refining Co., recently incorporated at $2,000,000, has secured options on a site at Sherbrooke, Que., where it proposes to start work soon on the construction of a smelting plant, which will specialize in copper and asbestos.

Stanley F. Jacob, R. R. No. 3, Tillsonburg, Ont., is asking for equipment, including a lathe and drill press.

The Spring Lock Mfg. Co., Belleville, Ont., is erecting a large addition and will install new equipment.

J. Birschall, formerly superintendent Columbus McKinnon Chain Co., and McKinnon Industries, Ltd., St. Catharines, Ont., has formed the United Chain & Mfg. Co., 114 Queenston Street, St. Catharines, Ont., to manufacture tire chains, automobile parts, etc.

California

SAN FRANCISCO, Oct. 27.

The Great Western Meter Co., 105 Montgomery Street, San Francisco, will erect a plant at Powell and Beaudry Streets, Emeryville, Cal., for the manufacture of gasoline and irrigation meters. The plant will cost $125,000.

Fire, Oct. 22, destroyed a portion of the plant of the Weaver Roof Co., 339-41 East Second Street, Los Angeles, roofing, with loss of $100,000, including equipment.

The W. P. Moran Co., 511 Central Building, Los Angeles, architect, has plans for a one-story automobile assembling plant at Vernon, near Los Angeles, 70 x 250 ft., to cost $75,000. The equipment will include a 70-ft. electric traveling crane.

Mechanical and electrical equipment will be installed in the one-story vocational shop building to be erected by the board of education, Berkeley, Cal., known as the "Edison Shop Building." It will cost about $50,000.

The Bay Belting Co., San Francisco, has acquired property at 520 Broadway, Oakland, Cal., and plans a plant for the manufacture of mechanical belting. E. W. Bosworth is president.

The State Highway Commission, Sacramento, Cal., has awarded a contract to M. E. Hopper & Son, Bacon Building, Oakland, Cal., for a machine shop and maintenance building for highway equipment service at Fourth Street and Thirty-fourth Avenue, to cost $56,800.

The Long Beach Petroleum Association, Long Beach, Cal., plans an oil refinery on a 12-acre site in the harbor district, recently acquired.

H. M. Seigler, 110 Sutter Street, San Francisco, has plans for a one-story machine shop at 55 North Geary Street, near West Palm Avenue. A feature of operations will comprise machine polishing work of various kinds.

The St. Louis Cornice Works, St. Louis, sheet metal products, heating and ventilating iron specialties, metal cornices, is arranging for the removal of its headquarters to Los Angeles, where an extensive plant will be operated. The change will be made about the first of the year. J. Herman is manager.

BOOK REVIEWS

Labor Maintenance. By Daniel Bloomfield. Pages, xvii, + 530, 5½ x 8½ in.; illustrations and diagrams 37. Published by the Ronald Press Co., New York.

The optional title given to this book is "A Practical Handbook of Employees' Service Work" and the main object of the book is to point the way to better methods in so-called "welfare work." Considerable space is first devoted to explaining and justifying the use of the word "service." The general dislike accorded to "welfare" is dwelt upon, and the difficulty of exactly defining the scope of employment department, labor department, personnel department, and industrial relations department. Included in this section is a discussion of the organizing of a service department, and the selection of, and qualifications for, a service manager.

After establishing the service department, the problems for it to handle, which this book treats with, are many and varied. There is the building up of a plant spirit and the training of the worker. On the matter of training, a survey of the methods employed in many representative plants is given. There is the problem of Americanization of the unassimilated foreign born. There is the worker's health with recommendations for the establishing and functioning of a health department. There is the matter of recreation, its need and methods. There is safety work, development of a suggestion system, establishment of an employees' restaurant, and the application of a plant newspaper or house organ.

All of these things just mentioned may be classified as matters having a rather direct bearing on the worker while at work and therefore routine problems of a service department. The remainder of the book is devoted to the larger problems, such as the one of housing and that of giving financial aid other than through direct earnings and bonuses. This latter is handled under the three heads of mutual benefit associations, group insurance, and profit sharing. In all of these, particularly profit sharing, surveys of representative plans now in use are given. The concluding chapter has to do with the community idea.

Six appendices are given touching on the explanation of labor turnover, estimating employment costs, sanitary standards, safety organization, the by-laws of the Dodge Mutual Relief Association, and the by-laws and forms of Cheney Brothers Benefit Association and pension regulation. E. C. R.

Personal Relations in Industry. By A. M. Simons. Pages, xi + 341, 5½ x 8½ in. Published by Ronald Press Co., New York.

The basic material for this book was developed, according to the author, through a period of years and originally for presentation to classes of the extension department of the University of Wisconsin. Evidently impressed by the teachings of such men as the late Frederick W. Taylor, the author has approached his subject from the angle of production as a result of proper personnel relations, an angle frequently lost sight of in works dealing with the labor problem.

Preceding a chapter dealing with the organization of a personnel department, a complete analysis of the problems of such a department is given. Commencing with a chapter on the changing viewpoint as regards such a department, chapters follow which treat with the job available, and the man available for it, how to interview him, give him both a mental and a trade test, introduce him into his new environment, how to interest him in management's problems, and how to train, transfer, promote or discharge him. All this naturally leads to a discussion of welfare work, wage relations including profit sharing, labor turnover in all its aspects and the drift toward a wide social control.

The remainder of the book is devoted to a study of democracy in industry. Such matters as joint management, collective bargaining, the Leitch plan, and others are discussed. The concluding chapters, one on union contributions in the matter of joint management in this country and the other on British experiments, are especially good. Throughout, the book is replete with quotations from various authorities on the subject of scientific management. E. C. R.

The shortage of coke in Austria, due to war conditions, rendered it necessary to seek a partial substitute for heating cupola furnaces, says London *Engineering*. The only promising material being oil, experiments were begun by building two burners, with the necessary air pipes, into a cupola furnace, without further alteration; and as the results exceeded expectations, the experiments were continued. The final results of the tests were considered to be highly satisfactory. The coke charge was reduced by 4 to 5 kg. with an oil consumption of 1 kg. per 100 kg. of iron charge, while the time required for a melt was reduced by 30 to 50 per cent. The temperature of the iron attained the highest requirements, and no increase of sulphur content occurred.

The name of the Bemis & Call Hardware & Tool Co., Springfield, Mass., wrenches, etc., has been changed to the Bemis & Call Co.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
9-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16¼c. to 19¼c.
High brass wire	17¼c. to 21¾c.
Brass rod	14¼c. to 20¾c.
Brass tube, brazed	27½c. to 31½c.
Brass tube, seamless	19 c. to 20½c.
Copper tube, seamless	20½c. to 22¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb...	$6.80	$6.55
			90 lb...	6.90	6.65
			100 lb...	7.00	6.75
IC..	$10.75	$9.25	IC...	7.15	6.90
IX..	12.00	10.75	IX...	8.15	7.90
IXX..	13.75	12.25	IXX...	9.15	8.90
IXXX..	15.50	14.00	IXXX...	10.15	9.90
IXXXX..	17.00	15.75	IXXXX...	11.15	10.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	10.50

Tin

Straits, pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	15½c.
Electrolytic	15¼c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	21½c.
No. 1 solder	19½c.
Refined solder	16c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....29c. to 31c.

Old Metals

The market continues quiet with a tendency to hold stocks for higher prices. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.25
Copper, heavy and wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.00
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.75
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.25

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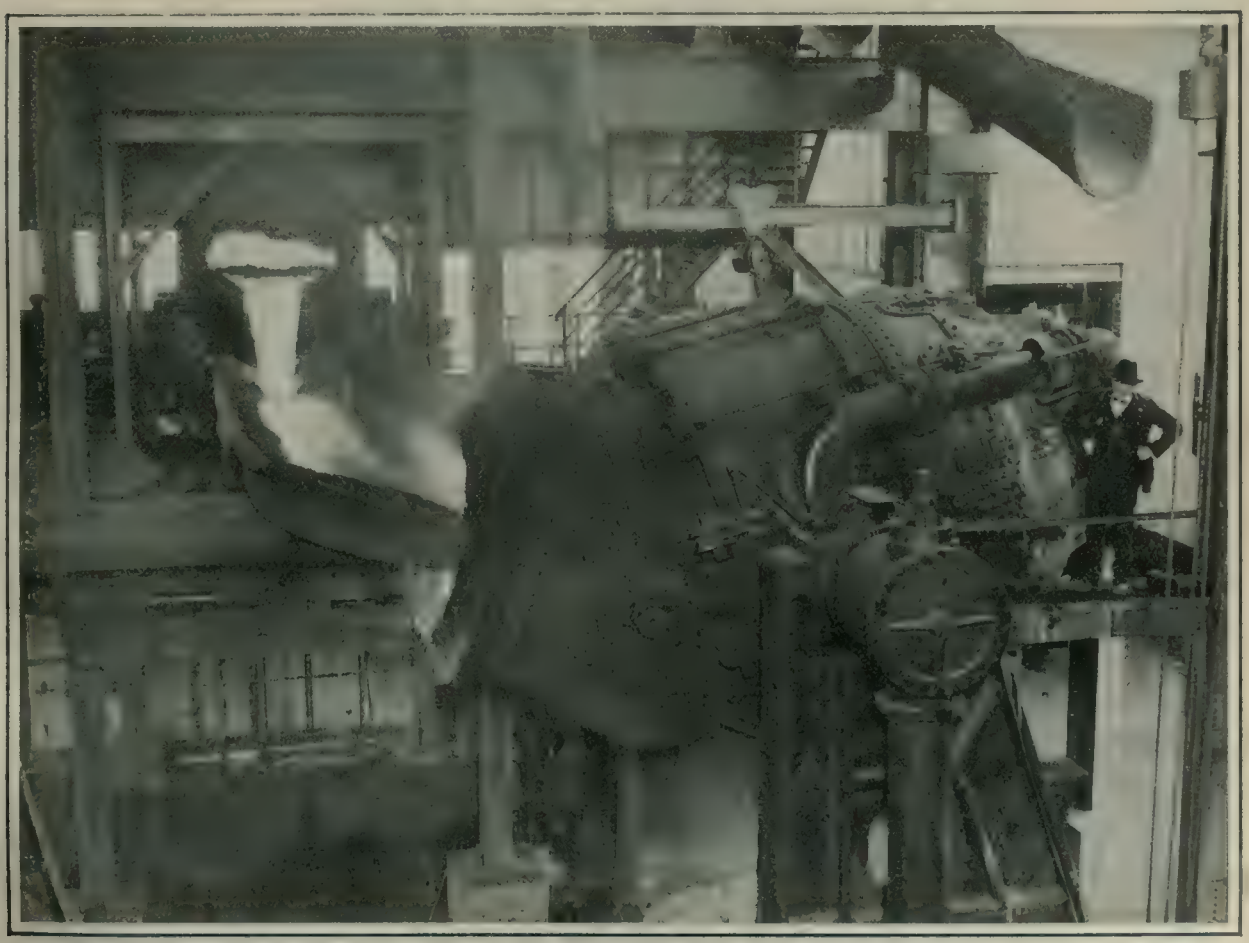
Bessemer Plant of Steel & Tube Company

Latest Developments in Design and Equipment Embodied in Addition to Mark Works for Manufacture of Pipe

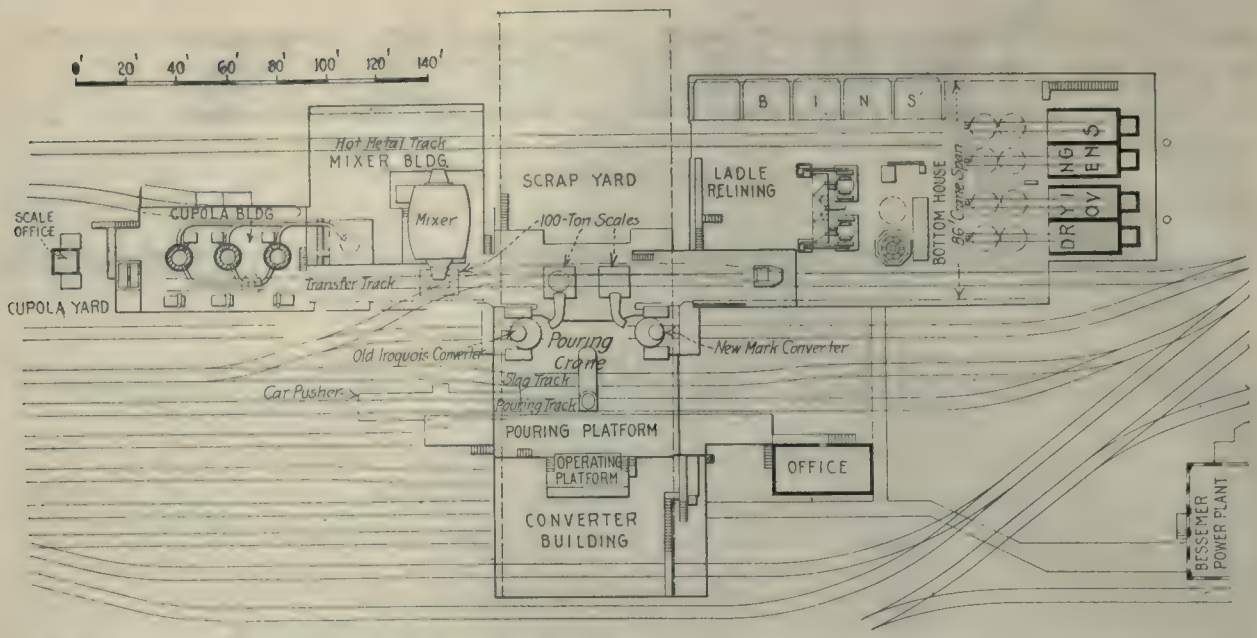
BY GILBERT L. LACHER

DURING the past fifteen years American production of open-hearth steel has tripled, while the output of Bessemer steel has remained practically stationary, never in any year equaling the record tonnage of 1906. The ascendancy of the open-hearth process is no longer questioned, but nevertheless it is acknowledged that Bessemer steel is still supreme for certain purposes, among which is the manufacture of steam, water and gas pipe. This commodity is generally cut and threaded by hand at the place of installation, and hence Bessemer pipe, because of the greater ease with which it is worked, is much preferred to the open-hearth product. So the leading western manufacturer of pipe has constructed what is probably the most complete, and certainly the most modern, Bessemer plant in the United States.

Up to this time the Mark plant has been supplied with Bessemer ingots by the converter at the Iroquois Works, South Chicago, also belonging to the Steel & Tube Co. of America. The new Bessemer plant, embodying the latest developments in design and equipment, is situated at the Mark works at Indiana Harbor, Ind., a more logical location. Hot metal is furnished by the Mark works blast furnace, while Bessemer ingots may be conveyed without delay to the soaking pits serving the pipe mills.



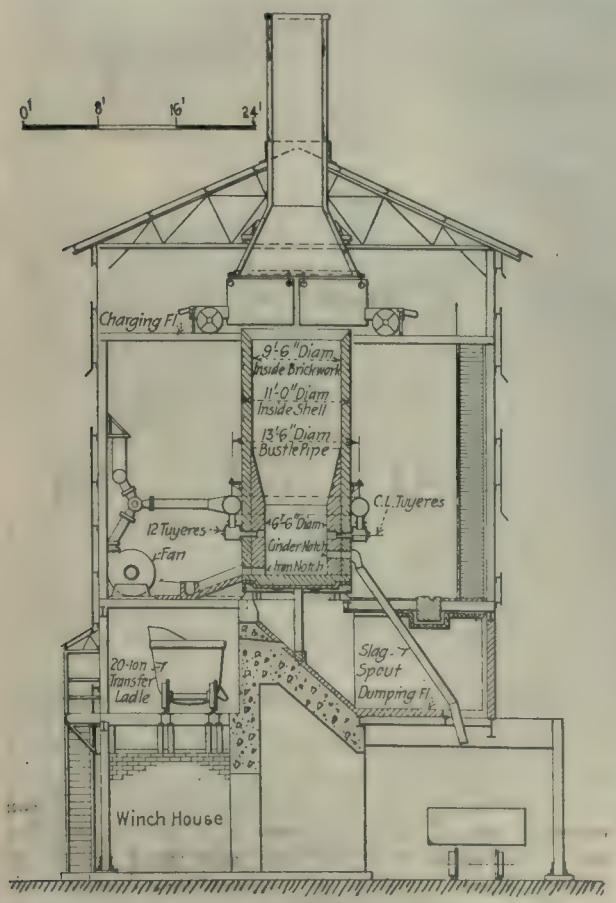
Charging the Converter; the Runner Carrying the Iron to the Converter Is Operated Hydraulically from the Transfer Track Platform. The hot metal ladle is tilted for charging by a tipping device mounted on the track scale platform. The scrap chute is to be noted above the man at the right



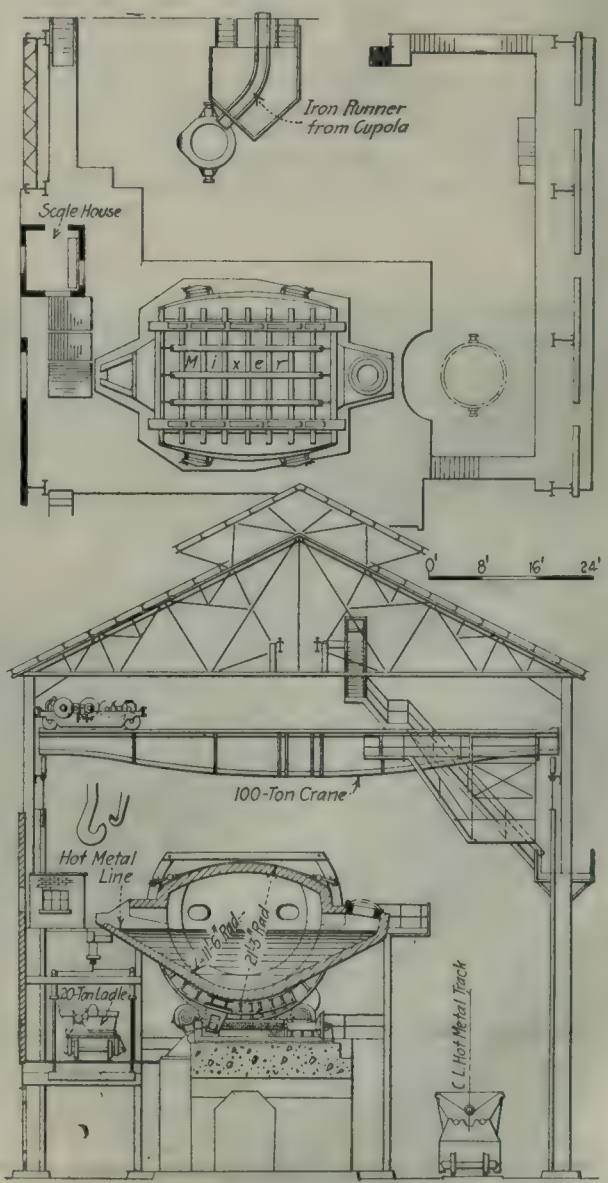
General Layout of the Bessemer Plant, Showing How Each Unit Is Arranged Conveniently to the Others with Which It Has to Operate. Hot metal comes from the left. The skull cracker and scrap yard are beyond the right end of the cut

Placed at the northwest corner of the Mark works, adjacent to Lake Michigan and the tracks of the Baltimore & Ohio, the New York Central and the Elgin, Joliet & Eastern Railroads, part of the buildings of the new Bessemer plant are located on land reclaimed from the lake.

The cupola yard, 97 x 140 ft., is served by a 10-ton overhead electric traveling crane and a skull cracker, both of which were furnished by the Morgan Engineering Co., Alliance, Ohio. The skull cracker trolley, at a height of 65 ft., operates on runways which not only extend across the end of the yard, but



Section Through One of the Three Cupolas, Showing the Iron Runners and Dumping Arrangements. Cinder disposal is indicated



Plan and Section Through Mixer Building, Showing Method of Tilting Mixer by a Massive Screw and Nut. The plan shows the discharge end of the iron runner from the cupola building. The crane here handles both the ladle of cupola metal and the ladle of blast furnace metal coming in at right

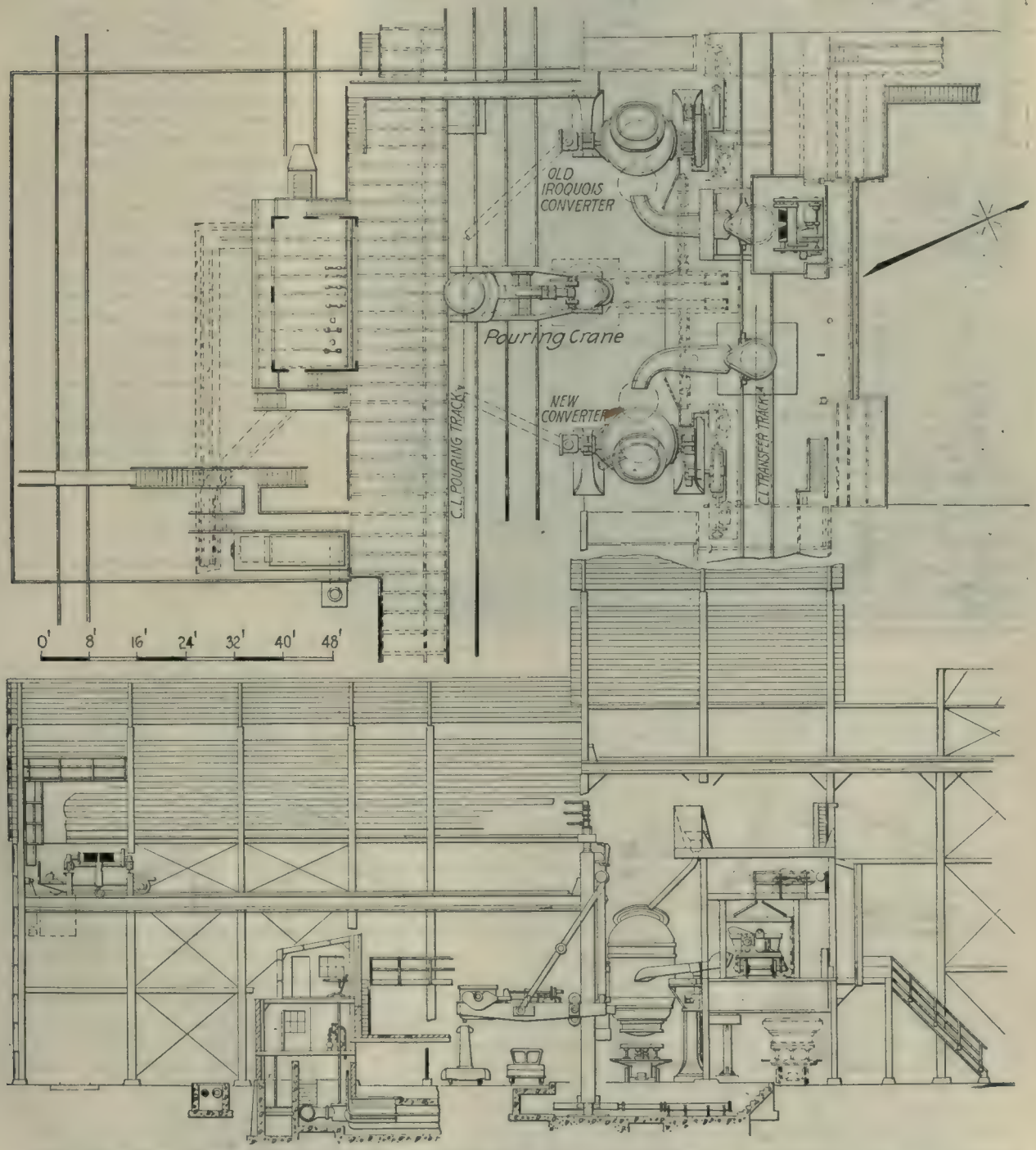
project over a track on each side. This overhang gives greater flexibility in operation. On the one side the skull cracker crane may be used for lifting slag pans and dumping their contents in the cupola yards, where metal may be reclaimed from the slag by magnet. On the other side, it may be used to break up metal for the converter scrap yard, which is served by the track under the overhang of the runway.

Used for the storage of pig iron, scrap, limestone and coke, the cupola yard has a traveling crane equipped with a motor-closing bucket furnished by the Hayward Co., New York. The advantage of individual motor operation is that it made unnecessary any allowance in the height of the crane runways, usually about 14 ft., for the opening and closing of the bucket.

Yard materials are placed in barrows, passed over two three-ton Standard Scale & Supply Co. blast furnace stock yard scales, and then elevated to the cupola charging floor. For the latter purpose two balanced double-cage Otis elevators have been provided.

In the cupola building, 40 x 66 ft., are three 11-ft. cupolas with a melt of 20 tons per hr., furnished by the Pennsylvania Engineering Works, New Castle, Pa. The cupolas may be charged at any point around their circumferences, as the tops of the cupola shells are level with the charging floor, the stacks being suspended above them from the roof members. Each cupola has its individual 75-hp. motor-driven fan, with a capacity of 10,000 cu. ft. per min. and a maximum pressure of 14 oz., and wind piping so arranged that a by-pass may be made, in case any one of the three fans gets out of working order.

All three cupolas are served by two sets of iron runners, one of which delivers to a 20-ton transfer ladle and the other to a 20-ton ladle stand in the adjoining mixer building. A motor-driven winch conveys the transfer ladle either direct to the converters, or to the mixer building, in case it is desired to transfer the contents of the ladle into the mixer. Ordinarily,



Plan and Section Through the Blowing Group. This shows the method of filling the converters with mixer metal poured through movable runners which, when not needed for this purpose, may be turned out of the way



The Converter in Blowing Position; It Is to Be Noted That the Iron Runner (Shown at Left of the Two Men) Has Been Swung Out of the Way, So That It Will Not Interfere with the Movement of the Converter. At right of the base of the flame from the converter is the mouth of the scrap chute, used for charging scrap into the vessel. Underneath the bottom of the vessel is to be seen the slag car. The slag pan has lugs on each side, through which crane hooks are inserted for dumping the contents in the cupola yard. The blast, as is usual, enters through the trunnion by the heavy vertical pipe shown in right foreground. At extreme left is a portion of the hydraulic center crane and of the steel ladle upon it. The tops of ingot molds occupy the immediate foreground

however, iron intended to go into the mixer is delivered by runner to the ladle stand in the mixer building, but the provision by which the transfer ladle may also be used for this purpose is a precaution taken to reduce to a minimum the possibility of interruptions in operations.

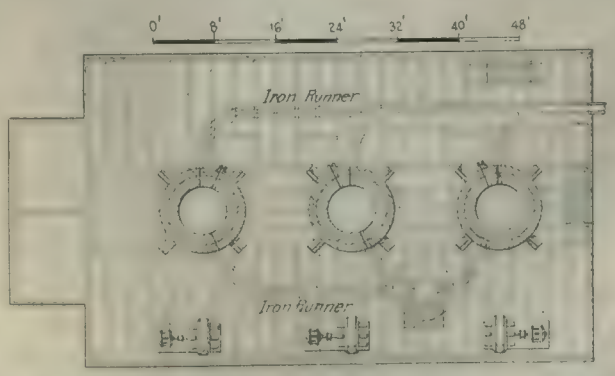
The mixer building is 66 x 75 ft. It is served by a Morgan 100-ton crane, which transfers hot metal from the cupolas and the blast furnace to the mixer. The ladle containing the cupola metal is lifted from the stand serving the iron runner, while the blast furnace ladles, of 60 tons capacity each, are taken directly from hot metal cars switched into the building.

The mixer, constructed by John Mohr & Sons, Chicago, has a capacity of 600 tons. Tar burners have been placed above the slag line to effect better temperature control. Tilting is accomplished by screw and nut, power being furnished by two 50-hp. motors. The mixer commands particular attention because of its electrical and mechanical safety appliances. In case of accident, the operator, by leaving the control platform, causes the mixer to stop automatically, and to return to a horizontal position. When the weight of the operator is removed from the platform, pawls engage teeth cast on the runners of the mixer, bringing operations to a halt. No sooner is this done than an automatic control is set into operation, which brings the mixer to normal position.

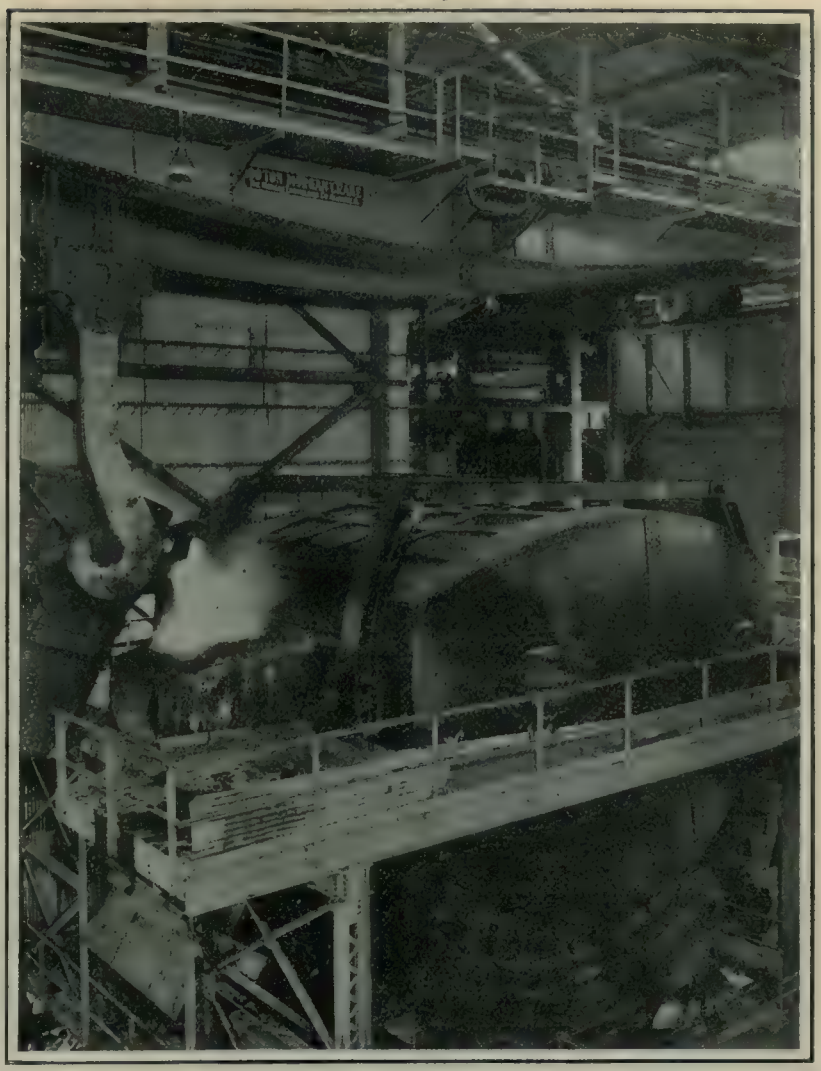
Iron from the mixer is discharged into a transfer ladle resting on a platform in the track, where it is weighed on a recording scale. The ladle is then conveyed by winch to the converter building. Here two additional platform scales have been provided, one adjacent to the present converter and the other for the proposed converter. The purpose of these last two scales is to make it possible to determine accurately the amount of high carbon metal to be added to the converter baths for recarburizing purposes, in case the company wishes to make a high carbon product. They are further testimony to the care exercised by the designing engineers in preparing for all possible contingencies. All three platform scales were furnished by the Standard Scale & Supply Co., Pittsburgh.

Movable runners, provided to carry iron from transfer ladle into the converters, are operated hydraulically from the transfer track platform. Electrically-driven ladle tipping devices, mounted on both scale platforms, discharge the contents of the ladle into the runners. These were furnished by the Morgan Engineering Co.

Above the transfer track is a converter scrap platform, adjacent to which is the converter scrap yard, served by a 10-ton Morgan overhead electric traveling crane. It is notable that no elevators, skip hoists or the like, are employed to lift scrap from the yard to the platform. All material is handled by magnet.



Plan of Cupola Tapping Floor, Showing the Two Sets of Iron Runners—the Upper One to the Mixer Building; the Other to a Transfer Ladle on the Floor Below



Pouring Hot Metal from the Blast Furnace into the 600-Ton Mixer. A 100-ton overhead traveling crane handles the hot metal ladles to and from the mixer, lifting them off the floor with the main hoist and tilting the ladles with the auxiliary hoist. The mixer itself, which, with contents, weighs nearly 1000 tons when full, is tilted by screw and nut, power for this purpose being furnished by two 50-hp. motors. The action is similar to that of a rocking chair, except that the heavy mass rolls forward upon eight massive spool rollers, instead of upon a flat surface. Thus the center of gravity remains nearly stationary and the pouring spout does not advance far from its position of rest. This insures that the stream of molten mixer metal falls near the center of the ladle car and eliminates slopping

Furthermore, the crane runway extends over the converters, so that all scrap dropped under the vessels may be picked up by magnet and conveyed to the scrap yard.

Scrap or ferroalloys for use in the converter are dropped by magnet into chutes, the tops of which are situated just above the level of the scrap platform.

Arranged for two 15-ton converters, furnished by the Pennsylvania Engineering Works, the converter building is 68 x 190 feet. Each vessel is operated by two 75-hp. motors. One converter is now in operation, and the second one is to be moved from the Iroquois plant and installed presently. The arrangement is such that the converters will blow in opposite directions.

A track has been placed directly under the converters for the slag and bottom cars. An hydraulic center crane handles the steel ladle after the converter has poured, conveying it to position over the ingot molds next to the pouring platform. An hydraulic car mover, built by the Morgan Engineering Co., moves the ingot cars to and from the pouring platform.

Centrally located between the two converters, the operating platform commands an excellent view of all operations in the converter building. It is adjacent to the pouring platform and on a higher level. Inclosed in glass, it is more elaborate and more comfortable than the usual operating pulpit. On this platform are located the levers for operating the converters and for controlling each movement of the center crane—the swinging of the arm, lowering and elevation, and the withdrawal and extension of the ladle on the arm itself.

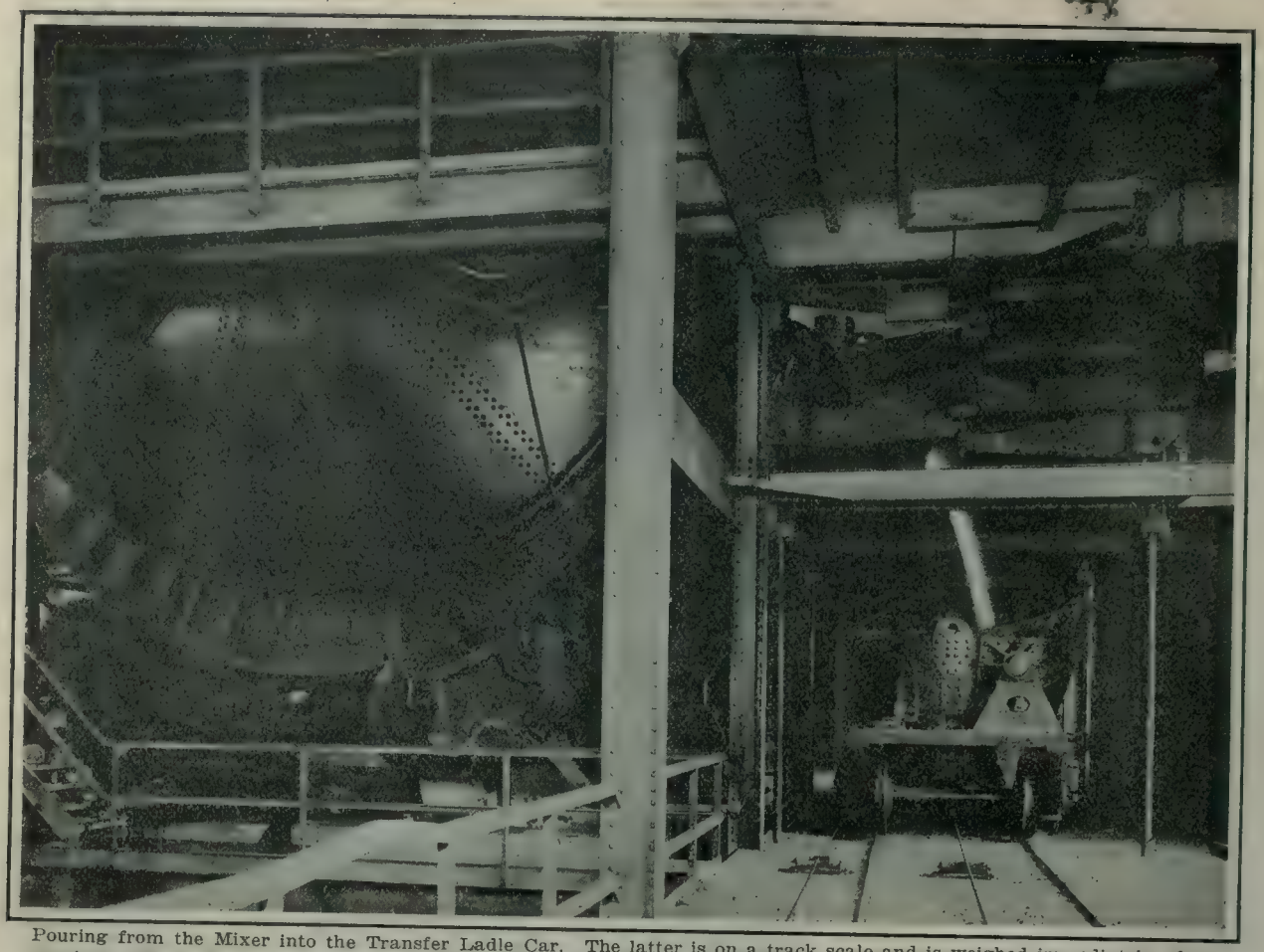
All hydraulic valves and the electric control connections for the converter are underneath the operator's platform. At the end of the pouring platform is a coal-fired oven capable of drying 48 stoppers at one time.

A 20-ton Morgan overhead traveling crane, serving the converter building, is used to place the steel ladle on the center crane, and to convey ladles to the repair and relining department back of the charging platform. Slag from the converters and steel ladles is poured into slag cars, which are removed to the cupola yard and disposed of in the manner previously described.

Adjoining the converter scrap yard is the bottom house, 86 x 140 ft. Along its outside wall, beyond a track running the length of the building, are the raw material bins. A 20-ton Morgan overhead traveling crane equipped with grab bucket commands the entire house. A Thos. Carlin Sons Co. grinding machine is used to grind clay and old brick for bottoms. There are four sets of coal-fired drying ovens, each oven taking two bottoms. Hydraulic jack cars are employed, both for removing old bottoms from the converter and for putting new ones in. For this purpose a permanent hydraulic connection has been provided adjacent to the converter.

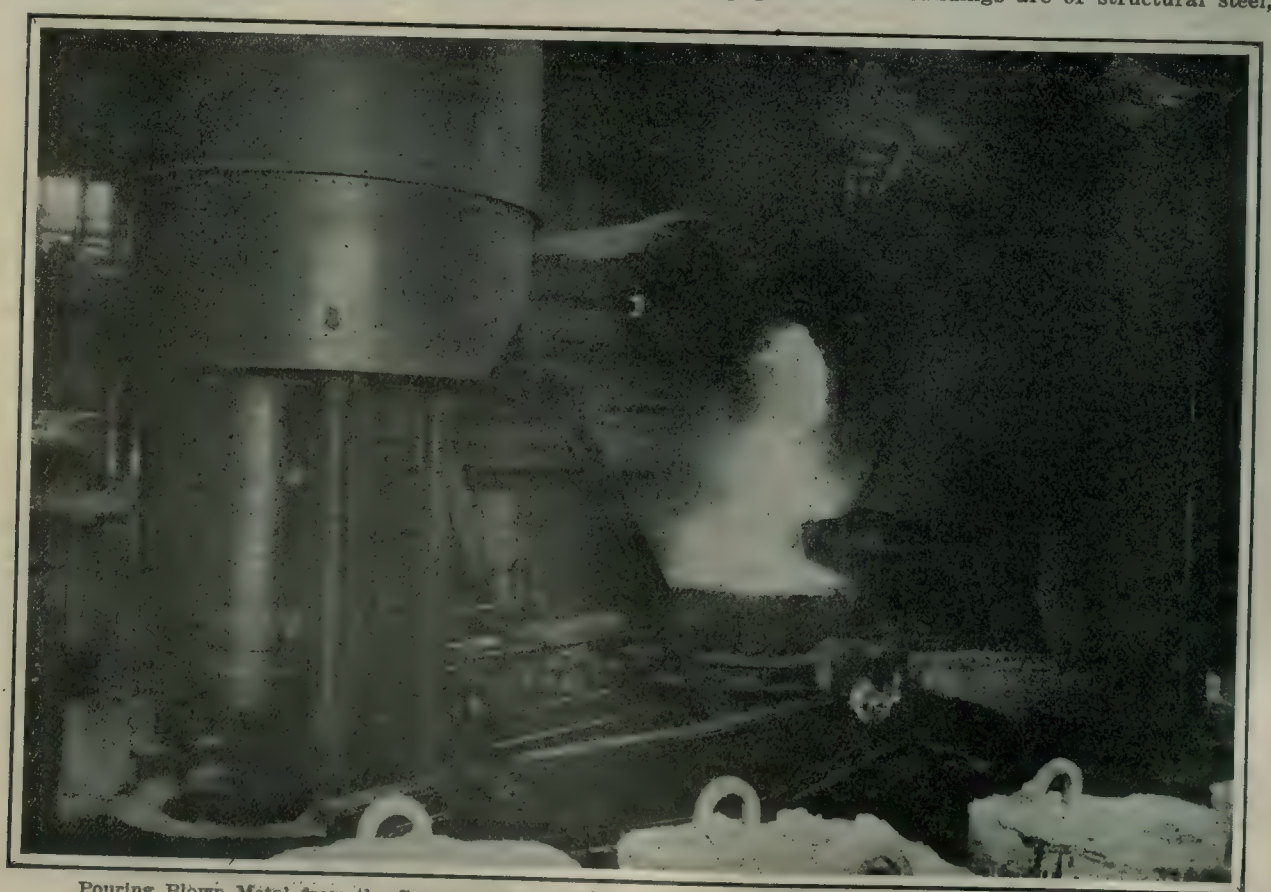
An unusual and distinctly advantageous feature of the design of the bottom house is the fact that the hot metal transfer track extends into it, and under the bottom house crane. Hence hot metal ladles in need of repair may be lifted off the track and replaced by relined ladles. The relining and drying out of ladles is done in the bottom house. For drying out, a preliminary wood fire is built in the ladle, and it is then subjected to a hot flame from tar atomized with steam, and supplied under pressure.

Perhaps the most impressive feature of the Bessemer plant, visualized as a whole, is the fact that mechanical appliances have been provided for practically



Pouring from the Mixer into the Transfer Ladle Car. The latter is on a track scale and is weighed immediately after pouring. The scale levers will be seen above the ladle—out of danger. The operation of the mixer has been rendered safe by electrical and mechanical appliances; in case of accident the operator, by leaving the control platform, causes the mixer to stop automatically and then return to horizontal position

every conceivable operation. The arrangement of the various departments in relation to one another also stands out as strikingly convenient, and conducive to maximum economy in operation, and minimum interruption of production in case of breakdown of any of the equipment. The buildings are of structural steel,



Pouring Blown Metal from the Converter into a Steel Ladle Held in Position by the Hydraulic Center Crane

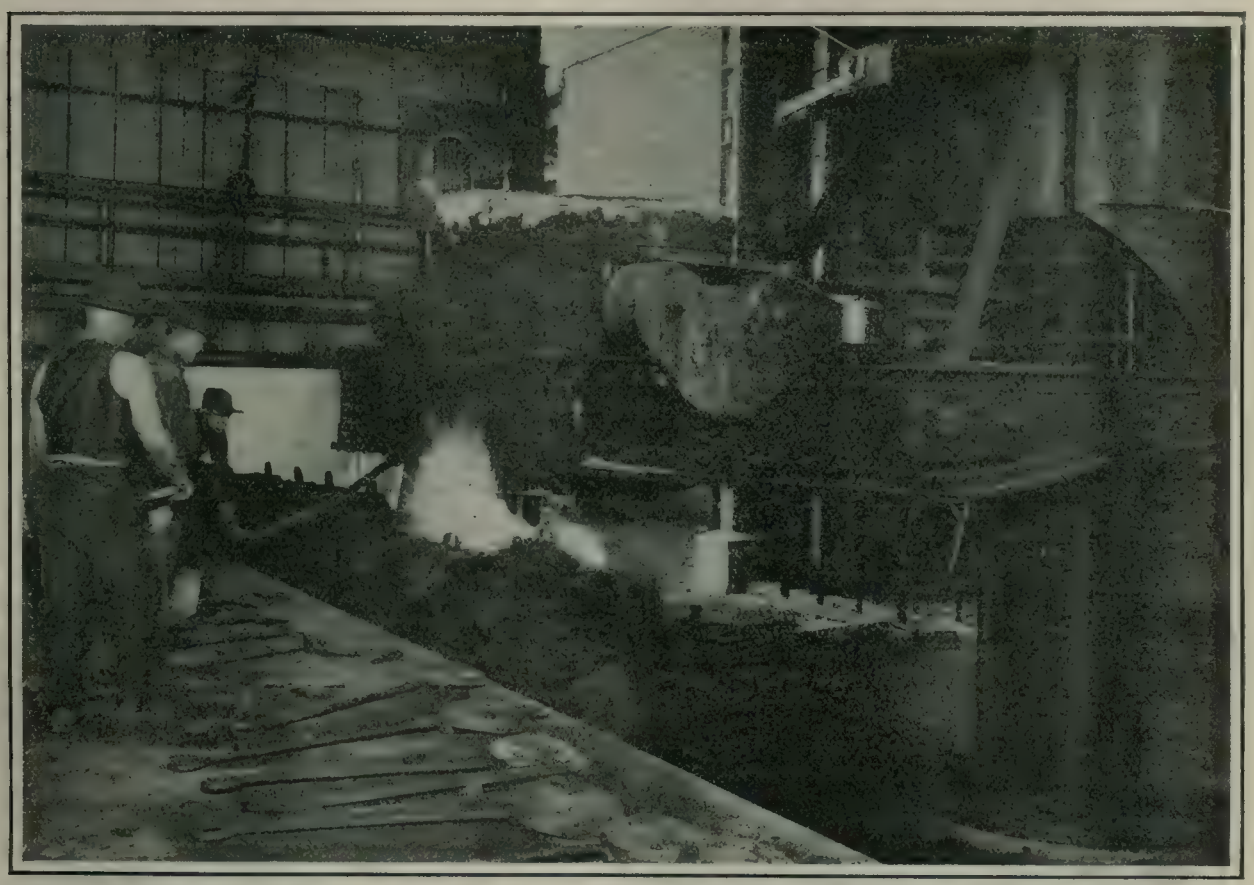
which is sheathed with corrugated galvanized sheets.

Offices of the Bessemer superintendent, and well appointed toilet facilities for the employees, are housed in a two-story brick structure. Another brick building, 42 x 100 ft., contains the power house equipment. A 25,000-cu. ft. Ingersoll-Rand turbo-blower furnishes the air for each converter. Other equipment includes a 2000-kva. Westinghouse turbogenerator, and two Cameron motor-driven hydraulic rotary pumps, with space for a third. Each of these is an eight-stage pump—four stages on each side. The turbo-generator was installed as an auxiliary to the main power house, tying into the main power line, thereby serving as a protection. A 20-in. accumulator serves the hydraulic equipment.

There are also three Cameron steam turbine driven boiler feed pumps and a Cochrane feed water heater. Two Cameron centrifugal pumps located in the basement draw hot water from the hot wells, which collect water condensed from the steam-driven equipment, and deliver it to the feed water heater. A steam separator in the steam lines removes moisture before the steam enters the engines. In addition, each engine has its individual separator.

Steam is furnished by four 300-hp. waste-heat watertube boilers, furnished by the Casey-Hedges Co., Chattanooga, Tenn. The boilers are arranged in pairs, each pair in a boiler house, 40 x 100 ft. They are fired from the waste gases of a corresponding number of open-hearth furnaces in the adjacent plant. Each boiler is steel clad, and closed tight on all sides, to keep out air leaks, thereby conserving a maximum of the heat of the incoming gases, which are at relatively low temperature. For the latter reason, also, the heating surface of the boilers was made exceptionally large—6500 sq. ft. each. The boilers are served by a steam turbine-driven fan, insuring static pressure of 6 in. Burners have been provided, so that the boilers may operate on coke oven gas if the open-hearth furnaces are down. As an additional precaution, they have been equipped with standard grates for coal firing.

This entire Bessemer plant was designed by the engineering staff of the company, and constructed by the company's own forces. It is expected to have a capacity of 65,000 tons of Bessemer steel per month when both the converters, provided for in the plan, are working double turn.



Teeming an Ingot. This view taken from the pouring platform shows the steel ladle in position over one of the ingot molds. The ladle has been transferred from the converter to the pouring platform by the hydraulic center crane

Carnegie Blast Furnace Operations

No. 1 furnace of the New Castle, Pa., works of the Carnegie Steel Co. was blown in Nov. 2 after being down for several months. During the suspension many improvements have been made to the furnace. Three 2-pass side combination stoves have been installed to replace five McClure 3-pass stoves which will be torn down. A Kling-Weidlein gas cleaner also is to be installed. No. 4 furnace of this group is being relined and probably will be blown in about Jan. 1. The Carnegie Steel Co. also put on a furnace at its Duquesne works recently and one of the Carrie group at Rankin, Pa., will go on this week. This will make a total of 20 in blast as compared with the minimum of 13 about July 1. The distribution is three Duquesne, five Edgar Thomson, four Ohio, three New Castle, one Lucy and four Carrie furnaces.

It is announced that the Dominion Iron & Steel Co., Sydney, N. S., his put into effect a 10 per cent reduction in wages, which applies to all workers and office staff at the Sydney plant. Accompanying the notice of the wage cut was an intimation that the step, while regretted, was the only alternative to a practically complete suspension of operations.

An official of the Republic Iron & Steel Co., Youngstown, Ohio, states that an extensive engineering survey has been started with a view to possible changes in the Bessemer department and substitution of electric for steam power in a number of units.

BUYING VERSUS BEING SOLD

Cost of Selling Always Paid by Buyer—Salesman Not Altruistic

BY JOHN J. RALPH

Selling. You have seen them, that army of men on the road, with their grips, their picture books, their samples. In a prominent plant ten, twenty, thirty of them in a day, each taking his half hour or more, and sometimes decorating the waiting room for hours.

Yes, they sell you. Not a concern where they do not! Starting out with a general idea of your wants, and a specific idea of their supplies, they get through you and sell you.

Ever reflect that each time a man "sells" you, it is a black eye to your firm, even if the buy is a good one? Should he not sell you when you need it, then it is more than a black eye. It is an internal injury, and that missed sale may have cost you more than the profits you may have made on all of the other purchases of the day.

Why so, if the sale was a good buy? Simply for the reason that, if it was a good buy, you should have known it before that salesman reached you. Because you have either actually lost money through not having made the purchase earlier, or you have foregone profits you might have had.

That salesman had the "edge" on you and your entire concern. He guessed your wants, or some other salesman tipped him off. But you were asleep, and let the opportunity get by until he forced his way in.

Buying Service Most Important

As between you and the seller, it is more important for you to buy than it is for the seller to sell. Buying is your corner-stone. You must buy, and on your purchases you must build your structure. It must carry your overhead. It carries all of your labor charges. On its quality and fitness largely depends the price you must pay to dispose of the finished product.

Yet buying is not generally held in its true importance—perhaps because the level of buying is so low. Perhaps because we do not sufficiently realize that all in the plant assist in the buying, and through disorganization there is inefficiency.

Perhaps it is because we like better to see gold coming in than going out, and we grudge the sowing of the grain. Then, too, the finished unsold product in the plant is an unburied corpse. It is notorious, the proportion of the residual estate the undertaker proverbially gets.

The Cost of Selling Service

It is convenient, is it not, this selling service given you so freely by those you patronize? Ever reflect who pays for it? That crowd of men calling on you day after day, eating and sleeping and traveling at "the company's" expense, and all practically calling on the same kind of industry. Would they not make a fine crew in the factory? Yes, all of your neighbors have had the same line of visitors to-day. It took most of your time to see them, too, did it not?

You paid for them, you are paying for them, and they are not under your direction, either. You and the others pay for them because of the low level of purchasing throughout the country.

Some of that service is a justifiable expenditure. There are certain machines so complex that no printed description could tell just how they operate and what they can do. There are salesmen who are experts in their lines, who can go out into the shop, size up your problem, and tell you what you need, because that is their business, their genius, their life. About what proportion of those who call on you are of this type?

Each one of the concerns sending you a salesman has already sent you its card. Where? This magazine carries hundreds of them. There are other magazines. News of them is found in the editorial pages and in the advertising pages. Some of these advertising pages are silent but eloquent salesmen. Others are mere announcements.

Each of these concerns, however, is ready to follow up this announcement with another silent salesman. This second salesman you can carry in your pocket, study at your leisure, file away for reference, turn over to others. The catalog seldom costs less than several hundred dollars, and sometimes runs up into thousands, just to get together the information and to put it into shape.

You send out these silent representatives yourself, and your salesmen often feel aggrieved at the small attention your catalog gets.

Ever figure how much actual cash is spent on you, to aid you in buying—traveling salesmen, advertising, catalogs? Much of it is due to the average low level of buying; to the attitude of the purchaser, that he is conferring a favor instead of embracing an opportunity.

The buyer pays for it all.

Relative Development of Buying and Selling

Some magazines are full of tales of marvelous courses which will show you how to sell, and open for you the vaults of Ali Baba; but how often do you see advertised the course that will enable you to buy? The ratio is merely an indication of the relative attention paid to the different elements of the business. The efficiency of their efforts is somewhat to be doubted.

Yet buying is the basic need. It is infinitely the more difficult. It touches every part of the plant. It is influenced by every business condition. It is an opportunity to return large dividends, and it is full of pitfalls. In average development it is far behind that of selling, and the losses due to the want of adequate buying knowledge and talent are infinitely greater.

The successful salesman is ordinarily a pretty confident sort of person. If he is diffident and retiring he does not get far. Consider his attitude.

Does he come to assist you with your problems, to grub down to find out whether this is really the best purchase you can make? Far from it. He is coming to sell you his goods. He is considering you as a psychological problem. Your needs are a lever which he uses to pry your business away from you.

He has marshalled facts and figures—not with the main idea of meeting your wants, but with the object of using them to assist his sale to you. He may no longer flatter you with suppers, wine dinners, fine cigars—although even such gross methods are not entirely dead—and they were foregone, not because of conscientious scruples but because it is no longer good business.

Just a word for the somewhat modest visitor, selected for a salesman because he knows the product and its use—sometimes even instructed not to sell unless, in his judgment, the purchaser really needs the materials or the machine. There are some such. Treat him gently and kindly, for he is not interested in playing on your moods and whims, but solely in the possibilities of helping your organization to make money through the use of his product.

Park Mathewson, vice-president of the Business Bourse International, Inc., will address the meeting of the Purchasing Agents' Association of New York, which will be held at the Builders' Exchange Club, 34 West Thirty-third Street, New York, Tuesday, Nov. 15. The meeting will be attended by the purchasing agents of many representative firms. Following the address an open discussion will be held on several problems of interest to the purchasing agent.

The McKinney Steel Co., Cleveland, will erect a sintering plant, the contract for which will probably be placed within 30 days and actual construction started early in the spring. A Dwight & Lloyd sintering machine will be installed. The plant will have a daily capacity of about 350 tons of sinter.

Experiments in Industrial Co-operation

Constructive Solutions of Employer-Employee Relations Presented at Meeting of the Academy of Political Science

NUMEROUS experiments in industrial co-operation with emphasis on what employers have done and can do in taking the initiative in this management problem were considered at the forty-first annual meeting of the Academy of Political Science, held jointly with the Industrial Relations Association of America in New York, Nov. 4 and 5. The subject of the meeting was "Constructive Experiments in Industrial Co-operation Between Employers and Employees" and, as pointed out by Sam A. Lewisohn, chairman of the committee on arrangements, and presiding officer at the opening session, it was the intention of the meeting to consider not the judicial phase of employer-employee relations but the continuous and constructive relationships, or, such problems as proper personnel administration within the plant and proper co-operation within the industry. "It is," he said, "a matter of working out the best possible adjustment between employer and employee for the year-in and year-out conduct of business."

There were five sessions, the first of which was devoted to co-operation within the plant, where the employer is the principal figure and where, as it would seem, he has the initial role of leadership. Proper team work within plants depends, the chairman pointed out, on the skill and enlightenment of the management. Charles B. Seger, chairman board of directors, United States Rubber Co., speaking on "Employee Representation and Personnel Work in a Large Scale Organization With Many Plants" emphasized the establishment of mutual confidence as the fundamental factor and advocated a point of contact through some form of employee representation or representative body—such as shop councils representing the employees and the local management representing the employers. Regarding outside interference Mr. Seger said that "if both parties will make a proper effort along lines of human relationship based on truth and honesty of purpose, there will not be any friction that cannot be cleared up between individuals or groups without any outside help."

After reviewing the personnel problems peculiar to a public utilities organization, E. K. Hall, vice-president American Telephone & Telegraph Co., in his paper on "Executive Leadership and Personnel Work in Public Service Corporations," stated that they were trying to give their people a real status in the industry, trying to foster in each employee a real interest in his job and in his concern. This is being done he said by giving them a financial interest in the company as employee stockholders, and by giving them all the information they can absorb regarding the policy of the business and its relation to the public.

He said that organization charts were used extensively to the end that employees may realize their relationship to others. "We try to make them feel," he said, "that there is one responsibility that all have in common and that is operation for and devotion to the public service."

Securing Leadership Through Confidence

Charles R. Hook, vice-president American Rolling Mill Co., Middletown, Ohio, was not able to be present, as scheduled, and a paper, "Winning the Confidence of Employees by Taking the Mystery Out of Business," was read by S. R. Rectanus, director of employment of the same company. It was pointed out that "mystery comes as the result of a lack of understanding and causes distrust. Just as we are taking the mystery out of our processes by investigation and replacing secret formulas by the standard practice instruction, so we hope that management will secure and hold its leadership through confidence based on understanding instead of through fear inspired by mystery." "We depend," he continued, "on experts for advice, organize committees to plan and recommend, but depend on individuals to execute, to do the job. Any plan which takes the responsibility for the execution of plans and policies away from the individuals who make up the management, is bound to result in inefficiency and the discrediting of the executives. We have endeavored to secure respect for the management and have tried to create among the workers a desire and willingness to have the work of management done by those who are best fitted to manage."

The organization and functions of the advisory-committee plan, in operation since 1904, was reviewed. This committee, it was stated, is called in by the management for advice and consultation and they in turn present matters of mutual interest to the management. The functions of the general advisory committee were given as follows: To advise with and learn the policies of the general management; to convey to the employees an understanding of these policies and to reflect the sentiment of the employees on such matters as may be of help to the general management. The committees have no administrative, executive or legislative functions. Meetings are held once a month following a meeting of the foremen with the management, or sometimes jointly with the foremen. At these meetings "we state, explain and discuss business policies, market conditions, plans for the future, successes or disappointments of the past. Our various department heads tell what their jobs are, what they do, how their part of the business is carried on." Instances showing the beneficial results of the plan were cited.

Reducing Unemployment

A paper on insurance against unemployment in a plant was presented by Harold A. Hatch, of Deering, Milliken & Co., New York, and president of Dutchess Bleachery & Abbeville Cotton Mills Co. He classified the motives of those demanding a cure for unemployment as being based on fear that unemployment will lead to discontent, on economy, and on spiritual considerations. Of the latter he said in part, "we may consider the question of unemployment as a spiritual one, as a call to serve our fellow men. This viewpoint is, I believe, in harmony with American tradition. With this viewpoint we can, I believe, have full confidence that sooner or later we will solve the problem." He then outlined the effect of such insurance in regularizing casual, seasonal and cyclic unemployment. He cited the experience of his companies in the matter and as to the cost of this insurance said in part: "At one plant since Jan. 1, 1920, the cost has been 4.516 per cent of the pay roll; at the other plant, for the same period, 1.539 per cent of the payroll." Both of these he pointed out may be regarded as maxima, on account of the general depression in the textile trade. As to the benefits accruing, he said: "I believe that as far as the companies themselves are concerned, even if they should pay the entire unemployment insurance, there would be no financial loss not compensated for by the increased efficiency of their employees."

Among those taking part in the discussion were Owen D. Young, treasurer, General Electric Co., who said that he was greatly impressed with the recognition of the necessity of co-operation as expressed in the paper of Mr. Hook of the American Rolling Mill Co. On the subject of unemployment he said that the problem was "bristling with difficulties" and that in the solution we must not go so far as to be unable to obtain

labor under conditions that will permit us to compete in markets of the world. "I hope," he said, "that we will find a remedy before long, but not in State action."

Public Interest in Strikes

A dinner meeting with "Good Will and Co-operation in Industry" as the topic was presided over by Secretary of Commerce Hoover. The theme of Mr. Hoover's introductory address was the primary interest of the public in certain classes of strikes and industrial controversies. He divided industries into two categories one of which included the transportation and the coal industry, where continuous operation is vital to the life and safety of the community, and where there is no alternative to some substitute service; and the other category including those industries from the continuous operation of which there is alternative supply without imperiling the life of the community. Of the latter he said that the public takes but a secondary interest in the dispute arising therein, but of the first group the public is impatient to find a solution.

"As a result of these things," said Mr. Hoover, "we have seen the gradual extension of the arm of the public to these disputes through both administrative and legislative action. We also witness this extension of public interest bitterly resented both by the employers and employees. The primary instinct of the public is self-preservation first and last, and where 1 or 2 per cent of the whole population may jeopardize the comfort and security of the other 98 per cent I do not believe that they can be restrained from exerting a commanding voice however much it may be resented by either side.

"The thing that must concern us all is that the entrance of the third party into these disputes will be in such form that it does not increase the ill will, that it shall be in such form as will secure justice, and that will preserve the very foundations of initiative and that type of American individualism upon which our whole social system is based, and that it will recognize the fundamental necessity to build up good will itself."

Other speakers at the dinner meeting included James J. Davis, Secretary of Labor, and Hugh Frayne, general organizer, American Federation of Labor.

The closing session of the meeting considered the question of what the State and other public agencies can do toward assisting and teaching constructive methods of handling personnel relations. It was suggested that the curricula of technical schools and colleges, from which personnel managers are recruited, be changed to include adequate courses of personnel relations. This question was taken up by Dexter S. Kimball, dean of the College of Engineering, Cornell University, Ithaca, N. Y., in his paper on "What Are Universities and Technical Schools Doing to Train Their Undergraduates in Industrial Relations."

Opportunity of the Chamber of Commerce

An interesting paper was read by Alexander C. Brown, president Brown Hoisting Machine Co., Cleveland, and president Cleveland Chamber of Commerce, on what the Chamber of Commerce can do in promoting better industrial relations in a community. Characterizing industrial discontent as a weed whose seeds scatter, Mr. Brown said: "It has long been a misconception that the square-deal policy of industrial relations in one's own plant is sufficient insurance against discontent, unrest and labor troubles in that plant. Recognition is now being given, all too tardily, to the danger lurking in an unsound labor policy in one's neighbor's plant." After pointing out the responsibility of the public in the matter of the settlement of labor disputes and the part that industrial relations plays in influencing economic conditions, he asked "who is to take the initiative in crystalizing public opinion as to the underlying principles of industrial relations that must be established in the public interest as the sole protection against these perils" of industrial extremes? Part of the responsibility for constructive leadership, he said, is broadly speaking, a federal and State function.

But effectiveness can only be attained by community action, he continued. "The very structure of our Government and the growth of our nation have been founded upon the development of the thought and action of the separate communities expressing themselves from within, rather than a centralized and paternalistic control exerted upon them by federal or State government. If then the responsibility for this leadership is primarily a community matter, where can it more logically fall then upon the chief civic and commercial organization of each community—the Chamber of Commerce?

Mr. Brown outlined the formulated labor policy or declaration of principles of the Cleveland Chamber of Commerce, made public in April, 1920, dealing with nine subjects, summarizing the principles underlying each. Research into current labor problems, was the next step advocated, with a view to furnishing the public with impartial information relative to them, and to direct attention, in specific terms, to the application of the adopted principles to these actual cases. Mr. Brown outlined various activities of the Cleveland Chamber of Commerce in the matter of promoting better industrial relations and in conclusion said, "Endless patience, unprejudiced judgment,, persistent determination and consistent policy are prerequisites to success and must be supported by the unwavering recognition that the public interest is paramount."

Wages for Mechanics in New York State

While average wages per factory employee in New York State in August, 1921, were 102 per cent above the figure for June, 1914, wages of those engaged under the group "metals, machinery and conveyances" were only 87 per cent above 1914, according to figures of the State Department of Labor. Those engaged in pig iron production and in rolling mills were getting but 62 per cent above 1914; while those building cars or locomotives, or employed in railroad repair shops, were being paid 118 per cent more than in 1914. Wages of structural and architectural iron workers were 95 per cent "up"; builders of automobiles, carriages and airplanes were receiving 82 per cent more; ship and boat builders, 66 per cent, and makers of machinery, including electrical apparatus, had pay envelopes averaging 76 per cent larger than in 1914.

American Foundrymen's Association Convention

CHICAGO, Nov. 7.—The American Foundrymen's Association will hold its convention and exhibit at Cleveland the week of April 24. The announcement has been sent out by C. E. Hoyt, secretary of the association.

The waterworks at Hopewell, Va., which during the war supplied the munitions plant of E. I. du Pont de Nemours & Co. and adjacent villages, has been sold by the Du Pont Chemical Co. to the Industrial Service Corporation of Virginia. The transfer includes electric and steam pumping stations, filtration plant, boiler plant, transmission lines, etc. The plant has a capacity of approximately 30,000,000 gallons per day. J. F. Muhlig is the general manager and operating head of the new corporation, with headquarters at Hopewell. Twenty firms have located at Hopewell.

James A. Campbell, president Youngstown Sheet & Tube Co., Youngstown, O., was a speaker at the 111th semi-annual meeting of the National Cotton Manufacturers' Association at the Copley-Plaza hotel, Boston, on the evening of Oct. 3. Mr. Campbell confined his remarks largely to the transportation situation. He is in favor of repealing the Adamson law, and a modification of the Esch-Cummins act to permit abolition of the railroad labor board or the transfer of its functions to the Interstate Commerce Commission.

Iron Industry's Message Favors Peace

Leaders Give Their Hearty Support to President Harding in His Effort to Limit Armaments—Earnest Denunciation of War

NINETEEN HUNDRED AND SEVENTEEN was described by THE IRON AGE as the year in which American iron and steel and machinery, along with every human and material resource of the nation, were summoned to a supreme test of ability of American institutions to endure. That year the American steel industry produced nearly three tons to every two tons in the rest of the world. In January, 1919, it was recorded that with "force to the utmost, force without stint or limit" as the nation's war cry in 1918, American steel blasted a way through and saved the world. The men of the iron trade did not hesitate then as to what their duty was. They gave not only of their wealth and their energy, but many of them their health and life itself, even if all were not called to the battle fields of France.

Now, as the International Conference on Limitation of Armament is about to meet at Washington, the great industry stands as firmly behind President Harding in his efforts to promote peace as it stood behind President Wilson in the days of the war. It is, of course, impossible to obtain complete expression by the leaders of the industry, but in response to requests from THE IRON AGE, a few have given briefly their views as to the Washington conference. They show unmistakably that the sentiment of the trade is opposed to war, for both humane and economic reasons. None fails to realize that the fundamental question is one of morals and none doubts that limitation of armaments is demanded to promote the welfare of the business of the country. The replies herewith printed are to be presented at the conference, probably at its first meeting next Saturday.

Judge E. H. Gary, chairman United States Steel Corporation, has been working in the seclusion of his Long Island home for several days and was not accessible to obtain a statement as to his position regarding the conference. Last December, when asked by the New York *World* "Should not the United States take the lead in a virile crusade for an immediate world-wide disarmament?" said:

"Upon the assumption that all other countries connected with the high seas would agree to a limitation concerning armament, I should like to see the United States participate on a just and reasonable basis. I am sorry I cannot more specifically answer your question."

World Police Force Needed

By E. W. Mudge

E. W. Mudge & Co., Pittsburgh

We believe that the iron and steel industry stands solidly back of President Harding in his disarmament efforts. We feel, however, that it is impossible to keep two school boys from fighting. The same will happen with nations. If the world would agree to disarmament with the exception of a proper police force to keep order throughout the world by a reasonable sized Army and Navy under the control of the Governments of Great Britain or the United States or both, the expense to be prorated among the nations of the world on an equable basis, we believe the problem would be solved.

Great Economic Advantage

By W. S. Pilling

Pilling & Co., Philadelphia

While the reduction or restriction of armament would result in an apparent decrease of demand for special and standard grades of iron and steel and thus perhaps temporarily seem to be a disadvantage, the net result in the long run would be a great economic advantage. Wealth, to be substantial or of real value, must be productive; arms and armament are destructive and add nothing to the real wealth of a country. It, therefore, follows that if our resources and labor can be diverted from destructive to constructive investment, the economic result must be beneficial. Aside from this, however, the humanitarian benefit is so apparent that no argument is necessary. Whatever prevents war, or reduces its destructiveness, is of value.

Armaments must necessarily be relative. It, therefore, follows that from either offensive or defensive standpoints, if restrictions of all nations are fair and equitable, each will occupy as favorable a position, relatively, as if the armaments were continually increased or held parallel. The reduction would also release valuable human material for useful purposes, and in the long run this must be beneficial to the whole world.

What Disarmament Means to Industry

By George M. Verity

President, American Rolling Mill Co., Middletown, Ohio

A proportionate reduction in the armies and navies of the world to a point that would salvage at least 50 per cent of the enormous sums now expended for such purposes would not only stop that terrific strain on the material resources of the world, but it would set free a great constructive force in money and in men that could almost remake the world in a few generations. There is an old saying that a dollar saved is equal to two dollars earned. Unquestionably, the enormous amount saved would be more than quadrupled in its constructive value to the world, as the constructive ability of all those engaged in the making of armament could be diverted to the pursuits of peace.

Unlimited national development could be enjoyed in material, educational and spiritual things, and the sum of it all would be beyond human computation.

The commerce and industry of the world will

prosper enormously when a condition of human happiness and stability can be enjoyed.

The higher the state of civilization, the greater are the combined wants of the peoples of the earth.

If there is such a thing as Christian civilization, is it not time that the great civilized nations of the world find a way to pool their moral and material strength in the attainment of real peace on earth and good-will toward all?

If it can be done at all, it can be done now as well as in the future.

If civilization, as we know it, is to be preserved, substantial progress toward world peace must certainly be made. The spirit of the ten million lives sacrificed in the last world war and of all those who were victims of it demand it.

A condition that will assure permanent peace among the major nations of the world, with resultant world stability, will be worth to industry a thousand times more than any possible benefit that can arise through the building of armament.

Conference Inspires Hope

By Samuel Mather

Pickands, Mather & Co., Cleveland

I am heartily in accord with President Harding's effort to limit armament. A conference attended by the representatives of the leading nations of the world to discuss a problem common to all irrespective of their national conditions is an inspiring thing in itself and tends towards the belief that in the not too distant future nations may be relieved to some extent at least of the great problem of self protection and turn the intelligence, the moral effort and the capital of their citizens into channels more productive of ultimate good to mankind.

I am proud to stand with others of the iron and steel industry heartily behind the President in this most worthy cause and wish him all success.

Most Important Question Before the World

By Willis L. King

Vice-President, Jones & Laughlin Steel Co., Pittsburgh

The limitation of armament is unquestionably the most important and far reaching question before the world to-day. The well being and happiness of present and future generations depend upon a favorable outcome. It will determine the moral, financial and economic future of the world and must not fail of its benign purpose. That our country has taken the initiative and will act the part of big brother in the deliberations is not only extremely gratifying but in my opinion forecasts early relief from the burdens of taxation and a prompt resumption of trade among the nations of the world.

World Wide Effect of Wise Policy

By E. A. S. Clarke

President, Consolidated Steel Corporation, New York

I stand heartily with President Harding in his effort to limit armament. I believe that such limitation, with the consequent reduction of taxation, would have a favorable effect on industry and trade, and should be a great help toward the restoration of prosperity and normal conditions. In addition to the direct effect on our domestic situation, the stimulation of buying power throughout the world will react favorably to us, since the full prosperity of the United States is so largely dependent upon the export of a substantial part of our manufactured products.

Heavy Burdens Imposed by War Should Be Lifted

By Clayton Mark

Chairman, Steel & Tube Co. of America

The economic necessity of relieving the people of the leading nations of the heavy burdens of taxation now imposed to provide means for wars and paying obligations for past wars is apparent to every one, for these taxes are paralyzing effort and absorbing earnings and thus checking the development and progress of the human race. If the energies now devoted to providing means for prosecuting wars were used to develop the world's natural resources by expansion of trade and transportation facilities and by improved education, the result would be better homes, higher standards of living, contentment, happiness, prosperity. I am sure the thinking people of all countries, including those in the iron and steel industry in this country, are unanimous in wishing whole-heartedly for the success of the conference called by President Harding.

Feasible for All to Join

By F. B. Richards

M. A. Hanna & Co., Cleveland

We are fully in accord with President Harding's views on the limitation of armaments and believe that the general adoption of his ideas will be the greatest step toward establishing international peace and prosperity and one of the essential steps to be taken in re-establishing prosperity in our own country. It is the one great economy in which it is feasible for all Governments to join and bring about quick results.

Steel Industry Now Is and Always Has Been for Progress

By Joseph G. Butler, Jr.

Vice-President, Brier Hill Steel Co., Youngstown, Ohio

Aggressive war is a relic of barbarism. It is a crime against humanity and civilization. It is rarely necessary and should never be unavoidable among civilized nations. Usually it is brought about by a sense of superior power on the part of the aggressor. The most potent cause of war is efficient machinery for carrying it on.

Reduction of armaments by the great nations of the earth would go farther to prevent war than any other method yet suggested. It would remove from the backs of nations the tremendous burden of military and naval establishments, eliminate the greatest cause of waste humanity has known, and promote peace and good-will among all the peoples of the earth.

The American iron and steel industry has always stood for progress. Its leaders have been in the forefront of every movement for advancement of the moral, political and physical welfare of this country. No practical effort toward greater liberty and prosperity has ever failed to receive its earnest and effective support. It now stands solidly behind President Harding in his desire to bring about agreement among the great powers for the limitation of their armaments to what may be necessary to guarantee internal peace and stability of government.

Generalities Would Be Disappointing

By John A. Topping

Chairman, Republic Iron & Steel Co., New York

Sentiment as I sense it in iron and steel circles is in accord with President Harding's plans for peace and in sympathy with the object of the limited armament conference. It is generally recognized that the conference has ahead of it both intricate and delicate questions to settle, but "where there is a will there must be a way," and it is hoped that a practical way will be found to establish a clear understanding, supported by substantial guarantees, for the maintenance of peace.

The business world would be disappointed with any settlement based on generalities and the economic reconstruction of the world would suffer in consequence, but with the peace of the world established on a firm base, supported by definite guarantees, reconstruction measures throughout the world would be quickened and normal business conditions hastened.

Will Make Momentous Decision

By Clarence H. Howard

President, Commonwealth Steel Co., St. Louis

At the request of President Harding, the nations of the world are assembling their representatives to discuss the limiting of armament. This most important meeting is to decide whether civilization, peace and prosperity are to continue or if we are to be governed by war.

It is the duty of the iron and steel interests to support our President. A right disarmament plan will relieve burdened nations of unnecessary taxation, will stimulate business and bring to the people of all nations a feeling of love and confidence in each other that will be of untold value to all.

War a Curse to Business and Humanity

By A. F. Huston

President, Lukens Steel Co., Coatesville, Pa.

We are heartily in favor of as much disarmament as possible and are ready to stand solidly with President Harding in any effort to bring this about. It undoubtedly would be of vast benefit to business, as the large items in our annual budget are for the Army and Navy departments. A recent visitor to Germany reports they are able to show their present prosperity because of not having to spend money for war purposes at present.

I am even stronger for disarmament for humanitarian reasons, believing that war is a curse and should be avoided.

Humanity's Universal Wish

By C. D. Dyer

Vice-President, W. P. Snyder & Co., Pittsburgh

Humanity never had a wish so universal as for armament limitation. The best interest of the world's business is typified in the ancient symbol of the sword and the plowshare and lies in the hope that the one activity fall into disuse to allow the widest development and expansion of the other.

If the coming conference reduces in any degree the 93 per cent of our national resources now devoted to war, every point gained means capital restored to the people for productive uses. It looks as if the conference is the place to collect any reward due the race from the world war.

Limitation of Armaments Is a Moral Question

By J. F. Welborn

President, Colorado Fuel & Iron Co., Denver

The question of the limitation of armaments is moral. It entirely outweighs all incidental economic questions, but prosperity depends upon the industries of peace, not of war. Naturally a successful solution of the problem to be considered by the coming conference at Washington should result ultimately in greater industrial activity when funds heretofore devoted to war or preparation for war are turned into constructive channels of trade.

Greatest Opportunity Since Time of Christ

By William A. Rogers

Rogers Brown & Co., Buffalo

The approaching conference for limitation of armaments offers an opportunity to accomplish the greatest good for mankind since the time of Christ.

War except in defense against greed and oppression is the greatest crime which civilized man commits and is a colossal folly when viewed as a means of settling disputes between nations.

There is an impression in some quarters that the iron and steel industry profits by war. That I believe to be a fallacy and that when the cycle is completed by readjustment to normal conditions, the industry has suffered loss.

The greatest prosperity comes through employment in the arts of peace.

History to Be Written—What Kind?

WASHINGTON, Nov. 8.—Washington is on the verge of writing history, perhaps a great chapter. Gathered in the Capitol are people from the four quarters of the globe who will constitute the actors in a world drama. What will be the outcome—weal or woe? The answer can be hazarded and that only, for never before in man's time has there been a comparable conference of the nations of the world called to consider the limitation of armaments? Is it being approached with suspicion, distrust, and cunning design by some? Or are all of the countries entering it with high hope and sincerity? Is it Utopian, and impossible of accomplishment? Or will a weary world demand that burdens and sufferings attendant upon war be lifted?

The issues are so difficult, intricate and unprecedented that they are staggering. They are both emotional and thoroughly practical. There are many minds in all the nations of the earth which think that civilization has barely escaped a breakdown and that a catastrophe can be avoided only by a sincere agreement to call a halt on armament. But it is obvious that no country will enter into a program that it considers endangering to its own welfare. Where the line can be drawn is a momentous problem, complicated and confusing.

As an economic matter reaching into finance, commerce, and industry, no question can exist that war is a decidedly eruptive force. It means a loss to all. The sane business man, no matter what his line, is as strongly opposed to war itself as the most confirmed pacifist can possible be, both from a point of humanity

and of sound economics. The difference is one would, and would not, have "peace at any price." The result of the world war with its over-expansion of the iron and steel and other industries, demoralized international exchange, depressed markets, and loss of purchasing power, interruption of work of constructive science, and education, drain on profits, heavy taxation on the people, is a complete answer as to the desirability of a frank international agreement to limit armaments and prevent war.

What it may be possible to evolve in this direction out of the world conference remains to be seen.

Conference on Industrial Cost Accounting

Contributions to Cost Questions Made at Pittsburgh at Second Annual Meeting of Industrial Cost Association

GETTING additional light upon several subjects which were under discussion at its first national conference, held at East Aurora, N. Y., last May, the Industrial Cost Association also considered a number of papers bearing directly upon its aims and objects at the second national conference, which was held at the William Penn Hotel, Pittsburgh, Nov. 2, 3 and 4. It was evident from the opening address of President Horace S. Peck, comptroller S-K-F Industries, Inc., New York, that the association had passed through a trying year, due to the industrial depression, which forced economies that made difficult accretions to membership, and this in turn created financial conditions which made impossible the full attainment of the plans laid down at organization a year ago and subsequently at the East Aurora conference. The fact that the organization had survived the trials, however, created a feeling of optimism regarding the future, and this feeling found reflection in the earnest discussions of the several papers presented.

The organization seemingly has found its feet and the plans presented by President Peck indicate a more coherent and unified purpose than was possible to attain in the organization's first year of existence. The national body in the future will propose the subjects for discussion of the individual sections, and it is hoped that this method will result in securing a country-wide view of a given subject. Hitherto, the individual section has chosen its own topics and the results of the papers and discussions have been almost local.

Different sections, now located in Buffalo, Chicago, Detroit, New York and Pittsburgh, will be asked to discuss simultaneously and report their findings on several papers soon to be issued by the national officers. Among them are: "The Balance Sheet from the Banker's Standpoint," by C. W. Tracy, Irving National Bank, New York; "The Opportunity of the Cost Accountant to Do Analytical Work for the Executive," by Robert E. Belt, secretary National Malleable Castings Association, and "Depreciation," by C. A. Porter, Hardinge Co., heavy machinery, New York. There was a registration total at the conference of 150, and the conference also was featured by an exhibit by a number of companies manufacturing mechanical office and accounting appliances.

How Accounting Should Help Sales Work

S. B. Taylor, general sales manager S-K-F Industries, Inc., New York, presented the first paper of the afternoon session. "What the Sales Manager Should Have from the Accounting Department" was his subject, and he said in part:

"The constructive value of the comptroller's department in its relation to the making of sales has only begun to receive the appreciation due it. Actual working contact between the accounting and sales departments starts with costs. That these figures should be available, dependable and of easy analysis is of prime interest in merchandising. Cost records should immediately show 'closed order' costs on finished units by dates of completion, the quantity of units involved and a segregation of material, labor and burden, as well as the per cent cost of list if the product is so sold. Supplementary to this, current information on 'in process' material, quantities involved, as well as the stage of manufacturing process, should be supplied. With the above facts in hand, quotations on present or future requirements of the buyer become both safer as to profits and surer as to delivery promises.

"There are certain pictures of the sales result which are of great value and which the accounting department should be equipped to supply as part of its routine function. For example:

"(a) Daily memorandum showing the number and value of the orders received, together with the number of units covered and from what plants ordered.

"(b) The above detailed by customer, with quantities and type of purchases.

"(c) Weekly reports giving all sales, intercompany and to the public, all returns and allowances for the period to date, segregated by plants, this to embody comparative figures for similar period for the preceding month and to date; the value of new business accepted and the status of unfilled orders forming a part of this report.

"(d) Monthly, a report showing gross profits for the month completed and the period to date, with comparisons for the same period of the preceding year.

"Figures of finished stock inventory as well as 'in process' items and raw stocks by months showing increases or decreases, should be available for ready reference. The proper allocation through coding of sales by territory and industry, assuming distribution to be varied, is an important responsibility for the comptroller's department. Correctly done, it forms a record from which the sales executive may learn much as to the ability of fields to absorb product and the desirability of such a field from the standpoint of profit; to note improvement or retardation, as it occurs, also to judge more fairly if various territories in which there is a common field for sales are bearing their respective part of the burden.

"The accounting department should provide where branch offices are maintained complete records by months of the activities of such offices for use of the sales department. Such tabulation should include the amount of sales, salesmen's salaries and commissions paid; expenses of travel; expenses of office; per cent commission and salaries on sales; per cent travel expense on sales; per cent total expense on sales. For reference purposes both as applied to the individual offices or as a group—if these be one—such figures are of high value."

Making Prices an Art, Not a Science

Jay Chapin, assistant secretary, James H. Mathews & Co., Pittsburgh, who led the discussion of Mr. Taylor's paper, declared that the making of sales prices was an art and not a science, while accounting was an exact science. The sales manager must know the conditions in his own company, his own business and his own factory as well as the efficiency of his factory in the formulating of prices which must meet the market. In addition he must be equipped with experience and facts and the fact must be provided by the accounting department. Co-operation between the sales and accounting departments was much simpler in the small or moderate-sized company than in the large ones, which often were highly departmentized.

E. C. Grimley, Victor Talking Machine Co., who spoke on "Inventories: Methods of Taking; Perpetual

versus Annual; Cost of Market," strongly advocated the perpetual as against the annual taking of inventories on the ground that the annual inventory could not be taken without a plant shutdown and that this was costly in normal times. He also favored the use of average costs in inventories for tax purposes, although citing the latest treasury ruling that the cost or market price, whichever was lower, was to be used in such cases. Discussion disclosed that in the compilation of the inventory the figures must be consistently one or the other and that the two methods could not be applied in an individual statement. No definite conclusion was reached as to whether it was cheaper to keep a perpetual inventory or shut down the plant for a time for an annual inventory; strong support was given to both views of the question.

Plant Idleness a Profit and Loss Charge

At the evening session on Nov. 2, F. S. Willett, comptroller Dodge Mfg. Co., detailed the responsibilities of the comptroller or accounting department in times of depression and T. W. Dinlocker, assistant comptroller S-K-F Industries, talked on the relation of idleness to industry, in which he declared that strikes in the last analysis are based on wage disputes. He advocated a sound wage policy, the encouragement of employees, provisions for advancement and mutual understandings as means to prevent idleness produced by strikes, which, he asserted, usually added to costs. Touching upon the question of whether idle plants should be charged to costs, the decision of the committee of the association having this item in charge has decided that it should be charged to profit and loss.

The morning session of Nov. 3 was given over largely to a paper by H. S. Breitenstein's, comptroller's department, Pittsburgh, who detailed the methods of compiling a municipal budget. Subsequent discussion developed that budgeting in the plant and office was not feasible except in a limited way where receipts and disbursements were known quantities.

Safety work and its value was discussed in papers by J. B. Ayres and William Hogg, both of the National Tube Co., in the afternoon session of Nov. 3. In the evening, at the banquet, Clifford B. Connelley, state commissioner of labor and industry, spoke in place of Newcomb Carlton, president of the Western Union Telegraph Co., who was unable to be present. Mr. Connelley devoted his talk to women in industry and reviewed the recent industrial conference in Harrisburg. Sanford Robinson, New York, the other speaker at the dinner, urged in a taxation talk, the repeal of the income and excess profit tax on the ground that it not only was burdensome, but also unjustifiable and would make securities now tax free, taxable.

At the closing session on the morning of Nov. 4, J. N. Howell, supervisor of costs, General Electric Co., Schenectady, N. Y., warned against the introduction of too many theories in a cost system, saying that a good many seemingly perfect systems had gone into the discard because they had been burdened by too many unnecessary trimmings.

Labor conditions in Cleveland show little change, according to the monthly report of the labor relations committee of the Cleveland Chamber of Commerce. The reports from industries employing over 100 men show a total of 66,797 employed Oct. 31 as compared with 68,119 on Sept. 30, or a decline of 1.9 per cent. Plants engaged in the manufacture of steel and their products employed 27,565 Oct. 31, as compared with 27,258 on Sept. 30, or a gain of 1.1 per cent. Automobile and accessory manufacturers had 7248 employees Oct. 1, as compared with 7773 on Sept. 30, a loss of 2.5 per cent.

Specifications and contract forms are on file in the New York office of the Bureau of Foreign and Domestic Commerce, covering the boiler plant for the new Vereeniging main pumping station at Johannesburg, South Africa, where bids will be opened on Dec. 22. The material includes three boilers with superheaters, stokers, induced draft apparatus, feed pumps, steam and feed water meters with all accessories to evaporate 8000 lb. of water per hour into steam at 200 lb. pressure, and temperature at 600 deg. Fahr.

TRUMBULL COMPANY ACTIVE

Partial Resumption of its Plant—Sheet Mill Operations Increased

YOUNGSTOWN, OHIO, Nov. 8.—Steel plant operations in the Mahoning Valley are beginning to ebb, though producers attach no special significance to the current decline, regarding it as one of the inevitable movements in the trend toward normalcy.

The most important change, from an operating standpoint, is the partial resumption of the Liberty tin plate works at Leavittsburg, Ohio, of the Trumbull Steel Co. Officials state the works will be operated for an indefinite period. Eight mills started this week.

The Carnegie Steel Co. is operating with nearly full bar mill schedules, four of six blast furnaces at the Ohio works, Bessemer department and 12 open hearths.

Eleven of 17 tube mills are under power, a decline of one from the previous week. The Youngstown Sheet & Tube Co. has seven pipe furnaces fired and the Republic Iron & Steel Co. four.

The Trumbull company presents the most promising tin mill schedule this year, with 27 active units, including 19 at its Trumbull works in Warren.

Sheet mill operations are enlarged, with 80 of 113 units under power as follows: Sheet & Tube company, 15; Republic company, 12; Brier Hill Steel Co., 18; Sharon Steel Hoop Co., four starting Wednesday morning; Trumbull Steel Co., 13; Newton Steel Co., 10, and Falcon Steel Co., eight. Sheet mill plant of the Mahoning Valley Steel Co. will continue idle.

Thirty-three of 51 independent open-hearth furnaces are charged.

Fabricating interests generally continue on a 60 per cent basis.

Industrial conditions at New Castle, Pa., are now better than at any time in the past eight months, with the blowing in of Rosena blast furnace by the Carnegie Steel Co. Three of the four furnaces in the Carnegie company's New Castle group are now on the active list. Operations in the steel department will be enlarged from 50 to 75 per cent shortly.

Plant Operations

The Mason Tire & Rubber Co., Akron, Ohio, has resumed full-time production at its plant, under three-shift operation, with production totaling about 11,000 tires a week.

The Tyler Tube & Pipe Co., Washington, Pa., has resumed production at its local plant, giving employment to about 150 men. This number will be increased gradually to a working force of about 600 operatives.

The American Wire Fabrics Co., Mount Wolf, Pa., has placed additional machinery in service at its plant and is now operating on a full time, night and day schedule.

The Phoenix Iron Co., Phoenixville, Pa., has closed all departments at its local plant for an indefinite period. Shop No. 7 is still being operated on a curtailed schedule.

The Reading Iron Co., Reading, Pa., has resumed production at its puddle mill on North Ninth Street, and is planning for the early operation of the 14-in. rolling mill at the same works. The Keystone blast furnace of the company was blown in on Oct. 31. The company's furnace at Emaus, Pa., is being made ready for operation, but no announcement as to date of resumption has been made.

The Canonsburg Steel & Iron Co., Canonsburg, Pa., has arranged for the immediate resumption of operations at its plant, following an adjustment in wages with employees. About 400 operatives will be employed. The plant has been closed since last spring.

The Progressive Mfg. Co., Torrington, Conn., screws and bolts, heretofore operating on a four-day weekly schedule, has gone on a five-day week.

The Whitney Blake Wire Co., Hamden, Conn., is operating with a day force working 49 hours per week, and a night shift, 50 hours.

Gray Iron Castings from Electric Furnace

Displacing the Cupola—Present Electric Practice and Some of the Advantages Over the Older Method—Comparative Cost

BY THOMAS ROBSON HAY

ONE of the significant industrial developments of the Great War has been the greatly increased usage of the electric furnace for producing high-grade steels requiring precision in analysis and physical properties of surpassing excellence. When the electric furnace is spoken of one usually thinks of it as a substitute for the crucible, the converter, or the open-hearth furnace in the manufacture of high-grade steels. And yet the production of gray iron, to mention only one other application, is one to which the electric furnace is peculiarly adapted both because of its design and its operating characteristics.

In the past the cupola has been the only satisfactory apparatus for producing gray iron and, as initially with the steel making industry, the gray iron foundryman reluctantly and unwillingly turns his back on an old and tried method to take up one that is new and strange. The reluctance in taking up and utilizing this new means of gray iron production is due largely to the low first cost of the cupola and low melting costs per heat rather than per ton of metal in the ladle. It is also due to the familiarity of the foundryman with the cupola and its operation, and furthermore to the fact that the demand for a higher grade of gray iron castings is a relatively recent development.

Under ordinary conditions the conversion cost of steel in the electric furnace is somewhat higher than the cupola-converter or open-hearth costs. The savings effected are due to the difference in the costs of materials charged into the electric furnace as compared with the other types mentioned. By the term conversion cost is meant the charges for labor, refractories and fuel. This will include all charges for labor and material, with the exception of that material which goes into the furnace in the shape of the raw material and comes out as iron or steel.

Electric Furnace Replacing Cupola

The electric furnace is steadily replacing the cupola, or supplementing it, in the production of gray iron chiefly, first, because of a demand for a much superior grade of output than the cupola is capable of producing and, second, because of the excessively high cost and uncertainty of supply of the ordinary grades of foundry pig. Experience has proved that, where reasonable rates for electric power prevail, say 2c. to 2½c. per kw. hr., it is possible and economically practicable to produce gray iron, ton for ton in the ladle, more cheaply in the electric furnace than is the case with the cupola. And this ladle cost does not take into consideration the greatly superior metal that is produced in the electric furnace.

The changed conditions of industry that have come about in the last five years have been related to and have affected the iron and steel industry just as truly as has been the case with other lines of industrial endeavor, and it goes without saying that those who realize this fact and act on the knowledge of it will surely be rewarded for their progressiveness and foresight. The costs of pig iron, coke and labor, the principal items in the cost of cupola iron, have increased enormously. High freight rates, which largely account for the high prices of the first two items, show little tendency to become lower. The demand for high-grade gray iron castings is increasing rather than diminishing, which, when added to the more intense competitive situation which confronts the gray iron foundryman, requires that he seek out and utilize the most up-to-date methods and practices.

By investigating and, where conditions permit, utilizing the electric furnace method of producing gray iron, the foundryman will not only be able to successfully meet this competitive condition, but will, with proper application and operation, be able to increase his net return, because of the superiority of his product and the greater ease with which it can be sold.

The matter of favorable production costs is of primary interest not only because such a condition means satisfactory returns from the marketed product, but also because it spells continuity of operation. More than one foundry can be referred to where high-grade soft gray iron castings are regularly produced from a charge of light steel turnings and with less melting loss, lower production cost and a higher percentage of perfect castings than is possible with the cupola charged in the usual manner with heavy machinery scrap and pig iron.

Gray Iron Electric Practice

In the electric furnace process for making gray iron, the metal is charged by hand or by means of a mechanically operated charging device, which is capable of delivering the charge directly onto a clean hearth. No heat generating fuel is added. The charge comes in contact with no sulphur impregnated coke or foreign matter other than the refractory lining and the pure carbon or graphite electrodes. No air blast is employed and, in fact, the furnace is made practically air-tight. It is obvious therefore that the metal can absorb no impurities because none are present in the charge other than those actually in the metal when it is placed in the furnace. Furthermore, another decided advantage of the electric furnace process is that certain of the impurities and undesirable elements, such as sulphur, phosphorus, obnoxious gases, oxides, slags, etc., that are present in the unrefined metal, when heated, can be readily worked out of the molten charge and such elements as carbon, silicon, manganese, etc., can be either added or removed, at the discretion of the operator. Such procedure is not readily possible in cupola operation and then only at the expense of other desirable characteristics that are required in the finished product.

Having, in a general way, considered the means, the methods and the processes, the question naturally arises as to what are the characteristic advantages and superiorities of gray iron produced in the electric furnace.

Advantages of Electric Gray Iron

Foundry practice has demonstrated that carbon is taken up more rapidly by a molten bath of steel (low in carbon) than by molten iron (high in carbon). On the other hand, a rather high silicon content is very essential in gray iron because it has the property of changing the combined carbon into graphitic carbon, thereby producing a casting of a fine grained gray color, which is readily machined. This permits of charging the electric furnace with a less expensive

metal, low in silicon. The carbon content can be readily adjusted in the bath and the essential silicon content can be obtained just before tapping. Such procedure cannot be followed in cupola practice and the makeshift of charging the more costly high silicon pig is the only alternative. The metal must be cast as it comes from the cupola and no opportunity is afforded to correct any undesirable conditions in analysis.

In many gray iron foundry operations attempts have been made to counteract the evil effects of too much sulphur by copious additions of ferromanganese to the cupola charge. Manganese undoubtedly neutralizes sulphur to some extent, but very little of it ever reaches the metal in the cupola hearth because it is unable to withstand the oxidizing influences of the furnace blast. In contrast to this, ferroalloys, of any nature and whenever desired, may be added in the reducing atmosphere of the electric furnace bath with the positive assurance that very little, if any, alloy will be lost by volatilization or oxidation. The absence of air in the electric furnace, that is, the reducing condition, prevents oxidation and retains the volatile elements in the bath. It is seldom necessary to add more manganese than is contained in the material charged. Unless some very special grade of iron is being produced, the silicon content and the temperature are the only features of operation that require attention, and these characteristics can be determined at any time during the heat by simply taking a spoon test and examining the sample when fractured. Gray iron castings, produced in the electric furnace, are, when properly made, universally soft, fine grained, uniform, and free from blow holes and slag.

It is often difficult to get cupola iron hot enough for pouring small, light or thin section castings without running the phosphorus content excessively high. Another limitation of the cupola is that the metal begins to cool as soon as it drops onto the hearth. This requires that the metal must be tapped before it becomes too dull for pouring into the molds. In case of delays in preparing to take the metal when it is ready for tapping the heat cannot be held long in the ladle. It must be taken out and pigged or otherwise be disposed of. Often, when the iron cannot be got sufficiently hot in the cupola to make it run rapidly and freely, high phosphorus pig is used. The phosphorus makes the metal more fluid, but it tends to produce "cold shortness," or brittleness, and to weaken the castings when taken from the molds. Such cupola gray iron is frequently used in the manufacture of stove plate and other light castings, the weakness of which is well known.

Regulating the Temperature

In marked contrast to these well known difficulties, the electric furnace process permits of the variation of the temperature of the bath at will or allows it to be kept constant, if necessary, for several hours. The metal produced in this manner can be poured at temperatures considerably in excess of any temperatures that can be obtained in the best cupola installations. In fact, iron containing only a trace of phosphorus can be rendered extremely fluid by the use of the electric furnace and can be poured into the smallest and thinnest section castings produced in the best modern foundries.

The electric furnace is easily adapted to foundry operations and lay-outs. It is tapped in the same manner as the cupola or, if on trunnions, it can be tilted by either hand or motor control, thus entirely emptying the hearth after each heat. It is more easily and accurately charged as the charge, measured accurately when necessary, is simply shoveled through the charging door at the side of the furnace, or it can be crane-handled onto a special chute, which dumps into the furnace. The heats can come quickly, thus requiring less floor space for molds, and repair and maintenance can be accomplished in minimum time and at minimum expense.

If a rapid melting type of electric furnace is used, power, electrode and refractory economies result which are reflected in the production costs. The fire hazard is reduced, with accompanying lower insurance charges; no great amount of yard space and capital is tied up in the storage of large amounts of pig iron and coke which are required for successful and economic cupola operation; and the plant need never be shut down for lack of raw materials, as the iron scrap required can usually be trucked from a nearby source, until railroad shipments arrive.

Actual production results indicate better gray iron castings from the electric furnace than from the cupola. They have a definite, predetermined analysis and uniform properties and, in the great majority of cases, the ladle cost is lower than is the case with cupola iron.

Characteristic Electric Iron Products

Some of the characteristic gray iron products that may be successfully and economically obtained in the electric furnace are high temperature and pressure pipe fittings; strong, long-wearing pistons and piston rings; and gas, oil and steam engine parts, subject to great wear and stress.

The competition met with by the gray iron founder is not only that of his neighbor, producing cheaper and better irons, but comes also from the steel founder who has encroached more and more on him, due to the gradual substitution of steel castings for gray iron. Steel with its greater strength, durability, and varied properties has taken the place of many parts heretofore made of ordinary cupola iron. The result has been that the gray iron founder, instead of attempting to improve his product, has turned to the manufacture of steel castings in an effort to hold his business. The electric furnace offers a ready and easy means of holding this business in competition with the steel founder, while at the same time continuing in the manufacture of high-grade, competitive gray iron.

A study of the heat treatment of cast non-ferrous alloys is to be made by the United States Bureau of Mines at the Pittsburgh, Pa., Experiment Station. It is proposed to study the annealing of cast non-ferrous alloys for the release of casting strains and the improvement of physical properties. The investigation, which will have special reference to aluminum, will be conducted under a cooperative agreement with a commercial firm. Work on the investigation will be under the supervision of R. J. Anderson, metallurgist Bureau of Mines.

Benjamin L. Whitney, formerly with the Byers Co., has opened an office at 528 Detroit Savings Bank Building, Detroit, and will represent the Orton & Steinbrenner Co., manufacturer of material handling machinery in that territory.

COMING MEETINGS

November

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

American Iron and Steel Institute. Nov. 18. Fall meeting, Commodore Hotel, New York. H. H. Cook assistant secretary, 61 Broadway, New York.

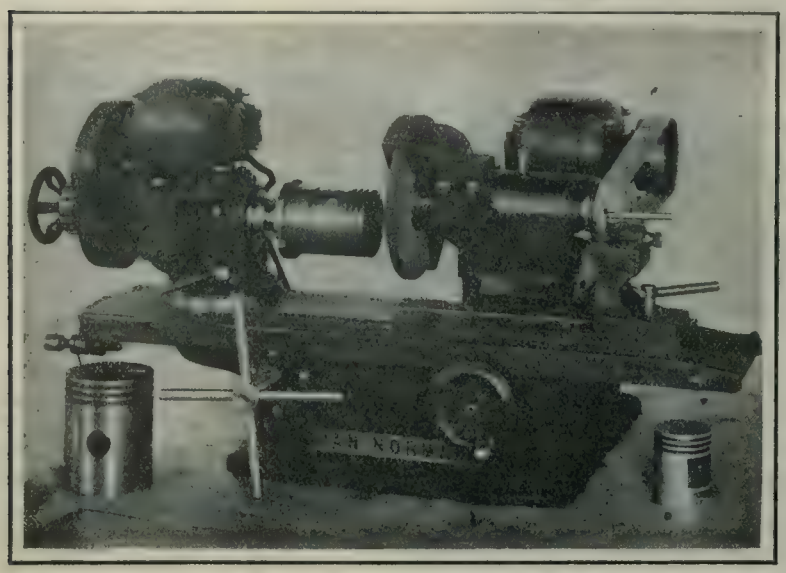
December

Taylor Society. Dec. 1, 2 and 3. Annual meeting, Engineering Societies Building, New York. Dr. H. S. Person, managing director, 29 West Thirty-ninth Street, New York.

American Society of Mechanical Engineers. Dec. 4 to 9, inc. Annual meeting, Engineering Societies Building, New York. Calvin W. Rice, secretary, 29 West Thirty-ninth Street, New York.

New Piston Grinding Machine

A utility tool, primarily for the garage, repair shop and service station, and known as the Van Norman Relio, has been placed on the market by the Van Norman Machine Tool Co., Springfield, Mass. The new tool is especially adapted for grinding pistons, valves, wrist pins and for regrooving pistons, as well as any other internal or external grinding or turning operations within the capacity of the machine. In general design, special attention is said to have been given to compactness and rigidity and to elimination of vibration, with handy appliances for setting and convenience of operation.



In Grinding Wrist Pins the Work Is Held Between Centers and Rotated by a Key or Pin Inserted in the Work-Head Center. In this case provision is made for holding a diamond truing tool on the tail stock

Among the features emphasized by the makers are: a ball-bearing head constructed in accordance with the principles employed on other Van Norman grinding machines; individual motor drive for both the work and the wheel head; and the arrangement of the work-head spindle to run in a taper bearing with ample provision for take up due to wear. Still other features are: adjustable stops for limiting the travel of the table; arrangement whereby the work head may be swiveled and set at any angle from 0 to 50 deg., locating holes being provided for 0, 30 and 45 deg. to enable same setting in grinding valves and reamers; and a quick and accurate method of holding pistons for grinding.

The workhead swing is 8 in. diameter, the distance between centers, 12 in. and the travel of the work table, 10½ in. The collet has a draw-in capacity of ¾ in. The motor on the work head is ⅛ hp. and is geared down on slow speed to a ratio of 20 to 1. The low speed of the work head is 63 r.p.m., and the high speed, 170 r.p.m. The motor on the wheel head is ¼ hp., and the wheel spindle has a speed of 2800 r.p.m. Power is obtained by connecting the machine with an ordinary electric light socket.

The machine shown in the illustration weighs 330 lb. and occupies a space of 3 x 4 ft. Provision is made in the base for bolting to a bench or stand. The regular equipment includes one 8 x ½ in. and one 1 x ¼ in. abrasive wheel; one internal wheel spindle nose; one ⅜ in. split collet; one collet draw-in spindle; one face plate; one piston adaptor plate and draw bar; one 45 deg. valve reseating reamer; a set of wrenches; a tool holder and a double valve seater.

In a survey of 30 industrial plants in Buffalo which in normal times employ 40,000 workers, 26,750 employees were listed in October as being steadily employed. The most encouraging sign of improvement generally was noticed in the iron and steel industry where the improvement is placed at 7 per cent in October over the preceding month. Building trades showed this industry still leads in employment.

Fuel Economy in Iron and Steel Works

In a paper read before a meeting of the associations of the managers and foremen of the firms of John Brown & Co., Ltd., and Thomas Firth & Sons, Ltd., in England, Capt. H. C. Armstrong had the following to say on fuel economy in iron and steel works:

In all questions of efficiency in metallurgical furnaces there is an outstanding need for much further data with regard to the thermal measurements, which must serve as an effective aid to the task of tracking down the elusive heat units. Experiments on the losses of heat by radiation and conduction of various materials should be made, and constant tests made of the temperature and composition of the flue gases. Lighting up before time and having too large a fire at the end of the task should be watched, as economy can be effected here.

The boiler firer naturally shies at the mention of CO_2 recorders as something beyond his ken, but as many as possible should be fitted to any boiler plant. There are now reliable self-recording instruments available, and the men would soon learn to look upon them as friends; if necessary even a bonus system could be worked on it. Few such recorders are used in the large works, yet practically all the electric power stations use them and keep careful records. When it is considered that to increase the CO_2 in the flue gases from 7 to 44 per cent effects a 15 per cent saving in fuel, the necessity of scientific control is surely obvious. Water meters to enable the boiler efficiency to be checked should be installed, so that haphazard and usually entirely optimistic guesses can no longer be made. Colliery engineers are perhaps the biggest delinquents in the boiler world. They must be made to realize that because coal is so handy it is not to be abused in its use.

Referring to the figures mentioned above, the comparison between a mill served by modern coal-fired, continuous furnaces and one of much older date, with ordinary hand-charged open-grate furnaces, is very striking. Over a fairly long period the coal consumption has been reduced to 2.02 cwt. per ton throughout as against a minimum of 8 cwt. in the case of the old-type furnaces. This is most significant. Over the period mentioned above a spring mill has reduced its consumption figure from over 5 cwt. to 4 cwt. and under. A tire shop has improved from 18 cwt. to 8 cwt., partially explained by a larger output, but this all the more shows the waste of heat that was going on.

With such figures as 10-12 cwt. for forging furnaces, and 11 cwt. in the case of Siemens producers, there remains a great deal to be done. Three press shops working on (*a*) no waste heat, (*b*) partial waste heat, and (*c*) nearly all waste heat, give consumption figures of 6, 4 and 1.7 cwt. respectively. This shows the advantage of waste-heat boilers. An average saving of 1 cwt. per ton of output in our works would mean about 7 per cent less coal burnt, or, in round figures, say 10,000 tons of coal saved per works per annum. That this could be done is quite possible, and no Utopian dream.

It is of interest to take the ratio of steam coal used to total coal used for all purposes on the works. This is a very constant figure, but in our case the ratio has been gradually improved from 0.415 to 0.370, with a quick return to 0.434 for the month of November. The improvement is due to greater care of the boiler department until the last month, when with several reheating furnaces shut down more steam was probably being produced than was really required.

The Milwaukee Auto Engine & Supply Co., Milwaukee, has changed its name to the Milwaukee Motor Products, Inc.

SUPERPOWER REPORT

Scheme for Consolidating Generation of Electric Power in Region Between Boston and Washington

Secretary of the Interior Fall transmitted to the President on Nov. 5 the completed report of what has been popularly called the superpower survey. This is an engineering study conducted by the United States Geological Survey to ascertain the possible fuel saving from the connecting in the Boston-Washington region of all the large generating plants—both steam and water power—in one great system. Looking ahead to 1930, with the increased demand for power that can then be reasonably expected, the total coal saved annually under the unified system is estimated at 50 million tons. Under motor operation the industries could save $190,000,000 annually in their power bill and could make a greater output of product. W. S. Murray, New York, was chief of the engineering staff. An advisory board of business men representing the railroads and industries gave practical value to the completed report, which is now published by the United States Geological Survey as professional paper 123.

The North Atlantic coast region was selected for this study because its industries and railroads have the maximum requirements for power. Economy of investment and economy of operation are the two ends sought by this plan, the outstanding feature of which is a network of inter-connecting transmission lines. Interconnection will mean 970 miles of 220,000-volt lines and five times that mileage of 110,000-volt lines. With these major lines, the 1200 miles of lines now operated at 33,000 volts or more will become simply distribution lines for the local public utilities. The area includes only 2 per cent of the United States but contains 22 per cent of the total population. The region contains 96,000 manufacturing establishments, 76,000 of which used power in 1919 to the amount of more than 12½ billion kilowatt hours. Nearly three-fourths of this power was generated by the industries themselves, largely in units of small capacity, with low efficiency as compared with the large units of the central stations of the electric public utilities. So it has been found that most manufacturing plants in this region economically purchase power, and if they had purchased it in 1919 they would have saved 13½ million tons of coal.

The report is replete with charts and tables, and further consideration will have to be postponed for a later issue. Besides the large section devoted to the analysis of power requirements of industries, there are sections covering electric utilities, electrification of heavy traction railroads and the cost of the system, including special studies of steam electric plants and hydro-electric plants.

Other Reductions Pending

CHICAGO, Nov. 7.—Numerous proposed changes in rates, rules and regulations, approved by Western lines but subject to concurrence of Eastern railroads, have been announced here by the Transcontinental Freight Bureau. The changes will not be effective until lawfully published and the probable effective date was not announced.

The changes include an extensive revision of import and export rates via Pacific ports.

It also is proposed to cancel rates on intoxicating liquors, including "high wines" and "spirits pure" and certain others.

The following rates on iron and steel rails, westbound for export in 80,000-lb. minimum carload lots, were ordered published:

From Chicago and West: $13.44 a gross ton; with the same rate prevailing from the "Birmingham district" and from Minnequa, Col. From "rate basis one points," $15.46 a gross ton.

Rates on iron and steel articles, carload lots, westbound for export, were amended as follows: From Chicago and West and from the Birmingham district, 60c. per 100 lb.; from Pittsburgh, 69c. per 100 lb., and from Minnequa, Col., 46c. per 100 lb.

Increase in Labor Cost in British Iron and Steel Works

In an editorial on industrial costs, the *Iron and Coal Trades Review*, London, publishes figures showing the part which wage schedules have had in pushing up the prices of pig iron and finished steel, as well as prices of the main materials from which they are made. The figures are given in the table below, together with the percentage of advance between 1913 and 1920. It must be remembered that this percentage would be lower, if account were taken of the gold value of the 1920 figures.

Average Wages Cost Per Ton

Shillings	1913	1920	Per Cent Increase
Ironstone (ore)	2.26	8.375	271
Coal	6.325	22.883	262
Limestone	1.283	4.51	252
Coke	13.067	50.73	288
Pig iron	29.84	123.825	326
Steel	68.42	296.55	333

While these figures were drawn from a single concern (Bolckow, Vaughan & Co., Ltd.), they indicate averages over entire years, and hence may be regarded as fairly representative. Figures for the total cost of producing a ton of steel are also given, which makes it possible to compare the rate of advance in direct labor cost with the rate of increase in all other items.

Shillings	1913	1920	Per Cent Increase
Total cost per ton	110.26	363.26	229
Labor cost per ton	68.42	296.55	333
Other costs per ton	41.84	66.71	59

Safety Cleaning Machine

A machine designed to do away with the bucket-and-brush method of cleaning ball-bearings, drills, milling cutters and other small tools and parts has been developed by the Black & Decker Mfg. Co., Baltimore.

It consists of a cast-iron pedestal with a bowl, 13 in. in diameter and about 12 in. deep, at the top. About 5 in. from the bottom of the bowl a fine mesh brass screen is supported. A plunger pump is cast integral with the bowl at one side, as shown in the illustration, and the bowl provided with a safety cover, arranged so that it cannot be left open. The cover is controlled by a handle which operates the plunger pump when the cover is lifted.



The Bowl Has a Safety Cover Which Cannot Be Left Open

A gallon of gasoline or other cleaning liquid is poured into the bowl and the operation of the plunger pump forces a stream of this fluid from one side into the center of the bowl. It passes through the screen and returns to the sump so that the liquid may be used over and over again. The part to be cleaned is held under the stream, which washes the dirt and chips from the part and deposits it on the screen below.

American Merchant Marine

Vigorous Policy Will Be Followed By the National Administration

WASHINGTON, Nov. 8—That the present Administration and Shipping Board are determined to employ every legitimate means to establish an American merchant marine is made evident by the official announcement from the board that reorganization plans have been completed and the board from now on will function as provided by the Jones act. It will be recalled that the Wilson administration declined to put into effect that section of the Jones law which auhorizes the abrogation of certain treaties in order to permit the establishment of preferential railroad rates on products that are to be carriel in American bottoms. As is usual with legislation of this kind, and particularly where it relates to attempts to build up an American merchant marine, this clause was the object of many protests, coming from certain interests within the United States and from foreign countries. The customary claims of discrimination and the violation of good faith were made, along with the hackneyed plea that such action would endanger international relations and bring about retaliation. These claims have been accepted as being disingenuous, made particularly so in view of the world-wide discriminations through various forms against American shipping.

It is desired by the Shipping Board to thoroughly arouse the country in all its aspects, including agricultural, industrial and finincial, to the vital necessity of establishing a permanent, privately owned American merchant marine and to get assistance from these sources to overcome obstacles that may stand in the way of such an achievement. The Jones act undoubtedly goes a long way in its direction and now that it is to be put fully into effect, it is believed that it will be an instrument that will give vigor to an American merchant marine. At the same time, there are, of course, obstacles such as the higher cost of operating American ships, some of them brought about by the LaFollette seaman's act, and this and related subjects are to be made a matter of study.

The Bureau of Construction will be under Commissioner William S. Benson. His duties will be to study the relative cost of shipbuilding at home and abroad, particularly the cost of building the most efficient types. Commissioner George E. Chamberlain will have charge of the Bureau of Law. Commissioner Lissner will head the Bureau of Research. He will conduct studies, and gather data pertaining to various activities in which the United States Shipping Board would be affected or interested.

CANADIAN ORDER HELD UP

Buyers in That Country Protest Against Ruling of Minister of Customs

TORONTO, Nov. 7.—The order of the Minister of Customs and Inland Revenue to the customs officers of Canada to appraise importation of basic steel products at not less than the values given in THE IRON AGE has been temporarily rescinded pending a further discussion of the subject. The regulation, as announced, was printed in THE IRON AGE of Nov. 3, page 1159.

Canadian buyers of steel are said to have entered a strong protest against the order. The alleged refusal of a few American mills to permit the Canadian customs authorities to examine their cost sheets was the incident that led up to the issuance of the order.

Representatives of American mills say that there has been no "dumping" of steel into Canada and that sales in that country have been made at prices which are no lower than those at which sales have been made in the United States.

The Canadian customs act, which was adopted June 4, 1921, gave the Minister of Customs the arbitrary power of stating what profit a foreign company may make on its goods, irrespective of what the home consumption price may be, and irrespective of whether the same goods are made in Canada or not.

Profits are defined as the ordinary profits which the exporter has been in the habit of making in the usual course of business on the particular article exported.

Where the Minister of Customs decides that the exporter of steel or other goods into Canada is not making enough profit, the Canadian purchaser must pay the Canadian Government the full amount of any additional profits which the minister may ask for, plus the full amount of the American exchange on the increase, and also the regular duty and excise tax, figured in the usual way on the total of the amount set by the minister, and exchange.

The Canadian Government waits until the importation of goods into Canada actually occurs, following which it sends its inspector to the manufacturer to examine his books to determine what profit he is making. The inspector brings this information back to Ottawa and the Canadian importer is afterward notified as to what he shall have to pay.

In times of normal demand, the Canadian steel mills fall short by about 1,000,000 tons of steel a year of meeting the Canadian home consumption demand, and most, if not all, of this has been imported from the United States. The practice of the Canadian mills has been to make prices which would just meet the United States prices, plus freight, duty and other charges involved in shipment into Canada. Lately the mills in the United States have made very low prices, which, however, are stated to be no lower than have prevailed on similar business in the States.

Drafting Aids to Manufacturers

In Springfield, Mass., a new departure in supplying draftsmen to manufacturing concerns has been under way since Jan. 1. The Engineering School of Drawing has been taking young men with practical mechanical or shop experience and teaching them to put properly on paper the necessary features of the design of a machine or mechanism. These men are then at the call of manufacturers, for temporary or permanent assignments, for supplementing an overloaded force or for developing a new idea or construction. The individuals are selected for such service by the head of the school, on the basis of the stated needs of the manufacturer and the observed capacities of the men available.

Lower Rates on Imported Manganese and Chrome Ores

WASHINGTON, Nov. 8.—Recent reductions in freight rates in official classification territory on iron ore have prompted a lowering of the rates on imported manganese and chrome ore to the same territory from all Atlantic ports, to become effective Nov. 15. The decrease will be approximately 25 per cent. Special permission to reduce the rates on 15 days' notice has been granted by the Interstate Commerce Commission to W. S. Curlett, A. P. Gilbert and N. W. Hawkes, tariff publishing agents.

At present the rates on imported and domestic manganese and chrome ore are the same. The differential in favor of imported ores beginning Nov. 15, therefore, will be about 25 per cent, but none of the reduced rates are to be lower than those established on iron ore.

The following table shows typical rates to be applied from Baltimore, Norfolk and other Virginia points, Boston and New York and Philadelphia per gross ton:

	Baltimore	Norfolk and Other Virginia Points	Boston and New York	Philadelphia
Sixty per cent points (Pittsburgh district)	$2.52	$3.46	$3.12	$2.72
Seventy per cent points (Stewart, O., district)	3.04	3.46	3.64	3.24
One hundred per cent points (Chicago district)	4.60	4.60	5.20	4.80

MODERATE BUYING

Valley Consumers Pretty Well Covered for This Year's Requirements

YOUNGSTOWN, OHIO, Nov. 8.—Buying of steel products is on a more moderate scale with the principal Valley independents, due in measure to the fact that consumers are largely covered on their requirements for the rest of the year. Interest is therefore directed toward 1922 and the prices which will be developed during the first quarter and the first half. Independent tin plate makers are on the $4.75 level definitely established last week by the reduction of the American Sheet & Tin Plate Co. on production plate. Prices generally reflect the weakening tendencies of the market, with the exception of wire products and nails. The Youngstown Sheet & Tube Co., principal independent maker in this territory, has finally established the higher levels of $2.60 for plain wire and $2.90 for nails, to which the American Steel & Wire Co. advanced Sept. 12. Independents which failed to follow the advance in wire products at that time have been accepting tonnage in the meantime under blanket contracts, permitting jobbers and manufacturers to order at the lower levels.

Weakness in Sheets

Lacking the support of the leading interest, the recent $5 advance per ton in black and galvanized sheets has failed to show strength, and it is common knowledge that tonnage is moving on the basis of 3c. for common sheets and 4c. for galvanized. Blue annealed sheets are quotable from 2.25c. to 2.50c., with moderate tonnages moving. A number of district interests exporting through the Consolidated Steel Corporation have been rolling lighter gages of black sheets, particularly to 30 gage, for consumers in Japan. In spite of failure of the attempt to establish quotations at 3.25c. and 4.25c., makers are much encouraged over the volume of buying which is being done and predict it will not be long until the higher levels find an actual basis in transactions. Galvanized grades continue in fairly active demand, while black sheets are being absorbed by manufacturers for all sorts of uses. The automobile industry continues to be a heavy buyer of both black and full finished sheets, as well as of strip steel, inasmuch as stocks of some large makers were unbalanced and in some instances largely depleted.

Plates for Cars

One of the most important transactions in plates involved placement of 10,000 tons of plates and angles with an Eastern producer by a fabricating plant in the Shenango Valley, the material to be used in manufacture of tank cars. It is understood the business went to the Cambria Steel Co. at a price considerably below the nominal quotation of 1.75c. by Valley interests. Quotations on plates range down to 1.60c. The chief district maker is shipping lighter gages to a car repair interest at Niles, against car repair contracts which it is filling. Another Valley plate maker states that it could not enter the market and produce plates at current costs below 2c., and its plate departmen is therefore obliged to remain inactive.

Makers of strips are endeavoring to establish the current quotations of 2.25c. on hot rolled and 4c. on cold strip on 1922 business. Most of the tonnage shipped during the remainder of the year was accepted prior to the recent $5 per ton advance. It is reported that the increase has had the effect of stimulating specifications against contracts at the old figures. One district strip producer has added a number of substantial customers within the past two months who promise to take in the aggregate considerable tonnage as conditions approach closer to normal.

Little Activity in Pig Iron

Current activity in pig iron is exceedingly limited, though a number of inquiries for first quarter delivery in 1922 are before steel works interests, with large accumulations. The market has settled to $19 for standard basic and $20 for Bessemer. Steel-making demands of district independents have generally been insufficient as yet to warrant operation of additional furnaces, though surplus stocks have been largely reduced in some cases.

One of the bright spots in the finished market is the sustained demand for merchant pipe, which is moving in steady tonnages for construction enterprises. Very little business in lapweld sizes is coming through and the market is far from normal. Makers are unable to give delivery under two to three weeks on certain sizes of standard pipe.

Though the tin plate price has declined $5, buying continued on a sustained basis, the best indication of the situation being found in the enlarged production of independents. It is indicated that a number of interests, which professed to have maintained a $5 price and a $5.25 quotation, were actually accepting business at $4.75, and were thereby getting tonnage that might otherwise have gone to the leading maker. Some tonnage in tin plate is understood to have been taken on this basis for 1922 delivery.

Iron and Steel Bars

Iron and steel bar buying is very limited and confined to actual needs. Producers are endeavoring to uphold a price of 1.65c. base, but have scarcely been successful in the attempt. An index of the weakness of the market is found in the average selling price of 1.70c. by mid-Western makers for the 60 days covered by the last bimonthly settlement. To establish the average, bars have evidently sold below this level and have been weaker, if anything, since the 60-day period ended.

In ferroalloys, the principal purchase of recent date involved several hundred tons of spiegeleisen taken by a steelworks interest in the Valley at $30, delivered. The best bid which buyers have been able to obtain in the last two weeks on 80 per cent ferromanganese is $58.35 at seaboard, for imported material. Domestic producers have offered to meet this figure. Buyers are holding out, though, for a price of $60, delivered, which governed a purchase several months ago. The offered price would amount to $64.40 delivered. Spelter has eased off and is moving at 4.55c., about 20c. down from the recent peak.

The old material market is inactive as consumers' requirements have been largely filled for several months. The market continues around $15 for heavy melting scrap and $12.50 for hydraulically compressed.

The only activity in semifinished material is confined to open-hearth sheet bars, which are moving under contract largely at $30, though it is unlikely new business would be accepted under $32.

Manganese Ore from Chile

WASHINGTON, Nov. 8.—Because of its high grade and the reduced ocean freight rates, according to Edwin Salz, American consular agent at Coquimbo, Chile, manganese ore from that country could be extracted and shipped to the United States in normal times with a good margin of profit. There is no export tax on this ore but mine owners must pay "patents" or license to operate every year, usually an insignificant amount. The most important deposits are at Marquesa, Tres Cruces, Corral Quemada and near the port of Carrizal Bajo. The approximate cost of manganese ores from the deposits at Marquesa, which are situated on the railroad into the Elqui Valley, 36 kilometers from Coquimbo, and Tres Cruces, situated on the longitudinal railroad 126 miles to the north of Coquimbo, is 35 to 40 pesos per ton, or about $3.50 to $4, United States currency at the present rate of exchange. The method of extracting the ores is most crude and if machinery and motor trucks were used costs would be materially reduced, it is stated. The grade of Chilean manganese exported in recent years, the report says, gave the following analysis: Manganese, 49, 50, 51 per cent; silica, 8 to 9 per cent; iron, 1 to 2 per cent, and phosphorous, 0.02 per cent (maximum).

Indicator for Powdered Coal Bins

An indicating gage to determine the amount of fuel in pulverized coal bins has been developed by the Quigley Furnace Specialties Co., New York. The indicator, which is placed in convenient reading position, is suspended by a chain and rod from a sheave, which may



Front View of a Fuel Bin at Works of Newport Rolling Mill Co., Showing the Fuel Gage Installed. Indicator board is shown at A and the sheave and support at B just above the girder in front of fuel bin. Switching valve for delivery of fuel to bin through collector is indicated by C. Both valve and gage are operated from the floor

be either supported from the bin by a suitable stand or suspended from overhead.

The operator lifts the heavy metal so-called float of the gage by pulling down the rod and then by lowering it "feels" the fuel level, the quantity of fuel required to fill the bin being shown on the indicator board. The gages are used in the plants of the Newport Rolling Mill Co., Otis Steel Co., the Falcon Steel Co., Inland Steel Co. and the Knoxville Iron Works.

Inquiry as to Coal Stocks

WASHINGTON, Nov. 7.—Many consumers of bituminous coal throughout the country have received a questionnaire from the Government at Washington, inquiring as to their stocks of coal on Nov. 1.

The purpose of the questionnaire is to find out how much coal is on hand as the country enters the winter, in order that consumers and producers alike may make intelligent plans. The Geological Survey's weekly coal report shows that soft coal production up to Oct. 1 was 112,000,000 tons behind last year, and from 75,000,000 to 90,000,000 tons behind normal. The decrease is in part to be expected, because of a decline in consumption and in exports, and it does not necessarily mean that consumers are unwisely burning up their reserves. But if there is any possibility that the above-ground reserves are below the safety line, the best way to settle the point, the Government thinks, is to take account of stock and lay all the facts before the public.

Secretary of Commerce Hoover, in particular, believes the information is necessary "in view," as he says, "of the disturbance to the coal trade that may eventuate with the renewal of the coal miners' biennial working agreement at the end of March."

It is hoped to complete the canvass and publish a preliminary report within 30 days and manufacturers are being urged to reply promptly to the questionnaire.

More Steel Workers at Work

WASHINGTON, Nov. 5.—Employment in the iron and steel industry for October showed an increase of 16,224, or 5.1 per cent, over September, according to the industrial survey of the United States Employment Service. This was more than half of the total increase of 30,772, in the 11 industries reporting greater employment, and an excess over the total net increase of 15,626 (1.01 per cent) on the pay rolls of 1,428 firms in October, when compared with September.

Industrial classifications showing increases were iron and steel, lumber, leather, liquors, chemicals, stone, clay and glass, metal and metal products other than iron and steel, tobacco and railroad repair shops. Industries which showed a decrease are paper and printing, vehicles for land transportation and miscellaneous lines. The employment in the iron and steel industry in October constituted 21.2 per cent of the total number of employees engaged in the 11 industries which reflected increases, and was greater than that of any other single line.

Youngstown showed the greatest percentage of increase in employment of all of the 65 cities reporting, amounting to 23.3 per cent, or 5,354 in number of employees. The increase in Pittsburgh was 8.8 per cent, or 5,723 employees. Other increases were in Johnstown, Pa., 6.7 per cent, or 743 employees; Birmingham, Ala., 5.2 per cent, or 1,153 employees; New York, 1.6 per cent, or 2,302 employees; Philadelphia, 1.5 per cent, or 1,521 employees. Cleveland showed a decrease of 2.5 per cent, or 1,422 employees.

Increases in employment in railroad repair shops amounted to 6.19 per cent, or 4,051 employees; while in metal and metal products, other than iron and steel, the increase was 2.16 per cent, or 1,156 employees.

Lake Superior Iron Ore Shipments in October

Shipments of iron ore from Lake Superior in October were 3,233,081 gross tons as compared with 8,848,986 tons in October, 1920. This is a decrease of 5,615,905 tons or 63.46 per cent. The season's shipments to Nov. 1, this year, have been 21,894,275 tons as against 53,122,342 tons to Nov. 1, 1920, a decrease of 31,228,067 tons or 58.78 per cent. The following table gives the October and season shipments by ports and the corresponding figures for 1920, in gross tons:

	October		To Nov. 1	
	1920	1921	1920	1921
Escanaba	1,030,683	405,554	6,514,327	1,719,885
Marquette	482,495	259,491	3,117,097	719,293
Ashland	1,260,162	335,180	7,447,197	2,183,108
Superior	2,274,801	655,915	13,566,737	4,833,413
Duluth	2,432,465	1,188,926	14,089,331	9,164,803
Two Harbors	1,368,380	388,015	8,387,653	3,273,773
Total	8,848,986	3,233,081	53,122,342	21,894,275
Decrease	.....	5,615,905	.....	31,228,067

The Duluth proportion this year to Nov. 1 of 41.86 per cent was considerably more than a year ago when it was 26.52 per cent of the total. The Great Northern dock at Superior is credited with 20.12 per cent of the total shipments this year against 22.01 per cent last year.

Timken Bearings for Mine Equipment

The Timken Roller Bearing Co., Canton, Ohio, has designed tapered roller bearings for application to mining equipment and signalized the fact by an exhibition which it made in the Coliseum, Chicago, at the time of the meeting in the week of Oct. 17 of the American Mining Congress. Among other things exhibited were mine car axles built by mine car manufacturers and equipped with Timken bearings.

EXPORTS TO BE RECLASSIFIED

Broadening of Scope and Finer Subdivision Are Features of New Arrangement

WASHINGTON, Nov. 8.—Reclassified and made more detailed and specific, the Bureau of Foreign and Domestic Commerce has completed new drafts of its schedules of exports carried in the monthly summary. The change in the form of publishing the figures will become effective in January. Reclassifications of import tables also will be made, after pending tariff legislation is enacted.

The rearrangement and increasing of the export items long has been under consideration, and frequently undertaken, but has never before been completed, for one reason or another. It has now been made in response to appeals from industrial interests of the country, who have desired a more scientific adjustment of the schedules, so that information of greater value might become available.

One means of doing this has been to subdivide general classifications into specific heads, that have been detailed according to the character of product and its special purposes. By co-operating with trade associations, and other organizations interested in the subject, the bureau has developed and enlarged schedules that will provide much greater data, and much more specific information, than the present schedules afford.

Broadly, the new schedules, which come under nine groups, are constructed according to uses and classification, by agricultural or industrial branches, as distinguished from the present system of alphabetical sequence. Indicative of the work of amplification that has been done is the fact that the new classifications show an increase of 70 per cent over the number of the present ones. The export tables now carry approximately 700 items; the new ones will contain about 1200.

Important changes have been made both in the iron and steel and machinery export tables, involving not only subdivisions under heads that now are general, but also the addition of new items. The number of additions to the machinery table is especially large.

Iron and steel products have been placed in group 6 under the general classification of "Ores, Metals and Manufactures of," the purpose being in this, as well as in all other instances, to include under one group all of the items pertaining to it, instead of scattering them miscellaneously through the tables according to alphabetical arrangement. An idea of the adjustment of the new schedule can be obtained by pointing out the more prominent revisions.

"Bars or Rods of Steel" as now carried, is to be subdivided, and gives recognition to the different classes of steel bars through the items "Iron and Mild Steel Bars, not Containing Alloys" and "Steel Bars Containing Alloys." "Iron Sheets and Plates" will now include "Iron and Steel Plates, Sheets, Boiler Plates, not Fabricated." "Structural Iron and Steel," has been subdivided into "Structural Iron and Steel, Fabricated" and "Unfabricated and Ship Plates." "Wrought Pipe" has been changed to "Welded Pipe," and both "Black" and "Galvanized" itemized. "Rails" has been subdivided into "Rails, 50 Pounds per Yard and Over" and "Rails, less than 50 Pounds per Yard." The item "Malleable Iron Fittings" also has been added.

Machinery exports have been removed from the iron and steel classification and placed under main group 7, "Machinery and Vehicles," which includes all classes of machinery, such as agricultural, automobile, aircraft, etc., some of which now are listed separately.

Such items as Diesel and aircraft engines, now included with other engines, are to be carried individually. Generators are to be divided into a number of items, including those relating to transformers, etc. Construction machinery of all kinds is classified, instead of being confined to excavating machinery; and mining machinery is detailed into different kinds, instead of being disposed of under mining machinery and "all other."

Metal working machinery items now number four, while under the new schedule there are 19 items, and textile machinery items have been increased from three to seven. Agricultural machinery items have been increased from eight to 27. Vehicles includes all motive power vehicles, and embraces automobiles, trucks, etc., which in turn have been subdivided by classes.

Decreased Demand for Refractories

PITTSBURGH, Nov. 7.—Demand for refractories still reflects closely conditions in the iron and steel industry. The slowing down in the demand for iron and steel resulting from the fact that the end of the year is in sight, and that buyers also feel they will gain something from a reduction in freight rates, is felt in the recent demand for refractories. Releases against contracts are fewer than they were recently and few new orders of any considerable size have lately been placed. The largest new order, one for 200,000 silica brick for an Eastern steel company, which ordinarily would not occasion a ripple, is regarded with real importance now.

We note no special change in quotations, which are largely nominal, and there continues to be some difference between what is quoted and actually paid. Manufacturers say there is no profit in business taken below quotations, but all of them are not in a position to hold firm against the demands of buyers for lower prices. Plant activities do not increase much.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $37.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		30.00 to 35.00
Chicago		35.00 to 40.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		60.00
Chrome Brick:		
Standard size, per net ton		50.00

Low Bids on Steel for Navy

WASHINGTON, Nov. 8.—Supplemental bids received by the Bureau of Supplies and Accounts, Navy Department, in connection with steel wanted for stock purposes at various yards, develop the fact that on the larger sized lots of plates, the Worth Steel Co., Claymont, Del., quoted a price equivalent to the base of 1.45c., Pittsburgh, and 1.60c. on some of the smaller sizes; the Donner Steel Co. bid the equivalent of 1.50c., base, Pittsburgh, on part of the shape tonnage, and of 1.40c., base, Pittsburgh, on part of the bar tonnage. The Cambria Steel Co., which bid on all of the plate, shape and bar tonnage, quoted from 1.57c. to 1.60c., base, Pittsburgh, on plates; 1.58c. to 1.60c. on shapes and 1.60c. on bars. Among other bids on either all or part of the tonnages, established on the Pittsburgh base equivalents were:

	Plates	Shapes	Bars
Jones & Laughlin Steel Co	1.60c.	1.60c.	1.60c.
Carnegie Steel Co	1.70c.	1.70c.	1.60c.
Bethlehem Steel Co	1.75c.	1.75c.	1.75c.
Central Iron & Steel Co	1.60c.		

Shippers Ask Prompt Rate Cut

A recent exchange of telegrams between W. H. Chandler, president of the National Industrial Traffic League and T. DeWitt Cyler, chairman of the Association of Railway Executives, indicates that the matter of further wage and rate reductions is still alive, notwithstanding the intimation of the Railroad Labor Board that another adjustment in wages is not in immediate prospect. In his telegram, Mr. Chandler pointed out that shippers and the public generally expect the carriers to make application for concurrent wage and rate cuts as quickly as compliance with provisions of the transportation act will permit. Mr. Cyler's reply intimates that applications for reduced wages are being made and that it is also the intention of his association to confer with the Interstate Commerce Commission as to further reductions in rates at the earliest date possible.

Reinforcing Steel for Road Use

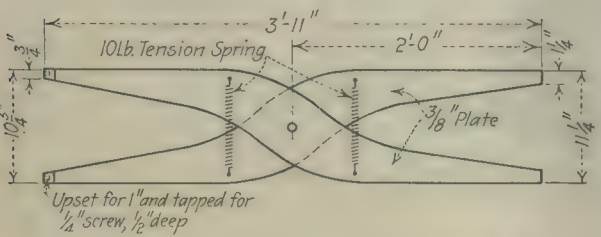
Test Highway Built by Columbia Steel Co. to Study Methods of Reinforcement —Special Device for Laying Steel

BY CHARLES W. GEIGER

ROAD building difficulties were studied by the Columbia Steel Co. last winter, with the idea of finding a way to reduce the cost of reinforcing steel. As a result, the company is manufacturing a special grade of steel having greater strength than the reinforcing steel now available. This steel is provided with an extra bond, so as to make the additional strength available, and also preserve the other qualities in steel necessary for work of this character.

This step reduced costs beyond expectations, and placed reinforced concrete within the range of practical possibility from the economic point of view. However, there was still a lack of information in other directions, and the company has now undertaken the construction of a test highway, which is to be destroyed by means of truck traffic.

Before starting the building of this test highway,



Extensometer Extension Used for Transmitting to the Recording Instruments the Movement of the Road

questionnaires were sent out to the highway engineers of California, asking for their views as to what should be included in the test, and for suggestions. State and federal engineers were also consulted, with the same object in view. The hearty co-operation of all was freely given, with the result that thirteen types were selected as conforming the nearest to all the views given.

The Columbia Steel Co. then began to build, at Pittsburg, Cal., a test highway, which consists of these thirteen types. The road varies from 5 to 8 in. in thickness, and the steel reinforcing used in the various sections varies from 20 tons per mile to 69 tons per mile.

Section H of the road is built with bars of structural grade. Sections C, D, G, K and L are built with bars of the special grade. Concrete in all cases consists of 1 part cement, 2 parts sand and 4 parts aggregate.

The two photographs show the structural steel, and the novel method of placing it, which insured an accurate placement. A cradle was designed, as shown, consisting of angles and pipes anchored to a 4-in. pipe 18 ft. long. The small pipes were flattened on the under side, the flattened section resting directly on the subgrade. This pipe supported the lower layer of steel





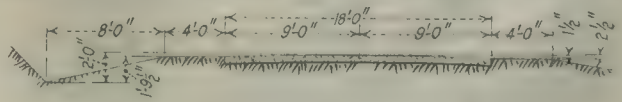
Two Views of the Method of Laying Steel Reinforcing in the Experimental Concrete Road. The large pipe at lower left acts as a drag for the smaller flattened pipes near the bottom of the concrete mass and the angles near the top of that mass. These two sets—pipes and angles—support the reinforcing steel in position until after the concrete is rammed solidly around it; then they are hauled out to support the reinforcing for the next section

reinforcing, 13/16 in. above the subgrade. The angles supported the upper layer of steel reinforcing, 2⅝ in. above the lower layer. The 4-in. pipe was attached to the concrete mixer and was used as a pull bar. As the mixer moved forward, the cradle was pulled ahead, leaving the reinforcing bars in place, and the angles and flattened pipes, when thus pulled out, left a minimum void in the concrete.

The highway, in the tests soon to begin, will be hammered to destruction by means of motor truck traffic. Complete check of results at all stages will be made so that, at the conclusion of the test, the results will be available in practical form, and used to advantage in determining what types of construction are best adapted to California soil conditions.

Although the experiment will cost approximately $100,000, it is estimated that it will cost considerably more to destroy the road than to build it. Donations of equipment and material have been made by several concerns and individuals who appreciate the value of the experimental work undertaken.

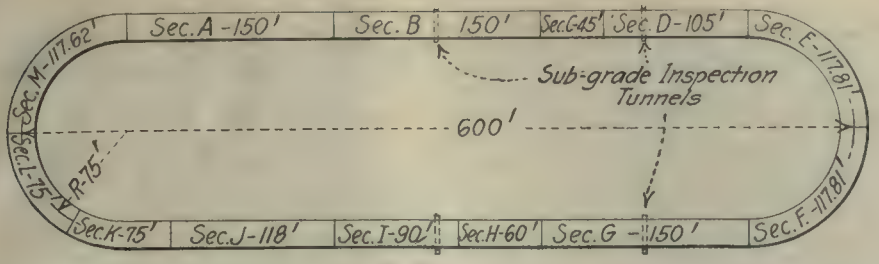
The conditions of the test are such, and the participation of eminent engineers of such a nature, that the results, it is believed, will be of the utmost value to state and county road builders. Sections of the road that give way first will be repaired, so that the



This Section Is Maintained Throughout the Length of the Experimental Roadway

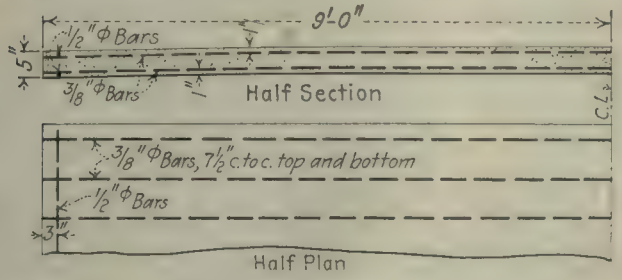
whole road will be usable until its last unit fails under the strain. This will afford valuable opportunity to observe results of various types of repair work, a matter of particular interest, as so many state highways are now undergoing reconstruction.

The road will be subjected to a greater strain, considering the number and weight of vehicles, than any highway in the state receives from its regular traffic. Observations will be made of the results of this traffic



Layout of Experimental Roadway, Showing Locations of Thirteen Sections Varying in Reinforcement and in Thickness. Four sub-grade tunnels permit inspection of the under side

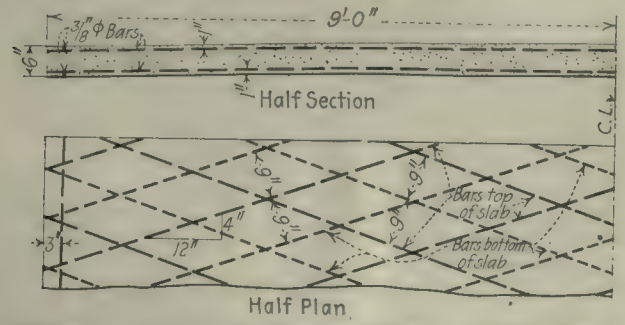
and later, when some of the stronger sections fail to yield, War Department equipment will be used to complete the destruction. These will include heavy tractors, gun carriages and the new Government caterpillar



Section K, Above, Is the Same as Section G, Except That the Latter Is 6 In. Thick

tractor, which weighs 28 tons and has a speed of 25 miles per hour.

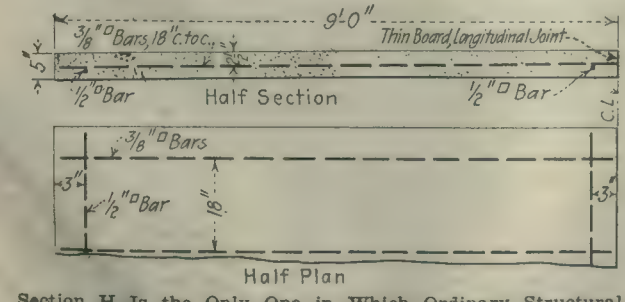
For the purpose of taking observations on the under side of slabs, to determine the effect of various truck loads and speeds on the flexure of the slabs, as well as on the subgrade, four tunnels have been built under



Section C, Above, Is the Same as Section D, Except That in Section D All Bars Running "Northeast and Southwest" Are in the Top of the Slab and All Bars Running "Northwest and Southeast" Are in the Bottom. Section L is the same as Section D, except that its thickness is only 5 in.

the different sections of the test highway. Steel rods, embedded in the concrete slab, extend down into the tunnel; to them are attached pens which bear on a moving record sheet, indicating directly the flexure caused by loads on top of the pavement.

The extensometer will also be used to measure these loads from the bottom of one of the reinforced slabs. Holes 10 in. apart were drilled in to the lower layer of reinforcing rods, and thimbles placed around the holes, so that the concrete could not flow into them. By means of an extension shown in one diagram the



Section H Is the Only One in Which Ordinary Structural Grade Steel Was Used for Reinforcing, and the Only One with a Longitudinal Joint Along the Center, Necessitating Additional Longitudinal Reinforcing at That Point

contraction and expansion of the reinforcing rod will be transmitted to the extensometer, which can be observed from the tunnel proper. Without this extension it would be difficult, if not impossible, to use the extensometer to measure the loads from the bottom of the slabs. Readings will also be taken with the extensometer on top of all slabs.

The research work is under the direction of Lloyd Aldrich, consulting highway engineer, and J. B. Leonard, consulting structural engineer. Details of the sections follow:

Section	Thickness	Reinforcement, Tons per Mile	Sub-grade	Remarks
A	5 in.	20	Crushed rock	California type
B	5 in.	20	Adobe	California type
C	6 in.	55	Adobe	Diagonal reinforcing
D	6 in.	55	Adobe	Diagonal reinforcing
E	8 in.	None	Adobe	Inverted curbs
F	8 in.	None	Adobe	Inverted curbs
G	6 in.	69	Adobe	
H	5 in.	24	Adobe	
I	5 in.	24	Adobe	Inverted curbs
J	6 in.	None	Adobe	Arizona type
K	5 in.	69	Adobe	
L	5 in.	55	Adobe	Diagonal reinforcing
M	7 in.	None	Adobe	Inverted curbs

To Make Charcoal Iron in Oregon

The Oregon Charcoal Co. has been organized and has prepared plans for the erection of a 50-ton charcoal iron blast furnace in Columbia County, Ore., where it is estimated there are over 4,000,000 tons of iron ore in a half section of land which the company has purchased. Assays made by five metallurgists show a 54 per cent content of metallic iron. The deposit lies in the hills about a mile and a half back of Scappoose. It is the purpose of the company to have owners of cut-over land near the proposed plant make charcoal, a man to be secured to teach them open pit charcoal burning. The company will also install its own kilns. Efforts will be made to induce others to install a wood distillation plant that would make a by-product charcoal. Limestone would be secured from either Puget Sound or Lime, Ore.

Expected markets for the charcoal iron are tractor manufacturers, grey iron foundries, car wheel manufacturers, freight car builders, as well as export. The freight on iron from the East is now $20 a ton. It is expected that a contract for the erection of the blast furnace will be let in 60 days.

The following are officers and directors of the company: C. I. Calkins, president, who is president of the Bank of Sherwood, Sherwood, Ore.; J. A. Miller, vice-president, Miller & Bauer, contractors; J. H. Kelley, secretary, attorney, Yeon Building; R. H. Par, Sherwood, Ore.; A. W. Martin, managing director; F. A. McGuin, auditor, W. R. McKenzie & Son; Conrad P. Olson, vice-president of the State Bank of Portland.

At the Northwest Experiment Station of the United States Bureau of Mines, Seattle, Wash., an investigation is to be undertaken regarding the preparation of super-refractories by melting and treating clays in the electric furnace and preparing from these products refractory materials, chiefly brick. It is expected that simple fusion of the clay will improve its refractoriness. It is also expected that some iron and silica can be removed with a subsequent improvement in the refractoriness. This investigation, which is in cooperation with the University of Washington, will be conducted by C. E. Williams, superintendent Northwest Experiment Station; C. E. Sims, electrometallurgist, and Hewitt Wilson, ceramist, Bureau of Mines staff, and A. Lee Bennett, fellow of the University of Washington.

Activities of the Testing Engineers

Since the last meeting of the American Society for Testing Materials, a special committee has been appointed to study the physical properties of reinforcement bars, and tests to determine the effect of sulphur in rivet steel have been practically completed, a new committee on sheet steels has been organized and a study of the heat treatment of wrought iron is being made. The total membership of the society is now 3022 and the continued association activity is shown by the holding of meetings in September and October of no fewer than 13 committees. The 1922 annual meeting will probably again be held at Atlantic City, N. J., and in the latter part of June, in accordance with the wishes of the plurality of the members as expressed through a questionnaire.

The personnel of the special committee to conduct an investigation of the physical properties of plain and deformed concrete reinforcement bars is: E. E. Hughes, Franklin Steel Co.; R. L. Humphrey, consulting engineer, Philadelphia; A. E. Lindau, Corrugated Bar Co.; C. F. W. Rys, Carnegie Steel Co.; W. A. Slater, U. S. Bureau of Standards; J. J. Yates, Central Railroad of New Jersey.

The primary object of the investigation is the study of physical properties of steel reinforcement bars—plain, deformed and twisted—rolled from the four different grades now in commercial use, tested in the form as rolled and as machined specimens. The data obtained will serve as a basis for possible revisions of the society's specifications for reinforcement bars.

The joint committee on investigation of effect of phosphorus and sulphur in steel has nearly completed the tests outlined to determine the effect of sulphur in rivet steel. A meeting of the committee on tests was held at Watertown Arsenal, Watertown, Mass., on Oct. 22, to review the completed test data. It is planned to release the data for general publication in the technical press as soon as possible. Publication in completed form will be made through a technologic paper of the U. S. Bureau of Standards.

The work of securing material for investigation of sulphur in plates and structural shapes is now going forward. Beginning Oct. 25, the committee on manufacture was scheduled to witness at the Cambria Steel Co., Johnstown, Pa., the manufacture of a part of the steel in this group, of sulphur content of 0.03 to 0.08 per cent, with carbon, manganese and phosphorus as nearly constant as possible.

The U. S. Department of Commerce has published English-Spanish and English-French editions of some 61 A. S. T. M. specifications particularly applicable to export trade.

Sub-Committee XIV on tool steels is engaged in the preparation of tentative specifications for high speed tool steel. The immediate work of preparing these specifications has been delegated to a special committee consisting of L. H. Kenney, J. A. Mathews and M. E. McDonnell.

The new sub-committee on sheet steels was organized on Oct. 6. One of the first problems to be undertaken by the sub-committee is the definition of the different grades of sheet steel and the proper differentiation between sheet steel and plate steel as to thickness. The committee is under the chairmanship of J. M. Darke, General Electric Co., West Lynn, Mass.

The committee studying the heat treatment of wrought iron has outlined three possible lines of work: The relation of composition and heat treatment of wrought iron to its final physical properties; the prevalence of brittleness in wrought iron when heated to temperatures in the neighborhood of the critical range; and the influence of welding methods and heat treatment on the strength of welds. It has been decided to investigate the first of these.

The Standard Tank Car Co., Sharon, Pa., has been awarded a contract by the New York Central railroad to repair 250 box cars. This order is declared to be the forerunner of others of similar nature from the same source.

Mining Conferees to Meet Hoover

WASHINGTON, Nov. 8.—Committees appointed by the American Mining Congress will meet next Monday with Secretary of Commerce Hoover to consider plans for the improvement of conditions in the mineral industry. It is proposed that the industry co-operate with the Department of Commerce along the lines of other industries, by providing the Department with certain statistics and making known its problems, which the department may aid in solving.

Committees selected to confer with Secretary Hoover follow:

Metals: Walter Douglas, Phelps-Dodge Corporation, New York; Clinton H. Crane, St. Joseph Lead Co., New York; Sidney J. Jennings, American Smelting & Refining Co., New York; Marshall Evans, Eagle-Picher Lead Co., Chicago.

Coal: J. G. Bradley, president National Coal Association, Dundon, W. Va.; S. D. Warriner, Lehigh Coal & Navigation Co., Philadelphia; Thomas H. Watkins, Pennsylvania Coal & Coke Corporation, New York; Charles S. Keith, Central Coal & Coke Co., Kansas City; Albert J. Nason, Nason Coal Co., Chicago.

Petroleum: E. L. Doheny, Mexican Petroleum Co., New York; H. F. Sinclair, Sinclair Refining Co., New York; Walter Teagle, Standard Oil Co. of New Jersey, New York; George S. Davison, Gulf Refining Co., Pittsburgh; A. L. Beaty, Texas Co., New York.

Elected to Engineering Foundation

The election of Arthur Lucian Walker, professor of metallurgy in the Schools of Mines, Engineering and Chemistry of Columbia University, as a member of the board of Engineering Foundation, which is organizing industrial research on a nation-wide scale, was announced by the chairman of the board, Charles F. Rand, New York. Prof. Walker succeeds the late Dr. Joseph W. Richards, of Lehigh University, eminent metallurgist, who died recently. He will represent the American Institute of Mining and Metallurgical Engineers on the board of the foundation. He has been a professor of metallurgy at Columbia since 1908. In 1898 he invented the Walker mechanical casting machine for casting copper into refined shapes. In 1902 he invented a new system for electrolytic copper refining tank room arrangement. As a consulting metallurgist, specializing in copper, he has been connected with many large corporations. During 1917-1918 he was consulting metallurgist at large for ordnance in the War Department.

Producing Oil from Waste Shale

WASHINGTON, Nov. 8.—It has been publicly announced that the Staveley Coal & Iron Co., at Hardstoft, in Sheffield, England, consular district, has been successful in producing oil from the waste shale of its pit dumps. The resultant product is said to be from 30 to 40 gallons of crude oil to the ton of shale. The company began its experiments before the war, according to a report from American Consul William J. Grace, Sheffield, and has now reached the successful stage of these experiments. The operations in this instance were carried on at Hardstoft, near Chesterfield, where a flow of oil was struck previously. Only one of the many wells drilled is producing oil and it is considered doubtful whether drilling for oil in that district will become a commercial success.

It is said that the British government has spent more than £500,000 in experimenting at Greenwich, with a view to producing oil from shale, and that it has thus far been unsuccessful. Hence the success of the Staveley Coal & Iron Co. is a matter of great interest. If this company will be able to make the manufacture of oil and other by-products from pit dumps a successful commercial proposition, it will be an entirely new industry in that section of England. There are millions of tons of this waste lying in the pit dumps of Yorkshire, Derbyshire and Nottinghamshire.

Varied Views on Coal, Coke and Ore Rates

Hearing of Petition of Buffalo Iron and Steel Companies Before Interstate Commerce Commission Develops Sharp Difference of Opinion—Doubt as to What Action Will Be Taken

BY L. W. MOFFETT

WASHINGTON, Nov. 7.—Taking a broad sweep affecting rates on all raw materials used in the manufacture of pig iron, the petition of Buffalo iron and steel interests for reduction in rates on coal and coke was the object of a protracted informal hearing to-day before Director of Traffic W. V. Hardie of the Interstate Commerce Commission. The upshot of it was that the representatives of the carriers promised to make early reply to the request for lower rates. Representing iron and steel interests were prominent men from the Buffalo district, eastern Pennsylvania, Virginia, West Virginia, Cleveland, Toledo and Chicago. Because of difference of opinion developing among iron and steel interests themselves, it is a question whether reductions of fuel will be granted in the immediate future or whether the recent reduction of 28 per cent in rates on ore from Lake Erie ports will be automatically eliminated Dec. 31 and old rates restored. It is hoped, however, that regardless of the decision on this, a general reduction in freight rates will be made comparatively soon.

Differences as to Ore Rates

Varying views from iron and steel people related to the relationship of rates on coal and coke and ore. While some of those present urged that reduced ore rates be made permanent even if coal and coke rates are not changed, others insisted that if the latter are not reduced the old ore rates should be restored in order to maintain so-called relationship between these three commodities. N. L. Gray, representing the New York Central Lines, and J. B. Large, representing the Pennsylvania Railroad, the only two representatives of carriers who spoke, said that the issues brought out to-day developed into such a wide character, affecting the general rate structure, that it would be necessary to make a report of the meeting to executives with the hope of an early decision being returned to the commission and the iron and steel interests. Director Hardie said the hearing being informal, no order will be issued by the commission, but that he was sure it would take such action as it thought it should if relief is justified. Among the chief spokesmen for the Buffalo interests was President W. H. Donner, Donner Steel Co., who pointed out the investments of iron and steel industries in that district aggregate $150,000,000, and were started prior to 1907 in reliance on continuation of relationship between ore rates from lower lake ports to interior furnaces and coal and coke rates from Pittsburgh, Connellsville and related districts to Buffalo. He said the lowering of ore rates without reducing coal and coke rates gave inland competitors an advantage to the extent of $2,100,000, based on pig iron production of 3,000,000 tons in the Buffalo district, and he estimated that the cost to interior furnaces was cut 71c. on a ton of pig iron.

Urges Re-adjustment

C. A. Collins, vice-president Hanna Furnace Co., urged re-adjustment of ore rates to inland furnaces and fuel rates from producing regions to Buffalo which will retain the advantages natural to the Buffalo district. He claimed the Buffalo district, based on recent reduction in ore rates from lower lake ports to Buffalo, is entitled to a rate of approximately $1.13 per ton on coal from Pittsburgh and $1.57 on coke from Connellsville. Statements of Messrs. Donner and Collins were approved by President G. F. Downs, Lackawanna Steel Co., and similar expression made by W. H. Marsales, general traffic manager of the Wickwire-Spencer Steel Corporation, and W. W. Rogers, vice-president and secretary Rogers, Brown & Co.

C. L. Lingo, traffic manager Inland Steel Co., Chicago, said either the old ore rates from lower lake ports should be restored or fuel rates lowered and Chicago district given its natural advantage as to location. Henry S. Pickands, representing the Perry Iron Co., Erie; Toledo Furnace Co., Toledo; and Otis Steel Co., Cleveland, said the situation at Buffalo corresponds closely to that at Erie, Toledo and Cleveland, and asserted that high fuel rates leave interests he represents at a disadvantage. With others asking for reduction in rates on fuel urging it be made immediately, Mr. Pickands said ore reduction had stimulated shipments from docks, although N. L. Moon, traffic manager Alan Wood Iron & Steel Co., and also representing eastern Pennsylvania iron and steel interests, said the cut in ore rates had not caused the Alan Wood company to move any more ore than had been previously decided upon. He said the situation in eastern Pennsylvania is worse than at Buffalo, because of increase in rates on fuel, which was combatted by Buffalo interests. Mr. Moon also asked that rates on blast furnace raw materials be reduced to permit the iron and steel industry to resume normal business. He declared interests he represents would object if fuel rates were lowered to other competitive points without similar action being taken in behalf of eastern Pennsylvania iron and steel makers.

Sharp Discussion

More or less sharp discussion was led by J. P. Daly, traffic manager Donner Steel Co., when he stated that his company was not represented in the agreement to the cut in ore rates with the alleged understanding that reductions in fuel rates would not be sought for the present. Others present said they also were not represented, although they said carriers seemed to believe that such an arrangement had been entered into in behalf of the entire iron and steel industry. Robert Hula, assistant traffic manager Steel & Tube Co. of America, said the disadvantage to his company as a result of the ore rate cut for interior furnaces as distinguished from lake front furnaces should be offset by a reduction in rates on coal before anything else is done, but said the 28 per cent cut in coal rates would not remove discrimination.

Claiming rates on blast furnace raw materials to Virginia furnaces had increased an average of 376 per cent since 1914, Richard Peters, Jr., Virginia Pig Iron Association, said his association has been seeking relief for some time and must have it if Virginia furnaces are to compete with others. Charles E. Bell, Eastern Pig Iron Association, said freight rates on general commodities, including fuel, must be cut and opposed any advance on ore as had been suggested by some in case fuel rates are not lowered. Relationship will be greatly disturbed if that existing in 1917 is not restored, but if coal and coke rates stay where they are, ore rates from lower lake ports should be increased to the previous level, said J. M. Gross, traffic manager Bethlehem Steel Co. W. F. Morris, Weirton Steel Co., said he was in accord with the position of Buffalo interests, although his company was the only inland manufacturer, with possibly one exception, which was represented at the meeting and hauled all raw materials all-rail. He said if ore rates were too high, as was indicated by carriers by action in reducing them, then rates on coal and coke also are excessive. James A. Burden, Burden Iron Co., in a telegram sent to and read by President Donner, expressed belief that ore reductions discriminate in favor of the Pittsburgh district and that freight rates on fuel should be reduced.

GERMAN MARKET ACTIVE

Heavy Buying in All Lines—Prices Continue Upward—New Guiding Prices

(*Special Correspondence*)

BERLIN, GERMANY, Oct. 23.—Activity during the past week has been without parallel since the recent revival. Jobbers and consumers seemed to be animated by only one desire; to get any kind of material at any price before the dollar was quoted at 300 m. or more. The situation is best illustrated by the fact that customers are placing the same order with several works and jobbers. Works are swamped with orders, often for extremely heavy tonnages, and are pressed by the trade and consumers alike to open sales for the first quarter of 1922. Most of the mills stolidly refuse to meet buyers in this respect, so that some of the business is going to Belgian, French and Luxemburg works.

Raw material supplies have not suffered any interruption so far and as coke is no longer controlled and large tonnages are available, a number of idle blast furnaces will probably be blown in. The coal situation is different, but the petition for an increase of the works' coal quota is still being considered by the coal commissioner. The poor transportation is particularly affecting the limestone supply, the scarcity of which is being severely felt.

The ore market is sharing in the present boom. Stocks have been moving in good shape, but the low value of the mark is prompting buyers to give preference to inland ores or second grade foreign ores and high grade calcined ores. Difficulties are being encountered in the supply of Swedish ores. Baltic Sea freight rates are steadily rising and bottoms are not plentiful. North Sea and Baltic shipping lines are again charging rates in foreign currency. In the minette market, interest centers on Lorraine and Briey grades, the sales of which will henceforth be handled by a newly established organization at Essen which practically embraces the entire industry.

Demand for pig iron is keen but supplies are mov ing slowly. Consumers are protesting at alleged hoarding of stocks by the syndicate. The syndicate, on the other hand, charges consumers with stocking up in excess of actual requirements for speculative purposes. Production is to a certain extent affected by a strike at the Gelsenkirchen blast furnaces. Luxemburg furnaces are asking about 200 fr. for foundry iron and many cases are on record of German consumers having lately paid 1550 m. per ton, 300 m. above the syndicate price. Ferrosilicon, 45 per cent, is rather scarce, and brings 4500 m. per ton. The only German works to be considered for ferrosilicon, Knapsack-Stinnes, declines to accept orders. Blast furnace silicon, 10 to 12 per cent, is quoted at 2200 m. per ton, f.o.b. Oberhausen; ferromanganese at 5200 m. per ton. With the increased domestic demand, the volume of foreign inquiries for pig iron is growing, Austria, Italy, the Balkan countries, and the Far East, especially Japan, being the principal buyers.

Semi-finished material was in heavy demand and experienced further price advances during the past week. The feature of the finished iron and steel market is a growing shortage of material. Increasing complaints are heard of works, resorting to the practice of rendering prices subject to revision in case of coal price, freight rate or other increases.

It is noteworthy that a fair portion of the output of structural shapes is being retained by the producers for use in plant extensions and new construction and the building market is also calling for large quantities. Mills specializing in railroad material are operating to capacity and are experiencing difficulty in meeting the demands of the State railroads for ties, as production has largely been adapted to more profitable business. Inquiries for mine rails are brisk and supplies are far from meeting the demand.

A feature of the sheet market is the improved demand for heavy gages. Mills are sold out until the end of February, but terms of delivery are less extended compared with other lines, 8 weeks being named for heavy sheets and 8 to 12 weeks for medium grades. For light plates, however, 5 to 6 months is being stipulated. Such is the activity in the wire market, where foreign orders predominate, that mills are not in a position either to quote prices or state when delivery can be effected.

The greater part of the wire nail output is finding its way abroad, particularly to Japan. Similar conditions obtain in the gas pipe market where mills are booked up for 5 to 6 months ahead and have to decline new business. Foreign requirements are mainly in the way of flanged pipes and boiler tubes. The oil and well pipe market is quiet, as demand has apparently been met. Although foreign shipments are very satisfactory, individual orders rarely exceed 500 tons. Domestic buying is primarily centered on gas pipes, locomotive, boiler and superheater tubes.

At a recent meeting of the Iron Control Federation, representatives of industry, trade and consumers drafted a guiding price schedule, effective from Oct. 20. In the meantime, labor has appealed to the Minister of Economics to re-introduce maximum prices, abolished in April of this year. The following quotations show current and guiding prices, per metric ton, with open-hearth material about 50 m. per ton higher:

	Current Price Marks	Guiding Price Marks
Billets	3,000	2,725
Sheet bars	3,000	2,790
Structural shapes	3,700	3,150
Bar iron	3,950	3,200
Hoop iron	4,150	3,585
Wire rods	4,000	3,500
Wire, drawn	5,100	....
Wire nails	7,600	....
Sheets, heavy	3,100	3,500
Sheets, medium	3,900	4,300
Plates, light	4,400	4,425

IMPROVED CONDITIONS

Melt of Ohio Foundries Increases—Pig Iron Stocks Reduced

CLEVELAND, Nov. 7.—Improved conditions in the foundry industry in Ohio were shown at a meeting of the Ohio State Foundrymen's Association held at the Winton Hotel, Cleveland, to-day. A chart compiled from reports of members indicated that their melt had increased from a low point for the year of 15 per cent Oct. 1 to 25 per cent Nov. 1. Foundrymen outside of those making machine tools and agricultural implement castings generally reported an improvement in orders. Stocks of pig iron in foundry yards declined from 80 per cent in August to 62 per cent Nov. 1. It was estimated that with scrap supplies and pig iron under contract and not yet delivered, foundries would have enough material to last for four months at the present rate of operations.

The pig iron contract form recently prepared by the National Association Purchasing Agents was approved, but the association took action favoring an additional clause providing that should there be a dispute between buyer and seller over the analysis of iron delivered, an impartial umpire be selected to determine the analysis.

William H. Barr, president National Foundries' Association, delivered an address discussing general conditions in foundries, costs, overhead, etc.; A. O. Backert, director of the American Foundrymen's Association, also spoke on business conditions. The association has increased its membership to 103 gray iron foundries.

The Wadsworth Electric Mfg. Co. held a sales conference Oct. 26 and 27 to discuss sales promotion, including the use of inclosed switches for the purpose of safety. G. R. Watson, formerly Cincinnati representative of the Crouse-Hinds Co., has assumed position as general manager of the Wadsworth company.

CONTENTS

Bessemer Plant of Steel & Tube Co. 1199
Latest Developments in Design and Equipment of Addition to Mark Works for Manufacture of Pipe

Experiments in Industrial Co-operation 1207
Solutions of Employer-Employee Relations Presented at Meeting of Academy of Political Science

Iron Industry's Message Favors Peace 1209
Leaders Give Their Hearty Support to President Harding in His Effort to Limit Armaments—Earnest Denunciation of War

Conference on Industrial Cost Accounting 1212
Contributions to Cost Questions Made at Second Annual Meeting of Industrial Cost Association

Gray Iron Castings from Electric Furnace 1214
Displacing the Cupola—Present Electric Practice and Advantages Over Older Method—Comparative Cost

Reinforcing Steel for Road Use 1222
Test Highway Built by Columbia Steel Co. to Study Methods of Reinforcement—Special Device for Laying Steel

Varied Views on Coal, Coke and Ore Rates 1225
Petition of Buffalo Iron and Steel Companies Before Interstate Commerce Commission—Doubt as to Action to Be Taken

Buying Versus Being Sold 1206
Labor Notes 1208, 1220
American Foundrymen's Meeting 1208
Plant Operations 1213
Coming Conventions 1215
Piston Grinding Machine 1216
Fuel Economy in Iron and Steel Works 1216
Superpower Report 1217
Pending Freight Reductions 1217
Labor Cost in British Iron and Steel Works 1217
Safety Cleaning Machine 1217
American Merchant Marine Policy 1218
Canadian Customs Ruling Protested 1218
Drafting Aids to Manufacturers 1218
Rates on Imported Manganese and Chrome Ores 1218
Manganese Ore from Chile 1219
Indicator for Powdered Coal Bins 1220
Inquiry As to Coal Stocks 1220
Iron Ore Shipments in October 1220
Low Bids on Steel for Navy 1221
Shippers Ask for Freight Cut 1221
Exports to Be Reclassified 1221
Refractories Demand 1221
To Make Charcoal Iron in Oregon 1223
Activities of Testing Engineers 1224
Mining Conferees to Meet Hoover 1224
Producing Oil from Waste Shale 1224
Foreign Trade Conditions 1226, 1244, 1247
Ohio State Foundrymen Meet 1226
Editorials 1228
Skilled Workers and Strikes—The Check-Off—Course of Railroad Earnings—Intelligence Tests.
Correspondence 1230
Buying Responsibility—Time for Conciliation and Reasoning.
October Steel Ingot Output 1231
Transcontinental Freight Rates 1231
To Dismantle Parts of Carnegie Sharon Works 1239
Open Price Associations 1243
Industrial Finance 1245

Iron and Steel Markets 1322
Comparison of Prices 1323
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1246
Non-Ferrous Metal Markets 1247
Personal Notes 1248
Obituary Notes 1249
Machinery Markets and News of the Works 1250
New York Jobbers' Prices 1258

ESTABLISHED 1855

THE IRON AGE

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"Skilled Workers" and Strikes

The country did not have the chance to find out what the railroad companies could do in operating their lines in a time of strike, with the five big unions doing their best to produce a tie-up. It is well known that preparations were made and that many thousands of men had enrolled and would have taken the strikers' places. Much of this enrollment was carried on directly between the railroad managements and men who wanted the work, without any resort to agencies making a business of furnishing strike-breakers, as distinguished from reputable workers. There is good reason to believe that the railroads, had the strike order stood, would have been far from the state of helplessness which the union leaders had in mind.

Apart from the well-directed effort by companies whose heads have been conspicuous for the cultivation of friendly relations with their employees, enough was done on this and on other occasions to demonstrate how rapidly apt men could become efficient in certain railroad jobs. Forty-eight hours, and in many cases 24 hours, proved sufficient for the mastery of many kinds of work. There is trustworthy testimony to the excellent progress made by candidates for various positions, particularly those of firemen, brakemen and other lines of train service. Some of the traditions concerning the "experience" required in some of these forms of service and some of the reasons given in justification of the high wage schedules fastened upon the managements under Government control were rudely shaken by the facility new men developed in preparatory try-outs.

The experience was quite parallel with that of managers of certain tin plate mills when the Amalgamated Association some years ago staked its all on the issue of limitation of output and lost. The union's monopoly of "experience" was counted on to win, but the mills were soon filled with young men fresh from the countryside and they were never displaced.

The railroad strike in Great Britain in September, 1919, demonstrated that neither the railroad workers nor the railroads themselves are as indispensable to the life of the community as has been supposed. Mechanical progress since the railroad strike of 1877, of which Pittsburgh was the center, has changed the situation to a marked degree. Skilled mechanics are becoming constantly less indispensable, through the evolution of fool-proof machinery. The tendency is to bring machinery within the capacity of anyone possessed of average intelligence. Drivers of motor cars are now numbered by the millions, and as drivers of trucks and even locomotives they would have been an important factor in the defeat of the unions had the recently threatened strike been declared. One of the greatest services of the British strike of 1919 was in proving how competent the ordinary untrained individual can become in carrying out the duties of the so-called "skilled workers." That demonstration stands both as assurance to the public and as deterrent to workers who would lightly lay hold of the weapon of a strike against the people.

The "Check-Off"

The "check-off" required in the United Mine Workers' wage scale for bituminous coal mines, whereby initiation fee, fines and monthly dues of all employees of the classes covered by the scale are deducted from the payroll and remitted in lump sum to the district organization, has been brought vividly to public attention by the injunction against it issued last week by Judge A. B. Anderson in the federal court at Indianapolis. Legally the matter hangs in the balance, as the court of appeal has granted an appeal and stay of execution to Nov. 16, but in any event the subject will not be forgotten.

The check-off is the chief support of the United Mine Workers. This is no new discovery. In the leading editorial in THE IRON AGE of Feb. 24, 1921, under the caption "Three Great Monopolies" it was said: "There are three great monopolies in the United States—the United Mine Workers, supported by the check-off; the railroad unions, supported by conditions created by the

United States Government, and the various building trades unions, supported by the fact that the building owner is a different man each time, and does not care to make a contest for the benefit of the next man."

The unique character of this check-off practice is seen in the fact that it was adopted some 20 years or more ago, under conditions it would require an antiquarian to elucidate now, and that it does not exist in any other line of employment. Usually it is a good rule, in determining what is fair and right conduct, to ask what would be the result if everyone did the thing. In this matter of the check-off, one may inquire what would result if every labor union, as soon as it got a foothold, were granted the check-off, so that membership in the union became compulsory, being in fact automatic upon the acceptance of employment, and payment of dues to the officials in possession became perfect. The samples that have been furnished indicate that industry could not bear the load.

The rule can be tried out further. Suppose that all purchasers of tin plate, just for illustration, were required to deduct 2 per cent from every tin plate invoice they paid and remit the total to the officials of the Tin Plate Makers' Union, who would use the funds to get non-union tin plate mills into the fold. Suppose that when anything occurred that did not suit the taste of these officials they would close the mills, allowing tin plate and canned goods to become scarce so that a starving public would pay more for canned goods and enable the packers to pay almost any price asked for tin plate.

The case is parallel in its general principles and in its effect upon the public. Where it is not parallel is in the law, for the Sherman law interdicts curtailment of production by agreement between manufacturers, while strikes by workmen aimed at curtailing production of coal or other commodities, or curtailing the service of trolley lines or railroads, to the direct injury of the public, have escaped the law.

There is a strong probability that, irrespective of the eventual legal fate of Judge Anderson's injunction against continuance of the check-off, the practice will be stopped. There is little likelihood in any event that the check-off will be included in any bituminous wage scale agreed upon for the period after the present scale expires March 31, 1922. The United Mine Workers can live without the check-off, but if it could not it would not deserve to live. The public will receive better service, and will be relieved of one of the three great monopolies which have been largely responsible for the unsatisfactory condition of industry for months past.

Severe as has been the decline in the pig iron and steel production of the leading producing countries, there is one interesting exception. The French pig iron and steel output has consistently maintained itself on practically a level with that of 1920. For the first eight months of this year, the average pig iron and steel ingot production has been virtually the same as the monthly average for 1920. While production early in the year was larger than in more recent months, even the August output was but slightly below that of the 1920 monthly average in both pig iron and steel. This is by no means true of the United States, Great Britain or Belgium; in all three the declines after the first quarter were severe and the later recovery still leaves production far below the 1920 average. The French showing is only in part due to exports; it is to be viewed also in the light of heavy home consumption following the war.

The Course of Railroad Earnings

Comparisons of monthly earnings of the railroads frequently fail to be illuminating because there are natural seasonal variations which mask the fluctuations due to changes in the general commercial situation and changes in the position of the railroads. To avoid reflection of these seasonal variations comparisons are sometimes made with the corresponding month of the preceding year, and to that method also there are obvious objections. In particular, a comparison of earnings last August with earnings in August, 1920, fails entirely to show anything except the fact that the "back pay" awarded employees in the Railroad Labor Board's decision late in July of last year was all charged to operating expenses in August.

The proper method to study monthly railroad earnings is by reference to a standard allocation of the year's earnings to months. The Bureau of Railway Economics adopts the system of dividing the expected 6 per cent annual return upon tentative valuation among the months according to the relative earnings the months showed during the three-year test period ended June 30, 1917. The following table gives the earnings reported in each of the first eight months of this year, by Class I roads and large switching and terminal companies, the requisite monthly earnings on a 6 per cent annual basis, and the actual rate of earning:

Railroad Earnings in 1921

	Required on 6% Basis	Earnings Reported	Rate of Earning
January	$67,272,000	$958,399*	0.1*
February	56,599,000	7,378,307*	0.8*
March	81,089,000	30,695,192	2.3
April	80,487,000	29,248,874	2.2
May	92,736,000	37,080,654	2.4
June	99,073,000	51,641,014	3.1
July	93,203,000	69,298,521	4.5
August	108,000,000	90,241,103	5.0

*Deficiency.

While the three-year test period is not an absolute criterion it is adequate for the purpose, and the wide fluctuations month by month in the amounts to be expected under what may be called uniform conditions are impressive. It becomes obvious that mere comparison of the quantity of earnings in one month or another this year does not really indicate what has been occurring. Comparison of the rates shown in the last column in the above table with a rate of 6 per cent shows approximately the proportion in which railroad earnings fell short of the gait that would produce a 6 per cent total for the year.

From January to February there was a recession, also a slight recession from March to April. Otherwise railroad earnings improved through the

month of August. Even August, however, showed only five-sixths of the proper return.

The comparison shows two things: First, that railroad earnings have been improving and by August had made a close approach to the expected rate. Second, that no increase in earnings can be expected such as would within a reasonable length of time make up the deficiency that has accumulated. While August showed the best rate of earnings in the eight months of the year, it did not decrease the deficiency, but added to it, the rate being 5 per cent, or one per cent under 6 per cent. Plainly it is on account of the accumulated deficiency that railroad officials are so anxious to postpone rate reductions. They would like to make up something—anything they can.

The detailed reports showing expenditures for maintenance month by month do not indicate the extreme skimping that has been suggested from the railroad side of this argument about rates. The figures do not indicate that the change from a large deficit in February to a 5 per cent rate of earnings in August was produced chiefly or even largely by such a route.

Intelligence Tests

During the war an important factor in the selection of certain officers of the army was the standing they made in so-called intelligence tests. These consisted in part of a set of questions which the enlisted men had to answer almost spontaneously. The grading depended on the accuracy and quickness of the answers, which were presumed to reveal not only the man's general intelligence and keenness of memory but also his ability to make quick and dependable decisions. As practiced it was not all that was claimed for it, but in the main the results were considered satisfactory as giving a line on a man's average brain power.

A modification of the war-time intelligence test is being used in a number of technical schools, the original having found its way into such institutions during the war. One of the largest American universities has found beneficial results from its application to one of its departments. A large Middle Western technical school has used since the war what it calls an intelligence test and some interesting results are reported. All students from freshmen to seniors are subjected to this test each year. From the results the faculty have formed a judgment of each man's "quality of brain." As the students progress through their respective courses it is declared possible to judge whether one who has not made a satisfactory grade can really ever be expected to graduate, or whether he has exercised his full ability. It has been possible in many cases to advise students whether to continue or to drop out.

An interesting development is that in the technical school referred to the average standing or grade based on these tests is practically the same for each class each year. It also appears that the new freshman class, entering this year, has a standing 10 to 12 points higher than that of any freshman class since the scheme was first tried. A distinct letting down was plainly noticeable in the two years just following the war.

The new practice is to be differentiated from the famous Edison questionnaire, which is designed largely to measure an applicant's memory and general reading. In the schools that have pioneered in the movement there is faith that it will become an important factor in educational work. Certain psychological principles are involved which need further study and application. There is the possibility, too, that a similar scheme properly elaborated may come to be used by employers in judging the caliber of men who are in line for larger responsibilities.

Secretary of Agriculture Wallace has suggested that with corn netting the farmer 20 cents per bushel or less and coal costing him $10 per ton, the corn will furnish the cheaper fuel both to the farmer and to the dweller in country towns in the corn belt. That illustrates vividly how the farmer is cut both ways by high freight rates. His net on whatever he sells will not give him back his cost, because of the freight that comes off the price at his marketplace, and the prices of the things he would buy are so high, because of excessive freights, that he must get along without them.

CORRESPONDENCE

Buying Responsibility

To the Editor: There appears on page 1139, Nov. 3 issue, an article by John J. Ralph, entitled, "Buying Responsibility."

This is one of the most practical and clearly set forth statements of facts on this subject I have ever read. Please convey my appreciation to the author.

H. C. PEARCE,
Director of Purchases and Stores,
Chesapeake & Ohio Railway Co.
Richmond, Va., Nov. 5.

A Time for Conciliation and Reasoning

To the Editor: Nothing like an entente cordiale prevails between labor and management. Management has not forgotten that organized labor during the war days exacted all that the traffic would bear. Management is resentful.

Heedless of the necessity for accelerating liquidation so as to hasten the return of normal conditions, labor is giving indubitable evidence of its intention to hold most of the advantages obtained during the stress of war. When necessity compels, the unionists retreat, but the line of retreat probably is studded with grudges. Indeed, it may be surmised that in those cases where labor has been forced to give ground, the first propitious opportunity to recover that which has been lost, will be capitalized.

Management proclaims that profits of industry have been whittled down to the little end of nothing, while labor asserts that it cannot permit a full squeezing out of war inflation, inasmuch as the cost of living has not descended to the extent of more than a few farthings.

Without holding a brief for either interest, an onlooker from the side lines may be permitted to venture the statement that the country needs industrial statesmen rather than industrial warriors. Bandying words only serve to beget intolerance. Ruthless warfare, no matter how well conducted by the encamped generals of labor or management, will not hasten the processes that make for economic repair.

At this time when wages must follow the general trends of the market places and when organized labor is losing its potency, management has a golden opportunity to show labor that it is intent upon exemplify-

ing the square deal. Now is the time for both employer and employed to abide by the counsels of fairness and to establish mediums for the free interchange of views with the object of fostering co-operation.

With co-operative organizations in every plant, with representatives of the employers and employed sitting together at council tables freely discussing conditions, intolerance would in due time give way to forbearance and understanding.

The task is one that calls for constructive industrial forces, not destructive industrial warriors.

JAS. J. MCCABE.

2 Rector Street, New York.
Nov. 3.

Large Gain in October Steel Ingot Output

The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in October of 1,616,810 gross tons as compared with 1,174,740 tons in September, with 1,138,071 tons in August and with 803,376 tons in July. The October increase over September was 442,070 tons, or 37.6 per cent. The increase in September over August was about 3 per cent. Estimating the production of other companies on the basis of the 30 reporting (though it is probable the small companies did not equal the rate of the larger ones) the total output of ingots in October was 1,920,202 tons, or 73,854 tons per operating day, counting 26 working days in October, against an estimated total of 1,395,178 tons or 54,713 tons per day in September. This is an increase of 525,024 tons or 19,141 tons per day. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920	26,197,843	8,112,753	121,656	34,432,252
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810

The October ingot production was at the yearly rate of 22,968,594 tons, counting 311 operating days to the year. This compares with a rate in September of nearly 17,000,000 tons, in August of 15,568,660 tons and in July, the low point, of 11,857,186 tons. The October production was therefore about twice that of July.

The increase of 525,024 tons in the estimated ingot output of all companies in October over that in September compares with an increase of about 250,000 tons in the October pig iron output over that of September.

The Youngstown Welding Co., Youngstown, Ohio, has puchased a three and one-half acre tract along the right-of-way of the Youngstown & Austintown Railroad, now under construction, and plans the erection of a model plant early next year. The company plans ultimate construction of three structural steel buildings, each 100 x 298 ft., one of which will be constructed in 1922. It is engaged in fabricating oil and other storage tanks, general tank work and light plate construction.

TO REDUCE FREIGHT RATES

Amendment of Proposed Reductions Filed with Interstate Commerce Commission

WASHINGTON, Nov. 8.—An amendment, which affects iron and steel along with other products, has been filed with the Interstate Commerce Commission in connection with the application made on Aug. 22 to reduce westbound transcontinental freight rates and contains additions, eliminations and changes in the original application. Sucker rods and sucker rod joints in bundles have been eliminated. On the other amended items, as they relate to iron and steel, reductions have been made. On cast iron pipe and connections, for instance, it was proposed originally to substitute for the present rates, which range from $1.17½ to $1.83½ per 100 lb., a rate of $1.25 from all Eastern groups to the Colorado section, with a minimum of 40,000 lb., and to apply a rate of $1 with a 60,000-lb. minimum. In the amended application, the rates proposed are $1.15 with the higher and 90c. with the lower minimum.

Changes proposed on iron and steel products, per 100 lb., follow:

Article, Carload	Present Rate Range	Rate Originally Proposed and Origin Groups	Rate Now Proposed and Origin Groups
Pipe bands and rods, etc.	$1.17½-$1.83½	1.25 A to H 1.17½ J	1.20 A to H 1.17½ J
Link belting chain, etc.	1.33 - 1.83½	1.25 A to J	1.20 A to J
Billets, blooms, etc.	1.17½- 1.83½	1.00 A to C 0.90 D to J	0.90 A to J
Butts and hinges.	1.33 - 1.83½	1.35 A to H	1.25 A to J
Rough cast'gs, etc.	1.33 - 1.83½	1.25 A to J	1.20 A to J
Pig iron, etc.	0.72 - 1.00	0.90 D to H 0.72 J	0.75 D to H 0.72 J
Boiler flues, etc.	1.17½- 1.83½	1.25 A to H	1.25 A to E
Nails, spikes, etc.	1.17½- 1.83½	1.00 A to J	0.90 A to J
Horseshoe nails, boxed	1.33 - 1.83½	1.25 A to J	1.20 A to J
Cast-iron pipe and connections	1.17½- 1.83½	1.25 A to J *1.00 A to J	1.15 A to J *0.90 A to J
Pipe fittings, etc.	1.25 - 1.83½	1.15 A to J 50,000-lb. min.	1.05 A to J 60,000-lb. min.
Open seam tubing	1.42 - 1.83½	1.25 A to E	†1.25 Gr. E
Wire and wire goods	1.17½- 1.83½	1.00 A to J	0.90 A to J

*60,000-lb. minimum.
†Rate extended to cover movement to north Pacific coast terminals.
Explanatory.—A, includes eastern groups; C, Indianapolis-Detroit section; D, Chicago and Middle West; E, St. Louis section; H, western Kansas-Nebraska; J, Colorado section.

Hearings on the application will begin soon in Chicago before Examiner Disque.

The Iron Age and Its Readers

The series of articles in THE IRON AGE by Henry D. Hibbard, one of the best known of consulting metallurgists in steel, will be worth the careful attention of all our readers who have to do with steel production. These articles appear under the title "Leaves from a Steel Melter's Notebook," and the first of them was printed in our issue of Oct. 27, dealing with the making of hollow ingots for seamless pipe. The second, which will appear this month, is on the "Design of a Structure to Resist Shock or Overstrain."

The appearance of a labor union as a salesman getting business anywhere is most unusual, and the efforts of the International Association of Machinists to book orders in Mexico and other countries south of the United States are interesting. Some complaint has been made by machine tool manufacturers that unfair methods have been adopted. Secretary-Treasurer Davidson of the International Association of Machinists gave his version of what has been done in an interview with the Washington representative of THE IRON AGE in the issue of Nov. 3. It is worth reading.

Iron and Steel Markets

RAILROAD BUYING

Rail Inquiry for 1922 and Orders for Cars

Heavy Products More Commonly 1.50 Cents—Large Tin Plate Contracts—Freight Reduction

Railroad inquiry for rails for 1922 and what may be the beginning of better buying of cars have appeared in the past week. Otherwise the chief developments in the steel market have been tin plate contracts for the first half of next year and some good business in wrought pipe.

The tin plate buying came after a reduction in price on Nov. 3 to $4.75 per box and was in volume sufficient to insure a large operation of tin plate mills through the winter. Can makers bought for the first half of 1922 and jobbers for the first quarter.

Rail inquiries for next year include 100,000 tons for the New York Central, with a possible 200,000 tons, also 40,000 tons for the Norfolk & Western. The Pennsylvania Railroad is considering a 1922 quota of 150,000 tons. Thus far the leading interest has booked 120,000 tons of rails since the $40 price was named.

Orders for 2500 cars for the St. Paul represent 29,000 tons of steel. The Western Pacific has placed 1000 steel cars and the Lackawanna 500 box cars. The Illinois Central inquiry is for 4000 cars and three car repair orders pending at Chicago foot up 1500. In locomotives the Southern Pacific order for 50 is conspicuous.

Steel production in October was 1,616,810 tons of ingots by the 30 companies reporting, or more than double the 803,376 tons produced by the same companies in July. The October increase over September steel output was 37 per cent, whereas pig iron output in October was but 22 per cent more than in September. The Steel Corporation's schedule this week represents 51 per cent of capacity.

Price developments reflect the effort some producers are making to hold operations to the larger scale recently reached. On the heavier products 1.50c., Pittsburgh, is more frequently quoted; the sheet market is drifting lower and adherence to the Sept. 16 card on tubular products is not rigid. In the wire trade, while a fair business has been done at $2.90 for nails, the establishment of a higher price is not imminent.

The expectation of steel producers is centering on Jan. 1 as the probable date of a freight rate reduction. If this should prove to be 15 per cent it would represent about $2 lower cost per ton of steel in the Central West.

At Washington Monday's hearing on the petition of Buffalo iron and steel companies for lower coal and coke rates let loose a flood of counter-petitions, showing that the recent 28 per cent reduction in iron ore freights had shaken the whole rate structure. Lower lake front blast furnaces seek the reduction on coal and coke because of the advantage interior furnaces secured from the cut in ore rates.

Conspicuous items in new fabricated steel projects totaling 18,000 tons are 6200 tons for strengthening a Boston & Maine bridge, and a railroad bridge at Kansas City. The awards of the week amount to about 15,000 tons in sizable projects, including 3600 tons for oil tanks. Additional oil tank work calls for 4000 tons of plates. The Jamaica Boulevard in New York will probably take 7500 tons of bars and the successful bidder quoted 1.50c., Pittsburgh.

Weakness has developed in the pig iron market, particularly in Buffalo, Cleveland and Birmingham, and concessions of from 50c. to $1 per ton are reported.

The ferromanganese market is interesting for its recent indications that domestic producers are making prices to hold their full share of the trade, also for the occasional reappearance of the Steel Corporation as a seller. At $60, Pittsburgh, and in some cases less, for the domestic product British ferromanganese at $58.35, Baltimore, is not competitive.

Heavy melting steel scrap is more active and higher. Recent prices have been enough below pig iron to increase the use of scrap as against pig iron at open hearth plants.

Reports to a convention of Ohio foundrymen at Cleveland, Nov. 7, showed that from the year's low point of a 15 per cent operation on Oct. 1 the industry had gone to 25 per cent on Nov. 1. In all foundry lines except implement and machine tool castings better orders were reported.

Shipments of Lake Superior ore by lake up to Nov. 1 were 21,894,275 tons. The movement for the season, not including all-rail, is estimated at 21,100,000 tons, or the smallest since 1904.

Though the upward turn in production came in July, further price deflation on the present movement is recorded for this week. THE IRON AGE composite for finished steel now stands at 2.134c. per lb., or less than 27 per cent above the average for ten years before the war.

Pittsburgh

PITTSBURGH, Nov. 8.

Downward slant of demand, coupled with the anxiety of the steel manufacturers to keep their plants running as full as possible, is reflected in sharper competition for business and a weaker tendency in prices. Particularly is the condition true of the heavier products in which there has been more frequent quoting of 1.50c., Pittsburgh. The sheet market still is drifting lower and adherence to the Sept. 16 card on tubular goods is not especially rigid. While the Steel Corporation subsidiaries do not appear to be leading in any of the price recessions which recently have taken place they are at least meeting those made by the independents. The market seemingly is a more open one now that it has been before since midsummer.

In line with a report in these columns last week, the American Sheet & Tin Plate Co. last Thursday opened its books for first quarter and first half tonnages, naming a price of $4.75 per base box. There had been a rather strong effort on the part of independent makers to stabilize the market on a base of $5, but with the announcement of $4.75 by the leading interests, all makers have adopted that quotation.

The market in pig iron has become utterly stagnant and prices are purely nominal in the absence of either

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 8, 1921	Nov. 1, 1921	Oct. 11, 1921	Nov. 9, 1920
No. 2X, Philadelphia‡	$22.84	$22.84	$21.84	$47.79
No. 2, Valley furnace†	21.00	21.00	21.00	41.00
No. 2, Southern, Cin'ti†	23.50	23.50	23.50	42.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	38.00
No. 2 foundry, Chicago*	21.00	21.00	21.00	40.00
Basic, del'd, eastern Pa.	20.50	20.50	20.50	44.46
Basic, Valley furnace	19.00	19.00	19.25	38.50
Bessemer, Pittsburgh	21.96	21.96	21.96	43.96
Malleable, Chicago*	21.00	21.00	21.00	40.50
Malleable, Valley	20.50	20.50	20.50	42.00
Gray forge, Pittsburgh	21.96	21.96	21.96	41.96
L. S. charcoal, Chicago	31.50	31.50	31.50	53.50
Ferromanganese, del'd	60.00	60.00	60.00	150.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$47.00	$57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	50.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	50.00
O.-h. sheet bars, P'gh	30.00	30.00	30.00	60.00
Forging billets, base, P'gh.	35.00	35.00	35.00	60.00
O.-h. billets, Phila.	34.74	34.74	36.74	60.74
Wire rods, Pittsburgh	40.00	40.00	41.00	70.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.60	1.60	1.60	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.50	1.50	1.60	3.00
Steel bars, Chicago	1.75	1.75	1.75	3.38
Steel bars, New York	1.80	1.80	1.98	3.38
Tank plates, Pittsburgh	1.50	1.60	1.60	2.85
Tank plates, Chicago	1.75	1.75	1.75	3.23
Tank plates, New York	1.88	1.88	1.98	3.38
Beams, Pittsburgh	1.50	1.60	1.60	3.00
Beams, Chicago	1.75	1.75	1.75	3.38
Beams, New York	1.88	1.88	1.98	3.38
Steel hoops, Pittsburgh	2.25	2.25	2.25	4.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Nov. 8, 1921	Nov. 1, 1921	Oct. 11, 1921	Nov. 9, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	2.90	2.90	3.00	6.00
Sheets, galv., No. 28, P'gh.	3.90	3.90	4.00	7.50
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	4.75
Wire nails, Pittsburgh	2.90	2.90	2.90	4.25
Plain wire, Pittsburgh	2.60	2.60	2.60	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.55	4.45
Tin plate, 100-lb. box, P'gh.	$4.75	$4.75	$5.25	$7.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	$16.00	$16.50	$16.50	$33.00
Carwheels, Philadelphia	17.50	17.50	17.00	39.00
Heavy steel scrap, P'gh.	14.50	14.50	14.00	25.00
Heavy steel scrap, Phila.	12.00	12.00	12.00	20.00
Heavy steel scrap, Chicago	12.00	12.00	12.25	18.50
No. 1 cast, Pittsburgh	17.50	17.50	17.50	35.00
No. 1 cast, Philadelphia	17.50	17.50	17.00	36.00
No. 1 cast, Ch'go (net ton)	13.75	13.75	13.50	22.00
No. 1 RR. wrot., Phila.	16.50	16.00	16.00	26.00
No. 1 RR. wrot., Ch'go (net)	12.50	12.50	13.00	16.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.00	$3.10	$3.35	$8.00
Foundry coke, prompt	4.25	4.25	4.50	9.00
Non-Ferrous Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.12½	13.12½	15.00
Electrolytic copper, N. Y.	12.75	12.75	12.82½	15.00
Zinc, St. Louis	4.75	4.55	4.60	6.80
Zinc, New York	5.25	5.05	5.10	7.25
Lead, St. Louis	4.40	4.40	4.50	6.50
Lead, New York	4.70	4.70	4.70	6.75
Tin, New York	28.62½	28.00	27.00	37.00
Antimony (Asiatic), N. Y.	4.75	4.75	5.00	6.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 8, 1921, Finished Steel, 2.134c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Nov. 1, 1921,	2.163c.
Oct. 11, 1921,	2.236c.
Nov. 9, 1920,	3.653c.
10-year pre-war average,	1.684c.

Composite Price, Nov. 8, 1921, Pig Iron, $19.97 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 1, 1921,	$19.97
Oct. 11, 1921,	19.93
Nov. 9, 1920,	40.22
10-year pre-war average,	15.72

inquiries or sales of a size sufficient to provide a real line on what could be done. Production is light but yet sufficient for requirements, and it is the prevailing idea that less than $19, Valley furnace, could be done on basic iron and that $21, Valley furnace, would be shaded on desirable business.

The scrap market does not appear to be as strong as it was recently and the fuel market is decidedly soft. The strike of the union coal miners on the "check off" issue has been avoided and it is the opinion that there will be no trouble during the winter. It is believed that the Federal Court of Appeals will be in no hurry to hand down a decision as to the legality of the injunction granted by Federal Judge Anderson, in Indianapolis, and if the question is not re-opened in the near future it is probable that the mines will be kept in operation at least until the operators and miners get together in February to work out a new wage scale.

There has been little change one way or another in plant operations in this and nearby districts. The Carnegie Steel Co. has between 35 and 40 per cent of its ingot capacity in operation and 40 per cent is a fair estimate of independent activities, taking in Pittsburgh, Wheeling and the Valley districts. The Carnegie Steel Co. last week blew in a blast furnace at its New Castle, Pa., works and will blow in one of the Carrie group this week. Of the 140 furnaces in this and nearby districts, 45 now are in blast.

Pig Iron.—There is an utter dearth of sales and inquiries are few and far between. We hear of occasional carloads of foundry iron being moved on a base of $21, Valley furnace, for No. 2 grade, but there is almost no interest in next year's requirements. Almost nothing is being done in Bessemer iron and activities in basic have to do largely with efforts on the part of brokers to move some resale lots or to secure bids slightly below current quotations, in the expectation of finding some producer who will accept the business.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.50

Ferroalloys.—Consumers are in the market only occasionally and then for merely their immediate requirements. A West Virginia steel maker recently closed for 100 tons of ferromanganese, 50 tons of 77 per cent manganese content, and 50 tons of 80 per cent material, the average price being slightly above $60, delivered. The nominal quotation of both American and English makers of ferromanganese is $58.35 seaboard, for 80 per cent, but that price also has been named at furnace by one American maker. Nothing has been done in spiegeleisen since the recent sale of 200 tons

at $30, delivered, to a Youngstown steel maker. Interest in 50 per cent ferrosilicon is low, only a few carloads being sought. This material is quotable at $55 to $57, furnace, freight allowed. It is reported here that the General Electric Co., which bought 300 tons of 75 per cent ferrosilicon, paid $92, packed in wood, delivered, Brackenridge, Pa., and not $112 as was reported by some publications.

We quote 78 to 82 per cent domestic ferromanganese at $60 delivered; 78 to 82 per cent foreign ferromanganese, $53.28 to $55, c.i.f Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $55 to $57, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market remains inactive and if there is a definite trend to prices, it is down. Soft 4-in. billets are available as low as $29 and efforts to raise the price of sheet bars have not succeeded. The latter are quoted by most makers at $32, but with sheet prices weakening and tin plate officially down $5 to $10 per base box, non-integrated makers cannot "see" sheet bars at higher than $30. Slabs are stagnant and only occasional inquiries are coming out for forging billets.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30 to $32; Bessemer and open-hearth sheet bars, $30 to $32; slabs, $30 to $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—With specifications on wire products falling short of contract tonnages and other users of rods still finding business rather slow, interest in them is small. The market not only is dull but unsteady, as frequent failure by those quoting $40 and $41 base, to obtain orders on inquiries makes it certain that some makers are accepting less. The higher figure has not been and evidently cannot be obtained, and accordingly omit it from our quotations. Prices are given on page 1246.

Wire Products.—Specifications on contracts for nails are coming in fairly well, but it is admitted that only in rare instances are jobbers ordering out their full quotas. In other wire products, the difference between the contracts and the specifications is even more marked. Lack of demand from agricultural sources still is commented upon, although there are some fence makers who are making up stocks against the spring demands and are taking out fairly full wire allotments. Prices are still uncertain. There is talk that the American Steel & Wire Co. is planning on a horizontal increase of $2 per ton, instead of advancing nails $3 per ton and wire $2 per ton, as was done in September. The probable date of the advance interests the trade. The more common opinion is that the general demand is not broad or strong enough to stand an advance.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Structural Material.—Decline in both the inquiries for and the awards of structural projects is reflected in plain material, prices of which, in the absence of demands of any considerable size, are rather indefinite. One large independent is reported to have made a price of 1.50c. Pittsburgh for plates, shapes and bars over the remainder of the year. Fabricating interests here say no such price has been made them, but believe if they had a good-sized order to place they probably would be able to get that figure. Bars for structural work can be readily placed at 1.50c., but on plates and shapes 1.60c. is about as low as makers are disposed to go on the orders now coming out. The McClintic-Marshall Co. has taken 75 tons for a warehouse and nitric acid shed in Brooklyn for the Grasselli Chemical Co., Cleveland; 370 tons for the expansion bends, Jamaica Bay Boulevard, Rockaway, N. Y., and 230 tons for a deck plate girder bridge for the city of Holyoke, Mass. The American Bridge Co. has taken 1600 tons for the Hotel Bluefield, Bluefield, W. Va. Plain material prices are given on page 1246.

Plates.—A quotation of 1.50c., Pittsburgh, has become rather more common in the past week and while the Steel Corporation subsidiary does not admit making this quotation, there is an impression in the trade that it would meet that price if refusal would mean the loss of a regular customer. We note one sale of 1000 tons to a Pittsburgh district railroad equipment company at 1.50c., Pittsburgh, and there is evidence to support the belief that individual orders of 1000 tons or more can be placed with more than one maker at that figure. We still quote the market from 1.50c. to 1.60c., but the higher figure refers only to small lots.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.65c. f.o.b. Pittsburgh.

Steel Rails.—The fact that the Edgar Thomson Works of Carnegie Steel Co. is one of the active units of that company tells the story about the demand for standard rails in this district. Before the recent reduction of $7 per ton, there were enough orders in sight to keep the Edgar Thomson rail mills running 50 per cent of capacity well up to Dec. 1, and recent releases mean the maintenance and possibly some gain on that rate for the remainder of the year. Interest in light rails is slack because the coal companies quite generally have covered against their winter requirements. Independents are quoting 1.65c. base for 25 to 45-lb. sections, while the Steel Corporation price is 1.75c.

We quote 25 to 45-lb. sections, rolled from new steel, 1.65c. to 1.75c. base; rolled from old rails, 1.60c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Pipe.—Business relatively is good, though there is not so insistent a demand as there was just prior to the settlement of the railroad strike. The least active class of goods is oil country pipe, in which lately there has been much price cutting, as is evident from the fact that one of the distributors of the National Tube Co. has increased the resale discount on mill shipments from 5 to 10 per cent off list, and also has increased the discount on shipments out of stock. It is claimed this was made necessary by competition. There is not strict observance of the Sept. 16, steel pipe card on merchant pipe and on line pipe the advantage still is largely with buyers. Plant activities are fairly high with independent steel pipe makers averaging about 60 per cent and the National Tube Co. about 40 per cent. A. M. Byers Co. is running practically full at its Girard, Ohio, works. Discounts are given on page 1246.

Iron and Steel Bars.—Competition for business in soft bars is sharp, and while makers here are trying to get 1.60c. and 1.65c. they are not successful, save for small lots. A Buffalo maker has quoted 1.50c., Pittsburgh, in the Columbus, Ohio, district, and that was the bid of the Cambria Steel Co. on 525 tons recently inquired for by the Navy Department. Makers of cold finished screw stock and shafting claim to be unable to develop a price of less than 1.60c., Pittsburgh, on either Bessemer or open hearth bars, but admit they have only moderate tonnages to place on ordinary bars, and where a fair sized tonnage is wanted 1.50c. is the common base. There have been no developments in connection with the re-letting of the Baldwin Reservoir job in Cleveland, and inquiry has not yet gone out for the 1750 tons of reinforcing bars for this project. These bars rolled from new steel are fairly readily obtainable at 1.55c. Makers of iron bars still are holding to 2.15c. to 2.25c. for refined iron, but it is believed a firm offer of 2c. would be accepted, since orders are not heavy.

We quote steel bars rolled from billets at 1.50c. to 1.65c.; reinforcing bars, rolled from billets, 1.50c. to 1.65c. base; reinforcing bars, rolled from old rails, 1.50c.; refined iron bars, 2.15c. to 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Sheets.—Demands still are on a tapering scale, and the efforts of some makers to get enough business to keep their plants going is causing irregularity in prices. A quotation of 3.75c. base has been made by more than one maker lately on galvanized sheets, or $5 per ton below the regular price, and a concession, almost as much of a cut, has been made in black sheets. The American Sheet & Tin Plate Co. still is adhering to 3c. base for black and 4c. base for galvanized, but is letting it be known that it does not propose to let the price cost it the loss of customers. Demand for automobile sheets is small, and few expect real improvement in this di-

rection until next spring. One independent company in this district, running heavily to automobile and electrical sheets, shut down last week for an indefinite period. Valley mills have a good schedule this week, but less than 75 per cent of the mills of the leading interest are in operation, and the industry as a whole is averaging about 65 per cent against the recent peak of 75 per cent. Prices are given on page 1246.

Tin Plate.—Verifying the statement in these columns last week that the American Sheet & Tin Plate Co. would name a price of less than $5 per base box for the first half of 1922, was its announcement of Nov. 3, of a base of $4.75, effective that day, and applying against jobbers' orders for the first quarter and those from manufacturers for the first half of the next year. This price is a reduction of $10 per ton from the former price of the company and is $5 per ton below what most other makers were quoting, although a few were taking business at $4.75. It was a surprise to many that the leading interest went below $5, but it had encountered competition as low as $4.75 on production plate and the naming of that figure undoubtedly was prompted by a desire to get away from the position of "holding the umbrella" for the other makers. All makers have fallen in line on price with the American Sheet & Tin Plate Co. Since the new price will not yield a profit except on a high rate of plant operations, it is expected to be more faithfully adhered to than would have been a higher price. Stocks of tin plate in consumers' hands are light and as this year's pack of canned goods was below normal and likely to be used up before a new crop is harvested and packed, container manufacturers are showing a disposition to put in their specifications and allow earlier shipments than has been the case before in several years. Indications point to unusually full employment of the mills during the winter months.

We quote standard production coke tin plate at $4.75 per base box f.o.b. Pittsburgh, for carload lots.

Hot-Rolled and Cold-Rolled Strips.—There has been some increase in specifications against orders for hot-rolled strips. Some of the automobile makers, it seems, have decided to start producing against spring demands next month. Shipments on specifications, however, are priced at 2c., base, generally, and the current quotation of 2.25c., base, finds little basis in sales. Similarly in cold-rolled strips, consumers being covered against requirement over the remainder of the year at 3.75c., base, the current quotation of 4c. is merely a quotation.

Hoops and Bands.—New business is small and specifications against contracts placed prior to the recent advance in prices leave much to be desired. This is notably the case on hoops due to the fact that there are some makers in the Middle West who still are taking business below the regular base of 2.25c., Pittsburgh.

Steel Skelp.—Business still is exceedingly light and prices poorly defined. Makers are quoting 1.65c. or the same base as plates, but with both pipe and tube orders to be had only at highly competitive prices, difficulty is experienced in getting that price, and 1.60c. is the more common figure. A really desirable order probably would mean the shading of the latter price.

Coke and Coal.—The recent possibility of a strike by the union coal miners as a result of the injunction against the "check-off" by Federal Judge Anderson in Indianapolis brought a few inquiries for non-union coke and coal for forward delivery and also created some expectation of an active and strong market. Suspension of the injunction by the Federal Court of Appeals in Chicago, however, means that the operators will continue to check off and that the strike order will be rescinded. The result of these developments is that the recent softness in prices has become more pronounced. The larger producers of coke still are asking around $3.40 per net ton, oven, for furnace grade, but the highest price at which any business recently has been done was $3.35. Several of the smaller operators who put on ovens before they had orders now are trying to find an outlet for the production and have taken business anywhere from $3.25 down to $3. Demand for foundry coke is lighter than it has been and there also has been some cutting of specifications on contracts. Sales of surplus tonnages of this grade have been done as low as $4, but the real market on standard grade is from $4.25 to $4.50, and as high as $4.75 still is being obtained for choice brands. The coal market is dull and weak. Representative of what now can be done we quote mine run steam coal at $1.65 to $1.75 per net ton at mines, by-product at $1.75 to $1.90, and gas coal at $2.25 to $2.50 for mine run and $2.65 for ¾-in. lump.

Boiler Tubes.—Makers of charcoal iron boiler tubes are holding rather firmly to the prices announced early in October, but the market on steel tubes is unsettled and weak with concessions noted of as much as $14 to $15 per ton from the quoted discounts. Business was fairly good in October, but has dwindled considerably this month. Evidently buyers covered their early winter needs last month. Discounts are given on page 1246.

Cold-Finished Steel Bars and Shafting.—Demand is slightly better than it has been, but it still falls far short of matching the supply and an order for 100 tons now gets as much notice as one ten times as large would have had a year ago. There is not enough business to go around among the makers and prices still are irregular and easy. The common range on cold-finished screw stock and shafting is 2.15c. to 2.25c. base, Pittsburgh, but as low as 2c. base has been done by some makers anxious to convert stock into cash. Ground shafting holds at 2.75c. base, mill for carloads.

Nuts, Bolts and Rivets.—A fair business was done by most makers last month, but purchases of that month evidently filled up buyers and demand this month so far has been light. Public quotations show no change, but it still happens that makers who insist upon them rigidly usually lose orders. Rivets are easy. Prices and discounts are given on page 1246.

Spikes.—The market on standard spikes is not over $2.25 base per 100 lb. Pittsburgh on lots of a carload or more, and it is said that even that price is being shaded by Middle Western makers. The Illinois Central Railroad recently inquired for 2000 kegs and the Erie Railroad for 3000 kegs. Small spikes are only moderately active. Prices are given on page 1246.

Old Material.—Although prices are not quotably lower, there is a distinctly softer tone to the market and it is easier for steel makers to get supplies than recently was the case. The fact that the early fall demand for finished steel has not held up has made melters a little more conservative about scrap purchases and the prices they are willing to pay. Since this tendency also prevails in centers which compete with Pittsburgh for supplies, offerings in this district are heavier. The demand for turnings and heavy breakable cast here is curtailed by the fact that one important consumer of these grades recently shut down. The Cambria Steel Co. is reported to be in the market for heavy melting steel, for which it is offering $15, Johnstown. A striking feature of the situation is that in the face of a slower consumptive demand and a drift toward lower prices, dealers still are paying high prices. Dealers paid $13.50 a net ton or $15.12 a gross ton for the steel recently offered by the Pennsylvania Railroad Central Region.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.50 to $15.00
No. 1 cast cupola size	17.50 to 18.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.00 to 16.50
Compressed sheet steel	12.50 to 12.75
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	11.00 to 11.50
Railroad knuckles and couplers	15.50 to 16.00
Railroad coil and leaf springs	15.50 to 16.00
Low phosphorus standard bloom and billet ends	20.00 to 21.00
Low phosphorus plates and other grades	17.50 to 18.50
Railroad malleable	13.50 to 14.00
Iron car axles	25.00 to 26.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	16.50 to 17.00
Cast iron wheels	16.50 to 17.00
Rolled steel wheels	15.50 to 16.00
Machine shop turnings	10.00 to 10.50
Sheet bar crop ends	14.50 to 15.00
Heavy steel axle turnings	12.50 to 13.00
Short shoveling turnings	11.50 to 12.00
Heavy breakable cast	15.50 to 16.00
Stove plate	13.00 to 13.50
Cast iron borings	10.50 to 11.00
No. 1 railroad wrought	12.00 to 12.50

New York

NEW YORK, Nov. 8.

Pig Iron.—The dullness reported last week continues and sales have been few and of small tonnages. One agency reports inquiries for first quarter of next year aggregating 1000 to 1200 tons, 300 tons being from a consumer at East Orange, N. J. Little, if any, eastern Pennsylvania iron is now obtainable for prompt delivery at less than $21, furnace, for No. 2 plain, although $20.50 is quoted for later delivery. Reports from New England indicate that many foundries are increasing their melt slightly, particularly those connected with the textile industry.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	23.02
Buffalo, sil. 1.75 to 2.25	25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16

Ferroalloys.—Demand for ferromanganese is light, inquiries including three lots of 50 tons each. There is evidence that domestic producers are holding the full proportion of the market they have had. Recently the Steel Corporation is understood to have been a seller in the Central West. Prices are nominally unchanged. The spiegeleisen market is inactive with inquiries and sales confined to small lots at prevailing quotations. Demand for manganese ore continues negligible. Inquiries for 50 per cent ferrosilicon are fairly numerous, the total aggregating about 150 tons. A sale of 100 tons is reported to a large Michigan consumer. Quotations vary, depending on the seller, but while some quote $60, delivered, as a minimum, it is admitted that business has been done as low as $56 to $58, delivered. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $61.00
Ferromanganese, British, seaboard, per ton.	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$56.00 to $60.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	10c. to 11c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.50 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—Bids were opened Monday of this week for 100 tons of 12-in. pipe for Washington. Though immediate business is falling off, due to the approach of winter months, prospects for a healthy business in the spring are very evident. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30 4-in. and 5-in., $52.30 3-in., $62.30, with $4 additional for Class A and gas pipe.

Warehouse Business.—The present situation in transactions compares rather unfavorably with the improvement in business that was noted in September by most warehouses. Prices remain unchanged in all materials, but they are undeniably weak in many lines. Warehouses dealing in wrought iron and steel pipe report extreme dullness, but an average number of small orders. The brass and copper market shows fair activity and prices are stiff. We quote prices on page 1258.

High Speed Steel.—Quotations on 18 per cent tungsten high speed steel continue at about 90c. per lb. Orders are confined to a few bars. Consumers in numerous instances, when in need of certain sizes not in their stock, are asking the manufacturer to exchange sizes which they are not using.

Finished Iron and Steel.—The New York Central is inquiring for 100,000 to 200,000 tons of rails of 120-lb. sections and lighter. No fresh railroad car business has been offered, but the Baltimore & Ohio has decided to ask for 1000 more hopper car bodies in place of the larger total number of coke cars and gondolas earlier under consideration. Railroad bridge work promises to expand. The Boston & Maine has invited bids for the strengthening of the Newburyport bridge taking probably 2200 tons, and the Philadelphia & Reading has placed a 600-ton bridge at Atlantic City with the American Bridge Co. General indications are that the November rate of buying is keeping up to the October level. It now develops that the concrete reinforcing bars for the Jamaica Boulevard will be supplied by the Jones & Laughlin Steel Co. at 1.50c. Pittsburgh, and that the total may mount to 7500 tons. Activity in pipe has been particularly noteworthy. One mill, for example, had been lately operating 80 per cent of its pipe furnaces, and its new orders and specifications for October were practically 50 per cent larger than its shipments. New fabricated steel work includes 2100 tons for the National Biscuit Co. at Buffalo, 1300 tons for a high school at Greenville, N. J., 350 tons for a viaduct for New York at 134th Street (this a revival of the proposal), 360 tons for a public school in New York and 600 tons for an electric station at Fort Worth, Tex. Among the contract awards, besides the Reading bridge already mentioned, are 600 tons for the Atlas Powder Co., Marshall, Tex., 1000 tons for a high school at Springfield, Mass., and 3600 tons for some 20 tanks for the Sinclair Crude Oil Purchasing Co. in Oklahoma, 15 of them being placed with the Phoenix Iron Works Co.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.80c. to 1.88c.; plates, 1.88c. to 2.03c.; structural shapes, 1.88c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Old Material.—Though there is reported an increase of buying of steel by mills in the Pittsburgh district, the high freight rate from this district prevents brokers and dealers here from taking advantage of it. Business was very quiet last week and is expected to be even more so this week because of the two holidays. Cast scrap is a trifle softer, but machine-shop turnings have advanced 50 cents.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$8.00 to $8.50
Steel rails, short lengths, or equivalent	9.50 to 10.00
Rerolling rails	12.00 to 12.50
Relaying rails, nominal	30.00 to 35.00
Steel car axles	12.00 to 12.50
Iron car axles	21.00 to 21.50
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track	9.50 to 10.00
Forge fire	6.00 to 6.50
No. 1 yard wrought, long	10.50 to 11.00
Light iron	4.50 to 5.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	4.50 to 5.00
Mixed borings and turnings	4.50 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.75 to 9.25
Stove plate	11.00 to 11.50
Locomotive grate bars	10.50 to 11.00
Malleable cast (railroad)	9.00 to 9.50
Car wheels	12.50 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to 17.00
No. 1 heavy cast, not cupola size	15.50 to 16.00
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Cleveland

CLEVELAND, Nov. 7.

Iron Ore.—Ore shipments during October were 3,233,081 gross tons and the lake movement until Nov. 1 was 21,894,275 tons, as compared with 53,122,342 tons during the same period last year, or a decrease of 31,228,067 tons. As the November movement is estimated at about 200,000 tons, lake shipments for the season will be approximately 22,100,000 tons, or slightly greater than recent estimates. Only a few cargoes remain to be shipped and all shippers expect to be through by Nov. 15.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Weakness has developed in the foundry pig iron market and a local interest is now quoting this grade on the basis of $20, Valley furnace, for shipment from Cleveland. This price means less than $20 at furnace in case the freight rate to consuming point is lower from the Valley than from Cleveland. Valley

producers continue to quote foundry iron at $21, and Lake furnaces, with one exception, are holding to a minimum price of $20 at furnace. Locally foundry iron is quoted at $20.50 to $21 at furnace, although a few sales are reported at $20, Valley, or $21.96 delivered. Sales during the week were exceedingly light. One producer sold 900 tons in small lots and some others smaller amounts. Inquiries are still light, although some inquiries have come from central Ohio for foundry iron in lots up to 300 tons. Two inquiries are pending from the Pittsburgh district, one for 800 tons of foundry and the other for 300 tons of malleable iron. The General Electric Co. is inquiring for 3000 tons of basic iron for delivery to a Brackenridge steel plant. Southern resale iron is still offered at $18.50. Shipments are lighter than last month. The McKinney Steel Co. blew in a second Cleveland furnace, No. 5, having just completed relining this furnace.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.00 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	35.00

Coke.—Softness has developed in the foundry coke market and some makes are 25c. to 50c. a ton lower. Quotations on standard Connellsville foundry coke range from $4.25 to $4.75.

Semi-Finished Steel.—The market is inactive with $30 regarded as the price on sheet bars, although some mills are asking $32. On slabs a quotation of $29, Youngstown, has appeared.

Finished Iron and Steel.—The demand is light and prices are weak. There is more activity in plates than in other lines. Structural material is particularly quiet. On steel bars 1.50c., Pittsburgh, seems to have become a more common quotation, and in the case of one small lot of reinforcing bars sold at that price the seller agreed to truck the steel from the cars to the work without charge. The plate market is irregular. A western Pennsylvania tank shop is reported to have placed 3,000 tons of plates at about 1.50c. Other quotations range from 1.55c. to 1.75c. Quotations on structural material appear to range from 1.55c. to 1.65c. Hard steel bars are unchanged at from 1.50c. to 1.60c. The seasonable slowing down of the automotive industry has resulted in a falling off in the demand for steel from that source. However, the plans of the Durant Motors, Inc., for getting under production resulted in the placing during the week of small orders including one for 104 tons of chrome nickel steel. There is little activity in the building field. Two new inquiries, one for a branch for the Union Trust Co. and the other for an addition to the plant of the Lamson & Sessions Co., Cleveland, each requiring 200 tons, have come out. The Stange-Walsh Construction Co., Washington, was low bidder for the Baldwin Reservoir, Cleveland, requiring 1700 tons of reinforcing bars.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—New demand is very light, but mills are getting good specifications on contract. The market is not firm and there are reports of concessions to 2.75c. on black sheets and to 3.50c. on galvanized sheets. Some mills are still quoting blue annealed sheets in all gages at 2.25c. Sales of light plates in blue annealed gages are being made at 2.10c.

Warehouse Business.—Warehouse prices on steel bars are weak, and although regular quotations have not been changed, leading jobbers are naming a 2.54c. price, or a concession of $2 a ton. Some jobbers are selling odd lots as low as 2c. Regular warehouse prices on other material are being well maintained.

Bolts, Nuts and Rivets.—There is a lull in the bolt and nut market and in view of the fact that inventory times are approaching, makers look for a quiet month. Price irregularities are still appearing. Two new inquiries, each for 1000 tons of structural rivets, have appeared from the East, one from a shipyard and the other from a boiler shop. In both cases, deliveries are wanted over a four month period. Local makers are taking small lot orders at 2.40c. for structural rivets and 2.50c. for boiler rivets, but these prices are being shaded $1 to $2 a ton.

Old Material.—The market continues dull, but prices are firm. A limited demand developed during the week from a local blast furnace for mixed borings and short turnings. One sale of a small lot to this consumer is reported at $8.75, which appears to be somewhat above the going market. Mills in the Youngstown district are still out of the market, but there is some activity on the part of dealers in that district who have unfilled orders. Sales are reported to dealers for delivery to Youngstown mills at $14 to $14.50 for heavy melting steel and $12.25 to $12.50 for compressed steel. Dealers say that the amount of scrap available at prices they are able to pay is quite limited.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$12.00 to $12.50
Steel rails, under 3 ft.	12.75 to 13.25
Steel rails, rerolling	13.50 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	8.65 to 8.85
Machine shop turnings	6.60 to 7.00
Mixed borings and short turnings	7.50 to 8.00
Compressed steel	9.50 to 9.75
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	6.25 to 6.60
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in.	8.00 to 8.50
Drop forge flashings, under 10 in.	8.00 to 8.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

Boston

BOSTON, Nov. 8.

Pig Iron.—Sales this week were confined to a few car lots, mostly Buffalo and eastern Pennsylvania iron. In the absence of business, prices are largely nominal. Sellers of Buffalo, in some cases, ignore silicon price differentials, and the impression among buyers is that round tonnages can be purchased for less than $20 base. A car of special analysis Buffalo sold this week at $19.50. On the other hand, iron of silicon 3.00 to 3.25 generally has sold at $21 furnace. Two cars of eastern Pennsylvania No. 1X iron sold at $24.75 furnace, but other brands are available at least $2 a ton less. No. 2X central Pennsylvania iron has sold at $20.75 furnace or $26.51 delivered. No Virginia sales are reported, and, as all furnaces are down, the market is firm at $24 to $24.50 base. Freights continue against sales of Alabama in this territory. A western Massachusetts melter asking tentative bids on 6000 tons and eastern Massachusetts foundry on an unstated tonnage, generally understood to be 5000 tons, first quarter delivery, have been unable to cover at prices wanted. Little 1922 iron has sold in this district. A Cape foundry recently purchased 500 tons of northern, silicon 2.75 to 3.25, mostly first quarter delivery, at $21 furnace. The average New England melter has enough iron on hand or on order to carry him well into the first quarter on the present basis of operations. Delivered prices follow:

East, Penn., silicon 2.25 to 2.75	$24.56 to $27.56
East. Penn., silicon 1.75 to 2.25	24.06 to 27.06
Buffalo, silicon 2.25 to 2.75	25.46 to 26.46
Buffalo, silicon 1.75 to 2.25	24.96 to 25.96
Virginia, silicon 2.25 to 2.75	31.08 to 31.58
Virginia, silicon 1.75 to 2.25	30.58 to 31.08
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Warehouse Business.—Movement of iron and steel out of stock is not as good as reported the previous fortnight. The demand for bolts and nuts is better, but competition for business is keener and prices are no more than steady. In fact, some jobbers offer an extra 10 per cent on semi-finished hexagon nuts. Mill indications of an impending advance in wire nails have not influenced the local market, which is $4 to $4.50 base. Sheet zinc is 1c. per lb. lower at 11c. base.

Finished Material.—The Providence Iron & Steel Co., Providence, R. I., is awarded 300 tons structural for a Masonic temple, Fall River, Mass., and McClintic-Marshall Co. 225 tons for the Valley bridge, Holyoke, Mass., and the New England Structural Co., Boston, 200 tons for the Bradley building, Boston, while the Boston & Maine Railroad Co. is asking bids on strengthening bridge No. 50, Newburyport, involving approximately 2300 tons. Revised bids are asked on the 600-ton Providence, R. I., high school job. No award on the Neponsit River bridge has been made. Otherwise the structural market is quiet and steady at 1.60c. Pittsburgh on shapes. Buying of other steel mill products has dropped to small proportions, an inquiry by the New York, New Haven & Hartford Railroad Co. for 200 tons plates, shapes and bars, delivery Sagamore, Mass., car repair shops, being among the largest prospective orders. The dullness is attributed to anticipated lower freight rates and to the drawing nearer of the stock taking period. On the other hand, warehouses and manufacturers who bought stock last month want mill deliveries. The bar market is unsettled; 1.50c. Pittsburgh can be done.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.31½; concrete bars, $2.15 to $2.81½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.73 to $3.78; steel hoops, $3.46½; toe calk steel, $5; cold rolled steel, $3.75 to $4.25; structural steel, $2.91½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.81½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Old Material.—Dealers report no improvement in the foundry demand for No. 1 machinery cast. A sale of No. 2 cast is reported this week at $13 delivered, but this price is out of proportion with those generally asked. A Norwood, Mass., consumer is still inquiring on stove plate, but getting little in this market. It is, however, securing New York material. There is a good demand for machine shop turnings and the market is about 50c. higher, while the call for rolling mill and chemical borings, especially the latter, exceeds the supply and prices are strong. One chemical company is inquiring on 500 tons of borings. Local buying of railroad wrought scrap also has improved at $15 to $16 delivered, an advance of about 50c. Almost no business is reported in heavy melting steel, there apparently being a deadlock between steel mills and dealers. Bundled skeleton and forged scrap inquiries are increasing and prices for same have stiffened on the inside.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	15.50 to 16.50
Railroad malleable	13.50 to 14.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.50 to $8.00
No. 1 railroad wrought	11.50 to 12.50
No. 1 yard wrought	9.50 to 10.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.25
Machine shop turnings	4.00 to 4.50
Cast iron borings, rolling mill	5.00 to 5.50
Cast iron borings, chemical	5.50 to 6.00
Blast furnace borings and turnings	3.50 to 4.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.00 to 12.00
Rerolling rails	11.50 to 12.00

Birmingham

BIRMINGHAM, ALA., Nov. 8.

Pig Iron.—Sales of pig iron, while in small lots, aggregated a tonnage for the week that is regarded as satisfactory considering the general waiting mood based on expectancy of lower freight rates. The buying was for November delivery almost entirely, interest in the future appearing to have collapsed for the time being. Southern consumers seem to feel that the market will neither rise nor fall and are not concerned over forward delivery, while the furnaces that are active are well booked for the remainder of the year and the make is moving out rapidly. Indications point to further diminution of stocks. The largest yard holdings will be about 30,000 tons and none others will amount to much in the merchant iron market. Inquiry was rather brisk with one maker, who received one for 5000 tons from a pipe maker outside the district. A few lots were sold immediately north of the Ohio River, but, as a rule, nothing is being done in that direction. The six merchant stacks on the active list seem just about the right number to care for the going business and blowing in of additional ones is not mentioned as of the near future. The pipe melt continues large and there is a steady movement of iron to pipe shop yards. All business is done on the $19 base. The resuming charcoal furnaces are delivering largely on past due contracts and new business is not of noticeable tonnage.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$19.00
Basic	18.00
Charcoal, warm blast	35.00

Finishing Mills.—Tennessee company's and Gulf States Steel Co.'s finishing mills continue on same satisfactory scale as for several weeks. Hoop and band mills, which were down a while, resumed Monday. There have been some small exports to South America and Asia. One structural steel mill is practically at 100 per cent on steel for buildings in the Southern States.

Cast Iron Pipe.—Both high pressure and sanitary pipe makers report much better business than usual for this time of the year, due to pressure to advance construction before winter sets in. October business in sanitary pipe was good, especially to Pacific coast and the East, but it was well scattered. Some shops are at 100 per cent capacity. Jobbers are protecting themselves for the remainder of the year at present prices, which remain for the most part at $40 base. All high pressure pipe shops are operating, although one is on fittings only. High pressure base is $33 to $35.

Coal and Coke.—Coal production has made another high mark for the year, a total of 280,000 tons per week being recorded, compared with normal of 300,000. South America has taken several consignments of Alabama coal out of Mobile. The Barrett company's pitch coke is pronounced a success, but sells at $7, compared with $6 for beehive and by-products. Coke is active and demand is widely scattered.

Old Material.—Scrap dealers hold to No. 1 steel hoping for higher prices. It is difficult to get in country scrap on account of freight rates. Expected strength in the old material market has not materialized.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Buffalo

BUFFALO, Nov. 5.

Pig Iron.—Falling off in demand is noticed by all the producers in the district and notwithstanding that $19 base price is the rule on large tonnages rather than the exception, sales have been light since the several purchases by radiator interests. Some evidence of the bargain nature at which this business moved is indicated by the fact that a furnace which quoted $19.50 for this business did not get any portion of the orders. Ore shipments have practically ceased for the year and the present blast furnace operation with seven stacks in blast will likely represent the apex of blast this year. One furnace has less than 1000 tons inquired for in a week and about 15 requests for prices made up this total. A sale of 400 tons at $20.50 was made by a furnace. A producer with two furnaces in blast will change one stack to run on malleable for a few weeks. There is no disposition by any furnaces to blow in additional stacks at present prices.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$19.50 to $20.00
No. 2X foundry, 2.25 to 2.75 sil.	19.00 to 19.50
No. 2 plain, 1.75 to 2.25 sil.	18.50 to 19.00
Basic	20.00 to 21.00
Malleable	20.00 to 21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—Some improvement in the demand for wire products and continued good business

in pipe summarize the only activity in the market. The wire improvement is based on the advance in the price situation, but generally the demand for plates and sheets is small. Some structural business has come out and several fabricators have found a trifling improvement in the demand for small sizes. Some of this inquiry concerns 1922 business. The Kellogg Structural Steel Co. will fabricate 100 tons for the Cox building, Utica, N. Y. The three open hearth furnaces in operation by a bar interest are producing in excess of demand and operation of a fourth mill is intermittent. No bar inquiry of consequence is on the market and business taken is for exceedingly small tonnages. Tin plate business is dull due to the close of the seasonal demand. In some quarters, the falling off in inquiry is not charged to the railroad strike alarm as much as it is to the belief that freight rate reductions may effect economies in buying and that wisdom is shown in waiting for new rates.

Warehouse Business.—Dullness has been evident since the crisis in the railroad situation was passed and the effect is apparent in sales as well as interest in prices. In some branches of the business the marked quiet is attributed to the fact that a number of buyers anticipated needs in advance of the strike date and this material is sufficient to carry them over for some time.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 5.90c.

Old Material.—Inquiry and sales has fallen off to a marked degree. One dealer is making no effort to sell at present prices and the mills that were buying in small lots in October appear to have filled their needs. In filling an order for heavy melting steel, a dealer paid $12.50. No other materials have moved in any large tonnages.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.004 and under	16.50 to 17.50
No. 1 railroad wrought	13.00 to 14.00
Car wheels	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.00 to 11.00
Grate bars	11.00 to 12.00
No. 1 busheling	10.00 to 11.00
Stove plate	14.50 to 15.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 17.50
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

St. Louis

ST. LOUIS, Nov. 8.

Pig Iron.—The market for pig iron is still rather inactive. Consumers in this district are buying very little, and the limited demand has come from other sources. For instance, a California melter bought 650 tons of Southern foundry iron from a broker here, a car wheel manufacturer in the Southwest bought 300 tons, and there were several 100-ton orders, while the Missouri, Kansas & Texas Railroad bought a carload of foundry iron for its foundry in Parsons, Kan. An Indiana melter has an inquiry out for 500 tons of malleable, and there are other scattering inquiries out for 1,000 tons. The market is firm at $21 Chicago, although in rare instances some producers are getting $22 Chicago.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern Foundry, sil. 1.75 to 2.25	$23.88
Northern malleable, sil. 1.75 to 2.25	23.88
Basic	23.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—The Missouri, Kansas & Texas Railroad expects to place orders some time this week for the machine tool list issued several weeks ago embracing 86 items. This road also has an inquiry out for 20 steel passenger cars and 10 steel baggage cars. The Missouri Pacific Railroad placed an order with the Sheffield Car & Equipment Co., Kansas City, Mo., for the repair of 530 box cars, involving considerable steel tonnage, and this road also purchased 2,000 tons of standard track spikes, for which an inquiry was reported several weeks ago. Cosden & Co., Tulsa, Okla., have bought 1,000 tons of plates required for tanks, which are being built by a Kansas City fabricator. The City of St. Louis will build a 3-story addition to Koch Hospital, involving 50 tons of reinforcing bars and 20 tons of structural steel. Bids will be opened on Nov. 22 for a high school at Lawrence, Kan., involving 230 tons of bars. It was learned here that the Concrete Engineering Co., Omaha, got the contract for the 1,000 tons of bars to be used in the Omaha Commercial and Technical High School. The demand for sheets seems to have fallen off.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The demand for coke is only fair. So far the troubles among the coal miners have not stimulated any demand for coke. Foundry coke is moving more freely. With colder weather, the sale of domestic coke is improving.

Old Material.—The market for old material does not show the strength recently displayed. There is an apparent softening all down the line and prices have receded from 50c. to $2 a ton from recent high levels. This weakness is attributed primarily to a slackening of demand. Consumers appear to have deserted the market entirely, and brokers are experiencing some difficulty in disposing of material now coming in, being compelled in many instances to sell at a loss. The recent cut of $7 per ton in new rails has not affected the relaying rails market to any extent, as relaying rails still are scarce and are quoted at from $30 to $35 per gross ton, according to section. Current railroad offerings include: Baltimore & Ohio, 10,800 tons; Missouri, Kansas & Texas, 1,800 tons, and Mobile & Ohio, 550 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$16.00 to $16.50
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard section	30.00 to 35.00
Cast iron car wheels	15.00 to 15.50
No. 1 heavy railroad melting steel	11.50 to 12.00
No. 1 heavy shoveling steel	11.00 to 11.50
Ordinary shoveling steel	10.50 to 11.00
Frogs, switches and guards, cut apart	11.50 to 12.00
Ordinary bundle sheet	5.00 to 5.50
Per Net Ton	
Heavy axles and tire turnings	$7.00 to $7.50
Iron angle bars	13.00 to 13.50
Steel angle bars	10.50 to 11.00
Iron car wheels	21.00 to 21.50
Steel car wheels	14.50 to 15.00
Wrought iron arch bars and transoms	15.00 to 15.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel couplers and knuckles	12.00 to 12.50
Locomotive tire, 42-in. and over, smooth inside	10.00 to 10.50
No. 1 dealer's forge	9.50 to 10.00
Cast iron borings	7.00 to 7.50
No. 1 busheling	10.50 to 11.00
No. 1 railroad cast	14.50 to 15.00
Stove plate and light cast	12.50 to 13.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.50 to 10.00
Pipes and flues	8.00 to 8.50
Heavy railroad sheet and tank	7.00 to 7.50
Light railroad sheet	5.00 to 5.50
Railroad grate bars	10.00 to 10.50
Machine shop turnings	6.00 to 6.50
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	8.50 to 9.00
Horseshoes	11.00 to 11.50
Railroad brake shoes	9.50 to 10.00
Railroad springs	12.00 to 12.50

Carnegie Steel Co. Will Dismantle Parts of Sharon Plant

YOUNGSTOWN, OHIO, Nov. 7.—The Carnegie Steel Co. announces it will dismantle steel making and rolling mill units at the Sharon, Pa., plant, leaving only a blast furnace. The plant was built in 1896 and consists of six open-hearth furnaces of 40 tons capacity each, four soaking pits, two continuous heating furnaces, one 35-in. blooming mill and one 27-in. three-high finishing mill. It has an annual capacity of 150,000 tons of ingots and had been running on sheet bars and skelp prior to its suspension about a year and a half ago.

Cincinnati

CINCINNATI, Nov. 7.

Pig Iron.—The market continues dull, though there are a few small-sized inquiries being figured on. The National Cash Register Co. is inquiring on 300 tons, half Northern and half Southern, for January shipment, and another Dayton manufacturer is in the market for 250 tons. With these exceptions, the inquiries are confined to carload lots. Several sales of 100 tons each are reported, a central Ohio stove maker taking 150 tons of iron from a Cleveland district furnace on the basis of $20. A southern Ohio melter is reported to have bought 100 tons from a southern Ohio furnace at $20, Ironton, and a sale of 100 tons of high silicon iron to a central Ohio melter is reported at the same figure. Some resale material is still available in the South at $18.50, but the usual quotation is $19, as most furnaces are quoting this figure on the base grade. An interesting feature of the market was a quotation of Buffalo iron into Columbus, Ohio, on an equal delivered basis with lake and southern Ohio furnaces. It is reported that two steel works furnaces in this district will be lighted shortly to supply the plants with iron to run open-hearth furnaces. No confirmation of the reports, however, is available.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil	32.86
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	$22.52 to 23.52
Basic, Northern	22.52
Malleable	24.02

Finished Material.—With the exception of wire and wire products, the market on finished materials was quiet during the week. The prospect of an advance in wire and wire nails brought out a little business, on the basis of 2.60c. on plain wire, and 2.90c. per keg for wire nails. The advance on these products has not been announced, but the indications are that it will be some time this week. It is currently reported that several independent nail mills have recently quoted $2.75 per keg on wire nails. The American Sheet & Tin Plate Co. has reduced its price on production tin plate from $5.25 per base box to $4.75. This latter price has been made for some time by independent producers, and the action of the Steel Corporation's subsidiary now makes it the general market quotation. Tin plate business has fallen off to some extent recently, and it is yet too early to forecast what the result of the price reduction will be. Sheet business is confined almost entirely to carload orders for fill-in purposes, and the prices of 3c. and 4c. for black and galvanized sheets, made by some independent mills, is not being generally adhered to. On bars, shapes and plates, 1.60c. is the ruling quotation, with business slow. In the structural field, the Big Four closed bids Friday on several plate girder spans, aggregating 400 tons, though an award has not yet been made. Two turntables which this road recently inquired for have been awarded to the King Bridge Co. A five-story hotel at Middletown, Ohio, to be built of reinforced concrete, has been awarded to Dwight P. Robinson Co., New York. An interesting feature in the steel market during the week was a river shipment of approximately 5000 tons of steel destined for points along the Ohio and Mississippi rivers. The steel was shipped by the Jones & Laughlin Steel Co. from Pittsburgh, and included bars, shapes, plates, pipe and wire products.

Coke.—The coke market is exceptionally dull, and from 25 to 50c. weaker. Connellsville foundry coke is now quoted at $4.50; Wise County, $5.75 to $6, and New River, $7.50.

Warehouse Business.—Local warehouses report business as fair. During the latter part of the week some nice orders were booked, some of the business coming from the railroads operating in this district. Bolts and nuts are fairly active, one jobber reporting receipt of an order for 25 tons. Wire nails are also moving fairly well, and there has been a limited demand for cold-rolled steel. Prices are unchanged, and, if anything, firmer.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.10c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Old Material.—A small flurry developed in the scrap market during the early part of the week, but soon petered out, and sales are practically non-existent. Prices are quotably unchanged.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	$4.50 to $5.50
Iron rails	12.50 to 13.00
Relaying rails, 50 lb. and up	25.50 to 26.50
Rerolling steel rails	11.00 to 12.00
Heavy melting steel	9.50 to 10.00
Steel rails for melting	9.50 to 10.50
Car wheels	12.50 to 13.50
Per Net Ton	
No. 1 railroad wrought	9.00 to 10.00
Cast borings	3.50 to 4.00
Steel turnings	2.50 to 3.00
Railroad cast	12.50 to 13.00
No. 1 machinery	14.00 to 15.00
Burnt scrap	8.00 to 9.00
Iron axles	16.00 to 17.00
Locomotive tires (smooth inside)	10.00 to 10.50
Pipes and flues	4.50 to 5.50

Chicago

CHICAGO, Nov. 8.

New business in most commodities in the iron and steel field has tapered off, but this is regarded as a natural reaction from the brisk buying which occurred on the eve of the threatened strike. It is also recognized that the general expectation of freight rate reductions is tending to hold back orders which can be deferred. This tendency toward renewed caution in buying has not yet had any material effect on furnace and mill operations and is regarded as a temporary pause in market activity.

Late information regarding the plans of the railroads indicate that they may be counted on to place large orders for iron and steel. Budgets for 1922 show large tonnages of rails, tie-plates and track fastenings, in many cases fully as large as the orders placed at the beginning of the current year. Liberal buying of cars and locomotives is also in prospect. It is to be noted that there is a sustained demand for structural steel with indications pointing to an increase rather than a diminution of fabricating work. There have been no material changes in the price situation, although signs of further weakness are to be noted in some directions.

Production in this district is on a slightly improved plane. The Illinois Steel Co. is operating at 47 per cent of ingot capacity and the Inland Steel Co. is on a 40 per cent basis.

Pig Iron.—Sales have been light during the past week, but inquiries are more numerous. A Milwaukee melter is in the market for 5000 tons of Northern No. 1 foundry for first half shipment and from 400 to 800 tons of 7 per cent silvery for December to June delivery. A Sheboygan consumer wants 400 tons of high phosphorus Southern foundry. Other inquiries include one for 200 tons of Southern charcoal and another for 200 tons of malleable for Michigan delivery. The appearance of inquiries for 1922 delivery brings up the question of what prices will be quoted for that shipment. While producers have not committed themselves on this point, it is intimated that one maker would accept orders for first quarter delivery at the present market. On the other hand, a recent sale of 500 tons of malleable for shipment over the next three months was closed at $22 base furnace. In sharp contrast with this order is an unconfirmed report of a sale of 300 tons of Bessemer for early shipment at $20, Chicago furnace. The warming up of an initial stack of the Iroquois plant of the Steel & Tube Co. of America is still under way and casts are expected to be obtained early next week. Charcoal iron has been more active

of late, numerous sales having been made, particularly in the Pittsburgh district, and a few, involving about 100 tons each, for shipment to Europe. The furnace at Wells, Mich., has gone in blast. Silvery has weakened, some material having been offered at the prices ruling before the recent advance by Jackson County producers. Occasional inquiries for Southern foundry are being received from melters who want that iron for their mixtures, and there is no longer any resale in this territory with which they can cover their requirements. Until freight rates are reduced, however, it is unlikely that much tonnage will be bought in the South.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b.. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50 to $33.50
Northern coke, No. 1, sil. 2.25 to 2.75	21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00
Northern high phos	21.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	21.00
Basic	21.00
Low phos., Birmingham	32.00
Low phos., Eastern furnace, sil. 1 to 2 per cent copper free	34.00
Silvery, sil. 8 per cent	34.82

Ferroalloys.—Aside from an inquiry for 50 tons of 50 per cent ferrosilicon on which $60 delivered is said to have been quoted, there is no activity in the ferroalloys.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Railroad Equipment.—The steel for the St. Paul cars placed with the Bettendorf Co., amounting to 13,000 tons of plates, shapes, bars and axles, will be rolled by the leading local independent. About 16,000 tons for the St. Paul cars to be built by the Haskell & Barker Car Co. is yet to be placed. The Western Pacific Corporation order with the Western Steel Car & Foundry Co. calls for 700 gondola cars with a 60-day option on 300 additional. These will require 16 tons of steel per car, the purchase of which has not yet been consummated. The Southern Pacific has ordered 50 locomotives of the 2-10-2 type from the Baldwin Locomotive Works. The Chicago & Eastern Illinois is inquiring for repairs on 500 national dump cars. The Burlington is asking for figures on the repair of 500 steel gondola cars and contemplates asking for repair prices on 500 box cars.

Sheets.—Local independent continues to operate all of its hot mills and because of business on its books, is unable to entertain many inquiries calling for prompt shipment.

Mill quotations are 3c. for No. 28 black, 2.25c. to 2.50c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Rails and Track Supplies.—Further releases against rail contracts are reported, but the individual tonnages involved are relatively small, ranging from 1000 to 5000 tons. Orders for spikes and bolts are more liberal, but competition for this business is keen and price shading is more general. Spike orders ranging from 1000 to 3000 kegs have been placed, while the bolt orders average about one-quarter as large. The Missouri Pacific has bought 2000 kegs of spikes. Considerable tie plate business is at the point of closing.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.30c., Pittsburgh; track bolts with square nuts, 3.30c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Plates.—The placing of car orders by the Chicago, Milwaukee & St. Paul and the Western Pacific Corporation has put a considerable tonnage of steel on local mill books. The inquiry of the Illinois Central for 4000 cars is expected to be closed soon and that will account for about 40,000 tons more. The Sinclair Oil Co. has awarded the 16 storage tanks for which it has been inquiring to an Eastern fabricator, and it is therefore probable that the steel will be bought from mills in the vicinity. In the aggregate, the demand for plates is still sub-normal and the price situation shows no change for the better.

The ruling mill quotations range from 1.75c. to 1.85c. Chicago. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—Fabricators and mills are encouraged not only because of an increased number of structural lettings, but the large amount of work in prospect. Recent fabricating awards include:

Sinclair Refining Co., 16 storage tanks, 2700 tons, to Phoenix Iron Works Co.

Standard Oil Co., 20 stills, Wood River, Ill., 577 tons, to Petroleum Iron Works.

Commercial High School, Omaha, 1676 tons, to Christopher & Simpson Iron Works.

Kennewick-Pasco bridge over Columbia River, Washington, 994 tons, to American Bridge Co.

Colorado State Highway Department, through riveted truss spans, Los Animas, Col., 435 tons, to Hansell-Elcock Co.

Red Hill bridge over Russian River, Cal., 453 tons, to American Bridge Co.

Iowa Highway Commission, four highway spans, 164 tons, to Pittsburgh-Des Moines Steel Co.

Oregon Highway Commission, highway spans, 124 tons, wood construction substituted for steel.

Atlas Powder Co., Marshall, Texas, furnace building, machine shop, etc., 325 tons, to Worden Allen Co.

Munising, Mich., high school, 125 tons, to Milwaukee Structural Steel Co.

Prospective business includes:

Superstructure, Federal Reserve Bank, Minneapolis, 2000 tons, bids to be in by Nov. 11.

Belden Hotel, Chicago, Fridstein & Co., engineers, 3200 tons.

Missouri Pacific Railroad, three bridges, 330 tons; also a 150-ft. through riveted truss span, tonnage not given.

Link Belt Co., bridge tramway for Duquesne, Pa., light company, 600 tons.

Arkansas Bridge Co., Kansas City, Mo., double track riveted truss spans, 4000 tons.

Highway bridge, El Paso, Tex., V. L. Sullivan, contracting engineer, 180 tons.

Bars.—Demand for mild steel bars has fallen off. In the reinforcing field, a number of good-sized jobs have been closed, however. The Concrete Engineering Co., Omaha, will furnish 800 tons for the Omaha Commercial high school. The Corrugated Bar Co. will supply 100 tons for a waterworks plant at Ashland, Ky. Various pending highway jobs in Illinois call for an aggregate of 1500 tons. The H. O. Stone Engineering Co., St. Louis, has the contract for a grain elevator at Chester, Ill., involving 275 tons of rail carbon reinforcing bars which have not yet been placed. Demand for bar iron is slightly improved, railroad orders ranging from 100 to 200 tons having been reported.

The mill quotation on plain material ranges from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Bolts and Nuts.—Further evidences of curtailment in the automobile industry have come to hand, with a corresponding contraction of bolt and nut orders from that source. Demand is generally light and discounts are still soft. Probably the largest pending inquiry is one from a local jobber calling for five carloads of hot-pressed nuts. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1246.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Cast Iron Pipe.—Detroit is expected to take definite action Nov. 8 on the bids submitted last week. Inquiries are less numerous, as is to be expected at this season, but there is still considerable tonnage unclosed. Recent awards include:

Ferndale, Mich., 850 tons, divided between American Cast Iron Pipe Co. and James B. Clow & Sons.

Stanton, Iowa, 100 tons, to National Cast Iron Pipe Co.

Taylor, Wis., 38 tons, to American Cast Iron Pipe Co.

Pending business includes:

Springfield, Ohio, 907 tons, bids in Nov. 5.

Fairfield, Iowa, 275 tons of 12-in., Nov. 4.

Montgomery County Commissioners, Dayton, Ohio, 1200 tons of 4 to 12-in., Nov. 10.

Parsons, Kans., 168 tons of 4 and 6-in., also alternate bids on cast iron, steel and reinforced concrete on 17,235 ft. of 16-in. and 17,600 ft. of 20-in., Nov. 7.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Wire Products.—Rumors of probable advances have brought in considerable business, particularly from jobbers who wish to protect themselves over the maximum contract period, which is 60 days. Railroads also are buying more liberally—two, three and four carloads at a time as against their usual purchases of single carload lots. Their orders are principally for nails. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1246.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Old Material.—Price tendencies are mixed with sentiment somewhat improved. Mills are evincing greater interest in the market by asking for quotations on material, but aside from a moderate purchase of heavy melting at advanced levels, no buying has resulted. Cast iron car wheels appear to be weaker, 100 tons having been bought by a consumer at $16, delivered. On the whole, the market is slow, although somewhat more active than a week ago. Railroad offerings include the Pere Marquette, 3000 tons; the Union Pacific, 3000 tons, including 1100 tons of mixed scrap; the Soo Line, 500 tons; the Pullman Co., 1000 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$17.00 to $17.50
Relaying rails	25.00 to 30.00
Car wheels	16.00 to 16.50
Steel rails, rerolling	13.50 to 14.00
Steel rails, less than 3 ft	13.75 to 14.25
Heavy melting steel	12.50 to 13.00
Frogs, switches and guards cut apart	12.50 to 13.00
Shoveling steel	12.00 to 12.50
Low phos. heavy melting steel	15.50 to 16.00
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.50 to 9.00
Axle turnings	9.00 to 9.50
Per Net Ton	
Iron angles and splice bars	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Iron arch bars and transoms	15.50 to 16.00
Iron car axles	20.50 to 21.00
Steel car axles	14.50 to 15.00
No. 1 busheling	9.50 to 10.00
No. 2 busheling	6.25 to 6.75
Cut forge	11.50 to 12.00
Pipes and flues	8.00 to 8.50
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Steel knuckles and couplers	13.00 to 13.50
Coil springs	14.00 to 14.50
No. 1 machinery cast	13.75 to 14.25
No. 1 railroad cast	13.50 to 14.00
Low phos. punchings	12.00 to 12.50
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	6.00 to 6.50
Stove plate	12.75 to 13.25
Grate bars	11.50 to 12.00
Brake shoes	11.50 to 12.00
Railroad malleable	13.50 to 14.00
Agricultural malleable	13.50 to 14.00

A. W. Blodgett, secretary Grand Rapids Metals Trades Association, Grand Rapids, Mich., reports that business is improving. The number of working employees has increased in the past four months from 1100 to 1500. In normal times 3500 hands are working.

The annual meeting of the Hoover Steel Ball Co., Ann Arbor, Mich., has elected the following board of directors: C. L. Anderson, William Arnold, Jr., Henry W. Douglas, R. T. Dobson, M. J. Fritz, Louis P. Hall, C. W. Lightall, Walter C. Mack and Henry C. Rinceman.

Philadelphia

PHILADELPHIA, Nov. 7.

Fresh developments in the iron and steel markets are few, but one of the most encouraging is the promise of fairly large rail rollings in 1922. The New York Central has come into the market for 100,000 to 200,000 tons for next year, the Pennsylvania Railroad has indicated that its requirements will be 150,000 tons, the Norfolk & Western, 40,000 tons, and the Philadelphia & Reading, 20,000. The order placed with the Baldwin Locomotive Works for 50 locomotives by the Southern Pacific Railroad is one of the largest domestic contracts of its kind since the war. Railroads in this territory have done very little contracting for new cars or the repair of old cars, but there are hopeful expectations that such business will develop within the near future.

The volume of steel business coming to Eastern mills is meager, and operations are merely holding their own in comparison with October. In the district east of Pittsburgh the Cambria works of the Midvale Steel & Ordnance Co. and the plants of the Bethlehem Steel Co. are showing the best operation, the Cambria works having averaged about 50 per cent in the past month.

In pig iron there is greater interest in first-quarter contracts with furnaces not anxious to quote. A cast-iron pipe company has inquired for 2000 to 4000 tons of No. 2 plain iron for that period, and is reported to have been quoted $21 and $21.50, furnace. Quotations of $4 on furnace coke for first quarter cause furnace operators to adopt a cautious policy in selling beyond Jan. 1.

An interesting event in the scrap market was the purchase by the Midvale Steel & Ordnance Co. for its Cambria works of 10,000 tons of heavy melting steel, the first purchase of steel scrap by this plant since before the war. The price paid was $15, delivered.

Pig Iron.—As an indication of the extreme quietness of the foundry iron market, one furnace company reports it has not taken an order of any importance in three weeks. While there seemed a prospect of a railroad strike, many consumers urged acceleration of shipments, with the result that most of them have more iron than is needed for day-to-day requirements. Moreover, foundries that are operating are generally covered until the end of the year and first quarter business has not opened up because of the unwillingness of furnaces to quote, though some buyers are making informal inquiry. A cast iron pipe foundry, to obtain protection on some work on which it is bidding, has asked prices on 2000 to 4000 tons of No. 2 plain iron for first quarter. Four furnaces were asked to bid, one declining to do so, and the others putting in prices of $21 and $21.50, furnace, equivalent to $22.50 and $23, delivered. The disposition not to quote for first quarter is due partly to the prospect of higher coke, some Connellsville interests having named $4 as their idea of first quarter price. While the dullness of the market is generally ascribed to expectation of freight rate reductions, the approach of the end of the year and inventory period is probably also an important element in the situation. Quotations of district furnaces for prompt shipment are quite uniform at $21 and $21.50 for No. 2 plain and $21.50 and $22 for No. 2X, the exact price depending upon the size of the inquiry and the freight rate advantage which competitors may have. Steel-making iron is not in demand. We note the sale of 400 tons of malleable iron at $24, furnace, with a freight rate to destination of $1.40.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.90 to $22.54
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.84 to 23.54
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	20.50 to 21.00
Gray forge	22.50 to 23.00
Malleable	25.40 to 26.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Eastern makers of ferromanganese have stiffened their quotations and now decline to shade $58.35, seaboard, which is also the price quoted by importers of British alloy. Spiegeleisen is quoted from $25 to $27, furnace.

Billets.—Orders for billets are few. Open-hearth rerolling billets are being sold at $29, Pittsburgh, and this might have been shaded $1 a ton. Forging billets are $5 higher.

Plates.—The Baldwin Locomotive Works has purchased about 1000 tons of plates for 50 locomotives for the Southern Pacific Railroad. The plate market is quiet and prices continue quiet. Attractive tonnages can be placed at 1.50c., Pittsburgh, while small lots are generally quoted at 1.60c., Pittsburgh.

Structural Material.—One fabricating company with plants in the East is reported to have closed contracts for 18,000 tons of structural work within the past week. Shapes are quoted from 1.50c. to 1.60c., Pittsburgh, the lower price applying usually only to desirable lots.

Bars.—The steel bar market continues easy, especially on reinforcing steel. On the latter, 1.50c., Pittsburgh, has been shaded. On merchant steel bars quotations range from 1.50c. to 1.60c., Pittsburgh. There is little demand for bar iron, which is nominally quoted at 1.60c., Pittsburgh, though this is being shaded in some instances.

Sheets.—The sheet market is somewhat mixed. Low prices reported in some quarters are offset by fairly firm prices quoted by other mills. It appears that blue annealed sheets are being purchased from 2.25c. to 2.50c,. Pittsburgh; black sheets from 2.90c. to 3c., and galvanized sheets, quoted at 4c., have also been shaded. Some sales are being made at the higher prices.

Rivets.—To meet competition, Eastern makers of rivets have reduced prices 10c. per 100 lb., the present quotations being 2.40c. for structural and 2.50c. for boiler quality, Pittsburgh.

Warehouse Business.—No important gain in sales of steel out of stock is reported. Prices are unchanged, with the exception that blue annealed sheets are now quoted on the basis of 3.50c. per lb. We quote for local delivery as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.75c.; squares and hexagons, cold-rolled steel, 4.25c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Old Material.—The Midvale Steel & Ordnance Co. last Thursday came into the market for heavy melting steel for the Cambria works and purchased 7000 tons before the end of the week and about 3000 tons early this week. This is the first purchase of steel scrap for the Johnstown plant since before the war. When its Bessemer plant is in operation, the Cambria works is self-contained as to scrap, but as this department has not been active of late, the company found it necessary to supplement its own supply and may continue as a regular buyer for a time. The use of scrap at Johnstown has been increased because of the high cost of making pig iron. Purchases were made at $15, delivered, which establishes a new high mark for the present upward movement of prices. The effect upon the Philadelphia district market is to restrict the quantity of heavy melting steel to be had at the prices which the mills have been offering, namely $12 to $13. Where freight rates are advantageous, available stocks of steel scrap have naturally been moved to Johnstown. However, a purchase of 200 tons was made last week by an eastern Pennsylvania plate mill at $12 delivered, but the shipping point was fairly close by. Railroad wrought is firmer, due to sales to a Troy, N. Y., consumer at $18, delivered. The effect of these sales is to deflect New England railroad wrought to Troy. The local market is quoted at $16.50 to $17. Cast borings are also up about 50c. a ton.

No. 1 heavy melting steel	$12.00 to $13.00
Scrap rail	12.00 to 13.00
Steel rails, rerolling	16.50 to 17.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.50 to 18.00
No. 1 railroad wrought	16.50 to 17.00
No. 1 yard wrought	14.00 to 14.50
No. 1 forge fire	10.50 to 11.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.50 to 10.50
Heavy axle turnings (or equivalent)	10.00 to 10.50
Cast borings (for rolling mills)	11.50 to 11.75
Cast borings (for chemical plants)	12.50 to 13.00
No. 1 cast	17.50 to 18.00
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	14.50 to 15.00
Railroad malleable	14.50 to 15.00
Wrought iron and soft steel pipes and tubes (new specifications)	13.50 to 14.00
Iron car axles	No market
Steel car axles	No market

OPEN PRICE ASSOCIATIONS

Federal Judge Carpenter Says Organizations Are Not Obnoxious to Anti-Trust Laws

In the case of the United States Government against the American Linseed Co. et al., decided at Chicago on Nov. 1 by Judge Carpenter in the Federal District Court, a victory for the defendants was scored, the opinion of the court being strongly in favor of "Open-price" associations.

The facts and reasons are fully and clearly set forth in the court's opinion. The members of the Linseed Oil Association entered into a contract providing for, among other things, the collection and distribution, from and to the members of the association, of many trade statistics. The principal issue in the case was the effect of the filing with the central bureau by the various members of their respective price lists and immediately reporting to the bureau any current quotations deviating from the price lists. These quotations were sent to the bureau by telegraph, and immediately forwarded to all of the members of the association. The Government contended that the natural, direct and immediate effect of the reporting and interchanging of such price lists and quotations was an artificial uniformity of prices, meaning thereby that the uniform prices were brought about through an agreement necessarily resulting from such a course of conduct, and, consequently, in violation of the Federal anti-trust laws.

The court has found that the reporting of prices in such a manner, the holding of monthly meetings of the members, the discussion of prices and business conditions are not unlawful, and, although quick and accurate information of what other competitors are charging naturally leads to uniformity in price, it does not necessarily indicate that there is an agreement among the competitors to charge the same price.

The court finds that an "open price" association plan is not obnoxious to the anti-trust laws, and that there is nothing inherently wrong in an agreement among producers in a certain line to furnish each other their prices, and not to make any sale deviating from their price lists without immediately notifying all the others. Also, there is no tenable reason for holding that an exchange, such as boards of trades, etc., is legal, which exchanges send out reports of actual sales, and an "open price" association is illegal, which association gave out price lists and deviations therefrom.

The court says, in substance, that if every association should be dissolved merely because it afforded an opportunity for the members to fix prices, then the Court, with equal propriety, could be asked to dissolve any lunch club where business men meet.

BELGIAN EXPORTS HEAVY

About 75 Per Cent of Output Exported—Union with Luxemburg Threatening Belgian Pig Iron Industry

(*Special Correspondence*)

CHARLEROI, BELGIUM, Oct. 22.—The opposition of the Belgian steel federation to the proposed customs and economic union with Luxemburg, the ratification of which will shortly be considered, seems to have entered a new stage. Indications are that the government is contemplating the abandonment of the present system of free trade in favor of protection. Negotiations are reported to be in progress between the government and the steel industry aiming at a compromise. No authoritative statement has been made as yet, but it is stated in usually well-informed circles that the government has intimated its intention of changing to a policy of protection if the federation will discontinue its present anti-ratification propaganda. There is little doubt that the suggested protection is largely directed against countries with low exchange rates, especially Germany, although the importance of German competition in the domestic market is often over-rated.

It should be borne in mind that approximately 75 per cent of the Belgian iron and steel output is finding its way to foreign markets which, of course, would not be affected by the proposed measures. Whatever may be the policy ultimately decided upon by the steel industry, it seems certain that the bill will be ratified although the industry is not convinced of the effectiveness of the proposed protection. On the contrary, the favorable conditions of costs under which the Luxemburg and French blast furnaces are operating because of considerably lower freight rates on coal and ores have never been more apparent than lately. The idea is slowly gaining ground in industrial circles that with the removal of customs barriers between Belgium and Luxemburg, economic necessities may lead to a discontinuance of pig iron production in Belgium in favor of the pig iron industry in Luxemburg, which would supply the Belgian manufacturers.

The pig iron market has been enlivened by increased domestic and foreign demand. The tone of the market is rather firm as, compared with the British price of 120s. for No. 3 G.M.B. foundry iron, Belgian material can be quoted at about 100s., c.i.f. British port. No. 1 foundry iron is quoted at 265 fr.; No. 2 at 250 fr.; No. 3 at 240 fr. Ordinary basic is named at 215 fr., while special grades are quoted at 230 fr. Business in British hematite has been stimulated by the reduction in quotations to 125s., f.o.b. British port.

A feature of the semi-finished material market is the acute shortage of supplies caused by the extended terms of delivery stipulated by Lorraine and Luxemburg producers. Incoming business in the finished iron and steel market is sufficiently large to keep mills occupied for some time to come, but there are complaints that the decrease in export shipments is not quite compensated by the increased domestic demand.

Mild steel bars are quoted at 450 fr. for export compared with a domestic price of 445 fr., while No. 2 wrought iron bars brought 400 fr. for export. Medium sheets and light plates are tending upward, but less satisfactory conditions obtain in the heavy sheet market owing to the shortage of raw material and keen foreign competition. We quote as follows: Heavy sheets, basic, 495 fr.; open hearth, 535 fr.; medium gages, basic, 590 fr.; light plates, 800 to 900 fr.

In the rail market the recent government order for 42,000 tons placed with the Ougrée-Marihaye Co. and Angleur is noteworthy. Rail quotations were around 435 fr. A quieter tone has prevailed in the wire, bolt and nut market, but the pipe market is showing distinct signs of stiffening, apparently because German pipe mills are filled up.

The September output returns show a decline in pig iron production by 4000 tons compared with August, the respective figures being 40,460 tons in September against 44,510 tons in August. The figures for other products are as follows: Crude steel, 31,270 and 25,150 tons; steel castings, 3240 and 3130 tons; finished steel, 52,180 and 46,020 tons; finished iron, 12,230 and 8580 tons, respectively.

British Pig Iron Sharply Reduced

(*By Cable*)

LONDON, ENGLAND, Nov. 2.

Cleveland pig iron has been further reduced. No. 1 foundry iron is now £5 15s. ($22.65) per gross ton in place of £7 ($27.58). No. 3 G. M. B. is £5 10s. ($21.67) in place of £6 ($23.64). No. 4 foundry iron is £5 5s. ($20.69) in place of £5 14s. ($22.46). No. 4 forge iron is £5 ($19.70) in place of £5 5s. ($20.69). All of these prices apply to iron both for home consumption and for export.

[*Note:* Conversion at $3.94 per £1.—*Editor.*]

Steel Prices Reduced—Cost of Living Lower—Depression in Shipbuilding Industry

LONDON, ENGLAND, Oct. 19.—The unemployment problem continues to receive careful consideration by the government and elaborate schemes are being drawn up for relief, but all to the detriment of the much harassed taxpayer. There is work to be done and many men could find it if they would submit to reasonable wages. The cost of living is on the down grade and the latest report of the Ministry of Labor shows a decline of 10 per cent in September, making the present rate 110 per cent above the July, 1914, level. The weekly wage bill was £240,000 down.

As to the iron and steel industry, little can be said of an encouraging nature except that steel makers have realized they must beat the continent to get orders and have cut prices to a considerable extent regardless of costs. Fuel does not come down in price as rapidly as desired and while Durham blast furnace coke is selling at around 31s., delivered, pig iron producers declare that 20s. is the maximum economic level they will pay. Steps are being taken in the right direction by the railroads and rates on iron ore, ironstone and limestone will be reduced as and from Nov. 1. The total number of Cleveland furnaces now blowing is only 18 out of a total of 72, and of these nine are working on hematite iron. Consumers are slow to purchase while such a price uncertainty exists and the only sales made are for immediate requirements, which in the present state of trade are not of much account. Export business in pig iron is quite stagnant, consumers being able to purchase from the continent at cheaper rates.

Steel prices have been reduced. Ship plates are now £10 10s., shapes £10 and heavy steel rails £10 10s., all per ton delivered home consumers' works. One result of this has been the requests on the part of purchasers of continental material to have their orders cancelled and it will be interesting to see what is the next move. Certain it is that purchasers will prefer to place orders in this country where deliveries are certain, apart from strikes, etc., than overseas, where already shipments are becoming in arrears, now that the price margin has been narrowed down.

Lloyd's Register of Shipbuilding returns give some interesting facts as to the depression in that trade. The merchant tonnage under construction at the end of last month was 700 vessels of a gross tonnage of 3,282,972 tons, a reduction on the quarter of 247,000 tons, and 448,000 tons less than a year ago. Of this year's total 731,000 tons have been suspended and 457,000 tons delayed in completion. The prospect for the future is most unfavorable, as the amount of tonnage on which work has been commenced during each quarter of this year has shown considerable decreases. In the March quarter the decrease as compared to the previous quarter was 113,000 tons, in the June quarter a further 324,000 tons, while in the September quarter only 51,343 tons were commenced.

IRON AND INDUSTRIAL STOCKS

Buying Based on Future Rather Than Present Industrial Conditions

While prices for iron and industrial shares, as quoted from day to day, disclose some irregularity, the general tendency continues upward. In some instances new high records for 1921 were established since last reports. In a few isolated cases, the advance in prices is accompanied by encouraging reports pertaining to the particular company, but in a majority the higher values are based largely on buying of dividend paying shares, attracted by the continued downward tendency of money rates and the freer supply of loanable funds. The fact that steel mills have issued unfavorable earnings statements has failed to check buying of steel shares, and the same is true of automotive and other concerns. Investment buying today evidently is founded not on past or current developments, but on future. The weakness of wheat is conspicuous, yet the further downward readjustment of Federal Reserve discount rates, and the strength of Government and railroad bonds strongly suggests the readjustment of industry in general is progressing satisfactorily.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	33½-34⅝	Gulf States Stl...	36½-39¾
Allis-Chalm. pf..	77 - 77½	Int. Har. com...	74⅜- 79
Am Can com....	28 - 30¾	Lackawanna Stl..	41 - 43½
Am. Can pf.....	85 - 88	Midvale Stl.....	24 - 25⅝
Am. C. & F. com.	129⅜-132¼	Nat. Acme	12½- 13¼
Am. Loco. com....	90⅞-92½	Nat. E. & S. com.	41½- 42¼
Am. Loco. pf....	107½- ..	Nova Scotia Stl..	21 - 21¼
Am. Radi't'r com.	75½- 80	Pittsburgh Stl. pf.	82 - 83½
Am. Ship com...	5¾- 6⅞	Pressed Stl. com.	59¼- 60½
Am. Stl. Fd. com.	25⅛- 28⅛	Pressed Stl. pf...	86½- ..
Am. Stl. Fd. pf..	83⅞- 85	Ry. Stl. Spg. com.	84 - 84⅝
Bald. Loco. com.	89⅝- 92⅛	Replogle Stl.....	20½- ..
Bald. Loco. pf...	98 - 99	Republic com....	49 - 51¼
Beth. Stl. com...	54½- ..	Republic pf.....	80½- 83
Beth. Stl. cl. B..	55⅛- 57	Sloss com.....	38 - 39
Beth. Stl. 8% pf.	101¼-103⅛	Un. Alloy Stl....	25 - ..
Chi. Pneu. Tool..	54 - ...	U. S. Stl. com...	80⅛- 81½
Colo. Fuel	24 - 25½	U. S. Stl. pf.....	109¼-111
Cruc. Stl. com...	62⅝- 66⅛	Vanadium Stl....	31¼- 33⅜
Cruc. Stl. pf.....	85 - ..	Va. I. C. & Coke.	85 - ..
Gen. Electric....	131¼-135⅝	Westingh'se Elec.	45⅛- 46¼
Gt. No. Ore cert.	31 - 32		

Industrial Finances

The Dobbins Core Drill Co., Inc., 147 West Forty-second Street, New York, has filed schedules in bankruptcy, listing liabilities of $28,851 and assets of $1800.

A petition in bankruptcy has been filed against the Standard Garage Equipment Co., 318 Rogers Avenue, Brooklyn.

The Holm Radiator Corporation, Milwaukee, has filed a petition in bankruptcy, with liabilities stated as $30,118 and assets, $37,244.

The Trumbull-Vanderpool Electric Co., Litchfield, Conn., manufacturer of electrical equipment, has increased its capital to $250,000.

The Maibohm Motors Co., 66 Leonard Street, New York, with plant at Sandusky, Ohio, has filed a petition in bankruptcy with liabilities stated as $681,640, and assets, $559,124. The company took over the business of the Maibohm Wagon Co., and has been specializing in the manufacture of six-cylinder automobiles and trucks. The Sandusky plant has a rated capacity of 50 complete automobiles per day.

The Harbison-Walker Refractories Co. has declared the regular quarterly dividends of $1.50 on both the common and preferred stocks. The common dividend is payable Dec. 1, to stockholders of record Nov. 19, and the preferred Jan. 20, to stockholders of record Jan. 10.

Directors of the Ford Motor Co. of Canada, Windsor, Ont., has authorized payment of a 15 per cent cash dividend on Nov. 15 to stockholders of record Nov. 3. This is the second 15 per cent cash dividend this year. The company has $7,000,000 stock outstanding and the dividend will amount to $1,050,000.

After allowing for expenses, maintenance, depreciation, interest and taxes for the three months ended Sept. 30, last, the Pierce Arrow Motor Car Co. shows an operating loss of $2,109,999, as against an operating profit of $592,827 for the corresponding period last year.

The Studebaker Corporation and its subsidiary companies for the nine months to Sept. 30, report a net profit, after interest and Federal taxes, of $9,644,326, which, after preferred dividends, is equivalent to $15.21 a share on the $60,000,000 common stock. For the corresponding period last year the company earned $15.38 a share.

Plans of New Companies

The Replacement Parts Co., 801 Beacon Street, Boston, 17, Mass., recently incorporated, will be a New England sales agent for the Richmond hammered piston rings, manufactured by Richmond Piston Ring Co., Richmond, Ind., and other parts.

The Wickey Battery Co., East Chicago, Ind., recently incorporated, manufactures electric batteries. The plant is equipped and doing business.

The Pequea Electric Co., recently incorporated, R. F. D. No. 1, Willow Street, Pa., has purchased from the Farmers' Electric Co. the entire electric lighting system south of Martindale, Lancaster County, Pa. All necessary equipment has been ordered.

The Fourchime Auto Whistle Co., successor to Hall Mfg. Co., 23 Marshall St., Newark, N. J., intends to manufacture its own product but may find it necessary to have some contract work done. It has enough machinery to take care of its immediate needs.

The Leafless Spring Co., Grand Rapids, Mich., was organized to market the Leafless auto spring which is entirely new, for Ford cars. The spring is to be manufactured in the plant of the Lyons Machine & Tool Co., Muskegon, Mich. Drop forgings and castings will be purchased outside, but all machine work and assembling will be done by the Lyons company.

St. Lawrence Boat Works, Inc., Ogdensburg, N. Y., was originally the A. G. Spalding St. Lawrence Boat Works. The plant was subsequently owned and used for manufacturing high grade motor boats and other craft. As the new company has taken the plant over from Mr. Leyare, who continues as general superintendent of boat building, the company is not in need of equipment at the present time but may be later if business expands.

The Phoenix Iron Works Co., Meadville, Pa., and Oakland, Cal., has opened a Western office in the Flaughter Building, Dallas, Tex., temporarily in charge of K. B. Thorndike.

Trade Changes

On Nov. 1 the Steel Sales Corporation, Jefferson and Adams streets, Chicago, became exclusive and direct sales representative of the Wickwire Spencer Steel Corporation, Worcester, Mass., and Buffalo, for Illinois, Iowa, Missouri, Wisconsin, Minnesota and Indiana. The company's own sales office and warehouse will continue to operate as formerly at 215 West Ontario Street, in charge of J. J. Collins, where it will carry in stock for the hardware jobbing trade of Chicago and the Middle West miscellaneous hardware products.

The Decatur Bridge Co., Decatur, Ill., has removed its Chicago office to the Continental & Commercial Bank Building. Carl R. Dick, district sales engineer, and H. H. Cosley, contracting engineer, are in charge.

Benjamin Briscoe, who recently severed his connection with Briscoe Motors, Jackson, Mich., has organized and incorporated an automotive engineering company to do business in Detroit, with offices in the Book Building. Capital stock is $205,000, and $100 shares of common stock. The company is known as the Briscoe & Stahl Co.

The Arrow Machinery Co., 234 North Third Street, Philadelphia, new and used mechanical equipment, has just begun business at the above address, dealing particularly in machine tools, shop equipment, including small tools. It would like to have catalogs, price lists and lowest dealers discount sheets from manufacturers. The manager has been a manufacturer of sheet metal specialties for many years, and of the Columbian safety air gun; and was later manager of the Metalform Tool & Stamping Co., maker of jigs, fixtures, tools and dies.

Unfavorable Year for Carbon Steel Co.

The annual report of the Carbon Steel Co., Pittsburgh, for the year ended Oct. 1, has been issued. Because operations have been suspended during the greater part of the year in most of the departments, the net results for the year were very unfavorable, according to Charles McKnight, president of the company. During the period in which operations were carried on the results show a manufacturing profit of $74,792. These profits, however, were considerably more than offset by idle plant expenses. There was a net loss from operations, including interest on borrowed money, of $544,399. Dividends on the various classes of stock of the company were suspended last June. The surplus on Oct. 1, 1920, was $3,481,302. This has been reduced to $2,119,355 on Sept. 20, 1921.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.65c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.65c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.25 to $2.40 base
Large boiler rivets.....2.35 to 2.50 base
Small rivets .....70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, rolled threads, 70, 10 and 5 per cent off list
Machine bolts, small, cut threads....70 and 5 per cent off list
Machine bolts, larger and longer..65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....65 and 10 per cent off list
Lag bolts .....70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under.....75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in.....75 and 10 to 80 and 10 per cent off list

Upset Set Screws

½ in. and under.....80,10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes .....70 and 10 per cent off list

Milled Set Screws

All sizes .....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $40; chain rods, $40; screw stock rods, $45; rivet and bolt rods and other rods of that character, $40; high carbon rods, $48 to $52, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.50 base; 5/16-in., $2.50 base. Boat and barge spikes, $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13.00; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.15c. to 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20–2.45	Nos. 11 and 12	2.30–2.55
Nos. 9 and 10 (base)	2.25–2.50	Nos. 13 and 14	2.35–2.60
		Nos. 15 and 16	2.45–2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.70–2.80	No. 28 (base)	2.90–3.00
Nos. 22 to 24	2.75–2.85	No. 29	3.00–3.10
Nos. 25 and 26	2.80–2.90	No. 30	3.10–3.20
No. 27	2.85–2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.90–3.00	Nos. 25 and 26	3.60–3.70
Nos. 12 to 14	3.00–3.10	No. 27	3.75–3.85
Nos. 15 and 16	3.15–3.25	No. 28 (base)	3.90–4.00
Nos. 17 to 21	3.30–3.40	No. 29	4.15–4.25
Nos. 22 to 24	3.45–3.55	No. 30	4.40–4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.70–2.80	No. 28 (base)	2.90–3.00
Nos. 17 to 21	2.75–2.85	No. 29	2.95–3.05
Nos. 22 to 24	2.80–2.90	No. 30	2.95–3.05
Nos. 25 to 27	2.85–2.95	Nos. 30½ and 31	3.00–3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Nov.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
2	13.12½	12.75	27.75	4.70	4.40	5.10	4.60
3	13.12½	12.75	27.87½	4.70	4.40	5.20	4.70
4	13.12½	12.75	28.25	4.70	4.40	5.25	4.75
5	13.25	12.75	....	4.70	4.40	5.25	4.75
7	13.25	12.75	28.62½	4.70	4.40	5.25	4.75

New York

NEW YORK, Nov. 7.

A fair demand and a strong tone permeates most of the markets. The copper market is stronger and more active. Business in tin has fallen off considerably, but prices are steady. There is a fair demand for lead at unchanged values. Unusual conditions in the zinc market have advanced prices.

Copper.—Developments indicate that the electrolytic copper market is firmly established at a minimum of 13c., delivered, for this year's delivery, with apparently a limited amount available at that price and with several large sellers quoting no less than 13.25c. or not quoting at all. There have even been sales made at 13.35c., delivered, in the last week by one or two interests. Inquiries continue fairly large and there have lately appeared definite ones for 1922 delivery, involving considerable business. Foreign sales are satisfactory, and it is stated that a low freight rate to Hamburg has been negotiated which is considerably below the cost of delivering the same metal at some Connecticut and New York points. Sales for October are estimated to have been 140,000,000 lb., which, taking into consideration that output of refined copper is not more than 40,000,000 lb. per month, would show a rapid lessening of stocks. Deliveries into consumption for October are not yet definitely known, but the average previous to that month have been between 70,000,000 to 80,000,000 lb.

Tin.—The market has turned exceedingly quiet and very few sales are reported. With the exception of a little business for January-February shipment from the Far East on Nov. 3 the market has been almost stagnant. There is less demand for spot delivery and what interest there is centers in far off shipments, with intermediate positions negligible. Spot Straits tin to-day was quoted at 28.62½c., New York. The London market to-day was considerably higher than last Tuesday at £158 10s. for spot standard, £160 for future standard and £159 for spot Straits. Arrivals thus far this month have been negligible with 4950 tons reported afloat. The firmness in the exchange value of the pound sterling has had a steadying influence on the price of spot Straits tin all the week.

Lead.—The market continues quiet, with a moderate amount of business reported and the price unchanged at 4.70c., New York, or 4.40c., St. Louis, in the outside market. The quotation of the leading interest continues unchanged at 4.70c., both New York and St. Louis.

Zinc.—The market for prime Western has experienced a sharp advance in price until to-day it is quoted at the minimum of 4.75c., St. Louis, or 5.25c., New York, for early delivery, which is about ¼c. higher than a week ago. This advance is generally ascribed not to increased buying by consumers, but to fairly heavy purchases by one or two interests who have evidently been accumulating the metal for the filling of contract or for holding for future sales. Producers generally are pretty well sold up as to early output and are not eager sellers for early delivery.

Antimony.—Wholesale lots for early delivery are quoted at 4.75c., New York, duty paid, with the market inactive.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 24.50c., f.o.b. plant, by the leading producer, but the same grade is available from import at 17c. to 18c., New York, duty paid.

St. Louis

ST. LOUIS, Nov. 8.—The lead market is weak and lower, while zinc is strong and higher. We quote lead at 4.40c., carlots, and slab zinc at 4.75c., at which 300 tons were sold on Thursday. We quote Lake Copper at 13.73½c., car lots; tin, 29.11c., and antimony, 5.48½c. In old metals, we quote: Light brass, 3.50c.; heavy red brass, 7c.; light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tinfoil, 16c.; tea lead, 2c.; aluminum, 9c.

JAPANESE BUYING DECREASES

Japanese Buyers Demand Lower Prices—South America Inquires—Chinese Buy High Grade Scrap

NEW YORK, Nov. 7.—Trade with Japan has shown a slight decrease during the past fortnight. It has been partially offset by the renewed activity in South American markets and some buying from Mexico. Wire and wire products are included in the inquiries appearing both from Japan and South America, but in the latter case it is proving difficult to transact business, as the usual long credits are generally asked and as most exporters have lost rather heavily in these markets by cancellations, they are not inclined to deal on anything but irrevocable letters of credit. The Japanese, on the other hand, are demanding lower prices than are now prevailing in the American domestic market. In the case of black sheets of Nos. 24, 26 and 28 gage, they claim that they have obtained them as low as $54 per ton, c.i.f. Japanese port, but fail to state whether or not they were of American or Continental origin. On practically all products, American mills show but little interest in making quotations for export, at present, as they claim that the prices demanded by the foreign buyers are too low to be considered and the loss suffered would be even greater than on domestic transactions.

China is showing some activity in small machine tools and machinery and recently purchased 100 tons of electrolytic copper through a New York export company to be used in the mint in Hongkong. The Pacific Development Corporation has shipped 100 carloads of scrap plates from steel gondola cars to Shanghai. These are used by Chinese blacksmiths in making small tools and utensils. There is a light demand for plates of this kind, and high-grade scrap angles, tees, beams and channels for this purpose. Some requests for quotations on plate cuttings are reported as well as a few sales. These, also, are used in China and Japan for the manufacture of small hand tools.

An inquiry is in the market from England for 500 tons of ¾-in. to 4-in. steel pipe, British thread, which, it is said, will be placed with an American company, provided the price is sufficiently low. It is not stated whether this tonnage is for British consumption or for re-export. The Indian Engineering Co. in India recently inquired for 100 tons of beams. The transaction was handled by the New York office of a British exporter, but before shipment was made the order was cancelled because of the exchange rate.

A few orders are appearing from Mexican buyers. A warehouse in New York has booked a good-sized order for open-hearth spring steel for a buyer in the Philippines. H. J. Nicol, Guatemala, C. A., importer and exporter, wishes to obtain an agency for a line of hardware, either representing the manufacturer directly or working through an exporter.

PERSONAL

G. Herbert Jones, first vice-president and general sales manager Inland Steel Co., Chicago, has tendered his resignation, to become effective about the first of the year. Mr. Jones has been identified with the iron and steel business for 50 years, the last 28 of which were with the Inland Company. He, alone among the present executives, participated in the organization of the company in 1893, and the remarkable development of its properties since that time has been due, in no small measure, to his efforts. As head of the sales department, he pursued an energetic policy which extended the market for Inland products apace with the steady expansion in plant capacity. Throughout the West he is an outstanding figure in the iron and steel world and the friendships he has formed extend from ocean to ocean. Since the inception of the Inland Steel Co., Mr. Jones has been unremitting in his efforts to promote its fortune and it is reluctantly and only because he feels that he must have time for rest and recreation, that he has asked to be relieved of his duties. During his years of service, the growth of the Inland company has been rapid. When, with his associates, he bought the barely completed plant structure of the defunct Chicago Steel Works at Chicago Heights, Ill., the initial rolling equipment consisted of 11 carloads of badly battered machinery. Throughout the first year or two, times were hard and the outlook was not bright for the infant industry. The storm was weathered, however, and subsequent expansion of the company came quickly. In 1897 Mr. Jones helped organize the Inland Iron & Forge Co., East Chicago, Ind., later bought by the Republic Iron & Steel Co., and in 1899 participated in the formation of the Buffalo Steel Co. In 1902 the first unit of the present steel plant at Indiana Harbor was completed, the initial steel-making capacity consisting of four open hearth furnaces. On Aug. 30, 1907, the first blast furnace was blown in, and in 1919 the last large works addition, known as the No. 2 plant, was completed. Today the facilities of company include three blast furnaces, 22 open hearth furnaces and numerous mills. The company has won a place among the foremost producers of iron and steel in the United States and is indisputably the largest independent in the West. Although the major portion of Mr. Jones' career has been spent with the great institution which he helped organize, his prior experience in the iron and steel business covered 22 years. During that entire time he was associated in various capacities with Hall, Kimbark & Co., wholesale iron and steel, Chicago, holding the position of general manager of sales when he left that organization. He was born in England on Jan. 25, 1856, and came to the country of his adoption in 1871. In retiring from the vice-presidency of the Inland Steel Co., Mr. Jones does not propose to sever connections with the business world entirely. He will probably continue to serve as director and member of the executive committee. He will also devote his attention to the Hillside Fluor Spar Mine, a property which he has been developing at Rosiclare, Ill. The mine will be fully equipped by the first of the year and Mr. Jones believes that a broad market for its products can be created by systematic sales effort. Mr. Jones looks upon this property in the light of a hobby to employ his time in the evening of his life, and he has already derived much pleasure from investigating the possibilities for its product not only in the metallurgical field but in other directions. Its applications in the field of wood preservation, for example, is indicated by the recent announcement of the U. S. Wood Products Laboratory, Madison, Wis., to the effect that sodium fluoride, a derivative of fluor spar, is a better preservative for wood than creosote. Its use for this purpose, however, has been restricted because the supply up to this time has been limited.



G. HERBERT JONES

H. R. Viot has resigned as purchasing agent of the Continental Motors Corporation, Detroit. He was formerly with the Oakland Motor Car Co., Pontiac, Mich.

Herbert L. Hochsched has resigned as treasurer of the Krasberg Piston Ring Co., Chicago.

Albert E. Newton has resigned from the presidency of the National Metal Trades Association, his business affairs demanding all of his time. He was formerly president of the National Machine Tool Builders' Association but resigned from membership in that organization when he sold his interest in the Reed-Prentice Co., Worcester, Mass. Mr. Newton is now identified with the Collins Co., Collinsville, Conn.

W. J. Drumpelmann, assistant sales manager Hudson Motor Car Co., Detroit, has resigned to become assistant sales manager of the newly organized Rickenbacker Motor Co. Mr. Drumpelmann has been with the Hudson company since 1917.

Charles R. Wise, Rockford, Ill., on Oct. 20, observed the fifty-first anniversary of his employment with the Rockford Bolt Works. He started as a roustabout in the shipping room and today is practically sole owner of the plant.

The Warner & Swasey Co., Cleveland, has made a change in its original plans for filling the vacancy created by the resignation of H. E. Witham, district sales manager at Chicago. Gerald Kochenderfer, representative at Indianapolis, has been appointed to succeed Mr. Witham, and C. E. Neubert, district manager of the Buffalo office, who according to the first announcement was to be transferred to Chicago, will remain in his present location.

D. M. Petty, electrical superintendent at the Lehigh plant of the Bethlehem Steel Co., Bethlehem, Pa., will address the Philadelphia section of the Association of Iron and Steel Electrical Engineers on Dec. 20 on "Yard Electrification of Industrial Plant Railways."

E. G. Lewis will be in charge of the new office of the Bucyrus Co., South Milwaukee, Wis., at suite 728, 30 Church Street, New York, as Eastern sales manager, effective Dec. 1. For many years he was with the sales organization of the Bucyrus Co., both in Chicago and in New York, and has also had wide experience in railroad and general contracting work, both in this country and abroad. M. J. Woodhull, who has had much experience in the manufacture and sale of railroad construction equipment with the Bucyrus Co. and elsewhere, is appointed Central sales manager, to succeed Mr. Lewis, in charge of the Chicago office, 622 McCormick Building. E. R. Weber is appointed Northern sales manager, at Minneapolis, 1224 McKnight Building, to succeed J. N. Gawthrop, who will become associated with Mr. Lewis in New York. Mr. Weber has been with the engineering, manufacturing and sales departments of the Bucyrus Co. for the last 15 years.

Earl B. Frost, secretary and general manager, National Machinery Co., Tiffin, Ohio, has been elected president of the Tiffin Chamber of Commerce.

Harry C. Williamson, who has been in charge of the Indianapolis sales office of the Betz-Pierce Co., Cleveland, jobber in iron and steel, has been transferred to Cleveland where he will look after city sales of the company, succeeding C. E. Sinclair, who recently resigned.

C. I. Drake, assistant to president, Walworth Mfg. Co., Boston, spoke on foundry costs before the members of the New England Foundrymen's Association at its meeting on Nov. 9 at the Exchange Club, Boston.

Harry Ross Jones and Edward L. Hang, president and vice-president-secretary, respectively, United Alloy

Steel Corporation, Canton, Ohio, have resigned, effective Dec. 31. Both will continue to serve on the board of directors and Mr. Jones will serve on the executive committee until the next annual meeting in April, 1922. Mr. Jones will look after his personal interests and Mr. Hang will soon start on a trip to the Southwest for his health, returning to Canton late next spring. The retiring officers have been with the company for 18 years. Mr. Jones went to Canton from Cleveland in January, 1904, at which time the United Steel Co., as it was then called, was in financial straits, with capital exhausted and plant not completed. Then its capacity was 3000 tons of steel ingots per month; its capacity to-day is 65,000 tons a month. Mr. Jones has been active in the development of vanadium and molybdenum steels.

The Hampden Corundum Wheel Co., Chester, Mass., property has been transferred to the Courtland Grinding Wheel Corporation, that village. The consideration is approximately $115,000.

V. E. Hillman, chief chemist and metallurgist Crompton & Knowles Loom Works, Worcester, Mass., last week addressed engineering students of the Massachusetts Institute of Technology on "Applied Research and Its Relation to Industry."

Clyde E. Dickey, Woolworth Building, New York, has been appointed sales representative for the Metropolitan district of New York for the Peerless Drawn Steel Co., manufacturer of cold drawn screw stock, shafting and alloy steels.

Millard Jiles, formerly associated with the Peck, Stowe & Wilcox Co., Middletown, Conn., has been appointed superintendent of the Springfield, Mass., branch of Charles Miller & Sons Co., manufacturer of plumbers' supplies.

J. V. W. Reynders, 120 Broadway, New York, has been elected chairman of the iron and steel committee of the American Institute of Mining & Metallurgical Engineers, succeeding the late Prof. Joseph W. Richards, Lehigh University.

E. W. Smith has been appointed assistant manager of the Chicago office of the Pittsburgh Steel Co., Pittsburgh, succeeding H. C. Woodside, who recently resigned. Mr. Smith has been with the sales department of this company for about 15 years. Mr. Woodside is now sales manager of the Northwestern Barb Wire Co.

H. W. Southard, formerly in charge of European sales and purchasing for Viele, Blackwell & Buck, 49 Wall Street, New York, recently resigned to accept a position in the Far Eastern department of the Foreign Traders Co., 154 Nassau Street, New York. Mr. Southard was succeeded by T. W. Havenstein, for five years in the engineering department of Viele, Blackwell & Buck. J. E. Goode, formerly purchasing agent American Steel Export Co., 233 Broadway, New York, has been appointed Far Eastern sales manager, and C. C. Marrin, purchasing agent.

Henry P. Bope, formerly first vice-president and general manager of sales, Carnegie Steel Co., has been elected president of the International Steel Tube Co., Cleveland, and will move to that city and devote his time to the affairs of that company, which plans to place its plant in operation early next year.

The C. C. Carter Machinery Co., Providence, R. I., has opened quarters at 36 Garnet Street, to deal in new and used machine tools, transmission and supplies. C. C. Carter is manager and Earl A. Adams, treasurer of the company. For the past eight years Mr. Carter was associated with the E. A. Eddy Machinery Co., Providence, and previous to that with Thomas & Lowe.

The Pittsburgh Machinery Co., 301 Jones Building, Pittsburgh, has been taken over by the Bradley Co., which will occupy the same offices and continue the business of new and used railroad, industrial, mining and contractors' equipment.

OBITUARY

JAMES B. RIDER, vice-president and general manager Pressed Steel Car Co., and the Western Steel Car & Foundry Co., died Nov. 3, at his residence, Northumberland Avenue, Pittsburgh, after an illness of four months. On July 2, the day he was to sail for Cuba to attend to business matters in connection with the American Steel Co. of Cuba, a subsidiary of the Western Steel Car & Foundry Co., Mr. Rider was stricken with tumor on the brain in New York and removed to a hospital. He never fully recovered from the operation which followed. He was born in Morrisons Cove, Pa., Sept. 10, 1879, and entered the service of the Pennsylvania railroad as a messenger boy. He worked through the several stages of shop order clerk, invoice clerk and stenographer, leaving the railroad in 1899 to join the Pressed Steel Car Co. as stenographer and clerk to the general manager. In 1905 he was advanced to assistant to the vice-president and four years later was appointed general manager, just 10 years after his coming to the company and when only 30 years old. In 1913 he was made a member of the board of directors and the same year appointed general manager of the Western Steel Car & Foundry Co. Mr. Rider was a member of several clubs in Pittsburgh and other cities. He was a director of the Chamber of Commerce of Pittsburgh.

DAN R. HANNA, for many years identified with the iron ore, pig iron and lake shipping industry in Cleveland as a member of the firm of M. A. Hanna & Co., died suddenly of heart failure at his home in Ossining, N. Y., Nov. 3, aged 54 years. He was a member of the Hanna firm founded by his father, the late Senator M. A. Hanna, from Jan. 1, 1891, to June 15, 1915. Since severing his connection with M. A. Hanna & Co., Mr. Hanna had devoted his attention to various personal business interests. The erection of the Hanna Building in Cleveland, as a monument to his father, was his last most important activity.

JARROTT P. DUGGER, Homewood, Ill., secretary Kewaunee Boiler Co. for 28 years, died after a long illness, at Indianapolis on Oct. 29.

HENRY S. REGESTER, SR., Baltimore, secretary of J. Regester Sons Co., manufacturer of church bells and other brass products, died of paralysis on Oct. 31, aged 69 years. The firm with which Mr. Regester was associated was dissolved about 15 years ago.

JOHN H. CARR, founder and president Union Metal Works, Chelsea, Mass., died suddenly at his home in Everett, Nov. 3, as a result of cerebral hemorrhage, aged 58 years. Mr. Carr was a director of the Everett National Bank, a member of the Massachusetts and the Federal Chamber of Commerce and the Everett Board of Trade.

HARRY WEBSTER WAITE, Waite, Ranlet & Co., Boston, metals, died at his home in Brookline, Nov. 3, age 67 years, as a result of a shock suffered about a week previous. He was born in California, but spent practically all his life in New England, where he was well known in the metals trade.

Water power in electric power plants conserves each month, in the United States, some 1,650,000 tons of coal, or its equivalent in fuel oil, according to figures issued by the Geological Survey. For the five months, May to September inclusive, the average electric production by water power was 1,216,000,000 kwhr.; by fuels, 2,084,000,000 kwhr. The coal burned averaged 2,464,000 (net) tons per month; the fuel oil, 1,026,000 bbl., equivalent to about 300,000 tons of coal.

The Blakeslee Drop Forge Co., Southington, Conn., closed two months, has resumed operations with a five and one-half day schedule of nine hours per day. Practically all employees returned to work.

Machinery Markets and News of the Works

RAILROADS ACTIVE

Half a Dozen Lines Are Openly Considering Tool Purchases

Continued Gradual Improvement Experienced—Buyers Show More Interest

Railroad business, both pending and prospective, is in the foreground. The mechanical department of the Erie Railroad has asked prices on 64 machines, the list appearing on this page, signifying its desire to purchase used machines in good condition where possible. The Santa Fe has asked for revised quotations on its pending list and is expected to order a few machines this week. A railroad purchasing agent in Chicago has a large list on his desk against which he will purchase when he is convinced prices are most satisfactory. The Rutland Railroad, Rutland, Vt., inquires for nine tools for estimating for its 1922 budget. The Union Railroad, Pittsburgh, property of the United States Steel Corporation, has purchased three tools. The Big Four has bought practically all the equipment asked for its Beech Grove shops.

Hopeful signs in the market are: The revival of old inquiries which have lain dormant for some time; the increasing interest of prospective purchasers who have heretofore given a cold reception to sales talk; the gradual, but certain, increase in the buying of single machines; the improvement in export business.

The West Penn Power Co., in the Pittsburgh district, has revived a list of 20 tools which was originally issued in February. A prominent exporting company in New York is making sales abroad at the rate of six times the value of those made early this year.

The Durant Motors Corporation has given a $12,000,000 order for engines and parts to the Continental Motors Corporation, Detroit and Muskegon, Mich., said to be the largest order in automotive history. It is likely that new equipment will be purchased in connection with this order.

Recent price reductions include: 10 per cent on small production lathes; 15 per cent by a Michigan maker of radial drills; 10 per cent on a line of air chucks; 20 per cent reduction on drill, tap, universal cutter and tool grinders by a Michigan maker; 10 per cent by an Indiana manufacturer of emery and polishing stands.

New York

NEW YORK, Nov. 7.

The mechanical department of the Erie Railroad, 50 Church Street, New York, has asked for prices on 64 miscellaneous machines for its various shops. The inquiry states that the railroad is anxious, where possible, to purchase used tools in good condition. The list follows:

Three 90-in. driving wheel lathes.
Four 500-ton car wheel presses.
Two 48-in. car wheel boring mills.
Six 28-in. shapers.
Two 6-ft. radial drills.
One 48-in. x 12-ft. engine lathe.
One 28-in. slotter.
One 42-in. boring mill.
Two 24-in. boring mills.
One double-head staybolt cutter.
Two 3 x 36 in. turret lathes.
One cutter grinder.
One universal milling machine.
Four 18-in. engine lathes.
One 1100-lb. steam hammer.
One link planing attachment.
One emery wheel stand.
Three power hack saws.
One 4-in. pipe threader and cutter.
One horizontal boring mill, 4 in. bar.
Three 60-ton presses.
Three 20-in. emery wheel stands.
One 100-in. tire turning mill.
One 42-in. truck tire lathe, motor drive.
One 4-in. pipe cutter and threader.
One 36-in. x 20-ft. lathe.
One 600-ton driving wheel press.
One Franklin portable crane.
Two electric trucks
One 42-in. vertical boring mill.
One 36-in. drill press.
Two 15 hp. motors.
One 4-in. pipe threading machine.
One 5-ft. radial drill.
One 14-in. sensitive drill.
One 54-in. boring mill.
One internal grinder.
One double-end axle lathe.

No purchases have been made as yet by the Delaware, Lackawanna & Western Railroad against its recent inquiry for about 40 machines. The New York Central Railroad list, now in prepartion, will probably be issued before the first of the year.

Bids were opened last week by the New York Board of Education on its list of machine tools, numbering upwards of 100, and other small tools and supplies for vocational training schools. Awards probably will not be made for some weeks owing to the great labor involved in tabulating the bids.

Export business in machine tools is not showing material gains, but J. W. Hook, president Allied Machinery Co., 51 Chambers Street, New York, which represents many of the leading American machine-tool builders in foreign trade, believes that the company has definitely turned the corner and that a steady, though probably slow, gain in export business can be hoped for. While the volume of business being booked is not large, the volume that is being quoted upon shows a marked gain, now averaging about $750,000 a week compared with an average of $125,000 a week early in the year. The company's inventories have been reduced, the total now standing at $4,750,000, including goods already sold and en-route but not yet delivered. The reduction in the inventory since the first of the year is about $3,000,000.

The Lamp Salvage Corporation of America, 501 West 145th Street, New York, which was recently incorporated, will engage in the refilling of incandescent lamps. The company expects to enlarge its production soon and contemplates leasing a new building. Special machinery for making lamps is now being negotiated for.

While the number of inquiries in the crane market shows no increase, those now being handled in this district are generally quite active. The inquiry of the American Car & Foundry Co., for two 5-ton electric cranes for its St. Louis plant, has been confined to the six lowest bidders on the previous purchase of two cranes. The Textile Finishing Machine Co., Providence, R. I., is receiving bids on seven small capacity cranes, four electric and three hand power. The Forbes Aluminum Products Corporation, which will build a plant at Easton, Pa., has placed its purchasing in the hands of the Fawcus Machine Co., 2828 Smallman Street, Pittsburgh. It will include a 15-ton electric crane. The Pacific Mills, Lawrence, Mass., recently purchased a 30-ton electric crane from an unnamed builder.

Among recent sales are: Cleveland Crane & Engineering Co., a 2-ton 30-ft. span, overhead traveling crane to the E. W. Bliss Co., Brooklyn, N. Y., for its Cleveland plant; Industrial Works, two 20-ton, 50-ft. boom locomotive cranes

to the Duquesne Slag Products Co., Pittsburgh; Northwest Engineering Co., two 10-ton dragline, crawler cranes to L. H. Barkhausen, Portage, Wis., and one 10-ton dragline crawler crane to S. O. Briggs & Son, Omaha, Neb.; Northern Engineering Works, Detroit, a 5-ton 3-motor electric traveling crane for the Pittsburgh Metallurgical Co., Niagara Falls, N. Y.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, has plans for a power plant, 80 x 130 ft., on Sixty-sixth Street, to cost $120,000. G. L. Knight, company address, is engineer.

The Taylor-Wharton Iron & Steel Co., 30 Church Street, New York, alloy steel and iron castings, rolling mill machinery, etc., with plant at High Bridge, N. J., has disposed of a bond issue of $3,250,000. Knox Taylor is president.

The Inwood Consumers' Ice Mfg. Corporation, 30 Church Street, New York, will at once erect an ice-manufacturing plant at Ninth Avenue and 213th Street, to cost $300,000, including machinery. The company was recently organized with $200,000. R. L. Belgardo is president.

The Electric Bond & Share Co., 71 Broadway, New York, is arranging for an increase in capital from $20,000,000 to $25,000,000, providing for extensions in plants and system. The Pennsylvania Power & Light Co., a subsidiary, is expanding at Allentown, Wilkes-Barre and elsewhere in eastern Pennsylvania. It recently acquired the Wilkes-Barre Electric Light Co.

The Faurot Scope Mfg. Corporation, Long Island City, N. Y., precision apparatus, has leased the two-story building on Prospect Street, at the Bridge Plaza, Long Island City, for the establishment of a new plant.

The New York Dock Co., 41 Whitehall Street, New York, has completed plans for a one-story power house at Furman and Montague streets, Brooklyn.

The Groton Electrical Devices Co., Groton, N. Y., has changed its name to the Airdry Corporation.

Valentine Petersen, 764 Fourth Avenue, Brooklyn, has plans for a one-story machine shop addition. John C. Wandell, 8525 Fourth Avenue, is architect.

The West Forty-ninth Street Garage Corporation, New York, will expend $250,000 for a two-story automobile service and machine repair building, 117 x 175 ft., on West Forty-ninth Street, near Eleventh Avenue. Maynicke & Franke, 25 East Twenty-sixth Street, are architects. Max Rothbart is president.

The Fulton Foundry & Machine Co., Brooklyn, now operating at 21 Furum Street, has incorporated at $100,000 to manufacture machinery, castings, etc. The company is headed by Albert W. Mesick, G. W. Van Eps and F. W. Baldwin.

The International Nickel Co., 67 Wall Street, New York, has awarded a contract to the United Engineering & Foundry Co., Farmers' Bank Building, Pittsburgh, for machinery and equipment for its new plant at Huntington, W. Va., for the manufacture of Monel metal, etc.

The Sheffield Farms Co., Inc., 524 West Fifty-seventh Street, New York, has plans for a three-story ice and refrigerating plant on Webster Avenue, to cost $125,000. Frank A. Rooke, 15 East Fortieth Street, is architect.

A bond issue of $3,000,000 has been sold by the Manitoba Power Co., Ltd., Winnipeg, Man., to New York banking interests, for a 165,000 hp. hydroelectric generating plant at Great Falls, Winnipeg River. Construction will be handled by Fraser Brace & Co., 32 Pearl Street, New York. A. W. McLimont is vice-president of the Manitoba company.

The Master Trucks, Inc., 237 West Sixty-first Street, New York, motor trucks and parts, has leased part of the building on Fourteenth Street, near Ely Avenue, Long Island City, owned and occupied by the George W. Copp Co., automobile equipment.

The Kings County Lighting Co., 4802 New Utrecht Avenue, Brooklyn, has plans for a one-story building at First Avenue and Fifty-fifth Street, for general mechanical service.

The Alaska Anthracite Railroad Co., care of the National Park Bank of New York, 214 Broadway, New York, trustee, has disposed of a bond issue of $1,500,000 to local banking interests, for new rolling stock, water terminals and bunkers, extension and branches to develop coal properties, shop equipment, etc. The company operates a line from Controller Bay, Alaska, to the Bering River coal fields.

A one-story automobile service and repair works, to cost $100,000, for company motor trucks, will be erected by the H. C. Bohack Co., 1291 Broadway, Brooklyn, grocers, on Metropolitan Avenue, Ridgewood, L. I. Arthur Koch, 32 Court Street, Brooklyn, is architect.

The Commissioner of Immigration, Robert E. Tod, Ellis Island, N. Y., will receive bids until 2.30 p. m., Nov. 15, for extensions to the coal hoist and fender system at Ellis Island.

The Richmond Ice Co., Rosebank, S. I., will build a one-story ice plant, 75 x 100 ft., on Clove Road, near Richmond Turnpike, West New Brighton, S. I.

The Penn Motor Corporation, 1714 North Broad Street, Philadelphia, Hilton W. Scofield, head, will soon take bids for a one-story automobile manufacturing plant at Pleasantville, N. J., 50 x 330 ft. Charles H. Donehower, Pleasantville, is architect and engineer.

The Maywald Rubber Co., 86 Park Place, Newark, specialties, with plant at Nutley, N. J., is arranging a stock issue, for plant expansion. Manufacture of inner tubes for automobile tires will be engaged in. Dr. Frederick J. Maywald is president, and George C. Plummer, vice-president and treasurer.

Fire, Oct. 31, destroyed the ice plant of Brady Brothers, Lake Hopatcong, N. J., including power house, equipment, etc., with loss of $150,000.

The Public Service Corporation, Public Service Terminal, Newark, operating electric light and power plants, gas works and traction system, has arranged for a stock issue of $2,000,000 for general operations, extensions, improvements, etc.

Pfaff & Kendall, 655 Ferry Street, Newark, iron pipe and kindred products, have plans for a two-story plant on Foundry Street, 38 x 110 ft., to cost $20,000. William L. Finne, 712 First Avenue, Elizabeth, N. J., is architect.

Fire, Nov. 3, destroyed three piers of the Erie Railroad Co., Jersey City, N. J., on the Weehawken, N. J., waterfront, with loss of $2,000,000, including equipment and stock. The loss also included property of the Standard Oil Co. of New Jersey and the International Milling Co.

Hedges & Brother, Inc., 10 Railroad Place, Newark, N. J., valves, pipe, plumbing supplies, etc., has acquired property on South Street, 60 x 100 ft., as a site for the erection of a new plant.

Philadelphia

PHILADELPHIA, Nov. 7.

Following the termination of receivership, the Ace Motor Corporation, Philadelphia, has resumed title to its plant at Erie Avenue and Sepviva Street, and will proceed with regular production. The works occupy about 7 acres of land, with a number of buildings. The company was recently reorganized under Delaware laws with a capital of $2,340,000. M. M. Sladkin heads the company.

The Bureau of Water, Philadelphia, has awarded contract to the Niles-Bement-Pond Co., Meadow and Mifflin streets, for the installation of an electric traveling crane at the Shawmont pumping plant. Contract has also been let to the O'Brien Machinery Co., 119 North Third Street, for equipment for the new machine and repair shop.

Fire, Oct. 30, destroyed a portion of the annex plant of the works of the Keystone Lantern Co., State Road and Cottman Street, Philadelphia, with loss estimated at about $25,000.

The H. S. & W. B. Cochrane Corporation, Seventeenth Street, Philadelphia, manufacturer of power plant equipment, has filed plans for a one-story addition.

The Insulated Wire & Cable Co., Olden and Taylor streets, Trenton, N. J., has completed plans for a one-story addition, 50 x 120 ft.

Machinery and electrical equipment will be installed in the new one and two-story addition to be erected to the Acme Sanitary Pottery Co., May Street, Trenton, N. J., manufacturer of sanitary ware, estimated to cost about $80,000.

The Harbor Engineer, Room 11, City Hall, Camden, N. J., is taking bids for a 3-ton electric traveling crane, locomotive type; electric tractor with 3 trailer trucks, and two portable electric winches for installation at the city harbor, Spruce Street pier. George W. Bradley, chairman of the Harbor Committee.

The Floyd-Wells Co., Royersford, Pa., manufacturer of stoves, ranges, heaters, etc., will take bids at once on revised plans for a two-story addition, 32 x 120 ft. A. S. Kepner, 121 Hanover Street, Pottstown, Pa., is architect.

Fire, Oct. 30, destroyed the plant of the Eclipse Wood Pulley Co., Berlin, Pa., with loss estimated at about $50,000.

The duPont Motors Co., Wilmington, Del., will erect a new one-story building, 75 x 100 ft., at its plant on Thirteenth Avenue, Prospect Park, Pa.

The Department of Public Grounds & Buildings, Capitol Building, Harrisburg, Pa., will soon take bids for a new one-story automobile service and repair building, 60 x 112 ft., at Eighteenth and Herr streets, for state motor cars and automobiles. Samuel B. Rambo is secretary; Frank A. Fahnestock, Patriot Building, is architect.

The American Natural Gas Co., Indiana, Pa., has completed plans for a new one-story building, 80 x 100 ft., for mechanical and machine shop service, and other operations. Xavier Wittmer is president.

The Vulcweld Rubber Co., Pottstown, Pa., is completing plans for rebuilding its tire manufacturing plant, destroyed by fire several months ago.

John H. Bradley & Co., manufacturers of hospital and institution equipment, have leased a factory building at 705 North Twelfth Street, Philadelphia, and have installed machinery. They are still in the market for a power brake, a power squaring shear and polishing machines. After Nov. 7 the name of the company will be the J. H. Bradley Mfg. Co.

Buffalo

Power equipment, ovens, conveying machinery and other equipment will be installed in the new five-story plant, 200 x 360 ft., to be erected at Ferguson Street and the Belt Line Railroad, the site of the former Buffalo Pitts foundry, Buffalo, by the National Biscuit Co., 217 Ellicott Street, to cost $1,000,000. New York offices of the company are Tenth Avenue and Fifteenth Street.

S. Cheney & Sons, Seneca Street, Manlius, N. Y., iron castings, etc., have completed plans for a one-story machine shop. Melvin L. King, Snow Building, Syracuse, N. Y., is architect.

The Pennsylvania Glass Sand Co., Lewiston, Pa., is completing plans for the superstructure of its one-story feldspar grinding mill at Rochester, N. Y., 50 x 130 ft., and will soon award contract. Contract for the foundation work has been let. The plant will cost $50,000, including equipment.

The New York State Gas & Electric Corporation, 123 South Cuyhoga Street, Ithaca, N. Y., will make extensions, to cost $25,000.

The plant of the Joseph T. Andrews Paper Co., Penn Yan, N. Y., including machinery, was damaged by fire Oct. 31, with a loss of $30,000.

T. Kennard Thomson and Peter A. Porter have applied with the New York State Water Power Commission for a preliminary permit to develop a power site below Niagara Falls. A hearing will be held Nov. 16.

Chicago

CHICAGO, Nov. 7.

The Santa Fe has asked for revised quotations on its pending list and is expected to place orders for a few machines this week. Other roads with headquarters in this city have taken no further steps toward placing orders. A purchasing agent of one line has a large list on his desk, which he is authorized to purchase, provided he thinks prices are right. It is evident that the indecision which has characterized the policy of railroad purchasing departments throughout the year, is still delaying action on machine tool requirements. It is to be noted, however, that railroad buying is expanding in some directions, notably in the placing of orders for cars and car repairs. Shops are now generally busy on the repair of equipment and it is felt that the purchase of machine tools for replacement purposes only cannot be longer delayed, except at the expense of shop costs.

Local machinery houses report current trade on a slightly improved scale, with orders for single machines still ruling. Sentiment is generally more cheerful, not because of any material increase in business in prospect, but rather on account of a growing conviction that basic conditions are improving. It is noted that pig iron production, long regarded as the barometer of trade, showed a sharp turn for the better in October.

No further important price changes have been reported, although a few open line reductions have been made. The Grand Rapids Grinding Machine Co., Grand Rapids, Mich., has announced a 20 per cent reduction on drill grinders, tap grinders, and universal cutter and tool grinders. The Clizbe Brothers Mfg. Co., Plymouth, Ind., has reduced emery stands and polishing stands 10 per cent.

The U. S. Ball Bearing Mfg. Co., 4535 Palmer Street, Chicago, has let contract for a one-story forge shop, 100 x 122 ft., to cost $26,000.

C. Kollet, 1545 George Street, Chicago, has let contract for a one-story garage and repair shop, 40 x 80 ft., at 2955-57 N. Ashland Avenue, to cost $10,500.

A. Bromstedt, 6440 Stony Island Avenue, Chicago, has let contracts for a one-story garage, 50 x 200 ft., 6022-24 Stony Island Avenue, to cost $40,000.

The Dearborn Truck Co., Maplewood Avenue and Thirty-fifth Street, Chicago, has sold its property, including a three-story plant, 110 x 118 ft., to Candy & Co., manufacturers of insulating materials. The Dearborn company is now negotiating for a building more suitable for its manufacturing requirements.

The G-A Ball Bearing Mfg. Co., 3051 West Lake Street, Chicago, has purchased property, 124 x 325 ft., on Harrison Street, 50 ft. west of Spaulding Avenue, as the site for a one-story factory and office building to contain 22,000 sq. ft. Plans have been completed by Dwight G. Wallace, architect, and construction will commence at once.

F. C. Austin, formerly of the Austin Mfg. Co., Chicago, has had plans prepared by Fox & Fox, 38 South Dearborn Street, for a four-story factory on Sangamon Street, to cost $90,000.

Mandel Brothers, Madison and State streets, Chicago, have let contracts for a one-story garage, 125 x 193 ft., southeast corner North Crawford and Schubert avenues, to cost $75,000.

Halperin & Braun, 19 South La Salle Street, Chicago, have let contracts for a one-story garage, 75 x 125 ft., on Loomis Street, for J. Dooley, to cost $25,000.

The Associated Silver Co., 4448-56 West Ravenswood Avenue, Chicago, has let contract for a one-story addition to its silver plate factory, 75 x 75 ft., to cost $18,000.

The Fleischmann Yeast Co. has let contract for a one-story brick boiler house, 30 x 50 ft., at 1578 Kingsbury Street, Chicago, to cost $15,000.

The Chicago Board of Education has let contract for a one-story garage, 47 x 100 ft., at 700 South Clark Street, to cost $24,000.

The Mathiessen & Haegeler Zinc Co., La Salle, Ill., has purchased the machinery and patent rights of W. C. Paisely, Ottawa, Ill., manufacturer of the "Smeeton" metal shingles.

The Cole Storage Battery Co., 2437 Indiana Avenue, Chicago, has tentative plans under way for a new two-story and basement addition, 80 x 120 ft., on Indiana Avenue, estimated to cost about $60,000. Halperin & Braun, 19 South La Salle Street, are architects. It is expected to build early in the spring.

The Crane Co., 836 South Michigan Avenue, Chicago, manufacturer of valves, pipes, steam fittings, etc., has awarded contract to the Priester Construction Co., Putnam Building, Davenport, Iowa, for a new three-story branch plant on West Second Street, Davenport, estimated to cost about $85,000. Local offices of the company are at 624 East Fourth Street; William T. Cotter is district manager.

The Common Council, Randolph, Neb., is planning for the construction of an addition to the municipal electric power plant to cost about $65,000. Bonds have been provided.

The J. S. Heath Co., Franklin and Ontario streets, Chicago, manufacturer of iron, brass and other metal products, is planning for the early occupancy of its new plant, now nearing completion at Waukegon, Ill. It will be equipped as a foundry, machine shop and for metal-plating work.

The Chicago & Northwestern Railroad Co., 226 West Jackson Boulevard, Chicago, has preliminary plans under way for extensions and improvements in its car and locomotive shops and yards at Winona, Minn., estimated to cost about $500,000. Work will commence early in the spring.

Cleveland

CLEVELAND, Nov. 7.

An encouraging feature of the machinery market is that some buyers who for a long time have declined to give any thought to the subject of buying machinery are beginning to show some interest, and this has made the tone of the market decidedly better. Sales show a slight improvement but are still confined for the most part to small single machines, used machinery being more active than new equipment. Dealers are working on a few more inquiries than they were a month ago and among these is one for about 20 machines which the trade believes will result in orders shortly. Virtually no business is coming from the railroads in this territory. The Toledo Crane Co., Bucyrus, Ohio, has just closed a deal with the Imperial Japanese Government, for a number of wall cranes for a new navy shipbuilding yard in Japan.

The E. W. Bliss Co. has moved its Cleveland plant from Hamilton Avenue to its new location on St. Clair Avenue and the New York Central Railroad at Bliss Road. On this site the company has erected a machine shop 125 x 350 ft. Later it plans to erect a forge shop. For the present it will discontinue the manufacture of forgings in Cleveland, buying these in the market to meet its requirements.

The National Fireproofing Co., East Palestine, Ohio, will rebuild its plant which was recently burned. Construction will be started as soon as contracts can be placed.

The Crane Co., Chicago, has acquired the plant of the Glenmore Lubricant Co., Lima, Ohio, and will use it as a distributing station for its various lines of products.

The Delphos Ice Machinery Co., Delphos, Ohio, has been incorporated with a capital stock of $250,000 and has acquired the plant of the Glamorgan Co., which it will equip for the manufacture of ice machinery. The company will make ice machines of from one to five-ton capacity.

The Salem Rubber Co., Salem, Ohio, has been incorporated with a capital stock of $250,000 and will operate the plant of the Porter Rubber Co. in Salem, making automobile tires. E. A. Tinsman is president and Grant Hill, secretary.

The Hagan Foundry Corporation has placed a contract for a 60 x 60 ft. addition to its Orrville, Ohio, foundry.

The Simon Sign Co., 1729 E. 12th St., Cleveland, has placed a contract for the erection of a two-story plant, 43 x 120 ft., on East Nineteenth Street.

The Scott-Wills Steel Co., Toledo, Ohio, was recently organized to conduct a jobbing business in iron and steel products and has acquired a warehouse at Chicago Street and the Wheeling & Lake Erie railroad. W. W. Scott is president, F. A. Miller, vice-president, and A. B. Wills, secretary and treasurer.

W. J. Carr, secretary Maibohm Motor Co., Sandusky, manufacturer of automobiles, has been appointed receiver of that company and an order of court has been issued for a sale of the plant at auction Nov. 14. It is expected that a reorganization will be effected. Liabilities are placed at $650,000 and assets at $800,000.

Baltimore

BALTIMORE, Nov. 7.

Christhilf & Ensey, Munsey Building, Baltimore, operating a general contracting business, have acquired property for a new one-story machine shop, 60 x 165 ft. Plans are being prepared.

The crystal Ice & Transfer Co., North Avenue and Chester Street, Baltimore, has awarded contract to Mason & Fox, Law Building, for a two-story addition to its service and repair building, 80 x 180 ft., for company motor trucks, estimated to cost about $30,000.

The Colonial Hotel Co., Betterton, Md., is having plans prepared for a new power plant for local light and power service. Clark & Dudnick, Drexel Building, Philadelphia, are architects.

The Board of Directors, John Hopkins University, Homewood, Baltimore, is reported to be planning for a one-story machine shop, estimated to cost about $400,000, including equipment.

Lyon, Conklin & Co., 13 Balderson Street, Baltimore, manufacturers of sheet metal products, have awarded contract to George B. Monmonier & Son, 1711 McCulloh Street, for two new buildings, four-stories, 66 x 75 ft., and one-story, 230 x 434 ft., respectively, estimated to cost about $75,000.

Thomas B. Finan, Cumberland, Md., and Townsend, Scott & Son, 209 East Fayette Street, Baltimore, are concluding negotiations for the purchase of the Edison Electric Illuminating Co. and the Cumberland Electric Railway Co., both of Cumberland, in excess of $2,000,000. The new owners are planning for a complete reorganization to be merged under one management. A stock issue will be arranged to provide capital for extensions and improvements, including the installation of electric and other machinery.

The Standard Oil Co., Pratt Street, Baltimore, has tentative plans under way for the construction of a new distributing plant at Crisfield, Md., with extensive tankage department, pipe lines, pumping machinery, etc., to serve the entire district. A site is being selected.

The McHenry-Millhouse Mfg. Co., South Bend, Ind., manufacturer of roofing, has acquired the plant of the Electrolytic Zinc Co., South Sixteenth Street and Second Avenue, Baltimore, for the establishment of branch works. The structure will be remodeled and enlarged, with the installation of equipment. The company is also said to be planning the erection of new works at Canton, Ohio. J. L. Kittinger is general manager.

Fire, Oct. 29, destroyed one of the plants of the Baltimore Brick Co., Maryland Trust Building, Baltimore, with loss estimated at about $100,000, which included machine shops, power house, brick manufacturing department and other structures, and considerable new machinery. Warren Griffiss is manager.

The Jamison Coal & Coke Co., Cumberland, Md., is planning for the electric operation of its Jamison Mine No. 9, and will install equipment for this purpose. Power service will be furnished by the Monongahela Power & Railway Co.

The Mineral Potash Corporation, 712 Equitable Building, Baltimore, recently organized with a capital of $750,000, has plans under way for a building at its properties, to be equipped as a grinding plant for feldspar. The works are estimated to cost close to $100,000, with machinery to cost about one-half this sum. Louis A. Hazard is president.

The Gibbs Machinery Co., Columbia, S. C., manufacturer of cotton ginning machinery, is planning for the installation of electrically operated equipment for parts production, repair work, etc.

The Building Commission of the State Hospital for the Insane, Goldsboro, N. C., has completed plans for a new power house and ice plant, estimated to cost about $75,000. Nathan O'Berry is chairman.

The Diamond Holfast Rubber Co., Atlanta, Ga., is completing plans for a new one-story factory, 80 x 240 ft., to manufacture rubber specialties and estimated to cost about $35,000. A. Ten Eyck Brown, Forsyth Building, is architect.

Loading and unloading machinery and conveying equipment will be installed on the wharf to be erected at the plant of the Wilmington Sugar Refining Co., Wilmington, Del., now in course of construction and designed to occupy a 12-acre site in the vicinity of B Street, South Wilmington. The entire project is estimated to cost in excess of $7,500,000. The Armstrong & Latta Co., Land Title Building, Philadelphia, is contractor for the sugar plant.

The Bristol Milling & Mfg. Co., Bristol, Va., is planning for the erection of a new ice manufacturing plant, with initial daily capacity of 30 tons, estimated to cost $50,000. It recently acquired the local plant of the Bristol Milling Co., and has also purchased the property of the Hitch Ice & Mfg. Co., Maryville, Tenn.

The Chesapeake & Ohio Railroad Co., Richmond, Va., H. C. Pearce, director of purchases and stores, will take bids until Nov. 17, for miscellaneous equipment and supplies. Specifications and information at the purchasing office, 1604 First National Bank Building.

Traveling cranes, loading and unloading machinery and other freight handling equipment will be installed on the new municipal piers to be constructed by the City Council, Norfolk, Va. A special election has been called to vote bonds for $5,000,000, for the project, the work to include a new grain elevator, estimated to cost about $800,000 with machinery. The initial terminal construction will be in the Sewalls' Point section. The city engineering department will be in charge.

The Groom Motor Service Co., Charlotte, N. C., with headquarters at 720 Mint Street, has arranged for a change of name from the Convertible Oil Gauge Co., to increase its general line of automotive specialty manufacture, at the same time changing its capital from $25,000 to $50,000.

Haynesworth & Lawton, Florence, S. C., will build a new cold storage and refrigerating plant, estimated to cost about $40,000. It will be arranged for early expansion, future work to cost approximately $100,000 with machinery.

A retort building, 68 ft. long, with industrial railroad, power equipment and other mechanical apparatus will be constructed by the North Charlotte State Creosoting Co., Charlotte, N. C., in connection with its new plant. The company was recently organized with a capital of $100,000.

The Buck Ice Co., Columbus, Ga., has prepared plans for the immediate erection of a new ice manufacturing factory, 150 x 150 ft., with daily capacity of about 30 tons.

The Maryland Car Wheel Works, Curtis Bay, Baltimore, manufacturer of car wheels, etc., has been reincorporated under the name of the Maryland Car Wheel Co.

Plans are being made by the Maryland Dairymen's Association, Fidelity Building, Baltimore, D. G. Harry, president, for the construction of a plant for the manufacture of butter and other milk products.

Alexander & Garsed, Charlotte, N. C., will rebuild their foundry, which was recently destroyed by fire.

The Baxter & Allen Iron Works, Inc., 17 Pinckney Street, Charleston, S. C., is asking prices and information on electro-galvanizing outfits. A. S. Herbert is secretary of the company.

Pittsburgh

PITTSBURGH, Nov. 7.

The Union Railroad, the Pittsburgh district interplant system of the Steel Corporation, has closed for a lathe, a radial drill and a planer with the Niles-Bement-Pond Co. The West Penn Power Co. has revived a list originally issued last February, calling for 20 tools against which revised quotations have been requested. A Johnstown district coal company recently purchased a motor driven punch and shears valued at $1600. Small purchases are fairly numerous and the trade also has been figuring on a number of fair-sized inquiries.

There is still some disposition on the part of prospective buyers to move slowly, but the expectation is fairly strong that this tendency will vanish after the turn of the year. It is figured that by then the uncertainty about business will

have been overcome and that financial considerations will give way as a factor in the demand for equipment.

Improvement and extensions at the plant of the Townsend Co., New Brighton, Pa., are reported to involve some machinery purchases.

The crane market does not show much life. The liveliest prospect is the Standard Underground Cable Co., which is expected to place four cranes shortly, two each for its plants here and in St. Louis. The Toledo-Edison Co. is equipping a power plant for which one crane is wanted.

The Gem Mfg. Co., Pittsburgh, has made a further reduction of about 10 per cent in its prices of oilers and torches.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, has awarded contract to the Austin Co., 16112 Euclid Building, Cleveland, for a new one-story foundry at New Brighton, Pa., 145 x 180 ft.

The Raylo Co., 1228 Fulton Building, Pittsburgh, manufacturer of mechanical specialties, has completed plans and will take bids at once for a new four-story and basement factory on Philadelphia Street, Indiana, Pa., 50 x 120 ft., estimated to cost about $85,000.

The National Fireproofing Co., 1126 Fulton Building, Pittsburgh, is planning to rebuild its plant at East Palestine, Ohio, recently destroyed by fire. It will be one-story, 100 x 100 ft., and is estimated to cost about $60,000. Sidney F. Heckert, Bessemer Building, Pittsburgh, is architect.

Arrangements have been made for the sale of the plant of the Pittsburgh Metal Spinning & Stamping Co., 821-23 Locust Street, Pittsburgh, by the Potter Title & Trust Co., receiver.

The Wilke-Groetsch Co., 4036 Liberty Avenue, Pittsburgh, has filed plans for a new two-story automobile service and repair building, 78 x 100 ft., estimated to cost about $40,000. John Groetsch is president.

The Madison Auto & Repair Co., Pittsburgh, now being organized, is arranging for the operation of a local repair and assembling plant for automobiles, motor trucks, etc. A parts department will be established. John Wolf and Robert A. Fisher head the company, which is represented by W. F. Stadtlander, 415 Frick Building.

The Wyckoff Drawn Steel Co., Economy, near Ambridge, Pa., is planning for the erection of a one-story addition, 60 x 240 ft.

The Townsend Co., New Brighton, Pa., manufacturer of bolts, nuts, rivets, etc., has arranged an improvement and extension program to cost in excess of $500,000. In addition to the erection of a new three-story and basement structure, 120 x 128 ft., now under way, three other buildings will be constructed. A housing development for employees is also planned. It is expected to give employment to about 500 additional men.

The Arburthnot-Stevenson Co., Penn Avenue, Pittsburgh, has awarded contract to the C. H. Kerr Co., Vanadium Building, for a new one-story automobile service and repair building, 75 x 210 ft., estimated to cost about $75,000.

The Chesapeake & Ohio Railroad Co., Richmond, Va., is planning for extensions and improvements in its car and locomotive shops at Huntington, W. Va., to cost about $65,000. A new car parts building will be constructed.

The E. P. Bailey Co., Nitro, W. Va., has completed plans and will soon commence the erection of a new one-story foundry and machine shop, estimated to cost about $100,000, including machinery.

The American Thermos Bottle Co., Madison Avenue and Forty-sixth Street, New York, has awarded a contract for the superstructure of its new plant at Huntington, W. Va., to the United Erecting Co., Euclid Avenue and East Forty-sixth Street, Cleveland, to be one-story, 100 x 290 ft., equipped for general manufacture, assembling, etc. The Arnold Co., 105 South La Salle Street, Chicago, is engineer. William B. Walker is president.

To finance the erection of its new plant, the Star Glass Co., Star City, near Morgantown, W. Va., has arranged for an increase in capital from $50,000 to $150,000. It will cost close to $200,000, complete, and will replace works destroyed by fire some time ago. J. W. Wiles has recently been re-elected president.

St. Louis

ST. LOUIS, Nov. 7.

The White Truck Co. will erect a two-story sales and service building at Vandeventer and Laclede avenues, St. Louis.

The Johnson Automobile Lock Co. has bought the two-story factory building at 4121 Forest Park Boulevard, St. Louis, where transmission and spare-tire locks will be manufactured.

Clark, Cameron & Butler have leased the one-story building at Nineteenth and Chestnut streets, for an automobile garage, to be known as the Union Station Garage and Service. The building is 168x109 ft.

A syndicate headed by J. H. McCawley has closed negotiations for the purchase of the half block on the east side of Seventh Street, extending from Walnut to Elm streets, St. Louis, as a site for a garage. The operation, including the cost of the site, involves an investment of $500,000.

Work has been started on the $1,000,000 plant of the Standard Underground Cable Co., in the northwest industrial section of St. Louis.

Detroit

DETROIT, Nov. 7.

The new Durant Motors Corporation has placed with the Continental Motors Corporation of Detroit and Muskegon, Mich., an order for 50,000 to 100,000 automobile engines and parts, involving the expenditure of from $12,000,000 to $15,000,000. The Muskegon plant of the Continental company, where the order will be filled, will increase its working force from approximately 1300 to more than 3000 by next spring.

Another Michigan concern which will benefit greatly by the advent of Durant motors is the Autobody Company, Lansing, Mich., which, it is announced, has the order for all open car bodies, involving several million dollars. This company will increase its working force probably by at least 500 men, very shortly and it is said will soon be in the market for additional equipment.

The Ford Motor Co. will build a 60 ft. addition to its body plant at Iron Mountain, Mich.

The Steel Furniture Co., Grand Rapids, Mich., which makes metal stampings, will soon start the erection of a two-story addition, 100 x 150 ft. Several departments have been working overtime for the last five months.

Construction has been started by the John Widdecomb Co., Grand Rapids, Mich., on a new machine shop, 50 x 75 ft., at Fifth and Muskegon streets.

Plans are being completed for a new power plant for the village of Marlette, Mich. R. L. Blackman is the designer.

The Atlas Drop Forge Co., Lansing, Mich., is preparing plans for another addition.

The Barnard Toy Co., manufacturer of wood, metal and rubber toys, with factories at Ann Arbor, Mich., and Ashland, Ohio, is moving its plants to 2755-65 West Fort Street, Detroit, where it is expected to get into production by Nov. 25.

The Motor Wheel Corporation, Lansing, Mich., has awarded contract to the H. G. Christman Co., Lansing, for a new one-story and basement factory, 120 x 240 ft. C. C. Carlton is secretary.

The Gray Motor Corporation, Detroit, recently organized by Frank L. Klingenschmidt, formerly vice-president Ford Motor Co., is perfecting details for the establishment of a local plant for the manufacture of automobiles, to sell at about $500. Mr. Klingenschmidt is president.

The Leasia Motor Sales Co., Detroit, care of Arnold & Shreve, architects, 308 Homber Building, Highland Park, Detroit, is having plans prepared for a new two-story automobile service building, with repair shop, on Woodward Avenue, estimated to cost about $42,000.

The University of Michigan, Ann Arbor, has preliminary plans under way for a new mechanical shop and engineering laboratory, estimated to cost about $750,000. It is expected to commence work early in 1922. Smith, Hinchman & Grylls, Washington Arcade Building, Detroit, are architects. S. W. Smith is secretary at the university.

The Associated Motor Industries, Inc., recently organized as a merger of a number of automobile companies, will take over the property of the Jackson Motors Corporation, Jackson, Mich., for $1,105,000. The plant will be operated as one of the units of the consolidation.

Following a reorganization of the Briscoe Motor Co., Jackson, Mich., and change of name to the Earl Motors, Inc., notice has been filed of increase in capital from $21,500,000 to $41,500,000, to provide for expansion. A bond issue of $5,000,000 is being arranged for plant enlargements, new machinery, etc. Clarence A. Earl, formerly vice-president Willys-Overland Co., Toledo, Ohio, heads the company.

Cincinnati

CINCINNATI, Nov. 7.

The Big Four Railroad was the leading purchaser during the past week, closing for practically all of the equipment asked for its Beech Grove shops. The greater part of this equipment will come to Cincinnati builders. Local manu-

facturers report that, while conditions are not improving very fast, they are getting no worse, and they are looking forward to better things within the next two or three months. The threatened railroad strike undoubtedly had a depressing effect on the industry, as a number of inquiries which were expected to be closed have now been held up indefinitely. Local dealers report orders as fairly good, though the demand is mostly for used tools and in practically all instances only one or two are purchased.

The Guaranty Trust Co., New York, has filed a petition for foreclosure of the $2,000,000 mortgage which is holds on the Barney & Smith Car Co., Dayton, Ohio. The plant will be offered at public auction within a few weeks. It is now being operated under a receivership.

Milwaukee

MILWAUKEE, Nov. 7.

The most encouraging feature of the machine-tool trade is the better prospect of business development, rather than any immediate revival of a marked character. Local metal-working shops are continuing to increase production, although slowly. Orders are increasing for one or two tools for replacement or piecing out equipment for greater efficiency. Large lots are absent, although several fair-sized requirements of railroads are in prospect. Generally speaking, inquiry is somewhat more active than in the last three to four weeks. The automotive industries are manifesting greater interest but demand from this source is still limited.

The Davis & Thompson Co., 251 Reed Street, Milwaukee, organized about three years ago to develop and manufacture a new type of continuous milling machine, contemplates the erection of a machine shop in the spring. The investment, it is said, will be approximately $100,000. Practically a full complement of new equipment will be required. Frank M. Davis is president, and J. T. Thompson, vice-president and treasurer. Details are withheld for the present.

The Purcell-Wischan Co., Madison, Wis., automobile dealer, has engaged Klug & Smith, Mack Block, Milwaukee, to design and supervise the construction of a brick and steel garage and service building, 117 x 132 ft., two stories and part basement, to cost $125,000.

The Gugler Lithographing Co., 694 Broadway, Milwaukee, has awarded the general contract to the Universal Construction Co., 97 Wisconsin Street, local, for a $100,000 printing and lithographing plant, 66 x 116 ft., three stories and basement. Additional equipment, including electric motors, etc., is being purchased. The architect is Eric Gugler, New York City.

The Madison Hardware Specialty Co., 617 Washington Avenue, Madison, Wis., manufacturer of and wholesale dealer in hardware, has plans by James R. and Edward J. Law, architects, Madison, for a three-story and basement factory and warehouse, 63 x 110 ft., estimated to cost $85,000.

The Board of Education, Stevens Point, Wis., has engaged Robert A. Messmer & Brother, architects, 221 Grand Avenue, Milwaukee, to design a three-story high school, 60 x 160 ft., as the first of three units to cost in the aggregate about $500,000. A vocational training institute will be contained in the first unit. Bids will be taken about Dec. 1. J. M. Pfiffner is chairman of the building committee.

The Board of Education, Beaver Dam, Wis., has decided to proceed with erecting and equipping a new high school and industrial training institute to cost $200,000. Parkinson & Dockendorff, La Crosse, Wis., are architects. It will be U-shaped, 87 x 139 and 37 x 130 ft., two stories and basement. Bids probably will be taken about the middle of December.

The University of Wisconsin, Madison, M. E. McCaffrey, secretary, is purchasing equipment for the forge shop of the new unit of the engineering shops now being completed at Camp Randall.

The J. P. Rundle Mfg. Co., Layton Park, Milwaukee, which recently let contracts for a boiler house addition, has placed contract with the John L. Stanage Co., 3216 Vliet Street, for a three-story addition, 50 x 100 ft., of brick and concrete, with steel sash, to cost about $45,000. Robert T. Hazelwood is president and general manager.

The Oshkosh Tractor Co., Oshkosh, Wis., expects to award contracts this week for the superstructure of its new factory, 152 x 380 ft., one story, with sawtooth roof and steel sidewall and monitor sash. Foundations have been completed. The architects are Auler & Jensen, Oshkosh. The plant will cost about $175,000, including equipment. A. D. Paine is president.

The Randolph Wagon Works, Randolph, Wis., has let the general contract to the Hutter Construction Co., Fond du Lac, Wis., for erecting a new two-story factory, 100 x 200 ft., estimated to cost $65,000.

The Board of Education, Whitehall, Wis., has plans by Oppenhamer & Obel, architects, Wausau, Wis., for a new $100,000 high school with vocational training department, but probably will not ask bids until after Jan. 1, 1922. A. D. Peterson is secretary.

The Central South

ST. LOUIS, Nov. 7.

The Missouri Holding Co., Broadway Hotel Building, Monett, Mo., is planning for a new one-story factory on Main Street, to manufacture dehydration machinery and parts, estimated to cost about $55,000. Preliminary plans are under way. J. Nelson, address noted, is secretary.

The Hall & Brown Woodworking Machinery Co., 1913-33 North Broadway, St. Louis, has completed plans and will soon take bids for an addition, estimated to cost about $50,000, including improvements in present works. Preston J. Bradshaw, International Life Building, is architect.

The Kansas City Power & Light Co., Kansas City, Mo., has been granted permission to issue bonds for $2,000,000, the proceeds to be used for extensions and improvements, general operations, etc.

J. E. Dougherty, 127 Blow Avenue, St. Louis, has plans under way for a new two-story automobile service and repair shop, 50 x 115 ft., at Thirty-ninth Street and McRee Avenue, estimated to cost close to $50,000. Work will commence at an early date.

The Chicago, Rock Island & Pacific Railroad Co., 139 West Van Buren Street, Chicago, is considering rebuilding its car and locomotive shops at Pratt, Kan., recently destroyed by fire. The work is estimated to cost $130,000.

The Knoxville Fertilizer Co., Knoxville, Tenn., has awarded contract to the Foundation Co., 120 Liberty Street, New York, for its new plant at Vestal, estimated to cost about $200,000. Work will commence at once. Manley & Young, 814 West Hill Avenue, Knoxville, are architects. James W. Dean is secretary and treasurer.

The Johnson Automobile Lock Co., St. Louis, has acquired a building at 4121 Forest Park Boulevard for the establishment of a new plant. Operations will begin at an early date. Joseph Hoffman is secretary and general manager.

The American Gasoline Co., Kansas City, Mo., is planning for the enlargement of its local oil refinery, comprising the former plant of the North American Refining Co. It is proposed to develop a capacity of about 4000 bbl. of oil per day, with a lubricating plant to have a daily output of 300 bbl.

The Signal Mountain Portland Cement Co., James Building, Chattanooga, Tenn., is perfecting details for the immediate erection of its new plant, estimated to cost close to $500,000 with equipment. John L. Senior, Jackson, Mich., is president of the company. Ralph Dow, Chattanooga address, is in charge.

The Board of Education, Coffeyville, Kan., will install machine shop and other mechanical equipment in the manual training department at its new junior high school. H. E. Martin is president.

F. R. Lawson, Nowata, Okla., will take bids at once for the construction of a one and two-story ice-manufacturing plant at Coffeyville, Kan., estimated to cost about $90,000, including machinery. C. A. Henderson, Coffeyville, is architect.

The J. P. Cantrell Oil Co., Crane, Mo., is planning for the construction of a new electric light and power house. An ice-manufacturing plant will also be constructed.

Freight handling machinery will be installed at the new freight depot to be erected at Oklahoma City, Okla., by the Missouri, Kansas & Texas Railway Co., St. Louis, to be one and two-stories, 45 x 600 ft. A. L. Sparks, company address, is architect and engineer.

The Buick Motor Co., 438 Monroe Avenue, Memphis, Tenn., has arranged for the erection of a new two-story service building, with repair shop, 100 x 218 ft. W. C. Lester, News-Scimiter Building, is architect.

The John G. Duncan Co., Jackson and Central streets, Knoxville, Tenn., is making inquiries for rebuilt locomotives, about 24-ton, standard gage.

W. E. Toler, Pawnee, Okla., is making inquiries for mechanical fans, exhaust and suction types, for cotton seed handling.

The Bridges Wheel Corporation, Texarkana, Ark., is planning for the purchase of special dies for the manufacture of wheels for steam and electric railroad cars. J. D. Cook is vice-president.

Seattle

SEATTLE, Nov. 1.

The Oregon Brass Works, North Second Street, Portland, Ore., has awarded contract to Camp & DuPuy, 426 East Alder Street, for a new one-story foundry.

Loading and unloading machinery, hoisting equipment, etc., will be installed on the new dock to be constructed by the Inman-Poulsen Lumber Co., Portland, at its plant in South Portland.

The Consolidated Diamond Refining Co., Spokane, Wash., has acquired property at Dishman, as a site for a new oil refinery. Preliminary plans are said to be in preparation.

J. R. Cartwright, Harrisburg, Ore., has completed plans for a new one-story automobile service and machine repair shop, 100 x 100 ft.

The Bureau of Yards and Docks, Navy Department, Washington, has plans in preparation for a new radio plant at Newport, Wash. Bids for tower construcution and other work will be asked at an early date.

Freight handling and conveying equipment, etc., will be installed on the new pier to be constructed by the Grays Harbor Port Commission, Aberdeen, Wash., estimated to cost about $150,000. The Grays Harbor Construction Co. will build the structure.

The Seattle Box Co., Fourth Avenue and Spokane Street, Seattle, is completing plans for a new three-story addition, 56 x 75 ft. Schack, Young & Meyers, Libby Building, are architects.

The Doerenbecher Furniture Co., Portland, Ore., has completed plans and will commence the immediate erection of a new six-story building at its plant on Sullivan's Gulch. Plans are now being prepared for a number of other additions.

The Gulf States

BIRMINGHAM, Nov. 7.

The City Council, Lake Worth, Fla., is planning for enlargements in its municipal electric power plant to include the installation of a new engine and other machinery. Ward Randolph is city engineer.

The Central Texas Ice, Light, Water & Sewerage Co., Mexia, Tex., will install new machinery at its electric plant, including pumping equipment, to cost about $50,000.

The Tipps Foundry & Machine Co., Austin, Tex., is planning to rebuild the portion of its plant, recently destroyed by fire.

The reorganization committee of the Texas Motor Car Association, Fort Worth, Tex., manufacturer of automobiles, has secured funds to acquire the property from the receivers and negotiations for the sale are now under way. Upon acquisition it is proposed to improve the plant and begin immediate operations. Captain L. W. Bilburn heads the committee.

The Anderson County Coal Co., Box 68, Palestine, Tex., is making inquiries for turbine engine equipment to be used in connection with lignite mining operations. J. J. Barry is manager.

The Texas-Mexia Refinery Co., Mexia, Tex., is planning to break ground about the first of the year for a local oil refinery. Plans are being prepared.

The Lone Star Ice & Cold Storage Co., Austin, Tex., will commence the immediate erection of a new ice and cold storage plant on East Second Street, estimated to cost about $50,000. A. J. Zilker is president.

The Southwest Portland Cement Co., El Paso, Tex., has plans under way for its new plant on property recently acquired in the vicinity of Waco, Tex. It is estimated to cost in excess of $2,000,000. O. J. Binford is secretary.

The Common Council, Vernon, Tex., is considering the construction of a new municipal electric power plant. An ice-manufacturing plant will also be erected. Details and estimates of cost are being made.

The Consolidated Ice Co., Monroe, La., is planning for extensions and improvements in its ice-manufacturing factory, estimated to cost about $50,000, including equipment.

Indiana

INDIANAPOLIS, Nov. 7.

The Crane Co., 836 South Michigan Avenue, Chicago, has awarded contract to Ericson & Crumlish, 123 West Madison Street, for the erection of its proposed new one-story machine shop and branch warehouse at East Chicago, Ind., estimated to cost about $30,000.

The Evansville Sash & Door Co., Evansville, Ind., has acquired land at Ohio Street and Wabash Avenue, and has preliminary plans under way for a new plant, 250 x 350 ft., to be either two or three stories.

The American Car & Foundry Co., Terre Haute, Ind., has awarded contract to the Austin Co., 16612 Euclid Avenue, Cleveland, for a new one-story machine and forge shop, 225 x 290 ft., to replace the building recently destroyed by fire. It will cost about $60,000. Construction will commence at an early date. E. D. Buick is district manager.

The Columbian Enameling & Stamping Co., Terre Haute, Ind., manufacturer of enameled kitchen utensils, etc., is completing plans for a one-story addition. J. G. Vrydaugh, 1515 South Eighth Street, is architect.

California

LOS ANGELES, Nov. 1.

The Western Pipe & Steel Co., 1670 Broadway, Los Angeles, has plans under way for works at Slauson and Santa Fe avenues, where about 20 acres has been secured, estimated to cost in excess of $75,000. The company engineering department is in charge.

The Manufacturers' Building Corporation, San Francisco, forming a consolidation of the M. & H. Plating Works, Larkin Specialty Co., and the Bankers' Utility Co., all of this city, has awarded contract to F. D. Boese, Call Building, for a new three-story factory at First and Clementina streets, estimated to cost about $30,000.

The Weaver Roof Co., 339-41 East Second Street, Los Angeles, has plans under way for rebuilding its plant on East Twenty-fourth Street, recently destroyed by fire with loss estimated at $100,000, including equipment. It will be located on a fire-acre tract, and will be equipped for considerable increased production. Sylvester L. Weaver is president.

The Southern Pacific Co., Southern Pacific Building, San Francisco, is planning for the erection of a number of additions to its shops at Sacramento. A new foundry will be constructed, estimated to cost $125,000; new planing mill, estimated to cost $185,000 with machinery; new fire protection system, oil supply and pumping system, and other improvements to cost about $140,000, with equipment. The work will be in addition to present expansion now under way.

The International Shales Process Corporation, care of the Golden State Construction Co., 415-17 Delta Building, Los Angeles, has awarded contract to the latter company for a number of oil refining plants in California, Utah, Nevada and Colorado, each estimated to cost about $85,000.

The Madera Sugar Pine Co., Madera, Cal., has preliminary plans under way for a new plant, to include a four-band saw mill. It will be equipped for an annual output of about 65,000,000 ft.

The Pacific Fruit Express Co., 65 Market Street, San Francisco, a subsidiary of the Southern Pacific Railroad, is considering the erection of a new ice-manufacturing plant at Santa Barbara, Cal., to cost about $75,000 with machinery.

Canada

TORONTO, Nov. 7.

While no additional life has appeared in the machine tool markets the past week, a very favorable demand still exists. Inquiries are also good and if only a small portion of those now before dealers turn into sales some good business will develop in the near future. The movement of small tools continues steady for limited quantities.

The York Sandstone Brick Co., Ltd., East Toronto, is in the market for a hardening cylinder for use in sand and lime brick manufacture.

The foundry at Chicoutimi, Que., owned by Cie de Pulpe de Chicoutimi, was destroyed by fire with a loss of $50,000. It is expected that it will be rebuilt without delay and new equipment purchased.

The Ontario Show Case Co., 321 King Street West, Toronto, has awarded contract for a factory to cost $50,000.

The Goldstein Mfg. Co., 180 John Street, Toronto, has let contract to L. E. Dowling, 167 Yonge Street, for a building to cost $75,000. It manufactures copper and brass tubes, etc.

The Mona Petroleum Products Co., 120 Adelaide Street West, Toronto, will build a refinery at Trenton, Ont.

The N. B. Prichard Mfg. Co.'s plant, operated at Sherbrooke, Que., by the Dominion Metal Co., is to be enlarged by a three-story brick, concrete and steel building, 40 x 150 ft.

The Anglo-American Motors, Ltd., recently incorporated will establish a plant at Trenton, Ont., to manufacture the La Marne car. Plans call for 10 buildings, each a complete and independent unit, to be equipped with automatic machinery. Col. C. R. Hill is president; F. J. Neale, vice-president; August A. Bolte, secretary-treasurer, and F. Richards, consulting engineer.

New England

BOSTON, Nov. 8.

Many of the prospects developed during the past month have failed to materialize and the day-to-day sales are barely holding their own in number and in dollars and cents. The machine tool market acts as though it is digesting its first recovery in business preparatory to another spell of activity. During this comparative lull in sales machine tool builders' prices continue to undergo further readjustment. For instance, a maker of small production and tool room lathes has reduced prices on the former 10 per cent and will shortly announce a reduction of as much or more on tool room machines. A New England manufacturer of upright drills has dropped his price 15 per cent, and a Michigan maker of radial drills as much. A line of air chucks has been cut 10 per cent. Some of the manufacturers of planers have notified local representatives that prices will remain unchanged.

Outstanding prospects have every indication of being closed before Jan. 1. In the meantime going business is confined largely to small industrial concerns, whose relatively small overhead permits them to underbid the large users of machine tools. An encouraging feature the past week is the fact that about 80 per cent of the machines purchased were new. The local used machinery market was influenced somewhat by an auction sale at South Boston by a local dealer of a considerable amount of equipment at very reasonable prices.

Sales the past week include: a 14-in. x 4-ft. tool room and two watch tool lathes to a local cutlery manufacturer; a No. 8S Standard power press to a South Boston manufacturer; a Fraser universal grinding machine to a Fall River, Mass., interest; a 16-in. crank shaper and a Brown & Sharpe surface grinder to a small Saugus, Mass., maker of automobile parts; several 14-in. New England made lathes and a used milling machine to a textile machinery manufacturer; and a No. 5A power press, several hand milling machines and considerable transmission equipment to Providence, R. I., concerns. A Pawtucket, R. I., manufacturer of an automobile accessory has purchased one 18-in. x 6-ft., one 16-in. x 8-ft. and one 14-in. x 6-ft. tool room lathe, and is considering the purchase of additional turning tools. The same firm is reported to have closed on a 16-in. Potter & Johnson shaper, a No. 2 Brown & Sharpe surface grinder, a 10 x 24-in. universal cylindrical grinder, a No. 1 Kearney & Trecker milling machine with a vertical attachment, a No. 2 size four-spindle and a No. 1 size four-spindle sensitive drill and a 20-in. vertical drill press. A central Massachusetts trade school is about to close on a 14-in. x 6-ft. engine lathe. The C. C. Carter Machinery Co., Providence, R. I., has purchased the machine tool equipment of the Flexograph Co., that city.

Few new prospects have developed. The Rutland Railroad Co., Rutland, Vt., is asking prices for estimating purposes for its 1922 budget on the following equipment: One double-end punch and shear with 42-in. throats; one 3-ft. radial drill; one 17-in. x 8-ft. geared head lathe; one 24-in. shaper; one 200-lb. Beaudry hammer; two 14-in. Blount combination wet and dry grinders; one 4-in. centering machine, and one 22 x 33 x 72-in. gap lathe. Two local shipyards are inquiring on used special machinery. A Cleveland jewelry manufacturer is sounding out the used market on 80 to 100-lb. foot power drop hammer equipment.

The local crane market shows more activity than it has in months. Manning, Maxwell & Moore, Inc., has sold a 30-ton electric crane to the Pacific Mills. The Power Construction Co., Worcester, Mass., bought a 5-ton one-motor Niles crane with two hand movements, while the Simbroco Stone Co., West Roxbury, Boston, closed on a 5-ton three-motor Niles crane with a 60-ft. span. A Providence, R. I., machinery interest is asking bids on four 5-ton shop cranes, and the American Woolen Co.'s 25-ton and 30-ton crane project is active.

Bids closed last week for an addition and alterations to the No. 5 machine room, Bird & Son, Walpole, Mass.

The Massachusetts Institute of Technology, Cambridge, Mass., is considering the erection of a one story, 45 x 90-ft. laboratory building for general combustion engines.

The Thomas Loughlin Co., 143 Fore Street, Portland, Me., ship chandlery hardware, last week was damaged to the extent of $30,000 by fire. Repairs will be made.

The Plainville Casting Co., Plainville, Conn., which started last June, is erecting two additions and contemplates more. Henry Washburn is president.

The Donnelly Brick Co., New Britain, Conn., plant, recently destroyed by fire, will be replaced by a new one, which will include office buildings, a garage, tunnel kiln unit, dryer room and machine room.

Plans have been drawn for a 68 x 70 ft. power station for the Malden Electric Co., Malden, Mass., to cost $65,000.

Bids have been taken by the Boston & Maine Railroad Co. for a boiler house and locomotive wash room at Concord, N. H. A. B. Corthell, 300 North Station, Boston, is engineer.

The Bush Mfg. Co., Hartford, Conn., radiators for trucks, tractors and airplanes, has purchased land and buildings on Wellington Avenue, that city. Col. Richard J. Goodman is president.

The fuse departments of the General Electric Co.'s D. & W. Fuse Co., Auburn, R. I., plant are to be transferred to Bridgeport, Conn., and the fuse cut out departments to Pittsfield, Mass., and the plant turned over to the manufacture of wire products. Louis W. Downes is manager.

The Leavitt Machine Co., Orange, Mass., general machinery, has increased capitalization from $10,000 to $250,000. Of the 2400 new shares, par $100, 1500 are to be paid as a stock dividend in the ratio of 15 new shares for each one held. The remaining 900 shares are to be paid for in cash or its equivalent. The increased capitalization represents excess surplus over liabilities. The company began business in 1890. Bayard P. Dexter is president.

The Griswold, Richmond & Glock Co., 2 West Main Street, Meriden, Conn., sheet metal and metal products, has awarded a contract to L. A. Miller, 22 Church Street, for a one-story plant, 50 x 160 ft., at West Main and South Grove streets, to cost $40,000.

A one-story power house, 41 x 72 ft., will be erected by the R. H. Long Co., Millbrook Street, Worcester, Mass., in connection with its new five-story plant, 75 x 600 ft., now in course of construction, to be equipped for the manufacture of automobiles. The entire plant will cost $500,000.

Fire, Oct. 31, destroyed part of the plant of the Chadwick-Boston Lead Co., 10 Hampden Street, Roxbury, Mass., with loss of $30,000.

The Norwalk Lock Co., Norwalk, Conn., has awarded a contract to the T. J. Pardy Construction Co., Bridgeport, Conn., for a one-story addition, 50 x 96 ft., work to start at once.

The Hegy Co., Inc., South Main Street, Holyoke, Mass., has completed plans for a one-story power house.

A machine and repair shop will be installed in the new automobile service building to be erected by J. Jacobsen, 1074 Broad Street, Hartford, Conn., one-story, 80 x 145 ft., to cost $45,000.

The Malden Electric Co., 129 Pleasant Street, Malden, Mass., is completing plans and will soon call for bids for a power house at Broadway and Oakland Avenue, Everett, Mass., 68 x 75 ft., to cost $65,000. The Charles H. Tenney Co., 201 Devonshire Street, Boston, is engineer.

The Instant Freezer Corporation, Springfield, Mass., is arranging an increase in capitalization from $25,000 to $500,000, for general expansion. The company will manufacture an electrically-operated metal ice-cream freezer and has closed a contract with the Victor Saw Co., Springfield, for initial production at its works. Paul Werber is president, and Harold Kittenger, treasurer.

The Plainville Casting Co., Plainville, Conn., considers the erection of extensions, following the completion of two one-story buildings. Henry Washburn is president.

Tileston & Hollingsworth, 49 Federal Street, Boston, paper manufacturers, have awarded a contract to the Aberthaw Construction Co., 27 School Street, for a one-story addition on River Street, Hyde Park, to cost $22,000.

The New York, New Haven & Hartford Railroad Co., New Haven, Conn., has awarded a contract to the American Creosoting Co., 17 Battery Place, New York, for a tie-treatment plant at New Haven.

The Berger Mfg. Co. of Massachusetts, 450 Broadway, Boston, metal ceilings, cornices, etc., has filed plans for a two-story building, 160 x 240 ft., at 307-9 Dorchester Avenue, to cost $75,000. Joslin & Landry, 161 Devonshire Street, are contractors.

The Girard Motor Co., 145 King Street, Northampton, Mass., has plans for a one-story machine repair and automobile service works on North Street, 100 x 125 ft., to cost $50,000. F. Girard is head.

The New England Tire & Rubber Co., Holyoke, Mass., plans immediate occupancy and operation of its new plant at South Holyoke, now practically completed. It expects ultimate output of 1000 tires and 1500 tubes daily. The company recently increased its capital from $3,000,000 to $53,000,000.

The board of directors, Fall River Hospital, Fall River, Mass., has plans for a one-story power house at the institution, 53 x 143 ft. Edward M. Corbett, Fall River, is architect.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
9-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16¼c. to 19¼c.
High brass wire	17¼c. to 21¾c.
Brass rod	14¼c. to 20¾c.
Brass tube, brazed	27½c. to 31½c.
Brass tube, seamless	19 c. to 20½c.
Copper tube, seamless	20½c. to 22¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$6.80	$6.55
		90 lb...	6.90	6.65
		100 lb...	7.00	6.75
IC..	$10.75	$9.25	IC...	7.15	6.90
IX..	12.00	10.75	IX...	8.15	7.90
IXX..	13.75	12.25	IXX...	9.15	8.90
IXXX..	15.50	14.00	IXXX...	10.15	9.90
IXXXX..	17.00	15.75	IXXXX...	11.15	10.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	10.50

Tin

Straits, pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	15½c.
Electrolytic	15¼c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	21½c.
No. 1 solder	19½c.
Refined solder	16c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	29c. to 31c.

Old Metals

The market is quiet with values practically unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.25
Copper, heavy and wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.00
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.75
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.25

THE IRON AGE

New York, November 17, 1921

ESTABLISHED 1855

VOL. 108: No. 20



Designed for Economical Production, New Kelly-Springfield Plant Has Unusually Complete Inter-Connection of Mechanical Services—Tunnels, Piping, Wiring and Communication

DURING 1916 the Kelly-Springfield Tire Co. decided to construct at Cumberland, Md., a model tire factory, especially designed for the most efficient and economical production, rather than to enlarge existing plants. A general contract was placed with the Hunkin-Conkey Construction Co., Cleveland; while the structural steel was furnished by the McClintic-Marshall Co., Pittsburgh.

Ground for the new factory was broken in 1917, but war conditions made progress slow, the first plant unit—the mechanical building—being completed the following year. The intake building and pump house were completed during 1919; boiler house, garage, hospital and laboratory in 1920, and the main factory building in the early part of 1921.

Designs provided arrangement of the various processes of manufacture with a minimum amount of transportation and handling of materials in process. Provisions have also been made for future plant expansion to at least four times present capacity, and to carry out such extensions without interfering with production activities. Insofar as manufacturing cost of product is dependent upon plant layout, arrangement and equipment, it is believed that this plant will attain the maximum of economy in the manufacture of tires. Total cost of plant construction was about $12,000,000.

In the general view, illustrating the entire plant and its surroundings, the small building, on the extreme left on Potomac River bank, is the intake house, controlling the river water supply for process service and for fire protection. Building with the two tall stacks is the boiler and power house, with standpipe at the right. Next building to the right, the pump house, contains all pumps other than boiler feed. Accumulators, air compressors and fire alarm and watchman's control station are also located here. Next building to right is the mechanical building, and houses machine shop, tool room, pipe shop, pattern shop, tin shop, etc.

The large multi-wing building, immediately back of those just described, is the main factory unit. The low building to the right houses the employment department, as well as the temporary hospital. To the right of this are the laboratory and experimental tire building departments. In rear of laboratory is the garage, housing service and tire-testing cars, as well as repair shop. An H-shaped office building is to be erected on the extreme right. Factory offices at present occupy the second story of one wing of the main building, utilizing a space about 60 x 430 ft.

The entire undertaking was designed to meet, in the most efficient way, demands of the company's business, conforming in every particular with the most approved method of modern factory construction as adaptable to the rubber industry. In the designs were incorporated every feature that would add to the safety and comfort of employees, and provide the most ideal working conditions for them. This item in itself involved heavy expenditure.

The six large buildings, comprising the plant at present, are connected by underground passages for inter-department traffic; by conduits for carrying electric cables and by tunnels for the various piping services. Except the fire-lines there is no piping buried. Tunnels and conduits under the floors take care of all pipes and wires from the power house to designated distributing points and, from these points on, all cables are underground until they reach the final sub-stations and rise to upper floors.

No electrical machinery on the first floor, or in the basement of main unit, has any cables other than those under the basement floor. Conduits were designed so as to make cables and wires readily accessible for repairs, extensions, etc.

About 125,000 bbl. of cement, 14,000,000 brick, 12,000 tons of structural and reinforcing steel and 7,000,000 ft. of lumber were permanently placed in this undertaking. In addition to these quantities, an immense amount of lumber and other materials were used in scaffolds, forms, sheds, bunk houses, commissary and

other construction facilities. The temporary structures, erected for the purpose of housing and feeding construction employees, were in themselves a small village.

The entire plant is safeguarded against fire through the installation of most complete fire fighting facilities, fire alarms and watchman's service. Hose houses, located at all strategetic points in the yards, are fully equipped with standard apparatus. All buildings have fire alarm boxes and watchman's service stations. All of these boxes and stations have telephones communicating direct with switchboard in the pump house. Fire mains are supplied by fire pumps, especially installed for this purpose, and are also so connected that plant service pumps may also be diverted to fire service. At the same time the entire fire system is connected to the city water mains. An automatic sprinkler system is also installed throughout the plant.

Ground area covered by buildings is about twelve acres, there being at present about twenty-two acres of floor space, over 80 per cent of which is devoted entirely to manufacturing. The entire plant is heated by utilizing exhaust steam.

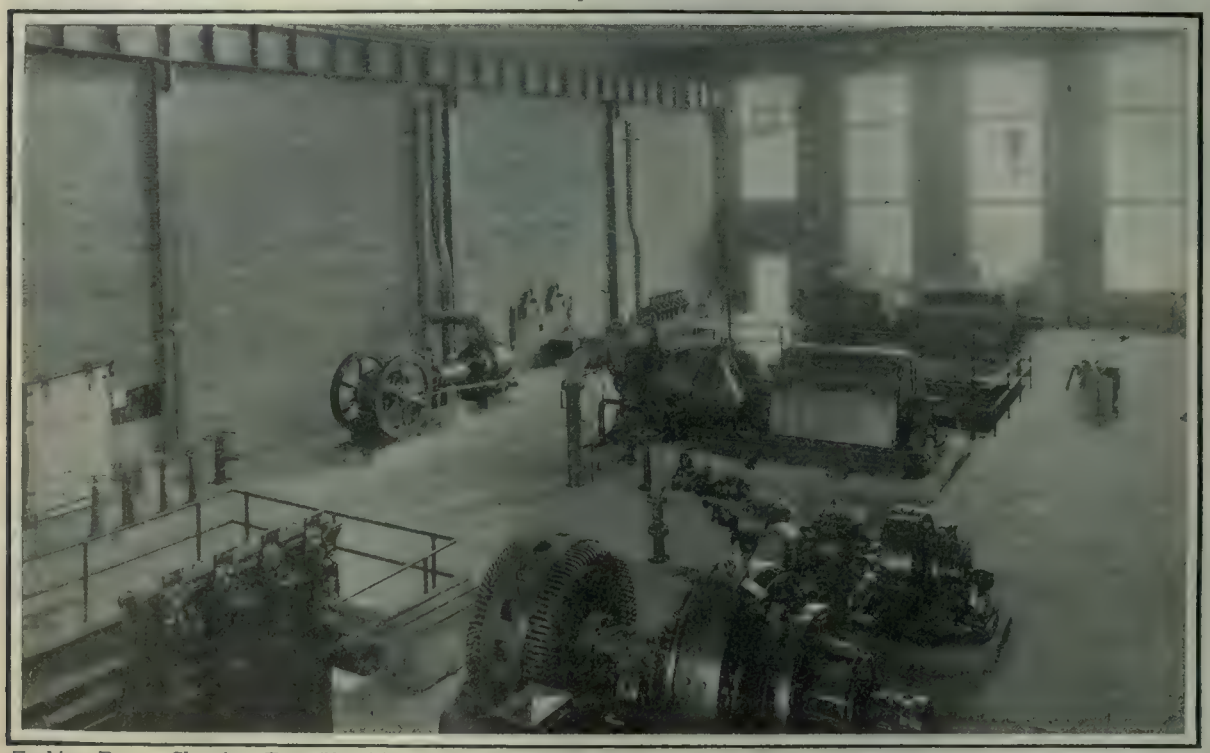
All sash are of steel, about 146,000 sq. ft. (3.4 acres) of glass being used in the main factory building alone. Glass is mainly of factory ribbed type, thus eliminating glare. All sash near floor levels have lower two rows of clear glass, thus permitting the workmen to observe outdoors. A large quantity of ribbed wire glass was used in sash at angles between wings of buildings, thereby reducing likelihood of fire communicating from one department to another by cutting across corners of courts.

The intake house, located on river bank, is of brick and steel, with concrete roof. All water, other than for drinking, passes through it by way of four screen-guarded concrete chambers and, after passing through moving screens of fine mesh, enters main water tunnel and continues over to power house. Branch tunnel is taken off to supply suction pit in pump house, there being no piping used between river and suction pits of the various pump installations. Intake house is about 42 ft. square, and, with river at lowest stage and with water entering at low velocity, has intake capacity in excess of the normal flow of the river at that point. This building has an overhead traveling crane to facilitate the raising of screens for inspection and repairs.

Boiler house and power house are built of brick and steel, with concrete roof and steel sash. Steam plant at present consists of six Stirling boilers of 750 hp. each, steel settings having been provided in present building for two additional boilers of same capacity. The boilers are capable of operating satisfactorily, and continuously, at least 200 per cent of rating. Steam plant is so laid out that it can be readily extended to any desired capacity.

Steam for operating turbo generator sets, and the different pumping units, leaves the boiler house at 175 lb. pressure and 100 deg. superheat, a loop system of piping being so arranged that superheated steam can be turned into saturated mains, or vice versa. Boilers have Foster superheaters, Riley stokers, Diamond soot blowers, Hagan combustion control, Bailey meters and other modern refinements that tend towards proper control and economical operation.

Superheaters are installed in front walls of boilers, with access from outside, by means of doors, and have low baffle walls between them and the combustion chambers. Stokers are of extra length design, each boiler having its own individual stoker drive. There are no line shafts, belts or chain drives used in any part of stoker installation, Sturtevant steam engines being utilized for driving them.



Turbine Room, Showing Two 5000-Kw. Turbo Generator Sets, One 1000-Kw. and One 300-Kw. Motor Generator Sets and One Vacuum Pump. The ample headroom and light are evident, as is also the crane service

Coal siftings, passing through stokers, drop into hoppers below blast chamber and are, from time to time, removed by discharging into ash cars in basement tunnel, and then returned to coal supply at elevator boot.

Boiler ashes drop into fire brick lined cast iron hoppers, below floor level, having capacity for two days' operation. They are removed through specially designed water-sealed hydraulically operated gates, discharging directly into electric storage battery cars, which convey them to the storage pit, of about 600 cu. yd. capacity, located at the end of the coal storage basin. They are loaded from this basin, by locomotive crane, into standard railway cars, or motor trucks, for final disposal.

Fly ash, from rear pass of boilers, is removed by periodically permitting it to flow through pipes down into ash cars in basement. These pipes are provided with hand operated gates, so designed that there is no likelihood of their being left open unnecessarily.

Boiler settings are entirely of special design, the steel work being incorporated with that of the building. They were designed by S. Diescher & Sons, engineers, Pittsburgh. Drums and tubes were furnished



General Pump House View, with Air Compressors, High Pressure Pumps and Accumulators, and Operating Balconies

by the Babcock & Wilcox Co., all other parts being made according to S. Diescher & Sons' designs. Brick work of boiler settings was carried out by George Allen & Sons Co. Sil-o-cel was used for insulating purposes, while Drake non-clinkering furnace blocks were used in the furnaces. Flat arches over combustion chambers are of special patented design.

All valves, inspection doors, soot blowers, superheaters and all piping are accessible from structural steel, grating floored, balconies and stairways, placed on several levels around each boiler, and so joined by bridges that all parts of boilers are within convenient reach for operation and repairs.

Forced draft for boilers is provided by steam turbine driven Sturtevant steel plate fans of sufficient capacity to take care of double the present installation when working at 200 per cent of rating. Forced draft, from fans, is conducted through concrete chamber with damper connection at each boiler, and so arranged, and equipped, with air locks that inspection may be made at any time by entering this duct even while under pressure. Through this provision blast gates may be repaired, or replaced, without shutting off draft from chamber, or in any manner interfering with the full operation of boilers in service.

Boiler feed pump capacity has been provided in liberal excess, there being two 18 x 30 x 16 x 24 in. Epping-Carpenter steam pumps installed in projecting wing of boiler house. This wing also contains Epping-Carpenter pumps for operation of the water sealed dump gates of boiler ash hoppers. Feed water is heated by exhaust steam from boiler and pump house auxiliaries, in connection with large sized Hoppes feed water heater, and is metered so that accurate records may be secured.

Brick lined steel plate breechings and flues connect the boilers to the two Custodius radial brick stacks, each 14 ft. inside diameter at top, and 250 ft. high above boiler room floor level. Each stack sets upon a concrete foundation, about 40 ft. in diameter, extended down below the water tunnels passing by. Stack foundations are tunneled so that ash tunnels under boilers may continue in a straight line, in event that boiler house is extended. Accumulation in stacks is removed



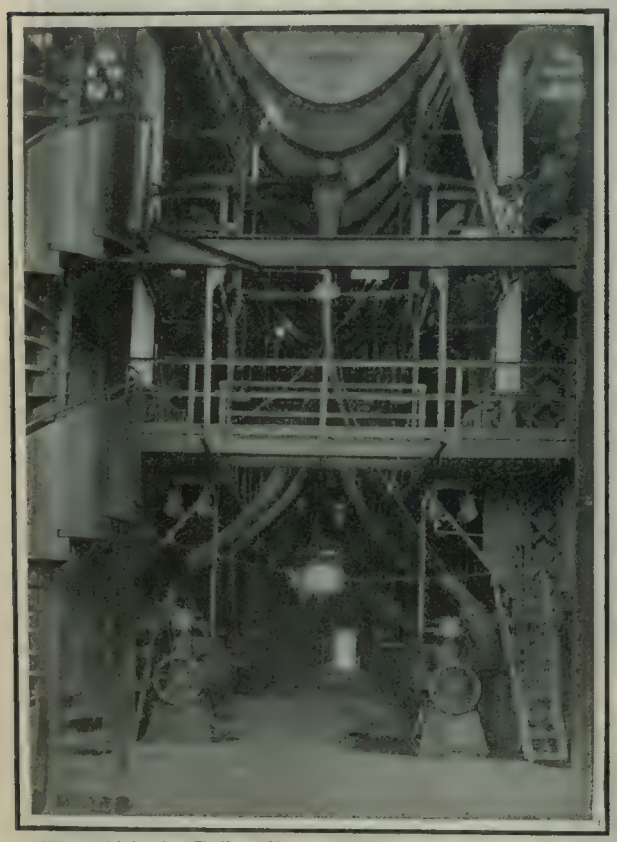
This Wing in the Mechanical Building Is Devoted Wholly to Boring Mills

by opening gates at the bottom of stack hoppers, and permitting the dust, etc., to drop into the ash cars, which convey it to ash waste pit.

Coal is received in standard drop bottom cars and dumped direct into the concrete coal basin, which has a capacity of about 7000 tons. Concrete bottom of coal receiving basin is located some distance below the normal water level of Potomac River, and the basin is so connected with the river that coal may be stored under water if desired. Connection between coal basin and river is controlled by sluice gates and valves, which make it permissible to enter water from the river, or drain from coal basin to river. Basin may also be flooded in event of fire.

Coal is passed from this basin by a Browning locomotive crane and Blaw-Knox clamshell bucket into Heyl & Patterson traveling coal crusher. Crusher, in turn, discharges through slot in tunnel roof onto conveyor belt below. This belt delivers coal to elevator, which conveys it to the overhead coal bunker above center aisle of boiler room.

A traveling coal crusher is installed above conveyor belt tunnel, which extends the full length of boiler house and beyond for short distance. This tunnel has a continuous slot in roof, protected against weather by folding gates. Coal crusher, as well as truck upon which it is mounted, is electrically driven. This arrangement makes it possible to handle coal from basin to crusher with utmost speed, since the crusher can at all times maintain its relative distance from the locomotive crane.



Firing Aisle in Boiler House Contains, as Always, the Stoker Engines, Overhead Coal Bunker and Chutes. Protected stairs at left give easy access above

A pit, containing coal elevator boot and hopper into which gathering belt discharges, is located along tunnel just mentioned. An emergency collapsing elevator is provided in the coal basin immediately adjacent to this receiving hopper, in such manner that, in event of breakdown in crusher or crane equipment, slack, or crushed coal, can be conveyed immediately from coal pocket into elevator boot. Hopper is also provided with an auxiliary chute, whereby crushed coal can be returned to the coal basin, adjacent to the emergency coal elevator, so as to be available in event of such breakdown.

Overhead coal bunker, above firing aisle of boiler room, is of Brown-Hoist construction, with concrete inclosed bracing members. Coal is distributed in bin by shuttle conveyor above, so designed and arranged that it can take care of double the present bunker length, without alterations. Aside from locomotive crane, all coal handling equipment is motor driven. Controls are all interlocked in such manner that breakdown or stoppage of any drive will automatically stop the entire coal handling system, thereby avoiding damage through jambing.

From coal bunker coal passes to each stoker receiving hopper, through two 12-in. pipe chutes, each equipped with weigh meter and chain-operated gate at hopper end.

Ample storage space is available in boiler house basement for tubes and refractories. Office, toilet and locker rooms and shower baths are provided for the employees. Every attention has been given to the comfort, safety and general welfare of those engaged in and about the plant.

The electrical power plant equipment at present consists of two 5000-kw. General Electric turbo generators, 3600 r.p.m., with their auxiliaries; also two 1000-kw. motor generator sets. Excitation units consist of one 100-kw. motor generator set and one 300-kw. turbo generator set, which can also be utilized for night lighting and elevator service, when plant is not operating 24-hr. per day.

The 5000-kw. units generate at 2300 volts, 60 cycle, 3 phase. Turbo generator units are all provided with quick stop valves, which can be tripped from remote points if desired. Motor generator sets take care of three-wire system, for variable speed motor operation and calender drives, 115 and 230 volts direct current.

Condensing equipment for the two 5000-kw. units is in the basement, with exception of the vacuum pumps. Condensing apparatus consists of two large surface condensers with their circulating pumps, condensate pumps and rotating dry vacuum pumps, all furnished by the Wheeler Condenser & Engineering Co.

Circulating pumps take water from tunnel below power house floor, pass it through condensers and down into discharge tunnel under basement floor at rear of condensers. All condenser auxiliaries are so cross-connected that they can be utilized on either, or both, condensers. Condenser hot wells have high water alarms and other devices which will automatically shut down the vacuum pumps, in event of excessive water, before any damage can be done to the pump.

Westinghouse switchboard is installed on the floor of power house, balcony above it containing switches and rheostats, all of which are solenoid, operated from switchboard below. Breaker panels for motor generator sets are located advantageously to the sets. At same time, the equalizer switches are all located on pedestals adjacent to the motor generators. Voltage regulators are located on their own pedestals adjacent to the main switchboard.

The two 1000-kw. motor generator sets rest upon concrete foundations extending below basement floor, and are cored out, thus affording chambers for their transformers, etc.

All conductors within the power house, and extending over to switching station in main factory building, are of bare copper, so placed as to be properly safeguarded.

Switching station for main factory building is located in fireproof chamber below the building, and connected with power house by bus tunnel, protected at both ends with wire screens and doors. Busses extend, through this tunnel, from power house switchboard.

Fabricated pipe, valves, fittings, etc., for the entire installation were furnished by Crane Co., Chicago, all of this piping material being ordered according to engineers' detailed drawings. Piping was erected by Riggs, Distler & Stringer Co., Baltimore, and, due to the shop work of the Crane Co., was assembled with field expense at a minimum.

The piping material included numerous special fittings, with supporting legs to rest on concrete piers, or with flanges for attachment to steel work, where otherwise several standard fittings combined would



Pattern Shop, in Second Story of the Mechanical Building. The fire doors, in rear, open into the fireproof pattern storage

have been necessary to accomplish the same results. Condensation, accumulated at separators, waterlegs and drips, is returned to boilers by Holly gravity return system.

Piping includes high and low pressure lines for steam, service water, water for fire protection, hydraulic lines of 300 and 2000 lb. pressure, compressed air lines, and low-pressure heating lines, the maze of pipe and cable often found in basements of industrial plants being avoided by resorting to the tunnels and conduits referred to. With the exception of a few of the smaller pipes, all lines are placed in trench, below basement floor, extending the full length of the main building and covered with floor plates. With this arrangement, leakage, or water from breaks in the piping, will drain through the trenches, and the floor plates give ready access for repairs. All high pressure hydraulic lines are safeguarded at strategetic points by installation of Crane hydraulic relief valves and shock absorbers.

The pump house is a steel frame, brick inclosed building, about 75 by 160 ft., and houses all plant service and fire pumps, air compressors and high-pressure hydraulic pumps with their accumulators. The Allis-Chalmers pumping engine, emergency centrifugal pump and the fire pumps are located on the lower level, while the balance of the equipment is on upper level, all accessible to 20-ton Shaw overhead traveling crane. Ample space is provided for more than double the present equipment, without extension to building.

Water is conducted to pump house through underground tunnel, about 50 sq. ft. in cross sectional area, joining with water tunnel of power house a short distance from the intake house. Adjacent to this connecting point, sluice gate chambers are provided to afford full control, or shut off, for cleaning tunnels, extension or for other reasons. Water enters pump house suction pit through traveling vertical screens of fine mesh, and thence into suction pit, extending entirely across the pump house, and with side walls extending high enough above basement floor to afford protection against high stage of water in river.

Suction pit is covered with grating floor, and has a depth equal to elevation of the river bottom. Drawing from this suction pit at present there is one Allis-Chalmers compound condensing pumping engine, of about 6,000,000-gal. capacity, with space provided for a second similar unit; motor driven centrifugal pump, for emergency use, of about 4,000,000-gal. capacity and also two Worthington Underwriters' fire pumps, each of 1500-gal. per min. capacity. Service and centrifugal pumps both deliver output to 25 x 115 ft. standpipe in yard adjacent to pump house. Drinking water, at present, is taken from the city water mains, and is piped



Hydraulically Operated Ash Gates, in the Ash Tunnel in Basements, Are Operated by Valves Mounted on Concrete Pads Along Wall at Right

in such manner that refrigerating unit may be connected at a later date.

High pressure hydraulic pumps, for plant service, of 300 and 2000 lb. per sq. in., are located on upper lever of pump house. These are of Worthington Epping-Carpenter make, while the accumulators were manufactured by the Wellman-Seaver-Morgan Co. The main hydraulic pumps are each 18 x 30 x 5 x 24 in., while the accumulators are 12 in. ram and 12 ft. stroke, provision being made for additional units as required. Low pressure hydraulic pumps, 300 lb. pressure, are also Worthington Epping-Carpenter make, 14 x 20 x 10 x 16 in. High pressure hydraulic pumps, pressures 300 to 2000 lb. per sq. in., are used in connection with tire vulcanization, and are supplied from suction tank. Water is returned from presses to tank, and after passing through strainers goes to settling chamber. Water level is controlled by float, and all lost water is replaced with the distilled water from power plant condenser.

Upper level of pump house also contains two 15 x 27 x 27 x 15½ x 24 in. Laidlaw air compressors, furnished by the Worthington Pump Co., with the usual after-coolers, air tanks, etc.

All water pumps, with exception of boiler feed and high pressure hydraulic pumps, are so connected that they may be utilized for fire fighting as well as for plant service. All discharge piping from the various fire pumps, service pumps and city water are bypassed, in basement of pump house, at a common point, thereby placing control, for fire fighting purposes, at a convenient point.

Mechanical building, adjoining pump house, is of same type of construction as main building and has been built with a view of adding additional stories later on. This building, with ground area of about 130 x 160 ft., is at present two stories and basement, with a mezzanine floor over part of the area. This department is provided with the necessary machinery to make all cores and molds required for the manufacture of tires, as well as to do all machine work in connection with maintenance and repair of the mill machinery. The building also contains blacksmith shop, tool-making department, pattern making shop, tin shop, and experimental machinery development.

Fireproof stair tower was provided in southwest corner of mechanical building, and extended above roof. High speed freight elevator, with platform about 8 x 17 ft., establishes freight communication between the different floor levels. This building is connected with pump house, power house and main factory building by a system of tunnels devoted entirely to traffic, pipe and electric cables having their own individual tunnels. These tunnels, all about 12 ft. in width and 10 ft. in height, afford ample facilities for storage battery truck traffic between departments. One of them extends for the full length of the main factory building, passing under the north end of each wing, thereby making it possible to transport repair parts between all floors of the machine shop, and any floor of the factory building, pump house or power house, and without in any manner interfering with the process traffic of plant.

The mechanical department was completed and placed in operation shortly after work commenced on the balance of the plant, and temporary power connections made with the adjoining public service plant of the Edison Co. This department was then devoted to the making of machinery and other equipment for the main factory building as well as carrying out the many forging and machining jobs incidental to main plant construction.

Employment office and temporary hospital are housed in the small one-story building to the right of main factory building. This covers a ground area of about 52 x 136 ft., and is divided by a wide center hall extending from end to end. Rooms on one side of the hall are devoted to employment offices, while those on the other side were planned to serve as temporary hospital quarters, including among other facilities, first aid room, dental room, rest room and a fully equipped operating room, with all usual appurtenances.

To the right of this building is the laboratory, covering an area of about 53 x 300 ft. The two-story section of this building is devoted to physical and chemical research, as related to the rubber industry. The one-story section, to the rear, is devoted to experimental tire making, the equipment being on the same large scale as found in the main rubber factory, all experiments and research being conducted on tires in full commercial sizes.

The entire laboratory and experimental building is of fireproof construction, there being no woodwork except a few exterior doors. All sash are of steel, while the window sills are all of Alberene stone. Laboratory furniture and fixtures, such as tables, hoods, vents, etc., are all of stoneware.

Back of laboratory is the garage, with its machine and repair shops and car storage. This is a two-story fireproof structure of brick inclosed steel, and measures about 66 x 150 ft. The first floor is devoted entirely to the storage of the company's trucks, and test cars, and the machine shop for maintaining them in proper condition and repair. Second story, reached by ramp on outside of building, is devoted to the storage of cars of employees.

The main factory building lies east and west, the head house being 760 ft. long and 120 ft. wide. From the north side, four wings extend to a length of 430 ft.,



Coal from the Outdoor Storage Basin Is Delivered to the Traveling Crusher by Clam-Shell Bucket on Locomotive Crane



Coal Is Distributed into the Bunkers Above the Boilers by This Shuttle Type Conveyor

to which length may be added as needed. Three of these wings are 60 ft. wide, while the fourth has a width of 200 ft. All are separated by courts 80 ft. wide, connected at north ends by bridges at all floors; the basements being connected by tunnels. The 200 ft. wide wing is divided into two 60-ft. wings above the first floor, with an 80-ft. light court between.

Fourteen stair and elevator towers at ends of wings are all of brick and concrete construction, with steel and iron stairs, and have automatic fire doors on all interior openings. Safety doors leading to yard and courts are also provided. Standpipes, with fire hose, are provided in all stair towers. Each stair tower in the main building houses stairway, wire shafts, elevators and toilet room. Elevator platforms are all about 8 x 17 ft., of about 10,000 lb. capacity. A duplication of the present wings on the south side of the main aisle, making the entire structure symmetrical on the center line, would add twelve towers, making the total twenty-six. All stair towers extend from the basement to a sufficient height above the roof to provide a convenient means of exit from the stairway.

The present structure is designed to be increased later on to a height of four or five stories, without interfering with manufacturing operations. The roof is formed, on the third floor beams, which are in place, of 3 x 4 in. surfaced yellow pine on edge, a size that can be easily warped to conform to the position of the purlins. Columns extend through the roof, with splice, for the next column section, protected by brick inclosure with flashing carried over the top. A cut stone cap gives further protection.

The basement floor is of concrete. The first, mezzanine, and second floors are of the packed or laminated type, 2 x 10 in. surfaced yellow pine being used throughout. The span between floor beam centers is 20 ft. These floors were designed to carry 360 lb. per sq. ft. Factory buildings were planned with a viewpoint of securing maximum daylight in all departments, and, in addition to steel sash, large areas of saw tooth monitor roofs are provided.

S. Diescher & Sons, Pittsburgh, were the designing and supervising engineers, who prepared plans and specifications and supervised the construction. Edward Necarsulmer, 507 Fifth Avenue, New York, was consulting architect.

Athol Machine Co. Readjusts Line

The Athol Machine Co., Athol, Mass., vises, announces a readjustment of its entire line. The company has spent approximately two years in this work and in bringing its plant up to a higher degree of efficiency. When the present management took charge the normal output was 60 to 70 vises per day. To-day the plant, in full operation, is capable of producing 250 vises per day with no increase in the number of employees.

Plant equipment has undergone a radical change. All original jigs and fixtures have been practically discarded and new quick-acting tools substituted. A very large percentage of the original metal-working equipment was classified as obsolete and discarded. The balance, together with latest designed machine tools, is rearranged in sequence according to machining operations, and the product is redesigned so that all working parts of any given size vise are interchangeable. Production operations thereby are simplified. Latest design cutting tools, as well as a modern tool crib have been added, and a special tempering department installed. A system whereby sales automatically govern plant output as well as the purchase of raw materials, and an effective cost system are among the many reforms.

In the foundry, machine-made molds have replaced hand. A new method of mounting patterns makes possible the welding of steel jaw faces to the cast iron during molding operations. The company has developed a molding sand deposit within its property.

H. R. Linton, general manager, secretary and treasurer, is responsible for plant and product improvements. Mr. Linton's connection with manufacturing began with the Means Foundry & Machinery Co., Steubenville, Ohio, with which he was associated more than eight years, most of the time as secretary and general manager. From here he became general manager Centre Foundry & Machine Co., Wheeling, W. Va., remaining two years. During the following three years Mr. Linton was engaged in special work dealing with manufacturing plants, and for the four years prior to going with the Athol Machine Co. was with the Ohio Valley Clay Co., Steubenville. At Athol, he has been ably assisted by Mervin Kessler, general superintendent. Mr. Kessler began his mechanical career with the Model Gas Engine Co., Peru, Ind. During the war he was associated with the Westinghouse Electric & Mfg. Co., first in Pittsburgh, and subsequently in Springfield, Mass., his work here being in connection with 8-in. shells and machine guns.

Powdered Coal Preparing Machine

An addition to the list of powdered coal apparatus is the new machine shown in the accompanying illustration, developed recently by the K-B Pulverizer Co., Inc., New York. It is called the Pulverburner and the advantages claimed for it are compactness, close regulation of fineness and air, economy and adaptability to small as well as large installations.

The essential features of the machine are the pulverizing mechanism and the air separating chamber. Feeding is by an automatic feeder of the belt type. The pulverizing is accomplished by means of six rapidly



The Velocity of the Air Through the Separating Chamber Determines the Fineness of the Product

revolving hinged beaters which smash the coal against breaking blocks and then against grinding plates in the bottom of the machine. The pulverized material is discharged by centrifugal force directly into a large separating chamber. An exhaust fan, in the discharge duct leading from the separating chamber, induces air at slow velocity through the chamber, removing the fine coal and allowing the oversize to return to the machine for further pulverization, the velocity of the air through the separating chamber determining the fineness of the product. From the separating chamber, the fine dust is drawn through the fan and blown directly into the furnace. Secondary air is added at the nozzle. By using "splitters" the stream of coal and air can be distributed to several nozzles, enabling one machine to serve several furnaces.

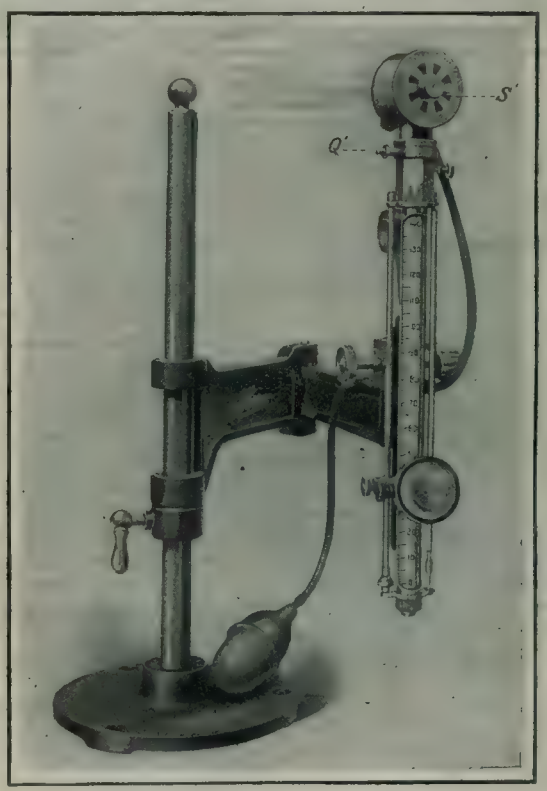
By combining impact pulverization with air separation the "fines" are removed from the machine as rapidly as produced so that the beaters are always operating on coarse material. This, it is pointed out, is an important item of power saving. Coal that has not been dried can be successfully handled in this type of mill, it is claimed, and because of the air separator, there are no screens to clog. Close regulation is a feature. The rate at which the coal is fed is controlled by the automatic feeder by means of a cam arrangement that varies the speed of the belt. The coal should be fed in such a size that a uniform ribbon is formed on the belt. Coal of 1 in. and under is satisfactory. A magnetic pulley can be used with the feeder to prevent tramp iron from entering the machine. Quantity of air is controlled either by the speed of the fan, if a variable speed motor be used, or by a damper in the discharge passage. Air is introduced around the shaft. Velocity of the air through the separating chamber is regulated by two vanes in the chamber controlled through a worm and wheel. The beaters can be extended radially outward as they wear. The entire controlling mechanism can be operated by an automatic regulator.

The apparatus is designed to be driven by either one, two or three motors. If one motor is used both fan and feeder are driven from the pulverizer shaft. It is sometimes desirable to drive the fan from a separate motor, likewise the feeder. The machines are built in a range of standard sizes, in capacities up to 3 tons per hour.

The Improved Shore Scleroscope

The demands made on the Shore scleroscope recently have been so intensive and often under such adverse conditions that its manufacturers have made a closer study of the advanced conditions of its application with view to further improving it. The results are announced as satisfactory. As a result the scleroscope, formerly known as Model C, has been listed as Model C-1, as described in Bulletin No. 20, issued by the Shore Instrument & Mfg. Co., Jamaica, N. Y. The refinements made are said to so increase the flexibility of the operating mechanism that it will give more uniform service even though the adjustments are comparatively approximate and the working conditions, including the skill of the operator, less favorable.

Among the features as shown by the illustration are: A special fine screen S, for eliminating dust from the operating mechanism; the leather operating piston, formerly used, has been replaced by one of tungsten steel, which is practically indestructible; the former



The Improved Shore Scleroscope, Model C-1

rigid adjustment of the hammer hook mechanism has been replaced by a flexible adjustment, Q, which also greatly prolongs the life of the glass tube; the hammer hooks have been provided with shock shoulders, which eliminate breakage or non-alinement of these parts. More highly perfected glass tubing is being employed.

An order has been entered by the Interstate Commerce Commission requiring Railroad Director General James C. Davis as agent for the Elgin, Joliet & Eastern Railroad, to pay to the Illinois Steel Co., on or before Dec. 20, $59,320.32 as reparation on account of the unreasonable rate charged for the transportation in 1918 of 15,450 carloads of coke from ovens to various points within the area of the complainant's plant at Gary, Ind.

The Bristol Brass Corporation, Bristol, Conn., is operating its plant nine hours per day, five days a week, as against eight hours per day, three days a week, heretofore.

Composition of Pig Iron and of Cast Iron

Chemical and Structural Composition—Various Elements, Their Characteristics and Effect on the Metal—Oxygen in Iron

BY Y. A. DYER*

CHEMICALLY stated, pig iron is composed of 100 units of metallic and non-metallic elements. It is the product, or metallic residuum, obtained after having reduced iron oxide ore in a blast furnace. The quality of the product depends on the character of ores available, composition and structure of coke used for their reduction and melting; limestone for fluxing; general furnace working conditions, and furnace practice.

In any given cupola mixture, the metallic iron—pure iron or ferrite—automatically adjusts itself to conditions, but the carbon ratio (graphitic to combined) is the final factor of adjustment to be "juggled" by the melter and mixer to produce the desired structural composition. Therefore, to produce a casting of maximum strength, it becomes self evident that, inasmuch as the chemical composition of pig iron has to be relied on as the prime factor in computing the total chemical mixture to be obtained from a given pig iron and given scrap, the matter of choosing an iron with as desirable chemical constitution as possible is paramount. To know the effect of the metallic and non-metallic alloys (manganese, silicon, sulphur, phosphorus) on the carbon is also of prime importance.

Structurally stated, pig iron is a composite aggregate of small crystalline metallic and non-metallic grains and flakes, cemented together with thin films of materials composed of ferrite (pure iron) and pearlite (iron, carbon and manganese in combination) embedded in the matrix or mass of metal or iron. The cementing material is stronger and tougher than the metal grains and flakes. Therefore, the structural properties creating strength and hardness in cast iron will depend on the nature of the substances embedded in the matrix.

In addition to the presence of 92 to 93 per cent of metallic iron as reported in pig iron there is also present from 7 to 8 per cent of metallic and non-metallic elements alloyed with it, and they have their peculiar effect on the general structure of the metal. These commonly referred to "impurities" are known as carbon, silicon, sulphur, phosphorus and manganese. Their characteristics and functions are described in the order named:

Carbon

The structure of cast iron differs as the ratio of its carbon constituency. That is: the degree to which its matrix is weakened by carbon graphitization, or strengthened by combined carbon, or carbon entering into combination with iron and manganese as a double carbide. In addition to carbon being the prime factor which controls the ultimate characteristics of gray and white irons, it also controls their melting-point and freezing-point. That is: the higher the graphitic carbon in iron the higher will be its melting point; the higher the combined carbon the lower will be the melting point. This fact is illustrative of the eutectic, or melting point of cast iron. The element carbon is associated with pig iron in two forms: definite carbon, commonly referred to as combined carbon and technically known as "cementite (Fe_3C)"; elemental or free carbon, commonly known as graphitic or pure carbon. Another form, technically known as "temper" or amorphous carbon, is present in malleable iron.

Combined carbon in gray iron is distributed throughout the metal in the form of very small particles of cementite—a mixture of iron and carbon (iron carbide) and manganese and carbon (manganese carbide). The remainder of the iron which is not contained in the cementite will exist in the free state, or as ferrite. Cementite is extremely hard and brittle. It contains, when pure, 93.33 per cent iron and 6.67 per cent carbon; has specific gravity of 7.24 to 7.74, according to Howe. The brittleness and hardness of white iron is due to the very large proportion of free cementite present. The cementite and ferrite are associated in mechanical mixture known as "pearlite" (Iron-cementite eutectoid) in the ratio of approximately 1:7 when perfect, or when the matrix of the metal contains pearlite only. That is: the eutectoid is perfect when its constituents are present exactly in this ratio—which is equivalent to 87.5 per cent iron and 12.5 per cent iron carbide, or combined carbon in the case of pig iron.

However, this mechanical "pearlitic" mixture is impossible in either gray or white iron, as will be noted from structural analyses given later. The cementite or ferrite present in excess of the ratio of 1:7 will exist in the free state. Therefore, cast iron containing less than 0.80 per cent combined carbon is said to have a hypo-eutectoid matrix. That is: its matrix will contain pearlite and free, or excess ferrite.

If cast iron contains more than 0.80 per cent combined carbon it is said to have a hyper-eutectoid matrix. That is: its matrix will contain pearlite and free cementite. The specific gravity of pearlite ranges from 7.82 to 7.84 and hardness 199 to 207, according to Howe. Therefore, it would appear that the strength of cast iron must be looked for in the quantity of combined carbon present and its constituency; and the nearer it approaches a true pearlitic structure (99.20 per cent iron and 0.80 per cent carbon) the more ideal its proportions; that is—when the combined carbon is near 0.80 per cent and the graphitic carbon as low as consistent with physical factors.

Distribution of Graphitic Carbon

Graphitic carbon in gray iron is distributed throughout the metal in the form of large and small flakes entirely free from chemical solution with either the iron or its carbides. Graphite contains 100 per cent carbon and has sp. gr. of 2.25. Its melting point has not been determined. Carbon in this form in cast iron largely differentiates the metallic matrix of the metal from that of steel. The graphite flakes weaken cast iron by reason of creating cleavage planes, therefore the extent to which they weaken the metal depends on their size and distribution. That is: if they should be disseminated throughout the metal in comparatively large and thin layers, more or less isolated, maximum weakness will occur; if the flakes should be smaller and held together in more or less compact mass the strength will be raised. This latter condition may be facilitated by the selection of irons well balanced in constituent elements, and by rational cupola practice.

It is within the scope of foundry practice to control graphitization of iron on remelt to suit conditions. The proportions of graphitic and combined carbon in pig iron vary. Their control is largely dependent on blast furnace temperatures, working conditions, slag and rate of cooling. High hearth temperatures and basic (limey) slag favor the reduction of silicon from the silica of the gangue. Silicon favors the formation of graphitic carbon, but tends to decrease the absorption of (total) carbon. Manganese favors the decrease of graphitic carbon and promotes the absorption of (total) carbon. Sulphur favors the decrease of graphitic carbon. The quicker iron is cooled, the higher will be its combined carbon.

Total carbon is the sum of graphitic and combined

*Birmingham, Ala.

carbons. To produce maximum strength in cast iron it should be the aim of mixer and melter to approximate 0.80 per cent combined carbon, then reduce the graphitic carbon by lowering the total carbon. In cupola melting this may be accomplished by the use of steel scrap added to mixtures. In this manner the graphitic carbon may be lowered to approximately 2.00 to 2.20 per cent, thus creating total carbon of 2.80 to 3.00 per cent. Total carbon may also be lowered by oxidation in air furnace, open-hearth or electric furnace. By lowering the total carbon a stronger and tougher cast iron or semi-steel may be produced.

While there is no fast set rule to serve as a guide, it should be expected that the total carbon in silvery, ordinary high silicon and low silicon irons would range from 3.00 per cent in silvery to 3.85 per cent in low silicon irons, in approximately the following manner with reference to silicon content:

Silicon	Total Carbon	Silicon	Total Carbon
1.25	3.85	2.75	3.50
1.50	3.80	3.00	3.40
1.75	3.75	3.25	3.30
2.00	3.70	3.50	3.25
2.25	3.65	4.50	3.15
2.50	3.60	5.50	3.00

However, there are exceptions to this arrangement of total carbon based on silicon content of the iron, as will be noted by following analyses of two Alabama irons:

	Silicon	Sulphur	Phosphorus	Manganese	Total Carbon
No. 1....	1.40	0.026	0.85	0.30	3.46
	2.40	0.020	0.85	0.30	3.65
	2.85	0.015	0.85	0.30	3.70
No. 2....	1.75	0.050	0.60	1.50	3.80
	2.25	0.038	0.60	1.50	3.75
	2.75	0.026	0.60	1.50	3.65

Therefore, it would seem that the foundryman should be entitled to receive from the furnace companies shipping him iron the percentages of graphitic and combined carbon along with other constituent elements. He will then be able to figure more intelligently on total carbon content in castings.

To attain maximum strength a casting should be well balanced in its carbon constituency, approximately as follows:

	Graphitic Carbon	Combined Carbon	Total Carbon
Gray iron	2.80	0.70 to 0.80	3.50 to 3.60
Semi-steel	2.50	0.70 to 0.80	3.25 to 3.35

Silicon

The element silicon has a very important effect on the ultimate constituency of cast iron. It is alloyed with cast iron dissolved in the ferrite; also in combination with iron. In the latter form it is known as iron silicide (FeSi). According to atomic weights of iron (56) and silicon (28) the silicon present produces (28:56=1:2) 3 times its own weight of iron silicide. Therefore, an iron with 1.50 per cent silicon will contain (1.50 x 3) 4.50 per cent silicide dissolved in its ferrite. Silicon exerts an important effect on carbon—largely determining its graphitic content. High silicon increases graphite, thus reducing strength and tending to brittleness. Foundry grades of pig iron usually range from 1.75 to 3.50 per cent silicon; forge irons as low as 0.75 per cent. With other elements well balanced, and consistent with machinability, the maximum strength of a casting will be reached with silicon approximately as follows:

	Per Cent Silicon
Gray iron	1.50 to 1.75
Semi-steel	1.15 to 1.35

Sulphur

By reason of the extreme affinity of manganese for sulphur these two elements readily combine and form manganese sulphide (MnS). According to atomic weights of manganese (55) and sulphur (32) the sulphur present produces (32:55=1:1.7) 2.7 times its own weight of manganese sulphide. Therefore, an iron with 0.06 per cent sulphur will contain (2.7 x 0.06) 0.162 per cent manganese sulphide. The sulphide has a melting point of 2948 deg. Fahr. Thus its splendid chance for segregation will be at once noted.

If the manganese present should be insufficient to combine with all the sulphur, the balance of sulphur will unite with the iron as iron sulphide (FeS). Howe gives eutectic of 7 per cent MnS plus 93 per cent FeS as 2160 deg. Fahr., and the melting point of FeS as 2140 to 2170 deg. Fahr. There is less chance for segregation by either of these sulphides on account of low melting points.

Sulphur favors the formation of combined carbon. While generally looked upon by foundrymen as highly detrimental, it would, therefore, seem no great bar to the production of strong castings if held within rational limits. Foundry grades of pig iron usually carry from 0.02 to 0.06 per cent sulphur; forge irons from 0.08 to 0.15 per cent. For light castings the sulphur should be kept within 0.05 to 0.07 per cent; medium castings 0.06 to 0.08 per cent. For heavy castings 0.09 to 0.12 per cent will not materially interfere. For carwheels, crusher parts, etc., 0.10 to 0.13 per cent is permissible. Maximum strength castings will show following approximate sulphur:

	Per Cent Sulphur
Gray iron	0.06 to 0.08
Semi-steel	0.06 to 0.09

Phosphorus

Phosphorus is present in cast iron as an iron phosphide (Fe_3P)—a conglomerate of iron and phosphorus containing 84.42 per cent iron and 15.58 per cent phosphorus, with specific gravity of 6.74. According to atomic weights of Fe_3 (3 x 56 equals 168) and P (31) the phosphorus present produces (31:168=1:5.4) 6.4 times its weight of iron phosphide. Therefore, an iron with 0.60 per cent phosphorus will contain (6.4 x 0.60) 3.84 per cent iron phosphide. The phosphorus in iron exerts no appreciable effect on the condition of the carbon, but it should be kept reasonably low from the fact that iron phosphide is likely to form segregation on account of its low freezing temperature (which is between 1800 and 1812 deg. Fahr. and tendency to seek walls of least resistance through which to exude and thus create globules and nodules.

Sometimes these globules are wholly separated from the metal matrix. Th author analyzed a specimen globule found segregated in a marine cylinder. The globule showed phosphorus 1.08 per cent, while the matrix of the metal analyzed 0.64 per cent phosphorus. The element phosphorus increases fluidity of metal by reason of the formation of a large quantity of fusible and fluid phosphide, therefore its presence is sometimes essential to aid fluidity in small and intricate work—but always at the sacrifice of strength. In large percentages it has a tendency to exclude carbon. Standard southern irons contain from 0.70 to 1.50 per cent phosphorus; a few special brands as low as 0.60 per cent phosphorus. Standard northern and eastern foundry irons contain from 0.40 to 0.80 per cent phosphorus—some special brands as low as 0.15 to 0.20 per cent phosphorus. With other elements rationally balanced maximum strength in castings will be shown when phosphorus content is approximately as follows:

	Per Cent Phosphorus
Gray iron	0.30 to 0.50
Semi-steel	0.20 to 0.40

Manganese

The manganese present first combines with sulphur, forming manganese sulphide (MnS), then combines with carbon to form manganese carbide (Mn_3C). In turn the manganese carbide unites with the iron carbide in the formation of constituent cemetite—the double carbide being known as iron-manganese carbide ($FeMn_3C$). The combining weights of manganese and sulphur have been mentioned. According to atomic weights of Mn_3 (165) and C (12) the carbon present produces (12:165=1:13.75) 14.75 times its own weight of manganese carbide. Therefore, an iron with 1.50 per cent manganese will contain (1.50 x 14.75) 22.12 per cent manganese carbide, excluding the percentage which forms with sulphur and oxygen present. Therefore, the element manganese is a very efficient desulphurizing agent.

Manganese also promotes deoxidation, forming manganese oxide (MnO) by combining with oxygen present and passing to the slag. The melting point of manganese is 2237 deg. Fahr.; that of iron-manganese carbide between 2350 and 2400 deg. Fahr. The carbide

is granular and hard. Pig irons deficient in manganese are generally "boosted" in the cupola by small charges of ferromanganese. However, it is preferable to use a pig iron which carries its own (inherent) manganese. With other elements rationally balanced, castings will show maximum strength by the presence of approximate manganese percentages:

	Per Cent Manganese
Gray iron	0.50 to 0.85
Semi-steel	0.70 to 1.25

Chemical and Structural Analyses of Iron

A comparison of the ultimate and proximate chemical analyses with structural analysis of iron will be of interest in studying the formation of cementite, pearlite and their relative bearing on the strength, toughness and hardness of cast iron. Following is comparison of a gray cast iron:

Ultimate Chemical Analysis		*Proximate Chemical Analysis*	
Graphitic carbon	2.70	Graphitic carbon	2.70
Combined carbon	0.70	Fe_3C	10.00
Manganese	0.60	Mn_3C	0.52
Silicon	1.75	FeSi	5.25
Sulphur	0.07	MnS	0.19
Phosphorus	0.40	Fe_3P	2.56
Fe	93.78	Fe	78.78
	100.00		100.00

Structurally, this iron contains (10.00 + .52) 10.52 per cent cementite, therefore the eutectoid matrix contains (10.52 x 8) 84.16 per cent pearlite, 2.70 per cent graphite and 13.14 per cent free ferrite; or 86.78 per cent iron, 10.52 per cent cementite and 2.70 per cent graphite as against true pearlitic structural composition of 87.5 per cent iron and 12.5 per cent cementite. Following is comparison of a white cast iron:

Ultimate Chemical Analysis		*Proximate Chemical Analysis*	
Graphitic carbon	0.03	Graphitic carbon	0.03
Combined carbon	3.17	Fe_3C	47.25
Manganese	0.50	Mn_3C	0.37
Silicon	0.70	FeSi	2.10
Sulphur	0.10	MnS	0.27
Phosphorus	0.50	Fe_3P	3.20
Fe	95.00	Fe	46.78
	100.00		100.00

Structurally, this iron contains (47.25 + 0.37) = 47.62 per cent cementite; therefore the eutectoid matrix contains

$\frac{800-120 \times 3.17}{7}$ 59.94 per cent pearlite, 0.03 per cent graphite and 40.03 per cent free cementite.

Oxygen

With humanly perfect cupola working conditions there will be a small quantity of oxygen absorbed by iron, usually in the form of ferrous oxide (FeO)—probably 0.01 to 0.02 per cent, as reported by Johnson. Exhaustive tests and research work carried on by Johnson have demonstrated that a small residual percentage is ever present, and may be intentionally increased to 0.07 per cent, or some higher. This small residuum of oxygen retained in combination by iron is probably representative of the scant capacity of metallic iron for stable constituent oxygen; for it is certain that not far beyond this narrow margin the oxygen has stronger inclination for synthetic action on the iron, or affinity for the carbon and manganese present.

The synthetic action may be described as a tendency of the oxygen to transform the metal back to its former natural state—iron oxide of brittle nature. Its strong affinity for carbon in the presence of heat causes it to combine readily with carbon in the iron to form carbon monoxide gas, which passes off as vapor if the metal remains liquid sufficiently long and venting of mold is good; otherwise the gas will be trapped and cause blowholes. That portion which unites with manganese usually passes to the slag as manganous (MnO) oxide, but if entrained in the metal may cause serious trouble. Therefore, it would seem that any beneficial results to be expected from constituent oxygen in iron must be looked for in the capacity of the metal to hold in combination, under strict equilibrium, the oxygen absorbed—otherwise the good effects may be destroyed by its excessively combining with iron under synthetic conditions and thereby causing detrimental reactions with the carbon.

In this connection, it should be borne in mind that iron oxide is very unstable and has a comparatively high melting point (2586 deg. Fahr.), thus will rarely be found dissolved in iron to any great extent; therefore, if segregated and entrained in the metal its high freezing point is likely to cause sponginess in castings. Sometimes it actually frees itself en masse, and mechanically carried with it particles of iron of lower freezing point to the top of liquid metal. As an illustration of this phenomenon on one occasion the author made a test of two heats by using several thousand pounds of a pig iron which had all the earmarks of being highly oxidized in the blast furnace.

Cupola conditions were checked closely and proved to be fairly ideal. The metal came down hot, was held for several minutes in a 12,000-lb. ladle and skimmed several times. However, scoria would quickly form on top of metal after each skimming. The iron was then transferred to small ladles, and by such process the agitation in pouring still further freed a large quantity of scoria, which in turn was skimmed while the metal was being poured in molds. This last agitation by pouring freed more scoria, which passed through the gate, through the mold and appeared on top of riser. The scoria from riser was analyzed, with following results:

Silica	17.4 per cent
Alumina	3.3 per cent
Lime	0.0 per cent
Iron oxide	16.0 per cent
Iron	60.0 per cent

Strictly speaking, this is not the analysis of a slag, inasmuch as no lime is present. The silica and alumina were doubtless gathered from the mold by mechanical attraction. The high melting point of iron oxide caused it to remain solid in the liquid metal of lower freezing temperature, and during its travel through the mold it mechanically carried much free iron. It was a spongy and gritty mass of considerable weight, due to the high percentage of iron. The large percentage of iron oxide tells the story—castings contained numerous blowholes and pinholes beneath the surface, and always on the cope side. A change in brand of pig iron effected a speedy remedy, and under identical cupola working conditions.

Much has been written, pro and con, in regard to the beneficial effects of constituent oxygen in cast iron, but the subject is yet far afield. It is a well established fact, however, that when iron has been oxygenated to considerable extent the metal takes on quite a different form—chemically and physically. Very hot metal becomes oxygenated rapidly when exposed to oxygen and assumes a hard and brittle nature—a principle well illustrated by the formation and expulsion of iron oxide scale on metal heated in a forge and hammered or rolled in the open.

Another illustration is the iron oxide film which is ever present on top of metal in a ladle, or on top of risers, sprues, etc. The iron globules which trickle down through the charges in a cupola are protected from complete oxidation by the film of oxide, or coating produced by the oxygen of the blast through which it passes on its descent to the hearth. The sparks seen flying from the cupola spout or agitated metal are due to small particles of iron being burned in the oxygen of the air. The meteorites are also burned in the oxygen of space. Numerous instances may be cited to substantiate the fact that heated metal is readily attacked by oxygen.

If, for any reason, the iron ore in a furnace should not be thoroughly deoxidized before it reaches the critical point of fusion, particles of iron oxide will be precipitated to the hearth and tapped with the metal; or if cast iron be subjected to undue oxidation, either during the melting process or by contact with constantly applied heat or acids, or constant exposure to moisture, then in either event on remelt in a cupola disastrous results will be reflected in the resultant metal—provided sufficient measures be not adopted for proper deoxidation—chiefly in the form of sluggish iron, blowholes, cold-shuts, etc.

Iron oxide scoria which is permitted to flow with

the metal from sprue or runner into gate will surely cause trouble, provided it does not pass through the mold and out at riser or shrink head without chemical reaction with the carbon in the iron. If entrained in the metal its oxygen will likely react with the carbon present (FeO+C=Fe+CO), thus forming carbon monoxide gas—a blowhole, or a series of them, will be the result if the gas does not escape. Its presence may be easily detected in company with flocculent masses of sand, graphite, etc., on top of pig iron after solidification—either sand or machine cast pig. If cupola metal should be unduly oxidized, similar spongy-like mass may be found freeing itself from the metal as it stands in the ladle, or on top of risers or shrink heads.

FERROMANGANESE SUPPLIES

Production at the Lowest Point on Record—Available Supplies—No Spiegeleisen Being Made

Although the decline in the pig iron output of the country, which culminated in July, has been the most severe in the history of the industry, the production of ferromanganese and spiegeleisen has fallen to levels lower by contrast than in the case of pig iron. In fact, so far as records go, production of both alloys is lower than at any time in the history of the industry.

From an average in the first quarter of this year of 19,178 tons per month the ferromanganese production has declined to an average of only 2892 tons per month in the third quarter, the culmination having been in July at 1509 tons. In 1913 the average output was 8280 tons per month and the height of the war period was 28,775 tons per month in 1918.

Production of spiegeleisen has ceased altogether, none having been made since July, with none in June and only 1197 tons in May. This contrasts with a monthly production in the first quarter of 11,667 tons per month.

The following table gives the output of ferromanganese and spiegeleisen for this year to November compared with previous periods:

Ferromanganese and Spiegeleisen Output in the United States in Gross Tons

	Ferro-manganese	Spiegel-eisen	Total	Aver. Per Mo.
First quarter, aver. per mo., 1921	19,178	11,667	.....	.....
April 1921	9,566	14,744	24,310	.....
May, 1921	3,339	1,197	9,232	.....
June, 1921	4,536	.....	4,536	.....
Second quarter, aver, per mo., 1921	5,814	5,314	.....	.....
July, 1921	1,509	4,015	5,524	.....
August, 1921	3,878	.....	3,878	.....
September, 1921	3,289	.....	3,289	.....
Third quarter, aver. per mo., 1921	2,892	1,338	.....	.....
October, 1921	3,902	.....	.....	.....
Total 1920	282,681	103,448	386,129	32,177
Total 1919	179,029	65,391	244,470	20,732
Total 1918	345,306	249,002	594,308	49,525
Total 1913	119,495	126,081	245,576	20,464

It will be seen that for the last three months the ferromanganese output has been under 4000 tons each month with no spiegeleisen made at all.

Available Supplies

The available supplies of ferromanganese for the first, second and third quarter of 1921 compared with other periods were as follows, as obtained from an analysis of the output, imports and exports:

	Output	Imports	Exports	Available Supply
First quarter, aver. per mo., 1921	19,178	917	60	20,035
Second quarter, aver. per mo., 1921	5,814	818	73	6,559
Third quarter, aver. per mo., 1921	2,892	466	68	3,290
Aver. per mo., 1920	23 557	4,938	288	28,123
Aver. per mo., 1919	14,923	2,752	255	17,420
Aver. per mo., 1918	28,775	2,264	298	30,741
Aver. per mo., 1917	21,486	3,703	776*	25,413
Aver. per mo., 1916	17,365	7,577	...	.....
Aver. per mo., 1915	12,021	4 605	...	.....
Aver. per mo., 1913	9,958	10,672	...	.....
5-year aver. (1910-14)	8,280	8,399	...	.....

*First half only.

Available supplies for the third quarter had fallen to 3290 tons per month as contrasted with 20,035 tons per month in the first quarter. In 1920 these were 28,123 tons per month.

Imports of British ferromanganese have further declined to half what they were in the first quarter, having been only 466 tons per month in the third quarter as contrasted with 917 tons per month in the first quarter and 10,672 tons per month in 1913.

Exports of the American alloy are insignificant, having declined from 288 tons per month in 1920 to 68 tons per month in the third quarter of 1921.

Manganese Ore Imports

Manganese ore imports into this country had declined to 14,823 tons per month in the third quarter of 1921 from 60,944 tons per month in the first quarter of this year and 50,119 tons per month in 1920. There were 28,858 tons per month in 1913. Present and past imports are given in the following table:

Manganese Ore Imports in Gross Tons

	Total	Average Per Month
First quarter, 1921	182,832	60,944
Second quarter, 1921	119,092	39,697
Third quarter, 1921	44,469	14,823
Total, 1920	601,437	50,119
Total, 1919	332,344	27,779
Total, 1918	491,303	40,942
Total, 1917	629,972	52,498
Total, 1916	576,324	48,027
Total, 1915	320,784	26,732
Total, 1913	345,084	28,858

The present import rate is only about 50 per cent of what it was in 1913 and about one-third of the 1920 receipts.

British Supplies of Manganese Ore

In Great Britain there has been a sharper decline than in the United States in the receipts of manganese ore as shown by the following table:

British Imports of Manganese Ore in Gross Tons

	Total	Average Per Month
First quarter, 1921	104,492	34,830
Second quarter, 1921	37,546	12,515
Third quarter, 1921	14,559	4,853
Total, 1920	452,613	37,718
Total, 1919	265,800	22,150
Total, 1918	365,606	30,467
Total, 1917	331,264	27,605
Total, 1916	439,509	36,625
Total, 1915	377,324	31,443
Total, 1914	479,435	39,953
Total, 1913	601,177	50,098

The average imports for the third quarter of this year had fallen to only 4853 tons per month against receipts in 1913 of 50,098 tons per month and 37,718 tons per month in 1920.

Supplies and Needs in 1921

Not long after the United States entered the war it was officially estimated that the monthly needs of the steel industry were 28,000 tons of ferromanganese. This was based on the use of 80 per cent alloy and a steel output of about 43,000,000 gross tons. In THE IRON AGE of May 13, 1920, it was estimated that with a steel production of ingots and castings of 45,000,000 about 316,000 tons of ferromanganese would be theoretically necessary. The 1921 production of steel, based on official reports to November, will be about 21,000,000 gross tons. The ferromanganese production, based on the output thus far this year, will approximate 94,720 gross tons, while the imports will come close to 8000 tons, making the total available, exclusive of exports, about 102,720 tons. Theoretically a 21,000,000-ton steel output will require about 147,000 tons of ferromanganese. At the end of the year, therefore, there would be an apparent deficiency of about 43,000 tons. Supplies carried over from the heavy production in 1920 and early in 1921 are probably ample to cover this theoretical lack of alloy.

Magnetic Surveys of Railroad Rails

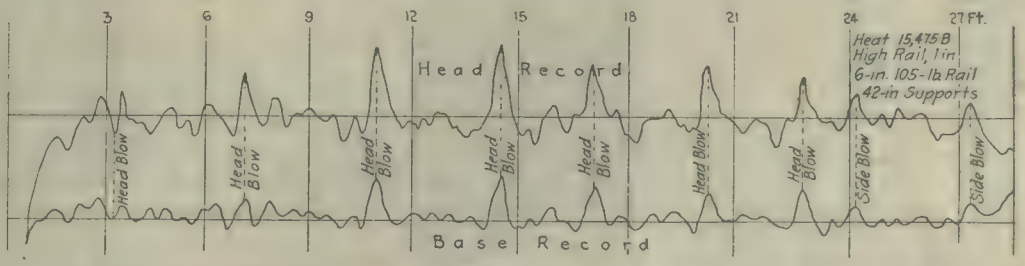
Determination of Fissures Obscured by Heavy Damage from Gagging Presses—Improvements Being Made in Section and in Straightening

SINCE the publication, two years ago, of the paper* by Dr. P. H. Dudley, before the American Society for Testing Materials, covering the results of his magnetic surveys on new and failed rails, his work has been carried forward in the New York Central shops at Harmon along the same lines as outlined in the paper. He reports, however, that very little of a new nature has since been discovered, most of the results being simply corroboration and duplication of facts previously established.

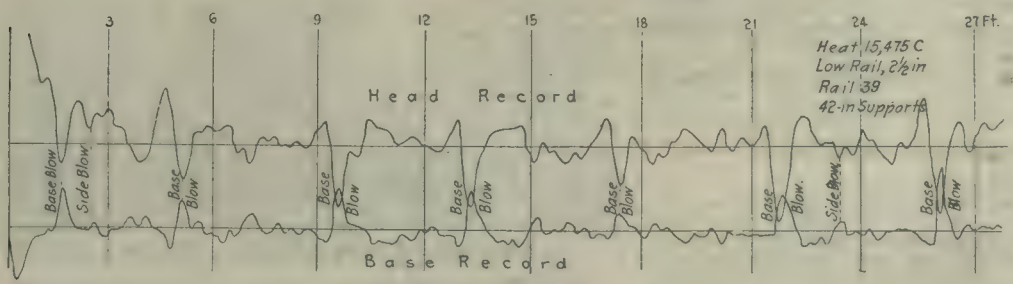
But it has been found possible by this means to distinguish between a ductile rail and one which is brittle, either because of its chemical composition or from the method of manufacture. The original idea of learning through these surveys something about the internal structure of the rail, particularly with regard to the presence or absence of fissures or of segregation of material chemically or through the effects of coalescence, is still under study. It is hoped that developments will make it possible to place dependence upon such a test.

While the effects might show up sharply in a rail which had not been straightened, the effect upon the rail of straining it beyond its elastic limit in the gag press, and thus producing a permanent set at various points along the length, so far overshadows, in its magnetic manifestations, lack of uniformity in the structure, as to mask the latter completely.

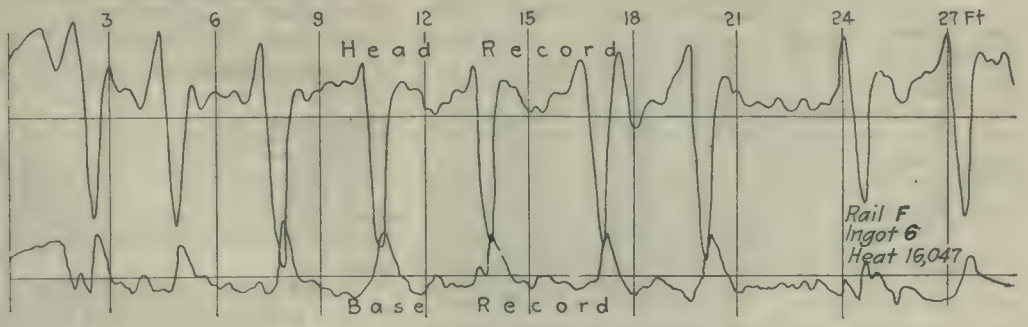
Some years ago it was common practice to support rails in the gag press upon centers 28 in. apart. At Dr. Dudley's insistence, the distance was lengthened to 42 in., with marked diminution of the number of rails which actually broke in process of straightening and of the number of failures in service caused primarily by gag press troubles. He is now advocating a distance of 60 in. between supports, and one of our illustrations shows the survey of a rail straightened in that way. All of the others are on the present standard of 42 in.



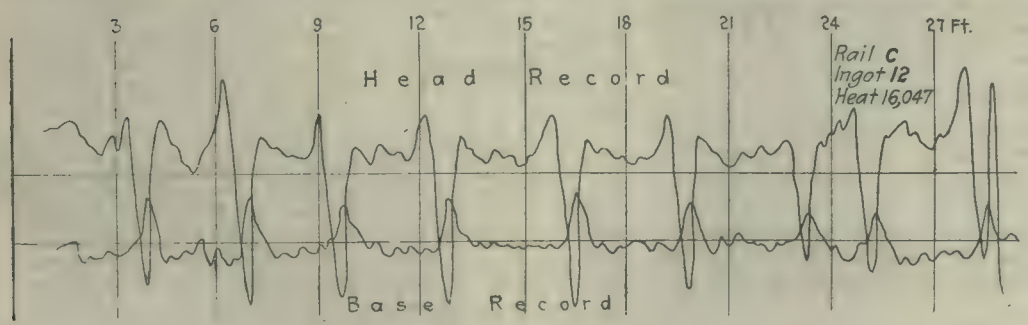
Magnetic Leakage Curves of a New Rail in Which Most of the Gag-Press Blows Were Delivered upon the Rail Head



Magnetic Leakage Curves of a New Rail in Which Most of the Gag-Press Blows Were Delivered upon the Base of the Rail

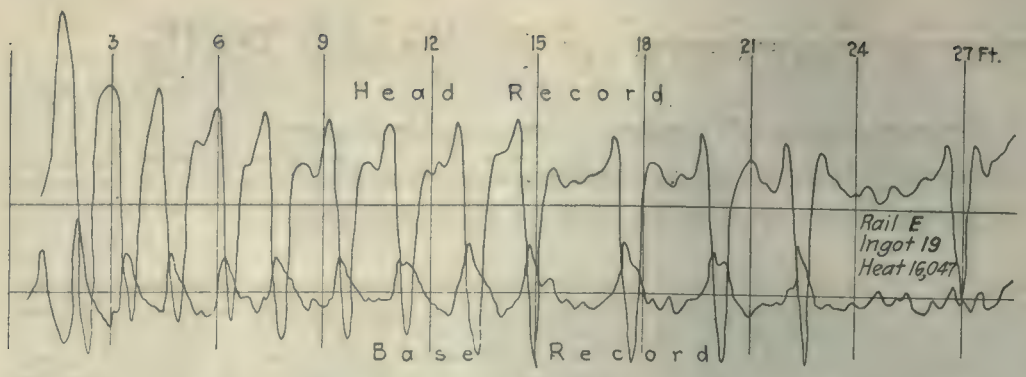


Magnetic Leakage Curves of a New Rail Made from the Sixth Ingot of a Brittle Heat of Steel

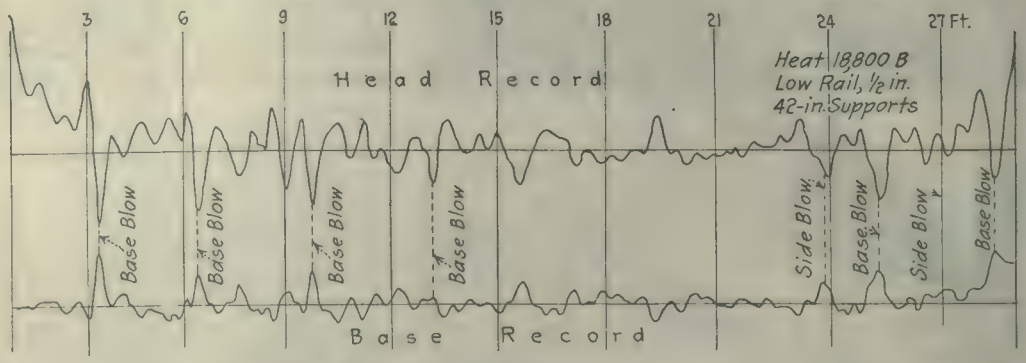


Magnetic Leakage Curves of a New Rail Made from the Twelfth Ingot of the Brittle Heat of Steel

*An abstract was published in THE IRON AGE, July 3, 1919, page 43.



Magnetic Leakage Curves of a New Rail Made from the Nineteenth Ingot of the Brittle Heat of Steel



Magnetic Leakage Curves of a New Rail in Which Most of the Gag-Press Blows Were Delivered upon the Base of the Rail

Three large mills have now replaced all gag presses with new ones, using supports 60 in. apart, and others are following this lead.

Rails on the cooling bed sometimes warp upward and sometimes downward, depending upon conditions. Those warping upward are called high rails, while the others are low rails. The former have to be straightened by gag press blows upon the head; the latter upon the base. These effects are shown in some of the diagrams.

As Dr. Dudley pointed out in his paper, the effect of re-heating rails after once the blanks have been made in the blooming mill is to reduce largely the number of rail failures. From the figures he gave, covering the experience of eight railroads and nearly 900,000 tons of rails (enough for 5600 miles of single track, laid with 100-lb. rails), there was one failure for each 531 tons of rails where the rails were rolled direct, and only one failure for each 5467 tons where the blooms were re-heated before the rails were finally rolled.

Elongation and Exhausted Ductility Tests

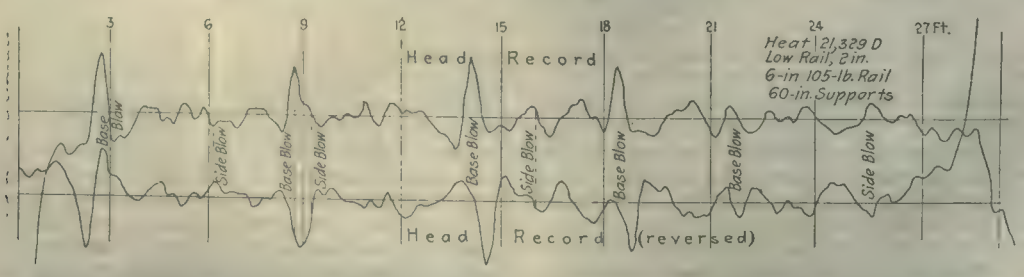
Heat No.	Ingot No.	No. of Drop	Permanent Set, In.	Elongation per Inch 1 In.	2 In.	3 In.	4 In.	5 In.	6 In.	Total
15,475	2	1	1.32	1.04	1.05	1.05	1.05	1.05	1.04	6.28
	20	1	1.32	1.05	1.05	1.05	1.05	1.04	1.03	6.27
		∎	2.38	1.08	1.10	1.10	1.09	1.08	1.05	6.50
		3	Broke	1.10	1.13	1.13	1.11	1.10	1.07	6.64
	37	1	1.34	1.03	1.04	1.05	1.05	1.05	1.04	6.26
16,047	2	1	Broke	1.02	1.02	1.05	1.03	1.02	1.02	6.16
	Retest	1	Broke	1.03	1.03	1.05	...	1.04	1.04	...
	10	1	Broke	1.00	1.02	1.02	1.03	1.04	1.03	6.14
	Retest	1	1.20	1.03	1.03	1.05	1.05	1.04	1.04	6.24
		2	Broke	1.03	1.05	1.07	1.12	1.11	1.08	6.46
	20	1	0.93	1.02	1.02	1.04	1.04	1.06	1.06	6.24
		2	Broke	1.02	1.02	1.04	1.05	1.07	1.06	6.26
18,800	2	1	1.10	1.03	1.04	1.05	1.06	1.05	1.04	6.27
		2	Broke	1.04	1.05	1.06	1.08	1.07	1.06	6.36
	20	1	1.32	1.03	1.04	1.05	1.05	1.05	1.04	6.26
		2	2.42	1.05	1.05	1.07	1.10	1.10	1.09	6.46
		3	Broke	1.06	1.07	1.10	1.12	1.12	1.11	6.58
	38	1	Broke	1.04	1.05	1.05	1.06	1.05	1.04	6.29
	Retest	1	1.42	1.03	1.04	1.05	1.07	1.07	1.05	6.31
		2	2.54	1.05	1.06	1.09	1.10	1.10	1.08	6.48
		3	Broke	1.07	1.08	1.13	1.15	1.14	1.11	6.68
21,329	2	1	Broke	1.02	1.03	1.04	1.04	1.03	1.02	6.18
	Retest	1	1.30	1.05	1.05	1.05	1.05	1.05	1.04	6.29
		2	2.22	1.08	1.08	1.08	1.07	1.07	1.06	6.44
		∎	Broke	1.09	1.10	1.10	1.10	1.09	1.07	6.55
	20	1	1.24	1.05	1.05	1.06	1.06	1.04	1.03	6.29
		2	Broke	1.07	1.08	1.10	1.08	1.07	1.05	6.45
	33	1	Broke	1.03	1.03	1.04	1.04	1.03	1.02	6.19
	Retest	1	1.32	1.04	1.05	1.05	1.05	1.05	1.05	6.29
		2	2.30	1.07	1.08	1.08	1.11	1.11	1.09	6.54
		3	Broke	1.08	1.10	1.10	1.13	1.12	1.10	6.63

Chemical Analyses of the Steel

Heat No.	Carbon	Manganese	Silicon	Phosphorus	Sulphur
	Percentage of				
15,475	0.715	0.73	0.149	0.028	0.049
16,047	0.686	0.94	0.160	0.025	0.033
18,800	0.710	0.73	0.161	0.020	0.045
21,329	0.700	0.79	0.125	0.033	0.032

Diagrams on these pages show clearly the difference between rails of more or less brittle structure and those which were found from tests to be ductile. The former exhibit very heavy fluctuations in the galvanometer record as compared with the more moderate fluctuations of ductile rails. All rails tested were of open-hearth steel.

It will be noted, from both sets of diagrams, that the head of the rail seems to show a much more marked disturbance from the gag press than does the base, regardless of whether the blow of the press was applied to the head or to the base. This is due in large measure to the greater mass of metal in the head. The effect of the side blow appears considerably less



Magnetic Leakage Curves of a New Rail Which Was Straightened on a Gag Press with Supports 60 In. Apart. This rail required a great deal of work on it, for it was 2 in. low in the center; but the distortion to its structure was very moderate, when compared with some of the others shown

than with the head or base blow, principally because it is of less force and consequently distorts the material to a smaller extent.

Chemical and physical tests of the rails involved in the graphic records are appended in two tables. It may be noted that the ingots from which the various rails were rolled were of a size for four rails each in all cases except the heat No. 16047, which happened to be the brittle heat. In this case there were six ingots rolled per rail. The ingot weights for four rails were approximately 5400 lb. compared with 8000 lb. for six rails. The weights of the heats of steel varied from 160,000 to more than 200,000 lb. in the four cases cited. In each case a study was made of the second ingot teemed, the last ingot and an ingot near the middle of the ladle.

In all cases the physical tests were made by dropping a 2000-lb. tup from a height of 20 ft., the section of rail receiving the blow being supported on 36-in. centers. The rails were of 105 lb. Dudley section, with a moment of inertia of 50 in.⁴

Rails which have been surveyed have since been laid in various places on main line track. Some of them have now had about two years of service, but it is still too early to have obtained definite information regarding their probable behavior and life. Ductile rails have been put into high-speed main line track; more brittle rails into freight track or sidings. In other cases, where five or six rails of a heat have developed fissures, all the rails of that heat have been removed from the track for survey.

November Meetings of Steel Treaters Chapters

The New York Chapter of the American Society for Steel Treating was addressed at its November session on Wednesday evening, Nov. 16, at the Engineering Societies Building by T. H. Nelson, works manager Henry Disston & Sons, Philadelphia, on "How Tool Steel is Made: Comparison of Foreign and American Methods of Manufacture." It was illustrated with lantern slides.

At the November meeting of the Hartford, Conn., chapter on Nov. 10, held at Jewell Hall, Y. M. C. A., Hartford, Stanley P. Rockwell discussed "Case Hardening." The December meeting on Dec. 8, will be addressed by George P. Moore, metallurgist Wallace Barnes Co., Bristol, Conn., who will discuss "Spring Manufacture."

The Schenectady, N. Y., chapter, at its monthly meeting on Nov. 15, was addressed by T. S. Fuller, metallurgist General Electric Co., who spoke on "Corrosion of Iron and Steel." The meeting was held in the civil engineering building Union College, Schenectady.

New York Electro Chemists Hold a Meeting in Memory of Dr. J. W. Richards

A meeting of the New York section of the American Electrochemical Society was held Wednesday evening, Nov. 16, at Rumford Hall, 52 East Forty-first Street, New York, at which several addresses were delivered on the life and works of the late Dr. Joseph W. Richards. Dr. Carl Hering, consulting electrical engineer, Philadelphia, reviewed the work of Doctor Richards as president and secretary of the American Electrochemical Society; Dr. W. S. Landis, president American Cyanamid Co., New York, took as his theme, "Dr. Richards as a Teacher at Lehigh University," while H. C. Parmelee, editor *Chemical and Metallurgical Engineering*, reviewed Doctor Richards' work as an editor and author. These memorial addresses were followed by one by Dr. Frederick G. Cottrell on "Personal Observations on the Russian Situation."

The eleventh annual convention of the Sheet Metal Products Association will be held at the Congress Hotel, Chicago, Dec. 8 and 9. The secretary is D. C. Jones, P. O. Box 769, Chicago.

The National Metal Trades Association announces that its next annual meeting will be at the Hotel Astor, New York, on April 19 and 20, 1922.

HIGH LABOR COSTS

Investigation at St. Louis Shows Why Building Has Been Retarded

ST. LOUIS, Nov. 15.—A conference of master builders, the building trades unions of St. Louis, material men and bankers begun last week in an effort to adjust conditions so that work may be started on building projects totaling more than $20,000,000, was adjourned until to-day. The work of the conference has been given an impetus by a proclamation issued by the mayor who recites that lack of building is retarding the city's economic progress and contributing largely to unemployment and states that concerted action by investors, contractors, material men and the unions is necessary to remedy the situation.

The conference followed the publication of the results of an exhaustive investigation into building conditions in St. Louis made by the St. Louis *Post-Dispatch*, in which it was ascertained that building projects of an estimated cost of $20,165,000, for which plans have been drawn, are held in abeyance because of the high cost of labor.

The present wage scale in St. Louis, to which the builders object, ranges from 67½c. an hour for laborers to $1.37½ for plasterers and hoisting engineers. The rate of $1.25 an hour applies to carpenters, cement finishers, electricians, lathers, painters, bricklayers, elevator constructors, ornamental iron workers, sheet metal workers, steam fitters and structural iron workers.

The president of the Building Trades Council has said that the men would be willing to accept a reasonable reduction provided this would assure that building would go forward. It is believed that the rate will be reduced from $1.25 to $1 an hour.

Construction 25 Per Cent Ahead of Last Year

Building contracts awarded during October in the 27 northeastern States of the country, according to the statement of the F. W. Dodge Co., amounted to $222,480,000. This figure is 25 per cent greater than the figure for October, 1920, and only 10 per cent less than the figure for September, 1921, which was a record month.

There was a marked increase in activity in New England during October. Other sections showed moderate declines, well within the range of seasonal declines that were to be expected.

Residential building still leads among the classes of construction, having amounted to $89,650,000 in October. This was 40 per cent of the total construction for the month.

Second in importance was the business building group, amounting to $37,405,000 in October, or 17 per cent of the total, a very good showing for this class of work.

Public works and utilities amounted to $35,141,000 in October, about the same as the September figure. Industrial building in October amounted to $18,419,000, an increase of 63 per cent over the September figure. Contemplated new work reported in October was 24 per cent greater than in September.

Considering the large volume of construction started within the past two months, it appears that activity will continue at a very substantial rate through the winter months.

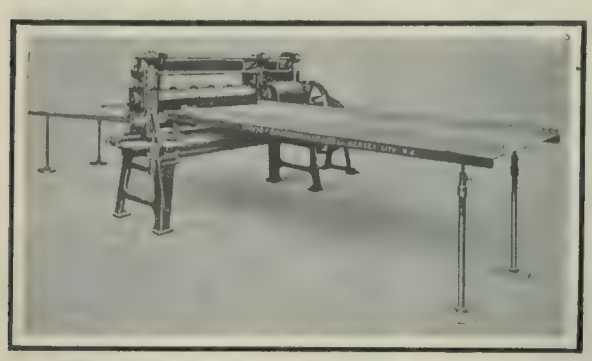
More Building in Detroit

DETROIT, Nov. 12.—New work coming from the offices of the architects shows an ever increasing volume, according to the latest weekly report of the Builders' and Traders' Exchange. The trend of conditions in the building industry is noted in the different types of new work coming out, virtually every type of construction being represented in the week's work. Although the residential class is still leading in volume, a new note was struck in industrial construction, more work of this type being reported than for some time previously.

WELDED TUBE MANUFACTURE

Machinery Required for Tubes ⅝ to 4 in. Diameter from Sheets of No. 10 and No. 22 Gage

The equipment of machinery necessary for the welding and fabricating of tubing, such as used in the construction of automobiles, bicycles, motorcycles, furniture, beds and office appliances, has been studied by the Davis-Bournonville Co., Jersey City, N. J., thus to supply machinery to plants taking up such manufacturing. The equipment comprises gang slitters, tube forming machines, welding machines, straighteners, seam grinders, cutting-off machines, draw benches, swagers and bending machines.

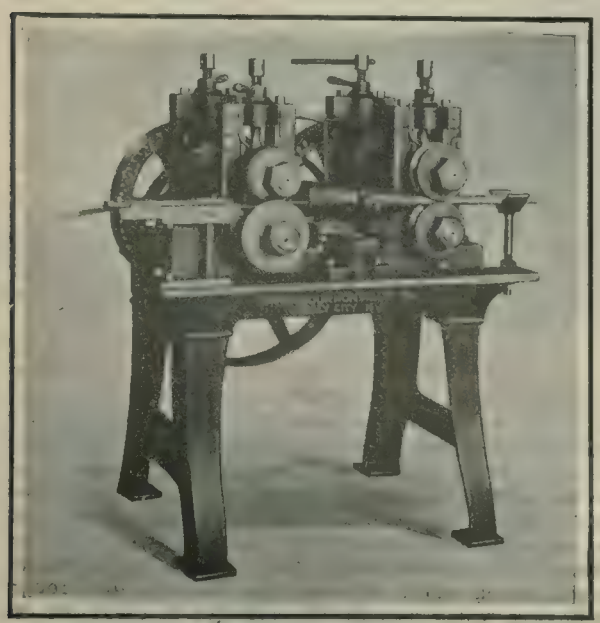


Gang Slitter. One end bearing housing may be swung out of position, facilitating removal of cutters

The commercial thought behind the lining up of the various machines for the given range of work is that manufacturers of specialties have then at their command the means for producing tubes of any common diameter and gage on short notice. Commercial steel sheets of any thickness from No. 10 to No. 22 may be cut into strips to form tubes from ⅝ in. to 4 in. in diameter and welded to meet immediate needs. With this equipment, it is not necessary, it is said, to carry in stock tubes of many diameters and gages to meet anticipated uses, but instead commercial sheets may be bought in the open market as required, or sheet stock in few gages kept on hand ready for slitting, forming, welding and subsequent operations. In the case of makers of welded tubing for the market, however, it is generally an advantage to purchase tube stock in strips trimmed to the required width.

The exact equipment required depends on the material to be used and the fabrication needed before leaving the tube shop. Where mill sheets are to be cut into strips suitable for the next operation, tube forming, slitting machines are required. Gang slitters of the type shown in the illustration are furnished in various styles and sizes for cutting sheets from 18 to 52 in. wide and up to 10 gage thick. The shafts are of alloy steel ground to dimensions and are fitted with keys the entire working length. Bearings run in bronze bushings and provision is made for simultaneous adjustment of bearings, thus maintaining accurate alignment. The cutters are made from steel forgings accurately ground, and re-sharpened by face grinding, thereby maintaining the original settings. The cutters are arranged to be used in opposed pairs and are set up with one wide and one narrow ring spacer.

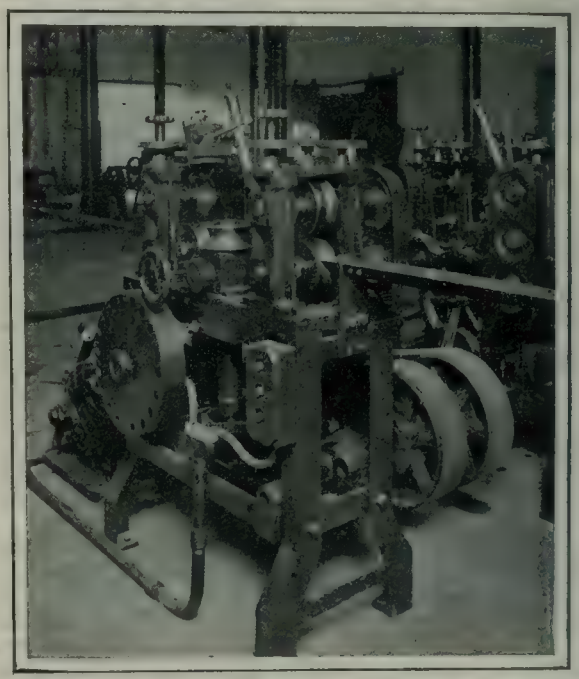
One end bearing housing may be drawn off the shafts by a screw and swung out of position thus permitting the cutters and spacers to be removed and changed in a few minutes' time, a feature particularly emphasized by the makers. Tables are provided on each side of the full width of the sheet to be cut. The feed table is fitted with adjustable guides. The normal cutting speed is 50 ft. per min., and the drive is through a friction clutch.



Tube Forming Mill. Mills run continuously when adjusted

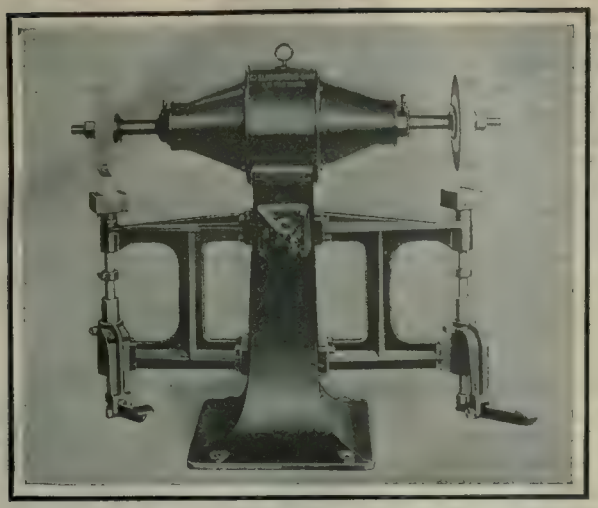
Tube Forming and Welding

Tube stock, whether cut from mill sheets or in rolled strips, must be form-rolled preparatory to welding. The tube forming mill illustrated is of the two-roll stands type, but a three-roll type is also made. The two-roll type comprises breakdown and finishing roll stands and operation is by one man who handles both the strips and the formed tubes. A hollow conical conductor between the roll stands completes the forming started by the first pair of rolls, and the second pair compresses the formed tube into a truly circular shape. Adjustments of the tube forming rolls may be made while the machine is running. Tube forming speeds are from 50 to 100 ft. per min., depending on diameter and gage. The three-roll stand type is similar to the two-roll type but has an extra stand of rolls.



Tube Welding Machine. Provision is made for 36 speeds

From the tube forming machines the tubing goes to the welding machines and thence to the inspector's station where unwelded spots are welded with hand torches. The illustration shows the No. 1 tube welding machine which is furnished for right or left hand operation, with or without motor drive and push button control. The usual power equipment comprises 230-volt adjustable speed direct current motor, field rheostat, magnetic control panel and push button station, with reverse. The speed range is said to be ample for all gages and diameters, provision being made for 36 speeds. The motor drives through a belt, and the equipment having dynamic braking characteristics permits instant control. Starting, stopping and reversing are



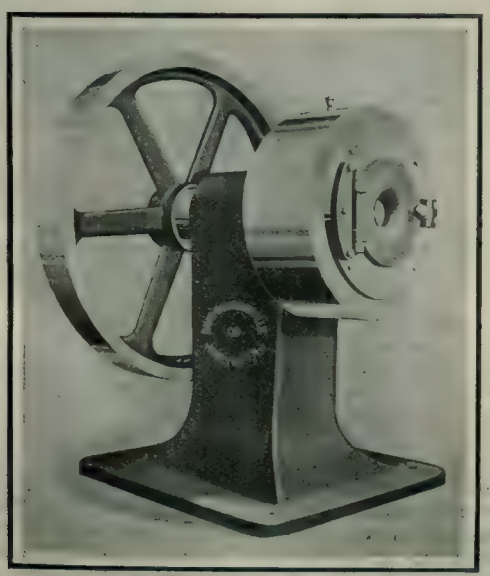
Machine for Grinding Off the Bead Produced by the Weld

said to be effected without shock. The main drive mechanism is covered and runs in oil.

The rolls are individually adjustable for alignment and the guide rolls are adjustable in relation to the welding rolls. The welding rolls are vertically adjustable to eliminate contraction stresses in the cooling metal, a feature intended to produce stronger welds. Rolls are furnished for any diameter tube from ⅛ inch to 3 inches, inclusive. Welding speeds vary between 36 and 72 in. per min. Conductors are furnished for 1¼ in. and smaller diameters of tubes to be placed between the welding and finishing rolls. A universal torch adjusting arm is furnished when required.

In the No. 2 tube welding machine all rolls are overhung. This is a feature emphasized by the makers, as it permits of quick and easy changes. The machine is furnished for right hand operations only. A two-speed gear change in the base, with the adjustable speed motor provides variations of welding speeds from 24 to 168 in. per min. Bearings subjected to heat are water cooled, water being circulated through cored spaces within the housing. Provision is made for two sets of following rolls to facilitate welding at the higher speeds. Rolls are furnished for tube diameters of 1¼ to 4 in. inclusive, 18 to 10 gage wall thickness.

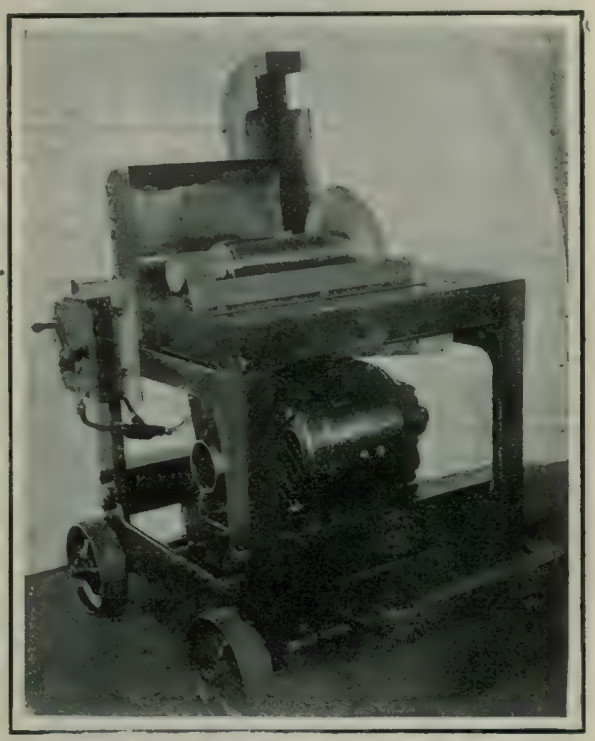
The welding tips for the tube welding machines are of the multiple-flame type, the number and arrangement of flames varying with the gage and diameter of the tube, speed of welding and kind of metal. These tips are emphasized by the maker as an important feature of the equipment. The larger tips are water-cooled in order to maintain uniform heat conditions, the cooling water being circulated through the tip and from thence into the barrel of the torch.



Tube Swaging Machine; May Be Equipped with Mechanical Feeding Device

Tube straightening machines are furnished in three sizes, all being of the ten-roll type with rolls arranged in two sets of five each, at right angles. Three rolls of each set are power driven, the last roll in each set being adjustable. The No. 1 machine has a capacity for tubes up to 1 in. diameter; the No. 2 machine straightens up to 2 in. diameter, and the No. 3 handles tubing from 1½ to 3 in. diameter.

Having been run through a straightening mill, the tubes then go to the seam grinders to remove the slight ridge produced by welding, or to the draw bench. In case of finishing by drawing, it is not necessary to grind off the ridges. The tube grinding machine is shown in the illustration. The tube passes under the wheel at an angle while supported in a formed rest elevated by foot pressure. Two operators may work simultaneously. The machine comprises a 7½-hp. alternating current ball-bearing motor, the armature shaft of which is extended to carry a grinding wheel at each end. The foot control pressure mechanism and tube guides are arranged to grind tubes at any desired angle. The wheel faces wear concave to fit the tubes,



Tube Cutting Machine with Saw Guard Raised

thus preventing the grinding of flat spots and permitting the full width of the wheels to be used.

Tapered tubes are generally made by swaging and a great variety of shapes and combinations can be produced by this process. A swaging machine for the purpose is shown in the illustration. It is of the rotary type using ten or more rolls in the head. The cage, rollers and dies, it is said, are of such design as to effect almost noiseless operation. The backs of the dies have a cam shape over which the rollers ride without destructive shock to themselves, the resultant action of the dies on the metal worked being more of a squeeze than a blow.

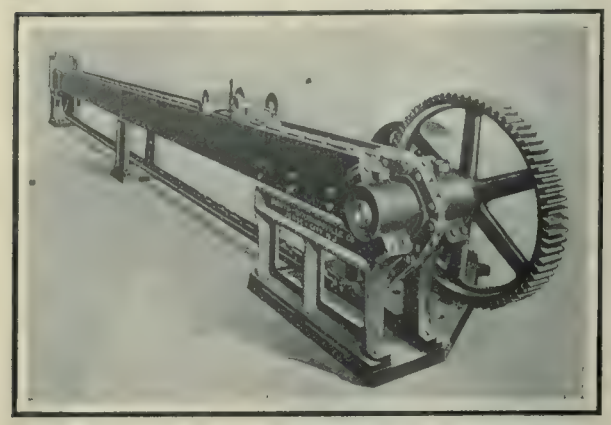
Three sizes are furnished, each of which may be fitted with dies of any practicable length. Mechanical feeding devices can be furnished.

The tube cutting machine shown in the illustration is part of the equipment, being designed for the rapid cropping of tubes. It is motor driven, the motor being mounted on the base of an oscillating cutting head carrying the saw arbor. The mechanism oscillates on a shaft mounted in bearings cast integral with the frame. The cutting head is held back against a stop by a coil spring and is actuated by a foot treadle through a linkage which permits the operator to exert the required pressure of the saw on the tube without undue fatigue. The usual diameter of the saw is 14 in. and

thickness 3/32 to ⅛ in. The saw arbor is mounted on ball-bearings packed in grease. The motor is 5 hp. and of any suitable type to drive the saw at speeds from 3000 to 4000 r.p.m. by an endless leather belt.

Draw Benches and Bending Machines

Draw benches constitute an important part of the fabricating equipment necessary to the tube maker. The draw bench illustrated, known as the No. 1, has capacity for tubes up to 2 in. diameter, 14 gage. A No. 2 machine is also furnished which has a capacity for drawing tubes up to 3 in. diameter, 14 gage. The construction embodies a single heavy steel H-section bolted between heavy head and transmission castings. The main chain is of the usual 2 and 1 construction, running over a steel sprocket driven by heavy double reduction gearing. The chain is adjusted by a grooved idler wheel, the bearings of which slide in slots in the head casting. The dog is made of heavy steel castings mounted on rollers running on the beam flanges. The dog jaws are machined for removable grips which may be serrated or machined to grip round tubing without marring. All shafts run in bronze bushings or split babbitt-lined bearings.



Drawbenches Are of Two Sizes and of Various Lengths, Equipped with Back Benches When Specified

Draw benches are fitted with back benches for drawing tubes over a plug or mandrel when required. Back benches are made from smaller H-section steel beams than used for the main section, and are provided with end casting and support for rod attachment. The driving clutch is operated by a shaft running the length of the bed and having a lever at the head of the bench. Solid dies and adjustable roller die heads are furnished extra.

Tube bending machines constitute the final item of equipment and are furnished in three sizes, designated No. 1, 2 and 3. The No. 1 machine, shown, is for round tubing and is furnished without power plug attachment. All machines are equipped with double clutch pulleys for operation in either direction. Nos. 2 and 3 machines are equipped with power attachments and back bench when required. Power attachments are made in various forms suited to the class of work to be done. The power attachment operates a rack to which is attached a plug for internal support when bending. The rack controlling the plug may be operated by power in either direction.

The main drive of the machines is through reduction gearing and steel worm operating a bronze worm wheel or a cast-iron worm wheel with band for the teeth, this construction depending on the work for which the machine is required. The oscillating tube carriage carrying the roll, vise and other parts are mounted on the worm wheel shaft. The carriage is so made that the tools for various diameters and radii can be readily attached. A stationary half die, furnished in conjunction with the oscillating members, is actuated by a cam or screw or in conjunction with a follower.

Directly beneath the worm wheel there is a dog operating on adjustable knock-outs which limit the angle to which a bend is made.

The machines are suitable for bending tubes of all kinds of metal and of any shape—square, rectangular, etc.—to angles not exceeding 180 degrees. The operating levers are placed so that the machine is readily controlled by one operator; two men are employed for maximum production.

The number of bends made per hour vary with the length, diameter and angle, running between 60 and 120 per hour. The No. 1 machine bends to 8-in. radius, maximum; the No. 2 bends to 12-in. radius maximum, regular, or 25-in. radius special, and the No. 3 machine bends to 35-in. radius, maximum, and larger radii to order.

Electricity in Britain and America

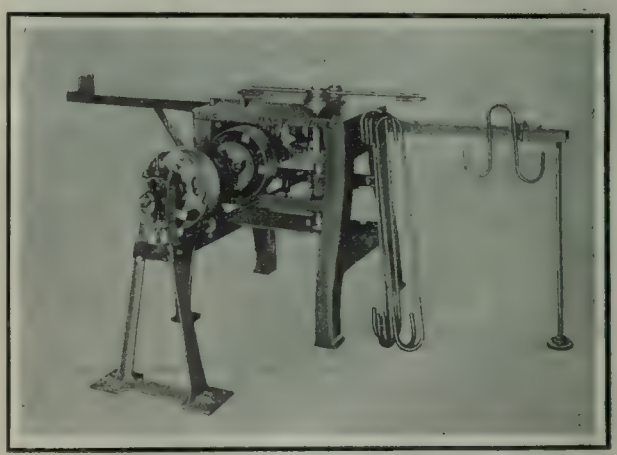
Figures for the electricity supply of Great Britain, issued by the Electricty Commissioners, show a total generation of 5,167,337,094 kwhr. for the year ended March 31. This, for a population of 42,767,530 in 1921, gives an average of 121 kwhr. per year for each inhabitant.

United States geological survey figures for the first nine months of 1921 show an average of 3,324,353,000 kwhr. per month. Based on a population estimated at 107,500,000 in 1921, this amounts to an average of 371 kwhr. per year for each inhabitant, or more than three times the British average.

Lack of standardization is given as the chief reason for the slow growth of British use of electricity. It is pointed out that in Greater London alone there are some 70 generating stations, representing a total of 50 different systems of supply, 24 different voltages and 10 different frequencies. This situation has made for unnecessary expenditures, wasteful use of coal and higher charges than proper co-ordination would have provided.

More Active Coke Ovens

PITTSBURGH, Nov. 14.—The H. C. Frick Coke Co. put in operation 600 more coke ovens to-day, bringing the number of active units of the company to 1702. The company has started up 200 ovens at Colonial No. 1, 150 ovens each at Leisenring No. 2 and at Lemont, and 100 at Youngstown, Ohio. The parent company recently has blown in blast furnaces at Youngstown, Ohio, and New Castle, Pa., and this explains in part the increase in the production of coke. Supplying those stacks with Connellsville coke permits the stocking of by-product coke at Clairton, Pa., against the winter requirements of the Pittsburgh district furnaces.



Bending Machine for Round Tubing. Maximum radius of bend is 8 in.

The December meeting of the New England Foundrymen's Association will be in the form of a complimentary dinner to the 30 past presidents of that organization. The speaker of the evening will be Richard H. Rice, general manager General Electric Co., Lynn, Mass. The dinner will be held at the Exchange Club, Boston, on the evening of Dec. 14.

General Freight Reductions May Come Soon

Conference of Railroad Officials in New York in Regard to Ore Rate May Be Followed by Action as to All Raw Materials

WASHINGTON, Nov. 15.—Instead of giving a prompt reply to the urgent requests of lake front iron and steel interests for lower rates on coal and coke, the railroads have called a conference for Thursday of the present week at 143 Liberty Street, New York, for the ostensible purpose of considering a plan to restore as of next Jan. 1 the rates on iron ore from lower lake ports to interior furnaces, which were reduced on Oct. 18. Attending the conference will be representatives of the iron and steel industry from the various sections of the country. Indications are that it will be a lively session of great importance, affecting the entire trade and upon which may hinge hastening or further delay in returning to an adjustment to a normal basis, depending upon whether further rate cuts may be the outcome or the old ore rates be restored. To some in the trade, it hardly seems conceivable that the carriers actually will attempt to restore the old rates on iron ore unless it is done as a temporary matter with a view to bringing down the entire rate structure as it relates to the iron and steel trade in a simultaneous move shortly afterward. Because of this it is believed that the conference will in a formal sense only deal with the question of restoring the old rates on iron ore. The belief prevails that it will take on a much wider scope and that, whatever may be done, it means that in the not distant future there will be a general reduction in rates on raw materials used and manufactured by the iron and steel industry.

Restoration of Ore Rate

The situation has been described as being entirely too indefinite on which a date for such action may be predicated, but confidence is felt that a general reduction must be forthcoming within a comparatively short time. A restoration of the old rate on iron ore from the lower lake ports to interior furnaces, it is pointed out, plainly would check progress toward readjustment of the industry with its heavy costs of operation in which high freight rates are such an important item. But if they are restored on Jan. 1 as a move toward re-establishment of so-called relationships between ore and fuel rates with the purpose of bringing down all of the rates at the same time at a period soon after, it has been stated, the railroads may feel that they have arrived at a solution of a problem which at present is a source of differences of opinion within the industry itself. Some men in the trade frankly are of the impression that these differences have done any injury to the trade and will tend to delay freight rate reductions of a general character. They are insisting that the cuts be made at once and are strongly hoping that there be no return to the old rates on ore. Others, however, as shown at the informal hearing here on Monday of last week claim that either the old rates on iron ore should be restored or rates on coal and coke to lake front producing interests be made immediately in order to maintain the relationship between fuel and ore rates. The lake front manufacturers say that otherwise they are the object of discrimination in favor of interior producers who have been granted lower ore rates. At the same time, there are those who believe that, so far as rate making goes, no reason exists for maintaining a relationship on assembling material for the production of pig iron.

Restoration of old iron ore rates from lower lake ports on Jan. 1 would in itself not be of much importance. The shipping season from mines will of course long have been closed by that time and the great bulk of dock ore moved to interior furnaces. Lake front makers have pointed out that the latter situation would be especially true this year because shipments would be stimulated more than ordinarily under the lower rates and previous to the restoration of the old rates. This fact has been cited by lake front interests to show that regardless of what the carriers may do about returning to the old rates, discrimination of a marked character has been practiced.

The tariffs effective Oct. 18, lowering the ore rates, carry plainly the provision for a restoration to the old rates on Jan. 1, but the trade has felt that this was largely a formal matter adopted by the carriers as a check to which they could turn should that be considered expedient. Whether or not they had in view the situation that has actually developed is only a conjecture.

Attitude of the Commission

It is a question of considerable discussion as to what the Interstate Commerce Commission can do regarding the ore tariffs in case the railroads attempt to restore the old rates on Jan 1. The assumption is that the commission could not prevent such action. The rates were lowered voluntarily by the carriers and not through an order of the commission, which approved the tariffs, at least to the extent of allowing them to go to its files with the language which, if nothing is done, will automatically restore the rates.

The subject takes on exceptional importance because of the drive for lower rates, a matter of a conference last Saturday between the railroad executives and the commission relating particularly to agricultural products, but which shippers of the country generally hope will prove to be an entering wedge toward a general reduction in rates of all kinds. They appreciate the problems of the railroads, their financial conditions, the necessity to guard their revenues, etc., and need for cutting wages, but also maintain that rate reductions could be made before some of the problems of the railroads are worked out and that it would be as helpful to the railroads themselves as it would to industry. Should the carriers in the ore rate situation practice the policy of limiting reductions to a specified time, and the commission in that way be divested of power to suspend rates, the carriers would acquire control over rates such as they have not had for many years. The allowing by the commission of the ore tariffs to become effective, it is pointed out, does not constitute a bargain between the carriers and the commission because there is no authority under which the commission could close the door in such a manner to formal protests.

Ferromanganese Anti-dumping Case Dismissed

WASHINGTON, Nov. 15.—Without an accompanying written decision, the Federal Trade Commission last Saturday issued an order dismissing its complaint in the ferromanganese anti-dumping case "for failure of proof." The opinion was unanimous, and sustains the recommendation made in the tentative report submitted by Trial Examiner Edward M. Averill, who had charge of the hearings.

While it is not unusual for the commission not to present written opinions with its orders, disappointment has been felt that it omitted such a finding in this case, which is the only one of the kind that ever

came before the commission and one of the principal issues was the question of jurisdiction. Attorney Joseph E. Davies, of the law firm of Davies & Jones, representing one of the respondent companies, Crocker Bros., maintained among other things during the hearings and arguments that the commission did not have jurisdiction under Section 5 of the act of Congress, approved Sept. 26, 1914, entitled, "An act to create a Federal Trade Commission, to define its powers and duties and for other purposes," under which the complaint was brought. Filed on March 8, 1920, the complaint, the outgrowth of claims by makers of domestic ferromanganese that importers of English ferromanganese dumped that alloy in the markets of the United States from June to December, 1919, at "substantially less" than the home market value and that the alleged practice constituted an "unfair method of competition." It was specifically under the latter charge that the complaint was made. It was the contention of Mr. Davies that the remedy, if any were required, under the act, rested with the courts which have responsibility for enforcement of the act. On the other hand, Attorney I. E. Lambert, who represented the commission, asserted that enforcement of the act rests with the commission. Because of the fact that an order of dismissal has been issued, it is assumed that the commission interprets the act to mean that it has jurisdiction, but it has been pointed out that this is not necessarily true. In any event the commission's discussion of the question of jurisdiction, it is held, would have been helpful as a guide for further proceedings of this character and afford the business interests of the country a clearer understanding of the question than they now have.

There also was a desire to learn the attitude of the commission as to the admissibility of trade paper quotations as determining evidence. This matter was the subject of considerable argument. Attorneys for the respondents contended that trade paper quotations were permissible as evidence, but not sufficient as a conclusive factor, while a contrary view as to the latter point was taken by Attorney Lambert. Examiner Averill in his tentative report made reference to the subject, when he said that "The published English home market quotations show that the usual customary rise or fall of ferromanganese is £2, and to be 'substantially less than the actual market value' there would have to be a drop certainly much greater than the customary market fluctuation." It was the opinion of the examiner that "There is no evidence that the importing and selling of ferromanganese by the respondents or their principals into the United States was done with any intent to injure the industry of manufacturing ferromanganese in the United States, and there are no facts or circumstances proved from which such intent can logically or legally be inferred."

The examiner also omitted discussion as to the question of jurisdiction, but apparently assumed the commission had jurisdiction. Interest is being shown as to whether the domestic makers of ferromanganese will now turn to the plea of the respondents regarding lack of jurisdiction and attempt to take the case to the courts, or seek to bring it before the customs officials of the Treasury Department under authority of the anti-dumping act.

The respondents in the case included Crocker Bros. and C. W. Leavitt & Co., New York, and Frank Samuel, Philadelphia. Originally the complaint included the name of Rogers, Brown & Co., but the case against them was dismissed during the hearings owing to the fact that they did not sell for the account of the principals in 1919 in the United States.

Increased Buying Power of the Pay Envelope Dollar

The larger purchasing power of every dollar in the pay envelope of 1921 as compared with 1920 has been brought before employees in various ways. None is more striking than the list of food products and household supplies which appears on a leaflet prepared by Frank J. Herman, 71 Broadway, manager of the New York office of Pilling & Co., Philadelphia. Mr. Herman is vice-president of the Austen Coal & Coke Co. No reduction in wages was made at the company's mine, but the purpose of the leaflet was to impress upon the men the fact that their wages have been steadily increasing. The comparison is given below, the prices being those prevailing at the Austen Coal & Coke Co. store:

The Purchasing Power of $30.00 During the Year 1920	
100 lb. granulated sugar	$25.00
20 lb. rice	3.00
1 bag flour, 24 lb.	2.00
	$30.00

The Purchasing Power of $30.00 During the Year 1921	
100 lb. granulated sugar	$7.50
20 lb. rice	1.60
1 bag flour, 24 lb.	1.50
10 lb. navy beans	.80
1 box toothpicks	.05
½ doz. cans best peaches, No. 3	2.10
½ doz. cans best sweet corn, No. 2	1.08
½ doz. cans large tomatoes, No. 3	1.08
1 lb. Rumford's baking powders	.35
1 pint Monarch catsup	.30
1 quart apple vinegar	.20
10 lb. loose coffee	1.50
1 bottle vanilla	.15
2 packages oats	.25
½ doz. cans pork and beans, No. 2	.90
100 cakes laundry soap	7.00
3 jars apple butter, 26 oz.	1.05
½ doz. cans milk	1.80
4 cans peas, No. 2	.72
1 box matches	.07
	$30.00

Below the tabulation is the legend, "Do you need more facts to convince you that the cost of living has been reduced in Austen?"

Will Erect Blast Furnace

SEATTLE, WASH., Nov. 12.—Investigations which tend to show that iron ore exists in commercial quantities in this State are the background for the building of a blast furnace and steel plant at Tekoa, Wash., in the eastern part of the State, according to W. C. Hayward, president of the Commerce Steel Corporation, who declares that iron ores in the vicinity of Tekoa are equal to the Lake Superior ores. Mr. Hayward explains that only hematite ores so far have been found in this territory. He announces that his corporation will start construction immediately on a 75-ton capacity furnace.

Announcement here by transcontinental traffic officials of a proposed reduction of export steel rates contingent upon the assent of Eastern originating and intermediary carriers is expected, if ratified, to increase steel exports from the Pittsburgh and Colorado districts to the Orient through the Port of Puget Sound. It is stated that the pre-war export rate of 60c. on iron and steel from Chicago and Birmingham will be restored. The rate from Pittsburgh is to be 69c. and from Minnequa, Col., 46c. A rate of $1.20 on minimum shipments of 80,000 lb. per car will be put into effect on tin plate from New York and intermediate points, this item being of particular interest to fish and fruit canners here.

Steel Corporation's Unfilled Orders Decline

Unfilled orders on the books of the United States Steel Corporation Oct. 31 were 4,286,829 tons, compared with 4,560,670 tons on Sept. 30, a decrease of 273,841 tons. This decrease compares with an increase of 28,744 tons in September, and decreases of 298,398 tons in August, 287,544 tons in July, 364,619 tons in June, 362,737 tons in May, 439,541 tons in April, 649,102 tons in March, 639,297 tons in February, and 574,958 tons in January. The unfilled tonnage a year ago was 9,836,852 tons, or 5,550,023 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	5,477,853
Feb. 28	6,933,867	9,502,081	6,010,787	5,288,443
Mar. 31	6,284,765	9,892,075	5,430,572	5,056,404
Apr. 30	5,845,224	10,359,747	4,800,865	4,741,882
May 31	5,482,487	10,940,465	4,282,310	4,337,623
June 30	5,117,868	10,978,817	4,192,855	3,918,866
July 31	4,830,324	11,118,468	5,578,661	3,883,801
Aug. 31	4,531,926	10,805,038	6,109,103	3,759,042
Sept. 30	4,560,670	10,374,804	6,284,638	3,297,905
Oct. 31	4,286,829	9,836,852	6,472,668	3,353,293
Nov. 30	.....	9,021,481	7,128,330	3,124,663
Dec. 31	.....	8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

How Disarmament Affects Steel Makers

Probable Amount of Scrap Involved—Effect on Armor-Making Capacity—Total Annual Steel Tonnage Devoted to Warship Building Almost Negligible

BY L. W. MOFFETT

WASHINGTON, Nov. 15.—Momentous as it is from a point of limitation of naval armament, the proposal of the American Government laid before the arms conference to scrap 15 capital ships now under construction for the American Navy would involve only 422,703 tons of steel, or approximately 1.25 per cent of the entire finished rolled output of the country in 1920, which totaled 32,347,860 gross tons. This, of course, is exclusive of the foundry production of steel castings.

The steel required for these 15 capital ships, consisting of nine battleships and six battle cruisers, with a total displacement of 618,000 tons, is divided in the various classes as follows:

	Net Tons
Plates	209,850
Shapes and bars	54,210
Pipes and tubes	17,469
Rivets	15,150
Castings	9,000
Forgings (guns)	6,714
Armor plate	110,310
Total	422,703

Old battleships which it is proposed to scrap number 15, with a displacement of 227,740 tons. Estimating the steel requirements on the basis of that included in 618,000 tons of displacement in the nine battleships and six battle cruisers, it would involve about 160,000 tons, making a grand total of 582,703 tons of steel in the 30 ships this Government would scrap.

No other types of war vessels having as yet been mentioned for scrapping, no calculation is made with regard to them. And the tonnage displacement of capital ships may fairly be taken to measure the relative strength of navies, as the provision for auxiliary combatant craft should sustain a reasonable relation to the capital ship tonnage allowed.

It also is not possible to give accurate figures as to the tonnages of steel represented in the ships of Great Britain and Japan which Secretary Hughes has proposed shall be scrapped. But basing them on the same terms as the American vessels, it is estimated that the 583,375 tons of British displacement it has been suggested should be scrapped, as well as that already scrapped, involves approximately 350,000 tons. This includes four Hoods, and those pre-dreadnaughts, second line battleships, and first line battleships up to but not including the King George V class, making 19 capital ships. The Japanese displacement it is proposed to scrap aggregates 448,928 tons, or about 200,000 tons of steel, on the basis of preceding calculations. The Japanese vessels include two battleships, four battle cruisers not laid down as yet, three battleships and four battle cruisers either laid down or having the material for them assembled, and ten older ships,

Steel Which Would Be Scrapped

The steel, therefore, included in the entire scrapping program, together with construction which it is proposed to abandon and not yet laid down, approximates 1,132,000 tons, divided as follows:

	Net Tons
America	582,703
Great Britain	350,000
Japan	200,000

This tonnage represents only about 3.5 per cent of the finished steel output of the United States of last year, and reflects further what a relatively small item peace time military activities are to steel production. As a matter of fact, the laying down of three capital ships per year, of the 35,000-ton size permitted by the program, would require the provision of some 85,000 tons of steel per year, which is but one-fourth of 1 per cent of our 1920 production.

From a point of armor plate, high tensile and forging steel, obviously a different situation presents itself. Naturally, armor plants are devoted exclusively to producing material for war vessels, and if the program of Secretary Hughes, or one that is anything like it, should be adopted, there would be an excess of armor making capacity in the United States. The American proposal would put Great Britain and America on a parity after the expiration of the suggested 10-year holiday, by allowing each country a maximum of 500,000 tons of capital ships. Japan would be allowed 300,000 tons. Assuming that each battleship may require 10,000 tons, and a battle cruiser 6000 tons, and placing the ratio two battleships to one battle cruiser, the 500,000 tons of displacement would call for a total of about 130,000 tons of armor for (each) the British and American navies, and about 80,000 tons for the Japanese Navy. But the annual armor replacement would be only about 5 per cent of this, or 6500, 6500 and 4000 tons, respectively. The present armor making capacity of the United States is approximately 41,000 tons annually, figuring each of the private plants at 11,000 tons and the naval plant at Charleston, W. Va., at 8000 tons. So, figuring replacement in 20 years for each capital ship, the present armor making capacity of the United States alone would be far greater than the annual requirements of all three nations. This might indicate probable scrapping of armor making capacity to a considerable degree, although such a plant necessarily is not operated continuously, and is held partially as a reserve.

Cost of Scrapping

The first cost of scrapping the American ships would be heavy, as is indicated by the statement of Secretary Hughes that, on the 15 capital ships it is proposed to scrap, already more than $330,000,000 has been spent. It would be necessary also, in cancelling contracts with steel makers and shipbuilders, to compensate them for their investments in the way of materials, organizations, etc. These contracts are subject to cancellation which, according to form, is to provide settlement "satisfactory to both parties," the Navy Department and the private manufacturer and shipbuilder.

Generally these settlements are easily made, the contractor accepting the terms of the Government often rather than go to the court of claims for what may be considered adequate compensation. Once these payments were made, however, the load on the taxpayer obviously would be greatly lightened. It is estimated

that the operating cost of the navy is between $500,000,000 and $600,000,000 annually.

Possible Salvage

There would, however, be some return, though comparatively light, in all probability, when the ships are scrapped. It is proposed that they be dismantled, and not sunk, and the material salvaged. Some of them will undoubtedly be made to serve as targets. Past experience shows that the salvage would be only an extremely small part of the original cost of the ships. The steel probably would have to be cut to size and used altogether as scrap, where it could be used at all. The greater value might lie in the extremely intricate and costly machinery, tools, etc. But once machinery is installed in a vessel, as is ordinarily the case when it is half-completed, it is difficult to salvage it in good condition.

On Nov. 1, the nine American battleships it is proposed to scrap were from 10.4 per cent to 83 per cent completed; while the six battle cruisers, which would undergo the same fate, were from 11.1 per cent to 29.4 per cent completed. Four of the battleships and two of the battle cruisers are being built at navy yards. The time of delivery of all 15 vessels is marked as indefinite. The official statement of the Bureau of Construction and Repair, Navy Department, regarding the degree of completion of the vessels, together with other facts, follows:

Battleships	Contractor	Per Cent of Completion Nov. 1, 1921 Total†	On Ship†
Colorado	New York Shipbuilding Corporation	83.0	81.6
Washington	New York Shipbuilding Corporation	69.8	63.6
West Virginia	Newport News Shipbuilding & Drydock Co.	64.0	57.3
South Dakota	New York Navy Yard	35.2	27.7
Indiana	New York Navy Yard	33.2	25.1
Montana	Mare Island Navy Yard	27.6	19.0
North Carolina	Norfolk Navy Yard	36.7	27.1
Iowa*	Newport News Shipbuilding & Drydock Co.	29.9	25.5
Massachusetts*	Bethlehem Shipbuilding Corporation (Fore River)	10.4	3.9
Battle Cruisers			
Lexington	Bethlehem Shipbuilding Corporation (Fore River)	26.7	17.8
Constellation	Newport News Shipbuilding & Drydock Co.	15.5	13.7
Saratoga	New York Shipbuilding Corporation	29.4	22.2
Ranger	Newport News Shipbuilding & Drydock Co.	2.9	1.2
Constitution	Philadelphia Navy Yard	11.7	6.8
United States	Philadelphia Navy Yard	11.1	6.2

*Contract calls for completion July 12, 1923.

†"On ship" is based on value of all materials worked into the ship, and of the labor involved; "total" includes also all other materials delivered to the yard, and the work done upon them.

Amount of Steel Scrap to Be Made Available

BY SIDNEY G. KOON

IN turning our naval swords into plowshares, along the lines laid down by Secretary Hughes' proposal before the Conference on the Limitation of Armaments, Nov. 12, a scrap problem of some magnitude is developed. Approximately 85 per cent of the rated displacement of a battleship consists of steel and iron —the latter a very minor item. In addition, there is a considerable quantity of copper and brass.

It is estimated that if the project materializes the amount of steel and iron scrap, from fifteen uncompleted battleships and battle cruisers and from twenty old battleships, will be about 600,000 gross tons. While portions of such scrap would not be marketable, at $10 per ton we should have $6,000,000 scrap value—about what a single old-type battleship cost to construct.

Some approximations had to be made in estimating below the material to be obtained from ships in the early stages of construction. Thus, with six battleships of the (new) Indiana class of 43,200 tons, and about 29 per cent completed on the average, it was assumed that one-half of the remaining material was assembled or in process of fabrication. The same assumption was made with regard to the six battle cruisers of 43,500 tons, where the average percentage of completion is only about 16. For the Colorado, Washington and West Virginia, 32,600 tons each, where the average stage of completion is 72 per cent, it is fair to assume that all of the remaining structural material and armor is in hand, more especially as two of these ships are actually afloat and the third nearly ready for launching.

With the above explanation, the figures for the probable amount of scrap are given in the accompanying table. This includes five old ships which had already been listed for sale or target practice. Those ultimately assigned to the latter fate will, of course, be removed from the list of scrap producers, unless they be sunk in shallow water, in a location where they may readily be recovered for the metal they contain.

Nothing that has been said about the scrapping of cruisers, destroyers, submarines or auxiliaries would make possible a forecast of scrap quantities.

Only two of the ships listed have fire-tube boilers —the Alabama and Wisconsin having each eight single-ended boilers, arranged in two rows of four boilers. If it be desired to preserve these boilers for any purpose, such as merchant ship use, they may readily be hoisted out after a certain amount of cutting away of the decks above. All other boilers are water-tube, of such types as permit ready dis-assembly.

Of course twelve of the ships have no boilers yet installed. Those twelve were designed for a total of 1,440,000 shaft hp., which will give some indication of the size of their boiler plants. The total heating surface provided for is 1,685,000 sq. ft., besides 162,000 sq. ft. of superheating surface. The remaining 23 ships, with 440,000 hp., have boilers aggregating 1,069,000 sq. ft. of heating surface and 21,944 sq. ft. of superheating surface.

Battleships and Battle Cruisers Proposed to Be Scrapped

Ships	Tons Displacement Unit	Tons Displacement Total	Aver. Per Cent Complete	Probable Tons Scrap
Indiana, Massachusetts, Iowa, North Carolina, Montana, South Dakota	43,200	259,200	29	142,000
Colorado, Washington, West Virginia	32,600	97,800	72	83,000
Constellation, Constitution, Lexington, Saratoga, Ranger, United States	43,500	261,000	16	129,000
Michigan, South Carolina	16,000	32,000	100	27,200
New Hampshire, Kansas, Vermont, Minnesota, Connecticut, Louisiana	16,000	96,000	100	81,600
Virginia, Rhode Island, Nebraska, Georgia, New Jersey	14,948	74,740	100	63,500
Ohio, Maine, Missouri	12,500	37,500	100	31,900
Alabama, Illinois, Wisconsin, Kentucky	11,550	46,200	100	39,300
Total 35 ships		904,440		597,500

Armor accounts for about 200,000 tons of the total displacement of the 35 ships. Of this amount, some 72,000 tons will come from the 20 completed ships. About 130,000 tons was to have been put on the 15

ships under construction, of which the 25,000 tons for the Colorado, Washington and West Virginia is mostly installed. Very little, if any, of the armor for the six big battleships and the six battle cruisers has been put in place, and only a portion of the amount has been delivered to the building yards. Hence the amount of armor entering the scrap market should be far less than 200,000 tons—perhaps 150,000 tons would cover it.

Big guns, 324 in number, account for about 24,000 tons of the displacement of the 35 ships. This is the mere weight of the gun barrels. The mounts would add 16,000 tons more. But about three-fourths of these totals represent the main batteries of the 15 unfinished ships—144 16-in. guns. There is reasonable doubt as to whether, in any event, these guns would be turned into scrap. They would be readily adaptable to coast defense service. The same remarks apply to the ammunition already accumulated for these guns, and to the multitudes of smaller guns (under 8-in. bore) not included in the figures above.

Oxyacetylene and other cutting torches, such as have been used to such effect in dismantling the guns and fortifications of Heligoland, should make it possible to handle this task with celerity. Indeed, it might well glut the scrap market, if pushed as fast as mechanical possibilities permit.

And it must be recognized that none of the ships listed could well be turned to commercial use without being cut up; the hulls are too heavily built, and lack the ready accessibility to large cargo spaces which merchant vessels require. The engines are too light for commercial purposes, and are designed for power rather than for economy in fuel consumption.

Secretary Hughes Proposes United States Do a Large Part

NEW YORK, Nov. 15.—Analysis of the capital ships to be left to Great Britain, Japan and the United States, if the armament limitation plan, as outlined Nov. 12 by Secretary Hughes takes effect, shows that the United States has gone to the length of heavily handicapping her navy. Not one of the 18 ships left to this country was designed for a speed greater than 21 knots. Fourteen of the 22 British ships were designed for speeds from 22 to 31 knots, nine of them being 25 knots or better. Nine of the ten Japanese ships have speeds of 22 to 28 knots.

In gun power much the same story must be told. Just one of the American ships carries guns of more than 14-in. caliber; thirteen of the British ships carry 15-in. guns. Not one of the British ships but has a main battery of 13½-in. guns (or larger); six of the American ships have nothing heavier than 12-in. The 12-in. gun throws a shell weighing 870 lb.; the 13½-in. gun, one of 1250 lb. The destructive effect of a shell has been stated to vary about as the square of the weight. The carrying power at long range is increased also with increasing weight.

Thus the handicap of the proposed American fleet, unable through lack of speed to force an issue, and with one-third of its ships armed with guns impotent at long range, is an outstanding feature of the proposal.

Both Britain and Japan have battle cruisers. Britain has four and Japan four. We have none. If the plan as announced were so modified as to permit us to complete four of the six battle cruisers now under construction, and then to scrap four of the ships carrying 12-in. guns, it would leave each of the three powers with a group of four battle cruisers; would remove part of our inability to send out ships of a speed sufficient to keep in touch with a fast fleet; would avoid most of our gun limitation by reducing to two ships the number carrying the 12-in. gun.

Such a modification would leave the United States and Great Britain exactly equal in number of big guns; almost precisely equal in average speed, and with a difference of slightly more than 1 per cent in tonnage displacement. Our ships would still be slightly slower, on the average, than those of Japan. The table shows both proposed arrangements.

Proposed Future Fleets of Capital Ships

Class of Ship	No.	Tons Displacement Unit	Tons Displacement Group	Guns Per Ship	Guns Group	Speed
United States						
Delaware*	4	20,900	83,650	10—12-in.	40	21 Kt.
Arkansas	2	26,000	52,000	12—12-in.	24	20.5
New York*	4	27,250	109,000	10—14-in.	40	20.75
Pennsylvania*	7	32,000	223,400	12—14-in.	84	21
Maryland	1	32,600	32,600	8—16-in.	8	21
Totals	18		500,650		196	‡20.87
Lexington	4	43,500	174,000	8—16-in.	32	33.25
Totals†	18		591,000		188	‡24.15
Great Britain						
Iron Duke*	8	24,500	196,000	10—13½-in.	80	21
Resolution	8	25,750	128,750	8—15-in.	40	22
Queen Elizabeth	5	27,500	137,500	8—15-in.	40	25
Tiger	1	28,500	28,500	8—13½-in.	8	30
Renown	2	26,500	53,000	6—15-in.	12	31
Hood	1	41,200	41,200	8—15-in.	8	31.5
Totals	22		584,950		188	‡24.25
Japan						
Settsu	1	20,800	20,800	12—12-in.	12	20.5
Fuso*	4	30,900	123,600	12—14-in.	48	22.5
Nagato	1	33,800	33,800	8—16-in.	8	24
Kongo	4	27,500	110,000	8—14-in.	32	28
Totals	10		288,200		100	‡24.63

*Ships similar, but not identical, are grouped where feasible.
†Omitting four of Delaware class.
‡Weighted average.

Benefits Would More Than Offset Tonnage Loss

YOUNGSTOWN, OHIO, Nov. 15.—Benefits which would accrue to the world from reduction of naval armament, as suggested by Secretary of State Hughes, would more than offset the tonnage loss to the steel industry, in the belief of steel makers in the Mahoning Valley.

"Such a program would have no appreciable effect on the steel industry," contends President James A. Campbell of the Youngstown Sheet & Tube Co. "The steel tonnage going into naval ship building never bulked large as compared with total production. Little steel for naval purposes was ever produced in this district.

"On the contrary, the benefits from such a policy would more than compensate for any direct loss in business. Taxes would be reduced and more money would thereby become available for commercial steel. Trade throughout the world would feel a beneficial stimulus.

"I believe that repeal of the LaFollette seaman's act, making possible operation of a merchant marine under the United States flag, would far more than offset the loss of steel for marine purposes. But for this legislation the merchant marine, now rotting in our harbors, could be profitably operated. A large merchant fleet would require much steel, likewise. We need to give more attention to legislation governing our merchant fleet and less to fears over naval armament reduction."

NATIONAL FOUNDERS' MEETING

Addresses of President and Commissioner at Opening Session Wednesday

General rather than specific references to the foundry business were made in his annual address by President William H. Barr at the National Founders' Association meeting, which opened on Wednesday morning, Nov. 16, at the Hotel Astor, New York. He devoted himself largely to the conditions which have controlled in Federal legislation respecting the tariff and taxes and to the industrial relations situation as shown by the country-wide consideration of unemployment, the threatened railroad strike and the troubles in the West Virginia coal fields. What he had to say in respect to foundry matters was in part as follows:

"It would be more or less futile to analyze the causes of present foundry conditions. The economist will go back many years to find the crude causes. The politician will have his own starting point. Many foundrymen will admit freely that, before business began to change quickly, they paid little attention to fundamental economic conditions and causes. There are some broad phases, however, which must be apparent to all. The war upset world industry and finance, and inflation was followed by chaos and maladjustment. In our country, the Government took over private business and turned it back in a frightful mess. Every fundamental law of economics was discarded by the Government and, when war was concluded, we had an indescribable situation.

"In searching for a simple explanation of the basic fault of the industrial situation both before and after the war, I can only sum it up in the two words, politics and unionism.

"On the other hand, economic laws are never suspended and, consequently, the time came when the penalty had to be paid by those who were absolutely innocent of any violation. Our industry attempted to struggle back from the paternalism of political government, carrying a burden difficult to assess. To restore that industry to normal, to make it function again and to bring back the buying confidence of the metal trades is an almost superhuman task. But we are quietly proceeding back to safe ground and to a basis where we hope economic laws will function, will be respected and obeyed.

"The hope to-day is that we are gradually purging industry of politics and unionism and the after effects of war. We are bringing to this contest the grim resolution of American business men to see the thing through, and we are mightily set upon correcting the conditions which have brought about the present situation. Let us not be too analytical as to the causes which promoted the present business conditions. Rather, let us accept the situation as it is and continue to work for normalcy. It is not an impossible fight and we possess everything that tends to make for victory. We have courage, a clean record, patriotism and the will to win."

A. E. McClintock in his annual report made a plea for putting plans into action for training workers against the time of need, as when business gets into full swing and skilled help is scarce. "I am well aware," said he, "that a foundry having no orders and shut down, or operating part time with a limited force, has a feeling of obligation, and rightly so, to give first employment to former faithful employees. Nevertheless, it is highly desirable to make definite plans for educating and training operatives who will again be needed to fill that 20 or 30 per cent of future vacancies which are responsible for a very large part of the total labor turnover. It is my firm conviction that the time to formulate plans for giving elasticity to an organization is before business starts on the upgrade, and have those plans developed to admit of expansion as the needs require."

Mr. McClintock also contended that too little thought and too little attention is given to the development within the company organization of the spirit of loyalty which should and does rank ahead of ability. "With loyalty as a foundation, ability can be taught and acquired; but with disloyalty as a base, the structure is elevated on shifting sand. It is my conviction that it is not only good business, but a duty the employer owes to his men to assist them to an understanding of plain fundamental economics."

Various reports took up most of the Wednesday morning session, special addresses were provided for on Wednesday afternoon, the annual banquet occurred on Wednesday evening, and on Thursday morning addresses were scheduled on foreman training and on foundry costs.

COMING MEETINGS

November

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

American Iron and Steel Institute. Nov. 18. Fall meeting, Commodore Hotel, New York. H. H. Cook, assistant secretary, 61 Broadway, New York.

December

Taylor Society. Dec. 1, 2 and 3. Annual meeting, Engineering Societies Building, New York. Dr. H. S. Person, managing director, 29 West Thirty-ninth Street, New York.

American Society of Mechanical Engineers. Dec. 4 to 9, inc. Annual meeting, Engineering Societies Building, New York. Calvin W. Rice, secretary, 29 West Thirty-ninth Street, New York.

MECHANICAL ENGINEERS MEET

Elimination of Waste in Industry to Feature Annual New York Meeting of A. S. M. E.

Announcing that a 5-day annual meeting will be held in New York, Dec. 5 to 9, the American Society of Mechanical Engineers has made public a statement by Herbert Hoover saying that the investigation of industrial waste recently completed by the American Engineering Council of the Federated American Engineering Societies has paved the way for an advance in American industry. The findings of this council's Committee on Elimination of Waste in Industry will form the leading topic of discussion.

Conditions in five basic industries "assayed"—to use Mr. Hoover's description—by the committee will be discussed Dec. 5. The industries include the metal trades, printing, boots and shoes, clothing and building. In the evening will come a session on education and training in the industries.

On Dec. 6 simultaneous sessions on railroads, power, and machine shop practice will be held. Speakers at the machine shop session will include Prof. John Airey, University of Michigan, who will discuss "The Art of Milling," and J. A. Smith, General Electric Co., and J. J. Callahan, Worcester, Mass., who will speak on "Waste in Machine Industry."

Sessions on management and gas power will be held in the afternoon. In the evening the presidential address will be delivered by the retiring president, Edwin S. Carman, Cleveland. Honorary memberships will then be conferred upon Henry H. Towne and N. G. Herreshoff, yacht designer and builder.

Sessions of the fuel and material handling divisions and of the student branches of the society will be held Dec. 8. In the afternoon a joint session with the Society for the Promotion of Engineering Education will be held, on "Professional Engineering Education for the Industries." Speakers will be F. C. Pratt, vice-president General Electric Co. and president Yale Engineering Society; J. E. Otterson, president Winchester Repeating Arms Co., New Haven; Dexter S. Kimball, president-elect of the society, vice-president American Engineering Council and dean of engineering at Cornell; and Prof. A. G. Christie, Johns Hopkins. On Dec. 9 sessions of the textile, ordnance and aeronautic sections will be held. The ordnance sessions will take up the recent army demonstrations at Aberdeen, Md., where the mechanical engineers co-operated.

CONTENTS

November 17, 1921

Mechanical Features of Tire Factory 1259
New Kelly-Springfield Plant Has Unusually Complete Inter-Connection of Mechanical Services—Tunnels, Piping, Wiring and Communication

Composition of Pig Iron and of Cast Iron 1267
Chemical and Structural Composition—Various Elements, Their Characteristics and Effect on the Metal—Oxygen in Iron

Magnetic Surveys of Railroad Rails 1271
Determination of Fissures Obscured by Heavy Damage from Gagging Presses—Improvements in Section and in Straightening

General Freight Reductions May Come Soon 1277
Conference of Railroad Officials in Regard to Ore Rate May Be Followed by Action as to All Raw Materials

How Disarmament Affects Steel Makers 1279
Probable Amount of Scrap Involved—Effect on Armor-Making Capacity—Annual Steel Tonnage Devoted to Warships Almost Negligible

Athol Machine Co. Readjusts Line..... 1265
Powdered Coal Preparing Machine..... 1266
Improved Shore Scleroscope..... 1266
Ferromanganese Supplies 1270
Steel Treaters' Meetings..... 1273
New York Electrochemists' Meeting..... 1273
Labor Notes 1273
October Construction Work..... 1273
Welded Tubing Manufacture..... 1274
Electricity in Britain and America..... 1276
Plant Operations 1276
Increased Buying Power of Dollar..... 1278
Steel Corporation's Unfilled Orders..... 1278
National Founders' Meeting..... 1282
Coming Meetings 1282
Mechanical Engineers' Meeting..... 1282
Editorials 1284
Reduced Armament a Fact—Naval Armament and Steel Output—Where the Steel Is Going—Fear of Foreign Competition.
British October Production..... 1286
Correspondence 1287
Increasing Production—Alloy Steel for Bridges.
Steel Shipment by Boat..... 1287
Tonnage Wages Reduced..... 1287
Taxpayers Granted Extension..... 1287
Molding Sand 1288
Fabricated Steel Business..... 1288
Foreign Trade Conditions.....1289, 1303, 1304
Ore Users Invited to Freight Hearing... 1295
Steel Jobbers to Meet at Washington.... 1299
Iron and Steel Imports of Great Britain. 1303
Engineering Meetings in December..... 1304
Foundrymen 1922 Convention..... 1304
American Iron and Steel Institute Meeting 1305
Mineral Industry to Co-operate with Hoover 1305
Campaign for Greater Use of Tin Plate.. 1307
Industrial Finances 1317
Plans of New Companies..... 1317

Iron and Steel Markets..... 1290
Comparison of Prices..... 1291
Prices Finished Iron and Steel, f. o. b. Pittsburgh..... 1306
Non-Ferrous Metal Markets..... 1307
Personal Notes 1308
Obituary Notes 1308
Machinery Markets and News of the Works..... 1309
New York Jobbers' Prices..... 1318

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Reduced Armament a Fact

Not in nineteen centuries has the world heard a more heartening message than went out from Washington on Nov. 12. The proposal of the United States for the scrapping of many of its battleships and for a 10-year holiday at navy yards is not only epoch-making; it has in it larger possibilities for the welfare of men than are contained in any state document in history. As the Washington conference is the greatest of international conferences, this paper of Secretary Hughes is the greatest utterance from such a council.

The response to the proposal has been little less a marvel than the proposal itself. At no time since the war have the American people been so nearly of one mind on any question of public policy. Variance and ill feeling, as exhibited most recently in the railroad dispute, have been so common that agreement on any matter of large import has seemed impossible. The advance comment on the armament conference showed that fear of divided counsels was in the minds of many, even though hope of a good outcome was the dominant note. But the electrical announcement of what the United States is willing to do to lift the burdens of armament from the people's backs, has united the nation in the confidence that the first day of the conference has virtually settled what will be its final decision.

This view need not be set down as unthinking optimism or as an enthusiastic reaction to a daring program. The world was not nearly so sick of war on the day of the armistice as it is to-day after three years of actual living with the problems left by the four worst years in history. The American people have come up to the Washington meeting with the conviction that if the three great sea powers allowed this opportunity to pass without definite action for the limitation of armament, they virtually would be telling the world that it is powerless to save itself from what Andrew Carnegie called "the most ferocious and yet the most futile folly of man." The main reason, therefore, for believing that the conference will do substantially what has been put before it to do is that this thing or something like it must be done if civilization is to be saved.

The response from Great Britain and Japan, which of necessity can only be expressed to-day in general terms, strengthens the belief that the conference will not disappoint the expectations of the President. There is the question of employment on naval work under way at home and abroad. It is a consideration of great importance and of many difficulties. But the way will be found and the price will be paid, because what is paid in compensation for all such losses will be far outbalanced by what is gained in stopping the waste of warships. The economic consequences of the peace of Versailles have been discussed for two and a half years in the aspect of Europe's well-nigh hopeless struggle against bankruptcy. The events of Saturday require that the economist's survey shall now deal largely with the forces set in motion at Washington that are to save the European world from bankruptcy.

Naval Armament and Steel Output

Greatly exaggerated is the common estimate of the steel industry's activities that are dependent on naval armament. In the writing that has been done in magazines and in the daily press on the effort to reduce the burdens of the nation's war establishment it is quite usual to put steel manufacturers in the list of those whose selfish interest makes them natural advocates of large appropriations for war purposes. For example, a New York paper had this in its Washington correspondence dealing with the remarkable developments of Saturday:

> Another blow was struck by Mr. Hughes at progressives and radicals of both political parties who have been whispering that the four American delegates were made to order to carry out the mandate of the Steel Trust. According to their predictions, there would be no chance of real limitation of naval programs because the steel interests make most of their money out of armor plate.

How small a fraction of the steel output of the country goes into naval armament is shown in the

analysis of the American proposals given in our Washington correspondence on other pages. It will be seen from this careful computation that 30 ships the United States would scrap, under the Hughes program, required for their construction 582,703 net tons of steel of all descriptions, including armor plate, plates, shapes, bars, pipe, rivets, forgings and castings. The finished steel output of the country in 1920 was 32,347,860 gross tons. Thus all the steel represented in the 30 vessels that are to be cut off is but 1.60 per cent of the country's production last year.

To build these 30 warships would be a matter of seven or eight years if all the eight yards in the country capable of building such vessels were to concentrate upon the work. In other words, the steel required for a year's naval program, in terms of tonnage, is only a fraction of 1 per cent of the output of American steel works. The three companies owning armor plate plants have a combined annual capacity of 33,000 gross tons, which with the Government plant at Charleston, W. Va., capacity 8000 tons, gives a total capacity in armor plate of 41,000 tons per year. No such amount of armor plate has ever been produced in a single year. The largest proposal ever made by the Government at one time was for 45,583 tons—the requirements of four battleships and four battle cruisers, which would probably be three years in building.

These figures are cited, not to minimize the contribution of naval construction to the steel industry. Plant requirements are not inconsiderable and many thousands of men are given work in the shops of the steel and shipbuilding companies which contract to do naval work. But the statement of the actual facts concerning the contribution made to the steel industry by the Government's naval programs serves to put in their true light the reckless assertions as to the steel trade's interest in continuing naval programs on the present scale.

The Government's outlay for the Charleston armor plate plant was probably $10,000,000 to $11,000,000. The existing private plants, built on a much lower scale of values, therefore represent but a small percentage of their total capital.

The American steel industry has been built up on the pursuits of peace. Its prosperity is a prosperity of peace. Its leaders have declared themselves as wholeheartedly in favor of President Harding's plans for the limitation of armament, relieving the American people of the fearful wastes and burdens of war expenditure. Viewed purely from the standpoint of self-interest and the largest expansion of their industry, they recognize that the constructive forces that will be released by the American proposals will mean far more in the end to steel works capital and labor than all that has ever come to them from the budgets of war.

New low records have been made in the manganese-iron alloy output of the country in recent months. An analysis of the ferromanganese and spiegeleisen production for the year to date, elsewhere in this issue, shows that no spiegeleisen has been made since July and that the ferromanganese production has declined to less than 4000 tons per month. The low point in the latter was 1509 tons in July. The slump in this industry has been more severe than that in pig iron or steel, with no recovery yet manifested. The analysis also shows that imports of British ferromanganese do not occupy the important position they once had. They have amounted to only 734 tons per month to Oct. 1, this year, whereas in 1920 they were over 4900 tons, and in 1913 over 10,500 tons per month. In the latter year British makers supplied one-half the amount consumed by American steel makers; to-day, probably less than one-fifth. Although production of ferromanganese is now considerably below the theoretical needs of the industry, due probably to the large stocks carried over from 1920, the ability to meet these needs is but latent. This was demonstrated by the remarkable outputs during the war. Liquidation in prices has been quite thorough, for the present selling price of about $60 compares with $250 to $300 during the war and with about $40 in 1914.

Where the Steel Is Going

The rate of steel ingot production in October was substantially the same as the average for the calendar year 1906. Production last month was at the rate of approximately 23,000,000 tons per annum, while the output in 1906 was 22,624,431 tons. The coincidence makes it easy to observe the great difference in the character of steel demand. Assuming that production last month was in harmony with consumption, the consumption now is totally different from that in 1906. That year stood out prominently among the years in the steel industry. It was one of the few calendar years in which there was an insistent and sustained demand. No subsequent calendar year until 1916 showed full operation of existing steel producing capacity throughout, and few preceding years had shown fully sustained production.

In 1906 there was produced 3,977,872 tons of steel rails, while rail production lately has been very light. New railroad construction in 1906 was 5623 miles, a greater length than has been laid in any year since, while there was also much laying of secondary track. There was produced 2,531,552 tons of steel plates and 2,114,053 tons of steel shapes, a large part of the demand being for the building of railroad cars. The *Railway Age* reported cars built in the United States and Canada in 1906, the Canadian output being relatively small, at 240,503 freight cars and 3167 passenger cars, while the output of locomotives was 6952. The production of rolling stock has been very light lately.

Thus railroad consumption of steel in 1906 was much larger than the consumption at the present time. The same observation can be made as to consumption of steel in factory, skyscraper and bridge construction. These lines of steel consumption have been quite inactive of late.

Very roughly speaking, the lines of steel consumption just mentioned absorbed between 40 and 50 per cent of the total steel produced in 1906,

while the same lines are now absorbing only 10 to 20 per cent at the outside of the steel production, the total steel output being substantially the same. By difference, the lines of consumption that used 50 or 60 per cent of the 1906 tonnage now absorb 80 or 90 per cent, i.e., they have increased by one-half or more. The arithmetical comparison is necessarily inexact, but it is illuminating. We are comparing 1906, when business conditions were extremely favorable, with the present time, when in most quarters it is felt that business in general is decidedly poor.

The lines which are more active now than in 1906, balancing the decrease in railroad consumption and building construction generally, include such items as pipe, sheets, wire nails and tin plate. These commodities have come into more widespread use, so that when business is relatively dull the consumption is greater than 15 years ago. Even the consumption per capita is evidently greater in most lines, for population has increased only 23 or 24 per cent since 1906.

It is no new experience, of course, for demand for certain classes of steel to fall off more than demand for other classes. The phenomenon has been exhibited more or less in all spells of slack employment for the steel industry, but the disparity is particularly marked at this time. It is obvious, therefore, that demand for steel has plenty of natural room for improvement. There is requisite not so much a large increase in the general volume of business in the country as a swing towards the lines of activity that absorb large tonnages of steel, including in particular railroad rehabilitation and development and large investment construction undertakings. The ordinary everyday consumption of steel is at a pace that is not half bad.

Fear of Foreign Competition

Since the change in our foreign trade relations due to the war those who have been trying to spread the doctrine that if we can hope to export goods we must count upon importing goods have had uphill work. The argument is that we do not want to sell goods unless we are paid for the goods, and there is no medium in which payment can be made except goods. Investments in foreign countries would do, but as a rule foreign investments do not appeal to Americans. The individual, however, is thinking of his own position, not of the position of the nation. He thinks of selling, not of buying. He has his particular goods to sell and is afraid of competition in his own market. He buys such a variety of goods that he takes no great interest in that matter. The individual cannot be severely criticised for his attitude is a very natural one.

To a great many men "merchandise imports" and "foreign competition" are practically synonymous and interchangeable terms. They would like to see imports restricted, for fear that in the imports there might be some goods which would compete with the goods they produce and wish to sell. The fact that in the assortments of goods imported there might be some which they would be glad to buy does not impress them. The testimony of the bare facts, however, does not support the idea of merchandise imports and foreign competition being in general synonymous terms. The facts, available in the form of statistics of our foreign trade, are not often consulted for verification or disproval of this idea. Below is given a presentation which should throw some light on the subject. It is constructed from the record of our merchandise imports and exports last September. The presentation ignores all countries with which we did not do a business, in either exports or imports, of a million dollars or more, except that since Africa does not furnish a single division with which we did such an amount of business the continent is taken as a whole. The point is to separate the countries with which we did more export than import business from those countries with which we did more import than export business. The first part of the table names the former countries, the second part the latter. In the first part the imports from the country are taken at 100, so that the preponderance of exports is shown. In the second part the exports to the country are taken at 100 and thus the preponderance of imports is shown. Thus last September we imported $3,025,130 from Belgium and exported to Belgium $12,769,770, or 323 per cent more, hence Belgium gets an index number of 423. Similarly, in the second table, to Switzerland we exported $605,880 and from Switzerland we imported $3,119,421, or 415 per cent more, hence Switzerland gets an index number of 515.

Proportionate Excess of Exports

Belgium	423	Scotland	151
Denmark	603	Ireland	147
Finland	364	Canada	232
France	159	Panama	340
Germany	547	Mexico	170
Italy	181	Cuba	106
Netherlands	280	Argentina	184
Norway	247	Australia	640
Spain	266	New Zealand	245
Sweden	169	Hong Kong	228
Turkey in Europe	910	Africa	216
England	383		

Proportionate Excess of Imports

Switzerland	515	British India	184
Dominican Republic	127	Straits Settlements	773
Brazil	119	Other British East Indies	730
Chile	452	Dutch East Indies	262
Colombia	251	Japan	116
China	108	Philippine Islands	125

Total imports were $179,282,568, total exports being $325,773,521, so that on the basis of imports at 100 exports were 182.

According to one conception not infrequently encountered, the countries we should be afraid of are the countries which export more to us than we export to them. If so, the second part of the above table contains a list of the countries we should be afraid of, while the countries given in the first part are harmless.

British Pig Iron and Steel Output in October

(*By Cable*)

LONDON, ENGLAND, Nov. 14.

The production of pig iron in Great Britain in October was 235,500 gross tons and that of steel ingots and castings, 405,400 tons. These compare with an output of 158,300 tons of pig iron and 429,300 tons of steel in September and with 93,600 tons of pig iron and 432,600 tons of steel in August. The average monthly output of pig iron in 1920 was 667,300 tons and of steel ingots and castings 754,700 tons.

CORRESPONDENCE

Increasing Production

To the Editor: The two letters discussing time study, which appear in the Oct. 13 issue of THE IRON AGE, contain much food for thought.

As Mr. Fitz states "to decrease manufacturing costs labor must be encouraged." The employer must go one step further, however, than setting standards which will enable the employee to earn his $10 in 8 hr. He must, with other employers, present a solid front against those outsiders whose mission in life is to form organizations the object of which is either to abolish the system which permits the workman to earn according to his ability or to compel the employer to pay the same wage to less efficient workers.

I am afraid that Mr. Blank's faith in the stop watch will never become widespread, as most operatives are convinced that it is a pace maker only. Furthermore, the stop watch demonstrates only that operations can be performed within a certain time limit and does not show the individual worker just what it is that keeps him from meeting the limit set.

It would appear that moving picture machines will have to be produced cheaply and small enough to be easily operated at close range in the machine shop. Thus the slower workman can be shown, by watching the reproduction, just how he can improve his handling of material or tools and eventually equal his more skillful colleague. This being a method which the workman cannot dispute, he supplying the evidence, and which aims at removing the cause, it will eliminate the stop watch as increased production will naturally result if the obstacles thereto are removed.

H. D. MURPHY.

Medford Hillside, Mass.
Nov. 10.

Alloy Steel for Bridges

To the Editor: Should reference not have been made in an editorial in THE IRON AGE, Nov. 3, to the use of nickel steel in the Quebec bridge? The employment of this material in the bridge enabled it to be constructed in a much lighter form and probably had much to do with the success of the last attempt to erect it. The same material was also used in the St. Louis municipal bridge over the Mississippi, in the Kansas City viaduct and bridge over the Missouri, and for the emergency dam, locks and spillway of the Panama Canal. It has been estimated that for bridges and similar structural work the saving in weight from the use of nickel steel amounts to from 10 to 30 per cent and in cost to 12 per cent.

STEEL.

Toronto, Canada, Nov. 12.

Steel Shipments by Boat

ST. LOUIS, Nov. 15.—Bringing between 500 and 600 tons of nails and barbed wire, the towboat Transporter of the Water Transport Co. reached St. Louis last Friday, completing the first water movement of freight from Pittsburgh to St. Louis in many years, and is now on her way back. The boat made the trip in 12 days. The return trip will be empty, no St. Louis freight having been found. However, the boat will continue to carry freight to St. Louis in the hope that a return business eventually will be upbuilded. The next sailing from Pittsburgh will be Sunday.

The Transporter left Pittsburgh with seven barges loaded with steel products. One was dropped at Huntington, W. Va., two at Louisville, three at Evansville, the seventh coming to St. Louis.

A meeting on industrial management problems is to be held at the rooms of the Providence Engineering Society, Providence, R. I., on the evening of Dec. 6 at which L. J. Young, manager efficiency and standards department, Sayles Finishing Plants, will deliver the leading address.

Tonnage Wages Reduced

Tonnage rates of sheet mill workers operating under the sliding scale of the Amalgamated Association of Iron, Steel and Tin Workers, will be reduced 8 per cent for the November-December period from the rates paid in September and October, as a result of the bimonthly settlement conducted Nov. 10 at Youngstown, Ohio.

Examination of sales sheets submitted by mid-Western independent makers affiliated with the Western Sheet and Tin Plate Manufacturers' Association revealed an average selling price of 2.75c. per lb., on shipments of Nos. 26, 27 and 28 gage black sheets during the previous 60 days. This is a decline from 3.10c., the average disclosed two months before. Under the new rates, employees of union sheet mills will still be 18 per cent above base. Their peak tonnage rates reached 109½ per cent above base.

Tin plate was unchanged at $5 per base box and rates of affected workers will thereby continue without change. Inasmuch as tin plate is now moving at $4.75, workers in tin plate mills will suffer a proportionate reduction in tonnage rates at the next settlement.

The examination, the last for 1921, was conducted by James H. Nutt of Youngstown, acting for the manufacturers, and M. F. Tighe, president of the Amalgamated Association, representing the employees.

Standard Bolt Co. Purchased

The Standard Bolt Corporation of Delaware has purchased the plant and property of the Standard Bolt Co., Columbus, Ohio. The new company has an authorized capital stock of $2,500,000 preferred stock and 25,000 shares of no par common stock. J. C. Burns, who has been the vice-president and general manager of the Standard Bolt Co. since its organization, will be the president and general manager of the new company. The other officers will be Harley E. Burns, vice-president and secretary, and Robert R. Vance, treasurer. The plant will be operated as heretofore and the change, while an actual purchase of the plant, is in reality practically an inside change whereby the controlling interest passes to J. C. Burns and Harley E. Burns. The new company expects to make changes and extensions in several of the departments of the business as soon as general business conditions in the country have advanced to a point to justify it.

Will Promote Foreign Trade

The Novo Engine Co., Lansing, Mich., has announced that the Associated Machinery Corporation has been organized in conjunction with three other noncompeting companies for the purpose of promoting foreign trade. The other companies are the Pawling & Harnischfeger Co., Milwaukee, the Insley Mfg. Co. Indianapolis, and the Chain Belt Co., Milwaukee. These concerns have a growing trade in India, Ceylon and Burmah. The officers of the new company are: Henry Harnischfeger, president; Clarence E. Bement, of the Novo company, vice-president; and Clifford E. Messenger, secretary-treasurer. Lionel R. Vinall-Moon is the managing director in India and Charles L. Langlotz is manager of the New York office.

Taxpayers Granted Extension

WASHINGTON, Nov. 15.—The Commissioner of Internal Revenue has just issued a decision extending from Nov. 24 to Jan. 15, the time in which taxpayers may file amended returns in preparation of income and profits tax for 1917 and subsequent years where they have used appreciated or inflated values in determining the amount of invested capital. Acting upon the Supreme Court decision in Labelle Iron Works case, the Treasury Department had required on Aug. 26 that such returns be made within 90 days or by Nov. 24. The extension of time was allowed by the new decision because many taxpayers were unable to complete returns in the time proposed.

MOLDING SAND

Conservatism Discussed at Chicago—Joint Committee Will Investigate

The disposal of old molding sand is often one of the most serious problems confronting a foundry. Where space is not available for dumping, the removal of used sand often involves considerable expense. In some cases this difficulty has been overcome by reclaiming the sand and using it again in molds. Successful reclamation, however, demands careful study of the physical properties of the sand, the added elements and the process required to make it suitable for reuse and other considerations. Investigations by H. M. Lane in the Detroit district indicated what might be accomplished both by washing and dry cleaning old sand, while research by H. B. Hanley and R. F. Harrington in the East showed results which might be achieved by adding clay or a new sand with an unusually heavy bond to provide the bond for used molding sand. In general, however, the methods employed in using molding sand and selecting the sand to be used have been of a haphazard character. Foundries which have gone to the trouble of making analyses of the sand they use, have found wide variations both in the physical and chemical properties of material coming from the same pits.

Joint Committee Formed

Believing that much can be gained by investigating the subject of molding sand with the end in view of arriving at standard methods of testing molding sand and classifying it into grades according to its bond, refractory qualities, permeability, fineness, etc., a joint committee of the American Foundrymen's Association and the engineering division the National Research Council has been formed.

To sound out the sentiment of the foundry industry on the work which has been undertaken and to secure the maximum of co-operative effort, a series of meetings will be held at which the subject will be presented to local foundrymen's associations. The first of these was a meeting of the Chicago Foundrymen's Club at Chicago on Nov. 12, which was addressed by R. E. Kennedy, assistant secretary of the American Foundrymen's Association and also secretary of the joint committee of that body and the engineering division of the National Research Council. Thus far comprehensive bibliographies of literature on molding sand as well as refractories have been prepared and the committee now finds itself in a position where it believes it desirable to ascertain how far the foundry trade would desire the investigation to go and to what extent it will actively co-operate in supplying data covering practical experience in the use and reclamation of molding sand. Mr. Kennedy pointed out that the State of Illinois was ready to make a survey of the sands of the State but could not proceed because there are no standard tests for sands and no recognized methods of grading them. Physical analysis, he asserted, was more important than ascertaining the chemical properties of molding sand, as sands with same chemical analysis would give widely different results in molding work. He described some of the physical tests used but pointed out that there are differences of opinion as to their value. The matter of keeping costs of sand used for molding is alone worthy of consideration—something which has been too often ignored by foundries.

Mechanical Preparation

Mechanical preparation of molding sand, the speaker said, had been developed intensively by the Germans with the result that they produce castings with better surface than the English who have much better grades of sand to work with. Intelligent mixing of old and new sands, or clay, offers an opportunity for economy as well as for a better product. Sands containing the same proportion of clay may have different properties because in the one case the clay is plastic and in the other it is not. In England sand is available which contains considerable iron hydroxide which increases its bonding characteristics and to this sand is attributed the superior finish on the British steel castings. Investigation which would result in ascertaining how to prepare a synthetic molding sand containing same desirable qualities would be invaluable. Much is to be gained by finding out the proper amount of water to add to molding sand. Certain research shows that the addition of four per cent water to a certain molding sand gives the best results; yet a sand may hold much more moisture than the amount at which it is best for use and test of the sands used by the best molders indicate wide variations in moisture content owing to their dependence on the sense of touch to determine the proper degree of wetness.

Further Improvement in Fabricated Steel

The October volume of contracting in fabricated structural steel work totaled 97,800 tons, according to the records collected by George E. Gifford, secretary Bridge Builders' and Structural Society, New York, or the largest amount since May, 1920. February marked the low point in the period since then. For that month the amount of business taken by the bridge and structural shops of the country did not correspond to over 14 per cent of capacity. For the next three months the average rate of contracting was about 30 per cent of shop capacity. The succeeding three months brought the percentage average to 35, and then in September bookings represented 48 per cent and the October figures about 54 per cent.

How lean a year 1921 is for the fabricating trade may be indicated by noting that for the first ten months of the leanest year of the last decade, 1913, the total volume of business was about 911,000 tons, while for the ten months of 1921 the total is less than 587,000 tons.

Dismantling Sharon Plant

Work has been started on the dismantling of the Sharon, Pa., plant of the Carnegie Steel Co., originally built by Sharon capital in 1896 and subsequently acquired by the Carnegie company. The bar mill machinery will be stored, although equipment of the other units will be scrapped. Buildings housing the machinery will be leveled. All open-hearth stock will be utilized at the Farrell works of the company nearby. The blast furnace at the Sharon plant will be started as soon as the pig iron market improves and operated until materials on hand are consumed, when it will be scrapped, according to present plans. The Carnegie company has been acquiring substantial land holdings at New Castle, Pa., within recent years and according to reports plans erection of a by-product coke plant to serve furnaces at Youngstown and New Castle.

At the annual meeting of the stockholders of the Carbon Steel Co. on Nov. 14 the following directors were unanimously re-elected: Charles McKnight, D. R. Wilson, C. F. Blue, Jr., W. D. Uptegraff, J. Ramsey Speer, A. L. Humphrey and F. C. Neale. Later the directors elected the following officers: Charles McKnight, president; D. R. Wilson, vice-president and treasurer; C. F. Blue, Jr., vice-president and general sales agent; W. W. Noble, secretary and assistant general sales agent; H. C. Fetzer, assistant treasurer.

The Iron & Ore Corporation of America, 11 Broadway, exporter and importer of ore, ferroalloys and semi-finished material, and William H. Muller & Co., 44 Beaver Street, New York, importers of foreign ores, have removed to the nineteenth floor of the Bowling Green Building, 11 Broadway, which the two companies are occupying jointly. There has been no change in the personnel of the companies.

The National Tube Co. is blowing in this week another blast furnace of its McKeesport, Pa., group, making three active at that plant.

AUSTRIA PARALLELS GERMANY

Heavy Buying Empties Warehouses—Exports Decrease—Foreign Customs Rates Responsible

(*Special Correspondence*)

VIENNA, AUSTRIA, Oct. 24.—The heavy buying which began in Germany several weeks ago has spread to Austrian markets with the result that warehouses have disposed of most of their stocks. There is now a real scarcity of material; the Alpine works is in arrears with deliveries caused by a temporary breakdown and shipments from Germany are moving slowly. Terms of delivery stipulated by the smaller mills average 10 weeks. The trend of prices is parallel to the developments in the German market. Compared with the August price of 3000 kronen per 100 kg. for bar iron, the Alpine works is now quoting 5000 kronen and Czecho-Slovakian works advanced pig iron prices by 40 kronen to 240 kronen some time ago.

The present buying activity is largely speculative, however, and cannot be regarded as a reliable sign of improved industrial conditions. Export business has lately decreased despite further deterioration of the currency, compelling works to concentrate their attention on the domestic market for the present. Decline in exports is held to be the result of the prohibitive customs rates introduced by the border countries. A movement is now under way to have the government invest in industry on a larger scale with a view to finding employment for the various branches of industry. Investments are particularly needed in railroads where government orders have been confined to limited quantities of machine tools and other material. Rolling stock is in need of replacement and no orders for rails and track supplies have been awarded for some time past. Repair work in the State-owned shops is progressing slowly but bids by private interests for locomotive repairs have not been considered as yet. The condition of the railroads is bad but it is difficult to see how and where the State will procure the required capital for a thorough reorganization.

Magnesite Exports

Magnesite exports during the first six months of 1921 were 40,000 tons compared with a total of 62,530 tons shipped in 1920. The corresponding figures for ore exports are 65,870 tons in the first half of 1921 and 126,854 tons in 1920. Other export figures for the first half of 1921 are: Metal ware, 3150 tons; machinery, 24,300 tons; electrical supplies, 3145 tons.

There is little activity in private building but co-operative building societies have been established, in the formation of which the iron industry is taking an active part, as instanced by the Bleckmann steel works. The primary object of these enterprises is the erection of workmen's dwellings at industrial centers and it is hoped that the attendant demand for building materials will revive the building market.

The Wöllersdorf plant, the largest State-owned munition works during the war, with the co-operation of Dutch capital, an international banking institute at Amsterdam and a new Austrian joint stock company, formed by a Dutch-German consortium, will be taken over and incorporated with 1,500,000,000 kronen capital. Locomotives will figure prominently in the production of the company and the plant will probably be extended by the addition of a steel works and foundries.

Business done at the first Vienna International Fair was on the whole satisfactory. Special machinery, such as drilling machines, shoe factory equipment, scales, household machinery, etc., were most in demand. Luxuries were rather neglected, shown by the insignificant turnover in expensive passenger cars but substantial deals were closed with American buyers of precious metal ware. Motor trucks, cutlery, kitchen utensils, hardware and other utility goods sold well.

CZECHO-SLOVAKIA IMPROVES

With Price Bottom Reached, Japanese, Chinese and Russian Orders for Bars, Rails and Sheets Are Booked

(*Special Correspondence*)

PRAGUE, CZECHO-SLOVAKIA, Oct. 22.—The continuous downward trend of the iron and steel market has apparently come to a halt but the situation is still far from improved. Coke has been reduced to 72 kronen per 100 kg. but this advantage may soon be offset by higher coal prices. The financial position of industry is unsatisfactory. Not only does the government owe large sums to the iron works but payments to rolling stock manufacturers and other customers of the iron and steel industry are slow, compelling the latter to extend considerable credit.

Practically all works are carrying large stocks, and are anxious to book orders to continue operation. It is doubtlessly because of this that some business has latterly been booked which would otherwise have gone to Belgian or German mills, Czecho-Slovakian producers being at present in a position to effect prompt shipments.

During the first half of October, the joint sales bureau of the Amalgamated Iron Works at Prague has been awarded orders amounting to several thousand carloads of iron bars, rails and sheets for shipment to Japan, China, the British colonies and Russia through the agency of German export firms. The margin of profit is stated to be very narrow. Recently the Soviet government placed an order for light plates totaling 6,000,000 kronen, of which 1,000,000 kronen have been paid as a first instalment. Several hundred carloads of rolled products have also been ordered by Germany for domestic consumption because of the inability of German mills to deliver. Germany has also placed orders for steel river craft required in the reconstruction of the Elbe River fleet, of which a certain percentage was surrendered to Czecho-Slovakia. The cost of one vessel, which is to have a capacity of 600 tons, will be about 1,250,000 kronen.

Further French Industrial Control

A feature in the engineering industry is the combination of the Skoda works and the United Machine Works Co. at Smichow. The Skoda works sold its machine shops during the war to the United Machine Works Co., which operated the Ringhoffer, Bromovsky and Ruston works. As the Schneider-Creusot interests in France is the largest shareholder in the Skoda works, the biggest Czecho-Slovakian engineering company is now controlled by French capital. The closer connection with the machine industry has evidently been effected with a view to pushing export business. The Skoda works has added new lines of production to their post-bellum program and are now manufacturing railroad material and rolling stock; spare parts for mining and smelting machinery, rolls, gearwheels, tires, carwheel sets, axles, etc.

Machinery not produced within the country is extended special customs facilities by a law in force Aug. 12. Reduction of rates or exemption from duty is provided for on machinery, tools, machine parts, plant equipment, new or used, if required in building up new industries or in the introduction of new manufacturing methods or in any other exceptional cases. The law will remain in force until 1923.

The R. E. Kidder Co., 35 Harmon Street, woodworking machinery, automobile parts and envelope-cutting presses, and the Taylor Brass Foundry, 288 Grove Street, Worcester, Mass., are to consolidate as the Taylor-Brown Mfg. Co., a new Massachusetts corporation, with a capital of $100,000. William H. Brown is president and general manager of the new company, and Walter B. Taylor, vice-president and treasurer. The new company, for the time being, will carry on the business at the two respective plants, but eventually will unite both under one roof.

Iron and Steel Markets

A CONSTRUCTIVE FORCE

The Steel Trade Favorable to Reduced Armament

Car Buying the Chief Factor in an Otherwise Quiet Market

Considered purely from the standpoint of ultimate benefit to the industry, the disarmament program has made a favorable appeal to manufacturers of steel in a week of general quietness. Naval construction calls for far less steel than is commonly thought—in tonnage only a fraction of 1 per cent of a year's output. It is true that the forge and machine shops of the three private armor plate and ordnance plants employ some thousands of men and that their communities would suffer for a time, as would various shipyards. But ultimately the steel industry as a whole would profit by the large release of labor and of tax money for merchant shipbuilding and other purposes of peace.

Features of the week having a direct bearing on the iron and steel market have been a slowing down of buying and an easing off in prices, with some reduction in mill operations. The remaining six weeks of the year, it is evident, will make a better showing in mill output than in new business put on the books.

Car work is still the most promising factor in the new buying. The Santa Fe has placed 2500 cars and the Illinois Central 1000. The latter is expected to close for an additional 3000 this week and to put out inquiries for 1000 more. The Alabama, Tennessee & Northern has closed for 300 and the Rio Grande for 700. The Burlington program calls for 7300 freight cars, 127 passenger cars and 55 locomotives. The Seaboard is inquiring for 400 cars and the Lackawanna for 500.

About 120,000 tons of steel will go to Chicago district mills for the cars just placed and under inquiry. Repair contracts let and pending cover 2400 cars.

The weakening of prices noticed this month represents the effort of the mills to keep up the operating rate of late October, a concession of $1 or $2 per ton being more than made up by the lower cost of fuller schedules.

The sheet mills' bi-monthly settlement with the workers confirms repeated reports of low prices, the average for September and October being 2.75c. for No. 28 black.

While there is little early shipment business in tin plates, some good orders have been taken for delivery in the early months of 1922, pointing to larger winter operations than in four years.

From a booking rate of 14 per cent of capacity in February, the fabricating trade has improved until for October new business went to 54 per cent of capacity. The three months following February averaged about 30 per cent and the succeeding three months about 35 per cent, with September at 48 per cent. The leanness of 1921 appears from the 587,000 tons contracted for in ten months against 911,000 tons for the corresponding ten months of 1913, the lightest year in fabricated steel work in the last decade.

Pipe orders are more satisfactory in point of volume than of price. Line pipe business in particular has developed weakness. A pending contract is for 183 miles of 8-in. pipe for the Humphrey field.

While demand for cast iron pipe has dropped off with the approach of winter, it is still considerable. Some makers have advanced from $3 to $4 the differential between 6-in. and 4-in. pipe.

The selling by a leading Southern merchant company of several thousand tons of pig iron on a basis of $18, Birmingham, has put the market down to that point, a decline of $1. Most of that sold was iron which melters had not taken on contract. A Buffalo radiator company bought 4000 tons of foundry iron and a Wisconsin melter has placed 6000 tons of foundry and charcoal grades. At Pittsburgh, foundry and malleable irons have declined 50c. and basic shows a tendency toward weakness.

In the warehouse trade reductions of $2 to $3 per ton have been made lately on various products, in recognition of the trend of mill prices.

The list of freight reductions grows. Rates on zinc and lead from the Mississippi River to the Atlantic seaboard are to be lowered from 49c. to about 35c. per 100 lb., effective around Dec. 10.

THE IRON AGE composite for finished steel, now at 2.113c. per lb., is 25 per cent above the average for the ten years before the war. The pig iron composite price has shaded off to $19.81 per ton. Unlike the price of steel, which has been gradually descending since July, 1920, the pig iron composite reached a minimum in the middle of August at $18.51, but rose again to $20.10 in September, with a subsequent downward change of only 29 cents in the seven weeks.

Pittsburgh

PITTSBURGH, Nov. 15.

The iron and steel industry takes a hopeful view of the naval construction policy proposed by Secretary of State Hughes, at the disarmament conference in Washington, but finds little to be cheerful about with regard to current business and current prices. The trade takes quite the opposite view to that of Wall Street on the effect of the disarmament proposals on the demand for steel. With the nations of the world cutting off expenditures for military purposes, it is held that taxation burdens will be lightened and industry will go forward in peaceful lines with much more vigor than otherwise would be possible. Naval construction calls for very much less steel than is popularly supposed, and it is a well-established fact that the manufacture of armor plate is not highly profitable.

The present condition of the iron and steel market is one of quietness, generally, tapering demands and steel plant operations, and weakening prices. In the reaction in operations, the Steel Corporation seems to be suffering less than the independents. The American Sheet & Tin Plate Co. has its steel works at Vandergrift, Pa., running full, and last week finishing mill operations averaged close to 80 per cent in sheet mills

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 15, 1921	Nov. 8, 1921	Oct. 18, 1921	Nov. 16, 1920
No. 2X, Philadelphia‡	$22.84	$22.84	$22.40	$44.79
No. 2, Valley furnace†	*20.50*	21.00	21.00	39.00
No. 2, Southern, Cin'ti†	22.50	23.50	23.50	42.50
No. 2, Birmingham, Ala.†	*18.00*	19.00	19.00	38.00
No. 2 foundry, Chicago*	21.00	21.00	21.00	40.00
Basic, del'd, eastern Pa.	20.50	20.50	20.50	41.16
Basic, Valley furnace	19.00	19.00	19.25	37.50
Bessemer, Pittsburgh	21.96	21.96	21.96	41.96
Malleable, Chicago*	21.00	21.00	21.00	40.50
Malleable, Valley	*20.00*	20.50	20.50	40.00
Gray forge, Pittsburgh	21.96	21.96	21.96	39.96
L. S. charcoal, Chicago	31.50	31.50	31.50	53.50
Ferromanganese, del'd	60.00	60.00	60.00	140.00

Rails, Billets, Etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$47.00	$57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	50.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	50.00
O.-h. sheet bars, P'gh.	30.00	30.00	30.00	60.00
Forging billets, base, P'gh.	35.00	35.00	35.00	60.00
O.-h. billets, Phila.	34.74	34.74	35.74	55.74
Wire rods, Pittsburgh	40.00	40.00	40.00	70.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.60	1.60	1.60	3.25
Light rails at mill	*1.55*	1.65	1.70	3.00

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	4.60
Iron bars, Chicago	*1.65*	1.75	1.75	3.75
Steel bars, Pittsburgh	1.50	1.50	1.50	3.00
Steel bars, Chicago	1.75	1.75	1.75	3.38
Steel bars, New York	1.80	1.80	1.88	3.38
Tank plates, Pittsburgh	1.50	1.50	1.60	2.85
Tank plates, Chicago	1.75	1.75	1.75	3.23
Tank plates, New York	1.88	1.88	1.98	3.38
Beams, Pittsburgh	1.50	1.50	1.60	3.00
Beams, Chicago	1.75	1.75	1.75	2.83
Beams, New York	1.88	1.88	1.98	3.38
Steel hoops, Pittsburgh	2.25	2.25	2.25	4.00

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Nov. 15, 1921 Cents	Nov. 8, 1921 Cents	Oct. 18, 1921 Cents	Nov. 16, 1920 Cents
Sheets, black, No. 28, P'gh.	*2.75*	2.90	3.00	6.00
Sheets, galv., No. 28, P'gh.	*3.75*	3.90	4.00	7.25
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.25	4.75
Wire nails, Pittsburgh	2.90	2.90	2.90	4.25
Plain wire, Pittsburgh	2.60	2.60	2.60	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.55	*4.45*
Tin plate, 100-lb. box, P'gh.	$4.75	$4.75	$5.00	$7.50

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$17.00*	$16.00	$16.50	$33.00
Carwheels, Philadelphia	*17.00*	17.50	17.00	38.00
Heavy steel scrap, P'gh.	14.50	14.50	14.50	23.00
Heavy steel scrap, Phila.	12.00	12.00	12.00	19.00
Heavy steel scrap, Ch'go	12.00	12.00	12.00	18.50
No. 1 cast, Pittsburgh	17.50	17.50	17.50	35.00
No. 1 cast, Philadelphia	17.50	17.50	17.50	34.00
No. 1 cast, Ch'go (net ton)	13.75	13.75	14.00	22.00
No. 1 RR. wrot, Phila.	16.50	16.50	16.00	24.50
No. 1 RR. wrot, Ch'go (net)	12.50	12.50	13.00	16.50

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.00	$3.00	$3.25	$8.00
Foundry coke, prompt	4.25	4.25	4.25	9.00

Non-Ferrous Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.25	13.25	13.00	14.75
Electrolytic copper, N. Y.	*13.00*	12.75	12.75	14.75
Zinc, St. Louis	*4.72½*	4.75	4.60	6.35
Zinc, New York	*5.22½*	5.25	5.10	6.80
Lead, St. Louis	*4.35*	4.40	4.40	6.37½
Lead, New York	4.70	4.70	4.70	6.50
Tin, New York	*28.50*	28.62½	28.50	37.00
Antimony (Asiatic), N. Y.	*4.65*	4.75	4.85	6.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 15, 1921, Finished Steel, 2.113c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel.

Nov. 8, 1921,	2.134c.
Oct. 18, 1921,	2.221c.
Nov. 16, 1920,	3.653c.
10-year pre-war average,	1.684c.

Composite Price, Nov. 15, 1921, Pig Iron, $19.81 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 8, 1921,	$19.97
Oct. 18, 1921,	20.03
Nov. 16, 1920,	39.22
10-year pre-war average,	15.72

and approximately 60 per cent in tin plate. The American Steel & Wire Co. has nine of its 13 open-hearth furnaces at Donora, Pa., in operation, and two of the four blast furnaces in this district making iron. The Carnegie Steel Co. is averaging about 35 to 40 per cent operation of ingot capacity, and has 21 blast furnaces in operation. The National Tube Co. has put on a blast furnace at its McKeesport, Pa., works, bringing the number of active stacks at that plant to three. Altogether 47 furnaces of the 140 merchant and steel works stacks in this and nearby districts now are making iron, and the Steel Corporation subsidiaries account for 26 of the total. A Pittsburgh district independent, which recently was operating at a 50 per cent rate in its open-hearth department, this week is idle in that portion of its plant, while we note a loss of three active open-hearth furnaces by a Youngstown steel company, the active units of which have dropped from nine to six. Independent operations, taking in blast furnaces, steel works and finishing mills, are in the neighborhood of 40 per cent of capacity. The week has brought a definitely lower market in foundry iron, a sale of a fair-sized lot of No. 2 plain to a sanitary ware manufacturing company having been made at $20.50, Valley furnace, as compared with a former nominal quotation of $21. The trend of prices of the steel-making grades is down, but there has not been enough interest to establish the new prices. The scrap market also has a weaker tendency and the fuel market is largely a buyers' affair. Weakness of a most pronounced sort still is noted in the heavy products, it being reported that beams have sold at 1.50c., Buffalo, by a Buffalo mill, while 3/16-in. plates have sold at 1.50c., Pittsburgh, from a mill which has a freight to absorb of 18c. per 100 lb. The going market on steel bars is not quotable at above 1.50c., except for retail lots. The week has developed definite quotations of 2.75c. on black sheets, and 3.75c. on galvanized sheets, a recession of $5 per ton from the stabilized level of early September, and $10 a ton from the prices one or two mills attempted to obtain about a month ago. The Steel Corporation is meeting competition on light rails which now are not quotable at higher than 1.65c, base.

Pig Iron.—Prices are slipping, and only the appearance of a sizable inquiry is necessary to establish the truth of this assertion. One steel maker is offering basic iron at $19, Valley furnace, and most of the others, who hitherto have not been interested at less than $20, now are open to offers of less. A considerable tonnage of resale iron, basic grade, is being offered through brokers who, if unable to obtain more, are allowed to dispose of this iron at $18.50, Valley furnace. There is much mystery as to the location of a lot of iron, amounting to about 20,000 tons, but the common belief is that it is an accumulation of one of the railroad equipment companies outside the Valley district which apparently has no need for the iron or figures on being able to replace it later at $18.50 or less. There have been no sales and consequently we still quote the market at $19, Valley furnace, the basis of the last previous transaction. Bessemer iron is firmly pegged at $20, Valley furnace, and a few carloads have been

moved at that figure. On foundry iron $20.50, Valley furnace, has been reached on a fair-sized tonnage purchased by a sanitary manufacturing company, this same interest having also purchased 500 tons of No. 2 iron at $18, Birmingham, the iron to go to its Southern plant. Some makers still are quoting $21, Valley furnace, for No. 2 iron, but only carload lots, and few of those, have been moved at that figure.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	20.00

Ferroalloys.—Demand is purely hand-to-mouth with few individual inquiries of more than a carload. Consumers of 50 per cent ferrosilicon are generally covered against their requirements for the remainder of the year and about the only business passing is the specifying against options secured a few weeks ago carrying a price of about $57 delivered. A few carloads of Bessemer ferrosilicon are wanted. Interest in ferromanganese is small. Both domestic and English makers are quoting 80 per cent material at $58.35, Atlantic seaboard, or slightly below $65 delivered this district, but consumers still insist that they do not have to go that high to secure supplies. No business recently has been done in spiegeleisen in this district. Production of this alloy has been nil for several months, but supplies still are available at about $30 delivered for 20 per cent material. Makers have found liquidations of their stocks difficult owing to a light demand.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $65 delivered; 78 to 82 per cent foreign ferromanganese, $53.28 to $58.35, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $55 to $57, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—There is an easier tendency to prices, this being evident upon the appearance of sizable inquiries. The New York Central Railroad recently was able to develop a price of $32 on forging billets as against the recent asking price of $35. We note some carload sales of forging billets at the latter price, but evidently less is asked against fair-sized tonnages. The common asking price on rerolling billets is $30, but only small lots are bringing that price and $28 to $29, Pittsburgh or Youngstown, appears to be a fair appraisal of what could be done on sizable lots. Open market activities in sheet bars are limited, but the Steel Corporation is reported to be lining up some of its regular business from tin plate makers which it has served for some time past. On such business as has recently been done there is no basis for a higher price than $30.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $28 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Consumers are making very few purchases and specifications against contracts are not as heavy as could be desired. Some makers still are asking $41 for No. 5 soft rods, but $40 is as high as any recent business has been done by makers in this district. Prices are given on page 1306.

Wire Products.—The expected advance by the American Steel & Wire Co. has not yet materialized and since the response to the drive for business was disappointing, there is some question as to whether any advance now will be made. Contracts made with jobbers early in September expire today, and probably will be renewed around the old price bases of $2.50 for plain wire and $2.75 for nails or at prices at time of shipment. Observance of the Sept. 12 prices of $2.60 for wire and $2.90 for nails have not been at all rigid and it is noted that a Pittsburgh independent as recently as last week quoted $2.75 on nails against a small inquiry from the New York Central Railroad. The chief hindrance to an advance at this time is the fact that few jobbers or manufacturers have specified fully against their September commitments, and cancellation is unlikely on the part of the buyers because of low prices or on the part of manufacturers because of the desire for business.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Structural Material.—A fair number of awards of fabricated steel still are being made, but none of those recently taken by Pittsburgh shops reach 1000 tons. The McClintic-Marshall Co. has taken 700 tons for a seven-story addition to the building of the Frick & Lindsey Co., Pittsburgh, North Side; 336 tons for the Military Avenue subway, Detroit; 170 tons for an addition to the grand stand of the Washington American League baseball team, Washington; 300 tons of miscellaneous steel for the Tin Plate Co. of India at Jamshedpur, India, and four 100-ft. deck plate girder spans for the Big Four Railroad for erection at Worthington, Ind., about 364 tons being involved. The Memphis Steel Construction Co. has taken 250 tons for a theater in Braddock, Pa., for the Braddock Theater Co. The Lackawanna Bridge Co. was low bidder for the Perry Street and Louisiana Street viaducts, Buffalo. These viaducts will take 2000 tons of steel. Attractive tonnages of structural beams are increasingly easy to place at 1.50c., Pittsburgh, and some makers are quoting that price at mills. On small tonnages the market is quotable at 1.55c. to 1.60c. Prices are given on page 1306.

Plates.—Buyers are experiencing little or no difficulty in covering their requirements at 1.50c. and any higher price refers to retail tonnages. The principal demand is from the tank builders, who lately have been getting a good many orders, especially from the Mexica field in Texas. The Riter-Conley Co. recently took 40 55,000-barrel tanks from various oil fields. About 6500 tons of plates will be used on these tanks, but the company already has covered on a considerable portion of the required tonnage. The Memphis Steel Construction Co. has taken a small tank for the New England Oil Refining Co. for which about 100 tons of plates will be required. The Pure Oil Co. recently placed nine 55,000-barrel tanks with a Columbus, Ohio, builder. The Republic Iron & Steel Co. put on its plate mill this week, after several weeks' idleness, but the purpose is to roll wide skelp for large outside diameter pipe.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.65c. f.o.b. Pittsburgh.

Steel Rails.—The old base of 1.75c. on light rails has disappeared, as the Steel Corporation no longer is quoting this price and now is accepting business at 1.65c. Independents also are quoting 1.65c. base, but have not let orders carrying $1 to $2 per ton less get away. Rails rolled from old standard sections no longer are quotable at higher than 1.55c. Demand on the whole is light, even for this time of year.

We quote 25 to 45-lb. sections, rolled from new steel, 1.55c. to 1.65c. base; rolled from old rails, 1.50c. to 1.55c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—The market on merchant bars now is quotable at 1.60c., Pittsburgh, for small lots, and 1.50c. for tonnages which will provide a rolling schedule. The Steel Corporation does not admit having abandoned 1.65c., base, but it is well established that it is meeting competition rather than suffer the loss of customers, and its competitors, with few exceptions, will go to 1.50c. on desirable business. The same range applies to reinforcing bars rolled from new billets, and this means that mills rolling these bars from old rails must go below 1.50c. to secure business. Makers of iron bars still are quoting 2.15c. to 2.25c. base for carloads, but firm offers of 2c. are getting consideration.

We quote steel bars rolled from billets at 1.50c. to 1.60c.; reinforcing bars, rolled from billets, 1.50c. to 1.60c. base; reinforcing bars, rolled from old rails, 1.45c. to 1.50c.; refined iron bars, 2c. to 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Iron and Steel Pipe.—There is a fairly satisfactory business in steel pipe, as far as volume is concerned, but so keen is the competition for orders and prices so

low, that the orders usually are not gratifying. Price cutting on line pipe is as severe as it has been at any time recently and the Pure Oil Co., which is in the market for 183 miles of 8-in. pipe for the Humphreys field, is expected to get it at a very low price. While quotations are being cut on line pipe, there recently has been some effort to get prices up on oil well goods, and some jobbers who have been quoting 10 per cent off on mill shipments and 5 per cent off on shipments out of stock, are attempting to restore the old discount of 5 per cent on mill shipments and list on shipments out of stock. On merchant pipe an additional 2½ per cent on top of the regular supplementary discount of one, five and 2½ has been fairly common. There is a little better observance of card discounts on the part of makers of wrought iron pipe than is true of the makers of steel pipe. Discounts are given on page 1306.

Sheets.—Demand is on a tapering scale with almost all makers, and the effort of some mills to keep running has resulted in even larger concessions in price than recently. Some makers have gone as low as 2.75c. base for black sheets and 3.75c. base for galvanized sheets, and apparently not much business has been done at higher than 2.75c. base for black sheets, because the bi-monthly settlement between the independent mills and the Amalgamated Association of Iron, Steel and Tin Workers disclosed an average price for September and October of 2.75c. If there was some business at the advance made early in September to 3c. for black sheets, it is evident there must have been some shipments carrying a price of 2.50c. to have produced an average of 2.75c. The more common belief is that little or no business was booked at 3c. and that all mills affected made shipments largely on order at 2.75c. Prices are given on page 1306.

Tin Plate.—Manufacturers are finding business calling for early shipment exceedingly limited, but report gratifying success in getting orders and specifications for the early part of 1922 delivery, and it is confidently believed that the mills will be more fully engaged during the winter months than before in several years, and also that the container manufacturers will have anticipated their shipments to a point where a congestion of rush orders next summer will be avoided. All makers are quoting $4.75 per base box for production plate for delivery immediately or after Jan. 1. Shading of this price is unlikely because it is well below cost of most makers.

We quote standard production coke tin plate at $4.75 per base box f.o.b. Pittsburgh for carload lots.

Cold-finished Steel Bars and Shafting.—Demand is somewhat better diversified, but still lacks volume. There are signs that some consumers have liquidated their stocks pretty well, but this hardly is applicable to the automotive industry which, as a whole, still is rather heavily stocked and indeed, is providing some competition for manufacturers by selling some of the surplus supplies. One division of the General Motors Co., which is overstocked, has written down the value to the equivalent of 2c., Pittsburgh, and is supplying some of the other divisions of that company at that price. Makers regard the market as 2.15c. to 2.25c. base, Pittsburgh, and are not disposed to shade these prices on the ground that they are unable to buy hot-rolled bars for cold finishing at less than 1.60c. Pittsburgh.

Hoops and Bands.—Makers here find business excessively dull. Few new demands are coming out and specifications against business taken by makers prior to the recent $5 per ton advance, to 2.25c. base, are light.

Hot-Rolled and Cold-Rolled Strips.—Recent improvement in specifications has not been maintained in either kind of material. Business, indeed, again is very quiet, and the common expectation is that it will remain slack until the end of the year. The official quotations are 2.25c. base, Pittsburgh, on hot-rolled strips, and 4c., base on cold-rolled, but only a very small fraction of the business on makers' books carries these prices.

Nuts, Bolts and Rivets.—There is little or no improvement in the demand and makers here still find it necessary to forget quoted discounts and prices to secure even small orders. Prices and discounts are given on page 1306.

Coke and Coal.—The market in furnace coke here is positively the most limited that the trade has experienced in a long time. Most of the larger oven operators are confining production strictly to contract requirements, and this production is ample for present demand. Those operators who put on producing capacity without having orders or consuming connections find there is almost no market for their coke, and have considered themselves fortunate in being able to make sales at $3 per net ton oven. On new production the market is quotable at $3.25. The contract market is indefinite because none of the blast furnace interests in this district yet is figuring on future requirements. The market is quiet in foundry coke, one prominent producer recently having put out 50 ovens in an effort to bring production and requirements closer together. The market is still quotable on standard grade at $4.25 to $4.50 per net ton oven, for standard coke, but extra choice brands occasionally fetch $4.75, but loaded cars are not readily disposed of above $4. The coal market is dull and weak, with non-union steam coal available at $1.50, for mine run grade; by-product at $1.75, while gas coal, being chiefly from union fields, is quoted at $3.40 for mine run and about $2.65 to $2.75 for lump.

Spikes.—The Illinois Central Railroad recently closed for 2000 kegs of standard spikes, and the Erie Railroad for 3000 kegs, the business going to a Pittsburgh maker at $2.25 base, per 100 lb. On large lots, the market is not quotable at above $2.25 base, per 100 lb., but makers are endeavoring to obtain $1 to $2 per ton more for less than carloads. Some weakness also is apparent in small spikes, which have sold as low as $2.40 base, per 100 lb. and are fetching more only in small lots. Prices are given on page 1306.

Old Material.—The market in the open-hearth grades is largely sustained by the purchases of one or two companies and it is admitted that should either or both withdraw from the market, lower prices would instantly ensue. The market lacks breadth and by the same token is lacking in strength. High prices still are being paid the railroads and other producers, but not by the consumers, who have rather fixed ideas as to prices and are disinclined to go above them. The prices being paid by dealers cannot be regarded as the market for the reason that only in rare instances are consumers meeting the dealers' prices. Rerolling rails recently offered by the Pennsylvania Railroad sold as high as $17 delivered, Newark, Ohio, but this price was paid by a dealer and not by the consumer at that point. The recent premium of about $1 per ton over heavy melting steel on rolled steel wheels and railroad knuckles, couplers and springs, lately has not been easy to obtain. A dealer recently paid $27 for iron car axles to complete a short contract. Foundries in this district are less fully employed than recently and are more sparing buyers of old material.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.50 to $15.00
No. 1 cast cupola size	17.50 to 18.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.00 to 16.50
Compressed sheet steel	12.00 to 12.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	11.00 to 11.50
Railroad knuckles and couplers	15.00 to 15.50
Railroad coil and leaf springs	15.00 to 15.50
Low phosphorus standard bloom and billet ends	20.00 to 21.00
Low phosphorus plates and other grades	17.50 to 18.50
Railroad malleable	13.50 to 14.00
Iron car axles	26.00 to 27.00
Locomotive axles, steel	24.00 to 25.00
Steel car axles	16.50 to 17.00
Cast iron wheels	16.00 to 16.50
Rolled steel wheels	15.00 to 15.50
Machine shop turnings	10.00 to 10.50
Sheet bar crop ends	14.50 to 15.00
Heavy steel axle turnings	12.50 to 13.00
Short shoveling turnings	11.00 to 11.50
Heavy breakable cast	15.00 to 15.50
Stove plate	13.00 to 13.50
Cast iron borings	10.50 to 11.00
No. 1 railroad wrought	12.00 to 12.50

Chicago

CHICAGO, Nov. 15.

Weakness pervades the iron and steel market. With the exception of wire products, cast-iron pipe and standard section rails, no material is on a stable price basis. Pig iron has been sold at as low as $20 base furnace. Plates, shapes and bars are moving in some instances at concessions varying from $1 to $3 a ton below asking prices. Sheets are weaker and are being offered at $2 under the previously ruling market. Prices on certain track materials show signs of softness. Bolts and nuts have grown no firmer. The entire situation is in a confused and nebulous state and it will perhaps take a week or two for it to clarify. Mills have been forced to add to their already heavy losses because of their desire to retain the gains in operations thus far achieved. With the accumulation of orders, however, they are expected to take a firmer stand in an effort to prevent further additions to the red figures on their ledgers.

The principal source of encouragement not only to the mills and furnaces but to foundries and a large group of manufacturers of equipment and appliances is to be found in the railroad car buying which is under way. Orders for new cars placed within the past week and fresh inquiries promise to put more than 120,000 tons of steel on the books of Western mills. Considerable additional steel will be bought for car repair work, which shows no signs of abatement.

Mill operations have improved, the Illinois Steel Co. being on a 50 per cent basis, while the Inland Steel Co. is averaging over 40 per cent.

Pig Iron.—The initial Iroquois furnace to be blown in is now producing iron and a Mayville stack is scheduled to go in the near future. While buying is still irregular and cautious, it is steadily eating up the reserves on furnace yards with the result that increased production has been found necessary. It cannot yet be said that the demand is other than light, but the situation appears to be headed in the right direction. The release of large orders for cars by the railroads is expected to bring tonnage to melters in this district. One car builder in this vicinity is reported to have bought 2000 tons of foundry within the past week. Notwithstanding the increased consumption in prospect, the market shows signs of weakness. The ruling price for foundry, basic and malleable still appears to be $21 base, furnace, but some concessions up to $1 a ton have been made. The largest orders reported for some time were recently placed by the Allis-Chalmers Mfg. Co., Milwaukee. This company bought 6000 tons of foundry, 2000 tons of charcoal and 500 tons of silvery for first half delivery. The foundry is reported to have been placed at $21 delivered, while the silvery, which was 7 per cent resale, is said to have brought $31 delivered. Another Wisconsin melter bought 150 tons of resale Southern high phosphorus. A local steel melter purchased 200 tons of copper free low phosphorus at $38, delivered. A cast iron car wheel manufacturer is inquiring for 800 tons of foundry for first quarter shipment to two of its Western plants. A Milwaukee melter wants 1700 tons of Southern foundry for first half delivery.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b., furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50 to $33.50
Northern coke, No. 1, sil. 2.25 to 2.75	21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00
Northern high phos	21.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	21.00
Basic	21.00
Low phos., Birmingham	32.00
Low phos., Eastern furnace, sil. 1 to 2 per cent copper free	34.00
Silvery, sil. 8 per cent	34.82

Ferroalloys.—The market is inactive.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Railroad Equipment.—The Atchison, Topeka & Santa Fe has equally divided an order for 2500 refrigerator cars between the American Car & Foundry Co. and the Haskell & Barker Car Co. The Illinois Central has bought 650 refrigerator cars from the General American Car Co., and 350 refrigerator cars from the Haskell & Barker Car Co. Directors of the Chicago, Burlington & Quincy and its subsidiary, the Colorado & Southern have authorized the purchase of $15,000,000 worth of new rolling stock, including 7300 freight cars, 55 heavy freight and passenger locomotives, and 127 all-steel passenger cars. Directors of the Chicago & Northwestern also announce that between $5,000,000 and $10,000,000 will be expended to replenish rolling stock. Inquiries by the Burlington call for 2500 box cars, 3000 general service cars, 500 stock cars, 1300 refrigerator cars, and 127 passenger service cars. The passenger equipment includes 12 dining, five chair, 12 baggage, 22 mail, 19 mail and baggage cars, 54 coaches, two combination coach and chair cars and one combination coach and baggage car. The Illinois Central is expected to close to-morrow on 2000 gondola cars and 500 Hart convertible cars. In addition it has an inquiry out for 500 46-ft. gondola cars and is preparing to ask for tenders on 500 flat cars. The Missouri, Kansas & Texas is expected to place orders next week for 30 coaches and 10 baggage cars and is also in the market for 32 underframes for 30-ton box cars. The Burlington has let repairs on 600 all-steel 50-ton gondola cars, dividing the order equally between the Western Steel Car & Foundry Co. and the General American Car Co. The Chicago & Alton has awarded repairs on 200 gondola cars to the Mount Vernon Car Mfg. Co. The Missouri Pacific is inquiring for repairs on 1000 30-ton box cars and the American Refrigerator Transit Co. wants steel underframe reinforcements for 100 refrigerator cars. The Chicago Great Western is asking for repairs on 100 refrigerator cars and 150 National dump cars, and the Belt Railway of Chicago is inquiring for repairs on 250 to 300 National dump cars. The Erie has let repairs on 100 composite gondola cars with the Standard Tank Car Corporation.

Cast Iron Pipe.—Makers have advanced their differentials $1 a ton. Four-in. water pipe, which formerly was quoted at $3 above the base price of 6 in. and larger, now takes an extra of $4 and the same is true of Class A and gas pipe. Base prices also appear to be firmer, the minimum going quotation being $34, base Birmingham. Although buying is falling off, as is to be expected at this season, it is still of encouraging proportions. Purchases by private gas companies have brought round tonnages to the pipe shops of late, and some good-sized municipal lettings are reported. The tonnage booked by pipe makers thus far this year compares favorably with that taken during the entire previous year. Lettings include:

Parsons, Kan., 2000 tons, to American Cast Iron Pipe Co.

Summit County, Akron, Ohio, 500 tons, to National Cast Iron Pipe Co.

Fairfield, Iowa, 275 tons, to American Cast Iron Pipe Co.

Loup City, Neb., 200 tons, to National Cast Iron Pipe Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $47.10 to $48.10; 6-in. and above, $43.10 to $44.10; class A and gas pipe, $4 extra.

Bolts and Nuts.—No improvement in demand is to be noted and discounts still lack stability. For mill prices, see finished iron and steel, f.o.b., Pittsburgh, page 1306.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ⅞ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to ⅞ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4.00 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—Plain material is weak and in some instances concessions of from $1 to $3 a ton below the minimum quotation named below have been made. The principal source of tonnage is from car builders, as structural lettings have fallen off. The Pittsburgh-Des Moines Steel Co. will fabricate 232 tons for the Lincoln High School, Des Moines, Iowa. The Kansas City Bridge Co., Kansas City, Mo., has the

general contract for repairs to the Wabash Railroad bridge, Attica, Ind., involving 340 tons, but the fabricating work has not been sublet. The Virginia Bridge & Iron Co. is low bidder on 400 tons for the Hunt Building, Tulsa, Okla. Bids have been taken on 1000 tons for a Masonic Temple, San Antonio, Tex. On Nov. 24 figures will be taken on 2050 tons for a building for the National Biscuit Co., Buffalo. Action will be taken on a bascule bridge at Green Bay, Wis., requiring 700 tons, about the first of the year, and bids on the general contract for a bascule bridge at Sheboygan, Wis., will be received Nov. 21 by Klug & Smith, engineers, Milwaukee.

The mill quotation on plain material ranges from 1.75c. to 1.85c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Bars.—Demand is light and prices are soft. Owing to the confused state of the market, it is impossible to put one's finger on a ruling price. A few sales, however, have been made at as low as 1.65c., local mill, for mild steel bars, and a $1 per ton less than that is also reported to have been named recently. In view of the increased losses accruing from each additional concession made, a reaction in the direction of greater firmness on the part of the mills is looked for by some observers. The largest reinforcing job in immediate prospect is the Grant Park stadium, Chicago, requiring 3000 tons on which bids will be taken Nov. 25. The Concrete Steel Co. will furnish 200 tons for the Lincoln High School, Des Moines, Iowa, and the Paul J. Kalman Co. will supply 200 tons for the South Park Bank, Chicago. H. H. Hall, contractor, has awarded 200 tons to the Laclede Steel Co. for State highway work in Jefferson and Washington counties, Ill., and still has 600 tons to buy. The B. K. Gibson Co., Chicago, will receive bids early next month on an eight-story reinforced concrete hotel at Grand Rapids, Mich., to cost $1,000,000. Bar iron business is light and prices have dropped to 1.65c., Chicago. Demand for hard steel bars shows no change for the better and the ruling market has declined to 1.65c., Chicago.

Mill prices are: Mild steel bars, 1.65c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.65c., mill or Chicago. Jobbers quote 2.68c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.10c. base. Hoops and bands, 3.28c.

Wire Products.—This market is relatively the most active in the iron and steel field; yet it is not so flourishing as some weeks ago. A reaction in cotton has had a depressing effect on business in the South and it is conceded that low grain prices impede buying in the Western agricultural communities. On the other hand, railroad purchases appear to be gaining in volume, one Northwestern line having recently placed an order for 1700 kegs of nails. An early advance in prices does not appear to be imminent. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1306.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Warehouse Prices.—Local warehouses have announced reductions on plates, structural shapes, bars, hoops and bands, rivets, bolts and nuts. Plates and shapes have been marked down from $2.88 to $2.78 per 100 lb., a reduction of $2 a ton. Mild steel bars have been reduced from $2.78 per 100 lb. to $2.68, a cut of $2 a ton. The quotation on hoops and bands has been changed from $3.48 per 100 lb. to $3.28, a reduction of $4 a ton. Cold rolled steel bars and shafting have been reduced $6 a ton, the new quotation on rounds being $3.55 per 100 lb. The revised quotations on rivets, bolts and nuts are shown in the bolt and nut paragraph. In addition to the changes in base prices noted above, the extra for 3/16-in. plates has been reduced from 18½ to 17½c. per 100 lb.

Plates.—Price shading is on the increaes, but with more and more railroad car business making its appearance, it is felt in some quarters that further changes in the market situation will be in the direction of stability. Orders and inquiries for new cars which have developed in the West during the past week will put more than 125,000 tons of steel on mill books. In addition, considerable tonnage will be accounted for by the placing of cars which have been pending for some time, such as those inquired for by the Illinois Central. Car repair work is still being undertaken on a large scale and will also result in large orders for steel.

The ruling mill quotations range from 1.70c. to 1.85c. Chicago. Jobbers quote 2.78c. for plates out of stock.

Sheets.—The market has weakened and concessions of $2 a ton have been rather commonly made on both galvanized and black. It is reported that as low as 3.75c. and 2.75c., base Pittsburgh, respectively have been named on some business.

Mill quotations are 2.90c. to 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.90c. to 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.
Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Rails and Track Supplies.—Further rail specifications in moderate tonnages are being received from day to day and it seems probable that the local mill will continue to produce at the present rate—about half of capacity—throughout the remainder of the year. Releases against contracts for spikes, bolts and angle bars are also more numerous. Standard spikes are weaker and do not appear to be moving at a higher price than 2.25c., Pittsburgh. Three thousands kegs bought by the Illinois Central were placed at slightly less than that figure.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.
Standard railroad spikes, 2.25c., Pittsburgh; track bolts with square nuts, 3.30c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Old Material.—Cast iron car wheels have advanced as a result of a fair-sized purchase by a railroad car builder. There has also been moderate buying of open-hearth grades by a local steel mill. With these two exceptions, the market has been quiet and practically devoid of consumptive demand. A few grades have advanced in anticipation of buying by foundries serving car builders and there have been a number of declines, but on the whole market prices show little change. No railroad offerings are reported.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$17.00 to $17.50
Relaying rails	25.00 to 30.00
Car wheels	17.00 to 17.50
Steel rails, rerolling	14.00 to 14.50
Steel rails, less than 3 ft.	13.75 to 14.25
Heavy melting steel	12.50 to 13.00
Frogs, switches and guards cut apart	12.50 to 13.00
Shoveling steel	12.00 to 12.50
Low phos. heavy melting steel	15.50 to 16.00
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.50 to 9.00
Axle turnings	9.00 to 9.50

Per Net Ton

Iron angles and splice bars	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Iron arch bars and transoms	15.50 to 16.00
Iron car axles	20.50 to 21.00
Steel car axles	14.50 to 15.00
No. 1 busheling	9.50 to 10.00
No. 2 busheling	6.25 to 6.75
Cut forge	11.00 to 11.50
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	12.50 to 13.00
No. 2 railroad wrought	11.50 to 12.00
Steel knuckles and couplers	13.00 to 13.50
Coil springs	14.00 to 14.50
No. 1 machinery cast	13.75 to 14.25
No. 1 railroad cast	13.50 to 14.00
Low phos. punchings	12.00 to 12.50
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	4.50 to 5.00
Cast borings	6.50 to 7.00
Stove plate	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	11.75 to 12.25
Railroad malleable	13.50 to 14.00
Agricultural malleable	13.50 to 14.00

Ore Users Invited

The traffic executive committee, Eastern territory, has invited shippers and users of iron ore to attend the hearing at its office, 143 Liberty Street, New York, Thursday, Nov. 17, at 2 p. m., with a view to determining iron ore freight rates after Jan. 1, until which time the 28 per cent reduction recently put into effect remains in force. The situation is explained in full in a letter from Washington, published in this issue.

New York

NEW YORK, Nov. 15.

Pig Iron.—Dullness continues and is generally attributed to the expectation of buyers that freight rates will be lower and that there will be a corresponding reduction in pig iron prices. In some foundries, particularly those connected with the manufacture of printing presses and textile machinery, there is much activity and shipments have shown an increase in some directions. On the other hand, a number of foundries have reduced their melt within the last week or two. Southern iron weakness has been emphasized by the action of one large company which, having sold large tonnages at prices as high as $40, has been unable to effect deliveries on a considerable part of the amount sold, and is selling the iron at $18 Birmingham, charging the difference between that price and the selling price to the customers. Prices on eastern Pennsylvania iron are being well maintained.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	23.02
Buffalo, sil. 1.75 to 2.25	25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16

Ferroalloys.—No inquiry for ferromanganese is noted and the market is nominal at prevailing quotations. It is reported that the leading steel producer of the country recently sold 1200 tons. There are inquiries for a few carload lots of spiegeleisen but otherwise the market is devoid of interest. One seller of manganese ore has a cargo of about 1000 tons on which he has been unable to obtain an offer. The 50 per cent ferrosilicon market is moderately active at prevailing quotations, and it is understood that the seller which was offering material at concessions is no longer active. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $61.00
Ferromanganese, British, seaboard, per ton.	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$58.00 to $60.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	10c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.50 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Warehouse Business.—Transactions in this district continue in about the same groove. Some warehouses believe that November will show a slight increase over the previous month, but in general business shows no change. The leading warehouse interest, the foremost independent and most of the other warehouses have revised their price schedules in accordance with the prices now being quoted by mills. The quotations are based on a 38c. per 100 lb. freight rate from Pittsburgh and a spread of 65c. per 100 lb. from the mill price. Mild steel bars are now quoted at 2.68c. per lb.; structural material, 2.78c. per lb. and steel plates at 2.78c. per lb., representing a reduction of 10c. per 100 lb. Hoops have been reduced from 3.88c. to 3.53c. per lb. and bands from 3.43c. to 3.28c. per lb. All these prices are f.o.b. warehouse or delivered in the Metropolitan district. Charcoal tin plate is down 50c. per box and primes and wasters, 75c. per box. Dealers in brass and copper report no change, business continuing good. In the wrought iron and steel pipe market, price schedules are unchanged, although there has been and still is some reselling at low prices. Excepting on very desirable orders, however, there is little tendency to shade. We quote prices on page 1318.

High Speed Steel.—The situation is unchanged, producers generally quoting 90c. per lb. for 18 per cent tungsten high speed steel, as orders now being placed are so small that buyers seldom ask for any quotation.

Finished Iron and Steel.—Railroad buying of cars now looms as one of the promising new features of the market. Recently the railroads have been contracting mostly for car repairs, but now the demand appears to be stronger for new cars. The Chicago, Burlington & Quincy heads the list with an inquiry for 7500 freight cars, 127 all-steel passenger cars and 55 locomotives. The Seaboard Air Line will shortly be in the market for 400 cars of miscellaneous types, the formal inquiry not yet having been issued. The Delaware, Lackawanna & Western may close this week for 500 box cars, the inquiry having been issued several weeks ago. The Santa Fe has placed 2500 refrigerator cars, 1250 each to the American Car & Foundry Co. and the Haskell & Barker Car Co. The Illinois Central has also bought 1000 "freezers" of which 650 were awarded to the Haskell & Barker Car Co. and 250 to the General American Car Co. The Alabama, Tennessee & Northern, which recently inquired for 250 gondolas and 50 flat cars, has placed part or all of this number with the Mount Vernon Car Mfg. Co. The Denver, Rio Grande & Western Pacific has ordered 700 70-ton steel general service cars from the Pressed Steel Car Co., with an option on 300 additional. Bids were opened last week by the Board of Water Supply, New York, for the water pipe line from the Catskill aqueduct, which will require about 20,000 tons of plates. The low bidders were the Frederick Snare Corporation, 8 West Fortieth Street, New York; Thomas Crimmins Construction Co., 126 East Fifty-ninth Street, New York, and Rice & Ganey, 2786 Bainbridge Avenue, New York. The work will probably be awarded to all three, with the steel tonnage divided as follows in the order in which the companies are named: 10,000, 8000 and 2000 tons. A part of the fabrication of the pipe will quite likely be done in the plant of the Merchant Shipbuilding Corporation, Chester, Pa. It is reported that price protection on the plates was given by more than one mill at 1.50c., Pittsburgh. The Public Service Commission of New York opened bids last week on the extension of the Queensboro subway to Eighth Avenue. The Powers-Kennedy Contracting Corporation, 149 Broadway, New York, was low bidder. This work involves 3200 tons of steel. The Saks' department store to be built in Fifth Avenue at Fiftieth Street, 5200 tons, which was awarded two weeks ago to Post & McCord, has been taken from that firm and awarded to the Hay Foundry & Iron Works. Other awards are as follows: 2100 tons for a group of bridges for the Philadelphia & Reading Railroad, to Bethelhem Steel Bridge Corporation; 450 tons for a clubhouse in West Sixty-fourth Street, New York, to Harris Structual Steel Co.; 1200 tons for an apartment house at Seventh Avenue and Fifty-seventh Street, New York, to Levering & Garrigues Co.; 2300 tons for a loft building in New York to Patterson Bridge Co.; 2400 tons for a loft building for George Bauman, New York, to Hinkle Iron Works; 500 tons for an office and storage building in Brooklyn for the Boyertown Burial Casket Co., Boyertown, Pa., to A. E. Norton. New work on which bids are being made include the following: nine bridges for the Lehigh Valley Railroad, 800 tons; Masonic Temple, Washington, D. C., 300 tons; loft building in West Thirty-fourth Street, New York, 400 tons; South Street bridge, Philadelphia, 1500 tons (bids close about Dec. 15). The price situation on steel products is about as has been reported in recent weeks. Attractive tonnages bring out the lowest figures, which are usually about 1.50c. on plates, shapes and bars. Relatively small lots of these products usually command 1.60c., Pittsburgh. There is some weakness in sheets and variation in prices. The expected advance in wire products has not been put into effect and doubt is expressed as to whether an advance will be made.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.80c. to 1.88c.; plates, 1.88c. to 2.03c.; structural shapes, 1.88c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Cast-Iron Pipe.—Operations continue at from 70 to 80 per cent and the cast-iron pipe industry is probably the busiest of any iron or steel industry, with the exception of the stove and radiator manufacturers. The most attractive pending business is the inquiry for

6700 tons of 36-in. pipe by Syracuse, N. Y., bids for which will be opened Dec. 6. A local contractor secured the contract for furnishing and laying 940 tons of 8, 12 and 20-in. pipe for the water department of New York. The R. D. Wood Co., Philadelphia, was low bidder on 1000 tons of 12-in. pipe for Yonkers, N. Y. The Glamorgan Pipe & Foundry Co., Lynchburg, Va., was last week awarded the contract for pipe for Washington, D. C. There is considerable inquiry for export, particularly for South America, India, Japan and China, but the exchange situation prevents many sales. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—The inquiry of the Cambria Steel Co. for 10,000 tons of heavy melting steel will not have much effect on this market because the company will pay only $15, delivered, the freight being too high to Johnstown for New Yorkers to profit. It is felt that this material will be supplied largely from territory west of Harrisburg, the steel in the Eastern territory more naturally going to the Bethlehem Steel Co. Borings and turnings have advanced within the week. There is a fair demand for stove plate. Local brokers are not expecting much improvement before spring.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$8.00 to $8.50
Steel rails, short lengths, or equivalent	9.50 to 10.00
Rerolling rails	12.00 to 12.50
Relaying rails, nominal	30.00 to 35.00
Steel car axles	12.00 to 12.50
Iron car axles	21.00 to 21.50
No. 1 railroad wrought	12.00 to 13.00
Wrought iron track	9.50 to 10.00
Forge fire	6.00 to 6.50
No. 1 yard wrought, long	10.50 to 11.00
Light iron	4.50 to 5.00
Cast borings (clean)	6.50 to 7.00
Machine-shop turnings	5.00 to 5.50
Mixed borings and turnings	4.50 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.75 to 9.25
Stove plate	11.00 to 11.50
Locomotive grate bars	10.50 to 11.00
Malleable cast (railroad)	9.00 to 9.50
Car wheels	12.50 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to 17.00
No. 1 heavy cast, not cupola size	15.50 to 16.00
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Philadelphia

PHILADELPHIA, Nov. 15.

The iron and steel markets have turned extremely quiet in the past week. Inquiries and orders are coming in in much less volume than in preceding weeks. Prices, too, are weak. Business prospects for the immediate future seem to be somewhat clouded, but the impression now prevails that comparatively little activity may be expected until after the New Year. Buyers apparently are holding off in the expectation that prospective freight rate reductions will affect their purchases. Moreover, there seems to be a disposition in some quarters to await whatever constructive economic results may be obtained from the limitation of armament conference now being held in Washington. There have been no developments of outstanding importance within the week.

Pig Iron.—With very little current business to engage attention, the pig iron trade is considering the probable demand for iron for first quarter. As yet there has been relatively little inquiry. Buyers seem to believe that prices will not go higher and that therefore nothing is to be lost by waiting, and, on the other hand, blast furnace operators are in no hurry to sell because of the uncertainty as to the course of costs and selling prices. While some in the trade express the belief that foundry iron prices for first quarter will be slightly higher than those now quoted, it may be said that there is a difference of opinion even among pig iron sellers on this point, with several furnace operators anxious to put their stacks in blast at the first favorable opportunity and with steel companies still offering their surplus iron freely, the opportunity for getting higher prices for iron seems somewhat remote. Considerable iron ore remains to be liquidated and some furnace operators would be willing to take their loss on this ore now if they could obtain sufficient orders to operate their furnaces. Barring some unexpected contingency, it looks, therefore, as if the supply of pig iron for this district would be more than ample to satisfy any expected demand in the near future. A substantial improvement in steel plant operations and consumption of iron would help the merchant pig iron trade immeasurably. A sanitary company is inquiring for 1300 tons of No. 2X iron for first quarter. The minimum price quoted is said to have been about $22.80, with other bids ranging from $1 to $3 a ton higher. Prices in this district for prompt foundry iron are holding firm, considering the low demand and the weakness which has developed in Birmingham and Buffalo markets.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	21.90 to $22.54
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.84 to 23.54
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	20.50 to 21.00
Gray forge	22.50 to 23.00
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Domestic producers of ferromanganese have not changed their price from $58.35, seaboard, despite the selling of ferromanganese by the Steel Corporation at $60, Pittsburgh. Spiegeleisen is nominally held at $25 to $27, furnace.

Billets.—There is very little inquiry. Open-hearth rerolling billets are obtainable at about $29, Pittsburgh, and forging billets $5 higher.

Plates.—Orders for plates have been placed at 1.50c., Pittsburgh, and even this price appears to have been slightly shaded by mills possessing a freight rate advantage. The demand is exceedingly light.

Structural Shapes.—Fabricators are figuring closely on structural steel work and on attractive projects have no difficulty in obtaining protection at 1.50c., Pittsburgh. It is intimated that this price has been shaded in recent transactions. A hotel for Los Angeles, Cal., requiring 6000 tons, is being figured on.

Bars.—The steel bar market is no weaker but low prices, usually about 1.50c., Pittsburgh, continue to be made on desirable business. Small lots of merchant steel bars are being sold at 1.55c. and 1.60c. Bar iron is nominally quoted at 1.60c., but on an attractive specification it would not be difficult to shade this price at least $1 a ton.

Sheets.—Various prices are being made on sheets, the general tendency being to shade quotations on attractive business. Blue annealed is being sold from 2.25c. to 2.50c.; black at 2.85c. to 3c. and galvanized from 3.90c. to 4c. base, Pittsburgh. Demand is light and not at all in keeping with the spurt which was in evidence a few weeks ago.

Bolts.—A shipbuilding company has inquired for 700,000 bolts, all of one size, for a large job on which it is figuring.

Warehouse Business.—Local warehouses have reduced prices on a number of items from $2 to $3 a ton.

Soft steel bars and small shapes, 2.65c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in, 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.75c.; squares and hexagons, cold-rolled steel, 4.25c.; steel hoops, No. 13 gage and lighter, 3.50c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.25c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Coke.—Prices for furnace and foundry coke have weakened. For furnace coke $3.25 is the nominal quotation, but this could be shaded at least 10c. and possibly as much as 25c. a ton. Foundry coke is available at $4.25 or slightly less.

Old Material.—Slight weakness has developed in some grades of scrap, notably railroad wrought, car wheels and pipe. Cast borings are higher. In common with the quiet which prevails in other branches of the market, the scrap trade is in the midst of another lull in buying and some material which had to be shipped has been sold at slight concessions. Railroad wrought is obtainable at $16, car wheels at $17 and pipe at $13.

No. 1 heavy melting steel	$12.00 to $13.00
Scrap rail	12.00 to 13.00
Steel rails, rerolling	16.50 to 17.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 18.00
No. 1 railroad wrought	16.00 to 16.50
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.50 to 11.00
Bundled sheets (for steel works)	10.50 to 11.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	10.00 to 10.50
Heavy axle turnings (or equivalent)	10.00 to 10.50
Cast borings (for rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	12.50 to 13.00
No. 1 cast	17.50 to 18.00
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	14.50 to 15.00
Railroad malleable	14.50 to 15.00
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Cleveland

CLEVELAND, Nov. 14.

Iron Ore.—The ore shipping season is over with the exception of three or four cargoes which will be brought down early this week. With the lightest movement of Lake Superior ore since 1904, or in 17 years, ore firms are beginning to look to the prospects for business next year and estimates of the 1922 shipments range from 40,000,000 to 50,000,000 tons. Operations in several of the mines of the Menominee range are being resumed. One interest, in order to furnish work for its miners, has opened a mine in that district at a further reduction in the wage scale, and another interest will start up two mining properties in the same district with a similar cut in wages. In both cases, the operators see no need of opening the mines, but they wish to furnish work for the men and feel that in view of the low wage scale they can stock ore without knowing what reductions will be made in ore prices. Owing to light shipments this year, the lake shipping season is closing with slightly less ore on Lake Erie docks than last year. The balance on docks Nov. 1 was 9,672,077 gross tons as compared with 10,212,975 tons on the same date a year ago. Ore receipts at Lake Erie docks during October were 2,052,113 tons as compared with 7,175,718 tons the same month last year. Receipts at Lake Erie ports for the season until Nov. 1 were 15,130,167 tons as compared with 39,134,919 tons during the same period last year. Shipments from Lake Erie ports during October were 1,621,635 tons as compared with 5,054,617 tons during October, 1920. Shipments from these ports for the season up to Nov. 1 were 11,191,362 tons as compared with 28,277,387 tons to Nov. 1 of last year.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market is very dull and there are increasing signs of weakness. On an inquiry for 500 tons of foundry iron from an Ohio jobbing foundry a Lake furnace quoted $20, Valley, but did not get the business. Had this furnace taken the order on that basis it would have meant a price considerably under $20 at furnace, owing to the freight differential against this furnace as compared with the Valley. While one Lake furnace is quoting foundry grades in some cases on a $20 Valley basis, merchant furnaces in the Valley district appear generally to be holding to $21 and a sale of a 500-ton lot was made during the week at that price by a Cleveland interest to a Pittsburgh district consumer. With the exception of one producer, Lake furnaces are holding to a minimum of $20 at furnace for foundry iron. One maker during the week sold 1400 tons and another 700 tons, all in small lots. Little inquiry is pending. Local prices are unchanged at $20 to $20.50 for foundry iron. In the opinion of the producer, the slump in buying is due to the expectation of lower freight rates, the buyers feeling that price reductions would follow a freight rate reduction. Shipments continue light, being in considerably smaller volume than during October.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.00 to 21.00
Southern fdy., sil. 2.25 to 2.75	25.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	34.00 to 35.00

Alloy Steel.—Prices on alloy steel have stiffened from ½c. to ¾c. per lb. over the prices that have been prevailing recently, and the market is somewhat more active, some orders being taken at the advance. Two or three orders placed by automobile and accessory makers aggregate 200 tons.

Bolts, Nuts and Rivets.—Demand for bolts and nuts has fallen off as compared with last month, but some car lot orders are still coming out. Price irregularities continue. The demand for rivets has improved slightly. The two inquiries from the East, each for 1000 tons, noted last week, are still pending. One of these is for pipe work.

Semi-Finished Steel.—Sheet bars are now commonly quoted at $30 and there is an unconfirmed report of a sale at $29. Slabs are quoted at $29.

Finished Iron and Steel.—The market shows little life. No orders of sufficient size came out during the week to test prices. While quotations as low as 1.50c. are appearing on steel bars, plates and structural material, much of the business that is going is being placed at 1.60c. for steel bars and shapes. A local bolt and nut maker placed 350 tons of bolt rounds during the week at 1.60c. Plates are weaker than bars and shapes, but plate sales are being made at 1.55c. to 1.60c. and a few small lot orders are being booked at 1.75c. In some cases, mills that have been adhering to the higher prices seem more inclined to make concessions. One local plate mill that has been on a 1.75c. basis is now quoting 1.65c. In the building field there is little activity. Cleveland will start the construction of a new $4,000,000 public library early in the year, the voters having authorized an additional bond issue. As this will be a reinforced concrete building, it will require a round tonnage of steel bars but little structural material. Detroit has taken bids for the Fort Street bascule bridge requiring 1200 tons of structural material, and another municipal bridge in Detroit requiring 330 tons is reported to have been placed with the McClintic-Marshall Co. The Mount Vernon Bridge Co. has taken a bridge in West Palm Beach, Fla., requiring 121 tons. The demand from the automobile manufacturers is limited and it is expected that orders to be placed later in the month for December requirements will be much lighter than purchases during recent months. Railroads that buy in this territory have not yet come in the market for rails for next year.

Jobbers quote steel bars, 2.54c.; plates and structural shapes, 2.64c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.14c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—With new demand very light, weakness in the sheet market is more pronounced. Black sheets are being quoted at 2.75c. and galvanized at 3.75c., or $5 a ton lower than the regular price, although 2.90c. and 3.90c. seem to be the more common quotations for small lots. Blue annealed sheets have slipped $3 a ton to 2.10c. for the heavy gages. Evidence has come out that some mills before they advanced prices protected customers for the remainder of the year with the 2.75c. and 3.75c. prices.

Warehouse Business.—Local jobbers have reduced prices $2 a ton on steel bars, plates and structural ma-

terial and on hoops and bands, basing present prices on mill prices of 1.65c. on bars, 1.75c. on plates and structural material, and 2.25c. on hoops and bands, with a 65c. differential. Other prices are unchanged. Warehouse orders for sheets are fair, but other lines are quiet.

Old Material.—The market shows a weakening tendency as a result of a falling off in the demand. A Canton consumer during the week purchased a moderate tonnage of shoveling turnings, but with this exception, no buying is reported by consumers. Dealers' sales for some time have been largely in the Youngstown district, but dealers have covered against orders for Youngstown mills, so that there is no new demand from that source. Shoveling turnings have sold at $10.80 for Canton delivery but with the softening of the market, dealers are now offering only $10.25 to $10.50 for that grade for Canton shipment.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$12.00 to $12.50
Steel rails, under 3 ft.	13.00 to 13.50
Steel rails, rerolling	13.50 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	8.00 to 8.25
Machine shop borings	6.75 to 7.25
Mixed borings and short turnings	7.75 to 8.25
Compressed steel	9.50 to 10.00
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	7.00 to 7.50
Steel axle turnings	10.00 to 10.50
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in.	8.00 to 8.50
Drop forge flashings, under 10 in.	8.00 to 8.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

Boston

BOSTON, Nov. 15.

Pig Iron.—Following a period of inactivity, the local market for Buffalo and eastern Pennsylvania iron is weaker. A lot of 400 tons of Buffalo iron, silicon 2.75 to 3.25, for 1921 delivery, sold this week to a local melter at $19.50 furnace, or $25.21 delivered. In this instance the furnace disregarded differentials, and still quotes a flat price on any silicon. Resale Buffalo, purchased by brokers during the recent dip in prices, is offered in any amounts at $19.50 furnace base. Differentials vary from 5c. to 50c., according to trading conditions. One Buffalo furnace, well sold up for the rest of 1921, holds at $20 base. An eastern Pennsylvania company heretofore quoting at $23 base, having increased its furnace output, has dropped to $20, and has sold a small tonnage to a Connecticut foundry having a $3.50 freight rate at $20.50 furnace for No. 2X, or $24 delivered. Another eastern Pennsylvania furnace, recently blown in and desiring a backlog, this week sold iron analyzing silicon 2.25 to 2.75 at $20, and silicon 2.75 to 3.25 at $21 furnace, or $24.06 and $25.06 delivered, respectively. On the No. 2X this represents a drop of 50c. a ton in the general market. Total sales of Buffalo and eastern Pennsylvania in this district approximate 1500 tons this week, all of it for 1921 delivery. A few New England foundries signify intentions of buying iron in December. Buying of Alabama and Virginia irons is not sufficiently active to create competition among sellers.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75	$24.56 to $25.06
East. Penn., silicon 1.75 to 2.25	24.06 to 24.56
Buffalo, silicon 2.25 to 2.75	24.71 to 25.96
Buffalo, silicon 1.75 to 2.25	24.71 to 25.46
Virginia, silicon 2.25 to 2.75	31.08 to 31.58
Virginia, silicon 1.75 to 2.25	30.58 to 31.08
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Finished Steel.—The First National Bank, Boston, has awarded 1550 tons structural shapes to the Consolidated Steel Corporation, New York, for a Buenos Aires branch bank. The Bethlehem Steel Corporation will do the fabricating. The McClintic-Marshall Co. is awarded 270 tons of steel for a Providence, R. I., high school. The placing of the Neponsit River bridge steel has been put over until another week. Steel mill representatives report little done the past week in bars, plates and other products. The Boston Elevated Railway Co. has purchased two 5-ton Holt tractors.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.31½; concrete bars, $2.15 to $2.81½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.73 to $3.78; steel hoops, $3.46½; toe calk steel, $5; cold rolled steel, $3.75 to $4.25; structural steel, $2.91½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.81½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Cast Iron Pipe.—The city of Fall River, Mass., unexpectedly has come into the open market for approximately 220 tons 6, 8, 10 and 12-in. cast iron pipe, 1921 delivery. Bids will be opened this week. Otherwise little, if any, business has developed since last reports. Pipe makers are well sold up on small sizes for the remainder of the year and not anxious to quote on deliveries inside five weeks. The situation as regard large pipe is not so tight. We quote per net ton in carload lots f.o.b. Boston and district on 1921 delivery, as follows: 3-in., $66.70; 4-in., $56.70; 6-in., $50.70; 10-in., and larger, $49.70, with a $4 differential on class A and gas pipe.

Coke.—The general foundry coke market shows little change. The two New England producers are still quoting November fuel on a basis of $10.66 delivered where the local freight does not exceed $3.40, while Connellsville is quoted at $4.25 to $4.50 ovens for spot and $4.75 for contract. While the demand for and movement of New England made foundry coke is more active, which is seasonable, there is no snap to the market. The New England Coal & Coke Co. has lighted another battery of 50 ovens, making seven out of its eight batteries in operation, or 350 ovens. This action is based on the growing demand for domestic and industrial coke. In fact, the demand for such cokes is carrying along the foundry coke end of the plant. A few hundred tons of 1922 foundry coke have been booked by one New England maker at prices ruling at date of shipment.

Old Material.—No new buyers of old material developed since last reports, consequently there has not been enough competition among dealers for business to influence prices. Some steel is being moved out of New England to Pittsburgh and Johnstown, but the eastern Pennsylvania mills are taking little, if any. A good demand continues for borings at previously quoted prices, but that for turnings is tapering off and the market is less firm, although not lower. The market for machinery cast is not particularly strong, the absence of buying having begun to make itself felt in spots.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$19.00 to $20.00
No. 2 machinery cast	17.00 to 18.00
Stove plate	15.50 to 16.50
Railroad malleable	13.50 to 14.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.50 to $8.00
No. 1 railroad wrought	11.50 to 12.50
No. 1 yard wrought	9.50 to 10.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.25
Machine shop turnings	4.00 to 4.50
Cast iron borings, rolling mill	5.00 to 5.50
Cast iron borings, chemical	5.50 to 6.00
Blast furnace borings and turnings	3.50 to 4.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.00 to 12.00
Rerolling rails	11.50 to 12.00

Iron and Steel Jobbers Select Washington

The executive committee of the American Iron, Steel and Heavy Hardware Association held its semi-annual meeting in New York Nov. 14 and 15, with Andrew Wheeler, Philadelphia, presiding. It was decided to hold the 1922 convention of the association in Washington in the early part of May. At a luncheon given on Tuesday, Nov. 15, by the executive committee at the Harvard Club, about 60 members of the trade were in attendance including iron and steel jobbers in the metropolitan district and a number of friends of the association.

St. Louis

ST. LOUIS, Nov. 15.

Pig Iron.—The market for Southern pig iron has been established at lower levels through the activity of one of the largest independent producers in the Birmingham district. This concern has made quotations of $18 at the furnace, and has let it be known that it would accept even lower, the action being taken, the trade has been given to understand, through a desire to dispose of such iron as had been sold by it under high-price contracts and then to charge the difference between the price obtained and the price named in the contract to the original purchasers. The Birmingham company is said to have gone so far as to solicit offers for this iron claimed to have been sold under contracts. A quotation of $17.50 made by a St. Louis broker for 650 tons of Southern foundry iron bought by the Southern Pacific failed to get the business because it was too low. Very little Southern iron is being bought here because freight rates still favor the Northern product. Northern pig iron is still being sold at $21, Chicago brokers holding resale iron at that price, and one independent producer there is quoting $22. The last week was exceedingly dull as far as inquiries and sales were concerned.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$23.88
Northern malleable, sil. 1.75 to 2.25	23.88
Basic	23.88
Southern foundry, sil. 1.75 to 2.25	23.91

Finished Iron and Steel.—Last week was one of great activity among the railroads. In addition to getting out a number of inquiries of large and small proportions, the purchasing departments are busily at work preparing requisitions for further requirements. The trade is looking to the railroads for considerable business. The Missouri, Kansas & Texas has revived an inquiry issued a year ago and withdrawn for 32 steel underframes for 36-ft. box cars of 60-ton capacity, and this road also wants 300 tons of plates, shapes and bars, which other railroads centering here are also making inquiries for in smaller quantities. The Missouri Pacific has an inquiry out for 100 car wheels, and the St. Louis & San Francisco Railroad wants 324 wheels and 72 tons of 10-in. channels in 41-ft. lengths. The Manufacturers' Railway (St. Louis) wants 73 tons of plates, and the Fort Worth Belt Railway is in the market for 140 tons of 85-lb. rails. Now that the price of oil has increased, there has come renewed activity in the oil fields. The Magnolia Petroleum Co. is in the market for tanks for the Mexia (Tex.) field. The Riter-Conley Co., Pittsburgh, has obtained orders from various Houston (Tex.) industries for 30 tanks. The State Highway Commission of Oklahoma at Muskogee wants 2200 tons of reinforcing bars for four bridges, and bids will be opened next week in Little Rock, Ark., for two concrete bridges, involving 1500 tons of bars. The building situation here is in process of clarification, the builders and the unions having been brought together into conference. Various matters have been referred to committees, and another meeting is to be held today. Labor seems willing to agree to a reduction in wages, possibly 20 per cent, if they can be assured that a building program said to amount to more than $20,000,000 will proceed.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The demand for coke is rather light. There was very little done the last week even in carload orders. The weather the latter part of the week was cold enough to stimulate some buying of domestic coke.

Old Material.—The market for old material continues dull, but prices are firm and unchanged. A limited demand developed during the week from one large consumer for special heavy melting steel, one sale of a small tonnage to this consumer being reported at $14.50 per gross ton, but aside from this there has been no activity from the mills. Rolling mill grades are especially quiet, and wrought and busheling scrap have been offered at slightly lower than listed prices without bringing any buying orders. Current railroad offerings include: Louisville & Nashville, 12,000 tons; Northern Pacific, 2600 tons; St. Louis & San Francisco, 1400 tons and Wabash 200 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$16.00 to $16.50
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft	13.00 to 13.50
Relaying rails, standard section	30.00 to 35.00
Cast iron car wheels	15.00 to 15.50
No. 1 heavy railroad melting steel	11.50 to 12.00
No. 1 heavy shoveling steel	11.00 to 11.50
Ordinary shoveling steel	10.50 to 11.00
Frogs, switches and guards, cut apart	11.50 to 12.00
Ordinary bundle sheet	5.00 to 5.50
Per Net Ton	
Heavy axles and tire turnings	7.00 to 7.50
Iron angle bars	13.00 to 13.50
Steel angle bars	10.50 to 11.00
Iron car axles	21.00 to 21.50
Steel car axles	14.50 to 15.00
Wrought iron arch bars and transoms	15.00 to 15.50
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel couplers and knuckles	12.00 to 12.50
Locomotive tire, 42-in. and over, smooth inside	10.00 to 10.50
No. 1 dealers' forge	9.50 to 10.00
Cast iron borings	7.00 to 7.50
No. 1 busheling	10.50 to 11.00
No. 1 railroad cast	14.50 to 15.00
Stove plate and light cast	12.50 to 13.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.50 to 10.00
Pipes and flues	8.00 to 8.50
Heavy railroad sheet and tank	7.00 to 7.50
Light railroad sheet	5.00 to 5.50
Railroad grate bars	10.00 to 10.50
Machine shop turnings	6.00 to 6.50
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	8.50 to 9.00
Horseshoes	11.00 to 11.50
Railroad brake shoes	9.50 to 10.00
Railroad springs	12.00 to 12.50

Cincinnati

CINCINNATI, Nov. 15.

Pig Iron.—Southern irons, on a sale of 1000 tons to a sanitary manufacturer for its Louisville plant, are $1 lower than a week ago, the price now being $18, Birmingham base. It is reported that some resale Southern iron had been sold at slightly under this figure, but confirmation is lacking. The prices from other districts remain unchanged, but silicon differentials are not being strictly adhered to. While $21 is still the general asking price on southern Ohio and Chicago irons, it is said that in competitive territory $20 can be done. Lake furnaces are still quoting $20, and it is possible in some cases to buy higher silicon irons at this figure. Nothing more has been heard of Buffalo iron in this district. The market is generally quiet in the Cincinnati territory. An Indianapolis melter is reported to have bought 500 tons of foundry, half going to Chicago and half to southern Ohio. In addition a small tonnage of silvery was placed, at prices prevailing before the advances made some weeks ago. A Dayton melter bought 150 tons of Northern foundry at $22.75, delivered, and a Louisville melter 150 tons of Southern at $18.50, Birmingham. A Virginia pipe company bought 1500 tons of Virginia iron at an unnamed price, and an Illinois melter 600 tons of high silicon malleable. The only inquiry of consequence comes from the Louisville & Nashville Railroad, which is asking for 250 tons. The National Cash Register Co. has not closed on its 300-ton inquiry for January shipment. The Ashland Iron & Mining Co. blew in a furnace on basic Saturday and it is reported that the Portsmouth stack will go in shortly.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$22.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	23.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	$22.52 to 23.52
Basic, Northern	22.02
Malleable	23.52

Finished Material.—With two holidays coming in one week, the steel business was rather quiet. Some

carload orders were placed, however, mostly for fill-in purposes. Some sheet mills are now quoting 3.75c. on galvanized sheets, the prices on blue annealed and black sheets remaining at the former levels. A northern Ohio mill booked 100 tons of reinforcing bars for immediate delivery at 1.65c. The usual quotation, however, on bars, shapes and plates still remains at 1.60c. Several good sized inquiries for reinforcing bars are being figured on, including about 200 tons for the new Elks temple and several hundred tons for the addition to the Hotel Gibson, the contract of which has been awarded to the Wells Bros. Construction Co. Bids will close Nov. 25 for the Elks temple, a five-story building, which will take about 250 tons of structural steel. This is the only project of size to come up during the week. It is reported that a manufacturer in this territory has placed an order for several thousand boxes of tin plate at a slight concession from the official price of $4.75 per base box. There will be very little change in plant operations during the coming week. The American Rolling Mill Co. at Middletown is operating its East Side plant full time, and the Whitaker-Glessner Co., Portsmouth, is reported to be putting on several additional mills. The plants of the Ashland Steel Co. and the Ashland Iron & Mining Co. are scheduled to resume operations in the near future. The plants of the Newport Rolling Mill Co. and the Andrews Steel Co. are still down, the difference between the management and its employees not having been settled.

Warehouse Business.—Some jobbers report a slight improvement during the past week, cold rolled steel and bolts and nuts showing fair activity. Prices are firm.

Tool Steel.—Some increased activity is noticed in the demand for tool steels and October was the best month since last spring. Up to date this month, orders are also showing a steady increase. Prices are firm and unchanged, 18 per cent tungsten high speed steel being quoted at 90c. per lb. base.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.10c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base, No. 9 annealed wire, $3.00 per 100 lb.

Coke.—A sale of 600 tons of furnace coke featured the market during the week. Otherwise business was light. Prices are practically unchanged from last week, though with a softer tendency.

Old Material.—The scrap market remains quiet with the occasional small sales reported. Some of the larger consumers who had been taking in material for some time past have asked dealers to hold up shipments. Locally business is quiet.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton

Bundled sheets	$4.50 to $5.50
Iron rails	12.50 to 13.00
Relaying rails, 50 lb. and up	25.50 to 26.50
Rerolling steel rails	11.00 to 12.00
Heavy melting steel	9.50 to 10.00
Steel rails for melting	9.50 to 10.50
Car wheels	12.50 to 13.50

Per Net Ton

No. 1 railroad wrought	9.00 to 10.00
Cast borings	3.50 to 4.00
Steel turnings	2.50 to 3.00
Railroad cast	12.50 to 13.00
No. 1 machinery	14.00 to 15.00
Burnt scrap	8.00 to 9.00
Iron axles	16.00 to 17.00
Locomotive tires (smooth inside)	10.00 to 10.50
Pipes and flues	4.50 to 5.50

Herbert A. Pike, formerly president and treasurer Boston Pressed Metal Co., Worcester, Mass., has sold his interest in that company to William Sanger, Toledo, Ohio. Douglas P. Cook, vice-president and general manager, becomes president and general manager, retaining his original interest in the concern. The Boston Pressed Metal Co., established in 1906, is capitalized at $100,000. Mr. Cook has been associated with it 14 years. Mr. Sanger has not been actively engaged in business the past two years. Previously he was manager of the Clouss Shear Co., Fremont, Ohio. He plans to make his headquarters in Worcester, and, as treasurer of the company, take an active part in its management.

Birmingham

BIRMINGHAM, ALA., Nov. 15.

Pig Iron.—The market ruled from $18 to $19 during the week. The lower price came about through putting on the market of overdue iron for sale on account of customers. At least this is the opinion of makers, who ran into this resale or realization iron and claim to have been forced to cut to $18 and $18.50 to get business in competition. There was sacrifice of differentials, lots of two differentials above base selling at base price, which read back $1 under market. One maker sold a half dozen lots aggregating 500 tons, the largest 350 tons, at $19 and got all differentials. Another maker, running into the resale iron, sold at $18 and $18.50, but also sold at $19. The weaker tone does not appear to have backing other than this resale metal and the belief is expressed that the market will rebound as soon as that movement stops. One maker did the best week's business in a long time. A total of 4000 to 4500 tons was done. One lot of 900, another of 600 and three of 500 tons were in the transactions, others being for smaller amounts. Some Pacific Coast business was done last week. Base is understood to have been around $18. Several lots of charcoal iron were also sold, car wheel makers reappearing for lots of 100 tons. The iron brought the base of $35. The stock situation at the beginning of the month was still further improved. Stocks on Alabama yards Oct. 1 and Nov. 1 were: foundry, 68,000 and 54,000; machine cast, 38,000 and 32,000; warrants, none and 5900; basic, 58,000 and 50,000; total, 165,000 and 144,000. The warrants are the first on yards in many months. The outgo is still brisk.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$18.00 to $19.00
Basic	17.00 to 18.00
Charcoal, warm blast	35.00

Finishing Mills.—Wire drawing mills sense an easing up in new orders following lower cotton prices, but operations average about the same as October, which was 70 per cent. The Tennessee company shifted from the operation of the structural mill to the plate mill this week, other operations continuing as they have for several weeks, which is 55 per cent of finishing mill production. Structural steel and galvanized sheets remain active throughout the Southeast. Band and hoop mills are resting a week.

Cast Iron Pipe.—Additional western orders were taken by the National Cast Iron Pipe Co. and American Cast Iron Pipe Co. High pressure pipe remains fairly active. Sanitary pipe had best October, following the best August on record, owing to large sales of extra heavy pipe at low figure in the East. Demand has eased off since rush shipments made when the threat of a railroad strike existed. The market remains at $40 in most instances with two interests holding at $45 and one making a differential of only $5 between standard and extra heavy. High pressure base is $33 to $35.

Coal and Coke.—Coal production has reached approximately normal, but indications point to smaller demand since the threat of a railroad strike eased up domestic coal dealers and some steam coal users. Coke as a rule has eased up somewhat. Base is $5.50 to $6.

Old Material.—Demand for cast scrap is good and prices are firm. Steel is weak and apparently at dictation of buyers owing to freight rates preventing competition far afield.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Buffalo

BUFFALO, Nov. 15.

Pig Iron.—Quotations of $20 base on No. 2 plain with differentials of 50c. for each advance of 50 points in silicon, prevail on small lots such as a carload or 100 tons, but on sizable tonnages price concessions are made in almost every instance. Radiator interests have purchased 4000 tons, the order divided between two Buffalo furnaces. The price was under $20, but the exact figure is not available. Inquiry has dropped and 8000 tons inquired for in scattered lots is in the hands of one producer. In this group there is but one inquiry for 1000 tons, a few for 500 tons and the rest 100 tons or less. The furnace which has this business to work on placed about 3500 tons in orders of the same character last week. Iron for 1922 has not made an appearance as yet either in orders or inquiry. Producers are not especially anxious to quote for next year delivery nor have they been called upon. The M. A. Hanna & Co. will blow in a furnace Nov. 20. The only stack in blast this year has been down for relining.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.00
No. 2X foundry, 2.25 to 2.75 sil.	19.50
No. 2 plain, 1.75 to 2.25 sil.	19.00
Basic	21.00
Malleable	21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—The depression which set in when the strike atmosphere cleared is unchanged and with the exception of sheet and pipe demand, the market is apathetic. In sheets one interest has almost normal business and demand for pipe has held up longer than expected. A bolt and nut inquiry embracing 250 tons for a car repair plant has not been placed. Tin plate orders have appeared in satisfactory numbers notwithstanding seasonal falling off was expected several weeks ago. In structural shapes some desirable business is in prospect. The Merchants Despatch at Rochester, a railroad subsidiary, will erect two buildings, one involving 500 tons and the other 100 tons. Bar business is quiet with all sellers. No 1922 rail orders have been placed with the leading rail mill, but two roads are in the market and one is expected in soon. It is likely much of their needs will be rolled here. William J. Conners, identified with lake shipping along the Great Lakes, has leased the East Buffalo car shops of the New York Central Railroad and expects to have full-time operation by Dec. 1. Inquiry for small lots of structural shapes has fallen off, but a number of orders have been booked by a structural mill with no individually large tonnages involved. The Buffalo mill which quoted bars and shapes for the Navy Department at 1.40c. and 1.50c. respectively bid at prices which no other Buffalo interest cared to quote. The $4,500,000 filtration plant referendum in Buffalo passed at the recent election and plans will soon be authorized. The Lackawanna Bridge Co. is low bidder on the city viaduct work, Buffalo, on which several hundred tons of shapes will be used.

Old Material.—Generally the situation is about on the plane of last summer when complete stagnation prevailed. The mills which bought steel a few weeks ago have apparently filled their wants for some time to come and are disinterested in further purchases, particularly in steel. There is belief that stronger prices will be heard of soon, but there is nothing in the way demand shapes up, to give this expectation weight.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.004 and under	16.50 to 17.50
No. 1 railroad wrought	13.00 to 14.00
Car wheels	16.00 to 17.00
Machine shop turnings	7.00 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.00 to 11.00
Grate bars	11.00 to 12.00
No. 1 busheling	10.00 to 11.00
Stove plate	14.50 to 15.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 17.50
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

Warehouse Business.—Dullness which characterized the market for the last three weeks is still apparent and little improvement is expected to take place this year. Orders are not as plentiful as in September and with the exception of some ship repair work which develops with the close of lake navigation, the general prospect is not encouraging. New prices became effective Nov. 11 on several commodities.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.80c.; plates, 2.80c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.70c.; hoops and bands, 3.30c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.80c.

San Francisco

SAN FRANCISCO, Nov. 9.

Pig Iron.—Although foundry activities continue very much restricted, there appears to be an increasingly better business from manufacturers of sanitary products. Foreign exchange and low freight rates still favor trading in Continental iron and the bulk of actual sales on the Coast is in these foreign offerings. The Southern Pacific Co. seems to be the main source of demand for domestic pig iron, that company just having closed bids for 850 tons, 250 tons of malleable, 350 tons analyzing 1.75 to 2.25 silicon and 250 tons of 2.25 to 2.75. The price is believed to be around $18, Birmingham basis. One importer recently has sold about 500 tons of Belgian material at something about $26, ex ship, San Francisco. A foundry has purchased 200 tons, but the price was not disclosed. About 300 tons of re-sale iron were moved, the price involved being reported slightly over $30, f.o.b. cars.

Cast Iron Pipe.—After the rather heavy demand a few weeks ago, the situation has quieted of late, as far as new prospects are concerned. The city of Long Beach, Cal., rejected first bids on 1750 tons of 4, 6, 8, 12 and 20-in. pipe and is asking for new bids on Nov. 15. Glendale has placed an order for 600 tons with the American Cast Iron Pipe Co. There continues a steady business from private sources. The price of $33 base is unchanged.

Finished Iron and Steel.—During the past week or two, the industry on the Coast has relapsed and continues quieter at this time. Prices also appear unsettled, and in certain products price cutting prevails. This condition applies particularly to plates and shapes. The market price on galvanized sheets a short time ago was 4c., but today figures as low as 3.75c. are heard, especially when an attractive tonnage seems to offer. It is believed that the falling off of interest in steel products is partly due to the lateness of the season, when many operators are desirous of keeping their stocks at a minimum, and also is the result of the general unsettled conditions, this retarding new building operations and the consequent consumption of bars. There is, however, one inquiry for 200 tons of reinforcing bars, and another involving 600 tons of structural materials for an out-of-town job. Some demand for rails from Japan and China is a brighter feature, along with a little export inquiry for tin plate and sheets.

Coke.—The inquiry for 600 tons of coke by the Southern Pacific Co., bids for which closed Nov. 8, is the only conspicuous business offering in this market at present. Smelting interests have taken some foreign coke, but general interest is rather light.

Old Material.—There has been a little improvement in scrap, but business cannot be termed active in any sense. Buying seems to be principally in cast iron scrap, the movement of which is fairly steady. The market price is considered about $20, but a straight car was sold a few days ago at $17, delivered. This, however, was not high grade material.

J. W. Dickson, who retired as vice-president and Pittsburgh district sales manager of Park & Williams, Inc., on Nov. 1, to go into business for himself, has opened offices at 605 Columbia Bank Building, Pittsburgh, and will do a brokerage business in pig iron, ferroalloys, coal and coke.

British Iron and Steel Market

Pig Iron Prices Weakening—Steel Deliveries from Continent Delayed—Tin Plate Situation Improving

(*By Cable*)

LONDON, ENGLAND, Nov. 15.

Demand for Cleveland pig iron is slow and prices are weakening, but the main hindrance are railroad rates, which are still 150 per cent above pre-war levels. French forge pig iron has sold at 105s. ($20.79), delivered Midlands, but Continental supplies are generally diminishing, owing to delayed deliveries. Hematite iron is weaker and makers are unable to dispose of a limited production.

Wales has bought a fair tonnage of low grade Spanish ore. Bilbao Rubio is quoted at 26s. ($5.14), ex-ship Tees.

Scottish shipyard steelmakers have abandoned their price-fixing policy. English makers are booking more orders, chiefly for home consumption, at current values but the position is generally still bad. Continental business with Britain is diminishing, mainly owing to bad deliveries. Germany is asking 12 weeks shipment and upward.

German merchant bars are quoted at £8 to £8 5s. ($31.68 to $32.67) f.o.b.; German wire nails at 14s. 6d. to 16s. 6d. ($2.85 to $3.26) base, f.o.b. for shipment early in the spring; German plates at £7 10s. to £8 ($29.70 to $31.68) f.o.b.; French shapes at £8 2s. 6d. to £8 5s. ($32.17 to $32.67) f.o.b.; Belgian No. 3 bar iron at £7 15s. 6d. to £8 5s. ($30.69 to $32.17) f.o.b. Belgian billets are quoted at £9 ($35.64) delivered Midlands and French billets at £6 10s. ($25.74) f.o.b. Saar Valley, with merchant bars at £8 2s. 6d. to £8 10s. ($32.18 to $33.66) f.o.b. America is quoting billets at £9 ($35.64) c.i.f.

The tinplate turnover is increasing and costs are declining. Home consumers are buying odd sizes steadily at 21s. 3d. ($4.18) base, f.o.b. paid for forward delivery, buyers' option. Contracts for first quarter are quoted at 21s. ($4.16) f.o.b. The Near Eastern demand for quarter wasters is forcing values up. After doing business up to 19s. 6d. ($3.86) f.o.b., sellers are asking 20s. ($3.96) f.o.b. Galvanized sheet makers are firm at £18 ($71.28) f.o.b. January shipment. Merchants have sold at £17 15s. ($70.29) f.o.b., anticipating lower values. Far Eastern specifications for black sheets have sold (January) at £18 17s. 6d. ($74.62) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.96 per £1 as follows:

Durham coke, delivered	£1 10	$5.94
Cleveland basic	7 7½ & £7 10*	29.20 & $29.70
Cleveland No. 1 foundry	5 15	22.77
Cleveland No. 3 foundry	5 10	21.78
Cleveland No. 4 foundry	5 5	20.79
Cleveland No. 4 forge	5 0	19.80
Hematite	7 0*	27.72
East Coast mixed	5 15	22.77
Ferromanganese	15 0 & 14 10*	59.40 & 57.42
Rails, 60 lb. and up	9 10 to 10 10	37.62 to 41.58
Billets	7 2½ to 8 5	28.62 to 32.67
Sheet and tin plate bars, Welsh	7 0 to 7 15	27.72 to 30.69
Tin plate base box	1 1 to 1 2½	4.16 to 4.46
		C. per Lb.
Ship plates	10 10	1.856
Boiler plates	15 0 to 16 0	2.65 to 2.83
Tees	10 15 to 11 10	1.90 to 2.03
Channels	10 0 to 10 15	1.77 to 1.90
Beams	10 0 to 10 10	1.77 to 1.85
Round bars, ¾ to 3 in.	11 10 to 12 0	2.03 to 2.12
Galvanized sheets, 24 g.	17 15 to 18 5	3.10 to 3.19
Black sheets	15 0 to 16 0	2.65 to 2.83
Steel hoops	14 5 & 14 0*	2.51 & 2.47
Cold rolled steel strip, 20 g.	24 10	4.33

*Export price.

Price Cutting for Export—Cleveland Pig Iron Lower—New Steel Company in India

LONDON, ENGLAND, Nov. 2.—Price cutting continues without, however, attracting buyers. The latest move in the right direction is a drop of 10s. to 14s. in the price of Cleveland pig iron, which doubtless will be followed by other makes. Pig iron, however, at 110s., taking No. 3 Cleveland as the basis, is still too dear and another fall of 10s. will have to take place if trade is to revive. Costs are the stumbling block and though wages are coming down, coal and coke still remain at impracticable levels. Hematite is hard to sell and here too prices are being forced down, East Coast mixed numbers being worth no more than 120s., only 10s. more than foundry iron.

Some workers are at last beginning to realize the fallacy of holding out for extravagant wages, and it is encouraging to note that the engineering and shipbuilding unions have decided to accept the masters' intention to withdraw the war bonuses which Mr. Churchill, when minister of munitions, granted to munition and piece workers.

English steel makers are more and more cutting prices for export business and would doubtless do so for home business were they not bound by associations. At the present time in some cases English steel is being sold at only 20s. more than continental makers ask, and when it is seen that continental producers can only offer almost indefinite shipment against practically immediate shipment as offered by English plants, it is not surprising that the shipper prefers to pay a little more for English material. Scotch makers, however, are unable to compete with English makers, their costs of production being higher, as they have to import much of their raw material and, at a basis price of £10 15s., which is 30s. more than English, are said to be incurring a loss of £4 a ton on manufacture.

A new company has recently been formed in India, called the United Steel Corporation of India, Ltd., and having a capital of 20 crores of rupees. The parties concerned are Messrs. Bird & Co., Calcutta, and Messrs. Cammell Laird & Co., of Sheffield. The board of directors include Lord Cable, Lord Inchcape, Lord Merton and W. L. Hichens. The plant, plans of which are well along, will have an annual capacity of 600,000 to 700,000 tons of pig iron and the rolling mills will be able to turn out 450,000 tons of finished steel a year. Offices are also to be established in London.

Iron and Steel Imports of Great Britain

British imports of iron and steel for nine months in 1921 showed a total of 1,135,791 tons, compared with 670,257 tons last year and 1,501,564 tons for the corresponding period of 1913. The figure is thus 25 per cent below 1913, but 69½ per cent higher than last year.

More than one-third of this year's total consisted of pig iron and ferroalloys, 432,349 tons, or nearly three times the quantity in 1920 or 1913. Billets and slabs accounted for 211,619 tons—about the same as 1920, but only 37 per cent of 1913. Plates and sheets, 109,501 tons; iron bars, rods, angles, etc., 102,595 tons; steel bars, rods, angles, etc., 89,310 tons; and rails, 39,969 tons, were the next largest items in 1921.

The Alabama Power Co., by acquiring temporary lease of the Government power plant at Sheffield, adds 110,000 hp. to its quota of steam-generated power, the remainder being 75,000 hp. at the plant on the Warrior River near Birmingham and 15,000 hp. at the Gadsden plant. By connection with the Georgia power lines, which are connected with the Carolina lines, the Alabama Power Co. has been furnishing power to operate Carolina cotton mills and other industries 400 miles distant and relieve a low water distress. Mitchell dam, being built on the lower Coosa River, will require two years to finish. It will generate 120,000 hp., the same as is generated now normally at the dam at lock 12 on the same river.

FAIR EXPORT ACTIVITY

Japan Buys 78 Miles of Wire and Places Rail Tonnage—New Steel Works in India

NEW YORK, Nov. 15.—Japanese buying, although not quite so heavy as formerly, is still about the largest item with most exporters. Orders being placed in the United States and new inquiries issued include wire, wire nails, rails, tin plate, steel bars, sheet bars and blue annealed and black sheets. In wire, one export house has booked an order for a total of 78 miles of ⅜-in. (125,000 circular mils) wire, to be used on transmission towers of the Tokio Electric Light Co. and 200 tons of No. 8 gage plain wire for electrical purposes. An order was recently booked by a New York export house for 100 tons of prime western spelter in ingots, and an inquiry is in the market for 1000 tons of electrolytic copper for Japan.

The recent inquiry for a total of 8000 tons of 60-lb. and 75-lb. rails for Yokohama, Kobe and Otaru, Japan, has been placed through a Japanese house in the United States at a price said to be $46.51 per ton for the 75-lb. rails, c.i.f. Yokohama and Kobe, and $47.25 per ton, c.i.f. Otaru, for the 60-lb. rails. Orders for tin plate, although not as numerous now, still continue. A New York export house has booked 5000 base boxes of oil can size tin plate for Japan. About 200 tons of sheet bars for Japan is reported by another exporter.

Besides the orders for iron and steel products being placed by Japan in the United States, the Far East, according to reports, is purchasing in Belgium, Germany, Austria and Czecho-Slovakia. In some instances, when the mark started its recent downward course of depreciation, British re-exporting interests and Japanese purchasers bought up the entire output of German mills for some time. Aside from the difficulty in obtaining delivery from Germany to the United States, dealing with German mills is difficult at present because of the general price uncertainty in the German market. Some time ago negotiations were entered into between a dealer in this country and the American representative of a German mill for an order of 28,000 kegs of wire nails. The order was placed, but at the last moment the German mill refused to fill it, because of inability to make delivery before the spring of 1922 or later. In order to hold up prices for export, despite the rapid fall of the mark, which is not entirely offset by the rise in domestic prices in Germany, exporters there are beginning to add percentages to the domestic quotation, which in some instances run from as high as 800 per cent to 1900 per cent. While iron and steel imports into the United States from Germany are at a minimum, some agents report a fairly active business in cement tiles, bricks and other building materials.

Bird & Co., Calcutta, India, and Cammell, Laird & Co., Sheffield, England, have incorporated the United Steel Corporation of Asia, Ltd. According to *Engineering*, London, works on a large scale will be erected near the iron ore, coal and limestone deposits in India, much of which is controlled by Bird & Co. Cammell, Laird & Co., Ltd., will be responsible for the design, erection and personnel of the works. The plant will be designed for the production of 600,000 to 700,000 tons of pig iron and 450,000 tons of finished material, but will operate at about one-half this rate.

The Victorian Government Railway Commissioners, Melbourne, Australia, have issued a call for bids on a list of material which includes double-headed screw machines and forging machines for the Newport shops, bids closing Dec. 14. Closing Jan. 4, bids have been asked on 60 tons of galvanized telegraph wires and 150 electric train stops for power signaling.

Engineering Meetings in December

Engineering meetings in December arranged for sections of the American Society of Mechanical Engineers include the following:

Dec. 6, Waterbury, Conn., address on "Belting" by A. C. Moore, Charles A. Schieren Co.

Dec. 7, Buffalo, N. Y., address on "Researches Into Foundry Practices" by Enrique Touceda, consulting engineer American Malleable Casting Association, Albany.

Dec. 9, Murphy's Hotel, Richmond, Va., "The Engineer in Foreign Trade."

Dec. 9, Auditorium of Interior Department, Washington, address on "Engineering Standardization" by A. A. Stevenson, chairman American Engineering Standards Committee.

Dec. 15, Hotel Stratfield, Bridgeport, Conn., address on "World Wide Industrial Conditions" by Dr. Magnus W. Alexander, chairman National Industrial Conference Board.

Dec. 15, Toledo Edison Co.'s auditorium, Toledo, Ohio, illustrated address on "Gas Manufacture" by A. Johnson, Atlas Chemical Co., Toledo; address on "Industrial Fuel" by Henry O. Loebell, Henry L. Doherty Co., New York.

Dec. 16, Bayonne, N. J., address on "Pulverized Fuel from the Operating Standpoint," following an inspection of the plant of the Babcock & Wilcox Co.

Dec. 19, at building of Hartford Electric Light Co., Hartford, Conn., subject, "Refrigeration and Air Conditioning," following a dinner at the Bond Hotel.

Dec. 20, at Engineers Club, Philadelphia, symposium on materials handling.

Foundrymen at Cleveland

For the convention and exhibit of the American Foundrymen's Association, to be held at Cleveland in the week of April 24, 1922, the association headquarters and exhibits will be in the new Cleveland public hall at Lakeside Avenue and East Ninth Street. The Institute of Metals division of the American Institute of Mining and Metallurgical Engineers announces that it will hold a joint convention with the foundrymen as has been the custom for a number of years. The new public hall at Cleveland is but a few minutes' walk from the downtown hotels and is directly across the street from the old Central Armory where the first foundry equipment exhibit was held in conjunction with the meeting of the American Foundrymen's Association in 1906.

Cleveland was selected for its central location, which makes possible a saving in traveling expenses and in the transportation cost to the exhibiting manufacturers of foundry equipment and supplies. Following the last convention by an interval of 18 months that at Cleveland is looked forward to with interest by the foundry and connected trades. The committee on papers announces that a number have already been received and that the first set of preprints will be mailed to the membership in January.

Stanley P. Rockwell spoke on case hardening before the Hartford Chapter, American Society for Steel Treating, Hartford, Conn., last week. He described case hardening on a large scale as well as the advantages and disadvantages of the various treatments and materials used in commercial operations. Mr. Rockwell has had wide experience in case hardening while with the New Departure Mfg. Co., Bristol, Conn., the Whitney Mfg. Co., Hartford, and other large concerns. George P. Moore, Wallace Barnes Co., Bristol, will speak before the chapter at its next meeting, Dec. 9.

The Design of Tools, Jigs and Fixtures was the subject of Charles J. Hall, chief designer Taft-Peirce Mfg. Co., Woonsocket, R. I., at a meeting last week of the designing and drafting section, Providence Engineering Society, Providence, R. I.

The Carnegie Steel Co. has put on another blast furnace at its Ohio Works, Youngstown, making a total of 5 of the 6 furnaces at that works now making iron. This addition brings the number of active Carnegie Steel Co. stacks to 21, out of a total of 59.

MODERATE ACTIVITY

Basic Pig Iron and Sheets Weak in the Mahoning Valley District

YOUNGSTOWN, OHIO, Nov. 15.—Though operations are fairly well maintained, the steel industry in the Mahoning Valley is drifting into a period of more moderate activity. New buying is slackening in sheets and strip steel, though it is firm in tin plate. A number of the larger can makers are seeking material for their 1922 requirements, involving heavy tonnages and such business is now occupying the capacity of district makers well toward 90 per cent. In fact, in all lines of finished steel, jobbers and manufacturing consumers are inquiring for material to cover their first quarter, 1922, requirements.

Finishing mills are operating this week at fully 60 per cent, with sheet mill capacity engaged to the extent of about 70 per cent. Sharon Steel Hoop Co. is operating four sheet mills at its Haselton works, Youngstown, after repairing a damaged coupling to the main driving shaft, which held up operations for two weeks. Of the 66 open-hearth furnaces in the Valley, 45 are charged. Pipe mill schedules continue with little change, with nine of 17 furnaces fired.

The Republic Iron & Steel Co. has been operating its plate mill, using the output for lapweld pipe. The Republic company has enlarged its sheet mills schedules, having the power on 14 mills this week, as compared with 12 last week.

Basic Pig Iron Weak

An unfailing index of the general situation with regard to prices is found in basic pig iron, which is being quoted at $19 by the larger steel works interests, while attractive tonnage, it is admitted, would command a lower price. In fact, some resale iron is reported to have been offered in this territory at $18.50. It is considered quite likely that district steelworks plants would negotiate sales of surplus iron stocks on some such basis, charging any loss in production to a marked down inventory.

One integrated interest which has been operating its single blast furnace since July 1 has been piling an average of about 2000 tons of iron in the meantime, in addition to the tonnage consumed by its steel department. The company acknowledges that it could have purchased iron at lower prices on the market, but figures that it is liquidating high-priced ore in the conversion process.

Another Valley interest which has been preparing to start a new stack has now deferred the date of turning on the blast, owing to recession in the price of pig iron. As a consequence, the furnace may not now start until spring, though raw materials have been assembled in sufficient quantity to start at any time. This company has been inquiring for 2000 tons of iron.

Sheet buying varies with different interests, though current tonnage moving from the mills is principally on specifications. Large tonnages of sheets of roofing quality have moved from this district. Jobbing mill sizes have been in limited demand and the jobbers of several interests have been idle for over a month. Quotations of 3.25c. and 4.25c. for black and galvanized grades respectively, put forth by a number of independents led by the Brier Hill Steel Co., have disappeared for the time being. The market is actually nearer 2.25c. for blue annealed, 2.75c. for common sheets and 3.75c. for galvanized, all base gages.

The average of 2.75c. for Nos. 26, 27 and 28 gage black sheets shipped during the past two months, as disclosed by the latest bi-monthly settlement, indicates that the higher prices did not prevail to any extent. A considerable volume of No. 28 gage black moved at 3c., however. The sales average is brought down due to the fact that substantial tonnages of No. 26 gage were shipped by several of the subscribing interests. Ordinarily No. 26 gage is sold at $2 per ton less than No. 28 gage, and No. 27 gage at $1 per ton less than No. 28. Several producers reported sales of No. 28 gage at 2.90c., against which shipments had been made.

Full finished sheets are in less demand from the automobile industry, though other users, among them makers of metal furniture, are in the market for somewhat larger tonnages. This grade of sheets is scarcely firm at 4.35c. for No. 22 gage auto body stock.

Inquiries for Plates

Inquiries aggregating between 4000 and 5000 tons have been before plate makers the past two weeks, coming largely from tank car interests. Some new tank car construction is under way, while there is a large volume of repair work, some plants being engaged wholly on the latter. Due to keen competitive conditions in plates, makers in nearby districts are reported to have accepted tonnage at 1.50c. The range on prices in the Valley is from 1.60c. to 1.70c., higher prices which were recently put out having been withdrawn.

Indications coming to the attention of district wire makers are that the attempt of the leading interest to drive in business at current levels, in likelihood of an advance, has failed to show strength. The contemplated increase may therefore be deferred, in which event current quotations of $2.60 for plain wire and $2.90 per base keg for nails are unlikely to continue firm. In fact, it has only been until recently that the principal independent maker in this territory has revised its prices upward in conformity with quotations of the American Steel & Wire Co.

Mineral Industry Will Co-operate With Secretary Hoover

WASHINGTON, Nov. 15.—Plans looking to close cooperation between the mineral industry and the Department of Commerce for the development of export trade were discussed yesterday at a meeting between Secretary Hoover and representatives of the industry, speaking for three branches, metals, coal and oil. J. G. Bradley, president National Coal Association, was named chairman and secretary. J. T. Callbreath, American Mining Congress, was made secretary of the committee under which are subcommittees, which will select additional members and after conferences with operators will make recommendations to the mining congress to be laid before Secretary Hoover. Bulkley Wells was made chairman of the subcommittee on metals; George S. Davison, president Gulf Refining Co., chairman subcommittee on oil, and T. H. Watkins, president Pennsylvania Coal & Coke Corporation, chairman of the subcommittee on coal.

The general committee on metals includes F. B. Richards, Lake Superior Iron Ore Association, iron ore; Edgar Z. Wallower, president Golden Rod Mining Co., zinc; B. B. Thayer, copper, and Bulkley Wells, gold.

American Iron and Steel Institute Meeting

Arrangements have been completed for the meeting of the American Iron and Steel Institute to be held at the Hotel Commodore, New York, Friday, Nov. 18. Following the delivery of the presidential address by Judge Gary in the morning, papers will be read at the morning and afternoon sessions. At the dinner in the evening, the guest of honor will be Marshal Foch of France, and he will be accompanied by General Pershing. It is expected that there will be more than 1500 guests.

The one-story building at 229-31 North Twenty-third Street, Philadelphia, recently leased by the Robbins & Myers Co., Springfield, Ohio, as referred to in THE IRON AGE, Nov. 3, will be occupied only as a warehouse and no manufacturing will be carried on.

A blast furnace, said to be the first in Argentina, has recently been installed near the city of Jujuy, says the London *Iron and Coal Trades Review*. There are deposits of iron ore in the vicinity. The furnace is producing about 24 tons of pig iron per day.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.25 to $2.40 base
Large boiler rivets.....2.35 to 2.50 base
Small rivets .....70, 10 and 5 to 70, 10 and 10 per cent off list
Machine bolts, small, rolled threads,
70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer,
65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads,
65, 10 and 10 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....65 and 10 per cent off list
Lag bolts .....70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under.....75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in.....75 and 10 to 80 and 10 per cent off list

Upset Set Screws

½ in. and under.....80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes .....70 and 10 per cent off list

Milled Set Screws

All sizes .....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $40; chain rods, $40; screw stock rods, $45; rivet and bolt rods and other rods of that character, $40; high carbon rods, $48 to $52, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.40 to $2.50 base; 5/16-in., $2.40 to $2.50 base. Boat and barge spikes, $2.40 to $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13.00; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2.15c. to 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20–2.45	Nos. 11 and 12	2.30–2.55
Nos. 9 and 10 (base)	2.25–2.50	Nos. 13 and 14	2.35–2.60
		Nos. 15 and 16	2.45–2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 22 to 24	2.60–2.85	No. 29	2.85–3.10
Nos. 25 and 26	2.65–2.90	No. 30	2.95–3.20
No. 27	2.70–2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75–3.00	Nos. 25 and 26	3.45–3.70
Nos. 12 to 14	2.85–3.10	No. 27	3.60–3.85
Nos. 15 and 16	3.00–3.25	No. 28 (base)	3.75–4.00
Nos. 17 to 21	3.15–3.40	No. 29	4.00–4.25
Nos. 22 to 24	3.30–3.55	No. 30	4.25–4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 17 to 21	2.60–2.85	No. 29	2.80–3.05
Nos. 22 to 24	2.65–2.90	No. 30	2.80–3.05
Nos. 25 to 27	2.70–2.95	Nos. 30½ and 31	2.85–3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Nov.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
9	13.25	12.75	28.37½	4.70	4.40	5.25	4.75
10	13.25	12.87½	28.37½	4.70	4.40	5.20	4.70
12	13.25	12.87½	....	4.70	4.40	5.20	4.70
14	13.25	13.00	28.62½	4.70	4.35	5.22½	4.72½
15	13.25	13.00	28.50	4.70	4.35	5.22½	4.72½

New York

NEW YORK, Nov. 15.

Two holidays in the past week, due to election day and armistice day, have interfered with demand, but the tone of all the markets is steady to strong. Copper is higher and more active. Business in Straits tin is moderate with prices firm. Lead continues in quiet demand at unchanged quotations. The zinc market has turned quiet, but prices are steady.

Copper.—Sales of electrolytic copper, both for domestic and foreign account, are reported as steady in volume. This has resulted in an advance in prices, the minimum for electrolytic copper for early delivery being 13.25c., delivered, or 13c., refinery, with some large producers asking from ⅛c. to ¼c. higher. Interest in the first quarter is active and the minimum quotation for this position is 13.50c., delivered. Sales for foreign consumption are good at as high as 13.37½c., f.a.s. Lake copper is steady at 13.25c. to 13.50c., delivered. The statistical position of the electrolytic market is better than in many months. It is now estimated that deliveries into consumption in October were at least 110,000,000 lb., which compare with an average up to October of 70,000,000 to 80,000,000 lb. per month. Sales for October, as noted last week, were estimated at 140,000,000 lb., with production only 40,000,000 lb. per month. It is reported that certain interests in Japan are inquiring for 1000 tons of electrolytic copper.

Tin.—On only one day in the last week has there been any business of consequence. On Thursday, Nov. 10, at least 300 tons of Straits tin was sold, the business having been done late in the day. The demand consisted of actual spot delivery and future shipment and, of the total sold, at least two-thirds went direct to consumers. Previous to Thursday the market had been lifeless. On Saturday a little more business was done, but yesterday and to-day the market has been dull. Spot Straits tin, New York, is quoted to-day at 28.50c., New York. The tendency of prices has been upward, due largely to the rising value of the pound sterling. Arrivals thus far this month have been 1505 tons with 3475 tons reported afloat.

Lead.—The feature in the market is the announcement that on or about Dec. 10 a reduction in freight rates will go into effect, amounting to about 15 points; that is, the present rate of 49c. per 100 lb. will approximate 35c. per 100 lb. from East St. Louis to the seaboard, and enable Western producers to more easily compete in this market. Business has been exceedingly quiet, with a steady demand reported at prevailing prices, which are 4.70c., New York, or 4.35c. to 4.40c., St. Louis, in the outside market, with prices of the leading interest unchanged at 4.70c., both New York and St. Louis.

Zinc.—The market has turned quiet, due principally to two causes. One is the fact that consumers supplied themselves liberally in the buying movement in October, at which time producers sold their output fairly well ahead. There is also the factor of a probable freight reduction on zinc from the Mississippi River to seaboard points for practically the same amount as in the case of lead, referred to in the preceding paragraph. Both of these conditions would tend to influence buyers to hold back. As the year approaches the end there is also the tendency to limit stocks for inventory purposes. We quote prime Western for early delivery at a minimum of 4.72½c., St. Louis, or 5.22½c., New York, with most producers asking 4.75c., St. Louis, or 5.25c., New York, if quoting at all.

Antimony.—The market is lower and exceedingly quiet at 4.65c., New York, duty paid, for wholesale lots for early delivery.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted at 24.50c. by the leading interest, f.o.b. plant, but it is probable that this seller would meet the quotations for the same grade as sold by importers at 17c. to 18c., New York, duty paid.

Old Metals.—Demand is better and prices are firm. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	$12.25
Copper, heavy and wire	11.25
Copper, light and bottoms	9.50
Heavy machine composition	9.50
Brass, heavy	7.00
Brass, light	5.50
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.75
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

Nov. 15.—Tin has advanced and zinc has declined, while other prices are unchanged. Inquiry for copper is light but prices are firmly held. There has been more activity in tin and prices have fluctuated from day to day, receding the latter part of last week and then recovering again. Lead is stagnant and weak. There has been considerable inquiry for zinc, but big buying is held up in anticipation of lower prices. We quote in carload lots: Lake copper, 13.25c. to 13.50c.; tin, 30.00c. to 30.50c.; lead, 4.45c.; spelter, 4.75c.; antimony, 7c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 8.50c.; copper bottoms, 7c.; red brass, 7c.; yellow brass, 5c.; lead pipe, 3c.; zinc, 2.25c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Nov. 15.—Lead is easier at from 4.35c. to 4.45c., car lots, while slab zinc is more steady at from 4.65c. to 4.75c., and up 5c. to 10c. for the week. In old metals we quote: Light brass, 3.50c.; heavy red brass, 7c.; light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tinfoil, 16c.; tea lead, 2c.; aluminum, 9c.

Campaign for Greater Use of Tin Plate

American manufacturers of tin plate, in the near future, will inaugurate a country-wide publicity campaign designed to enlarge the uses of their product. The opening wedge will be driven in an effort to induce the use of tin plate for containers for candy, coffee and tobacco, including cigars and cigarettes, in place of paper and cardboard. Apparently there is a large field for tin plate in candy containers, as a recent canvass disclosed an annual per capita consumption in this country of 12 lb. It also has been uncovered lately that coffee wholesalers have started a move seeking to have retailers, who do not distribute ground coffee in airtight containers, to grind the coffee upon sale, as it has been discovered that much of the aroma and strength leaves ground coffee between the time of packing and consumption when the container is of paper or some equally porous material. The superiority of tin boxes over paper or cardboard packages in keeping tobacco fresh has been so thoroughly demonstrated as to encourage the belief that for cigarettes and cigars there is a big field for tin contianers.

Work will commence on the oil refinery at Dishman, Wash., to be built by the Consolidated Diamond Oil & Refining Co., according to announcements of the company at Spokane headquarters. The refinery is designed to handle 500 bbl. per day.

PERSONAL

Daniel M. Clemson, one of the junior partners of Andrew Carnegie and for more than 40 years affiliated with Carnegie enterprises, recently announced his retirement from active business and plans to devote the remainder of his life to travel and leisure, free from the restrictions of business. He became identified with the Carnegie interests Jan. 1, 1880, as a mechanic at the Scotia ore mines of the company near Bellefonte, Pa. Later he was made superintendent of these mines. In 1887 he was promoted to the position of general manager of the Carnegie Natural Gas Co., the natural gas subsidiary of the Carnegie Steel Co., and about 20 years ago was elevated to its presidency. He was a director of the Carnegie Steel Co. as well as of its predecessor, the Carnegie Brothers Co., besides serving as an official of a number of the underlying Carnegie Steel Co. companies. Mr. Clemson has always evinced a keen interest in Pittsburgh charitable and philanthropic institutions, being especially active in the affairs of the Pittsburgh Association for the Improvement of the Poor.

J. M. Dillon, New England representative of the Detroit Twist Drill Co., has been promoted to district manager with an office at 45 Warren Street, New York.

Maj. Glen Edgerton, corps of engineers, has been appointed Director of Sales, War Department, succeeding Lt. Col. E. S. Hartshorn. For the past year and a half, Major Edgerton has been in charge of the sale and disposal of all surplus material of the corps of engineers.

H. V. Schiefer has been placed in charge of the Philadelphia office of the Webster Mfg. Co., Chicago. He has been affiliated with the C. O. Bartlett & Snow Co., Cleveland, as chief draftsman; Meese & Gottfried Co., San Francisco, as chief engineer; the Grasselli Chemical Co., Cleveland, as labor saving engineer, and the Arthur G. McKee Co., Cleveland, as manager of sintering plant department. He has contributed freely to the technical press on the subjects of material handling and the sintering of blast furnace flue dust.

John D. Wise, since 1919 with the Osborn Mfg. Co., Cleveland, foundry molding machines, has been appointed superintendent of the foundry laboratory at the University of Illinois.

Edward Kopper, Jr., formerly assistant superintendent American Hoist & Derrick Co., St. Paul, has resigned to become a partner in the H. C. McNair Co., St. Paul, agent for manufacturers of steel and railroad supplies.

W. B. Montgomery, formerly staff service director C. E. Knoeppel & Co., New York, industrial engineers, has joined A. F. Stock as Montgomery & Stock, Rochester, N. Y., industrial engineers.

Russell J. Englehart has become assistant superintendent of the forge laboratory at the University of Illinois. Previously he was with the Winchester Repeating Arms Co., for which he made an investigation of the manufacturing and heat-treating of steel.

J. W. MacMorris has become factory manager of the Mercer Motors Co., Trenton, N. J.

H. W. Townsend, formerly district manager Aldrich Pump Co., Pittsburgh office, has become works manager at the main plant at Allentown, Pa.

Edward Ray Weidlein has been appointed director of the Mellon Institute of Industrial Research by the chancellor and trustees of the University of Pittsburgh.

Fred W. Krebs, sales manager at Cleveland for the United Alloy Steel Corporation, Canton, Ohio, has been moved to the home office as sales promotion engineer. He has been succeeded at Cleveland by W. H. Forbes, formerly with the Cleveland office of the Carnegie Steel Co.

Leonard R. Nourie, Boston, Manning, Maxwell & Moore, Inc., has severed his connection with the company and has made no plans for the immediate future.

Bruce Barton, editor and writer, spoke on industrial relations building before the Greenfield Tap & Die Engineering Club, Greenfield, Mass., last week. During the evening motion pictures of the new G. T. D.-Morgan Hydroil grinder were shown.

Eliot K. Burr, Skinner Chuck Co., New Britain, Conn., has been made chairman of the New Britain Chamber of Commerce traffic bureau and also third vice-president of that organization.

George E. Quinn, Hartford, Conn., has puchased from Frank I. Hall and H. H. Hall the capital stock of the Draper & Hall Co., Middletown, Conn., tools and dies. The plant is located on Hubbard Street, being established there about 15 years ago.

H. C. Blake, secretary and general manager Foos Gas Engine Co., Springfield, Ohio, has been elected president in place of S. E. Baker, deceased. M. E. Baker has been elected secretary and treasurer.

John L. S. Birkinbine, Birkinbine Engineering Co., Philadelphia, has been made general manager of the Southern Coal & Iron Corporation and will assume the management of its iron properties at Rittenhouse Gap, Pa., and Roanoke, Va.

John Kirby, second vice-president and general superintendent of the William B. Pollock Co., fabricating interest of Youngstown, Ohio, was tendered a reception Nov. 12 by associates upon the completion of 50 years of service with the company. Mr. Kirby started to work for the Pollock company as a rivet heater when 16 years of age. He was presented with a huge loving cup and a 12-volume set of Spanish literature.

H. M. Witters has resigned as manager of the Milwaukee branch of the E. J. Woodison Co., Detroit, to become sales manager of the Western Malleables Co., Beaver Dam, Wis. His son, Charles H. Witters, has been promoted from assistant manager to manager of the Woodison offices in Milwaukee.

Leland F. Goodspeed, formerly chief engineer Barley Motor Car Co., Kalamazoo, Mich., has joined the Commonwealth Motors Co., Joliet, Ill., as vice-president in charge of engineering.

L. Kattenberg, a director of Handelmaatschappij R. S. Stokvis & Zonen, Rotterdam, sailed for Europe on the Olympic Nov. 15. Mr. Kattenberg, who interests himself in sales of iron and steel products for his company, made his trip to the United States to conclude transactions with American mills, which he says are able to hold their own with Germany in certain steel products. While in the United States his headquarters were with R. S. Stokvis & Sons, 17 Battery Place, New York.

Dr. Colin G. Fink, consulting electro-metallurgist, has removed his office to 101 Park Avenue, New York.

Waldo L. Phillips, F. R. Phillips & Sons Co., Pennsylvania Building, Philadelphia, steel exporter, will sail from San Francisco Dec. 5 on a business trip around the world. He will visit Japan, China, Italy, England and other countries, returning in about four months.

OBITUARY

THOMAS SMYTH FAUNTLEROY, president Moline Malleable Iron Co., St. Charles, Ill., died Nov. 9, at the Presbyterian Hospital, Chicago, and was buried on Nov. 11 at his home in Geneva, Ill. Mr. Fauntleroy had been president of the Moline Malleable Iron Co. since 1905, when he left the Ewart Mfg. Co., of which he was secretary and treasurer for 26 years. He was 77 years of age.

JOHN MAGEE, Magee Furnace Co., Union Street, Boston, died Nov. 7, at his home in Grafton, Mass., in his 74th year. He retired from active business about 10 years ago.

Machinery Markets and News of the Works

BETTER BUYING

Railroads, Automobile Manufacturers and Schools Provide Business

Durant Motors, Inc., Acquires 30 Turret Lathes and Other Shop Equipment

Though machine-tool buying continues at low ebb, there is a decided improvement this month, orders coming from several different sources, principally the railroads, public schools, automobile manufacturers and the brass industry.

Two new automobile companies, Durant Motors, Inc., and the Rickenbacker Automobile Corporation, both of Detroit, have made purchases. Durant Motors, Inc., bought 30 turret lathes and other new and slightly used tools, while the Rickenbacker Corporation acquired several miscellaneous tools.

Railroad buying has been confined to small lots. The Virginian Railroad, which took 10 tools, was the largest purchaser. The Union Railroad, Pittsburgh, a subsidiary of the United States Steel Corporation, has bought a radial drill, lathe and planer. The New York Central has purchased two lathes from Government stocks at Hog Island, Philadelphia. The Santa Fe, Rock Island and the Illinois Central have also bought in a small way.

The Missouri, Kansas & Texas, the Delaware, Lackawanna & Western and the Erie railroads have not yet purchased against their recent lists, but the M. K. & T. is expected to reach some decision within a week. The Erie will probably buy slightly used tools whenever such will meet their requirements.

Among current inquiries are the following: Three lathes for the Commonwealth Edison Co., Chicago, two lathes for the Ford Motor Co., Detroit, and two 42-in. heavy-duty lathes for the American Steel & Wire Co., Cleveland, the latter being a revived inquiry.

Three heavy-duty lathes have been sold by a Cincinnati builder for shipment to South America.

The Manchester, N. H., public schools have closed for nine metalworking tools, together with woodworking machines, electric and gas furnace equipment, etc.

A turret lathe manufacturer reports that the first two weeks of November brought the best business of the year, the brass industry being conspicuous as a buyer.

New York

NEW YORK, Nov. 15.

A little railroad activity continues to feature current buying of machine tools. The Union Railroad of Pittsburgh, a subsidiary of the United States Steel Corporation, has placed with a New York company an order for three large machines, a 6-ft. radial drill, 42-in. x 20-ft. lathe, and a 60-in. planer. The New York Central has bought a 24-in. and an 18-in. lathe from Government stocks at Hog Island, Philadelphia. No orders have yet been placed by the Delaware, Lackawanna & Western and the Erie railroads. The Erie, whose list was published a week ago, will probably purchase used tools.

Orders for single machines are somewhat more frequent. It is the smaller companies that are placing such business. Most of the larger users of metal-working tools have more shop equipment than they need for the present volume of business.

During the past week there have been a few purchases of electric cranes and a few new inquiries. Buying in this field, however, is still almost entirely a question of price. The Ferguson-Allan Co., 504 Bailey Avenue, Buffalo, N. Y., has requested offers of a second-hand or new crane of from 3-ton to 5-ton capacity, 40-ft. x 50-ft. span, either hand power or electric. William Steel & Sons Co., Philadelphia, which has been handling the purchase of four electric cranes for Horace T. Potts, Philadelphia, announces that purchase has been postponed until next spring. The Textile Finishing Machinery Co., Providence, R. I., which recently inquired for four electric and three hand power cranes, all of 5-tons capacity, has reached a decision on the bids submitted. The Booth Brothers & Hurricane Granite Co., 206 Broadway, New York, is receiving bids on a 15-ton, eight-wheel locomotive crane. The John W. Ferguson Co., United Bank Building, Paterson, N. J., recently in the market for a 10-ton crane, has purchased second-hand. .

Among recent sales are: Niles-Bement-Pond Co., 10-ton overhead traveling crane to the Merchants Despatch & Navigation Co., Buffalo, 5-ton, 47-ft. span overhead traveling crane to the Wheeler Condenser & Engineering Co., Carteret, N. J.; 5-ton, 60-ft. span overhead traveling crane to the Simbroco Stone Co., Boston, and a 50-ton, 38-ft. span overhead traveling crane to the Hudson Coal Co., 26 Liberty Street, New York; Brown Hoisting Machinery Co., a No. 2, type B, 5-ton electric locomotive crane to the city of New Haven, Conn.

The Loening Aeronautical Engineering Co., 351 West Fifty-second Street, New York, has leased property, 99 x 130 ft., on East Thirty-first Street, as a site for a new plant to manufacture aeroplanes, flying boats, parts, etc.

The O. J. Bloss Iron Works, 253 Monitor Street, Brooklyn, has completed plans for a new one-story iron-working building, 30 x 100 ft., on Henry Street. Charles A. P. Jehle, 350 Fulton Street, Brooklyn, is architect.

The Tiffany Electric Co., Inc., 165 Broadway, New York, manufacturer of electrical machinery and parts, is arranging a list of equipment for installation at its two-story machine shop, 40 x 150 ft., on Howell Street, Jersey City, N. J., now in course of erection, to include a wet grinder, radio drilling machine, etc.

The International Cement Co., 1834 Broadway, New York, has awarded contract to the Turner Construction Co., 244 Madison Avenue, for a new one-story building at its plant at Hudson, N. Y., 160 x 600 ft., estimated to cost about $200,000.

The Martin-Perry Co., 560 Jackson Avenue, Long Island City, manufacturer of automobile bodies, with headquarters at York, Pa., has had plans prepared for extensions and improvements in the building at Lincoln Highway and the Passaic River, Kearny, N. J., recently leased for a new branch plant, to cost about $50,000. The factory will be two stories, 50 x 100 ft. R. M. Barrett is in charge.

The Erie Railroad Co., 30 Church Street, New York, will soon call for bids for a one-story shop addition, 70 x 200 ft., at its yards at Hornell, N. Y., and estimated to cost about $100,000, with equipment. M. G. King, company address, is architect.

The Board of Education, Park Avenue and Fifty-ninth Street, New York, has leased four floors in the building now being erected at Concord and Duffield streets, Brooklyn, for the Manual Training School Department. It will be equipped for machine, mechanical, electrical and other affiliated branches of instruction.

The Emergency Fleet Corporation, Washington, has issued call for bids until Dec. 29 for proposed repairs to the steamship Leviathan. The work is estimated to cost about $5,000,000, including machinery, and specifications for the latter, temporarily held up, have now been completed. New power plant, oil-burning apparatus and other equipment will be required. The International Mercantile Marine Co., 9 Broadway, New York, is acting as agent and plans are on file at this office.

Electric motors, shafting, transmission and other mechanical equipment will be installed in the two-story and basement, reinforced-concrete laundry, 100 x 100 ft., to be erected at Fifth Avenue and 141st Street, New York, by the National Family Laundry Corporation, 1471 Wilkins Avenue, estimated to cost about $400,000, with machinery. The J. J. Gloster Co., 110 West Fortieth Street, is architect.

The Hub Electrical Supply Co., 558 Melrose Avenue, New York, manufacturer of electrical specialties, has acquired the three-story building at 616 Courtland Avenue, on site 25 x 100 ft., for new works. Alterations and improvements will be made at once. Joseph Newman is president.

The Studebaker Corporation of America, 1700 Broadway, New York, has leased the one-story building occupying the block front on Gerard Avenue, between 149th and 150th streets, for a new service and repair works for Studebaker automobiles.

A portion of the addition to be erected by the Royal Metal Furniture Co., 125 Eighth Street, Brooklyn, 70 x 75 ft., will be equipped as a foundry and the remainder for general manufacture. Work will be placed under way at once.

The Ward Baking Co., Southern Boulevard and St. Mary's Street, New York, has leased the two-story building at Southern Boulevard and 137th Street, recently completed, for a new service works, with repair department, for company automobiles.

The Warner-Quinlan Co., 79 Wall Street, New York, has commissioned George Gifford, engineer, 227 Fulton Street, to prepare plans for rebuilding its asphalt manufacturing plant at Linden, N. J., destroyed by fire last July with loss estimated at $3,000,000. The new works, it is said, will cost close to a like amount. W. W. McFarland is general manager.

The Lehigh Valley Railroad Co., Jersey City, N. J., has filed plans for a new shop and mechanical building at its car and locomotive shops at the foot of Chapel Avenue, to cost about $150,000.

The M. W. Kellogg Co., Jersey City, N. J., manufacturer of power plant equipment, steam specialties, etc., has removed a portion of its plant from West Side Avenue to the new buildings now completed in the Droyers' Point section. Work on other buildings will be pushed to completion, and it is proposed to have the entire plant completed and occupied early in the spring.

The Globe Tile Co., 865-71 Grand Street, Brooklyn, will commence the immediate erection of its new plant on Grand Street, 100 x 100 ft. It will be equipped with marble and stone-working machinery, and an electric traveling crane for yard and shop service will be installed. Harry L. Morton is manager.

A new power plant of about 1000-kw. capacity will be constructed by the Daniels Linseed Oil Co., 20 Ninth Avenue, Minneapolis, Minn., in connection with its new plant at Edgewater, N. J. Contract for the erection of a number of buildings has been awarded to the Tilt-Hargan Co., 90 West Broadway, New York, including main building, 150 x 250 ft. Samuel Mairs is secretary.

Fire, Nov. 8, destroyed the two-story plant of C. C. Galbraith & Son, Keyport, N. J., manufacturer of marine equipment, lifeboats, rafts, etc., with loss estimated at about $50,000, including equipment.

The Burroughs Machinery Corporation, 246 North Tenth Street, Newark, N. J., has acquired the property and business of the Charles Burroughs Co., for many years engaged in the manufacture of machinery at 141-49 Commerce Street. The company some time ago disposed of its factory site to the city and operations in the future will be conducted at the North Tenth Street works.

The Board of Freeholders, Court House, Newark, is planning for the installation of a new coal conveyor system for the power house at the Essex Mountain Sanatorium, Verona. Frederick O. Runyon, Runyon & Carey, 843 Broad Street, engineers, is in charge.

The Sun Machinery Co., 103 Commerce Street, Newark, has acquired property at 28 Mechanic Street and on Green Street and will remove its works to these locations.

Hoisting machinery, conveying and other mechanical equipment will be installed at the new terminal plant to be established by the William F. Shupe Co., 85 Day Street, Orange, N. J., builders' materials, on the former Government property at Kearny, N. J. The company has leased 30 acres with 1500 ft. of dock frontage on the Passaic River, improved with four buildings, each containing about 50,000 sq. ft. The project is said to involve about $2,000,000. The Shupe Terminal Corporation has been organized with a capital of $2,500,000, as a subsidiary organization, to carry out the details of the new plant and provide for operations.

Chicago

CHICAGO, Nov. 14.

The market situation has changed little except in sentiment, which is generally more cheerful. Inquiries are still few, but are more often followed by purchases than has been the case heretofore. Railroads with headquarters in Chicago are still disposed to postpone action on their outstanding lists, although they have placed orders for a few machines the past week. The Santa Fe bought an axle lathe, a 1500-lb. steam hammer, and two sheet metal-working machines for 14-gage material. This road, however, proposes to send out new inquiries covering the remaining machine tools on which it has previously secured quotations. The Illinois Central bought a 25-in. shaper, and the Rock Island has placed an order for a wet grinding machine. Joseph T. Ryerson & Son, Chicago, recently received an order from the Virginian Railway for about $20,000 worth of equipment, including two radial drills and a half dozen engine lathes. Word comes from St. Louis that the Missouri, Kansas & Texas has not yet bought against its pending list, but will probably take action this week. Perhaps the largest order received by a local dealer from a Chicago industrial user comprises a 24-in. x 10-ft. engine lathe, a 24-in. drill press, and a 24-in. shaper.

Crane activity is at a low ebb. Among the few orders recently placed, was one for a 5-ton 70-ft. electric overhead traveling crane, received by the Whiting Corporation, from the Indiana Fibre Products Co., Marion, Ind. The Whiting Corporation also will furnish 18 100-ton locomotive trucks to the Santa Fe, and has received an order from another Western road for a turntable tractor.

The Commonwealth Edison Co., Chicago, is in the market for three engine lathes.

The Troy Laundry Machine Co. will abandon its five-story plant, which covers an entire block on south LaSalle Street, between Twenty-second and Twenty-third streets, Chicago, and will move to the 83-acre plant of the Root & Vandervoort Engineering Co., which it has purchased at East Moline, Ill. The latter property comprises 20 buildings with 600,000 sq. ft. of floor space.

A one and two-story factory, 93 x 185 ft., 2065-71 Powell Avenue, Chicago, is now being constructed for the manufacture of golf balls. The plant, which will cost $45,000, will be occupied by Thomas E. Wilson & Co., sporting goods manufacturer.

The Duty Motors Corporation has let contract for the construction of a plant in Raymond Street, Elgin, Ill., to cost $15,000.

The Lincoln Water & Light Co., Lincoln, Ill., is remodeling a storehouse, east and north of its main building, into a machine shop. The machine shop was formerly located in the main structure.

The capacity of the Standard Brake Shoe & Foundry Co. plant at Pine Bluff, Ark., is to be doubled to take care of increasing business, according to F. L. Dilley, head of the company. The present capacity is 800,000 lb. of finished products per month. The contemplated improvement will cost about $20,000.

The Mechanical Devices Co., 134 Fox Street, Aurora, Ill., has been incorporated with $25,000 capital stock to manufacture oil-less peg bearings, barrel pumps and house service pumps. Its machinery requirements have been satisfied for the time being. The officers are: President, F. E. Sperry; vice-president, C. H. Greene; secretary and treasurer, C. S. Battles.

The Star-Buck Corporation, 1205 Lehmann Building, Peoria, Ill., recently incorporated with $35,000 capital stock, will not engage in the manufacturing business, but will confine itself to the merchandising of toys, novelties, and machinery.

The Weaver Auto Douser Co., 14 East Jackson Boulevard, Chicago, recently incorporated with $15,000 capital stock to manufacture automatic devices for the control of the operation of motion picture projection machines, is having its products made in a leased plant at Watts, Cal.

The Omaha Semi-Steel Foundry Co., 1409 Jackson Street, Omaha, Neb., has completed plans for a one and two-story plant, 60 x 100 ft. W. F. Gernandt, 701 O. L. & B. Association Building, is architect.

The Bogner Automobile Co., McHenry, Ill., has plans under way for a new two-story service and repair building, estimated to cost close to $50,000. H. B. Cox, Lehmann Building, Peoria, Ill., is architect.

The Carney Cement Co., Carney Station, Mankato, Minn., will hold in temporary abeyance the erection of eight new buildings at its plant. Foundation work for a number of the structures has been completed and plans for the superstructures prepared. R. K. Meade, 13 East Fayette Street, Baltimore, is engineer.

The Artificial Ice Co., Oskaloosa, Iowa, has completed plans and will commence the immediate erection of a new one-story ice-manufacturing factory to cost about $40,000. R. T. Panders is manager.

Conveying machinery, power equipment and other mechanical apparatus will be installed in the new one-story plant, 75 x 350 ft., to be erected by the Northern Illinois Cereal Co., Lockport, Ill., estimated to cost about $100,000, including machinery. C. W. Webster, Cutting Building, Joliet, Ill., is architect.

The State Board of Regents, T. W. Dwight, president, Pierre, S. D., has completed plans for a new power house at the State College of Agricultural and Mechanical Arts, Brookings, S. D. H. F. Berg, Pierre, is State engineer.

The Creamery Package Mfg. Co., Fort Atkinson, Wis., manufacturer of dairy and farm machinery, is having plans prepared for a new three-story building on Colfax Avenue, St. Paul, Minn., 95 x 170 ft., estimated to cost about $100,000. Headquarters of the company are at 61 West Kinzie Street, Chicago.

New England

BOSTON, Nov. 14.

Practically all local machine tool houses were closed from Thursday evening until to-day, which is reflected in the volume of business transacted the past week. The most important order placed was 14 metal-working machines and considerable wood-working equipment by the city of Manchester, N. H., for its schools. The Practical Arts High School list included one 20-in. drill, one Sipp sensitive drill, one universal milling machine, one 14-in. x 10-ft. lathe, one 11-ft. x 5-ft. speed lathe, one 12-in. x 6-ft. lathe, one No. 190 Wells cutter and reamer grinder, one 16-in. Hendey shaper, and one 16-in. x 5-ft. lathe, together with electric, gas furnace and miscellaneous wood-working equipment, including seven 11-in. x 4-ft., two 11-in. x 5-ft. and one 13-in. x 6-ft. lathes. The list for the West Side High School included one 20-in. drill, one 14-in. x 8-ft. lathe, one 11-in x 5-ft. speed lathe, one double head grinder and one 9-in. x 5-ft. lathe, with wood-working equipment including five 11-in. x 4-ft. and one 13-in. x 6-ft. lathes. All tools are motor driven, guaranteed against price and are to be delivered in May, 1922. The full list of equipment has not been purchased.

Other sales the past week include the following used equipment to a manufacturer of textile machinery: One 18-in. x 8-ft. lathe, one 21-in. drill, one speed lathe, and one universal grinding machine. A large manufacturer of electrical appliances bought a new multiple spindle drill, 24 spindles, for local delivery, while a Salem manufacturer closed on a new four-spindle drill. The American Woolen Co. threw out all bids on its prospective crane order and asked builders to submit bids on new specifications.

The Stark Tool Co., Waltham, Mass., precision lathes, has issued a new price list which shows reductions on some numbers only. Compared with ten months ago the company's line averages 32 per cent lower. Some makers of snap gages have reduced prices approximately 12½ per cent.

Among recent sales in Connecticut is that by Peck, Stow & Wilcox Co. of shears, rollers, bending machines, cornice brakes and drills to the Griswold, Richmond & Glock Co., sheet metal, 135 Cheldon Street, Hartford, where it occupies the first floor, 25 x 235 ft., formerly occupied by the Connecticut Blower Co.

The Burton-Furber Coal Co., 50 Congress Street, Boston, will erect a one-story garage and repair shop, 30 x 50 ft., at 161 Medford Street, Charlestown.

Ernest Kiesel, 25 Oliver Street, Stamford, Conn., is having plans revised for a three-story, 50 x 114-ft. garage and light manufacturing building.

Contract has been awarded by the Textile Finishing Machinery Co., Providence, R. I., for a two-story, 60 x 90-ft. machine shop and office.

The Mack Motor Truck Co., 185 Massachusetts Avenue, Cambridge, Mass., will erect a one-story, 44 x 110-ft. addition to its plant on Osborn Street.

The Builders' Iron & Steel Co., 262 Bridge Street, East Cambridge, Mass., will erect a one and one-half-story, 70 x 200-ft. manufacturing plant on Garvey Street, Everett, to cost about $65,000.

During the past week about 15 cars of equipment were unloaded at the new Meriden, Conn., plant of the New Departure Mfg. Co., Bristol, Conn., ball bearings, etc. No definite time has been set for opening the plant.

The Hampden Motor Truck Corporation, Holyoke, Mass., a $1,000,000 company granted a charter about a month ago, has purchased eight acres on McKinstry Avenue, Chicopee, Mass., on which it will erect the first unit of a manufacturing plant in the near future.

The Crane Co., Bridgeport, Conn., manufacturer of steam specialties, valves, piping, etc., has completed plans for a one-story addition to its plant on South Avenue, 75 x 175 ft., to be used for the most part for annealing operations. Headquarters of the company are at 836 South Michigan Avenue, Chicago.

The Connecticut Light & Power Co., Waterbury, Conn., is disposing of a stock issue of $4,000,000, the proceeds to be used for extensions and improvements. A hydroelectric generating plant is now being operated at Stevenson, on the Housatonic River, and a steam-operated plant at Waterbury. Irvin W. Day is vice-president.

The Southbridge Foundry Co., Southbridge, Mass., has awarded contract to the Truscon Steel Co., Youngstown, Ohio, for a new one-story foundry, 50 x 100 ft. Work will commence at once.

The plant and business of the Draper & Hall Co., Middletown, Conn., manufacturer of tools, dies, etc., has been acquired by George E. Quinn, Hartford, Conn., and the business will be continued in the building on Hubbard Street, as heretofore. Frank I. and H. H. Hall retire from the company, having disposed of their interests.

The Stafford Co., Hyde Park Avenue, Boston, manufacturer of weaving machinery and mechanisms, has arranged for a preferred stock issue, the proceeds to be used for general operations, expansion, etc.

The Cambridge Electric Light Co., 46 Blackstone Street, Cambridge, Mass., is having plans prepared for a new one-story power house, 80 x 180 ft. French & Hubbard, 210 South Street, Boston, are engineers.

The Eagle Construction Co., Bridgeport, Conn., has plans under way for a one-story, brick addition, 45 x 91 ft., to its metal and wood-working plant. Harry E. Koerner, Bridgeport, is architect.

An automobile service and repair building, three stories, 40 x 100 ft., for company cars, will be erected by Walter Baker & Co., Ltd., Pierce Square, Dorchester, Mass., at Lower Mills, to cost about $45,000.

Philadelphia

PHILADELPHIA, Nov. 14.

William A. Loveland, Inc., 2014 Sansom Street, Philadelphia, electrical construction and contracting, has leased the two-story building at 2025 Sansom Street, for a new works. Possession will be taken at once.

The Producers' Cold Storage Terminal, Inc., Philadelphia, care of Andrew J. Sauer & Co., Denkla Building, engineers, is having plans prepared for a 10-story ice and cold storage plant at Swanson and Water streets, 90 x 275 ft., estimated to cost about $1,500,000, with machinery.

The Paramount Electric Supply & Fixture Co., Philadelphia, has leased the building at 251 Market Street, for a new works. Possession will be taken at once.

The Department of Public Works, Bureau of Highways, City Hall, Philadelphia, is completing plans and will soon commence the erection of a new one-story machine shop, 56 x 120 ft., at Thirtieth and Spring Garden streets, in connection with an automobile service building, 80 x 105 ft., for municipal cars.

The Franklinville Ice Storage Co., 3423 North Sixth Street, Philadelphia, will make extensions and improvements in its plant at 5166-70 Jefferson Street, including the installation of refrigerating equipment, to cost about $40,000.

The Emergency Fleet Corporation, Washington, has perfected arrangements for the liquidation of its holdings at the Pusey & Jones shipyard, Gloucester City, N. J., and will dispose of all surplus equipment and supplies now at the yard.

The Nottingham Rubber Co., Trenton, N. J., recently organized with a capital of $500,000, is planning the erection of works near Philadelphia to manufacture automobile tires and tubes and other rubber products. Options are said to have been taken on a site. Samuel H. Bell, Reading, Pa., is president; I. Alexander, Trenton, secretary; and C. Francis Fisk, 150 East State Street, Trenton, vice-president and general manager. Details of the project will be handled by the latter.

The Spring City Glass Works, Spring City, Pa., has completed plans for a new machine shop, 25 x 50 ft., and will take bids at once. J. Vincent Poley, 162 Second Avenue, Royersford, Pa., is architect.

The Mifflinburg Body Co., Mifflinburg, Pa., manufacturer of automobile bodies, has awarded contract to Jacob Gehron & Son, 607 Cemetery Street, Williamsport, Pa., for a new two-story plant, 62 x 90 ft. J. C. Sterling heads the company. R. R. Markley, Spooner Building, Harrisburg, Pa., is architect.

The Harrisburg Stanley Spring Co., Harrisburg, Pa., will commence the immediate erection of a new plant to manufacture special self-oiling and boltless automobile springs. It is proposed to develop an initial output of about 1000 tons of material a year. Troy B. Wildermuth is president; William V. Davies, treasurer, and Harry D. Delmotte, secretary.

The Gray Iron Foundry Co., Reading Pa., will increase its line of production, to include axes, hatchets, hammers, tinners' tools and other hardware specialties. The company

will also increase manufacture in the line of kitchen products.

The Board of Directors, Marywood College, Scranton, Pa., has had plans prepared for the construction of a new one-story power house, 40 x 104 ft. John J. Hawley, Traders' Bank Building, is architect.

The Susquehanna Power Co., New York, headed by Francis T. Homer, 40 Wall Street, and associates, is said to have plans nearing completion for a number of hydro-electric generating plants along the Susquehanna River in Pennsylvania and Maryland. The initial plant will be established in the vicinity of Port Deposit, Md. The project is estimated to cost in excess of $10,000,000, including power plant equipment, transmission apparatus, etc.

The Scranton Electric Co., Scranton, Pa., has plans under way for extensions and improvements in its power plant and system to cost close to $1,000,000. The work will include an addition to the generating plant on North Washington Street, and the installation of a new 20,000 kw. turbo generator with auxiliary operating machinery.

The Ellwood City Forge Co., Ellwood City, Pa., has let contract for an addition to its plant to the Penn Bridge Co., Beaver Falls. It will be the same size as the present factory and will double the capacity. More than 100 additional men will be employed when it is completed.

The report that a 15-ton crane for the Shawmont pumping station, Philadelphia, has been awarded to the Niles-Bement-Pond Co. is incorrect. It was awarded to Alfred Box & Co., Philadelphia.

Baltimore

BALTIMORE, Nov. 14.

The Fowler & Farley Engineering Co., 2121 Oak Street, Baltimore, recently organized, has plans under way for a new machine shop, and is making inquiries for a number of machine tools. Claude Farley is president and E. A. Fowler vice-president.

Slaysman & Co., 810-11 Pratt Street, Baltimore, operating a machine works, are planning to rebuild the portion of their three-story plant destroyed by fire Nov. 10.

The West Virginia & Maryland Power Co., Tunnelton, W. Va., is negotiating for the purchase of the municipal electric light and power plant at Oakland, Md., recently completed at a cost of about $45,000. Upon acquisition, the new owner plans for extensions. The West Virginia company is also arranging for the construction of a central generating plant on the Cheat River, near Albrightsville, W. Va., for light and power service along the line of the Morgantown & Kingswood Railroad.

The Continental Garage & Service Co., Baltimore, care of L. Lawson Wagner, Union Trust Building, architect, recently organized, has plans under way for a new five-story automobile service building, with repair works, on a site at the John Hopkins University property. It is estimated to cost about $400,000, with equipment. J. Bacon Hyatt, former manager of the Mid-City Garage & Motor Supply Co., is president of the new company.

David E. Gunter, Frostburg, Md., has awarded contract to the Austin Co., Bulletin Building, Philadelphia, for a new one-story automobile service building and repair works, estimated to cost about $42,000. Work will commence at once.

Machinery at the plant of Musher & Co., Inc., East Fayette and Eleventh streets, Highlandtown, Baltimore, including buildings and site, will be offered for sale by the Baltimore Trust Co., trustee, on Nov. 21. The plant has been used for the manufacture of oil products, and the equipment comprises grinding machines, air compressors, motors, pumping machinery, steel glass-lined tanks, as well as patents covering the manufacture of special package-filling and soldering machines.

The Nash Motor Co., Oliver and Maryland streets, Baltimore, has completed plans for a new three-story automobile service and repair building, and will commence work at an early date. Owens & Sisco, 1605 Continental Building, are architects.

The Musselman Concrete Pipe Co., Inc., New Holland, Pa., will break ground at once for the first unit of its proposed plant at Claymont and Thirteenth streets, Wilmington, Del. It will be 30 x 80 ft. and will be supplemented by two additional units early in the spring.

The J. G. Tice Co., La Grange, Ga., has acquired a site for a new foundry and machine shop. Plans are under way for a building 75 x 175 ft. and work will commence at an early date.

The American Furniture Co., Martinsville, Va., has had plans prepared for a new power house. Lockwood, Greene & Co., Charlotte, N. C., are architects.

The engine house and shop at New Market, Va., used by the Baltimore & Ohio Railroad, Baltimore, and the Southern Railway, Richmond, Va., was partially destroyed by fire Nov. 7 with loss estimated at about $20,000. It will be rebuilt.

The Common Council, Enfield, N. C., is having plans prepared for a municipal electric light and power plant, estimated to cost close to $50,000. William C. Olsen, Kinston, N. C., is consulting engineer.

The Houston Mfg. Co., Thirtieth Street, Columbus, Ga., manufacturer of machinery and parts, will install new equipment at its plant, including a lathe and other machine tools.

Cleveland

CLEVELAND, Nov. 14.

A local builder of turret lathes reports a better volume of orders the first two weeks of November than during the corresponding period for the past 15 months. The demand was largely from the brass industry and was mostly in single machine orders. Dealers generally report a slight improvement in business. Orders are still almost wholly for single machines and are coming from small shops. A Cleveland maker has taken two turret lathes for the Long Island plant of Durant Motors, Inc.

Inquiries are somewhat more plentiful. Some manufacturers in metal working lines are lining up equipment that they will eventually need but are withholding orders until their business picks up. The American Steel & Wire Co. has revived an inquiry for two 42-in. heavy-duty lathes. An Illinois maker of vertical milling machines has made a slight price reduction on part of his line.

The C. & G. Cooper Co., Mount Vernon, Ohio, has moved its gas producer plant from Marion, Ohio, to Mount Vernon. Several years ago it acquired the plant of the Marion Tool & Die Works in which it has been making gas producers, with the exception of the castings, which have been made at Mount Vernon.

The New Delphos Mfg. Co., in which Lima and Delphos, Ohio, men are interested, has taken over the plant of the Delphos Mfg. Co., maker of sheet metal products. A. W. Wheatley, president the Wheatley Co., Lima, and others are interested in the new organization.

The P. R. Morren Foundry Co., 4260 East Ninety-eighth Street, Cleveland, has had plans prepared for a foundry, 40 x 102 ft., and pattern shop.

The Canton Brick & Fireproofing Co., Midvale, Ohio, will shortly begin the erection of a new plant.

The Youngstown Welding Co., Youngstown, Ohio, has purchased 3½ acres on which it contemplates the erection of a new plant early next year, comprising three buildings, 100 x 298-ft. each.

The Pressed Metal Mfg. Co., Waukesha, Wis., plans to move to Lima, Ohio. It will manufacture shock absorbers for automobiles.

The Lewis Electric Co., Minerva, Ohio, manufacturer of electrical equipment, has awarded contract to the Boldt Construction Co., 5902 Euclid Avenue, Cleveland, for the first unit of its new plant, one-story, 90 x 200 ft. J. C. Lewis is president.

The Continental Clay Co., Zinninger Building, Canton, Ohio, has plans under way for a new one-story factory, 100 x 100 ft., at East Canton, for the manufacture of sewer pipe, etc. It is estimated to cost in excess of $200,000.

The Sands Mfg. Co., 5407 Sweeney Avenue, Cleveland, Ohio, manufacturer of water heaters, heating apparatus, etc., is preparing plans for a new one-story forge shop, 35 x 100 ft., estimated to cost about $40,000. J. M. Sands is head.

Pittsburgh

PITTSBURGH, Nov. 14.

Actual machine tool business still is of small proportions, but in the prospective the market shows considerable activity, with numerous requests for preliminary price information. One crane company representative reports four such inquiries the past week, while another is figuring against inquiries involving seven cranes. This also is the case with dealers in machine tools, whose chief activities are in quoting rather than in selling. The most lively tool prospects before the trade are those for the Western Penitentiary and the West Penn Power Co. The former inquiry has been revised for the second time and now specifies for first quality tools. The Merchants Dispatch & Transportation Co. recently closed for three 10-ton Niles cranes through the Rochester, N. Y., office of the Niles-Bement-Pond Co. Indications are that

the four cranes required by the Standard Underground Cable Co. will not be placed until after Jan. 1.

The Ward Baking Co., Pittsburgh, has filed plans for a new one-story automobile service and repair building estimated to cost about $50,000.

The Standard Sanitary Mfg. Co., Bessemer Building, Pittsburgh, will soon take bids for a one-story addition to its plant at Sixth and A streets, Louisville, 50 x 400 ft., to be equipped as an enameling works. It is estimated to cost about $75,000. O. P. Ward, Lincoln Building, Louisville, is architect.

The new plant of the Denk Engineering Co., 45 Shannon Building, Pittsburgh, plans for which are now being prepared, will be equipped for the manufacture of a general line of mechanical products. It was incorporated recently under Delaware laws with capital of $150,000, and is headed by F. J. Denk, A. H. Peabody and Leo J. Schaedle.

The Appalachian Power Co., Bluefield, W. Va., is having plans prepared for enlargements in its plant at Glen Lyn, to increase the capacity from 20,000 to 40,000-kw. New generating machinery, boilers and other equipment will be installed. Viele, Blackwell & Buck, 49 Wall Street, New York, are consulting engineers.

The United Mfg. & Equipment Co., Clarksburg, W. Va., is considering plans for a new one-story machine shop. H. H. DeMoss heads the company.

The Automotive Co., Oberlan Building, Charleston, W. Va., will hold in temporary abeyance the erection of its new one-story plant, 80 x 250 ft., at Mount Pleasant, W. Va., for the manufacture of automotive products. It is estimated to cost about $90,000, including machinery. Contract was awarded recently to the Rust Engineering Co., 1901 Fifth Avenue, Pittsburgh.

The Raleigh Wyoming Coal Co., Maben, W. Va., will build a new one-story power plant, 70 x 80 ft., at its local properties. The Rust Engineering Co., 1901 Fifth Avenue, Pittsburgh, is engineer.

Detroit

DETROIT, Nov. 14.

The Fisher Body Corporation, Durant Building, Detroit, manufacturer of automobile bodies, will break ground at once for a new two-story machine shop, 30 x 50 ft., on Farnsworth Avenue, to cost about $30,000. Austin & Howe, Book Building, are contractors. Fred J. Fisher is president.

The Marinette & Menominee Paper Co., Menominee, Mich., has arranged for a bond issue of $2,000,000, the proceeds to be used for general operations, extensions, improvements, etc.

The Ford Motor Co., Detroit, has preliminary plans under way for a number of additions to its plant. The work, it is said, will be carried out primarily to relieve the present unemployment situation in this section. Bids are being taken for an immediate extension to cost $200,000.

The Mac Sim Bar Paper Co., Otsego, Mich., will soon call for bids for its new one-story electric power plant, 85 x 140 ft., estimated to cost close to $300,000, including machinery. Billingham & Cobb, Press Building, Kalamazoo, Mich., are architects and engineers.

The Northrup Lock Co., Flint and Marshall streets, Orion, Mich., has completed plans and will commence the immediate erection of a new one-story factory. Charles Northrup is president.

The General Motors Corporation, Detroit, is arranging for the discontinuance of its Scripps-Booth passenger car division. It has been producing about 20 cars per day.

The Common Council, Sandusky, Mich., is arranging for the construction of a municipal electric light and power plant to cost about $45,000. L. C. Reid is city engineer.

The Stearns Lighting & Power Co., Ludington, Mich., is making plans to erect a new power unit and to remodel the present one and install new equipment.

The Page Steel & Wire Fence Co., Adrian, Mich., is making additions to its machinery equipment and enlarging its working force.

The Dry-Kold Refrigerator Co., Niles, Mich., is building an addition which will increase the floor space of the machine department 2000 sq. ft.

The property of the Hinkley Motors Corporation, Ecorse, Mich., was sold last week at public auction to Henry M. Butzel, Detroit, acting in behalf of unnamed clients. A new company will be organized which will begin production in a new plant to be erected at High and Cicotte streets, Ecorse.

The Jewett Phonograph Co., Allegan, Mich., has under construction an addition, 24 x 110 ft.

The Beach Mfg. Co., of Charlotte, Mich., is erecting a plant addition, one story, 30 x 150 ft.

The Michigan State Administrative Board has authorized the construction of a new power house on the site of a projected State reform school at Lansing, Mich., to cost $2,000,000. Preliminary work is under way.

The L. Perrigo Co., Allegan, is having plans prepared for a two-story brick and steel factory, 65 x 125 ft.

The Motor Wheel Corporation, Lansing, Mich., has awarded to the H. G. Christman Co. contract for a one-story building, 120 x 240 ft.

Buffalo

BUFFALO, Nov. 14.

The National Lamp Works of the General Electric Co., Nela Park, Cleveland, has preliminary plans under way for a new one-story power house at its Buffalo plant, 757 East Ferry Street, estimated to cost about $100,000. It is proposed to commence construction early in the spring. E. J. Edwards, company address, is engineer.

The Electro-Refractory Co., Ellicott Square Building, Buffalo, manufacturer of steel crucibles, etc., is planning to rebuild its works on Townline Road, East Hamburg, recently destroyed by fire with loss reported at $200,000. It will consist of a main plant, 50 x 300 ft., and machine shop, 30 x 75 ft.

Z. T. Darrow, Canandaigua, N. Y., is having plans prepared for a one-story machine shop, 80 x 100 ft. William S. Lozier, Cutler Building, Rochester, N. Y., is architect.

The Seneca Falls Foundry Co., Seneca Falls, N. Y., has leased the foundry of the Seneca Falls Mfg. Co., vicinity of Bridge and Water streets, and will occupy the structure for casting production.

The City Council, Buffalo, has adopted an ordinance requiring the electrification of all steam railroads entering the city after Jan. 1, 1923. The cost of the change, including equipment, is estimated in excess of $2,500,000. The different railroads affected include the New York Central; Delaware, Lackawanna & Western; Lehigh Valley; Erie; New York, Ontario & Western; Lake Shore & Michigan Southern; Michigan Central; West Shore; Wabash; and Buffalo, Rochester & Pittsburgh.

The New York State College of Agriculture, Cornell University, Ithaca, N. Y., has completed plans for a new cold storage plant. Lewis F. Pilcher, Capitol Building, Albany, N. Y., is State architect.

The Common Council, Gilbertsville, N. Y., has been granted permission to construct and operate a municipal electric light and power plant. Work will commence at an early date.

The Gulf States

BIRMINGHAM, Nov. 14.

The American Cotton Oil Co., New Orleans, is planning for the erection of new mechanical works, to be used primarily for car repair and parts manufacturing.

The National Forge Co., Anniston, Ala., has plans under way for rebuilding of the portion of its works recently destroyed by fire with loss estimated at $40,000.

Fire, Nov. 2, destroyed the plant of the Gulf Shingle & Ice Co., Mobile, Ala., with loss estimated at about $75,000, including ice and refrigerating equipment.

Crushing and pulverizing machinery, motors and other mechanical equipment will be installed in the new laboratory to be erected by the Florida Terminal Co., Fernandina, Fla. R. M. Martin is plant superintendent.

The Engineering Department, New Orleans, has completed plans for the installation of a new refrigerating plant in the municipal market on Poydras Street, to be about 21 tons capacity. W. Ball, City Hall, is city purchasing agent.

The Alexander Lumber Co., Alco, La., will commence the immediate erection of a new mill, to include hand saw department, 48-in. gang saw plant, circular saw and other departments. The machinery installation will provide for a daily output of 200,000 ft.

G. C. Holmes & Co., Houston, Tex., are negotiating with the Chamber of Commerce, Rockdale, Tex., for a site for the erection of a new oil refinery.

The Fort Payne Ice Co., Fort Payne, Ala., recently organized, has plans under way for a new one-story, ice-manufacturing plant. J. B. Harlson is president and G. A. Wetherley secretary-treasurer.

Freight-handling equipment, conveying machinery, etc., will be installed by the City Commission, Pensacola, Fla., in connection with the development of municipal terminal facilities in the Palafox wharf section. The work is estimated to cost about $200,000.

The Board of City Commissioners, Mobile, Ala., is con-

sidering the construction of a municipal ice-manufacturing and cold storage plant. Wright Smith, city engineer, is in charge.

Freight-handling machinery, cranes, etc., will be installed by the Louisville & Nashville Railroad Co., Louisville, in connection with its improvements and extensions at New Orleans and Gentilly, a suburb. The total expenditure to be made by the road in this district within the next six months will aggregate over $6,500,000.

Indiana

INDIANAPOLIS, Nov. 14.

The Alena Steam Products Co., Hume-Mansur Building, Indianapolis, recently organized, has acquired six acres on South Denny Street, fronting the Pennsylvania Railroad, as a site for a new plant to manufacture steam-driven motor trucks and tractors. The initial works will consist of a main one-story structure, with two wings, aggregating 60 x 250 ft. The main building will be equipped as an assembling plant and the wings as a sub-assembling department and machine shop, respectively. It will cost close to $50,000, including machinery. Fred Hamilton is president and John W. Cadle secretary and treasurer.

The Pendergast Fence Co., Stillwater, Mich., manufacturer of wire fencing, etc., has revised plans under way for its branch plant on Division Street, Elkhart, Ind., to be one-story and basement and estimated to cost about $25,000.

The Symplex Lock Rim Co., Petersburg, Ind., manufacturer of automotive equipment, is planning for enlargements in its factory and the installation of new machinery in different departments.

The Twentieth Century Garage Co., South Bend, Ind., is completing plans and will take bids at once for a one-story addition to its service and repair plant, estimated to cost about $50,000. Austin Shambleau, 111 North Lafayette Street, is architect.

The Lock Joint Tool Co., Mishawaka, Ind., has awarded contract to the Smoger Lumber Co., South Bend, Ind., for a new two-story factory on Engeline Street, South Bend, to cost about $30,000. Work has commenced.

Cincinnati

CINCINNATI, Nov. 14.

Some fair-sized orders were booked the past week, including about 10 tools for the Virginian Railway and three heavy duty lathes for export to South America. The new Rickenbacker Automobile Corporation, Detroit, was also a purchaser in this market, a local manufacturer having booked a number of miscellaneous machines. The Durant Motors, Detroit, bought some new machines and a large number of slightly used tools, including about 30 turret lathes. Orders for single machines are increasing and altogether a more hopeful feeling is evidenced. There are a few inquiries outstanding, including three lathes from the Commonwealth Edison Co. and two heavy-duty engine lathes from the Ford Motor Co. The Missouri, Kansas & Texas list is expected to be acted upon shortly, and a list is in preparation by one of the largest railroad systems in the country, which it is expected will be issued within a few weeks. Local dealers report sentiment greatly improved and an increased demand, particularly for used tools.

The Standard Bolt Corporation, Columbus, Ohio, incorporated under Delaware laws with a capitalization of $2,500,000 preferred stock and 25,000 share of no par common stock, has purchased the plant and property of the Standard Bolt Co., Columbus, Ohio. The plant will be operated as heretofore and changes and extensions will be made in several departments when business justifies it. J. C. Burns, formerly vice-president and general manager Standard Bolt Co., is president and general manager of the new corporation.

The Springfield Motor Sweeper Co., Springfield, Ohio, has been incorporated with a capitalization of $100,000 to manufacture a motor-driven street sweeper. It is closely allied with the Buffalo-Springfield Roller Co., and arrangements have been made for manufacturing. C. F. Greiner is president.

The Marquette Tool Co., Dayton, Ohio, has been incorporated with a capitalization of $50,000 by Henry A. Ritter, Jr., and Arthur F. Greer. It is a reorganization of the Buckeye Engineering Co. and the new company will take over the plant of the latter company at 126 East Third Street, Dayton.

The Automatic Refrigerating & Service Co., Springfield, Ohio, will shortly be incorporated with a capitalization of $200,000 to manufacture refrigerating machines. It has purchased the patents and equipment of the Narco Co., Wapakoneta, Ohio, and will operate that plant for a short time, but it is the intention to move it to Springfield. Among those interested in the new company are George Reed, of the Reed Mfg. Co.; Charles Smith, Armstrong Mfg. Co.; Herman Voges, Jr., Webster & Perks Tool Co., and William J. Grim, public accountant, all of Springfield.

The Carroll Chain Co., 63 Smith Place, Columbus, Ohio, has been incorporated with a capitalization of $100,000 to manufacture chains and will buy about $25,000 worth of equipment. Daniel Carroll is president, and other incorporators are William S. Carroll, F. E. Shaffmaster, Ralph H. Sweetzer and Walter Carroll.

The Columbus Forge & Iron Co., West First Street, Columbus, Ohio, has awarded contract to the Middle States Construction Co., Rock Road, for two one-story additions, totaling 100 x 100 ft. Foster Copeland is president.

Milwaukee

MILWAUKEE, Nov. 14.

Slow but steady improvement in inquiry, with a slight increase in sales, has given the machine tool market a more encouraging aspect the past week. Trade is still dull and quiet, but it is evident that the better feeling recently noted is based on substance. The high spot of interest is railroad buying. The automotive industries are taking a fair quantity of tools, but this business is of such a piecemeal nature that it requires the aggregate to give it a semblance of volume. Production is increasing slowly, but operations still are on a very small scale compared with normal capacity.

The Outagamie Limestone Co., Black Creek, Wis., has engaged H. O. Welden, consulting engineer, 10 South La Salle Street, Chicago, to design a quarry plant, finishing and crushing houses and auxiliary buildings estimated to cost about $125,000. It is planned to start construction this year and to place orders for considerable equipment at once. F. A. Maas is president.

The Standard Bakers' Machinery Co., Milwaukee, has been incorporated with a capital stock of $20,000 to manufacture equipment for commercial bakeries. The incorporators are E. Koch, A. E. Davidson and Waldemar C. Wehe, attorney, 425 East Water Street, Milwaukee. It is intended to lease a factory and purchase machined castings for assembling.

Schmalz Brothers, Prairie du Sac, Wis., have let the general contract to Willis & Deason, Janesville, Wis., for a brick and steel garage and service building, 60 x 133 ft., part two stories, estimated to cost $22,000. A small list of equipment will be purchased.

The Oshkosh Tractor Co., Oshkosh, Wis., has let the general contract to the Badger Concrete Co., local, for the erection of the superstructure of its new factory, 152 x 380 ft., one story, to cost about $175,000. Foundations are being completed. The architects are Auler & Jensen, Oshkosh. A small list of equipment will be purchased, but the bulk is provided by the purchase of the entire property of the LaCrosse Tractor Co., LaCrosse, Wis. A. D. Paine is president, and L. W. Melcher, works manager.

The State Board of Normal School Regents, Madison, Wis., has engaged Arthur Peabody, architect, to prepare plans for a new light, heat and power plant costing about $35,000 for the State Normal School at River Falls. It will be of brick and concrete, 50 x 85 ft. Details of equipment requirements are not yet available.

The Board of Education, Green Bay, Wis., has engaged Foeller, Schober & Stephenson, local architects, to furnish designs for the new East High School, estimated to cost $350,000. Provision will be made for manual training and domestic science departments.

The Alliance Investment Co., 115 Wisconsin Street, will build a one-story garage and service building, 75 x 150 ft., for the Milwaukee Oldsmobile Sales Co., 528-532 Broadway. Plans are being completed by Martin Tullgren & Sons, architects, 425 East Water Street. It will cost about $40,000 equipped.

The Burlington Blanket Co., Burlington, Wis., has purchased the former plant of the Wisconsin Dental Burr Co., at Hartford, Wis., which it has occupied under lease since July 1. It will start work immediately on a two-story addition, 40 x 100 ft., and a new boiler house accommodating one high and one low pressure boiler. Considerable new textile equipment, with individual electric motor drive, and a 1000-lb. electric elevator will be purchased.

The Board of Trustees, Marquette University, 1200 Grand Avenue, Milwaukee, has let the general contract to Walter W. Oeflein, Inc., 86 Michigan Street, for a brick and concrete boiler house at Fifteenth and Clybourn streets, to cost about $100,000. Specifications on equipment are now being determined. Dr. H. L. Banzhaf is business manager.

California

SAN FRANCISCO, Nov. 8.

The National Lead Co., 485 California Street, San Francisco, has awarded a contract to the Cahill-Vensano Co., 110 Sutter Street, for the erection of a new three-story plant at East Tenth Street and Forty-fifth Avenue, Oakland, Cal., to cost about $50,000.

The Hicks Dovetail Latch Co., Inglewood, Cal., manufacturer of special latches and other hardware products, has acquired about two acres of land in the northern section of the city for the erection of a new plant.

The San Diego Ice & Cold Storage Co., San Diego, Cal., is having plans prepared for a five-story cold storage plant at Eighth and N streets, 105 x 158 ft., estimated to cost $100,000 with machinery. Frank P. Allen is architect.

The Lake Hemet Water Co., Hemet, Cal., is arranging for the construction of a new hydroelectric power plant in the San Jacinto section, estimated to cost in excess of $100,000. W. S. Post, Central Building, Los Angeles, is consulting engineer.

The Southern California Body Co., Long Beach, Cal., has leased the plant of the California Wood Products Co., 1241-49 First Street, for the manufacture of automobile bodies, washing machines and similar specialties. Later it contemplates the construction of a new plant.

The American Petroleum Co., 343 Sansom Street, San Francisco, has awarded contract to Hannah Brothers, 142 Sansom Street, for a new two-story plant on the waterfront at Oakland, Cal., including a power house.

The Central South

ST. LOUIS, Nov. 14.

The Missouri-Pacific Railroad Co., St. Louis, will build additions to a number of car shops on its lines in the State, each extension to be approximately 65 x 150 ft., one-story and basement, and is estimated to cost about $15,000, exclusive of equipment. Work has commenced on the shop at Nevada, Mo. V. H. Winnberg, master mechanic, Sedalia, is in charge.

The Board of Education, West Plains, Mo., has completed plans for a two-story machine shop on Main Street, 75 x 120 ft., to be used for vocational training, and will commence work at an early date. It will cost about $14,000, exclusive of equipment.

The United Railway Co., Thirty-ninth Street and Park Avenue, St. Louis, is completing plans for a new three-story car repair plant, estimated to cost about $150,000.

Fire, Nov. 11, destroyed a portion of the car and locomotive shops of the Chicago, Rock Island & Pacific Railroad, Shawnee, Okla., with loss estimated in excess of $200,000, including equipment. It also destroyed the neighboring building of the Choctaw Cotton Compress Co.

The Coffeyville Ice Co., Coffeyville, Kan., will build a new ice-manufacturing plant to cost about $100,000. Herbert Forrest is general manager. F. R. Lawson, Nowata, Okla., is interested in the project. Plans have been completed.

The National Lamp Works of the General Electric Co., Nela Park, Cleveland, will hold in abeyance the completion of its new plant at St. Louis, to be occupied by the Missouri Glass Division of the company. The plant is practically ready for the machinery installation and this work will proceed when conditions in the industry warrant.

The Haynes-Langenberg Mfg. Co., 4045 Forest Park Boulevard, St. Louis, manufacturer of steam, hot-water and other furnaces and heating equipment, is said to be planning to rebuild the portion of its plant destroyed by fire, Nov. 6, with loss estimated at close to $100,000.

The Southern Cotton & Paper Co., Chattanooga, Tenn., has acquired about two acres for the erection of a new plant to manufacture paper products. The initial building will be one story, 60 x 150 ft. Machinery will be installed for a daily capacity of about 15 tons. Mercer Reynolds heads the company.

Miner D. Woodling, 510 Reliance Building, Kansas City, Mo., has awarded contract to the Fogel Construction Co., Reliance Building, for a four-story and basement automobile service and repair works, 100 x 142 ft., at 1219-27 Baltimore Street, to cost about $175,000.

The Burgess Coal Co., Mulberry, Kan., is planning to rebuild the tipple at its properties recently destroyed as the result of an explosion. Electrical and mechanical equipment, used in other departments, destroyed, will also be replaced.

The Moomaw Tool & Machine Co., 113 Main Street, Joplin, Mo., is considering the construction of a new one-story and basement plant, estimated to cost about $50,000. Elvin Moomaw heads the company.

Freight handling machinery will be installed at the new freight depot and loading dock to be constructed at Oklahoma City, Okla., by the Missouri, Kansas & Texas Railroad Co., St. Louis. It will be one-story, 45 x 130 ft., and 50 x 150 ft., respectively. Work will begin at once.

A four-story ice and cold storage plant, 120 x 150 ft., to cost about $100,000 with equipment, will be constructed at Sixth and Virginia streets, Joplin, Mo., by the A. B. Thomas Fruit Co., Seventh and Virginia streets. Plans are being drawn. A. B. Thomas is general manager.

The City Ice & Storage Co., Twenty-first and Campbell streets, Kansas City, Mo., has awarded contract to Alfred Johnson, 3920 Belleview Street, for a one-story mechanical shop, 100 x 140 ft., at Twenty-second and Harrison streets, for machine work and other service. George Carman, Gumbel Building, is architect.

The Excelsior Springs Water, Gas & Electric Co., Excelsior Springs, Mo., is negotiating for the purchase of the power plants and properties of the Plattsburg Light & Power Co., Plattsburg, Mo.; Kearney Electric Co., Kearney, Mo.; and the Holt Electric Light Co., Holt, Mo. Upon acquisition it is planned to make extensions in the power plants for increased generation, with new transmission lines and distributing system.

Seattle

SEATTLE, Nov. 8.

Jobbers report an improvement in the domestic and export demand for light tools, but inquiries are quiet for heavy machinery. Shipyard stocks of second-hand heavy duty machines have been so largely decimated the past 90 days as to become almost a negligible factor.

Work will be started on the proposed improvements to the waterworks system of Walla Walla, Wash., during the first quarter, according to W. C. Craig, commissioner of finance, but states that it will not be possible to receive bids for 60 days. Engineer Hussey has prepared new plans and specifications.

A sawmill will be built near Noti, Ore., according to the purchase of 43,000,000 ft. of timber by George Forcia and T. V. Warson, Battle Ground, Wash.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has acquired the plant of the Kilbourne & Clark Mfg. Co., Columbus Street, Seattle, manufacturer of electrical drills, etc. It will be used for the manufacture of certain specialties, including switchboard apparatus, with assembling and testing departments for electrical machinery manufactured by the company. Possession will be taken at an early date.

The Pacific Stove & Stamping Co., Tacoma, Wash., is planning to immediately rebuild the portion of its works recently destroyed by fire with a loss of about $50,000. T. M. Eggers is president.

The Washington Cord Tire Co., Seattle, has acquired 10 acres at Vancouver, Wash., as a site for a new plant to manufacture automobile tires and other rubber products. F. C. Plouf is president.

The Western Foundry & Furnace Co., 3002 South Chandler Street, Tacoma, Wash., recently reorganized, has arranged for the establishment of a department at its plant to manufacture electrical specialties, including electrical heaters, clothes dryers, etc. A. Z. Love is president, and J. W. Wright, vice-president.

The N. E. Perry Co., Seattle, has acquired property at Boston Harbor, near Olympia, Wash., for $250,000, and has preliminary plans under way for a large lumber mill. W. H. Perry, one of the heads of the company, is in charge.

The Miles City Refining Co., Miles City, Mont., has acquired a local site and has plans under way for the erection of a new oil refinery. R. H. Daniels is secretary.

Canada

TORONTO, Nov. 14.

Machine tool demand continues fairly active, but the improvement the past month has not been as pronounced as dealers expected. Sales however, show progress and business booked in October was better than any month this year. Inquiries for nearly all kinds of equipment are being received in increasing numbers and many are expected to turn into sales early in the new year. Equipment for replacement purposes is in fairly good demand. Used tools are selling more freely than new lines, but this is considered merely a temporary condition. Small tools have been selling well for some time and show no signs of falling off.

The Stirling Trunk Co., New York City, has leased space at 510 King Street East, Toronto, and will establish a temporary factory there. It is the intention to erect a plant of its own in the spring.

The Red Arrow Tires, Ltd., 309 George Street, Peterborough, Ont., is receiving bids and will shortly start work on the erection of a manufacturing plant.

The Bishopric Lent Co., Cincinnati, Ohio, will erect a sulphate plant at Stink Lake, near Dunkirk, Sask., and has awarded general contract to S. Pritchard, 1120 Fourth Avenue N. W., Moose Jaw, Sask. The project includes power plant, equipped with steam engines, boilers and generators and will cost $100,000.

The Molson Brewery, 906 Notre Dame Street East, Montreal, is building a boiler house to cost $80,000.

The Gurney Foundry Co., 510 Queen Street West, Toronto, will make alterations to its plant to cost $18,000.

The Alliance Brass Mfg. Co., is establishing a plant at Peterborough, Ont. Machinery is being installed in the building and it is expected that operations will commence next February.

The Atlas Construction Co., 37 Delmont Street, Montreal, has the general contract for construction of an electric pumping station at Point St. Charles, Montreal.

The Town Council, Verdun, Que., is having plans prepared for the installation of two 5,000,000 gal. electric pumps, to replace present steam system.

It is stated that the Forbes Vibration Co., St. Louis, Mo., proposes to establish a plant in Canada for the manufacture of toys, etc.

The Prince Rupert Pulp & Paper Co., 602 Pacific Building, Vancouver, B. C., plans to start work soon on the first unit of a pulp mill at Prince Rupert, B. C., to have a daily capacity of 40,000 tons and to cost $1,000,000.

Silverwoods, Ltd., London, Ont., will shortly commence the erection of a factory at Chatham, Ont., to cost $75,000, to make artificial ice, etc.

The Roe Machine Tool Co.'s plant, Hamilton, Ont., is being reopened for the manufacture of vises and other metal working tools. Previously to the closing down of this plant several months ago, a general line of machine tools was manufactured.

The plant of Hiram Walker & Sons, metal products, Windsor, Ont., is being overhauled and organized. The company is a producer of special wires for electrical use, and this department is being moved to a separate building.

Manufacturers Buy Bonds

DETROIT, Nov. 12.—A significant move on the part of certain Detroit manufacturers is reported by bankers. During the last two or three weeks, a large number of Detroit manufacturing firms have been buying heavily of Liberty bonds, the total acquisitions being between $3,000,000 and $4,000,000 weekly. The idea is that with material prices uncertain and sales gaining slowly, the manufacturers are putting their current surplus into securities that will be wholly liquid when the funds so invested are needed.

The reason for the appointment of a receiver for the Lincoln Motor Car Co., Detroit, may be summed up in a few words. As compared with its financial situation at the end of last year, its statement of Nov. 8 of this year shows a deficit of $1,437,280 against a former surplus of $1,785,535. A statement issued by the receiver places the assets of the company at $14,800,000 and the liabilities at $8,237,280. Sales of cars this year have been a little below 200 a month, that figure being the smallest possible production at a profit. However, sales have increased every month and September and October were the largest months in the history of the company. According to the receiver, plans are under way for reorganization which will permit production with the least possible interruption. The blanket mortgage on the plant and other assets sold to Dr. Fred T. Murphy, of Grosse Pointe, in July, 1921, was last week converted into a permanent lien on all property of the company. This indebtedness now stands at $1,882,000.

The Republic Motor Truck Co., Alma, Mich., which had $500,000 of its $2,500,000 7 per cent notes mature Nov. 1, has mailed a letter to note holders asking an extension on such notes until 1926. The company is unable to meet the payment because business conditions have not permitted the liquidation of inventories and at the same time the retention of sufficient cash as working captal.

The Exeter Machine Works, Inc., West Pittston, Pa., has appointed the Hendrie & Bolthoff Mfg. & Supply Co., Denver, Col., exclusive sales agent for its rotary pump line in the Denver district.

IRON AND INDUSTRIAL STOCKS

Less Irregularity In Price Movements During the Past Week

Less irregularity attended price movements of iron and industrial stocks the past week, the trend being definitely upward. New high record prices for 1921 were established, with shares of the steel producing companies assuming leadership most of the time. The advance in United States Steel common perhaps has been more consistent than that in other steel shares. This possibly is explained by the recovery in the steel industry and by the fact that the floating supply of Steel common is probably less than a third of what it was only a few years back. That the Steel Corporation within a month or so will offer stock to its employees under its 1922 profit-sharing plan may also account in part for the strength of the shares. In most quarters, however, the upswing not only of steel, but of practically all stocks is largely attributed to buying based on cheaper money than has been experienced since the early days of the industrial war boom, and to the growing confidence in our industrial outlook. The somewhat freer buying of equipment by the railroads also has brought investors into the securities market. Then again, the disarmament conference at Washington, with its possibilities of a reduction in taxes and a lessening in war risks, appeals to the investor. The announcement by Great Britain that it intends to meet interest on its indebtedness to us has been another reassuring investment factor.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	33¾- 36⅝	Lackawanna Stl.	40¼- 42
Allis-Chalm. pf..	80 - 82	Midvale Steel....	24⅝- 25½
Am. Can com...	30⅛- 31⅞	Nat. Acme	13 - 13¾
Am. Can pf.....	87¾- 90¼	Nat. E. & S. com	39 - 41¼
Am. C. & F. com.	132 -137¼	N. Y. Air Brake.	57 - 60⅜
Am. C. & F. pf..	.. -115	Nova Scotia Stl.	20⅛- 22⅞
Am. Loco. com..	91½- 94⅝	Pittsb'gh Stl. pf. ..	- 83⅝
Am. Loco. pf....	107 -108	Pressed Stl. com.	60 - 61⅞
Am. Rad'tor com.	78½- 81	Pressed Stl. pf.. ..	- 91
Am. Stl. Fd. com.	27¾- 30½	Ry. Stl. Spg. com.	84½- 89¼
Am. Stl. Fd. pf.	86¾- 90¾	Republic com....	48½- 51⅝
Bald. Loco. com.	89⅝- 96¼	Republic pf.....	82 - 83½
Bald. Loco. pf...	101 -102½	Sloss, com.....	38⅜- 39¾
Beth. Stl. Cl. B..	55⅝- 58¼	Sloss pf.....	- 75
Beth. Stl. 8% pf.	102½-105	Transue-Williams ..	- 32
Colo. Fuel.....	24 - 24½	Un. Alloy Stl...	25½- 26¼
Cruc. Stl. com...	62½- 66	U. S. Pipe com.. ..	- 15½
Gen. Electric....	133 -135¼	U. S. Pipe pf....	45¾- 47
Gt. No. Ore Cert.	31⅞- 32¾	U. S. Steel com..	80¼- 83⅜
Gulf States Stl..	38½- 40¼	U. S. Steel pf...	110¾-112
Int. Har. com...	75 - 78⅞	Vanadium Stl....	31¾- 33⅝
Int. Har. pf.....	100 -104		

Industrial Finances

The Carroll Foundry & Machine Tool Co., Bucyrus, Ohio, has called a meeting of the stockholders to be held in Cleveland Dec. 5 to approve action taken by the board of directors, authorizing a bond issue of $200,000.

The Charcoal Iron Co. of America, Detroit, has disposed of a bond issue of $4,000,000, the proceeds to be used for general operations, expansion, etc. Frank W. Blair is president.

In the three months, ended Sept. 30, last, the Allis Chalmers Mfg. Co. billed out $5,369,612 goods, contrasted with $8,268,441 during the corresponding period last year, a decrease of $2,898,829. The net profits for that period were $421,366, which, after making allowances for the preferred dividend, were equal to 51c. a share on the outstanding common stock. In the preceding quarter the company earned $1.34 a share on its common stock, and in the quarter, ended Sept. 30, 1920, $2.49. Unfilled orders on hand Sept. 30, amounted to $7,260,574, as against $9,472,772 on June 30, and $19,814,948 a year ago.

A net loss, after charges, depreciation and Federal taxes, of $287,806 was reported yesterday by the Gulf States Steel Co. for the nine months ended Sept. 30. Gross earnings totaled $57,595, and the deficit, after dividends, $392,806. Notes and accounts receivable amounted to $1,136,830 and cash $530,190. Accounts and bills payable totaled $1,206,323.

A public offering was made last week of $4,000,000 Charcoal Iron Co. of America 8 per cent ten-year closed first mortgage bonds dated Nov. 1, and maturing in 1931. The purpose of this issue is to retire outstanding indebtedness and to provide additional working capital.

A public offering is being made of $3,250,000 Taylor-Wharton Iron & Steel Co. first and refunding sinking fund 7½ per cent bonds dated July 1, last, and maturing in 1946, a part of an authorized issue of $4,000,000.

The Republic Motor Truck Co., which had $500,000 of its $2,500,000 7 per cent serial notes maturing Nov. 1 was unable to meet payment due to its inability to liquidate inventories sufficiently to meet the payment and maintain adequate working capital. The note holders were asked to extend payment to 1926.

In connection with the proposed taking over of the Titusville Forge Co. by the Penn Seaboard Steel Corporation, a letter to the stockholders says: "Notwithstanding the very serious business depression the condition of the Penn Seaboard Steel Corporation has been materially improved. Since Jan. 1, 1921, the current and funded debt has been reduced $1,035,000. Inventories have been reduced approximately $467,000. Although operations have not been over 20 per cent of capacity and the corporation has been operating at a loss, monthly losses have been materially lessened during recent months by rigid economy in a reduction of forces, wages and salaries." Stockholders on Nov. 14 will be asked to authorize an increase in the Penn Seaboard Steel Corporation's capitalization from 350,000 to 700,000 shares of no par value, in connection with the proposed consolidation.

A deficit of $1,249,136, after charges and Federal taxes, resulted from operations of the Midvale Steel & Ordnance Co. for the third quarter. This compares with a deficit of $1,289,393 in the preceding quarter and a surplus of $4,448,079 in the corresponding period of 1920. Net earnings, after taxes, were $688,238, against $6,886,625 in the same quarter a year ago. Interest charges were $745,048 and depreciation, etc., $1,192,326.

Profits of the Crucible Steel Co. of America in 1921 Half Those of Previous Year

The report of the Crucible Steel Co. of America for the year, ended Aug. 31, shows a net profit after ordinary charges and taxes of $5,547,245, or $7.59 per share on the common stock after preferred dividends. For the previous year net profits of $11,780,021 or $20.06 per share on the common stock were shown. The net profits for the past year, however, are reported as before deductions for depreciation and amortization, for which a charge of $4,575,069 is set up against accumulated surplus. The annual report does not make it plain how much of this charge is attributable to the fiscal year. If it were all charged off against the year's operations, the profits amount to but $972,177, or 88c. a share on its preferred stock.

The consolidated profit and loss account of the company and its subsidiaries compares with that for the previous year as follows:

	1921	1920	Decrease
Total profits	$6,969,424	$17,274,489	$10,305,065
Repairs, depreciation, etc.	.....	3,775,291	3,775,291
Bond interest	306,250	312,333	6,083
Inventories, adjustment, etc.	*1,115,929	1,406,844	290,915
Net profits	5,547,245	11,780,021	6,232,776
Preferred dividends	1,750,000	1,750,000	.....
Surplus	3,797,245	10,030,021	6,232,776

*Includes $191,429 for depreciation in foreign exchange.

The balance sheet shows total assets and liabilities at the close of the year of $134,513,436, as contrasted with $145,587,227 on Aug. 31, 1920. The most striking changes in the assets are an increase of $2,101,067 in the value of real estate, plants, etc., a decrease of $5,383,011 in inventories, and a decrease of $6,782,013 in notes and accounts receivable. The liabilities show shrinkages of $250,000 in outstanding bonds, $2,000,000 in notes outstanding, and $6,058,857 in accounts payable.

The company's unfilled orders for the product of its tool steel mills on Aug. 31, amounted to 34,374 tons. At the close of the previous year they were 74,960 tons. At the close of the year the company had 6513 stockholders, of which 2097 were common and 4416 preferred.

H. S. Wilkinson, chairman of the board of directors in his report to the stockholders says in part: "Your company has passed through a very trying year for both the management and the employees. During the first three months of our fiscal year earnings were satisfactory, but in the second quarter the falling off in orders started and we were obliged to depend upon the unfilled orders on the books for a part of our business. During the balance of the year there was a steady decline in orders until the month of August, when, for the first time during the year, our orders showed an increase over the preceding month.

"During the year we have expended $2,101,067, in completing the by-product coke ovens and such other improvements as were under way at the beginning of the year. We have successfully operated our new blast furnace and coke ovens. We need only the resumption of business upon a normal basis to enable the company to enjoy the benefits of these improvements, as we now have the capacity to make a sufficient quantity of both coke and pig iron to meet all our requirements."

Plans of New Companies

The Ferguson-Allan Co., has leased the plant of the old Progressive Structural Steel Co. at 504 Bailey Avenue, Buffalo, including equipment, and will engage in fabricating structural steel buildings, steel tanks, steel stacks, water towers and other steel plate construction work. The company is in the market for a new or used crane, 3 to 5-ton capacity, 40 or 50 ft. span, hand or electric.

The Paradox Battery Mfg. & Service Co., whose present office is in care of Wille & Co., 401 Berlin Arcade Building, Milwaukee, was recently incorporated in Wisconsin to manufacture storage batteries of all descriptions. The company will manufacture about 50 per cent of the material used.

The Wetmore Mechanical Laboratory Co., 312 Montgomery Building, Milwaukee, organized in 1915 by Charles P. Wetmore and P. B. Rogers is again actively engaged in engineering and manufacturing work. Charles P. Wetmore is president and P. B. Rogers secretary and treasurer. This company was the designer and manufacturer of the Wetmore inserted blade expanding reamer, extensively used in the production of shells during the war, and later developed the commercial Wetmore reamers of this type. The Wetmore Mechanical Laboratory Co. with Mr. Wetmore in charge of the mechanical work will devote its efforts to the developing of mechanical devices and in the perfecting of manufacturing methods including jigs, fixtures and tool work. The company is now manufacturing several articles for companies in which it has also become a stockholder and is in position to develop and handle more contract manufacturing work of this kind. Die and screw machine work is also included. Factory and office are located at 129 Michigan Street, Milwaukee.

The H. A. Blake Machine & Foundry Co., recently incorporated with a capital of $50,000, was organized to take over H. A. Blake & Son's foundry and machine shop, Cheboygan, Mich., and other properties owned by H. A. Blake, who died January, 1920. These properties were valued at $37,840. The directors are: F. S. Ritter, J. A. Blake and W. H. Blake. The company does not contemplate building for some time, as present buildings will serve its purpose at least temporarily. It will carry on the old business with a specialty manufacturing department.

The Industrial Equipment Co., Milwaukee, will confine its activities for the present to the sale of machinery, small tools and shop equipment. Any manufacturing which it will do will be on a contract basis. It is looking for meritorious lines of shop supplies and equipment to handle on an exclusive basis in the State of Wisconsin and the upper peninsula of Michigan. It expects to have 10 branch offices established in the larger cities of the State by Jan. 1.

The Fenton Auto Lock Co., Fenton, Mich., recently incorporated, has taken over the Gilland Auto Lock Co., Grand Rapids, Mich., which had a capital stock of $10,000. The equipment of the Grand Rapids plant will be moved to Fenton, a plant having been purchased at Fenton to manufacture the company's product, which is a patented lock for automobiles. The company expects to get into production by Dec. 1, It will require soon some additional machine tools, particularly lathes, punch presses and milling machines.

The Elizabeth Boiler Repair & Sheet Metal Works, Elizabeth, N. J., recently incorporated, will repair boilers and turn out all classes of sheet metal work.

The Northern Radio & Electric Co., Seattle, Wash., intends to be distributor of apparatus which it will have manufactured in plants in that city, but if this is not found feasible, it will consider manufacturing on its own account. It is operating a radio telephone on the Seattle *Post-Intelligencer*, broadcasting news and music daily.

The Exeter Machine Works, Inc., West Pittston, Pa., has appointed the English Tool & Supply Co. exclusive sales agent for its rotary pump line in the Kansas City district. The English Tool & Supply Co. specializes in the marketing of tools and supplies for railroads, machine shops and mills.

The W. P. MacKenzie Co. has been appointed exclusive sales agent in the Philadelphia and Baltimore districts. The MacKenzie company is a sales engineer, specializing in the marketing of pumping machinery, having offices in the Pennsylvania Building, Philadelphia, and in the Equitable Building, Baltimore.

Payne Dean, Ltd., 103 Park Avenue, New York, manufacturer of Dean control for electrical operation of water, gas and high pressure steam valves, has established offices in Pittsburgh and Chicago. C. J. Burrage, captain in the army, and formerly of the engineering department of the Cutler-Hammer Mfg. Co., is in charge of the Pittsburgh office in the Bessemer Building. A. H. Kohlbusch, superintendent of construction for the Public Service Electric Co., has been placed in charge of the Chicago office in the Lumber Exchange Building, 11 South LaSalle Street.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.68c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.68c.
Hoops, base price	3.53c.
Bands, base price	3.28c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.78c.
Channels, angles and tees under 3 in. x ¼ in., base	2.68c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅝ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.78c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
9-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16¼c. to 19¼c.
High brass wire	17¼c. to 21¾c.
Brass rod	14¼c. to 20¾c.
Brass tube, brazed	27½c. to 31½c.
Brass tube, seamless	19 c. to 20½c.
Copper tube, seamless	20½c. to 22¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20½c. to 23½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$6.05	$5.80
		90 lb....	6.15	5.90
		100 lb...	6.25	6.00
IC..	$10.25	$8.75	IC...	6.40	6.15
IX..	11.50	10.25	IX...	7.40	7.15
IXX..	13.25	11.75	IXX...	8.40	8.15
IXXX..	15.00	13.50	IXXX...	9.40	9.15
IXXXX..	16.50	15.25	IXXXX...	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	15½c.
Electrolytic	15¼c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	22¼c.
No. 1 solder	20¾c.
Refined solder	17¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	29c. to 31c.

Old Metals

The market is quiet with values practically unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.50
Copper, heavy and wire	9.75
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.00
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.75
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.25

THE IRON AGE

New York, November 24, 1921

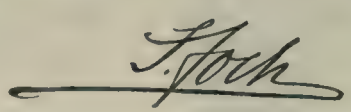
ESTABLISHED 1855 VOL. 108: No. 21

Institute Greets Leader of Allied Armies

Marshal Foch, Enthusiastically Received, Gives American Industry Full Credit for Its Part in Winning the War—Record Attendance at Meeting

THE twentieth annual meeting of the American Iron and Steel Institute held at the Hotel Commodore, New York, last Friday, Nov. 18, will be memorable for several features. The registration was 1700. The attendance at the banquet at which Marshal Foch was the guest of honor was 1550, a new record, and the speeches of Judge Gary, Marshal Foch, Charles M. Schwab and W. D. Guthrie will form a never-to-be-forgotten chapter in the post-war history of the institute.





Many of the leaders of the iron and steel industry in telegrams to THE IRON AGE, published in the issue of Nov. 10, had with great earnestness expressed themselves as favoring limitation of armament, but Judge Gary and Mr. Schwab had reserved their expression of opinion until the meeting of the institute. Judge Gary in his presidential address at the morning meeting declared his complete sympathy with the purpose of the conference at Washington, and predicted its success. Mr. Schwab in even more vigorous language, in his speech at the banquet, declared that although he owned the greatest shipbuilding and war materials manufacturing plants in the country, he would gladly see them sent to the bottom of the ocean if that would help in bringing about a reign of peace.

Several parts of Judge Gary's presidential address which related to reduction of taxation were enthusiastically applauded by the large audience, particularly his prediction that any politician or political party opposing substantial reductions of taxes will not continue in authority, but will go down to defeat at the first election and his statement that President Harding fully appreciates the overwhelming importance of decreasing taxation. His declaration in favor of the sales tax also met hearty approval. Judge Gary asserted that in addition to what is contemplated in the way of limitation of armament, there should be an understanding that if any international differences arise, no resort to military force will be permitted until after there has been a conference and full discussion by all the nations now participating in the deliberations at Washington. Never have the decorations at an institute banquet been more impressive than they were Friday night. The beautiful banquet hall was filled to its limit and everywhere the colors of the United States and France were displayed. The singing of the Marseillaise and the Star Spangled Banner was a feature of the evening.

When the Marshal, accompanied by his staff, and General Pershing, appeared, the great audience rose and applauded and cheered for several minutes as it did again when the Marshal rose to speak. In spite of the many entertainments at which he had been a guest during the day, the Marshal did not seem fatigued, but spoke with much vigor in the French language. After speaking a sentence or two in French, his words were translated by an Army officer. A magnificent gold bowl was presented to Marshal Foch by the institute.

Among the distinguished guests at the banquet table were: Capt. George B. Bradshaw, U.S.N.; Maj. Gen. Robert Lee Bullard, U.S.A.; Dr. Nicholas Murray Butler, president Columbia University; Hon. John W. Davis, former Ambassador to Great Britain; Thomas A. Edison, Hon. James W. Gerard, Gen. George W. Goethals, Most Rev. Patrick J. Hayes, archbishop of New York; Hon. W. C. Sproul, governor of Pennsylvania; Hon, William M. Calder, United States Senator, and Hon. Charles S. Whitman, ex-governor of New York. Letters of regret were read from Chief Justice Taft, John D. Rockefeller, Mayor John F. Hylan, New York, and Gov. Nathan L. Miller. About 200 ladies were seated in the balcony.

Judge Gary's Address

Before presenting Marshal Foch, Judge Gary spoke of some of the great events of the World War following the darkest days, which were in the early part of 1918. He described the meeting at Beauvais, France, on April 3, 1918, at which it was

decided to make General Foch the supreme commander. "No decision of greater importance concerning the welfare of the world has ever been made by mankind than the one which placed Foch in general command and direction of the allied and associated armies," said Judge Gary. "Possibly one of equal magnitude and consequence will be made at Washington in the near future." This declaration was heartily applauded. Judge Gary told of the magnificent work done by Foch after his appointment as general of the allied armies and of how victory finally came. He spoke particularly of the work of the Americans in the Argonne, which territory had been held by the Germans for four years until it was captured by General Pershing. "The world," said Judge Gary, "owes Marshal Foch a debt of gratitude it can never fully repay and, indeed, it does not desire to do so. We are all happiest in being his everlasting debtors. This brave, scholarly, thoughtful, Christian soldier honors us by his presence on this occasion."

Then in a few well chosen words, Judge Gary presented the loving bowl, which is a Tiffany creation of pure gold (24 carats), 12½ in. diameter by 8¼ in. high, and bears the following inscription, in relief, around the rim:

To Marshal Foch
as a token of the admiration
and affectionate regard of the
American Iron and Steel Institute
18 November 1921

Marshal Foch's Address

In opening his address, Marshal Foch referred to the brief period dating from Nov. 11 to 18, 1918, immediately following the signing of the armistice when the Germans were permitted to put their soldiers in some order preparatory for the movement back to Germany.

"This movement," said the Marshal, "was the culmination of final victory, the victory of which it gives me pleasure to speak before this assembly, a victory due to unity of sentiment, of ideas, and ideals. To bring about this victory it was necessary to have unity of action and no element in that action was so important as that contributed by industry. Wars cannot be won by human beings alone, for behind them must be materials to bring success. There must be supplies to support the soldiers. Early in the war, it was considered that the limit of the use of projectiles would be from 14,000 to 20,000, but later in the war from 20,000 to 30,000 projectiles were fired per day. To carry on this warfare, tremendous augmentation of supply of materials was necessary and this you gave us.

"In laying out our plans, we asked for certain materials and they always came forward on time. Back of this tremendous movement of supplies we can see that the power lay in the unanimity of sentiment in this country, where the one great purpose was to win the war. Permit me to salute the iron industry which made it possible to carry on the war and save thousands of lives. I salute you with feelings of the most profound gratitude."

The words of the Marshal, as translated, were greeted by repeated rounds of applause.

Able Papers Read

Fewer papers were presented at this meeting than at previous ones, but several of them were exceedingly long. All of them were available in printed form before the sessions. Abstracts are reproduced in the following pages of all of the papers except the one by A. E. Bourcoud, consulting engineer, New York, on "Direct Process for Steel Manufacture." This will be abstracted in a later issue.

President Gary on Business and World Conditions

Declares Some Middlemen Are Asking Too High Prices—Heartily Indorses Move for Peace—Takes Hopeful View of Outlook

JUDGE GARY, in his address at the opening of the institute, spoke as follows:

"It seems to be generally conceded that business conditions throughout the United States for the last six months have been perceptibly and steadily, if slowly, growing better. You have read in the daily press statements by financiers, commercial leaders, industrialists and others to this effect. Besides, the President of the United States and other officials have not infrequently voiced opinions concerning business conditions and prospects that were favorable and hopeful. The newspapers, perhaps without exception, by their editorials and otherwise, have lent encouragement to those who are connected with business enterprises. All this has been very gratifying and helpful, and it has been justified by the facts.

"In the steel industry the volume of business has more than doubled during the last ninety days, though the profits, as a rule, have been little or nothing, due to high costs and low prices.

"The resources of this country are so enormous and the necessities of the consuming public so extensive that there must be continuously transacted a large business, even though at times it is small when compared with the maximum periods.

"But it will be conceded that thrift even in a rich country may be interfered with, if not postponed. The pity is that often this is brought about unnecessarily and sometimes negligently or viciously. Even though we have now passed the most critical period in our recovery, I still think we would not be warranted in concluding we have arrived at the point where we can with certainty predict the exact time when there will be a return to a normal financial, commercial and industrial basis, for the world's economic structure has been terribly shaken by adverse winds during the last few years. There must be further adjustments.

"Every honest, intelligent person will insist that conditions are such at present as to enlist the efforts of all, private individuals as well as officials, to do everything possible toward protecting and promoting the economic welfare of the country and its people.

"It would not be useful at present to refer to unavoidable features that retard a complete restoration of prosperity throughout the world, including the United States, to a greater or lesser extent; but it may be deemed proper to refer to some that are avoidable.

"It may be that we of the steel industry are measurably blamable for the comparatively slow progress toward economic recovery in this country during the last eighteen months. I believe there are some things which might be justly criticised and others commended, but it is not intended on this occasion to discuss the attitude or action of the steel management. For your

edification and comfort I refer you to a letter on the editorial page of the New York *Times* of Nov. 11 instant, bearing the signature of Sidney G. Koon. I am not acquainted with Mr. Koon, nor with his source of knowledge, but I believe his statement of facts and figures is accurate. It is certainly up to all of us, day by day, to consider carefully and decide justly what shall be our conduct toward each other, and toward all others, in order to furnish all practicable assistance in restoring the equilibrium of business prosperity. This will be to our own interest as well as that of the general public, and I trust it will be our sincere and constant desire.

"The delay in complete restoration of a sound and satisfactory economic development and activity in this country is largely due to high costs—high costs of living, high costs of production and transportation, and high costs of owning and earning money or its equivalent.

High Costs of Living

"The war brought enormous inflation in prices, rates and indulgences. There was an orgy of extravagance. The purchasing value of money became lower and lower to correspond with the increases in the prices demanded for what it bought. When the armistice was declared, the whole range of prices was far above that of ante-war times. Every one realized that there would have to be readjustments to lower levels. Selfishness and cupidity loomed large in the upward trend and these traits have been just as noticeable in the effort to descend from the dizzy heights of apparent prosperity and economic advantage. However, be it said, the large majority of the people of this country have been earnestly active in the endeavor to reduce prices generally and equitably to a reasonable point. Still there are considerable numbers who seem to be possessed with a desire and determination to make the most out of the situation, to maintain high prices and to realize the largest possible gains; and those who are thus disposed are sufficiently numerous and successful to affect materially the cost of living. Here is one of the fundamentals of obstruction to a return to normal conditions. It may properly be claimed that as the advances in prices and values during the war naturally formed a circle, composed of various items, such as labor, transportation, production, living expenses, each affecting the others, so the same unhealthy and unwholesome symptoms may be seen in the endeavor to return to previous levels. The real obstructionists at present may be classified generally, if not distinctly.

"It seems to me that many so-called middlemen are more at fault concerning these matters than any others; they do not seem to have kept pace with the majority of business men in reducing prices; many have not lowered their selling prices in proportion to the reductions which have been made to them in their purchases. This is true of food, clothing and shelter, always the first things to be taken into consideration in discussing high costs. Every one is competent by experience to pass upon this question, for it is practical and personal. I would not purposely do an injustice nor indulge in exaggeration, and with the intention of being accurate and within the facts, I will specify a few of the features which tend to prove the assertions made. First, as to food and clothing. You will observe I have taken prices in the ordinary country stores and shops, where they are moderate as compared with many of the city establishments.

	Wholesale Price	Retail Price	Per Cent Spread
Sirloin steak	$0.23	$0.42	82.5
Round steak	.20	.40	100.
Rib roast	.23	.40	73.9
Bacon	.28	.45	60.
Cream cheese	.217	.35	61.3
Eggs	.64	.85	32.8
Beans	.05	.10	100.
Lard	.115	.19	65.2
Potatoes	1.53	2.20	43.7
Rice	.085	.12	41.

"Also, on wearing apparel as follows:

	Wholesale Price	Retail Price	Per Cent Spread
Men's shoes	$7.00	$9.00	28.6
Men's suits	25.00	40.00	60.
Men's overcoats	27.00	50.00	85.
Men's hats, derby and soft	3.00	4.50	50.

"On furniture and bedding the profit made by regular dealers ranges from 40 to 100 per cent, and by installment houses from 100 to 200 per cent.

"As to rents and coal, so much has been published that every one is familiar with the facts. Amounts have been demanded and paid which are so much larger than they were before the war that they seem outrageous.

"It must be admitted that the large prices already mentioned have been more or less influenced by labor rates, but I cannot too strongly state that labor which has been free to act in accordance with its own sense of propriety and justice has been fair and considerate in view of living expenses. Fortunately, this includes 85 or 90 per cent of the workmen.

"Where labor is directly under control of leaders not connected with nor interested in the results of the work in question, the rates in many instances are unreasonable and unjust. This relates particularly to trades which, in a measure, control building operations and affect rentals. I offer some figures of comparison showing wage rates per day in 1913 and 1921, respectively:

	1913 Rate per day	1921 Rate per day
Bricklayers	$5.60	$10.00
Carpenters	5.00	9.00
Electricians	4.50	9.00
Housesmiths (structural)	5.00	9.00
Marble cutters, carvers and setters	5.50	9.00 & 10.00
Metallic lathers	5.00	9.00
Painters, decorators and paperhangers	4.00	9.00
Plasterers	5.50	10.00
Plumbers and gasfitters	5.50	9.00
Slate and tile roofers	5.25	9.00
Steam fitters	5.50	9.00
Stone cutters	5.50	9.00
Stone setters	5.60	10.00
Stone masons	4.80	10.00

"But the wages paid are only a part of the story. The failure to render an hour's work for an hour's pay is even worse. The skill or energy or effort to accomplish is not one-half what it was formerly, so that the rates now paid are actually quadrupled instead of being doubled. The rules formulated by unions, under which the work is done, place limits upon production, as many employers and others know by bitter experience. The wonder is that so large a part of the public, which to a great extent suffers the consequence, apparently fails to appreciate these important facts pertaining to production.

High Costs of Production and Transportation

"The costs of semi-finished production and also transportation are about twice what they were before the war. The facts and figures relating to these have been under examination by governmental departments and have been published. These high costs result, in part at least, from the prices which are paid for materials purchased from the original producers and also the rates of wages paid. The net profits realized are much smaller than those received before the war and in many, if not most, cases they are *nil;* this is largely because wage rates were increased during the war and still are maintained much higher in proportion than the selling prices or carrying rates now received, and besides production results were likewise decreased as before suggested. I am not now intending to discuss selling prices or transportation rates.

"Clearly and emphatically there must be further adjustment and reductions concerning certain prices and rates down to a level which will not only be equitable, but will place every branch of industry on a just and reasonable parity.

"Unless there shall be a governmental supervision which is impartial and non-partisan and covers all interests, classes and departments equally and fully, there is no way of promptly returning to and maintaining normal and sound conditions in all respects, except by the natural means provided by the law of supply and demand, which requires time. By this simple route, with the benefit of full and consistent maintenance of law and order, so that it may be pursued without illegal hindrance, there will sooner or later be forced upon every one the necessity of disposing of whatever he has to offer only at fair and reasonable prices. Business of all kinds would succeed better if unhampered

by governmental interference, but if it is desired to proceed with the greatest dispatch towards the starting point of the upward march in prices influenced by the war, then every person and every interest, without discrimination, must submit to some kind of governmental supervision and regulation. Class distinction is the worst thing that can happen to any country.

"As the Government materially assisted in increasing costs and prices, although on grounds of necessity, it might be proper and expedient to render similar services in the struggle to decrease them.

The High Cost of Holding Money and Property

"Underlying all economic conditions in this country today, and perhaps throughout the world, is the high cost to the holder or earner of money or property. It is so high that the incentive to initiate, extend, develop or operate is not only discouraged, but it is nearly or entirely destroyed in many cases. I refer to the question of taxes. We have heard of being taxed to death. The people have been made to realize what it means. Both industry and individuals have suffered almost to the point of despair. They have staggered under the burdens of taxation. Neither the United States nor any other country can satisfactorily prosper while taxes remain so high as at present.

"Any politician or political party standing for present tax rates, or opposing substantial reductions down to the lowest practical level, will not continue in authority, but will go down to defeat at the first election. The people will not long endure the existing situation. In fact, they cannot.

"Under the present laws, one's income, whether derived from personal effort or invested property or business, is largely taken by the Government in income taxes. Extensions cannot be made nor industry progress while so much of the returns is taken away and diverted from legitimate enterprise.

"And the same argument applies to aggregations of capital held, or business transacted, by corporations. The point applies with equal force whether it refers to business carried on by individuals or by corporations.

"The total indebtedness of the world at present is ten times as much as it was before the war. I will not give the figures now; they are too startling and they are growing in amount. During the war stupendous expenditures were necessary, though at the time the amounts seemed extravagant and often wasteful. Perhaps this could not be avoided in view of the circumstances. The people generally overlooked and condoned. Now a stricter accounting and better management will be required; and greater and still greater economy is demanded.

"Judging by his utterances and efforts no one more than President Harding fully appreciates the overwhelming insistence for decreases in taxation.

"To the fullest extent possible earnings and incomes must be left in the hands of those who first receive them. Money is just as important as it ever was. Without it nothing can be done for any one or for any country. Remarks from the lips of men, especially from those who know nothing concerning their subject, amount to comparatively little. Money talks louder and more effectively than anything else when protection to life and health is concerned. Unless food, shelter and clothing are provided we will not listen to words concerning abstract questions, especially from those who work little and say much. Well, just at present we need more and more production, and money is necessary for this purpose. If we have more in the United States than we actually need let us apply it for the benefit of others who are less fortunate, but we must not waste it. There has been enough of that all over the wide world. I do not believe in a penny-wise policy. A great deal of money is required to pay interest on the enormous indebtedness of the Government, and for carrying on governmental affairs, but the expenses for this are too large. There are too many clerks, doing too little work in public offices, notwithstanding all that has been done under the able direction of General Dawes and others; there are too many committees making investigations at large cost, sometimes for political purposes, too much unnecessary display, altogether too numerous and great expenditures for useless and profitless things. I may overstate the situation, but not intentionally so. Of one thing we are certain, our Government is called upon as never before to reduce expenses and expenditures, and to modify and clarify taxation. The burdens are greater than we can long endure.

"Our governmental administration, not to specify dates or periods, by precept and example, has been largely responsible for the present economic situation. The high prices paid and advocated by Government officials, the rules established for work, the extravagance in many respects, perhaps necessary during the war, in part at least, I have admitted; but it all had a bad effect on private management, and the situation should now be remedied by legislation and otherwise, and I believe it will be. Industry is sadly in need of assistance from the Government; and, I repeat, individuals must reciprocate to the greatest possible extent.

"Undoubtedly the fairest way to raise money for the Government is by a sales tax which requires every one to contribute in accordance with pecuniary ability to buy. This is equal treatment of all the people and therefore is just. Moreover, it is easy and cheap in administration, and certain of full exposure and accomplishment.

"For the present conditions, so far as they are unsatisfactory and deprecative, any blame should be placed where it properly belongs, quite likely upon different classes, as I have suggested. A fair-minded public will sooner or later intelligently and surely apportion the blame.

The Washington Conference

"Of highest interest, having a direct bearing and immediate influence upon the questions already discussed, is the conference at Washington called to consider the limitation of armament by the different nations. Undoubtedly a very large part of national expenses during the last three years related to military preparation. Even though the object has been only for defensive purposes, nevertheless the cost has been as much as it would have been if the motive were less justifiable. If the expenditures in this direction shall be decreased only fifty per cent, the saving will be prodigious. But if an agreement to this effect is made it will probably go much further as to amount; and even better than this, it will cover principles which will tend to conserve peace, friendship and good-will, which is of inestimable value to all nations.

"Very great progress has already been made in Washington. The addresses of the President and Secretary of State, respectively, were of the highest type of oratory and their proposals were not only startling, but were universally received with joy and satisfaction. Other speeches already delivered show that the speakers were inspired by the same lofty emotions which prompted the utterances of President Harding and Secretary Hughes.

"The suggestions by some that there will be less steel manufactured as a result of armament limitation are unworthy of even a passing notice. In the first place, the amount of decreases, if any, which is doubtful, would be small, and even though they might be large, no sane and right spirited person would consider pecuniary interest as of any importance when discussing national or international welfare.

"Besides, the benefits which would be derived by reason of all the nations living under peaceful conditions as compared with military conflicts are beyond calculation. If means for the firm establishment and maintenance of peace can be found and generally assented to, it will mark an epoch of the greatest business prosperity, as well as the largest measure of happiness that the world has ever witnessed. We should be thankful that this conference in Washington has been called and that the different countries are represented by delegates of high principle and great intelligence and sincerity. Of course, there must be and will be many matters to be determined bearing upon the question of peace, outside of those suggested by the Secretary of State in his original proposition. There are a good many kinds of armament, some more destructive than others, but all important, and every one

heretofore or hereafter discovered must be covered by the international arrangement to be concluded.

"But with an agreement for the limitation of capital ships it would not seem to be practical to stop with less than a final treaty which will prevent future wars. In addition to what is contemplated by the limitation of armament there should, with other things, be an understanding that if any international differences arise, no resort to military force shall be permitted until after there has been a conference and full discussion by all the nations now participating in the deliberations at Washington.

"President Harding and the four selected, able and experienced representatives of this country will energetically and persistently strive for an agreement. They realize their constituents are unconditionally and fervently supporting them in their campaign for peace and limitation of armament and all this is true of each of the other nations.

"We may anticipate that before adjournment there will be many claims for consideration of national interest and protection by some of the countries represented, some of them selfish and inconsistent, for this would be natural, but there will be friendly and patient conversations or debates, and all with the endeavor to find a basis for maintaining international peace. Every living individual is more or less possessed with the contradictory characteristics of Dr. Jekyll and Mr. Hyde, but the good preponderates over the evil in the large majority of people, and this is particularly true of those who are now especially chosen to minister to the ills of a disorganized, diseased and suffering world.

"These delegates will meet as friends and I predict they will part as friends. All the appointees of the convention are gentlemen of the highest character and all favor limitation of armament and perpetual peace. It will be exceedingly strange if they fail of success on any ground that is not fundamental to national integrity, independence and honor, and none such is involved. It is unthinkable that there could be a different result. An adverse outcome would be intolerable and those responsible for it would be repudiated and everlastingly condemned. No claim for personal or individual advantage not based on the principles of right and justice, in the opinion of the majority, would be entertained.

"I may be pardoned for referring briefly to the situation in the Republic of Mexico. It is a country of great natural wealth and possible productivity, and it seems to have a strong, vigorous and respected governmental administration. President Obregon is an intelligent, honest, fair-minded man. He has established order and will maintain it. Evidently he intends to treat every faction and interest with equal justice. He desires the friendship and co-operation of every other country, especially the United States. If harmonious relations could uninterruptedly exist between the two countries, it would be of immense pecuniary benefit to both. One should visit and study Mexico in order fully to appreciate how valuable her friendship to us would be. It is to be hoped a basis mutually satisfactory will soon be reached which will enable recognition of the present Mexican Government by this country, and a renewal of our old-time business intercourse. If we can be of benefit to Mexico, we will be serving our own best interests.

Coming to Solution of Problems

"I believe we are coming to a correct and satisfactory solution of all the problems referred to. Therefore, I am hopeful. If there is delay longer than we have expected, we must be patient, consistent and courageous. There is no cause for despair. The majority of reasons favor a return to large prosperity in the comparatively near future. Let us keep within the limits of our resources and be trustful. We should not anticipate much, if any, profit in our business during the present quarter. If there are losses it will probably be our own fault. Let us look up and ahead; look at the wealth of the country and not the present poverty of business. Let us bear in mind that in the long past we have, on the average, been well treated and therefore in the future will probably receive still better consideration if we do our utmost to deserve it. We have a good and a great administration. We have a towering, level-headed leader who will guide us out of the paths of uncertainty into the broad highway of stability and progressive prosperity; and we are thankful."

Mr. Schwab Ready to Sink His Plants

IN beginning his address, Mr. Schwab said that it is customary to speak of soldiers of iron and nerves of steel. "Strong as are bands of iron," he said, turning to Marshal Foch, "they are weak as compared with the bands of love which you have forged about us." Mr. Schwab spoke of the great value of unity of action in times of war and peace. He praised highly Marshal Foch and also Judge Gary, saying that it would be well for the industry to follow the lead of the president of the institute in these days of depression, for he would lead to ways of prosperity.

Again addressing the guest of honor, he said, "My dear Marshal, it is hard to exaggerate in telling you how happy we are to have your commendation of us for what we did in furnishing munitions of war. It was a great satisfaction to me, when the United States entered the war, that the company of which I am president could offer its plants for the service of their country." Mr. Schwab referred to the greatness of Grant in time of peace and said that his words "Let Us Have Peace," which are inscribed upon the tomb on Riverside Drive, will always be remembered as exemplifying his great character. Continuing, he said:

A Bit of History

"When the war in Europe broke out and the safety of France was threatened, my sympathy and interest went out to France with all the ardor I possessed. And I may be permitted to relate a bit of history. The war had been in progress only a short time when I wrote a letter to one of the leading statesmen of France telling him that, if it would help, we would gladly place the ordnance and armament manufacturing facilities of the Bethlehem Steel Co. at the disposal of the French Government, believing, as we did, that we were the only large ordnance plant in the world sufficiently free and independent to be in a position at that time to render such a service.

Thrilled Beyond Expression

"I am at the head of the largest war materials manufacturing works in the world. The shipyards of my company build more naval ships than are built in any other yards under one management in the United States. But, I have been thrilled beyond expression, as has every good American, by the brilliant and statesman-like scheme laid before the conference at Washington by Secretary Hughes. The carrying out of that plan may involve great monetary loss in some quarters, but such a thing as financial loss can be of no consideration when compared with the inestimable boon to mankind which would be involved in the realization of that magnificent plan. What red-blooded American would not, indeed, make any sacrifice if the burden of armament could be lifted from the shoulders of humanity. May God speed the day when this noble conception can be realized!

"If the armed protection of our country, is necessary, the establishment of which I am the head, will devote itself with all its energy to providing means for protection of this country's homes and families. But I say to you from the bottom of my heart that if the statesmen now assembled in Washington under the far-sighted leadership of our President and Secretary Hughes, should find it possible to bring about disarmament and permanent peace, gladly would I see the war-

making machinery of the Bethlehem Steel Corporation sunk to the bottom of the ocean.

Eliminating War

"Nothing could contribute more to the ultimate and permanent prosperity and happiness of the world than the conclusion of agreements between the great nations of the world which would eliminate war and the causes of war. And, so, let us say to the men gathered in Washington, let it go out from this gathering of men of the steel and iron industry, that we are solidly behind every effort they can make which will hasten the coming of that time in future history when war shall be no more.

"If disarmament inflicts a money loss upon us, the American iron and steel industry will accept it willingly and gladly. We will do so not in a spirit of mere idealism and self-sacrifice, but in a belief that the greatest permanent, material prosperity would be brought about by the concentration of the energies of mankind upon constructive activities; upon means for well-being, and not for the destruction of civilization."

"France Needs No Treaty With Americans"—Guthrie

W. D. GUTHRIE, president of the New York State Bar Association, delivered a scholarly address in the French language.

"The president and committee of the American Iron and Steel Institute have felt that the inspiring idea and the deep sentiment that prompted this manifestation could find their ample expression only through the medium of your beautiful and poetic language. They have therefore done me the signal honor to invite me to be their interpreter to you on this happy occasion." He said in part:

"Your Excellency, you can return to France and say to your companions in arms that, whatever may be the result of the conference at Washington, France needs neither treaty nor contract with the Americans. Each phrase, each clause of a treaty may give occasion for the subtle disputes of sophists, of politicians, of irresponsible journalists, of reckless leaders of the crowd. 'The letter killeth; but the spirit quickeneth.' Did not the great Napoleon avow at the end of his career, so full of glory and of disappointment, that after all it is not diplomacy but sentiment, that is to say the heart, that governs the world? Your heoric country has conquered forever the heart of America. And as long as France shall merit our aid against all unprovoked aggression, she shall have it without treaty and without contract. The past has forged in our souls a sacred and sufficient entente and has engraved it in our hearts. The late Archbishop Ireland well said that it was in reading the history of his country that the American child learned to love France. Never can we forget the generous aid, the sympathy, the devotion and the unselfishness which the French people and the government of Louis XVI showed us at the outset of our history. The steadfast friendship of the two peoples, their mutual respect and confidence, their common sacrifices and common heroism these are your guarantees.

"On the tomb of the Unknown Soldier, consecrated symbol of the natural grandeur of man, the two people have renewed their ties and have felt again the intimate union of their souls."

Improvements in Open-Hearth Port Construction

Early Types—Water-Cooled Ports—The McKune System and the Venturi and Egler Furnaces with Some Results

BY JOHN W. KAGARISE*

THE proper operation of an open-hearth furnace is nowhere more dependent upon good design than in the ports and especially is this true with furnaces using producer gas as fuel. By far the larger proportion of furnace trouble originates in the ports, and even when perfectly designed as to size, arrangement and alinement, it is a difficult matter to keep them so.

In the pioneer days of the open-hearth, producer gas was the chief fuel used, and it was the practice of furnace builders to follow a rule of thumb formula for the construction of the port ends with the inevitable result that very little progress was made toward the solution of this most important problem.

The temperature required in the steel bath at tapping is 2900 to 3000 deg. Fahr. (1593 to 1639 deg. C.), the flame temperature required is 3100 to 3300 deg. Fahr., and the fusion point of the silica brick, of which the ports are built, is from 3300 to 3400 deg. Fahr. This is a very narrow range with which to work at such high temperatures, and the action of the waste gas passing out of the furnace cuts back the ports very rapidly.

Port Design of Early Furnaces

The first furnace in America to make open-hearth steel as a commercial success was a five-ton furnace using producer gas fuel, designed by the late S. T. Wellman and built by the Bay State Iron Works, South Boston, Mass., in 1869. The builders made no attempt to direct the flow of the gas by the lines of the port, but depended on the depressed roof over the furnace to force down the flame into contact with the bath. The roof burned away very rapidly, the heat transfer to the bath was poor, and the life of the furnace was short.

From this time forward there were many changes, and gradually the ports came to be built with both the gas and air openings inclined downward toward the hearth, the air being inclined to a greater degree than the gas. This construction caused the air to flow down sharply on top of the gas, kept the flame in close contact with the bath and also tended to protect the roof.

While these furnaces were a big improvement, still their life was short, and to overcome the short runs the gas arch was built longer, or nearer to the combustion chamber, to give more brickwork to wear away. This type of furnace worked slowly at first; as the long port caused the hottest part of the flame to be carried well out over the bath, the incoming end worked coldly and the gas was not fully burned before it passed out of the furnace. As the blocks and arches wore away, shortening the port and increasing the length of the combustion chamber, the furnace gained in speed and became a good working furnace. When the furnace run had lengthened and the port had burned very short, the flame was not directed properly and traveled close to the roof, soon putting the furnace out for repairs.

To prolong the life of the furnace, sand ports were often put in by placing a pipe in the port and ramming silica sand, mixed with lime or molasses, over it, to conform to the desired lines. The furnace was then heated up slowly and the pipe burned out. By the time

*Superintendent open-hearth department, Edgar Thomson Works, Carnegie Steel Co., Braddock, Pa.

(*Continued on page* 1326)

Authors of Papers Read at Meeting of the American Iron and Steel Institute

J. M. CAMP, director bureau of technical instruction Carnegie Steel Co., who read the paper, "The Relations of the Iron and Steel Industries to the Chemical Industries," is a graduate of what is now the University of Pittsburgh, in engineering, supplemented by a special course of two years in inorganic chemistry. His first position was as chemist of the Pittsburgh Steel Casting Co. In 1889 he accepted position as chemist of the Allegheny Bessemer Steel Co., now known as the Duquesne Works of the Carnegie Steel Co. At this plant he remained until 1911, in charge of the chemical and physical testing, including a year temporarily in charge of the blast furnaces. He was made chairman of the Chemists' Committee at its organization in 1907. The duty of this committee is to standardize in the best interests of accuracy and dependability of analytical results the methods of sampling and analyzing the material consumed and produced by the constituent companies of the Corporation. In 1911 he was appointed director of the Bureau of Technical Instruction, covering now practically all the educational activities of the Carnegie Steel Co. One of his most important achievements was writing with C. B. Francis as co-author the volume on "The Making, Shaping and Treating of Steel," published by the Carnegie Steel Co.



J. M. CAMP

W. A. HULL, Bureau of Standards, Washington, author of "Refractories in the Steel Plant," is a native of Ohio. He attended Ohio State University, graduating in 1902 with the degree Engineer of Mines in Ceramics. He entered the employ of the Reese-Hammond Fire Brick Co., Bolivar, Pa., as chemist, and spent the summer of 1903 in Germany studying factory practise in the production of refractories. Between 1903 and 1914 he filled executive positions connected with the production and sale of refractories and other clay products in Pennsylvania, Washington, Tennessee and Virginia. He has been with the Bureau of Standards since March, 1914. His present position is Chief of Refractories Section and Optical Glass Section of the bureau. He is a member of the American Ceramic Society, American Society for Testing Materials and National Fire Protection Association.



W. A. HULL



A. E. BOURCOUD

A. E. BOURCOUD, who presented the paper on "Direct Process for Steel Manufacture," is a metallurgist at 200 Fifth Avenue, New York. He is of Spanish nationality from Spanish and English descent. He studied civil engineering in England and obtained the degree of Doctor of Science. For a period of years he was engaged in general railroad and bridge building engineering in England and in Spain. In 1899 he took a leading part in the organization of a large chemical company which was located in the north of Spain for the manufacture of bleach and soda compounds by the electrolysis of salt. Mr. Bourcoud became managing director, designing and erecting a plant. Six years later he became chief engineer of the Madrid electric power station and installed the producer gas plant and gas engines. During the past 15 years Mr. Bourcoud has devoted his attention almost entirely to developing a process for obtaining steel direct from iron ore and in this connection conducted some large scale experimental work in London. Mr. Bourcoud came to the United States in 1915 and later went to Central America, but has made his home in the United States for the past four years.



J. W. KAGARISE

J. W. KAGARISE, superintendent open-hearth department, Edgar Thomson Works, Carnegie Steel Co., presented the paper on "Improvements in Port Construction in Open-Hearth Steel Furnaces." He was superintendent of the open-hearth departments Farrell and Sharon Works, Carnegie Steel Co., 1906-1913, and has been superintendent of open-hearth department, Edgar Thomson Works, Carnegie Steel Co., since 1913. He is chairman of the subcommittee on open-hearth furnace design and construction, United States Steel Corporation open-hearth committee, and chairman of the Carnegie Steel Co. open-hearth committee.

S. W. MILLER, president American Welding Society, who read the paper on "Welding," was with the Pennsylvania Lines from 1887 to 1906, as special apprentice to master mechanic. From 1907 to 1910 he was with the American Locomotive Co. as superintendent, and since 1910 he has been proprietor of the Rochester Welding Works, Rochester, N. Y.



THOMAS J. FOSTER

THOMAS J. FOSTER, chairman of the National Bridge Works, Long Island City, N. Y., who presented the paper on "Steel Lumber," graduated from Rensselaer Polytechnic Institute in 1892. Pindy & Henderson, the first engineers in this country to devote themselves entirely to designing the steel framework of buildings, were responsible for his start in business. After a couple of years with them he was engineer for the South Halsted Street Iron Works of Chicago for several years. He went to New York in 1897 and opened an office with Robert M. Greene under the name of Foster & Greene, designing and detailing structural steel. In 1902 the present business of National Bridge Works was started for the purpose of filling a need in New York of furnishing fabricated material from stock. No plant for emergency work exclusively had been operated in this territory at that time.

(*Continued from page* 1324)

the pipe was burned out, the sand was set, and if it did not crumble, the furnace generally made fair time on the heats. However, the life of a sand port was very irregular, a constant source of worry, and very ofter the cause of break-outs through the end of the hearth and serious damage to the furnace.

At several plants, the furnaces were so designed

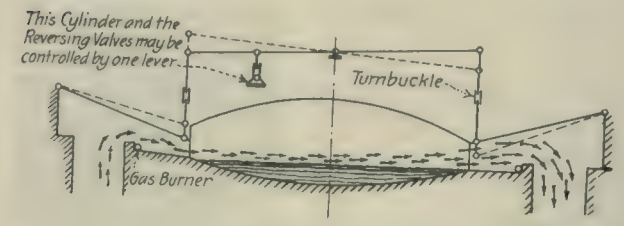


Fig. 1—Diagram to Illustrate the Principle of Modifying the Port Areas on Reversal

that a removable port was used. This removable port was built in a rigid framework which held all the brickwork above the charging floor level to the end of the furnace proper. A spare port was always ready and, when necessary, a burned-out port was removed and a new one installed. This type of port is practically out of existence and nearly all producer gas furnaces today use a port with a single gas opening, which is built as an integral part of the furnace.

There is no doubt that, if a properly designed brick port could be maintained, the uncooled brick port makes the most efficiently working furnace.

Water-Cooled Ports

The result of these experiences naturally led to experiments with water-cooling devices to protect the brickwork at its most vulnerable parts. Water-cooling had been in successful use at the blast furnaces for years, and naturally some of the earliest port cooling was tried with bronze blast furnace cooling plates buried in the brickwork. The effect of this cooling was an improvement in the life of the furnace while the plates lasted, but generally the life of the plates was short; and they were a complete loss, as they could not be removed when they started leaking and the water supply had to be shut off.

[The author describes and dismisses various types of water-cooled ports in use at South Chicago Works of the Illinois Steel Co. and also the latest forms of the Parks, Knox, and Blair ports.]

Ports for Burning Liquid Fuel and Powdered Coal

The burning of oil, tar and powdered coal as fuel for open-hearth furnaces has been in practice in this country for a number of years. Their efficient burning depends more on the burner used and its ability properly to atomize the fuel and direct the flame, than on the port construction. Water-cooled burners, which obviate the necessity of removal after each reversal, have been installed in furnaces with ports built for producer gas and natural gas, with modifications of both, and with ports built especially for these fuels, but the fuel consumption and furnace life are practically the same.

The use of by-product coke oven gas as an open-hearth fuel introduced new difficulties in flame control and efficient combustion of the gas. As a result, in the last few years, many experiments have been made

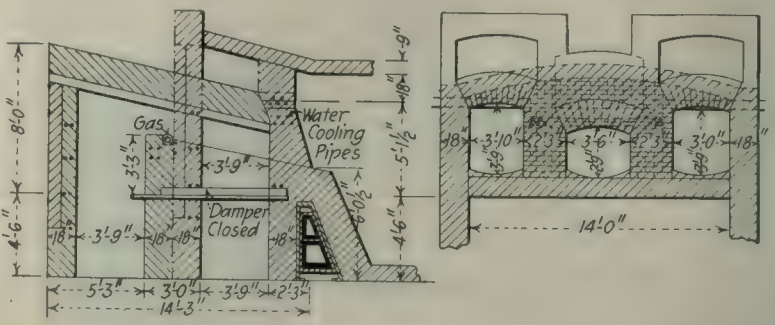


Fig. 2—McKune Furnace for Burning By-Product Coke-Oven Gas

in changing the lines of the furnace ports* to mix the gas and air more intimately, thereby getting quicker combustion, or by the introduction of dampers in the ports or up-takes, to restrict the incoming air to a small area and thereby give it a high velocity, with the idea in view of burning the fuel with more efficiency. Such ports are primarily intended to be used with furnaces burning by-product gas and producer gas, but may be used for burning other fuels with some degree of success. Such relations were illustrated in principle, in 1912, Mr. C. A. McCollum of the Homestead Works, and stated by him, in a report covering the efficiency of a furnace, as necessary with forced

*See F. L. Toy on "The Basic Open-Hearth Process," American Iron and Steel Institute Year Book, 1920, page 345.

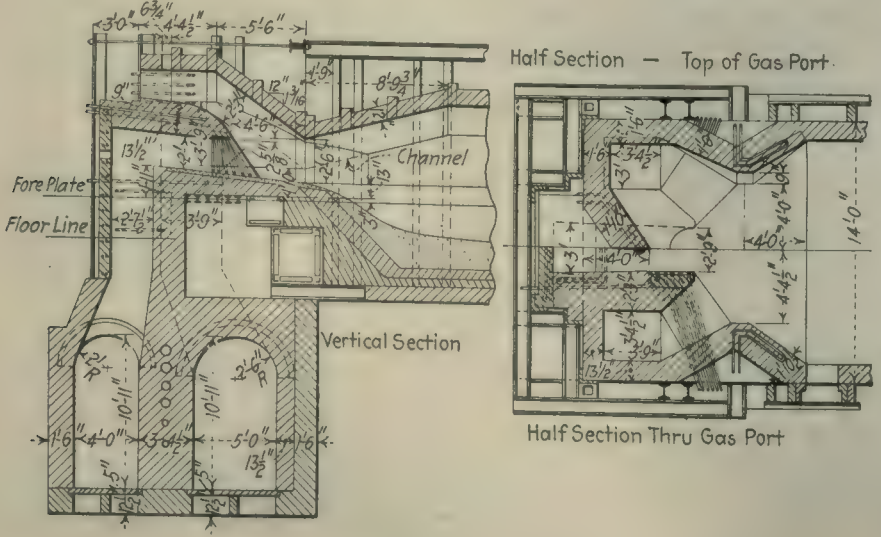


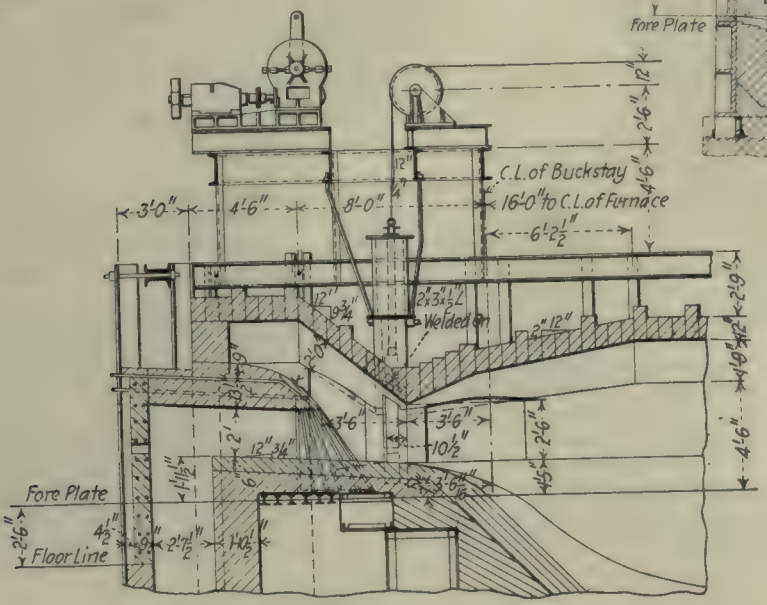
Fig. 3—Venturi Line Furnace, South Chicago Works, Illinois Steel Co.

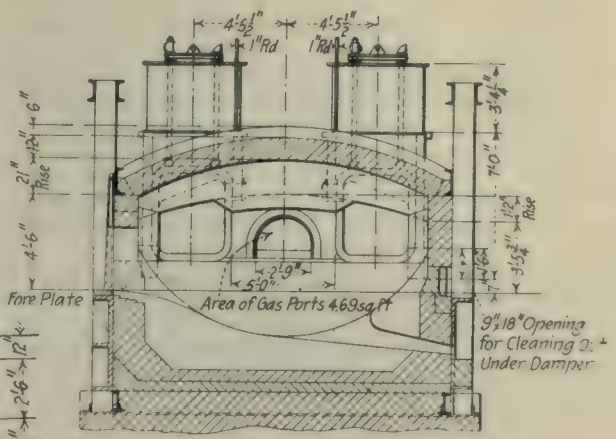
draft and desirable under all conditions. Fig. 1 is the reproduction of a diagram made by him at that time.

Among the many experiments that have been tried and seem to be standing the test are the McKune system, the Venturi line furnace and the combination of the McKune system and the Venturi line furnace at the South Chicago Works, and the Egler furnace in use at the Brier Hill Steel Co., Youngstown, Ohio.

McKune System

The McKune system, as shown in Fig. 2, originally installed in the open-hearth department of the Steel Co. of Canada, Hamilton, Ont., consists of a volume air blower, which is attached to the reversing valves and furnishes air for the furnace at a pressure of six oz. per sq. in.





Figs. 4 and 5—Combination of McKune System and Venturi Line Furnace, South Chicago Works, Illinois Steel Co.

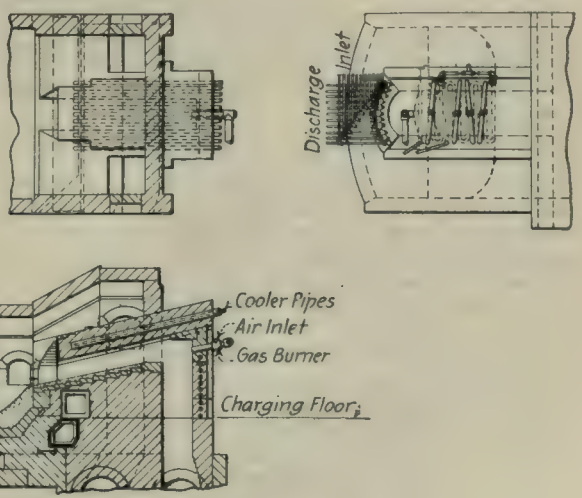
Fig. 6 (Lower)—Showing By-Product Gas Burner Installed in the End of Producer Gas Furnaces at Duquesne Works, Carnegie Steel Co.

The air is introduced through the checker chambers into a well and from there through a central port similar to that of a gas producer furnace. This further resembles the modern gas producer furnace in having two outside uptakes and one central uptake leading from the slag pocket, the two outside uptakes uniting in one common opening above the central port. The two outside uptakes, at either end of the furnace, are equipped with water-cooled dampers. These dampers are placed about four feet above the charging floor level, and are operated by a hydraulic manipulating system.

By-product coke oven gas is used as fuel and is introduced in either side of the central port at right angles to the line of the port. The dampers are so arranged as to close the outside uptakes on the incoming end and open them on the outgoing end. Therefore, the air on the incoming end must all rush through the central port under blower pressure, picking up the gas in its travel, which burns with an intensely hot and complete combustion within the first ten feet of the hearth length; then there is a slowing down of the products of combustion into the greater volume of the outgoing end, since the outside uptakes on that end are open.

Venturi Line Furnaces

The Venturi line furnaces, as shown in Fig. 3, so called because of the resemblance of the port lines to the lines of the Venturi meter, were developed at the South Chicago Works, and in a measure along the principles involved in the McKune type of furnace. They were designed with the idea of obtaining better combustion and flame control with their producer gas fuel. To accomplish this purpose the port area at the entrance of the furnace was greatly decreased by lowering the roof knuckles and moving the monkey or wing walls in, and in this manner a restricted opening for a short distance was obtained, with an easy approach on either side of it. In addition, the mouth of the gas port was placed back about three feet from the point of greatest restriction or neck, thus providing a chamber in which the gas and air could be thoroughly mixed before entering the furnace proper. No fan blowers are used on these furnaces, but all are equipped with



waste heat boilers and induced fan draft. This construction has proved successful and has been installed in all their furnaces.

A further development of furnace ports is being worked out at this plant by combining the McKune system with the Venturi line furnace (see Fig. 4). Instead of drawing in the monkey or wing walls and thus restricting the outgoing end, as well as the incoming end, a system of water-cooled dampers is installed. These dampers enter the port, one on either side of the gas port, through the roof at the knuckle, or point required for the greatest restriction, thereby taking the place of the wing walls. The dampers are operated so that the two on the incoming end are in the furnace, while the two on the outgoing end are out of the furnace, thus restricting the flow of the incoming gas and

air through a neck with an opening of 13 sq. ft., and permitting the waste gas to escape through an opening of 31 sq. ft. The furnace is equipped with a fan which forces in the air used for combustion, as well as being equipped with a waste heat boiler fan which draws out the waste gases. The furnace has been doing wonderful work and has been attracting attention from all sides.

During the month of August, the furnace, which produced an average heat last year of 72.6 tons, operating continuously, made 105 heats of 76.4 tons each, or a production of 8020 tons. The average time of the heats was 7 hr. and 5 min., tap to tap, including all delays. It was operated on a charge of 53.2 per cent hot metal, 41.2 per cent scrap and 5.6 per cent metal from the ore. The consumption per gross ton of ingots produced was 400 lb. of coal from the Lynch mine located in eastern Kentucky, of 13,200 B.t.u. value. As this furnace was an experimental one, it was taken off early in September and some changes made in the water-cooled frames of the dampers, as it was felt that there was too much water-cooling exposed to the preheated incoming air, and that it tended to cool the air unnecessarily.

The furnace was again put in operation and another run of a month was made, from Sept. 15 to and including Oct. 15, to correspond with the number of days in the previous trial month, using the same charge, and with the same operating conditions. On this run the furnace made 106 heats of 85.5 tons each for a total production of 9059 tons. The time of heats was 7 hr., 1 min., tap to tap, and the coal per ton was 348 lb.

The furnace received the greatest care and attention, and everything possible was done to speed it up, with the idea of finding out what could be done. The steel it produced was made on the regular orders and ranged from 0.08 to 0.45 per cent carbon. It is not to be expected that this furnace will do as well working under normal conditions, without special attention, but it should at least show results 70 to 75 per cent as good as those given.

Egler Furnace

The Egler furnace was conceived with the idea of making the flame enter the combustion chamber with a blow torch effect. Two of these furnaces, one using producer gas and one natural gas, have been installed in the works of the Brier Hill Steel Co., Youngstown, Ohio.

[A description of this system was published in THE IRON AGE, June 2, 1921.]

Both of these furnaces have been operating for some time and are giving good results, 75-ton heats being made in an average of 7½ hours, with a fuel practice of approximately 400 lb. of coal per ton of steel on the producer gas furnace, and 3700 cu. ft. of gas per ton on the natural gas furnace.

Burning By-Product Gas with a Luminous Flame

The burning of by-product gas in an open-hearth furnace has always given more or less trouble, because of the difficulty of keeping the flame down on the bath; and from the fact that it burns with a non-luminous flame, it was difficult for the furnaceman to know what he was doing. It has been the general practise to use tar in amounts dictated by experience for the purpose of giving luminosity to the flame. The usual procedure was to blow a jet of tar, atomized by air or steam, through the port, immediately over the incoming gas.

During 1918 a gas line was completed connecting the by-product coke plant of the Carnegie Steel Co., Clairton, Pa., with the Duquesne Steel Works, to supply the latter with coke oven gas as a substitute for natural gas. After this gas was made available, many experiments were required to effect its satisfactory substitution. The object of the experiments was to obtain, without the introduction of tar, the elementary principles of natural gas, namely, luminosity and a non-oxidizing atmosphere when necessary.

In the open-hearth practice, it was found that by the introduction of a small quantity of air in the burner, forming a primary combustion at that point, a luminous flame could be obtained in the furnace. It was also found that by varying the quantity of air introduced in the burner, full control of the flame from non-luminous to densely luminous was possible. For the secondary combustion, the required air was brought in through the ports in the regular manner.

The Duquesne Works has 32 producer gas fired open-hearth furnaces, each two connected to the gas producers by a single underground flue. Although the flues were burned out regularly every week end, a deposit accumulated in the underground flue, which had to be removed periodically by hand. This necessitated shutting down the two furnaces connected to the flue, which resulted in a considerable loss of tonnage.

To overcome this loss, all furnaces were equipped, as shown in Fig. 5, to burn by-product gas during the cleaning period, and all furnace crews have been required to burn this fuel, which they have done successfully and with good fuel practice.

The time of changing from one gas to the other ranges from fifteen to thirty minutes, and except for the introduction of the burner and admitting air through both the gas and air ports, when burning by-product gas, there is no change in the operation of the furnace.

At times when the gas supply was plentiful, the furnaces have been operated with it for varying periods, one furnace making a run of 55 heats, producing 3044 tons of steel, with a fuel practice of 9574 cu. ft. per ton.

In conclusion, it may be stated that while progress has been made in the last decade in improving the design of the open-hearth furnace, the result being larger furnaces, increased life and a decreased fuel consumption, yet the field for further improvement is large and every open-hearth superintendent and engineer should be on the alert to introduce such changes in design and practice as will tend to a more efficient burning of the fuel.

Discussion

BY M. J. DEVANNEY*

Water cooling of ports is both necessary and practical, especially when producer gas is used. However, excessive use of water cooling chills the incoming gases, and thus reduces the flame temperature. This results in raising the quantity of fuel consumed, and lengthening the time required to make the heat, thus both directly and indirectly increasing the cost of the steel.

More perfect combustion of the gases may be expected to follow rational port design, first, by providing a higher volocity to incoming currents of air, thus producing a quicker mixture with the gas and a higher flame temperature; second, by providing for free exhaustion of the gases through the outgoing ports and to the stack.

United States open-hearth practice shows a consumption of from 4,500,000 to 8,000,000 B.t.u. per ton of ingots, varying with the condition and operation of the individual plants.

BY J. H. RAMAGE†

Two of our twelve 75-ton open-hearth furnaces are fitted with the Egler type of port. The first furnace so fitted was No. 8, which had long been known as a "loafer." No matter what man was running the furnace, or what materials were charged into it, speed seemed to be out of the question. After the first few heats with the new ports, however, this furnace struck its stride, and was taking approximately 6 hr. per heat.

One great advantage discovered under these conditions, and with such modifications of the original lines as experience dictated, is in the life of the checkers in the regenerator chambers. Furnaces with

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the ordinary form of ports require rebuilding of checkers, in large part, after runs of about 150 heats, and the slag pockets contain 5 ft., more or less, of accumulated cinder. After a recent run, however, of No. 8 furnace with the Egler ports, which run covered 342 heats, there was less than 1 ft. of cinder in the slag pockets, and the checkers appeared to be just as good as they were at first. A test of some of the checker brick showed that they had not lost in quality. It was therefore not found necessary to go through the expensive and time-consuming operation of replacing hundreds of thousands of checker brick.

Another advantage is in the lower stack temperature, which is about 800 deg. Fahr., compared with 1200 deg. for other furnaces. Due, however, to the extreme temperature of the flame in the Egler type of furnace, which reaches 4200 deg. Fahr., it is becoming necessary to get a fire brick which will stand this extreme temperature.

The Egler port and similar devices may be considered the greatest advance in open-hearth practise since the adoption of checkers and the principle of regeneration. The 75-ton furnaces at Brier Hill may be depended upon, with such refinements, to make from 8500 to 9000 tons of ingots per month per furnace, and this figure will be increased by at least 1000 tons when a brick is obtained which will stand the temperature of 4200 deg. Fahr.

Relations of the Iron and Steel and Chemical Industries

Chemicals Consumed by Steel Makers—Steel Used by Chemical Plants—Role of By-Products from Coke—Indirect Relationships

BY JAMES M. CAMP*

CLASSIFIED according to their direct relations to our natural resources and with respect to their dependence for raw materials, our industries are basic or subsidiary, according to the way they are grouped, and dependent. The basic industries are those engaged in the production, or creation, of raw materials by life processes, such as farming; or in the extraction of raw materials from the earth, such as mining or oil and gas-well drilling; or in the conversion of natural potential energy into useful forms, such as our hydroelectric plants. But these industries must be supplemented by a number of others, which, although they are directly dependent upon these basic industries for raw materials and mechanical power, are so intimately related to the former by reason of their being engaged in converting and adapting certain raw materials for use that they must be accepted as co-ordinate to these basic industries and also co-ordinate to each other. Hence, all these closely related industries are to be looked upon as being subsidiaries to our industrial life as a whole.



Diagram Illustrative of the Interdependence of Certain Large Industries

For want of better names, we designate the basic subsidiary division devoted to the production of raw materials by life processes as the agricultural division; that devoted to the extracting of raw materials from the earth as the mining and well-drilling division; and that devoted to the transforming of natural energy as the hydroelectric division. As to the dependent subsidiaries, we call that one devoted to the separation and refining of the metals the metallurgical division; the one devoted to the preparation of refractories, bricks, all clay products, as well as glassware, etc., the earth-products division; and that devoted to the production of chemical compounds, the non-metallic elements, and certain of the rare metals, the chemical division.

One of the things we wish to emphasize now is the close relation and interdependence of all these grand divisions of industry. The accompanying diagram will both demonstrate and vividly illustrate the point we wish to make. This diagram shows that these subsidiary divisions of industry are closely connected and related to each other because they are dependent upon each other for necessary raw materials and supplies, and are each made up of a number of related industries so important that they are usually spoken of as being themselves the basic industries. Each of these industries is accompanied by a list of dependent industries so long that it was found impracticable to show them on this diagram.

It is such a subsidiary division of industry, not a small branch of industry nor yet one of the dependent industries, that we have in mind when we refer to our chemical industry. It consists of the chemical industry proper and a great number of dependent industries, which, though they are not engaged primarily in the production of chemicals as such, produce articles of a chemical nature or by chemical processes, or articles that depend mainly upon chemicals. The chemical industry proper has itself three branches, which are

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known as the chemical section, the acid section, and the coal-tar section.

Referring to the other part of our theme, we see in our country to-day a single branch of the subsidiary metallurgical division developed to such a high state of efficiency, and on that account occupying such a high position commercially that it casts a shadow over the importance of even the subsidiary divisions. Such an industry is the steel industry. And here lies great danger for us, in that we may be led to attach too much importance to one industry or one division of industry and not enough to the others. Trying to decide which of these grand divisions of industry is the more important is like trying to decide which wheel of an automobile is most important, for they form the vehicle upon which our civilization is riding toward that goal set up for it from the beginning, when man was commissioned to replenish the earth and subdue it.

Chemicals Consumed by Steel Industries

In reviewing the chemical products consumed by the steel industry, we find that sulphuric acid heads the list both as to quantity and importance. Statistics have never been compiled. We do know, however, that during the year 1920 the United States Steel Corporation used approximately 280,400 net tons, all of which was concentrated to give, on an average, a gravity test of 60 deg. Baumé. This fact leads us to the confident belief that our steel industries as a whole must have consumed last year at least 600,000 net tons of this acid, expressed on the standard gravity basis of 50 deg. Baumé. To make a striking comparison, the acid consumed during the year 1919 by the Steel Corporation alone amounted to almost 10 per cent of the total quantity of this acid reported by the Census Bureau as having been made in this country that year. Of this acid used by us, nearly one-half finally went into the manufacture of ammonium and iron sulphates and thus represented a recoverable outlay, but the remainder represented an actual consumption, from which there was no such recovery of acid or any other direct tangible return for the outlay. As to the direct purposes to which we put the acid not used in the manufacture of ammonium sulphate, a small portion was used in washing benzol and other homologous compounds produced by by-product coke plants, a smaller portion was consumed in making chemical analyses, and the remainder was employed for pickling.

The next items in point of quantity consumed by our corporation during the year 1920 were muriatic, or hydrochloric, acid and sulphur itself. Of the 10,200 net tons of the former consumed, some was used for pickling in processes where sulphuric acid is not suited to the conditions, such as the final pickling in galvanizing; some was consumed in our chemical laboratories, where it is used in practically every analysis made; some was neutralized with zinc to form part of the flux used in the manufacture of tin and terne plate; and a small portion was applied to various other purposes too numerous to mention here. The greater portion of the 22,000 net tons of sulphur used by us was consumed in the manufacture of sulphuric acid, which we also make as a by-product in zinc smelting, but a considerable portion was employed in the manufacture of certain grades of steel in the galvanizing of sheets, and in the erection of acid-proof water-tight brick tanks.

The fourth and fifth items next in importance are salammoniac, or ammonium chloride, and soda. During the year 1920 our corporation required almost 7,500,000 lb. of salammoniac and a little more than 1,120,000 lb. of soda, most of which was in the form of the hydroxide, commonly known as caustic soda, and the remainder in the form of the carbonate, or soda ash. The salammoniac was used chiefly as a flux in the application of tin, terne and zinc coatings, but a small quantity was consumed in the laboratories and shops, where it is indispensable in some work. With the exception of small amounts used in our laboratories and for cleaning purposes, the soda was employed in our plants for the neutralization of acids and corroding compounds, such as in the washing of benzol products and the softening of water for boiler use. Its effectiveness and the importance of its use for these purposes are matters that need not be elaborated upon nor emphasized here.

Other items are the 6,000,000 lb. of palm oil used in the tin plate plants of the corporation during 1920, the 63,477,000 gal. of fuel oil consumed, and the 3,264,000 gal. of straw oil required for the absorption of benzine and its homologues from our coke oven gas. Tar oils may be substituted for the straw oil, but no satisfactory substitute for the palm oil has yet been found, though such a substitute has been diligently sought.

A small item is nitric acid, of which we consumed nearly 6000 lb. in 1920. The use of this acid is restricted to laboratory purposes almost exclusively. During the same year, our requirements for the nitrate of soda called for more than 3,500,000 lb. of this salt, most of which was employed in the manufacture of sulphuric acid.

Next comes a long list of chemical articles for which we have no data whatever as to the quantities consumed by the steel industry.

Steel Consumed by Chemical Industries

Not only are the iron and steel industries large consumers of chemicals, hence good customers of the chemists, but the chemical industries are likewise large consumers of iron and steel. We have been unable to secure statistics as to the tonnage of iron and steel used by our chemists, but, judging from our knowledge of these industries, we know it must be large. The chemists deal largely with matter in the liquid and gaseous states, hence their apparatus consists of such vessels as stills, retorts, vacuum driers, pipes, tanks and various other containers, many of which are made of iron or steel entirely, while the remainder require these materials in their construction. They have need of much steel in the form of plates and sheets for vessels, ranging from tin cans to tank cars, in which to transport and market their materials. They employ much machinery, such as fans, rolls, pumps, presses, crushers, disintegrators and centrifugal machines, and, of course, require engines and motors to operate these machines. They require steel for their buildings, which usually must be fireproof; in 1919 there were more than 1300 establishments producing chemicals, 811 of which were devoted exclusively to the chemical industry proper.

Chemical Industry as a Customer

But it is in the sense of a prospective customer that the steel industry should show the keenest interest in the chemical industry, for the former has gradually worked itself into the position of a producer of certain chemicals and raw materials for the latter industries. Thus, during the war the scarcity and consequent high price of potash brought about the installation of apparatus for the recovery of this product from the dust in blast furnace flue gases wherever the amount of potash driven over with these gases would justify the expense. Similarly, a desire to eliminate waste led the steel industry several years ago to begin the manufacture, from spent sulphuric acid, of ferrous sulphate, commonly known as copperas or green vitriol. The production of this salt for the year 1919 amounted to almost 60,000 net tons, practically all of which we can be reasonably sure was produced by the steel industry.

It should be noted in passing that a similar desire to utilize what would otherwise remain waste products urged us many years ago into the manufacture of cement from blast furnace slag, of phosphate fertilizer from basic slag, and of paints containing zinc oxide and white lead or iron sesquioxide as base pigments. Although viewed with much prejudice and suspicion in the beginning, the high quality and economic importance of these by-products of the steel industry are now generally recognized.

Again, the change from the beehive to the by-product method of coking coal has brought the steel industry into the most intimate relationship with the chemical industries, particularly the coal-tar branch. This change has created an almost unlimited supply

of ammonia and the chief raw materials used by the coal-tar chemists.

[The author here discusses coal-tar and dye industry and gives some data.]

Fortunately, and also unfortunately, the steel industry does not rely upon the coal-tar chemical industry in disposing of these coke by-products and neither does the coal-tar chemical industry rely upon us for its supply of raw materials entirely. The steel industry finds a ready sale for all its benzol and toluol and a part of the naphtha as motor fuel, while the remainder of the naphtha and all of the naphthalene and tar can profitably be used as fuel in the steel mills. On the other hand, the coal-tar chemists can look to the gas manufacturers for many of their basic raw materials, and, indeed, so far as the refining of tar is concerned, they rather prefer certain gas tars to coke oven tar, as the former usually contains a higher percentage of the more desirable light and middle oils. This is the unfortunate side of this condition, that it does not promote the spirit of sympathy and helpfulness that goes with a mutual dependence.

Indirect Relationships

Leaving for a time the points of direct contact between these two industries, let us examine briefly their indirect relationships. The steel and chemical industries are indirectly connected in ways that are vital to the welfare of both.

One of these indirect relationships has to do with the fact that certain products of these two industries are absolutely interdependent for their effectiveness. Consider, for example, the dependence of liquified and compressed gases upon the high tension seamless steel tank, and then reflect that without the development of and the demand for such gases there would be no demand for the tanks. In the latter case the steel industry would have missed a good business, for, taking the case of compressed oxygen alone, the 1,200,000,000 cu. ft. or more of this gas compressed yearly requires the constant use of about 2,000,000 tanks to contain and market it.

Again, we find that the steel and chemical industries are connected in a similar indirect but vital manner through their more direct relations to certain other industries. In a word, both steel and chemicals are first essentials to many industries. A notable example is the electrical industries. Without chemicals for batteries and insulating materials, or without steel for magnets, armature cores, transformer cores and other vital parts of electrical machinery, the whole industry would be handicapped and certain branches would be impossible.

As a third important way in which the two industries are indirectly connected is that progress in one industry promotes progress in the other. The history of our steel laboratories reveals a perfect synchronization of progress in these two industries. For example, the development of compressed oxygen made possible the determination of carbon in iron and steel by the direct combustion method, and this method was in use less than two years before new and more efficient substances for absorbing carbon dioxide were brought forth by the chemical manufacturers. The latest example of this kind is perchloric acid, which is a reagent of marked chemical activity that has but recently been put on the market. Experiments conducted within the last year in some of our laboratories have indicated that this acid may be used to great advantage in getting into direct solution for analysis certain cinder and ores which have been dissolved with great difficulty.

While we maintain that all our industries are equally important to the physical comfort and general welfare of our people, we can also say that no others have contributed so much to our safety and progress as the steel and chemical industries. In times of war they have supplied our chief means of defense and in times of peace they have furnished us with tools wherewith we have hewn our way to material successes. And now we plead for more sympathy and co-operation in these industries to the end that they each may continue to contribute more and more to the security and prosperity of our own nation and to the advancement of all mankind.

Steel Lumber for Building Construction

How It Is Made—Various Types—Some Tests It Has Been Subjected To—Economical Results from Its Use

BY THOMAS J. FOSTER*

STEEL lumber consists of light structural steel members in the form of I-beams and channels of approximately one-third the weight of the standard sections of equal depth, and primarily designed to fulfill the functions of wooden joists and studs. The manner in which I-beam sections are made from channels by riveting or spot-welding and the method of attaching metal lath are shown in the illustrations.

In 1901 the first small sections, and in 1907 the first steel lumber joists, were made of sheet steel. The sheets were slit and formed into channel sections on brakes. The I-sections were formed by placing two channel sections back to back and riveting them. Lengths greater than 16 ft. 8 in. were made by splicing. The first installation was made in a two-family, 16-room dwelling at Tuxedo Park, N. Y., for the Tuxedo Park Association. The entire frame of the building including the joists, studs and rafters was made of this material. Metal lath was attached to the studs as a base for the stucco on the exterior and for the plaster on the interior. Metal lath was also placed over the tops of the joists, which formed a support and furnished reinforcing for a two-inch concrete slab. Wooden nailing-strips were fastened to the steel lumber joists and embedded in the concrete as a base for the wood floors. Metal lath was attached to the bottom of the steel joists to support the plaster ceiling. This was the first time a fireproof construction was used having the good qualities of wood construction.

The present method of producing steel lumber was started in 1919. The finished strips are made from slabs in a single mill. These slabs are from 8 in. to 16 in. wide by 3½ in. thick and weigh from 300 to 700 lb. each. A specially designed hot strip mill takes these slabs down gradually to strips of 0.072 in. to 0.102 in. gage and widths up to 17 in. The strips are made 130 ft. long, finished hot and coiled. The coils, when cold, are fed into forming mills which produce the steel lumber channel sections. I-sections are made by placing two channel sections back to back and passing them through automatic spot-welders. Two rows of welds ⅜ in. diameter are staggered along the web of the section. The ends are trimmed and the pieces cut to length by high-speed friction saws. The steel lumber is piled for convenience in handling and is then dipped in a large vat of special paint. This insures the paint getting to every portion of the steel. The painting is for protection until the steel lumber joists are installed in the building. After they are in place and the building completed, as in all buildings, conditions that cause corrosion do not exist.

In one mill producing these sections, having a capacity of 8000 tons per month, the steel used is of standard analysis, carbon content of from 0.16 to 0.24

(*Continued on page* 1373)

* Chairman, National Bridge Works, Long Island City, N. Y.

Semi-Automatic Arc Welding Lead

A semi-automatic arc welding lead has been developed by the General Electric Co., Schenectady, N. Y., for use with its automatic arc welding head, which retains the features of the automatic apparatus, yet allows the operator to direct the arc as required by the conditions of the work.

The apparatus consists of a welding tool held by the operator which acts as a guide for the electrode wire. In the handle of the tool, which has the appearance of an automatic pistol, there is a switch for operating the control on the panel of the automatic welder to start and stop the movement of the electrode wire. Attached to the tool is a 10-ft. length of flexible steel tubing called the flexible wire guide, with an adapter on the other end for attaching it to the automatic welding head. The wire passes from the feed rolls of the head into the flexible tubing, and thence to the arc through a guide nozzle in the welding tool. The automatic welder functions in its accustomed manner, the operator merely directing the arc as required by the particular job in hand.

The field of application of the semi-automatic is the welding of products where the seams to be welded



A Switch in the Handle Operates the Control on the Panel

are of irregular contour, or on large work where the travel mechanism and clamping necessary for the full automatic welder would be complicated and costly. In many cases the edges of the seams are not accurately prepared, making gaps in some places, and tight fits in others. The automatic welder with mechanical travel cannot compensate for these conditions by varying the speed, or by manipulation of the electrode, but with the semi-automatic, they are taken care of.

The semi-automatic welder it is claimed may also be used for building up metal rapidly, as in filling up blow holes in castings, or building up worn spots, etc. The speed of deposition of the metal varies widely, being somewhere between the ordinary hand speed, and that of the automatic, according to the conditions of the particular job. It is said that, in general, it is about twice as fast as hand welding.

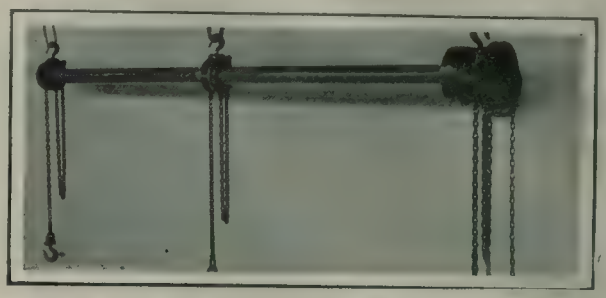
Complaint Against Ore Rate

WASHINGTON, Nov. 22.—The Mississippi Valley Iron Co. has filed a complaint with the Interstate Commerce Commission against the Chicago & Northwestern Railroad, et al., charging that the rate of $4.05 per gross ton on iron ore shipments from Ironwood, Mich., to Carondelet, Mo., is unreasonable, exorbitant, and unjustly discriminatory to the extent that it exceeds the rate of $3.25 made applicable to like shipments to Granite City, Ill., by the decision of the commission on June 23, of the present year. The new rate to Granite City, became effective on July 7.

Triple Hook Hoist

A triple-hook high-speed hoist for the handling of long and limber loads such as encountered in the lifting and conveying of long bundles of sheet metal, tubes, small diameter metal bars, wire and other unwieldly material has been brought out by the Wright Mfg. Co., Lisbon, Ohio.

The hooks on the hoist shown in the illustration are 5 ft. apart, but this distance can be varied to meet requirements. The rated capacity is 1-ton, although hoists of larger capacities are built. The hoist is ordinarily suspended from three ½-ton plain trolleys on an overhead I-beam and operation is by one man overhauling the chain on the single hand wheel which



The Chain on the Single Hand Wheel Operates the Three Chain Blocks

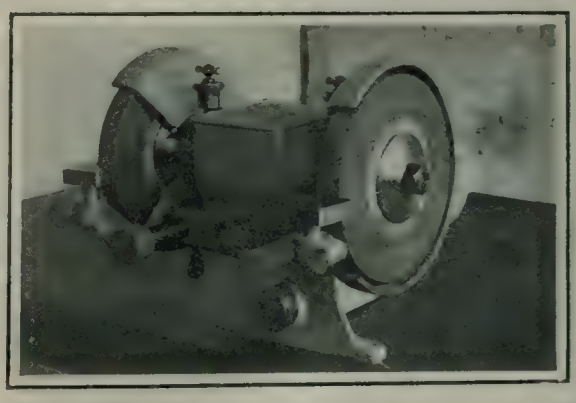
operates the three chain blocks, lifting the load evenly at all points.

The main drive shafts and pinions are of nickel carbon steel forgings; the load chain wheels are electric furnace steel castings, guaranteed not to break; and housings are of malleable iron. The hoists are said to be given rigid tests for strength, each hook being subjected to an overload test of 150 per cent of the entire capacity of the hoist.

New Electric Bench Grinder

An 8-in. electric bench grinder having a ¾ hp. motor of the universal type and operating on alternating or direct current is offered by the Black & Decker Mfg. Co., Baltimore.

The machine is shown in the accompanying illustration. The accented features include the arrangement of the grinding wheels which are set well forward of



The Grinding Wheels Are Set Well Forward of the Motor Casing

the motor casing and arranged so that they overhang the bench. This makes it possible to grind long pieces and odd shapes conveniently and also to wear the grinding wheels right down to the clamp washers. The motor is air cooled and has the cooling-air intake located 12 in. from the grinding wheels to reduce the possibility of grit being drawn into the machine. Grease lubrication is used throughout.

The machine is shipped as a complete outfit with one coarse and one fine grinding wheel, 8 in. in diameter by ¾ in. face; two wheel guards; two adjustable tool rests, and an electric cable fitted with attachment plug and switch.

NO SUSPENSION

Valley Plants Will Continue Operations on Thanksgiving Day

YOUNGSTOWN, Ohio, Nov. 22.—In the Mahoning Valley there will be no suspension of active iron or steel capacity on Thanksgiving Day, makers believing that, in view of the inactive summer, employees would prefer to observe the day at work. Losses in some directions are offset by slight gains in others, so that the average for the district remains the same, about 60 per cent for finishing mills. At New Castle, Pa., the American Sheet & Tin Plate Co. enlarged its tin mill capacity to normal, beginning with the first of the week.

It is a noteworthy fact that all of the 132 puddle furnaces in the Mahoning Valley are fired, including 88 of the A. M. Byers Co., Pittsburgh, at its Girard plant, and 44 of the Youngstown Sheet & Tube Co. at Youngstown. The Byers company furnaces, however, are operating on two 8-hr. shifts instead of three, as formerly.

Ten of 17 tube mills in the valley are in commission, five being operated by the Youngstown Sheet & Tube Co. and five by the Republic Iron & Steel Co. Both interests are likewise operating skelp mills.

Of the Valley's 113 sheet mills, only 62 are under power, a loss of about 15 per cent from the rate which prevailed the past month. Jobbing mill production, involving the heavier gages is still weak.

Producers of reinforcing materials report that schedules in affected departments are well sustained, owing to approaching completion of many buildings throughout the country. Continued demand for fireproofing lath comes from New England territory, with sizable orders likewise from Detroit. Metal furniture departments are less active than they have been.

Forty-two of the 66 open-hearth furnaces are charged this week, with but one of three Bessemer departments active.

Sheet mills are being operated as follows: Youngstown Sheet & Tube Co., 15; Republic Iron & Steel Co., 13; Brier Hill Steel Co., 12; Sharon Steel Hoop Co., four; Trumbull Steel Co., three; Newton Steel Co., 10, and Falcon Steel Co., five.

Only one of four plate mills in the Mahoning Valley, the 84-in. mill of the Brier Hill Steel Co., is rolling.

The Trumbull Steel Co. continues to operate 25 tinplate units.

Many Clamor for Work

The East Buffalo car shops of the New York Central Railroad, which have been idle for nine months, have been reopened by William J. Conners of Buffalo, who will operate them as the William J. Conners Car Shops. About 3000 men applied for work on the day the shops were reopened and it was necessary to call out the police reserves of Buffalo to maintain order. A force of 1500 will be employed and the shops will do work for the New York Central on a contract basis, Mr. Conners employing and paying for all labor and materials. Mr. Conners is publisher of two daily newspapers, chairman of the board of the Great Lakes Transit Corporation and prominent in New York State politics. The West Albany shops of the New York Central may also be taken over by private management, but an official of the road informs THE IRON AGE that no definite arrangement has yet been made.

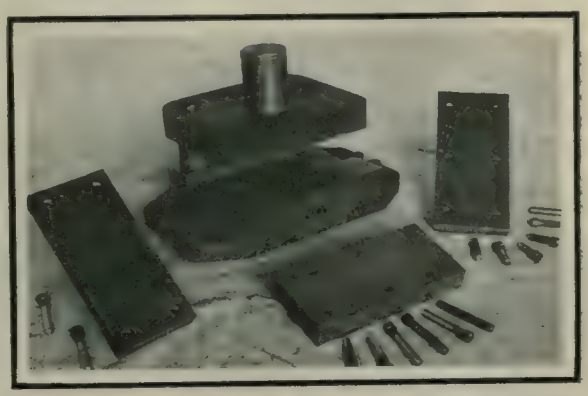
The Pure Oil Co., Columbus, Ohio, jointly with the Humphrey-Pure Oil Co., of Texas, has organized the Humphrey-Pure Oil Pipe Line Co. to build and operate a pipe line system from the Mexia, Wortham and Currie fields, of Texas, to the Gulf Coast. The new company has been incorporated in Texas as the Humphrey-Pure Oil Pipe Line Co., with an initial capital of $1,000,000. Construction of the new company's pipe line system is to be started immediately. The initial line will be 8 in., extending from the new oil fields to the Gulf.

Nearly Normal at Altoona

Data furnished the Altoona chamber of commerce by the Pennsylvania Railroad officials show that that city is nearly normal in the matter of employment of men in the railroad shops and in the monthly earnings of the workmen. When the company began laying off men a year ago there were 12,730 shopmen on the rolls here. All told, 8200 men were suspended, leaving 4500 still in service. Since the company began taking back the furloughed men, 5500 have been called. Of this number 4500 resumed work, 450 refused to sign the new working agreement, 434 refused to go to work and the others did not respond to the call for reemployment. In addition to the 9000 men working in the shops, 2000 more are employed in the round houses. For September, more than $1,000,000 was paid out in wages to the shopmen, and for October, this sum was increased $214,000. This latter payment is almost as large as for June, 1920, during the height of prosperity. Pennsylvania shopmen are on a piece work basis.

Standard Punch and Die Sets

In the construction of metal-cutting dies certain unit parts invariably remain the same as to shape, size and method of machining. The Diamant Tool & Mfg. Co., Inc., Newark, N. J., is producing these standard parts on a manufacturing basis and offering them in sets which are complete in every respect except the die openings and the holes required for inserting punches in the punch plate.



The Sets Are Adaptable to All Sizes of Standard Punch Presses

A set is shown in the accompanying illustration and consists of disc shoe, punch holder, die blank, stripper plate, punch plate, liner pins, liner-pin bushings and the necessary dowels and screws. When the design of the die has been determined, the die maker can take one of these sets, machine the openings in the die, stripper and punch plates, assemble the parts and the die is ready for use. Dowel holes are shown in the illustration but these are not regularly furnished drilled, as various conditions call for different locations. The die blank is of a good grade of oil-hardening tool steel and is from 0.006 to 0.010 in. over size in width to allow for shrinkage in hardening and for final grinding of the sides.

In addition to the type illustrated all possible combinations of the following types are said to be available: U-lug or flange die-shoe; lengthwise or crosswise die slot; rear or diagonal liner pins; shank or dovetail connection; blank sets with or without pins; and straight or tapered die slots.

The sets are adaptable to all sizes of standard punch presses. Among the advantages claimed by the maker is that being made in large quantities on an interchangeable basis the sets are produced at less cost than if machined in small quantities only as required. The standardization and large quantity production also eliminate delay, loss of time in waiting for patterns and castings, and in machining the various parts. The use of these sets, it is pointed out, makes a completed die cheaper and more promptly available.

TARIFF LEGISLATION

Much Delay Expected—Continued Opposition to American Valuation Plan

WASHINGTON, Nov. 22.—Prospects for permanent tariff legislation are decidedly indefinite. It is evident that it cannot be taken up for a protracted period. As yet hearings have been held on only three schedules by the Senate Committee on Finance, and while it is stated that hearings on agricultural products will begin in the near future, it is believed that they will be suspended temporarily after brief testimony is taken, leaving much evidence to be presented on this and the remaining sections. Among the schedules regarding which hearings have been completed is the one on steel, but it is a question as to whether economic conditions of the world will not have changed so materially before further hearings are begun that it will be necessary to get supplemental testimony in the light of a new situation.

Predictions are being made that the legislation will not be taken up in the Senate until after the elections in November of next year. Some Republicans are said to favor this plan and it is stated that high Administration officials are of the opinion that economic conditions are so unstable that indefinite postponement of tariff legislation is expedient. At the same time, there are Republicans who think a long delay would be politically unwise in view of campaign pledges.

The fight for and against the American valuation plan has become more intense than ever in the meantime. Importing and retail interests are especially active in fighting the plan and have flooded Congress with petitions, letters, telegrams and other forms of correspondence in opposition to it. There can be no doubt that their position has been strengthened by the powerful agricultural bloc which has rallied its influence against the plan. Justification probably exists for the report that some prominent men in the Administration and in Congress who have previously gone on record in favor of the plan have now grown lukewarm toward it and are hoping for some substitute, though members of the Tariff Commission and others who have studied the matter say there is no substitute. In other words, it is a case of either adopting the plan or of maintaining the present system of basing import levies on foreign valuation, which supporters of the American valuation plan point out is concededly discriminatory in favor of countries of lowest costs and lowest exchanges. The effect, therefore, is that the higher the costs of production and the more nearly exchange is at par the greater will be the import assessments against foreign countries, some of which are the best customers of the United States, one example of which is Canada, the heaviest buyer of all foreign nations of American steel. The result under the present plan, therefore, is to penalize a country which affords the best single market for steel.

These and many other points are kept in mind by steel and other manufacturers who are strongly in favor of adopting the American valuation plan, but it is evident that they will have to be alert if they are to adequately combat the vast amount of propaganda instituted against the plan. Study of the plan still is under way and is in charge of J. B. Reynolds, former assistant secretary of the treasury in charge of customs under Presidents Roosevelt and Taft, and it is hoped to make a report on it within a few weeks.

For the Brazilian Centennial Memorial

Chairman E. H. Gary of the United States Steel Corporation; Samuel Vauclain, president Baldwin Locomotive Works; Charles M. Muchnic, vice-president American Locomotive Sales Corporation, and Charles A. Stone, president American International Corporation, are among the members of the United States committee for the Brazilian Centennial Memorial. The committee has been formed to enlist nation-wide support for a plan to present Brazil with a memorial on behalf of the American people at the celebration in Rio de Janeiro in 1922 of the 100th anniversary of Brazil's independence. The committee for the United States will co-operate with the American Chamber of Commerce for Brazil, in Rio de Janeiro. Charles Keck of New York, the well known sculptor, has been commissioned to create the memorial, the design of which consists of a colossal figure in bronze, symbolic of friendship.

Ohio Forge Manufacturers Organize

The heavy steam forge manufacturers of Ohio at a meeting held at the Statler Hotel, Cleveland, Nov. 15, decided to form a permanent organization and named, as permanent chairman, Henry D. Martin, medical director of the Pollak Steel Co., Cincinnati, who presided at the meeting. The object of the organization will be to bring about the reduction of premiums paid by forge manufacturers on State industrial compensation insurance and the reduction of accident hazards. Under the Ohio compensation law, manufacturing industries are arranged in groups, and the insurance rate charged to each group depends on the insurance payments by the State growing out of the death or accident of employees in each line of manufacture. Consequently, a reduction in insurance payments results in a reduction in the insurance rates. By improving safety conditions in their shops last year and reducing accidents, the Ohio forge shops were able to secure a substantial cut in their insurance rates.

The forge men also decided to conduct a campaign among manufacturers in other lines to induce them to try to reduce their insurance rates by giving more attention to safety work and thus cut down the number of accidents. They also voted to ask the Ohio Legislature, at its next session, to appropriate funds for an efficient accident prevention campaign to be conducted by the State Industrial Commission.

The Ohio forge men also took up the matter of the rehabilitation of industrial cripples and decided to ask the State Legislature to make an appropriation to be used for the education of persons crippled in industries, so that they will be able to continue as productive members of society in some capacity.

Coal Mining Wage Reductions Start Colorado Steel Works

President J. F. Welborn of the Colorado Fuel & Iron Co. announces that apart from employees of two mines in the southern counties of Colorado, all workers at the company's coal properties have accepted reductions in wages. "Lower cost of coal will enable us to resume operations at our steel plant and give employment to several thousand men," said Mr. Welborn. "Except for intermittent work for about 1500 men, over 6000 have been idle for several months. Saving of production cost of coal will be passed on to consumers and result in increased business from all quarters where our coal is used. The increase in mine operations will be sufficient actually to increase employees' earnings over what would be possible at the high wage scale. Lower scales involve a reduction from $7.75 per day to $5.25 for basic occupations, such as mule drivers, and a reduction of 24 cents in diggers' rates, which range from $1.02 to $1.07 per ton in the districts affected."

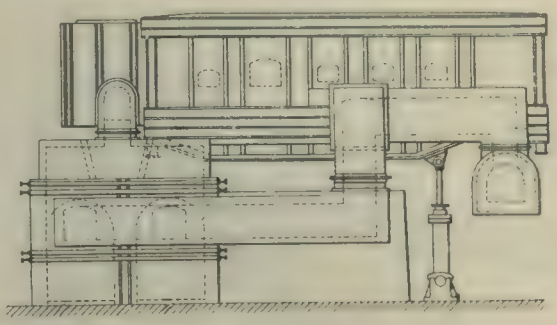
L. H. VanBriggle, former president of the VanBriggle Motor Device Co., Indianapolis, has been sentenced by Judge A. B. Anderson of the Federal Court at Indianapolis to four years in the Leavenworth prison and Henry S. Rominger, former treasurer of the company, to 18 months at the prison and a fine of $500. VanBriggle was charged with using the mails to defraud in sending out circulars advising the purchase of stock when he knew the company was insolvent. The charge against Rominger was that he accepted a dividend check of $6,120 when, as treasurer, he knew the company was insolvent and that he also knew, being treasurer, of the efforts being made, chiefly by VanBriggle, to finance the company.

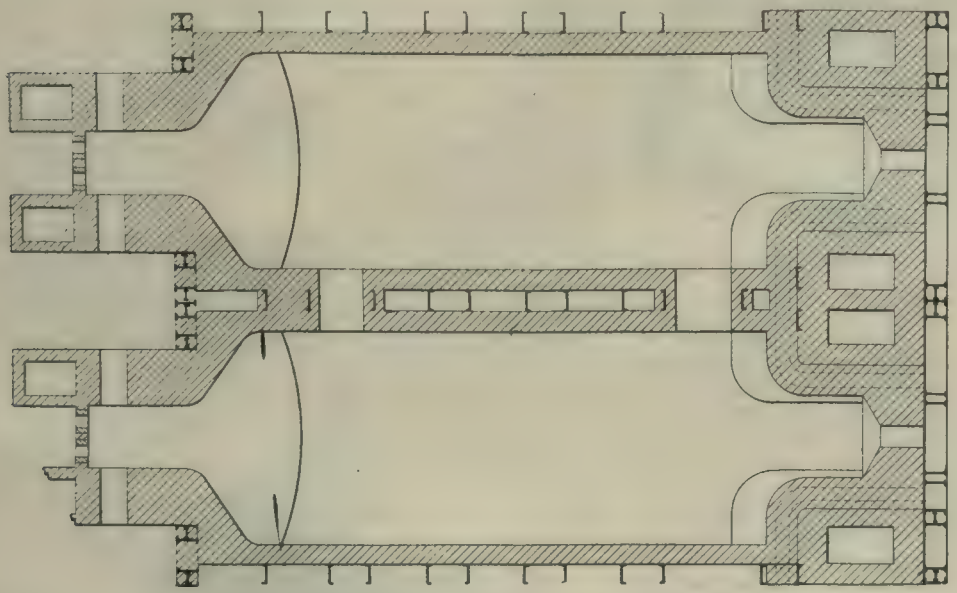
A New Talbot Open-Hearth Furnace of Large Capacity

An open-hearth furnace of very large capacity has been developed recently by Benjamin Talbot of Solberge, Middlesbrough, England, patents for which have been taken out in the United States (U. S. 1,383,444—July 5, 1921). The design marks a distinct departure from any existing type, not excepting the original Talbot tilting furnace.

The illustrations give an idea of the principles involved. The new furnace is intended to have twin or plural hearths connected by one or more ducts so that the metal can flow between them. This arrangement is expected to make it possible to treat a larger volume of metal than at present, the suggested output being from 350 to 500 tons. The provision for a central wall between the two hearths is expected to overcome the structural weaknesses of a single roof over so large a bath, and better to conserve the heat energy as well as reduce the time required for refining.

A feature of the new furnace is the plan to tilt it from one end instead of from the side as in the present Talbot furnaces, and the regenerator chambers are located at only one end. Thus the construction calls for all the gases to flow in the same direction and the waste gases are carried from the tapping end to the stationary flue leading to the regenerators. The inventor expects not only increased capacity but greater advantages in the ability to operate continuously; the maintenance of a very large body of molten refined metal by which comparatively uniform temperature conditions are possible, rapid reductions effected in the impurities of the relatively small addition of metal to the refined and a larger store of standardized refined steel available for tapping at short intervals.





The Upper Illustration Is a Vertical Sectional Drawing Through the Center Line of the Proposed New Talbot Furnace. The tilting mechanism at one end is apparent

The Other Drawing Represents a Horizontal Cross Section of the Proposed Furnace Showing the Two Baths or Compartments with the Connecting Channels between Them. The pouring end is at the left

Investigating Passage of Air Through Ore Beds

In an investigation of the reduction of iron oxide, being conducted at the North Central experiment station of the Bureau of Mines at Minneapolis, the resistance to the passage of air through beds of ore was the first factor studied. The results indicate that the pressure drop required to force air through an ore bed is directly proportional to the flow, and that this pressure varies inversely as to the square of the size of the ore particles. Experiments are also being conducted to determine the rate of transfer of heat from an air stream to an ore bed through which the air is flowing.

Investigations of Bureau of Mines

At the Southern experiment station of the Bureau of Mines at Tuscaloosa, Ala., studies of the atmosphere in the largest iron mines on Red Mountain have been made. Methods of development, mining and handling the ores of several mines on Red Mountain have been investigated. In the brown iron-ore district at Woodstock and vicinity, studies have been made of the character of the ore and methods of mining and preparation. A series of tests have been made on locating the workable deposits.

With a field survey of some iron mines at Ishpeming, Ironwood and Iron Mountain, Mich., field studies of timber decay and timber preservation have been completed by the Bureau of Mines. A general study of the preservation of mine timbers is being made under a co-operative agreement between the Bureau of Mines and the forest products laboratory of the Department of Agriculture.

Laboratory work on the purification of copper sulphate solutions is being conducted at the Pacific experiment station of the Bureau of Mines at Berkeley, Cal. At this station an effort is being made to determine where methane begins to function as a reducing agent for oxides of iron, with particular reference to the temperature above which reduction becomes rapid.

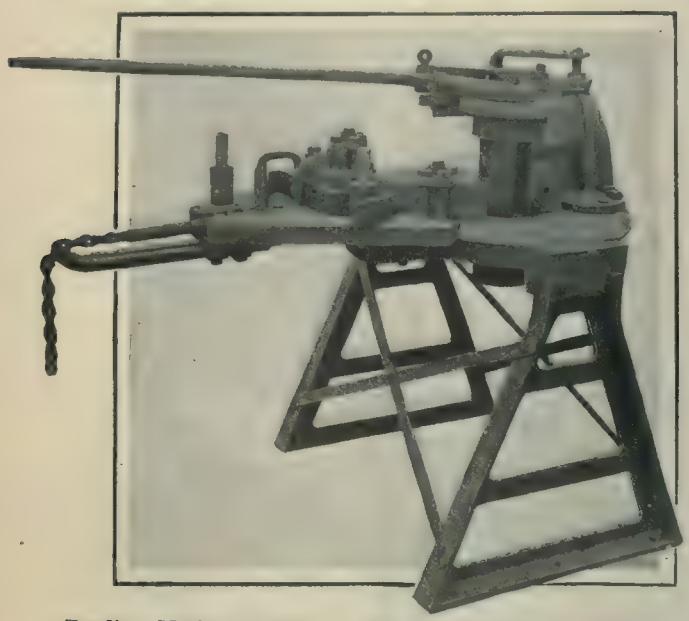
At the Northwest station of the Bureau of Mines at Seattle, Wash., a rotary furnace for the production of sponge iron has been completed. Several reduction tests have been made in which both magnetite and hematite ores were reduced with results equally as good as those obtained in previous tests made in an electric muffle.

A bronze tablet, 40 x 24 in., containing the names of 88 employees of the Builders' Iron Foundry, Providence, R. I., who served with the United States forces and their allies during the war, has been placed on the outside of the plant near the office entrance on Codding Street. During the war the 88 who saw service represented about 20 per cent of the company's employees.

Bending, Forming and Shearing Machine

A hand-operated metal bending, forming and shearing machine of the type shown in the accompanying illustration is being offered by the Bussel Machine Co., El Paso, Tex. Three sizes are furnished, the one illustrated being the No. 3 machine equipped with a compound ratchet lever and with the forming and shearing plate in position.

Among the advantages claimed for the machine are that it requires no extra dies to bend any size stock within its capacity to any angle and that stock will not



Bending Machine Equipped with Compound Ratchet Lever and with Forming and Shearing Plate

shift but will bend on the exact mark. The machine will work right or left without adjustment and one man can operate it. The table, it is pointed out, is an important feature, as all kinds of jobs can be done on it, such as bending heavy angle circles or heavy bars. The bending posts have four bending edges and make less than one-fourth turn in producing a 90 deg. angle. Stock larger than the bending posts will take edgewise, can be bent on the outside of the post. A 90 deg. angle can be bent without the use of a square.

The No. 3 machine has two bending posts, one for light, the other for heavier jobs. The small post will bend ¼ x 6 in. cold; ⅝ x 6 in. with sharp corner, hot; and ⅞ in. round or square, cold. The large post will bend ⅜ x 6 in., cold; 1 x 6 in. with sharp corner, hot; 1¼ x 6 in. with round corner, hot; and 2 in. and under pipe. The weight of the machine illustrated is 840 lb.

New Line of Drills of Special Steel

The Cleveland Twist Drill Co., Cleveland, is offering the trade a new line of drills known as Mezzo, a name to signify a product midway between carbon and high-speed steel. The new drills are said to be made from a special steel new to the tool field and to possess unusual qualities as a result of a special heat treatment which was worked out after extensive experiment.

In shops not properly equipped to get maximum results from high-speed drills, where improper equipment and tool breakage force a return to carbon steel tools and a consequent reducing of production, the new Mezzo drill, it is claimed, will bridge the gap. The inherent advantage of the new steel is its greater ability than carbon steel to withstand softening under the drawing effect of heat. Heating the cutting edge of a Mezzo drill to a dark blue color does not draw its temper. For cast iron, machine steels and the softer alloy steels the new drills perform at much higher rates of speed and feed than carbon steel tools. Their use, however, is not recommended for extremely hard materials.

As an illustration of what may be expected of Mezzo drills the following data is given from recent tests. These represent good average practice and should be compared with an average peripheral speed for carbon drills of about 35 ft. per min. in cast iron or machinery steel, with 0.010 in. feed per revolution. From this data it may be seen that the new drills can be expected to produce holes at three or four times the normal rate of carbon drills.

Test of Mezzo and Carbon Steel Drills

Size Drill, In.	Material Drilled	R.P.M.	Feed per Rev., In.	Peripheral Speed Ft. per Min.	In. Drilled—Mezzo	In. Drilled—Carbon
⅝	3 in. C.I.	356	0.320	60	60*	5
⅝	4 in. M.S.	356	0.024	60	32*	½
¾	4 in. M.S.	294	0.024	50	10½	¼
¾	4 in. M.S.	225	0.020	50	32¼	½
¾	3 in. C.I.	294	0.020	58	30*	1
⅞	4 in. M.S.	225	0.024	55	8	½
⅞	3 in. C.I.	294	0.032	75	30*	2½
1	4 in. M.S.	225	0.015	60	21	1½
1	3 in. C.I.	225	0.020	60	25	1
1¼	4 in. M.S.	180	0.016	59	24	4
1⅜	4 in. M.S.	144	0.020	51	12	1½
1⅝	4 in. M.S.	144	0.032	61	30*	2¾
2	4 in. M.S.	106	0.015	55	32*	3¼

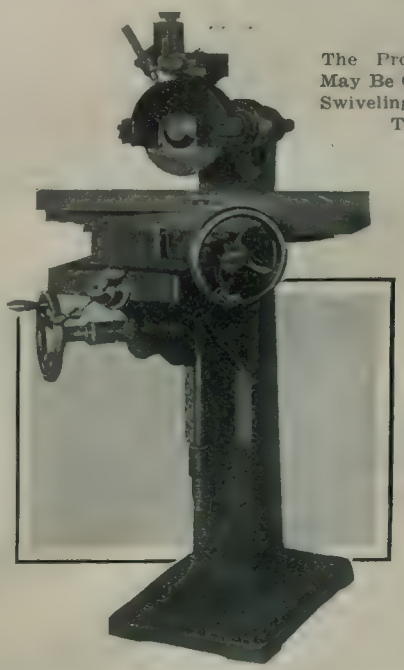
Note.—3 in. C.I. means a cast-iron billet 3 in. thick. 4 in. M.S. means a machinery steel billet 4 in. thick. *Means test stopped, drill still in good condition.

The drills are at present in furnished sizes from 9/16-in. to 2 in. inclusive. To make them readily distinguishable they are given a special blue-black, rust-resisting finish, and wrapped in deep blue paper.

Surface Grinder With Swivel Sub-Table

The Wilmarth & Morman Co., Grand Rapids, Mich., is marketing its No. 1 surface grinder equipped with an adjustable swivel sub-table as shown in the accompanying illustration.

This feature is intended to increase the usefulness of the grinder in providing additional means of conveniently and accurately handling many grinding operations, being particularly adaptable, it is said, to work of angular or irregular shape. It is not necessary to



The Proper Angle May Be Obtained by Swiveling the Sub-Table

remove the work from the table and to re-set it in order to procure the proper angle, this being obtained by swiveling the sub-table which is provided with suitable graduations to permit of close adjustment. It is not necessary to disturb the work on the table to dress the wheel, as this is accomplished by the built-in wheel trueing device located on the wheel hood. The machine is said to be built to very close limits and suitable for shops where the most accurate gage and die work is required.

The sub-table is provided with T-slots to accommodate the head and tail stock, or dividing head when grinding between centers.

Leaves from a Steel Melter's Note Book—II

Design of a Structure to Resist Shock or Overstrain—A Car Coupler Test Illustrating the Necessity of Proper Distribution of Metal

BY HENRY D. HIBBARD

ENOUGH similarity exists in the measures to be taken to enable a structure or piece of material to preserve its usefulness after being subjected to shock or to limited overstrain to warrant their being dealt with in one article. This phase of overstrain, which is stressing the piece or structure beyond its elastic limit, has not, so far as the writer is aware, been written upon hitherto or even considered. However, the design of structures to withstand shock has been made the subject of an interesting and valuable chapter by F. A. Halsey in his book on "Machine Design" (second edition) which will be referred to later.

In reading this article the distinction between static and dynamic stresses must always be kept clearly in mind. The slow pull of the tensile testing machine is a static stress, while the blow of the moving weight in the drop or impact test gives a dynamic stress. In the latter, in addition to the stress to be resisted, there is also energy to be absorbed. The dead load of a bridge causes static stresses, while the live or moving load causes dynamic stresses in its members. Compared with the static stresses the latter are, it is true, relatively small, at least in a bridge of any considerable size.

Whether a stress is less or more than the elastic limit must always be known and understood. If it is a dynamic stress and less than the elastic limit, the question is one of resistance to shock, while if the elastic limit is exceeded then the case becomes one of overstrain. One must also know the meaning of the word "resilience" (often wrongly used), which, applied to a piece of material, is the work required to stress it to its elastic limit. It is the property which enables a piece of structural steel to resist shock.

The two stresses, static and dynamic, affect the material subjected to them quite differently. Their effects are not comparable or convertible; that is, given the result obtained from one of these tests, the result from the other is not to be foretold with anything like exactness. The tensility of an article or structure—that is, its strength to withstand static stress—is therefore an unreliable index of its ability to endure dynamic stress or shock. The steel in a file has high tensility to resist a straight pull and yet the file may be broken if dropped on a hard floor, such as one of stone or iron. Glass has considerable tensile strength, also, but a light blow may fracture it. Neither of these brittle substances has any ductility or any elastic limit separate from its tensile strength. The merit numbers of both (described later) are extremely small.

Overstrain and Later Use

Apparently it may be claimed with some reason that any structure or mechanism should be so designed and constructed that it would not be overstrained in service. But a chain may still be useful after being pulled a little beyond the elastic limit of some or even all of its links. An anchor is usually serviceable after being somewhat overstrained. Many articles of wire are still useful if bent or twisted out of shape, and a car coupler, properly designed, will endure some distortion without breaking and be able to perform its functions after having been bent to a limited extent, which does not prevent it from still passing the contour gage.

The intensity of the strain set up in a piece of metal by a dynamic stress is practically not to be computed. It depends on the distance within which the energy of the stress is absorbed, which is usually exceedingly small, and when it approximates zero the strain becomes very great. If all pieces or parts of a class of structures were so designed as to withstand the greatest strains that they could be subjected to by dynamic forces they might become too large and heavy and consequently too costly to be practicable. It may be better, therefore, to make them reasonably strong (how strong is a matter for judgment based on experience), and then of such designs as will enable them to function even if somewhat distorted or put out of shape, as by an occasional excessive dynamic stress or shock.

To Increase Resistance to Dynamic Stress

Aside from making the part or structure heavier, there are two ways of increasing its ability to withstand dynamic energy. One of these is to employ a ductile metal having a higher elastic limit and the other to make the design such that each part will yield equally throughout under stress. The advantage from the use of a metal having a higher elastic limit for this purpose depends on the fact that the modulus of elasticity, which represents the rate of yielding under stress within the elastic limit, is the same for all steels. Hence the power of the metal to absorb energy within the elastic limit varies as the square of the elastic limit, as shown by Halsey. A steel with twice the elastic limit of another will have four times the resilience, or resistance to shock. It will endure twice the stress acting through twice the distance.

The greater durability of piston rods, of steam hammers made of relatively high-carbon steel containing about 0.50 per cent, as compared with those made of soft steel with 0.15 per cent of carbon, illustrates the value of high elastic limit in service. In the early days the high ductility of the soft steel was assumed to be desirable in any steel subjected to shock, yet it was a property that never came into play.

Higher elastic limit may be imparted to steel by increasing the carbon content or by heat treatment.

In fatigue tests the higher elastic limit prolongs the life of the test piece enormously, because the individual stresses, which may cause a steel having a low elastic limit to fail quickly when they are near that limit, are so small compared with a limit of elasticity two or three times as great that they affect the integrity of the steel with such a limit but slightly if at all. The endurance of such steel in fatigue tests, therefore, may be prodigious or practically endless.

The Question of Design

The effect of the equally-yielding design for withstanding dynamic energy is to increase to the maximum the distance through which the stress must act before causing permanent deformation or set, and hence the power of the structure to absorb dynamic energy before any part has become overstrained. If, however, the energy applied is greater than the power of the structure to resist without set, and it is overstrained, this design causes each part to yield equally in absorbing the excess of energy over that required to strain the structure to its elastic limit, so that the overstrain will be equalized throughout the piece or structure which may still resist rupture and perhaps remain of useful shape if the overstrain has not exceeded an allowable limit.

The power to withstand dynamic energy may be further amplified by changes in design which will lengthen the parts to be stressed, while still having them of uniform strength throughout. Such changes will increase both the quality of energy which may be

(*Continued on page* 1379)

LESS SHEET BUYING

Smaller Plants in the Valleys Curtailing Operations—Tin Plate and Pipe Active

YOUNGSTOWN, Ohio, Nov. 22.—Tin plate, steel pipe and sheets are the most active finished products in the Youngstown district at this time. Sheet buying is somewhat less active than a month ago due to price unsettlement, with the smaller, non-integrated makers curtailing schedules. Roofing grades are still active. The Consolidated Steel Corporation, export agent for a number of district independents, has distributed a number of black sheet orders among constituents in the Mahoning Valley. The Kalman Co., Chicago fabricator of steel reinforcing materials, has commenced construction of the initial unit of its Youngstown plant, which is being built to serve its Eastern trade. When completed and operating normally, this plant will have an annual consumptive capacity of approximately 70,000 tons of bars. A Shenango Valley tank car and repair interest is devoting its capacity to railroad car repair work, and present volume of business will run it into the first quarter of 1922.

This district is especially benefited by the expanding operations of the Carnegie Steel Co., which has added a fifth blast furnace at its Ohio works to the active list. Owing to the diversified output of its bar mills in this territory, they are being maintained at 65 to 70 per cent, filling sheet and tin bar requirements of Steel Corporation subsidiaries in nearby territories.

Keen Competition

In general, new steel buying lacks a sustaining influence and the situation is characterized by keen competitive conditions, proportionately weaker prices and efforts on the part of producers to maintain current schedules to prevent increases in unemployment. Improvement in the oil industry has brought in its wake enlarged inquiry for lapweld sizes of steel pipe.

Though a number of independents continue to nominally quote 3c. and 4c. on common and galvanized sheets, base gages, indications multiply that sales are being negotiated on a basis of $5 per ton less than these quotations. Blue annealed sheets are moving at 2.25c. and there is scarcely justification for any higher quotation. Recent bookings involved several thousand tons of blue annealed, placed in scattered lots of 200 tons and upward. Both black and full finished sheets are being taken in substantial volume by the auto industry and especially by automobile body makers, such as the Fisher Body Corporation. Among the active buyers in the sheet market have been subsidiaries of the General Motors Corporation, including Cadillac, Buick and Chevrolet. One district interest has considerable sheet stock piled in warehouses, produced under specifications from automobile builders, with delivery temporarily held up. Orders against such stocks are being made from time to time in several-hundred ton lots. Full finished sheets are still quotable at 4.35c. for No. 22 gage auto body stock.

Sizable tonnages of roofing stock are going forward to Southern buyers and to car repair interests, while recent consignments from a district independent were destined to Western States.

Pig Iron Conditions

Considerable interest is being evidenced in the pig iron market, especially by a steelworks interest fully self-contained except as to pig iron. Production in the Youngstown district is now about one-third of normal, with large surplus stocks and some of the current output going into stock piles. The market on standard basic is not firm at $19, and a sizable inquiry of a firm nature would develop a price 25c. to 50c. per ton lower, it is confidently believed. Makers with large stocks on hand are anxious to liquidate, having been deterred up to this time only by their belief that buying of finished steel would show enlarged volume. One interest which started its single blast furnace about July 1 has in the meantime accumulated 8000 tons, the remainder having been consumed in its steel-making departments. Two other independents which had planned to start additional furnaces have temporarily abandoned such arrangement, though one additional stack may possibly be put in blast before the end of the year.

Insofar as the valleys are concerned, the brightest spot in the market is in tin plate, with American Sheet & Tin Plate Co. and independent capacity largely occupied. Not all of the current output is being shipped, considerable tonnage going into warehouses under contract arrangement. This plan is being followed in order to avoid congestion later on, when can makers send in heavy specifications. All current business is moving at $4.75, which promises to continue without change for some time.

One of the two independent pipe producers in the Mahoning Valley continues to roll an accumulation of large-sized pipe orders, but will probably let down on such production within a short time. This concern, which has been buying its semi-finished requirements from other makers both in this and in other territory, may shortly find it advantageous to engage its own semi-finished mills owing to larger volume of business. Naturally such buying has been done cautiously and only against needs.

Plant Activities in the Wheeling District

WHEELING, Nov. 21.—In common with most other steel making centers, this district will not show as well this week in the matter of operations as it did recently. To be sure, the Carnegie Steel Co. is warming up two blast furnaces at its Mingo Junction, Ohio, works, and they are expected to be making iron this week. Enlarged operation of the tin plate mills of the American Sheet & Tin Plate Co. are an immediate possibility, since that company has been very successful in lining up business for early 1922 shipment, and, having the specifications of several of its largest tin plate customers, is planning on keeping its mills busier during the winter than they have been since before the war. But as an offset to these gains, the Weirton Steel Co. has cut down in both its steel works and finishing mills, which over a period of several weeks had been running practically full. The Wheeling Steel Corporation has two of its six blast furnaces in blast and is running a little below 40 per cent of its steel works capacity at Steubenville and about the same gait at Portsmouth, Ohio. Its tin plate capacity still is idle and only 25 per cent of its sheet mills are engaged. The best operation is at the Benwood works, where four of the five furnaces are engaged.

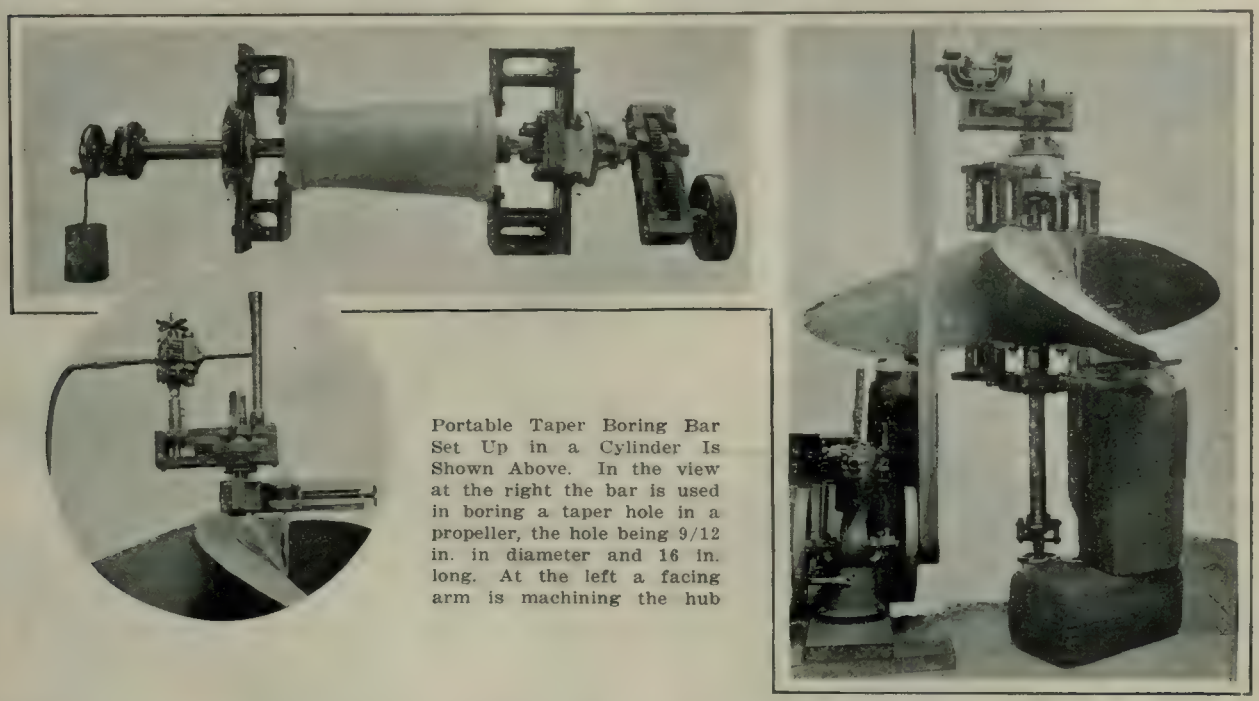
Proposed Utah Blast Furnace

In a statement to a San Francisco daily paper, L. R. Rains, president Carbon Fuel Co., Salt Lake City, Utah, says that preliminary plans have been made for an iron, coal and steel merger representing California and Utah capital. W. E. Creed, president Columbia Steel Co., which has a steel plant and rolling mill at Pittsburgh, Cal., and A. C. Denman, Jr., president Southern California Iron & Steel Co., Los Angeles, are among those mentioned in connection with the project. It is stated that the plans include the building of coke ovens and a 500-ton blast furnace at or near Salt Lake City and the shipping of pig iron to the plants on the Coast. The construction of a railroad from the Denver & Rio Grande, Sunnyside branch, to the blast furnace and coke plant, also of a 25-mile line from Lunn on the Salt Lake Railroad to iron ore properties would be a part of the plan. Limestone would be brought from a point near Salt Lake City. It is added that the plants of the Columbia Steel Co., and the Southern California Iron & Steel Co. would be enlarged and that ultimately a steel plant might be built at or near Salt Lake City. President Creed of the Columbia Steel Co. is quoted in a San Francisco paper as saying: "The proposed merger of iron, coal and steel industries of the Pacific coast is in the stage of investigation. Nothing has as yet been definitely completed, and details at present are all in a nebulous state."

Develops Portable Taper Boring Bar

A taper boring bar that is of interest not only in the marine field for boring or reboring propellers, as indicated in the accompanying illustrations, but in any machine work where a taper hole is desired, has been developed recently by the Pedrick Tool & Machine Co., Philadelphia. The appliance may be taken to the job and is adjustable for any degree of taper.

The device does not depend upon taper slides or guides nor necessitate making any fixtures or separate sets of them for different sizes of holes. It is said to be unlimited in scope and easily adaptable to any requirement. Operation is the same as that of the company's regular cylinder boring bar, in that the piece being bored serves as a support for the machine. To this piece are fastened the crossheads that hold the boring bar. These crossheads have four radially disposed set screws for the final and accurate alignment of the bar after it has first been roughly centered in the cylinder. The conical motion of the bar is derived from a cross-slide and yoke into which the bar is secured by a gudgeon pin. The degree of taper wanted is controlled by the distance the slide is moved from its central axis. The lower end of the bar to which the feed case is attached describes an orbit and requires in this crosshead a spherically shaped bearing. By preventing the handwheel of the feed case from turning, either by means of a weight or other simple method, the feed becomes constant and automatic, it is claimed.



Portable Taper Boring Bar Set Up in a Cylinder Is Shown Above. In the view at the right the bar is used in boring a taper hole in a propeller, the hole being 9/12 in. in diameter and 16 in. long. At the left a facing arm is machining the hub

The driving gearing is stationary so that it may be driven by belt, electric motor or air drill in vertical or horizontal positions.

In one of the illustrations a facing arm is shown machining the hub of the propeller. Such an operation requires the removal of the crossheads and space-blocks and a different means of holding the bar. This is accomplished by "spiders" which are held in the bore of the hub, top and bottom, by projecting set screws.

New Malleable Iron Foundry at Cadillac, Mich.

To manufacture malleable iron castings made entirely of charcoal iron for automotive, railroad and general uses, a company has been formed at Cadillac, Mich., where a plant will be built. A name has not been selected, nor has the company been incorporated, but these details will be attended to shortly after Jan. 1.

The organizers are C. T. Mitchell, W. L. Saunders, J. C. Ford, and others of Cadillac, and R. J. Teetor, Muskegon, who will construct and manage the plant. Foundations are now being put in and the plant will be in operation about July 1, 1922.

The plant has been laid out with a view to utilization of modern production, transportation and material handling methods, and will be of brick and steel construction. The foundry building will be covered with a Pond roof and will be equipped with crane service for charging. The annealing building also houses the rolling, sand-blast, grinding and shipping departments and will have crane service through its length.

Frank D. Chase, Inc., Chicago, is the architect and engineer.

Steel Treaters 1922 Convention and Exhibition in Detroit

The board of directors of the American Society for Steel Treating at a meeting at Cleveland last week unanimously selected Detroit as the city in which to hold the next annual convention and exposition, Sept. 25 to 30, 1922.

It was also decided to hold two sectional meetings during the coming year in addition to the regular annual convention. One will be held in New York in January or February, and the other in Pittsburgh in May. These meetings will serve the members of all of the chapters located in those particular sections, and will continue for one or two days at which a few preprinted papers will be presented. There will be no exhibits at the sectional meetings.

Companies Absorbed by Lackawanna Steel Co.

BUFFALO, Nov. 21.—Purchase of the Lackawanna Bridge Co. and the Ferguson Iron & Steel Co., both of Buffalo, by the Lackawanna Steel Co. has been consummated, though public announcement has not been made. The purchase will give the Lackawanna Steel Co. two fabricating shops.

More than a year ago, the Ferguson plants were sold to the Lackawanna Bridge Co. The crane material end of the business was sold shortly thereafter to Joseph T. Ryerson & Son, but the fabricating department was retained and operated under the Lackawanna Bridge Co. control.

"Predetermined Costs in the Manufacturing Plant" was discussed by W. H. Alden, Hess-Bright Mfg. Co., Philadelphia, before the meeting of the New York section of the Industrial Cost Association on the evening of Thursday, Nov. 17, at Keen's Chop House, 72 West Thirty-sixth Street, New York, following a dinner at 6.30 p. m.

EMPLOYEES WILL ELECT

Youngstown Workers Will Choose Representatives—Act Through Committees

The annual nomination of representatives under the representation plan in effect at the plants of the Youngstown Sheet & Tube Co., Youngstown, Ohio, will take place Dec. 6. Election will be held Dec. 9 in all departments except the plate mill and blast furnaces at Hubbard, Trumbull County, Ohio, which are inoperative at this time. Ballots are provided each worker. Since the institution a number of years ago of the representation plan, labor difficulties have been reduced to a minimum with the company, which ordinarily employs 12,500 workers.

The representatives carry on their work through committees which meet at regular intervals with officials and department heads. These committees are: Works Practice, Methods and Economics; Safety and Prevention of Accidents; Sanitation and Health; Wages, Employment and Working Conditions; Continuous Work and Reconstruction Problems; Rules; Housing, Domestic Economics and Living Conditions; Education and Publication; Transportation, Recreation, Athletics and Entertainment.

Working through these committees, the company awards three prizes each month of $10, $15 and $25 each for suggestions of various kinds to improve working conditions, effect economies and the like. For instance, the winner of the prize last month suggested a cut-off on the throttle of the Bessemer blowing engine, while a special prize was awarded for the suggestion of an attachment to the cut-off machine in the tube mill department.

Cost of Living Slowly Falling

Monthly figures of the Bureau of Labor Statistics show the wholesale price of all commodities during October 50 per cent above the average for 1913, compared with 52 per cent in September. There was a slight advance (1 per cent) in metals and metal products and a greater advance in cloths and clothing and in fuel and lighting. Chemicals and drugs remained stationary. There was a slight drop in building materials and the miscellaneous group, with a greater drop in farm products, food and food products and house-furnishing goods. The table shows the figures for the two most recent months, for October, 1920, and the peak of 1920. It shows also the amount of liquidation, between the peak price and the present, of the excess of the peak price over the average of 1913.

Index Numbers of Wholesale Prices, by Groups of Commodities

(1913 equals 100)

	1920		1921		Liquidation,
	Peak	October	September	October	Per Cent
Farm products	246	182	122	119	87.0
Food, etc.	287	204	146	142	77.5
Cloths and clothing	356	257	187	190	64.8
Fuel and lighting	284	282	178	182	55.4
Metals and metal products	195	184	120	121	77.9
Building materials	341	313	193	192	61.8
Chemicals and drugs	222	216	162	162	49.2
House-furnishing goods	371	371	223	218	56.5
Miscellaneous	247	229	146	145	69.4
All commodities	272	225	152	150	70.9

Statement to Employees as to Merger

The following note regarding the much-discussed independent steel merger appears in the current issue of the *Bulletin*, published for employees of the Youngstown Sheet & Tube Co., Youngstown, Ohio:

"There has been recently a great deal of talk, principally in the newspapers, concerning a projected combination of large steel companies, in which the Youngstown Sheet & Tube Co. is always mentioned as an important unit. The *Bulletin* realizes that its readers are greatly interested in this subject. About all that can be said on the question is, that should any such combination be made, it will be based on the mutual interests of such companies as may be concerned, and will be made only with a view to strengthening the competitive position of these companies, which will be to the advantage of their employees."

Steel Mill Employment Increases

A gain of 6.1 per cent for October compared with September has been recorded in the number of men on the payroll of 109 iron and steel plants. The gain in amount of payroll has been 15.1 per cent. This means that the average pay envelope has increased 8.5 per cent as compared with the previous month. At the same time, however, there has been a decrease of 3.9 per cent in the number of employees of 52 automobile factories, with a decrease of 10.8 per cent in the amount of weekly payroll. This means a reduced earning power per man of 7.2 per cent. Railroad car building and repairing in 63 plants follows the lead of the steel industry, with a gain of 7.6 per cent in number of men, 12 per cent in total amount of payroll and 4.1 per cent in the average pay envelope.

In the table which follows, comparison will be found not only between September and October for these three branches of industry, but also between October of this year and October of 1920.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
October, 1920	117	191,870	$15,393,187	$80.23
October, 1921	117	119,269	4,989,018	41.83
September, 1921	109	111,970	4,318,183	38.57
Automobiles				
October, 1920	50	116,615	4,299,731*	36.87
October, 1921	50	89,346	2,620,491*	29.33
September, 1921	52	93,296	2,944,511*	31.56
Car Building and Repairing				
October, 1920	62	71,116	5,342,742	75.12
October, 1921	62	59,772	3,081,558	60.70
September, 1921	63	47,339	2,759,235	58.29

*Weekly.

Civil Service Positions Open

Announcement is made by the Civil Service Commission, Washington, of examinations for positions in the Bureau of Standards. Engineers, physicists and technologists are wanted, at $2,800 to $4,000 per year; associates at $2,000 to $2,800 per year, assistants at $1,500 to $1,800 per year. Applicants may qualify in electrical, mechnical, civil, chemical, ceramic or radio engineering, in engineering of materials, or in any other specialized line of engineering. Junior technologists are also wanted, at $1,200 to $1,500 per year, plus $20 per month, qualifying in rubber technology, leather, paper, textile, oil or general technology. Junior engineers are wanted, also at $1,200 to $1,500 per year, plus $20 per month, in all lines of engineering specified above. For the juniors, examinations will be held Jan. 11, March 8 and May 17, 1922.

Mechanics and artisans are wanted at the Naval Ordnance Plant, South Charleston, W. Va., including armor plate pressmen, furnacemen, temperers, blacksmiths, etc., at pay reaching a maximum of $1.21 per hour.

Strikers Enjoined

ST. LOUIS, Nov. 22.—A restraining order issued Nov. 21 by Federal Judge Faris was followed last Friday by a temporary injunction against Amalgamated Sheet Metal Workers' Union, No. 1003, in behalf of the National Enameling & Stamping Co., operating a rolling mill at Second and Destrehan streets. It was alleged that members of the union, who had been on strike since Sept. 1 on the question of wages, had picketed the plant and performed illegal acts in attempting to intimidate workmen.

Iron and steel imports into Brazil during the first six months of 1921 are reported by the Bureau of Foreign and Domestic Commerce at 28,398,000 milreis ($3,709,000), compared with 9,553,000 milreis ($1,248,000) last year.

Further Gains in Iron and Steel Exports

Larger Outward Movement of Steel Sheets and Plates and of Welded Pipe and Fittings—Shipments of Steel Rails Only Half of September Figures

WASHINGTON, Nov. 21.—Stimulation of exports of iron and steel, which was shown in the September totals, was further reflected in October. The outgoing movement of 28 products in October was 106,582 gross tons, valued at $29,706,437, as compared with 95,169 tons, valued at $27,740,228, in September.

October imports made a slight gain, amounting to 13,565 tons, valued at $2,388,987, as compared with 12,573 tons, valued at $2,130,802, in September. Exports of machinery in October also were increased, with a value of $16,814,995, as compared with $14,173,968 in September. Imports of manganese ore and oxide in October made an increase of more than 250 per cent over September, amounting to 36,760 tons, as compared with 10,402 tons in September.

For the ten months ending with October, iron and steel exports aggregated 1,953,414 tons, valued at $549,475,950, as compared with 3,996,668 tons, valued at $884,767,691, for the same period of last year. Exports for October of last year totaled 452,015 tons, valued at $103,546,679. Imports of iron and steel for the ten months ending with October of this year totaled 99,997 tons, valued at $24,745,798, as against 387,204 tons, valued at $43,444,014, for the same period of 1920. Imports in October of 1920 totaled 39,786 tons, valued at $4,822,167.

For the ten months of this year imports of manganese ore and oxide totaled 377,834 tons, as compared with 467,712 tons for the same period of last year, while for October, 1920, they totaled 44,700 tons.

Exports of machinery for the ten months ending with October were valued at $261,003,558, while for the same period of last year they were valued at $370,952,731, and for October, 1920, at $40,585,539. Lathes to the value of $146,128 were exported in October of this year and for the ten months period the value of exports of this machine tool amounted to $2,789,770. The respective values of "other machine tools" exported were $143,224 and $4,283,666; for sharpening and grinding machines, $89,272 and $1,090,230, and for all other metal working machinery, $302,307 and $10,026,508.

Steel sheets constituted the largest single item of export in October. The outgoing movement of this product was 20,930 tons, while for the 10-month period the total was 122,115 tons. Of the October exports of sheets, Japan took 80 per cent, or 16,794 tons, while for the 10-month period shipments to that country totaled 66,250 tons. Shipments to Canada in October and the 10-month period were 2496 tons and 29,618 tons respectively, while those going to Argentina were 588 tons and 3383 tons, respectively.

Steel plates ranked second in the export movement, October shipments being 15,301 tons, while for the 10-month period they totaled 318,661 tons. Of these shipments Canada took 8948 tons in October and 94,475 tons during the 10 months. Exports to the United Kingdom amounted to 2699 tons and 50,375 tons, respectively; while Japan took 1591 tons and 29,646 tons, respectively, and Hongkong 1005 and 5626 tons respectively.

Exports of welded pipe and fittings in October totaled 12,865 tons and for the 10-month period, 320,464 tons. The movement to Mexico in October amounted to 4361 tons, and for the 10-month period, 109,108 tons; to Japan 648 and 21,383 tons, respectively; to Argentina

Imports of Iron and Steel—Gross Tons

	October		Ten Months Ending October	
	1920	1921	1920	1921
Ferromanganese	6,700	1,943	46,739	8,548
Ferrosilicon	1,239	1,359	12,882	5,242
Pig iron	15,938	406	118,068	20,933
Scrap	10,998	7,827	130,871	36,773
Bar iron	522	221	4,570	1,596
Structural steel	139	54	1,252	604
Billets, without alloys	640	502	18,674	3,524
All other billets	448	72	3,988	1,209
Steel rails	1,688	1,126	43,752	18,748
Sheets and plates	174	14	1,495	1,904
Tin and terne plates	43	26	322	339
Wire rods	1,257	15	4,591	577
Total	39,786	13,565	387,204	99,997
Manganese ore and oxide	44,700	36,760	467,712	377,834

Exports of Iron and Steel—Gross Tons

	October		Ten Months Ending October	
	1920	1921	1920	1921
Ferromanganese	716	10	2,170	614
Ferrosilicon	200	97	601	318
Pig iron	16,380	2,723	190,100	23,524
Scrap	20,947	3,293	187,528	30,494
Bar iron	5,401	314	36,202	12,009
Wire rods	8,434	1,330	105,843	13,305
Steel bars	49,209	5,647	508,389	167,645
Billets, ingots, blooms	11,853	153	206,416	8,244
Bolts and nuts	3,356	806	31,256	22,223
Hoops and bands	5,275	1,673	44,715	17,466
Horseshoes	321	41	1,734	509
Cut nails	445	262	2,570	911
Wire nails	9,044	1,805	71,018	21,016
All other nails, including tacks	1,460	311	9,161	4,062
Cast pipe and fittings	7,380	1,953	49,079	44,846
Welded pipe and fittings	24,539	12,865	219,806	320,464
Radiators and cast house boilers	913	611	6,237	3,070
Railroad spikes	1,578	462	13,414	7,426
Steel rails	53,266	9,976	473,940	292,138
Galvanized sheets and plates	8,717	3,060	89,059	48,629
All other sheets and plates	3,375	618	24,639	11,173
Steel plates	91,093	15,301	726,979	318,661
Steel sheets	17,129	20,930	135,896	122,115
Ship plates, punched and shaped	3,071	542	35,216	9,249
Structural steel	53,989	10,587	387,378	276,595
Tin and terne plates	20,288	5,504	189,988	90,176
Barb wire	13,654	3,621	100,716	26,160
All other wire	19,982	2,087	146,618	60,369
Total	452,015	106,582	3,996,668	1,953,414

Exports, January, 1920, to October, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	2,830	153
Ten months	1,953,414	24,456	8,244

1357 tons and 9889 tons, respectively; to Venezuela 601 tons and 4075 tons, respectively; and to Egypt 592 tons and 1580 tons, respectively.

Structural steel exported in October totaled 10,587 tons, and for the 10 months, 276,595 tons. Shipments of this product to Canada in October amounted to 3846 tons and for the 10 months, 51,038 tons; to British India, 3102 tons and 32,941 tons, respectively, and to Japan 1362 tons and 45,055 tons, respectively.

Steel rails exported in October amounted to 9976 tons, and for the 10-month period, 292,138 tons. Shipments to Japan in October totaled 5644 tons and for the 10 months, 27,812 tons, while those made to Canada were 3450 tons and 18,288 tons, respectively.

An interesting item of import related to ferromanganese, the total for October amounting to 1943 tons, an increase of 1139 tons over September, with 804 tons. All of this alloy came from England. The largest single item of import was scrap, the October incoming movement of this material amounting to 7827 tons.

Coal and Coke Output Reduced

UNIONTOWN, PA., Nov. 20.—Production of bituminous coal and coke in the Connellsville region will show a decrease this week despite the fact that the H. C. Frick Coke Co. during the week put in operation 850 additional ovens which had been idle since last March and April.

The dropping off in production has not caused the entire suspension of any operating plant, however, and the present situation is believed to be only temporary. Most observers believe that a freight rate reduction is in prospect and that this has caused consumers to send a flood of cancellations in the region.

H. C. Frick Coke Co. now has better than 2000 ovens in operation in the Connellsville region and plans are being made to fire more. The company is operating at about 55 per cent on coal production.

Will Sell Forgings and Castings

WASHINGTON, Nov. 22.—Announcement has been made by the director of sales, War Department, that approximately 13,500,000 lb. of aeronautical motor forgings and castings, now held by the air service, will be offered for sale by informal bids to be received until Dec. 10 by the office of the chief of air service. These forgings and castings, which consist of ferrous and non-ferrous metals, located at the Long Island air reserve depot, Long Island City, L. I., are to be sold on the basis of scrap metals. Informal bids will be received by the material, disposal and salvage division, chief of air service, Eighteenth Street and Virginia Avenue, N. W., Washington. No special forms of biddings are required. Inspection of the materials is invited, and bids will be considered for all or part of the various lots offered, but proposals are especially solicited on the entire quantity of each class of metals.

The quantities of metal being offered are approximately as follows: Steel, 11,534,937 lb.; cast iron, 1,041,249 lb.; bronze, 750,000 lb.; aluminum, 189,022 lb.; brass, 12,407 lb.

The Associated Machinery Corporation of Chicago announces that its managing director, Lionel R. Vinall Moon, has arrived in Burma, where he will open offices, proceeding then to India and Ceylon, where he will also open offices. The Associated Machinery Corporation was recently formed to handle exports of construction equipment to India, Burma and Ceylon. The companies interested are the Pawling & Harnischfeger Co., Milwaukee; Novo Engine Co., Lansing, Mich.; Insley Mfg. Co., Indianapolis; Blaw-Knox Co., Pittsburgh; Chain Belt Co., Milwaukee. New York offices are at 50 Church Street and are in charge of C. L. Langlotz.

The Ames Shovel & Tool Works, Elwood, Ind., has reopened its plant, closed since June. About 150 men have resumed work.

Honors to Henry R. Towne

Honorary membership will be awarded to Henry R. Towne at the annual meeting of the American Society of Mechanical Engineers to be held in the first week of December in New York. Mr. Towne has been a member of the society since 1882 and has served as its vice-president and president. The announcement of the bestowal of honorary membership states: "He has been a pioneer in appreciating the broadening function of the engineer and will be long remembered not only for his contributions to engineering literature on this subject, but also as the directing head of the Yale & Towne Mfg. Co."

Mr. Towne has also been elected honorary president of the Taylor Society, devoted to scientific management. In the letter of invitation to Mr. Towne, Henry S. Dennison, president of the society, said: "The board of directors of the Taylor Society desires to make public recognition of your eminent services to the cause of scientific management, and of your early and abiding appreciation of the genius of Frederick W. Taylor, and to that end invites you to accept the office of honorary president of the Taylor Society. This office is created for the particular purpose of doing honor to yourself and the Taylor Society. It is the expectation of the directors that it will be called into existence only rarely; possibly not again, for the historical circumstances of your service to scientific management are not likely to be repeated."

The letter recalls how Mr. Towne delivered an "epoch-making address" on "The Engineer as an Economist" before the American Society of Mechanical Engineers in 1886 and how he, more than any one else, realized the importance of Mr. Taylor's various papers —"Notes on Belting," in 1893; "Shop Management," in 1903 and "On the Art of Cutting Metals," presented in 1906.

On the first page of the November bulletin of the Taylor Society Mr. Towne is characterized as: "Chairman of the board Yale & Towne Mfg. Co.; honorary member and formerly president of the American Society of Mechanical Engineers; formerly president of the Merchants' Association of New York; formerly chairman of the board of directors of the Federal Reserve Bank of New York; pioneer representative of that rare combination in industry of scholar, scientist and executive; some 40 years ago the prophet of a science in management and the first engineer-executive to appreciate the genius of Frederick W. Taylor, the creator of that new science."

Steel Companies Acquire Portsmouth By-Product Coke Plant

The American Rolling Mill Co., Middletown, Ohio, and the Whitaker-Glessner Co. have acquired jointly all the capital stock of the Portsmouth Solvay Coke Co., and have reorganized the company. The name has been changed to the Portsmouth By-Product Coke Co. The main office will be at Portsmouth, Ohio, where the by-product coke ovens are located. The officers of the reorganized company are: President, J. H. Frantz, Columbus, Ohio; vice-president, R. H. Sweetser, Columbus; secretary-treasurer, H. K. Moore, Portsmouth, Ohio; auditor, J. L. Watkins, Portsmouth; superintendent of coke ovens, L. D. Huestis, Portsmouth.

The Portsmouth By-Product Coke Co. owns and operates Freeburn mine in Pike County, Ky. Thomas DeVenny is superintendent of this coal mine. Freeburn mine furnishes high-grade by-product coal to the coke ovens at Portsmouth and also furnishes steam coal to the trade.

New Hamilton Furnace

The Hamilton Furnace Co., Hamilton, Ohio, is having estimates made for the construction of a 600-ton blast furnace, adjoining its present furnace. The foundations for the new stack are practically completed and a new blowing engine is now being installed.

CONTENTS

November 24, 1921

Institute Greets Leader of Allied Armies 1319

President Gary on Business and World Conditions
Charles M. Schwab on Disarmament Program
Improvements in Open-Hearth Port Construction
Relations of the Iron and Steel and Chemical Industries
Steel Lumber for Building Construction
Fusion Welding and the Processes in Use
Refractories in the Steel Plant

Leaves from a Steel Melter's Note Book—II 1337

Design of a Structure to Resist Shock or Overstrain—Car Coupler Test Illustrating the Necessity of Proper Distribution of Metal

Further Gains in Iron and Steel Exports 1341

Larger Movement of Steel Sheets and Plates and of Welded Pipe and Fittings—Steel Rail Shipments Only Half of September Figures

Freight Reductions on Steel Still in Abeyance 1347

Hopes Based on Reduction in Ore Rates Seem Less Likely to Be Realized—Erroneous Railroad Attitude Respecting Steel Deflation

National Founders Quarter Century Old 1348

Annual Convention in New York Considers Railroad Problems, Wage Liquidation, Foreman Training and Foundry Costs

Advantages of a Foundry Cost System 1351

Forms Basis for Establishing Selling Price and Indicates Degree of Efficiency of Various Departments

Semi-Automatic Arc Welding Lead..... 1332
Complaint Against Ore Rate..... 1332
Triple Hook Hoist..... 1332
Electric Bench Grinder..... 1332
Labor Notes 1333, 1334, 1340, 1372
Standard Punch and Die Sets..... 1333
Tariff Legislation 1334
Ohio Forge Manufacturers Organize... 1334
New Talbot Open-Hearth Furnace..... 1335
Study Passage of Air Through Ore Beds. 1335
Investigations of Bureau of Mines..... 1335
Bending, Forming and Shearing Machine. 1336
New Line of Drills of Special Steel..... 1336
Surface Grinder with Swivel Sub-Table. 1336
Proposed Utah Blast Furnace..... 1338
Portable Taper Boring Bar..... 1339
Steel Treaters' 1922 Convention..... 1339
Companies Absorbed by Lackawanna Steel Co. 1339
Cost of Living Statistics..... 1340
Employment Statistics 1340
Civil Service Positions Open..... 1340
Coal and Coke Output..... 1342
Honors to Henry R. Towne..... 1342
Sale of Forgings and Castings..... 1342
Editorials 1344
United for Arms Limitation—Naval Tonnage and Rolled Steel—No Secondary Inflation—The Government and Rail Strikes—War and Reaction in Steel
New Rate on Tin Plate..... 1347
Future Price of Ferromanganese..... 1353
Scrapping the Battleships..... 1357
Predetermined Costs in Manufacturing.. 1366
Foreign Trade Conditions.....1367, 1369
Refractories Market 1371
Government Co-operation in Trade..... 1372
Lower Freight Rates to Coast..... 1372
Industrial Finance 1381
Plans of New Companies..... 1389

Iron and Steel Markets..... 1354
Comparison of Prices..... 1355
Prices Finished Iron and Steel, f. o. b. Pittsburgh..... 1368
Non-Ferrous Metal Markets..... 1369
Personal Notes 1370
Obituary Notes 1371
Machinery Markets and News of the Works..... 1382
New York Jobbers' Prices..... 1390

ESTABLISHED 1855

THE IRON AGE

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United for Arms Limitation

If, in addition to the telegrams sent to THE IRON AGE by leaders in the industry expressing their sentiments in regard to limitation of armaments, any further evidence were needed to show that American steel manufacturers stand squarely behind the policies promulgated by President Harding and Secretary Hughes at the conference in Washington, it was furnished by the speeches of Judge Gary and Mr. Schwab at the meeting of the American Iron and Steel Institute last Friday. Mr. Schwab, as head of the greatest shipbuilding and war materials manufacturing plants in the country, was as emphatic as anyone could possibly be in expressing his willingness to sacrifice these plants in the cause of peace. And Judge Gary not only spoke in favor of limitation of armament but declared that in addition to what is contemplated by the new restrictions upon arms there should be an understanding that if any international differences arise, no resort to military force shall be permitted until after a conference and full discussion by all the nations now participating in the deliberations at Washington. This is doubtless the expression of a hope rather than of a conviction that war will be stopped by an international conference, but it shows that industrial leaders as well as many others will not be satisfied until everything that possibly can be done is done to prevent war.

It is gratifying to know that as the leaders among the employers are taking a positive stand in favor of peace, the labor unions are also making themselves heard in no uncertain language. The rumor that the International Association of Machinists would not approve plans for scrapping battleships has been met by emphatic denial by President William Johnson of that organization, who makes the suggestion that it will not be necessary to scrap machine shops at the navy yards because it will be entirely possible to use them for making products not connected in any way with warfare. He also calls attention to the fact that certain repair work must always be done at the Navy Yards. However this may be, it would doubtless be true that in bringing about the reduction of armament, readjustments will be severe upon many companies and employees. But any temporary suffering or disarrangement will be of small consequence in comparison with the ultimate benefits to all industry.

Marshal Foch eloquently paid tribute last Friday night to the American people for all they did during the war, and especially to the industries which furnished the supplies on time, when they were sorely needed. The great soldier also expressed his appreciation of the unity of feeling which prevailed in this country when the one thought was to win the war. Happily the outlook now is that in the determination to bring about peace the unity of purpose will be just as complete as it was in 1917 and 1918, when the whole country was doing its utmost to support its soldiers.

Naval Tonnage and Rolled Steel

Study of the naval appropriations of the United States, during the 39 years since the beginning of the "new" navy of steel, shows that the construction has been authorized of a total of 2,947,698 tons of warships and auxiliaries. For the construction of these vessels, a total of 2,500,000 tons of iron and steel, more or less, has been required, spread over the 39 years. This includes plates and shapes, armor of all kinds, forgings and castings, pipe, chain and numerous other items.

During the same 39 years the United States produced 550,270,000 tons of finished (rolled) iron and steel. Thus, of each 1,000,000 tons produced, 4550 tons became worked into a naval ship of some character—less than ½ of 1 per cent. Such material as has been needed for repairs has been far more than offset by the forgings and castings and armor plate included in the naval tonnage, but not in the above figure for production.

And the naval ratio of use has not varied a great deal during the period. From 1883 to 1890, inclusive, 3550 tons was used from each 1,000,000 tons produced. From 1891 to 1900 the figure was 4570 tons. This included the Spanish war year.

From 1901 to 1910 it was 3210 tons; from 1911 to 1915, 3480 tons.

Only when the world war crisis appeared, and the famous three-year naval program of 1916 came, were these figures exceeded. From 1916 to 1921, each 1,000,000 tons produced paid a toll of 6680 tons to the naval war god. This condition was accentuated in 1917 and 1918, with 810,000 tons of steel and iron for the ships authorized, and 64,225,000 tons produced—a ratio of 12,600 per 1,000,000 tons.

It must be recognized, of course, that the steel for a warship authorized last year will probably be rolled this year and worked into its structure during this year and the next year or two. Hence the ships authorized, say, in 1900 did not use much of the 1900 steel. But over a long period of years this element disappears, and conclusions drawn from a comparison such as that above become valid. For the three-year and war program, however, where the large ships were all purposely delayed, the figure of 6680 tons per 1,000,000 tons of production is a fairer measure than 12,600 tons, for the use of steel was actually distributed over a considerable period.

This bears out the argument in the second editorial in the Nov. 17 issue of THE IRON AGE, to the effect that the cessation of naval building would exert an inappreciable effect upon the output of steel products. Without considering the probability of a stimulus in other directions, a loss of less than 1 ton in each 200 would never be felt.

No Secondary Inflation

Last spring there were predictions in some quarters that there would be "a secondary inflation." Deflation had been proceeding rapidly. Prices had been tumbling, large losses had been sustained and there was much "frozen credit." There was argument that inasmuch as prices had fallen much more in some lines than in others a partial recovery might occur, and it was suggested that a secondary inflation was so badly needed by some holders of goods that it might even be for the good of the general public that these holders be relieved.

It is plain now that no secondary inflation has occurred and that none is in prospect for the near future. For the distant future it is, of course, unsafe for anyone to predict, but the record to date is important.

The Bureau of Labor's index number of wholesale prices, which is considered to be well designed in its weighting and to be carefully compiled, is sufficient evidence that there is no secondary inflation. There was a suspicious upward movement in August, but that has now played out. The low point was 148 (1913 average prices being 100), shown for both June and July. Then there was an advance to 152 for both August and September, while now the report for October is issued, showing 150 for that month.

While the general index number advanced four points, or between 2 and 3 per cent net, from July to August, the advance was not in all groups and indeed was confined to two lines, farm products showing a slight increase and food a large increase. In September food lost part of the gain while clothes and clothing had a sharp advance, farm products advancing a trifle, and nearly all other products declining a trifle, so that the general average was unchanged. In October there were some slight advances, while the general trend was downward.

Thus it is plain that there has been at no time a tendency for commodities in general to advance. So drastic had been the decline in the general index number that if there were any reactionary capacity it would presumably have been shown by this time. The index number dropped from its maximum of 272 in May, 1920, to 207 in November, 1920, and to 151 in May, 1921. That was a drop of 65 points in the first six months and of 56 points in the second six months, but in proportion the first drop was 24 per cent and the second was 27 per cent, so that the declines should be considered practically identical.

That some sellers need relief, and badly need relief, from present conditions is quite plain. They are not promised relief by a "secondary inflation" in general and there is no evidence that there will be much relief by commodities that have fallen the most having a moderate rise. Yet there is means for relief, in many cases at least, by another route, through the medium of further decreases in cost of production. When prices were rising much reference was made to "the vicious spiral" by which an advance in one quarter produced an advance in another, and so around the spiral. Now we have the descending spiral instead.

From the general showing made by the course of prices in recent months, an important deduction is to be made for sellers whose products have had particularly heavy declines. Sellers sometimes feel that they may be able eventually to advance their prices by first making a reduction not otherwise warranted. The statistics available do not suggest that any such maneuver is feasible at this juncture. Prices once down stay down. Steel prices, for instance, which long ago declined to a lower relative level than commodities in general, have not reacted. While the October index number of the Bureau of Labor stands at 150, THE IRON AGE composite price of finished steel, referred to 1913 average prices at 100, now stands at 127, or 23 points below the general level.

There are two measures of the extent of the depression the after-effects of the war have brought to the tin industry of the world as seen in conditions at home. One is the decrease in imports and the other the liquidation of prices. Imports of tin into the United States, the largest consumer, were at the rate of 8,690,000 pounds per month in 1913; in the first nine months of this year they had fallen to 3,787,000 pounds per month. One cause, no doubt, of the low receipts this year was the heavy imports in 1920; at 10,503,200 pounds per month they exceeded all records. The average price of Straits tin at New York in 1913 was about 44.50 cents per pound. It rose to $1 per pound in 1918, but the course of

events in 1921 has brought the metal below 30 cents, the low point having been about 25 cents, with to-day's market at 29 to 30 cents per pound, New York. Demand for tin plate recently has been unseasonably active and the low point in both imports and prices of tin probably has been passed. The heavy buying of Straits tin in the past week, estimated at 1500 to 2000 tons, resembles old-time activity. It indicates unmistakably the more pressing needs of tin plate makers, who have used up their stocks in just the way all metal-working industries have worked up every ton of steel on hand before calling upon the mills.

The Government and Rail Strikes

Obviously a strike of employees of a public service corporation or a public utility is a strike against the public. The object is to cripple the service, a service rendered to the public. The public is injured much more than the employer. There has been criticism of the Transportation act in that it does not provide penalties for violation of its labor provisions, and it is a matter of general law that a crime or misdemeanor cannot be found unless means of punishment can be found. Accordingly it has been suggested that it may become necessary to "put teeth in the act." The point, however, is not well taken.

The jurisdiction the Government exercises over the carriers in the matter of charges and character of service is for the protection of the public, and naturally the jurisdiction extends over the employees of the carriers. The Clayton act amends the Sherman act so that a labor organization escapes its provisions. The labor union cannot be considered a conspiracy in restraint of trade, and it may not be restrained "from lawfully carrying out the legitimate objects thereof." The act, however, is directed solely to cases of dispute between employer and employee. A rail strike is not such a dispute. The carriers pay the wages prescribed by a Government agency, the Railroad Labor Board, and the dispute is with a third party, the Government, representing the public.

The Clayton act refers to injunctions in a dispute between employer and employee, but a conspiracy to deprive the public of service is another matter. It seems plain that in the event of a rail strike the Government could secure injunctions against the conspirators, not to force them to go to work, but to force them to cease promoting the conspiracy. Talk of its being impossible to force a man to work is beside the point. The chief conspirators in a rail strike would be men who do not work on railroads.

It is disturbing to reflect that the idea of the public having rights when labor is concerned is so new that it is not generally recognized. How curious this timidity of public thought really is may be illustrated by putting the shoe on the other foot. It is a matter of rendering service to the public. Suppose, then, that the railroads should go on a strike against a freight rate prescribed by the Interstate Commerce Commission and refuse, for instance, to carry any iron ore from Cleveland to Pittsburgh. Yet the Railroad Labor Board and the Interstate Commerce Commission are essentially cognate.

Once the principle is established and generally recognized that the Government is entitled to intervene, in the case of a rail strike, to see that service continues to be rendered to the public, the actual procedure would not be difficult. Methods in strikes, whether against manufacturers or against public utilities, are well known. The operation does not consist wholly or even largely in the individual strikers refraining from work. In all cases there are efforts to prevent others from working. The Government would be doing no radical thing in protecting those who wished to work, and that is the main thing necessary.

The railroad labor unions are not written out of existence by this principle. While the carriers are not permitted to refuse to carry freight or passengers at the rates prescribed by the Interstate Commerce Commission, they are permitted to unite in making representations to the commission as to what they think they should have. The railroad workers have the same privilege of hiring men to speak for them before the Railroad Labor Board.

War and Reaction in Steel

There has been adequate testimony from many sources in the past week that the American steel industry has a relatively small stake in naval or other armament. The utterances of leaders in the industry at the sessions of the American Iron and Steel Institute, including the thrilling declaration of Charles M. Schwab at the Foch banquet, should silence completely those who point to this industry as one of the "interests" back of war for the profits war brings.

In its world-wide aspect there is proof that war and its expenditures ultimately react upon and well-nigh paralyze industries that in war time were highly stimulated. An analysis of world steel operations, now and before the war, strongly supports this statement. In 1913 the pig iron and steel outputs of four leading producing countries—the United States, Great Britain, France and Belgium—averaged 4,067,800 tons and 3,824,300 tons per month respectively. German statistics have not been available since the war. In 1921, for the eight months ended with August, the production of the same four countries had shrunk to 1,972,235 tons per month for pig iron and 2,180,145 tons per month for steel. In other words, eight years have witnessed, not a normal expansion, but a decline to 48 per cent of the pig iron output and to 57 per cent of the steel output for 1913, and at the same time, in the face of greatly increased capacity, a world-wide prevalence of depression or reaction that is staggering. The disastrous effect on capital and labor is beyond measurement.

When war is abolished or armament expenditure greatly lessened, the steel and other industries will expand in response to the world's constructive needs and belief in war as a creator of prosperity will take its place in the limbo of economic delusions.

Freight Reductions on Steel Still in Abeyance

Hopes Based on the Reduction in Iron Ore Rates Seem Less Likely to Be Realized—Railroads' Attitude Due to Erroneous Views

WASHINGTON, Nov. 22.—Reductions voluntarily made during the past week by the railroads in freight rates on agricultural products and on lumber, the latter applicable to transcontinental traffic, have inspired the hope that the carriers will soon take similar action to give relief to the iron and steel trade. Disquieting reports persist, however, and if these are well founded the realization of the steel trade's hopes will be still further deferred. The reports arose partly from the meeting in New York last week between the railroad and steel men, which is said to have taken a wide range of discussion, centering largely about the reduced rates on iron ore from lower lake ports and the demand of producers for reductions in rates on fuel. The railroad interests again evaded definite committal, but at a meeting of executives in New York this week it was decided to continue the reduced ore rate to March 31 but to make no recommendation of lower coal, coke and limestone rates for the present.

The surprising fact is that some of the carriers are said to be holding out against freight reductions on the claim that iron and steel prices have not been sufficiently liquidated. It is even reported that this belief has found credence in influential Washington circles and this opinion in turn is bolstering up the position of the railroads. In view of all that has been published showing that steel prices not only have been deflated but that a vast amount of steel is being sold at less than cost, it is difficult to understand this attitude of mind. As shown in the illuminating article in THE IRON AGE of Sept. 22, pages 752-753, finished steel was then 37 per cent above its 1913 average (it is now only 27 per cent above 1913), while building materials were still 98 per cent above the 1913 level. The excessive transportation rates, now that wages in the steel industry have been deflated, are the chief cause of the higher level of to-day as compared with that of 1913. The greatest obstacle, consequently, to complete readjustment is in the present high freight rates, and apparently the railroads would maintain instead of removing the obstacle. It is said that one reason for the claim that steel prices have not been deflated is that rails are now quoted at $40, as compared with the pre-war price of $30 (for open hearth rails), without any consideration being given to the much higher costs on raw materials, due largely to higher freights. The cost of the manufacture of pig iron, for instance, is shown to be from $6 to $9 a ton higher than in 1913.

It is plain that until the steel trade is given lower freight rates there can be no such readjustment in that industry as has been called for in some quarters. It is becoming more and more evident that the pyramiding of costs due to high freight rates is an obstacle to buying by the agricultural community and that it stands in the way of such a readjustment in various industries as would encourage buyers to believe that comparatively stable levels had been reached.

ORE RATES EXTENDED

Reduction of Oct. 18 Made Effective Up to March 31 by Railroad Executives

NEW YORK, Nov. 22.—The railroad executives (Trunk Line Association) met to-day to discuss the demands of the shippers and arrange the ore rates to go into effect Jan. 1, when the present reduced rates on ore expire. At this meeting it was decided to extend the present rates on ore to March 31. The demand of the shippers for a lowering of rates on coal, coke, limestone, dolomite and other raw materials was taken up, but the carriers could not see their way clear to reduce freight rates on these materials at present.

A number of representatives of ore firms attended the previous conference of the railroads and pig iron and steel interests held in New York, Nov. 17, at the offices of the Trunk Line Association, called by the railroads to consider the question of restoring rail rates on iron ore from Lake Erie docks to interior furnaces, which were reduced 28 per cent, Oct. 18 and effective until Jan. 1, 1922. The ore men took small part in the proceedings, being largely interested spectators.

The Buffalo furnace men presented their request for lower rates from Buffalo and there was a heated discussion of rates on coal, coke, ore, dolomite and other raw materials. Steel men from all sections of the country went on record as strongly favoring a reduction of fuel rates. Interior furnaces asked for a 28 per cent rate reduction on the handling charges for ore at Lake Erie docks, which matter was recently taken up before the coal, coke and ore committee of the Central Traffic Association in Pittsburgh and approved by that committee.

Interior and Eastern furnaces also asked for a reduction as soon as possible on coal, coke and dolomite. Lake furnaces indorsed the position of the interior furnaces against the restoration of the former rates on iron ore, but contended that the rates on coal and coke were out of line. The Buffalo furnaces called attention to the discrepancy in the present differential between the ore rates of Lake Erie ports and Pittsburgh and the Pittsburgh-Buffalo coal rate. Formerly the rate on coal from Pittsburgh to Buffalo was only 20c. higher than on ore from Lake Erie ports to Pittsburgh. At present, the coal rate from Pittsburgh to Buffalo is $2.50 compared with 91c., the ore rate from lower lake ports to Pittsburgh, a difference of $1.59.

The New Rate on Tin Plate

PITTSBURGH, Nov. 22.—The proposed reduced rate on tin plate to $1.20 from Pittsburgh and New York to the Pacific Coast has not yet become effective, and probably will not go into effect until Dec. 15. Chicago now has a rate of $1.20 and Eastern railroads have concurred in granting a reduction to $1.20. The present rate from Chicago to $1.83½, from Pittsburgh $1.66½ and from Cincinnati $1.58½.

The United States Smelting, Refining & Mining Co., Boston, has placed an order with the Electric Furnace Co., Alliance, Ohio, for two electric melting furnaces. One of these is a 75 kw. nose tilting type furnace with capacity of 800 lb. for melting silver, and the other a 40 kw. pit type crucible furnace for refining gold.

"Luckily no one was hurt but the repair bill on the broken lathe amounted to $1,500," states a poster of the National Safety Council, illustrated by a photograph of the broken chain and broken machine. "The hoist chain was too small," it concludes. "Be sure your chain is strong enough before hoisting.

National Founders' Quarter Century Old

Association Meets in New York in Annual Convention—Considers Railroad Problems, Wage Liquidation, Foreman Training and Foundry Costs

"THE silver anniversary of the National Founders' Association, as President William H. Barr called the twenty-fifth annual convention, was occupied to a large extent in the consideration of the country's railroad problems—the high rates, low profits, threatened strikes and financial embarrassment. One of the papers was entitled "The Present Railway Situation"; reference was made frequently in other addresses to the problem, and the association adopted a nine-point resolution addressed to the Senate committee investigating the railroad situation, the resolution offering advice and recommendations.

The convention was held, as usual, in the Hotel Astor, New York, Nov. 16 and 17. The early session was reported in part in THE IRON AGE of Nov. 17. All officers were re-elected except Vice-President Julius Goslin, Joubert & Goslin Machine & Foundry Co., Birmingham, Ala., who resigned. He was succeeded by M. Griswold, Jr., General Electric Co., Erie, Pa., who modestly claimed that the honor was not in recognition of him personally but rather of his company, which had given extensive support to the association.

There was a registration of 327. Two of the best-received speeches were by men not listed on the printed program. They were those of Governor Henry J. Allen of Kansas, who spoke on the court of industrial relations in his State and the coal strike, and Jack O'Brien, the "soap box anti-socialist orator," who has proved effective as an antidote to Bolshevik propaganda. Governor Allen was a guest at the banquet Wednesday evening, where he was asked questions as to the workings of the Kansas court. E. L. Greever, counsel for the West Virginia coal operators, was to have spoken on the causes of the troubles in the West Virginia coal fields. He was absent due to the necessity of his appearance before the Court of Appeals in Chicago on an injunction case.

Railroad and Tax Problems Are Foremost

James A. Emery, counsel for the National Founders' Association at Washington, made a telling speech on "Industry and Public Affairs," occasionally illustrating his points with the kind of humor which put them in relief. For instance, in commenting on our present excess profits taxes, he said: "The laws should be so simple that the payer could figure out in a lifetime what he owes the Government." Again on the same subject he said: "No tax laws ever afford inspiration; the public never acclaims the author of such a law a hero; orators never get eloquent over a new tax law; poets never write about it. Tax legislation is recognized as a necessary evil."

The question is often asked, he said, "Why are not more labor legislation proposals coming before Congress?" The speaker explained that legislators and remedial advocates are waiting for decisions by the various courts on the present laws in the hopes that they may prove adequate. "We are awaiting the outcome of the Duplex case before the Supreme Court of the United States; there are the Tri-City cases where the Court will determine whether there is such a thing as peaceful picketing. In Arkansas there is being threshed out the question of whether a voluntary association like a labor union can be sued under its common name, or, in others words, if the large unincorporated organization can without leave destroy property. If these decisions turn out unfavorably to public interests, then we will need amendments providing remedies."

In speaking of the transportation problem he stated

What the National Founders' Association Asked the Senate to Consider in Respect to Railroad Regulation

In a resolution addressed to the Senate of the United States the National Founders' Association urges the consideration of the following affirmative principles to be recognized in the further regulation of the railroads of the country:

1—The deliberate and concerted interruption of our railroad service being socially destructive, disputes between carriers and their employees threatening a serious interruption of commerce should be subject to ultimate determination by a public tribunal, without stoppage of service.

2—The members of such tribunal should possess the highest personal qualifications and represent the public exclusively.

3—Such tribunal should be affiliated with and function as a part of the rate-making authority and the right of the public to appear before such tribunal for good cause shown should be affirmatively recognized.

4—That each carrier should be recognized as a primary unit of joint interest and co-operation in the establishment and maintenance of employment relations between the employees and management of such carriers.

5—That arbitrary discrimination between organized and unorganized employees or between those who desire to bargain collectively and those who desire to bargain individually is intolerable in the regulation of the railroads.

6—That while the carriers and their employees should be afforded the widest opportunity to fix the terms of their employment relations, no form is desirable or permissible that does not assure to management the opportunity to fulfill its primary public obligation to give uninterrupted and efficient service at reasonable rates.

7—That in the public interest all legislative restrictions imposing arbitrary burdens upon the efficient management and the rate structure of our transportation system should be repealed. Significant examples of these are to be found in the Adamson act within the Federal jurisdiction and the full-crew laws operating in many of our States.

8—That Federal control of through commerce is essential to its rapid and efficient movement at reasonable rates, and any return to State interference with through commerce would seriously obstruct our industrial progress.

9—That executive officers of this association are hereby empowered to appoint a committee to bring this resolution to the proper committee of the Senate of the United States.

that 90 per cent of the commodities produced in a State are commonly consumed outside; hence the importance of adequate transportation facilities. The scale of railroad earnings correspond to profits of $62 a year on $20,000 invested capital. "The railroads are yours in the last analysis; when you burden them you burden yourselves. Excess employees are merely passengers whom you are paying to ride. Though the railroads have the semblance of private management, such is not the fact because of the restrictions. As the Railway Labor Board is constituted, it is similar to one judge with two advocates. The personnel of this board should be composed of public representatives entirely. The State railroad commissions are exercising too much power and are destroying the unity of the whole system."

The speaker outlined the growing onus of excess profit taxes which were less than 1 per cent of profits in 1915 and which had grown to 22 per cent in 1917, and pointed out that relief will not come until 1923 covering the 1922 taxes. He condoned somewhat the delays in Congressional tax action, suggesting that as manufacturers connot agree on tax methods, one can hardly be surprised if Congress does not. The speaker concluded by urging all to take an active interest in the fight for more equitable taxes.

Business Upswing Not Yet Started

"There is nothing to indicate that we have started on the upswing of business prosperity" was the most striking statement of Magnus W. Alexander, managing director National Industrial Conference Board. He backed up his statements with charts covering the status of labor employment. The charts were part of the results of what he characterized as one of the most comprehensive surveys into labor conditions ever carried on in the United States. The National Industrial Conference Board will have the compilations completed in about five weeks. The wages and hours of work have been investigated separately in 26 industries. One branch of the investigation was devoted to foundries and machine shops, from which were separated the electrical, automotive and agricultural implement industries. Investigations were made of 1552 establishments, employing 500,000 workers, or over 80 per cent of the industry. Workers were classified as skilled, unskilled and women.

In July, 1914, the average wages properly weighted of all these classes in the foundries was 27.4 cents per hr. This had reached 63 cents per hr. in July, 1920, thereby representing an increase of 130 per cent, and was 56.1 cents in July, 1921. The charts showed radical changes from July, 1920, which represented the peak of activity, to July, 1921, by which time the slump was in the valley. In this period there was a 13½ per cent decline in hourly wages; 26.8 per cent decline in weekly earnings and 44.5 per cent decline in employment. The average weekly wage was $13.52 in July, 1914, about $33 in July, 1920, and $23.32 in July, 1921. In July, 1920, the number employed was 438,000, and in July 1921, 243,000. The number of hours worked per week was 53.5 in 1914, and 52½ hr. in the war period, and nominally has remained at this figure since though actually different. In July, 1920, there was an average of 50 hr. per week of plant operation, but in July of this year 41.5 hr. per week.

One noteworthy showing was that sometimes the average number of hours per week's operation of the plants was 3 hr. more than the average number worked by the employees, and this difference, now naturally largely absent in most industries, is being studied as a measure of the inefficiency of men and management. The charts also covered the findings in 95 automobile plants in which the employment of 108,000 in July, 1920, had dropped to 38,000 in the beginning of 1921, and after a rise slid down again in May of this year. In 138 agricultural implement plants 50.000 were employed in July, 1920, and 16,000 in July, 1921. Mr. Alexander made the guarded prediction that perhaps it will be two years before we will get back to normal production. Normal production will be that output of 1914 plus the natural increase in capacity since that time.

The convention was startled by the appearance of an apparent hardy son of toil with all the earmarks of a Socialist, the red necktie, party button, dark shirt, cap drawn over eyes and tortoise shell glasses. He was introduced by President Barr as follows: "Have any of you ever paused before a soap box orator who was addressing your workmen in Bolshevik language? I stopped to hear such a speech in Buffalo the other day. I am going to give you men the chance to hear such a speaker." The speaker was Jack O'Brien, the "soap box anti-socialist orator." He unlimbered his guns of socialistic argument with all the fire, bitterness and distorted argument of the typical red orator. Suddenly he removed his disguise and appeared as a normal American and proceeded to rebut the false arguments uttered previously.

The following were the chief points of his "red" talk. Employers are parasites; the workers are the only ones who produce. The employers are so entrenched that the laboring man is not allowed to utter the truth. The army, navy, police and state constabulary are all instruments of the capitalists. "Who built the Hotel Astor—the Astors? No, the workingman! The employers eat the steaks in the Hotel Astor dining room; the workmen eat the bones and are lucky to get them. Even when a Socialist like Victor Berger is placed in public office, he is at once removed by the capitalists. The laboring man produces the cigars that the rich man smokes and is glad if he himself can get a butt. Twenty per cent of wealth goes to labor; the 80 per cent to capital, the parasite. In a 10-hr. day, the workman works two hours for himself and eight hours for the parasites. Debs told the truth and they locked him up."

Jack O'Brien, the anti-Socialist, said: "Though only 20 per cent of plant income goes to labor, 65 per cent goes to buy the raw material, which is largely labor cost, as it leaves as finished product from one producer to become raw material of the next. Depreciation of plant and equipment, taxes, advertising, etc., must be taken care of. Russia, the glaring example of communism, is now reaching out to capital for rescue. We pass the hat for starving Armenians, Germans and Chinese, but when was the hat ever passed for starving Americans? Wherever we have tried out Communism it has proved a failure."

Governor Allen Explains Industrial Relations Court

The heroic figure of the convention was Governor Henry J. Allen, whose courage and foresight in recent Kansas labor troubles, like those of former Governor Coolidge of Massachusetts in the Boston police strike, won signal victories for the great American public. His self-confidence of speech, manner and gesture made it plain how he could stand up so successfully in the trials with which he was confronted. He has a facility for forceful expression, as when he described Samuel Gompers as a radical with the radicals; a conservative with the conservatives—but for Gompers all the time.

The following is a digest of what he said. In a certain speech Gompers said that the laboring man must keep in peace what he won for himself during the war. But the doctrine that the less you put into life the more you can take out has failed. High freight rates, due to high wages, means that for every three cars of livestock, one of these cars has to pay the freight of the other two. The railroad wage problem is not brought about because we pay one man too much, but because we pay too many men to do one job. The speaker gave an illustration of the simple removal of a part on a locomotive where men from six unions performed a series of operations formerly done by one handy man in a short time. The doctrine of "do as little for as much as possible" is having its reaction. In Seattle more masons and carpenters are out of work to-day than ever; more plumbers are out of work in Chicago than ever.

The Kansas law which provided for a Court of Industrial Relations came out of a great crisis. Here was the great coal strike and the public suffering tremendously. The court did not hesitate to violate precedent to protect the public. Its action taught that the State has a right to protect the public in a strike of an essential industry, such as that pertaining to the furnishing of food, fuel and transportation. Since the

industrial relations court has been established there have been 30 decisions, 29 of which have been satisfactory to both employers and labor. The law holds that the right to work is as sacred as the right to loaf. A fair and just wage the Kansas court holds to mean a living wage plus a reasonable amount for luxuries. Since the new Kansas court has been founded more coal has been mined with fewer miners because of the absence of strikes and a happier condition of the workmen.

Evolution of American Railroads

The evolution of the railroads during their century of life in the United States was outlined by A. C. Davis, vice-president Gurney Ball Bearing Co., who has had 25 years of railroad experience as a locomotive engineer and official. He showed how present railroad labor unrest was due to changed conditions. In the early days the long hours of work, the long periods of apprenticeship and the elimination of the unfit bred discipline, respect for superiors and sobriety of thought and action. The eight-hour runs of to-day give the men time to congregate and discuss imaginary grievances. Instead of an eight-year apprenticeship a green boy from the country can become a full-fledged fireman in a year and a half.

There is a popular fallacy that we make economic laws. The wise leader realizes that the best he can do is to conform to the economic laws which have become established through time. The reduction of railroad rates is not so important as the harmonizing of all factors in the conduct of a railroad so that they will conform to economic laws. If other factors are adjusted, the rate reductions will follow.

Many unjust conditions have existed in the past. There were secret rebates, railroad lobbying, free passes to the press and legislative favors. Immigrant labor is inclined to stay on the Atlantic Coast. To tempt it inland higher wages have to be offered. Railroads were paying more for labor in Seattle than in the East. The Boston railroad workers became dissatisfied and wanted their wages boosted to the level of their Western fellows. The Western men would demand further increases and thus the vicious circle progressed. Often the executive officers of the road received less pay than the more insistent workers. So conditions were much unbalanced. Then came the various legislative acts which made things worse, such as the Clayton act, the Adamson law, the Government operation of the roads and their return to private management. The recent calling off of the threatened railroad strike does not end the problem. We cannot assume that the brotherhoods will be abolished. The Interstate Commerce Commission and the Railroad Labor Board are two conflicting factors which are hampering the roads.

In conclusion he said that we cannot afford to buy railroad service for less than a fair price; we cannot afford to pay radically less wages, lest the standards of living of the workers deteriorate; we cannot entrust supervision of the roads to quasi-judicial boards of law and politics—we must have business men on these bodies; the Railroad Labor Board must allow outside business interests to give suggestions. We must realize that economic laws apply to railroads; operation must be placed in the hands of trained bodies of managers; supervision of work and wage conditions must be determined locally; outside interference must not be tolerated.

Vocational Training in Nebraska

On the second day of the convention L. A. Hartley, department of vocational training, State of Nebraska, explained how foremen are trained in his State. The method there is known as the project training method. The training course is not installed unless both the executives of a plant and its foremen are "sold" on the scheme. The experience in Nebraska has made it plain that the best foreman training group is recruited from one plant where interests are common; the number in the group should range from 12 to 30; each foreman should not be allowed to talk over 4 min.; the management should be first convinced regarding the value of the plan; details of place of meeting, officers, time and instructor must be decided upon; the management must choose whether instruction will be given on the company's time or outside of working hours; the instructor should be at least a high school graduate and have at least two years' experience. The total cost of foreman training in Nebraska last year was $3,000.

The speaker emphasized the following interesting parallel. Eight per cent of the youths of the United States finish high school; 2 per cent finish college. The same percentage holds in factory work—8 per cent of factory workers rise to foremen and 2 per cent to higher executive positions.

Mr. Hartley showed charts which indicated the saving in costs of operation because of the foreman training courses installed. In one plant burning oil, the amount consumed per ton of finished product was reduced from 36 gal. to 25.5 gal. In another plant the boiler efficiency was increased from a cost of $2,000 per hp.-yr. to $1,115.

According to experience of Nebraskans it is better to secure a foreman and teach him to teach, rather than to secure a school teacher, who lacks the practical experience of the things taught. The management gets as much help as the foremen from these courses. It is the rule in one factory that a foreman must never be promoted unless he has an understudy trained to succeed him.

A paper by Robert E. Belt, secretary-treasurer American Malleable Castings Association, on foundry costs, is published elsewhere in this issue.

Officers and District Committees

The following officers were re-elected: President, William H. Barr, Lumen Bearing Co., Buffalo; secretary, J. M. Taylor, 29 South LaSalle Street, Chicago; treasurer, Chicago Trust Co., Chicago. As already mentioned, M. Griswold, Jr., was elected vice-president. The administrative council reappointed A. E. McClintock as commissioner, with headquarters in Chicago.

The following district officers and committemen were elected, the first two names of each group representing respectively chairman and vice-chairman of that district:

First District.—Charles L. Taylor, Taylor & Fenn Co., Hartford, Conn.; H. B. Johnson, General Fire Extinguisher Co., Providence, R. I.; F. H. Weymouth, Hunt-Spiller Mfg. Corporation, Boston; Charles Berger, Eastern Malleable Iron Co., Naugatuck, Conn.; Robert E. Newcomb, Deane works, Worthington Pump & Machinery Corporation, Holyoke, Mass.

Second District.—George C. Forgeot, Worthington Pump & Machinery Corporation, Buffalo, N. Y.; James Eastwood, Benjamin Eastwood Co., Paterson, N. J.; W. H. Thomas, Straight-Line Engine Co., Syracuse, N. Y.; Walter S. Smith, E. W. Bliss Co., Brooklyn, N. Y.; J. T. Starkweather, Troy Foundry & Machine Co., Troy, N. Y.

Third District.—J. P. Allen, Union Steel Casting Co., Pittsburgh; H. E. Asbury, Enterprise Mfg. Co. of Pennsylvania, Philadelphia; Nelson J. Darling, Erie works, General Electric Co., Erie, Pa.; O. R. Read, Read Machinery Co., York, Pa.; Frank J. Eppele, Trenton Malleable Iron Co., Trenton, N. J.

Fourth District.—William M. Taylor, Chandler & Taylor Co., Indianapolis; J. M. Bashline, Star Drilling Machine Co., Akron, Ohio; H. A. Becker, Lakey Foundry & Machine Co., Muskegon, Mich.; Neil C. Lamont, Laidlaw Works, Worthington Pump & Machinery Corporation, Cincinnati; William Greenbaum, Acme-Palmers & DeMooy Foundry Co., Cleveland.

Fifth District.—C. H. Cole, United Iron Works, Inc., Kansas City, Mo.; T. S. Hammond, Whiting Corporation, Harvey, Ill.; Horace R. Culling, Carondelet Foundry Co., St. Louis; C. E. White, Deere & Mansur Co., Moline, Ill.; H. E. Muchnic, Locomotive Finished Material Co., Atchison, Kan.

Sixth District.—L. R. Barrett, Vulcan Iron Works, Winnipeg, Can.; Oliver Crosby, American Hoist & Derrick Co., St. Paul, Minn.; Frederick L. Stivyer, Northwestern Malleable Iron Co., Milwaukee, Wis.; E. A. Peterson, Valley Iron Works, Appleton, Wis.; E. H. Neese, Beloit Iron Works, Beloit, Wis.

Seventh District.—W. M. Gartshore, McClary Mfg. Co., London, Ont.; J. M. Taylor, Taylor-Forbes Co., Ltd., Guelph, Ont.; H. Cockshutt, Cockshutt Plow Co., Brantford, Ont.

Eighth District.—W. D. Tynes, Hardie-Tynes Mfg. Co., Birmingham.; L. J. Black, Beaumont Iron Works Co., Beaumont, Tex.; George M. Morrow, Jr., Birmingham Machine & Foundry Co., Birmingham; C. A. Young, Lucey Mfg. Corporation, Chattanooga, Tenn.; W. Henderson, W. K. Henderson Iron Works & Supply Co., Shreveport, La.

Advantages of a Foundry Cost System*

It Forms a Basis for Establishing a Selling Price and Indicates the Degree of Efficiency of the Various Departments

BY ROBERT E. BELT

TO foundrymen the subject of costs has not the same general interest as have other subjects which seemingly are more closely related to production or to profits. However, the question of what it costs or will cost to produce a particular type of casting and at what price it can be sold is more closely related to profits than any other subject to which the foundryman is required to give consideration. The effect of costs on the profit and loss statement is a most direct one and a distorted relation between costs and selling prices produces a serious situation. The longer the executive is in ignorance of a disturbed relation between costs and selling values, the more serious the situation becomes.

Accurate cost information is undeniably the only true basis upon which to make prices and arbitrarily quoting a price irrespective of the actual or of the normal cost of production almost invariably produces bad results both to the individual company and to the industry as a whole. The foundryman's most dangerous competitor and the industry's greatest menace is the fellow who is selling his product without a knowledge of its cost of production. It is obvious that one should know the cost to produce each kind of work he manufactures as competitive conditions are seriously disturbed where losses on one or more kinds of work are recovered from profits on other kinds.

Importance of Technical Information Realized

Practically all foundrymen recognize the importance of accurate and dependable technical information in the management of their plant; of determining the constituents and properties of their iron and of melting under laboratory control; of the advantages of paying labor on the piece-rate basis; of the advantages of machine molding over hand molding; and the importance of modern methods of handling and conveying materials. While foundrymen admit there are advantages in the more modern technical and physical methods, they are extremely slow to admit that there are equal advantages to be derived from modern office methods. No matter how modern and improved may be the technical end of the business, its successful conduct is not assured unless the cost of the various classes of product is known and the product disposed of at a figure in excess of cost.

Experience has demonstrated over and over that in the production of castings it is not safe to base a selling price on an average cost. In a jobbing foundry, the cost of the work of no two customers is the same; the cost of no two patterns of castings is the same. With almost every order, conditions vary, and the cost of production always varies with the conditions. The variations in cost should be known, studied, analyzed and watched.

Whether the product is gray iron, malleable iron or steel castings the most satisfactory cost in a jobbing foundry, in my opinion, is a cost on each principal pattern of castings. The first impression is that to get a quarterly or a monthly cost on each principal or long running pattern of casting would involve an immense amount of clerical work. Experience proves that is not the case, particularly where the cost system is free from complications and from hair-splitting refinements. The manufacture of castings is not a complicated process and I have never been able to see why accounting need be more complicated than the manufacturing process itself.

Next best to a cost on each principal pattern of casting is a class cost, the castings being classified by weight per piece divided into plain and cored classifications. For gray iron foundries engaged on light work of not extremely dissimilar types the weight classification for costing purposes usually gives fairly good results.

Adequate costs, apart from their value for price-making purposes, are an index of operating efficiency. With properly prepared costs, the relative efficiency of the different departments of a foundry can be watched and compared. The current results obtained in each department can be checked against those obtained in the past, thereby showing increases in efficiency, or the reverse, and the results of improvements in plant practice. Complete and properly designed cost statistics will be found to exercise the important and productive function of lowering costs and holding them at the lowest possible level.

Foundrymen Believe Their Business "Different"

Foundrymen who have not installed cost systems ordinarily have a number of reasons for not doing so. One of the objections is the feeling that exists in the minds of many that their particular business is so different from others that no system which could be operated in a practical manner would give them dependable results. It is true that some lines of foundry production and foundry practice lend themselves more readily to the determination of costs than others, but it is also true that no line is so complicated or the plant organization so complex but that a workable system can be devised and operated in a thoroughly practicable manner which will give reasonably accurate results.

The most common objection is that of the expense of operation. Many foundrymen are of the opinion that a cost system means an interminable amount of detail and red tape and the employment of a number of additional clerks. It is true that some extra labor may be required, but not to the extent that most foundrymen believe. There is in nearly every office that is not systematized, and where costs of production are not determined, sufficient unproductive clerical work to cut down the extra labor to a minimum. In many foundries where the office work has not been systematized, and where pay roll and cost work have been unified, it has not been necessary to employ any additional help.

The foundryman who is fortified with an accurate knowledge of his costs of production always has an advantage. Every foundryman should know his costs, regardless of cost methods. It were far better, however, if each distinct branch of the industry is to adopt uniform methods, as unfortunately, differences in accountings methods do produce different results.

The maximum economies in the production of castings are very largely the result of a study of comparative costs of production, thus enabling the management to maintain a standard of efficiency in keeping with the more efficient results. The most conclusive proof of the value of accounting from an operating standpoint is the fact that one of the first moves made by a large corporation or holding company, operating a number of plants manufacturing a given product, upon acquiring an additional plant is to change over the accounting system to the uniform one in use at the other plants of the company. No large corporation to-day attempts to conduct its business with non-uniform methods of accounting, or in other words, without a comparison of costs at the different plants. It is imperative that a comparison be had as only in this way can the rela-

*Read before the twenty-fifth annual convention of the National Founders' Association in New York on Nov. 17. The author is secretary-treasurer of the American Malleable Castings Association.

tive efficiency of the different plants be determined. If operating inefficiency is disclosed in this way in a large corporation operating various plants, should not the same be true in an entire industry, or in a distinct branch of an industry, through the use of similar methods?

The advantages to an industry of uniform accounting methods from the standpoint of unfair competition are of equal importance. There is a form of competition to which a foundryman cannot object, even though it cannot be met, and that is the competition of the man who prices his work on the basis of cost and whose lower price reflects advantages by reason of efficient methods of production. The competition, however, to which objection can be rightfully raised is that of the man, who, having no dependable knowledge of his costs sets prices which preclude the possibility of there being an adequate profit in the business for anyone. It is this situation that a knowledge of costs largely corrects for rarely does a man price a product at less than cost when known, but if he does not know its cost the price unknowingly may very likely be less. Uniform accounting, which recognizes the fundamental principles applicable to cost-finding in the particular industry, has the effect, therefore, of reducing unfair and unintelligent competition, but uniform accounting in itself does not regulate prices and does not in any measure restrict competition.

The adoption of uniform accounting methods, does not mean uniform costs. There are and always will be differences in costs of production, resulting from better plant organization, higher efficiency, more favorable location and other operating factors. In the industries where uniform cost methods are recognized and followed the members know that differences in costs are due to operating factors. In competition, the companies can feel that they are competing on an equal basis and have the satisfaction of knowing that they will not be called upon to meet a ridiculous price that has been based upon widely different costs determined in an entirely different manner.

Forty-three Foundries Bid on Same Proposition

The conditions that were found to exist in one of the branches of the foundry industry prior to an effort to improve and standardize cost methods are typical of conditions in other branches where no special cost education efforts have been made. About three years ago, in the branch of the foundry industry referred to, a test was made of the competitive conditions which resulted where concerns were either using different accounting methods or guessing at their costs. Two castings each were furnished 43 foundries which were asked to quote on an inquiry for 10,000 pieces of each pattern and to give their total estimated cost of production on the basis of $40 iron delivered. With the castings before them and the price of iron fixed you would not expect any great variation in estimated cost; but here is the result of the inquiry: Of the 43 cost estimates, on the one casting, about one-half showed a fairly narrow range—from about 7¼c. to 8¼c. per lb. Those were the foundries that were in a position to prepare an estimate on some more or less accurate basis. The variation in the estimated costs of these particular 20-odd foundries did not cause any special concern. It was the other half of the concerns, barring a few unreasonably high estimates, which were the ones that were crippling the industry through the establishment of a price which precluded anyone from getting business at a living price.

As compared with a normal and fair cost at that time (on the basis of $40 iron) of about 8c. per lb., there was one estimated cost of a fraction less than 5c.; another at 5½c.; and six others under 6½c. Excluding one abnormally high estimate, the range of the 43 cost estimates was from 4.9c. per lb. to 11.6c. per lb.

On the other casting, a more costly one to produce on account of its lower output per molder per day, the cost estimates were still considerably wider. Here again, the estimates of the companies which had dependable records upon which to base their estimates did not vary widely. They were from 12½c. to 14c. per lb. Compared with these normal estimates, there was one of 8.3c. and another of 8.6c. Of the 43 foundries estimating on this particular casting there were two estimates over 20c. per lb., and six estimates under 10c. per lb.

With conditions such as those existing, is it any wonder that the foundry industry is a hazardous one and that a good proportion of the aggregate tonnage, under normal conditions, is produced without profit; that there is so much dissatisfaction among customers when they learn that others are securing their requirements of similar castings from a trust-to-luck foundry at prices 50 per cent less than they are paying? There probably isn't another industry where there is so much "shopping around" for prices as there is in the foundry industry. Buyers realize that many foundries do not know their costs.

The investigation referred to also revealed the fact that there was almost as much variation in the estimated cost of molding as in the estimated overhead; that there was as wide a range in the price that the molder would be paid per mold as there was in the total estimated cost. In the same locality, where practically the same labor rates prevailed, the molders' price per mold for the same sized flask would vary as much as four cents, or the equivalent of $20 per ton in the final cost of the casting.

Piece Prices Often Determined by Rule of Thumb

A study of this important cause of variations in costs as among different plants disclosed that piece prices in most foundries—the foundation of costs—were determined by rule-of-thumb methods and that there was no common basis upon which different plants could determine an equitable piece price for molding a given type of casting. An effort was made, therefore, to determine piece prices in a somewhat scientific manner, along basic lines or standards which would be of general application.

For bench or squeezer molding, as an example, it was found that the molding price per mold could be based on a series of well defined operations or factors, such as the cubical contents of the flask, the number of cores and chills to be set, the handling of the pattern and flask, etc. These, in the main, constituted common factors and a standard value was placed upon each, such as a factor of 30 for each 1000 cu. in. of flask content up to 2000 cu. in., a factor of 50 for each 1000 cu. in. in excess of 2000, a factor of 2 for each small core set, 3 for each moderate size core set, 4 for each large core and 8 for each complex core, a factor of 12 for handling a plate pattern of one gate, a factor of 2 for each additional gate, etc. The sum of all the factors expressed in cents represented the relative value of the particular job. To reduce the sum of the factors to a price reflecting the prevailing wage scale of the locality, all that was required was to multiply by a coefficient which would produce the average desired earnings per hour.

The above plan is in successful operation among a large group of foundrymen and it is assisting materially in the standardization of plant practices and in the elimination of artificial differences in costs. It is only another effort for the establishment of equitable earnings of employees and for the maximum reduction of guess work.

Office Boys Do the Cost Finding

The principal reason, I think, that cost information has not attained the position in the foundry industry that it rightfully occupies is the belief of the average foundryman that any kind of help is good enough for the office; that an office boy in a year or two is fully equipped to take charge of the company's cost work. This is a serious mistake, particularly as most foundry executives have neither the time nor the inclination to analyze costs in order to determine the conditions which resulted in an unusually high or an abnormally low cost. This is the work of the accountant for the assistance and enlightenment of the executive. It is this phase of cost accounting—the real object and purpose—in which the so-called accountant is so often deficient and as a result, unless the executive realizes the accountant's deficiency he is most likely to decide that costs are of

little value and that the work of the accountant is unproductive.

The shortcoming, primarily, is the accountant's, and secondarily, the executive's. The cost accountant who neglects the proper application of his work and who is not inclined to read and analyze and present his findings, is not filling his mission and the executive who condones the omission of that essential in the accountant has either never been awakened to the possibilities of accurate and complete business information or is deficient as an executive.

There are many foundry executives who manifest but little interest in cost results and when the accountant is of the same trend of mind, it is not at all surprising to find a feeling which is adverse to cost work. This latent faculty of the executive, however, is easily and quickly exercised when the accountant presents the results of his work in a manner which means something to the executive. When the executive sees that accurate and complete cost information results in the reduction of expenses or in an increase in selling prices, he is going to realize the importance of the work.

Generally speaking, the work of the accountant should cover at least two fields, namely, ascertaining costs, and presenting them in an analytical and comprehensive manner. The department of the foundry management for which an analysis is made will largely determine the nature and character of the accountant's report. Generally, an analysis and report should be made for the operating or manufacturing executive, for the sales executive, and for the general administrative executive.

The operating executive of a foundry should be furnished with current comparative unit costs in sufficient detail to clearly illustrate the factors influencing cost fluctuations. Departmental labor costs comprise the most fruitful source of statistical and analytical information which can be furnished the plant management. Unit labor costs of the several departments can be readily shown from which the operating executive can easily see exactly where the labor costs were abnormal. They should be presented in comparative form, showing increases or decreases in cost per unit of product, and it is well to chart the cost trend for a period of months. In addition to presenting comparative costs of labor per unit of product by departments, it is well also to show comparative earnings of employees per hour, arranged by departments and by classes of labor. Various other statistical and analytical data can be profitably prepared for the operating officer, such as the average production per molder per hour, classified by types of product and methods of molding, the average weight per piece of castings produced, an analysis of the gross metal charge showing the loss of metal from oxidation, the percentage of bad production, the percentage of good production, the consumption of fuel, sand, fire-brick and other materials per unit of output. Other statements of equal value will suggest themselves to the alert accountant.

Sales and Manufacturing Departments Need Different Information

The character of the information which the sales department needs differs materially from that required by the manufacturing department. The primary interest of the former in costs is in connection with the establishment of selling prices, and therefore, total costs of production of individual patterns of castings or classes of castings covering past and future periods are of the most concern. In fact, the real concern of the sales executive should be in what the costs will be for the immediate future and it is here that the accountant has a real opportunity to use his knowledge and experience in forecasting costs. His forecasts, however, should always be based on the actual costs for the most recent period, modified by existing current conditions. He will have to take into consideration many factors, of which may be mentioned variations in output, in material costs, in labor costs, in overhead, etc., but with the accountant's first-hand information and with his knowledge of causes and effects, he is in a position to forecast costs with remarkable accuracy.

In most foundries of the smaller size, both sales administration and general administration are under the direction of the same official. When this is the case, the analytical reports to be submitted would not differ from those which would be prepared for the sales executive, but in addition, they should embrace a summary monthly profit and loss statement, arranged to show the month's shipments, the cost of the shipments, with beginning and closing inventories of raw materials, work-in process and finished castings, and the month's profits. The statement should show both aggregate values and unit values. The unit values and profits for the month should be presented in comparative form, month by month and cumulative by months.

Needless to say, statements should be standardized and the accountant should prepare them regularly and promptly and have them reach the executive's desk with unvarying promptness. The executive will then learn to expect them and even though the statements at first may not receive the consideration they deserve, it will not be long until they will be awaited with keen concern and will play a most important part in the administration of the affairs of the business.

The Future Price of Ferro-manganese

In a recent circular letter, C. W. Leavitt & Co., New York, comment on the ferromanganese situation:

"With the steel companies operating less than half of their capacity, it may seem ridiculous to predict higher prices on any raw material entering into the manufacture of steel. Notwithstanding the general belief that the scrapping of warships and a ten year naval holiday is a bullish argument for general business, we would submit the following figures as the basis of our belief that pig iron prices must be reduced, but we would not be surprised to see higher prices on ferromanganese.

"The domestic production of ferromanganese for the past three months averaged about 4000 tons per month, whereas the average domestic production for the past seventeen years was over 11,000 tons per month.

"During the period 1909 to 1920, the average price of ferromanganese was $116, seaboard, and for the same period the average price of Bessemer pig iron was about $23.50, f.o.b. Valley furnaces.

"Today ferromanganese is $58.35, seaboard, or nearly 50 per cent below the twelve-year average, whereas Bessemer pig iron is about $20, Valley furnace, or less than 15 per cent below the average for 1909 to 1920.

"Furthermore, the American price on English ferromanganese must follow the sterling rate of exchange, and if sterling continues to rise English producers will be compelled to advance their price. There is also the possibility of a high tariff on ferromanganese, and if Congress should adopt the Fordney rate, domestic producers undoubtedly would take advantage of that opportunity to advance their selling limit on ferromanganese."

A. H. d'Arcamble, chief metallurgist Pratt & Whitney Co., Hartford, Conn., delivered a lecture on high-speed tool steels, accompanied by lantern slides and specimens of steels showing fractures, before members of the Boston chapter, American Society for Steel Treating, at the City Club, Boston, Friday evening, Nov. 18. After discussing the three ways of hardening high-speed steels, Mr. d'Arcamble confined himself largely to tests made on high-speed and other tool steels, showing results obtained at the Pratt & Whitney Co. plant. He said the question has often been asked, "What is semi-high speed steel?" He claimed there is no such steel, that steel is either high-speed or it is not, there being no intermediate alloy, and he read numerous letters from steel producing companies to prove his contention. He said high-speed steel should contain 14 to 18 per cent tungsten, and approximately 0.65 per cent carbon.

Iron and Steel Markets

LOWER FREIGHTS WAIT

Railroads Decline to Reduce Fuel and Other Rates

Markets Generally Weaker, with an Effort to Advance Sheets

Freight rate reductions on iron and steel products may be longer deferred than has been expected, in view of the New York meeting in the past week between representatives of the industry and of the railroads. On Tuesday railroad freight executives at a separate meeting decided to continue to March 31 the 28 per cent reduction on iron ore rates which was to expire Dec. 31. At the same time they declined to grant reductions asked for on coal, coke, limestone and other raw materials.

The effort at Washington to link up the steel rail price with the question of iron and steel freight rates may postpone for some time the relief all industry has looked for from lower transportation costs.

The reduction of inventory limits buying by manufacturing consumers of steel, but does not check railroad car programs which call for 1922 deliveries. At Chicago the 7000 cars let in the past three weeks, the 13,000 now up for bids and the 8000 for which inquiries will soon come out represent 280,000 tons of steel.

The Chicago & Alton has placed 22,000 tons of rails for next year. The Grand Trunk will take 10,000 tons for its American lines and the Rock Island order is expected to be for 45,000 tons. Lower prices have developed on recent tie plate business, $37.50 appearing in connection with a southwestern order.

Operations are but little changed. The Steel Corporation is at 52 per cent, after having gone somewhat higher. Among independent companies the range is from 40 to 50 per cent.

Two Mingo, Ohio, blast furnaces long idle start making iron this week and the steel plant will resume next week. The Carnegie Steel Co. also starts one of its Carrie furnaces. A Wisconsin furnace and two in eastern Pennsylvania will go in about Dec. 1.

Steel pipe and tin plate are exceptions to the falling off in new buying. The pipe demand is due to active house building and to recent advances in oil.

The price situation is in some confusion. Attempts to stiffen lines lately weakened have had little success. In sheets, however, a fresh effort is under way. Last week black sheets were easily bought at 2.75c. and galvanized at 3.75c. On Nov. 19 several makers withdrew all quotations below 3c. and 4c. Some 1922 business has been done, but the leading producer has not yet opened its books.

In wire nails the recent move by the leading interest brought out considerable business at $2.90. Thus far, however, shipments by practically all makers are of $2.75 nails and there are signs of extensions of old contracts at that figure. Similarly $2.50 is the common market on manufacturers' wire.

Marked weakness is seen in the rivet market as indicated by a decline in eastern Pennsylvania prices of $3 to $4 per ton in two weeks.

Awards of fabricated steel work total about 15,000 tons, with few single contracts calling for more than 500 tons. New projects appearing in the week will require close to 20,000 tons. These are in addition to the considerable amounts of steel products called for by the oil companies, such as 14,000 tons for one oil pipe line, 4000 tons for tanks and 50,000 boxes of tin plate for oil cans.

With the exception of a sale of 6000 tons of basic in eastern Pennsylvania at $20, furnace, no large transactions in pig iron are reported and the general tendency is toward a lower level. On 1700 tons of Southern iron for delivery at Milwaukee, $17.50, Birmingham, was quoted, but $18 is the prevailing price.

A change has come over the market for heavy melting steel scrap in the Pittsburgh district, in line with the lower tendency in pig iron. A steel company that in its recent buying paid as high as $15 has cut its bid to $14. With this turn, more scrap is pressed upon the market and there is covering of some recent short sales.

The Navy Department has canvassed steel makers, shipbuilders and scrap dealers in view of the sale on Jan. 16 of a number of old vessels, some of them named in the Hughes plan. A total of 100,000 tons of metal is involved. Tentative prices named range from $6 to $8 per ton. For the larger dismantling program expected later the incorporation of one or more salvaging companies is already discussed.

With THE IRON AGE composite price of seven rolled steel products at 2.1c. per lb., about 90 per cent, or all but 0.415c. of the projection of the war peak above the ten-year pre-war average has come off.

Pittsburgh

PITTSBURGH, Nov. 22.

Outstanding in a situation that is decidedly irregular is a fresh effort at price stabilization in steel sheets. Up to last Friday, the market in this class of material was markedly soft, with black sheets being freely offered at 2.75c., and quotations of even less being named by some makers, while galvanized sheets also were easy to obtain at 3.75c. Last Saturday manufacturers advised district sales offices to withdraw all quotations of less than 3c. for black and 4c. for galvanized and apparently an effort now will be made to maintain the market at these levels. Some first quarter business is reported to have been taken at these figures, by the independents, but the American Sheet & Tin Plate Co. has not opened its books for early 1922 business. It is too soon to state definitely the reaction of buyers to the higher prices.

The recent attempt to establish higher prices for wire products evidently has not been a complete success. While some business in nails is going upon the books of makers at $2.90 base, per keg, there have been a number of extensions of contract made prior to Sept. 12 last, and carrying the then prevailing price of $2.75. On manufacturers' wire, the market has

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Nov. 22, 1921	Nov. 15, 1921	Oct. 25, 1921	Nov. 23, 1920
No. 2X, Philadelphia‡	$22.84	$22.84	$22.84	$42.79
No. 2, Valley furnace†	20.50	20.50	21.00	39.00
No. 2 Southern, Cin'ti†	22.50	22.50	23.50	42.50
No. 2, Birmingham, Ala.†	18.00	18.00	19.00	38.00
No. 2, foundry, Chicago*	*20.00*	21.00	21.00	40.00
Basic, del'd, eastern Pa.	**21.00**	20.50	20.50	41.16
Basic, Valley furnace	19.00	19.00	19.00	35.00
Bessemer, Pittsburgh	21.96	21.96	21.96	39.46
Malleable, Chicago*	*20.00*	21.00	21.00	40.50
Malleable, Valley	20.00	20.00	20.50	37.50
Gray forge, Pittsburgh	*21.46*	21.96	21.96	39.96
L. S. charcoal, Chicago	31.50	31.50	31.50	53.50
Ferromanganese, del'd	60.00	60.00	60.00	140.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	50.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	50.00
O.-h. sheet bars, P'gh	30.00	30.00	30.00	55.00
Forging billets, base, P'gh.	*32.00*	35.00	35.00	60.00
O.-h. billets, Phila.	34.74	34.74	34.74	55.74
Wire rods, Pittsburgh	40.00	40.00	40.00	65.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh	1.60	1.60	1.60	3.25
Light rails at mill	1.55	1.55	1.70	3.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	4.60
Iron bars, Chicago	1.65	1.65	1.75	3.75
Steel bars, Pittsburgh	1.50	1.50	1.50	3.00
Steel bars, Chicago	*1.60*	1.75	1.75	3.38
Steel bars, New York	1.80	1.80	1.80	3.38
Tank plates, Pittsburgh	1.50	1.50	1.60	2.85
Tank plates, Chicago	*1.60*	1.75	1.75	3.23
Tank plates, New York	1.88	1.88	1.88	3.38
Beams, Pittsburgh	1.50	1.50	1.60	3.00
Beams, Chicago	*1.60*	1.75	1.75	3.38
Beams, New York	1.88	1.88	1.88	3.38
Steel hoops, Pittsburgh	*2.00*	2.25	2.25	4.00

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Nov. 22, 1921 Cents	Nov. 15, 1921 Cents	Oct. 25, 1921 Cents	Nov. 23, 1920 Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	3.00	5.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	4.00	6.70
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.25	4.50
Wire nails, Pittsburgh	*2.75*	2.90	2.90	4.25
Plain wire, P'gh	*2.50*	2.60	2.60	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.55	4.45
Tin plate, 100-lb. box, P'gh.	$4.75	$4.75	$5.00	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$17.00	$17.00	$16.50	$32.50
Carwheels, Philadelphia	17.00	17.00	17.00	36.00
Heavy steel scrap, P'gh	*14.00*	14.50	14.50	20.00
Heavy steel scrap, Phila.	12.00	12.00	12.00	18.00
Heavy steel scrap, Ch'go	*12.25*	12.50	12.00	17.50
No. 1 cast, Pittsburgh	*16.50*	17.50	17.50	29.00
No. 1 cast, Philadelphia	17.50	17.50	17.50	31.00
No. 1 cast, Ch'go (net ton)	*13.25*	13.75	14.00	21.50
No. 1 RR. wrot. Phila.	*15.50*	16.50	16.00	24.50
No. 1 RR. wrot, Ch'go (net)	*12.00*	12.50	13.00	16.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.00	$3.00	$3.25	$8.00
Foundry coke, prompt	*4.00*	4.25	4.25	9.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**13.50**	13.25	13.00	14.50
Electrolytic copper, N. Y.	**13.25**	13.00	12.75	14.50
Zinc, St. Louis	*4.65*	4.72½	4.60	6.00
Zinc, New York	*5.15*	5.22½	5.10	6.40
Lead, St. Louis	4.35	4.35	4.40	6.00
Lead, New York	4.70	4.70	4.70	6.00
Tin, New York	**29.62½**	28.50	28.50	37.00
Antimony (Asiatic), N. Y.	*4.50*	4.65	4.85	5.87½

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 22, 1921, Finished Steel, 2.099c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel.

Nov. 15, 1921,	2.113c.
Oct. 25, 1921,	2.177c.
Nov. 23, 1920,	3.581c.
10-year pre-war average,	1.684c.

Composite Price, Nov. 22, 1921, Pig Iron, $19.64 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 15, 1921,	$19.81
Oct. 25, 1921,	19.97
Nov. 23, 1920,	37.63
10-year pre-war average,	15.72

settled back to $2.50 base per 100 lb., first quarter contracts having been entered at that figure. Little success has attended the attempt to put hot-rolled flats—hoops, bands and strips—back to a 2.25c. base. In general, demand still is on a tapering scale, the exceptions being pipe and tin plate. Evidently the new price of $4.75 per base box on tin plate appeals to container manufacturers, as they have been prompt in sending along orders and specifications for early 1922 shipments. The demand for pipe really is good, due to building activities, notably house construction, and the recent appreciation in oil prices.

Big demand for the major products still are lacking in this district, and the market in semi-finished material and pig iron is dull to the point of stagnation. The scrap market has reacted to the smaller demand. Fuel prices are decidedly soft. Operations show very little change outside of the fact that the American Steel & Wire Co. recently put on a blast furnace at its Pittsburgh plant and now has three of the four furnaces in this district making iron, while the Carnegie Steel Co., to-morrow, starts making iron at two Mingo, Ohio, furnaces and one of its Carrie furnaces at Rankin, Pa.

Pig Iron.—Interest in the market has not been so slight at any time since the depression began more than a year ago as it has been during the past week. A sanitary ware manufacturer, in addition to recent purchases, bought 500 tons of 2.25 to 2.75 silicon foundry iron at $21, Valley furnace. This constitutes the only important sale of the week. The only interesting development in steel making iron has been the withdrawal of a large tonnage of basic, against which a number of brokers were endeavoring to secure firm bids. This iron, held by a railroad equipment manufacturer, it seems, was never publicly offered nor its sale authorized, but apparently some middlemen believed that if they could secure orders they might interest the owner of the iron to let go. The undertone of the general market is weak and it is believed that quotations on foundry and basic iron would have to be shaded to attract purchases.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.00
Gray forge	19.50
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	20.00

Ferroalloys.—The market is dull to the point of stagnation and prices are entirely nominal. Both sales and inquiries are so few as to make extremely difficult the presentation of reliable ideas as to prices. The common quotation of makers of ferromanganese is $58.35 seaboard, or a little below $65 delivered this district for 78 to 82 per cent material. It is doubtful whether this price would bring much business to-day.

Business in 50 per cent ferrosilicon is largely the specifying against options taken several weeks ago. Very little interest is noted on the part of consumers here in silveries or Bessemer ferrosilicon.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $65 delivered; 78 to 82 per cent foreign ferromanganese, $53.28 to $58.35, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $55 to $57, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market remains inactive and if there is a definite tendency to prices, it is down. Occasional inquiries are being made for sheet bars, but the non-integrated sheet makers are not sufficiently well off with orders to be heavy buyers. The market on this form of steel is not quotable on sales at higher than $30, Pittsburgh or Youngstown. Demand for billets still is extremely light and while nominally quoted at $30 for 4-in., the market really is nearer $29 and it is believed that one or two makers who have a considerable accumulation would take even less to lighten their loads. An effort still is being made to maintain a premium of $5 over soft billets, on forging billets, but some mills are willing to take business at the pre-war differential, which is $2 per ton.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $28 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $32 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Prices are indefinite in the absence of any important demand. Makers generally are quoting $40 for the base size of soft rods, but some frankly admit that they would consider less. (Prices are given on page 1368.)

Wire Products.—The market is somewhat irregular in that while some business in nails is being secured at $2.90, base, per keg, it is reported that there have been a number of extensions of contracts carrying a price of $2.75, and as recently noted, $2.75 delivered Youngstown, was quoted by a Pittsburgh independent against a railroad inquiry. Makers are still quoting wire to jobbers at $2.60, base, per 100 lb., but the price for manufacturers' wire is $2.50, and some first quarter business has been entered at that price.

We quote wire nails at $2.75 to $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 to $2.60 base per 100 lb., Pittsburgh.

Plates.—Demand runs chiefly to small lots for early delivery and most makers are trying to get 1.60c. on such tonnages. The biggest demands are from points far removed from Pittsburgh, and to obtain such business it is necessary for makers in this and nearby districts to meet prices named in other centers.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.60c. f.o.b. Pittsburgh.

Steel Rails.—Public quotations on light rails rolled from new steel range from 1.60c. to 1.65c., base, but apparently less is being done because makers who have named these prices against inquiries have failed to secure the orders. Demand is seasonably light.

We quote 25 to 45-lb. sections, rolled from new steel, 1.55c. to 1.65c. base; rolled from old rails, 1.50c. to 1.55c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—Conditions are much as they have been several weeks past in merchant steel bars. Inquiries at all attractive in size are being accepted as low as 1.50c., while the common basis on small lots is 1.60c., with the Carnegie Steel Co. still nominally quoting 1.65c., but not letting regular customers get away on the question of prices. Just a fair demand is noted for iron bars. While makers are quoting up to 2.25c. base, the actual market ranges from 2c. to 2.10c.

We quote steel bars rolled from billets at 1.50c. to 1.60c.; reinforcing bars, rolled from billets, 1.50c. to 1.60c. base; reinforcing bars, rolled from old rails, 1.45c. to 1.50c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—Awards are fewer than they have been before in some time. The McClintic-Marshall Co. has taken 270 tons for a commercial high school in Providence and 700 tons for a three-story garage for the Bronx Equipment Co., Pittsburgh. The J. E. Moss Iron Works, Wheeling, W. Va., will fabricate and erect 1800 tons for a 10-story hotel, theater and office building, Cleveland and Third avenues, Canton, Ohio. The Jones & Laughlin Steel Co. recently was awarded 10 steel barges by the Iron City Sand Co., Pittsburgh, for which about 1500 tons of plates and shapes will be required. Prices of plain material are strictly on a quantity basis. Large tonnages can be placed at 1.50c., while the going price on small lots is around 1.60c. Prices are given on page 1368.

Iron and Steel Pipe.—The report about business still is one of improvement, but this is true because there is not very firm adherence to the Sept. 16 discount cards. It is particularly a buyers' market in line pipe which, despite the relatively high producing cost, as compared with other kinds of pipe, is being sold at prices which mean heavy losses to those taking the business. A firmer tendency is noted in prices on oil well pipe, as makers believe they should share in the recent appreciation in the value of crude oil. Merchant pipe finds a steady sale, but usually at some concession from the Sept. 16 prices. The Pure Oil Co. has not yet closed for 183 miles of 8-in. pipe for the Humphries field. The Midwest Refining Co. has put out an inquiry for a fair-sized tonnage of line pipe. Discounts are given on page 1368.

Sheets.—The American Sheet & Tin Plate Co. is expected to open its books soon for first quarter and first half of 1922 business, and the common impression is that it will name its current quotations of 8c. base for black, 4c. base for galvanized and 2.50c. base for blue annealed. Some of the independent sheet makers already have opened books for first quarter, naming those prices. Prior to opening their books for first quarter business, the independents quite generally withdrew outstanding quotations of less than 3c. for black and 4c. for galvanized sheets. Current demands are moderate and tonnages for early shipment have been accepted at $5 per ton below those prices. There has been a further drop in sheet mill operations, which in the Valley district are about 50 per cent, and in the Wheeling district only about 25 per cent of the total number of mills. The Steel Corporation has about 70 per cent of its mills in operation. Prices are given on page 1368.

Tin Plate.—Current demands are seasonably light, but orders for first quarter and first half shipments are coming in satisfactorily, and this already is finding reflection in mill operations. The leading interest has close to 75 per cent of its tin mills in operation this week and independents, with one or two exceptions, are maintaining their recent operating schedules. In view of the fact that container manufacturers are disposed to allow shipments to be made earlier than usual, the outlook is for rather full engagement of the mills this winter, and that tin plate manufacturers will not be obliged to stock much material and wait for specifications. The market is firm at $4.75 per base box, for production plate, for either prompt or future shipment.

We quote standard production coke tin plate at $4.75 per base box f.o.b. Pittsburgh for carload lots.

Cold-Finished Steel Bars and Shafting.—The quotation of 2.25c. base Pittsburgh, seems to have disappeared, as a sales price. On lots of a carload or more, buyers have not recently been obliged to go above 2.15c. base and on attractive orders have been able to find accommodation as low as 2c. Orders possibly are a little more numerous than they were a few weeks ago, but there remains considerable room for improvement. Ground shafting is unchanged at 2.75c. base, mill.

Hoops and Bands.—Demand still is extremely light, and while an effort is being made to obtain 2.25c., base, it is not specially successful, owing to a willingness on the part of some makers to go as low as 2c. to get orders. The market is quotable from 2c. to 2.25c., with 2.15c. the general maximum.

Hot-rolled and Cold-rolled Strips.—The effort to establish the market at 2.25c. base for hot-rolled strips and 4c. base for cold-rolled is not especially successful. Buyers are specifying fairly well on contracts entered prior to the advance of a few weeks ago, and carrying the prices then in effect, but the quoting of 2.25c. on new business in hot-rolled strips has not brought the orders. As far as sales and shipments are concerned,

the market is right around 2c. for hot-rolled strips and 3.75c. for cold-rolled.

Nuts, Bolts and Rivets.—Makers in this district still are finding business slow and unsatisfactory and to secure even the small orders which are passing they find it necessary to take less than what are regarded as regular quotations. Prices and discounts given on page 1368.

Boiler Tubes.—Business is rather spotty, but on the whole shows some improvement. Seamless tubes still are slow, largely because of the curtailed activities of the automobile industry. Card discounts are not specially well observed on steel tubes, but concessions from regular discounts on iron tubes are trifling. Discounts are given on page 1368.

Steel Skelp.—Quotations range from 1.60c. to 1.65c., but there has been no recent business at above the lower figure, and 1.50c. seems to be the price idea of those who usually are the biggest buyers. An appraisal of plate prices to-day is 1.50c. to 1.60c., and skelp usually sells within the same price range as plates.

Spikes.—New demands for standard spikes are few and generally small. Activity also is lacking in small spikes. Competition for business is sharp and prices favor buyers. Prices are given on page 1368.

Old Material.—The market is weak and at least 50c. per ton lower than a week ago on all steel works grades. This development, is the result of the virtual withdrawal from the market by a large independent steel company, the purchases of which were the chief prop to prices a week ago. This company, which has been paying up to $15 delivered for heavy melting steel, recently cut its bid to $14 for that grade and dealers who would sell cannot hope for more at the moment since other consumers in this material in this and nearby districts at present are not buying and are very sparing in their releases against contracts. We now quote heavy melting steel at $14 to $14.50, but the latter price is that which some dealers are paying to complete short sales. The usual anxiety by dealers to sell on a dull and declining market is evident and it is more than likely that further declines will be recorded before prices develop much steadiness. The foundries are sparing buyers and it is only because of moderate supplies that prices are not weaker. At that, they probably would have to be shaded to effect sales.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast, cupola size	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.00 to 16.50
Compressed sheet steel	11.50 to 12.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	10.50 to 11.00
Railroad knuckles and couplers	14.50 to 15.00
Railroad coil and leaf springs	14.50 to 15.00
Low phosphorus standard bloom and billet ends	20.00 to 21.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	26.00 to 27.00
Locomotive axles, steel	24.00 to 25.00
Steel car axles	16.00 to 16.50
Cast iron wheels	15.50 to 16.00
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	9.75 to 10.00
Sheet bar crop ends	14.50 to 15.00
Heavy steel axle turnings	12.00 to 12.50
Short shoveling turnings	10.50 to 11.00
Heavy breakable cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Cast iron borings	10.50 to 10.75
No. 1 railroad wrought	12.00 to 12.50

Coal and Coke.—The furnace coke market still is feeling the effects of the increase in capacity which came just prior to the threat of a railroad tie-up. A number of ovens started up merely on the expectation of business and with the calling off of the railroad strike and the fact that such furnaces as were in blast were covered by contracts, there has been no outlet for this excess production and prices have steadily eased down. To-day the market is hardly quotable at higher than $3 per net ton at ovens, although a few operators are quoting 15c. to 25c. more. The market also is weaker on foundry coke because the foundries are not as busy as they were recently and the cutting down of their requirements creates some surplus tonnage. The result is that the very choicest brands of foundry fuel are not quotable at above $4.50 per net ton, ovens, while the product of some of the operators who started up without orders is available as low as $4. The coal market is stagnant and prices are governed very largely by the valuations set by consumers. A fair appraisal of mine run steam coal to-day is $1.50 from non-union fields, $1.75 for mine run by-product and about $2.25 for mine run gas coal.

EXTENSIVE SCRAPPING

Organizing of Salvaging Companies to Dispose of Vessels is Suggested

WASHINGTON, Nov. 22.—Owing to the extensive scrapping of naval vessels being proposed by the Conference on Limitation of Armament, the prospects of creating a salvaging company with large capital back of it to handle work on a commercial basis is being discussed. The Navy Department already has canvassed steel makers, ship builders and scrap dealers for the purpose of getting quotations on old vessels which will be sold by sealed bids on Jan. 16 and if the limited armament plan is adopted there will be many more vessels and of much greater tonnage to be dismantled. Ships scheduled for sale obviously do not include any now building, but do include some of the old vessels mentioned in the Hughes plan for scrapping. The battleships in the list are the Maine, Missouri and Wisconsin, each with approximately 13,000 tons displacement. Other ships include the cruisers Colorado, Memphis and Brooklyn, with displacement ranging from 7000 to 15,000 tons. In addition are four monitors, with displacement of about 6000 tons each, one destroyer and smaller vessels. It is estimated that there is about 100,000 tons of metal in all of these vessels. With the other old battleships, nine being built and six battle cruisers under construction, the scrap would amount to approximately 700,000 tons.

Because of the large tonnages involved, the work of dismantling or converting ships into other types is recognized as a big problem. For that reason the suggestion has been made that one or more salvaging companies be incorporated, purchase ships as they are and either shelve them or beach or take to drydocks, where the latter of sufficient size are available. This would be a new undertaking in this country, but is being performed satisfactorily in England, where dismantling is done by the use of the acetylene torch. Steel makers, scrap dealers or shipbuilders, or a combination of them, it has been pointed out, might be interested in the plan and either use drydocks, shelving beaches or some large plant such as Hog Island. It is stated that steel makers have shown interest in quoting on old ships being offered for sale, but that prices range from $6 to $8 per gross ton, while it had been hoped $10 would be offered. Doubt is entertained in some quarters that in view of steel market condition more than $10 per ton would be offered for the metal itself, if that much. In addition to steel, it is pointed out that Scotch boilers and some machinery for commercial use could be taken from vessels in good shape and sold.

As an Ericsson celebration, in commemoration of the sixtieth anniversary of the battle of the Monitor and Merrimac, the board of directors of the Association of Swedish Engineers will hold a meeting on March 9, 1922, in Stockholm, Sweden, simultaneously with meetings in New York and Washington arranged by the DeLamater Ericsson Tablet Committee. H. F. J. Porter is chairman of the committee, which has headquarters in the Engineering Societies Building, 29 West Thirty-ninth Street, New York.

The 9 and 18-in. mills of the Republic Iron & Steel Co., Hammond, Ind., have resumed operations on single turns.

Chicago

CHICAGO, Nov. 22.

Caution characterizes the attitude of buyers. Notwithstanding the fact that some consumers are increasing their operations, they continue to purchase their needs on a hand-to-mouth basis. Possibly the desire to keep down stocks for inventory purposes accounts for this policy, and it is also likely that an early reduction in freight rates is looked for. With business from general sources slack, railroad car orders promise to bolster up the rolling schedules of the mills during the closing weeks of the year. Only a small percentage of the steel required for cars thus far placed has been ordered, owing to the fact that it ordinarily takes three or four weeks for the carbuilders to work out the specifications in detail. The steel yet to be bought for cars ordered and on inquiry, as well as for car repairs, will be of attractive proportions. Within the past three weeks Western lines have awarded contracts for 7000 new cars; inquiries for from 13,000 to 14,000 freight and refrigerator cars are now in the market, and bids are expected to be asked on 8000 additional. The grand total of 28,000 cars placed and in prospect will call for 280,000 tons of steel and iron, estimating the average requirements per car at 10 tons. Western roads are also preparing to enter the market for rails. The Grand Trunk wants 10,000 tons for its American lines and the budget committee of the Rock Island has given its approval to a program calling for 45,000 tons.

Mills have succeeded in holding their gains in operations. The Illinois Steel Co. has 10 furnaces in blast and is producing steel at the rate of nearly half of ingot capacity. The Inland Steel Co. has increased its operations to 45 per cent of capacity.

Cast-Iron Pipe.—Detroit has rejected bids on 17,000 tons, taken the first of the month. Lincoln Park, Mich., a Detroit suburb, has let 1500 tons to the United States Cast Iron Pipe & Foundry Co. The same maker will furnish 200 tons for West Carrollton, Ohio. Springfield, Ohio, has rejected bids on 900 tons and will readvertise. Montgomery County commissioners, Dayton, Ohio, have let the general contract on work involving 1200 tons, subject to the sale of bonds. Mt. Healthy, Ohio, took bids yesterday on 70 tons.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $47.10 to $48.10; 6-in. and above, $43.10 to $44.10; class A and gas pipe, $4 extra.

Pig Iron.—Although the market is momentarily quiet, evidence of a general increase in consumption is to be found in the fact that the leading merchant producer will blow in a furnace at Mayville about Dec. 1. Although buying has been subnormal throughout the year, the situation has gradually reached the point where the stocks on furnace banks are too small to take care of the current demand. The product of the Iroquois furnace recently blown in is being shipped as rapidly as it is cast. Perhaps no better indication of the improvement which has taken place can be found than the bookings of the leading Northern merchant in November. Thus far this month that interest has sold more tonnage than in any entire month this year. Recent and prospective orders for railroad cars are expected to call for an imposing tonnage in castings. As yet, however, few orders for pig iron to apply against this work have been received. Generally speaking, melters are limiting their purchases to immediate needs, in some cases perhaps because they look for freight rate reductions. Such reductions, if they do come, will not affect furnace costs until late in the spring, when fresh supplies of ore have been received and the present wage agreement with the coal miners expires. The present ruling market on Northern iron appears to range from $20 to $21, base local furnace. Carload and 100 to 200-ton lots are moving at the higher figure, while larger tonnages are being placed at from 50c. to $1 less. In fact, 800 tons of No. 1 foundry for Indiana delivery was sold at a flat price of $20, local furnace, the silicon differential of 50c. having been waived. Practically no sales of Southern iron are reported in this territory, but it appears that no trouble would be experienced in placing orders at $18, base Birmingham. On an inquiry for 1700 tons for Milwaukee delivery, $17.50 has been quoted by at least one furnace. Inquiries for 100 tons of low phosphorus and 100 tons of 10 per cent Bessemer ferrosilicon are before the trade. A Michigan melter is in the market for 1000 tons of foundry.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b., furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50 to $33.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50 to 21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00 to 21.00
Northern high phos	20.00 to 21.00
Southern foundry, sil. 1.75 to 2.25	24.67
Malleable, not over 2.25 sil	20.00 to 21.00
Basic	21.00
Low phos., Birmingham	32.00
Low phos., Eastern furnace, sil. 1 to 2 per cent copper free	34.00
Silvery, sil. 8 per cent	34.82

Railroad Equipment.—The Chicago & Northwestern has issued an inquiry for 50 passenger service cars, divided as follows: Twenty coaches, ten smoking cars, nine baggage, three chair, and eight combination baggage, mail and smoking cars. It has not yet asked for figures on freight equipment, but is expected to do so soon. The Great Northern is in the market for 500 refrigerator cars and 1000 double-sheathed box cars. The Pere Marquette is inquiring for from 500 to 2000 double-sheathed box cars. The Northern Pacific is inquiring for 1200 center constructions and other material for repairing cars in its own shops. The center constructions call for about 1800 tons of steel. The Wabash has let repairs on from 250 to 300 hopper cars to the Western Steel Car & Foundry Co. The Missouri Pacific has awarded repairs on 500 30-ton box cars to the Sheffield Car & Equipment Co. The Illinois Central is expected to close on 2000 gondola cars to-day or to-morrow.

Ferroalloys.—A local consumer is reported to have received a quotation of less than $60 delivered on 50 tons of 50 per cent ferrosilicon.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Bolts and Nuts.—Reports from the automobile industry are not encouraging. On Dec. 15 the leading maker of low-priced cars expects to shut down until the first of the year. The same manufacturer's November output will not exceed 50,000 machines. Jobbers also are less active in the bolt and nut market, probably because they want to keep down their stocks for inventory purposes. While demand is falling off, prices are no weaker and, if anything, steadier than heretofore. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1368.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ⅞ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to ⅞ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4.00 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—Buyers of plain material are experiencing little difficulty in covering their needs at 1.75c., Chicago, and when they have large tonnages to place, they are frequently obtaining quotations of 1.65c. or lower. Fabricating shops appear to be maintaining their operations at the October rate, but new business is less plentiful. Recent lettings included:

Standard Oil Co., 50 stills, Casper, Wyo., 900 tons, to James G. Heggie & Sons.

Oklahoma state highway work, 2200 tons, divided among a number of fabricators.

Masonic Temple, San Antonio, Tex., 1000 tons, to Mosher Steel & Machinery Co., Dallas, Tex.

Powerplant, Fort Worth, Tex., 600 tons, to Mosher Steel & Machinery Co.

Illinois Waterways Commission, eight girder spans, Ottawa, Ill., 263 tons, to Milwaukee Bridge Co.

Two standpipes, New Braunfels, Tex., 233 tons, to Stacey Mfg. Co.

McKeefrey Coal Co., coal tipple, Chestnut Hill, W. Va., 110 tons, to Pittsburgh-Des Moines Steel Co.

Gilmore Coal Mining Co., coal tipple, Venice, Pa., 105 tons, to Pittsburgh-Des Moines Steel Co.

Prospective business includes:

J. L. Taylor Co. Building, Chicago, Munnie & Jensen, architects, 1022 tons.

Roosevelt Building, Indianapolis, Vonnegut & Bohn, architects, 550 tons.

Chicago Union Station, Canal Street viaduct and approach to Monroe Street bridge, 3600 tons.

The mill quotation on plain material ranges from 1.60c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Bars.—With demand diminishing, mild steel bars have settled on a lower price level. Orders are being placed at from 1.60c. to 1.75c., Chicago, depending on the size of the tonnage and the character of the specifications. The automobile industry is steadily reducing its operations and the agricultural implement manufacturers show no signs of life. Railroad car builders are the most liberal buyers. In some cases, they are placing their business at even less than the quotations aforementioned. Several attractive reinforcing bar jobs are in prospect. The Koss Construction Co., Des Moines, Iowa, has the general contract for two bridges at Little Rock, Ark., requiring 1700 tons, which has not yet been placed. The Milwaukee Sewerage Commission will ask bids after Jan. 1 on the sedimentation and aeration tank group of the Jones Island sewage disposal system, involving 5000 tons. An inquiry for 1000 tons for the headhouse of the Chicago Union Station is also expected to be issued the first of the year. The State of Illinois has let highway contracts involving 3000 tons which will probably not be bought until next spring. The Chicago, Burlington & Quincy has bought 150 tons from the Corrugated Bar Co. Demand for bar iron and rail carbon steel bars is little, if any, better than heretofore, and intermittent mill operations are still the rule.

Mill prices are: Mild steel bars, 1.60c. to 1.75c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.65c., mill or Chicago.

Jobbers quote 2.68c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.28c.

Wire Products.—Buying is on a diminishing scale and this is accounted for, in part at least, by the fact that the first of the year is approaching and jobbers wish to keep their inventories as low as possible. Little is heard now of a contemplated advance in prices; on the contrary, the present quotations are not altogether steady. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1368.

We quote warehouse prices f.o.b. Chicago; No. 9 and heavier black annealed wire, $3.55 per 100 lb.; No. 9 and heavier bright basic wire, $3.70 per 100 lb.; common wire nails, $3.65 per 100 lb.; cement coated nails, $3.05 per keg.

Warehouse Prices.—Warehouse prices on deformed reinforcing bars, which have been weak for some time, now appear to be firm at 2.38c. base. Jobbers have also advanced wire and wire nails. No. 9 and heavier black annealed wire has been raised from $3.48 to $3.55. No. 9 and heavier bright basic wire from $3.63 to $3.70 and common wire nails from $3.63 to $3.65. Prices on cement coated nails remain unchanged.

Plates.—A local mill has booked 13,000 tons of plates, shapes and bars for the St. Paul cars to be built by the Haskell & Barker Car Co. The steel for other cars recently ordered has not yet been placed, as it requires some time for the car manufacturers to compute their exact requirements. Additional car inquiries have appeared and the tonnage of steel to be placed for these as well as that still to be bought for cars recently ordered promises to bolster up the rolling schedules of the mills during the holiday season when new business is ordinarily light. Prices have definitely dropped to a lower level. Orders of moderate size are being placed at from 1.65c. to 1.75c., Chicago, while attractive tonnages have gone at 1.60c. and in some instances at $1 or $2 below that price. The variation in going prices is accounted for by the fact that producers are at times willing to make concessions to secure orders with specifications which will fit into existing rolling schedules or to obtain a large tonnage which will tide their mills over until an accumulation of smaller orders has been booked.

The ruling mill quotations range from 1.60c. to 1.75c. Chicago. Jobbers quote 2.78c. for plates out of stock.

Sheets.—Mills have assumed a firmer attitude and are attempting to hold prices to 2.25c. base Pittsburgh, on blue annealed, 3c. on black and 4c. on galvanized.

Mill quotations are 2.90c. to 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.90c. to 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Rails and Track Supplies.—Outside of the New York Central, Pennsylvania and Norfolk & Western, there are few roads which have actually put out inquiries for rails. The Grand Trunk is in the market for 10,000 tons for its American lines and the Rock Island budget calls for 45,000 tons of which, however, no figures have yet been asked. The Illinois Central, the Burlington and the Chicago & Northwestern also expect to buy but have not yet announced the tonnages they will require. There continues to be a fair demand for spikes and bolts with prices on a lower plane. Moderate buying of tie plates has brought out some shading in both the iron and steel products. As low as $37.50 per ton is said to have been quoted on a tonnage of steel tie plates for a Southwestern road.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.20c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Old Material.—The market is generally weaker and prices of a number of grades have declined. Consumptive buying has not developed in volume and sellers have been forced to unload some of their stocks at concessions. A rolling mill bought 1500 tons of No. 1 railroad wrought at $12 delivered, while a car builder purchased about 1000 tons of grate bars and brake shoes at $12.25 and $11.75 respectively per net ton delivered. Railroad offerings include the Rock Island, 6000 tons; the New York Central, a blank list, and the Soo Line, 400 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$17.00 to $17.50
Relaying rails	25.00 to 30.00
Car wheels	17.00 to 17.50
Steel rails, rerolling	14.00 to 14.50
Steel rails, less than 3 ft	13.50 to 14.00
Heavy melting steel	12.25 to 12.75
Frogs, switches and guards cut apart	12.25 to 12.75
Shoveling stetel	11.75 to 12.25
Low phos. heavy melting steel	15.00 to 15.50
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.50 to 9.00
Axle turnings	9.00 to 9.50
	Per Net Ton
Iron angles and splice bars	15.00 to 15.50
Steel angle bars	12.00 to 12.50
Iron arch bars and transoms	15.50 to 16.00
Iron car axles	20.50 to 21.00
Steel car axles	14.00 to 14.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	6.25 to 6.75
Cut forge	11.00 to 11.50
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	11.00 to 11.50
Steel knuckles and couplers	12.75 to 13.25
Coil springs	13.75 to 14.25
No. 1 machinery cast	13.25 to 13.75
No. 1 railroad cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	4.00 to 4.50
Cast borings	6.25 to 6.75
Stove plate	12.50 to 13.00
Grate bars	12.00 to 12.50
Brake shoes	11.75 to 12.25
Railroad malleable	13.00 to 13.50
Agricultural malleable	13.00 to 13.50

The Inland Steel Co., which is converting its heavy structural mill at Indiana Harbor into a rail mill, is installing equipment which will enable it to furnish lengths up to 44 ft. The Standard length of rails is now 33 ft., but the economy of laying longer rails is gaining increasing recognition and each year some of the large railroads are specifying larger tonnages in those lengths. The Inland company is also doubling its splice bar capacity.

New York

NEW YORK, Nov. 22.

Pig Iron.—The market has shown a little more activity than in the preceding two or three weeks. Inquiries include 700 tons for spot delivery for a Connecticut buyer, 500 to 1000 tons from an up-State boiler company for its New Jersey plant, which is for the remainder of this and January delivery, 400 tons for the New York Central for immediate delivery and 1000 tons from another melter whose name was not made public. Prices show little change, but there is some tendency toward weakness, especially in the Buffalo district. The demoralization of the Alabama market has had a rather depressing tendency on the Northern market. It is understood that the recent purchase by a radiator company at Buffalo was on a basis of $18.50, furnace. It seems probable that $20, furnace, can be done on eastern Pennsylvania iron.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	23.02
Buffalo, sil. 1.75 to 2.25	25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16

Finished Iron and Steel.—A lull in buying of steel products now quite marked, is credited in some quarters to the usual year-end watchfulness of inventories, but the expectation of freight rate reductions is elsewhere given even greater weight. It remains that the volume of business is not in keeping with that of a few weeks ago. Inquiries, also have fallen off. A favorable indication is the increasing demands of the railroads for plates, shapes, bars, wheels, axles, tires, etc. While railroad business has not assumed substantial proportions, buying is on a scale not hitherto reached since the war and there is optimism that it will become an increasingly important factor in 1922. Bids will be opened on Friday by the New York Central Railroad on 100,000 to 200,000 tons of heavy rails for 1922 delivery. Oil companies are fairly active and the two largest new inquiries in the market are from this source. An oil company is inquiring for 14,000 tons of pipe for a 225-mile pipe line, there being 160 miles of 8-in. pipe alone; the remainder of the mileage is made up of other sizes. The Texas Co. is in the market for 50,000 boxes of tin plate in oil can sizes. Contracts may be awarded this week for the Catskill aqueduct work, and purchases of 20,000 tons of plates will probably soon follow. Structural steel work has dropped off somewhat, but a large volume of this business is expected to develop early in the new year. Public school construction and other municipal work are expected to become an important feature of steel lettings. Jersey City, N. J., has just authorized the building of six schools which will require 8500 tons of steel. Other work now being bid on follows: 700 tons, mostly plates, for tanks for the Standard Oil Co. of Louisiana; theatre at Paterson, N. J., 300 tons; loft building in West Fortieth Street, New York, 1500 tons. Contracts awarded: High school building at Springfield, Mass., 500 tons, to a local fabricator; power station at Fort Worth, Tex., 600 tons, to a local fabricator; viaduct for city of New York at 134th Street, 350 tons, to Bethlehem Steel Bridge Corporation; building in Brooklyn for Goetz & Co., 300 tons, to a local fabricator; high school building, Washington, D. C., 600 tons, to McClintic-Marshall Co.; bank building in Troy, N. Y., 250 tons to McClintic-Marshall Co.; building for the American Locomotive Co., Schenectady, N. Y., 700 tons to Lackawanna Bridge Co.; bridges at Holyoke, Mass., 300 tons divided equally between Lackawanna Bridge Co. and McClintic-Marshall Co.; school building at Syracuse, N. Y., 350 tons, to McClintic-Marshall Co.; building for Knickerbocker Portland Cement Co., 250 tons, to Pittsburgh Bridge Co.; commercial high school building, Providence, R. I., 650 tons, to McClintic-Marshall Co.; two apartment buildings in New York City, totaling 1100 tons, to George A. Just Co. An Eastern mill has been awarded 800 tons of bars for a concrete ship. Prices are unchanged, but weak. Whereas 1.50c., Pittsburgh, was only occasionally named a few weeks ago on tonnage of especial desirability, this now has become almost the common quotation on plates, shapes and bars from a carload upward. Very little new railroad work has come out within the week. The Buffalo, Rochester & Pittsburgh Railroad has awarded 500 cars for repair to the Buffalo Steel Car Co. The Pressed Steel Car Co. will repair 300 steel cars for the Burlington road and 250 for the Wabash. The American Car & Foundry Co. is reported to have the order for 500 box cars for the Delaware, Lackawanna & Western. Nearly all of the railroads are now standardizing on copper-bearing plates for cars for rust resisting qualities. The cost is only about $3 a ton above that of ordinary tank steel.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.80c. to 1.88c.; plates, 1.88c. to 2.03c.; structural shapes, 1.88c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Ferroalloys.—The ferromanganese market is exceedingly quiet with the demand confined to small and carload lots for which $58.35, seaboard, has been obtained, the sales including both British and American alloy. It is not known to what extent the leading steel producer is a seller at $58 to $62, delivered, Pittsburgh district. Business in spiegeleisen is also confined to small lots at regular quotations. The manganese ore market is flat with quotations nominal. There have been sales of a few carload lots of 50 per cent ferrosilicon at about $60 per ton, delivered. It is the general belief that any weakly held or resale metal, recently available under this price, has been absorbed and that $60 represents the minimum of the present market. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $61.00
Ferromanganese, British, seaboard, per ton.	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton..	$60.00
Ferrotungsten, per lb. of contained metal.	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered.	10c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.50 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard....	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Warehouse Business.—Business in this district has dropped back to almost the same basis as prevailed during the exceedingly dull months of June, July and part of August. Prices are weak and although no reductions are as yet recorded, warehouses believe that lower quotations on some products are imminent. In accordance with recent reductions on iron and steel bars, structural material and plates, tire steel, smooth and iron finish, has been reduced by warehouses 10c. per 100 lb. to 2.65c. and 2.85c. per lb. and toe calk steel is down 10c. to 3.35c. per lb. Spelter and sheet zinc are extremely weak and will doubtless show a reduction next week. The brass and copper market continues fairly stable in price. Dealers in wrought iron and steel pipe report business dull with no prospect of revival before spring.

High Speed Steel.—The market continues unchanged from week to week. Producers continue to quote 90c. per lb. for 18 per cent tungsten high speed steel but report little business possible at any price.

Cast-Iron Pipe.—Business is brisker than normal for this season of the year. The continuance of mild weather is responsible for continued buying, as pipe lines are still being laid. Most of the orders are for small sizes though the 6700-ton inquiry from Syracuse, N. Y., bids for which will be opened Dec. 5, will provide business in the larger sizes, 36-in. pipe being required in this instance. Principal competition for this order will lie among three producers. A prominent oil company which has been dormant in purchasing, has begun to ask for flanged pipe. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Coke.—Foundry coke ranges from $4.25 to $4.50, Connellsville base, though some brands are offered at

$4. Producers refuse to quote for 1922 delivery, though it is expected they will about the middle of December.

Old Material.—For the first time in many weeks, the market shows a decided softness and prices of several items have declined. One of the big Pittsburgh consumers has stopped buying. Another mill has its railroad yards congested and refuses to take more. A broker in New York gives his buyers the following instructions: "Do not under any circumstances exceed [the prices he quotes] as the market shows signs of softening. We believe that conditions are going to be dull over the rest of the year. Make all contracts cover shipments within 30 days."

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$8.00 to $8.50
Steel rails, short lengths, or equivalent	9.50 to 10.00
Rerolling rails	11.00 to 11.50
Relaying rails, nominal	30.00 to 35.00
Steel car axles	12.00 to 12.50
Iron car axles	21.00 to 21.50
No. 1 railroad wrought	12.00 to 12.50
Wrought iron track	9.50 to 10.00
Forge fire	5.50 to 6.00
No. 1 yard wrought, long	9.50 to 10.00
Light iron	4.50 to 5.00
Cast borings (clean)	6.50 to 7.00
Machine-shop turnings	4.50 to 5.00
Mixed borings and turnings	4.50 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.25 to 8.75
Stove plate	10.50 to 11.00
Locomotive grate bars	10.50 to 11.00
Malleable cast (railroad)	9.00 to 9.50
Car wheels	11.50 to 12.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to 17.00
No. 1 heavy cast, not cupola size	16.00 to 16.50
No. 2 cast (radiators, cast boilers, etc.)	10.50 to 11.00

Boston

BOSTON, Nov. 22.

Pig Iron.—The market for domestic iron has lapsed into inactivity once more, the estimated sales for the week amounting to not more than 900 tons of No. 2X and No. 1X. The largest inquiry this week is for 450 tons, silicon 2.25 to 2.75, November and December shipment, from a Rhode Island foundry, which is not covered. Among sales reported is one of 500 tons French iron, silicon 2.25 to 2.75, with high phosphorus, to a Massachusetts foundry at a little more than $19 on dock, Boston, or approximately $23 delivered, and a smaller tonnage on the same dock basis to another melter. Buffalo iron, with silicon differentials disregarded, is offered at $19, furnace, or 25c. a ton lower than during the previous week, in one instance to a foundry with a $5.18 freight or $24.18 delivered. It develops that part of the Buffalo iron sold a week ago to an eastern Massachusetts melter is to be shipped via the Boston & Maine Railroad making the delivered price $24.68, as against $24.96 delivered on the regular Buffalo freight rate. No. 2X eastern Pennsylvania sold this week in car and larger lots at $20 and $20.50, furnace, while practically all No. 1X sold brought $21. Scattered small tonnages of Virginia were taken at $24.50, furnace, for No. 2X or $24, base, but iron is obtainable at $23, base. High freights continue to eliminate Alabama iron in competition with Buffalo and eastern Pennsylvania. To compete with Buffalo at $19, furnace base, Alabama with a $10.66 freight would have to sell at $8.34, furnace base. The continued lack of interest among New England foundries in No. 2 plain iron is a market feature.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75	$24.56 to $25.06
East. Penn., silicon 1.75 to 2.25	24.06 to 24.56
Buffalo, silicon 2.25 to 2.75	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25	24.46 to 25.46
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Finished Steel.—No round tonnages of structural steel are reported placed this week. Buying of plates is in small tonnages, but there are plenty of orders. The price on ruling orders is 1.60c., Pittsburgh, but 1.65c. has been done, while 1.55c. was recently met on some tonnage. In connection with the plate market, it is interesting to note that New England steel yacht builders have more business on their books and in prospect than since before the war.

Warehouse Business.—Local quotations on steel bands over 6 in. wide and ⅛ and 3/16 in. thick are unchanged, but on all other sizes of bands as well as on hoop steel are 15c. per 100 lb. lower. Soft steel bars, flats, plates, structural steel and all reinforcing bars, with the exception of deformed in stock lengths, as well as refined iron, have been dropped 10c. per 100 lb. Deformed bars in stock lengths are 5c. higher. The readjustment in prices has resulted in a freer movement of iron and steel out of warehouses, but the market is a long way from active. Reports that certain jobbers are underselling the bolt and nut market have cropped up again. No large buying orders are coming into the market and concessions consequently are made on small lots. Most stocks of nails are working down to a point where business will have to be placed with the mills for early 1922 delivery.

Jobbers now quote: Soft steel bars, $2.71½ per 100 lb. base; flats, $3.21½; concrete bars, $2.20 to $2.71½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.31½ to $3.78; steel hoops, $3.31½; toe calk steel, $5; cold rolled steel, $3.75 to $4.25; structural steel, $2.71½; plates, $2.81½ to $2.99; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.71½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Coke.—The movement of foundry coke from New England by-product ovens to consuming points is less active than noted a week ago. Consumption at heater, stove and textile manufacturing plants is about normal, but the average daily melt of commercial foundries does not increase noticeably. Any increase in coke output at New England by-product ovens is due to domestic and commercial requirements rather than foundry. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to accept first half 1922 contracts at prices ruling date of shipment. For November delivery, both companies quote on a basis of $10.66, delivered where the local freight rate does not exceed $3.40. No new developments in the freight rate situation are reported this week.

Old Material.—Although not active, more and a greater variety of old material changed hands during the early part of the week than previously noted in some time. Since then, however, business has slackened. The freer movement was due largely to greater willingness on the part of holders to let go at buyers' prices. As a result, machinery cast is about $1 lower, with prevailing sales at or about $18.50 to $19 delivered, several hundred tons changing hands. Car-lots of stove plate brought $16 delivered, but that price to-day represents the extreme on extra good stock. The top price paid by horseshoe manufacturers for railroad malleable is slightly under $15 delivered, but the market to-day is $1 lower. A Connecticut foundry wants 150 tons. An advance of 75c. or $7 was paid for extra chemical borings, and rolling mill borings are all of 50c. higher. Both grades are scarce. Choice machine shop turnings sold at $10.25 delivered Pennsylvania, or $5.25 shipping point. Sellers apparently have no trouble in getting $4.50 for ordinary turnings. Coatesville buying of forged scrap at $10.50 delivered is over. Heavy melting steel is firmer. Dealers are reluctant to let go, however, consequently the movement is limited. Car-lots of cotton ties sold at $11 and $11.50 delivered eastern Pennsylvania, while horseshoes brought better than $17.

The following are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.00 to $19.00
No. 2 machinery cast	16.00 to 17.00
Stove plate	15.50 to 16.00
Railroad malleable	13.50 to 14.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to $8.25
No. 1 railroad wrought	12.50 to 13.00
No. 1 yard wrought	10.50 to 11.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	4.00 to 4.50
Cast iron borings, rolling mill	5.50 to 6.25
Cast iron borings, chemical	6.50 to 6.75
Blast furnace borings and turnings	3.50 to 4.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	11.50 to 12.00
Car wheels	11.00 to 12.00
Rerolling rails	10.50 to 11.00

St. Louis

ST. LOUIS, Nov. 22.

Pig Iron.—Three sets of prices were being made on Northern pig iron in this market last week. Brokers who the previous week were holding firm at $21, f.o.b. Chicago, were offering their holdings at $20, Chicago, and some sales were made on that basis. Furnaces were holding their iron for $21—that is, most of them were, while one of the largest producers in the Chicago district was asking $22 and getting it. Southern pig iron is freely quoted at $18, furnace, and some sales have been made at $17.50 on firm offers. The market is rather quiet, and outside of several sales of 500 tons each, there has been nothing of consequence since the purchase by the Scullin Steel Co. of 4000 tons of basic, which was evenly divided between a local furnace and a Chicago producer. An Illinois melter is looking for from 500 to 700 tons of malleable and 1000 to 1500 tons of foundry for first quarter, and an Iowa melter wants 500 tons of foundry. The resumption of operations by the American Steel Foundries at East St. Louis, which started one of its four furnaces after having been down since March, and the increasing of operations at the Scullin Steel Co. from five to six days are regarded as hopeful signs, both plants having received orders for castings from the railroads. There was a fair run of carload orders during the week.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$21.88 to $23.88
Northern malleable, sil. 1.75 to 2.25	21.88 to 23.88
Basic	21.88 to 23.88
Southern foundry, sil. 1.75 to 2.25	23.91

Finished Iron and Steel.—No additional inquiries for material were gotten out by the railroads last week, but some purchases were made. The St. Louis & San Francisco entered an order for 300 car wheels, while the Missouri, Kansas & Texas bought about 300 tons of plates and shapes. Continued activity is reported in the oil fields. The Magnolia Petroleum Co. bought 30 55,000-bbl. tanks, involving about 4000 tons of steel, for the Mexia (Tex.) field, dividing the order as follows: Five each to Warren City Tank & Boiler Co., Warren, Ohio; Reeves Brothers, Pittsburgh; Mount Cooper Boiler Works, Tulsa, Okla.; seven to Petroleum Iron Works, Sharon, Pa.; three each to Phoenix Iron Works, Meadville, Pa., and Union Iron Works, Kansas City, and two to the Graver Corporation, Chicago. Ability to make quick shipment was the governing factor in the placing of these orders. The Sinclair Oil Co. has bought for the Oklahoma fields 11 tanks of 80,000-bbl. capacity each, and four tanks of 55,000-bbl. capacity each, from the Phoenix Iron Works, Meadville, Pa. The contract for three of the four bridges to be built at Muskogee for the Oklahoma State Highway Commission was awarded to the Pioneer Construction Co., Kansas City, the other going to the Midland Bridge Co., Kansas City, in conjunction with the Clinton Bridge Co., Clinton, Iowa. The whole job involves 2200 tons of reinforcing bars. Bids were opened at Little Rock, Ark., for two concrete bridges, involving 1500 tons of bars, but the award was deferred for a week. Recently a Dallas jobber sent out an inquiry for 700 tons of bars, but this is off, as the job for which the bars were intended has been abandoned. The Truscon Steel Co. has received the order for 100 tons of bars to be used in the Shriners' temple in Springfield, Mo. All activity in structural steel in St. Louis has been temporarily set aside pending an adjustment of the wage situation, and conferences to that end are now being held by union labor and the master builders.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—Foundry coke is in light demand, the market ranging from $4.25 to $5 for Connellsville 72-hour foundry coke, with possibly some coke on the market for $4. Mild weather, together with the congestion at terminals, has slowed up the movement of domestic coke. The congestion was brought about by shipments in anticipation of railroad and miners' strikes.

Old Material.—The market for old material is weak and sluggish and very little material is moving in this district. Consumers are showing but slight interest in the market, and are not booking any tonnages except odd lots at bargain prices. The fact that the American Steel Foundries has lighted up one furnace in its East St. Louis plant may help the situation in the immediate future, but to-day old material is a drug on the market and about the only trading is among dealers themselves. Railroad offerings continue heavy, and as dealers are not willing to lay down additional tonnages at present levels, prices are declining and the market is weak and spotty. Relaying rails are being offered more freely and are quoted considerably lower. Current railroad offerings include: Chicago, Rock Island & Pacific, 5200 tons; Chicago Great Western, 300 tons; Chicago & Alton, 1250 tons, and Texas & Pacific, 800 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$15.50 to $16.00
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard section	25.00 to 30.00
Cast iron car wheels	15.00 to 15.50
No. 1 heavy railroad melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	10.50 to 11.00
Ordinary shoveling steel	10.00 to 10.50
Frogs, switches and guards cut apart	11.00 to 11.50
Ordinary bundle sheet	4.00 to 4.50
Per Net Ton	
Heavy axles and tire turnings	$6.50 to $7.00
Iron angle bars	13.00 to 13.50
Steel angle bars	10.00 to 10.50
Iron car axles	20.00 to 21.00
Steel car axles	14.00 to 14.50
Wrought iron arch bars and transoms	15.00 to 15.50
No. 1 railroad wrot	10.50 to 11.00
No. 2 railroad wrot	9.50 to 10.00
Railroad springs	11.50 to 12.00
Steel couplers and knuckles	11.50 to 12.00
Locomotive tires 42 lb. and over, smooth inside	9.50 to 10.00
No. 1 dealers forge	9.00 to 9.50
Cast iron borings	6.50 to 7.00
No. 1 busheling	10.00 to 10.50
No. 1 boilers cut in sheets and rings	8.00 to 8.50
No. 1 railroad cast	14.50 to 15.00
Stove plate and light cast	12.50 to 13.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.50 to 10.00
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	6.50 to 7.00
Light railroad sheet	4.50 to 5.00
Railroad grate bars	10.00 to 10.50
Machine shop turnings	6.00 to 6.50
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	8.50 to 9.00
Horse shoes	11.00 to 11.50
Railroad brake shoes	9.50 to 10.00

Cleveland

CLEVELAND, Nov. 22.

Iron Ore.—The close of the ore shipping season has been delayed owing to the fact that a Chicago district consumer has decided to take two additional cargoes of ore, and a third cargo of unsold ore will be brought down this week and placed on the Lake Erie dock. All the upper lake docks, with two exceptions, are through shipping for the season, and the remaining cargoes will be sent down during the present week.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—There is little activity in the market and prices are weak although there is a disposition among sellers not to go below $20 on foundry iron. However, on an inquiry from an Ohio foundry for 300 tons a lake furnace quoted on a basis of $19.50, Valley, but did not get the order. In this case another furnace had a slight advantage in the freight rate. The only order of any size placed during the week was 2000 tons of malleable iron purchased at $20 by a southwestern Ohio melter from a lake furnace for delivery extending through two or three months of next year. The purchaser is engaged largely in railroad work and the purchase of this iron is attributed to some recent orders for railroad car castings. The same seller booked orders for 1300 tons of foundry iron in small lots. Another

producer sold 1500 tons in small lots. With furnaces located in the Valley district the market appears to have settled down to $20.50 for foundry iron and a limited tonnage has been booked at that price. For Cleveland delivery quotations by local furnaces are unchanged at $20.50 to $21.00, at furnace. However, for outside shipment, the common quotation by lake furnaces is $20. Some sellers report a slight improvement in inquiry but none of the inquiries involves tonnages of any size. A few inquiries have come out for foundry iron for the first quarter, but furnaces have, so far, declined to quote for that delivery. Shipments on the whole continue very light owing to the fact that many consumers anticipated shipments in October when a general railroad strike was threatened. Shipments by some makers will fall 50 per cent or more below those of October.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.00 to 21.00
Southern fdy., sil. 2.25 to 2.75	25.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	34.00 to 35.00

Semi-Finished Steel.—Mills are placing small lot orders for sheet bars at $30 and efforts to get $32 seem to have disappeared. Slabs are quoted at $29.

Finished Iron and Steel.—The market generally is quiet and there seems to be a tendency toward further weakness in prices. However, a few bright spots are appearing. Two implement manufacturers in this territory have booked a good volume of business and have purchased several hundred tons of steel, mostly in bars. A local tractor company has taken a fair volume of business and a Cleveland manufacturer of motor trucks reports an improved demand for small trucks. Buyers are still pressing the mills for lower prices and there are unconfirmed reports of prices lower than 1.50c. on steel bars and plates. Sellers attribute these reports to a disposal of resale material at prices lower than mills will quote. A Youngstown consumer is reported to have purchased 2000 tons of Government steel in plates, shapes and bars for shipment from the East at prices ranging from 1.10c. to 1.25c. The more general quotations on steel bars are 1.50c. to 1.55c., but some small orders are being taken at 1.60c. The more common quotation on plates and structural material is 1.60c., but desirable orders are bringing out a 1.50c. price. A local plate mill has gone back to the 1.75c. price. The contract for the Baldwin reservoir, Cleveland, has been given to the Strange & Walsh Construction Co., Washington, which will shortly place an order for the steel for this work. With a change in the plans, the amount of steel required has been increased to 2750 tons of twisted square soft steel bars. In structural lines, the Bethlehem Bridge Co. has taken 1600 tons of structural material for the Fort Street bascule bridge, Detroit, and the J. E. Moss Iron Works, Wheeling, has taken 1800 tons for an office and theater building in Canton, Ohio. Local fabricating shops are fairly busy on small work. The sintering plant for the McKinney Steel Co., Cleveland, will require 700 tons of structural material. Cleveland companies have quoted on an ore handling bridge requiring 500 tons of steel, mostly plates, and bids for the Lakewood market house, Cleveland, requiring 125 tons, are being asked for. The Illinois Central Railroad will rebuild its bridge at Cairo, Ill., in order to provide double tracks, and this will involve an estimated expenditure of three or four million dollars. An Ohio boiler shop has placed 1200 tons of plates, sheets and bars. A few inquiries have come out for steel for next year's delivery on which mills have declined to quote, but some material has been booked for January requirements.

Jobbers quote steel bars, 2.54c.; plates and structural shapes, 2.64c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.14c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Hoops and Bands.—Marked weakness has developed in quotations on hoops and bands by some of the independent mills. Price concessions of $3 a ton to 2.10c. are being made on 3-in. and narrower sections and on wider bands quotations as low as 1.75c. are reported.

Sheets.—Efforts are again being made to stiffen up sheet prices, several independent mills that have been naming lower prices have announced that they will adhere to 3c. for black, 4c. for galvanized and 2.50c. for blue annealed sheets. However, one Valley mill is quoting blue annealed sheets at 2.25c. for all gages and a Cleveland mill is naming that price for the heavier gages. New orders are very light.

Warehouse Business.—Warehouse orders are lighter than they have been, except on sheets, for which the demand is holding up fairly well. Prices are unchanged.

Bolts, Nuts and Rivets.—The demand for rivets improved during the week. Several orders were placed with a Cleveland maker in lots up to 100 tons. These orders came from railroad boiler and tank shops. Local prices are unchanged at 2.40c. for structural rivets and 2.50c. for boiler rivets. The demand for bolts and nuts is not active and no change has developed in the price situation.

Coke.—Foundries have good stocks of coke purchased last month when there was a possibility of a railroad strike and virtually no business is being placed. Prices are unchanged at from $4.25 to $4.75 for standard Connellsville foundry coke.

Old Material.—With the recent slackening in the demand, the market is weak and quotations on several grades are lower. A Cleveland consumer, during the week, purchased a few hundred tons of shoveling turnings at $8.50, but with this exception, no buying is reported by consumers. Trading between dealers is very light as most of the dealers are long on the grades of scrap for which they have recently booked orders. Sales to dealers during the week are reported at $14.35 to $14.50 for heavy melting steel for Youngstown delivery, at $10.50 for borings and $10.25 for shoveling turnings for Canton delivery, and $11.00 for shoveling turnings for Weirton delivery.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$11.75 to $12.00
Steel rails, under 3 ft	12.75 to 13.00
Steel rails, rerolling	13.50 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	8.00 to 8.25
Machine shop borings	6.75 to 7.25
Mixed borings and short turnings	8.00 to 8.50
Compressed steel	9.50 to 10.00
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	7.00 to 7.50
Steel axle turnings	10.00 to 10.50
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in.	7.50 to 8.00
Drop forge flashings, under 10 in.	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

Birmingham

BIRMINGHAM, ALA., Nov. 22.

Pig Iron.—Birmingham iron has not been weaker in months following the proffer of tonnages overdue customers at what they would bring in the open market. After a faint effort to keep the market at $19, surrender was made and sales of carloads were made at $18.50 as a rule before week ended. This means a base of $18 for real tonnage. Silicons have been sacrificed. Where a deal has been made by brokers, the net base has been under $18, but, as a general proposition, the market is at $18 to $18.50, depending on tonnage and character of offer. No large tonnage followed the break in prices. Following the booking of a few lots of 1000 and 500 tons, orders were confined to a small tonnages. The larger lots were sold early in the price-cutting. Inquiry for 1922 is not active and sales into next year have not been large. One maker has booked about 1500 and two others about 4000 tons each for first quarter to regular customers. Consumers seem satisfied with the situation and will not buy 1922 iron unless guarantee against price recession is made. That is declined. On the other hand, the movement from

furnaces direct as well as yards seems to continue at about the pace of the past several months even with the added make. The largest active interest is among those piling no stocks. Very little business is being done outside the South. The large pipe melt absorbs the greater portion of the production. Makers look for continued dullness until the first of the year.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$18.00 to $18.50
Basic	17.50 to 18.00
Charcoal, warm blast	35.00

Finishing Mills.—The Tennessee company remains at 55 per cent of production with its rail mill and car works among the active plants and five of the nine open hearths producing. Over 2000 tons of rails and 300 tons of track accessories went to Japan out of Mobile last week and there was a shipment of 500 tons of wire mill products to the Dominican Republic. The Tennessee company is receiving 7000 tons of manganese ore from Brazil by barges up the Warrior River from Mobile. Wire mills are at 70 per cent capacity, but demand has eased off on account of lower cotton prices. Structural steel is active. Sheets are no longer active owing to the slump in cotton.

Cast Iron Pipe.—The National Cast Iron Pipe Co. remains at capacity and American Cast Iron Pipe Co. is doing well, recent orders including 2000 tons for Parsons, Kan. The base remains at $34 for high pressure pipe. Orders on books will carry the plants well toward the end of the year. Sanitary pipe continues to ease up, but there also order books are good until the end of the year. No 1922 buying is heard of in the sanitary pipe market. The base remains at $40 with most makers.

Old Material.—Old material is droopy. Even cast scrap is weak for the time being. Very little attempt is made at business.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Buffalo

BUFFALO, Nov. 22.

Pig Iron.—Some business for first quarter delivery 1922 has been placed, but the disinclination on the part of buyers to refrain from future booking is shared by producers as well. Increased furnace operation is not indicative of a lively market and the fact that one seller has just blown in a second furnace and plans on blowing in a third as soon as it can be prepared is not conclusive evidence of better business in steel products. This interest will have three furnaces in blast before Dec. 1; one going on foundry iron and the others on basic. The production of foundry iron from this furnace has been sold and practical withdrawal as sellers is close to hand—for the remainder of this year at least. As a general proposition, inquiry has fallen off. One furnace has 3200 tons inquired for and sales of about 3000 tons. This business was scattered and $20 base price prevailed. While nothing definite relative to the New York vehicular tunnel work is at hand, local furnaces are manifesting greater interest in this possibility and when bids are called for, it is likely the five producers will compete. One furnace is out of the market until February, 1922.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.00
No. 2X foundry, 2.25 to 2.75 sil.	19.50
No. 2 plain, 1.75 to 2.25 sil.	19.00
Basic	21.00
Malleable	21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—Out of all the factors in steel products but one has found improvement, and this interest has done considerable business. By way of comparison—more tonnage has been booked in November than any month this year and by virtue of a number of new orders, various departments now down or barely going, will show increased operation. Bars are quiet, but plates and shapes have been placed in fair proportion. Prospect of rail business is good and a portion of the 100,000 to 200,000-ton order which the New York Central railroad is expected to place soon, is expected here. One interest has taken an order for 2500 tons of sheet piling for delivery in the South. Wire business shows slight improvement and the capacity of the leading wire maker is now about 70 per cent of normal. Carload lots of bars (25 tons) feature the business with a bar maker. Pipe business maintains a healthy stride and one agency has taken an order for 1300 tons for delivery to a central New York automobile accessory maker. This is 6-in. material and all of one length. The 250 ton bolt and nut order previously referred to has been awarded to a local bolt maker. The Merchants' Despatch of Rochester has awarded the contract for 1000 tons of shapes for new buildings to the Kellogg Structural Steel Co., Buffalo. The general contract for the National Biscuit Co.'s addition to the Buffalo plant has been given to the Thompson-Starrett Co., New York, but the structural requirements have not been placed. On city viaduct work in Buffalo, mentioned in last week's issue of THE IRON AGE, about 2000 tons of shapes will be used.

Warehouse Business.—One peculiar feature of this branch is that the latter half of each month shows a greater volume of business than the first half, but no explanation has been arrived at by warehouses. Some improvement is manifested, particularly in sheets and shafting. Favorable weather conditions have served to bring out a fair volume of structural orders and material for car work is in demand.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.80c.; plates, 2.80c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.70c.; hoops and bands, 3.30c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.80c.

Coke.—Prices are weaker and inquiry has fallen off. Best grades now range from $4.25 to $4.75, f.o.b., ovens. The Donner-Union Coke Co. has just put in another unit and 100 ovens out of a total of 150 are now in service.

Old Material.—Some sales have been made, but the general quietness is still apparent. Prices are so unsettled that a sale of but a few hundred tons determines the price in that particular commodity. Dealers are not anxious to sell any sizable tonnages, preferring to hold stocks than take the small margin of profit possible. Scrap production is light and the only steel offered is by the railroads.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

Increased Activity of Carnegie Blast Furnaces

PITTSBURGH, Nov. 22.—The Carnegie Steel Co. tomorrow will start making iron at three additional furnaces, two stacks at the Mingo Junction, Ohio, works, which have been warming up go on tomorrow, while the other addition to the active list is in the Carrie group at Rankin, Pa. These furnaces will bring the total number active to 25, the distribution being five Carrie, five Ohio, five Edgar Thomson, four Duquesne, three Newcastle, two Mingo and one Lucy. The second furnace at the Schoenberger works of the American Steel & Wire Co. recently was blown in, making three of the four stacks of that company now in blast. Of the 140 merchant and steel works furnaces in this and nearby districts, 52 now are active.

Cincinnati

CINCINNATI, Nov. 22.

Pig Iron.—The local market was unusually quiet during the week, carload sales predominating, and these only being made occasionally. One of the largest sales reported was for 150 tons to a central Ohio melter, at $20, Northern furnace. A local melter took 100 tons and the Louisville & Nashville Railroad is reported to have closed on 300 tons of Southern, the order being placed direct with a furnace on an $18 base. Some Virginia iron was reported sold to pipe companies operating in that State, the tonnage amounting to 800. There are few inquiries and these mostly come from other districts. A Columbus inquiry is for 100 tons of foundry and a Detroit melter wants 500 tons of Bessemer. Prices are unchanged from all districts, $20 being the usual quotations from Northern furnaces, with silicon differentials being freely given away. In the South, reports of $17.50 are heard, but no confirmation can be secured locally.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$22.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	23.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	$22.52 to 23.52
Basic, Northern	22.02
Malleable	23.52

Finished Material.—Carload business is the main activity in finished materials. The market on bars, shapes and plates continues around 1.60c. for the small orders being booked, although it is said that 1.50c. could easily be done on a sizable tonnage. On sheets 2.75c. and 3.75c. are the prevailing quotations for black and galvanized respectively. Wire and wire products are moving fairly well, but the response to intimations that price advances might be made has been rather disappointing and it is expected that these advances will not materialize for some time at least. There has been a little activity in the structural field. The Pure Oil Co., Columbus, Ohio, let nine storage tanks to the Warren City Boiler & Tank Works, at Warren, Ohio. It is understood that about 1200 tons of steel is involved. The American Bridge Co. was low bidder on 600 tons of steel for dams No. 30 and 32 on the Ohio River. Bids on an addition to the power plant of Ohio State University at Columbus, and also for several dormitories closed on Nov. 18. E. Elford, 307 East Gay Street, Columbus, was low bidder on the buildings and the Brown Hoisting Machinery Co. was awarded the contract for the erection of the coal bunker. About 400 tons was involved. The plans for the Business Men's Club, Cincinnati, will likely be submitted to contractors early in the new year. Plant operations will remain about the same during the coming week, although the Ashland Iron & Mining Co. is now operating its plant at about 50 per cent capacity. The Ashland Steel Co., it is expected, will also resume operations during the coming week.

Warehouse Business.—Local jobbers reduced their prices during the week an average of about $2 a ton on bars, shapes and plates. Sheets and wire products were not affected. Business continues spotty, some days developing fair orders. Jobbers are now quoting:

Iron and steel bars, 2.90c. base; hoops and bands, 3.50c. base; shapes and plates, 3c. base; reinforcing bars, 2.97½c. base; cold rolled rounds, 1½-in. and larger, 3.70c.; under 1½-in., and flats, squares and hexagons, 4.20c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3 per 100 lb.

Coke.—There is practically no activity in the coke market, and prices are inclined to be weaker. Connellsville furnace coke is quoted at $3 and foundry at $4 to $4.50. Wise County furnace is quoted at $3.75 to $4.50 and foundry at $5.50 to $6. New River foundry is quoted at $7.58.

Old Material.—The scrap market is practically at a standstill. Consumers are waiting for lower prices, but there is a tendency on the part of dealers to hold materials for a better market. There was some activity in the early part of the week, but this soon subsided. Prices, while quotably unchanged, are weaker.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton

Bundled sheets	$4.50 to $5.50
Iron rails	12.50 to 13.00
Relaying rails, 50 lb. and up	25.50 to 26.50
Rerolling steel rails	11.00 to 12.00
Heavy melting steel	9.50 to 10.00
Steel rails for melting	9.50 to 10.50
Car wheels	12.50 to 13.50

Per Net Ton

No. 1 railroad wrought	9.00 to 10.00
Cast borings	3.50 to 4.00
Steel turnings	2.50 to 3.00
Railroad cast	12.50 to 13.00
No. 1 machinery	14.00 to 15.00
Burnt scrap	8.00 to 9.00
Iron axles	16.00 to 17.00
Locomotive tires (smooth inside)	10.00 to 10.50
Pipes and flues	4.50 to 5.50

Philadelphia

PHILADELPHIA, Nov. 22.

A slackening in business has become pronounced within the past week or 10 days. This is variously ascribed to year-end watchfulness over inventories, expectation of freight rate reductions, instability of prices and also to some degree of fear that the high-tax bill passed at Washington will have a deterring effect on business expansion. Possibly all of these factors are to some extent responsible for the slump in buying, but a majority of opinions favor the approach of the annual inventory period as the chief factor.

Steel prices continue very weak. Plates, shapes and bars have all dipped below 1.50c., Pittsburgh, on some transactions, though the general market on these major products is still quotable at 1.50c. Efforts to maintain the higher levels on sheets have apparently been abandoned; blue annealed sheets are being offered freely at 2.25c., Pittsburgh, and 3c. on black and 4c. on galvanized are quite commonly shaded. The pig iron market is also weak, though prices are not quotably lower in this district. Sales for shipment to New England and the New York district have been made, however, by eastern Pennsylvania furnaces at slight concessions to meet competition of Buffalo furnaces, which are naming $19 on No. 2 plain.

Pig Iron.—A sale of 6000 tons of basic iron is the only transaction of importance recorded during the past week. The price was $20, furnace, which is in line with other recent sales of this grade of iron. Demand for foundry iron is extremely light, sales being confined mostly to carloads or 100 tons, and there are few of these small sales. The market has an undertone of weakness, though prices have not actually changed so far as this district is concerned. In competition with $19 Buffalo iron, one or two eastern Pennsylvania furnaces have made slight concessions on New England business. Despite the lack of demand, more iron is soon to be made in this district. The Robesonia furnace has blown in again on foundry after repairs to its lining. The Brooke furnace will probably be put in blast about Dec. 1 and the Thomas Iron Co. is expecting to blow in its Alburtis furnace shortly. There is no pressure either to buy or sell first quarter iron. A few sales have been made for that delivery at approximately present prices. No. 2 plain iron is generally quoted at $21, furnace, No. 2X at $22 and No. 1X at $23. There is little or no inquiry for low phosphorus, malleable and gray forge grades.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.90 to $22.54
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.84 to 23.54
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	21.00 to 21.50
Gray forge	22.50 to 23.00
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Coke.—Weakness in coke prices is noted. Distress furnace coke has been offered at $2.75, Connellsville, for prompt shipment. Other offers of $3 coke have been made for early shipment, while $3.25 has been quoted for first quarter and $3.50 for all of first half.

Ferroalloys.—Domestic producers continue firm in their quotation of $58.35, seaboard, for standard ferromanganese, this also being the quotation of British agents. There is very little business. Spiegeleisen is nominal at $25 to $27, furnace.

Plates.—The plate market is decidedly weak. An order of ordinary attractiveness commands a price at least as low as 1.50c., Pittsburgh, while the larger tonnages have brought out quotations a shade under this. Eastern plate manufacturers say that it costs them at least 1.75c., Pittsburgh, per lb. They are at a loss to predict when there will be a turn in the market for the better. Some of the mills now operating may shut down for two or three weeks next month. The Sun Shipbuilding Co. will build two car ferries for the Pennsylvania Railroad, requiring about 1500 to 2000 tons of steel, which is reported to have been placed with a Pittsburgh mill.

Structural Material.—The market is quiet and prices are weak. Although ordinary lots are seldom sold below 1.60c., Pittsburgh, larger tonnages have been sold at 1.50c., Pittsburgh, and this latter price is said to have been shaded in a few exceptional instances.

Bars.—Merchant steel bars are being sold at a variety of prices ranging from 1.50c. to 1.65c., Pittsburgh, the lower price usually applying to fairly large tonnages of concrete reinforcing steel. The demand has slackened in the past week. Bar iron is quiet and 1.60c., Pittsburgh, is the nominal price, though attractive business, which is now lacking, would probably bring out concessions.

Sheets.—Some sheet mills are now freely quoting 2.25c., Pittsburgh, on blue annealed, while black sheets are being offered at prices ranging from 2.75c. to 3c. and galvanized at 3.75c. to 4c., Pittsburgh.

Old Material.—The scrap market, which has shown an appearance of strength for some weeks, took a decided slump last week when larger offerings were made by dealers. Early in the week $15 was paid for steel for Johnstown. Later this price was reduced to $14.50 and later all offers were withdrawn. Weakness in the Pittsburgh market was directly responsible for the reaction here. Prices on some grades are slightly lower. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$12.00 to $13.00
Scrap rail	12.00 to 13.00
Steel rails, rerolling	16.50 to 17.00
No. 1 low phos., heavy 0.04 and under.	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.50 to 16.00
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.00 to 11.00
Bundled sheets (for steel works)	10.00 to 11.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.50 to 10.00
Heavy axle turnings (or equivalent)	10.00 to 10.50
Cast borings (for rolling mills)	11.00 to 12.00
Cast borings (for chemical plants)	12.50 to 13.00
No. 1 cast	17.50 to 18.50
Railroad grate bars	14.50 to 15.00
Stove plate (for steel plant use)	14.50 to 15.00
Railroad malleable	14.50 to 15.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Iron car axles	No market
Steel car axles	No market

Rivets.—Marked weakness in rivets has developed. Quotations as low as 2.10c., Pittsburgh, for structural quality and 2.20c., Pittsburgh, for boiler quality have appeared.

Billets.—Open hearth rerolling billets have been quoted as low as $28, Pittsburgh, though $29 and $30 obtain on small tonnages. Forging billets have been quoted at $32 and $33, Pittsburgh. There is very little activity.

Warehouse Business.—Cold-rolled steel out of warehouse has been reduced $5 a ton. We quote prices for local delivery as follows:

Soft steel bars and small shapes, 2.65c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c. round edge steel. iron finish, 1½ x ½ in. 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.50c.; squares and hexagons, cold-rolled steel, 4c.; steel hoops, No. 13 gage and lighter, 3.50c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.25c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Pre-Determined Costs in Manufacturing

"Pre-determined Costs in the Manufacturing Plant" was the subject of the Nov. 17 meeting of the New York section of the Industrial Cost Association, held at Keen's Chop House, New York. The speaker was W. H. Alden, Hess-Bright Mfg. Co., Philadelphia. Mr. Alden presented a system of pre-determining costs which he had prepared and which is being used in part at the plant of the Hess-Bright company. He pointed out that pre-determination of the cost of an order was difficult unless the product involved is standardized, but that this system with a standardized product is superior to the "closed-order" method. By keeping an accurate check on scrap produced in different departments, through inefficient workmanship, faulty material or other causes and by showing these figures to the foremen, who brought them to the attention of the workmen, Mr. Alden said that a considerable reduction was made. Instead of quoting percentages, which generally mean little or nothing to the workman, the losses were translated into dollars and cents. In a period of six months losses from this item alone dropped in steps from $3,550 to $145. By keeping a check on what he termed inefficient routing of material, Mr. Alden said that in the same period there was a charge of $813.76 the first month and $604.19, $250, $180, $85 and $82 in the succeeding months.

The speaker exhibited several efficiency charts used in the plant for determining actual costs on orders as opposed to ideal costs. Following the address there was active discussion of several points, it being generally conceded that one of the best methods of obtaining results was to inform the workman as often as possible as to the actual costs of various orders passing through their hands, compared with the ideal costs.

Will Hear Arguments in Costs of Production Case

WASHINGTON, Nov. 22.—Arguments will be heard Friday of this week by Justice Bailey of the Supreme Court of the District of Columbia on the motion of the Federal Trade Commission to compel iron and steel manufacturers to produce books and other records showing costs of production. This will be a preliminary to the trial, set for Dec. 8, regarding the temporary injunction obtained by the iron and steel producers against the commission restraining it from inspecting their books. Known as the Claire Furnace Co. case, there are 18 producing interests involved in the proceedings, which involve many fundamental points as to the power of the commission to compel manufacturers to submit figures showing cost of production and other data of vital concern which are ordinarily not made public and which are protected as confidential by the Treasury Department in receiving income tax returns.

At the trial, the Federal Trade Commission will seek to have the injunction dissolved, while the iron and steel interests will endeavor to have it made permanent. The outcome of the motion to be argued on Friday is expected to have an important bearing on the trial. If it is granted, it is pointed out, the commission will have gained a vital point, while if it is denied, the iron and steel interests will have been strengthened in their position and desire to make the injunction permanent.

AMERICAN CONTRACTS ABROAD

Germans Foresee Sales to American Contractors —Brazil Contracts for Removal of Hill

NEW YORK, Nov. 22.—Germany believes that her future standing in the American market will be that of a supply house for foreign contracts received by American constructors. The war has left most of the financing ability in the United States and the German manufacturers believe that in the future American bankers will be led more and more into financing contracts in South American countries, the Far East and Europe. Such financing will undoubtedly be handled with a clause or an understanding that the contract resulting is to be handled by American contractors and it is these engineering concerns operating in foreign fields and desirous of obtaining low-priced equipment that the German representatives believe will be future buyers of their products—contractors' equipment and iron and steel and machinery.

The recent purchase of 2970 locomotives, 7800 passenger cars and 70,000 freight cars by the Polish government was placed entirely with shops in Poland at Chrzanow, Posen, Warsaw, Ostrow and Ostrowiec. Deliveries run from 1922 to 1932.

The contract for the removal of a hill at Hong Kong, China, involving about 3,000,000 Hong Kong dollars ($1,500,000) was awarded to a Chinese contractor—Sang Lee & Co., 24 Gage Street, Hong Kong. The contractor will purchase 5 miles of 35-lb. and 28-lb. rails, 5 small locomotives and an 8-ton barge crane. This contract is somewhat similar to the contract for removal of a hill at Rio de Janeiro, Brazil, for which Dillon, Read & Co., New York, bankers, recently handled the issue of $12,000,000 in 8 per cent bonds on the city of Rio de Janeiro. The contract has been awarded to Kennedy-Leonard & Co., 67 Wall Street, New York. The hill covers an area of about 1,450,000 sq. m. (1,584,850 sq. yd.) and is about 150 ft. in height.

The Japanese market continues fairly active, but a majority of the business is being transacted through large Japanese export and import houses. An order for 500 tons of 16-in. cast-iron pipe was recently placed in the United States—the pipe for use at Tsing Tao in China (Japanese controlled). Another inquiry is in the market for 2500 tons of 10 to 20-in. cast iron pipe for Japan. The Government Steel Works in Japan, at Kushui, is reported to be building a new rolling mill for the production of billets for private consumers. The mill, which will be completed by the spring of 1924, will have an annual capacity of 200,000 tons of billets, according to reports of the Bureau of Foreign and Domestic Commerce. The Zinc Smelter Works, which recently united with the Fushun Smelting Co., has closed down because of the condition of the zinc market. The company is capitalized at 5,000,000 yen and numbers among its stockholders the South Manchurian Railway Co., Mitsui Bussan Kaisha and Masuda interests.

Selling Tin Plate to Canada

A peculiar situation has arisen in export trade with Canada. According to the Canadian anti-dumping law, no foreign country shall be permitted to sell its products in Canada for less than 5 per cent reduction of its domestic market price, plus the duty. To-day tin plate from the United Kingdom can be sold in Canada at $4.25, but a large export company in the United States is offering tin plate for export at $4 per base box with the American market at about $4.75. The Canadian law prevents sales on this basis, although this export offer applies to all foreign markets and is quite evidently not an attempt at dumping within the meaning of the law.

British Iron and Steel Market

Some Lower Prices—Ship Contracts Lost to Continent—Tin Plate Activity

(By Cable)

LONDON, ENGLAND, Nov. 22.

The pig iron situation is unchanged. The supply of hematite iron exceeds the demand. Foreign ore is stagnant with Bilbao Rubio nominally at 26s. ($5.17) per ton ex ship River Tees.

A fair demand exists for British steel. Beams have sold for £9 ($35.80), f.o.b., against a nominal quotation a week ago of £10; and £10 10s. ($41.80) has been paid for ship plates.

The suspension of admiralty contracts pending the limitation of armament decisions at Washington is causing consternation at shipyards. Continental yards, meanwhile, have secured orders for two steamers for the Netherlands Steamship Co. at 20 per cent below the lowest British quotation.

Continental business with Great Britain is further diminishing. Many works are now quoting 12 to 16 weeks' shipment.

Prices are weakening. German 3/16-in. to ¼-in. plates have been done at £7 5s. (1.30c. per lb.), f.o.b., January shipment. German and Belgian beams are quoted at £8 (1.42c. per lb.), f.o.b. Belgian 2-in. to 4-in. billets are offered at £6 17s. ($27.25 per ton) for prompt shipment. Belgian flat bars are quoted at £7 3s., f.o.b., January shipment. Belgian No. 10-gage sheets are offered at f.o.b. £10 10s. (1.87c. per lb.). Luxemburg billets are quoted at £6 10s. ($25.87), f.o.b.

Tin plates are steadier. The Welsh output is now over 70 per cent of capacity. India has bought a small line of oil sizes at 22s. 6d. ($4.48) for February-March-April shipment. The Far East is buying quarter wasters, the buyers offering up to 19s. 6d., f.o.b. Sellers are asking 20s., f.o.b. Stocks are scarce and home consumers are purchasing good quantities of odd sizes.

Galvanized sheets are weak. Works have sold No. 24 gage corrugated sheets at £17 10s. (3.11c. per lb.), f.o.b., December shipment. Morocco is in the market.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.98 per £1 as follows:

Durham coke, delivered	£1	10						$5.97		
Cleveland basic	7	7½	&	£7	10*			29.35	&	$29.85
Cleveland No. 1 foundry	5	15						22.88		
Cleveland No. 3 foundry	5	12½						22.39		
Cleveland No. 4 foundry	5	5						20.89		
Cleveland No. 4 forge	5	0						19.90		
Hematite	7	0*						27.86		
East Coast mixed	5	15						22.88		
Ferromanganese	15	0	&	14	10*			59.70	&	57.71
Rails, 60 lb. and up	9	0	to	10	10			35.82	to	41.79
Billets	7	5	to	8	5			28.86	to	32.84
Sheet and tin plate bars, Welsh	7	0	to	7	15			27.86	to	30.85
Tin plate base box	1	1	to	1	2½			4.18	to	4.48
								C. per Lb.		
Ship plates	10	10						1.866		
Boiler plates	15	0	to	16	0			2.67	to	2.84
Tees	10	15	to	11	10			1.91	to	2.04
Channels	10	0	to	10	15			1.78	to	1.91
Beams	10	0	to	10	10			1.78	to	1.87
Round bars, ¾ to 3 in.	11	10	to	12	0			2.04	to	2.13
Galvanized sheets, 24 g.	17	15	to	18	5			3.15	to	3.24
Black sheets	14	10	to	15	0			2.57	to	2.67
Steel hoops	14	5	&	14	0*			2.53	&	2.49
Cold rolled steel strip, 20 g.	24	10						4.35		

*Export price.

Various large manufacturing concerns have indicated a willingness to co-operate in the investigation at the Pittsburgh experiment station of the Bureau of Mines of the corrosion of metals in mine water. Corrosion tests will be started shortly in three typical coal mines of Pennsylvania. The test pieces will be immersed in the water for a period of time, then taken out, measured, and the degree and character of acidity noted.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, $2.75 to $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 to $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50 to $2.60; galvanized wire, $2.95 to $3.10; galvanized barbed wire, $3.40 to $3.55; galvanized fence staples, $3.40 to $3.55; painted barbed wire, $2.90 to $3.05; polished fence staples, $2.90 to $3.05; cement-coated nails, per count keg, $2.35 to $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.25 to $2.40 base
Large boiler rivets..... 2.35 to 2.50 base
Small rivets .....70, 10 and 5 to 70, 10 and 10 per cent off list
Machine bolts, small, rolled threads,
70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer,
65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads,
65, 10 and 10 per cent off list
Cut threads .....65 and 10 to 70 per cent off list
Longer and larger sizes.....65 and 10 to 70 per cent off list
Lag bolts .....70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 to $5.25 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E..
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65,10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under.....75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in.....75 and 10 to 80 and 10 per cent off list

Upset Set Screws

½ in. and under.....80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes .....70 and 10 per cent off list

Milled Set Screws

All sizes .....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $40; chain rods, $40; screw stock rods, $45; rivet and bolt rods and other rods of that character, $40; high carbon rods, $48 to $52, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅜-in. and 7/16-in., $2.40 to $2.50 base; 5/16-in., $2.40 to $2.50 base. Boat and barge spikes, $2.40 to $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13.00; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
Butt Weld					
⅛	54½	28	¼ to ⅜	+3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			
Lap Weld					
2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	48	7 to 12	40½	27½
9 to 12	61½	48			
Butt Weld, extra strong, plain ends					
⅛	50½	33	¼ to ⅜	+4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			
Lap Weld, extra strong, plain ends					
2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20–2.45	Nos. 11 and 12	2.30–2.55
Nos. 9 and 10 (base)	2.25–2.50	Nos. 13 and 14	2.35–2.60
		Nos. 15 and 16	2.45–2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 22 to 24	2.60–2.85	No. 29	2.85–3.10
Nos. 25 and 26	2.65–2.90	No. 30	2.95–3.20
No. 27	2.70–2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75–3.00	Nos. 25 and 26	3.45–3.70
Nos. 12 to 14	2.85–3.10	No. 27	3.60–3.85
Nos. 15 and 16	3.00–3.25	No. 28 (base)	3.75–4.00
Nos. 17 to 21	3.15–3.40	No. 29	4.00–4.25
Nos. 22 to 24	3.30–3.55	No. 30	4.25–4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 17 to 21	2.60–2.85	No. 29	2.80–3.05
Nos. 22 to 24	2.65–2.90	No. 30	2.80–3.05
Nos. 25 to 27	2.70–2.95	Nos. 30½ and 31	2.85–3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Zinc	
Nov.	Lake	Electrolytic	Tin New York	New York	St. Louis	New York	St. Louis
16.....	13.25	13.12½	28.87½	4.70	4.35	5.20	4.70
17.....	13.25	13.12½	29.12½	4.70	4.35	5.20	4.70
18.....	13.50	13.25	29.12½	4.70	4.35	5.20	4.70
19.....	13.50	13.25	....	4.70	4.35	5.15	4.65
21.....	13.50	13.25	29.62½	4.70	4.35	5.15	4.65
22.....	13.50	13.25	29.62½	4.70	4.35	5.15	4.65

New York

NEW YORK, Nov. 22.

Two of the markets are active and strong with the others either steady or weak. Copper buying continues and the market grows stronger. The week has seen the most active buying of Straits tin in many months at advancing prices. The lead market remains quiet but firm. Dullness pervades the zinc market with the price tendency slightly easy.

Copper.—Further strength in the electrolytic copper market has developed, due to continued buying both for domestic and foreign consumption, as well as an increase in inquiries for nearby and future delivery. The major demand in the market is for January and first quarter shipment, although some business is reported for this year. The minimum quotation for this grade of copper for November-December delivery is 13.50c., delivered, or 13.25c., refinery, with some large producers either out of the market for this position or asking slightly higher prices. For first quarter delivery electrolytic copper is quoted at a minimum of 13.75c., delivered, although yesterday a small amount could be obtained at 13.62½c., delivered. The principal foreign buyers are England and France, with a good demand reported from Germany, at about 13.75c., f.a.s. Prices for copper in England are higher than in a long time. The market for Lake copper here has also advanced with quotations at 13.50c., delivered.

Tin.—Very heavy sales of Straits tin, recalling the days of old-time activity, characterized the market for Nov. 16, 17, 18 and 19. It is estimated that 1500 to 2000 tons was sold, the buying being generally distributed and confined mostly to consumers, although dealers participated. The interesting fact is that most of the sales were for either spot and nearby delivery with some extending into January-February shipment from the East. The change in the hitherto dull market came suddenly on Nov. 16, when everything offered at less than 29c., New York, was quickly taken until at the close of the day 29.12½c. was realized for part of the 500 or 600 tons sold on that day. Since then the market has continued to advance until spot Straits tin was quoted to-day at 29.62½c., New York. The larger business is attributed to the revival of the tin plate trade which has been a feature of the steel industry for several weeks. It also indicates that stocks are not as heavy as had been calculated. Deliveries into consumption for November are expected to be higher than any other month this year. Yesterday and to-day the market has been quieter but firm with the London market strong and any recession in sterling offset by a sufficient advance in London prices which to-day are £161 10s. for spot standard, £163 5s. for future standard and £162 for spot Straits. Arrivals thus far this month are 2355 tons with 2800 tons reported afloat.

Lead.—The market continues quiet and firm with consuming demand about equal to consumption and prices unchanged. The leading interest continues to quote 4.70c., New York and St. Louis, with independent sellers asking 4.70c., New York, and 4.35c., St. Louis. In England it is reported that lead is scarce and higher and one seller here states that he has received several inquiries for shipment to that country.

Zinc.—This market is the quietest of the major non-ferrous metals and prices are a little lower because buying interest has diminished, due to fairly large purchases covering this year's needs. Prime Western for this year's delivery is quoted at 4.65c. to 4.70c., St. Louis, or 5.15c. to 5.20c., New York, but the amount available at these levels is not large. Producers are not anxious sellers, many of them being either satisfactorily sold for the present or holding back in the expectation of a stronger market in the near future.

Antimony.—The market continues to sag, due to heavy arrivals from China. Wholesale lots for early delivery are quoted at 4.50c., New York, duty paid, with prompt metal at 4.55c.

Aluminum.—There is no change in conditions, virgin metal, 98 to 99 per cent pure, being quoted by the leading interest at 24.50c., f.o.b. plant, in wholesale lots for early delivery with the same grade, imported by dealers, available at 17c. to 18c., New York, duty paid.

Old Metals.—Prices are slowly advancing and business during the past week shows quite an improvement. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	$12.50
Copper, heavy and wire	11.50
Copper, light and bottoms	9.75
Heavy machine composition	10.00
Brass, heavy	7.50
Brass, light	5.75
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.75
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

CHICAGO, Nov. 22.—Tin and copper are closely held and are firm, but notwithstanding the appearance of considerable inquiry there is little buying. Tin has advanced in sympathy with the London market and a stronger sterling exchange. Lead, spelter and antimony are very dull and the latter two have declined. Old metal prices are unchanged. We quote in carload lots: Lake copper, 13.25c. to 13.50c.; tin, 30.50c. to 31.00c.; lead, 4.45c.; spelter, 4.70c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 8.50c.; copper bottoms, 7c.; red brass, 7c.; yellow brass, 5c.; lead pipe, 3c.; zinc, 2.25c.; pewter, No. 1, 17c.; tin foil 18c.; block tin, 20c.; all buying prices for less than carload lots.

German Market Erratic

(*Special Correspondence*)

BERLIN, GERMANY, Oct. 30.—For the first time since the beginning of the buying activity the iron and steel market shows a decidedly quieter aspect. There was a normal volume of inquiries during the last week but the market was erratic. Quotations remained on the previous week's level. The apparent stabilization of prices hardly comes as a surprise. It seems rather doubtful, however, whether prices have reached their maximum level. Pig iron prices were substantially increased at the meeting of the Syndicate held Oct. 26, and valid until November.

Consolidation in Tin Plate Manufacture

A notable transaction has taken place in the German tin plate industry. With the co-operation of the Otto Wolff company at Cologne, a number of leading tin plate consumers in Braunschweig and one Leipzig firm have established a joint purchase and sales organization. It is intended to pool orders and specialize production with a view to lowering costs. The transaction means another step in the consolidation of the tin plate industry by the Wolff concern, which now handles about 95 per cent of the total production. It is noteworthy that the Wolff concern has also gained a large control of the Vereinigte Stahlwerke van der Zypen which plays an important rôle in the German tin plate industry. With Thyssen, Otto Wolff holds a seat on the board of directors and only recently was reported to have acquired 5,000,000 m. worth of shares in the company from Thyssen.

PERSONAL

C. H. Bierbaum, vice-president Lumen Bearing Co., Buffalo, N. Y., and chairman bearing alloys committee, American Society of Mechanical Engineers, gave an illustrated lecture on non-ferrous bearings before the Machinery Club of Chicago on Nov. 19.

W. V. Lindblom, Walworth Mfg. Co., Boston, was one of the speakers last week at a meeting of the Boston Executives' Club at the City Club, Boston.

R. L. Wahl, chief engineer Inland Steel Co., Indiana Harbor, Ind., has been appointed acting general superintendent of mines for the company during the illness of William Wearne.

F. J. Jackson has been appointed manager of the factory branch in San Francisco of the Barley Motor Car Co., Kalamazoo, Mich.

Charles C. Henderson, assistant treasurer Allegheny Steel Co., Pittsburgh, recently was elected vice-president of that company.

Frank H. London has been appointed district representative at Chicago for the Falcon Steel Co., Niles, Ohio.

George C. McDonald, formerly identified with the steel castings industry in Detroit, has been put in charge of sales for the Monroe Steel Castings Co., Monroe, Mich.

Arthur G. Hertzler, who has been sales manager of the Bearings Co. of America, Lancaster, Pa., and connected with that firm in various capacities more than 18 years, will leave Lancaster for his new home in Salt Lake City, Utah, on Nov. 30. He has as yet made no announcement of his plans for the future.

Frank B. Gilbreth, consulting engineer, Montclair, N. J., addressed a joint meeting of the Society of Industrial Engineers, Chicago chapter, and the Western Efficiency Society at the Auditorium Hotel, Chicago, Nov. 21.

Thomas J. Collins, for many years auditor of the Page Steel & Wire Co., Adrian, Mich., has resigned to establish an accounting service in Adrian.

Charles H. Genrich, Cincinnati Milling Machine Co., Cincinnati, addressed the Chicago Superintendents' Club of the National Metal Trades Association at Hotel Sherman, Chicago, on Nov. 19.

Henry Duckworth, assistant treasurer; William LaCosta Neilson, general sales manager; Louis E. Saunders, in charge of the research laboratory department, and John C. Spence, for many years works manager, machine division, have been added to the board of directors of the Norton Co., Worcester, Mass., abrasives and grinding machinery. The board now consists of nine as against seven members as heretofore, two vacancies being caused by the death of Fred H. Daniels and John Jeppson. The other directors are George I. Alden, Aldus C. Higgins, George N. Jeppson, and R. Sanford Riley. Mr. Neilson has been associated with the Norton Co. 15 years, Mr. Duckworth 30 and the other two gentlemen 20 years. Until fairly recently Mr. Neilson was foreign sales manager, with headquarters in England. Mr. Saunders, until recently, was manager of various Norton Co. branches in this country and in Canada. The activities of the other two new directors have largely centered in Worcester.

J. D. W. Snowden, for the past four years manager at Rio Janeiro, Brazil, for the American Steel Export Co., New York, and for several years previously district sales manager at Cleveland for the Cambria Steel Co. and the Midvale Steel & Ordnance Co., has joined the W. Bingham Co.'s organization at Cleveland, and will be in charge of steel buying.

J. H. Wilhelm, L. E. Larson and John Cetrule, consulting engineers, 18 East Forty-first Street, New York, have been elected president, vice-president and secretary-treasurer respectively of the Triplex Machine Tool Corporation, which manufactures the Triplex line of combination machines. The new connection will not in any way interrupt their active practice as consulting engineers.

Stewart M. Marshall of the engineering firm of Perin & Marshall, New York, arrived in Japan a few days ago on a trip to India. He expects to spend some time in China.

Dr. Ernest Fox Nichols, president Massachusetts Institute of Technology, has resigned and has been given leave of absence until Jan. 4, when the corporation will ratify the action of the executive committee. Dr. Nichols was inaugurated president in June, last, but never assumed his office due to illness, and, at the suggestion of doctors, resigned.

D. J. Maloney, who has been assistant general manager of the Carroll Engineering Co., Dayton, Ohio, has resigned and is now associated with the Columbia Engineering Co., Dayton, Ohio, as president and general manager.

Frank Carroll has resigned as chief draughtsman of the Youngstown Sheet & Tube Co., Youngstown, Ohio, to become assistant to the chief engineer of the Inland Steel Co., Chicago.

Denis A. Burke has been elected president of the Durant Motor Co. of Indiana, with headquarters at the office of the parent organization, Durant Motors, Inc., 1819 Broadway, New York. W. R. Willet, Detroit, has been appointed general manager of the Indiana company, with offices at the plant at Muncie, Ind.

Ben L. Whitney, formerly with A. M. Byers & Co., has been appointed Detroit representative of the Orton & Steinbrenner Co., Chicago, manufacturer of material handling machinery.

H. P. Hoffstot, president Koppel Industrial Car Co., has been appointed vice-president of the Pressed Steel Car Co. and C. W. Wrenshall, who has been acting general manager, has been appointed general manager, these two succeeding to the positions of vice-president and general manager held by the late J. B. Rider. Mr. Hoffstot will retain his connection with the Koppel company, a subsidiary of the Pressed Steel Car Co.

E. M. Moreland, for a number of years associated with Carnegie Steel Co. as salesman, and more recently with the Iron Trade Products Co. as sales manager, has resigned to become affiliated with the Traders Steel & Pipe Co., Conestoga Building, Pittsburgh. He will be associated with this company as a partner and will handle sales of finished and semi-finished steel, pig iron, furnace products and ferroalloys.

H. F. Hoevel, M.E., has resigned as secretary and general manager of the Hoevel Mfg. Corporation, controlled by L. O. Koven & Brother, 154 Ogden Avenue, Jersey City, N. J. His address is Chemists' Club, 52 East Forty-first Street, New York. The sale of Hoevel sand blasts will hereafter be in charge of J. M. Betton.

Walter P. Hatch, until recently manager of the Detroit office at Wickwire Spencer Steel Corporation, has been transferred to the Worcester, Mass., office. He will travel through the New England territory.

Eugene S. Reilly, L. P. Monahan and L. A. Quinlivan announce their resignation as president, vice president and secretary, respectively, of the Reilly-Peabody Fuel Co., whose name has now been changed to Peabody Fuel Co., and also their resignation as officers of the American Coke Corporation, affiliated company of the Peabody Fuel Co. F. E. Peabody's resignation as treasurer of the Eastern Fuel Co. and its subsidiary, the Georges Creek Coal Mining Co., has been accepted. The present officers of the Eastern Fuel Co. are: President, Eugene S. Reilly; vice president, P. F. Merritt; secretary and treasurer, Laurence A. Quinlivan; assistant secretary and treasurer, E. Leon Carpenter.

H. E. Brenchley, structural contracting manager of the Minneapolis Steel & Machinery Co., was elected vice president of the Structural Steel Society for the ensuing year at a meeting in Chicago on Nov. 8.

OBITUARY

EDWARD WINDSOR RICHARDS, from 1876 to 1886 general manager, and later chairman, of Bolckow, Vaughan & Co., Ltd., Middlesbrough, England, died Nov. 12, at the age of 90. At Middlesbrough he was closely associated with the application of the basic Bessemer process for treating the high-phosphorus ores of Cleveland, Luxemburg and Alsace-Lorraine. From 1893 to 1895 he was president of the (British) Iron and Steel Institute, and in 1884 received from it the Bessemer gold medal for his contributions to the art of iron and steel metallurgy. The company of which he was formerly the head owns and controls the Cleveland Iron Works, Cleveland Steel Works, South Bank Iron Works, Clay Lane Iron Works, Grangetown Iron Works, Bessemer Iron Works, Middlesbrough Iron Works and Eston Sheet & Galvanizing Co., employing, in normal times, a total of 10,000 men. The company owns, also, collieries and iron mines. Its normal output is placed at 15,000 tons per week of pig iron and 8000 tons of steel, besides 3,000,000 tons of coal per year. Mr. Richards is well remembered by members of the American steel trade, having made a number of trips to the United States. One of these was in connection with the visit of the Iron and Steel Institute to this country in 1904, under the presidency of Andrew Carnegie.



E. W. RICHARDS

H. C. VOGT, an executive of the Schillo-Vogt Co., architectural iron fabricator, 2415 West Fourteenth Street, Chicago, died recently.

JOSEPH BLANKENSHIP, a pioneer blast furnace superintendent, died at his home in New Straitsville, Ohio, Nov. 15. He had been superintendent of the Bessie Furnace Co., New Straitsville, Ohio, for the past 20 years. At one time he was identified with the blast furnace industry in Cleveland, and later, at Columbus, Ohio. For more than a score of years he had specialized in the manufacture of high silicon pig iron and was one of the leading authorities in that branch of the industry.

JOHN J. EDSON, Jr., president Central Railroad Signal Co. and Pittsburgh Water Heater Co., and a son of John J. Edson, president United States Chamber of Commerce, died Nov. 15, in the Homeopathic Hospital, Pittsburgh, following a surgical operation. He was born in Washington, Jan. 10, 1871, going to Pittsburgh nine years ago. He was a graduate of Lehigh University and a trustee of the Hill School, Pottstown, Pa.

GEORGE W. S. LOUCKS, York, Pa., one of the founders of the firm of Jacob Loucks & Son, manufacturers of ice and refrigerating machinery, later the York Mfg. Co., died Nov. 11, at the age of 66 years.

J. FRANK DURSTON, Syracuse, N. Y., president Durston Gear Corporation and Sanford Motor Truck Co., both of that city, died Nov. 17, at the age of 79 years.

JOSEPH L. BLAIR, secretary and assistant treasurer Niles Tool Works Co., Hamilton, Ohio, died of appendicitis in Mercy Hospital, Hamilton, on Nov. 17. He was 58 years old.

FREDERICK ESTABROOK SMITH, a partner in the Barney & Smith Car Co., Dayton, Ohio, died in Pasadena, Cal., recently at the age of 77 years.

GEORGE D. SHERMAN, partner of Witherbee, Sherman & Co. before it became incorporated, died on Nov. 15 of heart disease at his home at Port Henry, N. Y. His father, Riley Sherman, was one of the founders of Witherbee, Sherman & Co. George D. Sherman was a principal stockholder of the Port Henry Iron Ore Co.

GEORGE W. ECCLES, general superintendent Davis & Farnum Mfg. Co., Waltham, Mass., foundry, died suddenly in Chicago Nov. 12, where he had gone to attend the convention of the American Gas Light Engineers Association. Mr. Eccles was about 55 years old. He was associated with the Davis & Farnum Mfg. Co. approximately 38 years, and was one of the best known foundrymen in New England.

Brick Prices Reduced

PITTSBURGH, Nov. 21.—Quotations on silica, magnesite and chrome brick have been reduced to the levels which recently have formed the basis of actual sales. New prices on Pennsylvania silica brick now range from $28 to $31 as compared with $30 to $35, the former range, while the reduction in magnesite brick is a matter of $5 per net ton and in chrome brick of $2 per net ton. Anxiety on the part of a few of the makers of these grades led to considerable shading of what had been regarded as the regular quotation and this led others to meet the competition. It is declared that the new prices are considerably below producing costs and it is stated that unless further economies can be made in producing costs, or prices soon begin to move up, there is danger that some of the smaller units may be forced out of existence. There has been no material change in prices of fire clay brick, but the demand is extremely light and there is an impression that quotations would be shaded on anything approaching a desirable order, and in this connection it might be said that what would have been considered a small order a year ago looms up pretty large these days.

We quote per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$34.00 to $37.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		28.00 to 30.00
Chicago		35.00 to 38.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		55.00
Chrome Brick:		
Standard size, per net ton		48.00

Coke Output Decreases

WASHINGTON, Nov. 22.—Production of by-product coke in October totaled 1,734,000 net tons, an increase over September of 311,000 tons or 21.8 per cent, according to the Geological Survey. As the capacity of the plants of the country is approximately 3,661,000 net tons a month, it will be seen that the output was but 47.4 per cent as against 85 or 90 per cent when the demand for coke is more active. The number of plants active during October was 57. Fourteen plants were idle throughout the month. One new plant, that of the Chicago By-Product Coke Co., operated for the first time during October. Observance of armistice day was the principal cause of the sharp decline in the total production of coal during the week ended Nov. 12.

The October output of beehive coke, like by-product coke, also showed a slight increase and amounted to 416,000 tons, as against 289,000 tons in September. The total production of both kinds of coke, therefore, was 2,150,000 tons, less than half the monthly average in 1920.

In addressing the Engineers' Club of the Youngstown district Nov. 11 on the current railroad situation, President James A. Campbell of the Youngstown Sheet & Tube Co., reiterated his belief that restoration of normal business cannot come until freight rates are adjusted downward. He urged abolition of the Railroad Labor Board or appointment in its place of a board composed entirely of disinterested persons. Mr. Campbell explained in detail various increases in freight rates in Eastern territory since 1915.

GOVERNMENT CO-OPERATION

Activities of Industrial Divisions of Bureau of Foreign and Domestic Commerce

WASHINGTON, Nov. 22.—Activities of the various industrial divisions of the Bureau of Foreign and Domestic Commerce in the way of co-operating with the domestic trades they represent and the work being done to develop foreign markets for them through supplying information are outlined in the current number of *Commerce Reports*. They indicate that constructive efforts are being made and those of the iron and steel, industrial and machinery divisions will be of especial interest to readers of THE IRON AGE.

The iron and steel division has ascertained the kind of information which the trade is most interested in securing from foreign countries through Government representatives. The division is arranging to secure fuller participation on the part of American manufacturers in all foreign tenders for iron and steel products; to secure a wider acceptance of American standard specifications for iron and steel as they pertain to tenders abroad; to ascertain what competition must be met in the markets of the world; to inform the trade as to production, new processes, imports and exports, current prices, stocks on hand, movement toward centers of consumption, important tenders, changes in tariff, discovery and development of resources of iron ore, etc. Basic studies of the industry are now being planned in some of the iron and steel producing countries.

The industrial machinery division has established contact with some of the many groups of machinery manufacturers and is co-operating with them to perfect their organization for handling foreign business. It is in touch with about 4000 machinery manufacturers who have never been organized, but can be reached in part through about three dozen associations. Some branches of the industry are not organized for export trade at all, and in such cases special attempts are being made to arrange for contact through the appointment of special committees. These efforts are being received with a good deal of enthusiasm by the trade. Arrangements have also been made with American Government representatives in foreign countries whereby reports are being received regarding markets for various types of machinery. These data are being passed on daily to interested manufacturers.

Equalization of Rates Demanded

Following a conference of industrial traffic representatives of the Mahoning Valley with railroad officials in New York last week, a demand has been made by Youngstown district steel interests for an equalization in freight charges on raw materials. It is claimed Youngstown plants are under a rate handicap, as compared with makers in Pittsburgh and Cleveland, which amounts to $1.50 per ton in cost of producing pig iron.

Among alleged discriminations are rates on limestone and dolomite from Narlo and Marblehead, Ohio, which have been reduced from $1.26 per gross ton to 90c., to Cleveland, whereas the rate to Youngstown is $1.54. Industrial interests are asking the railroads to restore the rate of $1.10 per gross ton, which applied before the 40 per cent freight rate advance in August, 1920.

Carriers have likewise been requested to reduce the assembly charges on coal going to Youngstown territory, in order not to work a hardship on the by-product coke industry. Figures submitted to the railroads show that the coal required to produce a net ton of by-product coke is subjected to a freight charge of $2.90, whereas the freight rate on beehive coke from Connellsville amounts to $2.52 per ton.

Steel makers at Youngstown are likewise at a disadvantage with Pittsburgh producers with respect to coal carrying charges. It is pointed out that coal is delivered to Pittsburgh at a freight rate of 30c. per ton-mile, while the rate from the Connellsville region to Youngstown is $1.58 per ton, plus 3 per cent war tax. A number of Pittsburgh steel companies own their own boats on the Monongahela river, pay no freight charges and are therefore exempt from the war tax on coal moved by water. The carriers have been asked to make such readjustments as will enable producers at Youngstown to compete on a more favorable basis with Pittsburgh interests.

Complaint was also registered against limestone rates from Martinsburg, W. Va., to Youngstown. Though the rate from Martinsburg to Pittsburgh was recently reduced, the Youngstown rate remains at $2.38 per ton. A proportionate reduction is asked.

Lower Freight Rates Asked

A hearing on the application of transcontinental railroads for lower freight rates to the Pacific Coast was begun before William Disque, examiner Interstate Commerce Commission, at the Great Northern Hotel, Chicago, on Nov. 17. Edward Chambers, vice-president Atchison, Topeka & Santa Fe Railroad, who acted as spokesman for the carriers, asked that the roads be authorized to make rates from the Atlantic Coast, the Gulf Coast and from interior manufacturing territory, such as the Chicago district, to Pacific Coast points, which shall be lower than charges on the same commodities to destinations east of the Pacific seaboard. This is desired to enable the railroads to compete with vessels using the Panama Canal. Mr. Chambers attacked the abandonment of canal tolls on the ground that it would create a lower basis for rates via water routes, which in turn would compel lowering rail rates and would place an additional burden on western railroads and western manufacturing interests. Among the manufactured articles on which lower transcontinental rates are asked are finished iron and steel commodities.

Complaint Against Steel Drum Rate

ST. LOUIS, Nov. 22.—The complaint of the Niedringhaus Metalware Corporation and the Wackman Weldedware Co. of St. Louis, against the Atchison, Topeka & Santa Fe and other railroads, that St. Louis is being discriminated against in the rate on steel drums to Southern points was heard here last week by an examiner of the Interstate Commerce Commission. The St. Louis manufacturers contend that the rate on steel drums from Niles, Ohio, to Galveston and other Southern points, which is $1.20 per 100 lb., and the St. Louis rate of $1.62 to the same points, formed a basis of discrimination.

Unemployment in Pennsylvania

Unemployment still is decreasing in the Pittsburgh district, according to the semi-monthly report of the State Bureau of Labor and Industry, which shows that as of Nov. 15, there were 51,400 men out of work in this district, as compared with 52,400 Nov. 1, and 55,050 on Oct. 15. The report shows that in the Johnstown district, unemployment increased from 7810 Nov. 1, to 8985 on Nov. 15. The total number unemployed in the State, as of Nov. 15 was 271,430 as compared with 276,350 Nov. 1, and 288,625 Oct. 15.

At the last meeting of the board of directors of the Miller Lock Co., Frankford, Philadelphia, the following officers were elected: E. S. Jackson, president; C. S. Jackson, vice-president; William Ramsay, vice-president; Norman W. Cummins, vice-president; A. C. Jackson, treasurer; Stanley G. Weigand, assistant treasurer; Walter M. Conard, secretary. George B. Comfort was elected a member of the board. The president, first vice-president and treasurer were re-elected, the others being newly-elected.

The Chamber of Commerce, Quincy, Mass., has indorsed the proposed naval holiday, as recommended by the Government. The Fore River Works, Bethlehem Shipbuilding Corporation, is located in this city.

Steel Lumber for Building Construction

(*Continued from page* 1331)

per cent. Phosphorus and sulphur are held under 0.04 and manganese from 0.30 to 0.50 per cent. This relatively high carbon content, together with the method of working the material, gives a uniformly high ultimate strength. The material from this mill will show an average ultimate strength exceeding 72,000 lb. per sq. in., compared to 60,000 lb. per sq. in. for the rolled sections.

The channel sections are furnished only up to 6-in. depth and are used for studs in partitions. The joists are furnished in 4, 5, 6, 7, 8, 9, 10, 11 and 12 in. depths. The flange widths are designed to secure the best working stresses in all parts of the section. The 4, 5 and 6-in. joists are 3 in. wide; the 7-in. section, 3½ in. wide; the 8 and 9-in. sections, 4 in. wide; and the larger sections are 4½ in. wide.

While the steel lumber joists, spaced 16 to 24 in. center, will require a little more steel than is used ordinarily for the steel beams in some types of floors, yet the dead weight of the floor being only about 40 lb. per sq. ft. instead of 80 lb. or more, as required in some other types of fireproof floors, requires less steel in the girders and columns, and less material in the foundations. Economy in the use of steel lumber results from the following causes:

The distribution of the steel requires less of other materials, eliminating their cost and the cost of carrying them.

All of the material used in steel lumber construction is a part of the permanent structure, and only enough material is used to give strength and rigidity.

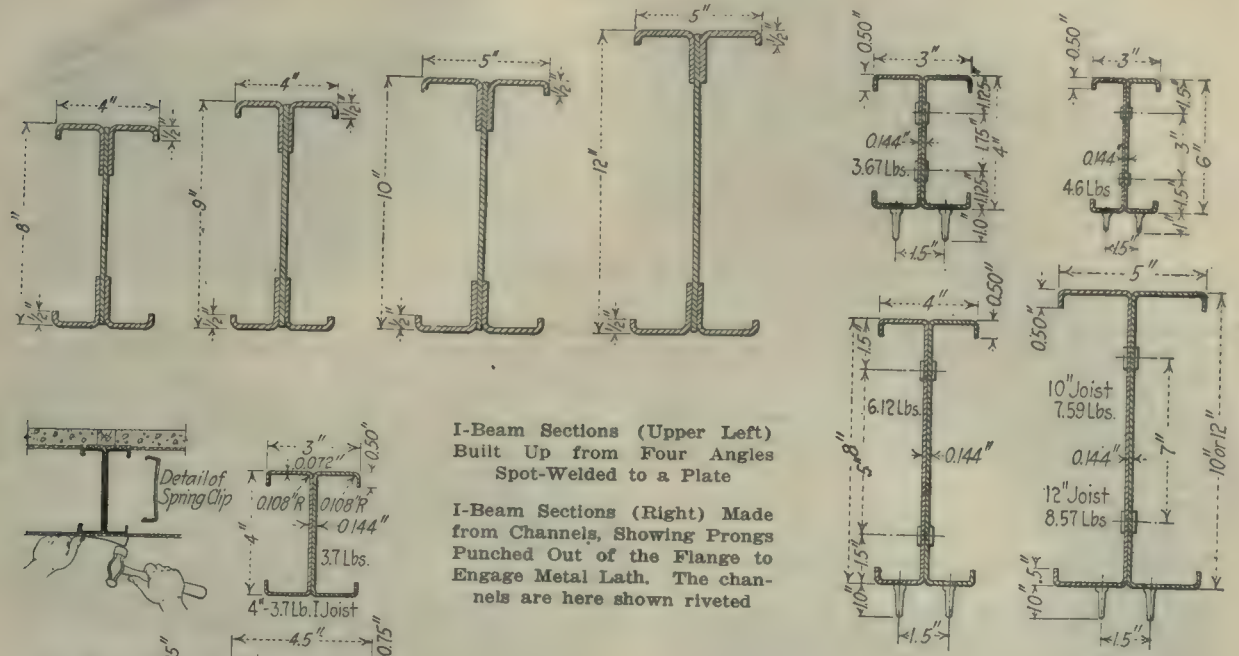
Less labor is used in producing the structure, as less material is put up, and there is none to come down and be carted away from the building.

It requires less time for construction. This results in getting the building ready in a shorter time for business or for the collection of rents, and cuts down the interest accruing on the investment in the land.

The cost of insurance and of maintenance is less in the steel lumber construction than in wood. In some cases these reductions will make the cost of the fireproof structure as low as the wooden structure after a period of ten years, and it will be a better and longer lived building.

The steel industry should be capable, by producing better shapes of the steel lumber type with the cheapness due to quantity production, of lessening the economic loss due to fires.

Tests were made of steel lumber construction by the city of New York on April 14-15, 1915. A floor designed for 150 lb. per sq. ft. live load was erected over a furnace and loaded to 150 lb. per sq. ft. with pig iron, and a temperature of 1700 deg. Fahr. was kept up for four hours. A stream of water was then played on the ceiling and there was practically no damage by fire or water. The next day after the fire the floor was loaded to 600 lb. per sq. ft. and after such loading had a deflection that was not excessive.



I-Beam Sections (Upper Left) Built Up from Four Angles Spot-Welded to a Plate

I-Beam Sections (Right) Made from Channels, Showing Prongs Punched Out of the Flange to Engage Metal Lath. The channels are here shown riveted

Similar Sections (Left) Showing the Channels Spot-Welded. Expanded metal lath is fastened to the section by a spring clip engaging both flanges of the I-beam section

Floors as usually constructed are composed of a large quantity of material and subject to bad cracks, no doubt caused by unevenness of expansion and contraction. Steel lumber floors show no cracks. The steel can always be depended on to do its work properly, and the two inches of concrete on top of the steel with the embedded metal lath will prevent any unevenness of expansion and contraction. The ceiling is also protected against cracking by the metal lath and cement plaster forming a uniform material over the entire surface.

Steel lumber was not produced on a tonnage basis until 1919, and its value has been recognized, as shown by the fact that 30,000,000 sq. ft. of this construction has already been installed throughout the country.

Residence work, including apartments, is 20 per cent of the total building of this country. The majority of this is furnished by so-called speculative builders. The houses are built to sell. No dollars will be put in on which quick returns cannot be made, but with an ideal steel joist, that can be installed as cheaply as wood, the tide will be turned and a large share of these wooden structures will be built of steel. The buildings now being erected with fireproof materials will be materially reduced in price by using the steel joist type of floor, the amount depending on various conditions, such as the use of the building, the load to be carried, and the location of the building. This will call not only for a large quantity of joists, but the joists will require rolled beams, and they will require steel columns. Thus the entire steel industry will receive an

impetus, and those occupying buildings, whether for residence, for business, for church or for schools, will have the benefit of cheaper occupancy and, for all of them, an occupancy safe from fire.

Discussion

BY H. M. NAUGLE*

It is interesting to know that, as far back as 1855, James Renwick built, at the corner of William Street and Exchange Place, New York, a structure in which old forms of rolled joists were used. These were made of 16 gage material in the webs and with ⅛ in. flanges. The sections were riveted.

*Vice-president Central Steel Co., Massillon, Ohio.

BY A. H. BROMLEY†

Pressed steel sections are intended to carry only floor or wall panels, instead of the whole structure, whereas structural steel carries not only the panels but its own weight and the outside sheathing of the building, whether this be of brick, terra cotta or stone. Being thus local in application, these pressed steel sections are light and naturally have a smaller section modulus than the structural steel members of similar depths. Thus, in a particular case, the pressed steel weighs 12.7 lb. compared with 31.8 lb. for structural steel of the same depth, giving a ratio of 2.55 in weight, and with a section modulus ratio of about three to one.

†Chief engineer, Berger Mfg. Co., Canton, Ohio.

Fusion Welding and the Processes in Use

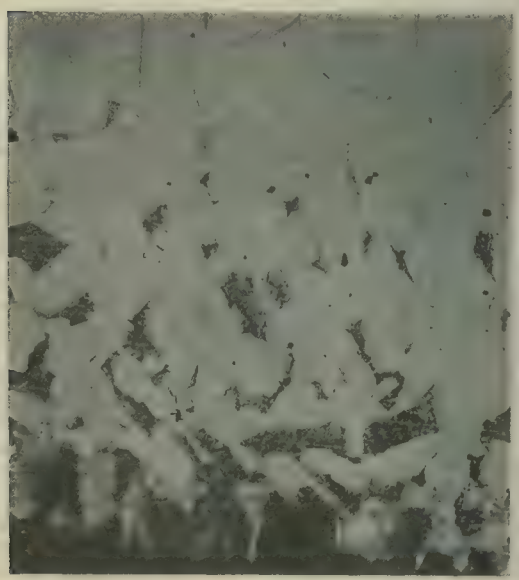
Composition of Welding Metal Used—Causes of Failures —Effect of Nitrogen—Welder's Skill—Testing the Welds

BY S. W. MILLER*

THE processes of fusion welding in use at the present time depend for their sources of heat on three reactions:

First: The burning in the presence of commercially pure oxygen of a combustible gas; acetylene is the one most frequently employed, although hydrogen, city gas and others have been successfully used.
Second: The electric current.
Third: The thermit reaction.

The first process, in its widest commercial application, makes use of acetylene as the combustible gas because it produces the highest flame temperature known, probably about 5500 deg. Fahr. This is by reason of its very large carbon content, 92.3 per cent.

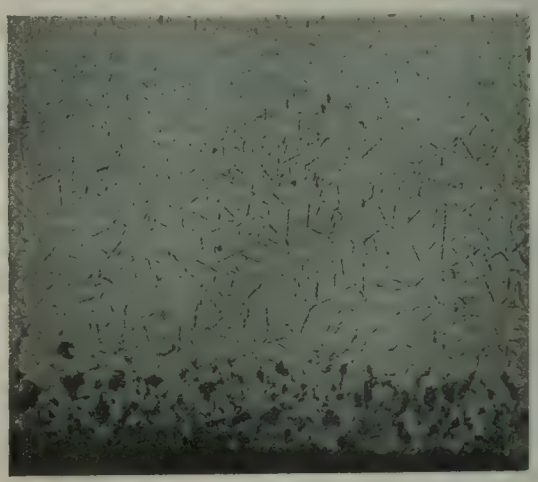


Nitrogenized Iron. Iron nitride (black) on outside (at bottom) and eutectoid of iron-iron nitride changing to plates as center is approached. Etched with picric acid; diameter 200 X

The second process may be utilized in two principal ways: First, by striking an arc between the piece to be welded, which is attached to one terminal of the circuit, and a rod of carbon or graphite connected with the other terminal. The maintaining of the arc produces an intense heat which melts the metal; necessary additional metal can be provided to fill cavities, etc., by holding in the arc a rod which is melted into the cavity. Second, by striking an arc between the piece to be welded and an electrode of metal, which on account of the heat of the arc is melted into the piece being welded, thus filling up the cavity or joining the pieces of metal together.

The thermit reaction is based on the fact that aluminum has a much stronger affinity for oxygen than most of the other metals, so that if powdered aluminum is mixed with a metallic oxide, such as iron oxide, and the mass be brought to a high temperature at one point by means of a red hot piece of iron, for example, the aluminum will combine with the oxygen of the oxide, setting free metallic iron.

The oxyacetylene process, or as it is frequently called, gas welding, is applicable to more metals and more conditions than either of the other processes. It is limited in its application chiefly because it is difficult for practical reasons to use it on very large sections of steel. The electric arc processes are in some respects more difficult of application because of the necessity of protecting the operator from the effect of the ultra-violet and infra-red rays of the arc, as well as from its intense glare and heat. For carbon arc welding a current as high as 1000 amperes at from 60 to 75 volts may be used, whereas a current of less than 300 amperes is of but little value. With the



Nitrogenized Iron or Electrolytic Iron Heated in Ammonia at 750 Deg. C. for Four Hours. View is from edge (at bottom) toward center (at top), showing change in structure as amount of nitrogen grows less. Etched with picric acid. Diameter 50 X

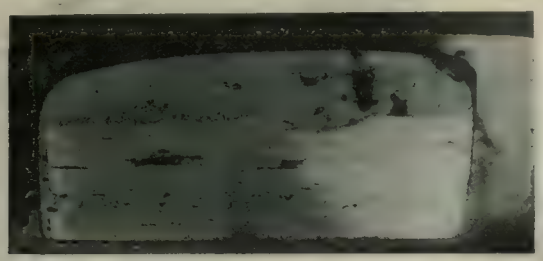
*President, American Welding Society, New York.

metallic arc, a current as high as 200 amperes may be required with an arc voltage of from 18 to 20. The temperature of the positive crater of the carbon arc is about 6300 deg. Fahr., but, so far as I know, the temperature of a metallic arc has never been determined; it is, however, very high and much more local than that of the oxyacetylene flame. The carbon arc process is usually confined to filling cavities in steel castings, although it has been used with great success in some cases for other purposes.

[The author here discusses in full fusion welding practice in welding cast iron and steel.]

Welding Metal for Fusion Welds

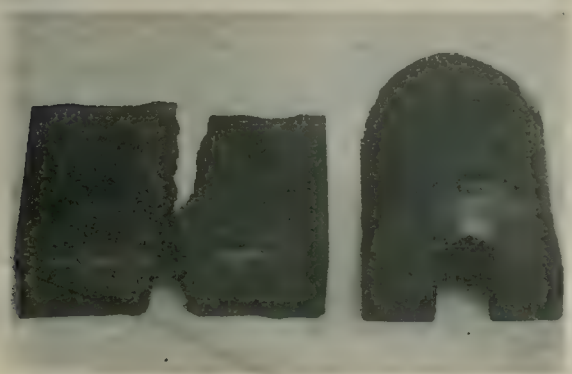
The usual material for gas welding steel is a straight low carbon steel wire of about the following



Chilled Iron Welded to Wrought Iron, Showing Gradual Change in Structure. Diameter 3.3

composition: Carbon, 0.06 to 0.10; manganese, 0.15; sulphur, 0.03; phosphorus, 0.03 per cent. In other words, it is a very pure low carbon steel. Evidently, the strength in a weld made with this material will be low, and it is found to be about 52,000 lb. per sq. in. in ½-in. plate. Where a stronger welding metal should be used one is found in nickel steel of approximately the following composition, which corresponds to the Society of Automotive Engineers' specification No. 2320: Carbon, 0.20; manganese, 0.40 to 0.60; sulphur, not over 0.04; phosphorus, not over 0.04; nickel, 3.25 to 3.75 per cent. This metal gives in the weld about 58,000 lb. tensile strength, although it has less ductility than the weld metal before referred to.

For electric metallic arc welding a usual composition of welding wire is as follows: Carbon, 0.15 to 0.18; manganese, 0.40 to 0.60; sulphur, not over 0.04; phosphorus, not over 0.04 per cent. The exact chemical composition is of much less importance than are uniformity and high general quality. Gas welding wire may be of any reasonable hardness, though it is usually



The Piece on the Left Was Welded with Low Carbon Steel Wire and the One on the Right with Nickel Steel Wire. Both were heated to a bright orange. The former broke off short and the latter bent as shown. Reduced one-fourth from full size

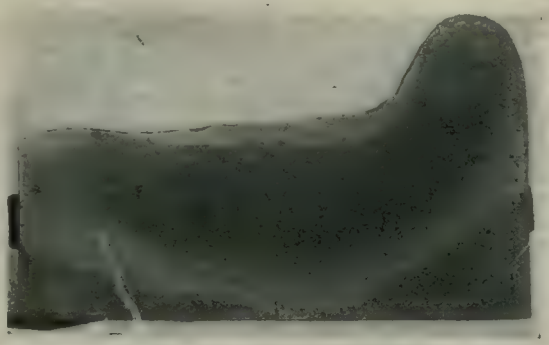
quite soft; but for electric welding the wire must be hard drawn to just the right amount or it will not work well.

[At this point the quality of the base metal and the skill of the welder are treated.]

One of the matters which is of vital interest to all those using welding processes is the cause of failures in welded parts. While there has been no systematic investigation of such accidents, it is probable that those which have caused the most trouble have been in the case of welded pressure vessels, and as these are usually made of steel the subject should be of interest to you. It has been stated before that it is essential in welding by any process to get a thorough union between the weld metal and the base metal, and that it is necessary that the weld be sound. Given good operators and proper welding material, there is no difficulty in obtaining the desired result, but it is of just as much interest to know how results are obtainable, and why welds fail, as it is to know how to make good steel and why steel sometimes fails.

The microscope shows better than any other instrument the nature of the defects in welds, and when this is known, and not until then, precautions can be taken to avoid them. Generally speaking, there are two avoidable effects which are in reality one: First, lack of fusion along the side of the V, and, second, the lack of fusion in the weld metal itself. The tendency in welding steel is to underheat the plate because it is much heavier in section than the welding wire, in which case the melted wire may fall into the V without being fused to it. The same thing may happen in the weld. When this occurs there is a thin film of oxide between the two layers of metal, and this, of course, destroys the strength of the piece.

In addition to this there is the oxidizing action of the water vapor in the gas welding flame and that of the air on the finely divided metal passing through the electric arc. If the gas welding flame be not properly adjusted, or if the torch be of poor design, there is the additional possibility of free oxygen being present and causing serious trouble. An improperly made weld will show streaks of oxide or other impurities which



Full Size (Reduced One-Half) Section of Locomotive Tire Gas Welded to Fill Up Rail Wear. The heat has altered the structure everywhere except in the lower corners

are frequently very small and thin, and yet the first evidence of distortion of such a weld is at these defects, just as the first evidence of distortion in a piece of steel is at similar defects. During the welding operation these defects appear as bright white spots or streaks in the case of gas welding, which can be floated to the surface and removed. In the case of electric welding this is not possible, except to a limited extent, because whatever impurity is in the electrode must go into the weld. The films or streaks referred to are frequently clearly visible under the microscope, but many times rupture occurs at the grain boundaries in both gas and electric welds, where there are no evidences of any films even at the highest power of the microscope.

It would hardly be expected that any ordinary heat treatment would alter the character of the ruptures in welds, and if defective welds were heated in an oxidizing atmosphere it might be expected that they would become more brittle. Such tests as I have made indicate that this is true. On the other hand, I have found that electric welds which were very brittle as made, were notably improved by heating several hours in a strongly reducing atmosphere at a temperature of about 600 deg. Cent. This would indicate that the difficulty is one of oxide. The characteristics of welds made by the gas process are their large grain size, their lowness in carbon, manganese and silicon, their

maintaining of practically the same amounts of phosphorus and sulphur as in the welding material, and their lack of ductility. It is quite evident that the heat will remove carbon, silicon and manganese, but there seems to be a point in the case of each one of these elements beyond which the reduction does not take place because of the diffusion of them from the base metal into the weld. The same statements are true of electric welds, except that their ductility is less, while their tensile strength is higher when both are made of ordinary material. Welds also offer comparatively slight resistance to alternating stress and shock. Inasmuch as all of these characteristics appear to be due to the presence of oxide, it will be well to consider what means have been taken to prevent oxidation.

[Methods to prevent oxidation are next discussed, as well as the testing of welded pieces and the effect of welding heat on the base metal.]

Effect of Nitrogen on the Weld

There has been much discussion as to the effect of nitrogen on steel, some taking the position that it makes steel brittle and others that it has very little if any effect. The presence of nitrogen as nitride can be quite accurately determined by chemical analysis, but its existence in other forms, such as dissolved gas, cannot be proven in this way. It is usually believed that when it is present in sufficient quantity it combines with the iron, making an iron nitride having the formula Fe_2N. In this condition it may be seen as a constituent of the metal in the form of plates lying along the cleavage planes of the grains, and with larger quantities is present as a eutectoid of iron and iron nitride at the grain intersections.

Electric arc welds have the same structure as iron N-ized, except that the structure is much finer because of the rapid cooling. Gas welds may also contain the plates when the metal has been overheated. Similar plates are also visible in samples of Bessemer steel taken just after the blow and before recarburizing. In all three cases the metal has been overheated, and it would seem to be quite possible for nitrogen to combine with iron as iron nitride at these very high temperatures. Of course, there is as yet no chemical proof that the plates are iron nitride, as they have not been isolated.

It is not worth while to discuss the matter here, except as to whether nitrogen is responsible for the brittleness in electric welds made with bare wire. I have tested many welds by bending them and examining them under the microscope, and in no case has it been found that the nitride plates have any effect on the path of rupture. The slip bands in the grains never follow the plates, but frequently stop at them when the two are at an angle to each other, and the rupture takes place either at defects in the weld, or at the grain boundaries, even where in the latter case no defects are visible, as they also sometimes do in the case of gas welds. This would indicate that as far as tensile stress is concerned nitrogen has no serious effect. In the case of alternating stress and shock tests, the results might be different, but no such tests have been made as far as I know. It seems to me that in view of all the facts the brittleness of welds is due to the presence of oxides, and I believe that in the future we will be able to make much better welds by providing some effective but simple means for the protection of the melted metal from the air, or for removing from the weld the oxides as they are formed.

Discussion

BY W. E. RUDER*

It is believed that electric welding is superior to fusion welding in all forms of light steel plates. In any case, the welding metal must be perfectly clean and sound. An open spongy metal, especially if there is any gas present, results in a weld of questionable quality. It must be admitted that a gas formed weld is generally more ductile than can be obtained by electric welding.

BY H. S. RODAN†

Fusion welding has a special application to steel and other castings. By taking reasonable and well understood precautions, cast steel, thermit steel and other similar forms of castings can be obtained, which are essentially safe in use. An increase in the proportion of manganese improves the properties of cast steel. Similar improvement may be made by adding titanium or by adding nickel. It is found advantageous to weld monel metal by the use of an iron weld rod, and similarly to weld castings, particularly cast iron, by the use of a monel metal weld rod.

In heavy sections, when welded, cracks are often developed, due to the chilling action on heavy members. Stresses set up under such conditions may be distributed through large areas, and thus rendered innocuous, by pre-heating or by heat treating or other methods. Usually, however, heat treating in such cases cannot be applied commercially.

BY A. M. CANDEE‡

Electric welding, whether by graphite or carbon electrode, sometimes gets into disfavor because the operator does not thoroughly understand the situation, the characteristics of the materials he is handling and the theory under which the work is done. With metal electrodes, on the other hand, we have a process which is more mechanical in its operation, and extreme skill on the part of the operator is less needed.

It has been found advantageous to use a welding metal having about 0.15 per cent carbon and 0.50 per cent manganese, in preference to a pure iron. This advantage lies in the fact that the dissipation of the carbon and manganese in the welding metal, thus turning it practically into a pure iron in the process, produces gases, which, by keeping out the air from contact with the surfaces, protects the metal of this surface better than when pure iron is used.

Such welds, made electrically in carbon steels, and with good operators, have shown an elongation of 18 per cent and a reduction of area of 30 per cent. The same is true of alloy steels. In both cases, still better results are obtained after forging the material, including the weld.

*General Electric Co., Schenectady, N. Y.
†Bureau of Standards, Washington, D. C.
‡General engineer, Westinghouse Electric Co., East Pittsburgh.

Refractories In The Steel Plant

A Plea for Adequate Specifications and Co-operation Between Producer and Consumer

BY W. A. HULL*

WITHIN the past five years, serious complaints have been made publicly by prominent metallurgists about preventable defects and wide variations in quality in refractories. The published statements have been made by only a few metallurgists, but they are men of such standing and represent such important consuming interests, that they cannot be passed over lightly in any consideration of the refractories situation. The evidence offered leads to the inevitable conclusion that

*Chief of the Refractories Section, Bureau of Standards, Washington, D. C. Published by permission of the director, Bureau of Standards.

important improvements can be made in refractories. In order to look forward and make a reliable prediction as to what progress may be expected in the next few years, it is necessary to look backward and obtain a conception of the progress that has already been made and the conditions that have affected the progress of the industry.

Twenty years is not a long time in the life of an industry, but the last twenty years have seen important advances in our technical knowledge of refractories. The literature on the subject was meager because there was little to put into it. There were practically no tests for the quality of a fire brick except the fusion test and the chemical analysis, and it was known, even then, that these did not tell the whole story. The only test that might have been of much value was the service test, and the conditions of service and the methods by which the bricks were built into the furnace were so variable that the tests of actual service would have been of doubtful worth even if complete and connected records had been kept.

In 1911, the Bureau of Standards published the paper by Bleininger and Brown, on the heat testing of fire brick under load. In 1913, the American Society for Testing Materials published a paper by Bleminger on the testing of refractories, in which he described not only this load test, but tests to determine the effect of quick heating and cooling and of slag on different kinds of fire bricks. In 1914, a Committee on Refractories was created in the American Society for Testing Materials and in 1916, came the paper by Nesbitt and Bell* describing the tests that had been put into practice by the Carnegie Steel Co. This was an excellent paper and it brought out a quantity of good discussion. This, and other contributions that followed, acted as a stimulus to progress. It is a noteworthy fact that several of the tests, which had been inspired by the ceramist and put into practice by the metallurgist, have since been adopted by the American Society for Testing Materials.

During these last ten years, investigators in the Bureau of Standards, in the universities, and in various industries, have been applying new methods to the study of refractories. Among the best contributions have been those of the research fellows of the scholarship maintained at Mellon Institute by the Refractories Manufacturers' Association and by those included in the technical staff of the Harbison-Walker Refractories Co. In these recent investigations the comparatively new science of physical chemistry has come into play and the microscope has been used with telling effect.

Lack of Uniformity

The extensive testing of refractories during these ten years has resulted in the discovery that even the best brands of fire brick do not run as uniform as they had been assumed to do, and certain typical failures that had been regarded as a necessary evil, have been found, on closer study, to be caused, or at least hastened, by the poor bricks in good brands. Defects that had formerly been counted of small consequence have been found to be vital factors in shortening the life of important installations. In other words, a product that unquestionably averages better than it did twenty years ago is of low repute because the eyes of users have been opened.

The consumers realize to some extent that they, as well as the producers of refractories, are responsible for the present status and that the rate of improvement must depend, not on the producer alone but on co-operation between consumer and producer. Nor should the impression be given that no progress has been made. The manufacturers have already made a good deal of headway within the last fifteen or twenty years, particularly in the production and application of silica refractories. The metallurgist undoubtedly has grounds for his complaint that producers are not supplying as good refractories as our present knowledge makes it possible to produce, and such complaints carry added conviction when they come from consumers who are making a considerable part of their own refractories, because they can make goods of a quality which gives vastly better results in certain kinds of service than anything that they can obtain from even the best manufacturers. On the other hand, the primary function of the fire brick maker has been to turn out a large tonnage of refractories at a minimum price. If he were to specialize too much and go too much into refinements, it would seriously interfere with this big job for which he is equipped and organized. In the writer's judgment, the producers are making a creditable effort to accomplish this improvement. The Refractories Manufacturers' Association, through its scholarship in the Mellon Institute, has been making extensive researches in the study and the further development of tests. One of the important features of the standard spalling test recently adopted by the American Society for Testing Materials is based on the work of these investigators, and it is important to note that the test is made not only more reliable, but much more severe, by this feature.

Vital Factors in Improvement

One of the vital factors of the improvement of the situation is that the Refractories Manufacturers' Association is bringing the producers together for the good of the industry. They are forming a production section for superintendents and foremen, which will meet four times a year. There are also geographical sections which hold meetings at which papers are presented and discussed. This sort of thing is going to make a stronger industry, better able to cope with the job of meeting the varied problems with which it is confronted.

The question of price is one of the big stumbling blocks in the way of improvement. It is, perhaps, not going too far to say that the greatest transgressor in delaying progress is the purchasing agent. One of the great handicaps of the purchasing agent is the almost total lack of specifications. Both manufacturers and consumers of refractories have been rather gun shy on this point; and in the writer's judgment it is one of the things that they will have to come around to and get together on in order to make the best speed. Up to this time the matter of specifications has been left too much to the fire brick manufacturers; and their tendency is to make specifications to fit the brick which they make, rather than to make them to fit service requirements. The Bureau of Standards is the logical clearing-house to serve both consumer and producer in the preparation and unification of specifications. It can, perhaps, be of greater service to consumers than to producers because the former are less united and their problems are so diversified.

[The author discusses fully the work of the Bureau and summarizes the results of this work. Both clay and silica brick are covered. Suggested specifications are offered.]

Granting that a specification should be made to conform to the service requirement, the first essential to the preparation of any specification is a knowledge of the properties in the refractory which determine its life under the given conditions. The fact that specifications are not now available is probably due, not so much to a lack of appreciation of their potential value, as to an underlying uncertainty as to the application of any proposed set of test requirements in actual service.

A test, in order to be of practical value, must be one that can be made conveniently and in a comparatively short time. In actual service, the fire brick must last a comparatively long time. It naturally follows that the tests considered in connection with proposed specifications are what are called accelerated tests—something that will determine a given property of the material rather quickly.

Refractories for Coke Ovens

Reference has been made to achievements in the production of silica refractories to meet the exacting demands of the by-product coke oven installations. The development of the by-product coke oven in the United

*C. E. Nesbitt and M. L. Bell, Practical Methods for Testing Refractory Fire Brick, Proceedings, American Society for Testing Materials, Volume XVI, Part II.

States has not only been rapid, but has proceeded along bold lines. In the beginning, German practice was the best guide. Within a few years, our American plants were so far in advance as to put German practice in the discard where American conditions are concerned. This has been accomplished by the co-operation of the coke oven builders, including the large steel interests and the refractories manufacturers. The coke oven builders were able to specify what they wanted and the refractories manufacturers were equal to the demands. It furnishes a good example of the value of a specification.

Conclusions

One is forced to the conclusion that no important advance has been made in the writing of specifications for refractories since 1911. It is of importance to note that the specifications of the Panama Canal are actually in use. The Canal is actually purchasing bricks on specification, accepting or rejecting by test and, what is more, keeping service records on the brick. There may be industrial concerns doing as much; if there are any, they should come forward and let it be known, for they are close to the head of the procession.

In no other industry is the question of refractories a more vital one than in the steel industry and in no industry is there to be found a more highly trained force of technical men. It would seem that the steel industry is the one place, before all others, to look for the purchase of refractories to meet a specification.

There is one point that can be established at the outset—progress will depend on co-operation. The steel man and the refractories man must unite in a common purpose; they must get away from the idea that their interests are not identical. No substantial progress can be made on any other basis. There is further experimenting to be done and this should be placed on a systematic co-operative basis. The new refractories which the brick plant brings out should be put in service in the steel plant under such conditions that reliable service records can be kept on them; and these service records should be compared with the data from the laboratory tests on the same type of material. This work cannot be done all at once, but it is necessary to make a start in the right way. The Bureau of Standards will be glad to be of service in any way in which it can further this work. Specifications established by the Bureau in co-operation with consumers and producers would probably meet with general acceptance.

Discussion

BY J. A. MOORE‡

The buying of refractory brick to-day is conducted on a lack of knowledge of the physical and chemical characteristics of the material, and is based upon service tests in use. This condition should be remedied by a spreading of technical knowledge. There are five general factors governing the use of refractories, as follows:

The distribution of stock in the furnace;
The quality of raw materials, especially coke;
The quality of the brick;
The method of furnace operation;
The continuity of that operation.

BY J. J. BROOKS*

One great need of industry to-day is standardization, both of materials and of sizes and shapes of bricks demanded. In 1916, as a single example, there were 77 separate so-called 9-in. fire brick made. This number has now been reduced to 27. The reduction helped materially in 1916, 1917 and 1918 in turning out the brick to turn out the steel imperatively demanded by the United States and allied forces. It is still a fact, however, that individual users have designed such bricks in great numbers and still call for them.

BY C. L. KINNEY, JR.,†

Technically trained refractories sales experts are one of the needs of the present situation.

Magnesite brick made in America from the best foreign magnesite is far from satisfactory, in comparison with its cost. When made from domestic magnesite, it is still worse. Most users desire a prompt return to the importation of Austrian magnesite as we did previous to 1914. Carborundum brick are not satisfactory, in spite of their great density, high conductivity and freedom from spalling. The high dissociation temperature of 2200 deg. Cent. (4000 deg Fahr.) is reduced to below 1200 deg. Cent. (2200 deg. Fahr.) by some portions of the structure. This makes it less satisfactory than silica fire brick, which carries temperatures up to 3400 deg. Fahr. Zirconium brick, from which much was expected, have failed in open-hearth practise, because the fluorine fumes from the fluorspar, used in rendering more liquid the open-hearth slag toward the end of the refining operation, have worked havoc with these brick.

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*General sales manager, Harbison Walker Refractories Co., Pittsburgh.

†Superintendent No. 1 Open-Hearth Department, Illinois Steel Co., South Chicago.

Pittsburgh Foundrymen's Association

PITTSBURGH, Nov. 21.—H. S. Covey, secretary Cleveland Pneumatic Tool Co., Cleveland, was the speaker at the regular monthly meeting of the Pittsburgh Foundrymen's Association, at the General Forbes Hotel, last evening. His subject was "How Pneumatic Tools are Made; Their Treatment in Service, and How to Obtain Maximum Efficiency in Their Work."

Mr. Covey traced the history of pneumatic tools, pointed out the necessity of care in handling them, and emphasized the necessity of re-conditioning tools, so as to prolong their life. The transmission of air was a very important factor in the efficient operation of pneumatic tools, the speaker stated, and he asserted that while there was a loss of 8 lb. through a 1-in. pipe in a travel of 1000 feet, there was practically no loss in the same distance in a 3-in. pipe. He decried the use of small pipes and numerous elbows and urged the importance of control of moisture and oil in the pipes. Moisture washes out lubrication, while the oil laying in the hose causes the rubber to disintegrate. Mr. Covey's remarks were introductory to a four reel film prepared by his company, which showed the manufacture of tools from the raw material to the finished products. Of particular interest was a sectional view, showing the operation of a pneumatic hammer.

At a meeting of the executive committee, following the meeting, plans were made for the annual Christmas entertainment, to be held at the General Forbes Hotel, Dec. 19.

The association elected William J. Brandt secretary. Mr. Brandt has been acting secretary since the death of Bayard Phillips.

Fabricating Steel in Transit

BIRMINGHAM, ALA., Nov. 22.—On Monday Birmingham, Atlanta and other Southern points began to exercise the privilege of fabricating of steel in transit according to the agreement reached some time ago with the Louisville & Nashville and other railroads. Birmingham fabricators now use about 85 per cent of Birmingham steel, but will save $3 to $8 a ton on imported steel that is brought in for fabrication.

The Charleston Chapter of the American Society for Steel Treating held its regular meeting Tuesday evening, Nov. 22, at Hotel Ruffner, South Charleston, W. Va. National Secretary W. H. Eisenman, Cleveland, Ohio, was present and spoke on "Heat Treating; Its Past, Present and Future." J. E. Arthur presented the first paper of the evening, "Steel Melt Shop Practice."

Leaves from a Steel Melter's Note Book

(*Continued from page* 1337)

absorbed, without set or, if that takes place, then without rupture.

Halsey cites as cases bearing on this question of design certain bolts used in rock-drill construction. One was a bolt which was given increased power to resist shock by turning down its body between its threaded ends enough to make the body of the same strength as the threaded part, which gave the bolt the maximum resilience. Other cases were bolts of increased length which were used in place of short ones, where the latter were either quickly broken or whose nuts were promptly jarred loose in service.

The matter of the proper design to resist overstrain was first brought up to the writer by the test of a car coupler of the well-known Janney type. The design, which was considered to be in some of its details an improvement over former couplers embodying its principle, was already made and drawn, and we were called in to assist in deciding on the steel and the heat treatment thereof for the manufacture of some trial couplers. The design called for an unusually heavy knuckle containing as much metal as the limitations of the prescribed contour allowed. It weighed about 105 lb. The couplers for test, both drawbars and knuckles, were made of steel which when heat-treated gave as an average of four test bars, 81,000 lb. tensile strength per sq. in.; 52,000 lb. elastic limit, 29.7 per cent elongation, and 54.4 per cent contraction of area, the pulled section being ½ in. in diameter, by 2 in. long.

The merit number obtained by multiplying the pounds of tensile strength per square inch by the percentage of elongation was 2,405,700, which was extremely good as compared with ordinary coupler steel having 60,000 lb. tensile strength and 26 per cent of elongation, which gave 1,360,000. This merit number gives some comparative measure of the ability of the steel to resist rupture and therefore dynamic test in which, to break it, the tensile strength must be overcome throughout the distance represented by the elongation. The steel, therefore, was felt to be suitable and the couplers were submitted to test with confidence.

All required tests were passed at the first trial except the jerk test, which is a dynamic test, the knuckle being subjected to a number of jerks given by a 1640-lb. weight falling and striking upon an equalizer bar, one end of which bears on the jaw of the knuckle in the suspended coupler. This test is intended to simulate the jerks a coupler gets in service. In the jerk test two knuckles were broken in succession at the fourth blow, while five were required for passing the test. Why knuckles of such steel did not pass was a mystery even though the principle of the coupler did not admit of as strong a knuckle as others, and failure of the coupler to pass the test seemed imminent.

Adding Strength by Cutting Down Metal

After considerable study of the matter it seemed as if the principle which made the merit number the measure of the resistance of the metal to dynamic test might also be applied to the design itself, so that the resistance of the knuckle to change of shape might be prolonged through as great a distance as practicable, which would in a way be equivalent to having increased elastic limit in the metal. The amount of work or energy required to produce rupture would be thereby proportionately increased. Having this in mind, the broken knuckles were seen to be unnecessarily strong and rigid in some parts, but having a weakest spot through the hub where they had given way with no yielding elsewhere. The hub could not have been made heavier or it would not have passed the contour gage. Manifestly some parts were too strong and we decided to cut them down on another knuckle so as to make it as nearly as we could of uniform strength throughout. From the knuckle we selected we cut away 20 lb., or about one-fifth of its metal, partly by cutting down its outline and partly by drilling holes along the neutral axis of the parts where there seemed to be an excess of metal and therefore of strength, with the aim of making it as nearly as possible equally strong at all points. That mutilated knuckle passed the test by a good margin and the day was saved.

The time was short and the only tools available were a drill press, hammer and chisel, so the work was crudely done. The altered design was not at all what would be recommended for regular work, but, the principle being recognized, a proper design suited to endure shock and overstrain could be worked out. At first it may seem rather paradoxical to make a thing stronger by cutting away part of it, but it is not hard to understand when explained. The matter was very instructive as it raised and answered new questions of importance.

A somewhat extended examination of books relating to machine design discovered no information whatever relating to the design of a structure likely to be or intended to be strained while cold beyond its elastic limit. In all the books looked at, stresses within the elastic limit of the material were alone provided for. Dead and live loads were both dealt with and ways for meeting them prescribed, but not overstrain or shock. Halsey's book came out later.

Breaks Under Static and Dynamic Stresses

In testing or using an article to destruction by static stress great enough to pass the ultimate strength of the material, it finally gives way at the weakest point regardless of the relative strength of the other parts. It does not alter the breaking load, however much stronger the structure is elsewhere. A bridge or stationary frame of a machine is but little the worse for being unnecessarily strong in some of its members or parts, except for the extra load imposed by any superfluous metal. The coupler in question passed its static test, which was a direct pull of two engaging couplers coupled together, one against the other, by a good margin. On the other hand, in testing or using an article to destruction by dynamic stress or shock, if there is a point where it is weaker than elsewhere, the thing breaks there when the energy applied to it exceeds the energy—absorbing ability of that spot. The greater strength of the other parts has weakened the structure as a whole.

The uniform strength demanded to give a piece or structure maximum endurance under dynamic stress does not necessarily require that the cross section be uniform or even of similar design throughout. But if the stresses are tensile and longitudinal the cross section is likely to be of the same shape and area from end to end as in the case of the bolt mentioned. If, however, the stresses tend to bend the piece the shape of the cross section may be different in the different parts of the piece, and the area of cross section will practically always diminish from the point of support to the point of loading, or vice versa, according to the way in which the load is applied. The one requisite is that the strength everywhere shall vary with the bending moment imposed by the load.

A piece so designed will have the maximum stretch, or spring or "give" within the elastic limit and therefore the greatest ability to absorb energy without being bent. If of ductile material and the load passes its elastic limit, the piece will be overstrained, but uniformly so, and the energy required to bend and then to break it will be the greatest possible. Conversely, a certain amount of dynamic energy applied may overstrain a structure of uniform strength and fail to do so with a similar one of uniform strength.

As Professor Sweet once said (quoted by Halsey) when considering machine design in an allied field: "Cut it down where it doesn't break." He evidently had had some experience along this line but what it was and the existence of the apothegm were alike unknown to the writer at the time of the coupler test.

A piece which has been overstrained will have a higher elastic limit than before, due to the cold working, and therefore to overstrain it further a greater stress must be applied than for the first overstrain. I remember a steel peel I once had made for charging a steel-melting furnace by hand. It was of the same carbon, 0.35 per cent, as other peels we had but it

bent in use and lacked the spring a peel should have. The men therefore did not like it and used the old peels instead whenever they could, but occasionally had to fall back on the new one, so that it had some use, being turned over frequently to compensate for and straighten out the bends it acquired. In time the cold working from this occasional use gave it the stiffness required and it became a satisfactory tool.

Another advantage from designing a structure as described to resist overstrain is that if moderately overstrained by some excessive load it will not be broken and may be restored to its original shape by subsequent hot or cold working.

Examples in Practice

A somewhat allied principle is involved in the manufacture of small articles made from wires, bars or plates of metal by cold working, as by pressing or bending. The uniform cross section affords the uniform strength desired sufficiently well, though the requirement here is that the piece shall endure the overstrain or cold bending incurred in its manufacture without breaking, rather than it shall have the greatest resistance to dynamic stress. A weak place resulting from a decreased cross section anywhere would be likely to lead to fracture in the wire or plate at that point when the piece is bent or worked and therefore could not be permitted.

Another matter brought up by this subject is the importance of standard test pieces in the impact test, particularly as to the contour of the bottom of the notch in the test piece. Whether this is a V or rounded or square makes a great difference in the amount of energy it will absorb in being broken.

The principle involved in the foregoing is simply that embodied in the famous poem, "The One Hoss Shay" of Oliver Wendell Holmes. As the deacon said, "The weakest part must stand the strain." So he built the shay uniformly strong throughout, "neither less nor more" strong in any part, and the result was maximum service.

The advantages from uniform strength of a structure have been long recognized in machine design in a limited way in the use of fillets in re-entrant corners, which have been found to be weak spots when they exist, as in a casting, and sometimes causes of failure. A fillet tends to make the strength of the piece more uniform by adding metal to the weakest spot and hence better able to resist both shock and static loads. The fillet also tends to prevent the formation of incipient cracks in the corner in casting and so performs a double service.

The lesson taught by all the preceding is that in designing all structures liable to be subjected to sudden stresses the most painstaking care should be exercised to have all the parts exactly proportioned to the stresses they may have to endure, so that the whole will be uniformly strong.

Structures of Brittle Material

The foregoing relates to structures of ductile material; but it may be worth while to consider briefly some made of brittle material having no ductility, or elastic limit aside from the tensile strength, which are liable to be overstrained. If a structure of such a material is likely to be cracked or broken in use, and it is impracticable to prevent such cracks by making the article stronger, as when it is cracked by unavoidable expansion or contraction which may be uneven, one or both, the articles should be made in pieces suitably fastened together if necessary, as by bolts. The joints will allow some yielding or expansion which will avoid the formation of other cracks. In extreme cases space may be left between the parts. The joints can, as a rule, be so located as not to be unsightly or troublesome. Cast iron bottom plates for bottom-casting steel ingots, which plates are unevenly heated by the hot steel should be so made by building them up of a number of castings provided with flanges for bolting them together. To develop the plan still further heavy loose channels of cast iron two inches thick or more may be imbedded in the bottom plate flush with its upper surface which channels hold the runner bricks. These channels furnish a considerable part of the surface in contact with the hot steel and, being free to expand, diminish the expansion of the bottom plate itself, and hence its liability to be cracked. Its term of service is thereby greatly prolonged.

Pavements in Sections

Cement pavements for either sidewalk or street are usually made in separate sections for the same reason. If made in one large piece or monolithic they will be cracked by expansion and contraction due to changes in temperature between day and night and between summer and winter. In this case the changes in volume are not uneven as in the case of the bottom plate, but the inability to shrink on cooling is because of the great size and weight as well as lack of strength of the pavement. Irregular cracks are therefore liable to run through it. The principle is applied by dividing the pavement into blocks or sections of suitable size, separated from each other by joints formed by paper or tar or other yielding substance. If cracks are unavoidable, put them in at the start.

Standard Foundry Co., Worcester, Changes Hands

The Crompton & Knowles Loom Works, Worcester, Mass., has purchased the Standard Foundry Co. property on Gardner and Tainter streets, that city. The Standard Foundry Co. in turn has purchased the Whitcomb-Blaisdell Machine Tool Co. foundry property on Southgate and Armory streets, and will occupy same on or before Dec. 15. All foundry work necessary in connection with the products of the Whitcomb-Blaisdell Machine Tool Co. and the Reed-Prentice Co., Worcester, and the Becker Milling Machine Co., Hyde Park, Boston, hereafter will be confined to the Reed-Prentice Co. foundry on Gold Street, Worcester.

The original Standard Foundry Co. property is in close proximity to the Crompton & Knowles plant, and has valuable Boston & Albany Railroad facilities. It is not the intention of the loom makers to operate their new foundry as such for the present, at least. Possibly patterns will be stored there, and in that event valuable production space in the loom making plant will be released. The Standard Foundry Co. is a $40,000 corporation. Charles F. Hutchins is president and treasurer. Its new property consists of about 106,000 sq. ft. of land, a main foundry approximately 340 x 100 ft., various pattern and carpenter shops, an office building and several pattern storage buildings as well as a New York, New Haven & Hartford Railroad siding. The Reed-Prentice Co. foundry has been closed since December, last, but as soon as possible will be put in operating condition.

Townsend Co. Improvements

Improvements and extensions now in progress at the plant of the Townsend Co., New Brighton, Pa., will enable the company to double its present output of rivets and in point of production the company will be the largest in the world in the manufacture of rivets. Present capacity of the plant is 6000 tons of rivets and next spring, when it is expected the extensions will be completed and in operation, an output of 12,000 tons a month will be possible. The company already enjoys the distinction of being the only one in the country which makes a complete line of rivets, its size range running from 3/32 in. to 1½ in., the company using both the solid and split die. The company also produces wire and wire nails and the addition to its wire mill will permit increases to its productive capacity. The company purchases its rods, but does all its own drawing, heating and cleaning. A 3-story concrete warehouse is included in the building program of the company. The Townsend Co. is one of the oldest industrial companies in the country, having been founded more than 100 years ago.

The National Metal Trades Association will hold its twenty-fourth annual convention at the Hotel Astor, New York, on April 19, 1922.

IRON AND INDUSTRIAL STOCKS

Attitude of Steel Industry Toward Disarmament is Reassuring

While the market for iron and industrial stocks continues to display underlying strength, the advance in values has slowed up considerably. In certain securities moderate reactions have resulted from selling based on dividend prospects, while disappointment over surtax legislation accounts for irregularity in other directions. The statements of Judge Gary and Charles M. Schwab before the members of the American Iron and Steel Institute last week, dealing with the steel industry as related to the limitation of navies, have had a reassuring influence upon investors, as is proven by the relatively small amounts of steel shares finding their way into the open market. The agreement of the railroads for an immediate reduction of 10 per cent in freight rates on farm products for a period of six months is generally accepted among investors as a step in the direction of lower freights on other commodities, which should result in greater industrial expansion. The recovery to normal money conditions for the first time since 1915, however, is the overshadowing influence upon investment buying to-day. Purchases of copper metal by manufacturers for 1922 delivery account in a measure for recent buying of copper shares.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	34¾- 36½	Midvale Steel.....	24⅛- 25½
Allis-Chalm. pf...	82¼- 83	Nat.-Acme	12½- 13¾
Am. Can com.....	30 - 32½	Nat. E. & S. com.	34⅞- 39¾
Am. Can pf.....	89 - 90	N. Y. Air Brake..	54 - 61⅞
Am. C. & F. com.	136 -138¾	Nova Scotia Steel.	21¼- 22½
Am. C. & F. pf...	113½-115½	Pittsburgh Stl. pf.	-- - 81
Am. Loco. com...	— - 93	Press. Steel com..	59½- 62
Am. Loco. pf.....	108 -109	Press. Steel pf....	90 - 95
Am. Radiator com.	80 - 85	Ry. Stl. Spg. com.	89 - 91¾
Am. Steel F. com.	28½- 32	Ry. Stl. Spg. pf...	105 -107
Am. Steel F. pf...	91 - 92	Replogle Steel.....	21 - 21¼
Bald. Loco. com..	93 - 97⅜	Republic com.....	48½- 50½
Beth. Steel com..	50 - 53¼	Republic pf.....	83½- 85⅞
Beth. Stl., Cl. B..	53¾- 57¼	Sloss com.....	38 - 39⅜
Beth. Stl., 8% pf..	101¼-103⅛	Sloss pf.....	— - 75
Chic. Pneu. Tool..	51 - 53	Superior Steel....	— - 30½
Colorado Fuel.....	24½- 25	Transue-Williams.	— - 32⅝
Cruc. Steel com...	62½- 67¼	Un. Alloy Steel...	25⅛- 26⅞
Cruc. Steel pf.....	— - 87½	U. S. Pipe com...	14⅞- 15½
General Electric..	133 -137	U. S. Pipe pf.....	— - 46½
Gt. No. Ore Cert..	32¼- 33¾	U. S. Steel com...	81¼- 83⅝
Gulf States Steel.	38 - 40	U. S. Steel pf.....	111¾-113¼
Int. Har. com.....	76½- 78⅝	Vanadium Steel...	30¼- 32⅞
Lackawanna Steel.	40⅛- 43	Westingh'se Elec.	46½- 47⅜

Details of Merger Agreed Upon

Details of the plan whereby the Pullman Co., Chicago, will absorb the Haskell & Barker Car Co., Michigan City, Ind., have been finally worked out. Under the plan, the Pullman Co. gives three shares of its stock in exchange for four shares of Haskell & Barker stock. With the consummation of the consolidation, Edward F. Carry, president the Haskell & Barker Car Co., will become president of the Pullman Co., succeeding John S. Runnells, who will become chairman of the board of directors. Special meetings of the stockholders of the two companies will be held to secure their acceptance of the proposals.

Industrial Finances

The International Nickel Co., after allowing for all operating charges, federal taxes and the preferred stock dividend, for the six months ended Sept. 30, last, showed a deficit of $696,188. During the corresponding period last year the company earned a surplus of $1,994,640, or $1.19 a share on the common stock.

An issue of $4,000,000 10-year first mortgage 8 per cent bonds of the Charcoal Iron Co. of America is being offered by P. W. Chapman & Co., Harvey Fisk and Sons and the Union Trust Co., of Detroit, at 98½, to yield about 8¼ per cent.

The Durant Motor Co. of Michigan has applied to the Michigan Securities Commission for authorization of its $5,000,000 of capital stock. The main office of the company and its plant will be at Lansing, Mich. Edward Ver Linden, of Lansing, is president of the concern; William C. Durant, of New York, vice-president; E. C. Shields, Lansing, secretary and treasurer. These three with Carroll Downs and C. F. Daley, both of New York, will comprise the board of directors. Mr. Ver Linden will serve as manager of the company. Mr. Durant holds $1,300,000 of the stock, and the rest, $1,000 each. No promotion stock has been issued. Total assets are listed at $1,437,669.

The Davis Sewing Machine Co., Dayton, Ohio, is putting on the market $3,278,000 of 8 per cent cumulative preferred stock. The company recently purchased the manufacturing business of the Blue Bird Washing Machine Co. and now manufactures sewing machines, bicycles, electric washing machines, forgings and gray iron castings. The proceeds of the issue will be employed to liquidate any current indebtedness and to provide the necessary additional working capital to take care of the increasing volume of business. It it not the intention of the company at the present time to make any extensions to their plant.

On petition of the Matthew Addy Co., Cincinnati, the Milwaukee circuit court has appointed Julius J. Goetz, 1910 St. Paul Avenue, receiver of the Seymour Laboratories Units, Inc., 3009 Lisbon Avenue, Milwaukee, manufacturer of automotive parts, chiefly piston rings. The plant is being kept in operation temporarily.

A committee of representatives of principal creditors of the John Obenberger Forge Co., Milwaukee, bankrupt, has filed a plan of reorganization with the referee in bankruptcy, proposing to form the United States Forge Co., Milwaukee, to assume the assets and liabilities of the defunct corporation. The Obenberger company failed in January with liabilities of $858,972 and assets of $1,778,329. The committee reports that the tangible assets of the proposed new corporation will be $1,170,000 and quick assets, $539,000. The reorganization contemplates an authorized capitalization consisting of $350,000 of 10-year, 6 per cent first mortgage bonds; $300,000 of second mortgage, 15-year, 6½ per cent bonds; $375,000 of 7 per cent cumulative preferred stock, and 500,500 shares of common stock having no par value.

The capital of the Reed Small Tool Works, Worcester, Mass., has been increased from $25,000 to $65,000, the additional $40,000 being in the form of common stock. The purpose of the additional capital is to provide working capital.

Stockholders of the Penn Seaboard Steel Corporation have ratified an increase in the share capitalization from 350,000 to 700,000 shares, no par value.

A banking concern has purchased $12,000,000 first mortgage 7 per cent serial bonds maturing in 1922 to 1946 of the General Motors Building Corporation, a subsidiary of the General Motors Corporation.

The directors of the Metz Co., Waltham, Mass., automobiles, due to an accumulation of undivided profits heretofore made by the company and holding of property in excess of liabilities, have voted to increase the capitalization from $500,000 to $925,000, or 4250 shares of preferred stock. They also voted to divide the new and old stock remaining unsold among common stockholders in the ratio of 2½ shares for each one held, and the balance to be kept on sale for cash. The distribution represents a 250 per cent stock dividend. The directors last February took similar action but failed to file notice of same with the secretary of Massachusetts within 30 days. Their action therefore became void.

The directors of Rolls-Royce of America, Inc., Springfield, Mass., passed the quarterly dividend of $1.75 a share on the preferred stock due Nov. 1. L. J. Belknap, president, in a letter to the stockholders says: "At the time of the organization of your company in November, 1919, provision was made through a trust agreement for a fund to be used in the payment of $7 per share annually to the preferred shareholders during the construction period. The amount so set aside provided for five payments which have been made at regular quarterly intervals up to Aug. 1, 1921, from which date dividends on the stock become cumulative. Your plant reached a basis of output on May 1 in accordance with the schedule of operations as originally planned. While the earnings of your company from this date have created a surplus, your directors do not feel that it would be good judgment in view of the present depressed business conditions and in view of deferred charges incurred during the construction, to inaugurate the payments of dividends at this time."

The shareholders of the Gillette Safety Razor Co., Boston, have ratified an increase in the capital stock from 250,000 to 500,000 shares, no par value. The payment of a stock dividend Dec. 19, amounting to 10 per cent to holders of record Dec. 12, was also approved.

The directors of the Graton & Knight Mfg. Co., Worcester, Mass., belting, have voted to defer the preferred stock dividend due at this time. Three months ago a scrip dividend of 1¾ per cent was declared.

Linfield Myers, president of the Madison County Trust Co., has been appointed receiver for the Buckeye Mfg. Co., Anderson, Ind. The company manufactures tractors.

The Reynolds Spring Co., Jackson, Mich., has declared a dividend of 1¾ per cent on the preferred "A" stock, payable Dec. 31.

Machinery Markets and News of the Works

IMPROVEMENT SLOW

A Few More Favorable Factors, However, in Machine-Tool Situation

Railroads Buying in a Small Way—Hopes Entertained for Increased Business from Carriers

Despite the lack of decided improvement in the machine-tool situation, the trend toward betterment is discernible. More inquiries are being received in some markets and sales, too, are more frequent. Second-hand tools are in greater demand than new tools, but this is not regarded unfavorably by the tool manufacturers, as the stocks of used tools must be considerably reduced before any marked increase in sales of new tools can be expected.

Railroads continue to buy in a small way, usually a machine or two at a time, but there are expectations that the carriers will become a more important factor in the market. Recently published lists of the Lackawanna, Erie and Missouri, Kansas & Texas railroads have not been acted upon, but some of this business may develop before the end of the year. The Santa Fe road has put out additional inquiries for several machines. The Haskell & Barker Car Co., Michigan City, Ind., which has recently taken several contracts for cars, has inquired for about a dozen fabricating machines.

The General Motors Corporation, which inquired for 11 tools for its Dayton, Ohio, plant, is expected to buy soon. A West Virginia manufacturer has bought eight used tools. A Cincinnati machine-tool builder received an order for nine tools from the New Orleans schools.

Bids will be opened this week by the Western Penetentiary at Pittsburgh on a list of tools and awards will probably follow soon afterward.

Gradual increase in operations at some New England machine-tool plants is reported.

New York

NEW YORK, Nov. 22.

Machine-tool buying shows no improvement. The demand is almost entirely for single tools, and second-hand machines are usually preferred. Buyers are seeking bargains and are shopping around a good deal to find what they want. A few railroad orders are being placed, but the volume is almost negligible compared with actual requirements of the roads. The Southern Pacific has bought a radial drill. The Merchants' Despatch Transportation Co., East Rochester, N. Y., has bought three cranes, a drop hammer and other tools. The company manufactures refrigerator cars.

The market for all types of cranes is quiet, activity being largely confined to negotiations on old inquiries, which include the cranes for the Textile Finishing Machinery Co., Providence, R. I., and the American Car & Foundry Co. Price continues the greatest factor in crane purchases and in this respect quotations are probably as near or nearer the pre-war level as in any line of manufacture. Calculating on a basis of price per lb., 10c., 11c. and 12c. is the average with many companies, while orders have been booked as low as 9c. The award of the 34 gantry cranes for the New York City piers at Stapleton, S. I., has not yet been made. The low bidder was Heyl & Patterson, 90 West Street, New York.

Among current inquiries is a 15-ton, 50-ft. boom locomotive crane for coal handling, being purchased through the Consolidated Products Co., 38 Park Row, New York. Bids for furnishing a 10-ton and a 40-ton crane, about 57-ft. 10-in. span, second-hand, are being accepted by the Florence Pipe Foundry & Machine Co., Florence, N. J. These are to be 3-motor, direct current, 220 volts for machine shop service. Selbach & Mayer, 601 Twenty-second Street, West New York, N. J., have been accepting quotations on a 5-ton, 50-ft. span, 3-motor or hand-power crane. The Bureau of Supplies and Accounts, Navy Department, Washington, has issued a call for bids on 177 chain hoists for Eastern and Western yards, closing Dec. 13, schedule 9065. The Navy Department closed bids Nov. 22, on 258 chain hoists for Eastern and Western yards. The Pawling & Harnischfeger Co., has sold six electric hoists of 2-ton and 4-ton capacity to the American Locomotive Co. for Schenectady, N. Y. The Industrial Works have sold a 25-ton, 50-ft. and 70-ft. boom locomotive crane to the Kenwood Bridge Co., Chicago, and a 40-ton, 50-ft. and 70-ft. boom locomotive crane to the Mount Vernon Bridge Co., Mount Vernon, Ohio.

A one-story mechanical building for automobile service and repairs will be constructed by the Willow Brook Dairy Co., 5 South Fulton Avenue, Mount Vernon, N. Y., in connection with its new plant, to cost about $300,000.

Machinery of the Dressel Mfg. Corporation, 3868 Park Avenue, New York, manufacturer of railroad lighting equipment, etc., will be sold to close the business.

The Charles G. Hupfel Brewing Co., 229 East Thirty-eighth Street, New York, is completing plans for extensions and improvements in its ice-manufacturing plant on East Thirty-eighth Street, to cost about $60,000. Bruno W. Berger, 131 Bible House, is architect. C. G. Hupfel is president.

The Interboro Hoist & Body Co., Williams Street, Long Island City, has leased the ground floor of the reinforced-concrete factory now being erected at Borden Avenue and Van Dam Street, Long Island City, for new works.

Murray Hulbert, Commissioner of Docks, Municipal Building, New York, is developing plans for the improvement of the waterfront at Flushing Bay, L. I., to include a platform wharfage about 8000 ft. in length, to be provided with traveling and revolving cranes. Other freight-handling machinery will be installed. The project is estimated to cost $3,000,000.

W. A. Jones, Washington and King streets, Mt. Holly, N. J., will commence the immediate erection of a one-story automobile service and repair works, 100 x 200 ft., estimated to cost $60,000.

The Fulton Ice Co., Inc., 18 East Forty-first Street, New York, will take bids at once for its two-story plant, 50 x 200 ft., at 138-40 Cherry Street, to cost about $100,000 with machinery. Milton H. McGuire, 315 Fifth Avenue, is architect.

The Inter City Fuel Co., 17 Battery Place, New York, is taking bids for its two-story automobile service and repair works for company cars at 423-25 East Twenty-ninth Street, to be 50 x 100 ft., and estimated to cost about $45,000. Parsons, Klapp, Brinkerhoff & Douglass, 84 Pine Street, are architects.

The State Ice Mfg. Corporation, New York, recently organized, represented by Schwartz & Jakobson, 150 Nassau Street, has acquired property on Stanton Street, 200 x 200 ft., for the construction of a one-story ice-manufacturing plant, estimated to cost about $500,000 with machinery. Work will commence at an early date.

The Weehawken Dry Dock Co., Weehawken, N. J., has made a proposal to the board of city commissioners, Jersey City, N. J., for a lease of a portion of the South Cove, near Henderson Street and the Morris Canal, as a site for a new shipbuilding and repair plant, estimated to cost about $300,000.

Bids will be asked at once by Koch & Wagner, architects, 32 Court Street, Brooklyn, for a one-story automobile service and repair building, 158 x 215 ft., at Ridgewood, L. I., to cost about $100,000. It will be built by the H. C. Bohack Co., 2191 Broadway, Brooklyn, for company cars and trucks.

The Knickerbocker Ice Co., 45 East Forty-second Street, New York, has awarded contract to the Turner Construction Co., 244 Madison Avenue, for its one-story ice-manufacturing plant at 1147 Nineteenth Street, N. W., Washington, 82 x 100 ft., to cost about $80,000.

The Metropolitan Roofing Material Co., 214 East 135th Street, New York, has plans under way for a one-story fac-

tory, 100 x 100 ft., on 137th Street. Albert E. Davis, 258 East 138th Street, is architect.

The Davis Transportation Co., Mamaroneck, N. Y., has awarded contract to Acampora Brothers, 39 Ward Avenue, for a one-story motor service and repair building, 54 x 100 ft. Charles A. Lupprian, 458 Main Street, New Rochelle, N. Y., is architect.

The Paul E. Flotron Co., Lafayette Building, Philadelphia, is contemplating the erection of a new ice-manufacturing plant at Pleasantville, N. J., with initial daily capacity of 50 tons. It will be three-stories, 100 x 130 ft.

The Florence Pipe Foundry & Machine Co., Florence, N. J., has awarded a contract to the Austin Co., Bulletin Building, Philadelphia, for a one-story machine shop, 60 x 250 ft. C. L. Reeves is superintendent.

Property at 242-68 Thomas Street, Newark, N. J., has been acquired by Hilmer M. Nelson, Brooklyn, as a site for a plant to manufacture heavy machinery for use in boiler and tank shops. Plans will be prepared at once.

Hedges & Brother, 10 Railroad Place, Newark, manufacturers of valves, piping and kindred steam and water specialties have awarded contract to A. C. Windsor, 263 Washington Avenue, for a two-story plant at 105-7 South Street, to cost about $22,000.

For use as a service works in connection with its new automobile manufacturing plant in the Belleville section, the Kelsey Motor Car Co., 25 Branford Place, Newark, has leased the building at 496-8 Central Avenue.

The Ingram Motor Co., Egg Harbor, N. J., will break ground at once for a two-story automobile motor plant, 40 x 200 ft., at Norfolk and Atlantic avenues. Joseph A. Ingram is president.

The Palmyra Motor Co., 115-17 Broad Street, Palmyra, N. J., has awarded a contract to George W. Shaner & Sons, Palmyra, for a one and two-story service and repair works, 58 x 110 ft. C. B. McCoy is head.

Chicago

CHICAGO, Nov. 21.

A number of local dealers report having booked the best week's business for several months. Orders are principally for single machines and come from miscellaneous sources. Inquiries are also more numerous. While no further railroad buying is reported, the Santa Fe has put out the following additional inquiries: Two 20-in. x 12-ft. engine lathes, one 42-in. squaring shear, one 8-ft. boilermaker's flanging clamp, one No. 3 Norton, or equivalent, double emery grinder with 1½-in. spindle and 24-in. wheel, one 250-hp. trip hammer. The Haskell & Barker Car Co., Michigan City, Ind., which recently received large orders for freight cars, has issued the following list:

One 12-ft. gate shear for ¾-in. plate.
Two single three-gang punches ¾-in. capacity.
One horizontal punch machine for ¾-in. steel.
One gang punch machine with 10 ft. between housing.
One No. 9 Williams-White bulldozer.
One 750-ton Bliss track.
Two 96-in. deep gap pit riveters, with capacity for ¾-in. rivets.
Two 48-in. shallow gap side riveters, ¾-in. rivet capacity.
One drawbar riveting machine.
Two Allen compress riveters.
Two Allen pinch bug riveters.

The Commonwealth Edison Co., Chicago, has withdrawn its inquiry for three engine lathes. The Johnston Brothers Clay Works, Clayworks, Iowa, is in the market for a 48-in. x 18 or 20-ft. engine lathe. The National Supply Co., Toledo, Ohio, wants a used 24-in. Steinle turret lathe.

The Herz Bed Co., 2318 Southwestern Avenue, Chicago, has been incorporated with $75,000 capital stock to manufacture spring beds, day beds, etc. It has leased 35,000 sq. ft. at the above address and has purchased the necessary spring bed machinery. The officers are Gene Herz, president, and R. J. Rosenberg, secretary and treasurer. Mr. Herz was for 15 years connected with the Englander Spring Bed Co.

The National Simplex Crane Engineering Co., 612 West Adams Street, Chicago, has been incorporated with $200,000 capital stock to manufacture cranes for material lifting or bucket work, and is looking for a site for the erection of a plant. The officers are: President, William J. Fortune; vice-president and treasurer, Mortimer B. Flynn; secretary, Willis D. Nance.

The Montrose Sheet Metal Works, 4616 North Clark Street, Chicago, has let contract for a one-story shop, 23 x 130 ft., to cost $5,000.

Ronneberg, Pierce & Hauber, architects, 10 South La Salle Street, Chicago, are receiving bids on a one-story battery service station, 50 x 60 and 100 ft., for John Richards on Northwestern Avenue near Addison Street, to cost $15,000.

The Ideal Book Builders, publishers, 9 South Clinton Street, Chicago, have let a contract for a three-story plant, 44 x 140 ft., at 4311-13 Ravenswood Avenue, to cost $40,000.

The Minneapolis & St. Louis Railroad contemplates the construction of a one-story repair shop at its Cedar Lake shops, Minneapolis.

The G. A. Ball Bearing Mfg. Co., 3051 West Lake Street, Chicago, is constructing a one-story office and factory, containing 22,000 sq. ft. on the south side of Harrison Street, 50 ft. west of Spaulding Avenue.

J. Longfield, Centralia, Ill., has let contract for a two-story garage, 80 x 106 ft., to cost $40,000.

The Duluth Auto Exchange Co., 201 East First Street Duluth, Minn., has let contract for a two-story garage, 100 x 140 ft., to cost $60,000.

The Woodruff & Edwards Co., Elgin, Ill., manufacturer of castings, etc., has awarded contract to the Illinois Hydraulic Stone & Construction Co., 24 South Twenty-first Street, for a one-story foundry addition, 50 x 100 ft., to cost about $13,000.

The Zeigler Ice & Bottling Co., Zeigler, Ill., is planning for a new one-story ice-manufacturing factory, 92 x 95 ft., estimated to cost about $50,000.

The Nebraska Power Co., Electric Building, Omaha, Neb., will build a new power house on North Thirty-ninth Street. Plans have been prepared.

The Handy Sack Baler Co., Eleventh Street and Ninth Avenue, Cedar Rapids, Iowa, manufacturer of sack-filling machines, will build a one-story and basement addition, 26 x 60 ft. J. C. Fulkerson is general manager.

The Great Northern Power Co., Alworth Building, Duluth Minn., has plans under way for a new electric generating plant in the vicinity of Fond du Lac, Minn., estimated to cost in excess of $750,000.

Farm Implement News, a publication, with offices in Masonic Temple, Chicago, is inquiring, in behalf of a client, for the following second-hand machines for export to Sweden: No. 3 or No. 4 bulldozer, 100-lb. Bradley hammer, No. 5 or No. 7 rope drop hammer, one tempering press for moldboards, etc., plow jointer, plow grinding stand, plow polishing stand, clothing polishing wheels, 3 x 20. Quotations should be addressed to "Plow Machinery," care of that publication.

New England

BOSTON, Nov. 21.

The machine-tool market continues slow, business the past week being confined to scattered sales of new and used equipment, mostly the latter. Numerous prospective purchasers have informed local dealers no action will be taken until after Jan. 1 or inventory time, and no new inquiries have developed. Sales the past week include a new 16-in. x 10-ft. quick change lathe to a Maine shipbuilding company, 13-in. x 5-ft. lathe to another Maine concern, four 9-in. x 4-ft. lathes to nearby interests and a 2-in. pipe machine to a textile machine manufacturer. The United Injector Co., Boston, bought new turret lathe equipment, and the American Optical Co., Southbridge, Mass., one-spindle drilling tools. The American Wringer Co., Providence, has closed on used screw machine equipment, the Waterhouse Welding Co., Boston, on three used 14-in. Reed lathes and two used Porter-Cable production lathes, while a Boston manufacturer took a 14-in. x 6-ft. lathe, plain milling machine and a drill press, all used equipment. A central Massachusetts manufacturer bought used No. 2 Brown & Sharpe motor driven surface grinding equipment and a two-spindle drill.

Some New England manufacturers of machine tools are gradually increasing their activities. The plant of the Putnam Machine Co., Fitchburg, Mass., Manning, Maxwell & Moore, after a long period of inactivity has resumed. A central Massachusetts maker of drilling equipment is operating five days a week with reduced forces and securing considerable business in special machines in the Detroit and other districts. A producer of lathes is gradually increasing working forces and is operating nine hours per day, five days a week. One of the largest grinding machine manufacturers is also increasing its working force, now employing close to 900 whereas only a few months ago less than half that number were employed. While some concerns report no increased plant activity, practically all machinery makers say inquiries are very much better and the prospects for business early in 1922 are highly encouraging.

The Bangor & Aroostook Railroad Co. is in the market for an 18-in. lathe. Bids will be asked early in 1922 on the following wood-working and machine shop equipment for a new

Newton, Mass., school: Three Ames bench lathes, two Ames bench millers, one Burke 10-in. motor-driven drill press, one Webster & Perks motor-driven tool grinder, three Blount motor-driven lathes, one American 6-in. bench jointer and one 6-in. motor-driven bench saw.

A Central Western manufacturer of cone driven milling machines has announced a further reduction in prices of approximately 15 per cent.

Machinists' forged clamps have been reduced 10 per cent, also drop forged wrenches and copper oil cans.

A central Massachusetts foundry purchased sand cutting equipment, but the melters as a rule are not inquiring for new machinery.

Fay, Spofford & Thorndike, Beacon Street, Boston, engineers, are taking bids on a pier approximately 1000 ft. long for Portland, Me., the erection of which is contemplated by the State. Present plans call for some lifting equipment.

The Union Hardware Co., Torrington, Conn., skates, etc., will erect a two-story, 60 x 100 ft. addition to its manufacturing plant, as well as a 60 x 200 ft. unit for storage purposes. The company is operating full and recently bought some machine tool equipment.

The O. B. Herith Mfg. Co., Inc., 32 Union Place, Hartford, Conn., special machinery, cutting tools and automobile accessories, has purchased land east of Windsor Street on which it proposes to erect a plant at an early date. Details have not yet been worked out.

Irving W. Reed, Boothbay Harbor, Me., and Fred M. Cook, naval architect, Bath Iron Works, Bath, Me., have formed a partnership under the firm name of the Reed-Cook Construction Co. for the purpose of constructing yachts and other craft. The East Coast Ship Co., Boothbay Harbor plant has been acquired.

Plans have been completed for a one-story, 30 x 60-ft. machine shop and foundry for Flink & Olson, 518 Page Boulevard, Springfield, Mass.

The Reed-Cook Construction Co., Boothbay, Me., recently organized, has acquired the local shipyard of the East Coast Ship Co., which it will operate. The company is headed by Irving W. Reed, Boothbay; and Fred M. Cook, naval architect, formerly connected with the Bath Iron Works, Bath, Me.

Bateman & Co., Inc., Chicopee Falls, Mass., manufacturer of agricultural implements and equipment, operating the Belcher & Taylor Agricultural Tool Co., has arranged for a bond issue of $700,000, the proceeds to be used for general operations, extensions, etc.

The Textile Finishing Machinery Co., Providence, R. I., is contracting for a number of traveling cranes.

Flink & Olson, 518 Page Boulevard, Springfield, Mass., manufacturers of mechanical specialties, have had plans prepared for a one-story machine shop and foundry, 30 x 60 ft. Stuart & Tessier, 94 State Street, are architects.

The American Steel & Wire Co., Worcester, Mass., is considering preliminary plans for the erection of an addition to its plant to cost about $100,000.

The Cambridge Electric Light Co., Cambridge, Mass., has made application for permission to issue capital stock to the amount of $450,000, the proceeds to be used for general operations, purchase of additional property, and extensions and improvements to plants and system. Plans are being drawn for a power house addition, 90 x 180 ft.

A machine and repair shop will be installed in the one-story automobile service building to be erected by A. A. Mills, 80 West Main Street, New Britain, Conn. Plans have been completed.

The M. M. Howe Co., Providence, R. I., operating an automobile repair plant at 417 Fountain Street, will break ground at once for a new one-story plant, 60 x 130 ft., with extension, 40 x 50 ft. The C. I. Bigney Construction Co., 357 Westminster Street, is contractor.

Philadelphia

PHILADELPHIA, Nov. 21.

The H. Brinton Co., 213 Race Street, Philadelphia, manufacturer of knitting machinery and parts, has filed plans for a two-story, steel and concrete works, 60 x 300 ft., and one-story structure, 80 x 140 ft., to cost $234,000. The William Steele & Sons Co., 1600 Arch Street, is contractor.

The Electric Storage Battery Co., Nineteenth and Allegheny streets, Philadelphia, has awarded a contract to the William Steele & Sons Co., 1600 Arch Street, for a one-story addition, 31 x 104 ft.

The Farmers Cold Storage Co., Philadelphia, care of Ophuls, Hill & McCreery, Inc., 112 West Forty-second Street, New York, engineer, has plans under way for a four-story ice and cold storage plant, 90 x 100 ft., at Levich, Milner and Delaware streets. Bids will be asked at an early date.

Metalworking and woodworking machinery at the plant of the Keystone Woodenware Co., 617-21 Reed Street, Philadelphia, will be sold at a receiver's sale on Nov. 29.

The Energy Elevator Co., 214 New Street, Philadelphia, manufacturer of freight elevators and appurtenances, has acquired property adjoining its plant for extensions. It will provide a total plant frontage of 93 ft. and depth of 54 ft.

Ovens, power plant equipment, conveyors, etc., will be installed in the extensions to be made to the baking plant of J. S. Ivins Sons, Inc., 627 North Broad Street, Philadelphia, to triple the present capacity. It has acquired adjoining property at 619-25 North Broad Street, and the structures will be immediately remodeled. The extension will be five-stories, providing about 100,000 sq. ft. of total floor space. Howard S. Roberts is president.

The Quaker City Iron Works, Tioga and Edgemont streets, Philadelphia, have filed plans for a one-story addition to be used as a boiler shop.

The Fanning-Schuett Engineering Co., 502 Ruscomb Street, Philadelphia, has taken bids for a one-story machine shop, at Third and Cayuga streets.

Jacob K. Altemus, 2824 North Fourth Street, Philadelphia, manufacturer of machinery and parts, has acquired the three-story factory on North American Street, 85 x 113 ft., for $47,250, and will use it for expansion.

The Escourt Hotel Supply Co., 910 Ridge Avenue, Philadelphia, has acquired property at 913-15 Ridge Avenue, for a new cold storage plant, estimated to cost in excess of $50,000. Plans will be drawn at an early date.

James J. O'Brien, trustee in bankruptcy for the Frid Engineering Co., 2320 Sansom Street, Philadelphia, will dispose of the machinery and property of the company.

The Borough Council, Lansdale, Pa., is considering the installation of new power equipment at the municipal electric power plant. Superintendent Durk is in charge.

The Board of Trustees, Harrisburg State Hospital, Harrisburg, Pa., is taking bids until Nov. 30, for boiler feed pump, circulating pump, hot water heater, water softening system, feed water filter, piping, fittings, etc., for installation at the power house. E. M. Green is superintendent.

The Department of Public Grounds and Buildings, Harrisburg, Pa., will soon take bids for a one-story machine repair and service building. Frank G. Fahnestock, Patriot Building, is architect.

The City Council, Harrisburg, Pa., has awarded contract to John H. Wickersham, Lancaster, Pa., for a new power house at the waterworks pumping plant, with installation of pumping and other machinery, to cost $243,622.

F. A. Seiberling, head of the New Castle Tire & Rubber Co., New Castle, Pa., and formerly president of the Goodyear Tire & Rubber Co., Akron, Ohio, has incorporated the Seiberling Rubber Co., under Delaware laws, with capital of $55,000,000, to manufacture tires and other rubber goods. The new organization has concluded negotiations with the Portage Tire & Rubber Co., Akron, Ohio, for the purchase of its plant and property, now under receivership, for close to $1,000,000. It will be operated as one of the company units, as will also the New Castle works. Mr. Seiberling is president of the new company.

Buffalo

BUFFALO, Nov. 21.

The War Department, Washington, will discontinue all operations at the plant of the Curtiss Aeroplane Co., Elmwood Avenue, Buffalo, and the property will be placed on the market.

William J. Connors, head of the Great Lakes Transit Corporation, Marine Bank Building, Buffalo, has leased the local car repair shops of the New York Central Railroad Co., at East Buffalo, and will operate the plant as the W. J. Connors Car Shops. The shops have been closed for about nine months.

The New Process Gear Corporation, 500 Plum Street, Syracuse, N. Y., a subsidiary of the Willys-Overland Co., Toledo, Ohio, has taken an order for the manufacture of a large quantity of differential gears for the Durant Motors, Inc., 1819 Broadway, New York.

The Independent Ice Co., Grant Building, Oswego, N. Y., is contemplating the erection of a new cold storage plant at Furnace Station, near Oswego.

The Precision Engineering Co., Hopkins Avenue, Jamestown, N. Y., is said to be planning to rebuild the portion of its factory recently destroyed by fire with loss of about $22,000.

The Canadian Crocker-Wheeler Co., St. Catharine's, Ont., has received an order for the construction of traction equipment for the new hydroradial cars for Windsor and Guelph. The plant has been closed for several months.

Milwaukee

MILWAUKEE, Nov. 21.

The volume of machine-tool business continues to make small but steady gains. November sales of milling machines are showing an increase over October, sustaining the gain established each month since July, the low point. Business comes from a wide variety of sources and is confined to single tools specifying quick shipment. However, a call for special types of equipment is increasing and is expected soon to have some effect on production. Local manufacturers of generating equipment report improvement in business through the better ability of private and public utilities to finance projected improvements and extensions.

The Allis-Chalmers Mfg. Co., Milwaukee, the past week booked an order for seven 23,000-k.v.a. waterwheel type generators, with direct-connected exciters, for the Southern Power Co. of Charlotte, N. C.

The Wetmore Reamer Co., 60-64 Twenty-seventh Street, and the Wisconsin Tool & Supply Co., 210 Sycamore Street, Milwaukee, have been consolidated by a reorganization and will hereafter be operated under the name of the Wetmore Reamer Co., with the following officers: President and general manager, Edward J. Waltzer; vice-president, Charles G. Forster; secretary, Charles F. Puls, Jr.; treasurer, Carl A. Forster; general superintendent, Edward D. Johnson. The Wisconsin Tool & Supply Co. manufactures special tools, jigs, dies, fixtures and thread gages, and for several years was under the general management of Edward J. Waltzer, president, who assumes similar duties under the consolidation. The Wetmore company manufactures expanding reamers, including cylinder reaming sets. The Wetmore Reamer Co. will specialize in the manufacture of expanding reamers for high-speed and quantity production work and expanding machine reamers under 1 in., which have been developed in the last six weeks. It will continue to build tools, dies, fixtures and special thread gages developed by the Wisconsin Tool & Supply Co. Operations have been consolidated in a plant erected a year and a half ago on Twenty-seventh Street.

The Nelson Machinery Exchange, Pearl and Walnut streets, Green Bay, Wis., jobber, dealer and repairer of machine tools and industrial equipment, has started work on an addition, the third within three years. It will be used largely for display purposes and upon its completion the present show rooms will be converted into a shop addition, providing about 3000 sq. ft. for manufacturing and repair work.

The Lincoln Foundry Co., Merrill, Wis., has been organized by Edward Heldt and Son, Harold Heldt, both connected for many years with foundries in Merrill, Antigo, Winona and other cities. It has broken ground for a new shop, 35 x 100 ft., one story, to be equipped with one cupola and two brass furnaces, and will be ready to melt iron about Dec. 10, and bronze, brass and aluminum about Jan. 1. Gray iron and semi-steel castings will be made at the start. Early in the spring additional buildings will be erected. The site is 200 x 600 ft.

The Stoughton Wagon Co., Stoughton, Wis., sustained an estimated loss of $225,000 by fire on Nov. 14 when an old factory building was almost totally destroyed, together with 20 completed trucks, as many in process, and considerable material. Most of the equipment was ruined. The wagon department and other buildings were saved. The concern intended to erect a new motor truck factory department during 1922 and will now advance the project. In the meantime the truck processes will be carried on in parts of the wagon and sleigh shops. F. J. Vea is president and general manager and also head of the Great Lakes Malleable Co., 715 Clinton Street, Milwaukee.

The Gold Seal Battery Co., Green Bay, Wis., has been incorporated with a capital stock of $100,000 to manufacture storage batteries and other electrical appurtenances. The organization was formed early this year and has been in production for some time in leased quarters. It is planned to erect a new factory in 1922 or erect additions to the present plant. John Brogan, G. W. Kennedy and A. B. Fontaine, all of Green Bay, are the principals.

The Elto Outboard Motor Co., Milwaukee, has been chartered with a capital stock of $100,000 to manufacture engines, machinery, etc., principally the production of quick detachable gasoline motors for application to rowboats, canoes, etc. It succeeds to the business established in the Manufacturers Home Building, 62 Mason Street, within the past year by Ole Evinrude, 413 Kenwood Boulevard, Milwaukee, inventor of the outboard motor and founder of the original Evinrude Motor Co. In the spring it is intended to purchase a factory or build a new shop, but details have not been determined.

The Board of Education, Birchwood, Wis., has let the general contract to Schaefer & Olson, Chippewa Falls, Wis., for a two-story brick and concrete high schol and junior vocational training institute, 65 x 160 ft., estimated to cost with equipment about $100,000. The architect is Edward Tough, Madison, Wis.

The Instant Heat Co. of America, Appleton, Wis., has been incorporated with $25,000 capital by Albert H. Krugmeier, L. E. Richardson and Herbert H. Pelkey, all of Appleton, representing a group which recently acquired the plant and other assets of the defunct Instant Wonder Heat Co. of Appleton. The new corporation will continue the manufacture of metal flasks and bottles automatically heating liquids through chemical compounds within walls of the container.

The Schpaatz Mfg. Co. of Grafton, Wis., has been granted a charter to engage in general manufacturing, principally automobile, tractor and farm operating equipment parts and accessories. The capital stock is $25,000 and the incorporators are Otto Kohlwey and Arthur Schpaatz, Grafton, and Oscar A. Mathes, Milwaukee. A shop building has been leased and equipment is now being installed.

The K. O. Muehlberg Co., Manitowoc, Wis., has been organized by Karl O. Muehlberg with $60,000 capital stock to take over and develop his business of manufacturing boring and reaming machines and tools and expects to start work Dec. 1 on foundations for a new machine shop, 50 x 100 ft., to be ready for occupancy about April 15. The general contract has been let to Frank Drumm, local.

Winther Motors, Inc., Kenosha, Wis., a recent consolidation of the Winther Motor Co., Marwin Truck Corporation and Kenosha Wheel & Axle Co., is erecting a one-story addition, 62 x 386 ft., with sawtooth roof, as the first of a series of extensions of the main factory. Details of future additions have not been divulged. Martin P. Winther is president and general manager.

The Wadhams Oil Co., 359 Clinton Street, Milwaukee, has awarded contracts for the construction of a new refinery group costing about $275,000, at Thirty-third Avenue and Burnham Street, to consist of a main building, 100 x 155 ft., a tank house, 85 x 110 ft., and a power plant, 30 x 50 ft., all of reinforced concrete, with steel sash. The general contract has been let to C. B. Danielson, 638 Mineral Street.

Pittsburgh

PITTSBURGH, Nov. 21.

The story of the machine tool and equipment market is one of hope deferred. Inquiries are numerous enough, but in most instances are for preliminary price information or new quotations against old projects, and little actual business is developing. The general belief here is that few orders are likely to be placed during the remainder of the year. The fact, however, that price information is being sought encourages the expectation that the turn of the new year will bring the orders. Bids for the tools for the Western Penitentiary will be opened late this week, and an award probably will follow soon. Illustrative of the fact that inquiries are fairly numerous, the representative of one crane company since the first of the month has had inquiries for no less than 15 cranes. This is probably somewhat above the average because a good many prospective buyers know the makes of cranes best adapted to their requirements and consequently send out inquiries to a selected list of makers.

The Seaman Implement Co., 735 Third Avenue, Huntington, W. Va., advises that it is in the market for several second-hand boilers and wood-working machines.

The Aluminum Co. of America, Oliver Building, Pittsburgh, has preliminary plans under way for a hydroelectric generating plant in the vicinity of Long Sault Rapids, N. Y. J. W. Rickey, Oliver Building, is engineer for the project.

The Wilkinsburg Ice Co., Centre Street, Wilkinsburg, Pa., has completed plans for a one-story ice plant, 85 x 105 ft., and power house at Turtle Creek, Pa.

The West Penn Power Co., West Penn Power Building, Pittsburgh, is arranging for the operation of an electric power plant at Grafton, W. Va., and will make a number of extensions in its lines. The company will insta l a number of machine tools at its shops.

The Keystone Rubber Mfg. Co., 1413 East Eleventh Street, Erie, Pa., has awarded a contract to A. W. Tuttle, 618 East Seventeenth Street, for rebuilding its plant, destroyed by fire several months ago. It will be three-stories, 65 x 120 ft. Joseph R. Mooney is president.

Fire, Nov. 16, destroyed the tipple at the plant of the Pittsburgh Coal Co., near Fayette City, Pa., with loss estimated at about $25,000.

The American Car & Foundry Co., 165 Broadway, New York, is planning for extensions and improvements at its branch plant at Huntington, W. Va., estimated to cost about $200,000.

J. H. Smith, St. Albans, W. Va., is planning to rebuild the automobile and service building, operated by the

St. Albans Garage, recently destroyed by fire with loss estimated at about $60,000.

The Mary Elizabeth Coal Co., First National Bank Building, Huntington, W. Va., is planning for the installation of electrical equipment, mechanical equipment and mining machinery in the vicinity of McGraws, W. Va. Bids will be asked early in the year. H. L. Cox is vice-president and general manager.

The Cherry River Paper Co., Richwood, W. Va., has commissioned J. H. Wallace, 5 Beekman Street, New York, engineer, to prepare plans for its one-story power plant, 40 x 150 ft., estimated to cost about $250,000. George Snyder is assistant superintendent.

The Elkins Power Co., Elkins, W. Va., is planning for the installation of additional machinery in its power plant for increased electric generation. The company recently increased its capital from $50,000 to $100,000 for expansion. C. C. Bosworth is general manager and engineer.

Baltimore

BALTIMORE, Nov. 21.

The Curran Motor Radiator Co., 401 Calvert Building, has acquired property at the foot of Hanover Street for a new plant to manufacture automobile radiators, etc. It will be one-story, 40 x 180 ft., and is estimated to cost about $30,000. The company recently increased its capital to $500,000. Elmer Altreith is president.

The Cherry-Bassett Co., 35 South Charles Street, Baltimore, manufacturer of dairy equipment and supplies, has acquired the factory at Ostend and Russell streets for a new plant.

The Morgan Millwork Co., 113 West North Avenue, Baltimore, has filed plans for a new three-story factory at 1809-25 Falls Road, 146 x 158 ft., estimated to cost close to $50,000. Work will commence at once.

The Board of Awards, City Hall, Baltimore, will receive bids until 11 a. m., Nov. 30, for furnishing and installing a 10-ton, hand-operated traveling crane at the Eastern Pumping Station of the Water Department. Howard Bryant is acting president of the board.

Machinery to cost about $50,000 will be installed at the plant of the Spanish-American Cork Products Co., Westport, Baltimore, to replace equipment recently destroyed by fire. The company has acquired the plant of the Spanish-American Cork & Specialty Co. and will defer rebuilding its own works. Additions will be built later, estimated to cost in excess of $125,000. Oscar T. Harms is president.

The Newport News Shipbuilding & Dry Dock Co., Newport News, Va., is converting its plant for other mechanical service, and for some time to come will devote a large part of operations to railroad car repair work. It has closed a contract covering the repair of several thousand steel and wooden cars. Homer I. Feguson is president.

The Columbia Graphophone Factories Corporation, Woolworth Building, New York, has awarded contract to the M. A. Long Co., Munsey Building, Baltimore, engineer, for the construction of a coal conveyor system at its new plant in the Orangeville section, Baltimore.

Conveying machinery, loading and unloading equipment, etc., will be installed on the wharf to be constructed at the foot of Wolfe Street, Baltimore, by the Belt's Wharf Warehouse, Inc., 936 Fells Street. It will be about 75 ft. long and is estimated to cost approximately $200,000.

The Atlantic Ice & Coal Co., Atlanta, Ga., has awarded contract to the Foundation Co., 120 Liberty Street, New York, for its ice-manufacturing plant, estimated to cost about $135,000, including machinery. Morgan & Dillon, Atlanta, are architects.

The Elberton Cotton Oil Co., Elberton, Ga., is considering the rebuilding of the portion of its plant destroyed by fire Nov. 9, with loss estimated at close to $50,000.

The Harris Hardwood Co., Roanoke, Va., has completed plans and will take bids at once for rebuilding its plant in the Norwich section, recently destroyed by fire. It will be one-story, 80 x 120 ft., and is estimated to cost about $100,000, including machinery. George L. Wade is general manager.

The Treasury Department, Washington, will take bids until Dec. 2 for ice-manufacturing and refrigerating machinery, electric elevators, sterilizers, etc., for installation in a new plant at the Government Hospital, Tanners Creek, Va. J. A. Wetmore, Washington, is acting supervising architect.

The Paxson Tie & Lumber Co., Abbeville, Ga., will establish a new local plant for the manufacture of wagons, plows and similar products.

Traveling cranes, conveying machinery, loading and unloading equipment, etc., will be installed at the proposed new piers to be built by the City Council, Norfolk, Va. J. C. Rue is city engineer.

Detroit

DETROIT, Nov. 21.

Machine tool and supply dealers in this district report a steady increase in inquiries and orders. Many state that during the last month they were able to show a profit for the first time in more than a year.

The Benton Harbor Casting Co., Benton Harbor, Mich., has received a large order from the Cleveland Stove Co., Cleveland, for stove castings, which with other bookings will make it necessary to increase its force to 100.

The Melling Forge Co., Lansing, Mich., has received an order from Durant Motors, Inc., for chassis forgings for 4000 automobiles and from the Firestone Tire Co. for a large number of forged rims. Work on these contracts will start at once.

M. G. Martin, Lansing agent of the Cord Tire Machine Co., Akron, Ohio, is seeking a site in Lansing for the location of a plant to manufacture tires.

The Huron Truck Co., Bad Axe, Mich., has been merged with the Ruggles Motor Truck Co., Saginaw, Mich. A new plant will be erected and production at Saginaw increased. The Ruggles company was organized by the former president of the Republic Motor Truck Co., Alma, Mich., and only recently got into production.

Earl Motors, Inc., Jackson, Mich., has acquired the plant and business of the Jackson Metal Products Co., which normally has employed about 200. It has been making sheet metal automobile accessories and has manufacturing facilities for fenders, running board aprons, gasoline tanks, etc. The plant will be improved and will become a unit of the Earl company.

The Michigan Hardware Co., Oakes and Ellsworth streets, Grand Rapids, Mich., has awarded contract to the Owen, Ames, Kimball Co., Michigan Trust Building, for a three-story top addition to its plant, 100 x 100 ft., to cost about $35,000.

The Peninsular Power Co., National Bank Building, Madison, Wis., will break ground at once for a new power house, 50 x 125 ft., at Crystal Falls, Mich., to cost about $60,000.

The National Portland Cement Co., 516 Book Building, Detroit, will defer the erection of its proposed plant at Coldwater Lake, Mount Pleasant, Mich., until spring. It is estimated to cost about $500,000 with machinery. H. C. Shields is manager.

The Port Huron Sulphite & Paper Co., Port Huron, Mich., will commence the immediate construction of its additions, estimated to cost about $150,000, including machinery.

The Steel Furniture Co., 1480 Buchanan Street, S. W., Grand Rapids, has foundations under way for its two-story and basement addition, 80 x 150 ft., estimated to cost close to $100,000 with equipment. E. S. Irwin is president.

The General Motors Co., Detroit, has disposed of a bond issue of $12,000,000, taking a mortgage on its new 15-story office building for this amount, the proceeds to be used for general operations, additions to working capital, plant extensions, improvements, etc.

Cincinnati

CINCINNATI, Nov. 21.

Local manufacturers report that the machine tool business is holding up fairly well to the volume attained in October, which was one of the best months this year. While inquiries are steadily increasing, the number of orders placed does not come up to expectations. It is the general opinion that business will be rather quiet for the remainder of the year, but that a marked increase in orders may be seen early in the new year. Sentiment is distinctly better and the recent purchases by railroads of rolling stock give encouragement to machinery manufacturers. There are no new lists before the local trade. The General Motors is expected to buy shortly for Dayton, Ohio, plants, 11 machines being on the list. A West Virginia manufacturer purchased eight used tools the past week and scattered orders for one or two machines were booked from various sections of the country. A local manufacturer is also reported to have booked nine tools for a vocational school at New Orleans. Local dealers state sales of used equipment show a steady gain.

The Harvey Brothers Tank & Welding Co., 315 East Second Street, Cincinnati, has completed plans for a new one-story steel building at the corner of Spring Grove Avenue and Brashear Street. It has not yet been decided whether construction will begin immediately or in the spring. Some new equipment will also be purchased.

The City Ice & Fuel Co., Cincinnati, will build an ice manufacturing plant costing $150,000 at Clark Street and Freeman Avenue. An ice storage plant will also be erected.

The Board of Trustees, Ohio State University, Columbus,

Ohio, is completing plans for a one-story and basement power plant, 139 x 200 ft., estimated to cost about $375,000. Carl B. Steel, Administration Building, is secretary.

The Carroll Chain Co., 63 Smith Place, Columbus, Ohio, manufacturer of iron chains, etc., is having plans drawn for a one-story plant on High Street, 50 x 150 ft., to cost about $25,000.

Indiana

INDIANAPOLIS, Nov. 21.

T. B. Laycock & Son, manufacturers of children's bicycles and specialties, Indianapolis, will build a two-story factory, 82 x 100 ft., at Eleventh and Fayette streets.

The Alexandria Metal Products Co., recently organized at Alexandria, Ind., has established its plant in the buildings formerly occupied by the Zeigler Fence Co. It manufactures automobile parts.

The Johnson Motor Co., South Bend, Ind., has been organized with $1,250,000 capital stock to take over the Johnson Motor Wheel Co., which went into receivership. The company manufactures motor bicycles.

The Stevenson Gear Co., Indianapolis, has removed from Daly Street to its new factory at Eleventh Street and Cornell Avenue. The company manufactures the Stevenson multiple shaper, a gear-cutting device.

The Standard Oil Co. of Indiana, Indianapolis, is considering the erection of a new two-story service and distributing plant, 40 x 200 ft., at Twenty-ninth and Schurman streets, estimated to cost about $100,000. Plans will be prepared early in the year.

The Columbian Enameling & Stamping Co., Terre Haute, Ind., will soon take bids for its one-story and part basement addition. J. G. Vrydaugh, 1515 South Eighth Street, is architect.

The Central South

ST. LOUIS, Nov. 21.

C. M. Byrd, 2319 South Ohio Street, Sedalia, Mo., is planning the construction of a new one-story and basement machine shop.

The American Refining Co., Okmulgee, Okla., is considering the erection of a new oil refinery in the vicinity of Great Falls, Mont.

The Osage Power Site Co., Lamar, Mo., has preliminary plans under way for hydroelectric generating plant on the Osage River, estimated to cost in excess of $2,000,000. Reed Wilson, Lamar, is consulting engineer. W. E. Brooks is manager.

Fire, Nov. 13, destroyed a portion of the plant of the St. Louis Cotton Compress Co., Little Rock, Ark., with loss estimated at close to $450,000, including machinery and stock.

The Lebanon Sheet Metal & Plumbing Co., South Cumberland Street, Lebanon, Tenn., has plans under way for a new factory to manufacture tanks and other metal products.

The Dewey Portland Cement Co., Bartlesville, Okla., will make extensions in its plant to cost about $60,000. H. M. Tyler is president.

The Legell Engine Co., El Reno, Okla., is planning for the construction of a new two-story factory at Wichita, Kan., estimated to cost about $55,000. L. Legell heads the company.

The Cotton States Tractor Co., Nashville, Tenn., manufacturer of farm tractors, cutters and other agricultural equipment, has been reorganized as the Dixie Silo & Cutter Co., with capital of $100,000. It is headed by J. H. Whalen, J. H. A. Ross and Thomas G. Kittrell, Nashville.

The Missouri Farmers' Association, Springfield, Mo., D. M. Gause, president, has plans under way for a new cold storage and refrigerating plant in the vicinity of St. Louis.

The Morrilton Cotton Compress Co., Morrilton, Ark., is perfecting plans for additions to cost about $75,000.

Fire, Nov. 16, destroyed a large section of the plant of the Fort Smith Compress Co., Fort Smith, Ark., with loss estimated at close to $500,000, including machinery and stock.

The Arkansas Light & Power Co., Pine Bluff, Ark., is planning to enlarge its power plant at Picron, Ark., estimated to cost about $100,000, the greater portion of which will be expended for electrical equipment. H. C. Couch is president and general manager.

The C. & A. Motor Car Co., Columbus, Kan., is planning the erection of a two-story service and repair building, estimated to cost about $50,000, with equipment. F. Hart, manager, is in charge.

The Montgomery City Electric Co., Montgomery, Mo., has preliminary plans under way for rebuilding the portion of its power house recently destroyed by fire with loss of about $50,000.

Yost & Cook, 231 South Fifth Street, Louisville, have had plans drawn for a one-story automobile service and repair works, 140 x 200 ft., estimated to cost about $80,000 with equipment. Work will commence at an early date.

The Louisville & Nashville Railroad Co., Louisville, is planning for the construction of new car repair and erecting shops at Mobile, Ala., in conjunction with a new train and classification yard, the entire project estimated to cost about $1,500,000. The company is also planning for improved shop, freight and operating facilities at New Orleans, with estimated cost of $940,000. W. M. Courtenay is chief engineer.

The Gulf States

BIRMINGHAM, Nov. 21.

The Crystal Ice & Storage Co., 1704 Avenue D, Birmingham, recently organized, has completed plans for a new ice-manufacturing and cold storage plant, with daily capacity of about 50 tons. G. E. Brett is engineer.

The Common Council, Fort Pierce, Fla., has completed plans for a municipal electric power plant to cost about $60,000. Work will begin at once.

Fire, Nov. 11, destroyed the plant of the Meridian Veneering Co., Meridian, Miss., with loss estimated at about $45,000, including machinery.

The Bolivar Cotton Compress Co., Cleveland, Miss., is planning to rebuild the portion of its plant destroyed by fire Nov. 11, with loss reported at close to $500,000.

The Chamber of Commerce, Beaumont, Tex., E. C. Bracken, general manager, is perfecting plans for a new oil refinery on local site. A project is also being advanced for the construction of a local paper mill to utilize timber waste.

The Polk, Hunt & Davis Co., Wauchula, Fla., recently organized to manufacture agricultural implements and other equipment, is perfecting plans for its proposed works to comprise machine shop, forge shop and other departments. Bids will be taken until December for machine tools, etc. V. S. Polk is president, and J. B. Hunt, vice-president and general manager.

The Common Council, Green Cove Springs, Fla., is planning to enlarge its electric light and power house, to cost about $50,000.

The Beaullieu Motor Co., Jeanerette, La., has awarded contract to McDaniel & Hartford, Beaumont, Tex., for a one-story service and repair works, 100 x 130 ft. E. J. Beaullieu is treasurer and general manager.

The Antarctic Ice Co., West Palm Beach, Fla., has leased a building, 60 x 100 ft., for a new ice-manufacturing plant with daily capacity of about 35 tons. J. E. Bender is president and general manager.

Crushing machinery, retorts, power plant equipment, boilers, etc., will be installed in the new plant to be established at Crichton, Ala., by the United States Turpentine & Rosin Co., Mobile, Ala., recently organized with a capital of $1,250,000. Frank W. Boynton is president.

The Burwell Motor Co., Jacksonville, Fla., has awarded contract to the P. J. McCullough Co., Jacksonville, for a new two-story service building, with repair shop, 75 x 100 ft., estimated to cost about $45,000. The structure will be owned by D. J. Conroy and occupied by the company under lease.

The Sewerage and Water Board, New Orleans, is taking bids until noon, Dec. 23, for two 55,000-bbl. oil tanks, and one watertube boiler, from 1500 to 1800-hp.

The Agricola Pipe Co., Gadsden, Ala., manufacturer of iron pipe, has awarded contract for a new one-story plant, 100 x 410 ft., to replace its works recently destroyed by fire. Otto Agricola is president.

California

SAN FRANCISCO, Nov. 15.

The Durant Motors Co., Oakland, Cal., has awarded contract to the P. J. Walker Co., Monadnock Building, San Francisco, for its plant at the end of East Fourteenth Street. It will be two stories, of reinforced concrete, with four wings, totaling over all 800 x 800 ft., and is estimated to cost about $750,000, including machinery. Hunter & Hudson, Rialto Building, San Francisco, are engineers.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is perfecting plans for a power house on the Pitt River in Shasta County, estimated to cost $100,000. The engineering department of the company is in charge.

A company is being organized by officials of the Tustin Farm Center, Tustin, Cal., for the erection of a cold storage plant estimated to cost about $35,000.

The Pima Textile Industries, Inc., 206 Monihan Building, Phoenix, Ariz., is in the market for considerable machinery and operating equipment for its new mill in the vicinity of Los Angeles. The company is capitalized at $4,000,000. Shane Morgan is president.

The Golden West Motor Truck Co., Sacramento, Cal., manufacturer of four-wheel drive motor trucks and parts, is perfecting plans for new works at Richmond, Cal. S. Michelson is president.

The Kimball Motor Truck Mfg. Co., Long Beach, Cal., has established temporary offices in the Jones Building, 1261 American Avenue, for the preparation of plans and specifications for its new works on the West Anaheim Boulevard, where four acres has been acquired. Three buildings will be erected, the first unit, 660 x 300 ft. M. O. C. Hull, vice-president, is in charge.

Seattle

SEATTLE, Nov. 15.

The Kilbourne & Clarke Mfg. Co., Columbus Street, Seattle, manufacturer of electrical drills and electrical equipment, has plans under way for a two-story factory, 140 x 160 ft., estimated to cost about $60,000. It recently sold its Columbus Street works to the Westinghouse Electric & Mfg. Co. Harry H. James, American Bank Building, is architect.

J. G. Galvin, care of M. D. Leehey, 620 Alaska Building, Seattle, has made application to construct a power plant on Aarons Creek, near Wrangell Island, Alaska. A company is being organized to carry out the project, which is estimated to cost in excess of $500,000.

The Metal Products Mfg. Co., Portland, Ore., W. W. Lucius, president, recently organized, is completing plans for a factory to manufacture aluminum cooking utensils and other metal goods. A site is being selected and bids for the building and machinery will be asked at an early date.

The Portland Railway, Light & Power Co., Electric Building, Portland, Ore., is perfecting plans for a hydroelectric generating plant on the Clackamas River, near Oak Grove, Ore. The initial unit will develop an output of about 200,000 kw. and is estimated to cost about $2,000,000.

The Shope Brick Co., Portland, Ore., D. F. Shope, president, manufacturer of concrete brick, has contracted with the Chinese Government for the construction of a plant at Canton, China, for Government service, with daily output of about 125,000 brick. Machinery for the plant will be built at Portland.

The Montana Power Co., Electric Building, Great Falls, Mont., has plans under way for a hydroelectric generating plant in the vicinity of Mystic Falls, Missouri River, estimated to cost close to $1,000,000. J. C. Robbins is manager.

Canada

TORONTO, Nov. 21.

The coming general election is having some effect on the Canadian machine tool market. The past week has seen a decided slump in the demand for equipment. It has become manifest that some American interests who were contemplating establishing plants here are putting off these projects until they see what the prospects are for reducing the tariff between Canada and the United States. If the reduction is sufficiently drastic, United States producers can supply this market from plants already in operation across the line and it will not be necessary to locate in the Dominion. On the other hand, should the protectionists continue in power American interests contemplating plants here will go ahead with their programs. At present, however, business is very dull and dealers state that their sales for November are much below those of the past couple of months. Even the small tool market which has been holding up under adverse conditions has taken a slump and consumers are buying in more limited quantities than usual.

The foundry owned by the Chicoutimi Pulp Co., Chicoutimi, Que., recently destroyed by fire with a loss of $50,000, will be rebuilt and new equipment purchased.

The Buffalo Specialty Co., Bridgeport, Ont., will rebuild its plant recently destroyed by fire with loss of $75,000.

The Three Rivers Pulp & Paper Co., Three Rivers, Que., will erect a plant to cost $500,000. Construction will start this year.

The Mona Petroleum Products, Ltd., Toronto, recently incorporated with a capital stock of $500,000, has secured 60 acres at Trenton, Ont., and will build a refinery.

Tenders amounting to $13,000 for an additional machine shop at the Central Technical School, Toronto, have been passed. Equipment will include 21 lathes, one drill, one hack saw, one grinder, 12 motors, and other tools.

The mill owned by the Canadian Lumber & Timber Co., Vancouver, B. C., was destroyed by fire with a loss of $100,000. It will be rebuilt at once.

The Thorold Motors, Ltd., Thorold, Ont., will start work in the immediate future on the erection of a plant to manufacture motor propelled vehicles.

The Colonial Motors, Ltd., recently incorporated with a capital stock of $1,000,000, will establish a plant at Walkerville, Ont. It is said that the plant of the Canadian-Detroit Lubricating Co. may be purchased to facilitate production.

The Service Truck Co., will start work this year on the erection of a plant on a site it recently purchased on the Wellington Road, London, Ont.

The J. R. Baxter Co., Montreal, will start work immediately on the erection of a grinding wheel factory, 50 x 200 ft., to cost $24,000, at Brockville, Ont.

The International Wheel & Rim Co., recently incorporated, is occupying offices in the Lumsden Building, Toronto. It proposes to establish a manufacturing plant and is looking for a suitable site.

The works and assets of the Ideal Concrete Machinery Co., Windsor, Ont., have been purchased by the London Concrete Machinery Co., London, Ont. The plant of the Ideal company will be moved to London, but it has not yet been decided whether the business will be operated independently or in connection with the plant of the London Concrete Machinery Co.

La Cie Electrique de St. Honore, St. Honore, Que., propose to build a hydroelectric plant to cost $60,000. J. F. Grenon, Chicoutimi, Que., is engineer.

The ratepayers of Brockville, Ont., carried a by-law authorizing the purchase by the town of 132 acres to be turned over to the Eugene Phillips Electrical Works, Montreal, in return for which the company will move its plant to Brockville. Preliminary work in connection with the construction of the plant, which will cost approximately $3,500,000, will start immediately.

The Alliance Brass Co., Peterborough, Ont., contemplates the erection of a manufacturing plant.

Government Requirements

The Bureau of Supplies and Accounts, Navy Department, Washington, is asking for bids as follows:

Schedule 9035, for South Brooklyn, N. Y., 780 engineer wrenches, 48 adjustable S wrenches, 180 diagonal cutting pliers and 600 pairs side cutting pliers, opening December 6.

Schedule 9045, for various deliveries, seamless boiler tubes, opening November 29.

Schedule 9046, for Hampton Roads, Va., 1 portable sectional steel building, 30 ft. wide, 100 ft. long and 12 ft. high, opening December 6.

Schedule 9050, for Mare Island, 9,100 ft. steel wire rope, opening December 13.

Schedule 9051, for navy yard, Philadelphia, 1000 gun firing and sight lighting storage batteries, opening December 6.

Schedule 9053, for Mare Island, bolts and nuts, opening December 13.

Schedule 9054, for the torpedo station, Newport, R. I., 2,500 lbs. 30% nickel steel, opening November 29.

Schedule 9055, for torpedo station, Newport, R. I., 150,000 bronze balls, opening November 29.

Schedule 9065, eastern and western yards, 177 chain hoists, opening December 13.

Aircraft Gun Mount Parts—Procurement Branch, Air Service, Tempo. Bldg. No. 6, Washington.—Bids are wanted until 2.30 p. m., December 21, circular ASA 16, for 20 Browning gun adapters, 20 flexible gun mounts, 20 wind compensator for flexible gun and 50 bomb sight brackets for heavy bombers. Address above.

Liberty Engine Spares—Procurement Branch, Air Service, Tempo. Bldg. No. 6, Washington.—Bids are wanted until 2:30 p. m., December 6, circular ASA 11, for furnishing miscellaneous spare parts for liberty engines. For information address above.

Steel Uprights—Office of the Purchasing Agent, Postoffice Department, Washington.—Bids are wanted until November 28 for 120 steel uprights. For information address above.

Cleveland

CLEVELAND, Nov. 21.

The machine-tool business is holding up at about the same volume as during previous few weeks, with orders mostly for single machines. Inquiries seem to be better, but some prospective orders will not be placed until after the first of the year. Some dealers report a better demand for types of machines that are not in as general use as the more standard lines. Orders for turret lathes are holding up in about the same volume as during October, and business placed during the week include a special vertical milling machine purchased by the City Machine & Tool Co., Toledo, Ohio.

Makers of general machinery report the development of a little activity on the part of steel plants in inquiries for coke making and other equipment. One inquiry has come out for an ore handling bridge for a blast furnace.

Crane inquiries show a little improvement. The Erie Malleable Iron Company, Erie, Pa., is inquiring for eight 5-ton electric traveling cranes, with from 34 to 40 ft. span, for charging its furnaces. The American Steel & Wire Co. has purchased a 10-ton electric traveling crane for one of its Cleveland plants from the Alliance Machine Co.

Makers of milling cutters have reduced prices of high-speed cutters from approximately 15 to 50 per cent by abolishing the increment list of extras which for a long time has been included as a regular extra in computing prices on cutters, and are now quoting these cutters at net list prices. It is stated that the price reduction on sizes most in demand is about 33 per cent and that the cut has brought high-speed milling cutters back close to pre-war prices.

Amos Lint has purchased the interests of his former associates in the City Machine & Tool Co., Toledo, Ohio, maker of dies, and is now sole proprietor of that company.

The American Steel Foundries Co. has resumed operations in its Alliance, Ohio, plant at about 25 per cent capacity.

The Andes Tire & Rubber Co., Toledo, Ohio, has been merged with the Towar Consolidated Mills, Toledo, a holding corporation which controls textile mills in Toledo and Niles, Mich. The Andes company, which will be a subsidiary of the Towar company, has a tire-making plant under construction.

The Lincoln Tractor & Implement Co., which has been developing a farm tractor in Dayton, Ohio, has been incorporated and is considering the location of a new plant in Urbana, Ohio. Several Urbana men are interested in the company, including L. H. Norton, who is secretary.

Plans of New Companies

A new plant for the Republic Photographic Corporation at Ferguson, Mo., is being designed by Alb. F. H. Seelig, St. Louis. The plant, with machinery and other equipment, will cost $250,000. There will be a main building, chemical laboratory, 77 x 162 ft. and a hall building for drying of paper, 54 x 250 ft. The buildings will be of steel and hollow tile construction with steel sash. Catalogs are wanted. The president of the Republic Photographic Corporation is E. B. Fish. Charles Schwab, assistant technical director, may be addressed at Ferguson, Mo.

The Witherbee Storage Battery Co., Inc., 643 West Forty-third Street, New York will again enlarge its manufacturing facilities, an expansion of about 100 per cent less than a year ago now proving inadequate. The company reports that its business has more than doubled in the past six months. The company's manufacturing operations carried on at present in factories in New York and at North Bergen, N. J., will be concentrated in a new plant in the Belleville district of Newark. The new factory, which will have 30,000 sq. ft. of floor space, will be devoted entirely to the manufacture of storage batteries and parts. Executive officers will be maintained in New York as at present.

The United States Cast Iron Pipe & Foundry Co. has opened a new office at 811 Dixie Terminal Building, Cincinnati, P. T. Laws, assistant works manager, will make this point his headquarters. Sales from this office will be in charge of Harold G. Henderson.

The stock, fixtures and equipment of the defunct Acme Motor Parts Corporation, 355 East Water Street, Milwaukee, have been purchased for $7,000 by the Maynard Electric Steel Casting Co., Milwaukee. The sale has been confirmed by the bankruptcy court.

The Anderson Wrench Co., Portland, Conn., has filed a certificate of final dissolution.

SHORT TRADE ITEMS

The Newton Steel Co., Youngstown, Ohio, recently opened a New York office at 803 Liggett Building, 41 East Forty-Second Street, in charge of H. D. Eller, district sales manager.

The Metropolitan Vickers Electrical Co., Ltd., with principal offices in Manchester, England, has just completed arrangements with the Railway & Industrial Engineering Co., Greensburg, Pa., whereby the latter company grants to the Metropolitan Vickers Electrical Co., Ltd., the exclusive rights to manufacture and sell apparatus of the R. & I. E. design in the British empire, with the exception of the British North and South American possessions.

The Austin Machinery Corporation announces that the Canadian Austin Machinery, Ltd., Woodstock, Ont., will act as sole manufacturer and distributor in Canada of the complete Austin Line of earth-moving and concrete-mixing equipment.

The firm of Schwartz & Land, 207 Center Street, machine tools, New York, has been dissolved. L. J. Land succeeds the former partnership and will continue the business under the name of L. J. Land at 207 Center Street, as heretofore.

J. M. Betton, who has been appointed sales manager of the Hoevel Mfg. Co., 154 Ogden Avenue, Jersey City, N. J., maker of sand blast machinery, will continue the manufacture and sale of the injector sand blast at 59 Pearl Street, New York.

The Morse Chain Co., Ithaca, N. Y., has moved its Philadelphia office to new quarters in the Fuller Building, 10 South Eighteenth Street.

The Wagner Electric Mfg. Co., Saint Louis, announces the appointment of F. T. Coup as district manager in charge of its Cincinnati office, 20 East Ninth Street. Until recently he was in charge of its Milwaukee office.

The firm of iron and steel brokers known as Avery & Canning (originated by Henry W. Avery about five years ago) has been mutually dissolved and Mr. Avery has formed a new selling company to be called the Henry W. Avery Co., which will continue in the same line of business at 512 Hippodrome Building, Cleveland.

The Boston office of the American Steel & Wire Co. has been moved from 200 Devonshire Street, room 262, to 185 Franklin Street.

The C. R. Armstrong Mfg. Supplies, Inc., 250 Franklin Street, Boston, has moved to 130 High Street.

The downtown office of the Bilt-Rite Equipment Co., Worcester, Mass., room 429, State Mutual Building, has been discontinued. All business is now transacted at 98 Beacon Street, that city.

The Riter-Conley Co. and McClintic-Marshall Co. have opened an office in the Scollard Building, Dallas, Tex.

The Combustion Engineering Corporation, New York, has opened two branch offices, one at 216 Latta Arcade, Charlotte, N. C., in charge of T. E. Nott and the other at Seattle, Wash., where Fryer-Barker Co., 1133 Henry Building, will be representative.

The Lucey Co., Houston, Texas, will handle machine tools and manufacture a complete line of oil well machinery and also engage in the export and import business.

Benjamin L. Whitney, formerly with the Byers Co., has opened an office at 528 Detroit Savings Bank Building, Detroit, and will represent the Orton & Steinbrenner Co., manufacturer of material handling machinery, in that territory.

The Milwaukee Auto Engine & Supply Co., Milwaukee, has changed its name to the Milwaukee Motor Products, Inc.

The C. C. Carter Machinery Co., Providence, R. I., has opened quarters at 36 Garnet Street to deal in new and used machine tools, transmission and supplies. C. C. Carter is manager and Earl A. Adams, treasurer of the company. For the past eight years Mr. Carter was associated with the E. A. Eddy Machinery Co., Providence, and previous to that with Thomas & Lowe.

The Pittsburgh Machinery Co., 301 Jones Building, Pittsburgh, has been taken over by the Bradley Co., which will occupy the same offices and continue the business of new and used railroad, industrial, mining and contractors equipment.

The Pressed Metal Mfg. Co., Waukesha, Wis., will move its plant and offices to Lima, Ohio. It manufactures shock absorbers.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.68c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.68c.
Hoops, base price	3.53c.
Bands, base price	3.28c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.78c.
Channels, angles and tees under 3 in. x ¼ in., base	2.68c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.65c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.85c.
Toe calk, ½ x ⅜ in. and larger	3.25c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.78c.

Sheets

Blue Annealed	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel			*Wrought Iron*		
	Black	Galv.		Black	Galv.
⅛ in. Butt	—55	—40	¾ in. Butt	—30	—13
¾ in. Butt	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt	—62	—49	2 in. Lap	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap	—55	—41	7-12 in. Lap	—23	— 7
9-12 in. Lap	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

* Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	16¼c. to 17 c.
High brass wire	17¼c. to 17½c.
Brass rod	14¼c. to 15 c.
Brass tube, brazed	25¾c. to 27½c.
Brass tube, seamless	18 c. to 19 c.
Copper tube, seamless	21 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$6.05	$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC	$10.25	$8.75	IC	6.40	6.15
IX	11.50	10.25	IX	7.40	7.15
IXX	13.25	11.75	IXX	8.40	8.15
IXXX	15.00	13.50	IXXX	9.40	9.15
IXXXX	16.50	15.25	IXXXX	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	15½c.
Electrolytic	15¼c.
Casting	15 c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7 c.
Solder, ½ and ½ guaranteed	22¼c.
No. 1 solder	20¾c.
Refined solder	17¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	29c. to 31c.

Old Metals

The market is stronger and values slightly higher. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.75
Copper, heavy and wire	10.00
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.25
Heavy machine composition	7.75
No. 1 yellow brass turnings	5.00
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.00

THE IRON AGE

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ESTABLISHED 1855 VOL. 108: No. 22

Scleroscope Hardness of Steel Balls

Widely Varying Results on Different Sizes—An Explanation of the Cause and a Suggested Remedy

BY ARTHUR L. COLLINS*

WHEN the scleroscope is used to measure the hardness of steel balls rather peculiar results are obtained. The old style instrument was used in the following tests, which had a diamond pointed plunger weighing 2.3668 grams and whose diameter of flat was 0.5 mm. In all cases the instrument was mounted on a 75-lb. anvil and repeatedly checked against a standard block to insure accuracy.

Several tests were run in different ways. All readings given are average figures obtained from three readings taken on each of 10 balls, the three readings on each ball being average, then the average of the 10 averages taken, giving the figure used. It is believed that this method gives as accurate results as could be obtained.

In operating the instrument, the ordinary precautions were observed, such as uniformity of pressure on the piece being tested and similarly of release of plunger by means of bulb. A magnifying glass was used to obtain greater accuracy in readings and the same person did all the reading. Before testing each ball was polished and, except as specially noted, it was the commercial product used in ball bearings.

It seems rather odd that a 7/16-in. ball should register 27 and a 1-in. ball 84 when it is known that both sizes were hardened and tempered properly so as to give maximum strength. Each ball was file hard, and one was three times as hard as the other—according to the scleroscope. But this we do not believe, and the problem involved therefore was to find out why this peculiarity exists and to discover some method to obtain an approximately straight line curve. And the method as discovered must be one which can be comparatively easy to apply commercially. Brinell and compression methods are tedious and ruin the ball for further use, but the scleroscope does not harm it for practical use. Details of the tests are as follows:

Test No. 1.—Balls resting on anvil of scleroscope, in same position as pieces are ordinarily tested:

Dia. in Inches	No.	Dia. in Inches	No.
3/16	85	5/8	51
1/4	81	11/16	58
5/16	79.3	3/4	65
3/8	51	13/16	73
7/16	27	7/8	78
1/2	34	15/16	82
9/16	44	1	84

NOTE.—Results of this test are shown in curve No. 1, Fig. 1.

*Metallurgist, Philadelphia.

Test No. 2.—Balls same as used in Test No. 1, but annealed:

Dia. in Inches	No.	Dia. in Inches	No.
5/16	40.3	11/16	35.7
3/8	32.4	3/4	33.7
7/16	12.3	13/16	35.9
1/2	15	7/8	42.1
9/16	24.9	15/16	47.9
5/8	28.4		

NOTE.—Results of these readings are shown in curve No. 1, dotted, Fig. 1.

It can be seen that the form of the dotted curve is about the same as for the hard balls. Of course, we should expect it to be lower, because a soft ball is less resilient than a hard one and offers less resistance to the impact of the plunger. It seems that this peculiar form of curve may be due to one of two causes:

Curvature of the surface, or
Mass of the ball.

In order to investigate the first possible cause, balls from 5/16 in. to 15/16 in., inclusive, were annealed, cut in half, hardened and polished. They were then tested on the scleroscope to obtain readings which would indicate the influence of curvature of surface. Given the same mass in each case, those readings taken on the outside or curved surface would differ from those taken on the flat or inside surface, if the curvature had any effect:

Inside or Flat Surface

Dia. in Inches	No.	Dia. in Inches	No.
5/16	65	11/16	36
3/8	60	3/4	48
7/16	55	13/16	65
1/2	50	7/8	60
9/16	45	15/16	76
5/8	43		

Outside or Curved Surface

Dia. in Inches	No.	Dia. in Inches	No.
5/16	84	5/8	62
3/8	77	11/16	40
7/16	82	3/4	58
1/2	63	13/16	66
9/16	67	7/8	76
		15/16	70

These results are shown in curves Nos. 2 and 3, Fig. 2. There is a little irregularity in these readings which nearly always occurs when using the scleroscope, but, when the curves are drawn, both of them have nearly the same form, and this form is similar to that shown in curve No. 1 obtained on the regular balls. It is now apparent that the curvature of the surface at point of contact has practically no influence on the form of the hardness curve. It is to be noted that

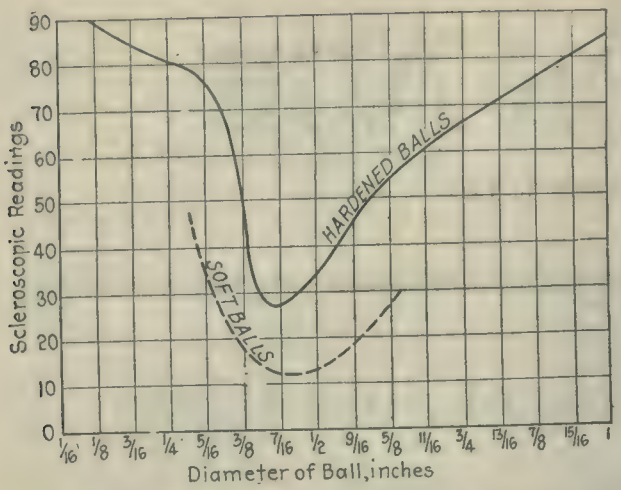


Fig. 1 (Upper)—Curve No. 1 Represents Scleroscope Hardness of Steel Balls Using Hardened Anvil Without Blocks

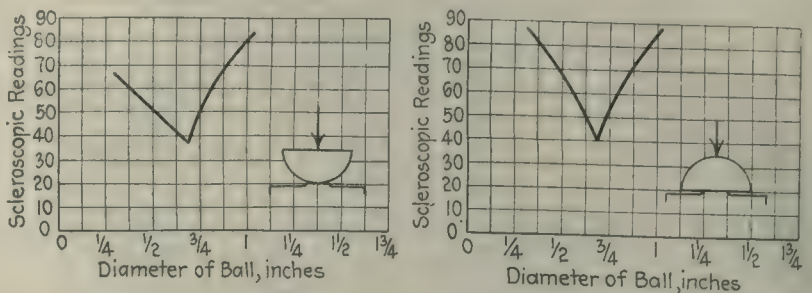


Fig. 2—Curves Nos. 2 and 3 Show Scleroscope Hardness as Influenced by the Curvature of the Surface

sizes; it does not explain why a 7/16-in. ball, which is really just as hard as a 3/16-in., should register only 27 as against 85 for the smaller size. There is no way in which we can actually increase the mass of the 7/16-in. ball. But it seems that the form of the ball also has some effect because we obtained a higher reading on the half ball, when that half ball had a larger area of contact on the anvil of the instrument.

This brings in the subject of the force exerted by the falling plunger and the reaction of the ball to that force. If an imaginary ball be cut in the test block, it would register the same hardness as the block, and we know that the actual ball is just as hard as the test block. So we come to the conclusion that the cause of the peculiarity of curve No. 1 is mass-form and consequent reaction of this mass-form to the falling plunger. If we could determine how the force of the plunger acts, what angles it takes, and properly construct a holder that would be sufficiently rigid to react against the components of the force, then we could get an accurate reading that would represent the hardness of the ball in all cases. The ideal would be a cup cut in a block and the ball would fit perfectly in this cup, and give rigid surface contact. As this is practically impossible, another method would be to give line contact in such a direction that it might give the same results by offering resistance in the proper direction.

the readings taken on the inside or flat surface are nearly all lower than those taken on the outside or curved surface. An explanation of this may be that the inside was not polished as perfectly as the outside, which was done mechanically and was almost perfect. But it is also to be noted that higher readings were obtained in the case of the test on the outside and that in this case there was a larger area of contact of the piece on the anvil of the scleroscope.

To see whether the readings obtained on the smaller sizes represented the hardness of the ball or, if not, what it did represent, a thin strip of lead was put in place and tested. It showed a hardness of 83, which of course is unreasonable. It showed that the reading did not represent the hardness of the piece at all, but was really the hardness of the anvil that supported the lead. This then demonstrates one of the weaknesses of the scleroscope—the inability to accurately measure the hardness of small articles.

The conclusion reached is that the curvature of the surface has very little effect on the scleroscopic hardness, but the mass of the ball does have a large influence. We have just seen that the small balls reflect the hardness of the greater mass of the supporting anvil. But that does not help us out with the larger

Consequently, a series of blocks was made with cone-shaped hole cut in them so that the ball would have a line contact. The form of these blocks is shown in the illustrations. There were three sizes of blocks with a 60-deg. V cut, so that all sizes of balls up to 1 in. might be held. The reaction of the block to the force of the falling plunger transmitted through the ball must of necessity be at an angle of 60 deg. to the horizontal for all sizes of balls and would of course pass through the center of the ball, and the resultant would be vertical, in opposition to the force of the falling plunger. But whether all of this force was directed to the supporting block was the question and could only be decided by the results of the tests.

As will be recalled, there is a slightly raised portion on the anvil of the scleroscope and the flat series of blocks rested on this. The cupped series was made so that they would rest steadily on the anvil and not touch the raised portion. Therefore, the block must of necessity be vertical at all times, which would be necessary to obtain uniform readings. The blocks were made of tool steel, machined accurately, weighed and

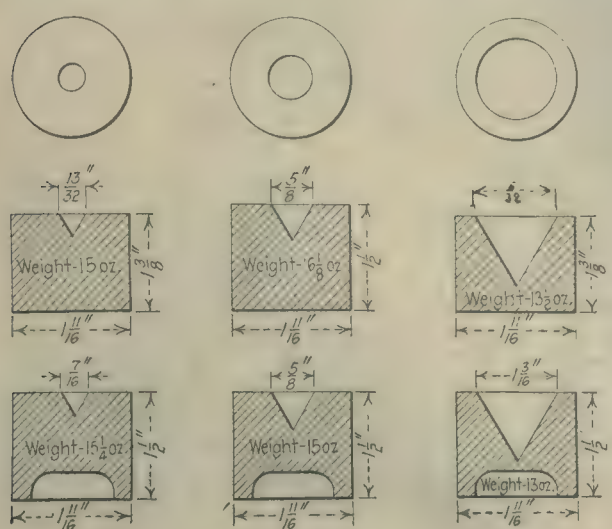


Fig. 3 (Left)—Series of Blocks with Cone-Shaped Holes Used to Determine Effect on Scleroscope Readings. These represent the three sizes with a 60-degree V cut in them

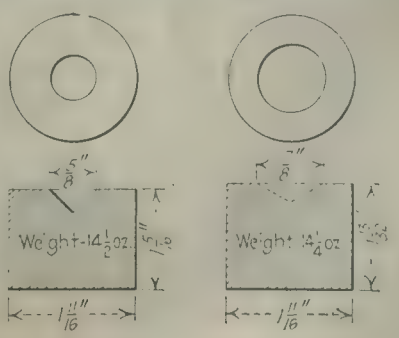


Fig. 4 — The 90-Degree and 120-Degree V Cut Block Used Similar to the 60-Degree

cups polished. It was believed that cups, polished and with a 60-deg. V cut, would give the best results, but blocks were also made with 90 and 120-deg. V cuts. Since these blocks would take up part of the strain exerted by the falling plunger, they would have the effect of increasing the mass proportional to the amount of strain they took up. Results of these tests follow and the readings are plotted in curves Nos. 4, 5, 6, 7, 8 and 9, Fig. 5.

Test No. 4.—Using a 60-deg. V in a soft block with flat bottom:

Dia. in Inches	No.	Dia. in Inches	No.
7/16	71.7	9/16	64.1
½	59.5	⅝	60.8

Test No. 5.—Using a 60-deg. V in a hard block with flat bottom:

Dia. in Inches	No.	Dia. in Inches	No.
7/16	70.5	⅝	70.7
½	68.3	11/16	76.1
9/16	70.1		

Test No. 6.—Using a 60-deg. hard block with cupped bottom:

Dia. in Inches	No.	Dia. in Inches	No.
5/16	76.2	11/16	67.9
⅜	67.9	¾	69.8
7/16	38.4	13/16	73.1
½	43.5	⅞	79.4
9/16	47.7	15/16	73.3
⅝	58.1	1	72.1

These curves show that a part of the strain is taken up by the blocks, but only a part. There is still something lacking. The peculiar dip is not so pronounced. It is also to be noted that the dip occurs at about the same place with the use of a cupped bottom block. The flat bottom block gives more uniform results, perhaps because it is more rigid than the cupped block.

Test No. 7.—Using a 90-deg. V hard block with flat bottom:

Dia. in Inches	No.	Dia. in Inches	No.
5/16	77.9	9/16	68.8
⅜	71.6	⅝	69.8
7/16	70.9	¾	72.5
½	69.2		

Test No. 8.—Using a 120-deg. V hard block with flat bottom:

Dia. in Inches	No.	Dia. in Inches	No.
5/16	74	9/16	52.1
⅜	65.5	⅝	39.8
7/16	61.5	11/16	47.1
½	53.1	¾	67

It can be seen that in this case the dip is present, but the minimum point is not at 7/16 in., but is advanced to ⅝ in. It is apparent that this angle is not the one to go ahead with.

Test No. 9.—Using a 60-deg. V block with cupped bottom and each ball held in soft solder up to the diameter:

Dia. in Inches	No.	Dia. in Inches	No.
5/16	80.0	11/16	81.3
⅜	81.1	¾	80.7
7/16	81.7	13/16	80.9
½	81.0	⅞	81.5
9/16	81.1	15/16	81.3
⅝	80.8	1	82.2

There is a maximum variation of 1.4 per cent from the average, which is as close as could be desired with a scleroscope. But it is evident that this method comes as close to the ideal as can be obtained practically, and it really does comparatively measure the hardness of the ball, whether it is large or small. The average of these readings is 81.13, which is a little low, but may be accounted for by the fact that the solder is not as rigid as steel would be. But the resistance is the same in each case, and consequently we get nearly a straight line. This is the result we had been after, and it is not difficult to apply this test as the solder melts in boiling water and the ball may be seated before the solder sets. It is necessary to have solder around the ball up to the diameter and the ball must also strike the sides of the block in line contact or the reading will be very low.

To show the results obtained by the various methods let us take the 7/16-in. ball and see the different degrees of hardness observed under the different conditions:

	No.
Without any block, ball on anvil	27
60 deg. hard block, cupped bottom	38.4
120 deg. hard block with flat bottom	61.5
60 deg. hard block with flat bottom	70.5
60 deg. soft block with flat bottom	71.7
60 deg. hard block, ball held in mercury	79.9
60 deg. hard block, ball held in soft solder	81.7

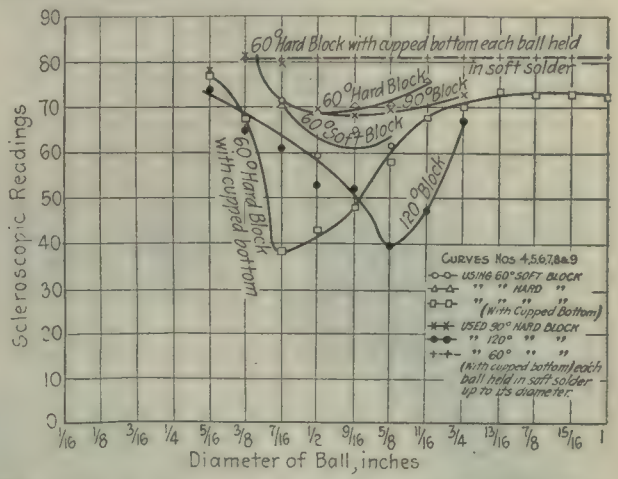


Fig. 5—Curves Nos. 4, 5, 6, 7, 8 and 9, Showing Scleroscope Hardness Resulting from Using Various Blocks

The Carroll Chain Co. to Manufacture Welded Chains

The Carroll Chain Co., Columbus, Ohio, has been incorporated to manufacture a complete line of welded chain. Capital stock to the extent of $100,000 was promptly subscribed and ground broken for the erection of a modern plant. Entirely new equipment of late design will be installed as rapidly as the building progress permits.

The company contemplates the production of both re-weld and electric-weld chain, but will begin operations by confining the manufacture to the fire-weld varieties, giving special attention to steam shovel and dredge chains.

Daniel Carroll, president of the new corporation, is a pioneer chainmaker of Columbus and a man who has devoted an active life to the development of the chain industry. He was one of the organizers of the Columbus Chain Co. in 1900, which is now the Columbus McKinnon Chain Co. The treasurer is G. G. McAlister, who has had 17 years of association with the chain business. J. M. White is sales manager and secretary. He is well known among hardware jobbers, having covered a large territory in a selling capacity. He was associated with the Johnson Sales Co., Pittsburgh, for eight years, leaving it to assume sales duties with the Columbus McKinnon Chain Co. The company expects to be producing some varieties of chain within 60 days.

High Water at Pittsburgh

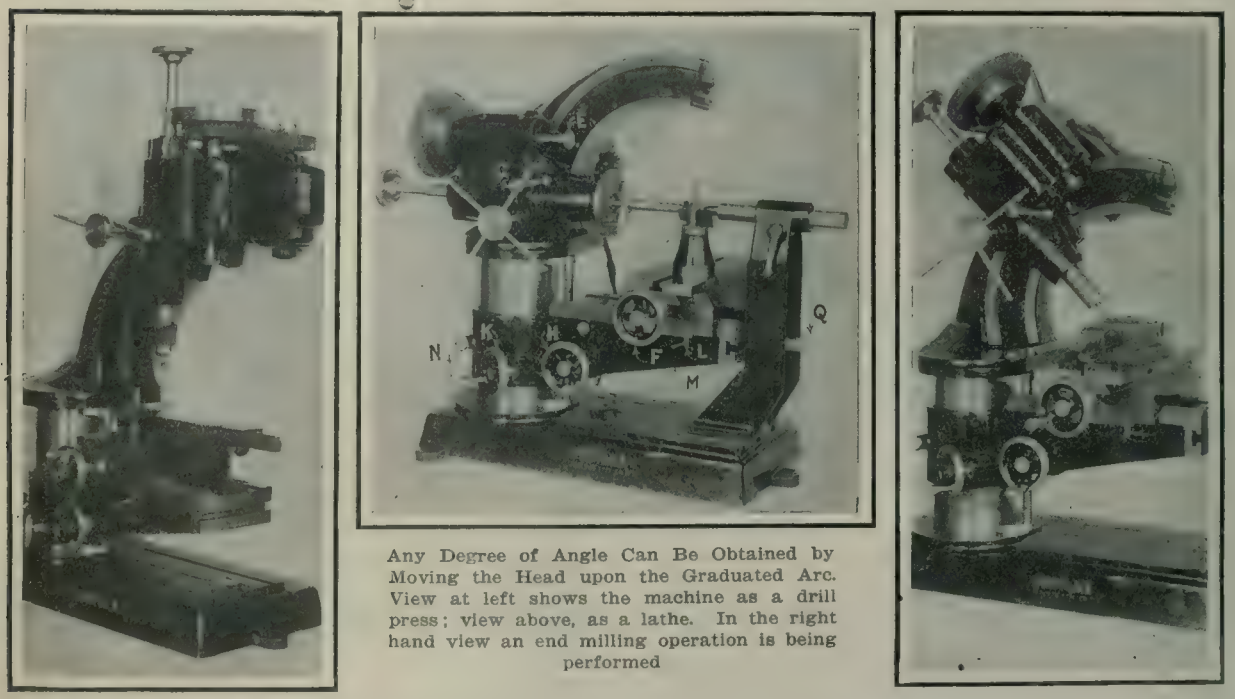
PITTSBURGH, Nov. 28.—Three days of rain here has created semi-flood conditions in the rivers, and some of the steel plants have been forced to suspend operations owing to the inundation. Soho works of the Jones & Laughlin Steel Co. is largely down as a result of this condition, only two of the ten open-hearth furnaces at that plant being in operation, while skelp mill activities also are affected. Unless there is an immediate change in the weather, it is probable that other plants along the rivers will be forced down.

Combination Bench Machine

A new combination bench type machine, known as the Triplex No. 1, which combines lathe, milling machine and drill press, has been placed on the market by the Triplex Machine Tool Corporation, 18 East Forty-first Street, New York. The machine, as shown in the accompanying illustrations, is motor driven and hand fed throughout, with the exception of screw thread cutting. It is said to be adaptable to all operations that can be performed on the bench lathe, bench miller and drill press.

Any degree of angle can be obtained for milling, drilling and boring by moving the head upon the graduated arc, and the spindle can be fed out a distance of 3 in. by the handwheel. The latter feature is of advantage in milling and lathe work, as an extended spindle which can be locked in any position is often required to handle difficult jobs. The spindle is locked by lever D.

The motor is attached directly to the head, so that power is supplied to the spindle when it is in either horizontal, angular or vertical positions. The motor used is a Holtzer-Cabot ¼-hp. reversible, ball-bearing type, and runs at a constant speed of 1750 r.p.m. There are six spindle speeds, from 90 to 1150 r.p.m. Changes in speed are obtained by shifting the shaft *E* upon which three shifting gears are mounted.



Any Degree of Angle Can Be Obtained by Moving the Head upon the Graduated Arc. View at left shows the machine as a drill press; view above, as a lathe. In the right hand view an end milling operation is being performed

When the machine is used as a lathe, as shown in the center illustration, the spindle holds either face plate, spring collet or chuck, thereby permitting a variety of tools to be used. The working table is 5 by 14½ in. The longitudinal feed is 10 in.; the transverse, 6 in., and the vertical 4½ in. The swing over the working table is 8 in. and over the ways of the bed 14½ in. The center distance is 14 in., maximum. The diameter of the milling arbor is ⅞ in. and the spring collet capacity ½ in. The bench space occupied is 16 by 26 in.; the height when spindle is vertical, 43 in., and the weight, 450 lb.

The handwheel *F* is used for transverse feeding, handwheel *H* for longitudinal feeding, and handwheel *K* for vertical feeding. Micrometer dials are attached to all three handwheels. The carriage can be locked in any position by the handle *L*. Tapers can be turned by moving the bed *M* to the right or left of the spindle axis and locking it by means of levers *N* and *Q*.

A separate illustration shows the head swung up at an angle and the end milling operation being performed upon the work held in the vise. The tailstock is removed. The end mill is held by a spring collet in the spindle. The radial arm is graduated in half degrees, which are spaced 1/16 in. apart, so that smaller units of a degree can be readily obtained. The clamping of the head on the radial arm is accomplished by tightening a single nut. The head is counterbalanced by a weight suspended in the hollow column and connected with the head by a steel cable which runs on pulleys.

Thread cutting is done by the master screw method, no lead screw being used. The work is held in a chuck or spring collet, and while the spindle is revolving the handle holding a nut segment is placed in contact with the master screw so that the spindle is thereby caused to feed forward, while the cutting tool remains stationary. At the end of the thread cut, the nut segment is thrown out automatically by the taper on the handwheel. The spindle is then returned to the starting place by the hand wheel. Internal threading is done in the same manner, by using an internal threading tool. The spindle head and motor are shown vertical in the left hand illustration, the machine being used as a drill press. The drill chuck used is a Jacobs No. 6, having a capacity from 0 to ½ in. The spindle is driven directly by gears, and a heavy cut can be taken when drilling. Vertical milling can also be done when the head is in this position. The bed can be swung entirely out of the way so that any type of work can be strapped to the base of the machine, which has three standard tee slots to accommodate ½-in. bolts. Horizontal, angular or vertical operations can be performed on work placed upon the base.

The machine is said to be rigidly constructed throughout, and to represent a complete equipment. In addition to its usefulness in tool rooms, experimental shops and shops having limited floor space, the machine is adapted for small production work requiring angular drilling or milling operations.

George L. Fairbank, president George L. Fairbank Co., Cleveland; F. W. Farnsworth, president, and K. F. Williams, vice-president, Chippewa Iron Mining Co., Cincinnati, have just returned from a visit to the Armstrong Bay mine of the latter company on the Vermilion range. They report the work is moving along more than satisfactorily. A good bit of the work has been completed on the railroad track connecting the mine to the main line. From present progress there is no doubt that the track will be ready for use by the opening of navigation in 1922. Work in the mine proper is going along in an excellent manner and new ore is being developed. The Chippewa Iron Mining Co., through its sales agent, the George L. Fairbank Co., will enter the shipping field next season. It is expected that about 100,000 tons of ore will be available for shipment next year.

The Transition to an Open-Shop Foundry

Methods That Have Been Used with Success in Training Molding Machine Workers—Increased Output the Aim, Not Low Pay

BY PAUL R. RAMP*

A GREAT deal has been written about the open shop and its advantages over the closed shop, but very little if anything about the best and most economical plan for establishing an open shop. Every company should know whether or not it would be benefited by having an open shop and whether or not it wants one, because in making a venture of this kind it is well before starting to know what must be overcome. Very often it is decided to create an open shop without counting the cost, and there is considerable disappointment to the management because it was not fully informed as to the trouble that might be encountered.

The open shop requires more supervision and more efficient supervision than the closed shop, as it is necessary to teach unskilled men many things that are not thought of when skilled labor is employed. In foundry work the green man must have numerous practical demonstrations of the way to do his work. He must be taught how to hold his rammer, how to ram his mold, how to tuck his bars, how to place his gaggers, how to draw his patterns, to place the cores in the mold, and many other details. Whenever it is possible to work a man on the same pattern for a long period he will soon learn his lesson and become a paying investment without continual supervision; but when it is necessary to change his work from day to day he will require instructions daily. His foreman must be more than a good mechanic to enable the company to realize a profit from the new man's work—the foreman must be a good teacher with an unlimited amount of patience.

As a rule, men who accept employment in an open shop with the idea of doing skilled work are very anxious to learn, and if the man in charge has in his make-up the ability to see in them his future mechanics, these men will be a success. It is well to bear in mind that the question of competent supervision must come first in the open shop. Many an attempt to establish such a regime has failed simply because the supervision was not equal to the occasion or leaned to the old order of things.

First, be sure your foremen are heartily in favor of this move, and that they are big enough to carry the load. If they are not, strengthen them by adding sufficient help of the right sort before proceeding any further.

Abolish Uneconomical Practices

One point that must be kept in mind is that the open shop will be of no value if the old shop habits are not made a thing of the past. The best plan is to establish working rules under the open shop administration, just the same as you would if your shop were an entirely new institution. For instance, if the molders have been in the habit of stopping work as soon as the blast goes on, and it is possible for them to keep busy until their iron is ready, make it a rule that they shall work until their iron is ready. This is possible. You cannot serve every molder with iron as soon as the blast goes on, and you are losing money when they follow the rule long established in foundry operation, to stop work when the blast goes on, and do nothing while waiting for iron.

This rule will not work a hardship on your molders, and if they are working by the piece they will be able to make more money for themselves while making more for you. If they are working by the day and do not produce any more by putting in the hour wasted waiting for iron on the regular day's work, they should be able to produce a greater number of good castings for you and fewer for the scrap pile.

Another important item connected with the molders remaining on the floor until their iron is ready for them is that it deprives them of an hour's time usually spent in gossip and trouble making. The closer you can keep your men to the bench or floor the less trouble you will have. The open shop makes it possible to abolish the waiting-for-iron system and get more castings per man and better castings.

In the open shop it is possible to induce a man to do what he can in the way of a daily production rather than what some committee has decided is enough for a day's production for one man.

The open shop breeds loyalty to the company. If these men are properly handled they will appreciate that they have a better job than they ever had before. Instead of being influenced by shop committees to think that they must "beat the boss" at every opportunity, they will be encouraged by their foremen to feel that the company is their best friend.

Reduces Labor Turnover

While the establishing of an open shop means the hiring and discharging of a number of men in order to select the best material, after it is started the labor turnover will be much lower than in any other shop. One reason is that these men will hesitate to try another shop for fear they will be given work so widely different from what they have been doing that they will fail. Another reason is that when men are working under their foreman's instructions and producing what they can without being restricted by any committee, it is possible for the company to pay them more money than they can get in a closed shop; and it is rather difficult for an organizer to induce a body of men to join an organization that cannot guarantee them a greater wage than they are receiving.

It is possible to do better on difficult work with the right supervision in an open shop than in a closed shop. We have in mind a very large foundry employing over 800 men which produced all of its castings with green help, and made castings superior to those furnished by the union shops.

In the open shop it is possible to induce a man to produce what he can per day rather than what he wants to, which makes his pay check larger and gives the company a greater volume of castings from the same floor space.

An open shop is never safe with a considerable sprinkling of union men in it. There is always the great danger of the shop being quietly organized, and should you wake up some morning and find all of the handy men members of the union it is a sure sign that there is going to be trouble, because a new union man is harder to control than the old members who have gone through several battles and have learned to hesitate before they make trouble.

The open shop can produce in 30 days a molder as competent as 90 per cent of the molders of to-day, with the proviso that his work must be as near the same class from day to day as possible.

Starting in a New Worker

A great deal depends upon how a man is started, in developing molders out of green men. Very often a helper who has worked with a molder on certain jobs becomes able to handle the jobs himself; but this takes time. To fill a shop with unskilled men and get

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production in a very short time requires much patience and care. It is surprising how many men can be taught how to mold in a very short time by one instructor if he goes at this work systematically. One method that has proved very satisfactory is as follows:

Establish your prospect on the floor you have assigned him. Get his strict attention by explaining to him that you are going to make one complete mold for him and that you want him to see if he cannot make one without your help after he has watched you make one. Call his attention to the way you riddle the first sand on the pattern; how you tuck the sand around the pattern, if this is necessary, and why you do it; how you fill the flask with sand, being careful to make as few unnecessary motions as possible; how you ram around the inside edge of the flask first, to produce a solid joint for the cope part of the mold. Explain why a solid joint is essential. Show him how you avoid ramming over the high portions of the pattern, and tell him why you avoid this. Show him how to prepare a light bed of sand over the drag, after it has been struck off, to rub the board down on before the mold is rolled over. Explain to him why this bed is required and why it should not be excessive. Roll the mold over and call his attention to the way you take hold of it. If a parting is to be made, explain every detail of the operation, and to make it more impressive rap and draw out the pattern, which will enable you to point out the places that were not parted down far enough, or the places that were parted down too far. It is more impressive to make this demonstration right at this time while the parting is being made, than to wait until the pattern is drawn out in the regular order of things.

Place the pattern back in the mold and show how you correct the poor parting you have made. Shake or throw on the parting sand, at the same time instructing the learner as to the disadvantage of using too much parting or not enough. Place your gate pins and tell him why you locate them at certain points. Riddle on your first cope sand. Tuck around the gate pins. If gaggers are necessary, place each one with an explanation. Give careful instruction as to tucking bars. Fill the cope flask with sand and ram at the same time. At this time teach the difference between the pean end of the rammer and the butt; when they should be used and why. Strike off the cope mold and enlarge upon the necessity of making a clean, smooth funnel for each down gate after the gate pins have been drawn out. Many are taught to make a clean mold and not how to make a clean gate. Show how you hold the vent wire; how you vent the mold; where you vent the mold and why. Give the prospect a lesson in detail on how to take hold of his cope to lift it off; how to lay it back; how to blow out his down gates; how to finish the cope; how to brush off the joint of the mold; how to swab around the pattern; how to rap the pattern; how to draw it. Teach him carefully how to get the feel of the pattern as it comes out of the sand. If there are any cores to be placed in the mold, make a lesson out of each core. Show where the vent escapes from the core and how to provide a corresponding passage for the escape of this vent gas from the mold and why. If the cores must be nailed down or held with chaplets, go into detail about it. Cut the gates, explaining how important it is that the gate passages must be soft and clean. In doing this it is well to teach the worker how to hold his hand in patting down the gate surface. Do not fail to make him understand that the gate is the most important part of the mold. Close the mold for him and tell him you want him to make one just like it for you. He will start off and probably get his pattern properly located on the follower board but will place the drag section of his flask on the follower board upside down. Call a halt, and tell him he has forgotten something but do not tell him what it is, and do not let him proceed until he has discovered the mistake himself. Sometimes it requires several moments for your man to discover his mistake, but when he does he never forgets it.

After he has corrected this error allow him to proceed until probably he neglects to tuck the riddled sand around his pattern. Stop him and hold him again until he finds the trouble. Remember, this is his first attempt to make a mold, and you have given him a great many instructions that will be hard for him to remember; but with your patient promptings on the first mold he will absorb sufficient knowledge to enable him to advance much more rapidly than if he does not receive this personal attention.

Going It Alone

After your man has completed this second mold, his first one, tell him you are going away for an hour and that he must work out his own salvation. While you are devoting this hour to teaching another group of men similarly, he will be making mistakes and correcting them himself. If he is ever going to be a molder you will see a decided difference in the way he goes to work at the end of the hour. We do not mean that you can make a molder in one hour, but if your instructions have been clear you will be able to tell in one hour whether or not he is the material you want.

This plan is of no value unless you teach your man the very best way to work, but we believe there is no better way to develop men that will become self-reliant quickly and grow through their own efforts.

The above example of how to teach these men may be a little overdone, but the principle involved is the same. In case of molding machine work there would be fewer details, but they should be taught with just as much patience if results are to be obtained.

A very good plan by which to qualify men quickly is to divide the work, giving one man the drag part of the mold to make; another the cope part of the same mold and teach another to place the cores. It will not require as much instruction to get three men producing this way.

Simplifying the Work

The greatest item in the open shop is to make the work simple. It is decidedly expensive and a slow process to try to teach unskilled men to mold after the methods used by molders who have served years at the business; and it is here that executive ability makes itself known and felt. A surprisingly large percentage of the most difficult pieces can be made simple jobs if the foundryman and the pattern department get their heads together. They can cut out drawbacks or loose lugs on the patterns and use cores. They can furnish special gates for the molds so it will not be up to the unskilled man to learn how to cut a gate. They can provide flasks that do not require much skill to ram up; but with it all they must personally teach their men how to do things. We have known of foremen who have kept handy men at work for six months endeavoring to teach them how to mold, when a three-day trial should have been sufficient to show that they would never make a success at the business. Be sure you have given the new man a chance; be sure you have taken the time to teach him the why of every move he makes, and if he does not improve with every mold you have the wrong man and you are wasting your time and the company's money by keeping him.

Not a Low Wage but Increased Output

The successful open shop does not mean the shop paying a low average day rate, but rather the shop with an increased production per man. The serious objection to the closed shop is not the high wage rate but the restriction of output per man. It is not advisable to allow the wage earned by the open shop to be lower than what is received in the closed shop, but quite the contrary. This is very important in keeping the shop open, and if proper steps are taken to secure a reasonable production from each man the wages paid will not work a hardship on the employers. It is not unreasonable to expect a 100 per cent increase in production in the open shop over that of the closed shop on many jobs.

All work should be placed on a piece work basis, with the prices fair to both parties. No man should be paid for defective or spoiled work for which he is

responsible. This plan will give the company a good production of good castings and enable it to pay its men a good weekly wage, which will no doubt be greater than they could receive in a closed shop where piece work and bonuses are prohibited. It must never be a question as to how much too high a man's wages are, but rather what does the work cost per pound. The fact that we are working unskilled men who have never received higher than laborer's wages in the past must not influence us to believe that they will be willing to work at a low rate indefinitely, and it is advisable to raise their pay just as quickly as the company can afford it, thus making it impossible for any outside influence to affect them.

Give nine men out of ten a chance to work hard and make good money and they will stick to the job just as long as you want them. A good plan in making piece rates in the open shop is to establish the price the company can afford to pay for good work and then find the man who can make money at that price. It is a mistake to ask men who are new at the business, "How much do you want for a job?"—even though they may agree to make it cheaper than the price you have in mind.

Rates Must Be Fair

Now that you have an open shop and you are your own shop committee and your own business agent, you must establish your own methods of making piece-work prices, and not at any time allow the old time plan of negotiating with the molder for a low price prevail. Such actions lead to discussions among your men on what should be paid, and discussion leads to collective bargaining, which will eventually create conditions in your shop that will become just as obnoxious as those endured in the closed shop.

The best plan is to pay a fair price which will give the company a profit and enable the workman to earn good wages, and after the price is made stick to it. Sometimes in the beginning it becomes necessary to discharge a man because he complains about a price on his work, in order to discourage any disposition on the part of the men to try to get fair prices raised. When you find that by honest effort a man cannot make good after you have tried a reasonable number of different men on the job, you must either simplify the job so it can be made for the price in question or raise the price. It is better to pay an increase in price to additional core-making rather than to molding whenever it is possible.

It is these little things so often overlooked by supervisors that prevent the employers from obtaining all the returns possible from the open shop organization; and if such details are not watched carefully from day to day it will be only a question of time when the new gang will not be doing any better than the old organization in the closed shop.

Start with Unskilled Men

When the open shop has been established, it is the general idea that the work is going to be produced by unskilled labor and that the unskilled labor is going to be taught how to mold, how to make cores, etc. Now, if instead of following out this plan, the supervision calls into the shop all the men that are outside of the union and have had experience the results will not be as satisfactory. While many of these men outside of the union are good, there is also loafing around, looking for a job in the "struck" shop, an element that has been a complete failure at the business and whose presence among your new men or rather your students will cause you a great deal of trouble. While not qualified to produce good castings, they will set out to inform your men how much they ought to do and how much they ought not to do. When it is possible, and often it is, it is an advantage to hire men who have never been inside of a foundry rather than some that have had experience. This plan keeps all the old rules that cost the company so much unnecessary expense from again creeping in.

The molding machine plays a very important part in the open shop, but it must be remembered that no molding machine will be a success without the man behind it. The flask equipment must be right; the patterns must be as near perfect as possible, and special care must be taken to have the patterns made so that they can be molded in the most simple manner.

The open shop plan is the best for any company with an investment in a foundry. The company is able to compete with others in the same line of work; to figure intelligently on the possible cost of its castings in making estimates. It has a chance to make a profit and to pay its men good wages simply because they are getting the production. With an organization of so much value it behooves every one interested to watch it carefully from day to day, because human nature is the same the world over, and without the right discipline, which should be strict but not at any time overbearing, there is only one thing to expect of the open shop and that is absolute failure to get the results to which the investment is entitled.

New molders or students must be helped daily, not simply by teaching them how to mold but in the more important lesson of loyalty to the company. It is interesting to watch men develop in a shop of this kind. Nearly all go through certain stages. Some get to the point of dependability very quickly, while others advance slowly. But regardless of speed they all are subject more or less to certain mental conditions that change their attitude toward their employers from time to time. We must be students of human nature and give the right kind of help at the right time.

Mental Reactions of the Worker

For instance, the fellow you have selected as one of your future mechanics may be honest, earnest, hard-working, and desirous of learning a trade, and for some time he will take great interest in all you tell him. He will have many heartaches over his failures. At this time he needs your encouragement, and you cannot afford to lose patience with him. A little later he becomes able to do good work. Then his brain begins to work along another line and he thinks he has discovered that he is a very good man and is not getting the consideration due him. While he is in this frame of mind he will either sulk or begin talking to others and make them dissatisfied. He needs your help at this time, just as much as he required it in the beginning, and you must use strenuous methods to get him lined up or you will be obliged to discharge him. Take him in the office and convince him that he is only in the primary department of the business and that he is of no special value to you; that he needs you more than you need him. You can finally settle with him by giving him a certain task to do and agreeing that when he can do this task satisfactorily you will pay him more. You are losing nothing and are helping him to realize that he has a great deal more to learn; and as he goes at the work laid out for him his mental condition will gradually change and you have a good man who will give you no more trouble.

Always remember that the men that are the most active are the men that are going to do the most toward making your open shop a success, but that as a general rule the fellows that are full of pep are the hardest to handle. Some of them may be led. Any of them, at times, must be driven up the grade. But you can make good men out of them. Force them to make good wages for themselves and profits for the company. Your labors are not finished when you have developed a shop full of good men. It requires just as much care and labor to keep a good man good as it does to make him that way. You baby men and you spoil them, or you treat them unjustly and lose their loyal support in the enterprise that means so much to the company.

Mistaken Consideration

It is a serious mistake to allow men to do only half a day's work because they did not go out on a strike with others. It is true we should be loyal to them if they have been loyal to us, but we are not benefiting them if we allow them to become a loss to the company. If we feel that they should have some extra consideration for their loyalty it will be better to pay them a higher rate of wages and insist upon them doing a

good day's work like every other man in the shop. These men should not be allowed any special privileges over other men in the shop. With the open shop you are building as nearly as possible a perfect organization, and it is costing money and time, and it would be decidedly foolish and expensive to allow anything to interfere with the progress of the work.

The open shop is the best for the workmen because they are able to make better wages. It is better for the employers because they are able to receive a greater production of good castings per man; but the big thing to bear in mind is that it must be kept open and free from all the things that for years have interrupted progress in the foundry. This means that a careful study must be made of molding methods, coremaking, patternmaking and human nature daily.

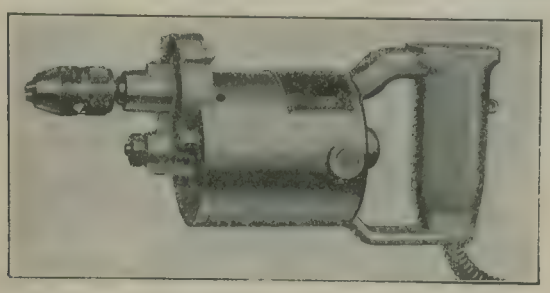
Hearings in Pittsburgh-Plus Case

WASHINGTON, Nov. 29.—Gathering of evidence by the Federal Trade Commission in the so-called Pittsburgh-plus case has proven to be a greater task than the commission had expected and as a result the proposed time for beginning now is set for early in January. Originally it had been intended to start hearings in September. Evidence still is being gathered in different steel centers of the country and it is stated at the office of the commission that there remains a considerable amount to be obtained. It is believed that the hearings will begin in Chicago and then shifted to other steel producing centers and it is possible that other proceedings may also be held in Washington.

H. E. Steinhauer, who has charge of gathering evidence, will be the trial attorney for the commission, but the name of the examiner has not been announced. While the chairmanship of the commission will change on Dec. 1, when Nelson B. Gaskill will succeed Houston Thompson in that position, this is not expected to have any bearing on the case. Importance is attached, however, to the filling of the existing vacancy created by the expiration of the term of John Garland Pollard. George W. Upton of Ohio has been named by the President to succeed Mr. Pollard, but no confirmation has been made by the Senate for reasons not known. Inasmuch as the commission as it now stands has two members who favor issuances of the complaint in the Pittsburgh-plus case and two who oppose such action, it is apparent that the attitude of the new member, who could be the deciding factor in a decision, or could ask for a review of the case, is important.

New Portable Electric Drill

The Lovejoy No. 3 electric drill is a new portable drill, which has been put out by the Lovejoy Tool Works, manufacturer of railroad and boiler makers' supplies, 319 West Ohio Street, Chicago. This tool is noteworthy because of its strength and compactness



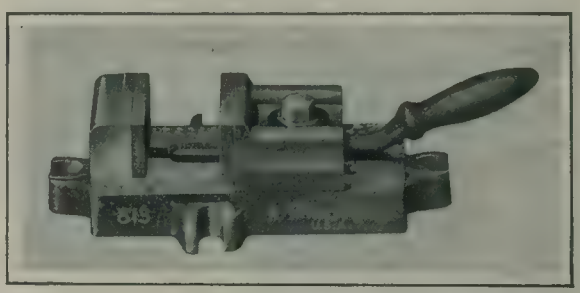
The Switch Is Arranged to Operate by the Thumb

and will drill a one quarter-inch hole in one quarter-inch steel. It weighs only four pounds and is furnished with either a 110 or a 220-volt motor suitable for either direct or alternating current. The switch is conveniently arranged to operate by the thumb. The drill can be held in one hand and has the additional advantage that the drilling point is always in plain sight of the operator. The tool has ample ventilation, has bronze gears and bronze bushings, with adequate provision for oiling.

Drilling and Milling Machine Device

A drill press and milling machine vise with the movable jaw operated by a lever, one movement only being necessary to open and close, has been placed on the market by the Athol Machine & Foundry Co., Athol, Mass. The vise is shown in the accompanying illustration. It is designed to facilitate the rapid drilling or milling of small work, the range being from 1/16 to 5 in.

The bed is of cast iron and is 10 in. long, 6 in. wide and 2¾ in. high, overall. Four lugs are provided for clamping to milling machine table or drill press bed, keyways in the base being provided also for use in this





Special Jaws Adapted to the Particular Work Give the Maximum Results. A special jaw is shown at the right

connection. The jaws are 3 in. wide, of cast iron and substantially built. Hardened steel plates are held in place by 3-in. screws on the front and by 1¼-in. screws on the back jaw. The lever is of cast steel and acts on a ⅝-in. steel bolt and nut. The vise weighs 10¼ lb. complete.

The vise can be used to advantage with plain jaws, but with special jaws adapted to the particular work, production, it is claimed, can be increased up to 75 per cent, according to the nature of the work. Special jaws can be made by the user, or furnished by the Athol company.

New Heavy-Service Hand Truck

A heavy-service hand truck, the frame of which is of one piece and pressed from ⅛ in. hot rolled open-hearth steel, has been put on the market by the Sharon Pressed Steel Co., Sharon, Pa. It is called the Blue-nose, from the steel blue color of its nose, and is made in two sizes: 54 in. long by 18½ in. at the nose and 64½ in. long by 23½ in. at the nose. The weights are 63 and 120 lb. respectively.

The frame is reinforced with beads and flanges at points of extra strain and the wheel lugs, which are integral with the frame, are stiffened by ½-in. beading pressed in. The nose is pressed from ¼ in. steel and has flanges at the corners to prevent springing when lifting a load. The footings are of pressed steel and are braced. The wheels are housed within the frame and the axle supported in lugs at four points. The truck is equipped with malleable iron wheels with plain or roller bearings or with cushion wheels and the handles are of steam-bent oak, held by lag screws.

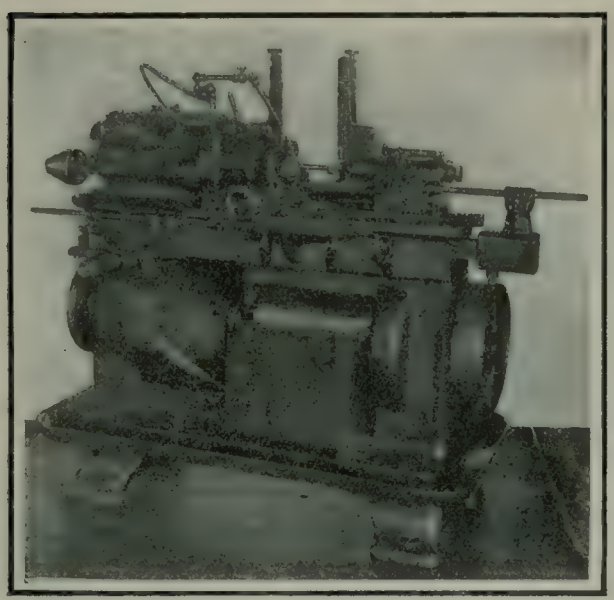
C. C. Chesney, general manager General Electric Co., Pittsfield, Mass., spoke on the 1,000,000-volt transformer developed recently at that plant, and Charles P. Perin, New York, consulting engineer, on the Electrical Development of India, at a meeting of the Engineering Society of Western Massachusetts, held on the evening of Nov. 22, at the Weldon Hotel, Greenfield, Mass. Members of the Engineering Club of the Greenfield Tap & Die Corporation were among the guests of the evening.

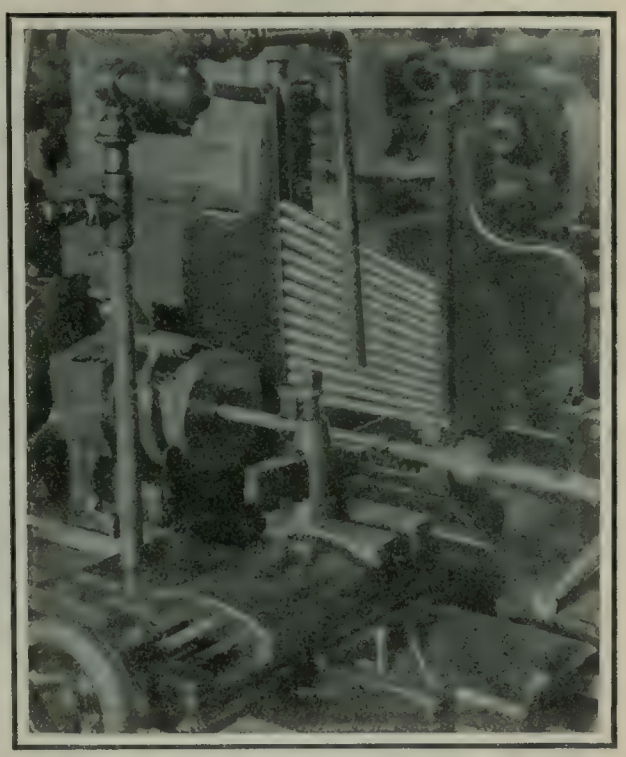
Pratt & Whitney Full Automatic Lathe

A new line of engine lathes entirely automatic in their action, taking from a magazine and gripping the work, turning one or more diameters simultaneously, and ejecting the finished piece independent of an operator, has been placed on the market by the Pratt & Whitney Co., Hartford.

The machines are designed for quantity production, handling cut lengths of bar stock or forgings that must be turned on centers. As the operator has but to replenish the magazine and keep cutting tools in condition, he may tend a battery of machines, the number of which depends on length of cut and stock removed.

The general features of the engine lathe are present in this design. Centers are provided upon which work is mounted while being turned; a driver rotates the work, a carriage is provided with the usual cross slide adjustments and a tool post, in which may be inserted any form of standard tools. In place of the lead screw a drum cam is employed for the carriage traverse. This cam in common with the other cams on the machine is mounted on a heavy shaft extending the entire length of the bed. Adjustable dogs are provided which may be arranged to produce the length of cut on the work in hand.





Geared Head Full Automatic Lathe. Work is fed from the magazine, a close-up view of which is shown at the right. The lower piece of work in the magazine rests on work carriers and is held in place by fingers

The machine is shown in the accompanying illustration. The carriage is mounted on an extended portion of the front ways of the bed, thus providing space for the work to drop from the center, when released, to the removable can below. A jointed taper bar mounted on a bracket in front of the carriage connects, by engaging rolls, with the cross slide of the carriage, enabling taper work to be turned or continuous cuts partly taper and partly straight to be made. By the substitution of suitable former bars irregular forms may be turned.

Two sizes are made fitted with either a cone or geared head drive. The work is fed from a magazine on a bracket attached to the rear of the bed, the magazine consisting of two uprights adjustable toward and from each other to accommodate short and long work. Two guides on each upright are adjustable to suit different diameters. The lower piece of work in the magazine rests on work carriers and is held in place by yielding fingers that depress and allow the carriers to withdraw after the work has been placed upon the centers. A friction joint is placed in the train of levers actuating the magazine feed mechanism so that in case of accidental displacement of the work the mechanism will not be damaged. The sequence of movements is as follows: The carrier moves forward presenting the work in alignment with the centers, the footstock center then moves up pushing the work between the jaws of the driver or chuck and in contact with the live center. The carrier then withdraws and the next piece of work drops into place on the fingers. The driver grips the work and the carriage moves the tool to the cutting position. The cam shaft has two speeds and the foregoing movements all take place during the high speed rotation, an arrangement that reduces lost time. Adjustable dogs on a cam located at the headstock provide a means for timing the cam shaft to suit the length of cut.

The driver or chuck is provided with three cam shaped jaws that open by friction operated by a cam on the cam shaft. The jaws close on to the work through the action of coil springs when the friction is relieved. The hardened contact surface of the jaws is shaped so that the greater the resistance caused by the cuts, the harder the jaws will bite. The smooth contact surface of the jaws prevents scars on the work. The mounting of the chuck on the spindle nose provides lateral float, thereby eliminating side strain on the centers. Slight variations in length of work and depth of center holes is taken care of by a slip ring actuating the footstock spindle to insure pressure on work before the spindle is clamped.

The tool being advanced to the cutting position, the speed of the cam shaft changes from fast to slow and the turning operation is carried through to completion. At this point the cam shaft is again speeded up; the chuck is opened; the tailstock spindle withdrawn and the work dropped out. The carriage is then moved to the extreme right of its travel and then a new piece of work is presented to the centers.

The geared head machine has four spindle speeds direct drive and four reduced speeds through back gears. Four changes of feed for each spindle speed are provided on the large machine and three on the smaller one. The hand lever at the extreme left of the bed in the geared head machine illustrated is used for shifting the cam shaft from fast to slow or vice versa, at the will of the operator. The same lever serves to disengage the power for hand manipulation when setting up. The squared shaft located below the lever is engaged by a hand crank for the purpose.

The length of work accommodated is 3¼ to 15 in. and 2½ to 11 in. in the large and small machines respectively and the diameters, ⅛ to 1⅛ in. and ¼ to ⅝ in. The maximum traverse of the carriage is 12 in. and 8 in.

GOVERNMENT RESPONSIBLE

Decision Involving Pittsburgh Basis in War Days by Comptroller General

WASHINGTON, Nov. 29.—The application of the custom in the steel trade in establishing prices on an f.o.b. Pittsburgh basis has been held repeatedly to be improper and illegal where it relates to dealings with the Government, but where prices were so fixed during the war emergency by a Government price fixing board, the responsibility is that of the Government and payments under these circumstances must be allowed. This recognition of steel prices fixed on the f.o.b. Pittsburgh basis by the War Industries Board is made in a decision of J. R. McCarl, Comptroller General of the United States, in a decision just announced, in which, at the request of the Republic Iron & Steel Co., Youngstown, Ohio, he reconsidered and overruled the decision of Aug. 26, 1921, of the Comptroller of the Treasury. Another portion of the case relating to contracts never executed, but where material was supplied on procurement orders, remains to be settled upon presentation by the claimant of the actual orders.

The Comptroller of the Treasury affirmed the action of the Auditor of the War Department in disallowing in settlement, dated May 18, 1921, the claim of the Republic company for $1,970.58 for freight differentials and in setting off against the remainder of its claim for retained percentages freight differentials amounting to $18,638.02, paid to the steel company by disbursing officers for certain steel. The Comptroller General, concurring in the view of the Comptroller of the Treasury in another decision as to the responsibility of the Government in paying for steel on an f.o.b. Pittsburgh basis where prices were so fixed by the War Industries Board, applied it to the Republic case and made allowances on four procurement orders placed by the War Department with the Republic company and, modifying the previous action taken, certified that a difference of $14,638.42 is due the claimant. This sum is made up of $538.90 on freight claimed and disallowed in settlement and $14,099.52 on freight paid by disbursing officers and offset in settlement. As a result of its finding, the Comptroller General orders a new settlement made and a war warrant for $28,528.12 returned to the Republic company.

The claimant contended that as in the four procurement orders in which the prices named were f.o.b. Pittsburgh, there was contained the qualification "which is in accordance with the price fixed by the Government authorities," or "which is the price fixed by the United States Government for material of this class," and as the Government's fixed price was "f.o.b. Pittsburgh basis" as understood and used in the steel trade, it was entitled to be paid on that basis, under the decision of the Comptroller of the Treasury of April 1, 1919.

The claimant submitted copies certified by the custodian of the records of the War Industries Board of steel prices agreed upon by that board and the representatives of the steel industry, these prices having been approved by the President, and which the Comptroller General says were binding on the procuring departments of the Government, to establish its contention that the prices agreed upon were f.o.b. Pittsburgh basis and not f.o.b. Pittsburgh, as stated in the procurement orders.

The Comptroller General says the agreed prices submitted contain no specific reference to the term "f.o.b. Pittsburgh basis," and then quotes prices on iron and steel, copper and coke, as fixed by the War Industries Board. The decision says:

> This schedule indicates that a distinction was drawn between prices f.o.b. a named point as in the case of copper, the price being "f.o.b. New York," and the prices fixed with reference to a basing point, as, for instance, steel bars, the prices fixed being based on Pittsburgh, that is, Pittsburgh basis. These prices were agreed upon between members of the War Industries Board familiar with the trade practices of the steel industry and representatives of that industry. All parties to the agreement seem to have understood and intended that the prices so fixed were f.o.b. Pittsburgh basis in conformity with the custom of the steel trade.
>
> The application of that custom of the trade to dealings with the Government has been held repeatedly to be improper and illegal. (25 Comp. Dec., 406 and 679, 89 MS. Comp. Dec. 19.) But in the last mentioned decision the Comptroller of the Treasury indicated that where prices were so fixed during the war emergency by a Government price fixing board, the responsibility was theirs, and that payments under those circumstances would be allowed. I concur in that view and, applying it to the case in hand, allowances will be made on the procurement orders. * * *

British Steel Exports Expanded in October—Imports Still Heavy

British steel exports in October continued the upward swing recorded in September, according to the official data, just made public. The total was 161,683 gross tons, excluding iron ore and including scrap, which is over twice that for July or August. The September exports were 138,248 tons. Compared with October a year ago, the outgo was about 60 per cent of what it was then at 277,183 tons. The total for the ten months this year stands at 1,325,243 tons against 2,868,625 tons to Nov. 1, 1920.

Iron and steel imports in October were not as heavy as in September. The total, excluding ore and including scrap, was 189,536 gross tons, which compares with 188,875 tons in October, 1920, and with an average per month in 1913 of 195,264 tons. The following table shows comparative data:

British Steel Exports and Imports, Gross Tons

	Exports	Imports
Average per month first quarter, 1921...	183,373	186,040
Average per month second quarter, 1921..	109,670	96,320
Average per month third quarter, 1921...	93,804	160,727
July, 1921	64,001	103,561
August, 1921	79,163	149,231
September, 1921	138,248	229,391
October, 1921	161,683	189,536
Average per month, 1919	188,519	50,801
Average per month, 1920	274,881	128,685
Average per month, 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data:

Principal British Exports, Gross Tons

	Average Per Month		Oct.,	Oct.,
	1913	1920	1920	1921
Pig iron	78,771	38,505	25,218	7,614
Steel rails	41,676	11,213	11,257	14,864
Steel plates	11,162	16,571	21,491	7,544
Galvanized sheets	63,506	34,244	29,196	32,222
Steel bars	20,921	30,322	32,260	10,711
Tin plates	41,208	29,418	36,204	25,356
Black plates	5,679	3,026	4,300	1,382
Steel sheets	.....	.....	12,044	3,758

Exports of steel rails have shown the most marked recovery in the above products with galvanized sheets and tin plates next.

Imports of pig iron in October were 92,544 tons, bringing the total for the ten months to 521,426 tons, compared with only 153,689 tons to Nov. 1, 1920. The present rate of imports is the heaviest on record.

Iron ore imports in October were only 140,508 tons, as compared with 541,742 tons per month in 1920. In October, 1920, they were 426,179 tons. The total for the first ten months of this year was 1,565,907 tons, as compared with 5,621,569 tons for the first ten months of 1920.

Manganese ore imports were only 3164 tons in October, which makes the total to Nov. 1, this year, 159,761 tons against 373,820 tons to Nov. 1, 1920.

To Make Manganese Steel Castings Electrically

The Electric Manganese Steel Co. has been organized at Reading, Pa., for making manganese steel castings in an electric furnace. A new plant is nearing completion at Fresh Valley, on the outskirts of Reading, and a Moore electric furnace is being installed. The main building is about 100 ft. by 40 ft. and is so designed that a 60-ft. bay can be added. Operations are expected to commence early in December. Ray Houck is president of the company.

Strain Lines in Low Carbon Steel

New German Etching Method Revealing Effects on Metal Which Has Been Stressed—Origin and Character of Lines

A NEW etching medium is described in *Stahl und Eisen* for Aug. 11, 1921, by Dr. A. Fry of Essen. It is claimed to bring out strain lines in low carbon steel which has been stressed. The copper-ammonium chloride etching method of Heyn shows the part rich in phosphorus as dark stripes on a clear ground, as shown in Fig. 1, which is a soft steel 1½ mm. plate. Fig. 2 shows the same sample etched in the new way. Peculiar dark marks are seen, not brought out by the known etching methods.

The Etching Method

The method requires a preliminary heating of the steel for half an hour at 200 deg. C. The sample is then prepared by sawing, machining, filing and polishing, as with other methods, which for microscopic examination is polished as at present. The etching medium consists of a strongly acid solution of copper chloride. The free acid is so proportioned that there is no deposit of free copper on the steel. The etching seems to take place by the deposit of copper-hydrogen compounds, that apparently change to an iron-hydrogen compound. Any copper deposits on the metal are quickly dissolved. For microscopic work the following solution has been used:

Concentrated hydrochloric acid	40 c.c.
Water	30 c.c.
Ethyl alcohol	25 c.c.
Copper chloride crystals	5 g.

The finely polished sample is etched a short time and if necessary is repolished and re-etched.

For macroscopic etching the method and solution are as follows:

Concentrated hydrochloric acid	120 c.c.
Water	100 c.c.
Copper chloride crystals	90 g.

In this solution the sample is etched 1 to 3 min., then taken out and etched further by rubbing well with a small patch of strongly soaked powdered copper chloride. The chloride is often renewed and repeatedly soaked in the solution. Rubber gloves are used. Etching usually takes 2 to 20 min. As soon as the lines are well developed the etching is stopped, the sample partially dried, rinsed off with alcohol and dried. Washing with water should be avoided, as the surface is immediately made dirty by copper deposits. If the surface is not clean it is rubbed with a little lot of chloride soaked in the solution and dried as mentioned above. By too strong etching the clearness is reduced. The sample must then be repolished. Also possible disturbances by too strong machining or grinding must be removed by careful polishing. After a little practice the method can be carried out without difficulty. With 10 to 20 hr. deep etching the strain lines in many cases are strongly brought out, but the delicate details are destroyed as shown by Fig. 3.

Origin of the Strain Lines

When amorphous materials are subject to pressure it is known that slip takes place along slip planes, the plane being at a certain angle to the direction of the stress, depending on the internal friction of the material. There is scarcely any doubt that in steel, slip plane formation is possible and further that these are responsible for the strain lines shown by the etching. Fig. 4 shows in section a block of soft steel into which a cylindrical stamp was pressed at room temperature. By a six hour heating at 730 deg. C. a recrystallized area was produced in the strongly deformed zone, that is clearly shown by the new etching. Further the etching develops dark strain zones that penetrate deep into the steel. If the lines of equal pressure produced by the stamp are worked out, then the curves are obtained shown in Fig. 5. The zones of strongest pressure, up to the line c can be considered as more or less totally deformed. As Fig. 4 shows, the greatest deformation is between the lines a and b. At the place of weaker pressure, e to f, the deformation appearance is only shown in separate slip lines, at an angle α to the local ruling direction of stress. As shown in the diagram this brings about bent lines, similar to those found by the etching in Fig. 4, which latter are therefore simply explained.

Fig. 6 shows the section of a soft steel block into which a ring-shaped stamp was pressed at room temperature and which was afterward heated for six hours at 730 deg. C. It was etched by the new method. In the vicinity of the impress the same appearances are seen as before. A clear recrystallized zone at the place of strongest deformation, then a completely darkened zone, and from this curved lines branching out.

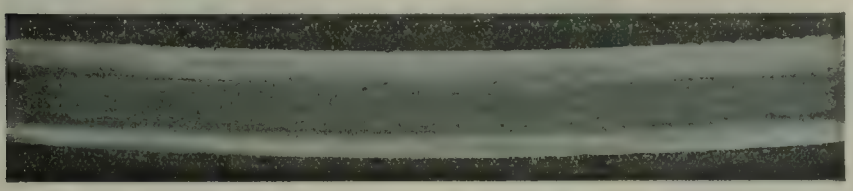


Fig. 1—A Section of Soft Steel Plate, Natural Size, Etched with Copper Ammonium Chloride



Fig. 2—The Same Sample of Steel as Fig. 1 but Etched with the New Medium

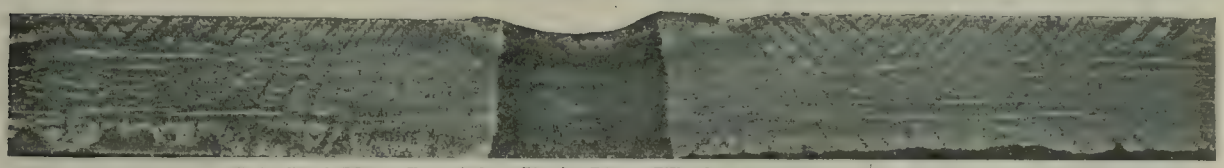


Fig. 3—Section of a Soft Steel Plate Containing Strain Lines Which Are Brought Out by the New Etching Allowed to Act Deeply. This is also natural size

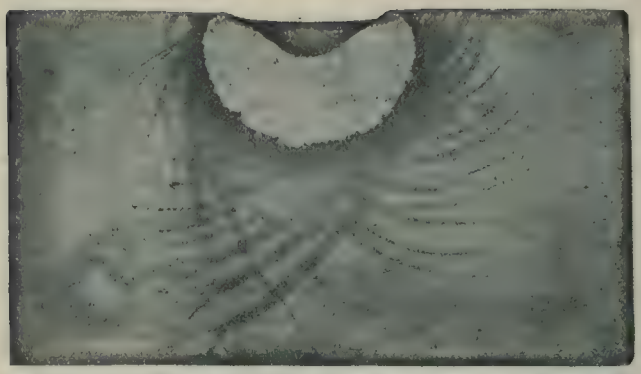


Fig. 4—The Pressure Effect of a Cylindrical Stamp in Soft Steel Revealed by the New Etching Medium. This is also natural size

Fig. 7 shows the longitudinal section of a bend test of low carbon steel, bent at 200 deg. C.

Character of the Strain Lines

These lines up to now have only been observed in soft steel, generally after the material has been subject to pressure. Further, after cold deformation alone they are not developed by the etching. A subsequent reheating to a suitable temperature is needed, for example ½ hr. at 200 deg. C. From this is follows that it is not the actual plastic or elastic deformations that give the dark figures developed by etching, but secondary disturbances that are brought about through heating and are due to the strains remaining in the deformed metal. By heating to a temperature high enough to give solid solution the strain lines are completely removed. Also by heating to 600 deg. C. they

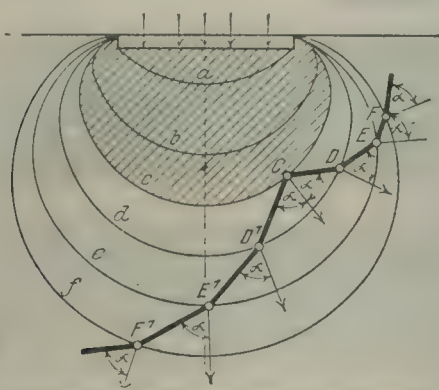


Fig. 5—A Graphic Representation of the Step Formation in Fig. 4

are made indeterminate in many cases, while in other cases several hours heating at 730 deg. C. leaves them clear and distinct. (Figs. 4 and 6.)

Microscopic examination was carried out to determine the nature of the disturbances shown by the strain lines, using the weaker etching solution. This investigation showed three kinds of structure disturbance:

1. In many cases a destruction of the crystals is visible. In the original crystals new slip lines may be seen, a fine example being shown in Fig. 8. This is a sample taken from a shock test at the place where struck by the hammer. The sample showed quite brittle under this test. Examination in the usual way with normal etching solutions showed no reason for the poor mechanical properties. By the new etching method slip lines were clearly seen, brought about by the influence of the blow. From these lines the size of the original crystals can be determined. Inside these lines new crystal junctions can be seen, usually independent of the slip lines, in irregular curves. These crystal destruction lines are undoubtedly closely connected with the fragility of this steel.

2. The crystal junctions etch more deeply and show up plainer than in the normal structure, so there has probably been some disturbance between the crystals. It is probable that these changes have an important effect on the physical properties of the metal.

3. It was further determined that the dark color of the strain lines, and the macroscopic etching effect is not due to the breakdown of the crystals and the disturbance of the crystal junctions. It is caused by extremely fine disturbances in the interior of the crystals. All three classes of stress effect seem to be brought about under the same conditions, and do not differ in their effects on the steel. Crystals with this third kind of disturbance do not generally show any clear indication under the microscope even at the highest magnification and even where very clear strain lines are seen macroscopically. It is an indication that the derangement is between the very smallest particles of the crystals. Careful examination seems to show they are microscopically fine slip phenomena, as shown in Fig. 9. The lines differ from true slip lines in that



Fig. 6—The Pressure Effect of a Ring-Shaped Stamp in Soft Steel as Brought Out by the New Etching. The reproduction is natural size

they are curved. It is interesting to consider whether the space lattice of the crystals has been disturbed, which requires careful examination with x-rays. Fig. 10 shows the structure of a strain line at high magnification. The fine slip lines seem to depend upon the orientation of the crystals.

The darkening of the strain lines by etching is therefore satisfactorily explained by the microscopic work. A clear macroscopic structure is only seen when the last named disturbance is present, that is, slip line formation in the interior of the crystals. If deformation has brought about destruction of the crystals, or of the crystal junctions, then macroscopic examination will not show this, but they can be seen more or less clearly after etching with the weak solution and microscopic investigation. Many times all three kinds of disturbance can be found in one and the same piece. When it is remembered that they are brought about by the influence of stresses and low annealing temperatures it is evident that the same influences are present as with the well known brittleness of steel at a blue heat, and it is therefore evident that the latter is due to the same causes, namely, the three kinds of crystal destruction outlined in detail above.

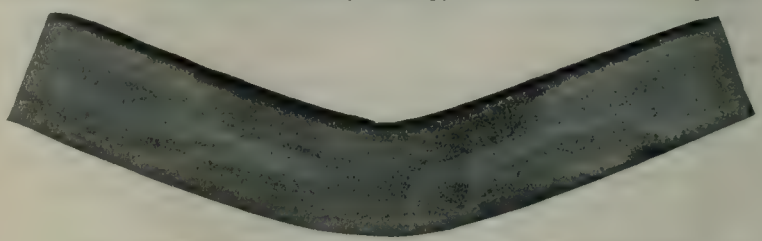


Fig. 7—Lines Formed in a Bend Test of Mild Steel Revealed by the New Etching Process. The piece is natural size

G. B. W.

Legal Tangles of Peace

The conclusion of peace with Germany brings new difficulties to the commercial world, or at least brings these difficulties to a point where their solution becomes imperative, for with the resumption of full trade intercourse between the countries the present status of all the numerous agreements of a commercial nature be-

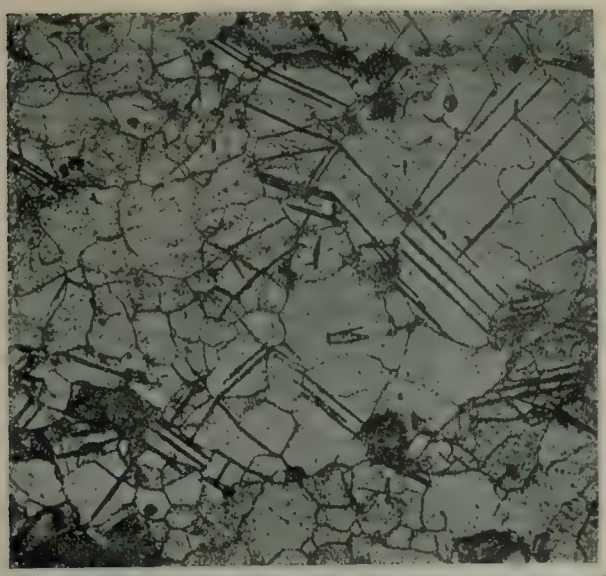


Fig. 8—Crystal Destruction with Slip Lines in a Piece of Steel Etched with the New Medium. Magnification 200 dia.

tween firms in the United States and in Germany must be determined. Which of these contracts was annulled by the declaration of war, and which only suspended? Is your foreign agent still your agent? Does your contract to buy or sell still hold good? Was your partnership dissolved by the outbreak of hostilities? These perplexing questions are discussed by A. J. Wolfe in *Commerce Reports* for Nov. 14 and 21, published by the Department of Commerce, Washington, in an article entitled: "Pre-War Contracts with Enemy Firms." In the concluding portion of his article Mr. Wolfe makes recommendations for the straightening out by arbitration of disputes arising from pre-war agency contracts.

Senator Kenyon's Unemployment Bill

WASHINGTON, Nov. 29.—Senator Kenyon of Iowa chairman of the Committee on Education and Labor, has arranged to begin hearings on his bill to relieve unemployment. The measure is designed to carry out the policy of the President's unemployment conference and to prepare in advance against future cyclical periods of business depression by providing for a long range planning of public works. The hearings are to begin shortly after the regular session of Congress, which convenes early in December. The Senator has not yet determined the list of witnesses who will be called, but it is believed that they will include delegates to the conference and State and city officials, as well as industrial and labor leaders not comprised in the conference.

Senator Kenyon has pointed out and has reflected in his measure the fact that a sound economic policy requires that a larger percentage of the public works and projects be undertaken and prosecuted during the period of major industrial depression and unemployment, when labor and capital are not fully employed in private industry. Supplementing this is the view that a smaller percentage of such works and projects should be undertaken and prosecuted during a period when private interests are active and competing for the same men and material, with resulting business strain and over-expansion. It is pointed out that this prosecution should be utilized as a stimulating force during a period of over-expansion, as well as during a period of depression.

Provision is made authorizing the head of each executive department to prepare and revise periodically all necessary plans for public works, in order that the work might go ahead without delay, once Congress has determined upon an appropriation. The Secretary of Commerce is authorized to publish monthly reports concerning the trend of business conditions in order that the President, the heads of executive departments, the Congress, governors of States and mayors of cities, and persons engaged in private industrial enterprises, may prepare against business strain and over-expansion and business depression.

The bill of Senator Kenyon has been favorably received in Administration circles and has been indorsed by a number of members of the President's unemployment conference. Among them are Secretary Edward Eyre Hunt and Otto T. Mallery, member of the Industrial Board of Pennsylvania, and secretary to the Committee on Public Works of the President's conference on unemployment.



Fig. 9—Slip Phenomena in a Strain Line Zone in a Section of Steel Etched Moderately Strong by the New Medium. Magnification 400 dia.

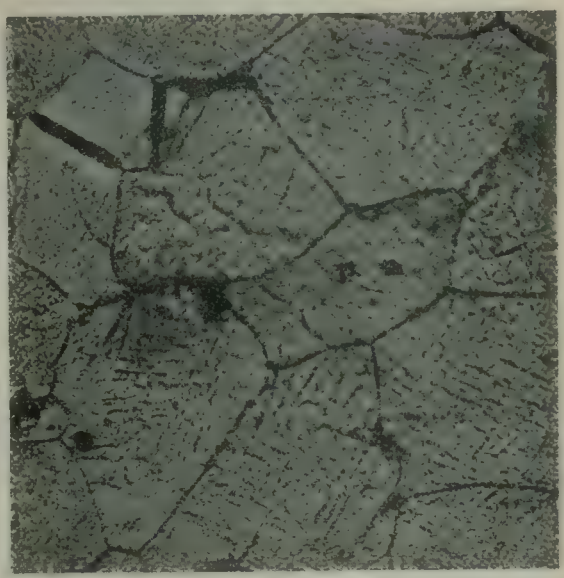


Fig. 10—Crystal Structure in Slip Lines as Revealed by the New Method of Etching. Magnification 1000 dia.

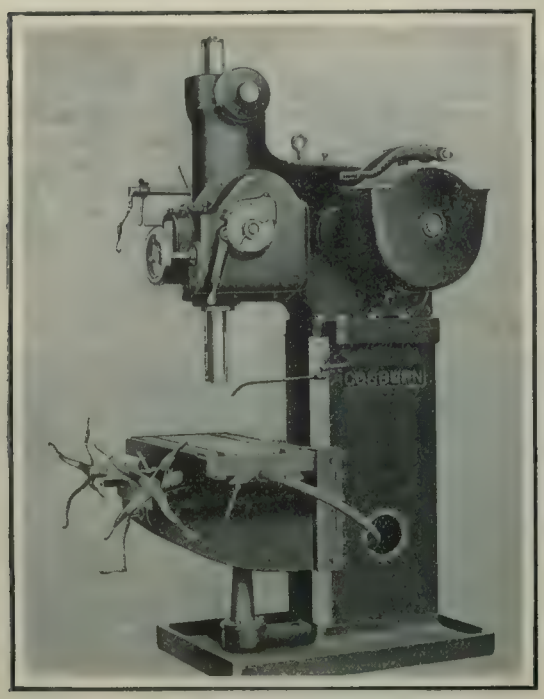
Minerals Act Signed

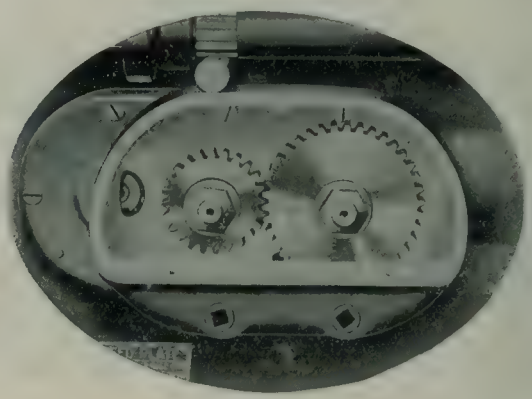
WASHINGTON, Nov. 29.—With the House accepting the Senate amendment eliminating the provision calling for re-appropriating of funds for claims, the liberalized war minerals act was passed on Tuesday of last week by Congress and has been signed by the President. The striking out of this clause, it is stated, will permit the reopening of claims which previously had been denied by reason of no "request or demand" and claims in which an earlier effort to produce war minerals can be shown. These claims, according to some members of Congress, if granted, will represent from $12,000,000 to $18,000,000.

Manufacturing Heavy Duty Drill Press

The Colburn Machine Tool Co., Cleveland, is offering a No. 6 manufacturing heavy duty drill press which, though essentially a production tool suited to the machining of duplicate parts in quantities, is said to be equally well adapted to handling a variety of work. A transposing gear arrangement provides a wide range of speeds and feeds, affording unusual flexibility.

The heavy box-type head; rigid column and table; the stub-tooth chrome nickel-steel drive gears, heat treated and hardened and running in a bath of oil; drive shafts of large diameter and short length; the use of ball bearings throughout the drive; and finally, the location of the spindle driving gear at the lowest point of the head and on the large diameter of the spindle, are points of construction emphasized by the makers. Simplicity of control and ease of operation are also features.





Manufacturing Heavy-Duty Drill Press Equipped with Compound Table. A transposing gear arrangement provides a wide range of speeds and feeds, the small speed-transposing gear on driving shaft being shown above

The machine is shown in the accompanying illustration. The capacity is given as 3 in. high speed drills in solid steel and the rated swing, 28 in. The distance from the center of spindle to face of column is 14 in., and the maximum distance from nose of the spindle to standard table is 36 in.; to the compound table is 30 in. The spindle travel is 18 in. The drive is through a constant speed belt to tight and loose pulleys mounted on the main driving shaft at the right of the machine. No countershaft is required.

All gearing is placed inside the head casting which is cored to form an oil-tight speed box. Speed and feed gears run in oil and journal bearings are lubricated by splash. Gears not running in oil are covered and provided with grease cups which deliver grease directly on to the teeth. All vertical bearings are lubricated by means of wicking which carry oil from the cored reservoirs around the bearings. The spindle has a No. 5 Morse taper and to equalize the strain is double splined. The quill or sleeve, made from 40 to 50 carbon steel, is bronze bushed and has rack teeth cut directly on its surface. A self-aligning ball bearing takes the thrust between the spindle and the spindle sleeve.

Two mechanical speed changes are provided which in conjunction with the transposing gear arrangement give 48 different spindle speeds ranging from 30 to 375 r.p.m. The mechanical speed changes are made by means of sliding gears located in the speed box and operated by a handle at the front of the machine. There are also two mechanical feed changes which, with the various transposing gears, give 36 feeds ranging from 0.005 to 0.134 in. per revolution of the spindle. The mechanical feed changes are made with the worm feed hand wheel.

A single pair of speed-transposing gears is furnished, which together with the two sliding back gears give four spindle speeds. The speeds obtained depend upon the transposing gears used. To illustrate: With one pair of gears having 23 and 33 teeth, four spindle speeds can be obtained; 52, 104, 108 and 216. However, only two of these speeds are available at a time for quick change through the sliding back gears, and they would be in pairs, 52 and 104; 108 and 216. The machine is regularly equipped with one pair of feed transposing gears which, with the two mechanical changes, give four feed changes. The feeds obtained depend upon the transposing gears used.

The machine is equipped with a plain table or a compound table, the latter being shown in the illustration. This is not an attachment to the regular table, but consists of a special knee with table having a rapid movement 20 in. longitudinally and 8 in. crosswise, obtained through a spiral worm and rack. The working surface of the table is 18 in. wide and 30 in. long. There are two T-slots, 10 in. from center to center.

A geared tapping attachment is furnished which consists of a set of friction clutch reversing gears having a reverse ratio of approximately 1½ to 1. They are mounted on the driving shaft and driven by a single pulley. Safety and interlocking devices are provided. An automatic tripping mechanism can be set to trip the feed at any desired depth. A spring counterbalance for the spindle is a feature. No chain, cable, counterweight or sheave wheels are required. The tension can be increased or lessened to accommodate tools of different weight, and automatic return of the spindle after tripping at any predetermined point can be accomplished. A drilling compound pump is attached directly to the machine. The storage tank consists of a compartment inside the lower section of the column, openings on each side of the column affording access for cleaning.

When motor drive is used the motor is mounted on the lower part of the column at the rear and belted to tight and loose pulleys. A 10 to 20 hp. motor is recommended. A special extended base with T-slots and finished surface is furnished for work requiring greater distance under the spindle.

The No. 6 manufacturing heavy duty drill press is also furnished in gangs of two, three and four spindles.

Improved Methods of Rolling Sheet Steel

Possibility of Use of Continuous Mills or Other Labor-Saving Devices—Plant in Austria Rolling on Continuous Mill Before War

BY SUMNER B. ELY.*

PROBABLY the first iron plates were made by hammering, and must indeed have been a crude production. About 1725 or 1730, however, rolls seem to have come into use, although it was a number of years later before anything resembling a thin sheet was made. Yet from that day to the present the same general type of machinery has been used for rolling sheet steel. To be sure, our sheet mills of to-day, compared with the early ones, would appear giants in size and strength, yet after all what real difference is there except this increase of size and strength? We still have no continuous sheet mills—do not even use roller-driven tables, automatic guides, etc.—and practically everything is done by hand.

This statement may need a little qualification. Occasionally we do come across some small devices in use, such, for instance, as a hinged or pivoted table to assist the catcher in returning the pack over the top of the rolls to the roller. This particular device does not save any labor, in the sense of fewer men being employed; it is merely a help to the catcher. Some devices, such as shifting tables, and auxiliary attachments to cold rolls, may have a tendency to cut down the labor force; but after all such small helps as these are not real changes in the machinery of sheet rolling, and are far from being universally used.

It would seem, however, as if something might be devised to cut down the number of men needed about a sheet mill; a mechanical catcher, for example, which would automatically catch the pack of sheets as it came through the rolls, lift it up and return it to the roller again. Such a device would seem to be a mechanical possibility, and probably could be made to work successfully, but the amount of saving it would effect has apparently not been sufficient to act as a real incentive.

There is no doubt that to roll thin sheets of steel or iron is a most delicate operation, and its success depends upon many things. Occasionally a sheet mill roller says that the weather is not right to-day, and he cannot turn out a satisfactory product; which simply means that some detail is wrong, and he is unable to find what it is. One also hears stories from sheet mill superintendents that, after they had had the windows of the mill cleaned, the rollers would have trouble, until they accustomed themselves to judge the heat of the steel in the brighter light; and this one can readily believe.

Importance of Proper Heating in Sheet-Steel Rolling

In the manufacture of heavier steel products the temperatures to which they are heated are high, comparatively, and there is some latitude; but with sheet steel the heat must be just right. Even starting with the bar, say, as it comes from the furnace for the first pass in the mill, if it is too cold the scale will not be lifted and this scale rolls into the sheets, making rough surfaces and causing them to stick together when later they are rolled in packs. If the sheet mill could receive only bars that were perfectly clean, no harm might be done even if they were a little too cold; but all commercial bars carry scale and this, of course, must be taken into account.

However, if instead of the bar coming too cold from the pair furnace, it is a little too hot, then there is still worse trouble; for the large sheet rolls will get hotter than the roller anticipated, will expand and the line of contact between them will not be correct. In addition, as the bar is too hot it will be softer than it should be, and will not spring the rolls the desired amount. The consequence of this is that the bar, when worked down on the chill rolls, will produce a sheet round on the back end, that is, thinner in the center than at the sides; whereas, probably, the bar that preceded it had the proper temperature and produced a sheet that was not long in the center, but long on each side, having what the roller calls "horns."

A round-end sheet indicates that the rolls are "full" in the middle, and horns show that the rolls are "hollow." Now when a circular-end sheet is placed on top of a horned sheet and the two are reheated and put into the rolls together, the pack will either pinch or run off at the back end; that is, the sheets will spread one from another on the back end of the pack, due to the uneven drawing. Even if the roller, by great care and judgment in adjusting the draft screw, is able to prevent a pinch, the scale which is produced by excessive heating will lift only in spots, sinking into the sheets and causing the pack to stick together in patches, so that the sheets cannot be pried apart without tearing.

Every one familiar with sheet rolling realizes that the rolls must be kept at the proper heat, so that they will maintain the proper shape to roll successfully such a thin product. A roller may (probably unconsciously) count on a certain spring to a stand of rolls, and by trial find the proper heat to go with it, so as to keep the shape of his rolls right; and he will watch carefully the size of the horns on each sheet, as this is an indication of the shape of the mill. He knows that if he rolls too fast—does not allow time enough between passes—his rolls will lose their shape. Neither must he roll too slowly.

Again, sheets always entered at the same place on the roll may cause trouble. He must constantly watch and guard against such things as cold drafts of air blowing on the rolls, or anything that will in any way affect the temperature of the roll. Of late years some of these difficulties have been helped by burning gas against the rolls to expand them when not in operation, or by blowing steam on working rolls to keep down the expansion.

Roll-Neck Friction an Important Factor

Another most important factor is the roll-neck friction; it is not always appreciated how much this is. For example, when finishing a pack, if one neck of a roll be greased (with hot neck grease) without greasing the other, the pack will always draw a long horn next to the neck that is dry. The reason is that the friction on the ungreased neck is greater, and consequently heats and expands the roll on that side. It is believed that from 60 to 90 per cent of the power required is used in overcoming roll-neck friction, although there are no definite figures to go on. This is one of the most important things in roll design, and yet there is no scientific information available on the subject; if there were it might lead to some radical changes.

Prof. W. Trinks† has plans for building an experimental rolling mill which is arranged so that each factor entering into the problem of rolling can be controlled. It is hoped that such a mill will be installed, for there is great need of definite figures in connection with all steel rolling generally. The apparatus devised for the purpose of determining roll pressures and

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spreading forces in this mill was described at length in THE IRON AGE, Jan. 8, 1920, pages 121-124, by W. B. Skinkle, then Director of the Bureau of Rolling Mill Research, Carnegie Institute of Technology.

On hot-roll sheet mills at work, a blue or indigo color is often observable. This corresponds to a temperature of about 550 deg. Fahr. This temperature often runs higher, although when reaching 750 deg., showing a gray, the roll is liable to break shortly afterward. In a totally dark room 900 deg. Fahr. would probably give the roll a perceptible red color. Naturally the roll is hotter in the center than at the ends, and the necks are still cooler; for although grease is often seen burning on the neck, yet the temperature at which it burns is generally lower than the temperature of the roll, as indicated by its color.

In the history of sheet rolling there has been a tendency continually to increase the diameter of the rolls, until to-day sheet rolls of 30 in. are seen, and rolls as large as 32 in. have been reported. The larger the roll, the more tonnage can be turned out, as the large roll does not change its temperature as readily as a small one. There is evidently a limit to the size, however (aside from practical considerations of handling such heavy rolls), for the larger the roll, the more the radiating surface to cause cooling. The fact that the volume varies as the cube, and the surface only as the square, of the diameter,* has only an indirect relation to this problem of cooling. It is also to be borne in mind that the larger curvature will not draw the steel so much for the same total pressure.

So far as the breakage of rolls is concerned, this is apparently due to unequal expansion, and not to the stress of rolling—as evidenced by the fact that rolls sometimes break when the roll is standing still, the roll train perhaps having been stopped for a few moments during the working period.

The Possibility of a Continuous Sheet Mill

Considering now the possibility of a continuous sheet mill, it will be remembered that, about fourteen years ago, the United States Steel Corporation spent a large sum at South Sharon, Pa., to install a continuous sheet mill, which consisted of a series of stands of ordinary two-high rolls in tandem; the sheet passing through one stand after another, never being in two stands at the same time. The sheets were automatically doubled and matched together in special devices at certain points in the train. It was thought that, even if it were impossible to roll the lighter gages, such as 26 and 28, heavier sheets of 18 or 20 gage could be thus successfully rolled. After a most thorough trial, however, the mill was dismantled and the ordinary method of sheet rolling installed.

This is a convincing and definite proof of the great difficulties of sheet manufacture, by using our present roll stands in a continuous train. Aside from any other question, the difficulty of keeping so many different rolls in a like expanded condition and shape seems insurmountable. The present method of using gas and steam on rolls, which was not known at that time, might have aided a little; but something much more certain than this must be devised if light gages are to be rolled in this manner. Possibly the heavier gages, 10 and 12, say, could be made in this way; but we already have satisfactory mills of a different type for this purpose, and we would be no further along toward automatically rolling light-gage steel.

Some method of heating the steel absolutely to a definite temperature, possibly some form of electric furnace, and some way of keeping the shape of the roll, must be devised. Rolls have been cast with holes through the centers, and steam introduced or gas burned inside them; but they have been found inadequate to hold their shape and stand up to the service. The practice already mentioned, of using gas and steam on the surface of the rolls, is more satisfactory. Perhaps some day rolls will be placed inside a constant-temperature furnace; but what would be done about the bearings and other details is a question as yet unanswered.

*For rolls equal in length, the volume varies as the square of the diameter, and the area directly as the diameter.—[EDITOR.]

Some twelve or more years ago the author visited an extremely interesting continuous sheet mill in Teplitz, in Northern Austria. There are five stands of two-high continuous rolls, all alike, having a diameter of 23⅝ in. and a length of 59 in. In front of this is a small set of three-high rolls, and to the right a larger set of three-high rolls.

An 8-in. slab is delivered to the large three-high mill and broken down to 3 or 4 in. thick. This slab is then cut in half and put into a reheating furnace. One of the halves then goes to the small three-high mill and is reduced to 9/32 in. (7 mm.) thick, and then without reheating is put into the continuous stands. This thickness (9/32 in.) is always the same, and the reduction is varied on the continuous mill to give the required final thickness. The sheet is finished about 60 ft. long, and is of course in all the stands at the same time.

Sheets are always rolled singly, never in packs or doubled, and are from 40 to 50 in. wide. The stands are about 9 ft. from center to center, and no idle rolls or automatic tables of any kind are used, simply stationary guides 6 or 8 in. high, and a cast-iron plate between the stands, on which the sheet slides. The gear train gives the first stand rolls 30 r.p.m., the next 37½, then 45, 52½, and 60 r.p.m. for the last stand. When the author saw the mill, it was rolling a final product of 12 gage, making a total reduction in the five stands of some 58 per cent (from 7 mm. to 3 mm.).

Several points of great interest present themselves in connection with this mill. The first is the fact that such a thin piece of steel could be in all the five stands of rolls at the same time, and neither tear nor be crumpled between them. There is a great deal of confusion as to the pull exerted by rolls generally on steel, but as a matter of fact there is little if any pulling action, assuming the steel to be free and not held by any outside force.

The resultant of the various forces acting on the steel must be vertical; for if it were inclined there would be an unbalanced horizontal component which would cause acceleration, making the bar go faster and faster. Therefore, if the speeds and drafts are correct among the various stands of rolls, the sheet will not "pull" itself to pieces going into the rolls, assuming that the shape of the rolls is also right.

This continuous mill has demonstrated the fact that not only can the shape of the rolls be controlled, but the speeds and drafts among the various stands can be properly adjusted, at least for single sheets as thin as 14 gage.

Another point of great interest is the fact that the back end of the sheet comes out thicker than the front end, due to the rapid loss of heat while in the continuous rolls. The finished sheets are respectively 2.5 mm. and 2 mm. thick at the edges at the back and front ends, and 60 ft. long. To operate this mill economically it must work these long lengths, and it is the practice to cut the 60-ft. sheets into short pieces, and afterward sort together the corresponding thicknesses from the different long lengths of finished sheets, so that the variation of thickness may not be noticeable to customers.

This mill was reported not a great financial success, as there was not demand enough to keep running steadily on these particular gages. Further, the engine running the continuous mill was of about 1000 hp. normal rating, and totally inadequate to run the mill satisfactorily.

Little experimenting had been done in trying to roll two sheets in a pack, for the furnace layout made it almost impossible to do so. But the little that had been done seemed to show, as one would expect, that the thinner the sheet the greater the non-uniformity of thickness. It would seem that a reversing two-high mill, receiving alternately the hot and cold ends of the steel, might equalize this thickness, and possibly be more satisfactory than the five continuous stands. So the question would naturally arise as to the best method to employ in rolling 12 and 14-gage sheets.

Then, too, it would be impossible to take this 12 or 14-gage material rolled on a special mill and finish it on the ordinary two-high sheet mill. Shapes of

sheets and rolls will not fit, and while one of two packs might be rolled with care, the scrap loss would be enormous; this has been tried commercially and failed.

It has also been suggested, and thought possible, to reduce the cost of sheet rolling by starting with the product from a universal plate mill, instead of a sheet bar mill. If a universal plate of 7 or 8 gage and of accurate width were cut to proper size, it would be equivalent to doing away with some of the present roughing-down process. However, when the price of universal plate is taken into account, there is little or no gain; and in addition the difficulty of doing good work has been greatly increased.

It would seem that sheets might be successfully rolled in packs on a two-high reversing mill. The condition of the same two rolls in the same relation to each other and the same pack of steel is what we have in the commercial mill now; and certainly with reversing roller tables, etc., a large saving in labor would result, even if the tonnage per set of rolls was not increased. But it must be remembered that, in a reversing mill, first one end of the pack and then the other would be entered; and that this thin pack of sheets would have to be drawn first in one direction and then in the opposite direction; and that the two ends of a pack are not alike. So that we really have a very different condition from the ordinary two-high stand.

This sheet-machinery problem is a real one, but the only logical way of approach seems to be from the scientific experimental side. It has been pretty well demonstrated that practise cannot furnish enough information. We need more knowledge of what actually occurs in rolling, what are the pressures, heat distribution, radiation, friction, etc. When enough data and information are at hand, new ways and means, as always happens, will be indicated.

ACTIVE PIPE DEMAND

More Inquiry from Oil Producers—Basic Pig Iron Firmer at Youngstown

YOUNGSTOWN, OHIO, Nov. 29.—Iron and steel situation in the Mahoning Valley has been marked by a number of distinctive developments during the past week. Among these has been an appreciable improvement in volume of inquiry for line pipe from important oil-producing groups, as well as stabilization of the sheet market on the basis of 3c. for No. 28 gage black and 4c. for No. 28 gage galvanized. General conditions in the industry are more encouraging than a week ago.

Another significant factor is a decidedly firmer tendency in pig iron, standard basic becoming stronger at $19. A Valley steelworks interest which has been in the market for 2000 tons of basic states that $19 represents the lowest bid which it has received.

Among line pipe inquiries before the trade are three of particular consequence, involving respectively 312 miles, 250 miles and 150 miles. District pipe interests expect some of this business to be allotted before the week ends. Report that an order for line pipe involving 18,000 tons was placed in the Mahoning Valley last week meets with denial by each of the two producers and lacks confirmation in other quarters.

An Important Contract

One of the most important single contracts in several months has been placed with the Powell Pressed Steel Co., Hubbard, Ohio, by the Durant Motor Co., Inc., for stampings and pressed steel parts. Value of the contract is estimated at $500,000, and it will engage the capacity of the pressed steel interest for nine to ten months. The company will do all the general stamping for the four-cylinder and six-cylinder cars to be manufactured by the Durant interests. The contract will supply a market for several thousand tons of strips, light plates and sheets. As rapidly as it secures dies and tools for the work, the Powell Pressed Steel Co. will expand its operating rate from 65 per cent, the current production, to 100 per cent, which it expects to reach in about four weeks.

A pressed steel interest at Warren has recently booked two large orders, one from the Ford Motor Co. for brake drums and pressed metal parts, and the other from a Chicago electrical stovemaker for 20,000 stoves. The stoves are shipped from Warren to Chicago, where the electrical appliances are installed.

Sheet and Tank Orders

The Warren City Boiler & Tank Works, Warren, has received an order for nine storage tanks from an oil interest, which will involve over 1000 tons of plates.

During the week sheet orders aggregating several thousand tons were placed with Valley independents, principally for round-lot tonnages and prompt shipment. While there has been some buying for delivery during the first quarter of 1922, it has been moderate in volume. Last Saturday's mail brought miscellaneous orders for 400 tons of sheets of various sizes and grades to one Valley producer.

Establishment of sheet prices at 3c. and 4c. is in line with the movement inaugurated during the early fall by a number of independent mid-Western interests to stabilize prices. This movement met with limited success and during the past two weeks before the new quotations were definitely established, the market suffered from price unsettlements.

Activity in blue annealed sheets has been of a restricted nature, with little new tonnage coming out. The market is quotable from 2.25c. to 2.50c. Considerable tonnages of sheets for Japan have been shipped from the Valley the past month, billed via the Panama canal.

In connection with the betterment in line pipe inquiry, producers say that prices are steady and that regular discounts are being adhered to. The same applies to merchant grades of pipe, they say, in the face of a somewhat weakening demand.

Firmness of Pig Iron

A number of Valley steelworks interests with sizable accumulations of pig iron declare that $19 represents the bottom of the market at this time. Two weeks ago a large interest admitted that tonnage of an attractive nature might be accepted on a lower basis. Policy of hand-to-mouth buying still largely prevails, though several sizable inquiries have been before the trade, one involving upward of 5000 tons for shipment to a steelworks plant.

Strip steel industry in the Mahoning Valley continues to benefit from the high productive rate maintained by the Ford Motor Co., and large tonnages of both hot and cold-rolled are going forward to Detroit. Other automobile interests are likewise strip buyers, besides taking good-sized tonnages of full-finished sheets. There is evidence of cautious buying, however, on the part of motor car builders.

The Chain Belt Co., Milwaukee, placed its gray iron foundry on a full time schedule during the past week and increased the working force 20 per cent, so that this department is now operating one shift of 9½ hr. a day, with as many hands as during the peak period since the new plant was built two years ago. The company reports orders for gray iron castings which will keep the foundry busy on full time well into 1922. Orders are coming from a widely diversified source and the November bookings were the largest of any month this year, upsetting the usual rule of a declining movement of orders in the last two months of the year. The malleable foundry department has also experienced a decided increase in orders and is now making two heats daily instead of one. In its special line of concrete mixers, paving outfits and construction equipment, the company looks for a fair business in 1922, with no spasmodic revival but a gradual, healthy growth.

Ore Transfer Car of New Design

A new design of side-dump ore transfer car having novel features has recently been built by The Atlas Car & Mfg. Co., Cleveland, for the Indiana Harbor works of the Inland Steel Co. The car is shown in the accompanying illustration. It has a capacity of 60 net tons and a hopper containing 960 cu. ft. of ore when level full. The discharge is from one side. The car has two independently controlled discharge gates which are operated by compressed air cylinders from the cab. The hopper is divided into two sections by a central partition so that either half may be dumped separately or both sections simultaneously.

A pusher arm is provided to push cars on parallel adjoining tracks. This arm is controlled by a compressed air cylinder and is operated by means of a valve in the cab. When the arm is in an upright position, it is locked in place to prevent accidents. The car is so arranged that the space between the sheathing and the car body proper can be heated by means of salamander fires in order to prevent the ore sticking in the hopper. The hopper itself is so shaped that the discharge opening forms the widest point of the car, all surfaces sloping toward the discharge opening so that there will be no tendency for ore to stick in the hopper even in the coldest weather.



The Hopper Is Divided Into Two Sections, Either of Which Can Be Dumped Separately, or Both Simultaneously

The length over end sills is 41 ft., the width 18 ft. 4 in., and the height 13 ft. 3 in. over all. The distance from center to center of trucks is 26 ft. Each of the discharge openings is 2 ft. 6 in. x 5 ft. 9 in., and the hopper opening is 18 ft. x 12 ft. The coupler height is 2 ft. 10½ in. The car is driven by four 62-hp., 250-volt series-wound motors of the railway type, mounted directly on the axles with spring suspension to the tracks. A Cutler-Hammer magnetic switch is provided.

Bureau of Mines Educational Films

Two new motion picture films have recently been produced under the direction of the United States Bureau of Mines, in co-operation with industrial organizations, and are ready for distribution for educational purposes.

"The Story of Heavy Excavating Machinery," produced in co-operation with the Bucyrus Co., depicts the many types of steam, gasoline and electric shovels and other heavy excavating apparatus that are used in mining operations. The picture shows scenes in the iron mines of northern Michigan and the quarries of New England, and illustrates coal stripping operations in Ohio, and also drag-line and tower work in the conservation work along the Mississippi River.

The second film, "Mexico and Its Oil," produced in co-operation with the Sinclair Consolidated Oil Corporation, carries the audience from Tampico, Mex., to the great oil fields of that country.

Application for the loan of these films should be made to the Bureau of Mines, 4800 Forbes Street, Pittsburgh.

Lower Coal and Coke Prices

UNIONTOWN, PA., Nov. 28.—The H. C. Frick Coke Co. continued to increase its active oven list last week, the company now having slightly in excess of 3000 ovens going in the Connellsville region. It is understood that a large part of the output of the ovens is being sent to tin plate plants of the Steel Corporation. Coal production of the company also has been slightly increased this week.

The week, however, brought a slump to independent operation in both coal and coke. This has been accompanied by a softening in the market with the result that coal is being sold at around $1.15 and upward; furnace coke at $3 and upward, and foundry coke at around $3.75.

Prospects of a reduction in freight rates is given as one factor in the slump. Another reason assigned is that some fuel interests stocked a little above the average as a result of the menace of a railroad strike and that these surplus stocks are now being worked off.

Construction of highways to the total value of $76,400,000, covering 6261 miles and employing more than 150,000 workers, is about to be undertaken by 30 states, as the direct result of the recent passage of the Federal Highway act, it is stated at Washington by the Department of Commerce. This is the act which was recommended by the President's conference on unemployment as an emergency measure to provide jobs for the nation's unemployed. The figures as to the amount of work which could be undertaken by the states in the construction of highways were supplied by the governors in response to letters sent them by Secretary Hoover. The letters asked what amount of work they could get under way within a period of 90 days after the passage of the act. According to the act, which created a fund of $75,000,000 to be apportioned among states taking advantage of the 90-day period, each state will be entitled to receive, on the basis of the value of its work, its specified federal allotment. Part of this allotment is available now and part will be available Jan. 1.

The Steel & Tube Co. of America, Chicago, has completed overhauling and improving its blast furnaces and coke plant at Mayville, Wis., formerly known as the Northwestern Iron Co., and expects to resume operations with a normal working force on Dec. 1.

Die Castings and Their Use in Industry

Their Relation to the Consumers of Sand or Malleable Castings—Dies and Their Construction — Designing the Castings

BY C. T. RODER*

LITTLE has been written on the principle of making die castings and the practicability of applying this to manufacturing establishments where the use of sand castings and malleables predominates. In the following the writer endeavors to give a brief history and general synopsis of the advantages of die castings, with a view to aiding concerns now manufacturing or using the product, or to those who might be prospective users.

History of Die Casting

The die casting process was used to make type 70 years ago, but it was not until 1892 that the Franklin Die Casting Corporation of Syracuse, N. Y., started production on a large scale. During the first decade of this industry, die castings were chiefly used by manufacturers of phonographs, telephones and cash registers. In 1906 the Doehler process came into the commercial world, and since then several other companies have been organized, most of which have failed. The progress of the industry is comparable with automotive development, its commercial and technical progress being connected with the manufacture of automobiles.

A die casting is produced by forcing liquid metal into dies under pneumatic pressure. It is only recently that aluminum base alloys have been developed and, until 1914, the only metals successfully die-cast were those which fused below 1300 deg. Fahr. Previous to 1914, 90 per cent of die castings were made of a composition of zinc alloys. Since aluminum alloys have been found to be practical and efficient, fully one-third of the die castings in use are of this composition. It is claimed that the annual production of such castings now reaches approximately 3,000,000 lb.

Advantages to the User

The advantages of die castings lie in the small amount of machining necessary, reduction of assembling, accuracy, finish and appearance, range of design, cost and possibilities of quick delivery. Most of these advantages are not appreciated until castings are used for a stipulated period and comparative data becomes available. For this particular reason it is difficult to convince a prospective user that the substitution of die castings for some of his present methods of manufacture is more efficient and in the long run will cost less.

The use of die castings can eliminate practically all machining. It is sometimes necessary and advisable to do some machining but in this case the casting is usually made simpler and the cost decreased. As an illustration inside threads, inside grooves, etc., are usually inadvisable to cast, therefore, machining becomes necessary. When necessary to machine, the cost is usually less than the same cost would be on sand castings owing to the accuracy and uniformity of die castings and the ease in which they can be handled in jigs and fixtures.

In the case of assembling, it often happens that several parts, which ordinarily must be made up separately and assembled otherwise, can be combined and cast into one die castings. In such a case one can easily see the advantages of greater accuracy, lower costs, much more rigidity and strength and far better appearance. Also, the combining into one part or casting eliminates the possibility for separate parts to become out of alinement. On account of the accuracy of die casts, this in itself makes assembling an easy problem.

It must be conceded that the accuracy of die castings are far beyond other methods of casting. Naturally, if a die is not made correctly castings will vary. Inasmuch as the metal is forced into the die under pneumatic pressure there is little or no possibility of the casting varying. However, designs and dimensions, also mixture of metals, have a material effect. Large castings are more difficult to cast than smaller ones and of course the possibilities of inaccuracy would be greater.

The shrinkage is taken care of in the die as shrinkage usually occurs after the casting is taken from the die. It has been found in various die casting shops that the shrinkage of mixtures are approximately as follows:

Lead and tin	Approximately 0.002 in. per inch
Zinc	Approximately 0.004 in. per inch
Aluminum	Approximately 0.007 in. per inch

On account of the great accuracy to which dies are constructed, a casting will have almost a perfect finish so that it is unusually smooth and free from porous conditions and other impurities so prevalent in sand and malleable castings. The finish depends upon correct mixtures and the manner in which the work is handled. Undoubtedly the latest designs in die castings machinery have perfected the above condition, even to a greater degree than is generally known to manufacturers now.

Greater and wider ranges of design are brought about by the die casting process. Many parts, if carefully analyzed and studied, can so be designed as to be applicable to die castings. It is sometimes said that range and design are almost without limit. One authority writes that die casting manufacturers have been forced to do "impossible" things during the past 10 years.

As to costs, this is more or less a difficult subject, as the initial cost of die casting is usually greater than sand castings. Costs on stock castings cannot be kept, as each individual part requires either a difference in design, weight or quantity. The principal item is the cost of dies, which is usually great on account of the quality of steel necessitated, the great amount of time necessary to build it and the skill of the tool or die maker. However, one must not overlook the fact that a die is a substitution for patterns, jigs and fixtures. If castings are used in quantities of 10,000, 25,000, 50,000 and 100,000 lots, and comparative data are kept on costs, the result will be less than sand castings. Labor costs are held to a minimum because, after the cost of the die, the completion of a casting can be achieved by the most ordinary unskilled workman.

Quick delivery can be effected almost immediately after a die is completed. This of course depends upon the machining necessary and to what extent gates, sprues and flash form a part of the casting. On repeat orders work can commence immediately, as the die is

*Port Huron, Mich.

usually held in the plant of the manufacturer who is responsible for its care and upkeep. Production also depends on how modern the manufacturer's equipment may be and how experienced he is in the die casting manufacture. On large orders and if the casting is not too complicated a production of 200 to 300 pieces per hour can be obtained.

Dies and Their Construction

In the writer's experience with dies, no greater problems have presented themselves as in the construction of successful die casting dies. When the heat at which the dies are operated, and the heating and cooling which take place are considered, it is easily understood that dies are subjected to extreme wear. The design, workmanship, quality and composition of steel used will be the important factors in the life of a die. Some dies can be used for 15,000 or 20,000 castings and others up in the hundreds of thousands. Only the most skilled tool and die makers can be employed on this work as it is clearly pointed out in the foregoing that 80 per cent of the accuracy and finish of a casting depends upon the die. Usually any inaccuracy in a casting can be traced to faulty design of the die.

In dies for parts made of white metal alloys a high grade of machine steel is used. In dies for aluminum parts an 0.40 to 0.50 per cent carbon steel is used. It is not the general practice to heat treat the steel that is used in die casting dies, as the distending and contraction causes cracking. On ordinary parts the dies are made of two blocks but, in cases of more intricate design, the dies are composed of several parts. The ejector box is made of cast iron. In this box is also the core and ejector pin both of which are operated by rack and pinion construction. A constant flow of water is continually flowing through the die when in operation to regulate the temperature and to keep it from becoming too hot. It has been only recently that power driven die casting machines have been designed as, heretofore, in order to hold the die absolutely compact, clamps and toggles were used.

Classifications and Weights

Generally speaking, the manufacture of die castings can be divided into the following divisions:

Aluminum base alloys	Lead base alloys
Tin base alloys	Zinc base alloys

Of the above, aluminum and zinc base alloys constitute the larger percentage of the total production of the die casting industry. An aluminum casting is probably more popular than zinc on account of the crystalline structure which is prevalent in zinc. Owing to the absence of this condition in aluminum castings they are more reliable. They are also superior in strength, have greater flexibility, are lighter and of lower specific gravity.

An approximate practical limit in weight of die castings is as follows:

Zinc and tin alloys	10 lb.
Lead alloys	15 lb.
Aluminum alloys	3 lb.

The size of die castings seldom exceed 24 in.

Designing Die Castings

One of the leading authorities in the manufacture of die castings claims that the following information, if borne in mind when designing, will make possible their successful use:

In dealing with steel cores, as is necessary in a process producing finished parts, undercuts or recesses in the casting should be avoided. In many cases it is, if course, possible to use collapsible cores, but this increases the cost of both dies and castings.

To give added strength, pins, rings and bushings made from brass, bronze or steel may be inserted in casting.

No allowance for shrinkage or machining should be included in making drawings except where the limits are such that a special operation is desired, when it should be clearly noted.

Parts which require little or no machining after being sand cast or which can be economically produced by stamping or screw machine methods are not usually adaptable to die casting.

It is cheaper to cast raised than depressed letters or figures, but both are practical.

Small fillets added at sharp corners greatly strengthen the casting and increase the rate of production.

The cost of die work may sometimes be reduced by knowing the important dimensions both where accuracy is required and where it is not essential.

The following limits should be borne in mind in designing die castings:

Limits or minimum wall thickness:

Lead	1/32 in.
Tin	1/32 in.
Zinc	1/8 in. (on small castings 1/16 in.)
Aluminum	1/8 in. (on small castings 1/16 in.)

Possible variations from drawing dimensions, per inch of diameter or length:

Lead	Plus or minus 0.001
Tin	Plus or minus 0.0005
Zinc	Plus or minus 0.001
Aluminum	Plus or minus 0.0025

Where the distance is several inches these limits may sometimes be reduced.

Maximum number of threads:

Lead, external	24 per inch
Zinc, external	30 per inch
Tin, external	34 per inch
Aluminum, external	20 per inch

In the case of aluminum, where close fit is required, thread should be cast oversize and chased. Where economical, internal threads may be cast in parts made from zinc, tin or lead base alloys, but this is not possible in parts made of aluminum.

Holes:

Lead	1/32 in. minimum
Tin	1/32 in. minimum
Zinc	1/32 in. minimum

Regulated by depth of hole and thickness of casting.

Aluminum	3/32 in. minimum

Size of hole is dependent on its length and general design of casting. Holes not cast can usually be spotted to facilitate drilling.

Draft:

Lead and tin, cores 0.0005 per in. of length and diameter; side walls, 0.001 per in.

Zinc, cores 0.001 per in. of length and diameter; side walls, 0.001 per in.

Aluminum, cores 0.015 per in. of diameter and length. Cores less than 1/4-in. diameter to have 0.005 per in. of length and diameter; side walls, 0.005 per in.

While the above draft is desirable, it is sometimes possible to modify these limits where they would interfere with the service required.

Thus, it will be seen from the foregoing that the die casting process is a varied one and one which presents unlimited difficulties. Each new die casting is really a job in itself, this being especially true in parts of intricate design. Hardly a day passes but what some experiment has been developed, either in die making, alloys or some other point of connection. Metallurgists and chemical laboratories are constantly experimenting and analyzing in their endeavor to perfect alloys for various parts being produced. Die designs are being made stronger and better. The understanding of what steel should be used in die construction is being improved daily and the life of dies are thereby enhanced. The understanding of finishes employed in die cases are reaching a point of perfection and nearly all alloys are successfully nickel, silver and gold plated, lacquered, coated with Bakelite; japanned or black oxidized.

Regarding the broadening of the field in which die castings may be used, it is safe to say that the manufacturer can solicit an order in practically every metal manufacturing institution in existence. The future of the industry lies in the proper development of a grade of steel which will permit the use of a die to stand up more efficiently under the wear and pressure to which they are constantly subjected.

It has been learned from experience that the follow-

ing classes of manufacturers are using and can use die castings in some or all of their product:

Adding and tabulating machines	Office appliances
Cash registers	Farm tools and machinery
Cameras	Cooking utensils
Clocks	Typewriters
Check protectors	Vacuum cleaners
Motorcycles	Fire extnguishers
Phonographs	Hardware
Fare boxes and registers	Pianos and players
Motion picture machines	Printing presses
Magnetos	Soda fountains
Safety razors	Weighing scales
Telephones and apparatus	Electrical equipment
Vending machines	Gasoline engines
Automobiles	Numbering machines
Washing machines	Plumbing fixtures

COMPANIES WIN

Preliminary Victory of Iron and Steel Manufacturers in Cost Reporting Case

WASHINGTON, Nov. 29.—Justice Bailey in the Supreme Court of the District of Columbia to-day denied the motion of the Federal Trade Commission to compel 22 iron, steel and coke makers to produce so-called sample sheets for inspection prior to the beginning of the hearing set for Dec. 8 in the monthly cost reporting case. The hearing, which is to be held before Justice Bailey, will revolve around the injunction restraining the commission from inspecting the books of the manufacturers concerned in case of the Claire Furnace Co., et al.

Decision Considered Victory for Producers

The decision of the court denying the motion is looked upon as an important victory for the producers, but has not changed the plan of the commission to proceed with the hearing. In denying the motion Justice Bailey took the position that to grant it would give to the commission the same material as that it is seeking to gather for the monthly reports and against which is an injunction, which the commission will seek to have dissolved, while the iron, steel and coke makers will attempt to have it made permanent.

In the arguments last Friday on the motion Attorney Levi Cook, appearing for the producers, said that such permission in advance would "be an unconscionable act of inequity." He declared that the commission wants to put its expert accountants at work on the books so as to "go on a fishing expedition and see what they can dig up." It was his contention that the commission would take advantage of the advance inspection in order to get material really desired through monthly cost account reports wanted by the commission from the manufacturers. It was maintained that the commission is now asking for more data than originally were asked, including every record and memoranda available, even involving data of the foremen. Mr. Cook declared that it would be a violation of the fifth article of the United States constitution preserving property rights to compel his clients to furnish reports. While the cost to do the work would be great, it was pointed out that regardless of this item the request is wrong in principle. Moreover, it was stated that it would be a physical impossibility to assemble at any one given point in any short space of time the books of the companies; that the production costs are not kept in the form asked by the commission and that its request is unreasonable.

Charged That Producers Hampered Government

Attorney William T. Chantland, who, with Attorney Jesse C. Adkins, appeared for the commission, charged that the producers were seeking to stop a Government agency from functioning. This case, it was claimed, is broader than the Maynard Coal Co. case was. In the latter Justice Bailey granted a permanent injunction against the commission, forbidding it to get cost of production figures from the respondent.

Three basic defenses are being made by the iron, steel and coke producers, said Attorney Chantland, who outlined them as follows: They charge the commission's request as unreasonable and an abuse of discretion; that it would involve work so burdensome as to deprive them of their rights under the fifth article of the constitution; and that it would interfere with private corporations, most of which do both an intrastate and interstate business, but, it was stated, they do not keep books separately on the two classes of business, the commission having jurisdiction only over interstate business. Mr. Chantland made arguments in which he sought to show the defense set up was not well taken. He declared, in arguing for advance inspection of so-called inspection sheets, that it will be necessary to require an examination of the books and that the Federal Trade Commission will want its own witnesses and to cross-examine those of the producers. It was contended by Mr. Chantland that he would be derelict if he did not ask for books in advance. Justice Bailey raised the question as to whether the manufacturers would bring in their books in advance. Mr. Chantland expressed the hope that they would, adding that in any event the case would be appealed to the United States Supreme Court. Mr. Adkins made arguments largely similar to those of Mr. Chantland.

The right to obtain cost production figures is claimed by the commission under Sec. 6 of the act creating it. When it attempted to assert that right last year, the 22 companies involved in the present cost enjoined the commission after the commission had instituted mandamus action against the Republic Iron & Steel Co., and the Bethlehem Steel Co.

Freight Rates on Scrap

A conference was held in Pittsburgh recently between steel company traffic officials and railroad officials, for the purpose of securing a reclassification of scrap iron freight rates. For years past, scrap iron tariffs have been based on the billet rate, and the steel company representatives claimed at the conference that it was unfair to charge as high a rate on what is properly a raw material as is charged on semi-finished material, particularly as scrap iron has much less value than the semi-finished steel. It was argued that scrap, save on those grades which are not remelted, should not carry a higher rate than pig iron, and a demand was made that the scrap rates be brought down to the same bases as pig iron. The railroad officials took the plea under advisement.

Jones & Laughlin Steel Co. Acquires Coal Lands

The Jones & Laughlin Steel Co., Pittsburgh, has just concluded negotiations for the acquisition of 14,000 acres of coal land in Greene County, Pa., along the Monongahela River, the seller being the Piedmont Coal Co., which took over the greater part of the holdings of Josiah V. Thompson, the Uniontown, Pa., operator. This coal is deep vein, and in addition to the advantage of river transportation afforded by the location of the property, it is in the non-union district, and the company thus will have more control over mining costs than is possible in the union fields. The company has extensive coal properties at California, Pa., known as the Vesta Coal Co., and operates a fleet of barges and tow boats between the mines and the coke plants at Hazelwood and Aliquippa works.

It is announced that the Main Committee of the American Foundrymen's Association will meet at 10 a. m. Friday, Dec. 9, in the Engineering Societies Building, New York. This is the last day of the fall meeting of the A. S. M. E. This committee is studying the problems encountered by foundrymen in their use of molding sand and furnace refractories.

The Alabama Power Co. will have the 90,000 hp. Government steam plant at Sheffield, Ala., in use by Dec. 1. Georgia and the Carolinas will get at least half of the power. The contract is for a year and may be terminated by Secretary Weeks at 30 days' notice.

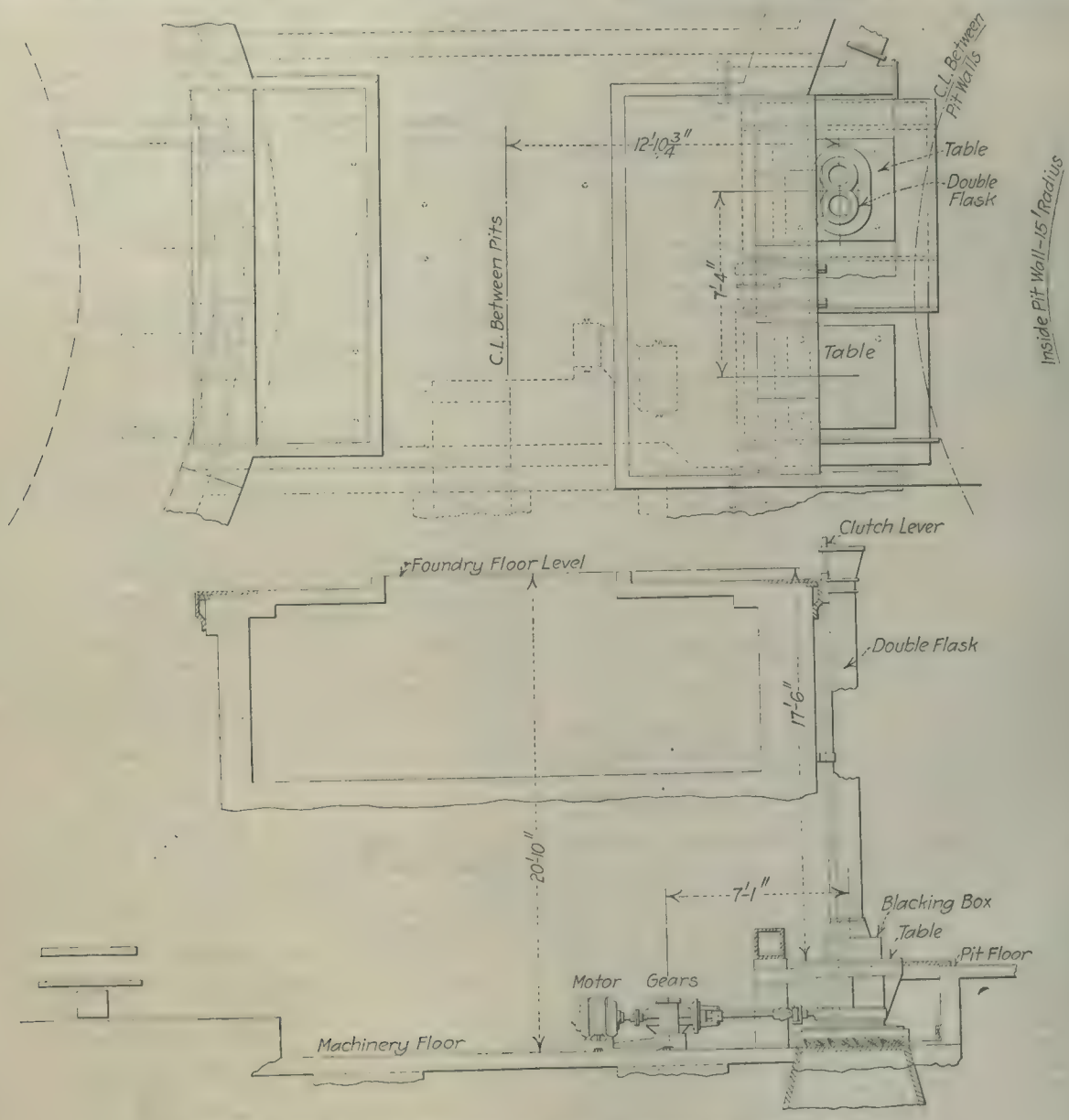
JARRING FOR MOLDING PIPE

Machines in Basement Handle Vertical Molds Arranged Within Reach of Jib Cranes

An application of the electric jarring machine, indicative of the wide field for its use, is to be found in the cast-iron pipe foundries in the South. The first pipe manufacturer to adopt the jolting machine for its molding work was the American Cast Iron Pipe Co. This company now has eleven in operation, while the National Cast Iron Pipe Co. has two and the United States Cast Iron Pipe & Foundry Co. is now installing two. All of the machines are motor-driven and were furnished by Henry E. Pridmore, Inc., Chicago.

tached to the sides of the pit serve to steady the flask, which is in a vertical position. After jolting has been completed, the top of the mold is hand-rammed and the pattern is drawn. In the National and American shops, where molding is done with the bells up, the slip socket forming the bell of the mold serves as a stripping plate; in the case of the United States plant, which molds with the bells down, the bead ring will serve the same purpose. After drawing the pattern, the blacking is applied to the inside of the mold, and the surplus, which in former practice was lost, is saved by withdrawing a slide in the pan underneath the mold, thereby permitting it to run into the blacking box below.

The jar-ramming machines have a capacity of 25



Plan and Section of Arrangement of Jarring Machines as Located in Two Pits, Each Served by a Jib Crane

Of standard Pridmore design, the jarring machine differs little from other installations except in size. The table is 48 x 48 in. and the lift is 1¼ in. Operation is by 30-hp. motor, power being applied through Jones reduction gears of the spur type. The machine is started and stopped through a rheostat instead of by friction clutch, as is the practice on most of the smaller types in use. The raising of the table is accomplished by a cam which works in contact with a roller follower forming one end of a bell crank.

The machine is situated in a basement under the foundry floor, the distance from the top of the table to the floor level being 17½ ft. The table is centered at the bottom of the pipe pit and on it are superimposed a blacking box and the pipe flask. Two guides at-

tons and have been used in making 6-in. and 8-in. pipe. It is planned, however, to use them for molding larger sizes, running as high as 16 in. in diameter. All molds are made in pairs, the flask being arranged to hold two molds and patterns.

The molding pit is served by two motor-driven jib cranes. One of these sets the empty flask on the jarring machine, draws the pattern, removes the mold from the machine and sets it on the drying oven. The other crane removes the mold from the oven, sets the core, pours the pipe and shakes it out.

Most of the operations—molding, drying, setting the core and pouring—are carried on in the pit. The method used in removing the flask from the pit and shaking out the mold is of interest. The flask is made

in two halves, hinged together on one side, with flanges on the other side which are clamped together. Before the flask is lifted out of the pit all of the clamps, except the one nearest the bottom, are knocked off. Separate crane hooks are then inserted into loops projecting from both halves of the flask on the flange side, midway between the top and the bottom. The flask is then raised until it is more than half way out of the pit, when, by knocking it against the edge of the pit, it is swung into horizontal position with the flanges on the bottom. After the flask has been conveyed to a position over a bed of rails, a workman knocks off the remaining clamp and the two halves of the flask pull apart, permitting the pipe to drop out. The flask is then immediately reclamped, and again superimposed on the jarring machine.

VARIED OPINIONS ON TAXES

Tax Revision Bill Attacked and Defended—Commission is Proposed

WASHINGTON, Nov. 29.—The tax revision bill enacted at the special session of Congress has proven to be such a disappointment to some prominent Republican Senators that there has already set in a movement for further revision of the internal revenue laws next year. Senator Calder, Republican, of New York, has introduced a bill to create a tax commission which would be empowered to study the entire question of internal taxation and report to the Congress at the earliest possible moment. Senator Smoot, who, like Senator Calder, is a leading Republican member of the Committee on Finance, expects that public sentiment will turn in favor of a sales tax. Senator Townsend, also a Republican, wants the excise taxes removed because they hamper the recovery of business, and Senator Walsh, Democrat, of Massachusetts, is desirous that the individual taxpayer, particularly the man with a small income, be considered first in revising rates. There are many others who have voiced criticism of the law as finally enacted and signed by President Harding.

Taxation Cannot Be "Popularized"

But those supporting the measure point out that the various criticisms prove it is not possible to adopt a measure that would be universally popular and that it is out of the question to ever "popularize" taxation. They maintain that the act, while open to some criticism, has some good points, one of which is the elimination of nuisance taxes and the simplification of its administrative features. Retention of the Senate maximum income surtax rate of 50 per cent, which the President had opposed, has been a source of regret. It had been hoped that a compromise at least would be reached in the absence of adoption of the House rate of 32 per cent. The present rate is 65 per cent, so that the reduction as finally made is 15 per cent, and is no greater because of the opposition of the powerful agricultural bloc. The latter was not moved by vigorous statements that the large surtax diverts capital from the ordinary activities to investment in tax-free securities, diminishes receipts from income taxes and makes normal financing more difficult. President Harding, in response to a request from Chairman Fordney of the House Committee on Ways and Means, said he favored the 32 per cent rate because "I still believe the rate approved by the House to be nearer to a just levy and the more promising one in returns to the public Treasury." For the sake of harmony, however, the President suggested a compromise upon a maximum of 40 per cent.

Twelve and a Half Per Cent Accepted

The Senate finally accepted the House rate of 12½ per cent on corporation income as a substitute for the present excess profits tax and normal tax of 10 per cent, estimated to relieve business of taxes aggregating $110,000,000 yearly. The measure also retains the existing normal taxes on individual incomes. The House accepted the Senate proposal to withdraw the specific exemption of $2,000 in the case of corporations having net incomes in excess of $25,000. Complete deduction was allowed for capital losses in the capital-gain provisions. The Senate accepted the House proposal which excludes corporations from the benefits of a reduced rate on capital gains.

The act repeals the war profits and excess profits taxes, transportation and insurance taxes, taxes on soft drinks, etc. Taxpayers will not get the benefit, however, of repeal of the excess profits tax and the changes in corporation income tax and individual surtax until they pay their taxes in the early part of 1923 on income of the calendar year 1922. But the individual taxpayers will be allowed the exemptions applying to dependents and heads of families with moderate incomes on taxes paid in 1922 on 1921 income.

It is estimated that the act will raise $3,216,100,000 in the fiscal year beginning July 1, 1922, and $2,611,100,000 in the fiscal year beginning July 1, 1923, and, according to Chairman Penrose of the Committee on Finance, will relieve the country of more than $700,000,000 in taxes.

These estimates naturally cannot be based accurately because revenue depends upon the volume of business transacted, and with the present condition of business, only a guess can be made as to the returns that may be expected. Necessarily, if business improves, the revenue will increase accordingly, while if resumption of activities is slow, the revenue will be held down. These reasons are cited to show that the present act must be considered as an emergency measure, aimed to apply as nearly as possible to prevailing conditions and give strength to the claims of members of Congress that tax revision again will be taken up soon.

Meeting on Pulverized Coal

The meeting which the Metropolitan section of the American Society of Mechanical Engineers is to hold on pulverized fuel at Bayonne, N. J., on Dec. 16, includes addresses by the following: James A. Kinney, chief engineer Lebanon Plant, Bethlehem Steel Co.; R. F. Walker, consulting engineer M. A. Hanna Co., Cleveland; William J. Fantneyer, superintendent Puget Sound Power & Light Co., Seattle; W. H. Maddocks, Parsons, Kan.; H. L. Kohlberg, of A. T. McGregor, Warren, Ariz.; H. R. Barnhurst, advisory engineer Fuller Engineering Co., Allentown, Pa.; H. D. Savage, Combustion Engineering Co., New York.

In the afternoon of that date there is to be an inspection of the plant of the Babcock & Wilcox Co., at Bayonne, followed by a supper and the technical session in the evening.

New French Aluminum Alloy

An alloy for mathematical instruments, known as aludur, recently placed upon the French market, is a hard, resistant, but light alloy containing 98 to 99 per cent of aluminum, which can be worked cold, stamped, pressed, or bent, says the London *Ironmonger*. Its specific gravity is 2.75. Three types are made, each varying slightly according to the uses to which the metal is to be put. It may be used for motor-car body work, articles used in the chemical industry, the dyeing industry, dairies and breweries, and in the manufacture of mathematical and optical instruments.

At McDonald in Trumbull County, Ohio, the model settlement created by the Carnegie Steel Co. for employees of its bar mills, and their families, the company is now completing a community house which will cost upward of $100,000. It is a three-story brick structure, approximately 50 x 150 ft. on the ground dimensions. The first floor will be devoted to commercial uses, the second will be fitted with offices, pool tables and bowling equipment, while the third will be used as a hall. Its use is given to the people of the community without charge.

BELTS AS INSPECTION TABLES

National Acme Co. Inspectors Pick Defective Parts from Moving Conveyors

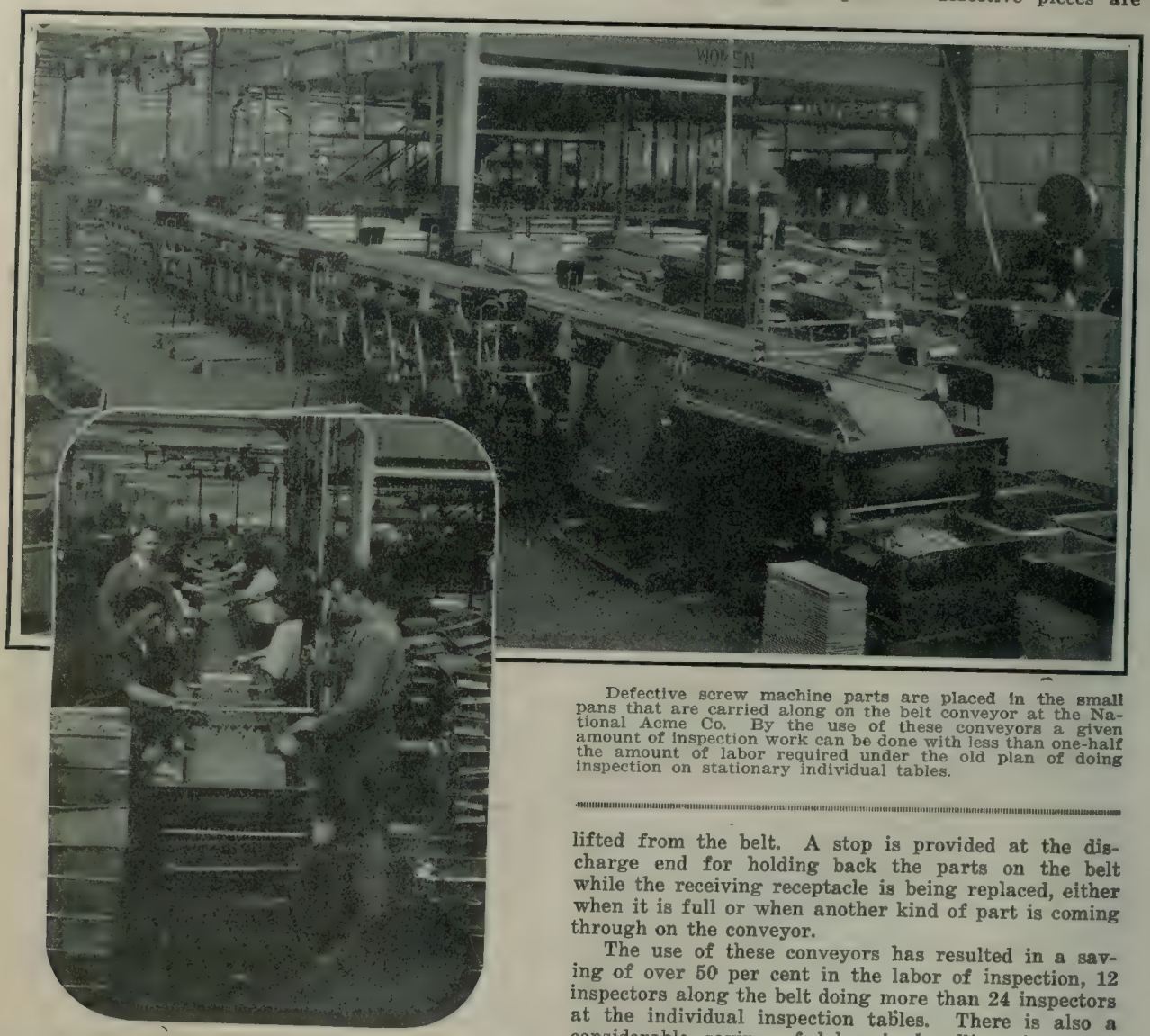
BY F. L. PRENTISS

A labor-saving method of inspecting screw machine products has been adopted by the National Acme Co., Cleveland, which is now using belt conveyors as inspection tables, the defective parts being picked out by inspectors while the product is moving along on the belt. These conveyors take the place of small individual inspection tables which have been generally used.

The first belt conveyor for inspection purposes was installed in the inspection department of the company's Coit Road plant about a year ago. This conveyor, built by the Barber-Greene Co., was designed for handling coal and its new use was decided upon as an experiment. The conveyor was set up in the inspection room with its belt running on a horizontal plane, about 3 ft. above the floor, and several changes were made in the form of additions of stops and guards to make it applicable for its new use. The conveyor proved so valuable from an economical standpoint for inspection work that the company has since installed two similar conveyors for use in inspecting small parts, and a fourth conveyor is ready to set up.

Two of the conveyors are 50 ft. long and two are 30 ft. long. The conveyor belts are 18 in. wide. The longer conveyors are operated at a speed of 22 ft. per min. and the shorter at 30 ft. per min. These speeds are found generally satisfactory for the purpose and consequently no quick speed changes are required, although different speeds may be provided by changing the gears.

The work is first dumped on a slanting table at the feed end of the conveyor and an operator shoves it from the table to the belt. Several inspectors sit on stools on each side of the table and each picks out imperfect parts as the work passes him. By the time the parts reach the discharge end of the conveyor all defective ones have been removed. These are thrown into small pans, very similar to bread pans, that are placed on the conveyor short distances apart, so that one of the pans is always within easy reach of an inspector. The good parts drop from the end of the conveyor into shop boxes in which they are trucked away and the pans of defective pieces are lifted from the belt. A stop is provided at the discharge end for holding back the parts on the belt while the receiving receptacle is being replaced, either when it is full or when another kind of part is coming through on the conveyor.



Defective screw machine parts are placed in the small pans that are carried along on the belt conveyor at the National Acme Co. By the use of these conveyors a given amount of inspection work can be done with less than one-half the amount of labor required under the old plan of doing inspection on stationary individual tables.

The use of these conveyors has resulted in a saving of over 50 per cent in the labor of inspection, 12 inspectors along the belt doing more than 24 inspectors at the individual inspection tables. There is also a considerable saving of labor in handling the parts. With the inspection tables the work had to be carried to each table and the parts carried away from each table after sorting. With the conveyor, all parts are delivered at one point at the feed end and are carried away from one point at the discharge end. Another important advantage of the use of the conveyors is the saving of floor space, as the conveyor takes considerably less space than the number of inspection tables required. Work is also inspected more thoroughly on the conveyors than on the tables.

In a report on the South African iron and steel industry in 1920 the Union Government's mining engineer states that during the year the works of the Union Steel Corporation of South Africa, Ltd., produced 9903 tons of open-hearth steel and 2342 tons of electric steel from the Héroult furnace. A new 25-ton Siemens open-hearth furnace is in course of construction.

Lowering of Freight Rates Will Be Urged

Iron and Steel Interests Will Continue Their Efforts—Lake Superior Iron Ore Association Active—Recent Refusal of Railroads Disappointing

BY L. W. MOFFETT

WASHINGTON, Nov. 29.—Refusal of the railroads to grant the request of lake front iron and steel interests for reductions in freight rates on coal, coke, limestone and dolomite came as a distinct disappointment. While it was not wholly a surprise, in view of the peculiar attitude of railroads, which is said to be shared by some Government officials, that reductions are not justified because steel prices are not sufficiently liquidated, it was strongly hoped that the cuts would be made. The trade is firmly of the opinion that readjustment to normal conditions is entirely out of the question until transportation costs have been sharply decreased. Leaders of the iron and steel industry maintain that such action is necessary in behalf both of the industry and the railroads themselves, and would benefit the complete commercial and financial structure. They point out that proof exists in abundance to show that the steel trade has deflated prices, is producing at a loss and must have relief through lower freight rates. They also are strongly combating another prevalent belief of some officials that reduction in coal rates would not be passed on to the ultimate consumer, especially the householder. The plea is made that the coal industry is so tightly organized that it would not allow advantages to domestic consumers and that consequently there is no use in lowering rates on fuel. It has been pointed out that this opinion exists, and, regardless of its merits, it has to be met.

Will Continue Efforts

The lake front iron and steel interests consequently propose to continue their efforts to get lower rates, despite the discouragements they have met. With this purpose in mind, they have begun preparation of a formal complaint. It is probable it will be filed with the Interstate Commerce Commission the latter part of the present week. Reports are to the effect that it will formally ask the commission either to reduce fuel rates proportionately to the cuts made in rates on iron ore from lower Lake Erie ports to interior furnaces, now that the life of these rates has been extended to March 31, to establish minimum rates on these ore shipments and adjust fuel rates in their proper relationship with them. Such action by the commission, if taken, probably would mean raising the level of the ore rates somewhat and a tapering off of the fuel rates accordingly. That this would be opposed by the interior furnaces is believed to be altogether likely. These furnaces plainly would rather see fuel rates brought down to the proper relation with the present lowered ore rates. Because of the idea of a minimum ore rate proposal, there is seen a possibility of difference within the steel industry, but it is stated that efforts will be made to avoid such a development.

An Interesting Suggestion

The suggestion for the fixing of minimum rates on ore, if it finally is determined to make it, would prove interesting. Previously to the enactment of the Esch-Cummins law, the commission had no authority to fix minimum rates, being empowered to establish maximum rates only. Extension of the authority was allowed by Congress in order to meet the requirements of Section 15a of the transportation act which provides that the commission must "initiate" rates that will give the railroads at least 5½ per cent in the period between the date of the act and March 1, 1922.

Opponents of any upward adjustment of ore rates from Lake Erie ports express serious doubt that the commission would establish minimum rates. But if such a plan is considered, it is said, they will attempt to frustrate it by showing that the present rates yield a good return to the carriers and that higher levels are without justification. It is believed in the trade, according to reports received here, that the railroads will continue the present ore rates beyond March 31 because, as the situation now stands, they apply only to dock ore, and unless they are extended, no benefit would be derived on the great bulk of the movement in the way of direct shipments which begin with the opening of lake navigation. The fact that ore rates in Southern territory were permanently restored on Nov. 26 to their levels existing before the general increase of last August also is cited as another reason for maintaining present rates on Northern ore shipments. The Southern rates, it will be recalled, were increased 25 per cent as against the 40 per cent increase applicable in the North. The Southern Railroad attempted to go farther than other lines in that territory by also reducing rates on limestone, but the commission denied that part of the application.

Hearings in Chicago

But the trade is not contenting itself with the decreases that have been made in ore rates. The Lake Superior Iron Ore Association will push its complaint against rates on ore from upper mines to Lake Superior docks. Hearings in this case will begin in Chicago on Dec. 7, before Examiner Hosmer, and the complainants assert that the reductions in rates from lower ports and in the South have strengthened their case, which, they point out, was already strongly in their favor. Reductions in the rail rates from mines to upper docks would necessarily benefit lake front furnaces, as well as further benefiting interior furnaces, as contrasted with the recent reductions in rates from Lake Erie ports which benefit only interior consumers.

The lake front interests, however, are insistent that the fuel rates be lowered and whatever may be done as the result of the general investigation by the commission to begin Dec. 14, they will press their claims for the desired reductions.

Investigation Will Be Sweeping

This investigation will be sweeping in character. All shipping interests are expected to take advantage of it and lay their arguments for lower rates before the commission. The iron and steel trade, it is believed, will take a prominent part in the proceeding and urge the necessity of general relief on rates on all manufactured products as well as on raw products. At the same time, it is doubted that if reductions are made as the result of the investigation they will be adequate to suit the trade. Moreover, it is feared that action will be considerably delayed. To comprehend such a scope the investigation would have to take on a broad aspect, but it is confidently believed it will assume such proportions, despite the limitation in the order instituting the proceeding. The investigation is to be conducted by the commission on its own behalf of the reasonableness of the present level of rates, and it has been indicated that the commission has some views on the subject that are not shared by the railroads and by reason of this has ordered the investigation.

One matter that is to be threshed out, it is said, will deal with the relationship between wages and railroad rates, and while the commission has no authority to determine wages, the two subjects are so closely interwoven that it is expected the investigation may make it plain whether wages or rates should be reduced

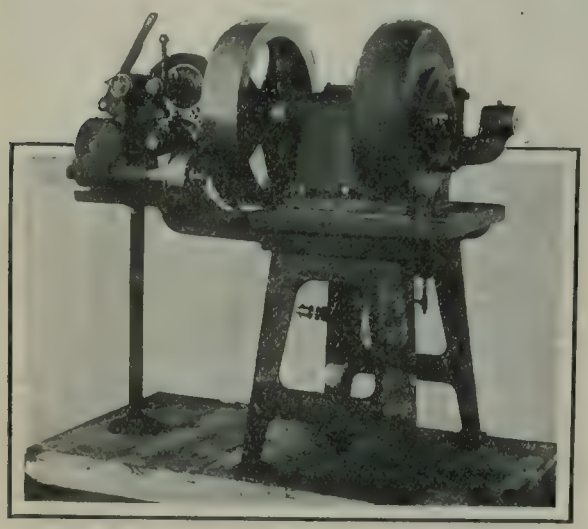
first. The order of the commission says that the investigation is to "determine whether and to what extent, if any, further general reductions in rates, fares, and charges can lawfully be required by order or orders of the commission under Sec. 1, or other provisions of the Interstate Commerce act, upon any commodities or descriptions of traffic." In the event such a limitation is strictly inforced, the discussion at the investigation will be of law questions, with only incidental reference to facts. Even with that limitation, however, it is pointed out that it will be possible to bring into the discussion the facts to show the poor financial returns of any or all industries because Sec. 1 is specifically mentioned. This section requires all rates to be just and reasonable and forbids those not in conformity with that rule. There is a division of opinion as to whether a rate to be just and reasonable to both carrier and shipper need necessarily be one that assures a reasonable return to the carriers. There is a school of thought that the carrier must make its rates so that the traffic may move freely. Plainly this would allow a wide range of data to be brought before the commission at the hearing.

Under section 15a, it is believed, the carriers will hold that the order cannot be construed as authorizing the commission to reduce rates for economic reasons, making the point that such action would prevent a return of 5½ per cent. The carriers also have always maintained that they have the power to lower rates when they consider them too high to move traffic for the same reason that they have the option of meeting or not attempting to meet competition.

New Langelier Swaging Machine

A swaging machine, designated as No. 3½AT4, of the roller cage type, which differs in construction and action from its standard machines, has been brought out by the Langelier Mfg. Co., Arlington, Cranston, R. I. In this machine the head is bored out to receive a driven-in ring of hardened steel which provides a running fit for the revolving cage carrying the rolls, whereas in the standard type the rolls are inserted directly in the head proper of the machine.

The spindle running bearing has loose perforated bushings, the perforations acting as small oil reservoirs, to facilitate lubrication of the spindle. The



Intermittent Rotation of the Cage Retards the Blow, Resulting in a Squeezing Action. The roll feed attachment withdraws the stock after swaging

flywheel is held on the spindle by a key and a two-bolt clamp hub, this having been found a favorable method to meet the quick, sharp strokes it has to withstand. The spindle head is slotted for receiving the hammer blocks, which are of hardened tool steel, and are bored at their upper ends for carrying the hammer-block rolls, which also are of hardened tool steel. The lower ends of the hammer blocks are slotted in a manner that enables them to carry the dies in a sliding fit.

A spindle plate, screwed to the front end of the spindle, retains the different working parts in place and provides a means of limiting the opening of the dies during the expanded period of their cycle of operations. This is attained in the following manner: The hammer-block rolls, which are a snug running fit in the hammer blocks, are provided in the front end with a concentric female cone. The spindle plate has cone-pointed adjusting screws with lock nuts by means of which the die opening is adjusted. The strike of the dies is regulated by inserting shims of required thickness, placed between the hammer blocks and dies.

When the machine is put in motion, the spindle rotates and the centrifugal force tends to throw the hammer blocks out from their center, thus enabling the dies to open. The head rolls in the revolving cage project toward the center beyond the path of the hammer-block rolls, and, as they contact, an intermittent rotation of the cage is caused retarding the blow and thus resulting in more of a sliding or rather a squeezing action. This action differs from that of the company's standard type of machine, in which the blow is direct and consequently much more sharp. The slow blows are said to be best adapted to solid work, as they permit the stock more time to flow.

The roll feed attachment is shown in the illustration. Its purpose is to withdraw the stock with a steady and smooth motion from the machine after swaging, thereby maintaining of the straightness of the work. The capacity of the attachment is from 0.375 in. to 1.313 in. and it will size any stock within that range. It can be moved to and from the end of the spindle over a distance of 5 in. by adjustment of the screw shown under the base plate in the illustration. The feed of the rolls can be changed from 30 in. to 45 in. per min. by changing the pulley on the spindle.

The rolls with their driving gears are mounted on crank arms, fulcrumed in the stand of the attachment. The lower roll arm is held stationary by a stop set screw which can be adjusted when required. The upper roll is pressed into the lower by a lever, and tension is maintained by an adjusting spring. The guide bushing on the end of the machine spindle is for guiding the stock into the center of the rolls, serving also to prevent the stock from catching in the gear teeth. The rolls can be opened instantly by means of a lever and changing of the drawing rolls can be accomplished quickly and conveniently.

Deferred Building Projects

ST. LOUIS, Nov. 29—Big building projects, aggregating in cost $15,270,000, which would be started between January and June of next year if wages and building material prices were reduced to a reasonable level, so that investors would have an adequate safety margin for their money, were reported by Nelson Cunliff, Director of Public Welfare, to the joint committee representing the Building Trades Council and the Master Builders. Cunliff is representing the public in the negotiations to resume building operations here.

Cunliff considered only projects of $200,000 and upward. Festus J. Wade, president of the Mercantile Trust Co., said that he would guarantee for one year an interest rate on building projects not to exceed 6 per cent and would reduce the commission on loans from 3 to 2½ per cent. The conferences will be resumed to-day.

The John Eichleay, Jr., Co., Pittsburgh, submitted the lowest bid, $36,000, for the construction of a survey and inspection motor vessel for use in the Mississippi River below St. Louis, for the Mississippi River commission. The boat will be 76 ft. long and will be equipped with two 60 hp. Diesel engines.

GRAY CO. OFFERS NEW PLANER

Features Include Improved Control and Lubrication—Helical Gear Table Drive

A planer of new design, designated the new Gray maximum service planer, incorporating novel features intended to increase the production capacity of the machine, has been brought out by the G. A. Gray Co., Cincinnati. Reducing the cost of planer work by the greatest possible conservation of the operator's time was, it is said, the guiding thought behind the new design. Centralized control and simple and natural movements in operating the various devices is an outstanding feature, one movement in most cases accomplishing the desired result.

The new Gray feed is called the Cantslip and as the name implies, is positive. Adjustment is by turning a knob at the operator's end of the rail until the required feed is indicated on the graduated dial, a partial turn of the wrist giving any feed from 0.01 to 1 in. in steps of one hundredths of an inch. The feed dial is automatically locked as soon as the fingers are removed from the knob. As shown in the illustration the feed mechanism for the rail heads is mounted on the end of the rail; that for the side head is mounted on the head itself, and thus is always within convenient reach. Rail-head and side-head feeds are entirely independent so that one can be changed without affecting the other. Feed changes may be made while the planer is running. Changing the feed it is pointed out is as simple as turning a door knob.

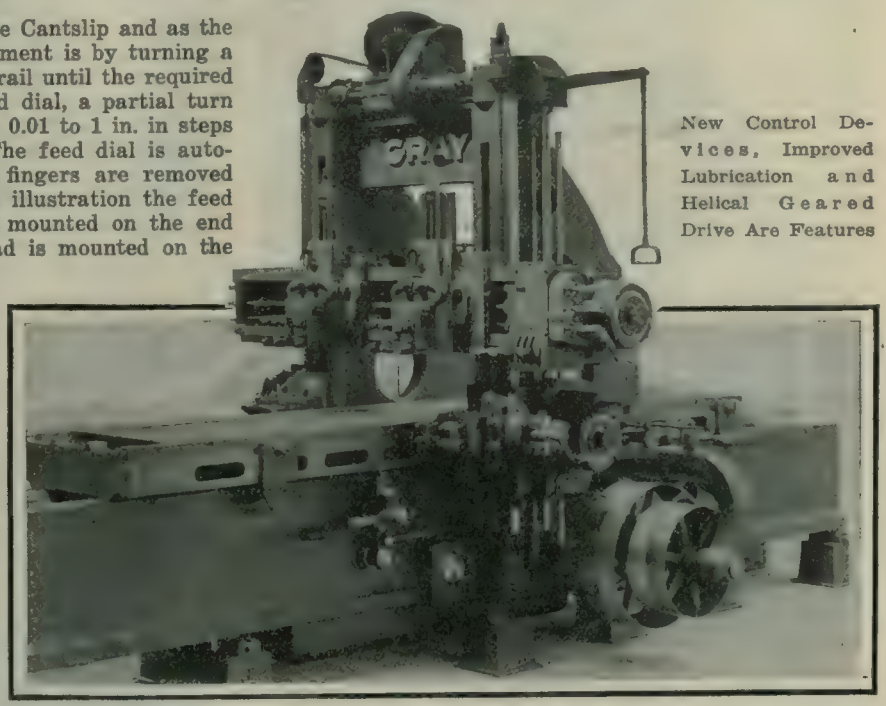
The rapid traverse embodied in these planers is applied to the side-heads as well as to the rail-heads. To move a head the operator simply shifts one lever, which disconnects the feed for that particular head, engages the rapid traverse mechanism and starts the small motor in the proper direction. Moving the lever back to neutral throws out the rapid traverse clutch, stops the motor and re-engages the feed. It is not necessary to make use of a separate starter to start the motor, nor does the motor run while not actually in use. No part of the rapid traverse mechanism is in motion unless a head is actually being moved.

As the traversing mechanism is entirely separate from the feed mechanism one head can be rapidly set for the next cut while the other head or heads are still feeding. Throwing in the traverse mechanism automatically disconnects the hand cranks. The levers for actuating the rail-heads are at the end of the rail, the lever for each side-head is on the head itself, as shown in the illustration. Shearing pins safeguard the traverse mechanism in case the rail-heads are accidentally jammed together. Safety stops obviate the possibility of lowering the side-heads too far.

To elevate the rail the operator pushes up a stirrup hanging near the end of the rail; to lower the rail he pulls it down. The stirrup is locked in the neutral position. A quarter turn of the wrist unlocks it. As this stirrup is suspended from a universal joint, the operator can stand out in front of the rail where he can see the position of work and tools. The control is said to be so perfect that the rail can be set to a line. The motor that operates the rapid traverse also furnishes the power for the rail setter. One movement engages the elevating mechanism and starts the motor. Bringing the lever to the neutral position disengages the elevating mechanism and stops the motor. Safety stops obviate the possibility of raising the rail too high.

Turning a crank on the operator's end of the rail releases or tightens the clamps that lock the rail to the housings. The automatic adjustment insures that the rail is clamped equally rigidly at both ends. The rail is locked to inside of the housings. This greatly stiffens the rail, as it shortens the length subject to torsional strain. A moderate pull on the crank clamps the rail even more firmly, it is claimed, than was possible with the old-fashioned outside clamps, tightened with a wrench.

As the lever operating the rail setter is also on the operator's side of the machine the planer hand can release his rail, raise or lower it and reclamp it without moving away from his operating position. On planers of the old type, the operator first loosened the clamping bolts on the front side of the machine; then walked around the end of the planer and loosened the bolts on the other clamp; then he operated the rail elevating lever on the rear housing and raised or lowered his rail. Then he tightened the bolts in rear clamp, walked around end of machine to right side and retightened the bolts in front clamp. Getting the bolts equally tight was entirely a matter of "feel" on the operator's part.



New Control Devices, Improved Lubrication and Helical Geared Drive Are Features

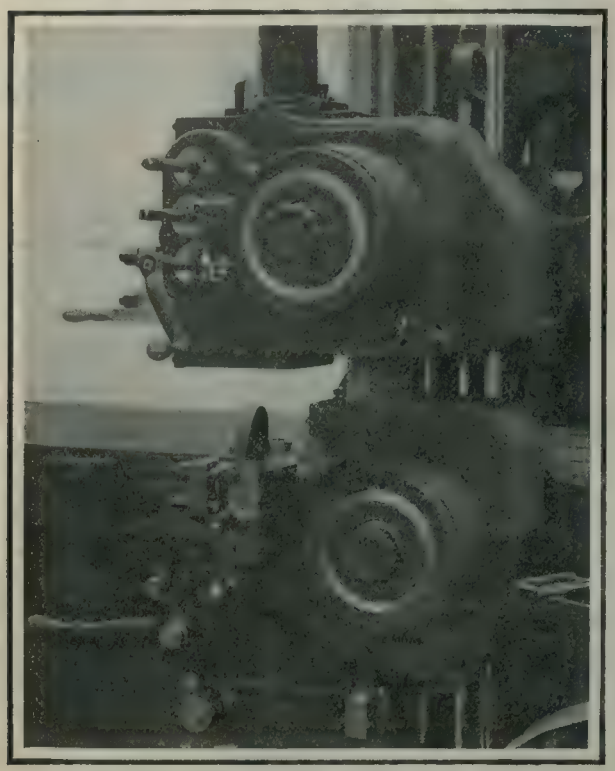
The net results of these improvements is to bring the control of practically all of the functions of the planer to the operator's usual position. Besides the raising, lowering, and clamping of the rail, as described, he can, without moving from his position, set the feed on rail or the right hand side head; traverse either rail-head or the right hand side-head quickly by power, set the micrometer collars on the rail screws so as to measure accurately the travel of the tool, and of course, use the tumbler which controls the movement of the table. In doing these things he is in position to watch his tools and so avoid accidents. This is of importance, it is pointed out, not merely because it adds to the convenience of the operator but because the elimination of physical effort makes it possible for him to work fast without fatigue, and will result in more accurate work because he is alert and not tired.

The bed of the new planer is made full length; that is, the working surface of the table never overhangs, even when taking the maximum stroke. In this way the table is always rigidly supported even when run way out to the front end of the planer for setting up work. By eliminating the table overhang, the wear that otherwise takes place at the ends of the bed is eliminated and the accuracy of bed and table maintained and better work made possible. Incidentally, there is no dripping of oil on the floor from overhanging table V's or oil pans. The table is of box section, with an uninterrupted center wall running the entire length of the table and tying the top and bottom plates rigidly together. This design also prevents endwise springing due to peining action that occurs when heavy work is clamped. Stop-pin holes open into the openings of the table and are accessible from the outside.

All of the driving gears run in a bath of oil. An oil

pump is direct-connected to the drive shaft and delivers oil not only to the V's but also to all of the drive shaft bearings. The pump is of the reversible type, operating on the return as well as on the cutting stroke.

From the pump the oil flows through a filter, thence to a hole in each V at the center of the bed. Each table V has a large oil channel running the full length of the V but closed at the ends. From this large channel the smaller supplementary oil grooves carry the oil to all parts of the bearing surface. By this means



The Feed Mechanism for the Rail Heads Is Mounted on End of the Rail; That for the Side Head Is on the Head Itself, As Shown

the oil supply is kept constant at all points regardless of the relative position of the table, since the pressure is instantly transmitted through the large oil channel. If, for instance, short stroke work is being done near one end of the table, the oil does not have to flow through a long tortuous groove of limited area to reach the far end of the table.

The surplus oil dripping from the table V's and rack flows through a screen into a settling basin at each end of the bed. The oil then flows to the center of the machine, through the pump and a filter so that only clarified oil passes through the oil system. As the table never projects over the end of the bed there is no dripping on the floor. The oil pipes are inside the bed.

As previously stated the driving shaft bearings as well as the V's are oiled by a forced feed lubricating system and require practically no attention. To simplify the oiling of other parts, central oil wells have been placed on rail and side-heads. Oil pipes lead from the central well to the different oil holes, so that the operator merely fills this large reservoir instead of many separate oil cups. This not only saves a great deal of time but also obviates the danger of overlooking inconspicuous oil holes. From the reservoir the oil is drawn through wicks by capillary attraction so that only clean oil reaches the bearings.

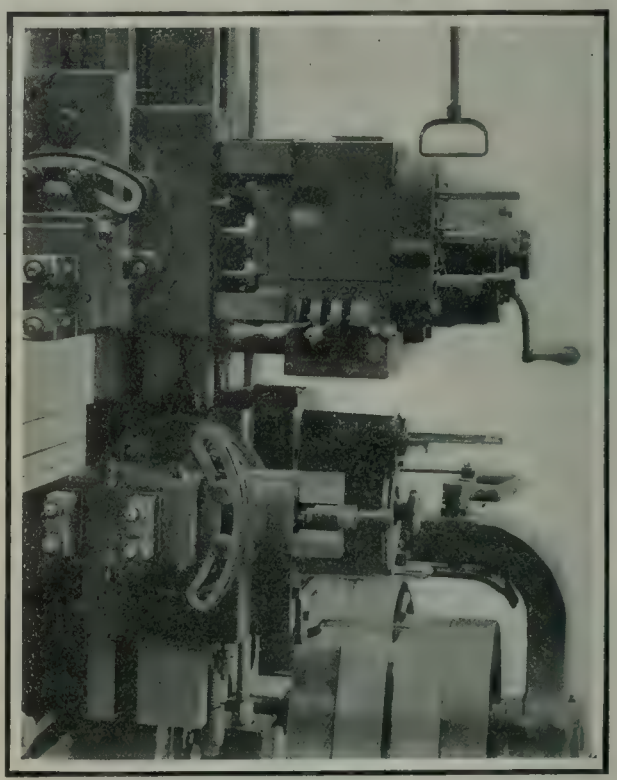
New "Gray-Geared" Drive

Probably the most important part of a planer is the gearing which drives the table. The Gray maximum service planer is provided with a new system of gearing in which advantage is taken of a number of properties of involute helical gearing to produce a drive of unusual smoothness and power.

Planers have heretofore been built with herringbone or helical gears for the first reduction, but the new Gray planer has helical gears throughout. The Gray company states that a train of planer gears having one or more pairs of spur gears cannot give the results which are obtained by the use of properly proportioned helical gears throughout, that is, from pulley shaft pinion to table rack.

Helical gears produce end thrusts. Advantage is taken of this fact to cause the end thrust of the bull gear and its pinion to counteract the side thrust of the tools when cutting. Moreover, the diameters and helical angles of the remaining gears of the train are so proportioned that their end thrusts very largely balance one another. Bronze thrust collars, provided with forced lubrication, take the slight residual end thrusts. Particular attention is called to the helical table rack which is of unusual width of face, giving great strength. The helical rack is arranged so that the end thrust of the bull pinion, which amounts to about one-tenth of the driving force, opposes and compensates for the side thrust of the cutting tools when they are being fed away from the operating side of the machine, a condition which obtains at least 90 per cent of the time. As the tool pressure increases, the power required to drive the table and the resultant balancing thrust of the bull-pinion also increases proportionately. This, it is said, equalizes the pressure and wear on the two sides of the V's, whereas with a rack of the spur form the pressure and wear are greater on one side of the V's than on the other, due to the side thrust of the cutting tools. It also overcomes the tendency of the tools to push the table up the side of the V's.

For the convenience of the operator, planer work is usually placed close to the operating, or so-called right



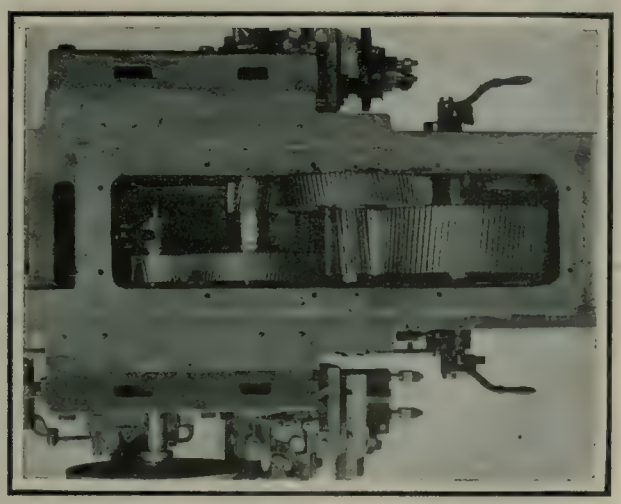
Rapid Traverse Is Applied Also to the Side Heads. Levers for actuating rail heads are at end of rail. Lever for side head is on the head itself

hand side of the machine. It is therefore desirable that the line of action of the driving force should be placed slightly toward the right hand side of the machine, so that the lines of action of the cutting tool and the driving force shall coincide as nearly as possible. The rack is accordingly so placed.

It may be noted that the table rack is cut with a very low pressure angle. This, it is pointed out, greatly reduces the tendency of the bull gear to lift the table and makes unnecessary hold down gibs or other devices for preventing this action. In order to obtain maximum torsional stiffness; reduce the strain on the shafts, and insure concentricity of the gears, the gears are not keyed to the shafts, but are pressed on and keyed to

the pinion bosses. The gear teeth are then cut, thus insuring not only rigid and permanent connection, but also absolute truth of mounting.

To provide correct tooth action, teeth of true involute form, cut by a generating process, are employed. In order to avoid interference and imperfect tooth forms, and to obtain great smoothness of action and stronger teeth, the pinion teeth are so cut that the greater part of the tooth face lies outside the pitch circle. The teeth have a low pressure angle, are cut full depth, and have a short arc of approach and long arc of recess, giving high efficiency, and greatly increasing the number of teeth in contact and the smoothness of action. The action of a tooth having a long arc of recess compared to one with a long arc of approach is analogous to the action of dragging the end of a pole behind you compared to pushing it ahead of you.



The New Drive Has Helical Gears Throughout

This design, it is said, also has the advantage of permitting the use of pinions of larger diameters and stronger tooth form without the disadvantage which attend the use of stubbed teeth, high pressure angles and low gear ratios.

In other words, the special form of tooth employed is distinguished by its full length, low pressure angle, short arc of approach and very long angle of action. The last feature greatly increases the number of teeth in simultaneous contact, reduces the specific pressure at the lines of contact, gives large and strong pinions, great smoothness of action, long life, and quiet action, and is said to produce work of unusual smoothness and accuracy of finish.

"Your eyes can't bear to look at the sun—then don't let other bright lights shine into them," warns the National Safety Council in a recent poster. The photograph depicts a machinist at work on a metal-working machine with the lamp focusing the light upon the work, his eyes being protected. Continuing, "This is the right way to use a lamp. The reflector keeps the light out of your eyes and on the work. Where the overhead lighting is strong enough, you don't need a lamp at your machine. Light is to see by—not to look at!"

Constantly broadening demand for fireproofing and reinforcing materials will require substantial enlargement of such capacity during the next few years, in the opinion of Wharton Clay of Chicago, commissioner of the Associated Metal Lath Manufacturers. In a talk Nov. 22 before contracting and building interests at the plant of the General Fireproofing Co., Youngstown, Ohio, Mr. Clay pointed out the growing requirements for such materials from the building industry throughout the country.

The *National Coal Mining News*, Cincinnati, has issued a coal freight rate sheet giving a large number of freight rates so arranged that they will be available for reference for those engaged in the shipping of coal.

REDUCED SHEET OUTPUT

Pipe Plants, However, Show Gain in Mahoning Valley—Blast Furnace Situation Unchanged

YOUNGSTOWN, OHIO, Nov. 29.—In the face of somewhat steadier buying in some lines, steel production still shows weakening tendencies in the Mahoning Valley, particularly felt in sheets, though losses in this direction are offset by gains in tube mill production. Eleven of the Valley's 17 independent pipe furnaces are fired, but only 58 of 113 sheet mills are active, as compared with 62 the week before.

The Republic Iron & Steel Co., which operated 13 sheet mills last week, has reduced the number to six. In operating its sheet mill plant at Niles, the company maintains the new units on the active list in preference to the old when business does not warrant larger production. The new mills are low-cost units. The Republic company is rolling an accumulation of bar orders at its Haselton bar mill.

Addition to Bessemer capacity is made by the starting of the Bessemer department of the Youngstown Sheet & Tube Co. On the other hand, open-hearth furnace operations register a decline, from 42 of the week before to 39 this week, out of a total of 66.

Sheet mill capacity of the Sharon Steel Hoop Co. at its Haselton plant, Youngstown, is unoccupied this week, while the Trumbull Steel Co. has only three sheet mills at Warren engaged. The sheet and tube company continues to operate 15 sheet mills, Brier Hill Steel Co. 16, Newton Steel Co. 10 and Falcon Steel Co. six.

Puddle mills of the Sheet & Tube company are at only 30 per cent this week, though the large puddling department at Girard of the A. M. Byers Co., Pittsburgh, is running close to normal.

The blast furnace situation in the Mahoning Valley is unchanged, with 11 of 25 furnaces blowing, including five in the Ohio Works group of the Carnegie Steel Co., two of the Sheet & Tube company, and one each of the Republic company, Brier Hill company, Sharon Steel Hoop company and A. M. Byers Co.

Of the 11 active tube mills, six are being operated by the Youngstown Sheet & Tube Co. and five by the Republic Iron & Steel Co. In both cases they are being supported by partial skelp mill production.

Experiments With Ball and Roller Bearings

Technological Paper of the Bureau of Standards, No. 201, entitled, "Friction and Carrying Capacity of Ball and Roller Bearings," discusses experiments undertaken by the Bureau of Standards, at the suggestion of the Navy Department, to determine the maximum safe load, and the static friction under load, of ball and flexible roller bearings. Tests were made on balls of 1.00, 1.25, and 1.50 in. diameter in grooved races and on rollers 1.25 in. in diameter and 5.25 in. long in flat and cylindrical races. The ratio of friction to load is practically constant and equal to 0.00055 for all three sizes of balls up to a "critical" load which varies with the diameter of ball. A similar "critical" load, 25,000 lb., was found for the roller bearings with a ratio of friction to load equal to 0.00075.

Caucasian Manganese Ores

It is reported that the Temo Co. of the Caucasus has conferred upon the Dutch firm of Vlessing & Co. the sole rights of disposing of its manganese ore output, says the *Metal Bulletin*, London. The Temo Co. is an association of mines in which British, French, Swiss, Armenian, Georgian and Dutch capital is interested. The concessionaires are to despatch plant to Batum and Poti with a view of production on a pre-war scale. The Russian Soviet Government has, it is understood, confirmed the agreement and promised its support.

Purchasing Foundry Irons by Specification

Standard Methods for Sampling—Defects in Iron Due to Furnace Irregularities—Iron Analyses Grouped by Geographical Sections

BY Y. A. DYER

WITH the advent of sound foundry practice, the purchase of pig iron by fracture grading has been fast relegated to the "dark age" periods. Strange to record, however, the new system of purchasing by analysis was fostered practically single handed by the foundrymen, the furnace interests being, with some few exceptions, inclined to cling tenaciously to the antiquated fracture grading system. Now that the change has come, furnace companies desiring to remain in the field, as producers of foundry iron, must either adopt furnace practise and methods which will insure the production of pig iron of desirable chemical composition, or else enter the market as basic pig iron producers, for the manufacture of steel.

It is necessary for the foundryman to decide which element or elements shall be the controlling factor in the pig iron which he desires to purchase, and then specify accordingly. Thus, if it should be desired to specify an iron with silicon 2.25 per cent, sulphur 0.04 per cent, phosphorus 0.50 per cent, manganese 0.60 per cent and total carbon 3.60 per cent, it must be borne in mind that the following variations are allowable:

Silicon	0.25 per cent up and down
Sulphur	Maximum percentage to be specified
Phosphorus	0.20 per cent up and down
Manganese	0.20 per cent up and down
Total carbon	Minimum percentage to be specified

Standard methods for sampling pig iron and cast iron, formulated by the United States Bureau of Standards, have been adopted by the American Society for Testing Materials, and are given below:

1. One pig to be selected at random from each four tons of iron, and ten pigs (40 tons representation) to constitute a unit of sampling.

2. The surface of each pig selected to be cleaned carefully, and the skin removed by emery wheel at the center of upper face of each pig. Drillings to be taken from one hole made with twist drill from top to bottom of each pig.

3. Drillings from the entire unit to be weighed, sifted to two or three portions of different fineness; the portions weighed and proportional parts taken in making required determinations.

In submitting samples to a chemist for determination, it should be understood that the "standard methods for determining the constituents of cast iron," adopted by the American Society for Testing Materials, are to be used by both foundry and furnace companies, as well as umpire chemist in case of dispute.

Defects in Pig Iron

When "off" pig irons are detected by the foundryman, they should again become the property of the furnace company, or else the price be reduced to a figure whereby the iron may be used for the class of work to which it is suited—weights, washers or less important bulky castings. Volumes have been written on the subject of bad castings and remedies therefor, but it seldom occurs to foundrymen (further than the conclusion that the "iron is bad") that possibly the basic trouble may sometimes be due to an off grade of pig iron which is being used; that is: an oxidized iron.

For this reason it may be of more than passing interest to the foundryman to have some knowledge of the detrimental factors of common occurrence in the production of foundry pig irons—first, to gain an insight into the irregularities of furnace conditions which may produce an "off grade" iron; second, as information which may assist in the location and correction of troubles likely to occur in foundry mixtures, by the use of such pig iron, and which seem difficult to locate after cupola practice and foundry conditions shall have been checked and found to be correct.

This chemical defect, which sometimes exists in foundry pig irons, does not appear to the foundryman by a casual reference to the routine chemical analysis or fracture tests; that is: by reference to determinations of carbon, silicon, sulphur, phosphorus, manganese and noted fractural structure of the metal. The oxidized condition of the iron is chargeable to irregular blast furnace operations and control, and when such iron is not noted and relegated to the "off grade" pile by the furnace company, it is handed down to the foundryman. In turn, its deleterious effects are reflected all down the line of foundry operation.

Oxidized Irons

Irons which contain this very undesirable defect are often referred to by the foundryman simply as "bad iron." Technically they are "oxidized" irons—due to furnace irregularities in the form of scaffolds and slips, too heavy burden or undue driving of the furnace, by reason of desire on the part of operator to boost production; or to certain ill designed or faulty lines and construction. "Scaffolds" may cause serious trouble and detriment to the grade of irons subsequently tapped.

When a scaffold finally "slips," a large quantity of iron oxide (the ore not having had time to complete its travel through proper temperature zones of dissociation, or decomposition) may be precipitated into the hearth of molten metal. The result is a pig iron of very inferior quality. Its grading and shipment should be watched closely by furnace operators, so that it will not be applied on orders calling for first-class iron. The presence of iron oxide, when excessive, is very noticeable on the tops of runners, sows and pigs; and excessive blow holes occur at the surface and throughout the metal.

Excessive blowing and driving of a furnace have their bad effects on the grade of metal, by creating a tendency to oxidize the iron; that is: by forcing the gases through the stock, or material, at such a high rate and pressure that they do not have proper time to remain in their respective critical zones, for uniform distribution and functioning of their carbonizing and reducing agencies on the iron oxide ores; also by working the stock through the furnace too fast. The slow driven—medium or small size—blast furnace, working on easily reduced ores, produces the most desirable grades of foundry pig irons.

Another form of "off iron" (high sulphur, low silicon) may be produced by the introduction of water into the furnace through a leaky cooler or tuyere, causing a cold hearth. The slag becomes less basic, the reduction of silicon decreases and sulphur increases.

Watching the Ore

An interesting source of helpful information to the foundryman is a knowledge of the character of raw materials used by the furnaceman in making the particular iron which he sells—more particularly as to the ore. The limonites, or brown ores, are most easily reduced in a furnace, compared with the more refractory hematites, therefore less driving of the furnace is necessitated.

As an illustration of the smooth and complete working of a furnace using large percentages of easily reduced brown ores, reference is made to the temperature at which decomposition begins and ends in the use of limonites and hematite ores. According to Hempel and Schubert, decomposition of the carbonates and oxides in brown ores begins at 932 deg. Fahr. and ends at about

2336 deg. Fahr.—the range of temperature of effective carbon deposition. Decomposition of hematites begins at about 2282 deg. Fahr. and ends at about 2732 deg. Fahr.

Therefore, decomposition of brown ore begins between 10 and 12 ft. below the throat, or top of furnace, and is completed before it reaches the usual danger points of scaffolds and slips. Decomposition of the hematites does not begin until this danger zone is reached, then extends far down into it; and is not completed until practically the fusion zone (point of concentration of elements) is reached—hence the least disturbance caused by slip may precipitate iron oxide (unreduced ore) into the hearth.

In addition to this, decomposition does not begin in the hematites until the ore is far down in the true zone of carbonization. Again, the brown ore, in its preparation, passes through a wider range of temperature, consequently distance of travel in the furnace, than the hematite ore. This fact, in addition to the more porous nature of the brown ore by reason of losing its hygroscopic water, permits of a more complete deoxidation and proper carbonization of the iron sponge. The net result is a more uniform and superior metal.

Iron oxide is soluble, to a moderate extent, in liquid metal, but as a whole it does not remain dissolved while the iron solidifies—hence it separates out and forms on top of pig or close beneath the surface. Iron oxide is probably directly or indirectly responsible for more foundry ills than any other agency. At times, unfortunately, a foundryman may receive from a furnace company iron which has been badly oxidized by irregularities in furnace practice; and in this manner a large percentage of iron oxide may be carried through the cupola and temporarily, at least, held in solution with the metal, or mechanically mixed with it.

Iron Analyses Grouped by Sections

Pig irons of the United States are grouped in practically six classes—charcoal, standard foundry and forge, basic, bessemer, malleable and special analysis. The first class may be subdivided into cold blast, warm blast and hot blast charcoal irons, manufactured at northern, eastern and southern centers. The second class may be subdivided into standard foundry and forge irons manufactured at northern, eastern and southern centers. The third class consists of the basic irons manufactured in northern and southern centers; the fourth class, the bessemer irons manufactured at northern centers; the fifth class, the malleable irons of the north; and sixth, the special analysis irons of the north, east and south.

Each iron producing section has its own analysis specifications. However, during the world war, there was created by the committee on steel and steel products of the American Iron and Steel Institute, Nov. 14, 1918, and approved by the President, a special foundry grading of iron equivalent to the following analyses:

		Percentages—Silicon	Sulphur
	No. 1 soft	3.25 to 3.74	0.05 and under
	No. 1 foundry	2.75 to 3.24	0.05 and under
	No. 2 soft	2.25 to 2.74	0.05 and under
Base	No. 2 foundry	1.75 to 2.24	0.05 and under
	No. 3 foundry	1.25 to 1.74	0.05 and under
	No. 4 foundry, or forge	0.75 to 1.24	0.05 to 0.08

No. 2 soft southern iron is equivalent to the old grading of No. 2 foundry, and in numerous instances the higher silicon, 2.25 to 2.74, is still shipped by Southern furnaces on No. 2 foundry orders. Manganese and phosphorus content are adjustable according to customary regulations peculiar to each district.

Following is a fair average of grouped analyses covering pig iron production in the United States:

	Percentage of—Silicon	Sulphur	Phosphorus	Manganese
Foundry:				
Northern	1.25 to 3.75	0.03 to 0.05	0.40 to 0.90	0.40 to 1.00
Eastern	1.25 to 3.75	0.03 to 0.05	0.40 to 0.90	0.40 to 1.00
Southern	1.25 to 3.75	0.03 to 0.05	0.70 to 1.50	0.20 to 0.60
Forge:				
Northern	0.75 to 1.25	0.05 to 0.08	0.40 to 0.80	
Eastern	0.75 to 1.25	0.05 to 0.08	0.40 to 0.80	
Southern	0.75 to 1.25	0.05 to 0.08	0.70 to 1.50	
Basic:				
Northern	1.00 max.	0.05 max.	0.50	0.75 to 1.50
Eastern	1.00 max.	0.05 max.	0.50	0.75 to 1.50
Southern	1.00 max.	0.05 max.	0.70 to 1.00	0.20 to 0.60
Bessemer	1.00 to 3.00	0.05 max.	0.10 max.	0.40 to 1.50
Malleable	0.75 to 1.75	0.05 max.	0.20 max.	0.40 to 1.50
Special foundry:				
Northern	1.25 to 3.75	0.02 to 0.05	0.15 to 0.40	0.40 to 1.25
Southern	1.25 to 3.75	0.02 to 0.05	0.50 to 0.60	1.00 to 1.50
	1.24 to 4.25	0.05 max.	0.40 to 0.90	1.00 to 4.00
Charcoal:				
Northern	0.10 to 2.50	0.01 to 0.03	0.15 to 0.28	0.25 to 1.30
Southern	0.10 to 1.75	0.02 to 0.03	0.40 to 0.60	0.20 to 1.25
Cold blast	1.50 to 2.00	0.01 to 0.02	0.35 to 0.45	0.30 to 0.40
Special low phos.	0.75 to 1.25	0.03 max.	0.03 max.	0.50 max.
Washed metal	Nil	0.01 to 0.04	0.01 to 0.04	Nil

Indicating the Business Drift

THE IRON AGE has called attention now and again to what the Department of Commerce is trying to do in new ways to help business. What is said below deals with what it has set out to do with its publications.

Manufacturers in all lines are making a greater and more intelligent use of the facts concerning production, consumption and prices in the country's leading industries than at any previous time. Never have business journals had so many requests for the statistics of production in previous years. Business men who have never thought much before of charts and diagrams are now gathering together all available data, having evidently made the resolve to be thorough students in the future of the curves of production and prices, stocks on hand and shipments to market. The Department of Commerce is meeting the call for trade facts by an extensive survey that has already proved its value. Each month the department brings out a *Survey of Current Business* which effectively supplements the well-known *Commerce Reports*. The latter publication is a weekly survey of foreign trade, which carries in addition much other information, with reports from American consular officers and representatives of the Department of Commerce in foreign countries. The price is $3 per year.

The *Survey of Current Business* consists in part of statistical tables which cover every field of the nation's agricultural, manufacturing, commercial and financial activities, but the tables are prefaced with a word summary or interpretation that is calculated to have the wide appeal, leaving for the special studies of the economist and statistician the facts on which the summary is based. It is planned hereafter to publish the detailed tables quarterly, owing to the great accumulating mass which is coming into the department, and the expense of full monthly publication, though the figures for the intermediate months will be supplied thus to keep the reader up to date. Briefly stated, the statistics include a price chart showing the 1913 averages, the peak prices of the war and the prices at the present time; production over a period of years, and month by month in recent years; foreign trade of different countries in the years since the war. There are many pages of transportation statistics and of figures of banking and finance. Price index numbers cover many pages. The metals and metal products pages cover pig iron, steel, copper and other metals, with production statistics, stocks and prices in monthly averages for the years 1913 and following.

All this work, which is of utmost value to the business man of the country in this transition period, takes money. Secretary Hoover has secured in the main the appropriations he has asked for, but this statistical work cannot go on on the present scale unless the business man, for whom it is intended, comes to its support. The *Survey of Current Business* is $1 per year. A great many remittances of $4 should go from the iron and steel and metal working trades for these two valuable publications.

Why Investment in Industry Is Hazardous

President Biggert, United Engineering & Foundry Co., Tells Employees the Difficulties of Companies Owing to Irregular Operations

IN a statement to employees on current conditions in industry, President F. C. Biggert, Jr., United Engineering & Foundry Co., Pittsburgh, states that because of fluctuations in business industry is the most hazardous use to which capital can be put. He points out, by charts, that the United Engineering & Foundry Co., "during a period of nearly six years of the greatest prosperity any country has ever known, was able to produce at only 76 per cent of maximum capacity."

"If industry can operate at only 76 per cent of capacity in a period of unexampled prosperity," he inquires, "and if in only three years out of 12 it is possible to book business equal to capacity, at what per cent can industry operate on an average?"

"No person will deny that 50 per cent is the highest probable average," he contends.

"The first thing that strikes one in studying the situation is the rapidity and magnitude of the fluctuations of work on hand," states Mr. Biggert. "Early in 1916 we had around 320,000 hr. to produce and at that time our producing capacity was about 50,000 hr. per month, or something over six months' work ahead of the shops. This mounted by leaps and bounds until about the middle of 1917, when we had the greatest number of uncompleted hours at any time in the history of our company. At that time we had some 680,000 uncompleted hours, but in the meantime the Tod department at Youngstown had been acquired and our producing capacity would be placed at about 85,000 hr. We then had about eight months' work ahead of the shops. The uncompleted hours then fell off quite rapidly until about the middle of 1918. This drop was due to the demand for quick deliveries on nearly all work offered, and as we were already booked up for a number of months, we were not in position to take much of the work then offering.

"After the middle of 1918 our deliveries had been shortened somewhat and we took on another volume of work which pushed the uncompleted hours up to a very high figure. A little later in the year it became evident that the war would soon end and there was a falling off in demand for machinery. After the armistice there were cancellations of large contracts by the Government, and this produced the sudden slump of the early part of 1919. Then came the revival of business, which lasted through the latter half of 1919 and most of 1920, ending in the present serious depression."

Mr. Biggert characterizes the period of the war as representing the maximum possibility of operation of the company's plants. As its products were of importance in prosecuting the war, it was able to obtain the assistance of Government agencies in getting material and shipments, and was free from strikes and other interferences to steady operations.

"After the armistice production gradually dropped off," he explains, "first due to the cancellation of orders, and in the latter part of 1919 it was held down by the steel strike and the coal strike, both of which affected us through inability to obtain materials and fuel. For this year the average production was only about 55,000 hr.

"In 1920 the production gradually rose, but was held back during the early part of the year by car shortages, railroad strikes and car embargoes. During the latter half of the year we reached an average production of about 65,000 hr., but the average for the whole year was not over 60,000 hr. During 1921 there has been a gradual reduction of production due to lack of new work and the rapid completion of that on hand.

"In all this period of nearly six years we had ample work to do and we could have produced 5,225,000 hr. Instead of this we actually produced 4,040,000 hr., or about 76 per cent of our possible production.

"If this is true, there is an enormous waste going on all the time, for every plant we build must have twice the capacity required to fill the needs of the country. We must build two plants to get the product of one. This is no new idea, but a fact which has been recognized for a long time. This is the source of some misunderstandings which have caused dissatisfaction and loss to those who invest and those who labor in industry. Persons who do not understand the effect of underproduction on the cost of production, criticise the policies of industry without taking account of these unavoidable fluctuations and their attendant losses.

"You will find that the man who believes our industrial system to be fundamentally wrong is invariably basing his reasoning on data from some particular industry and over a limited time. He may have selected a case where undue advantage has really been taken—such cases can doubtless be found. More probably he has taken a period during which the company has been prosperous and he has failed to allow for the inevitable time when conditions will be reversed. Our charts show the ups and downs of industry, and from them it is evident that the gains of a good year must be spread over several bad ones, for little or no gain can be made when production is at 50 or 60 per cent of capacity.

"As regards more uniform operation and more constant employment of man power, there is much to be desired, but no sudden change of system will improve these conditions. They can only be improved by gradual refinement of our present methods. There are real inequalities which can be lessened but never entirely eliminated."

Promise to Buy Rails

The mayor of Sydney, N. S., who was in Ottawa, Ont., recently interviewing Government officials with the object of securing business for the Dominion Steel Co., to relieve the unemployment situation, telegraphed to the citizens' committee that he had a satisfactory interview with Hon. J. A. Stewart, Sir Joseph Flavelle, chairman of the Grand Trunk Railway Board, and D. B. Hanna, president of the Canadian National Railways, the result being a definite promise of an early further order for 20,000 tons of rails and a strong possibility of still another contract for 15,000 tons.

In the Field of Labor

The average weekly factory wage in New York State was 54c. less in October than September, the State Department of Labor announces. Weekly factory earnings of workers were 15 per cent less in October, 1921, than in October, 1920.

Negotiations are under way between Cincinnati union foundries and their employees for a reduction in molders' wages from $6 per day to $5 per day of eight hours. The present agreement with the employees expires on Nov. 30, and the foundrymen feel that, with the competition keen from outside sources where lower wages prevail, the rate in Cincinnati should be cut. It is said that sentiment among the union molders is almost unanimously against the proposed reduction.

The labor barometer of the Employers' Association of Detroit, comprising 79 firms and two-thirds of the employment ability in Detroit, shows a net decrease of 1349 men employed for the week ending Nov. 22. The aggregate employment is 113,969, of which 68,051 are working on reduced schedules in 26 shops, averaging 40 hours per week.

CONTENTS

Scleroscope Hardness of Steel Balls 1391

Widely Varying Results on Different Sizes—Explanation of Cause and a Suggested Remedy

Transition to an Open-Shop Foundry 1395

Methods Used Successfully in Training Molding Machine Workers—Increased Output the Aim, Not Low Pay

Strain Lines in Low Carbon Steel 1401

New German Etching Method Revealing Effects on Metal Which Has Been Stressed—Origin and Character of Lines

Improved Methods of Rolling Sheet Steel 1405

Possibility of Use of Continuous Mills or Other Labor-Saving Devices—Continuous Rolling in Austria Before War

Die Castings and Their Use in Industry 1409

Relation to Consumers of Sand or Malleable Castings—Dies and Their Construction—Designing the Castings

Lowering of Freight Rates Will Be Urged 1415

Iron and Steel Interests Will Continue Efforts—Recent Refusal of Railroads Disappointing

Purchasing Foundry Irons by Specification 1420

Standard Methods for Sampling—Defects Due to Furnace Irregularities—Iron Analyses Grouped by Geographical Sections

Thorough Investigation of Steel Prices 1429

Interstate Commerce Commission to Inquire into Costs to Railroads Now and in August, 1920, in Considering Freight Rates

Combination Bench Machine 1394
Pittsburgh-Plus Case 1398
Portable Electric Drill 1398
Drilling and Milling Machine Vise 1398
Heavy-Service Hand Truck 1398
Pratt & Whitney Automatic Lathe 1399
Government Responsible in Pittsburgh Basing 1400
British Exports and Imports 1400
Legal Tangles of Peace 1402
Unemployment Bill 1403
Minerals Act Signed 1403
Colburn Drill Press 1404
New Ore Transfer Car 1408
Bureau of Mines Educational Films 1408
Companies Win in Cost Reporting Case 1411
Freight Rates on Scrap 1411
Jarring for Molding Pipe 1412
Varied Opinions on Tax Bill 1413
Meeting on Pulverized Coal 1413
New French Aluminum Alloy 1413
Belts as Inspection Tables 1414
Langelier Swaging Machine 1416
New Gray Planer 1417
Ball and Roller Bearing Experiments 1419
Caucasian Manganese Ores 1419
Indicating the Business Drift 1421
Hazards of Investment in Industry 1422
Labor Notes 1422
Editorials 1424
Steel Prices and Rail Freights—Tin Plate Revival Significant—Progress in Magnetic Testing—Financing Foreign Trade
Correspondence 1427
Car Wheel Specifications
Machining Cruiser Shafts 1428
To Eliminate Elevator Accidents 1433
Lake Ore Shipments 1441
Foreign Trade Conditions 1442, 1449
Book Reviews 1444
New Trade Publications 1444
Industrial Finance 1445
Ford Electric Steel Plant 1449

Iron and Steel Markets 1430
Comparison of Prices 1431
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1446
Non-Ferrous Metal Markets 1447
Personal Notes 1448
Obituary Notes 1449
Machinery Markets and News of the Works 1450
New York Jobbers' Prices 1458

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Steel Prices and Rail Freights

Iron and steel manufacturers have nothing to lose and much to gain from the inquiry the Interstate Commerce Commission is to make into the prices the railroads are paying now for steel and for all forms of equipment into which steel enters, as compared with the prices in effect in August, 1920. That was the month in which the 40 per cent advance in freight rates became effective. The investigation will be an important feature of the hearings that begin at Washington on Dec. 14 to determine the reasonableness or unreasonableness of existing transportation rates. A thorough canvass will be made of all the questions that have been under discussion in recent months relating to the cost of railroad operation, the influence of high freight rates on commodity prices, the extent to which high transportation charges are due to the excessive wage schedules of the railroads, the effect of the railroad policy of curtailing expenditures for road maintenance and equipment, the extent to which operating expenses have been reduced by cutting down forces and by reducing wages, the earning power of the carriers under present conditions—all the ground, in short, that has been covered in the effort of shippers, railroad workers and executives and the consuming public to find some solution of the railroad side of the pressing problems of deflation.

The iron and steel manufacturers will bring to the Washington hearing an abundance of evidence of the serious handicap imposed upon their industry by the present unparalleled charges for transportation. One of the phases of the Commerce Commission's inquiry relates to the percentage of the prices of rails and other steel products, as well as of railroad equipment, that is represented by transportation. Steel manufacturers will be able to show that the transportation cost of the nearly five tons of raw materials required for a ton of finished steel has practically doubled since 1913. For one Central Western steel company this freight cost, which was $5.80 in 1914, is to-day over $11.50 per ton of steel. The variations from these figures, due in some cases, particularly in the Pittsburgh district, to river transportation for a portion of the raw materials, will not be great. In other industries the story is the same. Beginning with agriculture, all are burdened by excessive carrying charges, due in turn to excessive railroad wages, so that the farmer and the workers in every line of manufacture actually find themselves working for the members of the railroad labor unions.

Over against the 100 per cent increase in the transportation cost of a ton of steel, where do the market prices of steel works products stand to-day in relation to the prices of 1913? THE IRON AGE composite for the seven principal forms of finished steel (including rails) one week ago was 2.099 cents per pound, whereas for 1913 it averaged 1.663 cents per pound—an increase of 0.436 cents, or 26 per cent. The percentage increase in transportation cost of steel, therefore, has been nearly four times the percentage increase in the prices paid by the railroads for the steel entering into their tracks and equipment.

The Commerce Commission's inquiry should be welcomed by the steel industry, since it will bring out in an authoritative way the fact that steel prices have been so far deflated that profits have disappeared and heavy losses are the rule, and that there can be no expectation of a real turn for the better apart from a reasonable readjustment in the cost of transportation.

A unique development in the work of the American Society for Steel Treating had its inception last year in one of the New England districts where certain chapters started an educational lecture program at their monthly meetings. This year the movement has so far expanded that the society may be said to take the lead in active educational work among its members. A conspicuous example is the Philadelphia chapter, which has organized an evening course in metallurgy and heat treatment at Temple University. In the New York chapter a series of monthly meetings has been arranged, the program for which contemplates a progressive course in steel metallurgy and heat treatment. Each month an authority in a particular line gives the chief lecture, which is followed by questions and discussions. Brief abstracts are given also of the principal articles

on metallurgical subjects in the technical press. Other local chapters are adopting similar plans. Fostered by the national board of directors and by visits of the national president to local chapters, the departure promises greatly increased interest in the work of this enterprising society.

Tin Plate Revival Significant

The bright prospect for tin plate consumption in 1922 is not a detached and unrelated phenomenon. A principle is involved which with the exercise of judgment can be applied more or less to the course of demand in all steel products. The tin plate revival is due to the liquidation of stocks, and in the broad sense that is what causes revival in demand for any description of steel, when there has been a period of abnormally light demand.

In the case of tin plate, large stocks were carried over from 1920, stocks of tin plate, of containers and of prepared goods. A secondary development occurred in the spring of this year, whereby the mills, underrating the influence the stocks of prepared goods would have upon tin plate demand, accumulated stocks which they expected would be called for in the summer in addition to current production, while the outcome was that the liquidation of the tin plate stocks necessitated a very light production in the summer months, lighter than in the corresponding period for many years past.

The situation as to tin plate, containers and prepared goods is now fully liquidated and the prospect is that there will be a full consumption of tin plate in 1922, in keeping with the growth of population and the enlarged use to which tin plate is now put. Depression exists now in not a few lines of trade, and there is likely to be some depression next year, but production and consumption of tin plate are expected to be in close relation to the best records of the past, if indeed a new record is not made. That is because there has been thorough liquidation.

Of all finished steel products tin plate shows the shortest time interval from production to final destruction, hence tin plate can "come back" in the shortest time. Other finished steel products have a wider range of application, and some of their channels of consumption exhibit a more even flow than others. Wire nails, for instance, have fairly steady consumption in box making, while their use in building construction fluctuates widely. Tubular products used in the oil industry cannot remain long in light demand because oil wells are constantly showing decreased yields and there must be additional drilling and piping to maintain production. At the present time one sees a very fair volume of demand for oil country goods, the result of liquidation in the oil situation in the past few months, even though the rate of oil consumption has not come back to the highest level previously shown. The demand for sheets by Southern farmers showed a quick revival last August and September, the need having accumulated, while the cotton crop provided the buying power.

Liquidation in the supply of dwelling houses occurred years ago, by demand exceeding supply, and houses long vacant secured occupants. The dwelling house building of the present time is surmounting the obstacle of high cost, because the liquidation has been so complete. There would be much more construction still if the cost were really reasonable.

In construction work of the larger kind liquidation takes more time, for the structures last longer. There have been periods in the past when a fair sized office building would be torn down to make room for a larger building, a 10-story structure, for instance, making way for a 20-story structure. The time is not yet ripe for such operations, but eventually it will be. Much the same is true of many bridges, which in time can be replaced advantageously by larger structures. The can of tomatoes lasts only until the contents are eaten, while bridges, buildings, freight cars, locomotives and other things last longer. Month by month the pressure for their replacement increases and eventually the reasons for deferring work are overcome by the reasons for taking it up.

Progress in Magnetic Testing

The magnetic testing of steel has already yielded definite results. Its disclosures as to the effect produced on rails by the gag press used in straightening them were discussed in an article in THE IRON AGE last week. It had been thought that magnetic testing would only reveal segregation, inclusions or lack of uniformity in certain sections of steel, but the researches of an important railroad have established the fact that other conditions can be detected. It has been known that the gag press strains certain points of the rail beyond the elastic limit of the steel. So delicate is the magnetic test that any section thus overstrained stands out prominently in the magnetic survey, but at the same time there is an entire absence of the evidence the test might give of lack of uniformity due to other causes. In other words, while information is obtained concerning gagging effects the results in other respects are entirely negative.

While this feature of magnetic testing is unfortunate in the one respect, it is advantageous in another, since it has resulted in vital improvements in the straightening process and in fewer rail failures. At the same time much light has been thrown on the problem of these failures in that it seems conclusively established that more failures are due to overstrained metal than to actual non-uniformity. This is in line, moreover, with the more recent results of fatigue researches.

Another interesting development is the experience of the Government in testing streamline wire used on airplanes. The magnetic test applied recently to a certain lot of wire showed, not a lack of uniformity in the wire, but a very slight deformation due to a minor irregularity in one of the rolls. The apparent non-uniformity of the wire was not shown by any ordinary tests nor was it a cause for condemning the wire. During the war a New York engineer perfected a magnetic device for testing the quality of welds in chain

making, using alternating instead of direct current, which rendered highly valuable service.

There are indications that the apparent disadvantages arising from the very sensitive nature of magnetic testing apparatus are in the way of being overcome. This may come about by modifications in the present apparatus or by the use of other devices jointly or separately. It is highly desirable that this method of testing which obviates the destruction of the metal itself should become a complete success.

Financing Foreign Trade

The Federal Reserve Board has compiled a statement showing the note circulation and metallic reserve of Belgium, France, Germany, Great Britain, Italy, The Netherlands, Canada and Japan at three times—at the end of 1904, ten years before the war started, in 1913, just before the war, and at the end of June, 1921. In thousands of dollars converted at par the circulation and metallic reserves are as follows, the ratio of reserves to notes being also given, for the eight countries taken together:

	Circulation	Reserves	Ratio
1904	$2,180,096	$1,402,858	64.4 per cent
1913	3,172,984	1,958,633	61.7 per cent
1921	35,885,319	3,080,806	8.6 per cent

000 omitted

Thus it is plain that the trouble about foreign currencies is not depletion of metallic reserve but increase in the circulation. From 1904 to 1913 is nine years and from 1913 to 1921 is eight years, but the metallic reserves while increasing only 40 per cent in the earlier period increased 58 per cent in the later period. The note circulation so increased, however, that the percentage of reserves dropped from above 60 to below 10.

These totals of course must not be considered typical of any country, for there are wide variations. Japan's metallic reserve increased from less than 10 per cent in 1904 to more than 100 per cent in 1921, and thus took part of the edge off the general showing. The Netherlands had a slight increase, and Canada had only a slight decrease. Then came Great Britain with a less favorable showing, the ratio in 1921 being about one-third what it was in 1904. France and Italy made still more unfavorable showings, while Germany has practically no showing at all, having had a reserve of 57.9 per cent in 1904, but only 1.3 per cent last June.

There is no prospect of material improvement in the foreign exchange situation except by overt acts. Exchange rates will not naturally return, and have been showing no disposition lately to return. Exports must be taken care of in some way or they cannot be made.

The net balance now due the United States on open account has been variously estimated, figures ranging from $600,000,000 up to $4,000,000,000. In its last review the Federal Reserve Board makes an extensive study of the subject, and finds that as nearly as it can estimate the various items the net unfunded balance due the United States as of Oct. 1, 1921, is about $3,408,000,000. Account is taken of exports and imports, freights paid, tourists' expenditures, sale of securities, private investment of American capital abroad, and many other items. The amount is less than estimates that have been made of Europe's unfunded indebtedness to the United States, but that represents no discrepancy, as countries outside of Europe may have net credits.

The balance, whatever it may be, and whatever balance is allowed to pile up in future, must be taken care of. Payment cannot be made in gold to any extent. As to private investments of American capital abroad, the board's presentation sets this item, up to Oct. 1, 1921, at $785,000,000, so that thus far operations under this means of settlement cannot be described as having been very brisk. Then there is the method of funding the indebtedness, but when three years have elapsed since the armistice it is evident that to be of avail the funding would have to be for very long periods. There remains the adjustment, which must occur if nothing else takes place, of exports being restricted and imports being encouraged. If an effort is made to discourage imports and nothing else is done, conditions will simply grow more pressing until the restrictions imposed are overridden. That is a fact that is not as generally appreciated as it should be. Gold can refuse to move, credits can be denied, American capital can exercise its prerogative and stay at home, currencies of foreign countries can go down as measured in gold and when all is said and done either merchandise will not move out of this country or foreign merchandise will come in. To do nothing but impose barriers to foreign merchandise is to foster the further disorganization and stress that would finally push the merchandise over the barriers. Much time has already been lost, for three years after the armistice there should not have piled up three billions or thereabouts of an unfunded balance due the United States in addition to the funded debt due the country.

As the fourth contribution to a series of papers on open-hearth practice before the American Iron and Steel Institute, to be possibly incorporated later in book form, the one on "Improvements in Port Construction," read at the recent New York meeting, discusses a subject of outstanding importance to the steel industry. The author traces the development of the earlier forms of ports and discusses the McKune, Venturi and Egler furnaces, citing the simple principle on which these are designed and pointing to some of the remarkable results from their use. It is always difficult to suppress surprise that, in this as in similar cases, so simple a principle was not hit upon earlier. Scientific regulation of the ingoing and outgoing gases, in this case the air in particular, has resulted already in more rapid heats, longer life to checkers, and lower stack temperatures, besides other gains. In one conspicuous case, cited by another authority, the life of the furnace as to heats was doubled and in others the output was increased at least 30 per cent. A production of 9500 to 10,000 tons of ingots per month from one 75-ton furnace is certain. On the testimony of

another writer, the Egler and McKune ports and similar devices "constitute the greatest advance in open-hearth practice since the adoption of the checkers and the principle of regeneration." Besides the advantages mentioned, there is also involved a decided elimination of waste in fuel and other materials, so important to economical production.

CORRESPONDENCE

New Car Wheel Specifications and Southern Charcoal Pig Iron

To the Editor: Under the above caption J. G. Henrick, in your issue of Aug. 25, discussed the tentative specifications for cast iron car wheels adopted by the American Society for Testing Materials at its annual meeting, as presented in THE IRON AGE of June 30 by H. J. Force. Mr. Henrick is entirely correct in his conclusions that these specifications are unjust and unfair to the Southern pig iron manufacturer.

It seems to the writer that the society in adopting these specifications, although but tentatively, has acted hurriedly in the premises without giving the matter the consideration that such an important subject deserved. Certainly the crippling of a necessary industry in any section of our country is not desired by right-thinking people anywhere. We of the South are grateful to Dr. Moldenke and others who endeavored to check this action, and we look to them to prevent these tentative specifications from becoming permanent. We note that in finally agreeing on 0.40 per cent as the maximum phosphorus content in the specifications this was done supposedly as a concession to the Southern manufacturers. As a matter of fact but few casts of charcoal iron made in the South run lower than this figure, the regular specifications for this element in Southern charcoal iron being approximately 0.40 to 0.60 per cent.

Mr. Force, recognizing the immediate need of improvment in the situation as to cast iron car wheels, has jumped to the conclusion that phosphorus is the cause of all its woes. He seemingly ignores the well-known facts concerning that element and, regardless of the effect of his conclusion on a large part of the industry, makes it the "goat." It has long been known that phosphorus in sufficient quantities will weaken cast iron. Most authorities agree that up to 0.75 per cent it has no appreciable effect on strength, and some assert that its good qualities overbalance its bad ones even up to 1 per cent. Tests made in our own laboratories show that our warm blast charcoal pig iron containing as high as 0.62 per cent phosphorus has a breaking strength of approximately 3500 lb. per sq. in., which is fairly representative of all Southern charcoal iron, and which will compare favorably with any charcoal iron having a lower percentage of phosphorus.

If, then, the failure of cast iron car wheels is not due to phosphorus, where can we look for the explanation? An inspection of tables No. 1 and No. 2 as presented by Mr. Force in his paper discloses facts that should be fairly conclusive when taken in connection with certain other facts bearing on the car wheel industry. In table No. 1 are listed six car wheels which were worn out in a service varying from five to eight years, and in table No. 2, 15 car wheels whose failure all caused serious derailments within a service, in the majority of cases, of from one to three years. In the first case we find that the sulphur averaged 0.142 per cent, with combined carbon 0.91 per cent, and in the second case the sulphur averaged 0.188 per cent, with combined carbon 1.12 per cent. Since the combined carbon in the resultant car wheel cannot be charged to the condition of carbon in the pig iron, but rather to operating and cooling conditions, too much stress cannot properly be placed upon that element. However, the influence of sulphur on the carbon is so marked that it does not surprise us to note the lower combined carbon accompanying the lower sulphur in the good wheels and the higher carbon (combined) accompanying the higher sulphur in the bad ones. In spite of the fact that the sulphur in the wheels that failed averaged 0.188 per cent, we find Mr. Force recommending 0.17 per cent as a maximum for this element, and the society actually adopting 0.18 per cent as its tentative specification. It seems strange that in the face of chemical and metallurgical knowledge such action should have been taken. The explanation lies in the conditions existing in the car wheel industry itself.

Mr. Henrick has shown that from 1915 to 1919 one Southern company decreased its shipments of charcoal pig iron to wheel makers from 53 per cent to 16 per cent, and it can be shown that the percentage for the entire Southern trade has gone lower since that date. This fact does not tend to bear out the conclusion drawn by Mr. Force that the higher phosphorus content found in these irons is responsible for the largely increased failures of car wheels in recent years. Again, it can be shown that charcoal iron, of any sort, is fast disappearing from use in car wheel manufacture. As a matter of fact, there are now large railroads manufacturing their own car wheels and certain large car wheel manufacturing enterprises that do not use a pound of charcoal iron in their mixtures.

This condition is largely brought about by the M. C. B. rules in effect on the railroads of the country by which, when a failure of a car wheel occurs while on the tracks of a given railroad, it must be taken in by that road at a fixed price, and its own wheels failing in the service of another road must be sold to that road at the same fixed price. Given this rule and the further fact that certain car wheel manufacturers in the last ten years claim to make as good wheels out of coke pig iron as from charcoal pig iron, and the answer to the existing situation unfolds itself.

There is no denying the fact that sulphur in coke iron is greater than in charcoal iron. Since more than half of the mixture of metal used by most car wheel manufacturers enters in the form of scrap wheels, as the old car wheels, such as those shown in table No. 1 by Mr. Force, disappear, and those made without the use of the low sulphur charcoal irons increase, it is but a question of time until the society will have either to increase its sulphur specifications to accommodate the pyramiding of sulphur in the coke iron car wheels or else to reduce it to about 0.12 per cent, where it should be and again force the use of charcoal iron into the industry.

It can also be shown that the standard of physical tests of car wheels has been lowered in recent years, and Mr. Force is to be commended for calling attention to the necessity of making these more rigid. With this done, and the chemical specifications placed where manufacturers will be forced to use only the best materials obtainable instead of the cheapest, the whole situation will adjust itself and the appalling losses due to car wheel failures will be reduced to a minimum.

As the situation stands at present, no railroad can afford to pride itself upon the quality of its wheels, and in self defense must continue to use the cheapest instead of the best wheel it can make or purchase, only concerning itself to see that the wheels meet the present day standards of physical and chemical tests. It behooves, then, a great organization like the American Society for Testing Materials to take such steps to guard those standards as will result in better car wheels; and when this is done it is quite certain that phosphorus within reasonable limits will not be made the "goat," and a large section of our country will not be practically barred from the industry. Also the days when car wheels made from charcoal iron wore out instead of failing will return and there will be no necessity for the use of the electric furnace or of the rarer metals as alloys.

B. F. WILSON, JR.,
General superintendent, Bon Air Coal & Iron Corporation.
Lyles, Tenn., Nov. 15, 1921.

MACHINING CRUISER SHAFTS

Extreme Accuracy Requires Special Precautions and the Most Careful Work

With the high speed of revolution and the great amount of power transmitted through the shafting of the new scout cruisers, now under construction for the United States Navy, the problem of balance at full speed has become one of considerable importance. Each cruiser has four shafts, designed to transmit approximately 23,000 hp. each, at 370 r.p.m. To obtain a rotating balance as well as a static balance, the Bethlehem Shipbuilding Corporation, in its Fore River plant, where the cruisers Raleigh and Detroit are being built, has adopted an interesting procedure described in the following paragraphs:

Each shaft, which is approximately 202 ft. long, is made up of four sections of line-shaft, varying from 25 to 32 ft., one stern tube shaft 42 ft. long and one propeller shaft 40 ft. long. All of this shafting has an outside diameter of about 14¾ in. and has a hole of 9⅛ in. diameter bored the entire length. Flanged couplings are used between shafts, being forged solid with the shafting.

From the nature of the duty imposed upon this shafting, its extreme length, the flexibility of the hulls in which it is placed, due to limitations in depth of girder, the high revolutions of the machinery and propellers and the absolute necessity of avoiding vibration, it becomes apparent that ordinary lathe work, with its possible errors in balance, would not be sufficiently accurate to obtain the desired results. This came particularly to notice through previous experience on destroyers, which, while considerably smaller vessels, have much the same sort of problem in connection with power. Very slight errors in balance and alinement on destroyers were found to cause excessive vibration.

This shafting is made of a high grade navy specification nickel steel of a tensile strength of about 80,000 lb. per sq. in. The characteristics of this steel, its natural hysterics and homogeneity, had to be studied during its turning and balancing. The word "hysterics" deserves explanation.

On a long length of shafting, subjected to a torque applied at any starting point, and constantly varying both in quantity and location of application, it is found that peculiar distortions take place in the shaft, sometimes temporary and sometimes permanent in nature. These peculiar manifestations occur sometimes on shafts entirely of dissimilar materials, and are believed to be traceable to strains in the shafting, set up while it is being forged, and then released under the application of the peining hammer and the cutting effect of turning the shaft to final dimensions.

Stern Tube Shaft Characteristics

While the stern tube shaft, 42 ft. long, may be taken as typical in describing the procedure, it may be mentioned that added difficulties were experienced on this shaft, due to the fact that it is entirely cased with composition sleeves ⅜ in. thick and about 15 in. in diameter. These sleeves, of course, have to be taken as a part of the shaft for the balancing and final turning operations. This section of shaft has no coupling forged on.

As received at the Fore River yard from the forging plant, the shafts have already been bored to the 9⅛ in. internal diameter, and have been rough-turned to a diameter 3/16 in. greater than the designed finish. The first operation upon the shaft is then to center it as accurately as possible upon the finished bore. On being placed in the lathe, the shafts are usually found to have an error of 1/32 to 1/16 in.

After spotting the error in one or two places, corresponding as nearly as possible to an equal division of the weight in relation to the length, a light cut is taken over the entire length of the shaft, until it runs truly. The shaft is then taken to the balancing blocks and carefully rolled to find out how much error in balance still exists, and where it is located. This error is found to run usually from 5 to 20 lb. and is considered due to lack of complete homogeneity in the steel.

Upon again being placed in the lathe, the shaft center is thrown over enough to compensate for the heavy side of the shaft. This is done more by a delicate sense of accuracy on the part of the operator than by any careful calculation, for it is found extremely difficult to calculate this error accurately and the operation becomes, therefore, one of trial and error. The shaft is then re-spotted and again turned in the lathe with a light cut over its entire length. This operation of centering, balancing, spotting and turning is repeated, usually some four or five times, before a balance is obtained which is regarded as satisfactory, and within the limits prescribed for the shaft.

From this point on the shaft is regarded as down to size and balance. There is, however, a minute error still existing, the amount and location of which are known and marked on the shaft. This information is used in lining up the shaft with the line shaft to which it is later connected at its forward end.

Allowing for the Composition Sleeves

It is assumed that the composition sleeves have all been turned and bored, ready for shrinking on. The manufacture of these sleeves has been carried on in a manner similar to that used for the shafting, with the object of arriving at a well balanced, homogeneous casting. In the shrinking on of these sleeves, great care must be exercised to avoid local overheating of the shaft, as, of course, a hollow shaft of this character would distort very easily.

After the sleeves are shrunk on, the shaft is brought back to the lathe to have the sleeves finished on the outside. It is usually found in this operation that there is an error in balance of anything up to 20 lb. in the total weight of some 16,000 lb. There is also found an error in trueness of the shaft, which may reach as much as 1/32 in. It is thus obvious that under the new conditions, that is, the shaft and sleeve considered as a unit, this unit must go through the same alternate operations of spotting, centering, balancing and returning as has already been described for the shaft alone.

If the operation already outlined is followed with great care, the final error in the 42 ft. length of shafting can be brought as low as 0.002 in. out of true and a balance perfect to 1 oz.

Final operations on the shaft consists of keyway cutting, and drilling of flanges. The various lengths of shafts are then brought together for alinement. In this operation, the known errors in balance marked on each shaft are taken into consideration, and the shafting is so reamed and bolted together that the successive errors in successive lengths are made to cancel out through the circle of 360 deg., so that the final error in balance and alinement for the entire 202 ft. of length becomes negligible.

Some of the Requirements

To produce a high class job of this character, it is obvious that the first requirement is workmen of the highest skill; second, comes unremitting carefulness and checking of results; close attention at all times to avoid not only the local overheating in shrinking on the sleeve, but also overheating in the lathe operations, and the utmost care in handling the shafting when it is suspended from overhead cranes.

To show the peculiar behavior of shafting of this class, it may be pointed out that, following a day's turning in the lathe, the shafting would be slightly warm and would show a noticeable error. On cooling off over night, however, this error has been found to disappear. The best results have been obtained with a flat tool, as the strain imposed by a roughing tool is sufficient to throw the shaft out of true, due to the peining effect of such a tool.

The American Metal Parts Co., 1916 St. Paul Avenue, Milwaukee, manufacturer of machinery and automotive materials, has increased its capital stock from $100,000 to $200,000. H. A. Sherff is president and general manager.

Thorough Investigation of Steel Prices

Interstate Commerce Commission Will Also Inquire as to How Costs Compare with Those of Last August—Reasonableness of Rates to Be Determined

WASHINGTON, Nov. 29.—That the Interstate Commerce Commission is going thoroughly into prices of steel being paid at present by railroads as compared with those in effect Aug. 31, 1920, was made plain to-day. The Commission, in a formal announcement of procedure to be pursued at the general investigation beginning Dec. 14 regarding reasonableness of rates specifically states 10 subjects which it suggests should be presented. A part of one of these is an inquiry as to how contracts and costs for rails, ties, other materials and supplies, locomotives, cars and fuel now current compare with those in effect on the last day of August, 1920. It is requested that figures be given and also to make known when the contracts expire and to what extent contract prices are conditioned on wage scales. Information as to what part of the cost of each of these materials and equipment is for transportation is asked.

Proceedings are to begin with the submission of evidence by railroads, with the opportunity for arguments at the close of the hearing when questions of law may be discussed. During the period Dec. 14 to 21 respondents are expected to put in their case. The hearing is to be resumed Jan. 9 for the shippers' side, which will be arranged according to commodities, etc., when steel manufacturers, among others, are expected to present their views regarding rates and related matters, answering one of the Commission's queries as to whether present rates are reasonable for specified commodities and, if not, to what extent they are unreasonable. Other matters relate to financial returns for railroads, to what extent operating expenses have been reduced since Aug. 31, last year, by furlough or discharge of employees, reduction of wages, changes in working conditions and by reductions in operating expenses.

The extent to which rates have been further increased and reduced since the general increase last year, changes in volume of traffic and suggestions as to what readjustments have not been but should be effected will be gone into thoroughly. Inquiry also will be made as to what extent, if any, maintenance of road and equipment has been curtailed since Aug. 31, last year, and as to present condition of road and equipment, together with amounts expended for additions and betterments. Another important question is in case rates are found unreasonable in the aggregate or in rate groups, should general reduction in all rates be required or reduction be required in rates on specified commodities or description of traffic. In case rates are found to be reasonable in the aggregate but unreasonable on specified commodities, the commission wants to know what readjustment should be required.

Plans of Congressional Committee Investigation

WASHINGTON, Nov. 29.—Selected as spokesman for the iron and steel industry, President James A. Campbell, Youngstown Sheet & Tube Co., to-day was appointed on one of 44 committees of shippers chosen by the joint Congressional Committee on Agricultural Inquiry for the purpose of securing data on marketing and transportation facilities. The joint committee is headed by Representative Sidney Anderson of Minnesota. The 44 committees are appointed in conjunction with the executive traffic committee of the railroads. F. E. Todd, vice-president Deere & Co., Moline, Ill., has been named to represent the agricultural implement industry. The committee is to complete its work by Jan. 1, when the evidence will be reviewed and analyzed by an advisory committee of 12 members, the personnel of which is to be announced later. Interest in the inquiry is heightened by reason of the general investigation as to reasonableness of rates ordered by the Interstate Commerce Commission and the opinion prevails that the purpose of the Congressional committee is to provide ground work for legislative work bearing on transportation costs and railroad earnings.

Chairman Anderson to-day said to THE IRON AGE representative: "Every phase of distribution is being investigated in relation to transportation. This investigation involves physical property, transportation service, the economic relation of transportation to agriculture and industry, and the administration of transportation, with an analysis of State and Federal laws applying to transportation. A study is being made of the relation of car service and supply and the successful distribution of products, with particular reference to the condition of equipment. It can be conservatively stated that 15 per cent of the equipment of the railroads is in poor condition."

The purpose of this inquiry, which was authorized by a special act of Congress last spring, is to apply four standard tests in an effort to measure the well-being of agriculture as compared with other industries. The inquiry will take in the purchasing power of the farmer's dollar; the absolute price of agricultural products as compared with prices of other commodities; quantity production of agriculture as compared with quantity production of other industries; and the rewards for capital invested and labor employed in agriculture as compared with the rewards for capital invested and labor employed in other industries.

It is significant that the commission has found that little evidence of an unreasonable spread exists between producers' and consumers' prices. In a statement to-day, Chairman Sidney Anderson said: "The costs of distribution were increasing slowly but steadily over those prior to 1913. So far as we can ascertain, they have about doubled since 1913, and to-day the costs of distribution represent about one-half of the prices which the final consumer pays. These increases in costs do not occur in any one place in the line of distribution. They occur as a part of the price of every element of service performed in connection with the distribution of the product all along the line. This means that the spread between the producer's and consumer's prices must, for the most part, be reduced by more efficient methods of distribution, by reducing unnecessary transportation hauls. By more efficient merchandising methods, by more closely relating output to market, by speeding up turnover, by reducing unnecessary stocks, and otherwise shortening and speeding up the steps between the producer and the consumer."

Iron and Steel Markets

YEAR-END QUIETNESS

Oil Lines and Railroads the Chief Sources of Orders

Welsh Get Canadian Tin Plate Order—40,000 Tons of Rails for Argentina

Oil company buying and further announcements of railroad requirements in rails and cars that may develop shortly into contracts have been the chief features of the week. It now comes out more definitely that the coming Commerce Commission hearings at Washington will take up the relation of steel prices and railroad buying to the agitation of iron and steel makers for lower freight rates. Meanwhile, railroads are deliberating over their rail tonnages for 1922. Orders may come about the first of the year for 300,000 tons or more.

In the Chicago district orders from builders who took recent car business came in time to prevent some curtailment of mill operations. About 30,000 tons has been placed in the past fortnight.

The activity in line pipe for oil fields is due largely to the fact that makers have been willing to accept low and unprofitable prices to secure orders. The Pure Oil Co. has contracted for a 250-mile line of 8-in. pipe amounting to 17,000 tons. Another contract for 13,000 tons of various sizes is expected to be closed this week. One oil company has increased a recent pipe inquiry to 20,000 tons and in addition is considering 10,000 tons of plates for tank work.

Seasonal influences are more evident in the heavier steel lines, particularly plates and structural shapes, which are quiet. Under present market conditions, tank shops are bidding on work without first getting prices on the steel. In structural work a 3100-ton contract for subway extension in New York and 2600 tons taken at Pittsburgh for power transmission towers in the South are the chief items.

Mill operations are fairly well maintained. In a few instances a special effort has been made to give more men employment against the holidays. The average for the industry is probably 40 to 45 per cent.

There is no new development in prices. On smaller lots of plates, shapes and bars 1.60c. is commonly the basis, and as heretofore larger business is done at 1.50c. In the wire trade, while there are $2.90 nail contracts on the books and plain wire contracts at $2.60, deliveries are made at $2.75 for nails and $2.50 for wire under extensions of the prices prevailing before Sept. 12.

The American Sheet & Tin Plate Co. opened its books on Nov. 23 for 1922 business at 3c. for black, 4c. for galvanized and 2.25c. for blue annealed sheets. Independent companies are naming these prices also, but the present inactive market has not seriously tested them.

Winter operation of tin plate mills promises to be on a good scale, in view of the thorough cleaning out of stocks. Welsh makers of tin plate, with 40 shillings ocean freight to Vancouver, took 150,000 boxes there lately at close to $5.25 per box, duty paid. This is well below any American competition. On recent Pacific Coast contracts, Baltimore makers, with an all-water haul, have been able to underbid Pittsburgh.

Bids on forty thousand tons of rails for the Argentine are to be opened this week. German and Belgian mills have $6 per ton advantage on freight, but the requisite financing may not be easy for European mills.

Very little activity is reported in the pig iron market, the principal inquiries being for 7000 tons of basic for a Harrisburg company and 4000 tons of basic for a company at Portsmouth, Ohio. The Pennsylvania Railroad is in the market for about 2000 tons of foundry iron. Some concessions are being made in the Philadelphia and Chicago markets and the $17.50 quotation on Southern iron is more freely named, although $18 is still the general asking price.

The 1921 movement of iron ore by vessel from Lake Superior ended this week with a total of 22,300,726 gross tons, the smallest since 1904. From 1920 the falling off was 36,226,500 tons, or 62 per cent. The record year was 1916, when 64,734,000 tons came down the lakes.

Lake Superior mining operations promise little for the coming winter, though at some Gogebic properties three days work a week instead of two has been given recently. At a few mines of independent companies mining wages are back to the 1914 level.

Pittsburgh

PITTSBURGH, Nov. 29.

General conditions in the iron and steel market show little change from those of a week ago. Outside of pipe, business in steel products still is on a tapering scale, and while this condition as yet has not seriously disturbed the operation of the various Steel Corporation subsidiaries, it is finding reflection in the activities of most of the independents. The Carnegie Steel Co. has about 55 per cent of its open-hearth furnaces in operation, and since these are at plants where the units are of large capacity, its ingot output is even larger than is indicated by the numerical percentage. This company still has 25 of its 59 blast furnaces in blast. The American Sheet & Tin Plate Co. last week averaged over 77 per cent of its hot mill capacity and this week's schedule calls for the operation of about 80 per cent. This schedule may not be attained, however, because the flooded condition of the rivers, resulting from several days' steady rain, will mean the loss of about two days' operation at the Wood works of the company at McKeesport, Pa. The National Tube Co. and the American Steel & Wire Co. are running higher than 50 per cent in this district. We estimate independent steel

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton	Nov. 29, 1921	Nov. 22, 1921	Nov. 1, 1921	Nov. 30, 1920
No. 2X, Philadelphia‡	*$22.34*	$22.84	$22.84	$40.79
No. 2, Valley furnace†	20.50	20.50	21.00	38.00
No. 2 Southern, Cin'ti†	22.50	22.50	23.50	42.50
No. 2, Birmingham, Ala.†	18.00	18.00	19.00	38.00
No. 2 foundry, Chicago*	20.00	20.00	21.00	37.00
Basic, del'd, eastern Pa.	21.00	21.00	20.50	38.46
Basic, Valley furnace	19.00	19.00	19.00	33.00
Bessemer, Pittsburgh	21.96	21.96	21.96	36.96
Malleable, Chicago*	20.00	20.00	21.00	37.50
Malleable, Valley	20.00	20.00	20.50	37.00
Gray forge, Pittsburgh	21.46	21.46	21.96	38.96
L. S. charcoal, Chicago	31.50	31.50	31.50	51.00
Ferromanganese	60.00	60.00	60.00	125.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. sheet bars, P'gh	30.00	30.00	30.00	47.00
Forging billets, base, P'gh.	32.00	32.00	35.00	56.00
O.-h. billets, Phila.	34.74	34.74	34.74	55.74
Wire rods, Pittsburgh	40.00	40.00	40.00	57.00
	Cents	Cents	Cents	Cents
Light rails at mill	1.55	1.55	1.65	3.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	4.35
Iron bars, Chicago	1.65	1.65	1.75	3.75
Steel bars, Pittsburgh	1.50	1.50	1.50	2.35
Steel bars, Chicago	1.60	1.60	1.75	2.73
Steel bars, New York	1.80	1.80	1.80	2.73
Tank plates, Pittsburgh	1.50	1.50	1.60	2.65
Tank plates, Chicago	1.60	1.60	1.75	3.03
Tank plates, New York	1.88	1.88	1.88	3.03
Beams, Pittsburgh	1.50	1.50	1.60	2.45
Beams, Chicago	1.60	1.60	1.75	2.83
Beams, New York	1.88	1.88	1.88	2.83
Skelp, gr. steel, Pittsburgh	*1.50*	1.60	1.60	3.00
Steel hoops, Pittsburgh	2.00	2.00	2.25	3.05

Sheets, Nails and Wire,	Nov. 29, 1921	Nov. 22, 1921	Nov. 1, 1921	Nov. 30, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	**3.00**	2.75	2.90	4.85
Sheets, galv., No. 28, P'gh.	**4.00**	3.75	3.90	6.00
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	3.90
Wire nails, Pittsburgh	2.75	2.75	2.90	3.25
Plain wire, Pittsburgh	2.50	2.50	2.60	3.25
Barbed wire, galv., P'gh.	*3.40*	3.55	3.55	4.10
Tin plate, 100-lb. box, P'gh.	$4.75	$4.75	$4.75	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$16.50*	$17.00	$16.50	$27.00
Carwheels, Philadelphia	17.00	17.00	17.50	30.00
Heavy steel scrap, P'gh.	14.00	14.00	14.50	20.00
Heavy steel scrap, Phila.	*11.50*	12.00	12.00	17.00
Heavy steel scrap, Ch'go	*12.00*	12.25	12.00	17.00
No. 1 cast, Pittsburgh	16.50	16.50	17.50	29.00
No. 1 cast, Philadelphia	17.50	17.50	17.50	31.00
No. 1 cast, Ch'go (net ton)	*13.00*	13.25	13.75	21.50
No. 1 RR. wrot, Phila.	15.50	15.50	16.00	23.00
No. 1 RR. wrot, Ch'go (net)	*11.50*	12.00	12.50	15.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$2.75*	$3.00	$3.10	$7.50
Foundry coke, prompt	4.00	4.00	4.25	8.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.50	13.50	13.12½	14.00
Electrolytic copper, N. Y.	**13.37½**	13.25	12.75	13.50
Zinc, St. Louis	4.65	4.65	4.55	5.60
Zinc, New York	5.15	5.15	5.05	6.00
Lead, St. Louis	4.35	4.35	4.40	5.25
Lead, New York	4.70	4.70	4.70	5.25
Tin, New York	**29.87½**	29.62½	28.00	33.50
Antimony (Asiatic), N. Y.	4.50	4.50	4.75	5.75

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Nov. 29, 1921, Finished Steel, 2.135c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, b.ack pipe and b ack sheets

These products constitute 88 per cent of the United States output of finished steel.

Nov. 22, 1921,	2.099c.
Nov. 1, 1921,	2.163c.
Nov. 30, 1920	3.217c.
10-year pre-war average,	1.684c.

Composite Price, Nov. 29, 1921, Pig Iron, $19.56 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 22, 1921,	$19.64
Nov. 1, 1921,	19.97
Nov. 30, 1920,	35.80
10-year pre-war average,	15.72

company operations in this and nearby districts as between 35 and 40 per cent of capacity.

Prices do not change much, but this must not be construed as meaning that the market is any firmer than it has been because in most instances the reverse is true. Activity in line pipe is ascribable largely to the fact that makers have been willing to accept very low and unprofitable prices to secure orders. One order for 17,000 tons of 8-in. pipe was let last Saturday and another for 13,000 tons of various sized pipe probably will be closed in a day or two. The situation in the major products is weaker to the extent that comparatively small tonnages are now being accepted at, or close to, 1.50c. So far there has been close observance of the new prices of sheets of 3c., base, for black and 4c., base, for galvanized, but demand is very light at present and no real test of these figures is provided. The American Sheet & Tin Plate Co., which opened its books Nov. 23 for first quarter and first half of 1922 business, named those prices on black and galvanized and 2.25c., base, for blue annealed.

There are signs that the recently established price of $4.75 per base box, for tin plate, is not always observed. There has been pretty general extension of contracts in wire products carrying the prices in effect prior to Sept. 12 last, and as far as actual business is concerned the market is back at $2.75, base, per keg for nails and $2.50, base, per 100 lb. for wire.

Utter stagnation prevails in pig iron, with quotations purely nominal. Old material prices still are inclined lower and the fuel market is dull and weak.

Pig Iron.—The market is so flat that it is almost invisible. The inquiry of the Whitaker-Glessner Co. for 4000 tons of basic iron for December delivery has reached this market, as has also one for 2000 tons of basic from the American Rolling Mill Co. The latter company was able to obtain 1000 tons from one of the furnaces now supplying it with iron and has withdrawn the inquiry for the larger tonnage. The Whitaker-Glessner inquiry probably will be placed with an Ironton, Ohio, furnace, as the tonnage is wanted for Portsmouth, Ohio, and the freight rate from Ironton to Portsmouth is only 84c. per ton. The Follansbee Brothers Co. has put out an inquiry for 1500 to 2000 tons of basic for delivery in 30 to 60 days, but this business is of little interest to Valley furnaces because of the high freight rate to its plant. Almost nothing has been done in the past week in Bessemer or foundry grades.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.00
Gray forge	19.50
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	20.00

Ferroalloys.—Activity still is lacking and in the absence of important sales, it is impossible to make any change in quotations. The Carnegie Steel Co. is an occasional seller of ferromanganese, but in connection with the few tonnages it has sold, it is stated that they were entirely for the accommodation of other companies which had contracted for tonnages, but were not getting shipments promptly enough to meet needs. The company disclaims having entered the market in a commercial way. Some of the sales were to companies which had a contract for German material. It is evident German makers are not living up to their obligations and lately material from that country has not been conspicuous in the offerings. Regular domestic makers of ferromanganese all are quoting $58.35 seaboard, for 80 per cent material, and that also is the quotation of English producers. The Edgewater Steel Co. is in the market for a carload of this material. Almost nothing is being done in spiegeleisen or in 50 per cent ferrosilicon.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $63.67 delivered; 78 to 82 per cent foreign ferromanganese, $58.35, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $55 to $57, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market is inactive but fairly steady at recent prices. Sheet makers who buy their bars are not well enough off in the matter of orders to be much interested in the market at the moment, and the tin plate companies which have the biggest bookings, either make their own tin bars or are covered by contract. There is no pressure to sell sheet bars for the reason that most companies which produce this form of steel in a commercial way also make the finished products and naturally are not inclined to increase the competition on the finished lines by cutting prices on the sheet bars. This also is applicable to billets and slabs. With merchant bars and plates available at 1.50c., there is no good reason why buyers should buy semi-finished material at current prices, and on the other hand, no reason why producers should cut prices on billets, and slabs since to do so would mean the shading of 1.50c. on the finished products, a price which is generally considered to be too low.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $28 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $32 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—There is no increase in demand and so little is going on that prices are indefinite. Makers generally are quoting $40 for the base size of soft rods, but would give consideration to firm offers of less. Prices are given on page 1446.

Steel Skelp.—We note no material increase in the demand, despite the fact that business in most lines of tubular goods is comparatively good, and prices are rather weak. Quotations still range from 1.60c. to 1.65c., but with plates available as low as 1.50c. it is believed that figure would be done on attractive skelp orders.

Wire Products.—Current demands reflect the proximity of the end of the year. Both jobbers and manufacturers are buying close to actual requirements to avoid too much of an inventory at the end of the year. Some makers have entered contracts for nails at $2.90 base, per keg, but such business, except in a few instances, has carried with it definite shipping instructions and is regarded as protection to buyers who are likely to provide shipping directions only in the event of an advance in prices. Little of the tonnage now moving is priced at higher than $2.75 per keg and the going market on plain wire is $2.50, although this price is not openly quoted except to manufacturers on 90-day contracts.

We quote wire nails at $2.75 to $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 to $2.60 base per 100 lb., Pittsburgh.

Plates.—There is no appreciable increase in the demand nor any material change in prices. The general asking quotation is 1.60c., but competition for passing orders is too sharp to allow makers to secure business, even in small lots, higher than 1.50c.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.60c. f.o.b. Pittsburgh.

Steel Rails.—Little business is coming out in light rails at present and competition for the few orders which are developing is so keen that prices largely favor buyers. On single carload lots makers are able to obtain 1.60c. base, and occasionally 1.65c., but on lots of more than a carload, the common price is 1.55c., these prices for rails rolled from new steel.

We quote 25 to 45-lb. sections, rolled from new steel, 1.55c. to 1.65c. base; rolled from old rails, 1.50c. to 1.55c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—There is no special change in the situation with regard to the demand, but prices are a shade easier in that comparatively small tonnages now are being accepted at 1.50c., base, or close to that price. Demand for iron bars is purely hand-to-mouth, with makers trying to maintain a base of 2.25c., but not letting orders slip away at less.

We quote steel bars rolled from billets at 1.50c. to 1.60c.; reinforcing bars, rolled from billets, 1.50c. to 1.60c. base; reinforcing bars, rolled from old rails, 1.45c. to 1.50c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Structural Material.—The market this week is even quieter than it has been recently, only one of the larger fabricating interests reporting any awards. It is getting pretty late for erecting and prospective builders feel they have nothing to lose by deferring their work. The Riter-Conley Co. has taken 1100 70-ft. transmission towers for a Southern power company for which about 2600 tons of steel will be required. Plain material is slow, with prices varying in keeping with the quantity sought. Prices are given on page 1446.

Iron and Steel Pipe.—Business in steel pipe is fairly satisfactory to manufacturers from the standpoint of volume, but not from the viewpoint of prices, which are kept down to unprofitable levels by the sharpness of competition. Particularly is this true of line pipe, which is selling at prices way below those for other kinds of goods, the difference between merchant pipe and line pipe being a matter of more than $25 per ton. The low prices on line pipe, however, are attracting orders. The Pure Oil Co., last Saturday, placed the order for about 225 miles of 8-in. line pipe for its Humphries field subsidiary, the business being divided between a Youngstown and a Middle Western maker. Slightly more than 17,000 tons are involved in this transaction. The Sinclair Oil Co. is expected to close shortly for 90 miles of 10-in. pipe, 60 miles of 8-in. and 20 miles each of 4-in., 3-in. and 2-in., this being equivalent to about 13,000 tons. A Pittsburgh company with wells in West Virginia recently placed with a Youngstown mill a total of 33 miles, or 700 tons, of 2-in., 3-in., 4-in., and 6-in. pipe. An Eastern oil company is a prospective buyer of 7500 tons of line pipe in the near future. The Midwest Refining Co. is in the market for a fair sized tonnage of oil well pipe and not line pipe, as reported a week ago. Makers of wrought iron pipe report a fairly well sustained demand for standard pipe, but not much activity in oil country goods. Discounts are given on page 1446.

Sheets.—The American Sheet & Tin Plate Co. opened its books on Nov. 23 for first quarter and first half business at 3c. for black, 4c. for galvanized, and 2.25c. for blue annealed. Independent companies also are quoting these prices and are adhering to them firmly. There is so little demand, however, for either prompt or future shipments, that the market is largely untested. Prices are given on page 1446.

Tin Plate.—There is a fair run of business calling for early delivery and the mills also are fairly successful in lining up business for first quarter and first half of 1922 delivery. Indications still point to considerable activity for the mills in the early part of next year, but it cannot be said that observance of the price of $4.75 per base box is as rigid as it was expected to be.

Some shading of this price is reported on the Pacific Coast, and on export business that quotation effectually bars out domestic producers because it is more than $1 a box above what Welsh makers recently have done.

We quote standard production coke tin plate at $4.75 per base box f.o.b. Pittsburgh for carload lots.

Cold-Finished Steel Bars and Shafting.—Orders are a little more frequent than they were a short time ago, but individually and collectively they are small. The general asking price on cold-finished screw stock and shafting is 2.15c. base, but on lots that aggregate more than a carload the price ranges down to as low as 2c. The recent rise in the price of oil has stimulated the demand for steel drills, one maker here having recently shipped three carloads. Ground shafting is unchanged at 2.75c., base, mill.

Hoops and Bands.—Trading still is limited and prices are irregular and easy. Hoops range from 2.10c. to 2.25c., and bands from 2c. to 2.25c. Most of the business is at the inside figures

Hot-Rolled and Cold-Rolled Strips.—Consumers are specifying fairly well on old orders carrying a base of 2c. for hot-rolled and 3.75c. for cold-rolled. Not much new business is developing.

Nuts, Bolts and Rivets.—Demand for bolts and nuts still is small, with buyers disinclined to take on more than actual requirements. Quotations are more of an asking than a selling basis. Rivet manufacturers are making a strong effort to maintain a price of $2.40 for large structural rivets and $2.50 for large boiler rivets, and those making a complete range of sizes disclaim having accepted business at less. Prices and discounts are given on page 1446.

Coke and Coal.—Beehive oven coke operators without regular consuming connections are finding it almost impossible to dispose of their product these days, because there is so little demand. Furnace grade offered by such producers lately has sold down as low as $2.75 per net ton, ovens, and $3 has become not only the maximum, but also an extreme price. Business in 48-hr. coke for future shipment also is slack, although we note one contract for 7500 tons per month for four months, starting Dec. 1, from an Eastern furnace. It is reported that this business was placed at $3.40 per net ton, oven. Foundry coke also is slow, with good grades available as low as $4, and $4.50 the top on choicest brands. The coal market is absolutely stagnant and sales are difficult even at very low prices. Good steam coal, mine run grade, can be bought at $1.50 per net ton, at mines, by-product coal at $1.75, and gas coal $2.25.

Spikes.—Some demand is coming out for small spikes, but the railroads seem to have covered their immediate requirements of standard spikes and activity is lacking in that quarter. Few makers have any considerable backlog of business and competition for passing orders is sharp and prices are easy. On standard spikes, $2.25 base per 100-lb. and on small spikes $2.40 base for 100-lb. rarely are exceeded. Prices are given on page 1446.

Old Material.—The market remains dull and weak, and prices have been further reduced on such grades as turnings, and borings, offerings of which exceed the demand. Only one or two steel companies in this district are buying scrap at present, and even they will not go very high to get tonnages, as they are fairly well stocked while their orders for finished steel are decreasing. Dealers, having completed most of their contracts, are not in the market except for such tonnages as can be picked up at bargain prices. Prices on rerolled reinforcing bars and light rails rolled from old standard sections are so low and unprofitable that makers of these products have practically withdrawn from the market for rerolling rails. The foundries are sparing buyers of old material. The Pennsylvania Railroad, eastern region, list for December, offers approximately 20,000 net tons of scrap, including 8000 tons of No. 1 rails and 2000 tons of scrap rails. The Baltimore & Ohio Railroad will take bids until noon, Dec. 5, on 17 cars and 10,255 gross tons of old material; also for 3000 lb. of high speed steel. The Dodge Bros. list, which closed yesterday, offered 500 tons of turnings, 300 tons of borings, 250 tons of compressed sheets, and 150 tons of shoveling steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast, cupola size	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	16.00 to 16.50
Compressed sheet steel	11.50 to 12.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	10.50 to 11.00
Railroad knuckles and couplers	14.50 to 15.00
Railroad coil and leaf springs	14.50 to 15.00
Low phosphorus standard bloom and billet ends	20.00 to 21.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	26.00 to 27.00
Locomotive axles, steel	24.00 to 25.00
Steel car axles	16.00 to 16.50
Cast iron wheels	15.50 to 16.00
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	9.50 to 9.75
Sheet bar crop ends	14.00 to 14.50
Heavy steel axle turnings	11.50 to 12.00
Short shoveling turnings	10.25 to 10.75
Heavy breakable cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Cast iron borings	10.00 to 10.25
No. 1 railroad wrought	11.50 to 12.00

Employment in St. Louis

ST. LOUIS, Nov. 29.—Replies received from questionnaires addressed by the Eighth Federal Reserve Bank to 210 leading employers in 21 of the largest cities in the district with an estimated normal complement of 203,219 workers, asking for employment data, developed in the following results:

Date		Number of Wage Earners	Pay Roll
Oct. 1, 1920	Men	186,890	
	Women	20,843	
	Total	207,733	$17,834,620.38
Oct. 1, 1921	Men	148,492	
	Women	18,753	
	Total	167,245	$12,572,533.84

From the above tabulation it will be noted that the number of employees of the reporting interests decreased 40,488, or 19.5 per cent, between the dates Oct. 1, 1920, and October 1, 1921. On Oct. 1, 1920, the number was 4514 or 2.2 per cent above normal, and on Oct. 1, 1921, the total was 35,974, or 17.7 per cent under normal. Wages figured on a semi-monthly basis decreased $5,262,086.54, or 29.5 per cent between Oct. 1, 1920, and Oct. 1, 1921. On July 1, 1921, the total number of wage earners was 27.4 per cent under normal and on Aug. 1, 1921, 23.1 per cent under normal.

High Water Closes Steel Plants

PITTSBURGH, Nov. 29.—The Wood works, McKeesport, Pa., of the American Sheet & Tin Plate Co. was obliged to suspend operations at midnight Nov. 28 owing to high water and at the National works of the National Tube Co., McKeesport, the inflow of water forced the suspension of its plate mills. The crest of the flood was reached here this afternoon about 3 o'clock and barring further rain the rivers are expected to subside sufficiently to enable the mills forced down to resume. None of the plants of Carnegie Steel Co. was affected but it is feared that the Mingo plant near Steubenville, Ohio, which recently started up, may be forced down temporarily by the flood condition. Not much steel works capacity is active in Wheeling and consequently the swelling of the rivers will have little effect upon operations.

Large Order for Pipe

YOUNGSTOWN, OHIO, Nov. 29.—The Youngstown Sheet & Tube Co. has secured a 250-mile 8-in. pipe line order from the Pure Oil Co. The order will engage the company's pipe mill capacity and additional skelp mills for about six weeks. It involves 17,000 tons.

Chicago

CHICAGO, Nov. 29.

Current buying is confined largely to immediate requirements, reflecting the desire of consumers to keep their stores down to a minimum as the time for taking inventory approaches. With new bookings generally light, orders for steel from car builders promise to prevent a curtailment of mill operations. Late reports indicate that the steel required for the refrigerator cars ordered by the Santa Fe amounting to 17,000 tons has been placed with a local producer. This tonnage, added to that ordered last week for the St. Paul cars makes a total of 30,000 tons placed within a fortnight. Rail orders for 1922 are also expected to be placed about the first of the year, as a number of Western roads are preparing to issue inquiries for their requirements.

The price situation shows little change, the only evidence of greater firmness to be noted being in sheets. Pig iron seems to have settled definitely to a $20 level, notwithstanding the appearance of more inquiry.

Mill operations are holding their own and pig iron production is increasing. The Illinois Steel Co. started the week with about 45 per cent of its ingot capacity active and the Inland Steel Co. is on about the same basis. The former company has added one more active furnace, a banked stack at Gary having resumed production. This producer now has 11 furnaces in blast, six at Gary, four at South Works and one at Joliet. This week the leading maker of merchant pig iron will start warming a furnace at Mayville with the probability that the first cast will be obtained about the middle of December. It expects to light a Federal stack in January.

Pig Iron.—With a Mayville furnace going in this week and a Federal stack scheduled to be put in in January, it is apparent that pig iron consumption has overtaken production. At the same time, prices are on a lower level than they have been for some time. On all except carload lots, which are still moving at $21 base local furnace, the market appears to range from $20 to $20.50 base. Some small tonnages for first quarter shipment have been placed at these prices and a number of inquiries for 1922 delivery are before the trade. A Wisconsin machinery maker wants 1000 tons of foundry for first half delivery and another melter in the same State is inquiring for 500 tons of foundry for shipment during the same period. The St. Paul Railroad is inquiring for 500 tons of malleable for prompt delivery. The Rundle Mfg. Co., Milwaukee, Wis., which has been inquiring for 1700 tons of Southern foundry for first quarter shipment, is expected to close this week. As low as $17.50, base Birmingham, has been quoted. Low phosphorus is now available at $38 delivered, or slightly under $33, Valley furnace. A recent sale of 500 tons of silvery indicates a drop of $2 in the market. All makers of charcoal are now quoting $28, base furnace.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b., furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50 to 21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00 to 21.00
Northern high phos	20.00 to 21.00
Southern foundry, sil. 1.75 to 2.25	24.17 to 24.67
Malleable, not over 2.25 sil	20.00 to 21.00
Basic	21.00
Low phos., Birmingham	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	33.00
Silvery, sil. 8 per cent	32.02

Ferroalloys.—A steel foundry is inquiring for 300 tons of 15 per cent ferrosilicon for shipment over the next three months. Spiegeleisen is now available at $30.50 to $32.50, delivered.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $30.50 to $32.50 delivered.

Railroad Equipment.—The Bettendorf Co. has bought 4000 axles at a reported price of slightly under 2c., base Pittsburgh. Few new car inquiries have appeared. The Great Northern is in the market for 500 gondola cars and 35 passenger cars, in addition to the 1000 box and 500 refrigerator cars noted in this column last week. The Chicago & Alton has let repairs on 150 gondola cars to the Streets Co., Chicago.

Bolts and Nuts.—Demand is light and discounts are still unsteady, although no weaker than they have been. There continues to be some railroad buying, confined largely to carload lots.

The Burlington and the Chicago & Northwestern are both in the market for a carload of machine and carriage bolts and lag screws. Some orders are being placed by car builders who recently received contracts for cars from the railroads. For mill prices, see finished iron and steel, f. o. b. Pittsburgh, page 1446.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ⅞ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to ⅞ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4.00 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—Fabricating awards are fewer and while several large projects are pending, construction activity appears to be declining as colder weather approaches. The Meridian Highway Bridge Co. will take bids this week on a highway and railroad bridge at Yankton. S. D., involving 3700 tons. Bids will also be taken this week on viaduct work for the Chicago Union Station, requiring 3600 tons, and on the J. L. Taylor Co. building, Chicago, calling for 1000 tons. Plain material prices range from 1.60c. to 1.75c., Chicago. Fabricating awards include:

Marquette University, Milwaukee, Dentistry Building, 115 tons, to Lakeside Bridge & Steel Co.

Evanston, Ill., Street Railway Co. trestle, 75 tons, to Milwaukee Structural Steel Co.

Pending business includes:

Eighth Street Bascule Bridge, Sheboygan, Wis., 650 tons, Wisconsin Bridge & Iron Co., low bidder.

Haskell & Barker Car Co., foundry and paint shop, Michigan City, Ind., 900 tons, bids in.

Elks' clubhouse, Milwaukee, estimated cost $1,000,000; structural and reinforcing bar tonnage details not yet worked out.

St. Louis Federal Reserve Bank, 2000 tons, figures to be asked soon.

The mill quotation on plain material ranges from 1.60c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Bars.—Demand for mild steel bars remains light and prices appear to be at the same level as a week ago. Activity in the reinforcing field is still subnormal, but a number of large projects calling for bar tonnage are in sight. A tuberculosis sanatorium for service men to be erected at the National Home for Disabled Volunteer Soldiers, Milwaukee, will require from 750 to 1000 tons. Bids will close Dec. 19 at the office of C. W. Wadsworth, general treasurer, Dayton, Ohio. The taking of bids on the Grant Park Stadium, Chicago, has been postponed until Dec. 12. This project will involve 2580 tons of bars and 160 tons of spirals. A million-dollar Elks' Club house in Milwaukee on which bids will probably be taken early next year, is expected to require a large tonnage of reinforcing steel. The general contract for bridges at Little Rock, Ark., requiring 1700 tons, was awarded to the Missouri Valley Bridge & Iron Co., instead of the Koss Construction Co., as reported last week. The steel was sublet in the East. The Corrugated Bar Co. will furnish 400 tons for a filtration plant, Grand Rapids, Mich., and 150 tons for the water department, St. Paul, Minn. New business in bar iron and rail carbon steel bars is light and the price situaton remains unchanged.

Mill prices are: Mild steel bars, 1.60c. to 1.75c., Chicago; common bar iron, 1.65c., Chicago; rail carbon, 1.65c., mill or Chicago.

Jobbers quote 2.68c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.28c.

Cast-Iron Pipe.—The approach of severe weather has tended to curtail demand for pipe. Only two new inquiries are reported. Hamtramck, Mich., will take bids today on 2600 ft. of 16-in. and specials and the Detroit Board of Fire Commissioners took figures yesterday on 70 tons, principally 6-in. Springfield, Ohio, which recently rejected bids on 900 tons, will take new figures on Dec. 5. Mt. Healthy, Ohio, awarded 70 tons to the United States Cast Iron Pipe & Foundry Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $47.10 to $48.10; 6-in. and above, $43.10 to $44.10; class A and gas pipe, $4 extra.

Rails and Tracks Supplies.—No new rail inquiries have made their appearance, but several are expected to be put out soon. The St. Louis Southwestern contemplates entering the market for 10,000 tons for 1922 requirements and the Kansas City Southern is also preparing to cover its needs. Spikes and bolts and tie plates are still weak, but the appended quotations still represent the ruling market.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.
Standard railroad spikes, 2.20c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Sheets.—Mills are holding firmly to 2.25c. base, Pittsburgh on blue annealed, 3c. on black and 4c. on galvanized. Although new business is lighter, no doubt because buyers are not yet convinced that the new quotations are stable, mill books are comfortably filled. The local independent is operating full and expects to continue at that rate throughout the remainder of the year.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.
Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Old Material.—With consumptive buying even smaller than heretofore, selling prices have generally weakened. Among recent purchases by users indicating the downward trend of the market may be mentioned 700 tons of No. 1 busheling bought at $9.50 per net ton delivered, 1500 tons of No. 1 wrought covered at $12 per net ton, and 400 tons of iron axles taken at $20.50 per net ton. Railroad offerings include the Burlington, 7400 tons; the Santa Fé, 3000 tons; the Baltimore & Ohio, 11,000 tons; the Lake Erie & Western, 400 tons, and the New York Central, a blind list.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton
Iron rails	$17.00 to $17.50
Relaying rails	25.00 to 30.00
Cast iron car wheels	16.50 to 17.00
Rolled or forged steel car wheels	14.50 to 15.00
Steel rails, rerolling	14.00 to 14.50
Steel rails, less than 3 ft	13.50 to 14.00
Heavy melting steel	12.00 to 12.50
Frogs, switches and guards cut apart	12.00 to 12.50
Shoveling steel	11.50 to 12.00
Low phos. heavy melting steel	15.00 to 15.50
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.50 to 9.00
Axle turnings	9.00 to 9.50
	Per Net Ton
Iron angles and splice bars	14.50 to 15.00
Steel angle bars	11.50 to 12.00
Iron arch bars and transoms	15.50 to 16.00
Iron car axles	20.00 to 20.50
Steel car axles	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	11.00 to 11.50
Pipes and flues	7.00 to 7.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	11.00 to 11.50
Steel knuckles and couplers	12.00 to 12.50
Coil springs	13.75 to 14.25
No. 1 machinery cast	13.00 to 13.50
No. 1 railroad cast	12.75 to 13.25
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	10.50 to 11.00
Machine shop turnings	4.00 to 4.50
Cast borings	6.25 to 6.75
Stove plate	12.50 to 13.00
Grate bars	11.50 to 12.00
Brake shoes	11.25 to 11.75
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.50 to 13.00

Plates.—A local fabricator is asking for protection on from 15,000 to 20,000 tons of plates for storage tanks wanted by the Humphrey and Humble Oil companies in the Mexia fields. No additional orders for steel to apply against railroad car contracts are reported, although a large tonnage is pending. The price situation shows little change. On attractive business, 1.60c., Chicago, is being done, while smaller orders are being booked at from $2 to $3 higher.

The ruling mill quotations range from 1.60c. to 1.75c. Chicago. Jobbers quote 2.78c. for plates out of stock.

Wire Products.—Demand is diminishing as the close of the year approaches and prices are not so firm as they were. For mill prices, see finished iron and steel, f. o. b. Pittsburgh, page 1446.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.65 per 100 lb.; ; cement coated nails, $3.05 per keg.

Warehouse Prices.—The recent advance on black annealed and bright basic wire has been withdrawn and the former quotations of $3.48 and $3.63 respectively have been reinstated.

New York

NEW YORK, Nov. 29.

Pig Iron.—More activity developed in the past week than was expected and sales included 700 tons to a Connecticut buyer, 400 tons to the New York Central Railroad, 1000 tons to a boiler company at Elizabeth, N. J., 900 tons for a heating equipment manufacturer, 850 tons for a railroad appliance company, and numerous small lots. All of this iron is for delivery this year except that a part of the boiler company's tonnage may be delivered in January. Little information was disclosed as to prices, but the usual quotation on No. 2 plain eastern Pennsylvania is $20 to $21, and on Buffalo iron from $19 to $20. The principal inquiry now in the market is for 1200 tons for the first quarter for the Pennsylvania Railroad for delivery at Altoona. Some foundries are increasing their melt and the jobbing foundry of Taylor & Co., Brooklyn, is again on a 6-day schedule with full force.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.52 to $25.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52 to 24.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	22.52 to 23.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.56
No. 2 Virginia, sil. 1.75 to 2.25	29.16

Ferroalloys.—There is almost no demand for ferromanganese, although the leading steel producer is reported to have sold 100 tons recently at $60, Pittsburgh. A rumor that British prices were to be advanced has not been confirmed. Imports in October were heavier than in some months at 1943 tons. No inquiry or sales of spiegeleisen are reported, nor is there any sign of interest in the manganese ore market. Imports of the ore in October were high at 36,760 tons, which compares with an import rate of 14,823 tons per month in the third quarter. Prices for 50 per cent ferrosilicon are again fairly firm at $60, delivered, but very little demand is reported. Quotations are as follows:

	Ferroalloys
Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton.	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton..	$60.00
Ferrotungsten, per lb. of contained metal.	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered.	10c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00
	Ores
Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.50 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	50c. to 60c.

Warehouse Business.—Prices are generally unchanged in this district, but blue annealed sheets at 3.53c. per lb. are rather weak, caused by the present mill quotations as low as 2.25c. per lb. No change in the situation is expected before the middle of January. Further approach to anything like the pre-war differential between mill and warehouse prices is deemed impossible under present high costs of handling material. Delivery free in the Metropolitan district seldom is quoted, no charge being made in many instances for trucking less than a load from Brooklyn to Yonkers, Jersey warehouses to Coney Island, or Flushing or Jersey points. This, added to higher wages to drivers and employees in the warehouse, makes the present $12 and $13 differential less profitable than the pre-war $8 to $10 spread. Wrought iron and steel pipe warehouses report business extremely dull. Dealers in brass and copper continue to report fair activity. We quote prices on page 1458.

High-Speed Steel.—Buying in this field continues at a minimum. Producers continue to quote 90c. per lb. for 18 per cent tungsten high-speed steel, which is the market, although sales have been made lower, where some producer found himself carrying an overstock and a large quantity was involved.

Finished Iron and Steel—Buyers seem to be waiting for the new year. Their buying at present is confined to very small lots with the object of carrying as little material as possible in year-end inventories. In common with the slowness in other lines, structural steel lettings and inquiries show a decline, but this is believed to be due partly to the imminence of a new scale of wages in the building trades, present contracts with the workers expiring Jan. 1. The largest job of the week is for new subway construction in Forty-second Street, the general contract for which has been let to the Powers-Kennedy Corporation. The steel, amounting to about 3100 tons, will be fabricated by the American Bridge Co. Bids have gone in on a highway bridge at Annapolis, Md., which will require 700 tons of shapes and a larger tonnage of steel bars. Bids will be opened Dec. 19 on the caissons for the Philadelphia-Camden bridge, this work requiring 1500 tons. A building for the Young Men's and Young Women's Hebrew Association of Newark calls for 900 tons. The Sinclair Consolidated Oil Corporation has inquired for tanks involving 10,000 tons of plates. The same company has increased its inquiry for steel pipe, referred to last week, requiring 20,000 instead of 14,000 tons. The Texas Co. is inquiring for 600 tons of oil pipe. Another oil company recently inquiring for 1200 tons of plates has closed for 2400 tons. Much of the present larger activity in the market, which is confined mostly to inquiries, is due to plans of the railroads and oil companies for development. In the railroad field the inquiries for new cars continue at a fair rate. Close to 12,000 cars are now pending, this including the formal inquiry of the Burlington, just issued, calling for bids on 3000 composite gondolas, 2500 steel frame box cars and 1300 refrigerator cars, a total of 6800. The Great Northern has come into the market for 1000 box cars, 500 all-steel gondolas and 500 refrigerator cars. The Illinois Central's inquiry for 2500 gondolas is still pending. The Pere Marquette is inquiring for 500 to 2000 box cars. The Lehigh Valley road has asked bids on the repair of 500 hopper and gondola cars. Although the inquiry is not yet out, it is expected that the Union Pacific will inquire shortly for 6000 cars, mostly of the refrigerator type. The Pennsylvania is also expected to inquire for a large number of new cars. The Baltimore & Ohio has divided 1000 cars between two companies, though little new steel will be required. Bids for 100,000 to 200,000 heavy rails for the New York Central's 1922 requirements were opened last Friday. Bidders were the Carnegie, Illinois, Bethlehem, Lackawanna, Cambria and Inland steel companies. The last-named company is now installing equipment for rolling rails. Bids were uniform at $40 for open-hearth first quality and $38 for the usual 5 per cent second quality rails. There were also bids on about 5000 to 10,000 tons of angle bars. The low bid was 2.40c., mill, put in by the Inland Steel Co. The Cambria Steel Co. bid 2.55c., mill, on both Bessemer and open hearth. Other bids were uniform at 2.55c. for Bessemer and 2.60c. for open hearth, although all companies did not bid on Bessemer steel.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.80c. to 1.88c.; plates, 1.88c. to 2.03c.; structural shapes, 1.88c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Cast-Iron Pipe.—Inquiries for large tonnages for delivery for next year are coming into the market with satisfactory volume. Some specify delivery during the winter months, whereas others ask for spring delivery. Inquiries from abroad persist, but the unfavorable exchange prevents business. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—Headed by heavy melting steel, which dropped 50c. during the week, all other principal items have receded in price accordingly. The drop in steel was precipitated when an Eastern Steel company reduced its offering price by 50c. The drop of the market is expected, since this is a dull period of the year. There is a scarcity of No. 1 machinery cast. Light iron has become a drug on the market and most dealers are having it removed from yards as rubbish. Accordingly, we are dropping it from our quotations. A New York broker warns the buying staff of his firm: "Market shows further signs of weakness. Make all contracts call for shipment within two weeks."

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.50 to	$8.00
Steel rails, short lengths, or equivalent	9.00 to	9.50
Rerolling rails	10.00 to	11.00
Relaying rails, nominal	30.00 to	35.00
Steel car axles	12.00 to	12.50
Iron car axles	20.00 to	21.00
No. 1 railroad wrought	12.00 to	12.50
Wrought iron track	9.00 to	9.50
Forge fire	5.00 to	5.50
No. 1 yard wrought, long	9.00 to	9.50
Cast borings (clean)	6.50 to	7.00
Machine-shop turnings	4.50 to	5.00
Mixed borings and turnings	4.50 to	5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.25 to	8.75
Stove plate	10.00 to	10.50
Locomotive grate bars	10.00 to	10.50
Malleable cast (railroad)	8.50 to	9.00
Car wheels	11.00 to	11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to	$18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	16.00 to	17.00
No. 1 heavy cast, not cupola size	16.00 to	16.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to	10.50

Buffalo

BUFFALO, Nov. 29.

Pig Iron.—Nine furnaces out of a complement of 22 are now in blast and five of the nine are on foundry iron. Sales of about 6000 tons represent the combined activities of all factors. It is generally assumed that foundry operation is about 25 per cent of normal; improvement is not expected until 1922 is well under way. One furnace announces it has taken a firm stand for $20 base price and that sales in of 2000 tons, one lot of 800 tons and one of 500 tons represent the largest individual purchases; the rest of the business consisted of carload lots. A radiator interest is expected to come into the market within a few days for a substantial tonnage. The largest inquiry now in hand is for 1000 tons for a New England purchaser. The total tonnage inquired for with one furnace is about 4500 tons.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$20.00
No. 2X foundry, 2.25 to 2.75 sil	19.50
No. 2 plain, 1.75 to 2.25 sil	19.00
Basic	21.00
Malleable	21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—Car business, both repair work and new stock, has brought out better orders for plates. Bar orders are more lively than in recent

weeks and a number of small tonnages in shapes have appeared. The Federal Ice Co., Buffalo, will erect a building involving 300 tons of shapes. The structural requirements for the additions to the National Biscuit Co. plant requiring 2000 tons of shapes have been placed with the Lackawanna Bridge Co. Tin plate is dull locally because of the season's close, but elsewhere it is understood demand has been strong; can manufacturers are apparently satisfied that prices are lowest obtainable for some time. A bid of $40 per ton on rails on which the New York Central Railroad asked prices was made by a local rail interest, but no award is expected within ten days or two weeks. Effective Nov. 21, price on sheets as announced by a sheet mill are: No. 10 gage blue annealed, $2.25; No. 28 gage black, $3, on cars Pittsburgh.

Warehouse Business.—Little of moment has occurred and business is about on the plane it has been on since September. One interest which carries a line of machine tools finds increased inquiry and the sale of a battery of nail-making machinery is recorded. Structural shapes have been in fair demand because of seasonal advantages.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.80c.; plates, 2.80c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.70c.; hoops and bands, 3.30c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.80c.

Coke.—Inquiry is lifeless and sales are for small lots only. Prices have not changed.

Old Material.—Stronger demand for heavy melting steel and turnings and borings is apparent, but very little steel is available, and there is little production in the latter materials. The $13.50 price on steel holds firm. None of the dealers has a great amount of steel to offer.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

Birmingham

BIRMINGHAM, ALA., Nov. 29.

Pig Iron.—Birmingham iron settled to an $18 base before the close of the month with no pretense of a higher one. One furnace maker sent out circular letters to the trade about Nov. 22 making an open offering of the product at $18 and brokers made the same offering for the same interest. Sales by brokers would make the net price under $18. The volume of business has been small, a 200-ton lot for an adjoining State being the principal transaction. The usual order has been for car lots for rush shipment. One maker's week's bookings were 250 tons and those of another were 500 tons. There is no inquiry for 1922. Interest in the market has reached a new low level. On the other hand, the outgo has been satisfactory. One active interest on Nov. 24 showed shipment of make to date and the movement of the greater part of very small stock accumulations. The largest active maker has also moved its make. This indicates that the iron ordered has been needed and that there has been a dearth of anticipation of needs. Operators seem reconciled to a state of inactivity until after the holidays and hope for the arrival of the time when the strong position of stocks will exert its influence, as it would if any kind of real buying movement were to ensue. Radiator plants remain at 100 per cent, but, with the exception of stove works and pipe shops, Southern melt is not increasing.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$18.00
Basic	17.00
Charcoal, warm blast	35.00

Finishing Mills.—The Tennessee company was on the same scale this as last week, one of 55 per cent with the rail mill at 6,000 tons capacity. The Conners Steel Co. is operating one of its hoop and band mills at Woodlawn, but the Calera mill remains down. This business has been jerky for several months. Sheets and steel pipe are fairly active. The Gulf States Steel Co. is making new high records of daily production in wire and rod mills. Wire drawing mill operations of the district remain at 70 to 75 per cent with demand easing off except as to nails.

Cast Iron Pipe.—Sanitary pipe shops continue at 75 to 80 per cent of production on old orders. New business is not coming in. Brokers will not talk 1922 business. September and October were unusually good. High pressure pipe plants are also fairly active on past business, but very little came to the front last week. Base of sanitary remains at $40 and of high pressure at $34.

Coal and Coke.—Coke has eased up and prices rule from $5.50 to $6 for beehive and by-product with $8 for the new pitch coke being made by the Barrett Co., in beehive ovens from residue pitch on their Tarvia factory yards. The pitch is 98 per cent carbon and has stood tests.

Old Material.—The scrap market is as dull as pig iron. Prices are nominal, because there is a dearth of trading.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

St. Louis

ST. LOUIS, Nov. 29.

Pig Iron.—The continued talk of lower freight rates is holding back buying of pig iron. Melters are not overloaded with orders, and they are just buying sparingly, so that they may be able to enjoy any reduction that might be made in freight rates. Northern iron is being sold on the basis of $20 and $21, Chicago. The market for Southern iron is at $18, Birmingham, with some offers at $17.50. Sales during the week included 300 tons of foundry iron to a Western car wheel maker and 100 tons to an Indiana implement manufacturer, with the usual run of carload orders. An Illinois car wheel maker is in the market for 1300 tons of foundry iron. Seven reporting stove foundry interests in the Eighth Federal District show October sales 4 to 10 per cent under those in September and 10 to 25 per cent under the corresponding month in 1920.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$22.88 to $23.88
Northern malleable, sil. 1.75 to 2.25	22.88 to 23.88
Basic	22.88 to 23.88
Southern foundry, sil. 1.75 to 2.25	23.91

Finished Iron and Steel.—The biggest order for rails placed here for some time was the Cotton Belt's requirements of 10,000 tons of 85-lb. rails, which went to the Illinois Steel Co., a subsidiary of the United States Steel Corporation. These are that road's 1922 requirements, and first deliveries will be made in early spring. No new requisitions were issued by railroads during the week. The buying of tanks for Southern oil fields continues. The Humphrey-Mexia Co., which is headed by Col. A. E. Humphrey, who discovered the Mexia (Tex.) oil fields, has placed orders for 55 steel tanks each of 55,000 barrel capacity, divided among the following: Warren City Tank & Boiler Co., Warren, Ohio; Petroleum Iron Works, Sharon, Pa.; Graver Corporation, Chicago; Riter-Conley Co., Pittsburgh, and Stacey Bros. Gas & Construction Co., Cincinnati. The demand for structural steel has ceased pending the result of the conference between the Building Trades Council and the master builders. The Hotel Jefferson

additon, involving 1400 tons of structural shapes and bars, is still in the hands of the engineers.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The coke market is very quiet, consumers holding off in their buying in anticipation of an early advance in freight rates. A western Missouri melter placed an order for 1,000 tons of foundry coke for delivery during the balance of this year and first quarter of 1922.

Old Material.—The market continues weak and prices are softening all down the line. Consumers still decline to purchase at prevailing prices, contending they are at present only interested in reducing their inventory of raw materials. Hence dealers have been forced to unload some of their stocks at concessions only two railroads offering this week: Burlington, 7000 tons, and an open list by the New York Central and Big Four.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$15.50 to $16.00
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft.	13.00 to 13.50
Relaying rails, standard section	25.00 to 30.00
Cast iron car wheels	15.00 to 15.50
No. 1 heavy railroad melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	10.50 to 11.00
Ordinary shoveling steel	10.00 to 10.50
Frogs, switches and guards cut apart	11.00 to 11.50
Ordinary bundle sheet	4.00 to 4.50
Per Net Ton	
Heavy axles and tire turnings	6.50 to 7.00
Iron angle bars	13.00 to 13.50
Steel angle bars	10.00 to 10.50
Iron car axles	20.00 to 21.00
Steel car axles	14.00 to 14.50
Wrought iron arch bars and transoms	15.00 to 15.50
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	9.50 to 10.00
Railroad springs	11.50 to 12.00
Steel couplers and knuckles	11.50 to 12.00
Locomotive tires 42 lb. and over, smooth inside	9.50 to 10.00
No. 1 dealers' forge	9.00 to 9.50
Cast iron borings	6.50 to 7.00
No. 1 busheling	10.00 to 10.50
No. 1 boilers cut in sheets and rings	8.00 to 8.50
No. 1 railroad cast	14.50 to 15.00
Stove plate and light cast	12.50 to 13.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.50 to 10.00
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	6.50 to 7.00
Light railroad sheet	4.50 to 5.00
Railroad grate bars	10.00 to 10.50
Machine shop turnings	6.00 to 6.50
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	8.50 to 9.00
Horse shoes	11.00 to 11.50
Railroad brake shoes	9.50 to 10.00

Cleveland

CLEVELAND, Nov. 29.

Iron Ore Carrying and Dock Rates.—The railroads have declined to make, at the present time, the 28 per cent reduction in charges for handling ore at lower lake ports as asked for by ore shipping and consumer interests which held that these charges should be reduced in the same proportion as the ore carrying rates. Had this reduction been made, it would have restored the ore handling charges that prevailed before the 40 per cent advance in September, 1920. The matter was recently taken up with the ore, coke and coal committee of the railroads which had approved the reduction and it was expected that the railroads would order it placed in effect. The railroad executives decided to postpone any action on the dock handling rates until March, when they will again take under consideration the ore carrying charges from Lake Erie ports to interior furnaces. While the action of the railroads in extending the present reduced ore carrying rates from Dec. 31 to March 31 meets the approval of shippers and consumers, its effect on operating costs will be very slight. Although the extension of the lower rates until April 1 will give consumers an opportunity to move off the docks at the lower carrying charges all the ore they will need before the opening of navigation, most consumers would have been able to do this even if present carrying rates had not been extended beyond Jan. 1. Consumers have been taking some dock ore in anticipation of the possible restoration of the higher carrying rates on Jan. 1 and shippers expect that the only noticeable effect of the extension of the present rates to April will be the withholding of shipping orders during December until some time prior to April 1. Some dock shipments scheduled for December have already been cut off.

We quote delivered lower lake ports; Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Mining Operations.—Many of the mining companies will resume the operation of their underground mines this winter providing the miners indicate a desire to return to their work at a wage reduction. Several mines have resumed operations in the Menominee range at an established scale of $2.10 for common labor for a 9 hr. day. Two mines in the Gogebic range have resumed operations at part time at the old scale of $3.05 for a 10 hr. day for common labor.

Iron Ore Shipments.—The ore shipping season closed Monday with the dispatch of the last cargoes from Ashland. The November movement was 406,451 gross tons and the total for the season was 22,300,726 tons. A tabulation of shipments by ports will be found in another column.

Pig Iron.—The past week has been about the quietest of the present year in the pig iron market. The only inquiry of any size was for 4000 tons of basic iron from a Portsmouth, Ohio, consumer. On this inquiry a lake furnace quoted $19, but it was reported that the business would be placed with a southern Ohio producer at about $19.50, as the lake furnace has a freight disadvantage of about $2 a ton. Sales of foundry iron during the week were very light, the largest order being for 100 tons. One seller booked only 700 tons in small lots and others sold smaller amounts. A carlot sale of low phosphorus iron was made at $34. There is virtually no change in the price situation. The market is weak with $20 as the usual quotation by lake furnaces for foundry iron, with local furnaces holding at $20.50 for Cleveland delivery. However, a local producer is still quoting a $20 Valley base for shipment from Cleveland which, in the case of some quotations made during the week, meant a price lower than $20 at furnace. November shipments on the whole fell considerably below October. While some makers have shipped about as much iron this month as in the previous month, shipments of others fell off to 50 per cent or more as compared with shipments during October when the buying was stimulated by purchases in anticipation of early requirements because of the threatened railroad strike. Consequently, a few foundries which had been buying from month to month, purchased no iron in November, but are expected to come in the market in December.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.00 to 21.00
Southern fdy., sil. 2.25 to 2.75	25.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	34.00 to 35.00

Finished Iron and Steel.—The leading interest reports a marked increase during the week in the number of orders for small lots of steel. However, with most of the independent mills the volume of business continues light. Several of the selling agencies booked a little more business in this territory during November than during October. The past week has shown an improvement in the demand from steam shovel manufacturers, who report an improvement in sales and a little more activity on the part of some other consumers. The Brown Hoisting Machinery Co. has taken an ore-handling bridge for the Wisconsin Steel Co. requiring 500 tons of steel, and the Cambria Steel Co. is negotiating for an ore bridge. Considerable demand is still appearing for steel for car and locomotive repair work. Repair work for the Wheeling & Lake Erie Railroad will require 800 tons of steel. The demand from the Western oil field for oil and tank work continues active, but with the present condition of the market tank shops are bidding on work without first getting protection on

steel prices. Some orders are being placed for steel for January shipment by consumers who wish to delay deliveries in order to avoid placing the material in their inventories. The price situation shows no change. Mills are apparently generally holding to a minimum price of 1.50c. on steel bars, plates and structural material for desirable orders, but a 1.60c. price appears to be the more common quotation for the small lots that are being sold. Local mills are quoting plates at 1.75c. Hard-rolled strip steel is weak, being quoted as low as 2c., at which some business has been taken for January shipment. Hard steel reinforced bars are inactive with 1.50c. as the usual quotation for a sizable order. In structural lines no new inquiries have come out. The only contract reported is for 150 tons for two buildings for the American Car & Foundry Co. taken by the Austin Co., Cleveland.

Jobbers quote steel bars, 2.54c.; plates and structural shapes, 2.64c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.14c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—The Ford Motor Co. has placed 700 tons of blue annealed sheets with a Youngstown district mill for December requirements. This purchase was larger than expected in view of the report that the Ford company will shut down its plant about Dec. 15 for inventory. With the price announcement of the American Sheet & Tin Plate Co. naming 3c. for black, 4c. for galvanized, and 2.25c. for blue annealed sheets for the first quarter, the regular quotations of the leading producers and independent mills are now uniform. While most mills are adhering to these prices, there is evidence that the 2.75c. price on black sheets has not disappeared.

Warehouse Business.—New demand is light. With the naming of new sheet prices by the leading interest the Carnegie Steel Co. has reduced its warehouse price on blue annealed sheets to 3.14c., this being based on a 2.25c. mill price, but this price is slightly higher than has been quoted for some time by the other warehouses.

Bolts and Nuts.—The demand for bolts and nuts is rather slow and limited to small lots. Makers look for little improvement until after inventory time. The demand for rivets which recently showed a little revival has fallen off. Rivet prices continue weak.

Old Material.—The market continues dull and prices are weaker. Heavy melting steel, compressed steel and some other grades have declined about 50c. a ton. There is virtually no buying by mills in any of the Ohio districts. In addition to the absence of a demand from consumers, two Ohio mills, during the week, ordered shipments suspended, one cutting off shipments of heavy melting steel and the other of turnings. A Cleveland mill during the week purchased a small tonnage of machine shop turnings at $7.50. A Buffalo mill is credited with a purchase of 13,000 tons of heavy melting steel scrap from a Buffalo dealer who is closing out his yard stock. With the recent decline in prices, some of the local dealers seem inclined to again buy scrap for yard stocks.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$11.00 to $11.50
Steel rails, under 3 ft	12.25 to 12.50
Steel rails, rerolling	13.50 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	8.00 to 8.50
Machine shop turnings	6.75 to 7.25
Mixed borings and short turnings	8.00 to 8.50
Compressed steel	9.00 to 9.25
Railroad wrought	12.00 to 12.50
Railroad malleable	11.75 to 12.00
Light bundled sheet stampings	6.00 to 7.00
Steel axle turnings	9.00 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in	7.50 to 8.00
Drop forge flashings, under 10 in	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

The Board of Awards, office of the City Register, City Hall, Baltimore, will take bids until 11 a. m., Dec. 7, for a quantity of cast iron pipe, pipe fittings and special castings for the water department, William A. Megraw, water engineer. Recent bids received were rejected. The material is estimated to cost close to $250,000.

Boston

BOSTON, Nov. 29.

Pig Iron.—The market on eastern Pennsylvania iron is steadier. Offerings at $20 furnace base are fewer, resale iron has again disappeared, more furnaces are holding to full 50c. differentials on lower silicons and $1 on the higher. On large tonnages, $19 base Buffalo furnace can be done, but most business is at $19.50 or slightly less. Few furnaces or consumers are interested in 1922 supplies as yet. Two furnaces this week endeavored without success to close with a Massachusetts foundry, which previously signified its willingness to purchase 5000 to 6000 tons low silicon iron for first half delivery. This and other melters are expected to come into the market during December. Two new small inquiries developed this week, one for 250 tons and the other 150 tons to be purchased in December. Business prospects otherwise are confined to car lots, mostly for No. 2X and No. 1X, but including malleable and charcoal. Of the Rhode Island inquiry for 450 tons, silicon 2.25 to 2.75, noted last week, 350 tons has been taken at prices above the lowest quoted. A sale of 100 tons of Buffalo iron, silicon 1.75 to 2.25, is noted this week, the first reported in some time. The average foundry, based on operating schedules, finds it more profitable to use machinery cast than No. 2 plain pig, as the spread between the delivered prices of the two materials amounts to several dollars per ton in favor of scrap.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75	$24.56 to $25.56
East. Penn., silicon 1.75 to 2.25	24.06 to 25.06
Buffalo, silicon 2.25 to 2.75	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25	24.46 to 25.46
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Coke.—Additional contracts for first half, 1922, by-product foundry coke have been placed the past week by New England melters at the price ruling at date of shipment. Such business, however, as well as releases on 1921 contracts, involves comparatively small tonnages, the movement from ovens showing little appreciable increase, with no prospect of becoming better the rest of the year. Fuel producers say they will be doing well to maintain shipments during December on the present basis. Both the New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., continue to quote foundry coke on a basis of $10.66 delivered where the local freight does not exceed $3.40. Railroads have notified oven interests they are willing to establish a through rate on coke from Boston to Montreal of $4.90, as against $6.30, the present rate. The conceded rate is not as low as desired by the coke makers and places them at a disadvantage when competing with Detroit shippers for Montreal business. The New England coke makers nevertheless will ask the carriers to put the new rate into effect at once. With the new rate Detroit shippers will have a freight rate advantage of 60c. a ton.

Old Material.—The undertone of the old material market is unmistakably easier, yet prices show little change due to lack of business since last reports. Dealers admit, however, new business can only be closed at concessions from prices obtained last week, and a downward revision in quotations can be expected on any market activity. In only two instances can prices be actually quoted lower this week, namely, forged scrap at $4.50 to $5, and cotton ties at $5. These materials are all of 50c. lower, on the withdrawal of buyers from the market. A Coatesville, Pa., mill apparently is the only consumer of forged scrap interested just now. In contrast, wrought scrap is active and strong on buying by makers of horseshoes. The Grand Trunk Railroad has sold 1000 tons rerolling rails to a Portland, Me., dealer, at approximately $12, f.o.b. Portland. Massachusetts foundry interests bought 500 tons of textile cast at 80c. per 100 lb. delivered. Other small sales to New England melters, mostly No. 1 machinery cast at about $19 delivered, are noted, but

the market generally is very quiet. There is an inquiry for a small tonnage of broken steam railroad wheels in the market.

The following are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.00 to $19.00
No. 2 machinery cast	16.00 to 17.00
Stove plate	15.50 to 16.00
Railroad malleable	13.50 to 14.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to $8.25
No. 1 railroad wrought	13.00 to 13.50
No. 1 yard wrought	10.50 to 11.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	4.00 to 4.50
Cast iron borings, rolling mill	5.50 to 6.25
Cast iron borings, chemical	6.50 to 6.75
Blast furnace borings and turnings	3.50 to 4.00
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	11.50 to 12.00
Car wheels	11.00 to 12.00
Rerolling rails	10.50 to 11.00

Cincinnati

CINCINNATI, Nov. 29.

Pig Iron.—An inquiry for 4000 tons of basic from an Ohio River steel plant featured the market during the week. The iron is wanted for December shipment, but has not yet been purchased, as it is reported that the company is considering lighting its own furnace. An Illinois car manufacturing plant is inquiring for 1000 tons of high silicon malleable iron for first quarter and two inquiries for foundry iron for the same delivery from Indiana melters, aggregating 500 tons, are before the trade. With these exceptions, inquiry is confined almost exclusively to one and two carloads. As regards sales, the week was quiet. A Dayton melter took two cars of Southern iron at $18, base, and a Columbus melter two cars of Northern at $20, lake furnace. An Ohio steel plant which recently purchased some basic iron is understood to have added a considerable tonnage to the original order, making its total purchases in the neighborhood of 10,000 tons. Prices in the North are reported firm at $20, furnace, in all districts, while in the South occasional reports are heard of $17.50 being quoted. In this territory, sales of Southern iron are being made at $18, base, but it is considered probable that an attractive tonnage could be placed under this figure.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$22.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	23.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	$22.52 to 23.52
Basic, Northern	22.02
Malleable	23.52

Finished Material.—A number of inquiries for concrete reinforcing bars appeared during the week, the largest being for 500 tons for shipment during the first quarter. Another inquiry for 400 tons is pending and one of 200 tons for a building which will soon be erected in Cincinnati is expected to be closed shortly. It is reported that 200 tons of reinforcing bars for the Central Y. M. C. A. building at Columbus, Ohio, has been taken by an independent mill at a price of approximately 1.62½c., delivered. Some wire and nail business was placed during the week, including one order for 100 tons of nails at $2.90 per keg, Pittsburgh. There is little activity in sheets, although the American Sheet & Tin Plate Co. has opened its books for first quarter at 2.25c., 3c. and 4c. for blue annealed, black and galvanized respectively. The price of tin plate is holding firmly, one indication of this being an offer made by a manufacturer in nearby territory to place a large order at $4.50 per base box, which up to date has found no takers. The market on bars, shapes and plates is rather quiet, although an independent company booked 100 tons of tank plates at 1.60c., Pittsburgh. The steel for the tanks, recently let to the Warren City Boiler & Tank Works, for nine tanks for the Pure Oil Co., is understood to have gone to one of the larger independent mills. There is very little activity in the structural field. A blast furnace for the Hamilton Furnace Co. at Hamilton, Ohio, is up for estimates, and bids will be closed to-day for the Elks' Temple, which will take about 300 tons. Plant operations in this district will not materially change. The American Rolling Mill Co. will operate its East Side plant full time during the week and the Whitaker-Gleasner Co. at Portsmouth, Ohio, will continue at about 40 per cent. The Ashland Iron & Mining Co., Ashland, Ky., is operating at 50 per cent of capacity and expects to continue for the remainder of the year. The plants of the Andrews Steel Co. and the Newport Rolling Mill Co. are still idle, as no settlement has yet been made regarding working conditions and wages to be paid.

Warehouse Business.—Local jobbers report a slowing up in business during the past week, due, no doubt, to the Thanksgiving holiday, as many plants were closed from Wednesday till Monday. There have been no further price changes and it is not expected that any will develop before the first of the year.

Iron and steel bars, 2.90c. base; hoops and bands, 3.50c. base; shapes and plates, 3c. base; reinforcing bars, 2.97½c. base; cold rolled rounds, 1½- in. and larger, 3.70c.; under 1½-in. and flats, squares and hexagons, 4.20c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3 per 100 lb.

Coke.—The coke market is exceedingly dull, so much so that a number of West Virginia operators are considering closing down their ovens on Dec. 1. There have been no market changes in prices, although foundry coke from the Wise County district is off 25c. a ton as compared with a week ago. Connellsville and New River prices are unchanged.

Old Material.—Local dealers report the scrap market as practically at a standstill. There have been no sales of consequence, and consumers are holding up shipments on contracts. This condition is also noticeable from other districts. Dealers report a scarcity of iron rails and axles. Some quotations have been reduced, but in the absence of sales, prices are practically the same as a week ago.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	$4.00 to $4.50
Iron rails	12.50 to 13.00
Relaying rails, 50 lb. and up	25.50 to 26.50
Rerolling steel rails	11.00 to 12.00
Heavy melting steel	9.50 to 10.00
Steel rails for melting	9.50 to 10.00
Car wheels	12.50 to 13.50
Per Net Ton	
No. 1 railroad wrought	9.00 to 10.00
Cast borings	3.50 to 4.00
Steel turnings	2.50 to 3.00
Railroad cast	12.50 to 13.00
No. 1 machinery	14.00 to 15.00
Burnt scrap	8.00 to 9.00
Iron axles	16.00 to 17.00
Locomotive tires (smooth inside)	10.00 to 10.50
Pipes and flues	4.50 to 5.00

San Francisco

SAN FRANCISCO, Nov. 23.

Pig Iron.—The Coast market continues quiet, as far as actual sales are concerned. Foundries and manufacturers are taking for their immediate requirements, for the most part, which at present are nothing more than of a routine nature. During the past week or ten days one large handler reported having sold approximately 500 tons, but none in any considerable quantity. The price was in the neighborhood of $27.50, ex ship. Foreign material is quite freely offered, in some cases around $25 to $26. Under prevailing conditions, however, interest is small.

Cast-Iron Pipe.—An improvement in private business is reported by the larger interests, chiefly in northern California, but municipal work remains light. The city of Sacramento closes bids on Dec. 1 for 42 tons of 6-in. pipe. Pasadena has received bids for 330 tons of 4-6-8-in. pipe, 100 tons of 12-in. and 12 tons of fittings. Alhambra was in the market for 45 tons of 4-6 and 12-in. pipe. The market price is about steady at $33, base.

Finished Iron and Steel.—A gradual broadening of interest in steel products, covering a wider range of materials, appears to be the most encouraging feature of this market, which is rather quiet and unsettled at the moment. There have been sporadic inquiries from the mines, cement mills, tool shops and oil well supply companies, which are considered as indicative of this broadening interest. Heretofore plates, bars, sheets

and tin plate have offered the major interest, and it is notable that demand for these lines is light at present, particularly in the case of reinforcing bars, indicating the still prevalent tendency for builders to refrain from new construction work on a large scale. The principal inquiries during the fortnight seem to be one for about 10,000 lb. of forged steel balls and a smaller quantity of cast iron balls from a large Coast cement company; 80,000 lb. of 6-in. squares for drill stems from the Union Tool Co., and an inquiry from a Southern street railway for special work. A better demand is also reported for alloy steels. Plates and sheets continue in a very much unsettled condition and 3.75c. appears to be the highest basis at which galvanized sheets will move, but even at this figure business is light. The question of a reduced freight rate and the lateness of the season are considerations tending to limit buying. There is a rumor current of an inquiry for about 5000 tons of plates from Honolulu coming up soon.

Coke.—The Southern Pacific Co. has just closed for 600 tons of domestic coke at what is described as an exceptionally low price. Foreign coke continues to offer in good quantity, and in the past two weeks about 2000 tons have been distributed among the foundry trade. This English material brought around $20, ex ship, San Francisco. Local smelters are still bringing in coke for their own use. While business cannot be called active, there is, however, a better demand for coke at this time, especially from the sanitary manufacturing trade.

Old Material.—A steady business is being done in scrap, especially cast iron material, several moderate-sized sales of which were reported at the prevailing price of about $20, even slightly higher, in one case. It is estimated that approximately 2000 tons of scrap is moving weekly at the present time. Heavy melting steel is rather less in demand at the $10 level.

Lake Superior Ore Shipments

CLEVELAND, Nov. 29.—The iron ore movement by water from the Lake Superior district for the present season, which closed Monday, was 22,300,726 gross tons, the smallest movement since 1904, when shipments by water were 21,226,591 tons. The 1921 movement shows a decrease of 61.89 per cent, or 36,226,500 tons from last year, when water shipments amounted to 58,527,226 tons. The high record was in 1916, when the shipments by water amounted to 64,734,198 tons.

The following table gives the season's shipments by ports and the corresponding figures for 1920 in gross tons:

	Season 1921	Season 1920
Escanaba	1,806,656	7,361,070
Marquette	786,946	3,415,108
Ashland	2,264,705	8,180,852
Superior	4,991,278	14,812,398
Duluth	9,164,803	15,479,334
Two Harbors	3,286,338	9,278,464
Total	22,300,726	58,527,226
1921 loss	36,226,500	.....

December meetings of the Chicago section, and of the Philadelphia section, of the Association of Iron and Steel Electrical Engineers are announced. In Chicago, Dec. 16, W. S. Hall, in a joint meeting with the Western Society of Engineers, will discuss "Electricity in Steel Mills." In Philadelphia, Dec. 20, in a joint meeting with the Engineers' Club and the American Society of Mechanical Engineers, D. M. Petty, electrical superintendent Lehigh plant, Bethlehem Steel Co., Bethlehem, Pa., will talk on "Yard Electrification of Industrial Plant Railways."

The Milwaukee Rolling Mill Co., Milwaukee, which started production in its new sheet mills on April 19, 1921, has increased its schedules to capacity operation to fill orders for black, blue annealed and galvanized sheets from manufacturers of enameled ware, utensils, building supplies, automobile bodies, and stampings of all descriptions. All of the eight mills are working 24 hr. a day in three 8-hr. shifts, with a force of 500 to 550 hands. Boyd B. Jack is general manager.

Philadelphia

PHILADELPHIA, Nov. 29.

December usually is a dull month in the iron and steel business, and present indications are that the coming month will prove no exception. In fact, the slump in buying has anticipated the beginning of December by at least two weeks. Business in the last week has been only a small fraction of that which was being booked during October. In the pig iron trade, there is a degree of optimism that a buying movement for first quarter may be expected in two or three weeks, very little iron having yet been purchased for that period. In the steel trade, however, there is a feeling that the present quiet conditions may be experienced until January or possibly until February.

Pig Iron.—The foundry iron market is somewhat easier, due both to lack of demand and to the active solicitation of business by furnaces which have just gone into blast or are making plans to do so. Sales have been made within the past week at $20.50 to $21, furnace, for No. 2 plain, and at $21.50 to $22.50 for No. 2X. The minimum prices represent a concession of about 50c. a ton. Present buying is confined to small lots—from a carload up to 100 or 150 tons—but a better buying movement for first quarter is expected to develop within two or three weeks. Practically no iron has been sold for that period and it is known that the stocks of many consumers will have been worked off by the end of the year, though deliveries on a few contracts for fourth quarter will run over into January. The largest inquiry in the market is for 7000 tons of basic for the Harrisburg Pipe & Pipe Bending Co., Harrisburg, Pa. Other Eastern steel makers are expected to buy shortly. In foundry iron the principal inquiry is from the Pennsylvania Railroad for about 2000 tons. The Baltimore & Ohio is inquiring for 400 tons.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.34 to $22.04
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.34 to 23.04
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	21.00 to 21.50
Gray forge	22.50 to 23.00
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Domestic producers of ferromanganese continue strong in their quotations of $58.35, seaboard, which is also the British price. Occasional carloads are being sold. There is no demand for spiegeleisen, which is nominally quoted at $25 to $27, furnace. The Sheridan furnace of the Lavino Furnace Co. will be put in blast on ferromanganese about Dec. 15.

Billets.—Open-hearth rerolling billets are quoted at $28 to $29, Pittsburgh, and forging billets at $33 to $34, Pittsburgh.

Rails.—Bids will be opened Dec. 1 by the Norfolk & Western Railroad on 40,000 tons of heavy rails for 1922 delivery. No inquiries have been issued by the Pennsylvania and Philadelphia & Reading, but they are expected to come into the market soon.

Plates.—The inquiry of the Merchant Shipbuilding Corporation, Chester, Pa., for 10,000 tons of plates for fabricating pipe for the Catskill aqueduct, New York, will probably be issued soon. The shipbuilding company will fabricate the pipe for the Frederick Snare Corporation, New York, which has been awarded the general contract for a part of the construction work. A few good-sized inquiries for plates have been received from tank manufacturers, who are figuring on oil tank work. As a whole, however, the market is dull and prices are soft. On ordinary lots, 1.50c., Pittsburgh, is freely quoted and on more desirable tonnages this price has been shaded at least $1 a ton and even $2 concessions have been reported.

Structural Shapes.—Demand has fallen off decidedly in the past two weeks. There are fewer large projects to bring out sharp price competition. The market is

quotable at 1.50c., Pittsburgh, though this price has been shaded to 1.45c. in some instances.

Bars.—Orders for steel bars have diminished considerably. Jobbers are not replenishing stock, preferring to work down their inventories toward the year end. Prices continue as recently quoted, 1.50c. to 1.60c., Pittsburgh, depending on the size and character of the rolling. Bar iron is nominal at 1.60c., Pittsburgh, there being so little business that this price has not been tested.

Sheets.—The announcement of the American Sheet & Tin Plate Co. that its prices are 2.25c. on blue annealed, 3c. on black and 4c. on galvanized, base, Pittsburgh, has tended to stabilize the market to some extent, though prior to this announcement there had been considerable shading of the 3c. and 4c. prices on black and galvanized sheets.

Bolts, Nuts and Rivets.—Prices are weak. Large size machine bolts are now freely quoted at 70 and 10 per cent off list, with other bolt discounts in proportion. Button-head rivets have been quoted as low as 2.10c., Pittsburgh. Nuts have been sold recently in this district at 5.60c. off list. About 500 tons of rivets will be required by the Merchant Shipbuilding Corporation for fabrication of pipe for the Catskill aqueduct, New York.

Warehouse Business.—A slowly increasing demand for steel out of jobbers' stocks is reported. Prices have not been changed within the past week. We quote for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.65c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅜-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.50c.; squares and hexagons, cold-rolled steel, 4c.; steel hoops, No. 13 gage and lighter, 3.50c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.25c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Old Material.—Prices are lower on many grades of scrap. An Eastern consumer last week bought 200 tons of No. 1 heavy melting steel at $11.50, delivered. Another paid $12, and a third consumer is offering $12.50. Cast iron borings is one grade that remains fairly firm. Sales have been made within the past few days at $12, delivered. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	16.50 to 17.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.50 to 16.00
No. 1 yard wrought	13.00 to 13.50
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	10.00 to 10.50
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.00 to 9.50
Heavy axle turnings (or equivalent)	10.00 to 10.50
Cast borings (for rolling mills)	11.50 to 12.00
Cast borings (for steel mills)	11.00 to 12.00
Cast borings (for chemical plants)	12.00 to 12.50
No. 1 cast	17.50 to 18.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	14.00 to 14.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.50 to 13.00
Iron car axles	No market
Steel car axles	No market

The results of railroad operations in October, as reported to date, have surprised rail officials themselves, the most optimistic of whom have not believed that the showing would equal that of last year, says the New York *Evening Post*. From the reports at hand, however, it would appear that October will prove to be the most profitable month for the carriers since the resumption of private operation A compilation of the gross and net railway operating revenues of 15 of the principal lines shows a marked increase.

GERMAN PRICES SOARING

Labor Continues to Demand Return of Price Control—Belgium, Spain and Far East Buy

(*Special Correspondence*)

BERLIN, GERMANY, Nov. 13.—The readjustment of the so-called "guiding prices" recently fixed by the steel federation has not been long in coming. At a sitting of the price committee of the federation, a few days ago, a considerable increase of these guiding prices was decided upon. The following table shows the old and new guiding prices in marks per metric ton:

	Former Price	New Price
Ingots	2,435	3,300
Cogged blooms	2,655	3,600
Billets	2,725	3,700
Sheet bars	2,725	3,800
Structural shapes	3,150	4,400
Bar iron	3 200	4,500
Hoop iron	3,585	5,000
Sheets, No. 6, U. S. gage	3,500	5,100
Nos. 7 to 11	4,300	5,900
Nos. 12 to 20	4,400	6,150
No. 20	4,450	6,300
Wire rods	3,500	4,900

The above are base prices on basic material f.o.b. works, the surcharge for open hearth material being 300 m. per ton. An advance of coal prices will automatically increase these guiding prices by 3.50 m. per 1 m. of coal price increase.

The fixing of new guiding prices was rendered imperative by the heavy slump of the mark, which caused a soaring of ore and scrap quotations, but even these new prices may be obsolete by the time this report is published. The price committee has called another meeting for the end of November, when prices will probably be revised unless the trend of the mark should take a sudden turn for the better. It is pointed out by certain producers that the new prices are inadequate in view of the renewed depreciation of the mark. There is little to be said in opposition, considering that the best scrap sells at about 3330 m., the amount set as the guilding price for ingots.

There are still many mills which are sold up for several months ahead at the old prices and who have next to no interest in price advances, as the regulations and agreements preclude closing contracts on the sliding scale principle.

It is important to remember that the establishment of guiding prices was largely dictated by a desire to forestall the reintroduction of official maximum prices by the Government. It still remains to be seen whether this voluntary move by producers and trade will have the desired effect. The labor delegates of the Iron Control Federation have lodged another protest against the increase of guiding prices, repeating their demand for reintroduction of maximum prices. The Federal Minister of Economics has now ordered a new examination of producers' costs, the results to serve as a basis for further negotiations at the coming meeting of the inland committee. Thus there is still the possibility of a reintroduction of legal maximum prices.

The strike at the Gelsenkirchen blast furnaces has been settled and operations resumed. The loss in pig iron output is estimated at approximately 20,000 tons. Fresh strikes are, however, announced from the Dortmunder Union and the Hösch steel works, where machinists have struck on a wages disagreement. Both works, as well as a part of the Phœnix plant at Hörde, are idle. A satisfactory agreement is expected. This dispute is causing less apprehension than the strike at some of the largest lime works in the Rhenish-Westphalian district which, unless speedily settled, threatens to render the position of blast furnaces and steel works precarious, as shipments of lime have practically come to a standstill.

Foreign inquiries and orders are still brisk and are gaining in volume lately. A feature of the market during the past week was the strong demand from Belgium, which German circles are inclined to account for by a pressure on mills similar to that in Germany. Spain is also in the market for fairly large quantities, and substantial orders have been received from the Far East, though a limited percentage only was accepted.

A noteworthy feature has been the heavy foreign demand for pig iron.

For once the heavy drop of the mark during the past week failed to have a corresponding effect on market prices, excepting perhaps light plates, which were quoted higher. Quotations were at about the previous week's level but fluctuated to an extraordinary extent. The tone of the market was rather erratic and such prices as were heard could not be regarded as indicative of the trend.

British Iron and Steel Market

Improvement in Finished Steel Gradual—Continental Delivery Delays Troublesome —Tin Plate Market Steady

(*By Cable*)

LONDON, ENGLAND, Nov. 29.

Pig iron price reductions are anticipated for early December. Hematite producers are pressing sales and accepting lower prices. Foreign ore is stagnant. The best Bilbao Rubio is quoted at 26s. ($5.17) ex-ship.

Steel improvement is gradual. The works are receiving more orders, but the plants are still only partly employed. There is some export inquiry.

Continental delays in deliveries are causing trouble. French merchant bars are being done at £7 17s. (1.39c. per lb.) f.o.b. French beams are offered below £8 (1.42c. per lb.) f.o.b.

German 3/16-in. plates have been sold at £7 5s. (1.29c. per lb.) f.o.b. for January shipment. German merchant bars are quoted at £7 15s. (1.38c. per lb.) f.o.b. for January and February shipment. German wire nails are quoted at 24½s. ($4.88) to 24¾s. ($4.93) c.i.f. Japan.

Belgian beams are being offered at £7 17½s. (1.40c. per lb.) f.o.b. Czecho-Slovakian merchant bars are being done at £8 to £8 2½s. (1.42c. to 1.44c. per lb.) f.o.b.

Tin plates are steady on good home buying of odd sizes and option contracts for forward deliveries. For December delivery, 21¼s. ($4.23) basis is being paid. Near East demand for wasters continues; buyers of quarters up to 20¼s. ($4.03) f.o.b.; sellers 20½s. ($4.08) f.o.b.

Cheap sellers of Welsh steel are less heard of. Galvanized sheets are easier.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.98 per £1 as follows:

Durham coke, delivered	£1	10			$5.97	
Cleveland No. 1 foundry	5	15			22.88	
Cleveland No. 3 foundry	5	10			21.89	
Cleveland No. 4 foundry	5	5			20.89	
Cleveland No. 4 forge	5	0			19.90	
Hematite	7	0*			27.86	
East Coast mixed	5	10			21.89	
Ferromanganese	15	0 &	14	10*	59.70 &	57.71
Rails, 60 lb. and up	9	0 to	10	10	35.82 to	41.79
Billets	7	5 to	8	5	28.86 to	32.84
Sheet and tin plate bars, Welsh	7	10 to	7	15	29.85 to	30.85
Tin plate base box	1	1 to	1	2½	4.18 to	4.48
					C. per Lb.	
Ship plates	10	10			1.866	
Boiler plates	15	0 to	16	0	2.67 to	2.84
Tees	10	15 to	11	10	1.91 to	2.04
Channels	10	0 to	10	15	1.78 to	1.91
Beams	10	0 to	10	10	1.78 to	1.87
Round bars, ¾ to 3 in.	11	10 to	12	0	2.04 to	2.13
Galvanized sheets, 24 g.	17	10 to	18	0	3.11 to	3.20
Black sheets	14	10 to	15	0	2.57 to	2.67
Steel hoops	12	0 &	12	5*	2.13 &	2.18
Cold rolled steel strip, 20 g.	24	10			4.35	

*Export price.

Galvanized Sheets and Tin Plates More Active—Large Stocks of High-Speed Steel

LONDON, ENGLAND, Nov. 18.—The first reflection of the Washington naval disarmament proposals, so far as the iron and steel market here was concerned, was to bring about a sharp fall in the price of armament shares which had been boosted up on the placing, just before the British delegates sailed for America, of orders for four super-ships at a cost of £36,000,000. It had been generally felt that this presaged British determination to force competition in shipbuilding for war purposes. The apparent approval of America's proposals at Washington was therefore the more surprising to the armament firms on this side. The general mass of the people, however, heartily welcome any proposals likely to bring about a return to world-wide sanity.

In a general way, there is very little new in the market situation. Here and there furnaces and mills are drifting back to work, but the only semblance of activity apparent so far, is in the galvanized sheet and tin plate trades, in both of which a great deal of booking has been done within the last few months, although even here there has been a disposition just lately to trade with caution. Prices have come down considerably now from their mid-summer level, which means that British works are in a better position to compete with those on the continent, especially as deliveries from the latter are getting seriously behind-hand, while the depreciation in exchanges constitutes a formidable stumbling block to international intercourse.

A point of interest is that the government seems to have discovered a stock of about 2000 tons of high-speed and other crucible steel. The extent of this surplus gave the market quite a shock, and it remains to be seen how this total can be disposed of. Makers of high-speed tool steel hope that the quantities will be found so muddled and mixed that it will be impossible to sort them out except with the greatest trouble, in which event manufacturing operations may not be so seriously affected as would otherwise be the case. If, however, the material were marketed on definite analyses it is feared that the high-speed steel makers might have a bad time ahead.

As to markets in general, pig iron is weak, No. 3 Cleveland being officially quoted at 110s., but merchants are prepared to negotiate for 5s. less. Consumers take little interest except where forced to cover immediate requirements. Export business is quite stagnant. There was a little renewal of business in hematite for export a short time ago, but now this has been satisfied, nothing fresh seems to be coming forward. Makers are unable to get their current production entirely absorbed and therefore are more disposed to make concessions. East Coast mixed numbers are still quoted at 120s., but it is possible to do business at less.

In finished iron and steel, while there is a certain amount of business passing, the volume does not total anything like normal proportions and works here have still sufficient orders to carry them on part time for a short period. Prices officially are unchanged for the home trade, but in some instances lower figures have been taken to secure the business. Export prices are weak and for sections £9, f.o.b., has been freely quoted, which compares very favorably with continental works, in that deliveries from that side are liable to indefinite delay.

The General Electric Co., Pittsfield, Mass., which has been closed for inventory purposes, has now resumed operations. The company has received another large order for transformers, amounting to about $250,000. A short time ago the company secured a slightly smaller order from Japan. The transformer department is much more active than the others, the motor department being particularly quiet. Operations for the plant are reported at about 25 per cent of normal.

The Cuban Collector will be published monthly by the American Protective & Credit Service Corporation, 23 Union Square, New York, beginning Dec. 15. The publication, which will be in the form of a bulletin, will describe in detail the prevailing conditions in Cuba, extracted from the daily cable reports of the corporation's adjusters. Names of those interested in Cuban conditions will be entered on the mailing list of the bulletin without charge.

BOOK REVIEWS

Walzen und Walzenkalibrieren. By Wilhelm Tafel, professor Technische Hochschule, Breslau. Pages 228, 6 x 9 in.; illustrations 161. Printed in German. Published by Verlag von Fr. Wilh. Ruhfus, Dortmund, Germany. Price $2.25.

Professor Tafel's book is a lucid and clear treatise explaining the basic facts of the rolling process and analyzing the various factors of importance in the practice of grooving rolls; it is an introduction into the art and science of rolling. The practical man interested only in succesful groove sketches will certainly be disappointed in the book because essential conceptions are dealt with in preference to empirical material, and rules are formulated to be applied, not examples to be followed; but the student willing to study and to digest the valuable information offered will not be disappointed, for his labor is bound to bear fruit. The work is an obvious attempt to raise the practice of rolling above the uncertainties of empiricism into the domain of scientific knowledge, and one cannot help but welcome these labor-involved pages that reflect the love of the teacher and the experience of the practical engineer that knows the mill.

Special attention is drawn to Professor Tafel's method of developing and calculating the sequence of grooves for irregular shapes. It leads to an astonishingly simple solution. His analysis of the problem of the mill drive is also noteworthy, explaining that the load factor is the crux of the controversy over the steam engine versus the electric motor. In his conclusions Professor Tafel is somewhat too unilateral, because electrification affects not the mill drives alone, but the whole plant. Worth considering are the new solutions, such as quick acting load regulators for turbines and novel type of control for transformer units to increase the efficiency of electrical drives.

The complete absence of literature on the rolling problem in the English language naturally leads to the suggestion that a translation of Professor Tafel's work would fill a real want. Amplification of the original text would be necessary on account of the numerous references to German books and technical articles not readily available to the American reader. The illustrations are rather poorly done and not up to standard —a small defect in the light of the excellency of the text.

J. F. S.

New Books Received

Fire Prevention and Fire Protection. By Joseph Kendall Freitag. Pages 1038, 4¼ x 7 in.; illustrations 395. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York.

The Port of Portland, Me. Port Series No. 1. By the Statistical Division, Board of Engineers for Rivers and Harbors, War Department. Pages 64, 6 x 9 in.; maps and charts 10. Published by the Government Printing Office, Washington.

Trading With Asia. By Frank R. Eldridge, Jr., chief of the Far Eastern Division of the United States Bureau of Foreign and Domestic Commerce. Pages xxii + 474, 5¼ x 8¼ in. Published by D. Appleton & Co., 35 West Thirty-second Street, New York.

Waste in Industry. By the Committee on Elimination of Waste in Industry of the Federated American Engineering Societies. Pages 409, 6 x 9 in. Published by the Federated Engineering Societies, Washington, and for sale by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Science and Common Sense in Working with Men. By Walter Dill Scott and M. H. S. Hayes. Pages ix + 154; 5 x 8 in. Published by the Ronald Press Co., 20 Vesey Street, New York. Price, $2.

American Society for Testing Materials Tentative Standards. 1921 Edition. Pages 518, 6 x 9 in.; 127 tentative standards. Published by the society, 1315 Spruce Street, Philadelphia.

Time Study and Job Analysis. By William O. Lichtner. Pages xvii+397, 6 x 9 in.; illustrations 81. Published by the Ronald Press Co., 20 Vesey Street, New York.

NEW TRADE PUBLICATIONS

Vacuum Pumps.—Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York, Bulletin No. 710. Dry vacuum pumps, steam, belt and motor driven of duplex type for high vacuum service, duplex pumps for both low and high vacua; single-cylinder pumps for high vacuum service and single cylinder pumps for both low and high vacuums are described in detail. The illustrations include photographic reproductions and sectional views. Size 6 x 9 in., 20 pages.

Radial Wall Drill.—Pawling & Harnischfeger Co., Milwaukee, Wis., Bulletin No. 206. Devoted to the company's No. 6 radial wall drill for use on unusually large surfaces, such as structural shapes, boiler plates and long beams. The illustrations show the machine in use. Line drawings with dimensions and condensed specifications are given. Size 8½ x 11 in.

Automatic Screw Machinery and Their Products.—National Acme Co., Cleveland, Calendar. Size 12 x 15⅝ in. Each of the twelve leaves gives the calendar for one month beginning with November, each sheet having also the calendar for the month previous and following the current month. The upper half contains half-tone illustrations on a tinted background either of one of the company's automatic screw machines or some of its products or accessories.

Hoists.—The Chisholm-Moore Mfg. Co., Cleveland. Catalog No. 26, describes and illustrates the company's line of Cyclone high speed and other designs of chain hoists, trolley hoists, trolleys, switches, hand power traveling cranes, jib and other types of cranes, power winches, etc. The illustrations include interior views of plants showing installations of the company's line of equipment for various handling purposes.

Babbitt Metal.—Westinghouse Electric & Mfg. Co. folder 4474 bears the title, "Lead Base Babbitt Metal." The subjects discussed in this publication are overheating, bearind design, preliminary machining of shells, cleaning of shells, care of tnning alloy, tinning of bronze shells, tinning of pipe and malleable iron bearing shells, anchor holes in cast iron bearing shells, ca e of babbitted metal, cleaning solutions and materials.

Cranes.—Whiting Corporation, Harvey, Ill. Catalog No. 158. Describes and illustrates the company's line of electric traveling cranes, with details as to crane bridges, bridge trucks, operator's cages and other components. A section is devoted to electric crane trolleys of various types and the company's double-stop limit switch, mechanical brake and electric solenoid brakes are described. Bucket, gantry, transfer, handpower, jib, pillar cranes and other types are included. The illustrations show details of construction and views of cranes in service. Supersedes catalog No. 151. Size 6 x 9 in., 80 pages.

Seamless Steel Tubing.—National Tube Co., Pittsburgh. Bulletin No. 17B, third edition 8½ x 11 in., 28 pages. Devoted to the mechanical and structural uses of Shelby steel tubing, taking up the properties and general characteristics; use in place of solid stock or forgings; range of sizes, wall thicknesses and weights; steels used; anneals and special shapes. The special operations that the company can perform on Shelby mechanical tubing are outlined and illustrated by line drawings. The forming and machining as performed by manufacturing consumers is described and illustrated. A chapter is devoted to the use of seamless tubing for specific purposes, such as axle construction, frames and fixtures, engine and boiler tubing, etc. The bulletin is concluded with a list of several hundred uses of the material.

Continuous Milling Machines.—Ingersoll Milling Machine Co., Rockford, Ill. Bulletin No. 41, size 8½ x 11 in., 23 pages. Several sizes of machines of the drum type and typical work done by them are illustrated and described. A section is devoted to face milling cutters, helical tooth channeling cutters and inserted tooth profile cutters of the company's manufacture. A section is also devoted to Ingersoll milling fixtures.

IRON AND INDUSTRIAL STOCKS

Hesitancy in General Upward Movement is Largely Dissipated

The hesitancy prevailing a week ago in the general tendency of iron and industrial securities is largely dissipated, although natural moderate setbacks occasionally come in individual cases. Leadership in the upswing has shifted from the steel to the railroad securities, mainly for two reasons. First, investors are counting on Congress soon taking favorable action on the railroad funding bill, and second, they find railroad shares entirely out of line with bond values. The relation of the railroad funding bill to railroad purchases is largely discounted by the advance in equipment shares already noted. But better business prospect as related to industry in general is not discounted in share values, which accounts for renewed investment buying of such stocks. Among investors an actual shortage of many kinds of merchandise is believed to exist. This shortage is not as manifest during the present curtailed buying period as it will be later. Recent buying of copper mining shares is now explained by the upward tendency of the red metal, which is now higher than it has been before in more than a year.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	35⅝- 36½	Int. Har. pf.	100⅝-103
Allis-Chalm. pf.	83 - 84	Lackawanna Steel.	41⅜- 43¼
Am. Can com.	30½- 32¼	Midvale Steel.	23¾- 25½
Am. Can pf.	87¾- 89¾	Nat.-Acme	12⅛- 12½
Am. C. & F. com.	137 -142	Nat. E. & S. com.	39 - 43
Am. C. & F. pf.	115 -115½	N. Y. Air Brake.	55 - 59
Am. Loco. com.	93¼- 95	Nova Scotia Steel.	21¾- 27
Am. Loco. pf.	— -110	Press. Steel com.	61½- 65
Am. Radiator com.	84⅞- 90½	Ry. Stl. Spg. com.	88 - 90
Am. Steel F. com.	31 - 32½	Ry. Stl. Spg. pf.	105 -107
Am. Steel F. pf.	91½- 92	Replogle Steel.	21½- 24½
Bald. Loco. com.	94⅜- 97½	Republic com.	48¾- 51
Bald. Loco. pf.	104 -104½	Republic pf.	85 - 88
Beth. Steel com.	51⅞- 53	Sloss com.	38 - 40⅝
Beth. Stl., Cl. B.	54½- 56¼	Superior Steel.	30 - 32
Beth. Stl., 8% pf.	102 -104	Transue-Williams.	32 - 33½
Chic. Pneu. Tool.	51 - 53	Un. Alloy Steel.	25⅜- 26
Colorado Fuel.	24⅛- 25	U. S. Pipe com.	14⅞- 18
Cruc. Steel com.	63¼- 66⅜	U. S. Pipe pf.	47 - 57
Cruc. Steel pf.	86 - 90⅛	U. S. Steel com.	82⅛- 83⅞
General Electric.	133¼-137½	U. S. Steel pf.	112 -112¾
Gt. No. Ore Cert.	33½- 35⅝	Vanadium Steel.	30¼- 32⅜
Gulf States Steel.	39 - 50½	Westingh'se Elec.	46⅞- 48¼
Int. Har. com.	75¼- 78¼		

May Be Due to Merger Talk

Reflecting credence accorded independent steel merger reports centering about the Youngstown Sheet & Tube Co., Youngstown, Ohio, is the fact that a small block of its common stock sold recently at $70, as compared with a market price of $52 to $54, which prevailed for several months prior to the amalgamation rumors. This represents an advance of $25 from the extreme low. Common stock of the Inland Steel Co., also frequently mentioned in connection with the merger reports, was quoted early this week in Chicago at $51 bid and $53 asked. Previous to merger talk, this stock was selling around $35. Equity for the common stock of both companies is placed considerably higher by them than current market values.

Youngstown Company Will Expand

To provide funds for expansion, the Commercial Shearing & Stamping Co., Youngstown, Ohio, is offering 16,000 snares of cumulative, convertible preferred stock, par value $25. The company now has outstanding $366,915 of common stock. A new charter which it has secured provides for 33,500 shares of non par value common, of which 16,000 shares are set aside for conversion of the preferred. The remaining 17,500 shares will be used in retiring the present common issue.

President Robert Carnick states that the present plant has a yearly capacity of 12,000 tons of sheared and stamped steel products, the principal items of which are plates, sheets, circles, flat blanks, boiler heads and automobile and agricultural implement stampings.

Through the new financing plan, which will produce about $400,000 of additional capital, the company will more than double its capacity of sheared plate production; will enlarge its pressed steel output by 300 per cent and will be placed in position to move a volume of direct mill business in excess of 300 per cent of present brokerage sales. This will permit in gross business, sales in excess of $3,000,000 annually it is claimed.

The company says its plant is the largest of its kind in the country devoted to shearing and fabricating plates into unit sizes. It furnishes manufacturers throughout the country with sheets and plates for their special requirements, while its pressed steel department supplies much material for the automobile and agricultural implement trades.

Plate ends are largely purchased from the Brier Hill Steel Co., Youngstown, under a special contract arrangement.

Industrial Finances

The United States District Court, Trenton, N. J., has appointed three receivers for the Willys Corporation, Elizabeth, N. J., manufacturer of automobiles, each to serve under bond of $50,000. The appointees are Clifford I. Voorhees, New Brunswick, N. J.; Frank P. Kennison, president of the Ohio Savings Bank & Trust Co., Toledo; and C. O. Miniger, head of the Electric Auto-Light Co., of the last noted city. Judgments for $200,000, representing 14 creditors, have been secured against the company.

Judge Knox, Federal District Court, New York, has appointed John B. Johnston and John E. Worley, receivers for the Habirshaw Electric Cable Co., 10 East Forty-third Street, New York, with joint bond of $25,000. The Electric Cable Co., and the Bare Wire Co., operated under the same management, are also subject to the receivership. The total liabilities are said to aggregate $5,000,000, and assets, $7,000,000.

Appraisers have been appointed for the Lincoln Motor Company, of Detroit. The Detroit Trust Co., receiver, is keeping the working organization intact. Production is still being maintained and some shipments of cars are being made.

The American Tool Co., Meriden, Conn. has filed a preliminary certificate of dissolution with the state authorities.

According to a statement filed by the B. F. Sturtevant Co., Hyde Park, Boston, blowers, with the Massachusetts commissioner of corporations, the total assets and liabilities as of June 30, last, amounted to $5,947,401, as compared with $6,610,962 at the close of the previous year, a decrease of $663,561. The surplus at the close of the year was $1,339,466, contrasted with $1,147,427 on June 30, 1920, an increase of $192,040.

The income account of the Colorado Fuel & Iron Co. for the quarter ended Sept. 30, last, shows gross receipts were $5,569,147, contrasted with $13,484,393 for the corresponding period last year, a decrease of $7,915,246. Operating expenses were $6,792,834 less than those for last year, yet net earnings dropped to $138,908, a decrease of $1,123,412. After interest, taxes, depreciation and other charges, a deficit of $810,868 is shown, as against a surplus of $907,376 for the same period last year. During the first nine months of the year the company showed an operating loss of $579,094, whereas last year it had a surplus of $1,890,515.

The American Metal Parts Corporation, 28 Brighton Ave., Brighton, Boston, has notified the state authorities of its intention of increasing its preferred stock capitalization to $200,000, and the common to 3500 shares, to be disposed of from time to time. Joseph Bornstein is president, and Arthur H. Doble, treasurer.

Directors of the Eastern Machine Works, Revere, Mass. have authorized an increase in the capitalization from $10,000 to $100,000, or 9000 shares, par $10. The additional stock is to be issued for a license to operate. Joseph A. Guay is president, and Leonard A. Dunn, treasurer.

The Bethlehem Steel Corporation has called for redemption on Jan. 15, next, $7,500,000 secured serial 7 per cent notes, series D, at par and accrued interest. These notes were to run until July 5, 1922. The right to convert them into consolidated mortgage 30-year sinking fund 6 per cent bonds expires Jan. 16.

A special meeting of shareholders of the Bessemer Limestone & Cement Co., Youngstown, Ohio, has been called for Dec. 16 to take action on the recommendation of directors authorizing an increase of $1,000,000 in the common capitalization and an issue of $750,000 8 per cent, five-year convertible notes. The proceeds will be devoted to making final payment on the cost of the company's new cement plant at Bessemer, Pa.; to pay for construction of a railroad connection, and for other betterments.

The Exeter Machine Works, Inc., West Pittston, Pa., has appointed Buckmaster-Luck-Malochee, Inc., New Orleans, exclusive sales agents for the Exeter rotary pump line in the New Orleans district. The Reeves & Skinner Machinery Co., St. Louis, has been appointed exclusive sales agent in the St. Louis district.

The Rivett Lathe & Grinder Co., Brighton district, Boston, recently opened a sales office in Detroit, located with the Reed-Prentice Co., 408 Kerr Building.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, $2.75 to $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 to $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50 to $2.60; galvanized wire, $2.95 to $3.10; galvanized barbed wire, $3.40 to $3.55; galvanized fence staples, $3.40 to $3.55; painted barbed wire, $2.90 to $3.05; polished fence staples, $2.90 to $3.05; cement-coated nails, per count keg, $2.35 to $2.45; these prices being subject to the usual advances for the smaller trade; all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.25 to $2.40 base
Large boiler rivets..... 2.35 to 2.50 base
Small rivets .....70, 10 and 5 to 70, 10 and 10 per cent off list
Machine bolts, small, rolled threads,
70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer,
65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, ⅝ in. x 6 in.:
Smaller and shorter rolled threads,
65, 10 and 10 per cent off list
Cut threads .....65 and 10 to 70 per cent off list
Longer and larger sizes.....65 and 10 to 70 per cent off list
Lag bolts .....70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 to $5.25 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
½ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E..
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under.....75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in.....75 and 10 to 80 and 10 per cent off list

Upset Set Screws

½ in. and under.....80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes .....70 and 10 per cent off list

Milled Set Screws

All sizes .....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $40; chain rods, $40; screw stock rods, $45; rivet and bolt rods and other rods of that character, $40; high carbon rods, $48 to $52, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.40 to $2.50 base; 5/16-in., $2.40 to $2.50 base. Boat and barge spikes, $2.40 to $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13.00; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel, Inches	Black	Galv.	Iron, Inches	Black	Galv
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20	Nos. 11 and 12	2.30
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.35
		Nos. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Nov.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
23.....	13.50	13.37½	29.50	4.70	4.35	5.15	4.65
25.....	13.50	13.37½	29.75	4.70	4.35	5.12½	4.62½
26.....	13.50	13.37½	....	4.70	4.35	5.12½	4.62½
28.....	13.50	13.37½	30.00	4.70	4.35	5.15	4.65
29.....	13.50	13.37½	29.87½	4.70	4.35	5.15	4.65

New York

NEW YORK, Nov. 29.

The markets are generally quieter than a week ago, but the price tendency is firm to higher. As is usual the Thanksgiving holiday has caused some let-up in activity. The copper market is a little quieter but prices have slightly advanced for all positions. Extreme inactivity pervades the tin market after the recent heavy buying. There is no change in the lead situation. The zinc market continues dull with but slight changes in quotations.

Copper.—While the electrolytic copper market is generally characterized by sellers as a little quieter, inquiry, particularly for first quarter, continues, and buying for that position as well as for this year's delivery is satisfactory. Prices have stiffened in the last week until metal for delivery this year is at a minimum of 13.62½c., delivered, or 13.37½c., refinery, with many sellers out of the market for this position. It is stated that by shopping around probably small amounts could be obtained for December delivery at 12.50c., delivered, but as a market factor this is not regarded as important. For January and first quarter electrolytic copper is firmly quoted at 13.75c., delivered, or 13.50c., refinery, with some sellers asking ⅛c. higher. Sales to foreign countries continue excellent with Germany a leading buyer this week as well as England. Lake copper is quiet and strong at 13.50c., delivered.

Tin.—Following the heavy sales of Straits tin reported a week ago, as reminiscent of old-time activity, the market has turned exceedingly quiet and practically no business is reported as done in the last two days. An influential factor in this dullness is the rise in the London market, particularly yesterday, of £2 per ton, as well as the strength of the pound sterling. This condition is said by one seller to have choked off buying completely. The quotation for spot Straits tin to-day was 29.87½c., New York, while the London market was £163 5s. for spot standard, £165 for future standard and £163 10s. per ton for spot Straits. Arrivals thus far this month have been 2505 tons with 3650 tons reported afloat.

Lead.—No change is reported in general conditions. Demand continues about equal to consumption and prices are firm in both markets. The leading interest continues to quote 4.70c., New York and St. Louis, while in the outside market the New York quotation is 4.70c. and the St. Louis 4.35c. The strength of the metal in London is attracting attention on this side. Quotations there have advanced from £24 15s. a week ago to £26 per ton to-day, and there is evidently a scarcity in Great Britain, due partly to a diminution of available supplies from Mexico and Spain, as well as from Australia. There is some prospect of export business from this country.

Zinc.—The market is virtually marking time with very little buying and but slight changes in quotations. Such buying as is reported is for immediate needs of galvanizers in particular and some other consumers, but it is limited. Consumers are evidently looking forward to the amount of stocks for inventory, keeping them as low as possible. The slight changes in quotations are due to the various views of a limited number of sellers, most producers being largely out of the market for this year's delivery. Prime Western is therefore quoted for this year's delivery at 4.65c., St. Louis, or 5.15c., New York.

Antimony.—Wholesale lots for early delivery are quoted at 4.50c., New York, duty paid, with prompt metal at 4.55c.

Aluminum.—It became known only in the last few days that the leading interest had changed its quotation for virgin metal, 98 to 99 per cent pure, from 24.50c., f.o.b. plant, to 19c., for wholesale lots for early delivery. This change is stated to have taken place about Nov. 15, but it does not come as a surprise because it has been understood that this producer was meeting foreign competition for the same grade of metal from importers, which is obtainable from 17c. to 18c., New York, duty paid.

Old Metals.—The market is stronger and values are higher. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.75
Copper, heavy and wire	11.75
Copper, light and bottoms	9.75
Heavy machine composition	10.00
Brass, heavy	7.75
Brass, light	6.00
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	6.00
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

Nov. 29.—The market has been quiet, no changes in prices have occurred except in tin which has advanced in sympathy with London. Old metal prices, which have remained unchanged for some time, have finally responded to the altered situation in the market for new material. Most grades of copper and brass have advanced while zinc has declined. We quote in carload lots: Lake copper, 13.25c. to 13.50c.; tin, 30.75c. to 31.25c.; lead, 4.45c.; spelter, 4.70c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 9c.; copper bottoms, 7.25c.; red brass, 7.50c.; yellow brass, 5c.; lead pipe, 3c.; zinc, 2.12½c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Nov. 29.—Both lead and zinc are weak. Lead is quoted at 4.25c., car lots, and zinc at 4.62½c. Lake copper is quoted at 13.73½c. to 14.48½c., car lots; tin, 30.73c. and antimony, 5.33½c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

The Purchasing Agents' Association of Pittsburgh has elected the following officers: S. E. Van Vranken, Locomotive Stoker Co., president; J. E. Stauffer, A. M. Byers, Co., first vice-president; W. G. Scott, R. D. Nuttall Co., second vice-president; B. H. Vockrodt, Frick & Lindsey Co., third vice-president; H. L. Oberlin, Wm. B. Scaife & Sons Co., treasurer; F. T. Adams, secretary; G. W. Sanborn, United Engineering & Foundry Co., director for national association; H. B. Charles, McClintic-Marshall Co., J. B. Connelly, Mesta Machine Co., A. Davia, Dravo Contracting Co., and G. W. Sanborn, directors.

The Van Dorn Iron Works, Cleveland, has placed an order with the George J. Hagan Co., Pittsburgh, for an electric furnace for heat treating and carbonizing. This will be a standard furnace 12 ft. long, 3 ft. 9 in. wide and 1 ft. 11 in. high. It will be 123 kw. furnace, 220 to 440 volt, 3-phase, 60 cycle. The electric equipment will be supplied by the General Electric Co.

PERSONAL

E. A. Wheaton, formerly superintendent of open hearth department No. 3, Lehigh plant, Bethlehem Steel Corporation, has been promoted to the position of open hearth superintendent at its Maryland plant, Sparrows Point. He succeeds F. F. Lines, who resigned a short time ago. Mr. Wheaton was graduated from Lehigh University in 1912, and entered the employ of the Bethlehem Steel Corporation as a metallurgical engineer following his graduation. At the meeting of the American Iron and Steel Institute, October, 1920, he read a paper on "High Manganese Iron in Basic Open-Hearth Practice."



E. A. WHEATON

E. M. Freeland, formerly with the Sparrows Point, Md., plant, the Bethlehem Steel Corporation, has become affiliated with Follansbee Bros. Co., as metallurgist at the company's plant at Follansbee, W. Va.

Fred E. Holtz has been appointed representative in the Milwaukee district for the W. A. Jones Foundry & Machine Co., Chicago.

Frank H. Willard, vice-president Graton & Knight Mfg. Co., Worcester, Mass., belting, has returned from an extended European tour. He found the most serious business depression in Europe in the Scandinavian countries.

Charles H. John, 1119 State street, Milwaukee, has been elected trustee of the Northwestern Bridge & Iron Co., bankrupt, Milwaukee, Wis.

J. D. Ackenheil has joined the Heltzel Steel Form & Iron Co., Warren, Ohio, as field engineer in the Pittsburgh district. During four years' service previously with the Portland Cement Association he devoted considerable attention to the subject of steel forms from a construction standpoint.

A. G. Labbe has been elected president of the Willamette Iron & Steel Works, Portland, Ore., succeeding Bert C. Ball, who will devote his time to other interests, chiefly to the Portland Vegetable Oil Mills Co. E. C. Pape, second vice-president, was advanced to first vice-president to succeed Mr. Labbe. N. H. Insley was chosen secretary and H. V. Carpenter treasurer.

W. H. Underwood, sales agent of the St. Louis Coke & Chemical Co., Boatmen's Bank Building, St. Louis, since that concern's Granite City, Ill., plant went into production in February, 1921, has been promoted to be sales manager. Mr. Underwood went to St. Louis from Chicago, where he had been manager for the Domhoff & Joyce Co.

H. M. Bush, 16 South Third street, Columbus, has been appointed sales representative for Central Ohio for standard punch and die sets manufactured by the Diamant Tool & Mfg. Co., Inc., Newark, N. J. Russell Propes, 1025 Cherry street, Norristown, Pa., has been appointed sales representative for southeastern Pennsylvania, including the Philadelphia section.

Hercules Smart, district sales manager in Detroit for the Illinois Tool Works, has been assigned to duties in the home office at Chicago. He is succeeded in Detroit by Gordon Stewart, who has been district representative in Indianapolis. The Detroit offices of the Illinois Tool Works are at 4835 Woodward Avenue.

O. E. Hunt, formerly with the Packard Motor Car Co., Hares Motors and, during the war, in charge of engineering in Detroit plants producing Liberty motors, has been made chief engineer of the Chevrolet Motor Car Co., Flint, Mich., with supervision over engineering in all Chevrolet plants throughout the country.

R. L. Warburton, for a number of years with the Celite Products Co., has become identified with the Quigley Furnace Specialties Co., 26 Cortlandt Street, New York, as sales engineer. He has a wide knowledge of furnace design and the application of heat insulation.

President James A. Campbell, Youngstown Sheet & Tube Co., Youngstown, Ohio, is spending several weeks at Pinehurst, S. C., going there from the American Iron & Steel Institute meeting in New York. Walter E. Watson, assistant general sales manager of the sheet and tube company, has also been at Pinehurst.

W. J. Priestly, metallurgical engineer United States Naval Ordnance Plant, South Charleston, W. Va., has been chosen chairman of the Board of Registration for Engineers of West Virginia, the body set up by an act of the Legislature. George E. Taylor, Anderson & Taylor, consulting engineers, Charleston, has been elected secretary of the board, the other members of which are Frank Haas, Fairmont, consulting engineer, Consolidation Coal Co.; H. C. Cooper, Clarksburg, general superintendent, Hope Natural Gas Co., and N. H. Mannakee, Bluefield, consulting mining engineer.

L. J. Stoddard, sales manager small tool division, Greenfield Tap & Die Corporation, Greenfield, Mass., has resigned, effective Jan. 1, to become sales manager of the Lakeside Forge Co., Erie, Pa., manufacturer of wrenches and drop forgings.

Carveth Wells gave an illustrated lecture on "Six Years in the Jungle" at an open meeting of the Boston section, American Society of Mechanical Engineers on Nov. 28, at the Harvard Union, Cambridge, Mass. Mr. Wells is a graduate of the University of London, and an associate member of the Institute of Civil Engineers, London. He spent many years building railroads in the Malay Peninsula, and his lecture concerned his experiences in connection with this work.

Henry D. Hibbard, consulting metallurgist, Plainfield, N. J., sailed on Nov. 30 for a sojourn in southern France and Italy.

John Agnew, formerly associated with the Philadelphia Rolls Corporation in charge of sales, has joined the sales organization of the Wheeling Mold & Foundry Co., Wheeling, W. Va.

Charles Addams, formerly a sales engineer with the Standard Roller Bearing Co., Philadelphia, has since Nov. 1 been identified with the Bearings Co. of America as sales engineer in the Eastern territory.

Lewis R. Smith, long identified with the Matthew Addy Co., has given up the management of the company's New York business to become its general representative, engaging in the larger plans of development which this company has inaugurated. The New York office has been discontinued.

More portland cement was produced in October than in any other month of 1921, notwithstanding the seasonal trend. Production was 10,506,000 bbl.; shipments, 12,114,000 bbl.; stocks held at end of month, 5,348,000 bbl., according to figures of the United States Geological Survey. Beginning with May, shipments have exceeded production every month, thus reducing stocks gradually from 12,600,000 bbl. at end of April to 42½ per cent of that amount. Shipments for the ten months (86,159,000 bbl.) exceeded the average of the five previous years by 11.3 per cent.

The Connecticut State Section of the American Society of Mechanical Engineers held its annual meeting on the evening of Nov. 28 in the Hartford Electric Light Co., Hartford, Conn., building. Among those who spoke were: R. C. Moore, chief engineer Schieren Co., New York, belting; Prof. William Kenerson, Brown University, Providence, R. I.; and Ernest Hartford, New York. During the afternoon, members of the society visited the plant of the Jewell Belting Co.

OBITUARY

AXEL S. VOGT, formerly mechanical engineer of the Pennsylvania Railroad, died in Philadelphia Nov. 11, in his seventy-third year. Mr. Vogt was born in Christianstad, Sweden, Jan. 19, 1849, and educated in the Swedish public schools. He came to this country in the early 70's and was employed as a draughtsman by the Rhode Island Locomotive Works. He entered the service of the Pennsylvania Railroad in 1874 as draughtsman, becoming chief draughtsman two years later, and with an intermission of a little over a year, when he was with Schutte & Koerting, machinists, Philadelphia, he spent the remainder of his active service with the road at Altoona. He became assistant engineer of tests in 1883, assistant engineer in 1886, and mechanical engineer in 1887, retaining the latter position until his retirement under the pension regulations of the road in February, 1919. Subsequently he became connected with the Baldwin Locomotive Works in a consulting capacity and held this position at the time of his death. Mr. Vogt's work was marked by great originality and artistic taste. He was a man of broad reading with a most retentive memory, and while the greater part of his work was devoted to the development of the steam locomotive, he seemed to be equally fertile in other branches of railroad mechanical engineering. Personally he was a charming companion.

HARRY D. HAMMOND, aged 51, sales agent at Indianapolis for the National Malleable Castings Co., Cleveland, died Nov. 22 at Boston. He joined the National Malleable Castings Co. in 1903 and was located at Indianapolis.

WILLIAM B. LANE, president Will B. Lane Unique Tool Co., 170 West Randolph Street, Chicago, died in that city on Nov. 19, aged 64.

FREDERICK A. KEYES, sales agent American Steel & Wire Co., died this week at his home in Westfield, N. J., at the age of 57.

Graduate from Foremen's Safety School

Graduation exercises held in McCreery's restaurant, Pittsburgh, Thursday evening, Nov. 17, concluded one of the largest and most successful foremen's safety schools ever conducted by industrial plants in the United States. The graduating class numbered 750 and each graduate received a diploma from the National Safety Council.

The safety school for foremen of industrial plants in the Braddock, Pa., district was inaugurated by O. J. H. Hartsuff, general superintendent Edgar Thomson Works, Carnegie Steel Co., and was originally intended for the instruction of Edgar Thomson plant foremen in safety matters. Later, however, he widened the scope of the course to include foremen from all the industries of the district, and the various plants of the district were represented on the committee which had charge of arrangements. Sessions of the school were held in the auditorium of the Braddock Carnegie Library under the direction of E. S. Willis, an expert in safety work. There were addresses on safety subjects by Dr. R. M. Little, New York Industrial Commission; J. A. Oertel, Carnegie Steel Co.; John Martin, burgh; E. Friedlander, Edgar Thomson Works, and Ohio Works, Carnegie Steel Co.; F. H. Trego, Pitts- Dr. William T. Dorward, Milwaukee.

William Laughlin, of the machine tool firm of Laughlin & Barney, 483 Union Arcade, Pittsburgh, has retired and his interests in the firm have been taken over by his partner, Harry Barney, who will continue the business under the trade name of the Laughlin-Barney Machinery Co. There will be no change in the personnel of the organization and the company will remain in its present location.

DECREASE IN JAPANESE TRADE

Buying Lighter from Far East—Yellow River Bridge Not Awarded—Argentina Active

NEW YORK, Nov. 29.—Japanese trade has declined considerably during the past two weeks. This change in the export situation is attributed to various causes, among which are the recent assassination of the Japanese premier, the present conference in Washington, and the fact that shipments of the fairly large orders of a few months ago are beginning to arrive in Japan. Japanese buying is temporarily confined to orders from small consumers. One New York exporter during the past week has booked 1000 kegs of wire nails and 40 tons of galvanized sheets, losing one order for a tonnage of wire rods on which he offered to quote $50 per ton, c.i.f. Japanese port. Some copper buying continues. The Chinese market is in much the same condition as the Japanese.

The design contest and contract for the Yellow River bridge in China, entries on which were opened June 30, has not been decided.

South American contracts awarded to American builders continue to increase. The Foundation Co., New York, has a contract for dam construction in Brazil. Some buying is being done, principally from Argentina. One order from this source, recently placed, called for about 400 tons of galvanized sheets. An exporter, who was among the low bidders, submitted a quotation based on 3.45c. per lb. base, Pittsburgh, plus rail and ocean freight to Buenos Aires, but did not receive the order, which was either placed at a lower base price or the seller figured a lower than regular ocean freight rate.

The Ministry of Agriculture and Commerce in Japan has authorized a committee to consider the standardization of gages and sizes in the manufacture of machines and tools of all kinds, according to the *Trans-Pacific*. This is a part of the intended adoption of the metric system provided for by the Japanese Diet.

Ford Motor Co.'s Proposed Electric Steel Plant

An electric steel plant of large capacity is planned by the Ford Motor Co. at its River Rouge plant, near Dearborn, Mich. Two electric furnaces of 10 to 15 tons capacity have been purchased, and a third furnace will be of 40 to 60 tons capacity. The ultimate installation may consist of eight to ten furnaces of 10 to 15 tons capacity each and two furnaces of 40 to 60 tons. The furnaces are to be used at first in melting scrap, but in the final form the plant will provide for the taking of hot metal from the blast furnaces to a mixer and a Bessemer converter, the metal being subsequently dephosphorized in the large electric furnaces and finally refined in the smaller electric units.

Quarter Deficit of Colorado Fuel & Iron Co.

The deficit of the Colorado Fuel & Iron Co. for the third quarter of 1921 amounted to $810,868, after taxes, interest, depreciation, etc. This compares with a deficit of $273,752 in the preceding quarter and a surplus of $307,376 in the corresponding period of 1920. For the first nine months of 1921 the deficit amounted to $579,-094, as compared with a surplus of $1,890,515 in the corresponding period of 1920.

Plans of Utah Steel Corporation

The Utah Steel Corporation, Salt Lake City, Utah, has plans under way for the erection of plant extensions which will include a blast furnace and a sheet mill plant for the manufacture of sheets and light plates. It is stated that the erection of the sheet mill plant will be started within 90 days and that the company expects to commence the erection of its blast furnace within six months. Engineers are working on preliminary plans for the blast furnace.

Machinery Markets and News of the Works

LARGE LIST ISSUED

American Locomotive Co. Inquires for 35 Tools for Schenectady Works

Missouri, Kansas & Texas Railroad Buys Heavily Against Its Recent Inquiry

Another indication that railroad buying may be the means of leading the machine-tool industry out of its depression is the list of the American Locomotive Co., New York, just issued, calling for quotations on 35 miscellaneous tools for an addition to its Schenectady works. From St. Louis and Cincinnati it is reported that the Missouri, Kansas & Texas Railroad has purchased heavily against its recent large inquiry. One Cincinnati tool builder received an order for five lathes; several drilling machines, a crank planer and other tools were also ordered.

Prospects of continuing railroad buying are fairly encouraging. At Chicago the Illinois Central and Chicago & Northwestern are working on budgets for 1922 and lists of machine-tool requirements are expected early in the new year. The Rock Island is expected to issue a list before the end of the year. The Santa Fe has asked for revised quotations on outstanding inquiries and in addition has inquired for two axle lathes, two 20-in. engine lathes and a radial drill. The Erie Railroad, at New York, is buying a few used tools against its recent inquiry.

There is an appreciable gain in the demand for tools, but many of the inquiries call for second-hand equipment. The American Steel & Wire Co., at Cleveland, has asked for prices on six used tools. The North East Electric Co., Rochester, N. Y., also wants six or seven used machines.

The International Nickel Co. has bought additional shop equipment for its new plant at Huntington, W. Va. A Cincinnati company is reported to have received an order for 10 lathes.

The American Car & Foundry Co., New York, has recently inquired for a few tools and some cranes. The demand for cranes has shown a steady improvement in recent weeks.

The New York Board of Education will shortly issue a new list of more than 100 metalworking machines and a considerable number of woodworking machines. The Youngstown schools require tools for manual training departments, the inquiry including six 10-in. and six 13-in. lathes.

A leading manufacturer of planers announces a price reduction of 15 per cent.

New York

NEW YORK, Nov. 28.

The American Locomotive Co., 30 Church Street, New York, has issued an inquiry this week for 35 machine tools to equip an addition to its plant at Schenectady, N. Y. The list follows:

Two 6A automatic chucking and turning machines.
One Lo-Swing lathe, 4 x 84 in.
One 12 x 60-in. plain grinder.
One 8 x 18-in. plain grinder.
One Heald grinder, No. 70.
One Besly 29-53 vertical grinder.
One Besly 6 x 20-in. grinder.
One No. 3 La Pointe broaching machine.
One No. 4 Cincinnati vertical milling machine.
One 5-ft. radial drill.
One 3-ft. radial drill.
One 10-in. vertical tool room shaper.
One 38 or 42-in. vertical turret lathe.
One 24-in. pillar shaper.
One No. 31 Lucas precision horizontal boring mill.
Two 2B two-spindle column-type high-speed drills, maximum capacity ⅞-in. hole in steel; 15 or 21 in. overhang.
One Whitney hand miller.
One 50-ton Lucas geared press.
One 2X automatic tapping machine.
One Cochran-Bly saw, 7 or 8-in. capacity.
One Peerless saw.
One Colburn D-6 drill, 37 in.
One 18 in. x 5-ft. engine lathe.
Three 22-in. lever drill presses.
One 16 in. x 8-ft. tool room lathe.
One 18 in. x 8-ft. tool room lathe.
One No. 3 universal milling machine.
One 18-in. pillar shaper.
One Greenfield cutter grinder.
One 12 x 36-in. universal grinder.
One No. 2 surface grinder.

November machine-tool business has been uneven. Some sales offices in New York report this month's sales in excess of October, which had been the best month of the year, but others say that their sales have not quite equaled those of October. In any event the gain in business is negligible, and on the whole November business probably just about equals that of last month.

Buying is still confined to widely scattered orders for single tools. Although railroad activity looks more promising very little business has yet developed. The Erie Railroad is picking up a few second-hand tools against its recent inquiry. The American Car & Foundry Co. has recently inquired for a few tools.

The American Sugar Refining Co., which recently purchased about a dozen metal-working machines, has an inquiry out for seven wood-working machines.

The New York Board of Education will issue a new call for bids on machine tools within a week or 10 days, this list being entirely different from that issued a few weeks ago. The new list includes more than 100 metal-working tools, a number of wood-working machines, and all attachments, small tools, etc. The list of the metal-working machines is to be about as follows:

Seven milling machines, No. 1 Kempsmith or equivalent.
Seven 15-in. shapers, Potter & Johnson or equivalent.
14 14-in. engine lathes, Monarch or equivalent.
28 12-in. engine lathes, Monarch or equivalent.
14 11-in. engine lathes, Blount or equivalent.
Seven 20-in. drill presses, Superior or equivalent.
Seven power hack saws, 6 x 6 in.
Seven 14-in. wet tool grinders.
Seven annealing furnaces.
Seven blowers for furnaces.
One cutter grinder, equivalent to Brown & Sharpe No. 2.
One universal grinder, equivalent to Brown & Sharpe No. 1.

The above tools are for general machine shops in the schools. The tools listed below are for automobile mechanics' shops:

Six 12-in. engine lathes.
Seven 20-in. drill presses.
Seven bench tool grinders.
13 3-hp. motors.
Two 10-hp. motors.
Four 2-hp. motors.

The National Tool Co., Cleveland, is interested in receiving information regarding molding machines. Literature

should be addressed in care of E. S. Chamberlain at the company's New York office, room 553, 50 Church Street.

Sales of cranes in the overhead field are extremely light with little prospect of any immediate improvement. Sellers of locomotive cranes, however, anticipate the development of some inquiry from the numerous construction contracts, domestic and foreign, which have been let during the past few weeks. Inquiry for locomotive cranes is fairly active.

Among recent sales was a bucket crane of about 7½ tons capacity, sold by the Whiting Corporation through the Wonham Bates & Goode Trading Co., New York, to the International Cement Co., Hudson, N. Y. The Cleveland Crane & Engineering Co. has sold two 2-ton tramrails, one to the Asbury Graphite Co., Asbury, N. J., the other to the Long Handkerchief Co., Scranton, Pa. The Textile Finishing Machine Co., Providence, R. I., has not yet closed for the seven cranes on its list recently issued.

The Suffolk Body Co., Sayville, L. I., manufacturer of automobile bodies, is considering the erection of a new one-story plant, 100 x 350 ft., at Sayville. Plans will be drawn at an early date.

The Forged Steel Yoke Corporation, a Virginia corporation, has filed notice of intention to operate in New York for the manufacture of steel forgings and other steel products. It is represented by P. A. Degener, 233 Broadway, New York.

The plant and business of the Reliance Spring & Mfg. Co., 3903 Second Avenue, Brooklyn, have been acquired by the Newcomb Spring Corporation, 238 Fortieth Street, Brooklyn, and future operations will be conducted under the latter name at the last noted address. E. L. Newcomb is president.

The Seneca Copper Corporation, 11 Broadway, New York, has arranged for a sale of 100,000 shares of additional capital stock, the proceeds to be used for the purchase of machinery at its mining properties and those of its subsidiary adjoining, the Gratiot Mining Co., and for extending operations.

Tindall & White, Inc., 239 East Twenty-second Street, New York, has acquired the business of the Perfection Sales Co., same address, and will continue the manufacture of all-metal lighting fixtures, etc. Officers of the new company, formerly connected with the Perfection organization, include W. L. Tindall, president and general manager, and C. A. White, secretary.

Plans for the construction of a four-story ice-manufacturing plant, 78 x 100 ft., to cost in excess of $75,000, at Webster and Carter avenues, New York, are being prepared by William H. Meyer, 1861 Carter Avenue, architect, who will take bids at an early date.

The Superintendent of Public Works, Charles L. Cadle, Albany, N. Y., will take bids until Dec. 20, for the installation of power equipment, battery charging apparatus and kindred equipment at the Barge Terminal warehouse, Gowanus Bay, Brooklyn, as per specifications on file at the office noted.

The Mutual Lamp Mfg. Co., Houston and Crosby streets, New York, now occupying a portion of the seven-story building at this location, has purchased the entire structure, 64 x 120 ft., for extensions.

The Clark Machine Works, Belmont, N. Y., has been reorganized under the name of the Clark Tool Works, Inc., for the manufacture of metal-cutting tools. Operations will be continued at the same location.

The Loening Aeronautical Engineering Co., 351 West Fifty-second Street, New York, has completed plans for a new one and two-story factory, 98 x 129 ft., on property recently acquired at 420-28 East Thirty-first Street, to manufacture aeroplanes, flying boats, etc. It will cost about $40,000. J. O. Whitenack, 231 West Eighteenth Street, is architect.

Following an expenditure of about $60,000,000 for extensions and improvements in its properties and electric subsidiaries during the past year, the Consolidated Gas Co., 130 East Fifteenth Street, New York, has arranged for a bond issue of $20,000,000, the proceeds to be used in part for the expansion program and general operations. The company operates the Astoria Light, Heat & Power Co., Astoria, L. I.; United Electric Light & Power Co., New York, and which latter interest is now building an electric generating plant on the East River to cost in excess of $5,000,000. George B. Cortelyou is president.

The Page Motors Corporation, New York, headed by Major Victor Page of Munn & Co., 233 Broadway, New York, is perfecting plans for the operation of a plant at Farmingdale, L. I., to manufacture a new automobile with air-cooled motor and special chassis. Charles Beadon is vice-president.

The Knickerbocker Ice Co., 45 East Forty-second Street, New York, has completed plans and will commence the immediate erection of a one-story plant, 49 x 98 ft., at 148-50 Elizabeth Street, to cost about $60,000. C. Leslie Weir, company address, is architect.

The Board of Education, Cohoes, N. Y., is planning for the installation of machine shop equipment, with transmission apparatus and hand tools at the department of industrial arts, high school.

The Royal Metal Furniture Co., 125-9 Eighth Street, Brooklyn, has filed plans for an addition, 61 x 176 ft., at 168-86 Seventh Street. William Higginson, 18 East Forty-first Street, New York, is architect.

The Wyoming Coal Co., Inc., 163 Sixth Street, Brooklyn, has had plans completed by the Guarantee Construction Co., 140 Cedar Street, New York, for a two-story, mechanically operated coal pocket, estimated to cost about $50,000 with equipment.

Operating equipment to cost about $3,000,000 will be used by the Transit Commission, 49 Lafayette Street, New York, in connection with the construction of the proposed river-to-river moving platform under Forty-second Street, for traffic. Preliminary plans and estimates have been prepared by Daniel L. Turner, chief consulting engineer for the commission. The entire project is estimated at $10,500,000.

A two and one-half story automobile service building and repair works, 100 x 200 ft., to cost $125,000, will be constructed at Thirteenth and Williams streets, Long Island City, by the Interstate Land Holding Co., Long Island City. The Ettinger Contracting Co., 44 Court Street, Brooklyn, is contractor, and Frank S. Parker, last noted address, architect and engineer.

The Bullock Mfg. Co., New York, manufacturer of lighting fixtures and equipment, has removed its plant from 408 West Thirteenth Street to 356 West Fortieth Street, where an entire factory will be occupied. Former production will be increased.

The Hunter Coal Co., 1576 Flatbush Avenue, Brooklyn, will build a one-story coal pocket, 36 x 130 ft., at 1064-76 East Thirty-fourth Street. Gustave Jensen, 639 Seventy-seventh Street, is architect.

The Wilson-Phifer Co., Millville, N. J., has acquired a local factory which it will equip for the manufacture of automobile bodies and kindred products.

The Vulcan Iron Works, Hudson Street, Jersey City, N. J., manufacturer of marine iron and steel products, has filed plans for a one-story addition, to cost about $17,000, exclusive of equipment.

The American Type Founders Co., Communipaw Avenue, Jersey City, is planning the erection of a one-story foundry at Elmora, near Elizabeth, N. J.

The Millville Iron Works, Inc., Millville, N. J., recently incorporated with a capital of $100,000, has arranged for the immediate operation of a local plant for the manufacture of iron and steel specialties. Daniel E. Campbell and Lester Fleetwood, Sixth Street and Florence Avenue, head the company.

The Board of Directors, New Jersey State Home for Boys, Jamesburg, N. J., L. L. Jackson, superintendent, has plans under way for the construction of a cold storage plant. A. B. Mills, 142 West State Street, Trenton, N. J., is architect.

The Perseverance Paper Mill Co., Lambertville, N. J., will remodel and improve its plant, including the installation of new equipment and repairs to present machinery, prior to resumption of operations. The mill has been closed for more than 12 months.

Pfaff & Kendall, 655 Ferry Street, Newark, N. J., manufacturers of iron pipe columns, have filed plans for the construction of a two-story plant, 38 x 111 ft., on Foundry Street, to cost about $18,000.

The Board of Education, room 316, Essex Building, Newark, N. J., will receive bids until Dec. 14 for steel lockers for installation at the local vocational schools. Robert O. Beebe is director.

The Peerless Weatherstrip Co., 390 Eleventh Street, Newark, manufacturer of metal weatherstrips, has purchased property at 51-53 Laurel Avenue, Irvington, 70 x 200 ft., improved with two buildings, for a new plant. The existing structures will be remodeled for early occupancy. Joseph C. and John C. Fauner head the company.

The Van Sicklen Co., Elgin, Ill., manufacturer of speedometers and other precision instruments, has abandoned plans for the establishment of a factory at Newark, N. J., and has disposed of the plant on Warren Street, recently acquired under lease, to the Prudential Insurance Co.

A vocational department will be installed in the new three-story high school, to be constructed by the Board of Education, Clifton, N. J., estimated to cost in excess of $800,000.

The Gulf Refining Co., Plum Point Lane, Newark, has filed plans for an addition to its plant on Doremus Avenue, to cost about $62,000.



CRANE SERVES AS DREDGE FOR INTAKE WELL

The debris arrested by the iron grills is removed by a grab bucket operated from the crane. The shape of the intake well is that of a sector of a circle and the crane spans it radially, having one end truck pivoted at the center of the circle and the other end traveling on a circular track. The crane trolley with its bucket travels along the entire length of the crane bridge. The crane was furnished for the power plant of the Union Gas & Electric Co., Cincinnati, by the Whiting Corporation, Harvey, Ill., to specifications issued by Sargent & Lundy, Chicago, engineers on the work.

New England

BOSTON, Nov. 28.

Indications early this month that November bookings of machine tools would exceed those for October failed to materialize, business the past fortnight more than offsetting any advantage gained the first 15 days. As the week closes the market virtually is at a standstill. An inquiry for a 12,000-lb. steam hammer and a 25-ton crane are the only important developments. New prospects for single machines have come into the market but are few in number, and most buyers express a preference for used equipment. In Boston, at least, the used tool market appears to have been thoroughly overhauled and there is a noticeable shortage of certain kinds of machines. As a result, used machinery dealers are turning their attention to Canada for supplies. Under such conditions prices should be steady or firm, but they are still tending downward, due to the scarcity of going business.

No great change in conditions is anticipated by the trade the remainder of 1921, but it is believed that things will be very much better early in 1922. One of the largest New England industrial manufacturers is making an investigation of each individual piece of equipment for the purpose of determining from an efficiency standpoint if it shall be retained, retooled, discarded or replaced. Several hundred metal-working machines are involved and the company already is inquiring on various types of equipment. Other important industries have made surveys of their equipment to determine the most profitable purposes to which it can be applied. As to railroad buying, local interests are not counting as much on New England carriers as is the machine-tool trade in other sections of the country on the larger roads. One New England road has inquired on a small list of tools for estimating purposes, another has signified its intention of buying some equipment early in 1922, while a third will require a fairly large amount of machines for a contemplated new shop, but there is nothing definite about these prospects.

From the New England machine-tool manufacturing standpoint, however, things are slowly but surely improving, as business is coming from other sections of the country. It is interesting to note that the artificial stone manufacturing industry in this section of the country is active and expanding, thereby offering a prospective field to the makers of cranes. The American Woolen Co. has not covered on its crane requirements, nor has the Textile Finishing Machinery Co., Providence.

The Armstrong line of high-speed cutters has been reduced about 10 per cent. One manufacturer of carriage clamps, used extensively in shops, has reduced prices approximately 40 per cent. Coe wrenches heretofore quoted at 33⅓ per cent discount are now 40 and 10 per cent.

L. A. Vachon, Inc., Washington Street, Brookline, Mass., is building a two-story, 60 x 149-ft. sales and service station for automobiles.

The Suffolk Oilless Bearing Co., Woburn, Mass., contemplates opening a plant about Dec. 1 in Buel Place to manufacture impregnated hardwood oilless bushings. George E. Parker, Jr., 230 South Street, Boston, is president, and Austin H. Welch, 105 Blossom Street, Fitchburg, treasurer.

The Fuller Brush Co., Hartford, Conn., will build in the near future a four-story, 80 x 400-ft. manufacturing plant, at an estimated cost of $400,000. It has outgrown its present quarters and is obliged to occupy space outside.

The Thompson-Copeland Co., Worcester, Mass., with a capital of $50,000, has been organized to manufacture a general line of iron and steel products. John T. Brierly, formerly of Brierly, Lombard & Co., Worcester, manufacturers' supplies, is president of the new company, Eugene A. Copeland, formerly with the Hobbs Mfg. Co., Worcester, is vice-president, and Harry C. Thompson, also formerly with the Hobbs Mfg. Co., treasurer. The company has been negotiating for manufacturing space in Worcester and is expected to shortly make an announcement. Initial production probably will be confined to a newly patented article.

The Crane Co., Bridgeport, Conn., manufacturer of valves, steam specialties, etc., has awarded a contract to the T. J. Pardy Construction Co., Bridgeport, for the erection of its proposed one-story addition, 75 x 175 ft., to cost about $48,000, exclusive of equipment. Ten annealing furnaces and auxiliary equipment will be installed.

The Chadwick-Boston Lead Co., 10 Hampden Street, Roxbury, Mass., is considering the rebuilding of the portion of its plant recently destroyed by fire with loss of about $30,000.

The Meisel Press Mfg. Co., 949 Dorchester Avenue, Boston, manufacturer of printing presses, screw machine products, etc., has purchased about 13 acres at Dorchester Avenue and Locust Street, as a site for a new plant to give employment

to about 1000 operatives. Plans will be prepared at an early date.

Edward T. Davis, Springfield, Mass., has awarded a contract to the Edward Radding Construction Co., 158½ Main Street, for the construction of a one-story automobile service and repair works, 75 x 100 ft., on Taylor Street, to cost about $50,000.

C. N. James, 139 Brookline Street, Cambridge, Mass., manufacturer of automobile wheels, will commence the immediate erection of a one-story addition, 100 x 125 ft., estimated to cost close to $50,000.

Failure of foundation caused the electric-charging building of the submarine base, New London, Conn., of the Bureau of Yards and Docks, Navy Department, to fall into the Thames River, Nov. 18, with loss estimated at $50,000. The structure was equipped with machinery for charging submarine batteries and kindred work. Captain F. D. Berrein is commandant at the base.

Philadelphia

PHILADELPHIA, Nov. 28.

The Department of City Transit, City Hall, Philadelphia, will commence the immediate erection of two new power houses on Cumberland and Grescom streets, estimated to cost $45,000 and $42,000, respectively.

The O'Brien Machinery Co., 119 North Third Street, Philadelphia, has received a contract from the Bureau of Water, City Hall, for engine lathes to cost $14,700, for installation at its new machine repair shop. Other machine tools will be installed, contracts for which will be let at an early date.

The City Purchasing Agent, Room 312, City Hall, Philadelphia, will receive bids until Dec. 6, for tools and hardware, as per schedule on file. A. Lincoln Acker is purchasing agent.

The Producers' Cold Storage Terminal, Inc., 1214 Widener Building, Philadelphia, will take bids about Jan. 1 for its ten-story ice and cold storage plant, at Water and Swanson streets, 90 x 275 ft., estimated to cost in excess of $1,000,000 with machinery. Andrew J. Sauer & Co., Denkla Building, are architects and engineers. C. P. Sharpless is president.

The Penn Motors Corporation, 1714 North Broad Street, Philadelphia, Hilton W. Scofield, head, will take bids at once for its one-story automobile manufacturing plant at Pleasantville, N. J., 50 x 300 ft., with power house. Charles H. Donehower, Pleasantville, is engineer.

Fire, Nov. 18, destroyed a portion of the factory of the L. Martin Co., Milner Street, Philadelphia, manufacturer of carbon products, lamp black, etc., with loss of about $100,000, including machinery. Headquarters of the company are at 81 Fulton Street, New York.

A machine shop for parts manufacture and general repair work will be installed in the eight-story automobile service building, 35 x 65 ft., to be constructed at 113 North Prince Street, Lancaster, Pa., by the Domback & Bissinger Motor Co. Grover C. Snyder, 28 North Mary Street, is architect and engineer.

Receivers for the Owen Magnetic Motor Car Corporation, Forty Fort, Pa., have been ordered by the Federal District Court to advertise and hold another sale of the property. Recent bids, tentatively accepted, are held as inadequate.

The Schmick Gear & Screw Co., Williamsport, Pa., recently organized under Delaware laws, has awarded contract to J. V. Bennett & Co., Williamsport, for a one-story plant at Campbell and Edwin streets, 40 x 100 ft., to manufacture special type automobile jacks and kindred products. E. E. Schmick is head. F. Arthur Rianhard, Masonic Temple Building, is architect.

Fire, Nov. 20, destroyed the automobile service and repair works of the Routman Motor Co., Sharon, Pa., with loss reported at $35,000.

The Board of Trustees, State Hospital for Insane, Norristown, Pa., will receive bids until Dec. 6 for a motor-driven centrifugal pump, metering feed-water heater, flue gas pyrometers and recording watt meter panel board for the power house. W. W. Hibbert, 415 Penfield Building, Philadelphia, is engineer for the board. Oscar L. Schwartz is steward.

A machine shop and mechanical department will be installed in the new high school to be erected by the Board of Education, Reading, Pa.

A new power house, with ice-manufacturing and ice storage plants, will be built by the Board of Directors of the Harrisburg Hospital, Harrisburg, Pa., in connection with the erection of additions to the institution, estimated to cost close to $900,000, with site.

A one-story power house will be constructed by the Lancaster Milk Products, Inc., Lancaster, Pa., at its new plant at 623 Thirty-second Street, Lancaster, estimated to cost about $100,000. John Harman, 48 North Queen Street, is architect.

Chicago

CHICAGO, Nov. 28.

The holiday last week accentuated the dullness of the market. The general situation shows little change, but prospective railroad buying seems closer to realization. The Rock Island, which has delayed buying for months because it regarded prices too high, is expected to issue a large list in the near future. The Santa Fe has asked for revised quotations on a list for its Argentine, Kan., shops, and in addition is inquiring for two axle lathes, two 20-in. engine lathes, and one radial drill. The Chicago & Northwestern and the Illinois Central are both working on their budgets and will probably issue lists early next year. At St. Louis the Missouri, Kansas & Texas has bought against its large inquiry reported in these colums some weeks ago.

The Rienzi Garage, 554 Diversey Boulevard, Chicago, has had plans drawn for a one-story garage, 117 x 230 ft., at the northeast corner of Lehman Court and Dole Avenue, to cost $100,000.

F. M. Feldman has purchased property at 15-19 South Racine Avenue, Chicago, and will at once erect an auto sales and service station to cost $30,000.

Charles S. Smith, Berwyn, Ill., has taken out a building permit to construct a one-story sales room and service station, 100 x 150 ft., at the northwest corner of Harlem and Ogden avenues, to cost $20,000.

The Swartz Mfg. Co., Freeport, Ill., has been incorporated with $100,000 capital stock to do a general foundry and machine shop business. A plant is now being constructed, but equipment has not yet been bought. Carl H. Swartz is president and treasurer and R. G. Youngblut, secretary.

The Rockford Automatic Sprinkler Co., 419 West State Street, Rockford, Ill., has been incorporated with $10,000 capital stock to engage in a contracting business for the installation of automatic fire sprinklers, steam and hot water heating. It has no plant at present. The officers are P. Schultz, president; D. E. McDaniel, secretary, and A. J. Retinger, treasurer.

The Agate Auto Appliance, Inc., 1721-25 Park Avenue, Chicago, is a reorganization of the Agate Foundry & Pattern Works. A change in name was prompted by the fact that the company's production now consists of automobile accessories, which it is marketing itself. It requires no additional equipment at present. The officers are: President, J. P. Brownlee; vice-president, D. H. Brownlee, and secretary-treasurer, K. H. Brownlee.

H. E. Forke, 3261 Fullerton Avenue, Chicago, has let contract for a one-story garage and automobile repair shop, 50 x 125 ft., on Milwaukee Avenue near Logan Square, to cost $40,000.

The Duty Motor Corporation, 19 North Spring Street, Elgin, Ill., has let a contract for a one-story plant, 250 x 250 ft., for the manufacture of automobile trucks, estimated cost $80,000.

Gerts, Lumbard & Co., 2104 West Grand Avenue, Chicago, manufacturers of calcimine brushes, have let contract for a three-story factory, 26 x 85 ft., to cost $27,000.

The Ogden Woodworking Co., 236 Kildare Avenue, Chicago, has let contracts for a one-story factory, 46 x 106 ft., to cost $9,500.

The Woodruff & Edwards Co., Elgin, Ill., plans to erect a three-story foundry, 50 x 100 ft., to cost $50,000.

The City Council, Corning, Iowa, will call for bids early in January for the erection of its one-story municipal electric power plant, estimated to cost about $60,000. C. K. Munns, Corning, is engineer.

A complete machine shop, foundry, electrical department, automobile engineering department, and other mechanical departments will be installed in the two-story and basement vocational school to be constructed by the Board of Education, Chisholm, Minn., estimated to cost about $400,000. E. F. Bromhall, 719 Alworth Building, Duluth, Minn., is architect.

P. G. McConnell, formerly connected with the Belden Mfg. Co., 2300 Southwestern Avenue, Chicago, has organized the McConnell Cable & Specialties Co., 426 South Clinton Street, to specialize in the manufacture of electrical specialties for automotive service, and other electrical equipment.

The Suburban Ice Co., La Grange, Ill., is contemplating the erection of a new ice manufacturing plant at Joliet, Ill., with initial daily capacity of 100 tons. It is estimated to cost $60,000. L. E. Stanley is president.

The Board of Education, City Hall, St. Paul, Minn., will build a four-story manual training building, 70 x 130 ft., on Fourteenth Street, to cost $60,000.

The Auto Top Co., 316 Park Avenue, Waterloo, Iowa, has awarded contract to John J. Judd, 711 Baltimore Street, for a one-story and basement plant to manufacture automobile tops and similar products. L. P. Miller is manager.

A machine shop, electrical shop and general mechanical department will be installed in the two or three-story junior high school to be erected by the Board of Education, Minneapolis, Minn., estimated to cost in excess of $600,000. A site will be selected at an early date. E. H. Enger, City Hall, is architect.

Detroit

DETROIT, Nov. 28.

A slight recession in buying the past week is reported by local machine-tool dealers, partly due to the slowing up which precedes the inventory season.

The General Forgings Corporation is making rapid progress on the construction of the first unit of its plant at Salliotte Avenue and the Michigan Central Railroad, Detroit. The first floor will house die rooms, cold trim room and forge shop. Several other units are in prospect. The site owned by the company covers about 10 acres.

The Michigan Hardware Co., Grand Rapids, Mich., will soon start the erection of an addition, 100 x 100 ft., to cost $30,000.

The Michigan Sheet Metal Works, Lansing, Mich., has moved into the new plant just completed by the H. G. Christman Co. and is planning on further expansions to take care of several contracts recently received.

The Olivine Co., Marquette, Mich., has started construction on a new rock crushing unit. When completed another unit will be erected.

The Champion Gravel Co., Iron Mountain, Mich., is completing a new rock crusher near Loretto, Mich. Another will soon be started at Pound, Wis.

The Muellers Metals Co., Port Huron, Mich., has received an order from a Detroit automotive manufacturer for brass parts amounting to $525,000 and states that future orders for replacements will probably bring it up to $750,000. The contract term is from Nov. 1, 1921, to Nov. 1, 1922.

A one-story power house will be erected by the Story & Clark Piano Co., Grand Haven, Mich. Plans have been prepared by Byron E. Parks & Son, Grand Rapids, Mich.

A vocational department will be installed in the two-story high school to be erected by the Board of Education, Kalamazoo, Mich., at a cost of $200,000. Robinson & Campau, 715 Michigan Trust Building, Grand Rapids, Mich., are architects.

The American Brick & Tile Co., River Rouge, Mich., recently organized, has acquired about 16 acres of land, with 600 ft. water frontage, as a site for a plant to manufacture pressed brick, tile, etc. Plans will be prepared at once. About 500 men will be employed.

The Kent Cold Storage Co., Front Street, N. W., Grand Rapids, Mich., is arranging for the erection of a new refrigerating and cold storage plant. G. H. Hess is engineer in charge.

Pittsburgh

PITTSBURGH, Nov. 28.

The past week has developed some activity in cranes. The West Penn Power Co. has closed with the Milwaukee Electric Crane & Mfg. Co., Milwaukee, for two 10-ton, one-motor cranes, one for a subsidiary, the Windsor Coal Co., Wellsburg, W. Va., and the other for a repair shop at Logan's Ferry, W. Va. These cranes are of 27-ft. span, to run on a 15-ton bridge, and trolley and bridge are hand-controlled. The city of Toledo has closed for a 10-ton Niles crane for a new municipal pumping station. The Northern Engineering Works, Detroit, was the successful bidder for a 15-ton, with 5-ton auxiliary, 4-motor crane of 50-ft. span for the National Roll & Foundry Co., Avonmore, Pa. It is expected that the Sanderson Cyclone Blower Co., Orrville, Ohio, will close this week for a 10-ton crane, and the award of two and possibly four cranes wanted by the Standard Underground Cable Co. now is looked for before the end of the year. A good many requests for revised prices against old crane inquiries are coming in and also for prices for estimating purposes. Some of the Steel Corporation subsidiaries are likely to place cranes after the first of the year and the Wheeling Steel Corporation is another prospect.

Machine-tool business still is of small proportions and is largely of a pick-up character. One local firm reports sales of a 4-in. motor-driven pipe machine, three motor-driven drill presses and a small floor grinder. There is no business from the railroads nor from the railroad equipment companies. The Pressed Steel Car Co. early this year put out an inquiry for a grinder, but has not yet bought, and it is regarded as dormant. The West Penn Power Co. is yet to close on the list of tools put out early in the year and recently revived, and bids against the tools for the Western Penitentiary are being tabulated.

The Pittsburgh Malleable Iron Co., Thirty-fourth and Smallman streets, Pittsburgh, has preliminary plans under way for a one-story plant at Ellwood City, Pa.

A vocational department will be installed in the new Samuel P. Langley High School, to be erected by the Board of Education, Pittsburgh, at Chartiers and Hutton avenues. The superintendent of buildings, 1326 Fulton Building, is in charge.

The Butler-Buick Co., Main Street, Butler, Pa., will take bids early in the year for a three-story service and automobile repair building on Main Street. The Hunting, Davis Co., 1150 Century Building, Pittsburgh, is architect and engineer.

The West Penn Power Co., Pittsburgh, operated by the West Penn Railways Co., has acquired the West Virginia & Maryland Power Co., Kingwood, W. Va., recently organized to operate at Grafton, W. Va., and vicinity. The power plant at the latter place will be taken over and extensions in generating plants and lines will be made.

The Jamison Coal & Coke Co., Greensburg, Pa., is planning for the installation of electrical equipment and other machinery at its No. 9 mine, Farmington, W. Va.

Fire, Nov. 23, destroyed the gas compressor plant of the West Virginia Utilities Co., Morgantown, W. Va., with loss estimated at about $100,000, including machinery. It will be rebuilt.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, is completing plans for a new generating plant in the Big Sandy district, near Pikesville, W. Va. Francis R. Weller, Hibbs Building, Washington, D. C., is engineer.

The Nitro Mfg. & Mine Supply Co., P. O. Box 1494, Nitro, W. Va., is arranging a list of equipment for installation at its machine shop and foundry, plans for which have been prepared.

Following the sale of its coal properties to the Consolidation Coal Co., Cumberland, Md., the Monongahela Power & Railway Co., Fairmont, W. Va., is planning to use a portion of the proceeds for extensions and improvements in its electric power plants and system. George M. Alexander is president.

Ohio

Cleveland dealers have received an inquiry from Youngstown for new equipment for a manual training school, the list including six 10-in. and six 13-in. lathes. The American Steel & Wire Co., through its Cleveland office, has sent out a new inquiry for about a half-dozen machines, used tools being specified. Inquiries are a little more plentiful and sentiment in the trade shows improvement. While inquiries are largely for single machines, two or three came out for lots up to four or five tools. The Durant Motors, Inc., is still buying equipment and is reported to have purchased during the week two large automatic machines from surplus equipment of a Detroit automobile plant. The U. S. Compressor Co., Cleveland, has purchased a three-spindle vertical drilling machine. The demand for presses continues fairly good.

There is virtually no change in the volume of standard tool sales. Many prospective purchasers are simply getting prices on machinery which they will not buy before the first of the year. This makes the outlook more promising for January, but the trade does not expect an increase in sales the remainder of the year. The only price change noted is a reduction of approximately 15 per cent on standard types of planers by the G. A. Gray Co., Cincinnati. The only crane order reported is one for a 10-ton Niles electric traveling crane placed by Toledo for a new waterworks pumping station.

Cincinnati manufacturers report the receipt of orders the past week which will bring the total for the month up to that in October. The Missouri, Kansas & Texas Railroad was a heavy buyer, one local manufacturer receiving an order for five lathes, another for several drilling machines, and one for a crank planer. A nearby manufacturer secured a number of shapers from the same road. The International Nickel Co. bought some equipment for its new plant at Huntington, W. Va., it being reported that a local manufacturer had secured an order for 10 lathes. A central Ohio machine-tool manufacturer bought three milling machines and a drill. Other sales of one and two machines, mostly used equipment, are reported, but the tendency to buy second-hand equipment at bargain prices is said to be slowly disappearing. A number of inquiries are being figured on at present and it is expected that after the first of the year many will develop into orders.

The Galion Iron Works & Mfg. Co., Galion, Ohio, is planning the erection of an addition to manufacture motor driven road rollers, and has placed contract for a 60 x 120 ft. steel concrete building for storage purposes.

The Interstate Cotton Pickers, Toledo, Ohio, has been organized with $250,000 capital stock to manufacture a new

type of cotton picking machine, recently developed in that city. It is expected that a plant to manufacture the machines will be established in Toledo. William H. Albrecht, treasurer Interstate Coal Co., Toledo, is secretary.

The E-Z Collapsible Rim Co., Conneaut, Ohio, has increased its capital stock from $10,000 to $1,000,000 and plans to increase its facilities for manufacturing automobile rims. It is reported that the company has under consideration the addition of a drop forge plant. W. T. Manning is president, and Frank Haefner, secretary and treasurer.

The Superior Refrigerating Co., Wapakoneta, Ohio, is contemplating the extension of its plant to manufacture refrigerating machinery.

The Billings-Chapin Co., Cleveland, manufacturer of paint, is having plans prepared for a four-story addition, 80 x 110 ft.

The National Sulphur Co., New York, has acquired a site in Akron, Ohio, where it will at once begin the erection of a plant, including four main buildings, 250 ft. long, of steel construction, and a boiler house, involving an expenditure of approximately $300,000.

The Lewis Electric Co., Minerva, Ohio, advises that the item recently published that contract for its new buildings had been let to the Boldt Construction Co., Cleveland, is incorrect. The company is erecting its own plant with the Watson Engineering Co., Cleveland, as engineer. The size of the main building is to be 62 x 162 ft., two stories, and there will be a one-story building, 20 x 40 ft., and a power plant, 20 x 25 ft. The construction is of brick and steel throughout. J. C. Lewis is president.

Baltimore

BALTIMORE, Nov. 28.

The Novelty Steam Boiler Works, 917 South Howard Street, Baltimore, has filed plans for a one-story addition, 52 x 73 ft., and two-story leanto building adjoining, 54 x 105 ft., to cost about $25,000.

The Adamantex Brick Co. of Maryland, Baltimore, recently organized with a capital of $1,000,000 to manufacture sand-cement bricks, has taken title to about 25 acres in the Towson section as a site for its plant. The initial works will develop a capacity of about 200,000 brick per day. Louis F. Ducker is president. The company is represented by Blum & Makover, Equitable Building.

The Darco Corporation, du Pont Building, Wilmington, Del., a subsidiary of the Atlas Powder Co., will break ground at once for its plant at Marshall, Tex., to manufacture a special refined carbon. It will have an initial output of about 6000 tons a year and with machinery will cost close to $500,000. W. J. Webster is president.

A vocational department will be installed in the three-story and basement high school, 140 x 170 ft., to be erected by the Board of Education, Newport News, Va., at an estimated cost of $400,000. Charles M. Robinson, Times-Dispatch Building, Richmond, Va., is architect. George L. Palmer, 2711 Washington Avenue, is chairman of the board.

The Southern Power Co., Charlotte, N. C., is planning for the construction of a new hydroelectric generating plant on the Catawba River, near Mountain Island, N. C., to develop about 80,000 hp. It is also proposed to enlarge the plant at Great Falls, S. C., from 40,000 to 60,000 hp.

The Bowie Stove Works, Rome, Ga., has filed notice of change of name to the Rome Range & Stove Co. Plans are nearing completion for rebuilding the local plant, recently destroyed by fire, with enlarged machine shop, foundry and other manufacturing departments. J. M. Berry is one of the heads of the company.

A vocational department will be installed in the two-story and basement high school, 75 x 300 ft., to be constructed by the Board of Education, Wilson, N. C., estimated to cost about $250,000. C. C. Wilson, Palmetto Building, Columbus, S. C., is architect. C. L. Coones is superintendent of the board.

The Davis Motor Co., 221 West Fourth Street, Charlotte, N. C., is arranging a list of equipment to be installed at its automobile service and repair works. C. A. Burgess is president and general manager.

The Fulton Bag & Cotton Mill Co., Atlanta, Ga., has commissioned J. E. Sirrine & Co., Greenville, S. C., engineers, to prepare plans for a new power plant.

C. T. Ingram, Atlanta, Ga., has completed plans for a new ice factory, with initial daily capacity of about 50 tons, estimated to cost $100,000, including machinery.

A machine and mechanical shop will be installed in the three-story high school, 215 x 270 ft., to be constructed by the Board of Education, Charlotte, N. C., at a cost of about $300,000. A power plant and cold storage department will also be installed. Bids will be asked about Dec. 15. Lockwood, Greene & Co., 101 Park Avenue, New York, are architects and engineers.

The Standard Ice Co., Lynchburg, Va., has completed plans for an addition to its ice and refrigerating plant at 609 Main Street, 50 x 75 ft., and will commence work at once. E. C. Ivey is president.

The Continental Garage & Service Corporation, 715 Gaither Estate Building, Baltimore, has been organized and arrangements are being made for the establishment of a plant for the repair of automobiles, etc. J. Bacon Hyatt is interested.

The Fowler & Farley Engineering Co., 2121 Oak Street, Baltimore, recently organized, will establish a machine shop. A. R. Kasson is manager.

The Nash Motor Co., Oliver Street and Maryland Avenue, will build a three-story automobile repair and service station.

Indiana

INDIANAPOLIS, Nov. 28.

The Indiana Hydro-Electric Power Co., Indianapolis, recently organized with a capital of $5,000,000, has plans under way for the construction of the first of five hydro-electric generating plants on the Tippecanoe River. It will be located at Norway, near Monticello, and is estimated to cost about $1,000,000 with machinery. Subsequent plants, all to be tied in with a main transmission system, will be constructed at Oakdale, Springboro and Tioga, with final site to be selected. Samuel Insull, head of the Middle West Utilities Co., 72 West Adams Street, Chicago, is president of the company; Harry Reid, president of the Interstate Public Service Co., Indianapolis, is vice-president and general manager.

The Reedy Elevator Co., 1026 Kentucky Avenue, Indianapolis, manufacturer of passenger and freight elevators, has preliminary plans nearing completion for the erection of a new factory on South New Jersey Avenue estimated to cost about $50,000. D. V. Reedy is president.

A vocational department will be installed in the three-story and basement high school, 230 x 450 ft., to be erected at Calhoun and Gumper streets, Fort Wayne, Ind by the Board of Education, work upon which is under way. It will cost about $750,000. Griffith & Goodrich, 211 East Berry Street, are architects.

The Carter Electric Co., Kokomo, Ind., has awarded a contract to Thomas Heckman, 810 South Webster Avenue, for a two-story and basement plant on South Washington Street to manufacture electrical specialties.

The International Harvester Co., 606 South Michigan Avenue, Chicago, is said to be planning to proceed with its new works on Pontiac Street, Fort Wayne, Ind., early in the spring. It will manufacture tractors and parts and is estimated to cost in excess of $3,000,000. Day & Zimmerman, 611 Chestnut Street, Philadelphia, are engineers.

Buffalo

BUFFALO, Nov. 28.

The North East Electric Co., manufacturer of electrical equipment for automotive vehicles, Rochester, N. Y., wants the following used machines in good condition:

No. 00 Brown & Sharpe automatics,
No. 0 Brown & Sharpe automatics,
No. 2 Brown & Sharpe automatics,
Two 74½ Bliss straight side geared presses,
No. 2 A Warner & Swasey screw machines,
No. 5 Cochrane & Bly cold saw,
Drop hammers up to 500 lb., either board or belt.

The Electro Refractories Corporation, Ellicott Square, Buffalo, manufacturer of crucibles, has awarded contract to Harding & Crea, Buffalo, for rebuilding its plant on Townline Road, East Hamburg, destroyed by fire Oct. 26, with loss approximating $200,000. The new plant will include a main works, 50 x 300 ft., and machine shop, 30 x 75 ft. L. U. Milward is manager.

Z. T. Darrow, Canandaigua, N. Y., has completed plans and will construct by day labor a new one-story machine shop, 80 x 100 ft. William S. Lozier, Cutler Building, Rochester, N. Y., is architect.

The Board of Supervisors, Buffalo, is considering the construction of a central steam power house for service at the county jail and other buildings. Recommendation for the plant has been made to the Board by William F. Waldow, County Sheriff, in charge.

A machine and mechanical department for vocational instruction will be installed in the two-story high school to be erected by the Board of Education, Williamsville, N. Y., estimated to cost about $150,000. Martin C. Miller and Daniel McNeil, associated architects, 80 West Genessee Street, Buffalo, are preparing plans.

Guerdon Hotchkin, Andes, N. Y., has completed plans and will commence the immediate erection of a two-story automobile service and repair building, 50 x 100 ft.

The American Body Co., 1200 Niagara Street, Buffalo, manufacturer of automobile bodies, is perfecting plans for the immediate erection of its three-story addition, 50 x 50 ft.

Milwaukee

MILWAUKEE, Nov. 28.

One of the most encouraging features of the market is the revival in demand upon foundries, which are steadily getting back to a normal operating basis. Orders cover principally gray and malleable iron, while steel foundries are making some progress as well. In the last 10 days orders have been coming to local shops with relative briskness, which is expected to have a favorable effect upon the machine tool business in the near future. There is a quantity of both new and used equipment to be disposed of before increasing demands will enable manufacturers to place their shops on anything like a normal production basis.

The Super-Traction Truck Co., Fox Lake, Wis., a $300,000 corporation organized a year ago and now manufacturing six-wheeled motor trucks in leased quarters, is negotiating with the Industries Bureau, Association of Commerce, Fond du Lac, Wis., with a view of establishing permanent works in that city. J. M. Gooding has been appointed chairman of a special committee to conduct investigation. D. G. Stroebel is manager of the Fox Lake concern.

The Jacobsen Mfg. Co., Racine, Wis., which has increased its capital stock from $50,000 to $100,000, expects to enlarge its plant during 1922 and at present is increasing its working force nearly 100 per cent. It specializes in the manufacture of a motor-driven lawn mower.

The International Steel Products Co., Hartford, Wis., established four years ago to manufacture mufflers or silencers for motor vehicle engines, is expanding its line of production into the general pressed sheet steel field, including pedestals, floor lamps, and other specialties. It does not contemplate enlargement of its factory at this time, but is buying a small quantity of new equipment from time to time.

The Fort Howard Paper Co., Green Bay, Wis., has let the general contract to the Ludolf M. Hanson Co., local, to design, erect and equip a new paper mill costing $125,000. It will be 100 x 120 ft., three stories and basement, with a separate power plant and boiler house. Foundations will be laid during the winter and the superstructure erected early next spring. A. E. Cofrin is general manager.

The Peshtigo, Wis., Service Garage, owned and operated by Parlow Brothers, will start work at once on the construction of a one-story addition, 50 x 76 ft., to be used principally for machine work and repairs. Equipment is now being purchased.

The Madison, Wis., Association of Commerce is considering an inquiry from a manufacturer of pneumatic tools and accessories, whose name is withheld, who seeks a new location and specifies accommodations at from 25,000 to 40,000 sq. ft.

The Board of Education of Burlington, Wis., has selected the site for the proposed new high school and vocational training institute and expects to designate architects and engineers at once. The investment will be about $200,000. F. F. Witter is city superintendent of schools.

The Maribel, Wis., Straw Cutter Co., Henry A. Elmer, president, is starting work on a factory, 40 x 95 ft., one story, for manufacturing attachments for threshing machines and feed cutters. It will cost about $25,000.

The Phoenix Chair Co., Sheboygan, Wis., will let contracts on Dec. 1 for a four-story brick, steel and concrete addition, 168 x 180 ft., at Twelfth Street and Virginia Avenue. Edward A. Juul, local, is architect and engineer. The work will cost about $115,000.

The H. & M. Body Corporation, Racine, Wis., has closed a contract with the Hupp Motor Car Corporation, Detroit, for 6500 open and closed automobile bodies for delivery in 1922 in carlots of 34 bodies each, beginning Jan. 1. The plant is operating with a force of 600, but more men will be added at once and by the end of the year 1000 will be employed. Instead of closing for inventory during the latter half of December, the H. & M. company reduced operations the last 10 days of November to facilitate handling of the Hupp order, on which production will start the coming week. The company also is building all bodies for the Mitchell Motors Co., Racine.

The Common Council of Sheboygan, Wis., will take bids soon for equipment of an addition to the municipal garbage incinerator plant, 40 x 65 ft., and to cost about $25,000 complete. C. U. Boley, city engineer, is in charge.

The Board of Education of Delavan, Wis., has engaged Edward Tough, architect, Madison, Wis., to design a new high school, 95 x 130 ft., three stories and basement, with manual training department. The estimated cost is $125,000. Bids probably will be taken immediately after Jan. 1.

The Gulf States

BIRMINGHAM, Nov. 28.

The Birmingham Paper Co., Birmingham, has awarded contract to C. M. Allen & Son, Birmingham, for a one-story plant, 100 x 200 ft., to manufacture corrugated paper boxes, estimated to cost about $75,000, and of which amount approximately $40,000 will be expended for machinery. T. M. McClellan is president.

The shipbuilding plant of the Foundation Co., New Orleans, comprising 52 buildings, has been sold to Oliver H. Van Horn, local dealer in machinery and mechanical equipment, for about $35,100, exclusive of machinery. The yard, with machinery, represented an investment of about $2,500,000. It is proposed to establish a number of industries at the site.

In connection with rebuilding the portion of its plant recently destroyed by fire, the National Forge Co., Anniston, Ala., will install a quantity of new equipment. The work is estimated to cost close to $50,000. T. C. King is treasurer and general manager.

Pending the rebuilding of its plant recently destroyed by fire the P. Forschler Wagon & Mfg. Co., New Orleans, will establish a temporary factory at 2831 Burgundy Street. J. A. Maschek is general manager.

The Bogalusa Paper Co., Bogalusa, La., has tentative plans in preparation for an addition to its paper mill, estimated to cost about $800,000, including machinery. W. H. Sullivan is president.

The Texas Utilities Light & Ice Co., Lubbock, Tex., is planning to rebuild its electric power and ice-manufacturing plants destroyed by fire Nov. 16, with loss estimated at about $100,000 with equipment.

The Standard Piston Ring Co., Weatherford, Tex., recently organized, has perfected plans for the early operation of a factory to manufacture piston rings for automobile engines and other specialties. E. A. Frantz is president and general manager.

The Humphreys-Mexia Co. and the Humphreys-Texas Co., affiliated, Mexia, Tex., are planning for the installation of new machinery and operating equipment, tanks, etc., at their properties, estimated to cost in excess of $2,500,000. Col. E. A. Humphreys is president.

The Owens Refinery Co., Ardmore, Okla., is planning for the immediate erection of a new plant at Cameron, Tex., with initial daily capacity of about 1500 bbl. Local offices will be established in First National Bank Building, Cameron.

The Common Council, Quincy, Fla., is arranging a bond issue of $100,000, the proceeds to be used for the construction of a municipal electric power plant.

An electrically operated pumping plant and re-lift station, estimated to cost about $103,600, will be constructed by the Board of Directors, Water Improvement District No. 3, Robertson, Neuces County, Tex., in connection with its irrigation project to cost $300,000 complete. Walton & Arneson, San Antonio, Tex., are engineers.

The Humphreys-Pure Oil Pipe Line Co., Mexia, Tex., recently organized by Col. E. A. Humphreys of the Humphreys-Mexia Co., and associates, with capital of $1,000,000, is planning for the erection of a new refinery in this section, with initial capacity of about 10,000 barrels per day. New pipelines and storage facilities will be provided to handle in excess of 25,000 barrels of oil per day.

The New Orleans Railway & Light Co., New Orleans, is arranging an appropriation of $1,000,000, most of which will be used to purchase new electric generating and other power plant machinery. It is proposed to provide facilities to accommodate 2500 new consumers.

The Texas Utilities Co., Plainview, Tex., has plans under way for extensions in its electric generating plant. An addition to the ice-manufacturing plant will also be constructed. J. B. Scott is manager.

The Baltimore Consumers' Supply Co., Montgomery, Ala., a subsidiary of the Gulf Cross Arms Co., has acquired property at Fairfield, Baltimore, Md., as a site for a new lumber mill, with machinery to provide for an output of about 500,000 ft. per month. Plans will be prepared at an early date.

The Alabama Power Co., Birmingham, has disposed of a bond issue of $5,500,000, the proceeds to be used for general operations, hydroelectric power plant and line extensions and improvements, etc. Thomas W. Martin is president.

Fire Nov. 19 destroyed the electric power plant of the

Corpus Christi Railway & Light Co., Corpus Christi, Tex., with loss estimated at about $80,000 including machinery. It will be rebuilt.

The George D. Collins Experimental Laboratories, Harrisburg, Tex., are in the market for a used 22 or 24-in. x 8 or 10-ft. engine lathe and a used 36-in. or 48-in. drill press.

The Central South

ST. LOUIS, Nov. 28.

The Missouri, Kansas & Texas Railroad last week placed orders for about 90 per cent of its machine tool requirements. The remaining items on the list of 86 tools, it is said, will be placed this week.

The Western Tie & Timber Co., St. Louis, J. H. Poleman, president, is having plans prepared for a hydroelectric plant on the Current River at Eminence, Mo.

The Unico Motor Products Corporation, 1225 West Fifty-ninth Street, Kansas City, Mo., will soon break ground for a new plant on Rochester Avenue, consisting of a main works, 60 x 224 ft., and one-story foundry, 60 x 160 ft. F. H. Crites, 2136 Belleview Avenue, has the contract. W. T. Alexander is head.

The Joplin Zinc Products Co., Joplin, Mo., has plans under way for a two-story factory to manufacture zinc shingles and other products, estimated to cost about $50,000. O. Greenstreet heads the company.

A machine shop and other mechanical departments will be installed in the two-story manual training school addition to be erected by the Board of Education, Muskogee, Okla., estimated to cost about $60,000. H. O. Valeur & Co., 705 Manhattan Building, are architects.

The King Foundry Co., Eighth and Donphan streets, St. Joseph, Mo., will make extensions and improvements in its welding works, 42 x 200 ft., and foundry, 60 x 80 ft., to cost about $22,000.

The Board of Education, Independence, Kan., will install a machine and mechanical department in its new three-story high school, 150 x 266 ft., estimated to cost about $500,000, bids for which will be received up to Dec. 15. A power house will also be erected. N. S. Spencer & Son, Old Colony Building, Chicago, are architects.

The Polar Wave Ice & Fuel Co., Grand and Olive streets, St. Louis, will soon call for bids for a two-story ice manufacturing plant on Gravois Avenue, estimated to cost close to $500,000, including machinery. H. G. Clymer, Wainwright Building, is architect.

The Republic Photographic Co., Ferguson, Mo., manufacturer of sensitized paper products, will build a power house in connection with its new plant, 77 x 162 ft. and 54 x 250 ft., ground for which has been broken. With machinery, the plant will cost about $250,000, or about double the amount previously estimated. Albert F. H. Seelig, 2194 Railway Exchange Building, St. Louis, is engineer. Headquarters of the company are at Kansas City, Mo. E. B. Fish is president.

A machine and other mechanical departments will be installed in the two-story and basement junior high school addition, 110 x 134 ft., to be erected by the Board of Education, El Reno, Okla., estimated to cost about $215,000. Layton, Smith & Forsyth, 701 Southwest National Bank Building, Oklahoma City, are architects.

The Dosch Chemical Co., Louisville, has acquired a building with over 15 acres of floor space for the establishment of a plant to manufacture spraying, dusting and other machinery. The structure will be remodeled and the machinery installation is estimated to cost in excess of $175,000. Theodore Dosch is president.

The Walsh Motor Car Co., 4919 Delmar Street, St. Louis, has plans nearing completion for a two-story automobile service and repair building estimated to cost about $80,000. Cornet & Casey, Chemical Building, are architects. W. D. Walsh is president.

A manual training department will be installed in the three-story and basement high school to be erected by the Board of Education, Wellington, Kan., to cost about $300,000. T. W. Williamson, Central National Bank Building, Topeka, Kan., is architect.

J. C. Perculers, Jr., 603 Wainwright Building, St. Louis, has plans under way for the erection of a one-story machine shop and automobile service works, 45 x 150 ft., at 5152 Southwest Avenue, estimated to cost close to $50,000, including equipment.

Seattle

SEATTLE, Nov. 22.

John A. Moge, Gresham, Ore., has acquired a site and has plans under way for a one-story foundry to manufacture malleable iron castings.

The Doernbecker Mfg. Co., Portland, Ore., will take bids at an early date for its new six-story furniture manufacturing plant on East Twenty-eighth Street, estimated to cost in excess of $350,000, including machinery. M. Patterson is company engineer.

Claude Starr, Portland, Ore., is having plans prepared by Sutton & Whitney, Lewis Building, architects, for a five-story automobile service and repair building at Pine and Fourth streets, estimated to cost $75,000.

The Okanogan Valley Power Co., Oroville, Wash., has preliminary plans under way for the second unit of its hydroelectric generating plant on the Similkameen River, estimated to cost in excess of $300,000, including machinery.

The Northwestern Power & Mfg. Co., New York Building, Seattle, Wash., has filed a permit to construct a hydroelectric generating plant at Lake Crescent and Lyre River, Clellam County, estimated to cost about $400,000, with machinery.

The N. W. Race Mfg. Co., Billings, Mont., recently organized, has plans under way for a new factory to manufacture valves and other steam specialties, estimated to cost $50,000. N. W. Race heads the company.

California

SAN FRANCISCO, Nov. 22.

The Santa Fe Railroad Co., Los Angeles, is completing plans for a new steam-operated electric power house at San Bernardino, Cal., estimated to cost about $200,000. H. S. Wall, mechanical superintendent of coast lines, is in charge.

The Buttress-McClellan Co., Los Angeles, has awarded contract to the Austin Co., Los Angeles, for a new steel fabricating plant, to comprise two one-story buildings, each about 50 x 160 ft., estimated to cost $100,000, including equipment.

The Tustin Ice & Cold Storage Co., Tustin, Cal., recently organized, has completed plans and will take bids at once for a new ice-manufacturing plant, estimated to cost about $55,000. Harvey Ritner is president, and C. A. Vance, secretary and treasurer.

Braun, Bryant & Anderson, Santa Monica, Cal., are planning to rebuild the portion of their asphalt manufacturing plant, including power house, recently destroyed by fire with loss estimated at close to $60,000.

A machine and mechanical department will be installed in one of the group of four high school buildings to be erected by the Board of Education, Pasadena, Cal., for vocational training, estimated to cost $500,000. Allison & Allison, 1405 Hibernian Building, Los Angeles, are architects.

The American Aluminum Metal Products Co., Burbank, Cal., will break ground at once for the first unit of its new plant, estimated to cost in excess of $50,000. Richard D. King, 519 Van Nuys Building, Los Angeles, is architect.

A machine shop, electrical department, automobile and other mechanical shops will be installed in the manual training division of the two-story high school to be erected by the Board of Education, San Diego, Cal., estimated to cost about $300,000. T. C. Kistner, 307 Bancroft Building, is architect.

Canada

TORONTO, Nov. 28.

The machine-tool market has improved considerably the past week and dealers have again become quite optimistic with regard to the early future. Some state that they have closed more business this month than for any other month this year and many buyers who have been inquiring for equipment are beginning to close orders. Small tools have not improved to any extent the past week, but dealers are receiving a steady flow of orders for small quantities. Although one or two concerns have recently let contracts for equipment for an entire plant or addition, no big lists are in the market and sales are confined mostly to one or two machines.

The Kinleith Paper Co., St. Catharines, Ont., is in the market for a 24-in. lathe with 15-ft. bed. It is also contemplating building a new paper-making machine for its own use, and in this event additional equipment will be required.

The Beaver Truck Corporation, Hamilton, Ont., is planning extensive developments there.

Contract for the erection of a plant at Peterborough, Ont., for the Red Arrow Tires, Ltd., has been awarded to John E. Hayes & Son. It calls for the completion of the plant within 120 days.

The Cyclone Fence Co. of Canada, Ltd., Hamilton, Ont., proposes to build a manufacturing plant there.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.68c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.68c.
Hoops, base price	3.53c.
Bands, base price	3.28c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.78c.
Channels, angles and tees under 3 in. x ¼ in., base	2.68c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.65c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.85c.
Toe calk, ½ x ⅜ in. and larger	3.25c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.78c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c.
No. 16	4.25c.
Nos. 18 and 20	4.40c.
Nos. 22 and 24	4.55c.
No. 26	4.70c.
No. 27	4.85c.
No. 28	5.00c.
No. 30	5.50c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
⅛ in. Butt	—55	—40	¾ in. Butt	—30	—13
¼ in. Butt	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt	—62	—49	2 in. Lap	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap	—55	—41	7-12 in. Lap	—23	— 7
9-12 in. Lap	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

* Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 17½c.
High brass wire	17¼c. to 17½c.
Brass rod	14¼c. to 15 c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18 c. to 19 c.
Copper tube, seamless	21 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$6.05	$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC	$10.25	$8.75	IC	6.40	6.15
IX	11.50	10.25	IX	7.40	7.15
IXX	13.25	11.75	IXX	8.40	8.15
IXXX	15.00	13.50	IXXX	9.40	9.15
IXXXX	16.50	15.25	IXXXX	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	32½c.
Bar	39c. to 41c.

Copper

Lake ingot	16 c.
Electrolytic	15¾c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	11c. open 11½c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7 c.
Solder, ½ and ½ guaranteed	22¼c.
No. 1 solder	20¾c.
Refined solder	17¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	29c. to 31c.

Old Metals

The market continues strong with an upward tendency. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.00
Copper, heavy and wire	10.50
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.50
Heavy machine composition	8.00
No. 1 yellow brass turnings	5.25
No. 1 red brass or composition turnings	6.75
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.00

THE IRON AGE

New York, December 8, 1921

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Charging Floor with Undercover Storage

Careful Hand Molding for Semi-Steel Printing Press Castings—Raw Materials Unloaded in Single Operations —Core-Making Expedited with Special Cement Boxes

BY EDWIN A. HUNGER

IN the design and construction of the new foundry and machine shop of the Duplex Printing Press Co., Battle Creek, Mich., manufacturer of newspaper printing presses and accessory stereotyping machinery, numerous innovations have been incorporated to lessen manual work as much as possible, and provide for the comfort of the men. In the foundry proper the big charging platform, entirely under cover, with storage capacity for 5000 tons of metal and ten carloads of coke at one time, is worthy of note. So also is the method of loading all raw material from freight cars entirely under cover in single operations, either through manholes to proper bins underneath the charging platform, or to special places therefor on the platform. The arrangement of foundry and machine shop, placed end to end, as it were, with cranes of machine and erecting shop and foundry overlapping, thus providing efficient means for straight-line routing of work, also deserves special mention.



This Ample Charging Floor, Entirely Under Cover, Extends the Length of the Foundry. Storage capacity for 5000 tons of metal and ten carloads of coke, and a central weighing station, opposite the cupola, are features

Located in Michigan, where the winters are none too mild, the facilities for unloading and loading entirely under cover add much to the convenience of handling materials, and particularly to the comfort of the men in cold and snowy weather. The loading and unloading tracks, moreover, are placed in separate bays, which, when cars are being pushed in or out, can be segregated from the shop and the foundry by electrically-operated steel aprons, thus preventing cold blasts of air from sweeping down on the men. Henry F. Bechman, vice-president of the company and superintendent and designer of the plant, has found that nothing is so irritating to foundrymen as digging around in snow for metal and other material. In planning the new plant, therefore, he made it a special point to work out this undercover unloading and loading arrangement.

Both foundry and machine shop are of steel construction, with all-glass walls and monitor roofs, making it possible for the men to work under best daylight conditions. The ventilating system in the foundry, of the Pond operating type, keeps the room clear of gases at all times. The foundry is 110 ft. wide by 180 ft.



Metal Can Be Moved from Storage on the Charging Floor to Scale, or to Charging Floor Trucks, by Magnet, without Need for Manual Handling. Cupola in background has two charging doors

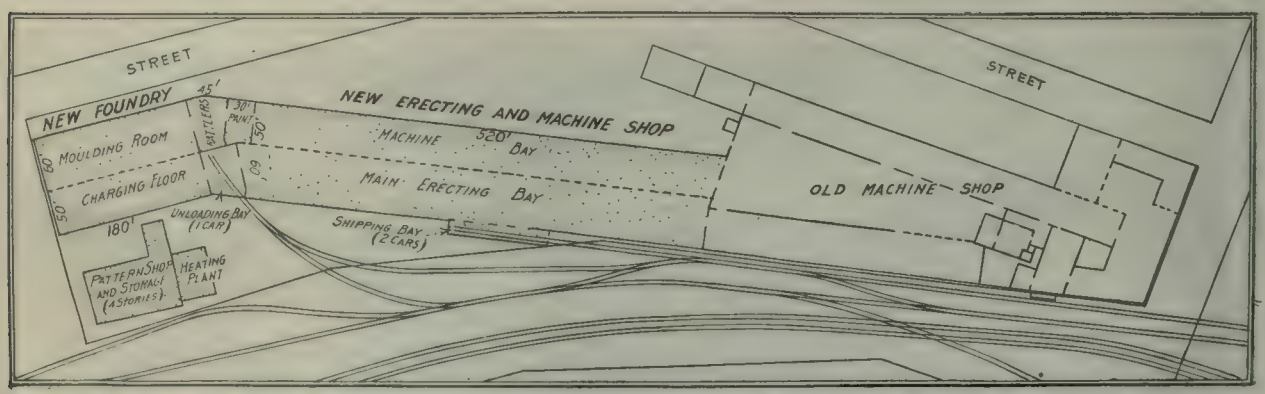
long, while the new machine and erecting shop, adjoining it on the east, is 520 by 110 ft.

lifted by a Cutler-Hammer 6-ton magnet the full height of the crane and then dropped.

The spacious charging floor, the full length of the foundry, rests on heavy 30-in. I-beams. It is 50 ft. wide and has a 10 x 10-ft. extension over the foundry proper at the east end, which serves as a special loading and unloading platform for the main foundry. Holes are provided in the charging floor for rods to hold coke storage boards in place.

The Whiting cupola is provided with double charging doors, is 60 in. in diameter, and takes from 15 to 16 tons of metal. Charges are weighed on a Toledo scale, and are conveyed about the platform in Whiting all-metal cars, six being of 500-lb. and six of 2-ton capacity. Thus, with these cars and with charging-platform-stored coke and metal to depend on, operations could be carried on, even with the charging platform crane temporarily in disuse.

Underneath the charging platform, going east to west, are storage area for flasks, two sand bins, cupola bay with cinder mill and storage for fire clay, core room and core ovens, storage for active patterns and wash and shower room. Two chutes are provided in one of the sand bins, one for facing and the other for blacking, both materials being unloaded into the chutes through holes from the charging platform above. A hole is also provided in the charging floor above the cupola bay, through which the magnet can be lowered to separate metal from cinders taken from the cinder mill. The flask-storage area and the core room are each served by two Detroit hoists (four in all) which have overhead tracks extending out into the foundry,

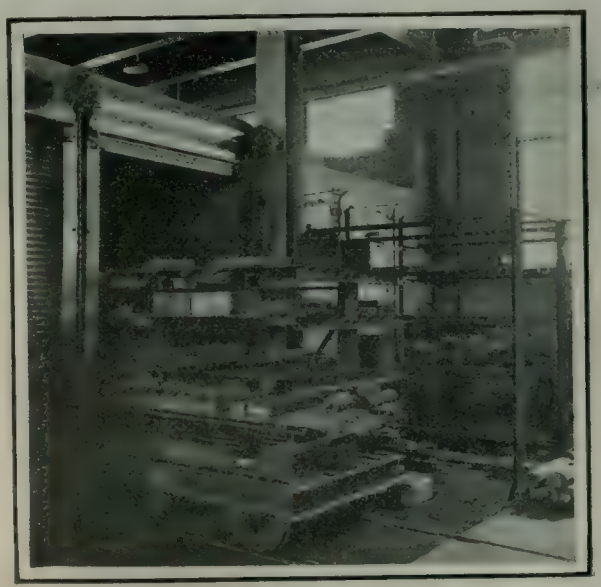


Devoted Entirely to Making Newspaper Presses and Accessory Stereotype Equipment, the New Machine and Erecting Shop and Foundry Are End to End, and to the West of the Old Portion of the Plant

Both foundry and machine shop are heated by steam radiators located overhead along the walls, as shown in the illustrations. The heating plant is in a separate building. Other buildings adjoining the main machine shop are devoted to machining smaller press parts, and assembling the stereotype machinery. A separate building of four stories is devoted to pattern making and pattern storage.

The unloading bay for raw materials is at the east end of the foundry, and between the foundry and the erecting bay of the machine shop. It is entirely inclosed and will handle one car at a time. Outside, the track divides into two spurs, onto one of which empty cars can be shunted, while loaded cars can be kept on the other. Material is moved from the cars, either by magnet or grab-bucket, and hoisted by a 5-ton Shaw crane to places provided for it. Sand is dropped through manholes into bins underneath the charging floor.

Since crane-ways of both erecting shop and charging floor overlap in this bay, machinery can be unloaded here also, and then conveyed to the machine and erecting shop or foundry as desired. A pit in the unloading bay is provided for breaking up big pieces of scrap iron. This is done by a 1-ton ball, which is



In the Core Room Are Two Through-Type and Three Tray-Type Ovens. For handling long cores, two trucks can be fastened together



General View of Foundry from East End of Charging Floor. Cupola spout is visible at left beneath end of crane

so that the foundry cranes can pick up their loads. All flasks are stored indoors, this also being especially convenient during the winter.

All flasks are of metal. The foundry is served by a 10-ton and a 5-ton Shaw crane, and all castings are conveyed to the cleaning room by magnet, thus obviating the need of using awkward and sometimes dangerous tackle.

For casting the various parts of printing presses and accessory equipment a high grade of metal and workmanship is required. All molding is done by hand, and is carefully supervised and inspected. So far as possible all operations are standardized. Workmen trained particularly for this special kind of work, by years of experience, know that the least flaw will mean the scrapping of their work, and so are taught to strive for quality in everything they do.

In the scrap metal which is used in the melts from 20 to 30 per cent scrap steel is employed; hence the company speaks of its machines, to the trade, as of semi-steel. In fact, the quality of the metal is considered so high that Mr. Bechman uses it to make the bushings (ordinarily made of tool steel) for all the jigs in the plant that can be hardened.

Many of the castings are large and of peculiar shape, and so, for cleaning and machining, require special equipment. This refers especially to the side frames of the big tubular presses, varying in length from 8 to 16 ft., and in weight from 2000 to 3400 lb. In the making of the press cylinders also, varying in weight from 800 to 4600 lb., an original method of core-making, molding and pouring has been developed. Usually, cylinders of such size are cast vertically; in the Duplex foundry, however, the more difficult horizontal method is employed. This is done by means of numerous gates and careful workmanship obtained through close supervision and numerous repeat operations.

Much of the work of the foundry is also devoted to making inking rolls, varying from 150 to 1500 lb. in weight. Gears, employed in goodly numbers in presses,



Two Big Rattler Boxes, One Revolving End for End and the Other Rolling Over Like a Log, Are Used to Clean Up Castings. The second box takes the long press side frames

call for the making of blanks varying from 3 to 60 in. in diameter.

In making cores, time and labor saving methods have been developed, which at the same time have helped to make better castings possible. Take, for instance, the making of cores for stereotype casting boxes (200 to 300 lb., and cylindrical in shape): a scheme has been worked out which dispenses with much work of the pattern maker and, moreover, has brought about a 300 per cent increase in production.

In making the core box for these casting boxes the pattern is placed on a bottom board inside a frame. A mixture of lake sand and cement is then rammed around the sides. After drawing the pattern, the cement mold is laid aside to harden. Another frame of the same dimensions is laid on top of the first frame, and a similar mixture of sand and cement rammed on the top of the first parting, thereby forming a perfect joint. This upper part is also permitted to harden.

When a core is needed for the casting, the coremaker first places the pattern in the lower core box and rams it up with core sand. He then removes the pattern, turns it over and places it in the other half of the box, ramming up that also. Lifting the pattern, he runs the two halves into the core oven. When thoroughly baked, the two halves of the core are assembled and the casting poured in the regular way. This method has proved more economical and expeditious than would have been possible with a regular set of core boxes. In the old days, in making these cores for casting boxes, green sand was rammed in, and to make a single core one man and helper were kept busy an entire day. Now, it is possible for the same workmen to make three or four in a day.

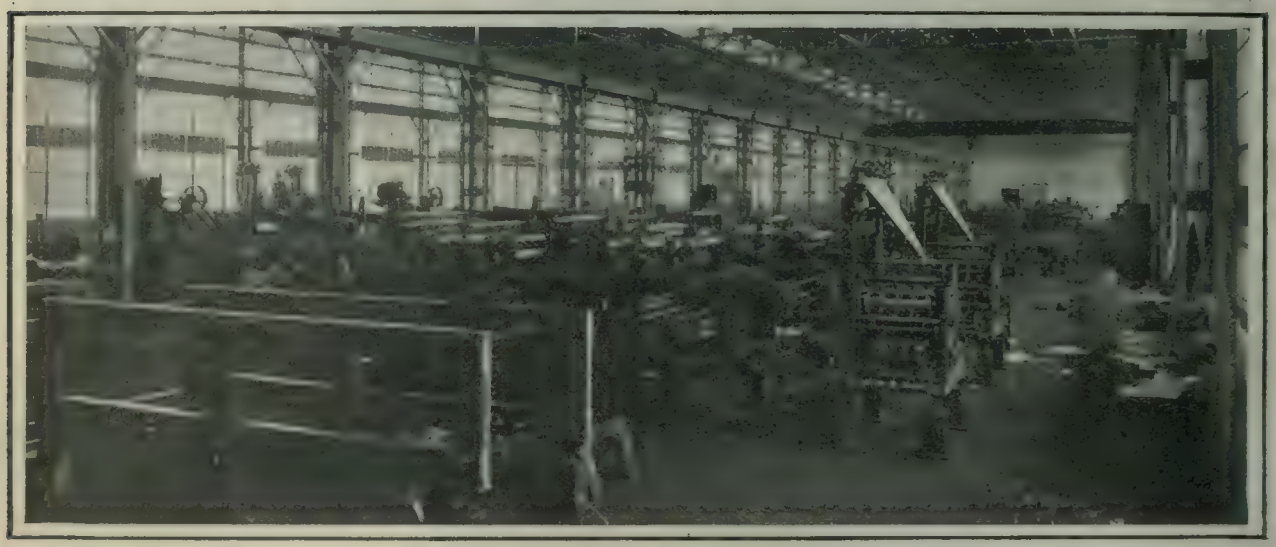
In the old days, also, the cores for the platen of a steam stereotype table, a rectangular casting 24 x 36 in., with one side flat and the under side reinforced with numerous ribs, were made with a deep-drafted pattern with intricate pockets, which entailed much skill and patience on the part of the molder. Here, too, the making of three or four cores by a highly skilled man was considered a good day's work; with the new method developed, one man can easily make a dozen in a day.

In making this core, instead of the usual core box method, dry sand is rammed around the pattern and the core baked in the regular manner. In making heavy press bed plates, time and labor are saved by making four separate cores with dry sand; whereas in the old method, when using green sand, the work was done with numerous gaggers to hold up the pockets, a tedious operation which did not lend itself so well as the present to the prevention of spoilage.

The core room is well lighted, and is equipped with three Whiting tray ovens and two Whiting through-type ovens, with six core-rack trucks serving the latter. Two of these trucks can be fastened together for supporting long work. A ten-barrel core-oil tank is mounted up above, and pipes lead to all core-making benches. An opening on the charging platform permits filling this tank.

An interesting rattling equipment has been developed to take the big side frames. This consists of a huge box 18 ft. x 16 in. x 54 in., which is revolved on its lengthwise horizontal axis. Use is also made of a smaller box, 9 ft. x 18 in. x 40 in., to take smaller castings. This is turned end over end, and can take two press cylinders at one time.

From the rattler and cleaning room the castings are taken to an adjacent room, where they are carefully painted. Air chisels are also used to clean the castings. From the paint room the castings are picked up by crane and taken to their proper places for machining, in the big machine shop. Small castings are taken on further by truck to machines in buildings adjacent to the big shop.



Erecting Bay of the New Machine Shop, 520 Ft. Long. All presses are assembled and thoroughly tested here before shipment

As mentioned before, the new shop is divided into a machining and an erecting bay. All the planers and lathes for finishing the big frames and turning the cylinders in the machine bay have individual drive. This bay is served by a 5-ton Shaw crane and the erecting bay by two 5-ton Shaw cranes. The machine and erecting shop crane runways overlap those from the foundry, so that work can easily be picked up by one set or the other as desired, without any manual handling.

All presses, before being sent out, are built up on the erecting floor and given a thorough test. They are then taken down, the various parts crated and loaded onto cars in the loading bay, two cars (the capacity of the bay) being required for the big tubular presses.

In designing the new foundry much thought was given to provisions for future expansion. Hence, with the foundry laid out as it now is, another cupola could be built opposite to the one now in place, both being served by the present charging floor, and an extension built south of the present building, where men serving the added cupola could work apart from men in the foundry now in operation.

Taylor Society in Annual Meeting

Holds Sessions Devoted to Plant Managers, Sales Executives, Office Managers, Labor Managers and Chief Executives

THE annual meeting of the Taylor Society this year was in the midst of an industrial depression. In recent years the Taylor system of scientific management has functioned in an era of relative prosperity and rising prices. Now it has an opposite kind of period to deal with, and it will pass through a severe test. Watching this test will prove of interest. This was one of the main thoughts at the annual meeting in the Engineering Societies Building, New York, Dec. 1, 2 and 3. The president of that plant where the system was first installed 18 years ago maintained that the system was functioning well during the present depression and he would make no innovations.

There were separate sessions for sales executives, plant managers, office managers and labor managers, as well as general sessions. For the first time in the history of the society attention was paid to the concrete problems of the man in general control of an industry. According to the report of the managing director of the society, Dr. H. S. Person, the society first gave attention to the scientific management of the shop. Several years ago attention was paid to the management of industrial relations; later to selling; finally, to scientific management in general control.

There was a record registration of 536. The closing function was a luncheon to Henry R. Towne, chairman of the board Yale & Towne Mfg. Co. and honorary president of the Taylor Society. Speakers were Mr. Towne; Wilfred Lewis, president Tabor Mfg. Co., Philadelphia, and Calvin W. Rice, secretary American Society of Mechanical Engineers, all of whom belonged to the mechanical engineers' organization in the days of the presentation by Mr. Taylor of his famous papers on belting, piece rate systems, shop management and the art of cutting metals.

Sessions other than those reported in detail were devoted as follows: Report of the committee on sales engineering, by Willard E. Freeland, Winchester Repeating Arms Co., New Haven, Conn.; the necessity of the quota for proper sales cost accounting, by Charles P. Staubach, manager Burroughs Adding Machine Co., Newark, N. J.; the application of the principles of scientific management to the office, by William H. Leffingwell, Leffingwell-Ream Co., Chicago and New York; the general control of a business, by John H. Williams, Day & Zimmerman, Philadelphia.

Richard A. Feiss, Joseph & Feiss Co., clothing manufacturer, Cleveland, was elected president of the Taylor Society to succeed Henry S. Dennison, Dennison Mfg. Co., Framingham, Mass. The other officers, newly elected, were: Vice-president, Robert B. Wolf, New York, to succeed Richard A. Feiss; member of the board of directors, Ida M. Tarbell, writer, New York, in place of Daniel M. Bates, Day & Zimmerman, Philadelphia, and L. Herbert Ballou, Walworth Mfg. Co., Boston, in place of Frederic G. Colburn, Bethlehem Shipbuilding Co., Bethlehem, Pa.

The officers who continued in office were: Vice-president, H. K. Hathaway, Finance Building, Philadelphia; managing director, Harlow S. Person, Taylor Society, 29 West Thirty-ninth Street, New York; treasurer, Edward W. Clark, 3rd, E. W. Clark & Co., Philadelphia; members of the board of directors, Ray M. Hudson, Holt Mfg. Co., Peoria, Ill., and J. C. Heckmann, United Drug Co., Boston.

"The Technique of the Appraisal of the Efficiency of an Industry" was presented by C. E. Knoeppel, C. E. Knoeppel & Co., New York. His discussion concerned the report of the committee on elimination of waste in industry of the Federated American Engineering Societies at the instigation of Herbert Hoover. In brief, Mr. Knoeppel said as follows: "We 18 engineers had a paradox on our hands to begin with. Mr. Hoover, on the one hand, asked for an assay of waste in industry, in a few short months, a task to which a lifetime could be devoted. Mr. Wallace, on the other hand, aided and abetted by Mr. Alford, looked through the dictionary for the one word which should guide our activities and located a most excellent one, 'quantitative.' We gave Mr. Wallace his way.

"I do not believe there was ever a committee of 18 men any stronger and abler than our committee, but this strength constituted our chief weakness, owing to the different schools of thought represented, the individualistic strength of each man and the different experiences and pronounced ideas of the members.

"We realized that we were setting out to appraise that most intangible thing on earth, human reactions. We were not going to assay a mine out-cropping, nor a railroad location, nor analyze a new form of gas. No accepted management and labor terminology exists and few units of weighing or measuring the performance of industry have been developed by engineers in a way to be standardized. We considered the development of a medium of expression and the creation of a yard stick.

"It was felt that if the medical specialist could take that most complex thing on earth, the human body, and diagnose and prescribe, we could well follow the same fundamental plan of assay. If the medical specialist, by confining his attention to certain definite things, can make his examination and diagnosis in a comparatively short time, through proper questioning and observations and tests, we could probably do likewise.

"In developing the questionnaire and evaluation sheet the following fundamentals were our guide: First, waste and not effectiveness was to be assayed, much as one would study a refuse pile to develop a by-product; second, a given practice is not wasteful until a better practice has been developed, therefore theoretical standards of excellence should be ignored; three, waste is the difference between possible attainment and actual performance, between the average practice and the best known practice; fourth, no result is 100 per cent wasteful; fifth, best practice would be 0 per cent waste; sixth, responsibility for the cause was as important to appraise as the cause itself.

Over Fifty Per Cent of Waste Due to Management

"On page 9 of the report there is this statement: 'Over 50 per cent of the responsibility for these wastes can be placed at the door of management and less than 25 per cent at the door of labor; while the amount chargeable to outside contacts is least of all.' Whatever else may be said of the questionnaire and evaluation sheet, the fact remains that a quantitative conclusion, satisfactory to the engineering mind, was the definite result of the assays made, and in itself amply justifies the use of the mechanism developed.

"A banker recently said: 'It is important to have a correct appraisal of your property, but how about your management? After all,' he said, 'it is your management and not your plant and product that we are investing our depositors' money in, for without good management, these are in themselves not productive.' Up to this time investigations have not amounted to all that they should because there has been no way of evaluating causes and responsibilities in definite figures. To say that the efficiency of something is 'about' 60 per cent, while looking wise and mysterious after a hop-skip-and-a-jump through a plant, is guessing, and guessing is unscientific and therefore has no place in an engineer's method of working. To tell me that I am not looking well, when I never felt better, is going to make no impression on me at all, but a definite evaluation showing blood pressure 170, pulse 92 and tem-

Guide Questions for Field Investigators, Paraphrased and Condensed from Field Questionnaire Committee on Waste in Industry

K. Organization

K 1. Have you an organization chart or its equivalent?

K 2. Is your organization functionalized or is it built around individual personalities?

K 3. Are the duties of each executive in your organization written up?

K 4. Are there standard written instructions for each executive or functionary?

K 5. Have you a research department that is not devoted wholly or in part to current production problems?

K 6. Do you keep up-to-date personnel records, particularly with reference to quality and quantity of production?

K 7. Are your workers selected carefully on basis of interviews, trade and other tests?

K 10. Do you make a practice of shutting down for inventories, unbalanced production, business fluctuations, etc.?

K 11. Do you follow up and investigate quits?

K 12. Do you tabulate and analyze labor turnover by causes?

K 13. How is wage remuneration determined? Union scale, competitive market, etc.; day work, piece work or other forms of incentive wage?

K 14. What are the hours of labor per day and week and how and by whom determined?

K 15. Is yours an open, closed union, preferential union or non-union shop?

K 16. What form of shop representation have you?

K 17. During the last 5 years what has been your strike record as to frequency, duration, causes, number affected, etc.?

K 18. During the last 5 years what has been your stoppage record as to frequency, duration, causes, number affected, etc.? (Stoppages are strikes by sections of workers not sanctioned by union.)

K 19. Are your industrial relations directed by a competent functional personnel head?

K 20. What does your accident record show as to the degree of danger of personal injury?

K 21. To what extent do you carry on personnel service work?

K 7. Is instruction of your workers in methods and quality given by specialists?

K 7. Do you apply a policy of systematically developing, advancing and promoting workers and others in your organization?

T. Technical

T 1. What organized external co-operation do you participate in with your own similar and inter-related industries?

T 2. Have you an up-to-date staff-made plant lay-out showing location of debts, workplaces, path of work, etc.?

T 3. Do you maintain an up-to-date equipment inventory showing cost, repairs, depreciation by individual pieces or groups?

T 4. Are there written standard specifications for equipment for each of the various operations?

T 5. Is your equipment maintained by a periodic repair inspection made by a separate maintenance department?

T 6. Are your tools standardized for each of the various operations?

T 7. What is the extent of variety in product design and construction?

T 8. Is each process standardized as to work content and method?

U. Utilization

U 1. Do you establish a progressive budget based on knowledge of your manufacturing capacity and forecasts of your business volume?

U 2. Is your manufacturing policy to make-and-sell or sell-then-make?

U 3. Do you compile a record of idle machine-time by amount, cost and causes?

U 4. Is your planning of work centralized or distributed among a number of shop executives and workers?

U 5. Does your shop administrative mechanism enable you to anticipate idleness of machines and workers and provide against it?

U 6. Is there a work ticket for each work assignment or its equivalent provided in advance and on which elapsed time is recorded by mechanical time stamp?

U 7. Have you a good current cost system tied in with the financial books?

U 8. Do you compile a record of idle worker-time by amount, cost and causes?

U 9. Do you compare production performance with production standards, with reference to worker, job department and equipment?

U 11. To what extent is purchasing done to standard specifications and does it clear through a purchasing agent?

U 12. What control exists over receipt, issuance and return of materials?

U 13. Is material storage convenient of access and arrangement and does it conserve space properly?

U 14. What types of internal transportation are used?

U 15. Is raw material subjected to careful examination and tests on receipt?

U 16. Is there competent independent functionalized inspection of work in process with rigorous quality discipline?

U 17. Is there competent independent functionalized inspection of finished product?

U 18. What is the amount and character of inspection equipment?

U 19. Are there proper performance standards based on careful detailed study and the workers' co-operation?

FIELD REPORT EVALUATION

COMMITTEE ON ELIMINATION OF WASTE IN INDUSTRY
AMERICAN ENGINEERING COUNCIL
OF
THE FEDERATED AMERICAN ENGINEERING SOCIETIES

INDUSTRY | PLANT NO. | EST. BY | DATE

KEY: ① + ⑤ + ⑨ = ⑬ Excellent = 0% Waste; Good = 20% "; Poor = 60% Waste; Bad = 80% "
④ + ⑧ + ⑫ = ⑭ Fair = 40% "
a + b + c + d = 100%
e + f + g + h = % Waste

CAUSES	Guide Questions for Field Investigator	RESPONSIBILITIES: MANAGEMENT Assigned Points	MANAGEMENT Est % Waste		MANAGEMENT Points Waste	LABOR Assigned Points	LABOR Est % Waste		LABOR Points Waste	OUTSIDE CONTACTS Assigned Points	OUTSIDE CONTACTS Est. % Waste		OUTSIDE CONTACTS Points Waste	TOTAL WASTE Assigned Points	TOTAL WASTE Points Waste
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
ORGANIZATION — Mechanism of Industry as to Type, Methods (Paper Work) and Personnel, Assignment and Discharge of Responsibility and Relationship	K1														
	K2														
	K3														
	K4														
	K5														
	K6														
	K7														
	K8														
	K9														
	K10														
	K11														
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	K13														
	K14														
	K15														
	K16														
	K17														
	K18														
	K19														
	K20														
	K21														
	TOTAL													a	e
TECHNICAL — Available Engineering Knowledge as to Product, Plant and Materials	T1														
	T2														
	T3														
	T4														
	T5														
	T6														
	T7														
														b	f
UTILIZATION — Effectiveness of Technical Knowledge and Organization. Direction, Control and Accounting Factors	U1														
	U2														
	U3														
	U4														
	U5														
	U6														
	U7														
	U8														
	U9														
	U10														
	U11														
	U12														
	U13														
	U14														
	U15														
	U16														
	U17														
	U18														
	TOTAL													c	g
GRAND TOTAL														d	h

perature 101, is bound to force me to take medicine and perhaps go to bed, whether I like it or not.

"A joint committee is now at work on management terminology, another is just starting work on standardizing graphic presentation. The waste report says: 'The assays of waste show first, the need of definite and quantitative industrial information on a multitude of points.' Is not this the time to begin a joint society work on perfecting the mechanism of analysis and evaluation which was given to the industrial world by the waste committee? Could not it be a work which would go down in the annals of American engineering as comparable to Mr. Taylor's 'Art of Cutting Metals,' by taking the bunk, the mystery and the false doctrines and practices, out of that most recent of developments—industrial management?"

Report Criticized and Defended

The discussion was occupied by various members of the Taylor Society endeavoring to pick flaws in the waste report and by defense arguments offered by those of the 18 engineers who were present. Only 46 questions (reprinted herewith) of the 260 on the questionnaire were submitted to the audience. Those giving the defense generally claimed that the fault finder would withdraw his statement if he knew all of the 260 questions. L. W. Wallace, chairman of the session and executive secretary Federated American Engineering Societies, and one of the 18 engineers who framed the report, held in his hand a copy of the book, "Waste in Industry." He frequently read passages from the book to meet the objections of the fault finders.

Boyd Fisher claimed that the analysis of waste in industry was subjective rather than objective; that concrete data and conclusions had not been reached. In rebuttal, Mr. Wallace read passages showing that the committee had determined in figures the amount of waste due to such definite causes as accidents, defective vision, strikes, etc. Mr. Fisher admitted that he had not read the book.

Dr. Person declared that a subjective assay was necessary, as only five months were allowed for the work. He stated that the report was a fine example of subjective work. He compared the problems of the 18 engineers to a hypothetical agricultural problem. "Suppose," he said, "a certain tract of land must be surveyed as to its fertility. The objective method would be to cultivate a portion of that land and measure the crops. But that would take time. The subjective method would be to consult expert farmers who had had experience in cultivating similar parcels of land and draw conclusions from their testimony."

E. E. Hunt, secretary Committee on Unemployment, Department of Commerce, Washington, stated that he did not consider this report the bonanza that Mr. Knoeppel made out, but rather only a beginning. Boyd Fisher maintained that the questionnaire was to determine the degree of orthodoxy of a plant to scientific management rather than the amount of waste. He was answered by Morris L. Cooke, consulting engineer, Philadelphia. Howard Scott, consulting engineer, New York, maintained that the questionnaire would bring out the effects of waste, rather than causes of waste.

Hugh Frayne, New York, representative of the American Federation of Labor, said that nobody had mentioned the human waste in industry. The human element prevails in industry all the time, yet nothing is ever allowed for the depreciation of this. We have a different problem in human waste in the United States than in any other country. Most countries are one-race nations. Here there are language handicaps in industry. We need better training of workers and more standardization of training. We must take better care of our children, who, underfed from birth, are mentally dead before they even enter industry.

Changes Made in a Taylor Installation

The paper of Charles F. O'Connor, production manager Universal Winding Co., Providence, was of especial interest because it illustrated a Taylor installation under stress of rush production. His subject was: "Reflections of a Production Manager." An additional point of interest was the fact that a member of the society, Carl Barth, had installed the system.

The normal method to pursue in installing a Taylor system in a plant is for the engineer introducing the system to take on an assistant, who will become production manager when he leaves. Intercourse between them may continue, but short-sighted business policy does not provide for that continuance. Like all construction work, the period of development has created a superstructure essential to the building, part of which may later be thrown into the discard. Also improved appliances and details of operating technique come into the market—there is always an element of progress which calls for some change.

How is the production manager to be guided at these critical times? How informed of the pitfalls and snares? The office of the Taylor Society should be a center of information, should help the manager find out where he can get the assistance that he needs—information concerning repairs, maintenance of methods and new details and implements of the technique of management.

The writer has found out, during the war and since, that to have operated without scientific management would have been confusion, though many details of scientific management had to be held in abeyance temporarily when speed, and not cost, became the prime consideration. Restoration has been a real problem. The society should accumulate data concerning such lapses and the way in which proper conditions have and may be restored. Such data would help many a manager to check up and set himself right.

The author then offered such data to the Taylor Society. For instance, four years ago route sheets, kept while a lot was in process, were filed in pockets on an inserted sheet in the route sheet books. These books were heavy, awkward, slow to handle, they fell apart and it was difficult for several persons to have access to them at once. Then Mr. O'Connor evolved a visible index route sheet, which is a Rand file laid flat on the table. Using two tables, the company now uses four persons, where 12 were formerly required. In other words, 300 per cent efficiency has been added to the route clerk. Board slips and moves which were formerly kept in pockets in the old style books, are now filed in compartments or drawers built in the tables and are easier to find.

Keppele Hall, Joseph & Feiss Co., Cleveland, in the discussion, spoke of the importance of a proper cost system. Before we can have a proper cost system we must have a proper classification showing the relation of one department to another, he said. Most cost accountants are helpless—they are handed figures over which they have no control and are asked to predict the future, though they have no influence themselves in production. We must express costs in terms that will indicate where responsibility lies.

Wilfred Lewis, Tabor Mfg. Co., Philadelphia, extolled the Taylor system which has been employed in his plant for 18 years during periods of unprecedented booms and unprecedented depression. Even when the company had a disastrous fire in 1919 and had to move its plant 10 miles, the Taylor system was again installed. The speaker said he would not consider any innovations as the Taylor system had proved adequate for any emergency. It is a great labor-saving device, he maintained.

R. G. Scott, H. H. Franklin Mfg. Co., Syracuse, N. Y., said that Mr. O'Connor's problems fell into two classes: Those that would continue and those that could be eliminated for good. A Taylor installation is nothing more than the groundwork of the principles of management.

Changing the System Is "Monkeying With Dynamite"

Frank Gilbreth, consulting engineer, Montclair, N. J., said that the changing of the Taylor system is serious; that Mr. O'Connor is "monkeying with dynamite." However, he admitted that Mr. Taylor did not know anything about the selection of workers, motion study, or fire protection, and hence his system has to be modified to line up with this added knowledge. Nobody ever did a job right—it could always be improved

on; motion study reveals the possibility of improvement. It is dangerous to change the work of another man, but it often has to be done.

H. K. Hathaway, Finance Building, Philadelphia, consulting engineer, did not approve of Mr. O'Connor's changes. He said that whenever he himself had deviated radically from the Taylor system he had gone wrong. It is not the function of the production manager to make such changes, he maintained. Mr. O'Connor has sacrificed certain advantages of the Taylor system. The tickets won't fall out of the pockets if handled properly; they can be easily found if put in proper order.

Two speakers made the observation that the present period of depression gave the best test for the degree of efficiency of the Taylor system. These were Richard A. Feiss and H. H. Farquhar, Belmont, Mass. The latter drew a chart to show that the system developed during the era of rising prices; it will be interesting to see how it holds up during a falling market. Mr. Feiss said that people talked too much about prewar standards and desired to get back to them. We should formulate standards of to-day, he said.

Combination Routing a Topic of Interest

A paper which aroused a great deal of interest and was thoroughly discussed was that of D. J. Walsh, Jr., Sanderson & Porter, engineers, New York, on "Combination Routing—to Meet the Problem of Small Quantities and Short Operations," presented at the plant managers' session, Dec. 3.

Combination routing, he explained as an attempt to counteract to the greatest possible extent the handicap imposed by small quantities and short operations. It cannot eliminate this handicap, he emphasized, but it modifies it to a degree that is a welcome relief. It is based on the feasibility of combining for short operations two or more batches that may properly be handled separately for longer operations. Likewise, it capitalizes the feasibility of routing in one batch a number of different products that call for essentially the same operating treatment, and are of the same degree of urgency. A useful feature of this sort of combination, he added, is the convenience of routing through the shop together products intended partly for stock and partly for shipment.

A specific case of this type of routing, in operation at the plant of Herrmann, Aukam & Co., Lebanon, Pa., manufacturer of plain and embroidered handkerchiefs, was given in detail. It was begun in 1914, and was said to be operating as smoothly as ever to-day. "At the start," he said, "practically all work available for introduction into the shop was in quantity less than was recognized as providing a desirable job at the principal operations. Time study and general observation determined desirable basic batch quantities for the principal operations for the different main varieties of product. Handling facilities were provided in accordance with these determinations, and these facilities in turn fixed the cardinal principle of the scheme of combination routing.

"The first rule was," he said, "that an element of any combination must be indivisible, and must not exceed the basic batch quantity. It could be any fraction of a batch quantity, and preferably, of course, should be exactly that quantity. Trucks and transportation devices were standardized and subdivided into units containing normally fixed quantities and an effort was made in the routing to make elements of a combination multiples of this normal fixed handling quantity." Time study was used in working out these details.

The permanent identity of any element in a combination was assured by assigning to it an "item" number in the routing, which number appeared on a tag placed on the goods before they left the store-room. This designation appeared in the first instance upon the route sheet which was designed to show simply and graphically the arrangement of the items in different combinations for successive operations, this being done by the route clerk solely for the benefit of the tag-writing clerks. Upon this sheet the route clerk could indicate any desirable combination of items or batches.

The second guiding rule for the route clerk was to make up full batches, the purpose of which was twofold: To use handling equipment to capacity and to provide a job of decent length at each operation. When the route clerk had indicated the combinations to be made, the tags and forms required were prepared by reference to the route sheet, and the allowed times entered by the time-study department. The routing then passed into the hands of the shop-order-of-work clerk.

As to the benefits of combination routing Mr. Walsh said "It not only cuts down the number of different jobs in the shops and stores, and decreases store-room transactions, but it also diminishes planning room transactions such as balance-sheet, payroll and production record entries. It holds down the volume of current manufacturing orders and route sheets, and generally contributes to an economical consolidation of both records and effort."

Views of various sections of the plant were shown, including route sheet and other forms used in the combination routing system in operation there. A. B. Rich, Dennison Mfg. Co., Framingham, Mass., presided at the session, and Carl G. Barth, consulting engineer, Philadelphia, and H. K. Hathaway, consulting engineer, Philadelphia, led the discussion.

Formula for an Efficient Workman

Boyd Fisher, Lockwood, Greene & Co., Boston, presented a formula for an efficient workman. His courage in attempting such a definite undertaking on such an abstract subject was commended by several who discussed his outline. Though minor changes in his formula were suggested, it was approved in the main by those who attended the session. The formula was in chart form, the following being the main outline:

Efficiency and development of the individual depend on:
- A. Ability to work.
  - I. Mental efficiency.
    1. Mental equipment.
    2. Assignment.
    3. Instruction.
    4. Supervision.
  - II. Physical efficiency.
    1. Physical development.
    2. Health.
    3. Assignment
    4. Plant conditions.
    5. Equipment.
    6. Material.
- Plus B. Willingness to work
  - I. Conscious will.
    1. Discipline.
    2. Enthusiasm.
  - II. Unconscious will.
    1. Home conditions.
    2. Treatment.
    3. Plant conditions.
    4. Financial incentives.

(These were divided into many subheads.)

The outstanding features of Mr. Fisher's talk were as follows:

"Lockwood, Greene & Co., managers, feel that whatever the development of machinery and processes, the human being is still the unit of efficiency and that the greatest progress of management will be found in considering the worker, not as an incident to, but as the chief factor of production. Improved methods and machines are considered as devised to help the worker, and when he is kept always in mind there is less danger of neglecting phases of his development and bringing about industrial discord and other social ills. This is the sincere and unprompted view of S. Harold Greene, president of the company. The service department is his creation and one of his chief interests. He depends upon it to secure the greatest efficiency and development of the individual workman.

"The service department, in conference, has devised this formula as representing, to its best present knowledge, all of the factors which regulate the efficiency and development of the individual workman. We do not believe that this chart indicates the relative weight of all factors, nor do we have any special point to make in the way the chart is put together. For instance, 'Enthusiasm' might have been placed over 'Discipline,' under the sub-heading of 'Conscious Will.' So far as we now

recognize them, this chart contains all of the principal items to be taken into consideration but makes no attempt to sub-divide them into all of their ultimate activities in the plant. This is particularly true of the health section. We should be glad to learn of principal divisions which should be included, and which we have overlooked. It is recognized that the choice of terms is open to discussion and that in many cases our own experience or even mere chance has determined the vocabulary.

"There is nothing final in our minds in the apportionment of supervisory responsibilities between the service (personnel) and the production department. In the first place, in the textile industry we do not clearly distinguish between line and staff functions and many things are set down under production in this department which should be consigned to some staff department, such as an engineering or a standards or a methods department. On this chart we wish merely to reassure the operating departments that by including things which they now do, if they are done, in a chart devised by a service department, we do not mean to take over the entire functions of management. There is, of course, another meaning in this division of functions, namely, that all departments work together for the efficiency of the individual, and that neither service nor production nor any other department that might be created to swing some of these duties, can alone produce an efficient workman. To the traditional operating head, the number of things set down as belonging to the service department, comes as a surprise, and he will need to be convinced that fully half the conditions of efficiency of workmen lie outside of his own province.

"Lockwood, Greene & Co. are using this chart as the first step in a personnel audit. It is intended to guide the service and the production departments in making inquiries as to what area of the individual workman's development is being neglected. It seems to us to be particularly practical for use in a traditional industry where such a device as time study or task setting is looked upon with distrust. When new methods are shown in perspective, they do not appear perhaps quite so formidable."

The first to discuss this paper was Meyer Bloomfield, Bloomfield & Bloomfield, Boston, who was introduced as "the first to break ground in vocational education." He stated that this chart should be entitled: "A formula for efficient management." He characterized it as a tragedy that labor does not take a more active part in promoting industrial efficiency. It is not truly scientific management when only one party takes all the initiative for improvement and assumes all of the responsibility. That one party is now management. He said that most of the items on the chart are not in the control of the workman but are in the hands of the management. The carrying out of the items on this chart would mean an efficient management. He expressed hope that the Taylor Society would be instrumental in inspiring labor to take its proper part in initiating industrial efficiency methods.

Dr. A. B. Emmons, 2nd, Harvard Medical School, Boston, was introduced as a "power in health research." He has been in change of the Harvard mercantile health work for two years and has examined employees and conditions in 24 department stores. Physical examinations in stores are not as prevalent as those in industrial plants. Only the best stores are making them; some are afraid to have such examinations. One of the best stores, employing 3500, reports that indigestion is the main cause of illness which causes absences.

"I fear that Mr. Fisher's outline would make a paternalistic Utopia," stated Miss Nelle Swartz, New York Department of Labor. There are not enough provisions in it for the employee's using of his own initiative, she said.

Having heard from an authority on physical hygiene, it was appropriate to hear from an authority on states of mind. Dr. Frankwood E. Williams, National Committee for Mental Hygiene, New York, emphasized the importance of the proper emotional state of the workman. He said that if the health and brain power of the worker continually increased, that worker's efficiency would not increase proportionately; in other words, that the factor of emotion would enter in. When making fundamental decisions it is frequently our emotional state that decides; we then rally our intellectual powers to try to defend the stand we have taken. Often a man who has passed all of the vocation tests for a position, falls down when he is in that position. The indigestion cases, mentioned by a previous speaker, are often emotional troubles, not gastric.

Mrs. Frank B. Gilbreth, Montclair, N. J., complimented Mr. Fisher for the good vocabulary of words he had chosen for the chart. She characterized it as a "worth while achievement." Additional remarks were made by Prof. Edward Robinson, department of mechanical engineering, University of Vermont; and E. A. Wilson, a manufacturer of Boston.

Inventory of Coal Stocks

WASHINGTON, Dec. 6.—The steel plants and coke industry of the United States on Nov. 1 had 42 days' supply of coal on hand. This is shown in a report based on an inventory of coal stocks as of the date mentioned taken jointly by the Department of Commerce and the Geological Survey, the total supply at that time being approximately 47,400,000 tons of coal in the hands of consumers, or about 43 days' supply. The supply in the hands of steel interests and coke makers, therefore, was representative of the average. The greatest tonnage was at gas works, which had 87 days' supply. The stocks on hand as of Nov. 1 compare with stocks as high as 63,000,000 tons in the past, according to a statement issued by the Department of Commerce to-day.

The estimated average number of days' supplies in the hands of various consumers are as follows:

Railroads, 29; steel plants and coke industry, 42; other industries, 67; gas works, 87; electric public utility, 54, and coal dealers, 47.

"It must be borne in mind," says the statement, "that these are averages and that many individual industries and dealers are far below the average."

The next inventory will be as of Jan. 1.

Wayne Company Buys Borromite Co. of America

The Wayne Oil Tank & Pump Co., Fort Wayne, Ind., has purchased the Borromite Co. of America, Chicago, for $500,000. Immediate enlargement of the factory facilities of the Wayne Oil Tank & Pump Co.; erection of an experimental laboratory; absorption of the Warriner Mfg. Co., organized a year ago, and centering of control of the zeolite mines of New Jersey in the Fort Wayne company are among the results of the transaction. As soon as possible the equipment of the Chicago company will be moved to Fort Wayne. Factory buildings will be erected upon the 17-acre tract owned by the Wayne Oil Tank & Pump Co., to house the new industry.

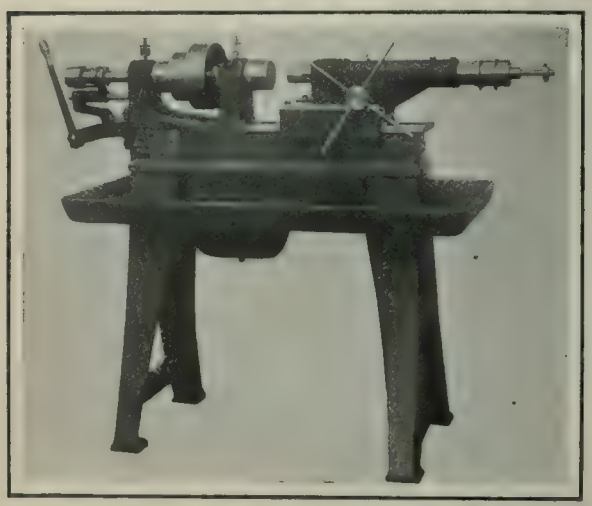
J. E. Patterson, superintendent of the Erie & Ashtabula division of the Pennsylvania Railroad, with headquarters at New Castle, Pa., announces that plans for completion of the Moravia yard directly east of Lawrence Junction at New Castle, are being revised preparatory to important construction operations. Development of the Moravia yard, started in 1913, was halted by the war and has not been renewed since. Repair shops are to be erected. The yard will be an important junction point for coal and ore cars. This development presages industrial expansions at New Castle, it being reported that the Carnegie Steel Co. will erect a by-product coke works at this point.

Nearly three-quarters of the fatal elevator accidents could be prevented if elevators and shaftway doors were equipped with well-designed interlocking devices, a survey and study conducted by the Bureau of Standards of the Department of Commerce has shown. About as many ride on elevators as on all the city traction lines. In providing vertical transportation, an elevator in the Woolworth Building travels about 40 miles a day and makes 4000 stops in that time.

Horizontal High Speed Drilling Machine

The horizontal drilling machine shown in the accompanying illustration is a recent addition to the line of turret machinery manufactured by the Acme Machine Tool Co., Cincinnati. It is especially adapted to drilling small deep holes, such as grease-cup holes in king bolts and similar work requiring quick-acting high-speed drilling.

The design is similar to a hand screw machine in that the spindle and chuck operation are identical. The work is held in the automatic chuck, which is opened and closed by operating the lever at the front head end of the bed. The high-speed drill spindle which takes the place of the standard turret is provided with a No. 1 Morse taper at the front end for holding the drill chuck. The spindle is driven from the countershaft connected by belt to the flange pulley on the



The Work Is Held in the Automatic Chuck. A No. 1 Morse taper in the drill spindle holds the drill chuck

spindle. The entire spindle and pulley are provided with ball bearings, those for the pulley being mounted on a separate stationary sleeve through which the drill spindle passes, a construction intended to relieve the drill spindle proper from belt pull and to allow it to be operated quickly and easily. The spindle is mounted in a separate sleeve which has rack teeth into which meshes the gear on the turnstile shaft. The turnstile handle moves the spindle backward and forward, the stop collar on the spindle's end acting as a stop gage.

The spindle is mounted in a casting block which in turn is mounted on the turret slide saddle, an arrangement which permits locating for long or short pieces, as may be desired. The drill spindle is ordinarily run at approximately 3000 r.p.m., which speed, together with the machine spindle speed of 500, gives a drilling speed of 3500 r.p.m.

New Export Bill of Lading

WASHINGTON, Dec. 6.—Effective Feb. 15, and applicable to all railroads in the country a new uniform through export bill of lading is to be adopted by order of the Interstate Commerce Commission. It is designed to enable shippers in the interior of the United States to forward their freight to a foreign port or to an interior foreign destination. Sweeping aside the jurisdictional questions raised by the railroads, American flag steamship companies and the Shipping Board, the commission said it had the power and laid down the form to be observed where shippers desire to ship on bills of lading that cover the property from point of origin to ultimate destination.

The new form is based on the commission's position that while Congress may not have empowered it to say that American railroads and American flag steamship lines shall enter into an arrangement for transportation on through bills, it did say that when they undertake to so transport, they shall use the form of bill to be prescribed by the commission.

While the railroads, steamship lines and Shipping Board denied the jurisdiction of the rate-making body, they co-operated with it in formulating the bill to the extent of indicating the terms and conditions which preserved their rights and would not be unreasonable. By reason of this co-operation, the opinion prevails that the bill will be generally used and that there will be no litigation on the subject such as marked the previous effort of the commission to make a uniform through bill.

Eastern States Blast Furnace and Coke Oven Association Meets

Organization of the Eastern States Blast Furnace and Coke Oven Association, comprising blast furnace and coke oven superintendents and operating officials, formed in Pittsburgh last July, was completed at a meeting and dinner held at the Fort Pitt Hotel, Pittsburgh, Thursday evening, Dec. 1. About 70 men active in the operation of blast furnaces and coke oven plants attended the meeting, which was featured by the presentation of papers by Paul O. Menke, superintendent of blast furnaces, Shenango Furnace Co., Sharpsville, Pa., on "The Disintegration of Blast Furnace Linings and the Effect of Zinc on Brick Work," and by Charles R. Meissner, of the Koppers Co., Pittsburgh, on "Methods Now in Use for Testing By-product Coke." The refractories industry was represented at the meeting and H. Koppers, the inventor of the Koppers by-product coke oven, also attended and spoke briefly on by-product plants.

James G. West, Jr., general superintendent, Eliza furnaces; Jones & Laughlin Steel Co., is president of the association, which includes in its membership men from plants as far west as Cleveland and Steubenville, Ohio, and east to Philadelphia. E. H. Collester, superintendent by-product plant, LaBelle Iron Works, Steubenville, Ohio, is secretary and treasurer. The directors chosen at the meeting are Roy Heffner, superintendent, Rainey-Wood Coke Co., Swedeland, Pa.; George Hohl, superintendent of blast furnaces, Bethlehem Steel Co., Bethlehem, Pa.; H. A. Berg, superintendent of blast furnaces, Midvale Steel & Ordnance Co., Johnstown, Pa.; L. E. Riddle, superintendent, city furnaces, Carnegie Steel Co., Pittsburgh, and George W. Vreeland, superintendent of blast furnaces, Carnegie Steel Co., Mingo, Ohio. The objects of the association are a mutual exchange of ideas, through the presentation of papers on blast furnace and coke plant problems and their discussion. Meetings are not to be held at any stated time, but are to be called from time to time.

Engineering Advertisers of Chicago Publish Monthly Bulletin

The Engineering Advertisers' Association of Chicago is now publishing a monthly bulletin in the interest of its members. The bulletin gives a digest of the speeches made at the various meetings and also includes other information and facts regarding the movement of goods from industry to industry, personal notes, etc. The current copy includes an address by Kenneth Groesbeck, vice-president Harry Porter Co., New York, on "The Baconian Theory of Advertising."

The first issue contains no advertising, but in later editions a small amount of advertising will be accepted, as the board of directors has agreed to devote two pages, divided into ten spaces each, to this publicity. This necessarily will limit the number of advertisers to twenty, and this space is sold merely to meet the cost of publishing.

New York Industrial Engineers to Meet

The St. Lawrence ship channel and power project is the subject selected for the dinner meeting of the New York Chapter of the Society of Industrial Engineers, to be held at the Café Boulevard, New York, Dec. 13. Dr. R. S. MacElwee, formerly director Bureau of Foreign and Domestic Commerce, now director of the School of Foreign Service, Georgetown University, is scheduled to address the meeting on the subject. The address will be illustrated with drawings and maps. General discussion will follow.

Double Helical or Herringbone Gears

Elements of Design to Combine Adequate Strength with Smooth and Continuous Action and a Minimum of Friction of Contact Surfaces

BY HOWARD H. TALBOT.*

IT is the purpose of the following to investigate and study the conditions existing in the action of helical gears, and if possible to establish thereby the principles basic to the best possible design of any double helical gearing. The term "best design" may be detailed as that which offers to the greatest degree the following qualifications:

Tooth strength commensurate with service,
Minimum friction of contact surfaces,
Smoothness or continuity of action.

Obviously, there are the following variables for any pitch diameter: circular pitch, height of tooth, or addendum and dedendum; helical angle; width of face; tooth shape (cycloidal or involute), from which to choose the best combination or proportions. We will eliminate from these variables, in this discussion, the "tooth form" and adopt the 20-deg. involute.

Tooth Strength

Unlike spur teeth (where under certain conditions it is possible to have the tooth pressure applied to the point of the tooth, having a lever arm of practically the tooth depth) in the helical tooth, of proper width of face relative to circular pitch, the lines of contact extend obliquely across the tooth surface from a point at the root, intersecting the pitch line, to a point at the top of the tooth. Thus the average tooth load is applied at the pitch line, and the lever arm A is nearly half that of the spur, indicating a tooth practically twice the strength of a spur tooth. This assumption,

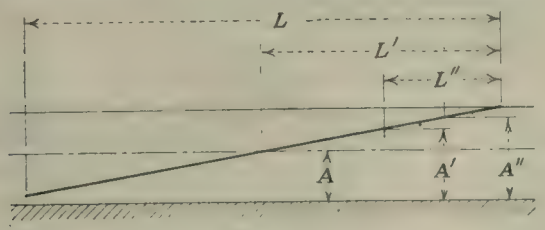


Fig. 1.

however, is not safe or literally true, as for instance—on the section of face L' (Fig. 1) the average leverage is at A', and for the section L'' is A'', etc. The point at which we can consider the leverage as applied depends upon the length of face L' or L'' which we can consider relative to the reinforcing effect of adjacent sections of the tooth.

It will not be necessary to develop any theory in this respect, but probably as a matter of strength only, it would be safe to consider a helical tooth approximately one and one-half times as strong as a spur tooth of same tooth section. There is also, of course, the elimination of any shock in the helical tooth, and it is always impossible to theorize in respect to shock.

Friction of Tooth Surfaces

Two problems entering into the reduction of tooth friction are:

To confine the tooth action to that part of the tooth curve nearest the pitch line, where rolling contact, instead of sliding, is obtained.

Friction during the arc of approach is always greater than in the arc of recess, indicating possibly the desirability of decreasing the first and increasing the latter. This might be carried to the point of having arcs of recess only, provided the strength of the tooth shape and other conditions are not excessively impaired. This, however, would be undesirable, as the portion of dedendum near the pitch line (rolling contact) would be sacrificed, were the pinion to have addendum only. Doubtless there is a ratio of addendum to dedendum which, in relation to other considerations of strength, etc., might be said to give the least practicable amount of friction.

Assume first the usual conditions of equal addenda for pinion and gear, or the arcs of approach and recess equal. By making the addendum and dedendum as short as possible, we can keep the contact area close to the pitch line, or as much as possible within the area of rolling contact. In order, for a given circular pitch, to reduce the addendum to a minimum, it is first necessary to establish an equation of relationship between the addendum and the arc of contact. There are limits of the arc of contact relative to the circular pitch.

Referring to Fig. 2, being a section of any spur or helical pinion normal to the axes: Path of point of contact $= P'P$. $P'T =$ Approach path. $TP =$ Recess path. aa' on base circle $= TP$ and arc of recess (on pitch line) $= TK = TP \times \frac{AT}{AM} = \frac{TP}{\cos 20^\circ}$. Arc of approach $= TK'$ (and aa'' on base circle). $TK' = TP' \times \frac{AT}{AM} = \frac{TP'}{\cos 20^\circ}$. For gears of equal addenda $TP = TP'$ and $TK = TK'$ or arcs of approach and recess are equal. (See Note A.) Total arc of action $= K'TK$.



Fig. 2.

In a spur gear, the circular pitch must be less than the arc of action $K'TK$, for continuous motion.

$PA =$ Outside radius.
$MA =$ Base circle radius.
$AT =$ Pitch radius.
$MT = AT \sin 20^\circ$.
$MP = \sqrt{(PA)^2 - (MA)^2}$.
$PT = MP - MT = \sqrt{(PA)^2 - (MA)^2} - AT \sin 20^\circ$.
$TK = TK' = \frac{PT}{\cos 20^\circ} = \frac{\sqrt{(PA)^2 - (MA)^2} - AT \sin 20^\circ}{\cos 20^\circ}$
and $K'TK =$ twice this.

Take a pinion of 20-in. pitch diameter; then $AT =$

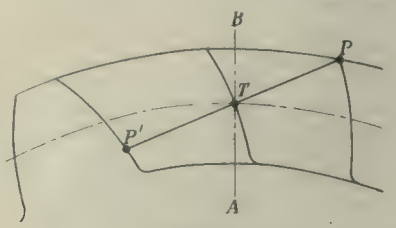
*Chief engineer Woodard Machine Co., Wooster, Ohio.

10 in., $AM = AT \cos 20° = 9.397$ in. Now for different values of addendum, AP assumes values shown in Table I. Solving the equation, the values of TK $(= TK')$ and the arc of action $(= TK + T'K)$ also appear in Table I.

Table I

Addenda	AP	TK	Arc of Action
2 in.	12 in.	4.3 in.	8.6 in.
1½ in.	11½ in.	3.42 in.	6.84 in.
1¼ in.	11¼ in.	2.94 in.	5.88 in.
1 in.	11 in.	2.45 in.	4.9 in.
¾ in.	10¾ in.	1.92 in.	3.84 in.
½ in.	10½ in.	1.34 in.	2.68 in.

If the three tooth curves be considered as located at certain intervals on the face of a helical tooth, the line $P'P$ (Fig. 3) becomes (in projection) the actual line of contact for the instant that the pitch point T



Projection

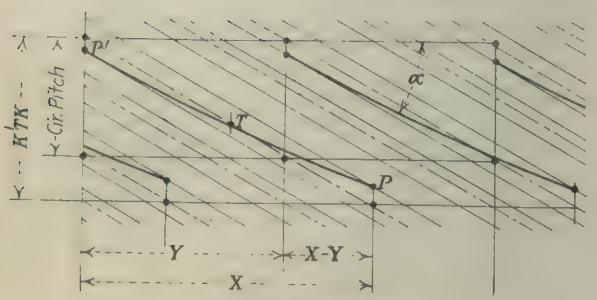


Fig. 3—Developed Plan View

of the middle curve is on the center line AB. Or in plan view (developed) thus, Let X = length of face parallel with axis, covering the line of contact or within which the pitch point traverses the arc of action.

Let Y = length of face parallel with axis, between axially opposite sections of successive teeth, or = length of face in which the helix advances one circular pitch.

If $X = Y$ (then also arc of action = the circular pitch) there will be continuous contact across the face of the pinion at any instant. If Y is greater than X, part of the face is not in contact at any instant, with consequent loss of effective face, (Circular pitch is greater than arc of action).

Unlike the case of the spur gear, where it is impossible to have the circular pitch greater than the arc of action and maintain continuity of action, it is here possible, though undesirable, provided the face is wide enough to insure one complete line of contact and a fraction of a second line.

It is therefore necessary to utilize the full face, that the circular pitch be not greater than the arc of action. It is even desirable that Y be less than X, so that the lines of contact overlap, thus insuring against having any gap.

On this basis therefore (if the circular pitch = the arc of action) the helical angle (α) cannot be greater than 45 deg., in which case $X = Y = K'TK$.

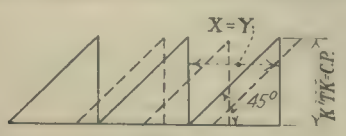


Fig. 4.

Maintaining 45 deg. $= \alpha$, if the circular pitch is less than arc of action, X is greater than Y, and there is overlapping of lines of contact as dotted in Fig. 4.

Also if the circular pitch is less than the arc of action the helical angle may be increased until X again $= Y$ (condition of no overlapping of lines of contact) to a value α whose tangent is $\frac{K'TK}{X = Y}$ and $K'TK$ is greater than X or Y. The angle α may be increased until its tangent $= \frac{K'TK}{X}$, so long as X does not become less than Y. If

$K'TK$ = circular pitch, $\tan \alpha = \frac{CP}{Y}$ and $Y = \frac{CP}{\tan \alpha}$

$\tan \alpha = \frac{K'TK}{X} = \frac{CP}{Y}$ but X must not be less than Y.

Referring to the 20-in. pitch diameter pinion, and the curve for addendum relative to arc of action, and letting $\alpha = 45$ deg.:

Assume eight teeth giving a circular pitch of 7.85 in. The diametral pitch = 0.4, and for standard tooth (spur) we would have an addendum of $\frac{1}{0.4} = 2\frac{1}{2}$ in. (or, for usual standard stub tooth, $\frac{0.8}{0.4} = 2$ in.)

The pitch normal to the tooth surfaces would be C. P. x cos 45° = 0.707 C. P. = 5.5 in. To give standard tooth proportion on this section (equiv. D. P. = $\frac{\pi}{5.5} = 0.572$) the addendum would be $\frac{1}{\text{D. P.}} = \frac{1}{0.572} =$ 1.75 in.

For 1.75 in. addendum, the arc of action is 7.8 in., which is practically equal to the C. P. of 7.85 in. and is the condition for continuous contact across the face of the pinion.

Assume 12 teeth, giving a circular pitch = 5.24 in., and diameter pitch = 0.6. Standard addendum for spur tooth $= \frac{1}{0.6} = 1.67$ in. and for stub $\frac{0.8}{0.6} = 1.33$ in. Normal pitch = 0.707 x 5.24 in. = 3.7 in. and equivalent D. P. = 0.85. The addendum would be $\frac{1}{0.85} = 1.18$ in. and from curve the arc of action = 5.65 in., showing overlap.

$dp = \frac{\pi}{C.P.}$, Equivalent $dp = \frac{\pi}{C.P. \times \cos. \alpha} = \frac{dp}{\cos. \alpha}$

Assume 16 teeth, circular pitch = 3.93 in. and diametral pitch = 0.8. Standard addendum (spur) $= \frac{1}{.08} =$ 1.25 in.; stub addendum $= \frac{0.8}{0.8} = 1$ in.

Normal pitch = 0.707 x 3.93 in. = 2.775 in. and equivalent diametral pitch = 1.15. Standard addendum for 1.15 diametral pitch $= \frac{1}{1.15} = 0.87$ in., and from curve, arc of action = 4.35 in., showing overlap.

Assume 20 teeth, circular pitch = 3.1416 in. and diametral pitch = 1. Standard addendum (spur) = $\frac{1}{1} = 1$ in.; stub addendum $= \frac{0.8}{1} = 0.8$ in.

Normal pitch = 0.707 x 3.1416 in. = 2.22 in. and equivalent diametral pitch = 1.415. Standard addendum for 1.415 diametral pitch $= \frac{1}{1.415} = 0.707$ in., and from curve, the arc of action = 3.65 in., showing overlap.

Assume 30 teeth, circular pitch = 2.092 in. and diametral pitch = 1.5. Standard addendum = 0.667 in.; stub addendum $= \frac{0.8}{1.5} = 0.533$ in.

Normal pitch = 0.707 x 3.93 in. = 2.775 in. and alent diametral pitch = 2.12. Standard addendum for 2.12 diametral pitch $= \frac{1}{2.12} = 0.47$ in., and from curve the arc of action = 2.5 in., showing overlap.

Table II—Elements of 20-In. Pitch Diameter Pinion or Gear, with 45-Degree Spiral Angle

	Number of Teeth 8	12	16	20	30
1—Diametral pitch	0.4	0 6	0.8	1.0	1.5
2—Circular pitch..	7.85 in.	5.24 in.	3.93 in.	3.14 in.	2.09 in
3—Standard addendum $\left(\frac{1}{\text{D.P.}}\right)$	2.5 in.	1.67 in.	1.25 in.	1.0 in.	0.67 in.
4—Stub addendum $\left(\frac{0.8}{\text{D.P.}}\right)$	2.0 in.	1.33 in.	1.0 in.	0.8 in.	0.53 in.
5—Normal circular pitch	5.5 in.	3.7 in.	2.77 in.	2.22 in.	1.48 in.
6—Equivalent diametral pitch.	0.572	0.85	1.15	1.415	2.12
7—Standard addendum*	1.75 in.	1.18 in.	0.87 in.	0.707 in.	0.47 in.
8—Arc of action* $(= X)$	7.8 in.	5.65 in.	4.35 in.	3.65 in.	2.5 in.
9—Y	7.85 in.	5.24 in.	3.93 in.	3.14 in.	2.09 in.
10—Overlap $(X - Y)$	—0.05 in.†	0.41 in.	0.42 in.	0.51 in.	0.41 in.

*From curve 1, Fig. 5. †Loss of face.
$X = K'TK \times$ cotan α; for 45 deg. $= K'TK \times 1$.
$Y = CP \times$ cotan α; for 45 deg. $= CP \times 1$.

In Table II is shown the resulting relation between the circular pitch and the addenda of line 7, which addenda give standard tooth proportions on a section normal to the tooth face, or at 45 deg. with the axis of the gear.

Comparison of curves 1 and 2 shows that the use of standard tooth proportions on this normal section give addenda (for the range up to 7.8 in. circular pitch, slightly greater than necessary, if it is desired only that lines of action on the successive teeth have no overlap, and also no gap, across the gear face, or, in other words, if the circular pitch is maintained equal to the arc of action, as shown by curve 1.

Some overlap is desirable rather than otherwise, so the use of standard tooth proportions on normal section is indicated as being about right for 45 deg.

Changes with Decreasing Spiral Angle

In like manner, let us investigate conditions if a spiral angle of 23 deg. is used, $\alpha = 23$ deg.

Assume 8 teeth, circular pitch = 7.85 in., diametral pitch = 0.4, standard addendum = 2½ in.

Usual stub addendum = 2 in., all as before.

The pitch normal to the tooth surfaces would be Circular pitch x cos. 23° = 7.85 in. x 0.92 = 7.22 in.

Equivalent diameter pitch $= \frac{\pi}{7.22} = 0.435$, and standard addendum $= \frac{1}{0.435} = 2.3$ in.

And from curve 1 the arc of action = 9.5 in., showing considerable overlap.

It also appears that while, in the 45 deg. angle tooth so proportioned, we have contact lines with practically

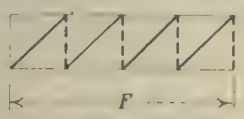


Fig. 6.

no overlap, or the sum of the projected lines of contact; X = the face (about) or $\Sigma x = F +$

$\frac{F}{Y}$ = Number of lines of contact across the face.

$\frac{Fx}{Y} = \left(\begin{matrix}\text{length of total pro-}\\ \text{jected line of contact.}\end{matrix}\right) = \Sigma x$ for given face F.

With the 23 deg. angle tooth so proportioned, we have considerable overlap. This of course is due to the greater length of addendum, and the resulting greater arc of contact for the same circular pitch.

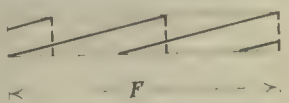


Fig. 7.

Now let us reduce the addenda to the same values as used for the 45 deg. angle tooth, giving the same arcs of action, and an extremely stubbed tooth section

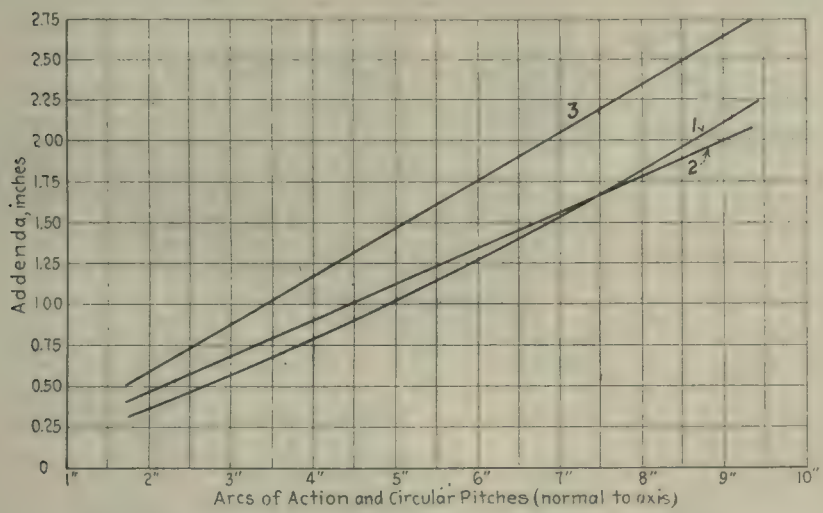


Fig. 5 Shows (1) Arc of Action in Inches on Pitch Line vs. Addendum for 20-deg. Involute Pinion of 20-in. Pitch Diameter; (2) Circular Pitch vs. Standard Addendum for $\alpha = 45$ deg. and (3) for $\alpha = 23$ deg.

Where X = length of face parallel with axis over which line of contact extends on a tooth surface (See Fig. 3) X = arc of action x cot α.

Distance Y = distance across face between like points on successive teeth:

$Y = CP$ x cot α

And, in this case,

$X = 9.5$ in. x 2.355 = 22.4 in.

$Y = 7.85$ in. x 2.355 = 18.5 in.

$X - Y =$ 3.9 in. overlap across face.

Table III—Elements of 20-In. Pitch Diameter Pinion or Gear, with 23-Degree Spiral Angle

	Number of Teeth 8	12	16	20	30
1—Circular pitch...	7.85 in.	5.24 in.	3.93 in.	3.14 in.	2.09 in.
2—Normal circular pitch	7.22 in.	4.83 in.	3.61 in.	2.89 in.	1.92 in.
3—Equivalent diametral pitch...	0.435	0.65	0.87	1.085	1.635
4—Standard addendum	2.3 in.	1.54 in.	1.15 in.	0.92 in.	0.614in.
5—Arc of action*..	9.5 in.	6.95 in.	5.5 in.	4.55 in.	3.22 in.
6—X	22.4 in.	16.35 in.	12.92 in.	10.7 in.	7.58 in.
7—Y	18.5 in.	12.3 in.	9.25 in.	7.4 in.	4.92 in.
8—Overlap ($X - Y$)	3.9 in.	4.05 in.	3.67 in.	3.3 in.	2.66 in.

*From curve 1, Fig. 5.

It therefore appears that in using standard tooth proportions for the section of tooth normal to the tooth surface, we have a larger tooth section for the 23 deg. angle than the 45 deg., as of course is evident from casual inspection.

normal to the tooth surface, and make comparisons in Table IV.

Table IV

	Number of Teeth 8	12	16	20	30
1—Circular pitch...	7.85 in.	5.24 in.	3.93 in.	3.14 in.	2.09 in.
2—Normal circular pitch	7.22 in.	4.83 in.	3.61 in.	2.89 in.	1.92 in.
3—Addendum	1.75 in.	1.18 in.	0.87 in.	0.707 in.	0.47 in.
4—Arc of action...	7.8 in.	5.65 in.	4.35 in.	3.65 in.	2.5 in.
5—X	18.32 in.	13.30 in.	10.22 in.	8.6 in.	5.9 in.
6—Y	18.5 in.	12.33 in.	9.26 in.	7.4 in.	4.9 in.
7—Overlap ($X - Y$)	—0.18 in.	0.97 in.	0.96 in.	1.2 in.	1.0 in.

Line 5 = line 4 × cot 23 deg.
Line 6 = line 1 × cot 23 deg.

Let us take the 16-tooth pinion in each case and assume a face $F = 4$ x $CP = 4$ x 3.93 in. = 15.72 in. (Considering single helical pinion or ½ double helical.) or say $F = 16$ in.

Then:

	45 Deg.	23 Deg.
Y	3.93 in.	9.26 in.
X	4.35 in.	10.22 in.
$\frac{F}{Y}$	4.07 in.	1.73 in.
$\frac{Fx}{Y}$	17.7 in.	17.7 in.

As we should expect, for the same arcs of contact, same pitch and same addendum, the lengths of contact surface across the face $\frac{Fx}{Y}$ are equal in each case, but, with the 45 deg. there are 4.07 lines of contact or 4.07

teeth in contact, while in the 23 deg. there are 1.73 only.

Let us compare the tooth forms on sections normal to the tooth surfaces. α is the helical angle on the pitch cylinder of the pitch line. Due to the different

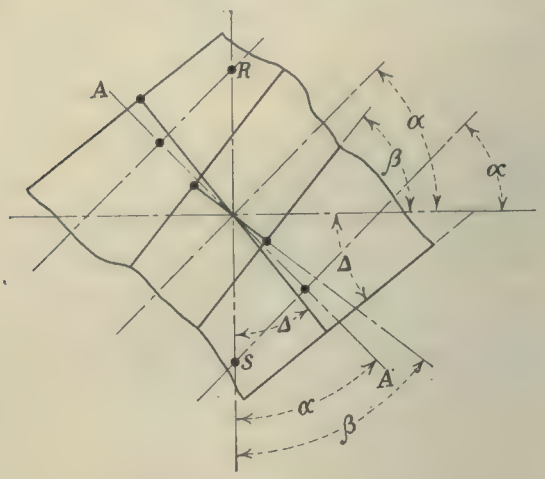


Fig. 8.

radii of the outside, pitch and root of any tooth, it is evident that the respective helical angles of the tooth point line, the pitch line and the root line, with respect to the axis vary.

If α = helical angle of pitch line.
β = helical angle of point line.
Δ = helical angle of root line.
β is greater than α,
and Δ is less than α.

Therefore, a section across the tooth normal to the elements of the surface is a warped surface. It will, however, be sufficient for our purposes to assume AA normal to the pitch line elements. RS = the circular pitch ÷ 2 = thickness of tooth on pitch line normal to axis.

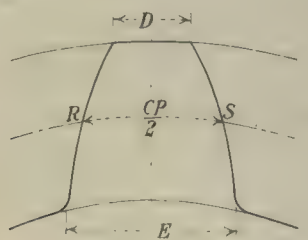


Fig. 9.

Let D = thickness of point.
E = thickness of root.
And corresponding dimensions on section
$AA = R'S'$, D' and E'.
$D' = D \cos \alpha$.
$R'S' = RS \cos \alpha$.
$E' = E \cos \alpha$.
For $\alpha = 45$ deg., $\cos \alpha = 0.707$.
For $\alpha = 23$ deg., $\cos \alpha = 0.92$.

Thus values of D', $R'S'$, E' for 45 deg. and 23 deg. vary as the cosines of the angles, and values for 23 deg. $= \frac{0.92}{0.707} = 1.3$ times values for 45 deg.

For example of 16-tooth pinion, circular pitch = 3.93 in.; scaled from tooth layout we have (Fig. 10)

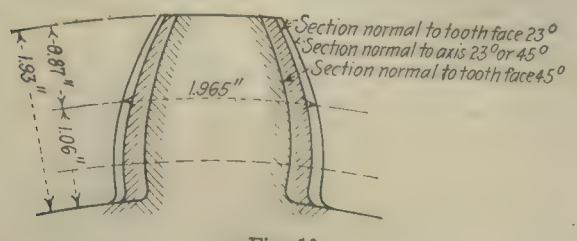


Fig. 10.

the section of 23 deg. tooth stronger than 45 deg. tooth section for equal addenda and equal circular pitch.

The section for 45 deg. tooth is, however, of ordinary standard tooth proportion, addendum $= \frac{1}{dp}$.

Tooth Pressures

Let P = total tooth pressure on a spur tooth.
Let p = corresponding pressure per infinitesimal unit width of face x (Fig. 11.)

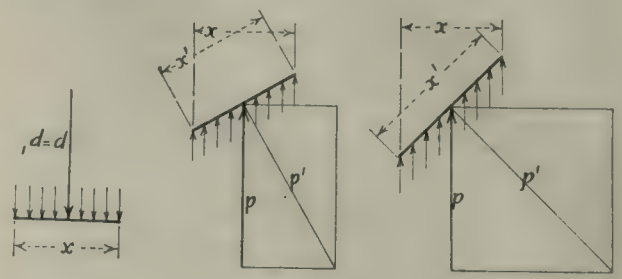


Fig. 11.

p' = resultant pressure normal to the tooth surface.
For the spur $p' = p$.
For the 23 deg. helical $p' = p$ sec. 23 deg. $= 1.086\,p$.
For the 45 deg. helical $p' = p$ sec. 45 deg. $= 1.414\,p$.
However, the unit face, against which the pressure p' is applied, has also increased to a value x'.
Where $x' = x$ sec. 23 deg. and x sec. 45 deg. respectively
$= 1.086\,x$ and $1.414\,x$.

So the pressure per original unit of face x remains constant in all cases. Therefore, the angle of the helix has no effect on the bearing pressure against the tooth surface per unit length of contact line.

From the above it would seem that, for a given circular pitch and for any helical angle, the minimum addendum which will give the conditions of the minimum required overlapping of the contact lines of successive teeth across the face, is that which would be standard for a section normal to a 45 deg. tooth, or:

CP = circular pitch normal to axis.
$C'P'$ = circular pitch normal to tooth surfaces.
dp = diametral pitch.
$d'p'$ = equivalent diametral pitch of $C'P'$.

$$\text{Addendum} = \frac{1}{d'p'}, = \frac{C'P'}{\pi} = \frac{CP \cos 45°}{\pi} = \frac{0.707\,CP}{\pi}$$

$$\text{And } CP = \frac{\pi}{dp} \text{ Then addendum} = \frac{0.707\pi}{\pi\,dp} = \frac{0.707}{dp}$$

Face Relative to Helical Angle

Referring to Fig. 3, face for single helical, or ½ of double, should equal at *least* 1¼ Y, and since $Y = CP$ cot α, $F = 2.5\,CP$ cot α, or more, for double helical.

For the minimum angle of 23 deg. total face would equal about 6 CP for double helical gears.

The selection of width of face and CP, of course, depends on the total tooth pressure and the resulting tooth pressure per inch of effective projected face, parallel to the axis. Considerations of tooth wear determine the allowable pressure per inch of face, rather than strength of the tooth.

Referring to Fig. 5 and the curve for the arc of action vs. addendum for the 20-in. pitch diameter pinion, the question arises, how will this curve apply to pinions of greater or less pitch diameter? Also, will the rule of addendum $= \frac{0.707}{dp}$ give the same proportionate conditions of overlap, etc., brought out in the above discussion?

Say we have a 40 in. pitch diameter pinion with 16 teeth, or a diametral pitch of 0.4, and the same addendum of 1¾ in. The arc of action in this case, figured from the formula, is 8.75 in. Here are the same proportionate conditions as we had in a 20-in. pitch diameter pinion having 16 teeth, where the arc of action was 4.35 in., and it will be noted that the two arcs are proportionate to the pitch diameter. The rule, therefore, based on this curve, becomes:

The arc of action for any pitch diameter and any number of teeth is equal to that of the 20-in. pinion for

the same number of teeth and standard addendum, multiplied by the ratio of the pitch diameters.

Or: Required arc of action =

$$\left\{\begin{array}{l}\text{arc for 20 in. pitch diameter}\\ \text{for same number of teeth}\\ \text{and addendum} = \dfrac{0.707}{dp}\end{array}\right\} x \frac{pa}{20} \quad (1)$$

Conditions of overlap of contact surfaces (i.e. X, Y and $X—Y$) will be a like proportion of that for the same number of teeth on the 20-in. pitch diameter, namely, $\frac{pd}{20}$, or $\frac{dp}{DP}$, Or,

The arcs vary inversely as the diametral pitches (2)

Let DP = diametral pitch of gear being considered.
Let ARC = arc of action of gear being considered.
Let dp = diametral pitch for 20 in. pitch diameter for same number of teeth.
Let arc = arc of action for 20 in. pitch diameter for same number of teeth.

Then (1) $\text{ARC} = \text{arc} \times \frac{pd}{20}$

or (2) $\text{ARC} = \text{arc} \times \frac{dp}{DP}$

The foregoing denotes, then, the proportion of helical or double helical teeth, where addenda of pinions and gears are equal, or where the arcs of approach and recess are equal, which will give the minimum height of tooth, and, therefore, restrict the contact surfaces of the tooth curve to the maximum degree to that portion nearest the pitch line, where rolling contact exists. In other words, the portions of tooth curve subjected to sliding contact are reduced to the practical minimum. The condition of minimum practical friction is thus established.

Note A

In the foregoing arcs of approach and recess have been assumed equal for all gear ratios, while as a matter of fact this is true only for gears of 1:1 ratio, or where the pitch diameters are equal.

Referring to Fig. 12:

$TN = BT \sin 20°$

also $P'T = P'N - TN =$

$$\sqrt{(P'B)^2 - (BN)^2} - BT \sin 20°$$

and for gears of equal pitch diameters,

$AT = BT$, $BN = AM$, $P'B = PA$

therefore $P'T = PT$, arcs of approach and recess are equal, and $TK = TK'$.

For larger gear—

$TN' = B'T \sin 20°$

and $P''T = P''N' - TN' =$

$$\sqrt{(P''B')^2 - (B'N')^2} - B'T \sin 20°$$

$$TK'' = \frac{P''T}{\cos 20°} = \frac{\sqrt{(P''B')^2 - (B'N')^2} - B'T \sin 20°}{\cos 20°}$$

Using the 20 in. pinion of Table II with addenda of line 7, the arcs of recess KT will be ½ the arcs of action given in line 8. Let us figure the arcs of approach TK'' for gears of various ratios.

Table V

	Number of Teeth 8	12	16	20	30
1—Diametral pitch	0.4	0.6	0.8	1.0	1.5
2—Arc recess (KT)	3.9 in.	2.82 in.	2.17 in.	1.82 in.	1.25 in.
3—Arc of action from Table II*	7.8 in.	5.65 in.	4.35 in.	3.65 in.	2.5 in.
3 to 1 Ratio:					
4—TK''	4.75 in.	3.26 in.	2.47 in.	2.03 in.	1.38 in.
5—Total arc†	8.65 in.	6.08 in.	4.64 in.	3.85 in.	2.63 in.
6—Ratio of (5) to (3)	1.11	1.075	1.065	1.055	1.05
6 to 1 Ratio:					
7—TK''	4.96 in.	3.44 in.	2.57 in.	2.11 in.	1.42 in.
8—Total arc†	8.86 in.	6.26 in.	4.74 in.	3.93 in.	2.67 in.
9—Ratio of (8) to (3)	1.135	1.11	1.09	1.075	1.07
12 to 1 Ratio:					
10—TK''	5.19 in.	3.54 in.	2.64 in.	2.15 in.	1.45 in.
11—Total arc†	9.09 in.	6.36 in.	4.81 in.	3.97 in.	2.7 in.
12—Ratio of (11) to (3)	1.165	1.125	1.105	1.09	1.08

*Being the arc for a ratio of 1 to 1.
†Total arc = $KT + TK''$.
For 3 to 1 ratio, $B'T$ = 30 in.; for 6 to 1, 60 in.; for 12 to 1, 120 in.

Due to the increase in the arcs of approach as the ratio of gearing is increased, the total arcs of action increase somewhat, as indicated by these percentages. This means that, in the higher ratios, there would be a proportionately greater amount of overlap across the face for teeth, based on the proportions set out in the above discussion, than there considered. This is desirable rather than otherwise. Should the designer wish in any particular instance he could reduce the addendum until the arc of action approximates more closely the circular pitch.

It will be evident, however, that for any standard, for tooth proportions, to be of standardizing value, it should apply to gears of any ratio. The proportions above developed, addendum $= \frac{0.707}{dp}$, which is based on the condition of shortest arc of action or 1:1 ratio, applies as well to the higher ratios, with a slight desirable increase in face contact. It therefore fulfills the requirements of a standard.

(To be concluded)

More Steel Workers Employed

WASHINGTON, Dec. 6—The iron and steel industry showed an increase in employment in November of 2.2 per cent, equivalent to 7284 workmen, when compared with October, according to the monthly report of the United States Employment Service. In metal and metal products there was an increase of 0.1 per cent, representing 80 workmen. Other industrial classifications showing increases were paper and printing, 4.2 per cent; lumber and its manufacture, 4 per cent; vehicles for land transportation, 2.7 per cent; tobacco manufactures, 2.2 per cent; chemicals and allied production, 1.3 per cent; stone clay and glass, 0.39 per cent; textiles and other products, 0.2 per cent. The total increases in nine industries was 17,144 workmen. Decreases in the remaining five industries amounted to 9925, so that the net gain was 7219, or 0.46 per cent. Industries showing decreases were liquors and beverages, 21.8 per cent; railroad repair shops, 5.6 per cent; food and kindred products, 2 per cent; leather and its finished products, 1.5 per cent, and miscellaneous inustries 0.8 per cent.

Among iron and steel centers showing increases were Johnstown, Pa., 0.4 per cent; Pittsburgh, 2.3 per cent; Birmingham, Ala., 1.5 per cent; Buffalo, N. Y., 1.5 per cent; and Cleveland 0.82 per cent.

New York Attorneys Protest Against Patent Office Delays

Protesting against the delay on the part of the Patent Office in granting patents, 75 patent attorneys of New York met last week and passed resolutions calling on Congress for a remedy. The principal speaker was Ex-Commissioner Thomas Ewing, who said that over 57,000 inventions were now lying in the Patent Office awaiting examination. Inventors are compelled to wait years, he said, before they can obtain capital with which to finance their inventions, due to the unwillingness of business men to put money into an invention unprotected by a patent. During this period of unemployment and depression, Congress should do everything in its power to encourage development of new industries.

Congressman Bond, New York, assured the meeting that he would work for the passage of a bill now before the House of Representatives which would increase the number and the salaries of the technical staff of the Patent Office. A committee was appointed to work for the desired improvements.

The Hendee Mfg. Co., Springfield, Mass., motorcycles, is gradually increasing operations. During November the company turned out 1000 machines, leaving on its books orders for 5000. The management is planning to develop its English business, which, up to the war, showed considerable promise.

The Kalman Co., 22 West Monroe Street, Chicago, manufacturer of steel reinforcing bars, will commence the immediate erection of its proposed plant at Youngstown, Ohio, with initial unit to be 120 x 375 ft.

PICKETING RESTRICTED

Supreme Court Says There Must Be No Intimidation or Enforced Discussion

WASHINGTON, Dec. 6.—Speaking through Chief Justice William Howard Taft, the Supreme Court of the United States in a decision handed down yesterday in the case of the American Steel Foundries, petitioner, vs. Tri-City Trades Council, et al., held in substance that "missionaries" in picketing are permissible, but that the line must be drawn at intimidation. The Chief Justice also took up the issue as to whether "interference of a local labor organization by persuasion and appeal to induce a strike against low wages is without lawful excuse and malicious."

"We think not," says the decision. "Labor unions are recognized by the Clayton act as legal when instituted for mutual help and lawfully carrying out their legitimate objects." It was held that where personal rights and privileges are interfered with by the labor pickets the picketing is invalid, but where there is no interference the picketing may be valid, while threats are never lawful. The decision, concurred in in substance by Justice Brandeis and dissented from by Justice Clarke, came up to the Supreme Court on an appeal brought by the American Steel Foundries growing out of a strike at its plant at Granite City, Ill. It reverses the decision of the Circuit Court of Appeals in part and affirms it in part and remands the case to the Federal District Court of Illinois for modification of its decree. Action was brought by the American Steel Foundries in the District Court to prevent injury to its plant by the strike called in an effort to force an increase in wages. The District Court granted an injunction against the defendants on the ground that a strike could not be conducted peacefully and that there was danger of injury to the plant. The Trades Council appealed to the Court of Appeals. The question was raised as to the jurisdiction of the District Court and the scope of the injunction as well as to the sufficiency of the evidence to justify belief that the plant would be injured by the strike. The decision of the district judge was reversed by the Court of Appeals and the last step was an appeal to the Supreme Court.

Picket Line Established

The company, a New Jersey corporation, normally employs about 1600 men at its Granite City plant. The council declared a strike and established a picket line outside of the plant. In the course of the picketing, there were a number of violent assaults, evidence cited by the court said, by picketers upon the employees as they went to and from work.

The company filed a bill in the Circuit Court, Southern District of Illinois, to enjoin the council and a number of individual defendants from continuing the strike. It charged a conspiracy to injure the business of the company by intimidation, violence and other means. The court issued a temporary injunction, preventing further trouble, and later the injunction was made permanent. This restrained the defendants from in any way or manner whatsoever, by use of persuasion, threats or personal injury, interfering with, hindering, obstructing or stopping any person from going to and from his work. In addition, the injunction forbade the defendants from assembling, loitering or congregating in the neighborhood of the plant for the purpose of picketing or maintaining at or near the premises of the company or on the streets leading to the premises any pickets to obstruct the company in the free operation of its plant.

Upon appeal to the Circuit Court of Appeals, the latter struck out the word "persuasion" from the decree and modified the words regarding picketing by adding to them the words "in a threatening or intimidating manner." The case then was appealed to the Supreme Court.

Application of Clayton Act

The Supreme Court, explaining that the case as it relates the picketers involved application of Section 20 of the Clayton act, forbidding an injunction against peaceful persuasion of others to cease employment, against peaceful picketing and peaceful assembly for a lawful purpose, held that these declarations do not introduce any new principle into the equity jurisprudence of the Federal courts. The decision said they are "merely declaratory of what was the best practice always."

The decision then proceeds:

"If in their attempts at persuasion or communication, those of the labor side adopt methods which, however lawful in their announced purpose, inevitably lead to intimidation and obstruction, then it is the court's duty—and the terms of Section 20 of the Clayton act do not modify this—to limit what the propagandists do as to time, manner and place, so as to prevent infractions of the law and violations of the right of the employees and of the employer for whom they wish to work.

"In going to and from work, men have a right to as free a passage without obstruction as the streets afford, consistent with the rights of others to enjoy the same privilege. We are a social people, and the accosting by one of another in an inoffensive way and an offer by the one to communicate and discuss information with a view to influencing the other's action are not regarded as aggression or a violation of that other's rights. If, however, the offer is declined, as it may rightfully be, then persistence, importunity, following and dogging become unjustifiable annoyance and obstruction which is likely soon to savor of intimidation. From all of this the person sought to be influenced has a right to be free and his employer has a right to have him free."

Chief Justice Taft then points out that under the circumstances it was idle to talk of "peaceful communication" and that the name "picket" indicated a militant purpose "inconsistent with peaceable persuasion." When one or more assaults or disturbances ensued, they characterized the whole campaign, the decision says, "which became effective because of its intimidating character."

Enforced Discussion

"The law does not look with favor on an enforced discussion of the merits of the issue between individuals who wish to work, and groups of those who do not," the decision states, "under conditions which subject the individuals who wish to work to a severe test of their nerve and physical strength and courage."

In making a distinction between peaceful persuasion or communication and unlawful picketing, the court says "each case must turn on its own circumstances."

"We think that the strikers and their sympathizers should be limited to one representative for each point of ingress and egress in the plant or place of business," the Chief Justice continues, "and that all others be enjoined from congregating or loitering at the plant or in the neighboring streets by which access is had to the plant, that such representatives should have the right of observation, communication and persuasion but with special admonition that their communications, arguments and appeals shall not be abusive, libelous, or threatening, and that they shall not approach individuals together but singly. This is not laid down as a rigid rule, but only as one which should apply to this case under the circumstances disclosed by the evidence and which may be varied in other cases."

The decision also points out that the right to combine for a lawful purpose has not in many years been denied by a court and that the strike is a lawful instrument.

A general meeting of the Michigan Foundrymen's Association is to be held in Kalamazoo, Dec. 13. J. Edgar Lee, Challenge Machinery Co., Grand Haven, is president; E. N. Turner, Manistee Iron Works, Manistee, is treasurer, and A. W. Blodgett, Kelsey Building, Grand Rapids, is secretary.

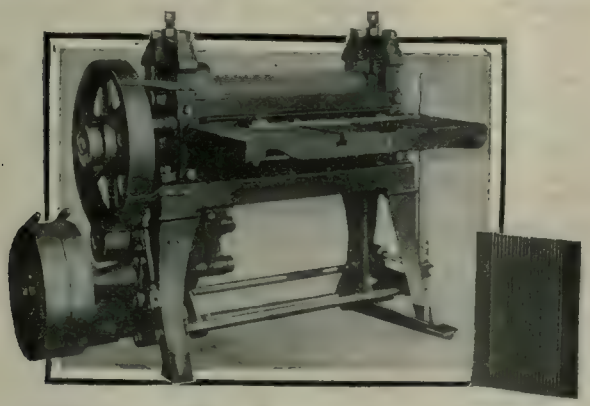
The Republic Iron & Steel Co. again has its plate mill in operation at Youngstown, Ohio, producing plate for large outside diameter pipe.

CORRUGATED ELBOWS

Machinery for Manufacture of One-Piece Elbows, 4 to 8 In. in Diameter and of No. 26 Gage Material

By separating the process into its elements and providing a machine for each operation, the Niagara Machine & Tool Works, Buffalo, is enabled to offer an equipment for the manufacture of one-piece corrugated elbows, including the modern idea of quantity production.

The equipment comprises a squaring shear; corrugating machine; corrugated forming roll; elbow compressor; elbow bending machine, and crimping machine. With the machine units properly grouped the work passes from machine to machine through the complete cycle of operations without lost motion. The equipment is designed to take material of No. 26 gage and lighter, and is said to accommodate without readjustment sheets showing more than an ordinary variation in thickness.

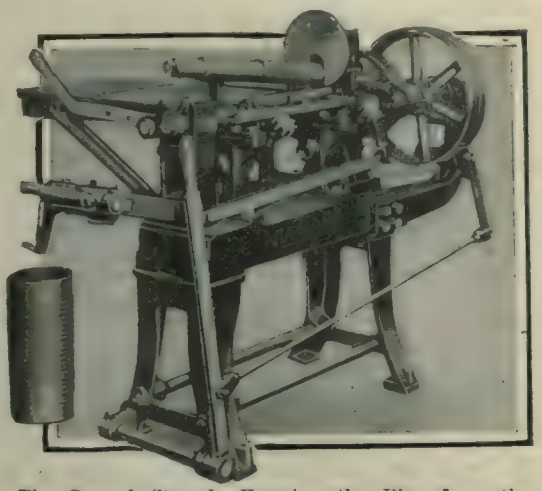


In the First Operation the Sheet Is Corrugated

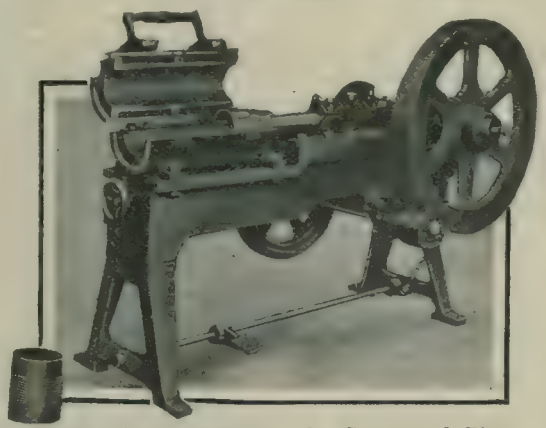
Blank sheets, when not purchased correct as to size, but of the proper width, are squared to size on the shear. The blank is then placed on the table of the corrugating machine against the front and side gages. The treadle is depressed and the sheet automatically feeds between the two corrugating rolls which have recesses for inserting additional corrugations for different sizes of elbows. They produce an offset in the corrugations on one edge of the sheet, thus providing a closer lap joint on the elbow. The corrugating machine is shown in the illustration and the forming roll also. The latter is used for the second operation in which the pipe is formed from the corrugated sheet. The blank is placed on the table of the forming roll, against the side and back gages. The rolls are then closed. A vertical moving slide puts an initial bend in the starting end of the blank. A friction clutch starts the rolls in motion, forming the sheet into a pipe. The machine can be adjusted to various sizes of elbows.

In the third operation the corrugated pipe is compressed on the compressor shown in the illustration. A ring is inserted in each end of the pipe, which is then locked in the mold of the machine, one stroke of which compresses the corrugations. While the compressed pipe is being removed from the mold, the rings are slipped out. The mold is adjustable for various sizes of elbows by means of steel rings, inserts and liners. The amount of compression can also be varied.

Bending the compressed pipe comprises the fourth operation, the machine for the purpose being shown in the three accompanying illustrations, two of which show the bending operation in detail. The compressed, corrugated pipe is clamped firmly on the chucks of the machine operation of which causes the chucks to form an angle of 90 deg. with each other, opening the corrugations on the outer curve of the elbow and slightly compressing the corrugations on the inner curve or throat, thereby pinching the seams, always placed in the throat, more firmly together. Adjustments and extra chucks and clamps are provided for various sizes of elbows.



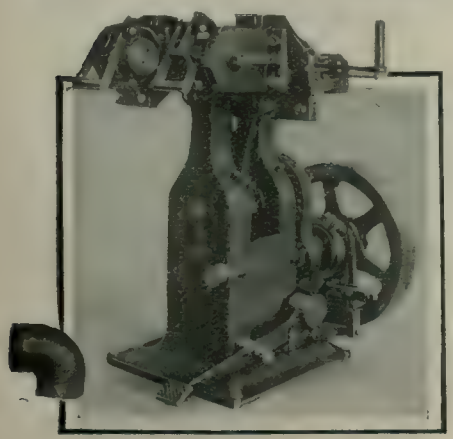
The Second Step Is Forming the Pipe from the Corrugated Sheet

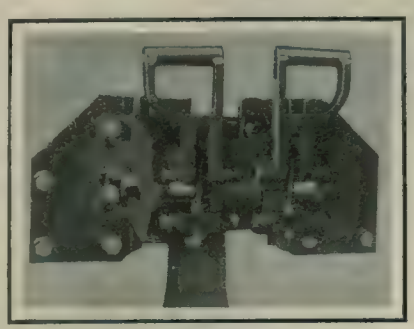


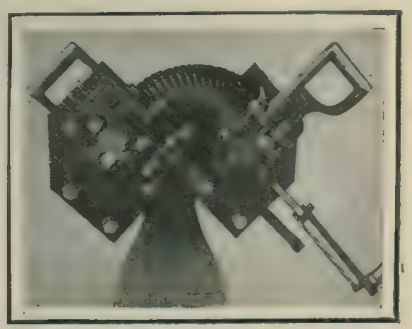
Machine for Compressing the Corrugated Pipe

One spot weld is made on each end of the elbow and one end then crimped on the company's No. 7 power bench machine, equipped with crimping rolls.

The four operations can be performed by three operators. The elbows produced are said to be uniform in







The Elbow Bending Machine Used in the Fourth Operation Is Shown at the Left. The bending operation is shown in detail in the two illustrations above, the one at the left being before and the one at the right after the bend

diameter, accurately bent to right angles, with well-rounded backs, tight throat seams and evenly radiating corrugations. It is also claimed that there is no stretching of the metal at the top of the corrugation which is detrimental to the strength or the breaking of the surface scale that mars the appearance and invites corrosion. The entire equipment may be driven by a 5 hp. motor.

PRICES TOO HIGH

Remarkable Allegations Made by Federal Trade Commission

WASHINGTON, Dec. 6.—Denial by Justice Jennings Bailey, in the Supreme Court of the District of Columbia, of the motion of the Federal Trade Commission to compel coke and iron and steel manufacturers to submit advance sheets in the cost reporting case, has been followed by the filing with the court of an amended answer by the commission. This answer seeks to justify the efforts of the commission to make the manufacturers produce monthly cost reports. Justice Bailey having granted a temporary injunction restraining the commission from securing these facts.

Hearing on the injunction had been set for Thursday of the present week, but has been indefinitely postponed to permit the filing of a reply to the amended answer. In the amended answer, the commission, speaking through its attorneys, Jesse C. Adkins and William T. Chantland, makes sharp comment regarding what it calls profiteering in coal last year, in an attempt to show the public need for the gathering of the data desired.

The commission mentions the unusual decline in prices of agricultural products in an effort to show that steel prices are out of line. In this connection, the answer says:

> The results of the information required by the commission are now and will be during the immediate future of particular value to the public generally, to Congress, and to the trade for the reason that, as is common knowledge, price readjustments are at the present time very much out of line and harmony, and prices on steel and steel commodities have declined from the war prices much less than on many other commodities, whereas, prices of many other commodities, notably agricultural commodities, to the producer, have declined down to or below pre-war prices (for example, oats and corn selling in agricultural districts at 20c. and less per bushel), that as a result of the general feeling that the price readjustments in the steel and iron industry are out of line, the people generally have stopped buying, or are buying only as little as possible, and that this has an effect, whether properly or improperly, upon the whole industrial and trade structure, and that it is, therefore, of prime importance that the truth and facts relating thereto be ascertained and made public—not so as to identify results as to any individual concern (and it is not the purpose or intention of the commission to publish facts so as to identify results of individual concerns), but the truth and facts as to the entire industry; and to disseminate such true facts, it is essential and necessary that the commission gather and compile the facts called for in its forms (which activities were temporarily enjoined in this suit).

The amended answer in large measure is a revised compilation of the original answer dealing with the authority of the commission to get the data under Section 6 of the Federal trade act, the manufacturers denying the jurisdiction of the commission. The commission in turn denies that compliance by the producers with orders and answers to its questionnaires will subject them to unnecessary expense and loss in the preparation of reports and in making provisions therefor in their system of accounts. It is further stated that requirements of the commission are not unreasonable or an abuse of discretion.

The claim of the attorneys for the commission that "prices on steel and steel commodities have declined from the war prices much less than on many other commodities" is interesting to say the least. But its accuracy will not stand the test of actual conditions. At the outset, the comparison in the decline between steel and agricultural prices is not considered to be well taken. The drop in agricultural prices has been exceptional and is far from representative. At the same time, the decline in steel prices under so-called war prices has been distinctly sharp and is much greater than that in many other lines, such as in building materials and in retail prices. The market to-day, as a study of the market shows, is only about 25 per cent above 1913 prices and as the industry is so painfully aware, a large tonnage is being produced at an actual loss, and will continue to be until transportation rates are materially reduced. Therefore, the statement in the commission's amended answer falls far short of truly reflecting the situation. The buyers' strike referred to is a part of a world-wide economic condition prevailing at present through numerous causes, one of which undoubtedly was the inflation of prices, labor and transportation costs, and which existed in all lines. To say that conditions in the steel industry were responsible for this development is taken to be an attempt to draw a conclusion not founded on fact and cannot be on the plea that the steel industry is the barometer of trade. Steel, as is evident, is not a commodity purchased by the average consumer and it was the attitude of the latter in halting purchases that started the so-called buyers' strike.

Estimates Present Pig Iron Production Costs in Three Centers

In an article on "The Manufacture of Pig Iron" in the *Griffin Bulletin* of November, published by the Griffin Wheel Co., Chicago, G. S. Evans, superintendent cupola division, presents estimates of the cost of making pig iron in the three principal producing centers, based upon materials acquired at current market quotations:

	Pittsburgh		Chicago		Birmingham	
	Tons	Value	Tons	Value	Tons	Value
Ore	1.8	$12.42	1.8	$10.17	2.7	$4.89
Limestone	0.4	0.48	0.4	0.48	0.4	0.40
Coke	1.0	4.50	1.0	7.00	1.6	8.00
Mis. supplies and relining		0.81		0.81		0.94
Labor		1.08		1.08		1.35
Cost per gross ton		$19.29		$19.54		$15.58

The Chamberlin-Roome Steel Co.

A new corporation has been organized in Chicago to engage in the merchandising of steel products, to be known as the Chamberlin-Roome Steel Co. The executives are all men who have been identified for a period of years with that district. They include Charles M. Chamberlin, president; William A. Roome, vice-president and treasurer, and Walter D. Monroe, secretary.

The general warehouse of the company is located at Thirty-ninth Street and Ashland Avenue, in the central manufacturing district, which is practically the center of the city, and affords excellent distribution facilities for the local trade and is served by the Chicago Junction Railway for out-of-town shipments. Offices will be maintained both at the warehouse and in the Continental and Commercial National Bank Building. It is the intention of the company to carry a complete stock of bars, bands, hoops, blue, black, and galvanized sheets, rivets, tubes, structural shapes, plates and boiler supplies. Equipment will be installed to permit cutting to length and size, but no provision has been made for fabricating facilities, as it will be the policy of the company to adhere strictly to the merchandising of iron and steel products.

According to a report of the Ford Motor Co., made last week, November production in its American and foreign plants would equal if not exceed that of October. October production was 92,000 automobiles. The Highland Park, Mich., and four other American branches made 85,000 cars, and the Canadian and overseas branch plants made 7000, with the Manchester, Eng., plant leading with 2000 cars.

BUSINESS IMPROVEMENT

Special Activity as Noted by Department of Commerce—Less Unemployment

WASHINGTON, Dec. 7.—Continued improvement in industrial and commercial conditions is shown by figures just published by the Department of Commerce in its monthly *Survey of Current Business*. Greater output of textile products as well as of iron and steel is shown, while a widespread increase in building has made itself felt in lumber, cement, brick and related industries. The department notes further declines in prices in October, but on a much smaller scale than earlier in the year. This relative stability of prices and the improved banking situation, as evidenced by increased reserves, smaller loans and lower interest rates, are considered favorable to further business improvement. The most serious drawback is stated to be the low price of agricultural products and the consequent decreased buying power of the farmers.

Retail prices on Nov. 1 showed no change, and wholesale prices declined slightly. Prices paid to producers for crops and livestock, however, still declined markedly and both groups are below the 1913 level for the first time since the beginning of the war, while wholesale and retail prices are still about 50 per cent above that mark. Wholesale prices in Canada, the United Kingdom and France also declined during October but continued inflation increased the price level in Germany and Italy.

The monthly export trade of the United States for the past six months is greater than in 1913, even making an allowance for an increase of 50 per cent in prices. On that basis, exports are 10 per cent greater than the 1913 average but imports are 10 per cent less.

Unemployment conditions continued to improve in October. Figures for the United States as a whole and for New York State show more men employed and larger payrolls, but average earnings appear to be on the decline. This factor is also reflected in the decline in postal savings. The small excess of immigration over emigration has also helped labor conditions.

Increased buying is reflected by greater sales in October by mail-order houses, and chain stores, greater advertising in magazines and larger postal receipts.

Shipping Steel by Water

PITTSBURGH, Dec. 5.—Interest in the possibility of the inland waterways for delivery of freight in quantity has been greatly quickened through the success of the undertaking by the Jones & Laughlin Steel Co. in use of the rivers for shipment of steel products to Southern and Southwestern consumers. That company already has sent two great fleets of barges, carrying approximately 400 carloads of steel products, south on the Ohio and Mississippi from its works in the Pittsburgh district, and is preparing to continue the service as a regular factor in its distribution system.

The first tow carrying about 100 freight carloads left the Pittsburgh harbor the last week in October and distributed its cargo to Huntington, W. Va., Louisville, Ky., Evansville, Ind., and St. Louis. The second tow, carrying 300 freight carloads of steel products, started down the river this week and will proceed as far as Memphis, Tenn., unloading parts of its cargo at several intermediate points.

The use of of the river system for delivery of its products was undertaken by the Jones & Laughlin Steel Co. primarily to avoid the present excessive freight rates, but has been so successful that, according to company officials, it is now the intention to make it a permanent service for a wider distribution of the products of its mills. Not only is the company planning an increased use of the inland waterways system, but is looking into the possibility of the use of sea-going steel barges for delivery of steel products to Gulf points and also in time to ports on the Pacific Coast through the Panama Canal.

The two Jones & Laughlin tows which have gone down from Pittsburgh have been composed of 200-foot steel barges belonging to the Vesta Coal Co., a subsidiary of the steel company. The first tow, feeling its way along, reached St. Louis in 14 days, as against an average of nine days by rail, but the second tow is expected to clip the time down close to rail delivery time, and it is the expectation of the company to be able eventually to make even better time than by rail.

Research on Molding Sand

An announcement by Alfred D. Flinn, chairman, Division of Engineering, National Research Council, is as follows:

Hundreds of thousands of tons of molding and core sands are used annually in the iron, steel and nonferrous foundries of America. A little of it is re-used; much more might be. Sands are not always correctly selected for specific purposes. Mixing and other treatment can secure improvement. In what ways can foundry practice as to sands be bettered? What economies can be realized, not only in reduced expenditure for sand, but also in less number of lost castings and higher quality of accepted product?

Last Spring, the American Foundrymen's Association decided that thorough study of this subject would be profitable and asked the co-operation of the American Institute of Mining and Metallurgical Engineers.

The institute referred this request to the Division of Engineering of the National Research Council, of which it is a member. Through joint action with the division, a valuable digest of the literature has been made by Prof. Robert E. Kennedy, of the University of Illinois, and a large committee of foundrymen, engineers and scientists has been selected, under the general direction of President W. R. Bean, of the Foundrymen's Association and the chairman of the division.

This committee on molding sand research has just been organized with the following officers and executive committee:

Chairman: R. A. Bull, consulting engineer, Sewickley, Pa.
Secretary: Robert E. Kennedy, assistant secretary American Foundrymen's Association, 909 W. California Street, Urbana, Ill.
W. R. Bean, president American Foundrymen's Association, Naugatuck, Conn.
Henry B. Hanley, metallurgist and chemist, 107 Ocean Avenue, New London, Conn.
Jesse L. Jones, metallurgist, Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
Prof. Henry Ries, geology department, Cornell University, Ithaca, N. Y.
Dr. Bradley Stoughton, consulting engineer, 10 East Forty-fourth Street, New York City.
Dr. George K. Burgess, chief division of metallurgy, Bureau of Standards, Washington, D. C.

The committee has 35 members, representing the many interests in the use of molding sand.

At a meeting of the executive committee, Nov. 26, in the office of division of engineering, Engineering Societies Building, New York, three sub-committees were appointed to deal, (1) with the formulation of standard tests for determining the working properties of molding sand, (2) reclamation of molding sands and greater use of old sands, and (3) methods of manufacturing synthetic sands. A meeting of the main committee will be held in the Engineering Societies Building, 29 West 39th Street, New York, on Dec. 9, to lay out a comprehensive program of research which will include the assigning of the various problems to appropriate laboratories and industrial plants. Some field work will be necessary in connection with these investigations.

The co-operation of men having like interests in Canada and England is assured and invitations have been extended to France and Belgium.

The Pittsburg Boiler & Machine Co., Pittsburg, Kan., has just completed a two story fireproof construction pattern shop and storage. It is also contemplating improvements and building for after Jan. 1.

Railroads Gain by Labor Board Decision

Working Rules for Shop Crafts Made More Elastic and Give Recognition to Non-Union Workers—New Regulations Mean Saving to Carriers of $50,000,000 Annually

BY G. L. LACHER

CHICAGO, Dec. 3.—A decision announced here this week by the United States Railroad Labor Board will mean a saving to the railroads of the country estimated at $50,000,000. The announcement of the board completes the work of that body in revising the working rules of railroad shop crafts. The attention of the board was confined to the revision of rules on which the railroads and employees failed to come to an agreement. The revised regulations as now published include rules which were approved by the board and made effective Aug. 16, additional revisions which became effective Oct. 16, and the remaining changes which were put into effect on Dec. 1.

Although the new rules are far more elastic than those included in the National agreement which was framed under the Railroad Administration, the principle of collective bargaining and union recognition was not abandoned. The recommendations of local shop committees are still to be heeded when vacancies are to be filled by promotion. The local committees are also authorized to present the cases of individual employees who believe they have grievances against the management. An important addition to the rules, however, is a specific provision authorizing employees who are not members of the shop crafts organizations to present grievances in person or by representatives of their own choice. This clause has been interpreted in some quarters as establishing an open shop. From a practical point of view, however, so long as the majority of the employees are unionized, negotiations between the men and the management will continue to be handled by union representatives.

Broaden Scope of Work

The new regulations are chiefly significant because they increase the authority of the management and broaden the scope of the work of the individual crafts. Under the old regulations, no employee who was in the service of the railroad 30 days could be discharged for any cause without first being given an investigation. Under the new rules, an employee may be suspended pending a hearing and if it be subsequently found that he has been unjustly suspended or dismissed from the service, he shall be reinstated with seniority rights unimpaired and compensated for the wage loss, if any, resulting from his absence from service.

One of the principal objections of the railroads to the National agreement was that it defined the duties of each craft in such minute detail that work not requiring specialized skill was assigned to skilled workmen, and employees were not permitted to perform duties other than those specified, even though the uninterrupted operation of trains urgently required their help. Under the revised regulations, the definitions of the duties of various crafts have been made far more elastic. Thus, engineers, firemen and cranemen of steam shovels, ditchers, clam-shells, wrecking outfits, pile drivers and other similar equipment requiring repairs on the line of road, are specifically authorized to make such repairs as they are qualified to perform, notwithstanding the fact that such work is normally done by machinists, boilermakers, et al. Similarly it is specified that in running repairs, other mechanics than sheet-metal workers are authorized to remove and replace jackets and connect and disconnect pipes where no repairs are necessary to the jackets and pipes in question.

Under the old rules, a sharp division was made between dead work and running repairs. Craftsmen assigned to running repairs were not required to do dead work at points where dead work forces were maintained. The new regulations provide that such craftsmen may be put on dead work, even at points where dead work forces are maintained, if there is not sufficient running repair work to keep them busy. Specific provisions in the old rules determining the number of craftsmen and helpers necessary on certain work have been tempered in the revised regulations. Thus the old agreement required that a boilermaker sent out on the road to do boilermakers' work must be accompanied by a helper when such work requires a helper at the home point. The revised regulation merely provides that boilermakers sent out on the road be furnished with a helper *when necessary*.

Transfer to Semi-Skilled Men

Various duties formerly assigned to skilled workers have been transferred to semi-skilled men. Boilermakers' helpers are now assigned the work of removing and replacing grates, which was formerly done exclusively by journeymen boilermakers. Operators of electric traveling cranes with a capacity of 40 tons and over are now classed as linemen instead of as electricians, and operators of cranes of less than 40 tons capacity come under the classification of groundmen instead of linemen, as formerly. Work on storage batteries, formerly assigned exclusively to electricians, is now to be divided between electricians and helpers as may be agreed upon locally.

Under the original National agreement, carmen exclusively were assigned to wrecking crews. As revised, the rule provides that, when needed, men of any class may be taken as additional members of wrecking crews to perform duties consistent with their classification.

Throughout the revised regulations, the divisions of duty as between crafts have been made less rigid, so that time will not be lost because the proper craftsmen are not immediately available and workmen will not be in idleness because there is not sufficient work coming within the scope of their specified duties to keep them busy.

Reduction of Forces

Reduction of working forces has been facilitated under the revised regulations. Under the old agreement, there was no provision for a reduction of working hours and five days' notice had to be given men before they could be laid off. Under the new rule, hours may be reduced to 40 per week before reducing the force and only 48 hours' notice need be given before such a reduction in hours is effected. On the other hand, when the force is to be reduced, only four days' notice instead of five days need be given the men affected. Whereas the old agreement rigidly provided that senior laid-off men must be given preference in re-employment and returned to their former positions, the new regulation specifies that they shall be returned to their former positions, *if possible*.

An entirely new set of rules promulgated by the board creates a new type of apprentice to be known as a special apprentice. Previously there have been only two kinds of apprentices, regular and helper apprentices. Special apprentices are to be selected from young men between the ages of 18 and 26 who have had a technical school education, and they are to serve only three years' apprenticeship before becoming journeymen mechanics.

Piece Work Permitted

One of the most important changes in the rules was made effective Oct. 16. This was a modification of Rule 1, governing hours of service, to remove all

inhibitions against piece work contained in the original National agreement and to permit the question to be taken up for negotiation on any individual railroad in the manner prescribed by the transportation act. Another important change was made on Aug. 16. Formerly overtime at the rate of time and a half was paid for all Sunday and holiday work. Under the revised rule, employees necessary to the operation of power houses, millwright gangs, heat treating plant, train yard, running repair and inspection forces, who are regularly assigned by bulletin to work on Sundays and holidays, are to be compensated on the same basis as on week days.

Pay for Overtime

Another important change made on Aug. 16, provides that for continuous service after regular working hours, employees shall be paid time and one-half on the actual minute basis with a minimum of one hour for any such service performed. Under the old agreement, the employee received credit for an extra hour of work if his task were not completed until a few minutes had elapsed beyond the even hour.

The employees involved in the decision are included in the six shop crafts: carmen, sheet metal workers, machinists, blacksmiths, boilermakers, and electrical workers, who were represented at the hearings on the case by the Brotherhood of Railway Carmen of America, the International Alliance of Amalgamated Sheet Metal Workers, the International Association of Machinists, the International Brotherhood of Blacksmiths, Drop Forgers and Helpers of America, the International Brotherhood of Boilermakers, Iron Ship Builders and Helpers of America, and the International Brotherhood of Electrical Workers. All of these organizations are affiliated with the American Federation of Labor and are enrolled in the railway employees' department of that labor organization.

There are two important qualifications to the application of the rules promulgated by the board. It is specified that the rules will not apply in instances where any particular carrier may have agreed with its employees upon any one or more rules, in which case the rules agreed upon shall apply on that road. It is also provided that the present rules are not to be understood or construed as carrying with them the interpretation placed on them by the United States Railroad Administration or any of its agencies.

TO PREVENT WASTE

Heavy Losses in Foundry Practice—Report of the U. S. Bureau of Mines

WASHINGTON, Dec. 6.—In his annual report made public to-day, Director H. Foster Bain, of the United States Bureau of Mines, points out the special efforts of the bureau to aid mineral industries to re-establish themselves on a safe business basis to meet renewed foreign competition and the changed conditions of supply and demand of the postwar period, showing the way to the possible saving of vast sums through the application of improved methods in the production of mineral materials.

An investigation of scrap losses in aluminum-alloy foundry practice showed that the annual losses in the United States amount to $1,200,000 and that universal adoption of methods recommended by the Bureau of Mines would probably result in a saving of about $600,000 per annum. Melting losses in this industry, which are largely preventable, aggregate $3,000,000 yearly.

The bureau investigated the properties and possibilities of molybdenum of which the United States possesses the largest known deposits, although the country is relatively poor in high-grade deposits of some other important alloying elements used in alloy structural steels, such as automobile steels. The bureau conducted studies directed toward devising means for utilizing extensive deposits of low-grade iron ores that can not be smelted profitably by present methods. These studies included investigations of the low-grade iron ores of the Birmingham, Ala., district, the manganiferous iron ores of the Lake Superior district, and the iron and steel situation in the Pacific Coast states.

The cost of production of zinc, with the standard retort process, is now so high that it endangers the position of zinc as a cheap metal. Plans have been formulated for an investigation of proposed methods for the electrothermic metallurgy of zinc, with a view to increasing the recovery of metal and lowering production costs. The results of an investigation regarding the losses of fines in the tailings of zinc metals in the Wisconsin district indicate that the use of concentrating tables of a certain type will greatly increase recovery. It is estimated that this practice would have added about $1,000,000 annually to the value of zinc output in this district had it been in operation in 1917.

As about one-quarter of the bituminous coal produced in the United States is used in industrial power plants, the waste of unburned coal and coke in the ashes from boiler plants has been investigated by the bureau. It has been possible to recover the greater part of the unburned fuel by washing the ashes on a concentrating table. As the result of a study of coal washing problems in the State of Washington, one mine has built a table washing plant to treat a pile of refuse amounting to more than 1,000,000 tons, estimated to contain 200,000 tons of recoverable coal of coking quality.

The bureau completed work on preparation and analysis of special alloy steels for the Navy. A comprehensive report on recent developments in electric brass melting was finished.

Improved Prospects in the Northwest

SEATTLE, Nov. 30.—Operators in the iron and steel trade who omit lumber from their future basis as regards sensing coming market conditions will miss a vital point that they may later regret. Mills and wholesalers in the West Coast fir territory, who have struggled through 11 months of leanness unparalleled in the history of the industry are able to report a rising market, unusually heavy buying of wooden parts of cars by Eastern car manufacturers, increasing inquiry for shingles and fir, unusually early for the industry, and symptoms of railway lumber maintenance buying. Inasmuch as steel and hardware follow all these improvements in conditions, lumbermen believe the two industries will be interlocked through the next 90 days in a manner never before known.

The communities of Priest River and Sand Point, Idaho and Newport, Wash., are well started in a movement to span the Pend Oreille River with a $200,000 concrete and steel toll bridge as an attraction to tourist travel. Citizens have formed the Interstate Toll Bridge Co. with authorized capital stock of $200,000 which will be subscribed in the communities affected. Dividends of 8 per cent are guaranteed.

Will Need Oil Drilling Machinery

SEATTLE, Dec. 1.—Unprotected by "blue sky" laws, investors in this State have been doubly cautious as regards buying oil development stocks of any kind, but the change in Alaska from gold to oil prospecting seems to have drawn many shrewd financial men of the State of Washington into the excitement, and oil drilling machinery, it is believed, will be in demand in the North next spring. More than 600 applications for oil leasing and prospecting permits have been received at the capital at Juneau. These affect 1,400,000 acres. Almost 50 per cent of the filings are in the Cold Bay region on the Alaska Peninsula. Geologists have reported favorably and drilling is expected to start in the spring.

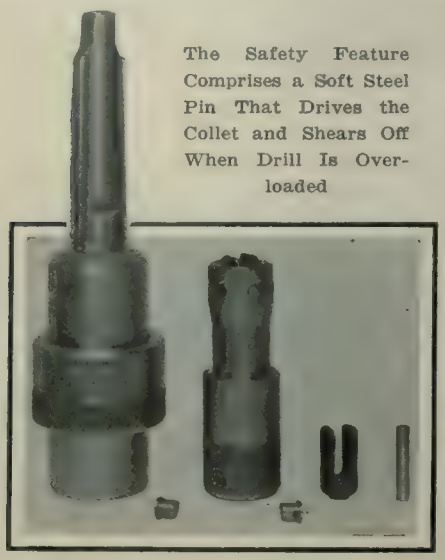
The Massachusetts Department of Labor and Industries reports encouragingly for the past week, having received notices of increased output in large metal and machinery establishments in that State.

Safety Quick Change Drill Chuck

A quick change drill chuck for holding drills with taper shanks, the dimensions and weight of which are practically the same as those of the ordinary quick change drill chuck on the market, yet having new features and known as the SaveAll positive safety quick change drill chuck, has been placed on the market by the SaveAll Tool Co., Waltham, Mass.

The chuck has a safety device intended to prevent drills, taps, reamers, counterbores, etc., from breaking and burning, and which comprises a soft steel pin that drives the collet and shears off when the cutting tool is overloaded. The pin is held in place by a pointed screw which positions in a groove in the pin, and when it is sheared can be removed by loosening the screw and inserting a new pin. Certain sizes of pins are applicable to drills of various diameters; for instance, the same pin is used with 37/64 to 29/32-in. diameter drills.

The drill or other tool is held in a collet which slips



The Safety Feature Comprises a Soft Steel Pin That Drives the Collet and Shears Off When Drill Is Overloaded

into the chuck when the sleeve on the latter is raised. Lowering of the sleeve forces in jaws which engage the collet on the taper end. The collet is made with two diameters, beveled on the outer ends. These bevels pilot the collet into the chuck, the diameters entering a small and a large hole simultaneously, preventing the collet from getting out of line and sticking while being changed. A compensating collet lock for automatically taking up wear and eliminating end motion is provided, as well as a Bristo hollow safety set screw for preventing the tool from pulling out. Tools can be changed while the machine is in motion or at rest.

In the small end of the collet there is an ejector, a light blow on which releases the drill. The chuck shown in the illustration is a No. 2, the capacity of which is ¼-in. to 2-in. taper shank drills, i.e., Nos. 1, 2, 3 and 4 Morse tapers. The chuck is simple in design, there being but four working parts. With the exception of the shear pin, which is of cold rolled steel, all parts are hardened.

By removing the danger of burning and breaking the drill, the maker claims that an operator is enabled to drill steel at 5 in. to 7 in. per min., and cast iron at 10 in. to 14 in. per min. without danger to the cutting tool. A record submitted shows that in a 2-in. screw machine drilling ¾ x 5¼-in. holes in machinery steel at 6½ in. per min., 3 to 5 pins were sheared per 300 holes, which was the production for 8 hours.

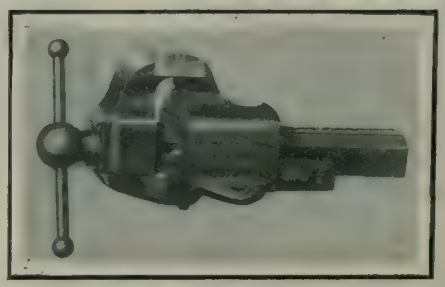
New Question for Manufacturers

WASHINGTON, Dec. 6.—In addition to changes that are being made in the schedule in the census of manufactures for 1921, which have been previously pointed out, they contain one question prepared by the Secretary of Commerce that is taken to be significant. The question incorporated and to be answered by manufacturers is an inquiry as to the estimated percentage of output compared with possible output "if you had had such demand as to require full running time."

In view of the expansion in the steel industry, especially in some departments such as plate capacity, the Government is trying to assist manufacturers in developing export markets so as to absorb the surplus output above domestic requirements. It is believed that the question incorporated at the direction of Mr. Hoover has a bearing on this subject.

New U-Beam Vise

The Athol Machine & Foundry Co., Athol, Mass., has placed on the market a U-beam vise of improved type, shown in the accompanying illustration. The material used in its manufacture and the workmanship



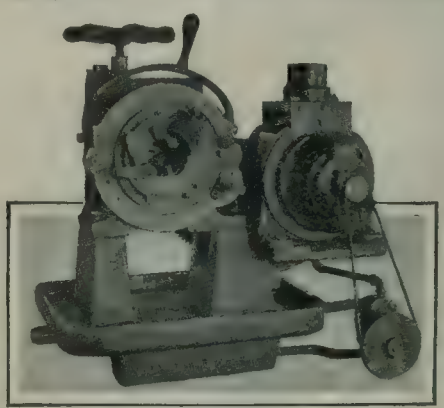
This Vise Is Bolted to the Top of the Bench

involved are the same as embodied in the company's machinists' vises, and it is said to be more rugged in construction than the oval slide type vise formerly made by the company.

The screw is of the buttress type, the nut of malleable iron, the jaws of tool steel, carefully checked and hardened. The beam, eye and ball are unfinished, but the surface of the vise otherwise is smooth and well finished. It is bolted to the top of the bench instead of the front, as is the oval slide type vise, thereby giving a better purchase. The improved type is made in four sizes, 2½ in., 3 in., 3½ in. and 4 in., weighing 13, 21, 30 and 37 lb., respectively. The jaws of the 2½-in. vise open 3½ in.; the 3 in., 4½ in.; the 3½ in., 5½ in.; and the 4 in., 6 in. All parts are interchangeable.

Threading and Cutting Machine for Small Pipe

A motor-driven portable threading and cutting machine designed especially for rapid production of small pipe threads, either in the shop or on the job, has been



An Automatic Die Release Is Provided

placed on the market by the Curtis & Curtis Co, Bridgeport, Conn.

The machine is designated the No. 430 and is said to be entirely new in design. It is equipped with an automatic die release which opens the die when the thread is completed, while the machine is still running. An oiling system is provided and also an improved cut off and dies and cut off tools for the range of the machine. A commercial motor is used, adapted for any of the standard currents. The machine is self contained. Large range, light weight, simplicity of operation, and low price are features emphasized by the machines.

Investigation Favors American Valuation

National Association of Manufacturers Will, However, Ask Thorough Consideration of All Arguments—Modification May Be Agreed Upon

BY L. W. MOFFETT

WASHINGTON, Dec. 6.—Because of the wide diversity of views regarding the proposal to adopt the American valuation plan in connection with tariff making, much interest is manifested in the questionnaire sent out by the National Association of Manufacturers to its members in order to get their views on the subject. The referendum is being conducted at a time when this matter is occupying the minds of both the executive and legislative branches of the Government, as well as the business interests of the country.

As has been pointed out previously, it is unquestionably true that prominent men both in Administration circles and in Congress who originally were strongly in favor of the plan now entertain doubts as to its feasibility. Some who have modified their views claim that they have done so because of changed economic conditions during the past few months, particularly as they affect depreciation of foreign exchanges. It is their contention that, because of the further drop in these currencies, especially the German mark and the Austrian crown, resulting in low cost of production, when compared with American costs, an advantage exists, where raw materials are already on hand, that cannot be overcome by the adoption of the American valuation plan without at the same time setting up barriers against other foreign countries, including the allied nations.

It is recognized, however, that such a barrier is even increased under the present plan of basing customs duties on foreign valuations and that consequently the existing system does not meet the situation. Some sort of substitute is being considered but nothing satisfactory in this direction has yet been determined upon, although a number of suggestions have been made. Among the proposals is the granting of authority to the President to change duties by executive order as conditions of exchange require. The enormous propaganda, especially that conducted by importers and retailers, has without doubt had an important bearing in creating opposition to the American valuation plan.

At the same time, manufacturers' interests, including the iron and steel trade, are strongly in favor of the American valuation plan, and while realizing that it may have its disadvantages, it is maintained that it is a much more practical basis of assessing tariff duties than any other that has been suggested. The proposed Presidential power would be similar to the plan of issuing "orders in Council" along the system followed in Canada involving "variable" duties with a minimum fixed, below which drop in exchange is not recognized.

It is true also that there are members of Congress who still adhere to the American valuation plan, and some prominent members of the House Committee on Ways and Means have insisted that they will not accept any other principle of fixing duties, although they might consider revisions to the plan as it passed the House. While some Republican members of the Senate Committee on Finance also appear to be strongly in favor of the principle of the American valuation plan, it is apparent that they are ready to consider changes in the provision as passed by the House, as well as those prepared by the Finance Committee itself. Being a new subject, and having been brought up at a time of unprecedented world-wide economic conditions, there is confusion as to how the plan and the system of "variable" duties might work, and by reason of this it is hoped that considerable light will be thrown on the American valuation plan in the report by J. B. Reynolds, director of the American valuation investigation, which is to be submitted to the Secretary of the Treasury, and afterward laid before the Finance Committee.

The investigation, it is stated, has strengthened arguments in favor of the plan, and among other things has developed the fact that there are fewer "non-comparable" articles produced in this country than it was believed even by those supporting the plan. One of the chief arguments against it has been that it would not be possible to levy duties intelligently under the American valuation plan on many imports, because of the lack of similar articles in this country. It has been conceded, even by opponents of the plan, that on many products such as iron and steel, it would be a simple matter to apply the American valuation plan.

Other points are expected to be developed as a result of the referendum being conducted by the National Association of Manufacturers. The questionnaire sets forth arguments both for and against the plan. Those made in favor of the plan are as follows:

Arguments for Plan

American valuation means that ad valorem duties on imports will be imposed upon the American wholesale value in this country, instead of the foreign wholesale value of any country from which the goods may happen to be imported into this country. It has these distinct advantages:

1. It will prevent undervaluation for the reason that the value will be determined by the United States Government in this country, where we have jurisdiction to subpoena witnesses and to get at all the facts.

2. It will result in securing more revenue from low-priced countries, because the American value will be the same for any article, regardless of the country from which it is imported into the United States.

3. This plan will make it possible to treat all foreign countries alike by imposing the same duty upon the same article regardless of the country from which it comes, in accordance with our treaty obligations.

4. This plan will make it unnecessary for this Government to carry on foreign inquisition in an almost fruitless attempt to secure foreign values for the purpose of administering our tariff laws.

5. The American valuation plan meets the difficulties now confronting this country in imposing ad valorem duties, due to depreciation of foreign currency. Under the present law, the greater the depreciation the less the duty, so that those countries whose currency has depreciated to the greatest extent pay the smallest amount in duty.

6. The American valuation plan will be easier to administer within the intent and meaning of the law. Under this plan we have to have the wholesale value in one country only. Under the present law we have to attempt to be familiar with the wholesale values in more than 100 different countries from which articles may be imported into the United States.

7. The American valuation plan will make it possible to get an adequate protective tariff at this time against ruinous foreign competition, giving to the American workman an opportunity to earn a living.

It is of course easier to ascertain the American wholesale value of any commodity than it is to secure the wholesale value in the various foreign countries as required under existing law. Unless the American valuation plan be adopted the present chaotic condition will continue indefinitely.

Arguments Against Plan

Arguments in opposition to the plan are as follows:

The American valuation schedule is impractical of operation, for the reason that it is impossible to state what is an American value. This must therefore be left to the judgment of a board of appraisers, and human judgment is always fallible.

An example of determining value, with which every one is

familiar, is automobile tires. What is their value? There are many makes—all claiming to be first-class, and with great variation in prices.

To determine the uniform value for products would be equivalent to fixing prices by a Government board, which is a condition that is not to be desired and, further, would be a basis of making uniform prices throughout the market in contravention of the Sherman anti-trust law. Though the present method of determining values has difficulties, these are all recognized, and methods of meeting them have been worked out, and are due largely to dishonest people presenting false documents and facts, and the percentage of these is small in comparison with the total amount of business. With the increased efficiency of our consular service, due to placing this under the civil service rules, these difficulties are rapidly disappearing.

The demand for the American valuation schedule has arisen largely from the disturbance in the normal rates of foreign exchange, and this condition is taking care of itself.

The American valuation schedule would pledge the country to the protective tariff policy and ad valorem duties, which would immediately place it in the category of a political issue and subject it to possible change with every change of administration, which would add one more variable factor for the disturbance and upset of business in the United States.

ACTIVE PIPE DEMAND

Large Tonnage Awarded Steel & Tube Co. of America—Fair Sheet Business at Youngstown

YOUNGSTOWN, Dec. 6.—In most active demand are line pipe, storage tanks for oil and tin plate. The Youngstown Sheet & Tube Co. is now working off the order, divided with the Steel & Tube Co. of America, involving about 17,000 tons of 8-in. line pipe, placed by the Pure Oil Co. The Steel & Tube company also took the Sinclair Oil Co. business, involving about 13,000 tons of line pipe, including 90 miles of 10-in., 60 miles of 8-in. and the rest divided equally between 2-in., 3-in. and 4-in. casing. There was keen competition among makers for both of these orders, and the fact that Western makers received the lion's share of the business indicates their location advantage, as compared with producers in the Pittsburgh or Youngstown district, for Western and Southwestern tonnage.

Volume of business of the Electric Alloy Steel Co. has been steadily increasing since the middle of the year. The company received 63 orders in July, 74 in August, 83 in September, 104 in October and 145 in November.

Sheet Prices Firm

Scattered sheet tonnage is keeping district capacity engaged at about 50 per cent, considerable output going to the automobile industry. Prices for the present at least are firm at 2.25c. for blue annealed, 3c. for black and 4c. for galvanized, though there are hints that weakness may develop in the latter two grades. Car roofing interests continue to take sizable tonnages, while small quantities are going to makers of mesh for road building. The metal furniture industry is a steady consumer, in limited tonnages. Auto body manufacturers are inquiring for 1922 tonnage and their requirements represent a considerable aggregate.

One district interest recently worked off an order for 600 tons of No. 30½ gage black sheets. Sheets material produced in this district has been consigned recently to the fabricating plant in Japan maintained by an important district interest. Several 300-ton orders of mixed grades and gages were received last week by Valley interests. Stamping and pressed steel concerns are taking regular quotas of sheets, strip steel and light plates.

Orders for Tanks

A tank builder in this territory has booked two 55,000-bbl. oil storage tanks and inquiries for 20 additional tanks of the same capacity are being figured. Some of this business, it is confidently expected, will come into the Valley. Reports received by pipe makers and tank interests generally from their Southwestern representatives indicate that considerable business is developing in the South, largely from oil groups.

Tin plate tonnage for first and second quarter delivery in 1922 is coming through in good volume and is holding operations of both independents and the Steel Corporation subsidiary in this territory at 80 per cent in this division. Recent tin plate orders included a number from canneries along the Pacific Coast, packing salmon. The Standard Oil Co. has likewise been taking tin plate for conversion into containers. Tobacco manufacturers have been among recent buyers. Reports of price weakness have so far not been reflected in this territory, though independents have repeatedly cut under the Steel Corporation this year in order to get business.

It is evident that prices of wire and wire products have slipped a peg and that makers are accepting tonnage at the level which prevailed prior to Sept. 12 last, of $2.50 per 100-lb. plain wire and $2.75 per base keg of nails. With some independents it is doubtful whether the higher prices of $2.60 and $2.90 respectively ever found much basis in transactions. The principal producer of wire products in this territory, for instance, lagged behind other makers in the last price advance. Indications are that tonnage is being accepted at the lower levels under blanket contract arrangement.

Inquiries for Sheet Bars

In semi-finished material, chief interest is in the inquiries which are being put forth by a number of non-integrated sheet makers to cover their first half 1922 requirements. Business of this nature is now being closed and additional contracts will be signed before the end of the year, or current contracts extended. Only unattractive open-hearth sheet bar tonnage elicits a quotation of $32, the ruling figure being $30. Makers report little slab or billet tonnage before the trade.

Strip business is moderate and promises further recessions before the year ends. Effort to move up quotations $5 per ton has met with little success. Quotations therefore continue at 2c. for hot-rolled and 3.75c. for cold-rolled. Automobile makers continue to take the largest tonnages.

In the pig iron market, chief interest centers about the inquiry of the Trumbull Steel Co., which has been in the market for several thousand tons. Carload lots of iron are sold occasionally, especially to foundries. It depends altogether on how anxious makers are to sell, whether the price goes below $19.

Plates are quotable in the Valley at 1.50c. to 1.65c., with demand very spotty.

Foundrymen's Convention and Exhibition in 1922

Following the announcement that the next convention and exhibit of the American Foundrymen's Association will be held in Cleveland the week of April 24, 1922, many letters have been received by the association, asking when floor plans and application blanks will be ready.

C. E. Hoyt, secretary of the association, states that "floor plans showing the layout of exhibit space in the arena and exhibition hall, together with application blanks and general information, will be mailed to all former exhibitors, following the meeting of the convention and exhibits committee, held in Cleveland, Tuesday, Dec. 6. A number have already advised that they are planning to show something entirely new at this exhibition and, while we will not have space for as large a show as in 1919 and 1920, we hope to take care of all our old exhibitors and present to the men of the foundry industry the most interesting exhibition of equipment ever shown."

A banquet will be held Dec. 12 at the Nelson Hotel, Rockford, Ill., on the occasion of the first regular meeting of the newly organized local chapter of the American Society for Steel Treating. Among the addresses will be one by W. H. Eisenmann, national secretary of the organization.

Blast Furnace Building in China

G. Gordon Green Tells of Progress in Erecting the Stack in a Suburb of Peking and Gives Interesting Description of Business and General Conditions

IN a recent letter to W. W. Hearne, Matthew Addy & Co., Philadelphia, G. Gordon Green gives an interesting account of conditions in China. Mr. Green is a brother of James A. Green, president of the Matthew Addy Co., Cincinnati. He was born in Cincinnati and educated at the Columbia School of Mines, New York. A number of years ago he was employed by Charles C. Perin to tear down the Battelle furnace at Battelle, Ala., and move it to India, erecting it in that country for the Tata Iron & Steel Co., and afterward he erected two other furnaces in India for Perin & Marshall. He is now erecting a blast furnace under their direction for the Lungyen Mining Administration in a suburb of Peking. He writes from Shiechinshan Iron and Steel Works, Shiechinshan, West Peking.

"Our furnace work is getting on nicely," says Mr. Green, "and we expect to finish May 1. It is the brickwork that will hold us up to that date, since most of the plant will be ready in March. Our plant is one of the sights of Peking and visitors come here every day or two, Chinese, Japanese and foreigners. The stoves are finished and are being bricked now. The furnace is rising above the charging platform. The 180-ft. stove chimney is finished and the boilers and stack and powerhouse are all taking permanent form. We have done all this in 90 days and I am proud of the record. If we can light the fires on June 1, 1922, it will mean that we have built an entire plant in one year, exclusive of excavation, which was not pushed. But we put in our first concrete May 25 this year. I see THE IRON AGE of Sept. 15 says that the new Trumbull furnace in Ohio was built complete in ten months and claimed that as a record. If we do it in 12, I will certainly claim that as a record. In India they cannot do it in that time, nor in twice that time, and the last furnace built in China took seven years and is not in blast yet. The old Battelle furnace in 1903-1904 took 18 months to build and that plant was not as large as this one."

Imports Manganese Ore

As to manganese ore, Mr. Green says:

"China imports a small quantity of manganese ore, probably for use in open hearths at Hankow—the Hanyang Iron Works—but I cannot find where China exports any manganese ore at all. In the commercial statistics, China is said to export about 45,000 tons of miscellaneous ores valued at about $90,000. As this is other than iron ore—of which China exports to Japan about 300,000 tons yearly—and the value runs about $2 Mexican money a ton, it is quite possible that some of it may be manganese, but it is not specified."

Great Possibilities of China

As to business and general conditions, Mr. Green says:

"We should get over our idea that China is so different from the rest of the world. They surely have a most curious mixture of conditions, varying from those of medieval Europe to ultra modern. Practically they have no government at all. Most of the departments of the government are business institutions pure and simple, the heads of which have managed, in ways known only to themselves, to achieve the power of their positions.

"Notwithstanding that government as we know it does not exist in China, and there is no national unity, the Chinese often exhibit traits that indicate that if a great leader, strong and able, were to weld China, or even half of it, into one working unit, the possibilities would be tremendous. The basic material is here, but the leaders are lacking. But in business the Chinese are very like all the rest of us. And like all the rest of us, there are very good men and very bad men and everything in between; and the proportion of good men in China would not suffer by comparison with any other nation—least of all by comparison with ourselves. Within the last few years there have been many wildcat schemes launched in China by Americans that never had any merit or even purpose other than pure theft, and it has not done the nation any good. However, there are many old companies and some new ones that are perfectly honest, and this the Chinese know. It is these concerns that uphold our good name in China.

Chinese Are Like Americans

"The Chinese are more like us than any other Orientals I have ever met. They think about as we do and the workmen do their work in much the same way as do our workmen. Most any of my men, in any line of work, would fit in with any of our home organizations and with little training would very quickly be so like our own men that you would not notice the difference.

"There is a vast amount of talk just now about our future in China. We haven't made a start on it yet. It is going to take many years of slow plodding work to get acquainted with these people, and one of the first things we must do—the hardest thing we will have to do—is to learn that we must do business with the Chinese in the Chinese way and not in our way. We stand small chance of making the Chinese do our way.

"They are millions to one and they are deep-rooted in the belief of their way of doing things. Had we a thousand concerns in China where we now have one, it would not make a dent in the manner of doing business with the Chinese. It must be done slowly, with smiles and tea and in mixing with them socially to a large extent and particularly in studying their personal and individual makeup and in dealing with them man to man. The impersonal relationships fostered by our big business is entirely unknown here. Furthermore, the Chinese is a very efficient trader, and where graft does not enter, price and quality are essential. The Chinese detest England, but have faith in English business. Japan has many friends and many enemies, but in business—usually the smaller businesses—she has a tremendous footing in China. France and Belgium also have business connections here out of all proportion to their size. But the Chinese do not fear us and do not hate us. They hope to benefit by our friendship. In certain lines they recognize our superiority, but there is always a lurking suspicion that quality is not our strong point. We are too fast, therefore we cannot be as good as the slower ones. This does not apply to railways or blast furnaces or machinery, but does apply to lesser things.

Chinese Business World

"Political upheavals do not mean upsets in business, but apparently are things entirely outside the Chinese business world. They do not affect the coinage values, since these are only and always the actual silver values. The Chinese government issues nothing but coin—no paper—except shinplasters for very small values. But all the paper money of a value of a dollar and more are issued by private banks, both Chinese and foreign, and some of the Chinese banks are of a semi-official character, but the money bears the promise of the bank, not of the government. This money circulates at par and sometimes when a bank fails—as did recently the French bank—the other bankers themselves arrange to redeem the outstanding paper and collect from the defunct bank if they can—which they did in this case. There was but a few days when the value of these notes fluctuated, quickly coming back to par at the time of redemption. Political upheavals sometimes are the

means of destroying property, but the risk of this is very small indeed.

Future American Relations

"As to the future of America in China, we must secure from China certain rights privately protecting American property in China and then by uniting with Chinese capital, and dividing directorates and management, develop China industrially, gradually raising wages to such a point that the Chinese workmen can improve their living conditions and have a surplus to spend—to put money in the hands of these millions of people and to cultivate in them a desire for the better things of life, a willingness to work for it. That desire already exists. If these men had a chance to improve their conditions in life they would work as no other people ever worked. It would automatically create a demand for the things that industrial China would produce. But we cannot do this with wholly American capital and wholly American management. To win and hold their good will, and to bring the efficiency of industrial works up to the highest attainable, it is necessary for us to divide capital, management and responsibility with them. Unlike any other Oriental people, except only the Japanese, they have the country, the climate and the individual capacity to rise to such an opportunity and to make the most of it. This would make for the most rapid education of both the Chinese and of ourselves, for we have quite as much to learn about it as they have. Furthermore, the English and the French are totally unsuited temperamentally to become successful copartners with the Chinese in the development of their country. They can never mix with them as we easily do and besides they have had no training in building up a country, a training such as we have been getting for the last hundred years."

Proposal to Abolish Private Manufacture of War Materials

A proposal for the abolition of private manufacture of war material has been made to the Committee on Land Armament at Washington by Edgar Park, organizer and first president Marlin-Rockwell Corporation. His suggestion is made on the premise that "the people of every nation are convinced that the private development and manufacture of munitions of war is extravagant, inefficient and improper; that it acts as an incentive to war and constitutes a perpetual prewar influence."

Anticipating the argument against his proposal to the effect that it would throw workmen out of employment, he states that such procedure would be similar to the throwing of bartenders out of work because of prohibition, and would be justified. Workmen could find better jobs in peace time pursuits.

Mr. Park organized the Marlin-Rockwell Corporation in 1915 and first manufactured 18,000 machine guns for Russia. After the United States entered the war his company made machine guns for the American training camps and devised a new type of machine gun for shooting between aeroplane propeller blades. The company owned three factories in New Haven, Conn.; three in Philadelphia and one each in Boston, Pittsburgh, New York, Norwich, Conn., and Southern Delaware. The company has converted its plants for the manufacture of automobile accessories.

Mr. Park would substitute a system of manufacture, allotment and use of war materials under international control.

An increase of 4.4 per cent in the number of persons employed in the large manufacturing establishments of Rhode Island during November is indicated in records supplied by George H. Webb, commissioner of labor, Rhode Island. The largest gain is shown in the metal trades. During October employment increased 6.3 per cent.

The Brier Hill Steel Co., Youngstown, Ohio, has suspended its Western Reserve works at Warren, consisting of eight sheet mills.

Weatherproofing New Hudson River Bridge

That an annual saving in upkeep of $400,000 in the proposed Hudson River bridge will be effected by means of a new feature of bridge construction, is stated in a bulletin of the Copper & Brass Research Association, 25 Broadway, New York. The plan, in brief, is to weatherproof the bridge with bronze.

The steel work will be so completely inclosed with rain-and-moisture-excluding bronze that the annual cost of repainting—a serious item in the upkeep of a big bridge—will be reduced to a minimum. That this matter of protection figures in maintenance economy, and is indeed vital, is realized when it is understood that it is expected to reduce the cost of painting from $500,000 annually to about 15 per cent of that figure.

In the bridge are to be a pair of suspension trusses or inverted arches spaced 160 ft. apart, center to center, each truss consisting of two cables from 60 to 80 ft. apart vertically, with vertical panels and diagonal bracing between to supply the stiffening under passing loads. From the two suspension trusses, vertical eyebar chains carry the double-deck floorway.

On the proper strength, functioning, and permanence of the chains depends the integrity of the bridge. Each eyebar is separated several inches from the adjacent bar, so that it can be inspected at any and all times. Each cable is inclosed in a covering or gallery of bronze for protection and to permit of inspection, so that, once the eyebars are painted they will be well protected from the elements.

Prices of Refractories Still Shaded

PITTSBURGH, Dec. 5.—Prices of refractories still are soft and there are so many instances of shading of what are regarded as the regular market quotations on fire clay and silica brick that an early revision downward of these quotations is likely. Sales of high duty Pennsylvania fire clay brick have been done fairly frequently of late at $32 as against the quotation of $34, and the latter price no longer means much. Similarly the product of other districts is being priced so that business may be secured. The recent reduction in silica brick has failed to stabilize the market, as less than $28 recently has been accepted by some Pennsylvania makers. Chrome and magnesite brick remain weak.

Business again is dwindling after having been on a rising scale since about the middle of the summer. That point brought a turn in the iron and steel industry and was followed by the releasing of shipments on old orders for brick and some new business. The refractories industry got down to as low as 15 per cent of capacity operation during the extreme low point of iron and steel production last July, but from that it went back to about 30 to 35 per cent operations. The indications are that this month will bring some reaction from this rate, for outside of the Steel Corporation subsidiaries, the trend of steel plant activities is down. The falling away may not be relatively as great as that in the steel industry, however, because the glass manufacturers and some other brick consuming industries are doing better now than before in some time. Real activity in refractories, though, depends for the most part on how well the iron and steel industry is doing.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$32.00 to $35.00	$28.00 to $32.00
Ohio	32.00 to 35.00	28.00 to 32.00
Kentucky	32.00 to 35.00	30.00 to 32.00
Illinois	35.00 to 38.00	30.00 to 35.00
Missouri	37.00 to 40.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		28.00
Chicago		35.00 to 38.00
Birmingham		40.00
Magnesite Brick:		
Standard size, per net ton		52.00
Chrome Brick:		
Standard size, per net ton		46.00

The Noiseless Typewriter Co., Middletown, Conn., has increased its working hours from 32 to 48 hours per week, but has reduced its working forces approximately one-third, and has made a wage reduction of 10 per cent.

CONTENTS

Charging Floor With Undercover Storage 1459
Hand Molding for Semi-Steel Printing Press Castings—Core-Making Expedited with Special Cement Boxes

Taylor Society in Annual Meeting 1463
Sessions Devoted to Plant Managers, Sales Executives, Office Managers, Labor Managers and Chief Executives

Double Helical or Herringbone Gears 1469
Elements to Combine Adequate Strength with Smooth and Continuous Action and Minimum of Friction of Contact Surfaces

Railroads Gain by Labor Board Decision 1478
Rules for Shop Crafts More Elastic and Give Recognition to Non-Union Workers —Saving to Carriers of $50,000,000 Annually

Investigation Favors American Valuation 1481
National Association of Manufacturers Will, However, Ask Thorough Consideration of All Arguments

Blast Furnace Building in China 1483
Process in Erecting Stack in a Suburb of Peking—Business and General Conditions Discussed

November Pig Iron Production 1490
Daily Output 6968 Tons Larger Than in October—November Total, 1,415,481 Tons—Twenty-four More Active Furnaces

Proposed Merger of Seven Steel Companies 1492
Their Combined Steel Making Capacity About 20 Per Cent of the Country's Total—Full Range of Steel Products from Integrated Companies — Iron Ore Supply

Industrial Waste Discussed by Engineers 1494
Deficiencies of Management, Particularly the Financial, the Subject of Papers at Meeting of American Society of Mechanical Engineers

Inventory of Coal Stocks 1467
Horizontal Drilling Machine 1468
New Export Bill of Lading 1468
Eastern States Blast Furnace and Coke Oven Association Meets 1468
Engineering Advertisers Publish Bulletin. 1468
New York Industrial Engineers to Meet .. 1468
More Steel Workers Employed 1473
Protest Against Patent Office Delays 1473
Picketing Restricted 1474
Corrugated Elbow Machinery 1475
Federal Trade Commission Assails Prices. 1476
Pig Iron Production Costs 1476
Business Improvement 1477
Shipping Steel by Water 1477
Research on Molding Sand 1477
Foundry Waste Prevention 1479
New Question for Manufacturers 1480
Quick Change Drill Chuck 1480
U-Beam Vise 1480
Threading and Cutting Machine 1480
Foundrymen's 1922 Convention 1482
To Abolish Private War Material Manufacture 1484
To Weatherproof Hudson River Bridge ... 1484
Refractories Market 1484
Editorials 1486
Trade Commission's Charges—Revising War-Time Shop Rules—Call for Lower Freight Rates—Price Relations —New Etching Mediums for Steel
Correspondence 1489
Demand for Railroad Readjustments
Pittsburgh Plus Case Complaint Amended. 1489
Broadening Use of A. S. M. E. Code 1489
Dismantling Chickasaw Shipyard 1491
Ore, Coal and Coke Rate Conference 1493
Personal Research Agencies 1508
Foreign Market Conditions ... 1508, 1509, 1513
Comment on President's Message 1509
Washington Steel & Ordnance Co. Dissolved 1512
Industrial Finance 1521

Iron and Steel Markets 1496
Comparison of Prices 1497
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1510
Non-Ferrous Metal Markets 1511
Personal Notes 1512
Obituary Notes 1513
Machinery Markets and News of the Works 1514
New York Jobbers' Prices 1522

ESTABLISHED 1855

THE IRON AGE

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The Trade Commission's Charges

Statements made by the Federal Trade Commission in the case pending in the Supreme Court of the District of Columbia to compel certain manufacturers to submit advance sheets in the cost reporting case show surprising ignorance of steel trade conditions by a body which should be well informed as to all the industries of the country. This is the most charitable statement that can be made in regard to allegations set forth in the document filed with the court a few days ago. The commission charges that the prices of steel products have declined from the war prices much less than those of many other commodities, and that, as a result of the general feeling that price readjustments in the steel and iron industry are out of line, people generally have stopped buying or are buying only as little as possible; that this has an effect upon the whole industrial and trade structure.

The facts have been published repeatedly in THE IRON AGE and elsewhere, showing that prices of iron and steel products are now only 26 per cent above those of 1913 and are, in fact, relatively lower than those of 1913 when it is considered that the costs of transportation, labor and fuel are much higher than they were before the war.

Only recently it has been shown that the liquidation in prices of steel has proceeded to a much greater extent than that for furniture and house furnishings, building materials, cloths and clothing, fuel and lighting, chemicals and drugs. In some of the leading finished material products, such as bars, plates and beams, prices have fully returned to figures that were common in pre-war times or have gone even lower.

If any people are not buying things they need because they think that iron and steel prices are too high, it is because they are deceived by such statements as those issued by the commission. During a bitterly contested campaign, such allegations might be made by demagogues and irresponsible newspapers, but it is not to be expected that what ought to be a dignified and judicial body, a branch of the Government entrusted with highly important duties relating to the business of the country, would be so woefully lacking in information or so reckless in misrepresentation. While ostensibly seeking information by prying into the affairs of many companies, the commission is refusing to avail itself of facts that are at hand. The question before the court, which the members of the commission apparently seek to evade by stirring up the public mind, is whether the commission has the right to require the steel companies to expose their costs and to go to many thousands of dollars annual expense per company in filling out forms entirely different from anything they have ever kept in their own business.

Unfortunately, it is true that prices of farm products have declined to such an extent that the financial condition of many farmers is approaching bankruptcy. The reports indicate that corn is being burned in some Western States because it does not pay to send it to market. Is it the Federal Trade Commission's desire to bring the iron and steel industry, already showing losses on every month's business, to the distressing condition of the farmers?

Revising War-Time Shop Rules

The revision of working rules of railroad shop crafts by the United States Railroad Labor Board, as announced last week, marks a distinct advance in restoring common sense to the operation of the railroads. In war times, even after the signing of the armistice, the domination of the railroad unions was so complete that all kinds of unreasonable regulations were forced upon the railroads. There were often ridiculous restrictions on the kind of work different workmen might do, and they increased the cost of operation to an amazing extent.

Careful study of the recent decision and a comparison with the old rules, as made in the letter of the Chicago representative of THE IRON AGE printed elsewhere, indicate that the open shop has not been recognized to the extent indicated by newspaper reports. It is true that the new regulations authorize non-affiliated employees to present their grievances to the railroad management, but throughout the rules reference is made to local committees which, in all probability, will be made up of representatives of the majority who are unionized. For this reason the unions will continue to dominate to a large extent, but some chance

is afforded the non-union man to assert his rights, and carriers that have agreed with their employees upon any rules may continue that arrangement.

Many of the narrow restrictions of the old rules are wiped out. Hereafter, for example, when a boilermaker is sent out on the road to do repair work, he is to be accompanied by a helper only when such a helper is necessary. The mere fact that the making of this rule is required shows the extent to which nonsensical regulation had advanced. The old plan was to increase expenses by hiring helpers at high costs whether they were needed or not. Even in the case of wrecks, unreasonable exactions were insisted upon and are now made impossible.

One of the most interesting features is that which provides for a new type of apprentice—a man, who, having obtained a technical school education, can now become a journeyman after only three years of apprenticeship. Certainly a student of such education should have an opportunity to use that education, and the new rule gives it to him.

The estimate that the railroads will save $50,000,000 under the new regulations may not prove correct, but whether that figure be close to the fact or not, the country is to be congratulated upon obtaining a considerable degree of freedom from the unreasonable and wasteful war-time exactions of the railroad unions.

The Call for Lower Freight Rates

On all hands there is criticism of the present railroad freight rates and a clamor that the rates be reduced. But the attitudes of the various critics show differences in the reasons given for the reductions and in the things held responsible for the high rates. Some of the arguments used are unsound and naturally irritate railroad officials. But it is unfortunate, and at the same time unfair to many sensible men who are by no means unfriendly to the railroads, that the roads should so generally assume the defensive on proposals for rate reductions.

Some newspapers have told their readers that salaries for railroad management are altogether too high, that the Interstate Commerce Commission's valuation of the railroads, against which the 6 per cent objective in earnings was computed, is $5,000,000,000 to $7,000,000,000 too high, and that the railroads are wasting money in various ways. A great many charges are made that are absolutely false, and they are made in connection with an argument that freight rates should be reduced. Then there are those who contend—and a strong case has been made for the contention—that railroad wages are too high and that a great deal of money is being wasted on account of the working conditions prescribed by the National Agreement. These men also urge that freight rates should come down.

The comparisons commonly made as to freight rates are between rates in 1913 or 1914 and rates at present. It will be recalled that for several years before the war railroads had advanced rate cases before the Interstate Commerce Commission almost constantly, and one of their arguments was the great decline that had occurred in rates. The comparisons now being made, therefore, are not necessarily entirely fair. The *Railway Age* has done a service to intelligent men, who wish to consider this subject from the broadest viewpoint, by giving a presentation, in its issue of Dec. 3, of average rates per ton mile from 1890 to date, with concurrent prices of groups of commodities according to the Bureau of Labor's index numbers. The basis, 100, is the average for 1890 to 1899, inclusive. Rates were in a trough in 1913, 1914, and 1915, standing at 87 for each year, while in July of this year they were at 149. In 1913, 1914 and 1915 commodities, instead of being in a trough, stood at 135, while in July, 1921, they were at 200.

Accordingly it makes a wide difference whether in comparing freight rates and commodity prices one uses 1913 to 1915 as a basis or makes 1890 to 1899 the basis, because in 1913-15 freight rates had gone down 13 per cent from the 1890-99 average, while commodity prices had gone up 35 per cent. Using 1913-15 as a basis, freight rates last July were up 71 per cent and commodities were up only 48 per cent, but using 1890-9 as a basis, freight rates are up only 49 per cent, while commodities are up 100 per cent.

The argument for a reduction in iron and steel freight rates has come from an industry whose fortunes have been closely linked up with those of the traffic lines traversing the most thickly populated sections of the country. In 1896-7 the railroads in this territory found that a chief contribution to their prosperity was made by their own unparalleled orders for equipment, seeing that every ton of steel thus utilized represented the hauling of six tons of freight. Moreover, it was realized and admitted by railroad officials, when the 40 per cent advance was made last year, that it bore heavily, too heavily, against coal, coke and ore, the raw materials of iron and steel manufacture.

In the case of the Lake Superior ore rate, which is under consideration at Chicago this week, last year's advance on the Mesaba range from 63½ cents per ton to $1 per ton (with corresponding advances on other ranges) represents an addition of nearly 57.5 per cent—a burden against which the mining companies unitedly protest. The facts concerning that increase in the cost of iron and steel making should have fair and full consideration in just the way in which the facts about the relation of present freight rates to those of other periods should be considered. That seems to be a case in which the railroads would do themselves credit by uniting with the petitioning mining companies and asking the Interstate Commerce Commission that a reduction be made.

There are signs that in some respects readjustment in Continental Europe, outside of Russia, has proceeded farther than is generally believed. Agriculture there is in better condition than in seven or eight years. Socially Europe is more

stable than any time since the armistice and more stable even politically; but the outstanding fact that obscures all else is that Europe has been degenerating in its handling of government finance. To put an end to currency inflation there is so fundamental that for American business and finance to emphasize the money cost of maintaining land fighting machines is entirely in order. What is particularly interesting in this connection is that the deficiencies in the budgets of European countries are almost exactly the costs of land armaments. Thus a discussion of the limitation of land armaments is regarded as vitally important if this country is to develop the confidence in Europe that is essential if financial aid is to be extended by the United States.

Price Relations

A point in the general liquidation of iron and steel prices should not be overlooked, that there has been an almost complete return to the relations between pig iron, billets and finished products, respectively, that obtained before the war. Under the war-time control billets were placed enough above pig iron to insure a profit to the steel maker who bought his pig iron, and finished steel products were placed enough above semi-finished steel to give a small margin to the finishing mill buying its steel. That was an unusual alignment. The arrangement was adopted in order to stimulate production and enable all plants to run.

It may be asked how non-integrated plants were able to operate when there was no war. There were various opportunities. As markets rose and fell there was a chance to cover raw materials ahead in an advancing market. Long-time contracts were sometimes made at special prices. The finishing mill frequently obtained a premium for quick delivery of its product, and many specialties were made, commanding prices above the base rates. Practically all these items were non-existent at the time of the war control, chiefly because the control prices represented large reductions from the previously existing market.

Taking billets as a balancing or intermediate material, they have been quoted lately at $29, and that is precisely the price to which billets rose in the 1912-13 advance. Basic pig iron reached its top back there at $16.50, valley, or somewhat below the present market, while merchant bars got up to 1.40 cents and shapes and plates to 1.50 cents, or $28 and $30, respectively, per net ton. They average a trifle higher now.

At the low point at the end of 1914 open market prices were $12.50 for pig iron, $19 for billets and 1.05 cents for bars, shapes and plates. The spreads were of course smaller in dollars, while on the percentage basis a difference was that billets were relatively lower. The percentage of bars, shapes and plates above pig iron was almost the same at the low point as at the high point. One may take it that the high market all around affected billets somewhat more than either pig iron or finished products, or that when all prices were low billets suffered the most.

If a student of statistics, absolutely ignorant in iron and steel, were given a chart of pig iron, billet and finished steel price fluctuations for a number of years before the war and a schedule of prices now existing, his judgment would be that pig iron is now a trifle too high, but that billets and finished steel products stand in natural relation. A full knowledge of the subject would furnish the explanation. Practically all items of cost are much higher now than before the war. In one way or another the higher wage rates, higher taxes and higher priced materials generally affect all branches of the iron and steel industry in much the same way; but there is one notable exception. The higher freight rates fall much more heavily in percentage of the value of the product made, upon pig iron than upon semi-finished steel or finished rolled products. The matter of freight rates really explains somewhat more than the divergence that is found. In other words, pig iron is now a trifle low by comparison with billets and finished products, when allowance is made for the factor of freight costs.

New Etching Mediums for Steel

The possibilities of etching mediums for steel examination were emphasized by an article in THE IRON AGE of Dec. 1 which gave the results of a new German etching solution. Hitherto it has been the aim, in using etching compounds, to bring out details of microscopic or macroscopic structure. The new medium, perfected by Germans, reveals in detail the strain lines in a low carbon steel as distinct from the actual crystalline, pearlitic or other structure. In other words, so far as the new solution has been tested, it is possible to locate alterations in the body of the steel caused by stress. No other method of etching has accomplished such results. While the new solution has been found available thus far for mild steel only, it will be of great value in future investigations, if made capable of general use. It is known that many steel failures, of rails in particular, are due to over-stressed metal and that fatigue failures are due largely to the same cause.

An experiment recently conducted by a large Eastern railroad presents a striking analogy to the German results. Thin strips of highly polished low carbon steel were laid on the surface of a rail over which a locomotive wheel was allowed to press gently. It was found that there resulted in the strips a distinct set of lines, entirely different from anything encountered previously. These lines bear a singular resemblance to the strain lines brought out in one of the pieces of German steel. In other words, it seems probable that similar lines of stress were developed in the two pieces of steel, the one brought out by unusual conditions, the other by the new etching process.

Developments in this field of research are increasingly rapidly. The Bureau of Standards has been conducting some important work on new ways of etching nickel steel and some striking results have been reached by the use of hydrogen sulphide on certain non-ferrous alloys in a method of "contrast etching." The discovery of the new German medium is prophetic of new and

delicate combinations of chemicals which may gradually revolutionize our knowledge of steel and of other metals and alloys.

An interesting analysis of pre-war and current exports of iron and steel by Great Britain to its own dominions has been made by the London *Iron and Coal Trades Review*. The results are rather unexpected in view of conditions in the British industry this year. In 1913 the total steel exports to countries within the empire represented 46 per cent of the total. In 1920 there was a decline to 30 per cent; but for the nine months ended with September, this year, the percentage has risen again to 43 per cent, or only a little less than in 1913. While the actual tonnage this year is small in comparison with 1913 or even 1920, the percentage showing reveals the intimate connection existing between the mother country and its dominions. It is also a factor which must be reckoned with in all estimates of future export trade in steel. There is also, however, to be taken into account the new steel capacity in India and Canada. Further additions are under way in India, and new plants in Canada for making steel plates and tin plate have been a factor in reducing imports from Great Britain. In general, the rapid recovery of the British steel export trade in the last three months is a fact not to be overlooked.

CORRESPONDENCE

Demand for Railroad Readjustments

To the Editor: There seems to be no question that the present transportation costs on steel products, and particularly fabricated structural steel for bridges and buildings, are so far in excess of an equitable proportion that in order to bring about a return to normal conditions in the building industry there must be a considerable reduction in freight rates on all iron and steel and on materials entering into their production.

The Bridge Builders and Structural Society, after a careful investigation of the subject, has found that at the present selling price of fabricated structural steel, the item of freight amounts to about 40 per cent. Fabricated steel to-day is selling at not more than 50 per cent over the average prices of 1914, while the item of freight alone is more than 100 per cent over the 1914 cost. The fabricator has reduced his labor and other items of cost in every way possible and is now sacrificing a part of his overhead charges in his efforts to meet the demands for lower prices. The item of freight alone is unchanged.

Recognizing the need for readjustment of freight costs, the Bridge Builders and Structural Society recently prepared and adopted a resolution (copy inclosed) and has sent it to various railroad associations and to officers of the Government having to do with railroad and labor matters, with the hope of shortly bringing about an improvement in the relationship between freight and other cost items.

GEORGE E. GIFFORD,
Secretary Bridge Builders and Structural Society.
New York, Nov. 30.

The resolution set forth that "it is the sense of this society that business revival on a stable basis and common justice to the wage earners in our industry demand a prompt readjustment of freight rates and railroad wages in such a manner as to bring about a proper and equitable relationship between these elements and commodity prices and wages in our industry; and further, that it is the sense of this society that Government interference with railroad management should be so far eliminated that the railroads may be operated with sufficient freedom to meet promptly changing economic conditions."

Complaint in Pittsburgh-Plus Case is Amended

WASHINGTON, Dec. 6.—Assigning as its reason the simplification and expediting of the hearings, the Federal Trade Commission has amended its complaint against the United States Steel Corporation and its subsidiaries in the so-called Pittsburgh-plus case so as to make the charges refer to each particular rolled product as distinguished from "discriminating in price between the purchasers of all of its rolled steel products" as alleged in the original complaint. The issue in the amended complaint is the same as that contained in the original complaint. The amended complaint makes precisely the same charges with respect to each particular rolled product and charges, as did the original complaint, that such alleged discriminations are in violation of the Clayton and Federal Trade acts for the reason that they are not made because of any difference in the grade, quality or quantity of the product sold, nor because of different costs of selling or transportation, nor because the different prices were made in good faith to meet competition.

The commission considers that by taking up each product separately it establishes a more specific case and it will shorten proceedings by making it unnecessary to gather a greater amount of evidence. It specifies the particular products sold on the f.o.b. Pittsburgh basis and those not so sold, such as rails.

The Steel Corporation has 30 days from yesterday, when it was served with the complaint, to make reply, in consequence of which hearings cannot begin before the expiration of that period.

Broadening Use of A. S. M. E. Boiler Code

The annual report of Charles E. Gorton, chairman of the administrative council of the American Uniform Boiler Law Society, 253 Broadway, New York, shows continued progress in the legal adoption and use in various states and cities of the steam boiler code drawn up under the auspices of the American Society of Mechanical Engineers. Mr. Gorton's activities in the last year have been directed in a large part to cities and States of the western part of the country. The Industrial Accident Commission, California, has approved the adoption of the code. Tulsa, Okla., voted to make it effective on Jan. 1, 1922. The Industrial Accident Commission of Oregon put the part of the code relating to new installations in effect on July 1, 1921, and the part relating to existing installations effective Jan. 1, 1922. Early announcement of the date of application of the code for Delaware is expected and rules were formulated for the operation of the code in Maryland. Development in details respecting the use of the code in Oregon, Michigan, Illinois, Massachusetts and possibly Hawaii were given extended attention in the report.

Circular of the Bureau of Standards, No. 113, entitled, "The Structure and Related Properties of Metals," which replaces one of earlier date (No. 42, Metallographic Testing), is a comprehensive discussion of that phase of metallography indicated by the title. The numerous examples which have been used throughout the test have been taken from the results of metallographic examination made by the Bureau, of specimens submitted for examination as well as those for research. The various methods for revealing the microstructure as well as the meaning of the features revealed are discussed, and a list of reagents for revealing the microstructure included. By means of numerous "live" examples the conditions which affect the structure of metals are discussed, also the effect of structural features upon mechanical and chemical properties of metals. A rather comprehensive discussion of the applications of the microscopy of metals has been given.

IRON OUTPUT UP AGAIN

November Production 6968 Tons Per Day Larger Than That of October

Twenty-four Furnaces Blown In, None Shut Down

The upward swing in the pig iron output of blast furnaces, which started in August after the low point of the year in July, continued in November the momentum gained in October. The gain per day last month was nearly 7000 tons as contrasted with 7465 tons per day in October over September. Gains in August and September over the previous months were 2070 tons and 2891 tons per day, respectively. The November total is close to the February production of 1,595,522 tons.

The production of coke and anthracite furnaces for the 30 days in November amounted to 1,415,481 gross tons or 47,183 tons per day as compared with 1,246,676 tons or 40,215 tons per day for the 31 days in October, according to data revised since the original returns by telegraph were published in THE IRON AGE, Nov. 3. The increase in November over October was 168,805 tons or 6968 tons per day.

The total number of furnaces in blast on Dec. 1 was 120 as compared with 96 on Nov. 1, with 82 on Oct. 1, with 70 on Sept. 1 and 69 on Aug. 1, the low point in the recent decline. In November, 24 furnaces were blown in and none blown out. This is the first month in the year in which no furnaces have been blown out or banked. The capacity of the 120 furnaces active Dec. 1 is estimated at 51,665 tons per day as compared with 40,850 tons per day for the 96 furnaces active on Nov. 1.

The November output of manganese-iron alloys was only 3525 tons, all ferromanganese, no spiegeleisen having been made for several months.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from November, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
November	71,669	26,161	97,830
December	66,037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889
August	26,037	4,743	30,780
September	27,189	5,661	32,850
October	33,365	6,850	40,215
November	37,960	9,223	47,183

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94,473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	39,768
May	73,015	108,422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107,820	110,354	78,340	98,931	27,889
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	30,780
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	32,850
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	40,215
Nov.	101,244	110,394	106,859	111,802	79,745	97,830	47,183
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	.....

No furnaces were blown out during November. Among the furnaces blown in were the following:

Nos. 6 and 8 Lackawanna furnaces and Buffalo B. furnace in the New York district; one Lock Ridge furnace in the Lehigh Valley; Keystone furnace in the Schuylkill Valley; Robesonia furnace in the Lebanon Valley; Nos. 2 and 4 Carrie furnaces and the J and No. 4 Edgar Thomson furnaces of the Carnegie Steel Co., one furnace of the American Steel & Wire Co. and one Monongahela furnace of the National Tube Co., all in the Pittsburgh district; Newcastle No. 1 furnace of the Carnegie Steel Co. in the Shenango Valley; Adrian furnace in western Pennsylvania; No. 2 Ashland furnace in Kentucky; Nos. 3 and 4 Mingo furnaces of the Carnegie Steel Co. in the Wheeling district; No. 2 Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; one furnace of the National Tube Co. and No. 3 River furnace in northern Ohio; one Iroquois furnace and No. 11 Gary furnace in the Chicago district; one Mayville furnace in Wisconsin and the A furnace operated by the M. A. Hanna Co. in Michigan.

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for November, and the three months preceding:

Pig Iron Production by Districts, Gross Tons

	November (30 days)	October (31 days)	September (30 days)	August (31 days)
New York	91,535	65,502	50,970	44,948
New Jersey	4,525	4,745	4,370	4,689
Lehigh Valley	30,020	27,614	27,566	33,014
Schuylkill Valley	35,850	28,176	23,126	20,735
Lower Susquehanna and Lebanon Valleys	19,356	20,581	21,903	23,939
Pittsburgh district	337,851	295,741	250,128	255,274
Shenango Valley	50,555	35,430	8,649	none
Western Penna.	67,432	61,742	60,073	47,565
Maryland, Virginia and Kentucky	14,754	15,827	16,046	15,470
Wheeling district	44,966	36,520	18,706	18,076
Mahoning Valley	165,562	157,512	125,705	111,722
Central and Northern Ohio	156,767	140,914	110,327	83,552
Southern Ohio	13,893	14,485	8,200	3,548
Illinois and Indiana	252,566	229,009	171,380	191,658
Mich., Minn., Mo., Wis., Colo. and Wash.	20,059	11,940	14,641	27,304
Alabama	108,125	99,948	73,739	72,699
Tennessee	1,665	990	none	none
Total	1,415,481	1,246,676	985,529	954,193

Capacities in Blast Dec. 1

The following table shows the number of furnaces in blast Dec. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Nov. 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	Dec. 1 In Blast	Dec. 1 Capacity per Day	Nov. 1 In Blast	Nov. 1 Capacity per day
New York:					
Buffalo	22	9	3,385	6	2,185
Other New York	4	1	215	1	180
New Jersey	4	1	150	1	150
Pennsylvania:					
Lehigh Valley	18	4	1,040	3	985
Spiegel	2	0	....	0	....
Schuylkill Valley	15	3	1,195	2	910
Lower Susquehanna	10	1	420	1	480
Lebanon Valley	8	2	335	1	180
Ferro	2	0	....	0	....
Pittsburgh District	55	26	12,700	20	9,700
Ferro and spiegel	4	1	115	1	125
Shenango Valley	19	4	1,685	3	1,140
West. Pennsylvania	26	6	2,245	5	1,665
Maryland	6	1	345	1	480
Wheeling District	15	5	2,190	3	1,410
Ohio:					
Mahoning Valley	27	12	5,715	11	5,235
Central and Northern	26	11	5,470	9	4,540
Southern	16	2	465	2	465
Illinois and Indiana	42	16	9,000	14	7,270
Mich., Wis. and Minn.	11	3	1,065	1	385
Colorado and Missouri	6	0	....	0	....
The South:					
Virginia	16	0	....	0	....
Kentucky	7	1	270	0	....
Alabama	41	10	3,605	10	3,330
Tenn., Ga. and Texas	16	1	55	1	35
Total	418	120	51,665	96	40,850

Production of Steel Companies—Gross Tons

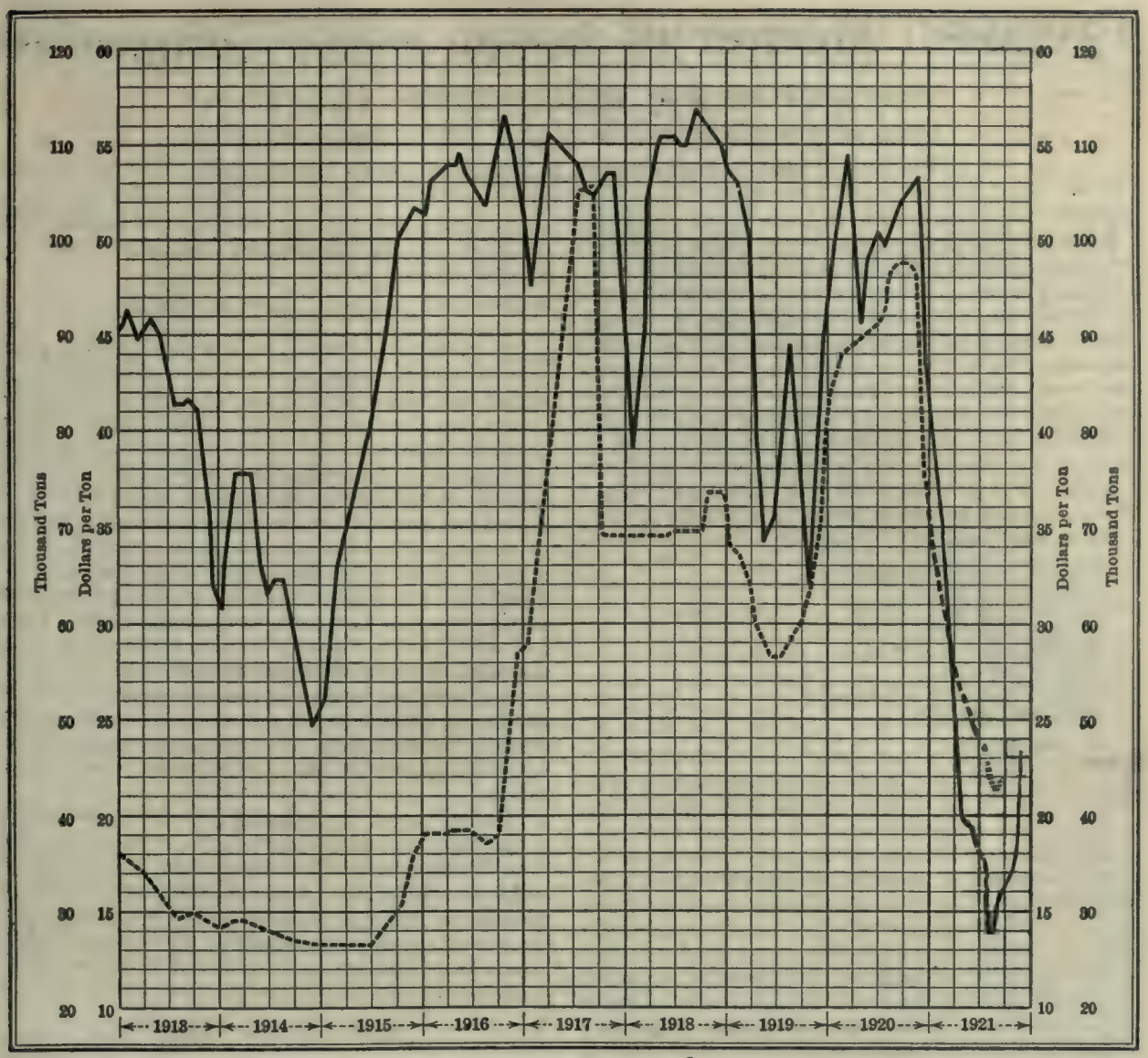
Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production 1919	1920	1921	Spiegeleisen and Ferromanganese 1919	1920	1921
Jan.	2,430,022	2,232,455	1,932,159	32,787	23,957	22,228
Feb.	2,209,470	2,181,679	1,625,695	28,105	28,038	29,013
Mar.	2,277,507	2,480,663	1,323,443	26,644	35,275	41,294
Apr.	1,838,677	1,968,542	1,015,621	17,308	27,628	24,310
May	1,586,805	1,128,720	1,024,678	14,604	33,407	9,232
June	1,655,944	2,209,770	883,312	14,254	34,751	4,536
July	1,906,604	2,230,567	715,664	14,805	36,789	5,524
Aug.	2,108,566	2,254,943	807,144	17,419	36,985	3,878
Sept.	1,828,613	2,247,250	815,692	20,631	39,546	3,289
Oct.	1,295,690	2,393,644	1,034,312	20,238	34,786	3,902
Nov.	1,727,656	2,150,075	1,138,789	19,964	26,944	3,525
Dec.	1,916,249	2,047,167	.....	15,718	28,023	....

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302,260	3,015,181	2,416,292
Feb.	2,656,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
Apr.	3,334,960	3,288,211	2,478,218	2,739,797	1,193,041
May	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
June	3,270,055	3,323,791	2,114,863	3,043,540	1,064,833
July	3,342,438	3,420,988	2,428,541	3,067,043	864,555
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	954,193
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	985,529
Oct.	3,303,038	3,486,941	1,863,358	3,292,197	1,246,676
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	1,415,481
11 mos.	35,303,063	35,072,430	27,949,610	33,710,259	14,894,600
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Ttl. yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1920 production of this iron was 323,396 tons.

Blast Furnace Notes

The American Steel & Wire Co., Dec. 5, blew in its second furnace at its Donora, Pa., works. This company now has all four of its blast furnaces in this district in blast. With the Carnegie Steel Co. having 25 of its furnaces on and the National Tube Co. three furnaces in this district active, the Corporation now accounts for 32 of the 53 active furnaces in the Pittsburgh and nearby districts.

Of the 24 furnaces blown in during November, 12 were Steel Corporation furnaces, five were independent steel making and seven were merchant furnaces.

Of the 24 furnaces blown in during November approximately 15 went in after Nov. 15 and 9 early in the month.

The Steel Corporation Dismantling Its Shipyard at Mobile, Ala.

The United States Steel Corporation has decided to abandon its shipbuilding plant at Mobile, Ala., operated by the Chickasaw Shipbuilding & Car Co., and is disposing of equipment there either by sale or by shipment to other Steel Corporation plants. Connected with the operations at Mobile are also the Chickasaw Utilities Co., which supplies electric current for lighting and trolley purposes, and the Chickasaw Land Co. The Mobile enterprise was entered upon at the request of the Government for the building of ships during the war, and 14 vessels were built, most of them now being in the foreign trade of the Steel Corporation. The Chickasaw Shipbuilding & Car Co. will continue to operate the large car plant completed this year at Fairfield, Ala., adjoining the structural mill of the Tennessee Coal, Iron & Railroad Co.

It is the purpose of the Steel Corporation to continue all the activities of the Federal Shipbuilding Co., which operates a shipyard and repair plant at Kearny, near Newark, N. J. The shipways at this yard were extended last year so as to permit the construction of ships 500 ft. in length, and in the past year a floating dry dock of 10,000 tons capacity has been installed for use in repairing vessels.

Proposed Merger of Seven Steel Companies

Their Combined Steel Making Capacity About 20 Per Cent of the Country's Total—A Full Range of Steel Products from Integrated Companies—Iron Ore Supply

THAT seven important independent steel companies will be merged in a corporation second in producing capacity to the United States Steel Corporation is a probability in view of information made public in the past week. Thomas L. Chadbourne, of the law firm of Chadbourne, Babbitt & Wallace, 14 Wall Street, New York, made a statement to the press to the effect that several independent steel companies are considering a plan for arriving at a possible basis for consolidation; that he was working with the companies upon such a plan, but that the matter is now only in a preliminary stage. The seven companies whose merger is contemplated are the following in the order of their steel making capacity:

Midvale Steel & Ordnance Co.
Lackawanna Steel Co.
Youngstown Sheet & Tube Co.
Republic Iron & Steel Co.
Inland Steel Co.
Steel & Tube Co. of America.
Brier Hill Steel Co.

In the past two years reports of negotiations for the consolidation of various independent steel companies have come out from time to time. From three to five of the companies named above have been mentioned in connection with these reports. At times the Bethlehem Steel Corporation has been named as a probable member of such a consolidation; at other times the Jones & Laughlin Steel Co. It can be said that neither of these companies is a party to the present negotiations. A consolidation composed of the seven companies named above would have an annual capacity of 10,129,000 tons of steel ingots, or roundly 20 per cent of the country's total ingot capacity.

Appraisals Being Made

It is understood that several meetings have been held of men prominently connected with the seven companies, and that appraisals of the various properties are now in progress. Naturally, the basis on which the various companies shall enter the consolidation is a matter on which there will be considerable variation in the estimates of the different interests. The question of financing is not expected to involve great difficulties, as there will not be large requirements of new capital. What will take time and much negotiation will be the exchange basis for the stocks of the different companies. Probably the consummation of the present plans, if they should be successful, will be a matter of several months.

With three large plants in the Youngstown district, two in the Chicago district, one at Buffalo and the operations of the Midvale company carried on in both eastern and western Pennsylvania (Johnstown, Coatesville and Nicetown) the consolidation would have the advantage of a number of strategic locations. In particular the inclusion of the Inland Steel Co. and the Steel & Tube Co. of America, which have nearly all the merchant steel capacity in the Chicago district outside of the Steel Corporation, would give the consolidation the same access to Western markets which the building of the Gary plant was intended to secure for the Steel Corporation. For some time it has been known that a proposal for the merging of the Youngstown Sheet & Tube Co., the Inland Steel Co. and the Steel & Tube Co. of America was under negotiation, but it is now believed that these three companies will participate in the larger plan each on its own individual footing.

Advantages of Consolidation

The great consolidation movement of 20 to 22 years ago, it will be recalled, came on the heels of the prolonged depression of the late eighteen-nineties. The trying time through which the steel industry is now passing, bringing with it as one phase the elimination of Pittsburgh price basing on a considerable amount of business being done in the Chicago district, has furnished one incentive to the consideration of a merger of interests. The high transportation costs of to-day give the Steel Corporation, with large plants in the Pittsburgh and Valley districts, in Chicago territory and in the South, a considerable advantage. Those who seek to bring about the new merger regard the reduction of overhead, through the unifying of organizations, and the benefits of mass production through the use of certain plants for continuous runs, as important considerations. Both have been exemplified in a marked degree in the United States Steel Corporation.

Most of the seven companies have been associated in the export trade through stock ownership in the Consolidated Steel Corporation which was organized under the Webb act. Combining the seven into one corporation would give an increased advantage over the existing export arrangements of the independent companies, through the concentration of export business in certain forms of product at particular plants.

Ingot Capacities Included

In the table below the ingot capacities of the different companies are set down, and comparison is made with the ingot capacity of the United States Steel Corporation, also that of the Jones & Laughlin Steel Co., the Bethlehem Steel Corporation and the Colorado Fuel & Iron Co., the three important independents not included, as well as with that of the various smaller independent companies that are not in the plan.

	Ingot Capacity Gross Tons	Per Cent of Country's Total
Midvale Steel & Ordnance Co.	2,894,000	5.74
Lackawanna Steel Co.	1,840,000	3.65
Youngstown Sheet & Tube Co.	1,500,000	2.98
Republic Iron & Steel Co.	1,395,000	2.77
Inland Steel Co.	1,000,000	1.98
Steel & Tube Co. of America	900,000	1.79
Brier Hill Steel Co.	600,000	1.19
Total	10,129,000	20.10
United States Steel Corporation	22,700,000	45.00
Bethlehem Steel Corporation	3,217,000	6.38
Jones & Laughlin Steel Co.	2,640,000	5.24
Colorado Fuel & Iron Co.	1,138,000	2.26
Other steel companies	10,620,000	21.02
Total for the country	50,444,000	100.00

The Steel Corporation's ingot capacity of 22,700,000 tons is considered to represent roundly 45 per cent of the country's total ingot capacity. On that basis the ingot capacity of the country is 50,444,000 tons. Some estimates would give a somewhat higher figure, but 45 and 55 may fairly be taken to represent the Steel Corporation, and the independent percentages, the 50,444,000 tons standing for a practically attainable capacity, as distinguished from a theoretical capacity. It will be seen that the Steel Corporation and the pro-

posed consolidation would take in 65 per cent of the country's capacity, with Jones & Laughlin having 5.24 per cent, the Bethlehem Steel Corporation 6.38 per cent, the Colorado Fuel & Iron Co. 2.26 per cent, and all the remaining independents, large and small, 21.02 per cent.

The pig iron capacity of the seven companies, represented by 54 blast furnaces, foots up 8,335,000 tons according to the figures of the Iron and Steel Works Directory of the United States.

Full Range of Finished Products

In finished material the consolidation would have a capacity of 7,698,040 tons, reckoning that finished steel output is 76 per cent of ingot output, an average established by the statistics of a number of years, apart from 1917 and 1918 when the large discard from war-steel ingots made the percentage yield of finished material smaller than usual.

The seven companies represent the whole range of finished material products except tin plate. Undoubtedly a tin plate plant would be provided through extensions in connection with the very considerable sheet mill capacity existing in the Youngstown district.

Without going into detail as to the rolling capacity of the various companies in the different lines of finished material the facts in general concerning the markets in which they chiefly compete are these:

Midvale and Lackawanna have rail mills and Inland is now completing a rail mill which will figure in the rail trade of 1922. All seven companies have plate mills, the most important of these in the sheared plate trade being the Coatesville mill of Midvale. Structural shapes are rolled by Midvale, Lackawanna and Inland. Republic, Lackawanna and Midvale lead in the production of bars, while Inland and Youngstown Sheet & Tube also have considerable bar capacity. Youngstown Sheet & Tube and Inland have been the principal producers of sheets, but Brier Hill is also a good sized factor in the sheet market, and the Republic in 1919 acquired the sheet mills of the Deforest Sheet & Tin Plate Co., of Niles, Ohio. In wire products the Youngstown Sheet & Tube Co. and the Cambria works of Midvale have figured in an important way. Lackawanna also is a producer of wire rods. In wrought pipe Youngstown Sheet & Tube, Republic and the Steel & Tube Co. of America are the largest of the independent producers. Some of the plants of the seven companies roll billets and sheet bars for the market, and in addition to the leading forms of finished material mentioned above the consolidation would have a great range of smaller products such as rivets, nuts and bolts, spikes and miscellaneous track supplies, besides a variety of cold rolled and cold drawn products.

In coke supply the consolidation would be substantially self-contained. Most of the seven companies have large coal mining operations and holdings of coal lands.

Iron Ore Supply

The survey of iron ore supplies represented in the holdings of the seven companies is probably one of the most important of the preliminaries engaging the attention of the consolidation promoters. Expressed in terms of the respective pig iron capacities of the companies, the life of their iron ore reserves ranges from 10 years in the case of one company to probably 30 years in the case of the company having the largest total of ore. There are large holdings in the Lake Superior region, principally on the Mesaba range, though four of the companies are well represented on the older ranges also.

When the United States Steel Corporation was formed it acquired the Rockefeller ore holdings on the Mesaba range and also the Oliver interests in the Oliver Iron Mining Co. There are no large outside holdings available to-day apart from those of the Mesabi Iron Co. and of various merchant ore firms at Cleveland. The Mesabi Iron Co. has very large deposits of magnetite on the Mesaba range and has built an extensive sintering plant, which in the past two years has made it a factor in the merchant ore trade. Its properties have been estimated to represent 500,000,000 to 600,000,000 tons. The Midvale company is now presumed to have some interest in the Mesabi Iron Co., five of its directors being on the board of the latter. Midvale has some 300,000,000 tons of ore in the Buena Vista group on the northeast coast of Cuba, similar to the clayey Mayari ores of the Bethlehem Steel Corporation, but nothing has been done thus far in their development. Pickands, Mather & Co., of Cleveland, have close ore connections with the Youngstown Sheet & Tube and the Lackawanna companies. The Cleveland firm also has extensive Lake Superior properties a part of whose output is under contract to the two companies named.

From the summation given above, of the forms of finished steel produced by the seven companies, it will be seen that any consolidation that may be formed will be on the vertical rather than the horizontal order. That is to say, a variety of products is turned out by each company, all being integrated from the ground up. There is thus no chance of any counterpart of the Steel Corporation's sheet subsidiary, or its wire or wrought pipe subsidiary. The analogy is rather with the Carnegie, Illinois and Tennessee subsidiaries of the Steel Corporation.

Will Hold Another Conference on Ore, Coal and Coke Rates

WASHINGTON, Dec. 6.—Relationship between reduced rates on ore from Lake Erie ports to interior furnaces and prevailing coal and coke rates to lake front furnaces will be the subject of another conference to be held here to-morrow afternoon with members of the Interstate Commerce Commission. The meeting has been called by the second division of the commission, consisting of Commissioners Daniels, Esch and Campbell, which has charge of the sixth section of the commerce act allowing the commission to permit railroads to put rates into effect upon short notice, instead of 30 days as is ordinarily required.

The carriers have sought permission to extend the time of application of lowered ore rates from Jan. 1 to March 31, which is opposed by some lake front interests in view of the fact that the latter have not been given lower rates on coal and coke. They, together with iron and steel interests favoring the extension and railroads, will be represented at the conference. If the extension suggested as the result of the recent conference in New York is to become effective, it will be necessary for carriers to get permission to put the new tariff into effect upon short notice.

Meanwhile Buffalo iron and steel producers are withholding the filing of their formal complaint against the rates on coal and coke. The complaint asks for the establishment of just, reasonable and non-prejudicial rates on coal and coke and of minimum rates on iron ore.

Postpones Lighting Stack

YOUNGSTOWN, Dec. 6.—The Trumbull-Cliffs Furnace Co. has definitely postponed, for the time being, the lighting of its new 600-ton stack at Warren, erected along the Mahoning River across from the open-hearth department of the Trumbull Steel Co. The latter interest has bought 3500 tons of basic pig iron at $19, furnace.

The National Enameling & Stamping Co. has purchased 50 acres adjoining its steel works in Granite City, Ill., supplementing a previous purchase of 150 contiguous acres. The price paid for the 50 acres was $48,500.

Industrial Waste Discussed by Engineers

Deficiencies of Management, Particularly the Financial, the Subject of Papers at Annual Meeting of American Society of Mechanical Engineers

"AMERICA is the most wasteful of all nations," said President E. S. Carman in his remarks opening the first session of the forty-second annual meeting of the American Society of Mechanical Engineers begun in New York, Dec. 5. "Although we accomplish results," he added, "we accomplish them regardless of the waste involved." He said that the main theme of the entire meeting, which will last through Friday, Dec. 9, would be the elimination of waste in industry, a subject he regarded as representing one of the greatest problems confronting the American people to-day. The fundamental basis of the elimination of waste was, he said, largely a matter of management.

The program was made up by the division of management and L. P. Alford, a vice-president of the society and chairman of that division, presided. The responsibility of management, particularly financial management, in the matter of eliminating waste was discussed in a paper by E. F. Du Brul, general manager of the National Machine Tool Builders' Association, Cincinnati. The title of the paper was, "Saving Financial Waste—the Biggest Waste of All."

Responsibility of Financial Management

"Most of the discussions on waste," he said, "seem to be concerned with wastes of productive effort, wastes of material and loss of operating efficiency. Occasionally some one touches on the waste due to idleness of plants in times of depression. Many production men seem to lay this idleness to the sales department's inability to secure orders. Seemingly few men are prepared to challenge the necessity of the greater part of this waste and few seem to challenge the department of business within whose province that avoidable waste occurs. It does not seem logical to worry so much as we do about wastes in cost of production to the end of saving even considerable sums in such waste elimination, if industry is to throw away all these savings and greater sums besides that were previously accumulated as profits and still other sums represented by original invested capital."

All this sort of waste has occurred lately, he pointed out, as it has in every industrial depression we ever had. Putting the question as to which element in the organization of business is responsible for this loss and whose duty it is to study the situation and minimize the evil, he pointed out that it was the management that must bear the responsibility, "since management, particularly financial management, is the element whose policies must be followed by the production and sales departments."

"Students of the subject," said Mr. Du Brul, "come inevitably to the conclusion that bad judgment of managers is the most potent contributing cause of the excessive heights of booms and the consequent excessive depths of depression. Management cannot eliminate all undulations in business but it can and must eliminate the excessive movement that is due to those controllable causes that lie in the province of management to control. Management is therefore very properly on trial before the bar of public opinion.

"The fire waste of our country, of a half billion dollars a year, receives comment and discussion merely because organized forces call the public's attention to those losses and advocate remedies," he continued, "but what organized force is crying from the housetops against financial waste? The record of failures in ten months shows a greater waste than the year's fire waste. Liabilities of failed concerns amounted to $591,000,000 in the first ten months of 1921. How much more waste was incurred, such as loss of useful value, loss in inventories and loss in profits in concerns that did not reach the bankruptcy courts?"

How Financial Losses May Be Reduced

As to the management shirking the responsibility for such waste by saying that it can only guess blindly, he said that it is essentially a function of management to do more than make blind guesses. "It is," he said, "within the power of management to secure such information as makes possible a fairly intelligent estimate of demand instead of a blind guess." The reason why management had not done better in avoiding much of this financial waste was, he said, "because managers have not chosen to co-operate, as they must, in the study of actual facts as to demand and supply of the commodities they produce. They have refused to divulge necessary information on consumption, production, stocks on hand, and orders received for three reasons: First, they have not known the value of such statistics to themselves; second, they fear that the statistics of a whole industry might in some way hurt their individual chance of success; and third, they have not known how to use such statistics, if and when they were available.

"Such information can be gathered, and it is being gathered by trade associations in some lines of business. It should be gathered and composite statistics published for every line of industry. No manufacturer of consequence can better protect his business than to contribute his quota of information about his industry. With such information made available and properly used, over-enthusiastic promotion can be minimized, for one thing, and ignorant competition avoided for another. Without such composite information an industry can only run blindly into disastrous financial waste.

"Production men desire to run shops full up, to show the least possible unit cost. In times of low demand, whole industries pursue that policy and the result is a sure maladjustment that causes financial waste in large amounts. Without the light of facts, the enthusiastic salesman is allowed to overstock dealers beyond their final ability to pay, to the ruin of the dealer and perhaps of the manufacturer, who has provided plant facilities in socially-wasteful excess of actual consumer demands. Some men are promulgating as a new gospel of business that the end of business must be service, not money; production, not profit. But there are a few basic human facts, whose continued existence proves the untruth of the new doctrine. The sole object of business is profit. It can have no other object. Unless it makes a profit it dies. The new apostles of service mistake the means for the end. Service is the means of gaining profit. No profit can be gained unless the service offered is actually in demand.

"The controlling factor in management is, and must be, the financial factor, because that factor alone assumes the final responsibility, stands the losses and gets the profit, when there is one. The financial factor, therefore, must tell the production and the distribution factors when to go, how far to go and when to stop. The financial factor must know that the financial tides are ceaselessly moving up and down, and must study the fundamental causes of these movements."

What Management Needs to Learn

Referring again to the wastefulness of business depressions, he said:

"The causes of these extremes have been studied and the results of these studies have been made avail-

able, but management has not availed itself of the information. Many men who could increase the value and body of this knowledge have refused to do so.

"Many managers base production policy on a fallacious idea of getting a steady normal business that does not change either in the amount of demand or in the varying costs that inevitably come about with changing business conditions. They seem to think that this 'normal' of their dreams must coincide exactly with the maximum theoretical production of which their plants are capable. Such dreams have caused large losses and great misery.

"Management must study why some things, perfectly proper at one stage of a business cycle, are absolutely wrong at another stage. Management must learn that there are underlying economic laws, not man made, but inherent in human nature; laws that can be violated with impunity no more than can the laws of physics. Unless management conducts operations in harmony and conformity with them, the end is inescapable disaster. The study of the business cycles and the causes and effects of different changes in business conditions require that management freely contribute the statistical data that alone makes the study possible. Management must then also learn how to use the information, learn what to do and what not to do in the various stages of a cycle.

"Management that will not co-operate in the collection, analysis and dissemination of these facts and will not co-operate in the general education of the public as to their significance and use is shirking a most pressing responsibility to society in general and to its own investors in particular. Only by co-operation of competitors can these facts be gathered. In industries that are doing this now, through their trade associations, some managers have learned how to use their information and their enterprises are not suffering to the same extent as those of their ignorant competitors. But all do suffer from the crass fatuous ignorance that is entirely too prevalent. This one thing is possible and profitable for management to undertake. Unless it be undertaken it is certain that the financial strain on industry will become increasingly greater with each recurring cycle."

Incentives for Preventing Industrial Wastes

Fred J. Miller, past president of the society and member of the American Engineering Council's committee on the elimination of waste in industry, in charge of the inquiry into the metal trades, dwelt on the incentives for the prevention of wastes in industry. Industry's chief problem was perhaps, he pointed out, to conserve, develop and make use of the natural desire of the individual to be accomplishing something, and further, to relieve workers, so far as possible, from such conditions of work as are deadening to ambition, to initiative and to creative instinct. "Far more can be done along that line," he said, "than may seem possible at first sight."

Classifying incentives into penalties and rewards, he pointed out that the two differed widely in their nature, but emphasized the idea that they differ no more than the results that are obtained by them. The reward class was further subdivided into group-reward and individual-rewards. Group incentives included profit sharing, group insurance, employee representation or bonuses paid to all employees alike, etc. Individual incentives were understood to include individual increase of wages, piece work, bonuses to individuals for specific personal attainments, etc.

As to which of these incentives should be employed, Mr. Miller gave it as his belief that after establishing good working conditions in the line of proper light, heat, ventilation, sanitary and safety measures and also including foremen and other executives who have been selected and trained to take an enlightened and human attitude toward employees—after these conditions were met, the rest of the way to the best possible general results was through individual reward incentives. In this connection he said that individual rewards can be applied intelligently only when means are provided for having a continuous record of every employee's performance with reference to established standards.

In connection with enlisting co-operation of the workers he said that there has been some tendency to over-elaboration in certain of the measures taken to overcome our industrial difficulties. "I still have faith," he said, "in the comparatively simple means of enlisting the enthusiastic co-operation of minor executives and employees and an essential part of this is to give them such treatment as every man likes to receive from those with whom he comes in contact; always remembering that work people are not essentially different from other people; are at least as readily responsive to candid, fair and courteous treatment as are other people and also as well able to judge whether or not they are receiving it.

Industries to be Directed by Engineers

Defective administrative methods was given as a major cause of waste, and as to the adoption of better methods and practices he said that "on the one hand we see employers who are too easily prevailed upon by charlatans to take up methods that are little better than a group of unrelated 'stunts' and on the other hand, those who always delay progress along new lines until pretty nearly every one else is far in advance of them. It is the work of engineers to educate and to show the better ways, and my prediction is that as time goes on our industries will be more and more directed by engineers who know how to direct them for production and who will regard production and service as the prime objects to be attained by an industrial organization. When this change has been effected, one of the greatest causes of waste will have been removed. I could mention entire industries that are in the control of men who are little if at all interested in production, but devote their entire time to high finance.

"It would, I think, surprise a great many of us if we could know just how much of the wastes of industry that are caused by careless, inefficient work, have a deeper underlying cause in a feeling created by the conditions under which men work, that make them believe they cannot do what they should do, and for reasons entirely beyond their control.

"Especially do we need to adopt such methods of management as will enable the facts to be fairly presented to both sides in every difference that arises between employer and employee; and experience shows that when we have done that, both the employer and the employee are far more reasonable and considerate than either usually imagines the other to be. Production has been and is restricted by workers, both organized and unorganized, and most of such restriction is wrong economically if not ethically.

Many Conditions Which Restrict Production

"In most industries, however, I think it can easily be shown that restriction of production by workers is insignificant compared with the restrictions caused by financial juggling of one kind or another; by avoidable irregularity of employment of labor and of plant by presidents or managers who are temperamentally unable to make decisions and stick to them, or are unable to do so because they are under the control of men 'higher up' who knew nothing of industrial science, or even that there is any such thing; by unnecessarily large inventories and consequent tying up of capital that could be otherwise usefully employed; by inadequate control of the movement of material through the works from one operation to another and from inadequate, or entire absence of provision for teaching or training operators and minor executives; absence of effective means of recording attainments of workers, foremen, etc.

"In other words, the greatest and most effective incentive for the prevention of industrial wastes is disarmament, so to speak; the cultivation of friendly relations between all those concerned in industrial enterprises; and the maintenance of such a system as will enable every man, from the highest to the lowest, to know what he is responsible for, to whom he is responsible, and that he personally will be credited and rewarded in proportion to service rendered."

Sessions were held on Dec. 6 in continuation of the subject of industrial waste.

Iron and Steel Markets

PIG IRON USED UP

Expansion in Steel Output Forces Many Blast Furnaces to Start

New York Central Rails Placed—Further Car Inquiry—Good Pig Iron Buying

The returns of the country's pig iron output in November indicate plainly that the expansion in steel production in the past two months had made large inroads in pig iron stocks, compelling the rapid blowing in of a good many iron furnaces.

Last month's output was 1,415,481 tons, or 47,183 tons per day, against an October total of 1,246,676 tons, or 40,215 tons per day. The November rate represents 2,500,000 tons more per year than that of October. Twenty-four furnaces were blown in in November and none went out. The capacity active Dec. 1 was 51,665 tons per day for 120 furnaces, against 40,850 tons per day for 96 furnaces on Nov. 1.

The Steel Corporation blew in 12 furnaces, or half of those that started in November, and the independent steel companies 5, the remaining 7 being merchant stacks.

The steel trade is taking great interest in the plans for merging seven important independent companies, all integrated, and representing every form of rolled products except tin plate. The consolidation would have about 20 per cent of the country's steel capacity, while the Steel Corporation has 45 per cent. As bearing on the Government's attitude, it is recalled that in wartime the Midvale consolidation and that of Bethlehem, the two taking in 12 per cent of the total capacity, were passed without protest. The new combine would have a larger share of the country's capacity in plates than in any other product.

Except for demand from the railroads, car builders and shops doing tank work, the market is waiting for the impetus of January, or possibly February. The Steel Corporation is still running at something above 50 per cent. Tin plate mills are particularly busy and their winter operations will be on a larger scale than in several years.

Recently the leading producer took orders for 2,500,000 boxes for the Pacific Coast, in view of which the 150,000 boxes the Welsh mills got at Vancouver scarcely indicate the recapture of the coast market by the British.

Allocation of 125,000 tons of rails has practically been completed by the New York Central and options taken for 25,000 tons in addition. It appears likely that 80 per cent of the total will be divided nearly equally between the Lackawanna Steel Co. and the United States Steel Corporation and the remaining 20 per cent among three or four companies, including the Soo rail mill, which will supply Canadian branch lines.

The Pennsylvania Co.'s call for bids on 150,000 tons of rails is expected this month. The Burlington has made tentative reservations for 25,000 tons which will go to Illinois and Colorado mills. Texas & Pacific and Atlantic Coast Line orders amount to 25,000 tons.

Car business keeps up. For the Argentine 2000 cars will be supplied from Middletown, Pa. China, Chile and Spain are also expected to buy American cars. The Pere Marquette has ordered 1000 and the Great Northern has increased its inquiry from 2000 to 3000. The Union Pacific is in the market for 1500 and the C & O for 500.

Seeing that financing is needed, the Argentine order for 40,000 tons of rails is expected to come to this country, in spite of low bids by European mills.

The outstanding fabricated steel award of the week involves 6000 tons for an office building in Philadelphia. Other awards will call for 12,000 tons and fresh fabricating steel work will take 10,000 tons. No up-turn in fabricated steel prices is yet discernible.

In the wire trade activity is looked for after inventory is taken and there are expectations of good buying for the second quarter in view of the promise of new building. From agricultural buying little is expected.

Chicago steel producers are interested in impending reductions in domestic and export freight rates to the Pacific Coast.

Unexpectedly heavy buying of pig iron, especially in the East and in Cleveland and Buffalo, has caused a much more cheerful sentiment in that market. At Philadelphia, about 20,000 tons, divided equally between steel making and foundry grades, has been placed, while in New York, Boston, Cleveland and Buffalo manufacturers of radiators and house furnaces have bought freely. The Pennsylvania Railroad has ordered a larger tonnage than was expected. Prices in eastern Pennsylvania have been well maintained, but some weakness has developed in central Pennsylvania and Buffalo and Southern iron is more freely sold at $17.50, Birmingham.

German steel prices have gone soaring and the rapid fluctuations in that market have led to quotations on the dollar basis both in export and domestic transactions.

Pittsburgh

PITTSBURGH, Dec. 6.

The close proximity of the end of the year is telling more and more on the demand for steel. Nobody wants to carry over any more tonnage than possibly can be helped into 1922 and current orders and specifications are of lots that can be quickly used. Steel pipe stands out as the one product in which an improved demand is maintained and in the case of line pipe there has been an actual increase in business in the past few weeks. A Middle Western manufacturer is the chief beneficiary of some big line pipe orders recently closed. Railroad buying still is inconspicuous in this district and such activity as is developing in plates is ascribed largely to the demand for oil storage tanks. One maker in this district has taken 20 additional 55,000-barrel tanks for the new Mexia field, which will take 3000 tons of steel. There also has been some activity in steel river craft, one company here having taken 10 steel barges and another 12. Structural activities are dwindling as usual at this time of the year.

Changes in prices are few, but it cannot be said that the general market is any stronger than it has

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 6, 1921	Nov. 29, 1921	Nov. 8, 1921	Dec. 7, 1920
No. 2X, Philadelphia‡	$22.34	$22.34	$22.84	$37.79
No. 2, Valley furnace†	20.50	20.50	21.00	37.00
No. 2 Southern, Cin'ti†	*22.00*	22.50	23.50	42.50
No. 2, Birmingham, Ala.†	*17.50*	18.00	19.00	38.00
No. 2, foundry, Chicago*	20.00	20.00	21.00	36.00
Basic, del'd, eastern Pa	21.00	21.00	20.50	35.00
Basic, Valley furnace	19.00	19.00	19.00	33.00
Bessemer, Pittsburgh	21.96	21.96	21.96	36.96
Malleable, Chicago*	20.00	20.00	21.00	36.50
Malleable, Valley	20.00	20.00	20.50	37.00
Gray forge, Pittsburgh	21.46	21.46	21.96	37.96
L. S. charcoal, Chicago	31.50	31.50	31.50	51.00
Ferromanganese, del'd	60.00	60.00	60.00	110.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. sheet bars, P'gh	30.00	30.00	30.00	47.00
Forging billets, base, P'gh	32.00	32.00	35.00	56.00
O.-h. billets, Phila	34.74	34.74	34.74	49.24
Wire rods, Pittsburgh	*38.00*	40.00	40.00	57.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh	1.50	1.50	1.60	3.00
Light rails, Pittsburgh	1.55	1.55	1.65	3.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	4.35
Iron bars, Chicago	1.65	1.65	1.75	3.25
Steel bars, Pittsburgh	1.50	1.50	1.50	2.35
Steel bars, Chicago	1.60	1.60	1.75	2.73
Steel bars, New York	1.80	1.80	1.80	2.73
Tank plates, Pittsburgh	1.50	1.50	1.50	2.65
Tank plates, Chicago	1.60	1.60	1.75	3.03
Tank plates, New York	1.88	1.88	1.88	3.03
Beams, Pittsburgh	1.50	1.50	1.50	2.45
Beams, Chicago	1.65	1.60	1.75	2.82
Beams, New York	1.88	1.88	1.88	2.83
Steel hoops, Pittsburgh	2.00	2.00	2.25	3.05

Sheets, Nails and Wire,	Dec. 6, 1921	Nov. 29, 1921	Nov. 8, 1921	Dec. 7, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	2.90	4.35
Sheets, galv., No. 28, P'gh.	4.00	4.00	3.90	5.70
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	3.55
Wire nails, Pittsburgh	2.75	2.75	2.90	3.25
Plain wire, Pittsburgh	2.50	2.50	2.60	3.25
Barbed wire, galv., P'gh	3.40	3.40	3.55	4.10
Tin plate, 100-lb. box, P'gh.	$4.75	$4.75	$4.75	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$16.00*	$16.50	$16.00	$27.00
Carwheels, Philadelphia	17.00	17.00	17.50	27.00
Heavy steel scrap, P'gh	14.00	14.00	14.50	19.00
Heavy steel scrap, Phila	11.50	11.50	12.00	16.00
Heavy steel scrap, Ch'go	*11.50*	12.00	12.00	16.50
No. 1 cast, Pittsburgh	16.50	16.50	17.50	28.00
No. 1 cast, Philadelphia	17.50	17.50	17.50	27.00
No. 1 cast, Ch'go (net ton)	13.00	13.00	13.75	18.50
No. 1 RR. wrot, Phila	15.50	15.50	16.50	20.00
No. 1 RR. wrot, Ch'go (net)	*10.50*	11.50	12.50	15.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$3.00	$6.50
Foundry coke, prompt	4.00	4.00	4.25	7.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	13.75	13.50	13.25	14.00
Electrolytic copper, N. Y.	13.50	13.37½	12.75	14.00
Zinc, St. Louis	4.87½	4.65	4.75	6.25
Zinc, New York	5.37½	5.15	5.25	6.60
Lead, St. Louis	4.45	4.35	4.40	5.00
Lead, New York	4.70	4.70	4.70	5.00
Tin, New York	31.75	29.87½	28.62½	35.00
Antimony (Asiatic), N. Y.	4.50	4.50	4.75	5.75

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 6, 1921, Finished Steel, 2.135c. Per Lb.

Based on prices of steel bars, beams, tank plates plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Nov. 29, 1921,	2.135c.
Nov. 8, 1921,	2.134c.
Dec. 7, 1920,	3.146c.
10-year pre-war average,	1.684c.

Composite Price, Dec. 6, 1921, Pig Iron, $19.47 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Nov. 29, 1921,	$19.56
Nov. 8, 1921,	19.97
Dec. 7, 1920,	35.13
10-year pre-war average,	15.72

been, and the absence of business of importance probably explains the lack of price reductions. It is still a buyer's market. There is very little change in the average of steel plant operations in Pittsburgh, due to the fact that so many of the Steel Corporation units are located in this district, and most of them are as well engaged this week as they were last week. The American Sheet & Tin Plate Co. has only 70 per cent of its hot sheet mills in operation as compared with 77 per cent last week, but this loss is partly offset by a higher rate of operation of its tin plate units, of which about 83 per cent are running this week. The American Steel & Wire Co. yesterday put on its second blast furnace at its Donora, Pa., works, and now has all four of its blast furnaces in this district making iron. The Carnegie Steel Co. has 25 blast furnaces on and is averaging about 50 per cent operations of its ingot capacity. Both the National Tube Co. and the independent makers of steel pipe are running well, some of the latter having a rate as high as 80 per cent. Independent sheet makers are not averaging more than 50 per cent and some of the Valley independents have materially curtailed steel works operations this week. One company with 14 open-hearth furnaces has all of them down this week, and the same is true of another company with 12 open-hearth units.

The pig iron market remains excessively dull, and gives signs of weakening on the appearance of any important business.

Curtailment of coke production has not benefited prices because there is so little demand. Continued lack of demand keeps scrap prices down.

Pig Iron.—Outside of a couple of sales of basic iron, one of 4000 tons and the other of 2000 tons, business has been almost negligible. The larger purchase was by a Valley steel company which, it is claimed, took the iron from another Valley steel company, through a middleman, at $19, furnace. There have been frequent reports that less than $19 could be done on Valley iron of this grade, but no actual business has been uncovered at a lower figure. The smaller tonnage was taken by a West Virginia melter, the business going to nearby furnaces at a delivered price which would figure back to less than $18 from Valley furnaces. There has been no important sales of Bessemer iron, which nominally is quoted at $20, Valley furnaces. Interest in foundry grades also is limited and some producers now are finding difficulty in getting shipping instructions on tonnages already on their books. A few suspensions have actually been asked against December quotations of foundry iron. The average prices of basic and Bessemer iron from Valley furnaces for November, as compiled by W. P.

Snyder & Co., show net sales of basic averaged $19 and of Bessemer $20, the same prices as in October.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.00
Gray forge	19.50
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	20.00

Ferroalloys.—Slowing down of the operation of a number of independent steel works in this and nearby districts finds reflection in an even more limited demand for ferroalloys than recently was the case. The Carnegie Steel Co. continues a factor in the ferromanganese market, having met the requirements of a number of steel companies over the past three or four weeks, and its price of $60, Pittsburgh, is much more attractive than that named by commercial producers. The latter quite generally are quoting 80 per cent material at $58.38, Atlantic seaboard, to which must be added a freight to Pittsburgh, common rate points, of $5.32, making the delivered price $63.67. German ferromanganese is coming through on order in normal time of about four weeks, but since imports are entirely on order, there are no stocks to draw upon for prompt shipment and consumers who have contracted for German material sometimes find themselves without sufficient supplies to carry them until a consignment is due. German 80 per cent material is quoted at $54 c.i.f. Atlantic seaboard, or $59.32 delivered Pittsburgh, common rate points. There has been no recent business in this district in spiegeleisen and the market for 50 per cent ferrosilicon is extremely limited. Offerings of the latter material, however, have shortened up considerably in the recent past and $57, furnace, freight allowed, now appears to be as low as any producers will go to secure business.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $63.67 delivered; 78 to 82 per cent foreign ferromanganese, $58.35, c.i.f. Atlantic seaboard; German, $54, seaboard. Average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $57, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Interest in the market remains extremely low, due to the fact that finishing mills, with the exception of those making tin plate, are not very well off in the matter of orders, and little new business is developing. The tin plate makers with the largest order books, either make their own bars or are covered by requirement contracts. Possibly the appearance of a really attractive order for sheet bars would bring out a price of less than $30, but one Pittsburgh district plant, which operated practically full in November, and in addition is a low cost unit, was unable to get the cost down as low as $30. A number of mills which roll billets into bars and slabs into plates and skelp are able to buy the finished products for less than it would cost to make them and consequently are not interested in semi-finished material.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $28 to $30; 2 x 2 in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $32 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The market is weaker, chiefly as a result of the failure attending the effort to maintain prices announced Sept. 12, last, on wire products. The market on wire rods just prior to that date was as low as $38 Pittsburgh, for No. 5 soft rods, and now that the prices for nails and wire are back at old levels, consumers of rods feel they should have supplies at prices low enough to get out whole on the going price of the finished products. As low as $38 has been done recently and we revise our quotations accordingly. Prices are given on page 1510.

Steel Skelp.—Activity still is absent and prices are rather indefinite, with makers holding to 1.60c. and consumers are inclined to regard 1.50c. as the highest price they should pay. It is said that on the basis of what line pipe recently has been sold at, the value of the skelp is considerably below the latter price.

Iron and Steel Bars.—A few small demands for merchant steel bars for quick shipment are coming to makers in this district, but sizable inquiries are lacking, and interest in tonnages for early 1922 delivery is small. An attempt still is being made to maintain 1.60c., but buyers, even on small tonnages, by a little shopping, seldom have to go above 1.50c. The railroads are buying more iron bars than they did earlier in the year, but general business still leaves much to be desired.

We quote steel bars rolled from billets at 1.50c. to 1.60c.; reinforcing bars, rolled from billets, 1.50c. to 1.60c. base; reinforcing bars, rolled from old rails, 1.45c. to 1.50c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Sheets.—Demand is on a diminishing scale, and since most makers have completed such business as they had on their books, mill operations are declining accordingly. Prices recently named by both the American Sheet & Tin Plate Co. and the independents of 3c., base, for black; 4c., base, for galvanized and 2.25c., base, for blue annealed, are well observed. Buyers do not seem to be interested beyond their actual needs, and since these prices allow no profit except on a high rate of operation, there is no tendency on the part of manufacturers to cut them to secure business. In naming prices recently, the American Sheet & Tin Plate Co. established them merely for the first quarter of 1922, and not for the first half, as announced in this column last week. The company will take first half business, but will announce prices for second quarter shipments later on. Prices are given on page 1510.

Tin Plate.—The market is seasonably quiet. Container manufacturers quite generally have entered orders for early 1922 delivery and mill activities are chiefly in making up tonnages which can be moved after Jan. 2. There is fair observance of an established base of $4.75 on production tin plate, but instances are not lacking where concessions from this figure have been made.

We quote standard production coke tin plate at $4.75 per base box f.o.b. Pittsburgh for carload lots.

Structural Materials.—Awards not only are few but generally involve only small tonnages. The Jones & Laughlin Steel Co. has taken 150 tons for an addition to the plant of the Erie Brewing Co., Erie, Pa., and 75 tons for an addition to the plant of the Pittsburgh Valve, Foundry & Construction Co., Pittsburgh. The McClintic-Marshall Co. will fabricate 180 tons for a wharf to be constructed at Hilo, Hawaii, by the Hawaiian Dredging Co., and 150 tons for storage bins for the Bronx Equipment Co., Warren, Ohio. The Dravo Contracting Co. has been awarded an emergency dam for the Lake Washington ship canal, Seattle, calling for 400 tons. On business of at all attractive proportions, the plain material market definitely is at 1.50c. base, and some fabricating interests now think they will be able to get an even lower price on later requirements. Prices are given on page 1510.

Plates.—Demands upon mills in this district still are light, although some rather good oil storage tank orders are coming out, and there are orders for barges for which considerable plate tonnage will be required. The Riter-Conley Co. has taken 20 additional 55,000-barrel oil tanks for erection in the Mexia field for which 3000 tons of steel, largely plates, will be required. The Dravo Contracting Co. has taken an order for 10 steel coal barges for the Island Creek Coal Co., Huntington, W. Va., taking 1800 tons of steel, also a steel tow boat for the Joyce-Watkins Lumber Co., Chicago, taking 225 tons, and a steel hull derrick boat for the United States Engineers, Nashville district, involving 100 tons. The American Bridge Co. will build 12 steel barges for the J. K. Davison & Brothers Sand & Gravel Co., Pittsburgh. The Green Bay Dry Dock Co., Green Bay, Wis., was low bidder for four steel dump scows asked for by the Pittsburgh District Federal Engineer's office. Plate prices still range from 1.50c. to 1.60c., but the lower figure is the more common one even on small tonnages.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.60c. f.o.b. Pittsburgh.

Iron and Steel Pipe.—Steel pipe stands out as the most active of any of the finished steel products. All makers are getting an unusually good run of merchant

pipe for this time of year, but it is in oil country goods that the greatest activity is noted. Following closely on the recent order of the Pure Oil Co. for about 17,000 tons of 8-in. line pipe, divided between the Mark Mfg. Co. and the Youngstown Sheet & Tube Co., is one of 20,000 tons of 10-in., 8-in., 4-in., 3-in. and 2-in. line pipe by the Sinclair Oil Co. awarded to the Mark Mfg. Co., which in the past few weeks has booked about 35,000 tons of oil country pipe, chiefly line pipe, and this tonnage constitutes a backlog sufficient to engage its lap weld capacity for the next five or six weeks. The Midwest Refining Co recently closed for 3500 tons of casing and other well pipe. There is before the trade an inquiry for 7500 tons of 6-in. line pipe for the Tidewater Oil Co. Prices of steel pipe generally are slightly firmer than they were recently, but still show variation in favor of buyers from the Sept. 16 cards. Business with makers of wrought iron pipe is gaining but not very rapidly, because of the wide difference in prices of iron and steel pipe, in favor of the latter. Discounts are given on page 1510.

Cold-Finished Steel Bars and Shafting.—The most favorable thing that can be chronicled of this line is that stocks in consumers' hands are getting depleted, and even if there is a further contraction in the activities of consuming industries, it is likely to mean more business for manufacturers because of the light stocks. Business is better than it was earlier in the year, but far short of what could be wished. Prices take a wide range on cold-rolled and drawn stocks, going from 2.15c. down to 2c. on the more desirable orders, and up to 2.25c. on small lots. The Cumberland Steel Co., reduced the price of ground shafting $5 per ton to $2.50 per 100 lb., base mill, for carloads and $2.75 for less than carloads, effective Dec. 1.

Hoops and Bands.—There is no increase in the demand nor any strong tendency to prices, which still range from 2c. to 2.25c., base, with 2.15c. the general maximum.

Wire Products.—Buyers are specifying rather well for the time of year, although taking good care not to order beyond what can be immediately used and not add to their inventories. Some inquiry is noted for early 1922 requirements, and the trade is looking for some fair-sized orders after the turn of the year. It is expected that second quarter nail business will be big, due to indications of activity in new building work next spring. The Sept. 12 prices still are quoted, but seldom obtained, the market on sales being back at the levels in effect prior to that date, or $2.75 base per keg for nails and $2.50 base per 100 lb. for wire. The outlook for agricultural business is rather unpromising. The farmers still are hard pressed financially. Those who sold their crops had to sell so cheaply that they have only slightly reduced their obligations to the banks and those who still have their crops also are lacking in funds.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Hot-Rolled and Cold-Rolled Strips.—Both orders and specifications are light and the common report is that business is poorer than since mid-summer. Occasional orders are being secured at 2.25c. base for hot-rolled and 4c. base for cold-rolled, but the more common prices are 2c. and 3.75c., respectively, and there are some sales at even below these figures.

Steel Rails.—The official quotation on light rails of the important producers has dropped to 1.60c., base, but demand is light and competition for passing orders so sharp that this figure is maximum.

We quote 25 to 45-lb. sections, rolled from new steel, 1.55c. to 1.60c. base; rolled from old rails, 1.50c. to 1.55c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Coke and Coal.—The market on spot furnace coke is not quotable except on small tonnages of high-grade fuel, at higher than $2.75 per net ton ovens. It is not alone on loaded cars that this price has been done, as there are some small operators, without regular consuming connections, who have been willing to take business, calling for shipment over a week, at that figure. There has been some shutting down of merchant ovens in the Connellsville district, but even with this decline in production supplies are more than ample for current demand. This also is true in a large measure of foundry coke, which readily is available at $4 per net ton oven for a really good brand. There is no interest yet in contracts for future shipment. The coal market is dull, with prices nominal, at the levels of a week ago, or $1.50 for mine run steam, $1.75 for by-product and $2.25 for gas grade.

Boiler Tubes.—While business is better now than it was during the first eight months of the year, there still is considerable room for improvement and since there are not enough orders to go around, prices are highly competitive, particularly on steel tubes, both lap-welded and seamless. It is impossible to publish quotations on seamless tubes that would be reliable, because makers are naming prices according to the desirability of the orders presented. Discounts are given on page 1510.

Bolts, Nuts and Rivets.—Activity in nuts and bolts still is lacking in this district, makers finding that buyers are meeting merely their actual requirements and not showing much interest in future needs. There seems to be fairly close adherence to public quotations by makers in this district, but they have lost business as a result of this attitude. The going market on rivets is $2.40 base for large structural rivets and $2.50 for large boiler rivets, but on really desirable orders these prices have been shaded about $3 per ton. The ruling market on small rivets is 70, 10 and 10 per cent off list, but some business also is being entered at higher prices. Regular manufacturers of rivets have been obliged to meet some competition on certain sizes from bolt makers, having heading machines. Prices made by the latter, however, hardly can be recognized as quotations, since they refer to only a few sizes. Prices and discounts given on page 1510.

Spikes.—Demand still is on a tapering scale and prices favor buyers. Only on retail lots is it now possible to obtain more than $2.25 base per 100-lb. for standard spikes, and $2.40 base per 100-lb. for small spikes. Prices are given on page 1510.

Old Material.—Business remains extremely slack, but prices are fairly steady as a whole. A Pittsburgh independent steel company recently bought 3000 tons of heavy melting steel at $14.25 and would pay that price for other tonnages, although its public bid is $14. Not much material of this grade is coming on the market at current prices for the stocks in dealers' yards carry an average price considerably above today's value, and the railroads are expected to withdraw considerable tonnage unless a price of around $15 can be obtained. Prices merely are nominal on a number of grades, notably rerolling rails, low phosphorus scrap and turnings, which, although not very plentiful, are not very much wanted at the present time. Important users of turnings in this district all are out of the market at present and this also is true of users of rerolling rails. Steel foundries, in expectation of lower prices, are only nibbling at low phosphorus scrap.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast, cupola size	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	11.50 to 12.00
Bundled sheets, sides and ends	10.50 to 11.00
Railroad knuckles and couplers	14.50 to 15.00
Railroad coil and leaf springs	14.50 to 15.00
Low phosphorus standard bloom and billet ends	19.00 to 20.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	25.00 to 26.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	16.00 to 16.50
Cast iron wheels	15.50 to 16.00
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	9.50 to 9.75
Sheet bar crop ends	14.00 to 14.50
Heavy steel axle turnings	11.00 to 11.50
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	14.50 to 15.00
Stove plate	13.00 to 13.50
Cast iron borings	9.50 to 10.00
No. 1 railroad wrought	11.50 to 12.00

Chicago

CHICAGO, Dec. 6.

Except for demand emanating from the railroads, car builders and tank fabricators, there is little current market activity. With the approach of the end of the year, buyers wish to keep their stocks at a minimum for inventory purposes. The talk of possible reductions in freight rates is also influencing consumers to postpone purchases. The price situation shows little change. Large inquiries for plates, shapes and bars are still bringing out low quotations, but on smaller business the mills appear to be striving to hold prices to a more stable level. Ordinary tonnages of structural steel placed by fabricators are bringing a minimum of 1.65c., Chicago. In this connection it is to be noted that the reaction upward in sheets has proved successful, all makers holding to 2.25c., 3c. and 4c. base, Pittsburgh, respectively for blue annealed, black and galvanized.

The largest steel order placed during the past week involved 13,000 tons required for 50 80,000-barrel storage tanks to be fabricated by the Chicago Bridge & Iron Co. for the Sinclair Crude Oil Purchasing Co. The Humphrey-Mexia Co. has ordered 15 tanks from the Graver Corporation and is reported to have placed 30 additional with the Chicago Bridge & Iron Co. No further orders for car steel have been reported.

Mill operations are on the same basis as last week.

Local producers are interested in impending reductions in domestic and export rates to the Pacific Coast. The Chicago, Milwaukee & St. Paul has issued a tariff providing for a rate of 50c. per 100 lb. of iron and steel products shipped from Chicago via Northwest Pacific Coast ports to Japan, China and the Philippines. The rate from Pittsburgh territory is fixed at 59c. The tariff is expected to become effective in about 10 days. A similar tariff is being prepared by the Southern Pacific. One of a series of hearings on transcontinental rates on domestic shipments to the Pacific Coast is being held by the Interstate Commerce Commission in San Francisco this week. A blanket rate of $1 for shipments from all points east of Omaha has been proposed, but this is opposed by local manufacturers, who contend that they should have a rate advantage over their Eastern competitors commensurate with the difference in distance from the coast. Under the present rates, Chicago has an advantage of 16½c. on rail shipments to the Pacific.

Ferroalloys.—The Scullin Steel Co., St. Louis, is in the market for 50 tons of 50 per cent ferrosilicon, and the Commonwealth Steel Co., St. Louis, wants 50 tons of 12½ per cent Bessemer ferrosilicon. Two sales of 200 tons each of ferromanganese have been made in this district at the ruling price. The Eastern furnace, which has been quoting spiegeleisen at a price equivalent to $30.50, delivered Chicago, has exhausted its stocks of standard material and is no longer a factor in the market. The lowest present available price is $36, delivered.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Pig Iron.—The Mayville furnace, recently blown in, produced its first cast last Saturday and an initial Federal furnace is now warming up. Although it is undeniable that the market is still quiet and buying is cautious, the resumption of merchant furnace operation indicates that aggregate bookings are steadily piling up. The ruling market level rests at $20 base furnace for foundry, malleable and basic, although 1500 tons of malleable and foundry for first quarter delivery is reported to have been placed for less. A Wisconsin melter and two local jobbing foundries, however, each bought 500 tons of foundry for first quarter at $20 base, and some carload lots have brought as high as $20.50 and $21, furnace. The St. Paul is reported to have bought the 500 tons of malleable for which it issued an inquiry a week ago, and is now in the market for 200 tons of the same grade of iron. The Oliver Chilled Plow Works has closed for 300 tons of foundry for prompt shipment. The Rundle Mfg. Co., Milwaukee, which was in the market for 1700 tons of Southern foundry, secured no furnace quotation below $17.50 base, Birmingham, but covered part of its requirements with resale material bought at less than that figure. Malleable shops appear to be getting more railroad work and are commencing to enter the market for iron.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b., furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago		$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50 to	21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00 to	21.00
Northern high phos	20.00 to	21.00
Southern foundry, sil. 1.75 to 2.25	24.17 to	24.67
Malleable, not over 2.25 sil	20.00 to	21.00
Basic		21.00
Low phos., Birmingham		32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free		33.00
Silvery, sil. 8 per cent		32.02

Railroad Equipment.—The Pere Marquette has ordered 1000 steel underframe box cars from the Western Steel Car & Foundry Co. The Great Northern has issued an inquiry for 1000 composite stock cars in addition to the 500 general service, 500 refrigerator and 1000 box cars previously mentioned in this column. The same road is asking for repairs on 50 passenger cars. The Union Pacific is in the market for 500 double-sheathed wooden box cars, 500 composite 40-ft. automobile cars and 500 all-steel 50-ft. automobile cars. The Northern Pacific has ordered 97 passenger cars from the Pullman Co.

Rails and Track Supplies.—The Burlington has made tentative reservations for about 25,000 tons of rails for 1922 delivery, the exact tonnage not yet having been definitely decided upon. The business will be divided between the Illinois Steel Co. and the Colorado mills.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills. Standard railroad spikes, 2.20c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bolts and Nuts.—The principal source of current business is the railroads. Although the carriers have issued numerous inquiries, they are slow in placing orders. Prices are not appreciably firmer, concessions being reported whenever an attractive inquiry appears. On large machine bolts as low as 70 and 10 and 5 off, f.o.b. Chicago, has been quoted. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1510.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ⅞ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to ⅞ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4.00 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Structural Material.—The American Bridge Co. submitted the low bid on 3800 tons for a bridge at Yankton, S. D., its tender being approximately $74 delivered. The same fabricator was the successful bidder on 3600 tons for viaduct work for the Chicago Union Station. Bids will soon be asked on 175 tons for remodeling the McVickers Theater, Chicago. Generally speaking, construction work appears to be on the wane. The plain material price situation is substantially unchanged.

The mill quotation on plain material ranges from 1.65c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Cast-Iron Pipe.—The only new business reported is an inquiry from Galesburg, Ill., for 450 tons of 4- and 6-in., on which bids were taken yesterday. James B. Clow & Sons were the successful bidders on 187 tons for Hamtramck, Mich., and 70 tons for the Detroit Board of Fire Commissioners. Spring Wells, Mich., let 500 tons to the American Cast Iron Pipe Co., and Denver, Col., awarded 78 tons of 36- and 48-in. specials to the United States Cast Iron Pipe & Foundry Co. The latter company and James B. Clow & Sons were the only companies which submitted bids on 900 tons of cast iron pipe for Springfield, Ohio. An alternate steel bid was made by the National Tube Co. The National Cast Iron Pipe Co. is low bidder on 200 tons for Canton, Ohio.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $47.10 to $48.10; 6-in. and above, $43.10 to $44.10; class A and gas pipe, $4 extra.

Bars.—Except for orders and inquiries from car-builders, there is little current demand for bars. Re-

inforcing projects are less numerous and there is a tendency on the part of contractors to postpone their purchases until next year. Additional contracts for highway work have been let by the Illinois State Highway Commission, but most of the orders for the reinforcing required will not be placed until next spring. The largest reinforcing project in prospect is a sewage disposal plant at Milwaukee requiring 5000 tons. Bids on the general contract will be taken Jan. 13 by the Milwaukee Sewerage Commission, J. H. Fowles, City Hall, secretary. Demand for bar iron is light and while the ruling market is still 1.65c., Chicago, as low as 1.60c. is reported to have been done. Hard steel bar mills continue to operate intermittently. The going price for rail carbon steel bars is 1.65c., Chicago, but concessions below that figure have been made in some instances.

Mill prices are: Mild steel bars, 1.60c. to 1.75c., Chicago; common bar iron, 1.65c., Chicago; rail carbon, 1.65c., mill or Chicago.

Jobbers quote 2.68c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.28c.

Sheets.—Mills continue to hold firmly to the prices appended below, but buying is not active. Both local makers have opened their books for first quarter at present market quotations.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Wire Products.—Buying has fallen off appreciably, reflecting the desire of jobbers to keep their inventories down to the minimum at the close of the year. While the jobbing trade is diminishing, orders from the railroads, principally for nails, are gradually increasing. For mill prices, see finished iron and steel, for Pittsburgh, page 1510.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.65 per 100 lb.; cement coated nails, $3.05 per keg.

Old Metal.—Consumers are manifesting little interest in the market and some of them, notably the steel mills, are having difficulty in handling shipments against old orders. Iron mills are buying nothing and demand from foundries is at a minimum. One reason for the present inactivity is the desire to keep stocks down for inventory taking. In the absence of buying, all grades of scrap are weaker and most of them have declined in price. Railroad offerings include the Pere Marquette, 2600 tons; the Union Pacific, 1000 tons; the St. Paul, 700 tons; the Monon, 740 tons; the Pullman Co., 700 tons, and the Erie, a blank list.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$16.50 to	$17.00
Relaying rails	25.00 to	30.00
Cast iron car wheels	16.00 to	16.50
Rolled or forged steel car wheels	13.50 to	14.00
Steel rails, rerolling	13.00 to	13.50
Steel rails, less than 3 ft	12.50 to	13.00
Heavy melting steel	11.50 to	12.00
Frogs, switches and guards cut apart	11.50 to	12.00
Shoveling steel	11.00 to	11.50
Low phos. heavy melting steel	14.00 to	14.50
Drop forge flashings	8.00 to	8.50
Hydraulic compressed sheet	8.50 to	9.00
Axle turnings	8.50 to	9.00
	Per Net Ton	
Iron angles and splice bars	14.00 to	14.50
Steel angle bars	11.00 to	11.50
Iron arch bars and transoms	15.50 to	16.00
Iron car axles	19.50 to	20.00
Steel car axles	13.50 to	14.00
No. 1 busheling	8.50 to	9.00
No. 2 busheling	6.25 to	6.75
Cut forge	10.50 to	11.00
Pipes and flues	6.50 to	7.00
No. 1 railroad wrought	10.50 to	11.00
No. 2 railroad wrought	10.50 to	11.00
Steel knuckles and couplers	11.50 to	12.00
Coil springs	12.50 to	13.00
No. 1 machinery cast	13.00 to	13.50
No. 1 railroad cast	12.50 to	13.00
Low phos. punchings	11.00 to	11.50
Locomotive tires, smooth	10.00 to	10.50
Machine shop turnings	3.50 to	4.00
Cast borings	5.50 to	6.00
Stove plate	12.50 to	13.00
Grate bars	10.50 to	11.00
Brake shoes	11.00 to	11.50
Railroad malleable	11.50 to	12.00
Agricultural malleable	11.50 to	12.00

Plates.—The Sinclair Crude Oil Purchasing Co. has placed 50 oil storage tanks of 80,000 barrels capacity each with the Chicago Bridge & Iron Co. Approximately 13,000 tons of stel is involved and all of it has been booked by a local mill. The tanks are to be erected in the New Mexia field in Texas where wells are just coming in and storage facilities are urgently needed because of the present inactive demand for oil. Mills report that specifications for carbuilding steel are slow in coming in, although a considerable tonnage is pending. The bulk of current demand is for tank and car construction. The ruling price on attractive business ranges from 1.60c. to 1.65c., Chicago, while unusual tonnages have been placed at as low as 1.50c. Small lots continue to move at 1.75c. and 1.75c., Chicago.

The ruling mill quotations range from 1.60c. to 1.75c. Chicago. Jobbers quote 2.78c. for plates out of stock.

New York

NEW YORK, Dec. 6.

Pig Iron.—Continued activity in the pig iron market when it was expected that there would be very little buying for the remainder of the month has been a pleasant surprise, and indicates that, particularly among the manufacturers of house furnaces and radiators, there is considerable demand for foundry products, while the purchase by the Pennsylvania Railroad, which had been in the market for 1200 tons, has been made for a somewhat larger tonnage than that, showing that this railroad is requiring an unexpected tonnage of pig iron at Altoona. The largest purchase of the week was made by Richardson & Boynton, Dover, N. J., who bought 5000 tons of foundry grades for first quarter delivery. It is understood that this tonnage was mostly of Pennsylvania irons, but included about 600 tons of Virginia iron and some from Buffalo. Another New Jersey furnace company is about to buy 2500 tons for first quarter, and a number of purchases of 100 and 200 tons have been booked. Pending inquiries include 2000 tons from the Sessions Foundry Co., Bristol, Conn., for the first half, high silicon being specified, a large tonnage for a melter at Westfield, Conn., and 1500 tons for a radiator company for delivery running through February. Prices are being well maintained by eastern Pennsylvania makers, who are not quoting lower than $20.50, furnace base, and some central Pennsylvania iron has also sold at about that price, but some low quotations have been made by one or two central Pennsylvania furnaces for delivery in New England, and as low as $18.50 is also reported as having been named by one interest at Buffalo. An inquiry for 7000 tons for export to Japan is being carefully figured on, being treated much more seriously than most of the inquiries recently received from foreign countries. On the whole, pig iron sellers in this district are in a much more cheerful frame of mind than for some time.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.52 to $25.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52 to 24.02
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	23.02 to 23.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.56
No. 2 Virginia, sil. 1.75 to 2.25	29.16

Ferroalloys.—The ferromanganese market is more active. There have been sales of both domestic and British alloy on the basis of $58.35, seaboard, amounting to about 1000 tons. The leading steel producer is also understood to have sold about 400 tons on a basis of $60, Pittsburgh. There is more inquiry, one Ohio consumer considering the purchase of 500 tons for first quarter or 1000 tons for the first half, and another consumer asking for bids on about 200 tons. An agent in this market who sells German ferromanganese states that there has been no delay in deliveries of all German alloy sold. Negotiation is $54, seaboard. The spiegeleisen market is quiet at prevailing quotations, with several carload lots being reported sold. There is no demand for foreign high-grade manganese ore and the market continues nominal. Demand for 50 per cent ferrosilicon

is light, with the market firm at the quotations recently prevailing. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton..	$60.00
Ferrotungsten, per lb. of contained metal.	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered.	10c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	45c. to 50c.

Finished Iron and Steel.—Despite the slump in steel business noticeable this month, the steel companies are detecting numerous signs of expansion early in the new year. There are indications that demand for tin plate and sheets will be exceptionally good and the outlook for structural material also appears favorable. In plates the outward signs of a substantially improved demand are not yet in evidence, though car building and repairing are likely to bring about a better demand for this product. Railroad buying this month has not been large, but 1922 budgets are being worked out and in some instances fairly large sums are being figured on for much-needed improvements to roadbeds and rolling stocks. The Great Northern Railroad has issued an additional inquiry for 1000 stock cars, making a total of 3000 cars in all. The Illinois Central and Burlington business, aggregating 9300 cars, may be placed this week. The Chesapeake & Ohio has asked for prices on 500, "more or less," gondolas and hopper-type cars. In connection with financing recently completed by Argentina for the purchase of locomotives in the United States, it is now learned that provision was also made for the purchase of 1000 gondolas and 1000 box cars. Although all details have not been completed, it is probable that these cars will be partly constructed in this country and assembled at the plant of the Middletown Car Co., a subsidiary of the Standard Steel Car Co., which has a plant in Argentina. Close to 10,000 tons of plates for the Catskill aqueduct has been placed with an Eastern mill by the Merchant Shipbuilding Corporation, Chester, Pa., which will fabricate pipe for one of the contractors, the Frederick Snare Corporation. It is reported that the delivered price on the plates figures back to less than 1.40c., base, Pittsburgh. The American Locomotive Co. has placed about 1000 tons of plates for the 25 locomotives to be built for the Seaboard Air Line. Locomotive companies are also inquiring for about 1600 tons of plates for the 55 locomotives recently inquired for by the Burlington. Structural work is not as active as during November, but a fair volume of business is being placed. Among new inquiries are the following: 500 tons for a hospital in Baltimore; 400 tons for the American Tobacco Co., in Brooklyn; 700 tons for a hotel at Frederick, Md.; 1000 tons for a loft building in Thirty-fifth Street, Manhattan; 1400 tons for a loft building in Thirty-sixth Street, Manhattan; 1200 tons for a Chamber of Commerce building in Newark. Recent orders include a building in Philadelphia taking 6000 tons, awarded to the American Bridge Co.; 800 tons for an apartment house in New York for the Shamokin Realty Co., to Levering & Garrigues Co.; 100 tons for a bridge for the Lehigh & Hudson River Railroad; 600 tons for a hotel at Atlantic City, N. J., to American Bridge Co.; 600 tons for bridges for the Pennsylvania Railroad, to American Bridge Co.; 500 tons for a building for the Warner-Quinlan Asphalt Co., to Hammond Iron Works; 500 tons for an apartment building in Eighty-eighth Street, New York, to George A. Just Co.; 150 tons for a bridge for the Chesapeake & Ohio Railroad. The distribution of rails for the New York Central Lines has not yet been completed, but 125,000 tons has been ordered with options covering 25,000 tons in addition; about 40 per cent will probably be given to the Lackawanna Steel Co. and also to the United States Steel Corporation, and the remaining 20 per cent to two or three other rail makers, including doubtless the Algoma Steel Corporation.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.80c. to 1.88c.; plates, 1.88c. to 2.03c.; structural shapes, 1.88c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—Although November made an auspicious beginning from the standpoint of increased business, the depression of the final two weeks was such as to leave a record with most warehouses as the worst month for business since last July. As a rule, transactions were about 10 per cent less than the business of October. December is expected to be the dullest month of the year, but there is belief that after the middle of January buying will resume, as consumers, as a rule, have permitted stocks of material to dwindle to a minimum. Blue annealed sheets have been dropped from 3.53c. per lb. for No. 10 to a base price of 3.28c. per lb. The quotation on black sheets, No. 28 gage, seldom exceeds 4c. per lb., and some warehouses are quoting 4.85c. per lb. instead of 5c. per lb. on No. 28 gage galvanized sheets. Prices on steel wire are stiff and small lots would probably cost the consumer higher than the price that has prevailed for some time. Brass and copper warehouses report about the same conditions during November as the iron and steel warehouses experienced, business having decreased slightly. There is no change in wrought iron and steel pipe. We quote prices on page 1522.

High-Speed Steel.—The market is unchanged. Some sellers are interested in the prospect of some of the large tonnage of high-speed steel discovered by the British Government being exported to this country at extremely low prices. Producers generally quote 18 per cent tungsten at 90c. per lb., although special brands with different analyses are sold at slightly higher prices.

Cast-Iron Pipe.—The two most favorable features are the steady demand for the smaller sizes and the inquiry from oil companies. Next to the stove and radiator industry the cast-iron pipe industry remains the busiest in the iron and steel field. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe

Coke.—The market is about 25c. lower, guaranteed coke being obtainable at $4, Connellsville base. The price ranges up to $4.50. Where consumers are not so particular as to analysis, foundry coke can be obtained at $3.75. Considerable coke has been sold the past few days.

Old Material.—The market is inactive and the price tendency is lower. Among the items which have declined are railroad heavy melting steel, wrought, pipe and cast scrap. Dullness is expected to continue for some time because of the coming holiday period and inventory taking on the part of the mills.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.50 to $8.00
Steel rails, short lengths, or equivalent	8.50 to 9.00
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	30.00 to 35.00
Steel car axles	12.00 to 12.50
Iron car axles	19.00 to 20.00
No. 1 railroad wrought	11.00 to 11.50
Wrought iron track	8.50 to 9.00
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Cast borings (clean)	6.50 to 7.00
Machine-shop turnings	4.50 to 5.00
Mixed borings and turnings	4.50 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.00 to 8.50
Stove plate	10.00 to 10.50
Locomotive grate bars	10.00 to 10.50
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Cincinnati

CINCINNATI, Dec. 6.

Pig Iron.—While the volume of business is light, last week showed a slight improvement over those immediately preceding. The orders are small, a few amounting to 150 and 200 tons, but the general run consisting of carloads. A West Virginia manufacturer bought 150 tons of Northern iron at $21, Ironton, an Indianapolis melter 200 tons at $20, Chicago, a Kentucky melter 150 tons of Southern at $18, Birmingham, and a southern Indiana melter a similar tonnage at the same figure. A Michigan melter closed for 500 tons of foundry, the order going to a Chicago district furnace. Inquiries include one for 500 to 1000 tons of malleable for first quarter from an Indiana melter, and one for 400 tons of foundry from the same district. The National Cash Register Co. is inquiring for 100 tons of foundry for prompt shipment. The Whitaker-Glessner Co has decided to blow in its Portsmouth furnace and will not purchase iron against its 4000 ton inquiry. This furnace will probably be lighted about Dec. 27, the coke plant commencing operations one week earlier. Prices are inclined to weakness, and it is said that $19 can be done on tonnages from lake furnaces. Southern Ohio iron is pretty generally quoted at $20, and Southern iron, on small inquiries is quoted at $18, base. On a larger tonnage it is said $17.50, Birmingham, can easily be done, and it is intimated that this figure is now the prevailing one on Southern business.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$22.00 to $22.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	22.50 to 23.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52 to 23.52
Basic, Northern	22.02
Malleable	23.52

Finished Material.—While as a general thing the market is quiet, there are several bright spots, and as a result expectations of better business following the beginning of the year are more general. Several fair-sized inquiries for reinforcing bars for first quarter shipment are still before the trade, and it is reported that a local construction company has been able to place 300 tons for this delivery, the price reported being 1.50c. A number of plate inquiries from tank construction companies are current, and some business from this source has already been placed. The sheet market is quiet, but tin plate inquiries for first quarter and first half are becoming more numerous. There is very little moving in bars, orders placed being mostly for carload lots. In wire and wire products, there is only fair activity, nail orders being few and far between at the present time, due no doubt to the desire of jobbers to show as low an inventory as possible. Prices show little change, the usual quotation on bars, shapes and plates being 1.60c., though on a desirable order 1.50c. at least can be done. Weakness has again developed in sheets, galvanized being quoted at 3.75c., though the American Sheet & Tin Plate Co. is quoting galvanized at 4c. for immediate and first quarter deliveries. Wire nails are commonly quoted at $2.75 per keg, base, and plain wire at $2.50 to $2.60 per 100 lb. In the structural field, there is more activity. The Middle States Construction Co., Columbus, Ohio, will fabricate 200 tons for a building for the Commercial National Bank, Columbus. Bids are in for an enameling building for the Standard Sanitary Mfg. Co., Louisville, Ky., involving 185 tons; the Roosevelt Office Building, Indianapolis, approximately 800 tons, and the Elks Temple, Cincinnati, about 350 tons. A municipal auditorium and market building at Memphis, Tenn., involving about 800 tons, will be up this week. Several Cincinnati projects involving considerable tonnages of reinforcing bars will shortly go ahead, including the Gibson Hotel addition, the contract for which has been let to the Wells Bros. Construction Co., and a group of seminary buildings, which the Ferro-Concrete Construction Co., Cincinnati, will erect. There will be very little change in plant operations, the American Rolling Mill Co. continuing its same schedule at Middletown, Ohio, and the Whitaker-Glessner Co. at Portsmouth, adding several mills. The latter company is expected to blow in its blast furnace during the month, and the plant of the Portsmouth By-Product Coke Co. is scheduled for a 50 per cent operation early in January. The Ashland Iron & Mining Co. will continue its present rate of operation, about 50 per cent. The plants of the Andrews Steel Co. and the Newport Rolling Mill Co. at Newport, Ky., will likely resume operations in the near future, as good progress is being made in the adjustment of wage scales with its former employees. The plants will be operated as open shops.

Warehouse Business.—The first week of December showed some improvement over similar periods during the previous month, but the tonnage moving is still light. Prices are unchanged.

Iron and steel bars, 2.90c. base; hoops and bands, 3.50c. base; shapes and plates, 3c. base; reinforcing bars, 2.97½c. base; cold rolled rounds, 1½-in. and larger, 3.70c.; under 1½-in. and flats, squares and hexagons, 4.20c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3 per 100 lb.

Coke.—There is nothing specially to report on coke. A sale of 1000 tons for first half is reported at a sliding scale based on wages paid, and another of 200 tons to a Southern railroad was made during the week. With these exceptions the market was rather quiet, with prices unchanged. Many operators in the New River district are either closed down or are contemplating going out.

Old Material.—There is practically no activity in the scrap market. Some steel companies have asked that shipments on old contracts be suspended for the time being. Prices are lower, the average decline being 50c. a ton, the whole list being affected.

We quote dealers buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	$3.50 to $4.00
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.50 to 11.00
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 9.50
Car wheels	12.00 to 13.00
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	3.00 to 3.50
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	13.50 to 14.50
Burnt scrap	7.50 to 8.00
Iron axles	15.50 to 16.50
Locomotive tires (smooth inside)	9.50 to 10.00
Pipes and flues	4.00 to 4.50

Buffalo

BUFFALO, Dec. 6.

Pig Iron.—About 5000 tons has been sold by four of the five factors; the one exception not having sold any iron in 30 days. Considerably larger inquiry has appeared, but as most of it is from outside the district there is little optimism that it will develop into sales. The American Radiator Co. wants are 4000 tons. One interest which has 14,000 tons inquired for has made sales of 3500 tons. Sales of malleable and basic iron as well as foundry have been taken. Some first quarter business has been booked. On the current inquiry put out by radiator interests, 1300 tons has been booked at $19, base.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$20.00
No. 2X foundry, 2.25 to 2.75 sil	19.50
No. 2 plain, 1.75 to 2.25 sil	19.00
Basic	21.00
Malleable	21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—A wire maker now operating 75 per cent with bookings sufficient to carry on the same schedule until well into 1922 represents the high tide in this district. Other activities are perhaps no better off than in June or July, when the dull period was at its worst stage. The ruling price on bars is 1.50c. Pittsburgh, but the ruling price is known to have been disregarded on sales which have not been extraordinary in volume. A price of 1.40c. on bars, upon investigation, is said to have developed the information that the order was filled with re-rolled material. A

desire to keep inventories down for tax purposes is given as one cause of a buyers' embargo, and the fact that what little material is ordered is wanted for immediate delivery, lends strength to this belief. Canadian business is especially quiet. Some plate demand for car work both old and new continues to appear. The Lackawanna Bridge Co. will fabricate 100 tons of shapes for a Lockport theater. Bar orders coming to one mill are mostly carload with an occasional call for 100 tons; with an accumulation of these rolling is carried on intermittently.

Warehouse Business.—Although prices are admittedly satisfactory to buyers, the general run of orders is quiet. Nails are especially weak, and with the exception of a slight flurry in structural shapes for rush delivery in cleaning up some operations before weather intervenes, little is occurring from day to day.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.80c.; plates, 2.80c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.70c.; hoops and bands, 3.30c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.80c.

Old Material.—Two mills are buying small lots of steel—practically the only worth-while activity in the market. No price changes have occurred nor is any expected until after the close of the year. No tangible reason is apparent for expecting any improvement in the new year, but the majority of dealers prefer to take such a view.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

Cleveland

CLEVELAND, Dec. 5.

Iron Ore.—With the close of the ore shipping season, ore firms are giving a little more attention to next year's prospects. The ore buying movement in 1922, like the present season, is expected to start very late. The shipping season closed with less ore on the docks and in furnace yards Dec. 1 than on the same date a year ago. While pig iron production at this time last year was approximately double the present production, it fell off rapidly during the winter months as compared with an upward trend at present. Consequently, ore men predict there will be slightly less ore on the docks and at furnace yards at the opening of navigation next year than there was at the same time this year. The amount of ore on docks and in furnace yards Nov. 1 was 39,070,000 tons as compared with 39,600,000 tons on the same date a year ago. On Dec. 1 last year, there was over 41,000,000 tons of ore on docks and in furnace yards and with the very light ore movement in November, it is expected that figures will show a reduction of 3,500,000 to 4,000,000 tons on docks and in furnace yards Dec. 1 from the amount on hand Dec. 1 last year. M. A. Hanna & Co. resumed operations Dec. 1 at their Carpenter and Monongahela mines at Crystal Falls on the Menominee range.

We quote delivered lower lake ports: O'd range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The American Radiator Co. during the week purchased 7600 tons of foundry iron for early shipment, including 4500 tons for Buffalo, 2500 tons for Detroit and 300 tons each for its Springfield and Titusville plants. The market improved somewhat both in orders and inquiries during the week, but the price situation shows a weakening tendency, as the $20 price for foundry iron which has been generally quoted as a minimum by lake and Valley furnaces is no longer being firmly held. A lake furnace has sold 1000 tons of foundry iron to an Ohio sanitary interest for January and February delivery on the basis of $20 Valley furnace. This iron will go to two plants, one with the same freight rate from Cleveland as from the Valley, and the other has a 40c. differential against Cleveland, making the price $19.60 at furnace. On a 500-ton inquiry the prospective buyer claims to have been quoted $19.50. Several inquiries in lots up to 1000 tons for the first half have come out, but in each case the consumer decided to buy in smaller lots for only two months' requirements. Some producers will quote current prices for the first half delivery. One lake furnace sold 1500 tons during the week in small lots at $20, including 250 tons of malleable iron purchased by an Indiana melter. The Whitaker-Glessner Co., which inquired for 4000 tons of basic iron for its Portsmouth, Ohio, plant, has decided to blow in its Portsmouth furnace earlier than it had intended, and will not buy basic iron. A Connecticut consumer is inquiring for 2000 tons of foundry iron for the first half. December shipments are starting out light and stocks in furnace yards are increasing.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6 67 rate from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.00 to 21.00
Southern fdy., sil. 2.25 to 2.75	25.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	34.00 to 35.00

Finished Iron and Steel.—The demand for finished steel has fallen off, although some of the mills continue to get small orders. It seems to be the general attitude of buyers to have their stocks as low as possible at inventory time and they are buying only such material as they actually need and are deferring purchases until the last minute and then insisting on quick shipment. However, a little inquiry has come out for steel for January delivery. With the tapering off in the tonnage, some mills expect to find it difficult to keep up their present schedule of operations until January, when better buying is looked for. Prices on steel bars, plates and structural material have more generally settled down to 1.50c., but some of the smaller plate mills are still holding to 1.60c. and 1.65c. However, mills generally show no inclination to go below 1.50c. and some buyers have made unsuccessful efforts to place attractive tonnages at lower prices. Interest during the week centered on 3000 tons of soft steel reinforcing bars for the Baldwin Reservoir, Cleveland, for which the contractor, the Strange & Walsh Construction Co., has taken bids, specifying deliveries of 1000 tons for each of the first three quarters of next year. While this order will test the market, it seems probable, because of the extended deliveries, mills may not be inclined to go as low as they otherwise would. The only sizeable tonnage placed during the week was 800 tons of plates purchased by a lake shipyard for repair work. Some other round lot plate orders are still pending for oil country work. There is virtually no activity in structural material. Hoops and bands continue weak. Some hot strip mills are competing with hoop mills with a 1.75c. price for heavier sections, figuring these products on a bar basis. Hard steel reinforcing bars are in very light demand with 1.50c. as a common minimum quotation, but the market is weak and a good lot inquiry might bring out a lower price. In tin plate, a fair volume of business is being placed in first quarter and first half contracts.

Jobbers quote steel bars, 2.54c.; plates and structural shapes, 2.64c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.14c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—The sheet market is very dull. Consumers generally have covered for the remainder of the year at prices $5 a ton lower than present quotations and there is little buying for January shipment. The mills seem to be holding to the regular quotations of 3c. for black, 4c. for galvanized and 2.25c. for blue annealed sheets.

Warehouse Business.—Warehouse orders have fallen off this month and sales are extremely light. Prices are unchanged.

Bolts, Nuts and Rivets.—New demand for bolts and nuts continues very light. Consumers are buying very small lots, as they wish to keep their stocks low at inventory time. The demand for rivets is slow and prices are irregular. Regular quotations of 2.40c. for structural rivets and 2.50c. for boiler rivets are being shaded from $2 to $3 a ton.

Old Material.—The market shows a little more life as a result of some new demand that has come from consumers and prices on grades that have become active have stiffened. The National Tube Co. is credited with the purchase of approximately 5,000 tons of heavy melting steel for its Lorain plant at about $14.50 delivered, and odd lots are being purchased from dealers to fill the Lorain order. According to local dealers, the National Tube Co. has never previously purchased scrap for its Lorain plant. A Cleveland mill is reported to have purchased a small lot of heavy melting steel at $13 and some tonnage of the same grade has been placed by another Ohio mill. Some demand has been created for borings and turnings for a Cleveland consumer who has arranged with a dealer to take blast furnace scrap instead of heavy melting steel scrap covered by an old contract. Sales between dealers are reported at $8 for machine shop turnings and $9 for mixed borings and short turnings for delivery to this mill.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$11.50 to $12.00
Steel rails, under 3 ft	12.50 to 13.00
Steel rails, rerolling	14.00 to 14.50
Iron rails	12.00 to 12.50
Iron car axles	18.00 to 19.00
Low phosphorus melting	13.00 to 13.50
Cast borings	8.50 to 8.60
Machine shop turnings	7.50 to 7.60
Mixed borings and short turnings	8.50 to 8.60
Compressed steel	9.00 to 9.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet stampings	6.00 to 7.00
Steel axle turnings	9.00 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in.	7.50 to 8.00
Drop forge flashings, under 10 in.	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

St. Louis

ST. LOUIS, Dec. 5.

Pig Iron.—The demand for pig iron is rather light. The approach of inventory time, the anticipation of lower freight rates and the lack of orders are all having their effect on the trade. The inquiry of the Mount Vernon Car Wheel Co., Mt. Vernon, Ill., was for from 500 to 1000 tons of malleable, and it placed an order, the exact amount of which is not stated. A local melter bought 1500 tons of malleable and 500 tons of foundry iron from a local producer for immediate and nearby delivery. A Wisconsin melter is in the market for 800 tons of foundry iron for delivery during all of next year, which is regarded as an expression of confidence in the present market price. A radiator company in this territory is in the market for from 500 to 1000 tons of foundry iron, silicon 2.25 to 2.75, for December shipment. A local producer has received an inquiry from Porto Rico. An Indiana melter wants 1000 tons of malleable for the early part of next year. While no formal announcement has been made, it is understood that the furnaces of the St. Louis Coke & Chemical Co., Granite City, will be started up soon. The market is at $20 and $21, Chicago, for Northern iron, and while Southern iron is quoted at $18, some offers are being made at $17.50, Birmingham.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$22.88 to $23.88
Northern malleable, sil. 1.75 to 2.25	22.88 to 23.88
Basic	22.88 to 23.88
Southern foundry, sil. 1.75 to 2.25	23.41 to 23.91

Finished Iron and Steel.—There is very, very little activity in structural steel locally, all building operations being at a standstill pending the result of a referendum among the 14,000 members of the Building Trades Council for a reduction in wages from $1.25 to $1 an hour. An Oklahoma City contractor obtained the contract for the Masonic Temple there, involving 1500 tons of structural shapes. The general contract for the Roosevelt Building, Indianapolis, involving 250 tons of structural steel has been let to Hetherington & Berner, that city. An inquiry has been received here from the Union Pacific Railroad 500 50-ton all steel box cars, and 500 40-ft. automobile cars, with 500 50-ft. automobile cars in prospect. Inquiries from railroads centering here are rather light, the largest being from the Missouri, Kansas & Texas Railroad for 75 tons of plates. Inquiries were being made by a railroad supply house for 2500 kegs of track spikes and 1500 kegs of track bolts.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The market for coke is very quiet, the only inquiry of note being from a Western gas manufacturer for 5000 tons. Users of foundry coke are not interested in purchasing, because of a lack of orders for castings, the approach of inventory time and the belief that freight rates will be lower. The mild weather until the latter part of last week has affected the sale of domestic coke. An inquiry was received by a local producer from Porto Rico.

Old Material.—The market for old material is dull and listless, and while there has been no marked decline in prices, the tendency is toward lower levels. Buyers are not interested, and will not make any further purchases this year, unless it be an occasional bargain. Inquiries for relaying rails are almost nil, and prices are softer. The railroad offers before the market this week follow: Baltimore & Ohio, 11,000 tons; Wabash, 1500 tons; Pennsylvania System, Northwestern Region, 2700 tons; Southwestern Region, 4500 tons; Eastern Region, 20,000 tons, which includes 8000 tons of No. 1 steel rails and 2000 tons of miscellaneous scrap rails.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$15.50 to $16.00
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft	13.00 to 13.50
Relaying rails, standard section	25.00 to 30.00
Cast iron car wheels	15.00 to 15.50
No. 1 heavy railroad melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	10.50 to 11.00
Ordinary shoveling steel	10.00 to 10.50
Frogs, switches and guards cut apart	11.00 to 11.50
Ordinary bundle sheet	4.00 to 4.50
Per Net Ton	
Heavy axles and tire turnings	6.50 to 7.00
Iron angle bars	13.00 to 13.50
Steel angle bars	10.00 to 10.50
Iron car axles	20.00 to 21.00
Steel car axles	14.00 to 14.50
Wrought iron arch bars and transoms	15.00 to 15.50
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	9.50 to 10.00
Railroad springs	11.50 to 12.00
Steel couplers and knuckles	11.50 to 12.00
Locomotive tires, 42 lb. and over, smooth inside	9.50 to 10.00
No. 1 dealers' forge	9.00 to 9.50
Cast iron borings	6.50 to 7.00
No. 1 busheling	10.00 to 10.50
No. 1 boilers cut in sheets and rings	8.00 to 8.50
No. 1 railroad cast	14.50 to 15.00
Stove plate and light cast	12.50 to 13.00
Railroad malleable	10.00 to 10.50
Agricultural malleable	9.50 to 10.00
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	6.50 to 7.00
Light railroad sheet	4.50 to 5.00
Railroad grate bars	10.00 to 10.50
Machine shop turnings	6.00 to 6.50
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	8.50 to 9.00
Horseshoes	11.00 to 11.50
Railroad brake shoes	9.50 to 10.00

"He didn't know whether the drill was through or not—he found out when it tore off his finger." This is the caption of a photograph appearing on a recent poster of the National Safety Council. The photograph represents a machinist feeling under a plate being drilled."

Boston

BOSTON, Dec. 6.

Pig Iron.—Competition between central Pennsylvania and Buffalo furnaces, with practically the same freight rate for business in this territory, was keen this week, and the market broke below $19, Buffalo furnace base. Little regard is paid silicon differentials and extra discounts for cash are offered. Among sales are 200 tons Pennsylvania, silicon 4.00 to 5.00 at $20 furnace; 250 tons, silicon 2.25 to 2.75 at $19; 200 tons at practically the same price; a round tonnage of Buffalo silicon 2.25 to 2.75 at less than $19, and silicon 2.75 to 3.25 at less than $19.50. Buffalo iron with silicon above 3.25 is offered at less than $19.50. Smaller lots include 150 tons malleable and a car of special analysis at approximately $19 furnace; a car of Buffalo No. IX at $19.50, and two cars of lake charcoal iron at $28. A sale of 500 tons of Northern No. 2X for Vermont delivery, at private terms, is reported. An unconfirmed sale of 2000 tons central Pennsylvania No. 2 plain at between $23.50 and $23.75 delivered western Massachusetts is reported. Eastern Pennsylvania iron at $20 furnace base is offered more freely. There are furnaces in this district holding at $20.50 and $21, but getting practically no business in New England. The Bethlehem Steel Co. has opened its first quarter books. Alabama iron is now offered on this market at $18 furnace base, but freight rates restrict sales. The recent reduction from $6.50 all rail to $6.08 rail and water Merchant & Miners Transportation Co. rate from furnace to Boston and Providence, has failed to stimulate buying of Virginia irons. French iron, silicon 2.25, high in phosphorus, is offered at $19.75 per gross ton, c.i.f. dock Boston, but no sales are reported.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75	$24.56 to $25.56
East. Penn., silicon 1.75 to 2.25	24.06 to 25.06
Buffalo, silicon 2.25 to 2.75	23.93 to 25.68
Buffalo, silicon 1.75 to 2.25	23.93 to 25.18
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	29.16
Alabama, silicon 1.75 to 2.25	28.66

Warehouse Business.—Local quotations on cut washers have been reduced $1.50 per keg, and on cast washers 1¾c. per lb. Malleable washers are unchanged. Cone head, boiler quality and button head structural rivets are down 25c. per keg, and cut nails as much, the latter at $4.25 per keg base. Bolt and nut quotations have been revised, both advances and declines showing, while coach screws have been cut 10 per cent, and set screws 5 per cent. The market on standard makes of anvils is 4c. lower at 16c. per lb. There has been a further adjustment in local quotations on black wire cloth, f.o.b. Pittsburgh, on factory shipments through jobbers, to conform with mill lists issued some time back. The movement of bars out of warehouse just about holds its own. The demand for sheets and tin plate is relatively better than that for structural steel, although most warehouses are doing a very good structural steel business.

Jobbers now quote: Soft steel bars, $2.71½ per 100 lb. base; flats, $3.21½; concrete bars, $2.20 to $2.71½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.31½ to $3.78; steel hoops, $3.31½; toe calk steel, $5; cold rolled steel, $3.75 to $4.25; structural steel, $2.71½; plates, $2.81½ to $2.99; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.71½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Finished Material.—Bids were opened this week by the Boston & Maine Railroad on 2300 tons structural steel for the Newburyport bridge, but no award was made. Bids on the Neponset bridge project, involving 1270 tons structural steel, for the second time were rejected because of insufficient appropriation. The structural steel market is quiet and indications are it will remain so until early next year. On small tonnages 1.60c., Pittsburgh, is the general price, but 1.50c. could be done on large lots. The Portland Co., Portland, Me., has purchased between 300 and 400 tons wide plates, fire box steel. Other buying has been in small tonnages, generally at 1.50c., Pittsburgh, or 1.55c. The demand for bars has dropped to small proportions, while that for sheets is slightly better. Operations at the Wickwire Spencer Steel Corporation, Palmer, Mass., wire products mill were greatly curtailed for three days, due to the failure of electric power. The recent ice storm practically put the power company out of business during that time.

Coke.—The New England Coal & Coke Co., Boston, and the Providence Gas Co., Providence, R. I., made no change in their quotation on by-product foundry coke this month, both quoting on a $10.66 delivered base where the local freight does not exceed $3.40. Average daily shipment from ovens is slightly in excess of that for the corresponding period last month. Most New England foundries are slowly increasing their melts and have comparatively small fuel supplies, which accounts for an increase in contracting for first half coke at price ruling date of shipment. The market for both contract and spot fuel lacks snap, however.

Old Material.—The market has been practically at a standstill since last reports. The average New England foundry apparently has enough stock on hand to carry it over the year-end. Brokers have made unsuccessful efforts to move stove plate at $15 delivered, No. 1 machinery cast at the same price, and No. 2 cast at $13 to $13.50. A demand for cast iron borings still exists and prices hold firm, but the market on turnings is all of 50c. lower on the withdrawal of buyers. Railroad wrought and wrought pipe also are easier because owners are more willing to sell than they have been and buyers naturally are holding back. The market at the moment appears nominal at $8 for heavy melting steel, but large tonnages possibly could be obtained for slightly less.

The following are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.00 to $19.00
No. 2 machinery cast	16.00 to 17.00
Stove plate	15.50 to 16.00
Railroad malleable	13.50 to 14.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to $8.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	7.50 to 8.00
Machine shop turnings	3.50 to 4.00
Cast iron borings, rolling mill	5.50 to 6.25
Cast iron borings, chemical	6.50 to 6.75
Blast furnace borings and turnings	3.50 to 4.00
Forged scrap and bundled skeleton	4.50 to 5.00
Steel car axles and shafting	11.50 to 12.00
Car wheels	11.00 to 12.00
Rerolling rails	10.50 to 11.00

Birmingham

BIRMINGHAM, ALA., Dec. 6.

Pig Iron.—The Birmingham iron market entered December on an $18 base, the usual quotation, but shading of this base by more than one interest when needed to secure business is not denied. Some iron has sold at $17.50 when sacrifice of differentials is considered, or where broker's fees entered. As a whole, the market remained at $18 toward the end of the week with very little business. One maker did not enter an order during the week. Another booked 600 tons, the largest order being for 100 tons. One lot of 500 tons of No. 3 for delivery in an adjoining State was booked at $17.50 just before the latest market weakening. One active furnace interest booked its one-stack make in November, but others do not claim to have booked more than half to 75 per cent of make. One active concern has added 4,000 tons to stocks. Others have either reduced yard holdings or at least not added to them. Pipe prospect is so good that reasonable consumption in that quarter seems assured for some time. It remains that lower prices failed to bring business. Never was the volume less. Even pipe company purchases are made in driblets. St. Louis iron interests are asking the Southern freight rate committee to establish the same commodity rates on iron to Birmingham and other Southern points from St. Louis as apply to St. Louis from Birmingham. There are no Southbound iron commodity rates at present.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$17.50 to $18.00
Basic	17.00
Charcoal, warm blast	35.00

Finishing Mills.—The Tennessee company resumed this week at the Fairfield structural mill on an accumulation of orders, other mills operating on the same schedule as for weeks past. The week's schedule approaches 60 per cent. The car plant of the Chickasaw Shipbuilding and Car Co. has received an order for heavy repairs on several hundred Central of Georgia Railroad cars and is building 15 standard steel cars per day for the Louisville & Nashville. The Ingalls Iron Co. has booked two steel bridges in Mississippi and seven in Georgia besides the Agricola Pipe Co. shop in Gadsden and National Forge Co. shop in Anniston. It is completing a steel building for the Knoxville Fertilizer Co. and a building for the Fulton Bag Co. at New Orleans. Structural steel operations are at 60 per cent. Galvanized steel for roofing and steel pipe for plumbers' use are fairly active. The Gulf States Steel Co. made a record of 7,515 tons of rods in November.

Cast Iron Pipe.—The Pacific Coast is taking considerable high pressure pipe, from 5,000 to 6,000 tons leaving the port of Mobile this month for distribution via Los Angeles. Demand for sanitary pipe is also regular, shipments being to practically all the Pacific Coast ports. Freight via canal is $14.13 vs. $31.70 all-rail. General pipe business is not coming in, but plants have enough for operation for remainder of year and outlook is good. High pressure base is $34 and sanitary base $40.

Coal and Coke.—The Monterey, Mexico, district is taking 2500 tons of by-product coke per month on a continuing basis. Pacific Coast business is inhibited for time being by high freight rates and cheaper foreign cokes. Operations have not been reduced. The scale is $5.50 to $6 for beehive and by-product and $8 for Barrett Co. pitch coke.

Old Material.—No scrap is being bought pending the shop inventory period. Stocks on consumers' yards are sufficient for the remainder of the year and they are not adding to supply. Cast scrap is weaker by $1 following slump in pig iron.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Philadelphia

PHILADELPHIA, Dec. 6.

Aside from a fairly substantial improvement in the demand for pig iron, the local market continues to reflect the year-end dullness that has been noted in the past two or three weeks. Buying of iron in the past week totaled 20,000 tons, divided about equally between steelmaking and foundry grades, and inquiries aggregating fully 15,000 tons are pending. Much of the interest in foundry iron is from consumers who have not hitherto covered their requirements for first quarter.

A 10,000-ton order for plates from a shipbuilding company which will fabricate water pipe for a contractor who is to build a portion of a new line from the Catskill aqueduct to New York is the only conspicuous item in the steel trade. This business has gone to an Eastern mill, and though the details are somewhat obscured at present, it is reliably reported that the business was taken at about 1.80c. to 1.90c., delivered, Chester, Pa., which includes a 15c. per 100 lb. extra for flanging. This works back to a base price of about 1.30c. to 1.40c., Pittsburgh, but the mill taking the tonnage will net upward of 1.50c., mill.

Pig Iron.—Though the latter part of November brought with it marked dullness in the Eastern pig iron trade, the expectation of sellers that buying for first quarter delivery would start early in December seems to have been verified by events of the past week. Fully 10,000 tons of foundry iron for shipment in the first three months of 1922, and in some instances shipments commencing this month, have been sold locally in the past week and at least 15,000 tons of iron inquiry is pending, much of which comes from the New England and New York districts. One New England melter will probably close this week on 7500 tons and there are other sizable inquiries and a considerable number which average from 100 to 200 tons. A furnace company in New Jersey closed a few days ago for 5000 tons of foundry grades, including about 600 tons of Virginia iron, paying for the latter about $28, delivered. The eastern Pennsylvania iron purchased was at $21, furnace, for No. 2 plain and probably $1 higher for No. 2X. Most of the iron sold for first quarter has ranged from $20.50 to $21, furnace, for No. 2 plain and from $21.50 to $22, furnace, for No. 2X. Sales of the week include 9000 tons of basic iron, of which 7000 tons will go to a Harrisburg steel company and 2000 tons to a Delaware steel company. Most of the business was taken at $20, furnace, but on one sale the price was slightly under this figure. In one instance a high freight rate was paid by the buyer to obtain iron which he particularly desired. The Pennsylvania Railroad, which inquired for 2500 tons of foundry iron, has placed its order with a central Pennsylvania furnace company. Prices on foundry iron are fairly steady for this district, but eastern Pennsylvania furnaces have shown an inclination to shade quotations on New England and New York State business in competition with Buffalo furnaces quoting $19, furnace, on No. 2 plain. There is little or no activity in low phosphorus, malleable and gray forge grades.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.34 to $22.04
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.34 to 23.04
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	21.00 to 21.50
Gray forge	22.50 to 23.00
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Coke.—The market is weak and some distress coke continues to appear. Offers of coke of this kind have been made as low as $2.60, Connellsville. Foundry coke, prompt, is available at $4 and upward. No contracts for furnace coke for first quarter are reported, but furnaces are negotiating and hope to buy at a figure close to $3. The coke operators are asking figures up to $3.40, Connellsville.

Ferroalloys.—No change has occurred in the ferromanganese situation. Both American and British sellers are adhering firmly to $58.35, seaboard, for the standard grade, but there is very little buying. Spiegeleisen continues nominal at $25 to $27, furnace.

Billets.—Quotations on open-hearth rerolling billets range from $28 to $30, Pittsburgh, and on forging billets, $33 to $35, Pittsburgh. There is very little demand.

Plates.—The market is extremely dull, so dull, in fact, that an Eastern steel company which desired to operate its plate mill during the two weeks prior to Christmas to give its men holiday funds was unable to stir up any interest among consumers, and may fail in its objective. There is considerable interest in the 10,000-ton order of the Merchant Shipbuilding Co., Chester, Pa., which will fabricate some of the pipe for the Catskill aqueduct work in New York. The business is reported to have been placed with an Eastern mill at a price approximating 1.80c. to 1.90c., Chester, this including an extra of 15c. per 100 lb. for flanging. Deducting the extra and the Pittsburgh freight rate, this price works back to about 1.30c. to 1.40c., Pittsburgh, but will net the company taking the order slightly above 1.50c., mill. Ordinary lots of plates are quoted at 1.50c., Pittsburgh, but this price is usually shaded when attractive orders are in prospect.

Structural Material.—Very little building work is in prospect in Philadelphia and nearby cities. The city of Philadelphia is in the market for a few bridges, for which a few hundred tons of steel will be required. Plain material is usually quoted at 1.50c., Pittsburgh, on ordinary lots.

Bars.—Soft steel bars are quoted at 1.50c., Pittsburgh, and bar iron at 1.60c., Pittsburgh. Demand is very light.

Sheets.—Prices have been somewhat stabilized by the recent announcement of first quarter prices by the American Sheet & Tin Plate Co. These prices, 2.25c. on blue annealed, 3c. on black and 4c. on galvanized, Pittsburgh, are now quoted by all producers.

Old Material.—Consumers are taking in very little old material this month, and prices have sagged. A number of items have been revised downward about 50c. per ton. We quote for delivery to consumers in the Philadelphia district as follows:

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	16.50 to 17.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	13.00 to 13.50
No. 1 forge fire	9.50 to 10.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.00 to 9.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	12.00 to 12.50
No. 1 cast	17.00 to 17.50
Railroad grate bars	13.50 to 14.00
Stove plate (for steel plant use)	13.50 to 14.00
Railroad malleable	13.50 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	No market

W. J. Rainey, Inc., has appointed E. Arthur Tutein, Inc., Philadelphia, as sales agent for its coke in the Philadelphia district. The Philadelphia office of E. Arthur Tutein, Inc., including that of the Goshen Furnace Co. and the Thomas Iron Co., will be moved from the Finance Building to the Real Estate Trust Building.

Personnel Research Agencies

"Personal Research Agencies" is the title of a bulletin just issued by the United States Department of Labor, through its Bureau of Labor Statistics (No. 299). It is intended to serve as a guide to organized research in employment management, industrial relations, training, and working conditions.

About a year ago a conference was held in Washington, under the auspices of the Engineering Foundation and National Research Council to consider the practicability of bringing about co-operation among the many bodies conducting research relating to persons employed in industry and commerce, from management to unskilled labor. This conference, which was attended by 40 representatives of organizations of labor, manufacturers, employment managers, engineers, physicians, educators, economists, and social workers, requested the Bureau of Labor Statistics to undertake a survey of existing agencies whose activities include studies and investigations relating to the employee and his job. The above bulletin contains the results of this survey arranged in the form of a handbook for ready reference. It describes the research activities of about 300 bureaus, associations, foundations, laboratories, and university departments, which deal with the problems of an employment manager's office, vocational psychology, wage systems, cost of living and budgets, employee representation, training of managers, foremen and workmen, whether in educational institutions or in the factory, the relation of hours of labor, fatigue, lighting, ventilation, food, etc., to output and health of workers, occupational diseases and health hazards in the various industries, safety codes and appliances for the prevention of accidents, and the special problems connected with the employment of women and young persons, immigrants, colored workers, the handicapped or disabled, and the mentally deficient or unstable.

British Iron and Steel Market

Steel Situation Discouraging—Some Plants Closing—Pig Iron Reduction Did Not Stimulate Buying—Continental Steel Weak

(By Cable)

LONDON, ENGLAND, Dec. 6.

Cleveland pig iron was reduced 10s. ($2.00) last week; but recent reductions are still insufficient to attract buyers. Hematite demand is slow and prices are weak. Foreign ore is unchanged. Belgian foundry iron is being offered, on six to eight weeks' shipment, at £4 2½s. ($16.75) f.o.b.

There is a fair amount of inquiry for steel generally. British makers are competing keenly for export orders, prices down to £8 10s. (1.54c. per lb.) f.o.b., having been accepted for beams. General business, however, is not enough to keep the plants going and several mills are ceasing their operations.

Mannesmann Tube Co. secured a contract for boiler tubes for Russia. Continental steel is weak, Belgian merchant bars being quoted at £7 15s. (1.405c. per lb.) f.o.b., for shipment in February and March. For the same delivery, Belgian beams are held at £7 7½s. to £7 15s. (1.38c. to 1.405c. per lb.) f.o.b. Number 3 Belgian bar iron is quoted at £7 5s. (1.314c. per lb.) f.o.b. for February and March delivery.

Luxemburg merchant bars are quoted at £7 15s. (1.405c. per lb.) f.o.b., for shipment in six to eight weeks. German sheet bars are being sold at £6 10s. ($26.39) c.i.f. Britain, for December and January delivery. German wire nails of the usual Japanese assortments are now sold at 24s. ($4.87) cost and freight, for January and February shipment. German wire rods are held at £8 15s. to £9 ($35.53 to $36.54) f.o.b. for January and February delivery.

Tin plate is easier on offering of stock plates, resulting in realizing on stocks, and bear selling. Forward deliveries, January and February, are sold at 20¾s. ($4.21) basis f.o.b. The home trade is purchasing odd sizes, 20¾s. being done f.o.b. Quarter wasters are sold also at 20¾s. f.o.b. ex-stock.

Galvanized sheet makers are anxious to book orders for January onwards. They have accepted £17 (3.08c. per lb.) basis f.o.b. for 24 gage sheets. Far-Eastern specifications for black sheets are nominal.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.06 per £1 as follows:

Durham coke, delivered	£1 10	$6.09
Cleveland No. 1 foundry	5 5 & £5 10*	21.32 & $22.33*
Cleveland No. 3 foundry	5 0 & 5 5*	20.30 & 21.32*
Cleveland No. 4 foundry	4 15	19.29
Cleveland No. 4 forge	4 10	18.27
Hematite	7 0*	28.42*
East Coast mixed	5 7½ & 5 10*	21.82 & 22.33*
Ferromanganese	15 0 & 14 10*	60.90 & 58.87*
Rails, 60 lb. and up	9 0 to 10 10	36.54 to 42.63
Billets	7 5 to 8 5	29.44 to 33.50
Sheet and tin plate bars, Welsh	7 15	31.47
Tin plate base box	1 0½ to 1 2	4.08 to 4.47
		C. per Lb.
Ship plates	10 10	1.90
Boiler plates	14 0 to 16 0	2.54 to 2.90
Tees	10 10 to 11 10	1.90 to 2.08
Channels	9 15 to 10 15	1.77 to 1.95
Beams	8 10 to 10 10	1.54 to 1.90
Round bars, ¾ to 3 in.	10 10 to 12 0	1.90 to 2.18
Galvanized sheets, 24 g.	17 0 to 17 5	3.08 to 3.13
Black sheets	14 10 to 15 0	2.63 to 2.72
Steel hoops	12 0 & 12 5*	2.18 & 2.22*
Cold rolled steel strip, 20 g.	24 10	4.44

*Export price.

The steel oil storage tanks for the new Mexia, Texas, oil field to be built by the Chicago Bridge & Iron Works by the Sinclair Crude Oil Purchasing Co., Tulsa, Okla., will include 50 of the 7-ring 80,000-bbl. capacity tanks. They will be steel throughout with 3/16-in. steel roofs and steel roof framing.

COMMENT ON MESSAGE

How President Harding's Recommendations on Important Measures Were Received

WASHINGTON, Dec. 6.—The sweeping change in the American system of making tariffs recommended by President Harding to the Sixty-seventh Congress in his message this afternoon created great interest. It had, however, been anticipated and therefore did not carry any surprise.

Of outstanding interest were his recommendation as to supervision of labor organizations and suggestions as to upbuilding of the merchant marine and the need of action toward further tax revision.

Views on the Tariff

Urging early legislation on the permanent tariff, the President recommended "flexibility and elasticity" so that rates may be adjusted to meet unusual and changing conditions which cannot be accurately anticipated. Recognition was given by the President to differences of opinion concerning the merit of the proposed American valuation plan and he stated that Congress should give the executive branch authority to proclaim American values, under prescribed conditions, on any given list of products imported. Where there are evidences of unfair practices due to conditions of exchange, the President's idea is to give the tariff commission power to recommend rates to meet changing economic situations. The President observed the constitutional questions involved, but made it plain that he is of the opinion there are none to prevent extension of the power suggested. It is altogether likely, however, that there will be considerable opposition in Congress to the plan.

Senator Smoot's Bill

That it will be taken up was shown by the fact that Senator Smoot, prominent member of the Finance Committee, immediately after the message was read, presented an amendment to the pending tariff bill providing for American valuation on imported products. Another amendment he introduced would empower the President to proclaim such tariff rates upon any commodity or group of commodities as would equalize advantages of competing domestic and foreign products. Although the proposed departure in tariff making would be distinct from the present system, the President said: "It is no radical departure in view of varying conditions and the disordered state of money values to provide American valuation, but there cannot be ignored the danger of such a valuation, brought to the level of our own production costs, making our tariffs prohibitive. It might do so in many instances where imports ought to be encouraged."

Industrial Courts

In dealing with the labor situation, the President suggested industrial courts to arbitrate disputes between capital and labor, which, it is believed, might follow the system of industrial tribunals in Kansas. He made it plain that labor organizations should be supervised and controlled as is done in the case of capital, but did not say specifically what regulation he has in mind, whether by incorporation or otherwise.

The President was known to favor continued suspension and probably actual repeal of that section of the merchant marine act providing preferential duties on goods shipped in American bottoms, which would call for abrogation of treaties. Because of this his suggestion for tolerance of Congress for "non-compliance for a very few weeks until a plan may be presented" was no surprise. The President soon will devote a special message to the merchant marine. He is known to favor ship subsidy and is expected to recommend such a system to upbuild the merchant marine. He also has indicated previously that he will recommend tax revision and his casual reference to this subject, to be taken up "later," only confirms the opinion that has prevailed, but is a source of gratification to business interests of the country.

ELECTRIC PLANTS FOR JAPAN

Contract for $2,000,000 Awarded—Light Rails Bought for Lumbering—Tin Plate Inquiry

NEW YORK, Dec. 6.—Not only is Japanese trade showing more activity from week to week but purchases are appearing from large interests as well as small dealers and consumers. A notably large contract for electric material for the Far East has been closed by Takata & Co., 50 Church Street, New York, representing the Westinghouse Electric & Mfg. Co. in Japan. This contract, which totals slightly less than $2,000,000, is for supplying large generators and other units for 154,000-volt electric transmission to the Daido Denrioku K. K. (Consolidated Electric Power Co.). Details of the installation have not yet been received from Japan. The Consolidated company is a producer of hydroelectric power, selling it to distributing companies for use in Tokio, Osaka and other cities. In Tokio this transmission of power is handled by the Tokio Electric Light Co., which recently closed a contract with Takata & Co. for Westinghouse material, totaling about $600,000. This contract was let in conjunction with 610 transmission towers. While the wire was placed in the United States, the towers are being fabricated by the Ishikawajima Iron Works, a subsidiary of the Ishikawajima Dockyard Co., one of the largest dockyards in Japan. The steel was probably rolled in a British mill or came from the Imperial Steel Works in Japan. Another large purchase for hydroelectric work by the Japanese will probably be made in the near future for the Formosa hydroelectric project, inquiry on which has been in the market since early in the summer. This includes plates for bending into pipe, about 225 miles of transmission towers, heavy pipe and other equipment.

Japanese purchases of copper continue at intervals. One New York export house recently booked an order for 450 tons (1,008,000 lb.) of electrolytic copper for shipment to Japan, probably to be consumed by wire mills, which are engaged in the manufacture of much of the wire for the electrical expansion that is taking place in Japan. Buying of light rails also continues, purchases being chiefly from governmental sources. The latest shipments seem to be largely rails of about 30-lb. section for use in lumbering on the island of Saghalien, north of Japan. One export house has recently booked orders for 1000 tons of 30-lb. rails for this use. One order of 500 tons of sheet bars is reported by a Japanese house and an inquiry is in the market for oil can tin plate, totaling about 12,000 base boxes.

Business with Germany

German competition is evidently no greater to-day than it was six months or a year ago. Price increases have kept pace with the mark's depreciation. Freight rates, however, are an aid to German export selling, but low ocean freights may be somewhat offset by the recent 50 per cent increase in German railroad freight from mills to ports of shipment and the addition of 4 per cent to the already large export duty levied by the German Government. Ocean freights from Hamburg to foreign points quoted in pounds sterling are generally 12s 6d ($2.54) to Buenos Aires, Argentina, about 40s ($8.12) to Hong Kong and Japanese ports, 40s 6d ($8.22) to Shanghai, and 15s ($3.04) to Bombay, India. German sellers are reported to have placed a fairly large amount of structural material in Argentina, their price f. a. s. Hamburg being now about the equivalent of 1.40c to 1.45c per lb. Pittsburgh.

Some inquiry has recently appeared from the Far Eastern markets for wire shorts. One exporter is now attempting to fill an order in hand for 15 tons of wire shorts. Wire shorts are purchased largely in the Far East, where labor is cheap. They are resold to individuals, who among other uses, roll them on spools for sale at retail. The shorts generally demanded are from 23 ft. to 75 ft. long. This is a product that, like the second hand plates and shapes used by the Chinese blacksmiths, was diverted to American mills by the war.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, $2.75 to $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 to $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50 to $2.60; galvanized wire, $2.95 to $3.10; galvanized barbed wire, $3.40 to $3.55; galvanized fence staples, $3.40 to $3.55; painted barbed wire, $2.90 to $3.05; polished fence staples, $2.90 to $3.05; cement-coated nails, per count keg, $2.35 to $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.25 to $2.40 base
Large boiler rivets.....2.35 to 2.50 base
Small rivets .....70, 10 and 5 to 70, 10 and 10 per cent off list
Machine bolts, small, rolled threads,
70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer,
65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads,
65, 10 and 10 per cent off list
Cut threads .....65 and 10 to 70 per cent off list
Longer and larger sizes.....65 and 10 to 70 per cent off list
Lag bolts .....70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads.....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....65 and 5 per cent off list
Larger and longer sizes.....65 per cent off list
Hot pressed sq. or hex. blank nuts.....$5.50 off list
Hot pressed nuts, tapped.....$5.00 to $5.25 off list
C.p.c. and t. sq. or hex. blank nuts.....$5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped.....$5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts, carloads.....3.25c. to 3.50c. base
Track bolts, less than carloads.....4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under.....75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in. .....75 and 10 to 80 and 10 per cent off list

Upset Set Screws

½ in. and under.....80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in.....80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes .....70 and 10 per cent off list

Milled Set Screws

All sizes .....70, 10 and 5 per cent off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38 to $40; chain rods, $38 to $40; screw stock rods, $43 to $45; rivet and bolt rods and other rods of that character, $38 to $40; high carbon rods, $46 to $52, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅜-in. and 7/16-in., $2.40 base; 5/16-in., $2.40 base. Boat and barge spikes, $2.40 to $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13.00; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	23	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20	Nos. 11 and 12	2.30
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.35
		Nos. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Nov.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
30.....	13.50	13.37½	29.87½	4.70	4.35	5.15	4.65
Dec.							
1.....	13.50	13.37½	30.37½	4.70	4.40	5.25	4.75
2.....	13.50	13.37½	31.00	4.70	4.40	5.25	4.75
3.....	13.50	13.37½	....	4.70	4.40	5.30	4.80
5.....	13.75	13.50	31.50	4.70	4.45	5.35	4.85
6.....	13.75	13.50	31.75	4.70	4.45	5.37½	4.87½

New York

NEW YORK, Dec. 5.

Every one of the leading metals is more active and higher. Buying of copper continues and prices have advanced again. The tin market is once more active and prices have advanced. Demand for lead has increased and prices are firmer. The zinc market also shows more activity at slightly higher levels.

Copper.—The electrolytic copper market continues to advance on increased buying for both domestic and foreign consumption. Prices vary, depending on the seller, and range from 13.75c. to 14c., delivered, or 13.50c. to 13.75c., refinery, for spot and this year's delivery, with January and first quarter ranging generally from 14c. to 14.25c., delivered. At the minimum levels the amount of copper available for this year's delivery is not large and in more than one case producers refuse to sell, not only at those levels but at even the higher prices. The principal buying is for January and first quarter delivery and the demand is quite general. For foreign consumption the minimum seems to be 14c., f.o.s., with Germany and England the leading purchasers. Japan purchased 450 tons during the week. It is estimated that total sales for November were 190,000,000 lb., as compared with 140,000,000 lb. for October. November sales therefore were the largest for any month this year. Production still continues at about 40,000,000 lb. per month. Estimates of delivery into consumption have not yet been made but without doubt they were higher than in October, when they were about 110,000,000 lb.

Copper Averages.—The average price for Lake copper for the month of November, based on daily prices in THE IRON AGE, was 13.37c. The average price of electrolytic copper was 13.07c.

Tin.—Demand for Straits tin has again become active and the market is stronger and higher. Last week a fair business was done at close to 30c., above or below, depending on the position. On Saturday also there was a little business at the same levels. Yesterday very heavy sales were made, estimated at between 500 and 750 tons for all positions, with prompt and nearby delivery selling at 31.25c. to 31.50c., and with the far off positions at 31.50c. to 31.75c. Sales at 32c. were also reported. Consumers were the principal buyers yesterday, with dealers taking perhaps one-quarter to one-third of the total. To-day only a slight business was reported, with the market closing at 31.75c. for spot Straits, New York. Electrolytic tin has sold at 31.50c. New York. The London market is featured by higher prices and heavy sales. For the week covered by this report, or since Nov. 30, sales in that market amounted to over 4250 tons, which represent an unusually active market. Prices have also advanced, the quotation to-day having been £167 17s. 6d. for spot standard, £169 10s. for future standard and £168 78s. 6d. per ton for spot Straits. Deliveries of tin into consumption in November are reported as 3250 tons, with stocks and the quantity landing on Nov. 30 at 1316 tons. Imports for the first 11 months of this year were 20,668 tons against 48,093 tons for the first 11 months in 1920. The quantity afloat is reported at 4650 tons with arrivals thus far this month at 580 tons.

Lead.—Demand has increased and the market has stiffened. The leading interest continues to quote 4.70c., New York and St. Louis, at which it continues to take business, but in the outside market sales have been made at points outside of New York as high as 4.75c. and 4.77½c., delivered. The market at St. Louis is firmer, independent sellers asking 4.45c. for early delivery. The strength of the London market and the scarcity of the metal there continue to attract attention.

Zinc.—There is more demand from galvanizers who need the metal for immediate consumption and the market for prime Western is higher, due to this demand, as well as to the continued indifference of large producers to sell freely. For early delivery or 30 days' delivery prime Western is quoted at 4.87½c., St. Louis, or 5.37½c., New York.

Antimony.—The market is quiet and wholesale lots for early delivery are quoted at 4.50c., New York, duty paid, with prompt metal at 4.55c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by the leading interest in wholesale lots for early delivery at 19c., f.o.b. plant, with the same grade available from importers at 17c. to 18c., New York, duty paid.

Old Metals.—Business is better and metals are held firm. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.00
Copper, heavy and wire	12.00
Copper, light and bottoms	9.75
Heavy machine composition	10.00
Brass, heavy	7.75
Brass, light	6.00
No. 1 red brass or composition turnings	8.25
No. 1 yellow rod brass turnings	6.00
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

DEC. 6.—Copper, tin and zinc have advanced not because of active buying but rather on account of a concerted effort on the part of producers to secure satisfactory prices. Further advances in the old metals reflect the greater firmness in new material. We quote in carload lots: Lake copper, 13.75c.; tin, 32.25c.; lead, 4.45c.; spelter, 4.95c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10c.; copper bottoms, 8c.; red brass, 8c.; yellow brass, 5.25c.; lead pipe, 3c.; zinc, 2.25c.; pewter, No. 1, 22c.; tin, foil, 23c.; block tin, 25c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Dec. 5.—Both lead and zinc are stronger. We quote lead at 4.45c., carlots, against 4.25c. last week, and zinc at 4.70c. to 4.80c., against 4.62½c. last week. We quote Lake copper, 14.48½c., car lots; tin, 31.86c., and antimony, 5.08½c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Competition in Line Pipe

YOUNGSTOWN, Dec. 6.—Demand for line pipe is still lively, but competitive conditions have forced down prices to the point where they are unattractive for a number of producers. The advantage of Chicago pipe producers in periods of close competition is indicated by the fact that some very attractive business has lately gone to Chicago makers.

The Chicago district has a freight rate advantage over the Youngstown district of about $7 per ton in shipping pipe and casing to the Southwestern oil fields.

The 781 building permits issued in St. Louis during November represented improvements of the value of $975,125. In November, 1920, 574 permits were issued for improvements of the value of $523,730. The building permits issued in 1921, up to Nov. 30, represent construction costing $15,651,585, as against $17,694,078 for the entire year of 1920.

PERSONAL

M. A. Hanna & Co., Cleveland, have announced a number of changes in their sales organization. George A. Maltby, who has been located at the firm's Detroit office, has been named resident agent at the Buffalo office, and associated with him will be P. F. Murray and F. C. Mosedale, the latter being named special representative. B. S. Stephenson, formerly in charge of the firm's Pittsburgh office, and later transferred to Cincinnati in the same capacity, has been appointed resident agent at the Detroit office and will also continue to have charge of the Cincinnati office. E. Kay Ford will be associated with him in the Detroit office and H. D. Comey and William Kerber in the Cincinnati office.

Dr. Colin G. Fink, consulting electrometallurgist, New York, has been appointed by the board of directors of the American Electrochemical Society to the position of acting secretary to serve during the unexpired term of Dr. Joseph W. Richards.

W. J. Clucas has been appointed special representative in Western New York for the Lancaster Steel Products Corporation, manufacturer of cold rolled and cold drawn steel.

Louis J. Campbell, president Electric Alloy Steel Co., Youngstown, Ohio, is convalescing from an attack of pneumonia, and has not yet resumed his duties.

Joseph G. Butler, Jr., vice-president Brier Hill Steel Co., Youngstown, Ohio, is planning an addition to the Butler Art Gallery at Youngstown, which he erected and fitted with a collection of paintings, for the people of the Mahoning Valley.

G. H. Rehling has been appointed district sales manager for the Wyckoff Drawn Steel Co., Pittsburgh, for the Southwestern Ohio territory, with headquarters at Dayton, Ohio.

John B. Dobson, who has been Southeastern manager at Atlanta for Warren Webster & Co., Camden, N. J., steam heating system manufacturer, for more than 17 years, on account of ill health, has found it necessary to give up active work in the South. He has been transferred to the home office organization at Camden. Edward W. Klein has been appointed Southeastern district manager, and L. C. Boland will continue as district engineer, maintaining the present office at 1318 Atlanta Trust Co. Building, Atlanta. The company will also maintain an office at Charlotte, N. C., in the Commercial Bank Building, with which Charles F. White will be associated as Sales Engineer. The Charlotte office will also be in charge of Mr. Klein, as Atlanta will be the principal selling office. Mr. White has been transferred from the home office organization.

R. M. Derby, export manager Niles-Bement-Pond Co., 111 Broadway, New York, who has just returned from a six weeks business trip to Mexico, during which time he made his headquarters in Mexico City and made trips to the outlying districts, says that Mexico is in many ways evidently running behind financially, probably because of lack of recognition by the United States and the consequent check to American banking. Business is at a low ebb, as the government there cannot buy except on credit and individual purchasers must pay cash. The railroads, which recently purchased a large number of locomotives from the Baldwin Locomotive Works, on a long term credit arrangement, are in great need of machine shop facilities. Representatives of car manufacturers in Mexico seem not inclined to extend the credit necessary for the car purchases desired. Mr. Derby brought back a few small orders for machine tools. He found the country itself in a prosperous condition and law and order prevailing, large business alone waiting on action by the United States.

Col. Samuel M. Nicholson, president and general manager Nicholson File Co. and president American Screw Co., Providence, R. I., has been made chairman of the board of directors of the International Trust Co., Providence, to succeed the late Col. Samuel P. Colt.

J. E. Osmer, Detroit, superintendent of power and master car builder of the Ann Arbor Railroad for nine years, has resigned his position. He has no definite plans for the future.

W. M. MacCleary has been appointed New York district manager for the Warren Iron & Steel Co., Warren, Ohio, with offices at 2 Rector Street. He has been in the steel business for many years, having been associated with the Whitaker-Glessner Co., Portsmouth, Ohio. During the war he had charge of the raw material purchases in the Ordnance Department, holding the rank of colonel.

O. C. White, formerly agent in the Fort Worth, Tex., territory for the Youngstown Boiler & Tank Co., Youngstown, Ohio, has been appointed sales manager in the Southwest, with headquarters at 801 North Houston Street, Fort Worth.

William Rosenthal, for years traveling representative of the Hyman-Michaels Co., Chicago, dealer in iron and steel scrap and relaying rails, has been placed in charge of the company's St. Louis office at 2115-18 Railway Exchange Building. The company maintains extensive yards in St. Louis.

Thomas Hoops, Jr., has resigned as general manager and a director of Wilcox, Crittenden & Co., Inc., Middletown, Conn. He had been connected with the company for 22 years.

Oswald Fowler, of the non-ferrous department of Rogers, Brown & Co., New York, sailed Tuesday on a business trip to Norway, Sweden and Great Britain in the interest of the firm.

Harry Coulby, president Pittsburgh Steamship Co., Cleveland, and John C. Chandler, Cleveland district sales manager Lackawanna Steel Co., sailed for Europe Dec. 7 and will spend four months abroad. During Mr. Chandler's absence, E. B. Thomas, who is connected with the Chicago office of the Lackawanna Steel Co., will have charge of the Cleveland district sales office.

Horace B. Spackman, president Allegany Ore & Iron Co., owned by the Lukens Steel Co., was elected president of the Eastern Pig Iron Association at its monthly meeting in Philadelphia on Dec. 2.

A. D. Keene, electric furnace engineer General Electric Co., Schenectady works, is now with the Pittsburgh Electric Furnace Corporation as engineer on electric furnace designs and applications in the steel and metal industries. He has had practical experience in the design of electric furnaces and ovens for diverse applications. His joining with the 'Lectromelt Furnace forces indicates a broadening out of its line, which has heretofore been confined to melting and refining furnaces for steel, iron and brass, bronze and ferro-alloys. He has moved his residence from Schenectady to Pittsburgh.

M. H. Roberts, chief engineer Franklin Railway Supply Co., Inc., New York, is chairman of a board of engineers recently appointed by H. Foster Bain, director Bureau of Mines, to study the production of helium in Texas.

Washington Steel & Ordnance Co. Dissolved

WASHINGTON, Dec. 6.—The Washington Steel & Ordnance Co., Giesboro, D. C., has been dissolved by action of its stockholders. Having completed all of its contracts, it is said the plant will not be operated again. It was formerly a branch of the Firth-Sterling Steel Co., but in 1911 was established as a private corporation under the laws of West Virginia. The officers of the corporation were Corcoran Thom, president; Lewis J. Firth, chairman of board; James W. Kinnean, Pittsburgh, vice president; Roy B. McKenna, E. B. Clarke, William E. Dalton and H. F. Clarke, directors.

OBITUARY

BENJAMIN E. D. STAFFORD, vice-president and general manager Flannery Bolt Co., Pittsburgh, died Nov. 30, at Atlantic City, where he had gone for his health. He was born in Brooklyn, Feb. 25, 1866. Prior to becoming associated with the Flannery Bolt Co. in 1904, he had been with the Hopedale Machine Co., now the Draper Corporation, the B. M. Jones Co., Boston, and the Ewald Iron Co., Louisville, Ky. He retired from active business about two years ago on account of ill-health and had been living on his farm at Millvale, N. J. Mr. Stafford was a member of the American Society for Testing Materials, the American Society of Mechanical Engineers and the National Geographic Society.

JOHN J. NOLAN, vice-president, secretary and director Dravo Contracting Co., Pittsburgh, dropped dead at the Pittsburgh Country Club on the afternoon of Dec. 1. Following his participation in a golf tournament, he complained of not feeling well and went out in front of the club to revive. Death, it is believed, was due to apoplexy. Mr. Nolan had been with the Dravo Contracting Co. for 20 years. He was born in Carbondale, Pa., 45 years ago, and was graduated from Lehigh University in 1901, joining the Dravo company that year. He was a member of the University, Duquesne and Union clubs of Pittsburgh.

J. H. PRICE, secretary-treasurer Washington Coal & Coke Co., Dawson, Pa., died suddenly at his home in that town, Dec. 5. He had been ill for several weeks and only recently returned from Battle Creek, Mich., apparently in restored health. Prior to his connection with the coal and coke business, Mr. Price had been associated with the American Steel & Wire Co., Cleveland, and with another wire company at Milwaukee.

M. C. WILLIAMS, for many years in the steel industry, died at the home of his son, Charles H. Williams, Terre Haute, Ind., on Nov. 29. He started in the steel business as a young man and served in various capacities, including those of roller, manager and mill owner. He had lived a retired life on the farm for the past 10 years.

JAMES D. IRELAND, for the last five years member of the firm of M. A. Hanna & Co., Cleveland, died Dec. 6 after a year's illness, aged 43. He was general manager of the iron ore mines of M. A. Hanna & Co. for seven years previous to becoming a member of the firm, and since he had become a partner he had had charge of the firm's iron ore and anthracite coal mines.

ARNOLD HINKINS, president Butler Street Foundry & Iron Co., Chicago, which he organized in 1891, died of pneumonia on Dec. 1. Mr. Hinkins was born in Holland on March 20, 1843, and came to America in 1849, settling in Chicago in 1856.

FRANK A. HYDE, Boston, manufacturer of safes and strong-boxes, died Nov. 29 at the Malden Hospital, Malden, Mass., in his sixty-fifth year, following a recent serious operation.

HENRY D. ATWOOD, Taunton, Mass., for a long period head of the Phenix Crucible Co., died Nov. 29. He was born in Taunton in 1838.

WALTER HERBERT WESSON, Springfield, Mass., manufacturer of firearms, died Nov. 29. He was born at Grafton, Mass., Jan. 23, 1850.

The Aluminum Goods Mfg. Co., Manitowoc, Wis., with branch factories in Newark, N. J., and Two Rivers, Wis., has recently increased its operating forces to 3000 and placed its main factory in Manitowoc on a 24-hr. schedule to fill orders for stamped aluminum utensils and drawnware. Deliveries during November were the largest in any single month in the history of the company and unfilled orders Dec. 1 were the largest on record.

GERMAN PRICES SOARING

Export Prices Unchanged When Translated into Dollars—Dollar Quotations Appear in Domestic Transactions

(*Special Correspondence*)

BERLIN, GERMANY, Nov. 20.—Judging by events of the past week Germany is well on the road to Austrian high prices and the time may not be far distant when German prices will be quoted in five figures. The chaotic conditions of a fortnight ago have now crystallized into a definite upward trend. Prices are increasing at an alarming rate and can only be regarded as nominal, virtually any price being paid for quick delivery. In the absence of mill quotations, warehouses, brokers and resellers are ruling the situation.

Bar iron has now reached 6400 m. compared with 4200 m. two weeks ago, but the contrast is even more marked when compared with quotations during July and converting figures into dollars. On July 12, 1921, bar iron was quoted at 1800 m., equal to $23.25 at the day's rate of exchange. Last week's quotation of 6400 m. exceeds the July price by 4600 m. or 255 per cent, but the dollar price remains practically unchanged, working out at about $23.68. Consequently foreign buyers have not been put at a disadvantage by the rising domestic prices and Germany is still in a position to export at a fair margin of profit. This exporting capacity will be severely tried, however, when mills begin to sell finished products made of foreign raw materials purchased at current prices unless aided by a further corresponding depreciation of her currency. This has been exactly the case since the conclusion of the war but this state of affairs cannot continue indefinitely and a repetition of the stagnant period prevailing throughout the spring and summer of 1920, only on a greater scale, is feared by many.

The desperate financial position of Germany has led in many instances to the dollar taking the place of the mark in the domestic market. Baltic ore shippers adopted that practice some time ago with a view to protecting themselves against loss, but there are also many instances of the dollar substituting the mark in transactions between domestic works. Ever since the boom started there has been strong opposition by consumers to price advances, held to be justified by the producers because of the increases in production costs. Producers not only failed to score but they were unsuccessful in attempting to reintroduce sliding scale quotations. It now appears that the dollar standard offers a new basis for transactions and firms operating on this basis are obviously convinced of a further deterioration of the mark.

Quotations during the past week were changing rapidly. Disregarding high prices paid under exceptional conditions, we quote as follows in marks per metric ton:

Bar iron	6,400
Flats and rounds	6,250
Angles	6,400
Concrete bars	6,500
Squares	6,000
Soft bolt and nut stock	7,750
Hoop iron	6,200
Hoop iron, box band quality	8,600
Sheets, heavy	5,700
Sheets, medium	6,850
Plates, light, acc. to gage	9,800 to 11,500

The price advance recently decided upon by the Association of German Rivet Manufacturers has been followed by a further increase.

The Baker Mfg. Co., Evansville, Wis., manufacturer of gasoline engines principally for farm purposes, on Dec. 1 enlarged its operating schedules from three 8-hr. to six 8-hr. days a week, to bring production to a level with unfilled orders. A horizontal reduction of 25 per cent in wages was placed in effect at the same time.

Machinery Markets and News of the Works

RAILROAD PROSPECTS

Outlook for Substantial Buying by Carriers Grows Brighter

Rock Island Expected to Place Orders Soon for About $800,000 Worth of Shop Equipment—List of 70 Tools Issued

Prospects of machine-tool orders from the railroads grow considerably brighter. It is reported from Chicago that the Rock Island Lines are said to feel that they can now buy at satisfactory prices and preparations are being made to place large orders, which may aggregate in value about $800,000. Of this amount $300,000 is from the 1921 budget, for tools authorized but not purchased this year, and $500,000 is scheduled on the 1922 budget. The Rock Island has issued a list calling for bids on about 70 machines, many of large type. The Illinois Central and Chicago & North Western are also preparing large lists for 1922.

The Chesapeake & Ohio Railroad closed bids on Nov. 28 on about 20 tools and may buy shortly, while the Virginian Railroad is expected to send out new lists for about 20 tools. The latter road recently placed orders for a number of machines. The Big Four Railroad is in the market for a 300-ton wheel press.

The New York City Board of Education took bids this week on another list of machine tools for vocational training schools. This list included about 80 tools, and in addition there was a large quantity of small tools, supplies, etc.

One of the largest single orders of the week in Chicago was placed by the Hurley Machine Co., that city. Fifteen power presses, costing about $20,000 were purchased.

The American Car & Foundry Co., New York, which inquired last week for 35 machine tools, is expected to place its orders very quickly, as contracts have been let for the company's addition at Schenectady, for which these tools are intended.

Recent developments in the oil fields of the Southwest point to the possible development of some machine-tool business in that district.

Year-end liquidation of inventories is bringing more used tools into the market. The General Motors Corporation is collecting all of the surplus tools from its various plants and is storing them in the old factory of the Northway Motor & Mfg. Co., Detroit, preparatory to placing them on sale through various dealers. It is expected that about 1500 or 1600 machines will be offered for sale.

The Standard Parts Co., Cleveland, has decided to dispose of the tools in its American Ball Bearing plant, numbering 50 to 100, and these will be offered for sale shortly.

New York

NEW YORK, Dec. 6.

It is expected that the American Locomotive Co., New York, will place orders very soon against its inquiry for 35 miscellaneous machine tools, published in THE IRON AGE of Dec. 1. Contracts have been let for the addition to its Schenectady plant, for which the tools are intended, hence there is apt to be no unusual delay in the closing of the business.

The New York City Board of Education has asked for bids on another list of machine tools, bids closing tomorrow, Dec. 7. The list includes the following items, in addition to a large number of small tools, supplies, etc.: For a forge shop: 14-in. sensitive drill, 20-in. upright drill, 14-in. wet tool grinder and 10-in. dry grinder; for mechanical laboratory: Olsen testing machine, Olsen duplex micrometer extensometer, six Riehle Brothers' testing machines of various types; for machine shops: 20-in. fixed-head drill press, one United States hand milling machine, two 14-in. sensitive drills, two 14-in. Blount wet tool grinders, two 11-in. x 4 ft. speed lathes, one 3 x 3 in. power hack saw, 10 to 12 in. blade, equivalent to Marvel No. 1; one Hendey No. 5 special manufacturing milling machine, 35 12-in. x 5 ft. engine lathes, Hendey or Pratt & Whitney; one surface grinder, Walker No. 2; six Hardinge Brothers' bench lathes, one Stewart triple purpose furnace, one Stewart No. 3 pressure blower, one Segal key-filing machine, one Blount dry grinder, 12 x 2 x 1 in., one Blount 20-in. wet tool grinder, one American positive pressure blower, one American oven furnace, one Wisconsin hand milling machine, one Monarch engine lathe, 10 in. x 5 ft.; one Star engine lathe, 11 in. x 4 ft.; one Worcester engine lathe, 12 in. x 4 ft.; one Shepard engine lathe, 10 in. x 4 ft. 3 in.; one Flather engine lathe, 12 in. x 5 ft.; one Wells special lathe, 11 in. x 4 ft.; one Rhodes 7-in. horizontal crank shaper, one Washburn 14-in. sensitive drill, one Superior 20-in. drill, one Blount speed lathe, 11 in. x 4 ft.

Machine-tool business continues quiet, with some improvement in inquiry for used tools. December is not expected to be an active month, but the local trade is looking for better buying shortly after the new year.

Present activity in the crane market has been affected by the fact that the end of the year is approaching. The bids submitted on the 34 gantry cranes for the two piers of the Pan-American Terminal & Dock Co., at Stapleton, S. I., have been rejected. An irregularity was claimed by one bidder to exist in the low bid, but the Corporation Counsel of the city of New York declared all bids regular. It was decided by the Board of Estimate and Apportionment that lower prices might be obtained by a second tender. Specifications and conditions of bidding are unchanged. New bids were advertised by the Commissioner of Docks on Dec. 8 and bidding will close Dec. 21. A request for bids on 18 electric cranes of 3-ton, 5-ton and 10-ton capacities has been made by a dealer in New York. These cranes are reported to be for a company in Yonkers, N. Y. An export inquiry is in the market for 12 electric cranes, ranging from 4-ton to 5-ton capacities. George B. Spearin, 90 West Street, New York, has been receiving bids on a 15-ton, 33-ft. span hand power crane, which is included in a contract for the Passaic Valley Sewage Commission and will be erected at the Wallington Pumping Station, Wallington, N. J.

Among recent sales is a 25-ton, 37-ft. 10-in. span, stationary gantry crane placed with Niles-Bement-Pond Co. by the Erie Railroad and to be erected at Twenty-eighth Street and Thirteenth Avenue, New York, replacing a 15-ton hand power gantry crane. Other bidders were New Jersey Foundry & Machine Co., Toledo Crane Co., Northern Engineering Works and N. B. Payne, 25 Church Street, New York. The American Car & Foundry Co. has purchased three 5-ton overhead traveling cranes of 90-ft., 70-ft. and 58-ft. spans from the Pawling & Harnischfeger Co., two for its St. Louis plant and one for Depew, N. Y.

The Hoover Wagon Co., York, Pa., manufacturer of automobile bodies, has purchased the two-story factory at Webster Avenue and the Boulevard, Long Island City, comprising about 18,000 sq. ft., for a branch plant.

The Wolis & Diamond Iron Works, 335 East Thirty-fourth Street, New York, has awarded contract to Louis Brooks, 5 East Fortieth Street, for a branch plant, 50 x 80 ft., at Whitlock Avenue and 149th Street, estimated to cost about $17,000.

Plans for a four-story ice-manufacturing and storage plant on Webster Avenue, estimated to cost about $100,000

with machinery, are being prepared by W. H. Meyer, architect and engineer, 1861 Carter Avenue, New York. The owner's name is withheld temporarily.

In addition to the erection of a factory extension, 61 x 176 ft., the Royal Metal Furniture Co., 125-9 Eighth Street, Brooklyn, has filed plans for improvements to its present works, to cost about $12,000.

George E. Gratz, Jr., Brooklyn, operating a plant at 1143 DeKalb Avenue, for the manufacture of wrought iron products and specialties, will soon take bids for a one-story addition, 22 x 86 ft. Louis Allmendinger, 20 Palmetto Street, is architect.

The Robert Dollar Steamship Co., 11 Moore Street, New York, will expend about $375,000 for the installation of equipment and refitting of the vessel, Calleo, recently acquired from the United States Shipping Board. The power will be changed from coal-burning to oil-operated.

The Pierce Oil Corporation, 25 Broad Street, New York, has disposed of a bond issue totaling $2,000,000. It operates an oil refinery at Dallas, Tex., with daily capacity of 48,000 bbl. which will be increased to 54,000 bbl.

Ovens, conveying equipment, power apparatus and other mechanical equipment will be installed in the new plant to be erected by the General Baking Co., 45 East Seventeenth Street, New York, on property purchased on 144th Street. The works will aggregate about 180,000 sq. ft. of floor area. William Deininger is president.

The Iroquois Door Co., Bridge and Tivoli streets, Albany, N. Y., has awarded contract to the Feeney & Sheban Building Co., 164 Montgomery Street, for a one-story building, 100 x 100 ft.

The Colonial Steel Co., Pittsburgh, has leased the two and three-story buildings at 149-51 Varick Street, New York, from the Garvin Machine Co., for a factory branch.

The Tide Water Oil Co., 11 Broadway, New York, has leased the first floor of the factory now being erected at Borden Avenue and Van Dam Street, Long Island City, for a new machine and repair shop.

A vocational department will be installed in the junior and high school building to be erected at Pennsylvania Avenue and South Main Street, Elmira, N. Y., preliminary plans for which are under way. Pierce & Bickford, 118 Lake Street, are architects.

The Hamilton Industrial Corporation, Hamilton Street, Albany, N. Y., will build a one-story power house at its new two-story factory, 50 x 240 ft., East Greenbush, N. Y., contract for which has been awarded to the Austin Co., 217 Broadway, New York.

Following the leasing of its car and locomotive repair shops at Hornell, N. Y., and Marion Ohio, the Erie Railroad Co., 50 Church Street, New York, is perfecting arrangements for similar private operation of its shops at Youngstown, Ohio.

The Stowell Mfg. Co., 260 Culver Avenue, Jersey City, N. J., manufacturer of roofing products, has awarded contract to the Turner Construction Co., 244 Madison Avenue, New York, for a two-story, reinforced-concrete building, 75 x 100 ft., to replace a structure recently destroyed by fire.

Christian Feigenspan, Inc., 50 Freeman Street, Newark, N. J., will soon commence the erection of an ice-manufacturing and cold storage plant, totaling about 30,000 sq. ft., at Bishop and State streets, Jersey City, N. J., with initial capacity of approximately 300 tons per day.

F. Bach, 21 Leonard Street, Jersey City, has filed plans for a one-story machine shop.

A vocational department will be installed in the two-story high school, 146 x 262 ft., to be erected at Summit, N. J., for which bids are being taken until Dec. 19. Pamela W. Lyall is secretary of the board.

The Bates Mfg. Co., Lakeside Avenue, West Orange, N. J., manufacturer of numbering machines and parts, has purchased the three-story factory on North Day Street, previously occupied by the Vosburgh Miniature Lamp Co., for a new plant. For some time past the company has been located at the Thomas A. Edison works. It was incorporated recently under state laws with capital of $200,000, to provide for expansion.

A vocational department will be installed in the two-story and basement junior high school at First Avenue and Loomis Street, Elizabeth, N. J., estimated to cost about $700,000. C. Godfrey Poggi, 275 Morris Avenue, is architect.

The Kolb Sheet Metal Works, Newark, has acquired the factory at 175-79 Vanderpool Street, for the establishment of a plant to manufacture blower and exhaust ventilating equipment, heavy metal work, etc. Norman L. Kolb heads the company.

Phineas Jones & Co., 305 Market Street, Newark, manufacturer of automobile bodies, wagons, etc., are taking bids for a one-story plant, 50 x 300 ft., on Hillside Avenue, Hillside, estimated to cost about $300,000, including machinery. William E. Lehman, 738 Broad Street, is architect.

The General Electric Co., Harrison, N. J., has filed plans for the construction of a one-story lamp manufacturing factory at Nineteenth and Springdale avenues, East Orange, N. J., estimated to cost about $12,000, exclusive of equipment.

The Erie Railroad Co., 50 Church Street, New York, has preliminary plans under way for rebuilding its piers at Weehawken, N. J., recently destroyed by fire with a loss of $1,500,000, including freight-handling machinery, etc. R. C. Falconer, company address, is engineer.

The Bell Electric Motor Co., Garwood, N. J., has changed hands and is now being conducted by new officers. Business will be carried on in the same location with increased facilities under the same name.

Chicago

CHICAGO, Dec. 5.

As the last month of the year opens, dealers find current business slightly improved and prospects of orders, particularly from the railroads, considerably brighter. The Illinois Central is preparing a large list of its 1922 needs and the Chicago & North-Western has been working on its 1922 budget for several weeks. Revised quotations are being made on the Santa Fe list, as noted a week ago.

The Rock Island, which has held purchases in abeyance for months, has issued the following list:

One 600-ton hydrostatic driving wheel press, 90 ft. between rails;
Six 60-ton hydrostatic driving box and rod presses;
Eight 36-in. upright drill presses;
One 48-in. heavy duty radial drill for drilling and boring cross heads;
One 1½-in. double head stay bolt cutting machine;
Two 1½-in. triple head bolt cutters;
Three 2-in. double head bolt cutters;
One Universal grinder, 36 in. between centers, with 12-in swing;
Two double car axle lathes;
One 2-in. x 26-in. turret lathe;
One 3-in. x 18-in. turret lathe;
Two 3-in. x 36-in. turret lathes;
One 16-in. tool room lathe;
One 18-in. x 36-in. gap lathe;
Nine 18-in. x 72-in. centers double back geared engine lathes;
One 48-in. steel tired car wheel lathe:
One 26-in. heavy duty shaper;
One 20 x 96-in. double back geared engine lathe;
Five 24-in. double back geared engine lathes, 72 in. between centers;
Two 36-in. double back geared engine lathes, 72 in. between centers;
Four 36-in. x 36-in. x 12-ft. heavy duty planers;
One power hack saw to handle 4 x 4 stock;
One power hack saw to handle 8 x 8 stock;
Eight 18-in x 3-in. Duplex grinders;
Five 16-in. portable engine lathes, 36 in. between centers.

One of the largest orders placed for some time was closed last week by the Hurley Machine Co., Chicago. This company purchased 15 power presses of various sizes, involving a total investment of about $20,000. One of the largest individual orders taken recently was a $4,000 milling machine, bought by a general machine repair shop in this city. One machinery house reports selling the entire equipment for a small manufacturing shop which has been started in this city. The purchase included an engine lathe, shaper, milling machine, grinding machine, two upright drills, punch press, an arbor press and miscellaneous small equipment.

The G. A. Ball Bearing Co., Lake and Albany streets, Chicago, has let contract for a one-story plant, 124 x 163 ft., at 3305-21 West Harrison Street, to cost $50,000.

C. Schroeder, 5007 North Winchester Avenue, Chicago, has let contract for a one-story machine shop, 50 x 125 ft., at 2633-35 Belmont Avenue, to cost $10,000.

The Shakeproof Screw & Nut Lock Co., 404 Wrigley Building, Chicago, has been incorporated to manufacture shakeproof nut and screw lock washers. The product was designed to meet the need for a lock washer which will positively hold nuts and screws under excessive vibration. The company proposes to lease a plant for the present and will be in the market for 25 to 30 power presses. The officers include H. R. Hough, president; W. L. Stickney, vice-president; and R. T. Hosking, secretary.

The Progressive Mfg. Co., 2812 North Avenue, Chicago, has been incorporated with $20,000 capital stock to manufacture a bench sheet metal shear and a combined center finder and center drill for machinists. It has leased a plant

at the address given and is fully equipped for the time being. The officers include Alfred K. Johnson, president; Gustav E. Schmidt, secretary; and Ernst Schmidt, treasurer.

W. Edwards & Co., Inc., has let contract for a one-story garage, 75 x 224 ft., 3731-39 Broadway, Chicago, to cost $60,000.

The State Board of Control, Capitol, St. Paul, Minn., has taken bids on a three-story metallurgical laboratory on the State University campus, to cost $225,000.

The Common Council, Shelbyville, Ill., will hold in abeyance the erection of its municipal electric power plant, estimated to cost about $75,000, and will call for bids next spring. Fuller & Beard, Railway Exchange Building, St. Louis, are engineers.

A vocational training department will be installed in the new high school building to be erected by the Board of Education, Chadron, Iowa, estimated to cost $180,000.

H. C. Christensen, architect, 7258 Union Avenue, Chicago, is taking bids for an ice-manufacturing plant, 125 x 250 ft., at Talman Avenue and Twelfth Street, estimated to cost in excess of $250,000. The owner's name will be announced later.

The Commonwealth Edison Co., 72 West Adams Street, Chicago, has made application to the Public Service Commission for permission to issue stock to an amount of $535,000, the proceeds to be used for general operations, extensions, etc.

The Keith Furnace Co., 326 South Eleventh Street, Des Moines, Iowa, will hold in abeyance the construction of its new plant at East Twenty-sixth Street and Dean Avenue, estimated to cost about $250,000. Foundation work has been started and erection of the superstructures will begin early in March. Boyd & Moore, 314 Securities Building, are architects.

The Bergman & Henkens Co., Omaha, Neb., has awarded a contract to P. Kiewitz & Sons, Omaha National Bank Building, for a two-story foundry, 60 x 60 ft., at Eleventh and Grace streets, estimated to cost about $42,000. Work will commence at once.

Philadelphia

PHILADELPHIA, Dec. 5.

The Philadelphia Electric Co., Main and Chestnut streets, Philadelphia, has disposed of a bond issue of $12,500,000, the proceeds to be used for general operations, plant extensions and improvements, etc. Joseph B. McCall is president.

The Department of Public Works, Bureau of Highways, Philadelphia, has broken ground for a one-story machine shop, 61 x 150 ft., at Delaware and Fairmount avenues, estimated to cost close to $30,000.

The machine shop and equipment of the James Carr Co., Philadelphia, has been acquired by the Rusfel Mfg. Co., of the same city, for increased manufacture of precision grinding lathes, tools, etc.

The Longacre Park Ice Co., Yeadon, Pa., care of S. L. Brumbaugh, 1427 Walnut Street, Philadelphia, is completing plans for a one-story automobile service and machine repair works at Yeadon, 32 x 164 ft., and 32 x 32 ft., respectively, for company trucks, estimated to cost about $45,000. J. T. Hoekstra, 1713 Sansom Street, Philadelphia, is architect.

A vocational department will be installed in the three-story and basement high school, 180 x 180 ft., to be erected by the Board of Education, Atlantic City, N. J., and it is estimated to cost close to $1,000,000, including equipment. John T. Rowland, Jr., 100 Sip Avenue, Jersey City, and H. A. Stout, Guarantee Trust Building, Atlantic City, are associated architects.

A one-story power house will be erected in connection with the three-story State normal school, 138 x 300 ft., by the State Board of Education, Trenton, N. J., on Mullican Hill Road, Glassboro, N. J. Guilbert & Betelle, 665 Broad Street, Newark, are architects.

The Chicago Bridge & Iron Works, Greenville, Pa., will devote a portion of its local plant to the manufacture of oil storage tanks for the Sinclair Crude Oil Purchasing Co., New York. The order covers 50 80,000-bbl. tanks.

A sale of the plant and property of the Lehigh Machine Co., Lehighton, Pa., will be held on Dec. 12.

A vocational department will be installed in the three-story junior high school, 230 x 340 ft., to be erected at New Castle, Pa., estimated to cost $650,000. W. G. Eckles, Lawrence Savings & Trust Building, is architect.

The Board of Trustees, State Hospital for the Insane, Norristown, Pa., will receive bids until Dec. 13 for an electric truck and trailer. W. W. Hibbert, 415 Penfield Building, Philadelphia, is engineer. Oscar L. Schwartz is steward in charge.

The Spring City Glass Works, Spring City, Pa., will soon take bids for a one-story machine shop, 25 x 50 ft., estimated to cost about $15,000. J. Vincent Poley, 162 Second Avenue, Royersford, Pa., is architect.

Fire, Nov. 30, destroyed the machine, forge and woodworking shops at the mines of the Centralia Lehigh Valley Coal Co., Mahanoy, Pa., with loss estimated at $25,000. The plant will be rebuilt.

New England

BOSTON, Dec. 5.

The local machine-tool market, which in the latter part of November displayed little life, has revived somewhat. Actual and prospective business, however, is limited, and calls for deliveries at points usually north of Boston. In central Massachusetts, Rhode Island and Connecticut things appear at a standstill on the surface, but considerable quiet looking about is going on which it is felt will develop into something tangible early in the year. Sales by local dealers the past week, while limited, were of sufficient proportions to impart encouragement and the belief that December will be more profitable than anticipated.

Buying interest centers largely in lathes. Next to lathes, milling machines have the best call and there is some inquiry for shapers and one or two-spindle drills, but on the general run of machine-tools inquiries and sales are only occasionally reported. One large Massachusetts manufacturer is in the market for 10 12-in. x 5 ft. geared head lathes for immediate delivery and possibly will materially increase the number of machines bought. In this case it is reported the buyer will not consider more than three makes. A textile machinery maker has purchased a 3-ft. radial drill and is inquiring for a single-spindle five-hole turret full automatic screw and stud forming machine, while a Greenfield manufacturer is negotiating for four to six used milling machines, and a local dealer is looking for a universal milling machine, shaper and upright drill, all used equipment, for a prospective customer.

Flat drill sockets and taper sleeves have been reduced approximately 5 per cent. Critchley reamers are quoted about 10 per cent lower.

The Billings & Spencer Co., Hartford, has issued a new discount sheet which shows machine wrenches 10 per cent lower, adjustable wrenches 5 to 12 per cent, wrench sets 10 per cent, and dogs 10 per cent. Tool kits and tool makers' hammers, formerly quoted at 33⅓ per cent discount, are now 40 per cent.

Plans are being drawn for a two-story, 70 x 128 ft. sales and service station on Commonwealth Avenue, contemplated by Owen F. Farley, 27 State Street, Boston.

The Eastern Metal & Refining Co., Boston, has abandoned its projected one-story, 43 x 160 ft. manufacturing building at 30 Commercial Street.

Plans have been drawn for a one-story, 60 x 100 ft. plant on Connecticut Boulevard, East Hartford, Conn., for the Charter Oak Machine Co., 438 Asylum Street, Hartford.

The Market Forge Co., Garvey Street, Everett, Mass., will erect a two-story addition and make alterations in the original plant.

C. N. James, 139 Brookline Street, Cambridge, Mass., automobile wheels, has awarded contract for a one-story, 100 x 122 ft. addition.

Equipment is being installed in the Hartford fire department's new machine shop and general service station on John Street. Lathes, drill presses, milling machines and grinders are in operation.

The New York, New Haven & Hartford Railroad has completed plans for the erection of a coal pocket at New Haven, to cost approximately $58,000. An electric hoist is included in the equipment wanted.

Work has been started by the Easthampton Foundry, Easthampton, Mass., on its new plant on Lake Street. During construction the company will have its castings made in Florence, Mass.

The Middletown Firearms & Specialty Co., Middletown, Conn., has transferred to Oscar B. Welker a building and land on Warwick Street, together with shafting, pulleys, etc., which will be used for manufacturing purposes.

The Cumberland County Power & Light Co., Portland, Me., is tentatively considering the construction of an auxiliary steam power plant on the east side of the Portland bridge. Plans call for the installation of two 5000-kw. steam turbine generator units.

An automobile service and repair building, 60 x 88 ft., will be constructed at 23-25 Fitchburg Street, Somerville, Mass., by the Great Atlantic & Pacific Tea Co., 150 Bay Street, Jersey City, N. J.

e Malden Electric Co., Malden, Mass., has awarded ıct to the Hudson Construction Co., 6 Beacon Street, n, for a one-story power house, 63 x 66 ft., at Everett, ., estimated to cost about $65,000.

ıe Shawmut Machine Works, Inc., 81-83 Elmwood Street, Boston, has filed plans for a one-story machine shop, estimated to cost about $20,000.

he Farmington River Power Co., Windsor, Conn., is having plans prepared for the erection of a new hydroelectric power plant, with initial capacity of about 12,000 hp. I. W. Jones, Milton, N. H., is engineer.

The Windham Mfg. Co., South Windham, Me., is completing plans for the construction of a hydroelectric power plant. Arthur P. Safford, 66 Broadway, Lowell, Mass., is engineer.

A one-story automobile service and repair building, 63 x 95 ft., for company trucks will be built by the General Baking Co., Roxbury, Mass. The Scully Co., East Cambridge, Mass., has the contract.

Pittsburgh

PITTSBURGH, Dec. 5.

There have been fewer inquiries and sales of machine tools and equipment the past week, but this is regarded as merely a seasonal development, due to the close of the year and the wish of prospective buyers to avoid spending money, with inventory taking immediately at hand. Prospective business is good and the belief still prevails that the new year will bring some orders.

The only crane business lately placed was a 15-ton, 40-ft. span overhead for the Wheeling Mold & Foundry Co., Wheeling, W. Va., which went to the Champion Engineering Co., Kenton, Ohio. This crane is for installation at the old plant of the Wheeling Steel Castings Co., Warwood, W. Va., purchased early in the year by the Wheeling Mold & Foundry Co., and which is being enlarged for making chilled iron rolls. Four crane companies are figuring on a 75-ton crane, but the identity of the prospective buyer is kept secret. There are a number of similar instances where buyers have sent out their inquiries to a selected list of manufacturers most likely to provide the kind of crane wanted, but the question naturally arises as to whether the lowest possible price can be obtained when the number of bidders is limited. Apparently, buyers do not suffer from this practice, because they always have recourse to submitting inquiries elsewhere if the original bidders do not make a satisfactory price. Nothing yet has developed in connection with cranes inquired for by the Standard Underground Cable Co., Pittsburgh, and the Sanderson Cyclone Blower Co., Orrville, Ohio, which have been looked upon as likely to be closed at an early date.

Max Solomon, Pittsburgh, scrap iron and steel, is laying out a storage yard at Wheatland, just outside Sharon, Pa., and is inquiring for two 25-ton yard cranes.

The National Tube Co., Pittsburgh, is in the market for two jib cranes, 5 and 7½ tons respectively. The Mackintosh-Hemphill Co., 1227 Liberty Avenue, will install a 5-ton crane at its plant.

Some steel mill equipment is being bought and some good business is pending. The Jones & Laughlin Steel Co. recently placed with the General Electric Co., through its Pittsburgh office, a direct connected motor for driving a Morgan continuous mill at its Aliquippa works. It is expected that the Wheeling Steel Corporation soon will close for a uniflow engine for driving a 19-in. continuous mill and for a reversing twin tandem engine for driving a 35-in. blooming mill, both for installation at the Steubenville, Ohio, works. The Worthington Pump & Machinery Corporation is low bidder for a 2,000,000-gal. pumping engine for the waterworks of the Borough of Tarentum, Pa. Another waterworks project attracting interest is that of the city of Cleveland. Bids were opened Dec. 1 for eight turbine driven centrifugal waterworks pumps.

The National Fireproofing Co., Fulton Building, Pittsburgh, will rebuild by day labor its plant at East Palestine, Ohio, partially destroyed by fire. The main building will be one-story, 200 x 200 ft., and is estimated to cost about $50,000.

The United States Lock Nut Corporation, 400 Michigan Avenue, Chicago, has tentative plans under way for a new factory at Pittsburgh, estimated to cost $500,000.

The Proctor Coal Co., Huntington, W. Va., is planning the construction of a new tipple in the vicinity of Amherstdale and the installation of considerable electrical and other mining machinery, estimated to cost $200,000. A. J. Dalton is president.

The Community Power Co., Petersburg, W. Va., has made application for permission to construct a dam and hydroelectric power plant across the South Branch of the Potomac River, near Petersburg. A. J. Welton represents the company.

The Steel City Automobile Co., Pittsburgh, local representative for the Peerless automobile, has leased the five-story building, 60 x 137½ ft., at 3968-70 Forbes Street, to include service and repair departments.

A vocational department will be installed in the new high school to be erected by the Board of Education, McKeesport, Pa., estimated to cost about $300,000.

The Tyler Pipe & Tube Co., Washington, Pa., has completed plans for the erection of a one-story power house and producer plant, 25 x 50 ft., and 50 x 50 ft., estimated to cost $50,000, including machinery. The Simplex Engineering Co., Washington Trust Building, is engineer.

Milwaukee

MILWAUKEE, Dec. 5.

The gradual enlargement of operations by foundries and machine shops, due to improvement in orders, has imparted unusual interest to the trade, especially as activity ordinarily declines as the year comes to a close. While buying has been only slightly affected by the increased operations prospects appear considerably improved and manufacturers and dealers look for one of the best months of the year in December, with a new year outlook much improved in comparison with last year. Major industries are establishing gains in unfilled orders.

By Dec. 1 the value of building permits issued by the city of Milwaukee had exceeded those issued in the entire year of 1919, which marked the previous high record. So far this year the aggregate value of permits is $23,403,205, while for all of 1919 it was $23,366,077.

The village of Eagle River, Wis., adopted a bond issue of $20,000 for the purchase of additional generating equipment for installation in the municipal hydroelectric generating plant. An engineer will be selected at once.

The American Hide & Leather Co., 1320 Elston Street, Chicago, is taking bids at Milwaukee through Lockwood, Greene & Co., consulting engineers, 38 South Dearborn Street, Chicago, for the erection and equipment of a new plant estimated to cost $500,000. It will replace the Milwaukee tannery at 658 Commerce Street, destroyed by fire early in September. The main building will be 260 x 315 ft., three stories and basement. The project involves replacement of virtually all tanning machinery, power plant equipment, coal and ash handling machinery, boilers, etc. G. A. Riker is local manager at Milwaukee.

The Milwaukee County Board of Supervisors, W. J. Cary, county clerk, has engaged Vaughn & Meyer, consulting engineers, 209 Grand Avenue, Milwaukee, to prepare plans and specifications for a central light, heat and power plant for the group of county institutions at Wauwatosa. The cost is estimated at $250,000 with equipment. W. L. Coffey is manager of county institutions.

The Wisconsin Wagon Co., 115 South Carroll Street, Madison, Wis., has let the general contract to A. D. & J. O. Frederickson Co., local for a three-story factory, 50 x 132 ft., to replace the one destroyed by fire recently. It will cost about $50,000, including equipment.

The Maxon Co., Milwaukee, has been incorporated with a capital stock of $75,000 to manufacture machinery, tools, mechanical appliances, etc. The incorporators are Glenway Maxon, Jr., 366 Kane Place, George F. Luecking, 729 Fourth Street, and Glenway Maxon, Sr., 27 Mack Block, Milwaukee. It intends to lease space and engage in the production of patented tools designed by Glenway Maxon, Jr. Further details will be issued later.

F. C. Seeger, Milwaukee, is equipping a small shop at 660-662 Third Street, for the production of sheet metal work.

The E. L. M. Tire Co., Racine, Wis., has plans for a new tire and rubber goods factory, 150 x 160 ft., two stories and part basement, estimated to cost $100,000. Work probably will not begin until April 1. O. W. Dunham is secretary.

The Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., is inquiring for a bucket elevator conveyor system, blower fan heating system, water screens and other special equipment for a $125,000 addition to its plant at Biron, Wis., now under construction. L. A. DeGuere, local, is architect and consulting engineer.

The Milwaukee Parts Corporation, Wauwatosa, Wis., has been organized with a capital stock of $50,000 to manufacture, axles, tools, machinery and mechanical appliances. It takes over the business of the Wisconsin Gear & Axle Co., which has conducted a machine shop at State Street and Hawley Road. The incorporators are John L. Michalski, 677 Grove Street, Louis Scheible, 475 Nineteenth Street,

Milwaukee, and Alfred J. Tank, secretary Wisconsin Gear & Axle Co., Wauwatosa.

The Federal Safety Mfg. Co., Milwaukee, has been incorporated with a capital stock of $5,000 to manufacture burglar alarm systems, home protection devices, etc. The incorporators are Henry Steurnagel, E. C. Kambe, 425 East Water Street, and John E. Lee, 103 Twenty-eighth Street. It is intended to establish a small shop for experimental purposes and to effect a small production of proved devices.

Detroit

DETROIT, Dec. 5.

Machine tool inquiries in this district have shown some improvement the past week, and dealers report a considerable number of sales of single tools for delivery early next year.

The Detroit Marine Aero Engine Co. has been organized and will have its headquarters in Highland Park. Among those interested are A. A. Schantz, president Detroit & Cleveland Navigation Co.; Gar Wood and J. Lee Barrett, of the Wood Hydraulic Hoist & Body Co.; O. F. Barthel and Fred R. Hill, all of Detroit, and Carl G. Fisher and James A. Allison, Indianapolis.

It is reported that Frank W. Ruggles, president Ruggles Motor Truck Co., Saginaw and Bad Axe, Mich., will take over the plant of the defunct Bolistrom Motors, Inc., St. Louis, Mich., and operate it in conjunction with the wheel plant of the Ruggles company in Alma, Mich.

The Michigan Hardware Co., Grand Rapids, Mich., has awarded contract for its three-story addition to cost $35,000. The present building is 100 x 100 ft.

The Reed Foundry & Machine Co., Kalamazoo, Mich., has awarded contract to Miller & Boyer for a machine shop 100 x 120 ft., one story. It will be of saw tooth type and consist of four units, each 30 x 100 ft. Work will be rushed on the initial units, which are expected to be ready for occupancy by Feb. 1. Contracts for equipment are being placed

The Outagamie Limestone Co., 75 Thirtieth Street, Milwaukee, is having plans prepared for a new plant at Black Creek, Mich., the equipment to include quarrying, crushing and other machinery, estimated to cost close to $200,000. H. O. Welden, 10 South La Salle Street, Chicago, is engineer.

A vocational training department will be installed in a two-story central high school to be erected by the Board of Education, Flint, Mich., at a cost of $1,250,000. Bids will be taken at once. Malcolmson, Higginbotham & Palmer, Moffat Building, Detroit, are architects and McColl, Snyder & McLean, 2348 Penobscot Building, Detroit, engineers.

The Standard Auto Co., 648 Bridge Street, N. W., Grand Rapids, Mich., has awarded contract to F. Burgstahler & Son, 527 Fremont Street, N. W., for a two-story service and repair building, 102 x 130 ft., at Bridge and Gold streets, N. W., to cost about $30,000.

The Board of Water & Electric Light Commissioners, Lansing, Mich., will receive bids until Dec. 15 for the construction and equipment of a new municipal electric power plant. The installation will include a locomotive crane, bridge crane, coal and ash-handling machinery, steam turbo-generator and auxiliary electric machinery, condensers, feed-water equipment, etc. J. E. Woodwell, 501 Townsend Street, Lansing, is consulting engineer. O. E. Bulkeley is superintendent.

The Otsego Angle Steel Co., Plainwell, Mich., has construction under way on a one-story plant, 45 x 200 ft.

Indiana

INDIANAPOLIS, Dec. 5.

Sales of machine tools show little improvement the past week. The Link-Belt Co. recently purchased a 42-in. vertical boring mill for its Indianapolis plant, and the Interstate Car Co., which has been inquiring for a vertical boring mill, 5-ft. radial drill and a No. 3 universal milling machine, has withdrawn its inquiry.

Used machine tools continue to find favor, and a number of cases are noted where inquiries for new tools have been withdrawn after the buyer became aware of the great difference in price. Used drill presses and cylinder grinders are most in demand.

The Butler Mfg. Co., 3234 West Washington Street, Indianapolis, is inquiring for a machine to turn the relief of automobile piston bosses.

The Central Machine Works, Indianapolis, Ind., is looking for a used horizontal boring, drilling and milling machine with a 3 to 4-in. bar vertical adjustment to the spindle and cross feed to the work table.

The Speedway Engineering Co., 910 North Illinois Street, Indianapolis, has an inquiry out for a used No. 2 universal milling machine.

The American Machinery Corporation, 334 North Capitol Avenue, Indianapolis, is inquiring for a used Fischer oil groover and a new automatic brass rod polishing machine to polish brass tubes 30 in. long and 1½ in. in diameter.

The Victor Bearings Co., 202 South Pennsylvania Street, Indianapolis, manufacturer of ball bearings, etc., will erect a one and two-story plant, 120 x 151 ft., estimated to cost about $50,000. W. L. Sandage is president.

The Haskell & Barker Car Co., Michigan City, Ind., is taking bids for a one-story addition to its foundry and power plant, estimated to cost close to $500,000, including machinery. Frank D. Chase, Inc., 545 North Michigan Avenue, Chicago, is architect and engineer.

A one-story power house will be erected by the Storms Novelty Works, Winchester, Ind., in connection with its two-story plant, 50 x 100 ft., now in course of erection.

The Indiana Hydro-Electric Power Co., Indianapolis, has been granted permission to issue bonds for $1,250,000 and stock for $4,500,000, the proceeds to be used for general operations and the construction of hydroelectric generating plants on the Tippecanoe River. The company was recently organized. Plans are being prepared by John A. Shafer, engineer, Indianapolis. Harry Reid, president Interstate Public Service Co., Indianapolis, is vice-president and general manager.

The Marion Foundry Corporation, Marion, Ind., has established headquarters at Auburn, Ind., and in the future will operate at the latter place.

J. W. Johnson, Kokomo, Ind., and associates have purchased the plant of the Liberty Pressed Metal Co., Kokomo, at a receiver's sale. The new owners are planning to operate the works.

Ohio

Some Cleveland dealers state that their aggregate sales during November were a little better than in October, but with others business fell off. As a whole it is probable that November was no better or worse than the previous month. Single too inquiries hold up fairly well, but the placing of much prospective business will probably be deferred until after the first of the year. The only railroad inquiry is from the Big Four for a 300-ton car wheel press for its Linndale shops.

Used machinery in large quantities is still coming on the market. The General Motors Corporation is collecting used tools from its various units at the old plant of the Northway Motor & Mfg. Co. in Detroit, which it will place on the market through dealers. It is reported that this equipment will amount to from 1500 to 1600 machines, much of it being in very good condition. The Standard Parts Co. is placing on the market the equipment of one of its units, the American Ball Bearing plant in Cleveland, which will aggregate from 50 to 100 machines.

In Cincinnati the past week was most encouraging in the machine-tool field, as a number of orders were booked by local manufacturers and inquiries were received from sources which have been inactive for some time. While most of the orders are for single machines, on many inquiries tools built locally are specified, and it is expected that contracts will be placed here. Part of the Virginian Railroad order recently placed was booked with local manufacturers and the probabilities are that this road will shortly issue two more lists for other shops, about 20 tools in all. The Chesapeake & Ohio Railroad is reported to have placed orders for eight lathes with an Eastern manufacturer. This road closed bids on another list Nov. 28, calling for about 20 machines, including eight lathes, five punches and shears and other equipment. It is expected this business will be placed shortly. On the Santa Fe list buying is looked for within a week or two, and other roads now preparing lists of 1922 requirements will probably issue them shortly after the new year. Recent developments in the Southwestern oil fields are expected to furnish some business for machine-tool manufacturers. Local dealers report increased inquiry in both new and used tools and look for orders to develop shortly after the new year.

The Butter Cutter Mfg. Co., Cleveland, was organized recently and is establishing a plant at 5902 Carnegie Avenue to manufacture machines for cutting butter, used largely in hotels. It expects to buy several machine tools.

The Hearing Tool Co., Zanesville, Ohio, has been incorporated with a capital stock of $25,000 to manufacture garage tools and locking and steering wheels. For the present the product will be manufactured in Columbus. S. D. Hearing is president and H. W. Unkel, vice-president.

The Bock Bearing Co., Toledo, has sold its Grand Avenue

plant to Herbert W. Bigelow and will consolidate its activities at its main plant in West Toledo.

The Baltic Bending Co., Sugar Creek, Ohio, has acquired a new site on which it will erect a plant to take the place of one recently burned.

The Sands Mfg. Co., 5407 Sweeney Avenue, Cleveland, maker of water heaters, etc., plans the erection of a forge shop 35 x 100 ft.

The Willys-Overland Co., Toledo, Ohio, will move its Willys-Knight motor assembling plant from Elyria, Ohio, to Pontiac, Mich., where production will be concentrated, owing to the fact that motor castings are being made at the plant of the Wilson Foundry & Machine Co. in Pontiac. The Elyria plant will be used for other purposes.

The E. W. Bliss Mfg. Co., St. Clair Avenue, Cleveland, manufacturer of presses and other machinery, is planning for the erection of a one-story forge shop, estimated to cost about $42,000.

A vocational department will be installed in the two- and three-story high school, 115 x 170 ft., now being erected by the Board of Education, Alliance, Ohio, estimated to cost about $400,000.

The plant of the Marion Die, Tool & Machine Co., Marion, Ohio, is being moved to Mount Vernon, Ohio, where it will be consolidated with the C. & G. Cooper Co.

The Gulf States

BIRMINGHAM, Dec. 5.

The Common Council, Vernon, Tex., is perfecting plans for a municipal electric light plant to cost about $65,000. An ice-manufacturing plant is also being considered. A bond issue of $100,000 is being arranged.

The Decatur Ice & Cold Storage Co., Decatur, Ala., is completing plans for an ice and cold storage plant, 34 x 55 ft. T. J. Jones is manager.

Following the acquisition of the plant and equipment of the Talladega Foundry & Machine Co., Talladega, Ala., by Morris W. Bush and associates, Birmingham, the new owners are said to be planning the organization of a company under the name of the Talladega Pipe Co., capitalized at $100,000, to operate the plant. A section of the works has been placed in service and it is proposed to begin production in other departments at an early date.

In connection with the establishment of a gravel plant the Thomas Gravel Co., Alexandria, La., will install two steam shovels, two industrial locomotives, dump cars and other miscellaneous equipment. The company was incorporated recently with a capital of $140,000. I. L. Thomas is general manager and R. C. Baker, treasurer and secretary.

The Magnolia Petroleum Co., Dallas, Tex., has acquired about 165 acres at Mexia, Tex., for the establishment of an oil tank farm.

Ira P. De Loach, Dallas, Tex., has filed plans for a three-story automobile service and repair building at 2113-23 Main Street, estimated to cost $102,000.

The Uvalde Rock Asphalt Co., 1113 Central Trust Building, San Antonio, Tex., will build a one-story machine shop and automobile service works, 50 x 100 ft. J. B. Smythe is president.

A vocational department will be installed in the new high school to be erected by the Board of Education, Amarillo, Tex., bonds for which in the amount of $220,000 recently have been voted. Plans will be prepared soon.

The Chamber of Commerce, Rockdale, Tex., is organizing a company to establish a plant for the manufacture of water filters and kindred products. Patents held by Jones & Moore, Rockdale, who will be interested in the new company, will be taken over. It will be capitalized at $50,000.

Adam J. Walz, Fort Mason, Tex., is organizing a company to establish a plant for the manufacture of bricks, etc. A pressed brick department will be installed.

Nelson & Wofford, Gadsden, Ala., have completed plans for a one-story machine shop and automobile repair works, 40 x 125 ft.

The Board of City Commissioners, Mobile, Ala., has preliminary plans under consideration for a municipal electric light and power plant.

The Dallas Co-Operative Ice & Mfg. Co., Dallas, Tex., has plans under way for an ice-manufacturing plant to cost about $75,000.

The action for a receivership for the Southern Motors Mfg. Co., Houston, Tex., has been dismissed. The company will resume operations and plans an extensive production schedule.

The Houston Power Co., Dothan, Ala., has plans under way for the construction of a hydroelectric generating plant on the Choctawhatchee River, Dale County. The initial installation will be about 2000-hp.

A vocational department will be installed in the three-story high school to be erected at Uniontown, Ala. Frank Lockwood, Montgomery, Ala., architect, will prepare plans and specifications.

Buffalo

BUFFALO, Dec. 6.

The Carbo-Oxygen Co., Pittsburgh, has construction under way on new works at Buffalo to manufacture commercial oxygen and hydrogen and will enlarge its plants at Bayonne, N. J., Coraopolis, Pa., Cleveland and Columbus, Ohio, establishing a complete oxygen works at each location. To carry out the project, the company has arranged for a preferred stock issue of $2,000,000. J. C. Trees is president and J. R. Rose, vice-president.

The Syracuse Lighting Co., Syracuse, N. Y., has disposed of a preferred stock issue totaling $500,000, the proceeds to be used for general operations, extensions, etc.

In connection with a project for the construction of an electric railroad from Buffalo to Wellsville, headed by C. A. Finnegan, 339 Washington Street, Buffalo, owner of the Buffalo & Wellsville Railroad, new rails and splices are estimated to cost $300,000; electric lines and poles, $200,000; electric booster stations, $60,000, and equipment, $125,000. The right of way will comprise the abandoned roadbed of the Buffalo & Wellsville road. A company will be organized and bonds for $1,000,000 issued.

A one-story cold storage plant will be constructed by the New York State College of Agriculture, Cornell University, Ithaca, N. Y. Lewis F. Pilcher, Capitol Building, Albany, N. Y., State architect, has completed plans.

The Adams Basin Electric Light & Power Co., Ogden, N. Y., has made application to construct a local electric power plant.

An automobile service and repair building will be constructed by the National Biscuit Co. in connection with its two- and five-story plant at Buffalo, contract for which has been awarded to the Thompson-Starrett Co., 49 Wall Street, New York. The entire plant will cost $1,000,000, including equipment.

A vocational training department will be established in connection with the two-story and basement, high and grade school, 125 x 136 ft., now being erected by the Board of Education, Little Valley, N. Y., estimated to cost about $200,000. Daniel G. McNeill, 80 West Genesee Street, Buffalo, is associate architect for the project.

Baltimore

BALTIMORE, Dec. 5.

The Curran Motor Radiator Co., 401 Calvert Building, Baltimore, will soon take bids for its one-story plant, 40 x 180 ft., estimated to cost about $30,000.

The Baltimore & Ohio Railroad, Baltimore and Charles streets, Baltimore, has commenced the erection of a one-story ice manufacturing plant at Evitt's Creek, Cumberland, Md., estimated to cost $150,000, including machinery. H. A. Lane is chief engineer.

The Board of Police Commissioners, Baltimore, is completing plans for a one-story automobile service and repair building to cost $30,000. O. Eugene Adams, Calvert Building, is architect.

The S. B. Sexton Stove & Mfg. Co., 501 West Conway Street, Baltimore, has commenced operations at the former plant of the Isaac A. Sheppard Co., Excelsior Stove Works, Chester and Eastern avenues, recently acquired at a receiver's sale. It will also continue its present works.

The Canton Co., Commerce and Water streets, Baltimore, will build a one-story power house, 40 x 70 ft., at Third and Sixteenth streets.

Fire, Dec. 1, destroyed a portion of the plant of the Parker Metal Decorating Co., North Avenue and Gay Street, Baltimore, with loss estimated at $100,000, including equipment.

A vocational department will be installed in the high school to be erected at Clifton Park by the Board of Education, Baltimore, estimated to cost about $500,000. Preliminary plans are being drawn and bids will be asked early in the new year. Dr. Henry S. West is superintendent.

The Bureau of Yards and Docks, Navy Department, Washington, will install new equipment at its power house at Bellevue, D. C., under specification No. 4497.

The Town Council, Springfield, is having plans prepared for the installation of a municipal electric lighting plant.

The Agricultural and Technical College for Negroes, Greensboro, N. C., will build an automobile mechanics building, with machine shop and other departments, and agricultural experiment building, estimated to cost $100,000. M. C. S. Noble is chairman of the building commission. Harry Barton, Greensboro, is architect.

A one-story power house will be constructed by the Board of Education, Winston-Salem, N. C., in connection with the new four-story Reynolds academic arts school building, 160 x 250 ft. R. H. Latham is superintendent of public instruction.

The Skaggs Brothers Electric Co., Hillsville, Va., will build a new hydroelectric generating plant on Little Reed Island Creek, for commercial light and power service.

A vocational department will be installed in the new two-story and basement Yorkville high school, 81 x 168 ft., to be constructed by the Board of Education, York, S. C., and to cost about $125,000. Edward & Sayward, Atlanta, Ga., are architects.

The Central South

ST. LOUIS, Dec. 5.

The Kansas City Light & Power Co., Fifteenth Street and Grand Avenue, Kansas City, Mo., has commenced excavations for a one-story and basement power house, 50 x 140 ft., at 1110-12 Baltimore Avenue.

The Decker Machine & Tool Co., Okemah, Okla., recently organized with a capital of $75,000, is arranging for the establishment of a plant, to include a machine repair department for oil-well and other equipment. A branch works at Henryetta, Okla., is also being considered. Harry C. Decker and R. C. Johnson head the company.

The Dewey Portland Cement Co., Mutual Building, Kansas City, Mo., has awarded a contract to the MacDonald Engineering Co., 53 West Jackson Boulevard, Chicago, for an addition to its plant at Dewey, Okla., to cost about $60,000.

The Southern Electric Mfg. Co., P. O. Box 435, Bristol, Tenn., has leased a local building for the manufacture of electric fuses, plugs, cut-outs and kindred specialties. The machinery installation will include punch presses, sensitive drill presses, bench tools, etc. William M. Nelson is general manager.

The Board of Education, Memphis, Tenn., has awarded contract to R. S. Wilkes, 80 North Main Street, for the erection of a one-story mechanical shop addition at the Crockett Technical High School.

The Common Council, Columbia, Mo., is planning for enlargements and improvements in its municipal electric lighting plant, to cost about $40,000. Additional equipment will be installed.

The Coline Oil Co., Ardmore, Okla., has acquired about 40 acres, near Ardmore, for the establishment of a tank farm, the initial installation to comprise 25 steel storage tanks, each of about 55,000 bbl. capacity.

A one-story ice and cold storage plant, estimated to cost close to $45,000, will be constructed by the Goodner-Mitchell Produce Co., Tulsa, Okla. It will be 95 x 100 ft.

S. T. Odell, Johnson City, Tenn., will break ground at once for a one-story and basement wagon and carriage shop, 42 x 162 ft., to cost about $25,000. Mitchel & Gradig, 108 Spring Street, are architects.

The Gray Knox Marble Mills, Knoxville, Tenn., are planning for enlargement and improvements, with the installation of new finishing and other machinery, estimated to cost about $200,000.

A vocational training department will be installed in the three-story and basement junior high school, 100 x 134 ft., to be erected by the Board of Education, Topeka, Kan., estimated to cost about $150,000.

The Mountain Grove Creamery, Ice & Electric Co., Gainesville, Mo., is planning for the construction of a hydroelectric generating plant on the North Fork River to furnish electric service at Gainesville and vicinity.

W. J. Barnhill & Son, Madisonville, Ky., have preliminary plans under way for a two-story machine and automobile repair works, 65 x 165 ft. J. T. Waller, Hopkinsville, Ky., is architect.

The Appalachian Marble Co., Knoxville, Tenn., is arranging an appropriation of about $35,000 for the purchase of additional machinery. A new one-story building will be erected. T. J. Deane is president.

A one-story cold storage plant, 92 x 100 ft., estimated to cost $40,000, will be constructed by the Bazzell-Wright Co., Muskogee, Okla. H. O. Valeur & Co., Phoenix Building, are architects.

California

LOS ANGELES, Nov. 29.

The City Engineering Department, Los Angeles, is preparing plans for a one-story machine shop, 75 x 128 ft., estimated to cost $12,000, exclusive of equipment.

The Red Seal Refining Co., Long Beach, Cal., has acquired property on West Anaheim Street for the erection of a plant, estimated to cost in excess of $600,000, including machinery. H. L. Hagerman is treasurer.

The Kittle Mfg. Co., 643 Santa Fe Avenue, Los Angeles, has construction under way on a one-story plant, 140 x 160 ft., to manufacture sheet metal products, enameled goods, etc., estimated to cost about $65,000, including machinery.

The California Car Co., Richmond, Cal., is completing negotiations with the city officials at Martinez, Cal., for a plant to manufacture automobiles and parts, estimated to cost close to $100,000. It will give employment to about 250. A. D. Bowen is president.

The Central Garage, Santa Ana, Cal., will build a one-story machine repair and service building, 50 x 120 ft., on West Third Street. B. W. McClure is head.

A vocational department will be installed in the new high school to be erected by the Board of Education, Pomona, Cal., estimated to cost about $425,000. Bids will be asked soon.

The Willard Storage Battery Co., San Francisco, is having plans drawn for a two-story building at Second and Stillman streets estimated to cost about $40,000. O'Brien Brothers, 240 Montgomery Street, are architects.

The Hutchinson Lumber Co., Oroville, Cal., has increased its capital from $2,000,000 to $3,000,000, a portion of the proceeds to be used for the completion and purchase of equipment in its box manufacturing plant, saw mill and veneer factory, now in course of erection.

The Cinemaphone Co., Los Angeles, recently organized with a capital of $1,000,000 to manufacture electrical specialties, has commissioned the Austin Co., Los Angeles, to prepare plans for a factory, comprising machine shop, general manufacturing building, electrical laboratory, etc. George J. Webster is president.

Canada

TORONTO, Dec. 5.

Inquiries for machine tools are being received in goodly numbers, many of which will shortly turn into sales. While big lists are still absent orders calling for one or two tools are fairly numerous. On the whole the market is making progress, but dealers do not expect business to reach a normal stage until well into next year. Canadian Railroads have been ordering steel rails, but up to the present there has been but little equipment buying. Small tools are in fair demand for spot delivery, but future buying is out of the question at present.

The Metal Stampings Co., 111 Adelaide Street West, Toronto, Ont., is in the market for the following equipment for immediate delivery: Three spinning lathes, 28-in. swing, 6-ft. bed; three buffing spindles; two foot presses with deep throat for riveting; one automatic riveting machine with deep throat; 25 to 30-hp. motor, alternating current, 550 volts; rotary shear and one double action Toggle press, 12 to 16 in. stroke 30 in. between uprights.

The Ontario Hydro Electric Commission, University Avenue, Toronto, Ont., will build a hydroelectric system for Yarmouth Township, N. S., at a cost of $115,000.

The London & Port Stanley Railway, London, Ont., is having plans prepared for the installation of additional power units, enlarging terminals, and construction of additional sidings, to cost about $100,000.

The Bishopric Lamp Co., Cincinnati, Ohio, will erect a sulphate plant near Dunkirk, Ont., and has awarded contracts. The project includes power plant, equipped with steam engines, boilers and generators and will cost $100,000.

The Chandler Machinery Co., Chandler, Que., is building an addition to cost $8,000.

R. Patterson, 770 Third Avenue East, Owen Sound, Ont., is interested in a company which proposes to erect a cement manufacturing plant, of four units, with a daily capacity of 4000 bbl.

William R. Whiteway, architect, 1406 Dominion Building, Vancouver, B. C., is preparing plans for trunk and bag factory to cost $30,000.

The Frost Steel & Wire Co., Ltd., Hamilton, Ont., is asking for a 15,000 lb. Olsen wire testing machine, motor driven, with autographic register.

The Beaver Truck Corporation, Hamilton, Ont., has taken over the plant and business of the Beaver Motor Truck Co., and extensive developments are planned. It proposes to produce a new model truck of 1¼ tons.

The Weeks Engineering Corporation, a United States organization, has decided to establish a plant at Welland, Ont. It is taking over the works of the Welland Machine & Foundries and will install machinery for the manufacture of boiler plates, etc. Additional buildings will be erected next spring on the site, which comprises about 4 acres.

Seattle

SEATTLE, Nov. 29.

The Minnaugh Lumber Co., Wallowa, Ore., has applied for permission to construct a hydroelectric generating plant on the Wallowa River for general mill service.

The Mack International Motor Corporation, Seattle, has awarded a contract to the Great Northern Construction Co., New York Building, for a one-story service and repair building, estimated to cost about $100,000.

A vocational department will be installed in the new high school building to be erected by the Board of Education, Kelso, Wash. Plans are under way.

Loading, unloading and conveying equipment, etc., will be installed at the dock of the Inman-Poulsen Lumber Co., Portland, Ore. Plans have been drawn for an extension to the present dock for a structure 45 ft. wide and 450 ft. long, and for the construction of a new dock in the same section, 35 x 300 ft.

The City Council, Seattle, is considering extensions and improvements in the municipal power plant and system during the next 24 months, to cost $1,500,000.

The Chehalis Box, Basket & Veneer Co., Chehalis, Wash., has completed plans and will immediately rebuild its plant, recently destroyed by fire with an estimated loss of $50,000, including machinery. L. J. Sticklin is president.

O'Brien Machinery Co. Improvements

The O'Brien Machinery Co. now occupies new offices and show rooms at 113 North Third Street, Philadelphia, Pa. The company was formerly located at 119 North Third Street. Its new home is in a five-story building which was recently purchased for its exclusive use. Extensive improvements have been made in the building. The entire five floors have been well shored and braced, so that each can be used for the display or repair of equipment. The new and increased space afforded by the building enables the company to departmentalize its business, electric motors, dynamos and generators being shown on one floor, small and moderate-sized machine tools on another, heavy tools on another, etc. One floor is devoted to the repair, re-winding, baking and testing of electrical equipment. On the ground floor heavy racks have been erected for the display of motors, etc. A fully equipped machine shop for repairs is a feature.

An elevator has been installed and on each floor is a two-ton chain hoist on trolley and I-beam to facilitate the handling of machinery. Modern conveniences of every kind have been installed, and throughout the building the company has followed out the idea of having plenty of light. Each floor is painted white, trimmed with gray, making the building an attractive one in which to work and receive visitors.

The company has offices double the size of the old offices, these being newly equipped. It will carry a larger stock than in the past in view of its increased facilities. It will retain its warehouses where surplus stock is stored.

The O'Brien Machinery Co. was formed six years ago by two brothers, Frank L. O'Brien and Clarence J. O'Brien, both of whom were well versed in the buying and selling of new and used power and machine shop equipment. Both are active in the conduct of the business. They believe that the heavy expenditure, during a dull period, involved in remodeling a building from top to bottom for their uses will be justified by a large volume of business in the near future. The new establishment is open to inspection. Both new and used equipment are shown.

Directors of the Wheeling Steel Corporation at a meeting Nov. 30 reduced the dividends of the preferred A. and B. stocks. The former was cut from an annual rate of 8 to 4 per cent and the latter from 10 to 5 per cent. The action was deemed necessary, officials said, in order to conserve the company's resources, as a result of the business depression which has made the steel business unprofitable for the past several months. The common stock dividend again was passed. The preferred dividends are payable Jan. 2.

IRON AND INDUSTRIAL STOCKS

Buying Power Outweighs Selling and Tendency of Prices Is Still Upward

As is usual at this time of the year, evidences of profit-taking are noted in the market for iron and industrial stocks. Such selling, however, is outweighed by buying with money not needed in the ordinary business operations, and the trend of security values, generally, is still upward. Special strength is shown of late in such issues as General Electric, American Car & Foundry, and Worthington Pump, denoting investment confidence in a wider variety of industries. The market for steel shares is irregular, with the underlying strength of United States Steel common the outstanding feature. That corporation's 5 per cent sinking fund bonds recently sold at par, for the first time in a number of years. Recent buying of copper stocks is reflected in November sales, amounting to 160,000,000 to 170,000,000 lb., a new high monthly record for 1921. Quiet investment buying of the rails and more vigorous of certain equipment securities, resulting in firmer prices, evidently is based on the promulgation by the Railroad Labor Board of 148 new working rules to supplant the national agreements with the railroad shop crafts.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	36⅛ - 38½	Lackawanna Steel.	41⅝ - 48⅞
Allis-Chalm. pf...	85 - 86	Midvale Steel.....	29⅛ - 30¼
Am. Can com.....	31⅛ - 33⅛	Nat.-Acme	12¼ - 13⅛
Am. Can pf.....	89⅞ - 92½	Nat. E. & S. com.	41¾ - 43
Am. C. & F. com.	142 -151¼	N. Y. Air Brake..	60 - 61⅜
Am. C. & F. pf...	— -115	Nova Scotia Steel.	25 - 27
Am. Loco. com...	93¾ - 98¼	Press. Steel com..	64½ - 68½
Am. Loco. pf.....	- -110½	Press. Steel pf....	89 - 91¼
Am. Radiator com.	87 - 91	Ry. Stl. Spg. com.	88¾ - 94¼
Am. Steel F. com.	31¼ - 35	Replogle Steel....	22½ - 24½
Am. Steel F. pf...	92 - 92¾	Republic com.....	49⅜ - 55
Bald. Loco. com..	94¼ - 98¾	Republic pf.....	86 - 91
Bald. Loco. pf....104	-105	Sloss com.....	38¼ - 41½
Beth. Steel com..	52 - 52⅞	Sloss pf.....	74 - 75
Beth. Stl., Cl. B..	54¾ - 57⅛	Superior Steel.....	30 - 30½
Beth. Stl., 8% pf..104	-105	Transue-Williams.	33⅞ - 34
Chic. Pneu. Tool..	50⅞ - 53	Un. Alloy Steel...	25 - 25¾
Colorado Fuel.....	24¼ - 27	U. S. Pipe com...	17½ - 18⅞
Cruc. Steel com...	63½ - 66⅝	U. S. Pipe pf.....	54¼ - 57½
Cruc. Steel pf.....	87 - 88	U. S. Steel com...	82 - 84⅜
General Electric..135¼	-143¾	U. S. Steel pf.....112¼	-114⅛
Gt. No. Ore Cert..	32 - 33¼	Vanadium Steel...	30⅞ - 33⅜
Gulf States Steel.	47 - 50⅞	Va. I. C. & Coke..	85⅜ - 85¾
Int. Har. com.....	75 - 82⅝	Westingh'se Elec.	47 - 49⅜
Int. Har. pf.....101	-101½		

Industrial Finances

The Zenith Foundry Co., Detroit, has gone into a receivership, the Security Trust Co. of Detroit being appointed receiver. The company's assets are given as $255,682 and liabilities $162,723. It is reported that the officers of the company, which was started in 1920, are considering a reorganization.

Stockholders of the Electric Alloy Steel Co., Youngstown, Ohio, producer of high-speed tool steels and steels of special analysis, on Dec. 1 ratified recommendation of directors for an issuance of $750,000 of 8 per cent cumulative preferred stock, convertible into common. The purpose is to provide additional working capital. The company is operating its rolling mills and crucible furnace at its Charleroi, Pa., plant and expects to start its electric furnace shortly. Approximately two-thirds of the issue has been subscribed for by interests identified with the company.

Following a voluntary petition in bankruptcy by the Groton Iron Works, Groton, Conn., James Swan has been appointed temporary receiver. A hearing will be held later on the appointment of a trustee. The schedule attached to the petition in bankruptcy gives the liabilities as $4,028,504 and the assets as $16,353,018. Of the latter, $13,153,000, a claim against the United States Shipping Board now pending in the courts, is included. Without this claim, therefore, the assets amount to $3,200,018. Cash on hand is given at $18.07. The Groton Iron Works is engaged in shipbuilding, with plants at Groton and Noank.

The Mutual Truck Co.'s plant and equipment at Sullivan, Ind., will be offered at public sale by the receiver Dec. 22. The sale will include 12 acres, with siding to the C. & E. I. and Illinois Central railroads; a large modern brick building with steel truss roof; heating plant, machine tools, drawings, blue prints and a miscellaneous stock of materials and parts for building a 2½-ton motor truck. The First National Bank, Sullivan, Ind., is the receiver and E. D. Maple the trust officer in charge

Recent dividend declarations include: Railway Steel Spring Co., regular quarterly of $2 on the common and $1.75 on the preferred; Haskell & Barker Car Co., regular quarterly of $1 a share; General Railway Signal Co., regular quarterly of 1½ per cent on the preferred.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.68c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.68c.
Hoops, base price	3.53c.
Bands, base price	3.28c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.78c.
Channels, angles and tees under 3 in. x ¼ in., base	2.68c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.65c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.85c.
Toe calk, ½ x ⅜ in. and larger	3.25c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	4c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.78c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c.	.....
Nos. 22 and 24	3.85c.	4.50c.
No. 26	3.90c.	4.55c.
No. 28	4.00c.	4.65c.
No. 30	4.25c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.95c. to 4.10c.
No. 16	4.10c. to 4.25c.
Nos. 18 and 20	4.25c. to 4.40c.
Nos. 22 and 24	4.40c. to 4.55c.
No. 26	4.55c. to 4.70c.
No. 27	4.70c. to 4.85c.
No. 28	4.85c. to 5.00c.
No. 30	5.35c. to 5.50c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
9-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

* Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 17½c.
High brass wire	17¼c. to 17½c.
Brass rod	14¼c. to 15 c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18 c. to 19 c.
Copper tube, seamless	21 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$6.05	$5.80
		90 lb....	6.15	5.90
		100 lb....	6.25	6.00
IC..	$10.25	$8.75	IC...	6.40	6.15
IX..	11.50	10.25	IX...	7.40	7.15
IXX..	13.25	11.75	IXX...	8.40	8.15
IXXX..	15.00	13.50	IXXX...	9.40	9.15
IXXXX..	16.50	15.25	IXXXX...	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	32½c.
Bar	39c. to 41c.

Copper

Lake ingot	16 c.
Electrolytic	15¾c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	6½c.to 7c.
Sheet zinc, No. 9 base, casks	11c. open 11½c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7 c.
Solder, ½ and ½ guaranteed	22¼c.
No. 1 solder	20¾c.
Refined solder	17¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	29c. to 31c.

Old Metals

Values are slightly higher and business shows improvement. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.50
Heavy machine composition	8.00
No. 1 yellow brass turnings	5.375
No. 1 red brass or composition turnings	7.00
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

THE IRON AGE

New York, December 15, 1921

ESTABLISHED 1855 VOL. 108: No. 24

Tramrail Reduces Labor Force to Half

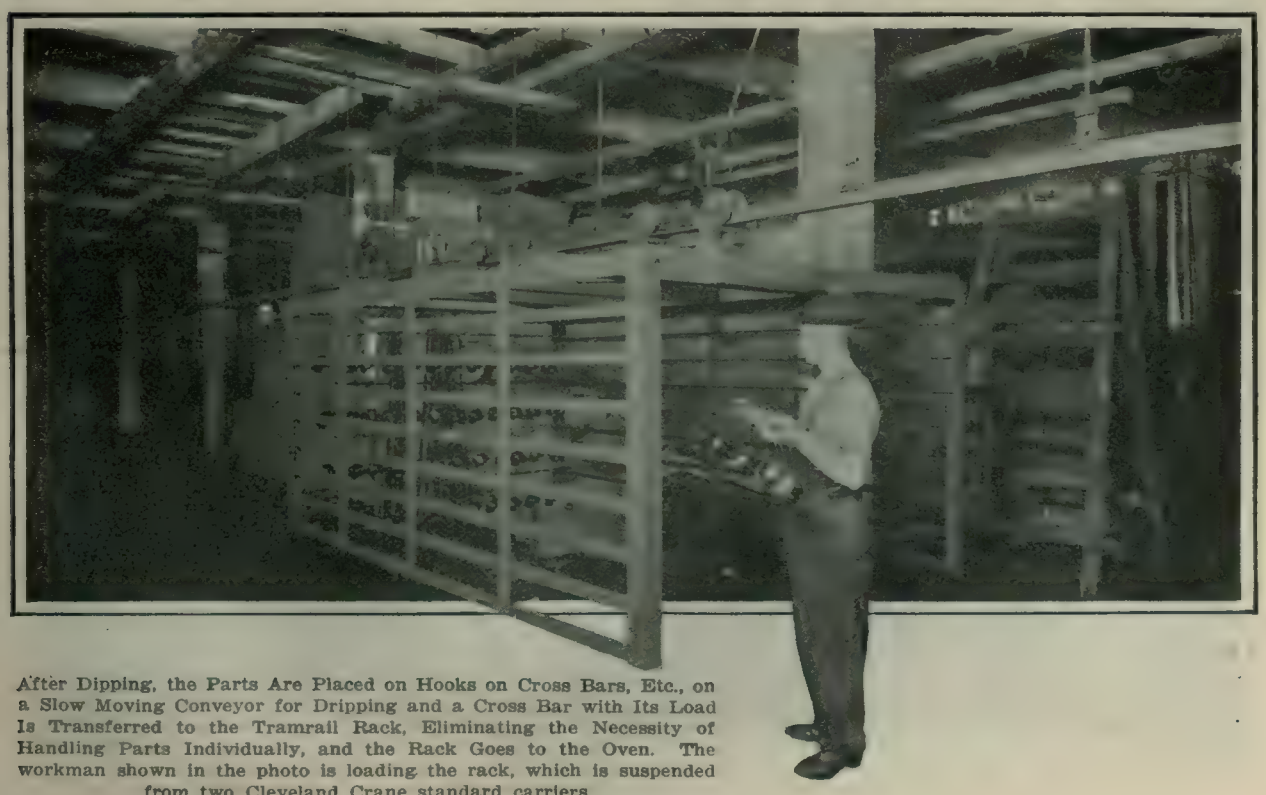
Japanning Department of Globe Machine & Stamping Co. Uses One Oven in Place of Seven —Old Elevator Shaft Carries Away Fumes

A MARKED reduction in production costs has recently been effected by the Globe Machine & Stamping Co., Cleveland, by the installation of a new conveying system and japanning equipment. The conveying equipment includes a transportation system for the handling of sheet metal stampings from the press room on the first floor to the japanning department on the second floor, through a continuous baking oven and on to the final assembling, shipping and storage departments. The new equipment includes a japanning oven, rather unusual in construction, and its arrangement shows a practical use for a discarded elevator shaft in reapportioning a plant to cut production costs.

The company's product consists largely of metal tool and battery boxes and other stampings used chiefly in the automobile field and requiring a japanned finish. The plant is equipped for operation on a high production basis and the handling of the product from one department to another has hitherto not only entailed a high labor cost, but has to some extent been a retardant to maximum production.

With the new arrangement of conveying equipment, all parts that are to be japanned are carried on electric trucks from the manufacturing departments on the first floor to the washing room, where they are fed by hand to a Niagara washing machine. Tool and battery boxes are delivered from the machine onto an endless conveyor, 42 ft. long, inclined to about 45 deg. This conveyor delivers them onto a table in the japanning room on the floor above. Small stampings are taken from the washing machine, piled on trucks, and are carried up in an elevator to the japanning room. Work carried up on the conveyor is diverted by an inspector to wipers, cleaners and polishers or directly to the japan dipping tank.

The japan dipping tank is arranged with connections to three 10-barrel japan storage tanks on the floor below. These contain the three grades of japan that are used, one for the first coat, one for the second, and the third for the finishing coat. The japan is forced from the storage tanks to the dipping tank under air pressure. The supply is drawn off each night and pumped back in the morning. With this arrangement the japan has a chance to settle in the tank over night. The material is thoroughly mixed when being pumped up to the dipping tank and fire hazard is reduced. If during the day a change from one to another



After Dipping, the Parts Are Placed on Hooks on Cross Bars, Etc., on a Slow Moving Conveyor for Dripping and a Cross Bar with Its Load Is Transferred to the Tramrail Rack, Eliminating the Necessity of Handling Parts Individually, and the Rack Goes to the Oven. The workman shown in the photo is loading the rack, which is suspended from two Cleveland Crane standard carriers

grade of japan is desired, it takes but little time to empty the dipping tank by allowing its contents to drain back into a storage tank and then to refill the dipping tank from another storage tank.

After dipping, the work is hung on hooks on cross bars suspended from a slowly moving overhead conveyor, directly back of the dipping tank. This conveyor is 67 ft. long and 10 ft. wide. It takes approximately 30 min. for the work to pass from one end of the conveyor to the other, during which time the surplus japan drips off and the preliminary drying takes place. The conveyor is roofed over and partially inclosed at the sides to prevent floating dust from adhering to the work.

After leaving the drying conveyor work is handled through the oven and on to its destination on a tramrail system installed by the Cleveland Crane & Engineering Co., Wickliffe, Ohio. This system consists of hand-operated carriers and eight racks or cages, especially designed for holding the work, and the necessary monorail tracks and switches. The racks are constructed of angle iron, being virtually steel frames with open bottoms. They are 10 ft. long, 6 ft. wide and 4 ft. high. When running on the monorail, the bottoms of the racks are 2 ft. above the floor.

In transferring work from the drying conveyor to the conveying system that is to carry it through the oven, the cross bar is carried with its load of several small parts to the rack, on which the cross bar with its load is suspended, avoiding the necessity of handling the parts individually.

Each rack is suspended from two standard carriers of 2000-lb. capacity each. Two tracks run into and through the oven, which holds four racks at a time. The racks are pushed into the oven and, after the work is baked, pass through doors on the opposite side and are pushed along the trolley system and through switches are diverted to the various departments on the second floor for further assembling operations, to the chutes for loading on cars, to the shipping department or to the warehouse for storage. When a rack is emptied it continues its circuit around the floor back to the place for loading in front of the baking oven.

While a carrier, with its rack and full load, weighs approximately two tons, the design of the tramrail system makes it so easy of operation that one man can push the load along on the rail. The tramrail system is designed for hard service. The wheels on the carriers run on a double row of ball bearings. The wheel serves as an outer race for the bearings and is chilled at two points—where the wheel comes in contact with the rail and where the balls come in contact with the wheel or race. The race is ground on the chilled surface of the wheel. The inner race is of hardened high carbon steel, the seats for the balls being ground on the race after hardening.

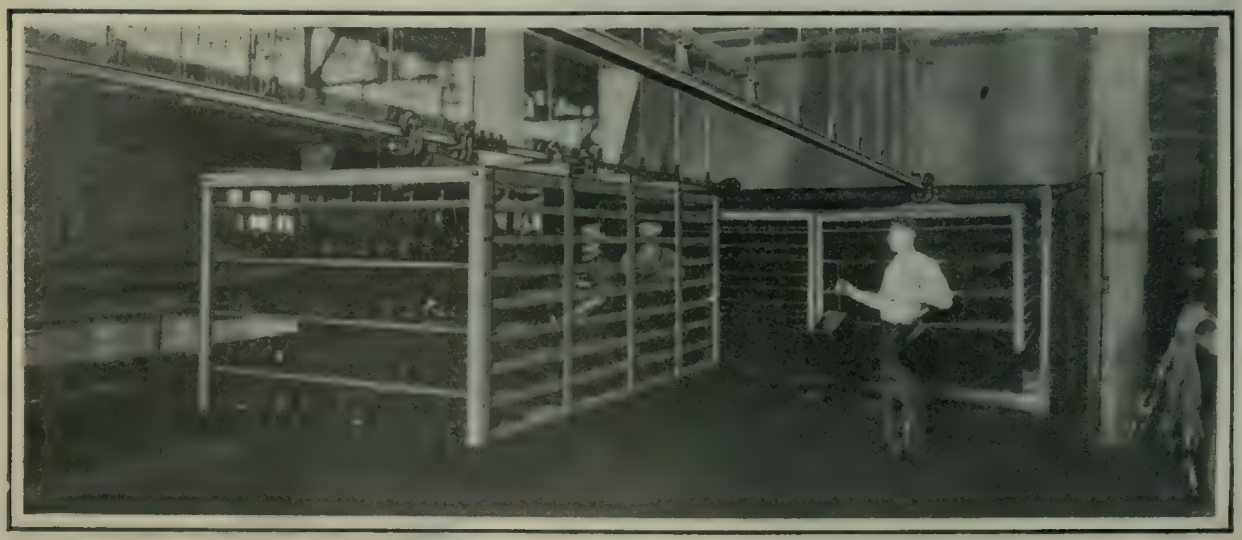
Although the carrier with the rack is 10 ft. long, it can be operated on a curve with a 4-ft. radius. To the rail is attached a rail clamp at regular intervals and these clamps, in connection with hanger rods of various lengths, suspend the system from overhead supports. The hanger rod can be screwed either in or out of the rail clamp so that the rail can be suspended perfectly level, regardless of whether the ceiling or overhead support is level. The method of suspension makes the rail flexible instead of rigid, permits the easy movement of the rail under the wheels of the carrier, thereby avoiding the danger of having the carrier so loaded that the load is carried on the wheels on one side of the carrier. It is stated that the rail will twist under the load sufficiently to permit an even pressure under every wheel. In order to prevent the rail swinging under the load, side strain brackets are used to limit the side movement.

The switch is so designed that the carrier can pass over it smoothly and it has a safety stop that prevents the carrier from running off the rail at the open end of the switch.

The japan baking oven is located in an elevator shaft which was no longer being used for its original purpose. The oven is 14 ft. wide, 20 ft. long and 8 ft. high. It is oil-fired through Ray burners on the lower floor, 12 ft. below the oven.

The heat is carried through a 2 x 2-ft. brick flue to the floor of the oven, where it passes around a baffle plate and through the oven. With this arrangement the burners do not connect directly to the oven chamber. Two outlets, 10 in. in diameter above the oven, run into the elevator shaft and the fumes are carried up the elevator shaft to the roof and are discharged through openings in the sides of the pent house. A damper is provided in the basement at the bottom of the flue to provide and regulate the fresh air supply. Connected to the oven is a Wilson-Maeulen Co. thermo electric temperature indicating instrument. The temperature is taken at three points in the oven, including the warmest spot, or directly above the flue, and at one corner where the temperature is likely to be the lowest. The efficiency of the oven is such that the heat variation at different parts of the oven is less than 5 deg. Fahr. and the oven has proved unusually efficient in fuel economy.

Before installing the new equipment the parts to be japanned were carried into the oven by hand and with the time required to cool the oven after a heat sufficiently for the workmen to go inside and with the



Two Tramrail Tracks Run Through the Baking Oven Shown in the Background, the Capacity of the Oven Being Four Racks. The rack in the foreground is being loaded while the others are in the oven



A Loaded Rack That Has Come from the Oven Is Here Being Pushed by One Man Along the Track on Its Way to the Assembly Department

time taken for loading, only three heats could be taken during a day. With practically continuous operation by pushing in the four loaded racks as soon as the four others are taken from the oven, and with no cooling of the oven being necessary, ten heats can be taken in a day. With the old system, seven ovens were used, one of the same size as the present oven, the total oven capacity being more than double the amount provided by the one oven now used. Then the japanning department was unable to turn out work as rapidly as it came from the other manufacturing departments. Now this department can handle work faster than produced in the stamping department. From the standpoint of labor efficiency with the economy of handling by means of the tramrail system, more pieces can go through the japanning department with less than half the number of men formerly employed.

The conveyor system was laid out to meet the special requirements of the plant by the engineering department of the Cleveland Crane & Engineering Co. in conjunction with the engineers of the Globe Machine & Stamping Co. The baking oven was designed by R. R. Root, superintendent of the Globe plant.

Attaching Wire Rope to a Socket

When wire rope is used with a socket attached, it is important that the socket be attached in such a way that the full strength of the rope may be developed. It is a common thing in factories where there is not enough work of this kind to employ an experienced hand on cables, to have the engineer or repair man do the best he knows how. In discussing the subject, E. J. Edwards, superintendent of foundry maintenance of the General Electric Co. at Erie, Pa., says he has seen lead, solder, soft babbitt, etc., used in sockets, and, upon inquiring, finds the man who did the job was a good mechanic but had no idea just what should be used and what should be done to prepare the cable for the operation.

When the work is done in the ordinary way, Mr. Edwards points out, the wires are bent back on each other and the basket of the socket filled with lead, babbitt, etc. Sockets attached in this manner under no circumstances should be used on elevators, cranes or hoisting machinery, as many times they result in the socket's pulling away from the rope. The wires are not all engaged and some of them creep back into the rope preventing a perfect contact between rope and socket.

He considers one of the most important operations in attaching a wire rope to a socket is to clean both socket and part of rope to be attached. The end of rope should be served securely and the socket cleaned well with gasoline or kerosene oil. Then the rope is passed through the socket and served again for a distance from the end equal to the length of the basket or socket, being very careful not to let the strands or the lay of the rope open. After this is done, the hemp center should be cut off the length of the opening and the wires in the strands separated. This can be done by using a small piece of pipe or a marline spike. Then the wires are cleaned well with gasoline, and dipped in a solution of one half muriatic acid and one half water for five minutes' soaking. The wires are then dipped in a solution weakened by the addition of one part more water. After wiping dry, the socket is pushed over the wires until they are even with the top of the basket of the socket. Friction tape is wrapped around the rope at the bottom of the socket to serve as a shield and melted zinc is poured into the basket of socket.

German Bauxite Supplies

Germany's bauxite production before the war was so insignificant as to render her virtually dependent on French supplies, the total requirements in 1913 amounting to about 38,000 tons valued at more than 2,000,000 m. With a view to becoming independent of foreign bauxite, steps were taken, during the war and since, to explore domestic bauxite fields. Valuable deposits worth working were found in Hessen. They are being exploited by the Bauxitwerke Aktiengesellschaft at Giessen and represent the only mines in operation in Germany. The principal consumer of the ore is the state-owned Lauta works with an annual output capacity of 14,000 tons of aluminum while the rest is taken by other electric smelting works, emery works and the chemical industry, used by the latter in the production of aluminum salts. The present average monthly output, representing the production of 15 mines employing about 300 men, is 1200 tons but there is claimed to be nothing in the way of increasing output by sinking new shafts and employing additional labor. In accordance with the growing demand, it is planned to bring production to 20,000 tons during 1922.

Over 30 proposals for adoption as standards in automobile manufacture will be presented at the meeting of the standards committee of the Society of Automotive Engineers in the Engineering Societies Building, New York, on Jan. 10. Sixteen divisions representing different fields in the automotive industry and parts or material manufacturers will be represented. The iron and steel division will submit a complete revision of the present iron and steel specifications which have been used widely in industries other than the automotive industry since they were first published in 1911.

Piette By-Product Coke Ovens at St. Louis

Simplicity and Substantial Construction Are Features —Modification of Design, Just Patented, in the Interest of Fuel Economy Through Better Combustion

MORE than fifteen hundred Piette-type by-product coke ovens are in commercial operation in Europe, but the first battery to be constructed in this country was recently completed at the Carondelet oven station of the LaClede Gas Light Co. of St. Louis. This installation of eight ovens was built for experimental purposes at the expense of the Franco-Belgian Coke Oven Corporation, Brussels, Belgium. The design is an adaptation of the European oven to American practice, giving recognition to differences in coking methods and to the quality of coal used, as well as to the wider utilization of silica brick in this country. The results achieved were so favorable that an American company, known as the Belgian-American Coke Oven Corporation, was formed to market the ovens in the United States. This corporation controls also a recently patented Piette oven which will give a still more perfect combustion of gas and air for heating the ovens and will obtain greater constancy in the temperature throughout the length of each oven chamber.

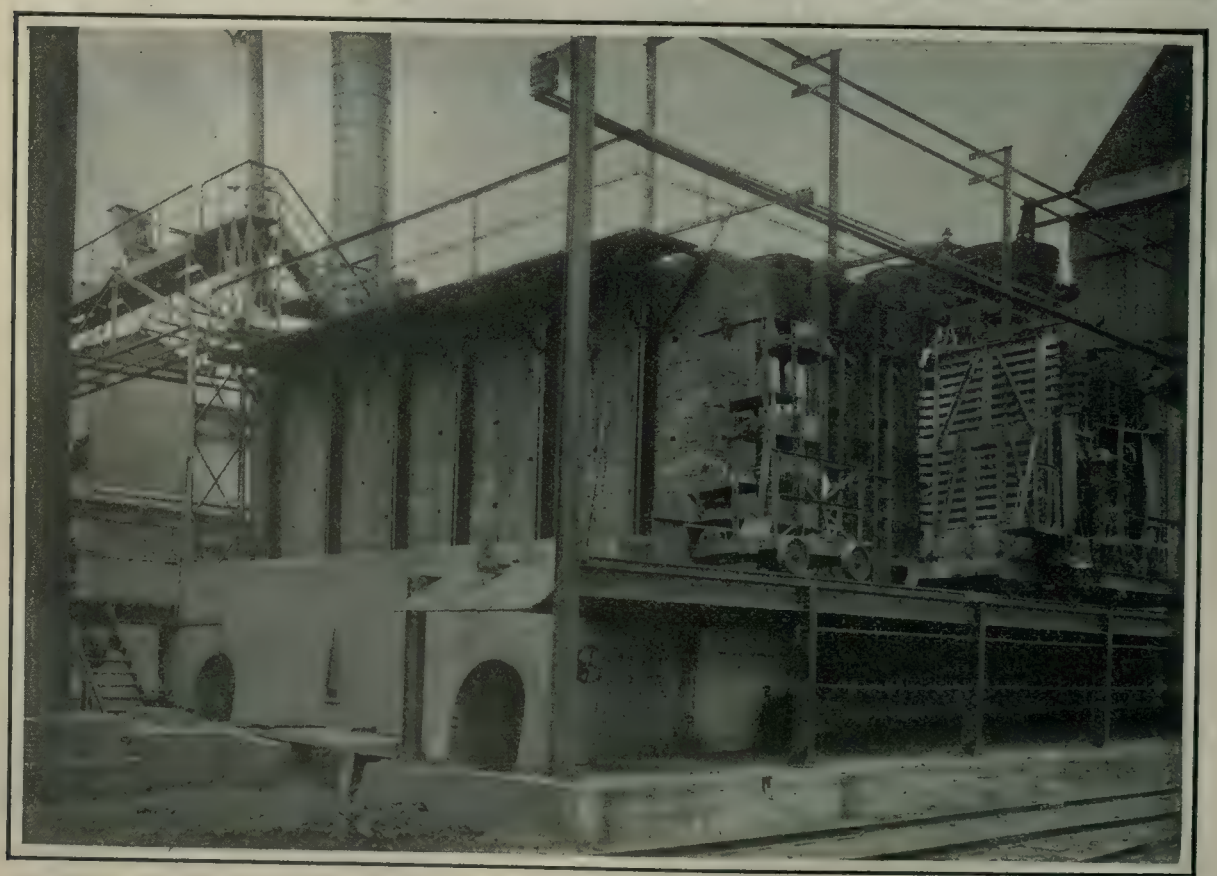
Styled by the designers as Type C, the St. Louis ovens are of the horizontal type, with vertical flues and transverse regenerators. The regenerator chambers extend the whole length of the battery, at right angles to the heating walls and oven chambers. Although arranged in longitudinal chambers, the regenerators are actually of the transverse type, and the products of combustion pass through the checker work in a direction parallel with the axis of the ovens, taking a longitudinal course only after reaching a free space in the outlet chambers. There are four parallel regenerating chambers—a pair of primary and secondary regenerators in each half of the battery, arranged conversely, the primary regenerators being adjacent to the outside walls.

Galleries have been placed under the regenerators, as well as between the oven soles and the secondary regenerators, for the passage of air prior to its introduction into the regenerating chambers. This arrangement permits the air to absorb heat which would otherwise be lost by radiation through the chamber walls. Tests have shown that the air heated in this manner reaches a temperature of from 200 to 280 deg. Fahr. before entering the regenerators.

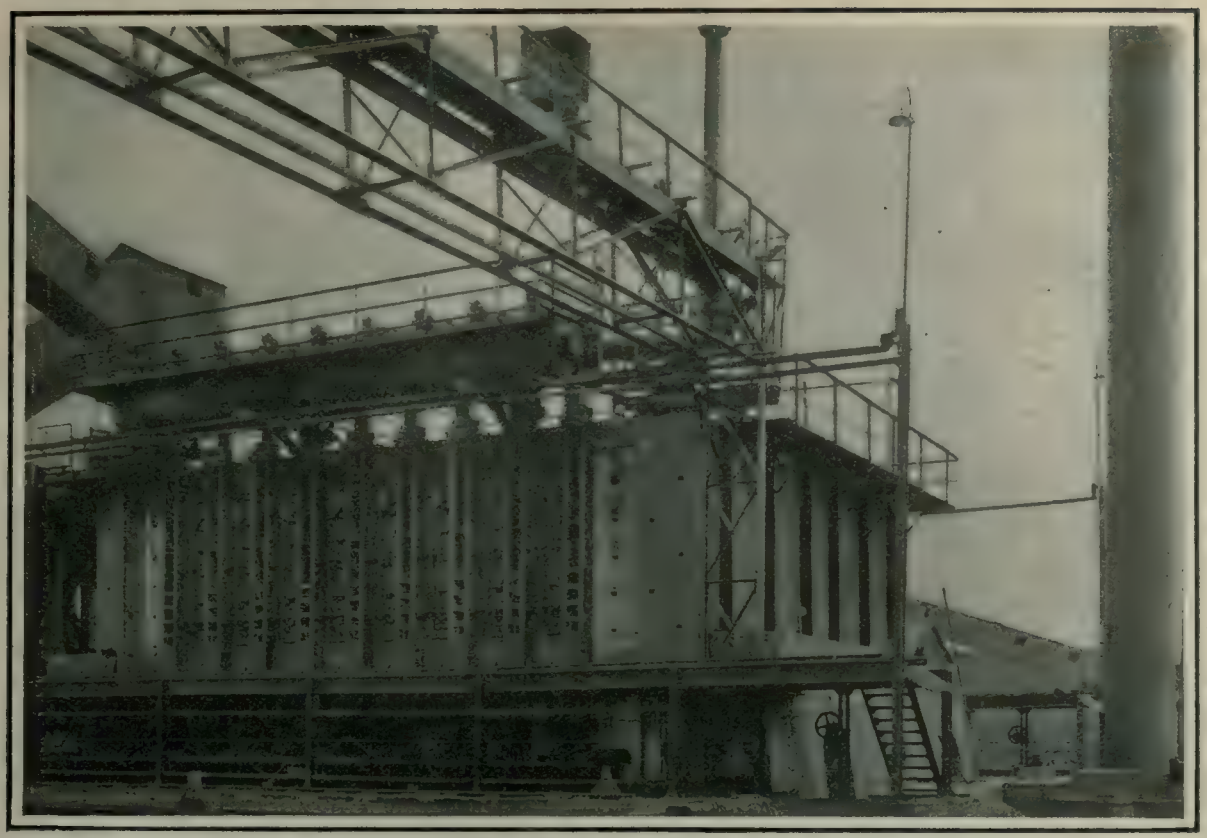
The sections of the flues connecting each pair of primary and secondary regenerators are so designed as to compensate for the effect of the drop in pressure in the secondary chamber, where, after leaving the checker work, the burnt gases pass lengthwise of the battery to the stack. The total resistance is lowered to ¼ in. of water gage, instead of 1 in. or more, as is often the case with longitudinal regenerators which do not operate transversely. Thus the pressures in the oven chambers and heating flues are more nearly equalized, making for a maximum of gas tightness and a maximum recovery of by-products.

While the passage of air and burnt gas through the regenerators is at right angles to their axis, the fact that each regenerating chamber is continuous from one end of the battery to the other insures a uniformity of temperature throughout the entire battery, and prevents the possibility of differentiation of heating between ovens, as happens when separate regenerators are used for each oven. In this connection, the designers of these ovens contend that the amount of gas required per hour in heating by-product ovens is so small as to make it exceedingly difficult to regulate the heat of individual regenerators for so many ovens. Continuous longitudinal regenerators, they assert, are the only insurance against irregularity in the various oven temperatures.

An outstanding feature of the Piette ovens is the stability of their construction. The regenerators are at right angles to the ovens, and the intersection of



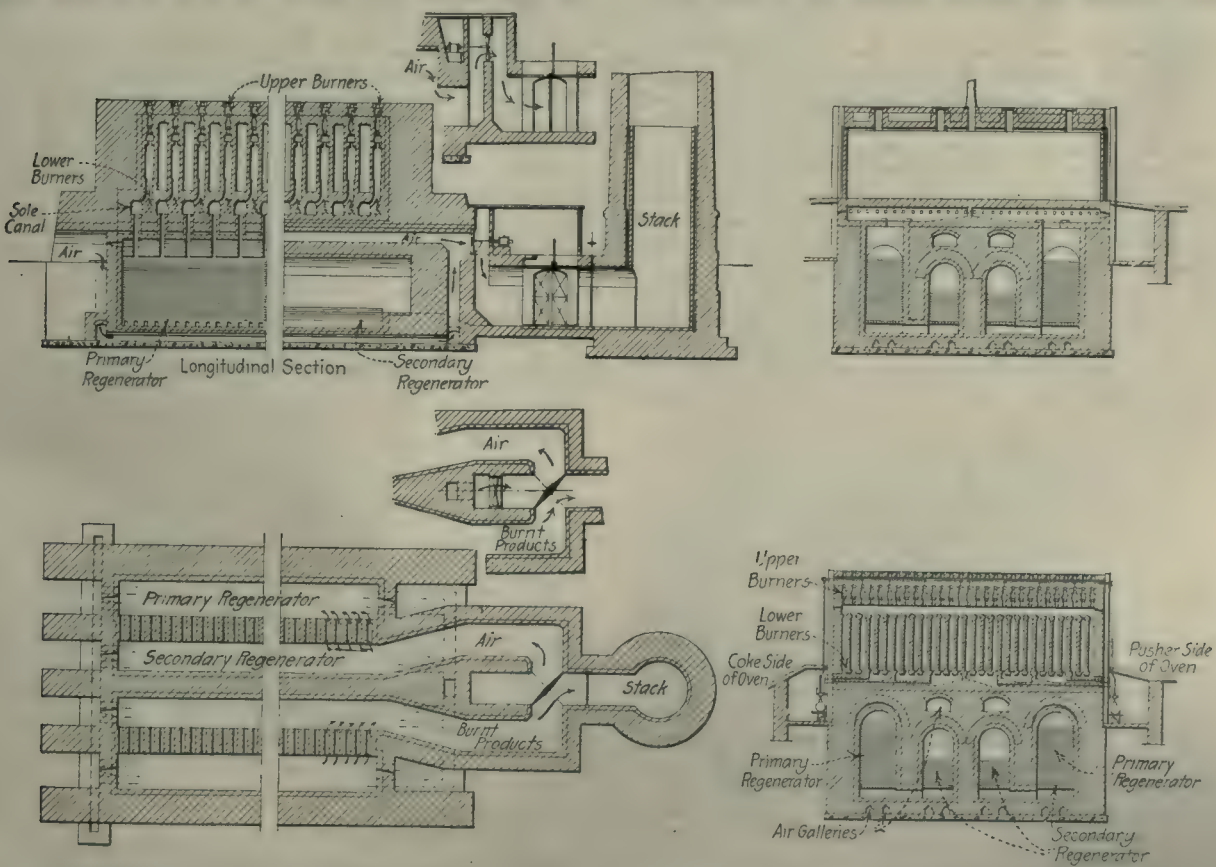
Coke Side and One End of the Piette Ovens at St. Louis, Showing Coke-Receiving Car in Position for Drawing an Oven



Pusher Side of St. Louis Ovens

the two series of walls makes for solidity throughout the entire structure. The expansion of the linings and of the arches of the regenerators, as well as of the flues connecting the primary chambers with the sub-sole flues, is completely independent of the sustaining mass of the battery. Consequently, the refractory material which constitutes the sole-oven walls and the ovens rests on a rigid monolithic block, which cannot be deformed. An allowance of 2 in. for expansion has been allowed on both the pusher and coke side of the ovens, as well as on top; but the construction is such that the chambers remain tight, and no cracking results. When, however, the oven walls rest on the regenerator walls below them, and are really a part of those walls, as is the case in some types of construction, it is contended that unequal expansion is bound to obtain, because of the different temperatures to be found from the foot of the regenerator walls to the top of the oven walls.

The axis of the battery divides the heating walls



Longitudinal, Transverse and Plan Sections of Piette Ovens. The installation at St. Louis has no upper burners, as featured in the new design. Upper view at right is a section through the oven chamber; below it is a section through the heating flues and regenerator chambers. The variations shown around the reversing valve are of interest

of the ovens into two symmetrical parts, reversals being made from one side to the other every 30 min. Each oven wall is divided into eight chambers, four in each half of the battery. Each chamber is equipped with burners for three or four vertical flues. The area of the air nozzle for each burner, and the number of flues per chamber, have been carefully calculated to make for uniformity of temperature throughout the oven. Thus, the chambers at each end of the oven contain only three flues, to counteract the cooling effect of the outside atmosphere. The second chamber from the coke end of the oven also contains only three flues, greater intensity of heat being required per wall area at that point to compensate for the greater width of the oven on the delivery side.

As a result of this arrangement—with two small chambers at one end of the wall and one small chamber at the other end—the reversing axis of the battery does not coincide with its metrical axis. The same amount of gas is fed to the short or coke side of the oven wall as to the long or pusher side. Gas is fed to the chambers by individual tuyeres, each provided with a regulating cock. Independent of these cocks is also a control cock common to each half-wall. The air supply for each half of the oven wall is regulated by a damper located at the junction of the sole canal with the primary regenerator. Fixed sections, determined by calculation and confirmed by practise, are used to regulate quite closely the discharge of burnt gases from the top of the vertical flues, thereby rendering the use of dampers unnecessary. Numerous dampers, the Piette engineers contend, are always difficult to handle, and often stick to their seats after having been in use for some time; furthermore, they put regulation at the mercy of the indifference or incompetency of the heaters.

The separation of the flues, with an upward flow of gas from the half of the oven wall containing the flues, with a concurrent downward flow, reduces the possibility of leakages or short circuits of the heating flames.

Reversal of the draft and operation of the burner valves are accomplished by the operation of a single lever. The reversing valve alternately connects one of the two secondary regenerating chambers with the chimney, at the same time effecting the entrance of air into the opposite secondary chamber. While not essential, the use of a blower to drive the air tends to establish an equilibrium of pressures between the oven chamber and the heating wall flues, thereby serving to prevent the springing of leaks for the escape of gas, even when an oven is being overworked.

Regulation of the battery is facilitated by sight-holes which permit the inspection of the interior throughout the route of the flames and gases. Sight-holes placed at the ends of the primary regenerators permit a view of the top of the checker work for the full length of the chambers. Sight-holes on top of the ovens permit inspection of each vertical flue in the oven walls. If any chamber is being insufficiently heated, due, for instance, to an accidental obstruction of a cock or of a gas pipe, this immediately becomes apparent.

Modification in Design Just Patented

Although gratified by the results obtained from the battery at St. Louis, the engineers of the Belgian-American Coke Oven Corporation have designed and patented a slight modification in the construction of the ovens which, they believe, will result in greater economy in gas consumption and increased uniformity in oven temperature. The change will also permit the use of a larger proportion of high volatile coal than is now used.

In heating oven walls by means of vertical flues, one cause of loss of efficiency has heretofore proved unavoidable: Any air admitted to the heating flues, in excess of that strictly required for the combustion of the gas, involves a loss in efficiency, because it carries away heat which can be only partially recovered. Yet in vertical-flued ovens it has been necessary to mix more air with the heating gas than theory requires, for two reasons. The theoretical mixture of gas and air, burning within the necessarily short space of the vertical flue, would overheat those portions of the flue lining nearest the burners, so that even the silica bricks of which it is made would melt. It is also necessary to use an excess of air to insure short flames which will not extend above the height of the vertical flues. It is essential that each flame give the whole of its heat to the vertical slice of coal which corresponds to the combustion flue; if the flame were to extend into the horizontal inversion flue, local overheating of the wall would result, and efforts to obtain uniformity in heating the distilling chamber would be nullified.

These obstacles are believed to have been overcome in the new design. The superstructure of the oven alone has been modified, a channel having been provided above the refractory top of each oven wall and above the horizontal inversion flue. Within this channel, which is open to the air at both ends, two gas pipes with burners are laid—one in each half of the oven wall. So as not to interfere with the inspection of the combustion flues through the sight-holes, the pipes are placed on one side of the channel, instead of in the middle. The purpose of the burners in this channel is to consume the oxygen remaining in the burnt gases discharged from the combustion flues.

Under this plan, the upper burners are active at the same time that the lower burners are operating in the opposite half of the oven wall. Thus the design not only makes for more complete use of the air, but also provides for combustion throughout the length of the oven at all times, the lower burners of one-half of the oven wall being in operation at the same time as the upper burners of the other half of the wall. The same control cock which admits the gas to the lower burners also introduces the gas into the upper burners, gas being fed simultaneously to the upper and lower burners of opposite halves of the oven wall.

According to the engineers, the new design will insure maximum efficiency as the result of perfect theoretical combustion. At the same time, the whole surface of the oven wall is made available for intensive heating; whereas, in the ordinary reversing system, in which gases burnt in one half-wall are sent through the other half-wall, nearly 50 per cent of the heat-transmitting surface is lost, as the burnt gases, upon reaching the horizontal inversion flue, are cooled to such a degree that they have few calories left to yield to the flues in their downward flow. Another possible material advantage of the intensive heating will accrue from a substantial reduction in the time necessary for carbonization.

The new design also will permit a considerable increase in the height of the ovens, and thus allow much larger loads to be handled without, in the opinion of the engineers, lengthening the coking time or increasing the length of the ovens. Using the new type of construction, the corporation expects to build ovens which will coke over 25 tons of coal per 24 hr.

The ovens now in operation at St. Louis are 37 ft. long between doors, and are 18½ in. wide on the pusher side and 21 in. wide on the coke side. Their height under the arch is 9 ft. 10⅝ in. Under normal conditions they are heated by 37 per cent of the gas given off by the coal in terms of B.t.u.

Results of Tests at St. Louis

A 30-day test of the ovens in operation at St. Louis was begun three months after their completion. The following data show in detail the results obtained:

The mixture of coal charged consisted of 65 per cent high volatile Elkhorn coal from the Consolidation Coal Co. mines in Kentucky, and 35 per cent low volatile Pocahontas from the Cleveland-Western Co. of West Virginia. The average analysis of this mixture was:

Moisture	4.13 per cent
Volatile hydrocarbons	29.06 per cent
Fixed carbon	61.37 per cent
Ash	5.44 per cent
	100.00 per cent

The load of one oven was weighed daily and was then screened, following which samples were submitted

to laboratory tests. The screening was done on an inclined screen with 2½-in. roller grizzly. The results of the tests follow:

Ovens and Coal

Total number of ovens charged and pushed	282
Total quantity of coal charged in 30 days	7,549,400 lb.
Average load per oven	26,770 lb.
Average coking time	20 hr. 18 min.
Average quantity of coal charged in 24 hr. per one oven	31,455 lb.
Average temperature of smoke at outlet of heat regenerators, corresponding to 3.8 per cent oxygen or an excess of 25 per cent of air	624 deg. Fahr.

Coke

Total quantity of coke produced in 24 hr. in one oven	21,764 lb.
Total yield of dry coke, calculated on coal as charged	69.19 per cent
Proportion of foundry coke in total coke	38.15 per cent
Proportion of other cokes	61.85 per cent
Average analysis of the total coke obtained:	
Moisture	1.94 per cent
Volatile matter	0.96 per cent
Fixed carbon	90.33 per cent
Ash	6.77 per cent
Specific gravity:	
Apparent	0.973
Real	1.906
Porosity:	
Coke substance by volume	51.03 per cent
Air spaces by volume	48.97 per cent
Shatter test	55.57 per cent

Heating Gas

Cu. ft. of gas burnt during the 30 days, at 30 in. pressure and 60 deg. Fahr.	20,332,000
Volume of gas burnt per lb. of coal charged	2.693
Heating value of this gas (B.t.u. per cu. ft.)	479.3
B.t.u. consumed per lb. of coal charged	1,290.7

Gas Produced and B.t.u. Available

Total cu. ft. of gas produced during the 30 days, at 30 in. and 60 deg. Fahr.	44,159,000
Volume of gas produced per pound of coal charged	5.849
Average calorific value of this gas (B.t.u., per cu. ft.)	564.5
Total quantity of B.t.u. available per lb. of coal charged (non-debenzolized gas)	3,301.7
B.t.u. (surplus) available per lb. of coal treated	2,011.0

Average analysis of the gas produced:

CO_2	1.7 per cent	CO	6.1 per cent
C_nH_m	3.4 per cent	CH_4	29.8 per cent
O_2	0.4 per cent	N_2	6.8 per cent
H_2	51.8 per cent		

Average specific gravity at 30 in. mercury and 60 deg. Fahr. 0.39

Yields of By-Products Per Net Ton of Coal Carbonized

Ammonia (NH_3)	5.63 lb.
Tar (dry)	7.01 gal.
Benzol (product distilling below 200 deg. C.)	3.42 gal.

These figures show that the yield in available B.t.u. would be—after deducting the B.t.u. needed for heating the ovens—60.9 per cent of the total B.t.u. produced.

This satisfactory proportion does not, however, represent the real power of this system of ovens, the engineers declare. A small number of ovens cannot give the same yield as a bigger battery—say 50 or more ovens of the same type. In a big battery the gas used for the heating of an end-wall is distributed over a larger number of ovens, and as matter of course over a larger quantity of the coal distilled. If the heat lost in one end-wall is distributed over a battery of 50 to 60 ovens—the average number in a modern battery—the reduction in B.t.u. consumed would be, it is asserted, fully 6 per cent. Taking this into account, the calorific balance sheet of the Piette ovens at St. Louis would be:

B.t.u. produced per pound of coal	3,301.7	100.00 per cent
B.t.u. in the surplus gas	2,088.4	63.25 per cent
B.t.u. consumed in the heating gas	1,213.3	36.75 per cent

This consumption is said to be the smallest yet realized in the United States, considering the conditions imposed by the tests.

The purchasing agents of factories of Marion, Ind., have formed an organization with Raymond M. Oaks chairman and Ancil Witmer, vice-chairman. The association is for the exchange of ideas and the consolidation of shipments of raw material and supplies. It is believed the movement will result in a large saving of money for the industries.

The Velie Motor Co., Marion, Ind., has begun operations with 150 employees. The Western Drop Forge Co. has resumed operations with excellent prospects, and the Indiana Truck Works has added to its force of employees.

HELPING BUSINESS

Secretary Hoover and Director Klein Tell of Progress and Plans

WASHINGTON, Dec. 13.—Though the report of the Department of Commerce is for the entire fiscal year ended June 30, 1921, Secretary Hoover points out that it covers but four months of the administration of the department under his direction. Summarizing the activities of the new Administration during these four months, the Secretary said that the time had been devoted to two primary questions: "First: Reorganization of the departmental expenditures. Second: Reorganization of those bureaus concerned with industry and trade, that they may become of more effective service to the community.

"The results of reorganization enabled a revision of the estimates of expenditure for the fiscal year 1921-22, so that while the total appropriations available for the department for this period are $24,222,192, yet it now seems probable that the expenses during this fiscal year will approximate $20,200,000, showing a total saving of about $4,000,000, or 16 2/3 per cent of the available appropriations.

"The results of reorganization of the bureaus concerning industry and trade are in part indicated by the increase in volume of demand upon the department for helpful action or information. These demands have now reached a rate of over 500,000 per annum.

"The further practical results to American commerce and industry will be more evident later in the year and comment upon them can best be deferred until results have been further realized.

"The establishment of a real Department of Commerce, effective in service to the producers, manufacturers, and distributors of commodities, able to give economic interpretation of importance to the American public generally, to stimulate American trade and merchant marine, requires a thorough reorganization and entire regrouping of the Federal functions bearing upon these problems. Inasmuch as these matters are not actively before Congress and the Administration, it is not necessary on this occasion to enter upon discussion of them."

Director Julius Klein of the Bureau of Foreign and Domestic Commerce has the following to say:

"The bureau requires great additional strength if it is to serve the purpose really intended by Congress and meet the demands that are made upon it by the business men of the country in their present distress. Not only should more attention be given to trade promotion, with which the bureau has been almost exclusively concerned in the past, but it should be possible to make the more detailed economic surveys that are now so indispensable because of the enormous financial interest we have in foreign fields. There never has been a time in the past, and perhaps may never be in the future, when accurate economic data on the situation in foreign countries was so vital to our material well-being.

"Before the close of the fiscal year under review, Congress provided funds for the establishment of commodity divisions in the bureau, and shortly after the beginning of the new year a sufficient number of high-class men were found to organize some twelve or fourteen such divisions. These divisions will not only organize and direct the collection of information abroad concerning their commodities (such as textiles, coal, machinery, etc.), but will set up, with the active help of the industries themselves, the machinery for the best possible distribution of such information. These divisions are revolutionizing the methods of the bureau and should be considered a long and important step in the right direction. Next year another long step should be taken and money should be forthcoming to expand the work along logical lines.

"Congress has also very wisely provided a new technical division to handle the difficult subject of foreign commercial laws. The bureau should have more technical divisions of this sort to provide really expert advice on such subjects as foreign credits, packing, and transportation."

ABSORPTION METHODS

Federal Trade Commission Discusses Practices Tending to Lessen Competition

WASHINGTON, Dec. 13.—That the Federal Trade Commission issues only a small number of formal complaints and a still smaller number of orders compared with the number of cases it handles in which unfair competition is charged is indicated by its sixth annual report. The report states that it has handled some 3000 cases of this kind, and has issued 788 formal complaints and 480 orders. The commission states that it is significant that with very few exceptions these cases have been brought to its attention by business itself, but it apparently overlooks the obvious fact that in the vast majority of instances the charges are not well founded, for otherwise more complaints and orders would ensue.

The commission, realizing it has no punitive powers by way of assessing fines against or imprisoning offenders, but may merely issue cease and desist orders, subject to review by a court, makes it plain that it would like to have its authority broadened. This is seen in the statement that ineffectual features of the Clayton Anti-Trust Act have been brought to the attention of Congress. It is stated that activities of the commission under this act have developed the fact that frequently the effect of a tying contract may be to enable the seller to hinder competition without bringing himself within the prohibitive terms of the law.

This practice is referred to as one of four methods which the commission says it has handled in cases under the Clayton act relating to the absorption of competing companies by a single unit and other practices tending to lessen competition and to create monopoly. These practices, other than the one mentioned, deal with the acquisition of shares of capital stock, to interlocking directorates, and to discrimination in selling price, and wider authority to control them is sought.

"The commission has found," says the report, "that corporations frequently now absorb competitors, not by acquiring capital shares, but by acquiring the physical assets which the Clayton act does not forbid. Likewise the commission has found that a great business unit lessens competition more often by the device of discrimination in price in buying its raw material than by discrimination in price in selling its product. Similarly, it has been found that concentration of control of supposedly competitive units in the hands of a few is accomplished more often by ownership of capital shares by that few by control through common directors.

The Economic Division of the commission discusses briefly the situation as to receiving reports from steel interests, mentions the injunction restraining the commission from compelling reports to be made and says that because those received were not considered suitable for publication of average results, the commission last November advised those reporting to stop.

STANDARDIZATION IN INDUSTRY

Its Significance to Industry and to the Federal Government

A. A. Stevenson, chairman American Engineering Standards Committee, in an address before the American Society of Mechanical Engineers, Washington Section, Dec. 9, expressed the belief that the present is "a particularly opportune time for the launching of extensive cooperation between government and industry. The United States Government is probably the largest purchaser of materials in the world. It maintains an unrivaled group of research organizations, the one object of which is the furthering of the development of our industries. In addition to the continuing work of the Government in promoting the national welfare through such aids as it may properly give to industry, the efforts of the present Administration have shown a keen appreciation of the importance of standardization and of its bearings upon industry as a whole, and constitute a most significant development in the relation of the Government and industry.

"In both Great Britain and Germany," he continued, "national standardization is being carried on intensively. The German industries are carrying out a far-reaching program of standardization as a necessary step in building up an unprecedented industrial structure which must rest in large measure on an extensive foreign trade. It is being woven very intimately into the industrial fabric of the country, under the guidance of an organization which functions very much like the American Engineering Standards Committee, and in its work 5000 German industrial firms are cooperating.

"A recent event of unusual importance was the organization of the Federal Specifications Board for the purpose of unifying the specifications for all purchases to be made by the Government, military as well as non-military. This board has been charged with the duty of compiling and adopting standard specifications for materials and services, and bringing specifications into harmony with the best commercial practice wherever conditions permit, in order to broaden the field of supply. If common standards are arrived at for the Government and the industries of the country, might it not be advantageous to have a common agency charged with the duty of determining what materials and services do meet properly the standards adopted? It is understood that, in at least two of the most important industries of the country, plans are now under consideration for the establishment of such a common bureau of inspection.

"It cannot be too often repeated, that a national standardization program means almost unlimited advantage to the manufacturer in cheapening the processes of production and stabilizing his market; to the distributor in clarifying and simplifying his problems; and to the ultimate consumer by lessening costs and expediting deliveries, with whom the Government as a purchaser is to be included; and to the Government as a body of great research agencies, by selling the results of its researches to industries in return for an increased prestige with the general public and an increased support from industry."

British Pig Iron and Steel Output Increased in November

(*By Cable*)

LONDON, ENGLAND, Dec. 13.

The production of pig iron in Great Britain in November was 271,800 gross tons and that of steel ingots and castings, 442,800 tons. These compare with an output of 235,500 tons of pig iron and 405,400 tons of steel in October, with 158,300 tons of pig iron and 429,300 tons of steel in September and with 93,600 tons of pig iron and 432,600 tons of steel in August. The average pig iron output for the 11 months of this year has been 212,400 tons per month and that of steel 294,890 tons per month. In 1920 the production of pig iron averaged 667,300 tons per month and of steel ingots and castings 754,700 tons.

Unemployment still is decreasing in Pennsylvania, according to the semi-monthly report of the State Department of Labor and Industry, which shows the number registered for work at the various district offices as of Dec. 1, to have been 269,322, as compared with 271,430 on Nov. 15 last. The figures by districts follow: Altoona, 13,020; Erie, 13,100; Harrisburg, 11,292; Johnstown, 9260; McKeesport, 3940; New Kensington, 3750; Philadelphia, 128,000; Philadelphia, women, 11,600; Pittsburgh, 51,400; Scranton, 17,725; Williamsport, 6235.

Double Helical or Herringbone Gears

Use of Long Addenda in the Pinion and Short Addenda in the Driven Gear, to Increase the "Follow Through"

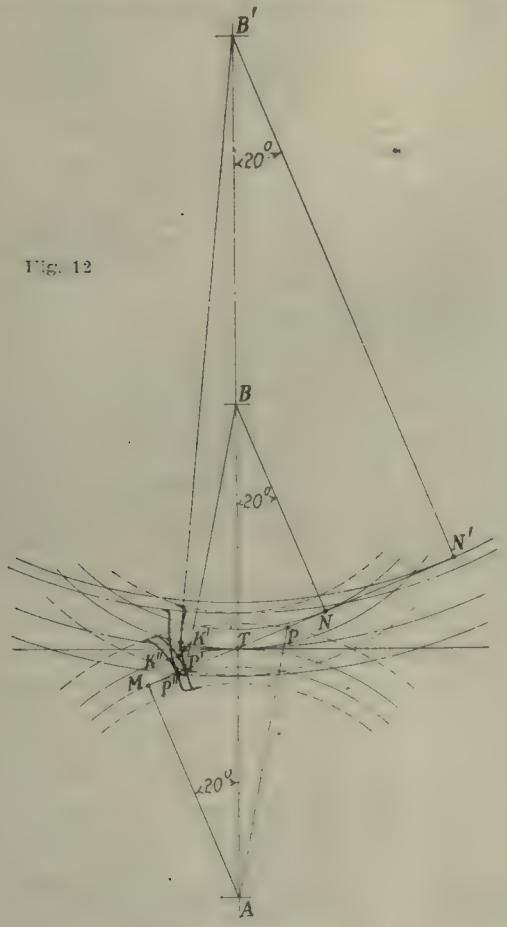
BY HOWARD H. TALBOT*

(*Concluded from page* 1473, *Dec.* 8)

LET us investigate now the possibility of using long and short addenda, so as to reduce the arc of approach and increase the arc of recess.

As before, $K'T$ = arc of approach and KT = arc of recess; and KT is greater than $K'T$. Also, to insure

Fig. 12



conditions of continuous contact, etc., total arc of contact KTK' should be at least as great as the circular pitch—better, a little greater. (Fig. 13).

Assume the addendum of the pinion as long as would be considered good practice; i.e.: equal to standard for the tooth section normal to the axis, or $\frac{1}{dp}$

This would produce a standard dedendum on the gear or driven pinion. Inasmuch as, for pinions having comparatively few teeth meshing together, the base circle usually comes between the pitch line and the dedendum circle, and since the tooth curves below the base circle are radial lines, we would have weak teeth, in the driven pinions at the root, if we made the dedendum greater than standard to suit a longer than standard addendum of the driving pinion.

If the driven gear is larger, it would be possible to increase the dedendum, say to a point where the dedendum circle would approach the base circle, with corresponding increase in addendum of the driving pinion. This increase of addendum is limited to that causing interference, or giving an undesirable degree of tooth pointedness.

*Chief engineer Woodard Machine Co., Wooster, Ohio.

It may be desirable in certain instances to increase the addendum, thus, over the standard, with these limitations. For given circular pitches, then, the arcs of action should be maintained as before. It remains then to determine the length of addenda of the driven gear, *add. B*, (Fig. 13) to make the arc of approach $K'T$ = previous total arc of action minus TK.

This addendum would be equal to that referred to the driving pinion, were TK made equal to TK'. Then $K'T$ = (previous arc for given circular pitch) — TK.

And, substituting in the original equation for addenda relative to arcs of action, we obtain the addendum for condition of equal addenda which will equal *add. B*. This addendum + the usual clearance of $\frac{0.157}{dp}$ = dedendum, *ded. A*.

Referring to Fig. 2.*

$$TK = TK' = \frac{\sqrt{(PA)^2 - (MA)^2} - AT \sin 20°}{\cos 20°}$$

Taking again the example of a 20 in. pitch diameter pinion, 20 deg. involute, let previous arc of action = $P.A.A.$

TABLE VI

	Number of Teeth				
	8	12	16	20	30
1—Diametral pitch	0.4	0.6	0.8	1.0	1.5
2—Circular pitch.	7.85 in.	5.24 in.	3.93 in.	3.14 in.	2.09 in.
3—Standard addendum $\left(\frac{1}{dp}\right)$	2.5 in.	1.67 in.	1.25 in.	1.0 in.	0.67 in.
4—*P.A.A.**	7.8 in.	5.65 in.	4.35 in.	3.65 in.	2.50 in.
5—Arc of action..	10.28 in.	7.42 in.	5.88 in.	4.9 in.	3.45 in.
6—KT (½ arc of action)† ...	5.14 in.	3.71 in.	2.94 in.	2.45 in.	1.72 in.
7—$K'T$ [(4) — (6)]	2.66 in.	1.94 in.	1.41 in.	1.2 in.	0.78 in.
*For condition of equal addenda:***					
8—PA	11.01 in.	10.68 in.	10.44 in.	10.36 in.	10.22 in.
9—Addendum B..	1.01 in.	0.68 in.	0.44 in.	0.36 in.	0.22 in.
10—Clearance $\left(\frac{0.157}{dp}\right)$	0.5 in.	0.33 in.	0.25 in.	0.20 in.	0.13 in
11—Dedendum A [(9) + (10)]	1.51 in.	1.01 in.	0.69 in.	0.56 in.	0.35 in.
12—Height [(11) + (3)]	4.01 in.	2.68 in.	1.94 in.	1.56 in.	1.01 in.
13—Dedendum B [(3) + (10)]	3.0 in.	2.0 in.	1.5 in.	1.2 in.	0.79 in.

*From curve 1 of Fig. 5, and line 8 of Table II.
†For addendum of line 3, the arcs of action being taken from curve 1 of Fig. 5.
**$KT = K'T$; solve for resulting addendum (of the driven gear); $PA = \sqrt{TK \cos 20° + AT \sin 20°)^2 + (MA)^2}$ and AT = 10 in. = pitch radius.

Line 9 gives the addenda of the driven gear to give the arcs of action (line 4) with the pinion standard addenda as in line 3 for the circular pitches of line 2. For curves based on this table see Fig. 14.

These proportions of the pinion tooth, where we have short dedenda, will, in practically all cases, give good width, without undercut at the root of the tooth, since the root or dedendum circle is very close to the base circle.

As previously mentioned, in the case of a driven gear having a small number of teeth (say, the same number as in the pinion), although there is the same thickness at the root of the tooth as in ordinary standard gearing where the dedendum $= \frac{1.157}{dp}$, these proportions may give too much undercut. It may then be desirable to re-proportion the teeth to provide standard stub tooth length of dedenda, or to a condition of equal addenda for driving pinion and driving gear.

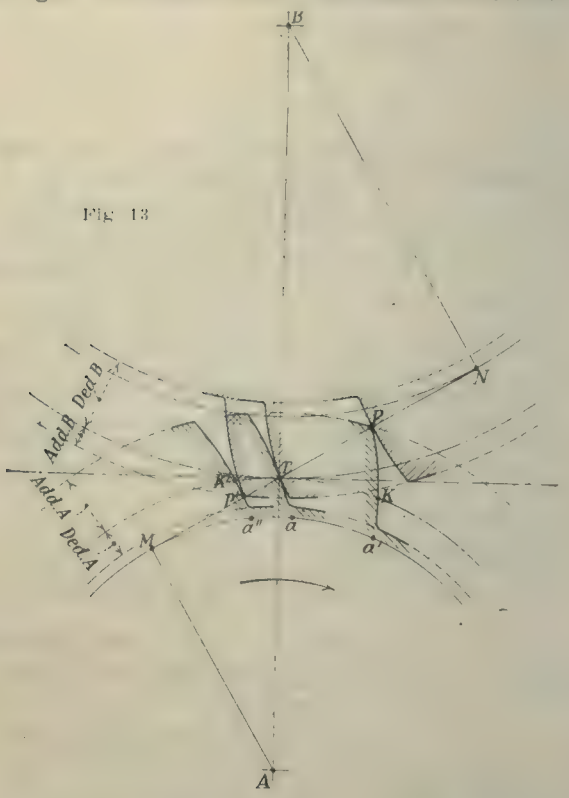
Where there are two pinions of equal pitch diameter and number of teeth, as in the case of rolling mill pinion housings, it is desirable that the pinions be in-

*The Iron Age, Dec. 8, page 1469.

terchangeable as to position, and also as to driver and driven; hence, tooth forms of equal addenda are essential.

For appreciable ratios, however, the base circle of the gear usually lies well inside of the root circle and no undercut exists. However, since the pitch line of the gear is so much nearer the outside circle than in

Fig. 13



the case of the pinion, this gives a tooth width at the root much greater than in the pinion. The opposite would be preferable, and that the pinion had the thicker teeth. This follows, in view of the fact that the pinion teeth have a greater amount of wear, or times in contact, proportionate to the ratio of reduction. This condition may be corrected by making the pinion teeth thicker at the pitch line (greater than ½ the circular pitch) to a point of about equal root thickness.

Let us lay down as a rule for the use of the foregoing proportions of teeth, that the base radius of the gear must not be greater than its pitch radius minus the pinion addendum:

or BN may equal or be less than $BT - add.\ A$

or for 20 deg. involute, the minimum pitch radius of the gear $= BT = BT \cos 20° + add.\ A$

$= 0.9397\ BT + add.\ A$

$Add.\ A = BT - 0.9397\ BT = 0.0603\ BT.$

$$BT = \frac{add.\ A}{0.0603} = \frac{1}{0.0603\ dp}$$

$$\text{Minimum pitch diameter} = \frac{1}{0.03015\ dp} = \frac{33.17}{dp}$$

The examples of the diametral pitches previously used, and corresponding pinion addenda, give the following minimum pitch diameters of the gears.

dp	0.4	0.6	0.8	1.0	1.5	2.0
Add.	2.5 in.	1.67 in.	1.25 in.	1 in.	0.67 in.	0.5 in.
PD	82.9 in.	55.29 in.	41.46 in.	33.17 in.	22.11 in.	16.58 in.

Or for the nearest whole number of teeth:

Pitch diameter	80 in.	53.33 in.	40 in.	32 in.	21.33 in.	16 in.
Number of teeth	32	32	32	32	32	32

Thus we find that for any dp, 32 teeth constitutes the least number for the driven gear, using the foregoing method of proportioning teeth.

Comparing the total heights of teeth for teeth of these proportions and teeth of the foregoing proportions for equal addenda, of total heights based on addenda in line 7, Table II vs. height, line 12 of Table VI, we can show them to be practically identical, as in Table VII.

TABLE VII

Diametral Pitch	Height (2)	Height (3)
0.4	4 in.	4.01 in.
0.6	2.69 in.	2.68 in.
0.8	2 in.	1.94 in.
1.0	1.61 in.	1.56 in.
1.5	1.07 in.	1.01 in.

(2) = Heights Table II =

$$2 \times \text{add. of line 7} + \text{clearance of } \frac{0.157}{dp}$$

(3) = Heights Table VI.

Take an example of the 20 in. pitch diameter, 16-tooth, 0.8 diametral pitch pinion and 40 in. pitch diameter, 32-tooth gear, and lay out the tooth forms to scale, as in Figs. 15 and 16.

Fig. 15 shows the teeth for the example cited, where the thicknesses of the teeth at the pitch line are equal. Fig. 16 shows, for the same example, the thickness of the pinion teeth on the pitch line, greater than that of the gear teeth, the pinion teeth being 55 per cent of the circular pitch and the gear teeth 45 per cent. Variation of these thickness proportions for any particular gear ratio is a matter for the engineer to determine in his design, having in mind the strength and wearing properties of the materials of which the gear and pinion are made.

Helical Angle

With reference to Fig. 10, and noting the relatively heavier normal tooth section for the 23 deg. angle than the 45 deg., it may be argued that the lesser angle is preferable. There is another factor, however, affecting this choice, having in mind that teeth of constant addenda and total height are being considered for any angle. In the usual gear drive used for driving steel mills, etc., there is always considerable end play of the motor armature shaft, caused by fluctuations in the load. Although a flexible coupling is generally used, a considerable amount of this impulse is transmitted to the pinion, tending to create endwise fluctuation.

It is further generally conceded to be the best practice, in rolling mill gear drives, to "anchor" the main gear between thrust collars, which are adjustable to compensate for wear. The pinion, however, should "float" in its bearings, having no side thrust collars. Did the pinion have thrust surfaces, even if adjustable,

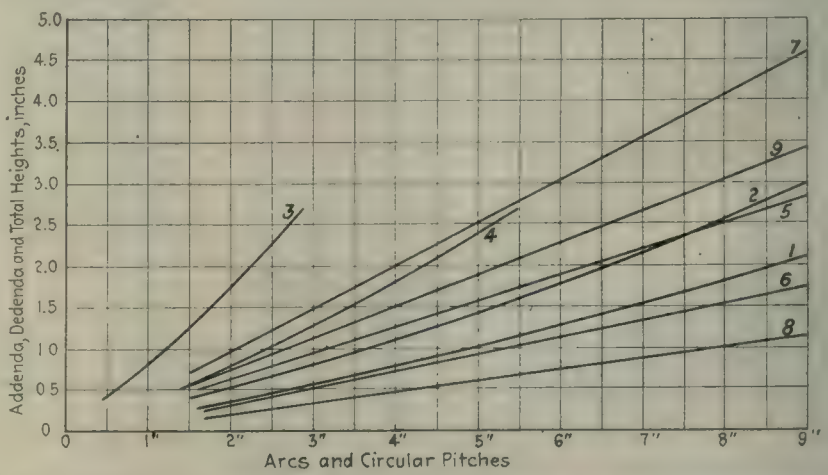


Fig. 14 Shows (1) Arc of Action vs. Addenda, for Equal Addenda on a Pinion of 20-In. Pitch Diameter; (2) Arc of Action vs. Addenda = $K'TK$ vs. Addenda of Pinion; (3) Arc of Approach vs. Addenda = $K'T$ vs. Addenda of Pinion; (4) Arc of Recess vs. Addenda = KT vs. Addenda of Pinion; (5) Circular Pitch vs. Pinion Addenda; (6) Circular Pitch vs. Pinion Dedenda; (7) Circular Pitch vs. Total Tooth Height; (8) Circular Pitch vs. Gear Addenda and (9) Circular Pitch vs. Gear Dedenda

it will be seen that, as the thrust surfaces of the main gear wore, a misalinement would be caused between the gear and pinion; the pinion would be crowded over against its thrust collar, with consequent unequal distribution of the tooth load on either "leg" of the helical teeth. Even by adjustment of the pinion thrusts, it is a difficult matter to get exact alinement.

With a "floating" pinion, alinement of the pinion in proper mesh with the gear results inherently, due

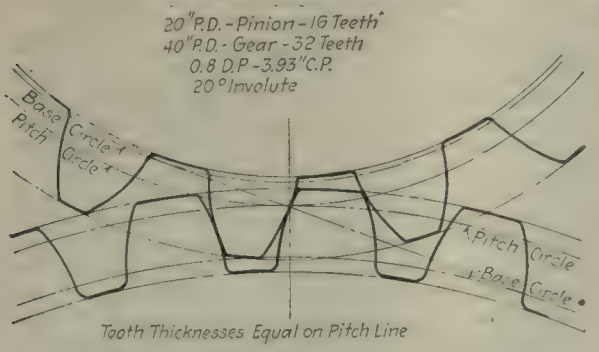


Fig. 15

to the double helix or "V" of the teeth. It may here be also stated that with the most accurately cut gear possible, especially in a drive of large reduction ratio, the line traced through the apexes of the "V" teeth around the gear will not be exactly true, resulting in a tendency to cause the pinion to fluctuate endwise. This may amount to only a few thousandths of an inch, but it is enough to cause uneven tooth pressures, if the pinion is anchored.

It will be readily seen that end play of the pinion, caused by external impulses, is resisted by the "V" of the teeth. For constant amount of backlash (x in Fig.

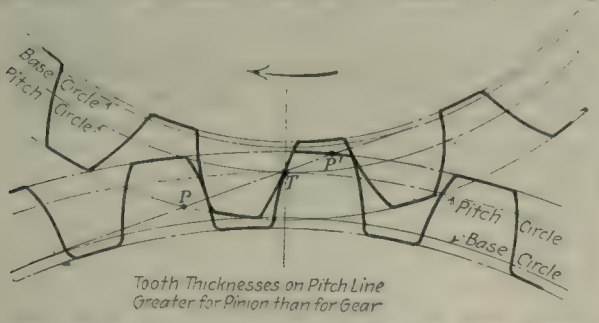


Fig. 16 Shows, Like Fig. 15, a 16-Tooth, 20-In. Pinion Meshing with a 32-Tooth, 40-In. Gear, Both Having 0.8 Diametral Pitch, 3.93-In. Circular Pitch and Being 20-Deg. Involute Gears

17) between the surfaces of the teeth (on section normal to their elements) the possible endwise movement would be (y) where

$$y = \frac{x}{\sin \alpha} = \frac{x}{0.39} = 2.56\ x \text{ for } 23 \text{ deg.} = \alpha$$

$$\text{and} = \frac{x}{0.707} = 1.41\ x \text{ for } 45 \text{ deg.} = \alpha$$

The steeper angle has then approximately twice the power to keep the gear and pinion centralized or alined.

Referring to Fig. 10, the normal section of the 45

Fig. 17



deg. tooth (though it is the ordinary standard tooth form) is a little thin, while the 23 deg. section is more stubbed than necessary. The writer believes a compromise desirable, say 30 deg. or even 35 deg., which will give a sufficiently stubbed form, and also have sufficient centralizing or alining effect on the mating gears.

The above discussion, though applying to all double helical gearing, has reference particularly to that used in the heavier drives used in steel mill and similar work. There are several different methods of cutting these teeth, also slight variation in helical angles, though nominally the same angle, when cut in different machines, resulting in the ever present difficulty of cutting a gear or pinion to mesh properly with an existing gear, always exist.

From these considerations the writer believes it impractical to attempt any standard design giving interchangeability, as we have in the involute spur gear system. The engineer will always have, then, considerable leeway in his design, and the above discussion is an attempt to clarify the principles of this design.

We summarize our conclusions, then, as follows:

20 deg. involute teeth.

Helical angle 30 deg. to 35 deg. $= \alpha$.

For 1 : 1 ratios or other ratios having equal addenda in gear and pinion, addendum $= \frac{0.707}{dp}$. (See curve, Fig. 5.)

Where the gear has more than 32 teeth, use the long and short addenda in accordance with curve, Fig. 14.

Minimum width of face $= 2.5\ CP \cot \alpha$.

Increase in Steel Exports from Germany

WASHINGTON, Dec. 13.—An increase of 25 per cent in the volume of iron and steel exports from Germany in September when compared with the average monthly exports for the preceding four months, is shown in a cabled report made to the Department of Commerce, by Commercial Attache C. E. Herring, Berlin. Exports of rolled zinc showed the remarkable increase of 90 per cent, while copper and copper goods increased 16 per cent, and coal 35 per cent. Exports of machinery showed a decrease of 12 per cent. The improvement in the German iron and steel industry, however, is partially offset by labor unrest. Mr. Herring refers to a strike declared on Nov. 14, by 60,000 Dusseldorf metal workers, who demanded an increase in wages. This dispute has been settled by the raising of the average wage level 15 per cent and full work was resumed on Dec. 4. The total production in the metal trade was apparently reduced by 2 per cent during the period of the strike.

Estimated figures for Germany's foreign trade during September and October show that both imports and exports are increasing. Total imports for October are estimated at 3,000,000 metric tons, valued at 13,900,000,000 paper marks, as against 2,500,000 metric tons in September, valued at 10,668,000,000 paper marks. Total exports for October amount to 1,970,000 metric tons, valued at 9,700,000,000 paper marks as against 1,870,000 metric tons in September, valued at 5,519,000,000 paper marks.

Studying Problems of Industrial Mobilization

WASHINGTON, Dec. 13.—An exhaustive study is now being made by the office of the Assistant Secretary of War, based on records of the War Industries Board and the Council of National Defense, in relation to the problem of industrial mobilization, says Secretary of War John W. Weeks, in his annual report in connection with the discussion of the subject of preparedness for national defense. This will form the basis of plans for industrial mobilization to be amplified by the supply branches of the War Department.

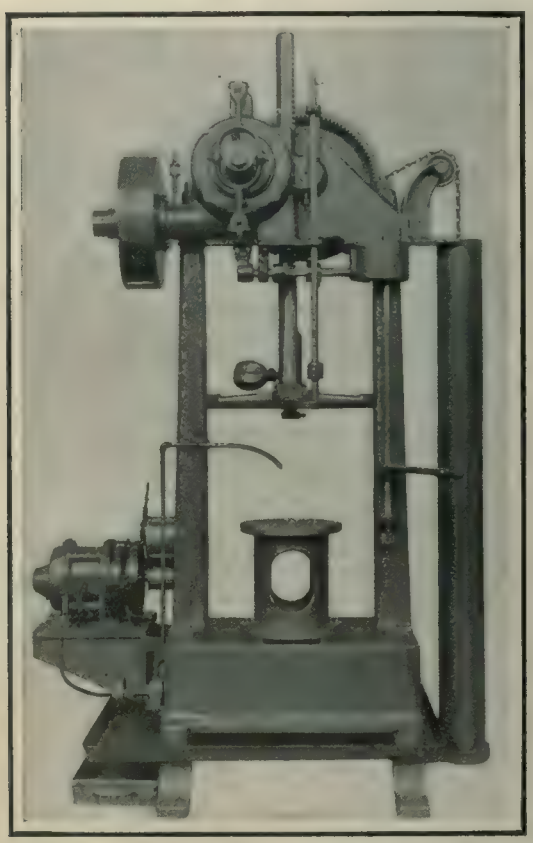
The problem of industrial mobilization has been divided into its elements relating to commodities, labor, power, and transportation. Secretary Weeks points out that there must be the closest co-operation between the technical elements of national defense and the industries of the country. He says that the four most important fields for such development appear to be those relating to mechanical traction and transport on land, explosives production, chemical warfare, and the control of the air. Plans initiated for preparedness of national defense contemplate a more complete state of preparedness than at any period of peacetime in the history of the country, but there remains a great deal to be done.

This subject is dealt with in greater detail by the different bureaus.

New Vertical Broaching Press

A vertical push-broaching machine which is a modification of its power forcing press, a general purpose machine, has been placed on the market by the Lucas Machine Tool Co., Cleveland. Two sizes are regularly made, for 15 and 30 tons capacity, the machine shown in the accompanying illustration being the 15-ton size, equipped with motor drive.

The new machine is said to be modified to increase its usefulness on repetition work, where speed and ease of handling count heavily, by increasing the speed of the stroke and by the addition of a quick power return and lever control. One outstanding field for the machine, it is claimed, lies in the substitution of vertical push broaching for horizontal pull broaching on certain



The Operating Lever on the Rod in Front of Right Hand Column Is Adjustable Vertically for the Operator's Convenience

work, with the advantage of shorter and therefore less expensive broaches; better lubrication of cutting edges of broaches; natural and easy positioning of the work on a horizontal surface; ease of operation; and much less floor space. The machine is also well adapted for production assembling, the lever control and automatic quick return of the ram giving the operator time to take out the finished work and put in a new piece.

The working elements consist of a ram actuated by gearing which is controlled by a friction engaging a worm wheel driven continuously by a worm on the pulley shaft. This friction is controlled by a horizontal operating lever which is adjustable vertically on a rod in front of the right hand column; an arrangement intended for convenience of the operator when either standing or sitting. Moving the lever to the left engages the clutch and starts the ram on its down or pressure stroke. The ram continues to descend until the upper trip on the trip rod strikes a dog on the horizontal shaft connected by bevel gears with the vertical shaft to which the operating lever is attached, which stops the downward movement of the ram. The trip rod is located in front of the ram and is adjustable to operate at any point.

Moving the operating lever to the right starts the ram up, at a quick rate, and it continues until the lower trip strikes the dog, which stops the motion and completes the cycle.

The gage is graduated to register the pressure in tons and provision is made on the gage itself for convenient replenishing with liquid of the reservoir above the plunger. An adjustable friction drive, adjacent to the pulley, has been provided which can be adjusted to any pressure up to the maximum capacity of the press. It consists of asbestos washers between friction disks which are adjusted by nuts outside of the pulley.

In the standard machines the distance between housings is 25 in. and 30¼ in., for small and large machines, respectively. The greatest distance from the base to the end of the ram is 48 in., the height of the base without pan being 12 in. in both cases. The distance from the floor to the top of the base, including pan, is 21 in. The circular broaching stand is 16 in. high and 15 in. in diameter. The speed of the driving pulley is approximately 500 r.p.m. The speed of the ram, power down stroke, is 9 ft. per min. in the small machine and 6 ft. per min. in the larger, the speed on the quick return up stroke being 21 ft. per min. and 15 ft. per min. respectively. The net weights are approximately 2900 lb. and 3800 lb. respectively. A high pattern with vertical capacity of 60 and 72 in. for both sizes is furnished. For electric drive the size of the constant speed motor required is 7½ and 10 hp. respectively, the motor speed recommended being 1200 r.p.m.

Muskegon Foundry Company Will Open New Unit After Jan. 1

The new unit of eight contemplated units of the Campbell, Wyant & Cannon Foundry Co., castings for the automotive industry, will be opened shortly after Jan. 1 at Muskegon, Mich. This will be known as Plant No. 3, Plants Nos. 1 and 2 having been outgrown.

In planning the new foundry sufficient ground was obtained to provide for future expansion and have building sites for employees houses. The company purchased 200 acres and the new plant is one of eight to go on a tract of 80 acres, especially set aside for foundry purposes. There are four acres under roof in the new unit. When placed in operation, the company's total employees will be 3000 and the daily production over 1,250,000 lb. of castings.

A total of 65,000 sq. ft. of glass is used in the roof and side wall sash. The building is 350 x 420 ft. and the roof area is 165,000 sq. ft. The materials yard, 90 x 560 ft., will be served by a 5-ton crane, augmented by an electric magnet. The plant is on the tracks of the Muskegon Belt Line Railroad, which connects with the Pennsylvania, Grand Trunk and Pere Marquette railroads. Twelve cars may be loaded at a time at the 25 x 420 ft. platform.

One hundred and thirty electric motors will be installed; no less than 650 hp. for motors will be needed to supply the required compressed air for molding machines, etc.

The plant was started in Muskegon in 1908, though the three original partners joined in 1905 in Chicago. Though the partners were the sole working force at the start, by the end of the first year 25 were employed.

Models of early electrical illuminating apparatus of a historical and educational value may be placed on display in the rooms of the Edison Pioneers on the ninth floor of the Engineering Societies Building, New York. The Edison Pioneers is described as "an exclusive society, consisting of men who had been intimately associated with Thomas Alva Edison in the early and memorable days of his career." At a recent meeting, the constitution of the organization was revised to provide for a class of membership, known as "descendant members," to consist of the sons and daughters of actual members. Frederick A. Scheffler was elected president. F. A. Wardland is secretary pro tem, room 2077, 50 Church Street, New York.

Steel Revival Depends on Ore Rate Reduction

Chicago Hearing on Upper Lake Iron Ore Rates Brings Out Pointed Testimony from John A. Topping, A. C. Dinkey and Others

"UNLESS the railroads are willing to reduce the cost of transportation, many consumers of Lake ores will be forced out of business or compelled to seek other sources of supply; in other words, the railroads must abandon the policy heretofore followed of exacting all that traffic will bear, and adopt a policy of co-operation, for unless a policy of enlightened selfishness is adopted many steel companies will be unable to live and the carriers will lose much of this highly profitable traffic."

This statement was a salient passage in testimony of John A. Topping, chairman Republic Iron & Steel Co., as the delegated representative of all complainant companies in a hearing before Howard Hosmer, examiner of the Interstate Commerce Commission, which began at the Great Northern Hotel, Chicago, on Dec. 7.

The first hearing on this case was held before the same examiner in Chicago, July 25, but a continuance was granted to give the railroads an opportunity to examine the voluminous cost exhibits put in by the complainants. It was alleged in the complaint that the rates charged for the transportation of iron ore from the various upper Lake ranges to the Lake docks are unreasonable and unduly preferential in favor of the United States Steel Corporation, through its subsidiaries, and unreasonably discriminatory against iron ore as a commodity. The case, designated as No. 12071, Adriatic Mining Co., et al., complainants, versus the Chicago & North Western Railway Co. et al., defendants, concerns 87 iron mining, ore handling, and iron and steel companies. At present there is a blanket rate applying from all of the Lake Superior ranges to docks of $1 a gross ton, including a dock charge of 5c. Prior to the war the rate from the Mesabi and other Minnesota ranges to the docks was 55c., and from Wisconsin and Michigan mines, 45c.

High Freight Rates a Cause of Depression

"The present demoralized and depressed condition of the iron and steel industry of the country is, of course, due to a great many causes," declared A. C. Dinkey, president Midvale Steel & Ordnance Co., at the hearing, "but one of the chief of them is lack of response by the railroads to the call for a liquidation of freight rates." He pointed out that all iron and steel costs other than freight have been materially reduced, and prices have declined to such an extent, in fact, that independents have been showing heavy losses, but that it is unreasonable to expect business to return to anything like normal volume, unless all freight rates, especially those on raw materials, are substantially reduced.

Whereas railroad executives and railroad labor leaders have been stoutly insisting on the maintenance of war freights and war wages, Mr. Topping pointed out in his testimony, steel manufacturers and their employees have already made heavy contributions toward cheaper iron and steel. As evidence he presented comparative composite prices of finished steel, as published in THE IRON AGE, showing that present going quotations are 60 per cent below the war peak and are only 26 per cent above the ten-year pre-war average. His argument is given below:

Statement of John A. Topping

"WHILE general argument will be presented in this case by counsel to show that rate relief should be granted as a matter of equity, may I not point out to your commission and the defendant carriers, as the delegated representative of the complainant companies, some of the business aspects of the iron and steel situation, as related to the economic necessity for restoring not only to the producers but also to the consumers of Lake Superior ores their former competitive situation, in order that the highly profitable traffic of transporting Lake ores may be resumed on more nearly a normal basis.

Lessening Percentage of Lake Ores

"In order that you may have a clear understanding of the competitive situation, it may be stated that, as a result of raw material supplies being developed elsewhere, the country is now less dependent than formerly, upon Lake Superior ores. This fact is clearly evidenced by the great growth of steel production in the East and South, and by the growing importance of the Pacific coast steel industry. See exhibit A.

"In the South, very large iron ore reserves exist, which can be cheaply mined and transported, due to the fact that coal and iron are in close proximity. At tidewater points, high grade foreign ores are now obtainable at considerably less price than Lake ores, as a result of developments in iron mining in Cuba, Chile and Brazil, which ores now supplement supplies heretofore obtained from Sweden, Spain and other points. These foreign ores promise more formidable competition than heretofore, because of the great growth in ocean shipping, with its intensified competition and lower freights. For details of prices at various delivery points, see exhibit F.

"As to the South, it is well known that large extensions to the steel-making capacity could be quickly made available by diverting present pig-making capacity to steel-making purposes. In addition to the menace of this competition of cheaper overseas ore and the cheaper ores from the South, I call your attention to the decreasing requirements for Lake Superior ores, as reflected by the decline in the percentage of Bessemer steel produced, which for many years was the backlog in support of the Lake Superior ore trade.

"The force of this claim is emphasized by an examination of the figures of production for the past 20 years. These figures show that for the year 1900 the Bessemer steel production was approximately 66 per cent of the total steel output, but that production for the year 1920, of Bessemer steel, was only 21 per cent of the total steel output for that period, whereas open-hearth steel increased from 33 per cent to 79 per cent of the total output. It is also significant that while the total steel production since 1900 increased approximately 320 per cent, pig iron—one of steel's raw materials—increased only about 167 per cent, due to the increasing use of scrap iron. For tables of pig iron and steel production see exhibit E.

"Do not these figures eloquently proclaim that the constant increase over the past twenty years in the cost of Lake Superior ores, at various points of consumption, has resulted in driving out of many competitive fields Bessemer steel, and the ores from which this steel is made? Furthermore, do not the figures clearly indicate that non-Bessemer Lake ores are being gradually supplanted by such substitute material as scrap iron and other ore supplies which are being developed elsewhere? While the production of Lake ores has shown substantial growth since 1900, and has increased about 215 per cent, yet this growth is not commensurate with the 320 per cent increase which has taken place in steel production. For details of iron ore production see exhibit B on the next page, a 20-yr. summary.

"The explanation of these figures of production, and of the slower growth indicated by both pig iron and iron

ore, is that in the production of open-hearth steel about 60 per cent of the metallic charge used may be scrap; this leaves only 40 per cent of the charge pig iron. In Bessemer steel-making 100 per cent of pig iron is required. As it takes two tons of ore to produce a ton of pig iron, and inasmuch as a ton of scrap is equal for melting purposes to a ton of pig iron, it will be obvious that an enormous displacement of iron ore by scrap iron results by the manufacture of open-hearth steel. This ore displacement represents not only a direct loss to the Lake ore carriers, but also, through idle blast furnaces and Bessemer steel works, an enormous loss to capital invested, through inability to meet the competition of cheap scrap and the cheaper non-Bessemer ores found outside of the Lake districts.

Exhibit A.—Steel Producing Companies Not Dependent Upon Lake Ores. Data from Iron and Steel Institute Directory, 1920

State	Name of Company	Capacity Gross Tons	
Alabama	Gulf States Steel Co...	288,000	
	Anniston Steel Co.....	19,200	
	Tennessee Coal, Iron & Railroad Co.	1,115,000	1,422,200
California*	Southern California Iron and Steel Co.	66,000	
	Judson Mfg. Co.....	55,000	
	Pacific Coast Steel Co..	145,000	
	Llewellyn Iron Works..	35,000	301,000
Oregon and Washington	Pacific Coast Steel Co..	115,000	
	Western Rolling Mill Co.	building	115,000
Colorado and Utah	Colorado Fuel & Iron Co.	1,138,000	
	Utah Steel Co.....	50,000	1,188,000
			3,026,200
	In addition to the above is the Bethlehem Steel Works, whose present and future raw material basis is Chilean and Cuban ores—annual capacity		3,132,000
	Total tonnage of steel-making capacity, non-dependent upon Lake ores		6,158,200

*[Since the Directory was published the Columbia Steel Co., Pittsburgh, Cal., has added 50,000 tons of open-hearth capacity to supply steel to a bar rolling mill.—EDITOR.]

Open-hearth Cheaper Than Bessemer

"The cause of this revolutionary change in steel process is not due to one but a number of influences, not the least of which is that standard open-hearth steel is cheaper than standard Bessemer, and is as desirable for most purposes and more desirable for many. Open-hearth steel is cheaper to produce, because the long haul on Lake ores is minimized by the use of a larger percentage of scrap, and also because the process admits of the use of cheaper ores of a higher phosphorus content. Such ores are found in many places outside of the Lake region, and while they cannot be used in Bessemer practice, are available for the open-hearth method of steel-making. Furthermore, iron ores used for non-Bessemer purposes, such as are found in Alabama, Colorado, New York and New Jersey, are smelted locally and therefore involve short rail hauls. What is true of the local ores used in open-hearth steel practice is likewise true to a large extent of the scrap iron used, viz., local supplies and short rail hauls. Where foreign ores are used, cheap water transportation recommends their use for economic reasons.

Use of Ore Must Be Stimulated

"As a result of these various influences, the percentage of Lake ores consumed in the production of a ton of steel has been gradually reduced, and will be further reduced unless the Lake ore trade is restored to its former position through reduced cost of transportation.

"In considering the business aspects of the Upper Lake rates of freight on iron ore, it is clearly evident that mutuality of interest should exist between the carriers and shippers, and unless the railroads are willing to reduce the cost of transportation, many consumers of Lake ores will be forced out of business or compelled to seek other sources of supply. In other words, the railroads must abandon the policy heretofore followed of exacting all that traffic will bear, and adopt a policy of co-operation; for unless a policy of enlightened selfishness is adopted many steel companies will be unable to live, and the carriers will lose much of this highly profitable traffic.

"It may be questioned by some whether the scrap supply is sufficient in quantity to maintain the demands being made upon this substitute material by the open-hearth steel producers. My answer to that question is: Scrap to-day is relatively cheaper than pig iron and in abundant supply, and as the steel production of the country increases in total, so will the tonnage of scrap increase in proportion; furthermore, the older our civilization becomes, the more scrap will be made available, as a result of wear and tear on steel products; at least the history of European steel production suggests that scrap supply grows with time.

Liquidation of Steel Values

"As indicating to what extent the steel people have gone, with respect to stimulating business and traffic, in response to the demand for lower cost of iron and steel, I can state without qualification that we have not only liquidated our cost of production over 40 per cent, but in addition thereto have liquidated all profit in production; in fact, most of us, or at least those of us who are entirely dependent upon the common carriers for freight rate protection, are making current losses of such a substantial nature that capital investment is threatened unless quick relief is granted.

Heretofore not only railroad executives, but the union railroad labor leaders, have all stoutly insisted upon the maintenance of war freights and war wages, the railroad executives claiming that freight rates could not be reduced on account of revenue necessities; the labor leaders maintaining that there was no necessity for liquidating labor. The public, however, in no uncertain voice demands a return to lower values in support of lower living costs, and this demand has been very generally met by capital and labor engaged outside of the transportation field. This same public will unquestionably insist upon capital and labor engaged in transportation making a generous contribution to cheaper living costs.

Exhibit B.—Summary of Iron Ore Shipped During Years 1900-1920, as Compiled by the Lake Superior Iron Ore Association

Year	Bessemer	Non-Bessemer	Total Tons
1900	12,020,639	7,059,740*	19,080,379*
1901	12,733,469	7,559,776	20,293,245
1902	17,750,293	9,812,273	27,562,576
1903	15,424,572	8,868,388	24,292,960
1904	14,191,891	7,563,468	21,755,359
1905	20,890,708	13,361,407	34,252,115
1906	22,514,807	15,906,366	38,421,173
1907	23,563,400	18,607,478	42,170,878
1908	13,493,378	12,399,160	25,892,538
1909	18,111,426	24,392,684	42,504,110
1910	19,397,078	23,946,410	43,343,488
1911	15,026,290	17,651,211	32,677,501
1912	20,297,322	27,820,194	48,117,516
1913	19,451,931	30,350,176	49,802,107
1914	12,201,035	20,422,925	32,623,960
1915	15,724,430	31,467,737	47,192,167
1916	22,866,340	43,572,745	66,439,085
1917	22,155,336	42,145,035	64,300,371
1918	20,289,507	42,448,609	62,738,116
1919	15,863,300	32,590,532	48,453,832
1920	19,596,473	40,685,528	60,282,001

*Estimated.

NOTE:—The increased Bessemer production since 1900 is approximately 63 per cent; increased non-Bessemer production since 1900 is approximately 480 per cent; total average increase of both Bessemer and non-Bessemer since 1900 is approximately 224 per cent.

Lower Freight Rates for the Farmer

"I am gratified to observe that this voice has finally been heard and that a 10 per cent reduction in freight rates on farm products has been recommended by rail-

road executives, which, while the amount is small, is a move in the right direction.

"If relief to the farmers is necessary to restore normal activity of farm products and normal prosperity to the farmer, it is equally important to consider broad, general relief measures not only for the iron ore trade, but generally the iron and steel trade, because our business is notably a key industry, and to a large extent the prosperity of many other industries depends upon steel prosperity and steel prices. The carriers themselves will be enormously benefited by cheaper steel; the building trade, now stagnated, will be quickened into greater activity; the makers of agricultural machinery, whose plants are now mostly idle because the farmers demand cheaper machinery, will be enabled to resume operations on a lower cost basis, and many other industries dependent upon iron and steel likewise stimulated into greater activity. On the other hand, unless rail freight reductions are made, iron and steel prices must be advanced, because we cannot indefinitely conduct our operations at a loss, as we are now doing.

"As previously stated, steel manufacturers and their employees have already made heavy contributions toward cheaper iron and steel, by drastic liquidation of not only their profits, but labor cost as well. Iron and steel prices have been reduced approximately 60 per cent, current prices averaging less than 26 per cent above the pre-war 10-year average; in fact, current prices represent a loss in production of from $5 to $10 per ton, notwithstanding labor costs have been reduced about 46 per cent below the war level. I submit herewith price data compiled by THE IRON AGE. See exhibit C.

"As compared with these figures, freight rates both in and outbound are about 90 per cent above 1913 rates; in fact, at current prices for steel-making pig iron (approximately $20 per ton) freight charges represent about one-half of the pig iron value. As an illustration of what this freight increase means, I would state that our company (Republic Iron & Steel Co.) disbursed for the year 1913, on account of inbound freights, $4,033,000, while in 1920 it paid approximately $7,610,000—both years' freights applying on a tonnage slightly in excess of 5,000,000 tons.

Steel as a Large Freight Maker

"As our company produces about 1,000,000 tons of steel per annum, these figures indicate that for every ton of outbound shipments the railroads receive five tons of inbound freight, or in other words obtain six tons of freight for every ton of steel we produce. With our freight charges nearly doubled on five tons of inbound supplies, required in the production of one ton of outbound finished product, and iron and steel prices 60 per cent below the peak, current losses are easily accounted for. In this connection I submit as exhibit D the income statements of three of the larger so-called independent steel companies, which rely entirely upon the common carriers for their transportation, as they do not conduct railroad operations in connection with their steel-making operations.

"When it is considered that all these companies are fully integrated and own their own supplies—iron ore and coal—and to some extent vessel interests on the Great Lakes, and that these companies have been able under pre-war conditions to operate profitably, but are unable to do so under existing conditions, it would seem obvious that with management unchanged and facilities no less favorable than heretofore, the explanation for their current excessive losses is to be found in the unfair freight burdens now imposed.

"While the condition of the larger independent companies is difficult, it will appear obvious that the many smaller companies, without the advantages of integration, and which do not own their own raw materials, are even more seriously affected. It is equally obvious that iron and steel plants wholly dependent upon rail transportation for both coal and iron ore are greater sufferers from war freights than are those plants which enjoy the benefits of river and lake transportation, or those which control or own railroad transportation.

"It should be apparent to this commission and the defendant carriers, therefore, that unless fair competitive conditions are restored, through freight rate reductions, and fair readjustments of differentials, many large consumers of Lake ores will be driven out of business, in which event the railroads will not only be enormous losers but heretofore prosperous communities will also go into decay.

Export Trade and Lower Freights

"I would also call attention to the necessity for cheapening steel production, through cheaper transportation charges, in support of the export trade for iron and steel, for it will require the fullest co-operation between transportation interests and the steel producers to maintain foreign trade connections established during the past ten years. In normal times about 10 per cent of our total capacity has been exported; today, owing to the growth of production, which was stimulated by war necessities, I estimate we have not less than 25 per cent of our present capacity available for export. This surplus estimate is based upon a full home demand. Current exports are running not far from 3 per cent of our total capacity. Current sales abroad are being made at losses far in excess of what the business justifies us in accepting, and these current sales in foreign markets are being continued only with the hope that we will be relieved of part of the burden of maintaining this business by lower costs brought about through reduction in freights.

"The problem before us is a big one, but should be worked out to the satisfaction of all interests by intelligent study and co-operation. More nearly pre-war conditions must be re-established, particularly with respect to the restoration of fair differentials between the various producing districts, and by such reductions in freight rates as will put all iron and steel districts on a fairly competitive basis. To do this, due regard will have to be given to all competitive influences, water competition not excepted.

Freight Reductions Should Come Soon

"Shippers generally realize that cost of conducting transportation is abnormal and must be liquidated, otherwise normal freights cannot be re-established. We also believe, however, that the railroads should not

Exhibit C.—"Iron Age"

records show composite price of finished steel:

July, 1917 @ $5.334 per 100 lb.
Nov., 1921 @ 2.113 per 100 lb.
10-year pre-war average 1.684 per 100 lb.

Present prices are 60 per cent below "peak," and are only 26 per cent above 10-year pre-war average.

Average Grades Pig Iron

July, 1917, @ $52.19 per ton
Nov., 1921, @ 19.81 per ton
10-year pre-war average 15.72 per ton

Present price is 62 per cent below "peak," and about 26 per cent above 10-year pre-war average.

Exhibit D

	1921 Republic Iron & Steel Co. Quarters			1921 Lackawanna Steel Co. Quarters			1921 Midvale Steel & Ordnance Co. Quarters		
	1st	2d	3d	1st	2d	3d	1st	2d	3d
Net earnings, after provision for all taxes	$521,497	*$453,574*	*$1,037,743*	$667,695	*$384,762*	*$580,936*	$536,577	$571,524	$688,238
Interest	184,244	224,269	194,319	260,038	258,891	258,516	760,287	755,439	745,048
Depreciation, etc.	232,642	205,830	166,348	398,922	339,474	368,823	1,171,492	1,105,478	1,192,326
Profit or *deficit*	$104,611	*$883,673*	*$1,398,410*	$8,735	*$981,127*	*$1,208,275*	*$1,395,202*	*$1,289,393*	*$1,249,136*

delay a start toward normalcy, but should immediately revise their commodity schedules as much as possible. If this revision involves wage reductions, make them effective, as lower wages generally prevail in all trades as a result of lower living costs, and railroad labor should not be exempt.

"The Adamson law as a war measure may have been justified, but is it justified as a peace measure?

Exhibit E.—Production of Steel Ingots and Pig Iron as Compiled by the American Iron and Steel Institute for the Years 1900-1920—Gross Tons

	Steel Ingots:				
Years	Open Hearth	Bessemer	Crucible	Other	Total
1900	3,398,135	6,684,770	100,562	4,862	10,188,329
1901	4,656,309	8,713,302	98,513	5,471	13,473,595
1902	5,687,729	9,138,363	112,772	8,386	14,947,250
1903	5,829,911	8,592,829	102,434	9,804	14,534,978
1904	5,908,166	7,859,140	83,391	9,190	13,859,887
1905	8,971,376	10,941,375	102,233	8,963	20,023,947
1906	10,980,413	12,275,830	127,513	14,380	23,398,136
1907	11,549,736	11,667,549	131,234	14,075	23,362,594
1908	7,836,729	6,116,755	63,631	6,132	14,023,247
1909	14,493,936	9,330,783	107,355	22,947	23,955,021
1910	16,504,509	9,412,772	122,303	55,335	26,094,919
1911	15,598,650	7,947,854	97,653	31,949	23,676,106
1912	20,780,723	10,327,901	121,517	21,162	31,251,303
1913	21,599,931	9,545,706	121,226	34,011	31,300,874
1914	17,174,684	6,220,846	89,869	27,631	23,513,030
1915	23,679,102	8,287,213	113,782	70,939	32,151,036
1916	31,415,427	11,059,039	129,692	169,522	42,773,680
1917	34,148,893	10,479,960	126,716	305,038	45,060,607
1918	34,459,391	9,376,236	115,112	511,693	44,462,432
1919	26,948,694	7,271,562	63,572	387,404	34,671,232
1920	32,671,895	8,883,087	72,265	505,687	42,132,934

NOTE: It will be observed from the above table that the growth of the steel production of the country since 1900 has been 314 per cent.

	Pig Iron:			
Years	Anthracite	Charcoal	Bituminous*	Total
1900	1,677,048	384,482	11,727,712	13,789,242
1901	1,712,527	383,441	13,782,386	15,878,354
1902	1,115,247	390,169	16,315,891	17,821,307
1903	1,911,347	505,684	15,592,221	18,009,252
1904	1,228,140	337,529	14,931,364	16,497,033
1905	1,674,515	352,928	20,964,937	22,992,380
1906	1,560,686	433,007	23,313,498	25,307,191
1907	1,371,554	437,397	23,972,410	25,781,361
1908	355,009	249,146	15,331,863	15,936,018
1909	698,431	376,003	24,721,037	25,795,471
1910	649,082	396,507	26,257,978	27,303,567
1911	229,575	278,676	23,141,296	23,649,547
1912	247,179	347,025	29,132,733	29,726,937
1913	300,041	339,981	30,326,130	30,966,152
1914	91,464	263,924	22,976,856	23,332,244
1915	84,753	296,152	29,535,308	29,916,213
1916	217,788	372,411	38,844,598	39,434,797
1917	381,048	376,525	37,863,643	38,621,216
1918	283,592	348,877	38,422,175	39,054,644
1919	138,337	327,097	30,549,930	31,015,364
1920	302,567	323,396	36,300,024	36,925,987

*Coke.

NOTE: It will be observed from the above table that the growth of the pig iron making capacity of the country since 1900 has been 176 per cent.

GENERAL REMARKS: The iron ore displacement which has taken place since 1900, as reflected by the production figures above noted, is clearly emphasized. Growth in pig iron production since 1900 has been 176 per cent, whereas the increased output of steel was 314 per cent.

For it is well known that the effect of this law has been to establish a basic eight-hour day, rather than eight hours of work, and as a result does not shorten the day's work, but does lengthen the day's pay.

"While it is a matter of history that the iron and steel industry of this country was founded upon Lake ores, and is now largely dependent upon these raw materials, yet, as heretofore pointed out, Lake ores are being rapidly displaced by various other raw materials, exclusive of scrap, as evidenced by the steel producing capacity of the Pacific Coast, Rocky Mountain districts, Alabama and the Atlantic seaboard, which sections now produce approximately 6,160,000 tons per annum. As the iron mines of the districts named contain large reserves, the potential producing capacity of these districts is largely in excess of their present capacity.

"Aside from the competition within our borders, the Canadian steel production has now reached a total of approximately 1,500,000 tons per annum and is also subject to large extension. It should be apparent, therefore, that the effect of all this competition has been and will be to localize the influence of Lake ores by narrowing the markets for iron and steel products produced from them, unless fuller consideration is now given the weakness of our present competitive position by reductions in freight on Lake ores, and also by reductions in freight on iron and steel products generally, in order that all our markets may be broadened and demand stimulated; for it should not be overlooked that iron ore moves only in response to the demand for pig iron and steel, and that the demand for these products is dependent upon our ability to maintain prices low enough to encourage the maximum use of these materials.

"If this economic principle is accepted—that high prices discourage and low prices stimulate demand—then the only question at issue is, to what extent the railroads should immediately reduce freight charges. As to their ability to make a substantial start toward liquidating transportation charges on iron ore and iron and steel products, there is but little doubt, in view of the gradual reductions being made in railroad operating costs, which are reported by the Bureau of Railroad Economics, for October, to show a reduction of 24.2 per cent.

Railroads Fare Well by Comparison

"Another authority, *Wall Street Journal*, reports that October railroad income shows about 5 per cent earned on the total valuation of the roads, and that the amount earned was about 85 per cent of what the Transportation Act set up as a fair basis for capital return. This same authority estimates that the railroad returns for the year 1921, notwithstanding the poor showing made in the early part of the year, will average close to 3½ per cent on total railroad valuations. While it may be conceded that railroad profits are in no sense excessive, based on their average showing for this year, yet by comparison with the financial showing of the steel companies, the railroad position is one of affluence, as the steel people would be well satisfied to be able to earn 5 per cent on their total property values. Under present prospects, however, there is no hope of any profit, as we see no escape from continued losses which are currently averaging from 5 per cent to 10 per cent on invested capital. The present condition of the iron and steel business is one of extreme depression, and while some improvement has been made with respect to a slightly increased demand, it is the general opinion of most of us that further improvement will undoubtedly be slow and that further readjustment must be made before a return to normal conditions can be hoped for.

"How far we are from a normal demand is suggested by the present rate of consumption of pig iron per capita, which is approximately 280 lb.; in other words, the rate of consumption has dropped back to the rate approximate for the year 1896, at which time the population was 70,000,000, as compared with the present population of approximately 110,000,000.

Exhibit F.—Prices of Foreign and Lake Superior Iron Ores Delivered at Various Eastern Points in 1921

		—Foreign Ores—		—Lake Superior Ores—			Net Margin in Favor of
Point of Delivery	Average Price C.I.F. Atlantic Ports	Freight* from Nearest Port	Delivered Price	Lake Erie Price	Freight* from Nearest Port	Delivered Price	Foreign Ores	Lake Superior Ores
Sparrows Point	$5.46	....	$5.46	$5.80	$2.31	$8.11	$2.65	
Chester	5.46	$1.12	6.58	5.80	2.24	8.04	1.46	
Wharton	5.46	1.26	6.72	5.80	2.24	8.04	1.32	
Bethlehem	5.46	1.40	6.86	5.80	2.24	8.04	1.18	
Coatesville	5.46	1.26	6.72	5.80	2.24	8.04	1.32	
Reading	5.46	1.54	7.00	5.80	2.24	8.04	1.04	
Lebanon and Harrisburg	5.46	1.68	7.14	5.80	2.24	8.04	.90	
Johnstown	5.46	2.66	8.12	5.80	1.53	7.33		$0.79
Earlston	5.46	2.66	8.12	5.80	2.01	7.81		.31
Pittsburgh	5.46	2.80	8.26	5.80	1.36	7.16		1.10

*Based on rates in effect prior to Oct. 20, 1921.

NOTE:—From data furnished by the Midvale Steel & Ordnance Co.

"The limited demand for pig iron fairly reflects conditions in the steel trade, as the current production of steel ingots does not exceed 40 per cent of capacity. Financial statements of the independent iron and steel companies, as previously stated, indicate that they have gone as far as is possible for them to go, through sacrificing profits by reduction in prices, to stimulate demand, and it is clearly up to the railroads to make the next move. Any temporary sacrifice of profits which the carriers may make, through reduction in freight rates, will unquestionably be more than offset by an increased volume of business; and when it is considered that the most profitable business which the carriers have is the long haul and highly profitable iron and steel traffic, it is at least debatable whether reductions in freight rates on iron and steel commodities would prove to be a sacrifice, or rather a move in the direction of increasing railroad profits."

Statements of A. C. Dinkey and Others

PRESIDENT A. C. DINKEY, president Midvale Steel & Ordnance Co., submitted the following:

"The present demoralized and depressed condition of the iron and steel industry of the country is, of course, due to a great many causes, but one of the chief of them is lack of response by the railroads to the call for a liquidation of freight rates.

"In the iron and steel costs other than freight, and in the prices charged, the liquidation that has taken place can be shown by examining two items, viz., commodity prices and wage rates. After the armistice and in the early part of 1920, the price for structural steel and bars was 2.65c. per lb.; to-day it is 1.50c., a decline of approximately 43 per cent. The wage rate declined from 46c. per hour for common labor to 25c., equal to 46 per cent. In the case of our own company, which is one of the best equipped of the so-called independents, our loss for the first three quarters of this year is $3,933,000, and this is typical of other steel companies which depend upon the sale of steel only for their final profit or loss.

Five Tons of Inbound Freight for Every Ton of Outbound

"The steel industry is more intimately tied up with transportation facilities and transportation costs than any other basic industry, due to the fact that it employs and moves five tons of inbound freight for every ton of outbound freight. Thus, in the sale of every ton of finished steel, the railroads secure six tons of revenue producing freight.

"In my judgment, it is unreasonable to expect business to return to anything like normal volume unless all freight rates, especially on raw materials, are substantially reduced. No business can revive which, like the iron and steel industry, is on an unprofitable basis because of excessive transportation costs.

"The freight cost in a ton of steel at Johnstown in 1914 was $6.83. In 1921 it is $12.52.

"The ore rate under discussion was 63½c. when the Railroad Administration took charge; it now is $1. This $1, for the reason that we use approximately two tons of ore in every ton of steel, represents $2 of the $12.52 freight cost in steel. In all good conscience and fair treatment, this rate should be materially reduced."

Testimony of Ore Selling Firms—Rates on Old Range

The mining, ore selling and pig iron selling organizations were represented by Col. F. B. Richards, M. A. Hanna & Co., Cleveland; H. G. Dalton, Pickands, Mather & Co., Cleveland; W. G. Mather, Cleveland-Cliffs Iron Co., Cleveland; Seymour Wheeler, Pickands, Brown & Co., Chicago, and others. Part of the testimony had to do with an intervention by witnesses for interests on the Gogebic range, who brought out that the carriers had been assessing a rate of 85c. a ton on all mines in Gogebic territory to docks at Ashland, but subsequent thereto their freight was increased to $1, which was allowed to become effective by the commission with the express understanding that the carriers justify it at this hearing. Gogebic shippers, however, contend that the 85c. rate is itself too high for the service performed on the ore, and testified as to the advantages of their location which, they believe, entitle them to a lower rate than the other ranges have. Representatives of the Menominee range also submitted testimony on the advantages of their location and contended that any rates that were fixed for application to the Gogebic range should also apply to the Menominee mines. After the depositions of the complainants had been taken, representatives of the railroads presented testimony to show the costs involved in handling ore traffic.

Conveyors Corporation Makes Cast Iron Storage Tank

The American cast iron storage tank, designed not to hold liquids but for dry storage purposes, has been developed by the Conveyors Corporation of America, Chicago. Among materials considered for storage are ashes, coal, building materials, foundry supplies, such as coke and sand; chemicals and allied raw materials, such as granular fullers earth, gilsonite, kieselguhr, bauxite, potash, animal charcoal—in general loose, bulky materials that are ordinarily stored in silos, tanks, hoppers and bins.

Of the advantages enumerated for the cast iron storage tank emphasis is placed on its long life and low maintenance costs. Cast iron tanks resist corrosion, abrasion and rust. They are easy to erect, an unskilled workman, it is pointed out, being able to do the work.

It is cylindrical in shape, erected on a 5 in. reinforced concrete slab. It is supported on a structural base or tower, built up of standard fabricated structural shapes. The body of the tank is built up of cast iron radius plates, held vertically between cast iron H-sections. The tank can be built to any convenient height.

To Reduce Unemployment

The following statement has been made by the General Electric Co. to employees of its Schenectady plant:

Co-operating with Schenectady's unemployment committee, the General Electric Co. announces that necessary steps have been taken to afford employment to part of its men who are out of work or may be thrown out of work by the prospective discontinuance of its naval program. The management of the Schenectady Works has decided to build a substantial amount of apparatus for stock and in anticipation of future sales. This work will be largely in the nature of large apparatus and is designed to take the place of Government work now in the shops.

The company will also arrange to have a considerable amount of repair work and maintenance work done during the winter months which under other conditions would be deferred.

These actions have been taken by the General Electric Co. to help relieve the unemployment situation in Schenectady during the coming winter and will necessarily be confined to employees of the Schenectady Works who are either now working only part time or who have been temporarily laid off on account of lack of work.

The city of Philadelphia is building a forge shop and foundry for its water department of a complete character, judging from the equipment to be provided in them. The general contract for this work, which has been awarded to F. J. Ryan & Co., industrial engineers, Philadelphia, covers forges, billet heating furnaces, treating furnaces, core ovens, brass furnaces, lead furnaces, pumping and air pressure system and an oil-burning system for the heating boilers of the plant.

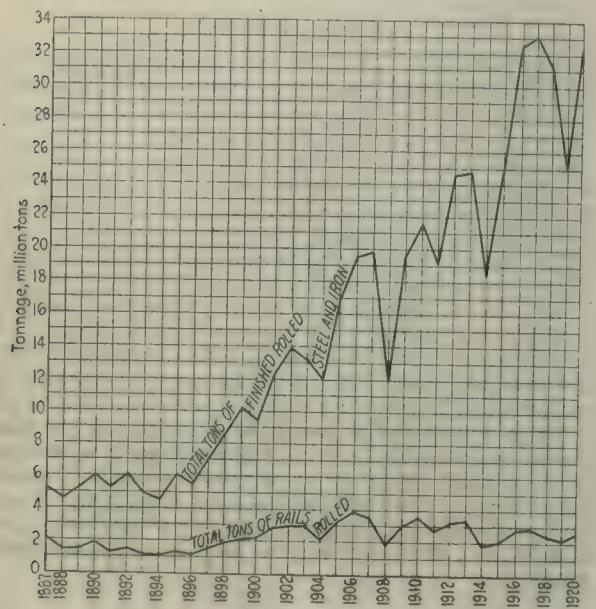
The International Harvester Co., is re-opening its motor truck plant at Springfield, Ohio, and expects shortly to turn out 25 speed trucks a day. About 250 men will be employed. The plant has been closed down since last July.

EVOLUTION OF THE HEAVY RAIL

Progressive Changes in Design of the Dudley 80-lb. to 120-lb. Rail—Effect on Their Life

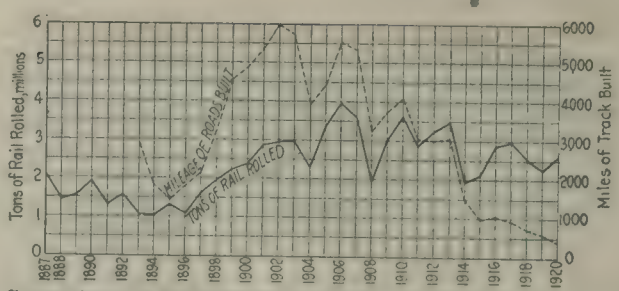
The use of steel rails of heavier section has been a feature of the rail policy of the leading railroads for the past 15 years or so. Various causes have brought this about, particularly heavier locomotives, cars and rolling stock. In the earlier days, 65-lb. to 85-lb. rails were the rule, but now most of the leading lines have adopted the 100-lb. or 105-lb. as the standard rail. For special conditions a heavier rail, up to 130 lb. to the yard, is in use.

The New York Central Railroad has been one of the pioneers in this development. Illustrative of the gradual modification of the design of these rails, the progressive line drawing reproduced herewith shows in detail the various changes introduced by Dr. P. H. Dudley, the company's consulting engineer. In the 5-in. 80-lb. rail, the radius in the top of the head was 12 in. This design produced a rail much flatter than the section in general use at that time. For the 5⅛-in. 80-lb. rail, Dr. Dudley made the radius of the top of the head 14 in., the same as in the 6-in. 100-lb. rail. The difference in the widths of the heads at the lower or under surface of the head of each particular section is a feature. The 6-in. 100-lb. rail was not put into service in the Grand Central Station until 1895, which was also the date of the 5⅛-in. 80-lb. rail.



Total Tonnage of Finished Rolled Steel and Iron Compared with Tonnage of Rails Rolled in the United States, According to Data of American Iron & Steel Institute

Dr. Dudley states that in switching service he has observed that the head of the 6-in. 100-lb. rail outwears practically three heads of the 5⅛-in. 80-lb. rail, and this he regards as a very important fact. On the Pennsylvania division of the New York Central, under 60,000,000 tons of mineral load or traffic per year, the 6-in. 100-lb. rail wears out 2.7 of the heads of the 5⅛-in. 80-lb. rail. The same ratio applies in general to the 105-lb. rail.



Comparison of Rails Rolled and Miles of Track Built in the United States

Two charts are reproduced which strikingly show the wide difference between the rail production and the finished steel output over a period of years as well as the similar divergence between the mileage of roads built in the United States and the tons of rails rolled over a similar period of years. Lack of new track construction in the past few years has reduced rail demand by several hundred thousand tons.

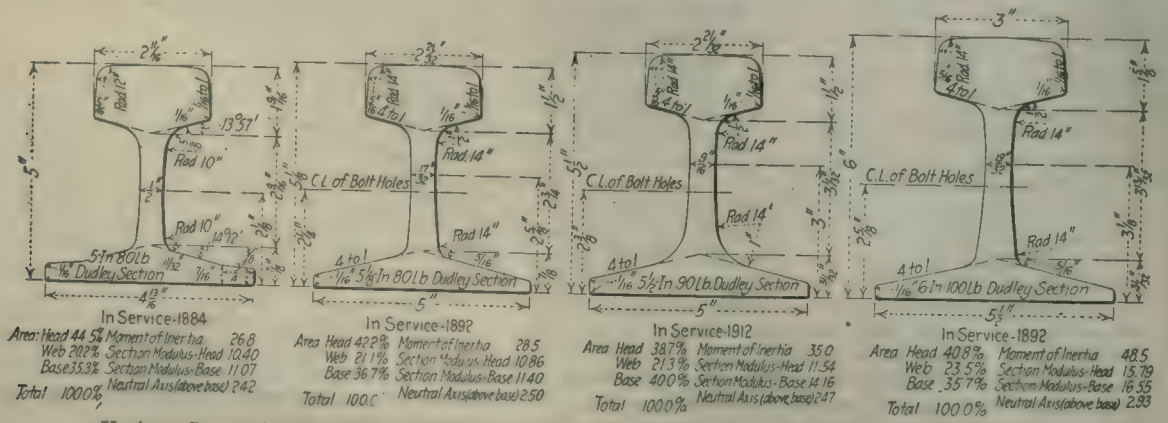
It is also the belief of Dr. Dudley and his associates that one reason for the drop in the rail production and in railroad demand for rails is the longer life of the heavier rail as compared with that of the lighter one. This influence gradually has been accumulating for the last 20 years, but the effect is more pronounced in more recent years.

Gases in Metals

Aside from the more or less familiar importance of gases as related to the deoxidation of steel and the production of sound ingots and castings, many operations in refining, working, and treating of metals are vitally concerned with the action or effect of various gases.

Many of the inherent differences in quality of steels made by different processes are generally attributed to the amounts and compositions of the gases with which the metal is in contact when in the molten state in a converter, open-hearth or electric furnace, or in a crucible. It is reported that steel converters operating in a vacuum have recently been successfully used on a commercial scale in England to produce cutlery steel of unusually fine quality. The presence and nature of occluded gas in cast iron has been said to be closely connected with two important characteristics of such material, namely, the graphitization of cast iron and the growth of gray cast iron.

Of no less importance are dissolved or occluded gases in non-ferrous metals, says the Bureau of Standards. For example, the fire-refining of copper is wholly a matter of intentionally dissolving a gas



Various Stages in the Changes in Design of the Dudley Rail from the 80-Lb. to the 120-Lb.

(oxygen) in crude copper and then removing nearly, but not quite, all of this same gas. If the final step of this refining is carried to the complete removal of oxygen, by poling only a minute or two longer than necessary, the whole furnace charge must be entirely reworked as if it were a fresh charge of crude copper.

In the working and fabrication of copper, gases must be again considered. Operations involving the cleansing of steel or iron by pickling in acids must be followed by treatments designed to remove hydrogen taken up from the metals by the gases. If not removed, this occluded gas will make the metal too brittle to work, or will give trouble in subsequent operations when the metal is exposed to heat, as, for instance, causing blisters in enamel. Occluded gases have also been shown to have a marked effect on the electrical conductivity of metals, their magnetic properties, their consistency in dimensions, as well as their mechanical properties.

Small Decrease in Corporation's Unfilled Orders

Unfilled orders on the books of the United States Steel Corporation, Nov. 30, were 4,250,542 tons, compared with 4,286,829 tons on Oct. 31, a decrease of 36,287 tons. This decrease compares with one of 273,841 tons in October, an increase of 28,744 tons in September, and decreases of 298,398 tons in August; 287,544 tons in July; 364,619 tons in June; 362,737 tons in May; 439,541 tons in April; 649,102 tons in March; 639,297 tons in February and 574,958 tons in January. The unfilled tonnage a year ago was 9,021,481 tons, or 4,770,939 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28	6,933,867	9,502,081	6,010,787	9,288,443
Mar. 31	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30	5,845,224	10,359,747	4,800,865	8,741,882
May 31	5,482,487	10,940,465	4,282,310	8,337,623
June 30	5,117,868	10,978,817	4,892,855	8,918,866
July 31	4,830,324	11,118,468	5,578,661	8,883,801
Aug. 31	4,531,926	10,805,038	6,109,103	8,759,042
Sept. 30	4,560,670	10,374,804	6,284,638	8,297,905
Oct. 31	4,286,829	9,836,852	6,472,668	8,353,293
Nov. 30	4,250,542	9,021,481	7,128,330	8,124,663
Dec. 31	.....	8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Tin Plate for British Columbia

SEATTLE, Dec. 8.—The entire tin plate order for British Columbia for 1922 was placed by the American Can Co. with British makers for the first time in seven years. The trade was retrieved by the British makers on a reduction in price. The cut in tin plate alone will mean a reduction per case of 75c. The total purchase by the American Can Co. for its British Columbia supply will reach 25,000 tons. The first shipment is to leave the United Kingdom about Dec. 15 for Vancouver.

Gain in November Steel Ingot Output Small

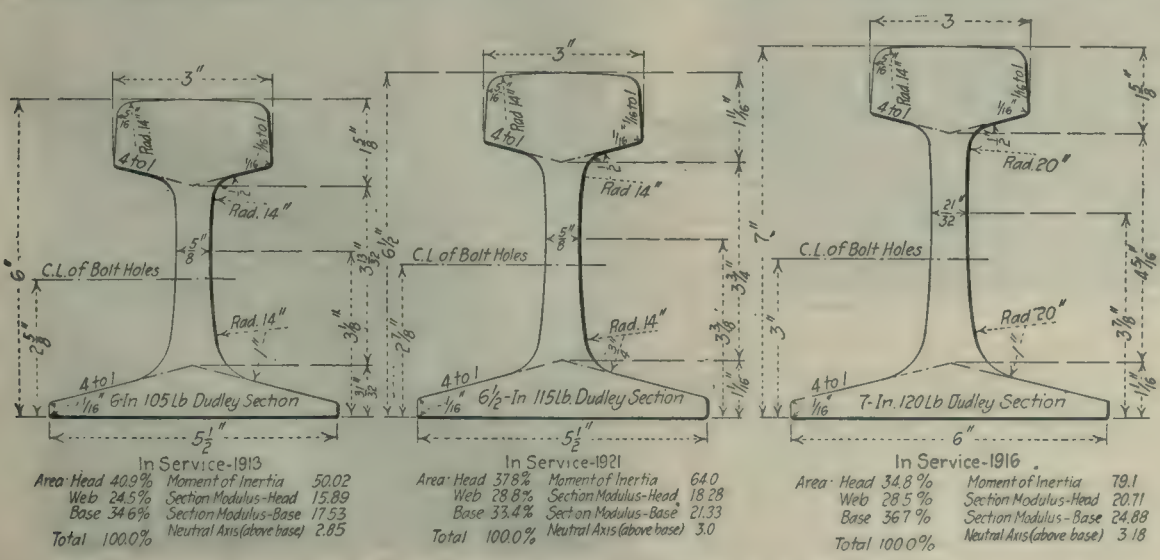
The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in November of 1,660,001 gross tons, as compared with 1,616,810 tons in October and with 803,376 tons in July. The November increase over October was 43,191 tons or 2.67 per cent. The increase in October over September was 37.6 per cent. Estimating the production of other companies on the basis of the 30 reporting (though it is probable the small companies did not equal the rate of the larger ones) the total output of ingots in November was 1,971,497 tons, or 75,826 tons per operating day, counting 26 working days in November, against an estimated total of 1,920,202 tons or 73,854 tons per day in October. This is an increase of 51,295 tons or 1972 tons per day. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920	26,197,843	8,112,753	121,656	34,432,252
January, 1921	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071
September	908,381	265,152	1,207	1,174,740
October	1,269,945	345,837	1,028	1,616,810
November	1,294,371	363,912	1,718	1,660,001
Total, 11 mos.	11,996,404	3,383,302	20,147	15,399,853

The November ingot production was at a yearly rate of 23,581,886 tons, counting 311 operating days to the year. This compares with a rate in October of nearly 23,000,000 tons, in September of nearly 17,000,000 tons, in August of 15,568,660 tons, and in July, the low point, of 11,857,186 tons. The November production was therefore about twice that of July.

The increase of 51,295 tons in the estimated ingot output of all companies in November over that in October compares with an increase of 168,805 tons in the November pig iron output over that of October.



The 120-lb. rail is a special section used only on the viaduct, 100th to 135th streets, New York

Modern Rolling Mills for France

Interchangeability and Labor Saving Are Features—Both Reversing and Three-High Mills Included

AMERICAN built structural mills are being installed by the Société Anonyme des Acieries de Micheville. The entire equipment was designed and built by the United Engineering & Foundry Co., Pittsburgh. The small scale plan shows the layout, which comprises two separate units. The one unit consists of a 44-in. reversing blooming mill, a 36-in. reversing roughing mill, two stands of 28-in. three-high rolls and one stand of 28-in. two-high rolls. This unit will be used as a combination rail and structural mill. The second unit is a light structural mill, known as the "cross-country" type. It consists of one stand of 24-in. three-high rolls, two stands of 20-in. three-high rolls and two stands of 20-in. two-high rolls.

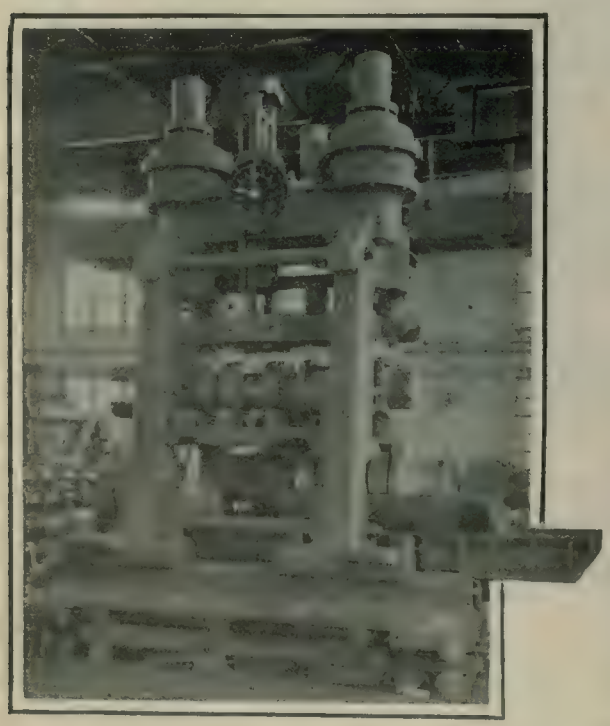
The 44-in. reversing blooming mill has rolls 37 in. in diameter, with body 100 in. long. It is equipped with modern mill tables and manipulator. With the exception of the passes in the rolls, it is an exact duplicate of the 44-in. blooming mill which the same company built for Homecourt, France.

The 36-in. roughing mill has a feature which is new. Large collars are necessary on the bottom rolls to permit rolling blanks for structural beams. This ordinarily means an exceptionally wide window in the housings, or else a removable cap on the housings. It will be appreciated better what this means when it is stated that these collars are frequently 48 to 50 in. in diameter. To overcome these difficulties, the engineers designed a new roll-carrying device for the mill. The bottom roll is mounted in a cradle which can be moved by means of a hydraulic cylinder. One photograph shows this feature very clearly, the bottom roll being shown partly removed. This mill has a screwdown, as it will, at times, be operated as a billet mill. The tables on both sides of the mill are equipped with manipulators for turning and moving the beam blank and rail blooms.

The 28-in. mills are of the standard type, with the housing feet bolted together so that the entire stand can be lifted off the bed plate and another stand substituted. This feature is common in America, as it greatly reduces the time required for changing the mill from one section to another. The United Engineering & Foundry Co. designed the rolls and guide equipment, all of which were fitted in place before shipment. The first stand of the 28-in. mill is equipped with tilting tables fitted with United patent stake manipulators. Table No. 16 is of the composite type, that is, one-half tilting, and the other half stationary.

By these arrangements the rails or structural material being rolled are automatically switched from one pass to another. All the operator has to do is to raise or lower the tables. These refinements not only increase the output of the mill, but reduce the quantity and quality of labor required. The runout table is equipped with a device for hot straightening beams and channels. This materially reduces the amount of cold straightening. The saws, gages, roller tables and hot bed are especially arranged for handling both rails and structural material.

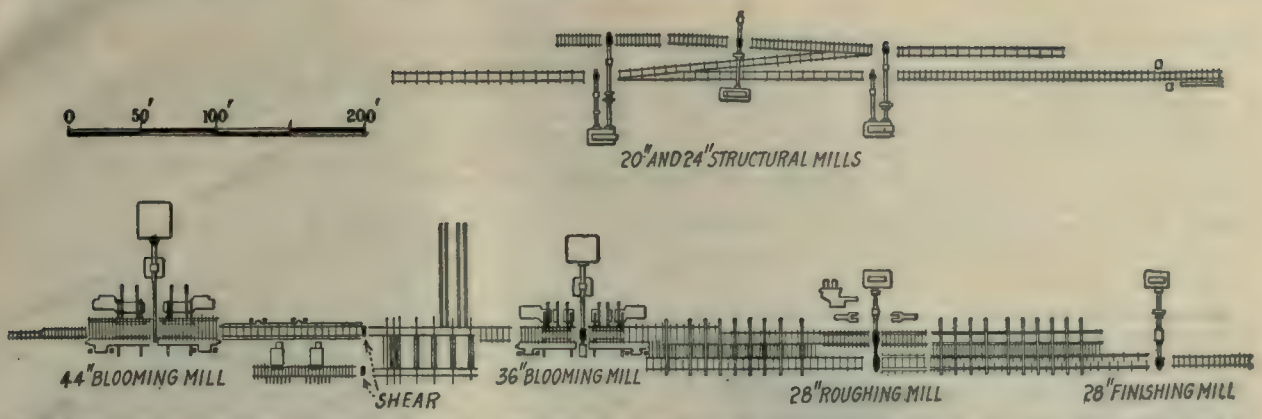
The light structural mill roll stands are similar in design to the 28-in. mills. The first stand is equipped with tilting tables fitted with patent stake manipulators. The mill is designed to roll light structural sec-



In the View Above, the Cradle and Slide, by Means of Which the Lower Roll Is Removed from the Stand, Are Prominent. This permits the use of rolls with large collars, rolling blanks for structural steel



At the Right Is One of the Three-High 28-In. Mills



It Is Expected That the 44-In. Blooming Mill, at Lower Left, Will Supply, Not Only All the Blooms for the 36-In. Mill in Center and the 28-In. Mills at Right, But Also a Portion of the Steel for the 24-In. and 20-In. Structural Mills at Top of Cut. Some of the steel for the structural mill will come from an older blooming mill

tions, also mine rails. On account of the large tonnage such a mill will produce, it has a double finishing end. Space was allowed so that the hot bed could be increased in length. The roller straighteners are equipped with extra housings, so that they can be changed from one section to another as quickly as the roll stands. The blooms for the light structural mill will be partly supplied by the 44-in. blooming mill and partly by an existing blooming mill, not shown on the layout. The runout tables are equipped with both cold saws and shears.

France to-day controls approximately 35 per cent of the iron ore reserves of Europe, or twice as much as the British Isles and three times as much as Sweden or the German Republic. With the introduction of American practice into its rolling mills, France should soon take the lead in Europe in the production of steel. The next twenty years may witness a wonderful growth and development of the industries of France.

American Rolling Mill Co. Offers to Buy Ashland Iron & Mining Co.

The American Rolling Mill Co., Middletown, Ohio, has made a definite proposition for the purchase of the assets of the Ashland Iron & Mining Co., Ashland, Ky. The details of the offer have not been made public. The offer to purchase the Ashland company's plant is being made with a view to strengthening the position of the American Rolling Mill Co. in the steel industry. Should the deal go through, the American Rolling Mill Co. will acquire two blast furnaces with a capacity of 100,00 tons of pig iron yearly; a practically new open-hearth department, consisting of six 100-ton furnaces; a very modern blooming mill and six sheet mills. The deal also includes the railroad property of the company and the coal holdings. A meeting of the stockholders of the Ashland Iron & Mining Co. has been called for Dec. 21 at Ashland to hear and discuss the proposition made by the Middletown company.

Navy Awards Bar and Shape Tonnages

WASHINGTON, Dec. 13.—The Bureau of Supplies and Accounts, Navy Department, has awarded steel bar and shape tonnages in connection with the opening of bids on Nov. 1. It has not as yet made awards on plate and sheet tonnages. The material is for navy yard stocks. Of the 1000 tons of steel bars called for, 450 tons went to the Cambria Steel Co., at 1.60c., base Pittsburgh, while miscellaneous lots went to the Camden Forge Co., the Empire Galvanizing Co., the Erie Forge Co., and the Pacific Coast Steel Co. Of the 1300 tons of shapes included in the schedule, 900 tons went to the Cambria Steel Co., also at 1.60c., base Pittsburgh, and other lots went to the Pacific Coast Steel Co., the Bethlehem Steel Co., and the Empire Galvanizing Co.

The bureau cancelled a portion of the steel bar and shape tonnages, having transferred material of this kind from yards where it was not needed to those where it is required.

The Bureau of Yards and Docks of the Navy Department opened bids on Wednesday of last week for a warehouse to be built in Hawaii, involving 600 tons of shapes and a small quantity of reinforced concrete bars. The lowest bid for the general contract was submitted by W. F. Martens, Rochester, N. Y., at $249,964, who has promised completion of contract in 280 days from the date of the award.

Will Prepare Plant to Make Larger Guns

WASHINGTON, Dec. 13.—The naval ordnance plant at South Charleston, W. Va., will be prepared during the present fiscal year for the manufacture of guns of the larger size, according to the report of Rear Admiral C. W. Park, Civil Engineers Corps, Chief of the Bureau of Yards and Docks, Navy Department.

During the fiscal year ended June 30, Rear Admiral C. B. McVay, Chief of the Bureau of Ordnance, reports that practically all of the cancelled wartime contracts were financially closed. A few contractors, however, did not accept what the bureau considered just and reasonable settlements and have brought suit in the Court of Claims.

A total of $101,247,784.26 has been returned to the Treasury Department out of war-time appropriations, in addition to the $195,833,843.69 which was returned by the act of Feb. 25, 1919.

New contracts, amounting to $8,204,253.20, were awarded during the year for technical ordnance material, such as guns, gun forgings, projectiles, fire-control equipment, etc. This does not include contracts for commerical material procured through the Bureau of Supplies and Accounts.

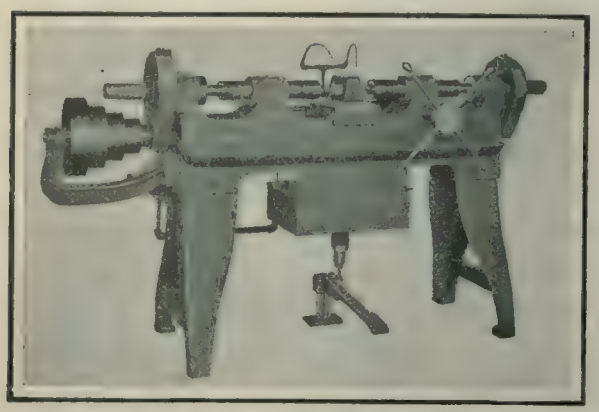
Will Establish Yale & Towne Plant in Germany

The Yale & Towne Mfg. Co., Stamford, Conn., hoists, locks, etc., announces it will establish in Germany a branch plant. This company does a large export business, particularly in South American countries. By establishing a plant in Germany it will avail itself of the low production costs in that country, thereby placing itself in a position to compete more successfully for export business. Where the German plant will be located and when production will start, has not been made public. Peter F. Augerbraun, superintendent of design and production Stamford, will be manager of the proposed German plant.

W. A. Baldwin, regional manager of the Erie Railroad at Youngstown, Ohio, announces that car repair shops of the Erie at Meadville, Pa., Cleveland and Galion, Ohio, will be closed the middle of December and will not reopen until after the first of the year. The suspension is necessary, states Mr. Baldwin, in order to curtail expenses in this period of light freight traffic, which is declared to be 33 per cent lighter than normal. He reports that the Erie shops have not operated full time since November, 1920.

Nipple Reaming and Chamfering Machine

A nipple reaming and chamfering machine intended to produce a better nipple at a lower cost than by the present established method, is being placed on the market by the Murchey Machine & Tool Co., Detroit. The reaming and chamfering is handled as one operation, the thread cutting being a separate operation. Where reaming is done on a threading machine at one operation with the threading, it causes an undue strain on the dies, it is claimed, this strain resulting in relatively



The Chuck Is Opened by the Foot Lever

higher manufacturing costs, due to the necessity of constantly repairing and replacing dies and die parts.

The machine shown in the illustration is equipped for reaming and chamfering, the capacity being ½ to 2-in. pipe in lengths, close nipple, to 12 in. The pipe is held in the chuck which is opened by the foot lever and which automatically closes when the foot is raised and the lever released. After the nipple is reamed and chamfered it is knocked out by the operator putting in a new pipe, and drops into the receptacle provided. The chuck has hardened and ground jaws, slides on wide bearings, and centers itself as the dies start cutting. The machine is ruggedly constructed and has ample bearings on all moving parts. The countershaft is arranged with right and left hand pulleys and cone pulley, resulting in four different speeds. An oil pump is provided.

The output is said to be 650 ¾-in. or 350 1½-in. nipples per hour reamed and chamfered. The weight is given as approximately 1200 lb. and the floor space required, 8 by 2 ft.

While primarily designed for reaming and chamfering purposes, for plants whose production is not great enough to make advisable a separation of the operations, the machine can be equipped with dies for threading nipples or pipe from ⅛ to ¾ in. in diameter. It will also thread tees, valves, studs and other parts requiring threading on both ends.

New Form of Planer Motor Drive

With the intention of solving the problem of preventing planers from overtravel, either on reversal, or on failure of voltages, or from other causes, the General Electric Co., Schenectady, N. Y., has developed a new form of control for the direct connected motor drive, which employs dynamic braking for stopping.

The apparatus consists of a control panel on which are mounted the necessary rheostats, contactors, etc., a resistance; a master switch or push button, and a standard direct current reversing adjustable speed motor. The control falls into two groups, one with a resistance selecting contactor, the other without it. The rest of the equipment, consisting of forward, reverse and accelerating contactors, is the same in both cases.

The selective resistance contactor controls the value of the dynamic brake resistance in each direction of rotation, so that the resistor can be adjusted for one direction without affecting the adjustment in the other. A machine equipped with this control that is geared to give 25 to 50 ft. per min. on the cut stroke, and 50 to 100 ft. per min. on the return stroke with motor speeds of 250 to 500 r.p.m. on the cut and 500 to 1000 on the return can have the dynamic brake on the cut adjusted to give a maximum stopping effort of 500 r.p.m. without regard to the return. Otherwise, it is explained, the resistance being adjusted for 1000 r.p.m. or the maximum speed, the braking effort at 500 r.p.m. will not be great enough to stop the planer quickly on the return stroke.

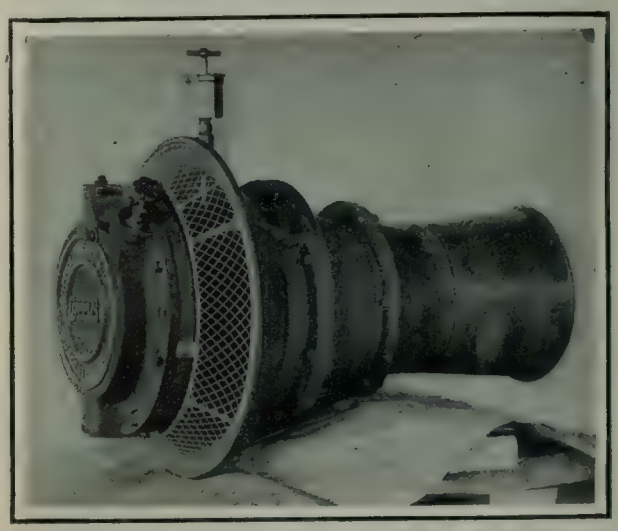
On a machine in actual operation the full load of the cutting tool is added to the braking load of the motor, and, if both are equal the overtravel beyond the set limits of the machine will be half of the overtravel with no load on the tool. With the resistance selecting contactor, the braking load on the motor at 500 r.p.m. is made approximately 200 per cent of full load, which is said to affect the difference in overtravel in two ways. First, the brake resistor being adjusted at 200 per cent instead of approximately 100 per cent of full load, reduces overtravel 50 per cent. Second, the effect of full load on the tool reduces the overtravel 33 per cent the motor braking effort being twice that on the tool load. Thus the difference in overtravel between no load and full load becomes approximately 33 per cent of the difference when no selecting contactor is used.

The features claimed for the new type of drive are dependability, ease, certainty and adaptability of operation, and time efficiency. Difficulties due to the welding of contactor tips are said to be effectively and simply avoided. The utilization of dynamic braking with the further refinement of the selective resistance is said further to permit of many operations which are difficult, if not impossible with other types of control. It is said to be possible to jog the planer effectively by means either of the master switch or with a push-button station.

New Screw-Blade Propeller Blower

A screw-blade propeller type blower, known as the Vano, which operates against pressure up to 8 in. water, has been placed on the market by the Coppus Engineering & Equipment Co., Worcester. In addition to high running efficiency it is claimed that the power consumption at constant speed is practically unaffected by variations in air delivery or pressure.

The blower is shown in the accompanying illustration. The air current leaving the propeller is sub-



The Air Current Is Subdivided by Individual Guide-Vane Blades

divided by individual guide-vane blades and is taken up by them without shock. These blades have a curvature that increases in the direction of the propeller rotation, which concentrate the air current and give it a further acceleration inside the stationary guide vane so that a considerable part of the pressure is produced in the latter. A large part of the end thrust is thus taken up by the stationary guide-vane casing. The air streams into which the flow of air has been subdivided leave the guide-vane casing slightly rotating, and converge toward the axis, so that the smallest section of the air flow is beyond the guide-vane casing.

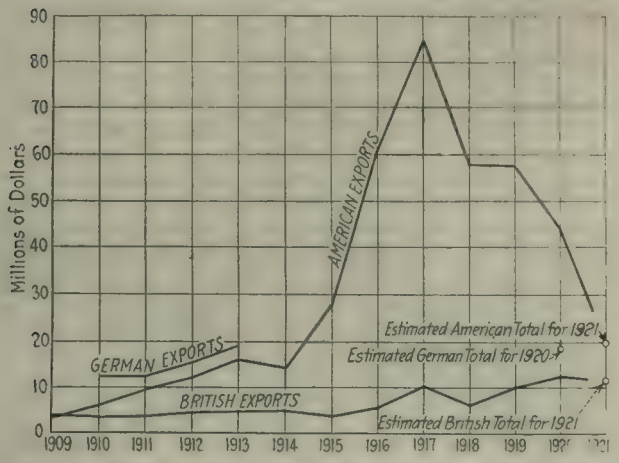
Trend of British Machine Tool Exports

Not Keeping Pace with American Machine Tools, in Spite of Being Cheaper—German Pre-War Predominance More Apparent Than Real

BY W. H. RASTALL*

RETURNS of British exports and imports of machine tools that have just become available provide interesting information as to the comparative position of American and British tools in the world's markets. Recent years have witnessed some abnormal conditions in the foreign demand for machine tools, and one has considerable uncertainty on attempting to feel the way back to "normalcy," as there seems to be no such thing. One of the charts represents the position in the world's trade of the three most important producing countries, during the past twelve years.

The first interesting detail revealed, and also possibly the most important, is the situation shown by the record before the war. Up through 1913 the American position was rapidly improving, while it will be



British, German and American Exports of Machine Tools

noted that British trade made very little progress; the actual British figures being about $3,700,000 in 1909 and $4,900,000 in 1913, as compared with American exports of some $3,600,000 in 1909 and $16,000,000 in 1913.

Such returns testify most eloquently to the splendid engineering represented in the American designs, and the actual recognition of this superiority in the markets of the world. Plainly, American manufacturers and exporters have little to fear from foreign "competition"; and it is recognized that in the world's markets for these tools there is little real competition, because the differences in design, in materials and in workmanship frequently place the American product in a class by itself, far above all foreign tools.

Now, the line representing German experience is deceptive, because the classification employed by the German customs authorities includes all metal-making equipment and machinery, much of which is not included in the British and American returns, and the large bulk of the German totals suggests that they enjoyed a very large trade, which is not the case. Their best market during these pre-war years, outside of Europe, was South America, and their influence in that market was comparatively strong.

Yet, according to a survey made by one of our American publishing companies, British manufacturers had supplied about 42 per cent of the tools, American manufacturers 39 per cent and German manufacturers 12 per cent, which represents more accurately the estimate one forms of the comparative trade of the several nationalities after traveling through overseas markets.

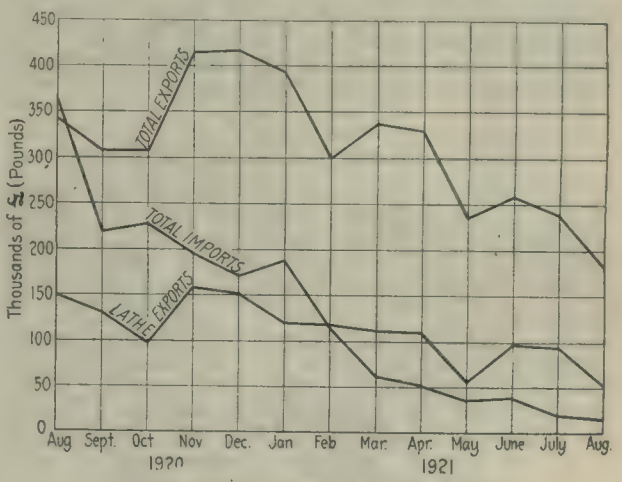
*Chief, Industrial Machinery Division, Department of Commerce, Washington.

Because of this difference in classification, it is important to note not the values represented by these lines, but the slope. German trade increased from about $12,400,000 in 1910 to $19,500,000 in 1913, a gain of 57 per cent, while the American gain was 166 per cent during the same period. Obviously, American interests have every reason to be perfectly satisfied with this pre-war record.

Confusion resulting from the declaration of war in 1914 caused a temporary setback in American exports, and the German business was completely destroyed, not to revive until after the armistice, late in 1918. The record of the war years requires no comment. British manufacturers were wholly occupied with war duties, and American manufacturers could sell all that they could ship, and this condition continued for some time after hostilities ceased.

Our present problem is introduced by the remainder of the chart. British tools usually differ greatly from the American types, and the world's markets for such equipment have been inadequately supplied for some years. Also, the increase in cost per tool would cause the line to rise, in spite of the fact that the values have been corrected for fluctuation in exchange and are expressed in dollars, not pounds sterling. But at any rate the American line is falling rapidly, the British is rising, while the German return for 1920 is approximately the same as for 1913, at about $19,000,000. The probability is that the American total for 1921 will approximate $20,000,000.

In the second diagram we have further details as a monthly record of more recent British experience,



British Foreign Trade in Machine Tools

taken from data published by *Machinery* (London) and forwarded by Candler Cobb, American Trade Commissioner there. This data cannot be checked with that for the first diagram, as it does not cover a complete calendar year, and the data are from a different source. However, it will be noted that, contrary to the suggestion of the first diagram, British total exports are decreasing rapidly, and for all of 1921 will approximate less than £3,000,000, or (say) $12,000,000.

This trend in the line on the diagram suggests that, although one would expect that the demands for British style tools had not been adequately supplied for years, and the corresponding market for American style tools had been over-supplied, the influence of the latter is still powerful enough to prevent the development of the market for the former, viz., the simpler and less expensive types of equipment—a circumstance

TABLE I

British Machine Tool Exports

	Drilling		Grinding		Lathes		Milling		Planing and Shaping		Presses, Punching, Shearing		Other Descriptions		
1920	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	Total £
Aug.	296	39,700	68	8,864	607	150,651	58	22,893	103	44,526	88	17,776	269	59,290	343,700
Sept.	310	40,721	75	5,871	489	131,132	86	32,031	78	21,475	56	17,403	215	59,696	308,329
Oct.	309	58,383	90	8,990	472	98,509	63	17,458	78	36,313	57	15,055	205	73,271	307,979
Nov.	395	68,140	103	15,091	615	160,291	91	24,625	79	45,302	113	28,800	305	73,838	416,087
Dec.	338	68,565	173	16,466	596	152,043	118	25,845	111	50,729	65	17,417	251	86,018	417,083
1921															
Jan.	355	59,221	101	20,547	431	120,036	59	23,940	136	54,981	53	17,761	334	98,293	394,779
Feb.	234	46,549	76	16,769	255	116,405	55	17,612	46	21,492	75	20,740	197	60,725	300,291
March	159	48,422	101	15,147	368	111,748	125	21,805	81	36,815	99	39,591	255	64,311	337,839
April	147	50,543	47	17,239	243	109,336	26	18,987	64	53,710	50	21,032	256	60,686	331,533
May	174	25,444	29	6,837	138	56,268	83	17,161	66	26,948	88	26,522	216	76,535	235,715
June	76	24,168	41	10,556	246	96,958	88	31,249	27	18,055	24	10,472	146	68,421	259,879
July	170	20,422	44	6,488	236	95,440	60	15,440	23	21,052	34	18,824	129	59,883	237,549
Aug.	87	29,824	73	11,841	192	54,048	8	3,122	32	12,260	45	21,510	117	49,098	181,698
Total	3,050	580,102	1,021	160,705	4,888	1,452,860	920	272,168	924	443,658	712	272,903	2,895	890,065	4,072,461

that encourages more aggressive selling on the part of Americans.

In considering the comparative position of American and British machine tools in the markets of the world, it should be remembered that, for many years, America has shipped great quantities of these tools to the United Kingdom, while the trade in the opposite direction has not exceeded $100,000 in any one year—a condition that is not to be attributed entirely to the workings of the tariff.

But, following the armistice, there has been a strong tendency for the British imports of American made tools to recede from the very high levels of war days. In August, 1920, British imports still exceeded their exports, but as the diagram shows, there has been a rapid decrease in the volume of this business, and it has reached low levels, which fact in itself has a most important influence on the American returns; for even as late as 1920 the United Kingdom absorbed 25 per cent of the total American exports of metal working machinery.

The diagram also shows the monthly record of British lathe exports. Further details of this sort for other types of machine tools are given in Table I, from which it will be noted that the trade in standard tools, such as lathes, drills, milling machines, planes, shapers, etc., is rapidly decreasing, while special types, like grinders, punches, and the unclassified types are still in good demand. Corresponding data with regard to British imports are shown in Table II.

Boston Chapter, A. S. M. E. Meets

The Boston section, American Society of Mechanical Engineers, on Wednesday afternoon, Dec. 14, inspected and studied the Lynn, Mass., plant of the General Electric Co. The members attending were made up into four parties for the inspection by groups of the motor, turbine, street lighting and meters and instrument departments. Late in the afternoon, moving pictures of various manufacturing operations were shown, following which dinner was served. In the evening there was a joint meeting with the Lynn section, American Institute of Electrical Engineers at which W. E. Hoke, Baltimore, formerly with Pratt & Whitney Co., Hartford, Conn., delivered a paper on "Precision in Machine Tool Work; Its History and Modern Developments."

Sheet Metal Products Association Meets in Chicago

The Sheet Metal Products Association held its eleventh annual convention at the Congress Hotel, Chicago, Dec. 8 and 9. The meeting was attended by 45 sheet metal products manufacturers and mill representatives. Considerable attention was given in the discussion to cost accounting and sales problems. The matter of gaining wider recognition for the association label and greater publicity for the products manufactured by the members brought out a general expression of opinion and resulted in the adoption of a resolution urging the rolling mills to give serious consideration to the launching of a general advertising campaign to promote the demand for sheets and sheet products. The secretary was directed to send copies of the resolution to all mills.

Officers elected for the coming year include: President, F. L. Nelson, O. K. Harry Steel Works, St. Louis; treasurer, A. N. Eaton, Nebraska & Iowa Steel Tank Co., Omaha, Neb.; vice-presidents, F. L. Canine, Crawfordsville (Ind.) Wire & Nail Co., William A. Knapp, Butler Mfg. Co., Kansas City, and M. B. Armstrong, Thomas & Armstrong Co., London, Ohio. The association membership is made up of manufacturers of sheet metal farm and highway equipment, such as grain bins, corn cribs, watering tanks, culverts and wagon tanks.

Five hundred tons of steel for the Riley Creek bridge, the last gap in the Government's standard gage railway from Seward to Nenana, Alaska, has reached Seattle recently from the Atlantic seaboard on the steamship Harry Luckenbach. The steel was immediately transshipped on the Admiral liner LaTouche for delivery to Anchorage, Alaska. The new Riley Creek bridge will be completed in January, when the Government will have a standard line of 411 miles. A gap at the Tanaka River will later be spanned by a 700-ft. steel bridge.

TABLE II

British Machine Tool Imports

	Drilling		Grinding		Lathes		Milling		Planing and Shaping		Presses, Punching, Shearing		Other Descriptions		
1920	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	No.	£	Total £
Aug.	313	82,824	121	32,450	215	40,809	176	52,517	96	28,482	1,095	18,228	428	107,444	362,754
Sept.	443	32,744	115	28,332	214	35,735	98	22,634	56	24,640	83	12,568	350	62,393	219,046
Oct.	145	64,200	131	16,626	145	22,097	117	32,445	72	12,120	161	37,919	454	42,003	227,410
Nov.	216	54,062	122	10,614	95	12,386	83	24,832	43	12,989	132	45,456	198	35,854	196,193
Dec.	148	32,671	44	8,624	123	19,917	27	5,841	63	17,764	92	46,748	212	40,871	171,936
1921															
Jan.	126	20,990	79	16,715	127	17,628	27	13,242	25	4,891	72	49,406	171	65,843	188,715
Feb.	123	6,496	2	2,460	111	14,751	37	14,640	48	3,599	58	26,300	312	47,510	115,756
March	188	4,482	8	665	137	14,787	8	237	14	1,994	36	14,092	128	24,959	61,216
April	189	4,636	91	2,184	145	6,318	7	2,990	45	3,454	40	12,141	65	19,490	51,213
May	10	1,270	21	6,296	16	3,552	9	2,633	17	550	36	11,763	170	11,613	37,677
June	152	3,395	9	1,205	35	4,326	5	345	12	2,169	78	17,643	35	10,166	39,249
July	61	1,691	26	4,533	37	1,500	11	3,811	8	1,715	4	4,275	23	3,257	20,782
Aug.	46	869	35	960	55	1,675	3	172	13	2,343	17	1,415	56	9,214	16,648
Total	2,160	310,330	805	131,664	1,455	195,481	606	176,339	510	116,710	1,904	297,954	2,602	480,117	1,708,595

Calculating a Foundry Iron Value

Unit Valuation of Elements in Foundry Pig Irons —Silicon, Manganese and Phosphorus Considered as Metalloids—Carbon and Sulphur Grouped with Fe

BY Y. A. DYER

FOUNDRYMEN who have been accustomed to thinking and speaking in terms of the simple ratio of "silicon to iron," in purchasing metal for the ordinary run of foundry work, will at some time face the problem of producing castings which must comply with rigid specifications—chemical and physical. Measured by these standards, the elements silicon and iron will not suffice—it becomes imperative to co-ordinate all alloyed elements in a mixture, by lowering or raising them, to balance the rigid chemical and physical specifications demanded of a high duty and complicated casting.

The cupola mixing process then hinges on whether the metals to be used contain the desired inherent elements in balanced form; whether deficient elements have to be chemically incorporated as ferroalloys, or whether excess elements have to be lowered by the use of selected or special metals. Then it is that the matter of unit valuation of elements, present and absent, becomes a real factor to the foundryman, rather than a mere academic question.

Commercial pig iron is a conglomerate mass of iron, carbon, silicon, sulphur, phosphorus and manganese, in varying proportions. Each of the metallic and metalloidal elements alloyed with cast iron performs its conjunctive function in determining ultimate results, therefore (with the possible exception of sulphur) a fairly approximate unit value may be placed on each one. Carbon is the distinguishing and controlling factor in cast iron; that is: its presence or absence in substantial amounts determines whether the metal is cast iron, steel or wrought iron. Hence its unit value, together with sulphur, may be included with the iron unit value, and the total weight of the three elements computed by difference, after having determined the weights of silicon, manganese and phosphorus.

Silicon, manganese and phosphorus may be considered the alloyed elements of basal value; and if the accepted base metal for a mixture does not contain sufficient silicon and manganese to impart the requisite amounts of each element to the resultant casting, ferroalloys are used. If phosphorus is needed, and the iron does not contain a sufficient amount of this element, ferrophosphorus is used; or if an iron contains too much phosphorus for specific work, a certain percentage of low phosphorus metal is used to produce a low average of that element in the mixture. Therefore, the elemental manipulations sometimes become complicated; and to obtain satisfactory results in balancing a metal mixture, with desirable inherent constituent elements, requires skill and expense.

Advantage of Using Irons Rather Than Alloys

But as such a natural mixture will admit of a more uniform distribution of the elements throughout the metal mass, compared with a mixture "boosted" by ferroalloys, the intrinsic value is in favor of using as a base metal an iron which carries well balanced elements. The loss by oxidation of manganese, when used in ferromanganese form, is 20 to 25 per cent greater than the manganese loss when a manganous pig iron (1.25 to 2.50 per cent manganese) is used. The oxidation loss of silicon is greater when ferrosilicon is used than when a normally high silicon pig iron is used.

Therefore, in addition to the regular value factors given below for ferroalloys, there is a recognized inherent premium unit value attached to the element iron which is so balanced in silicon, manganese and phosphorus contents that it may be used as a base metal, to the exclusion of ferroalloys, in the manufacture of high-grade castings. This premium value to a melter may be safely placed at 10 per cent over the price of standard iron unit value—or (0.0092 x 0.10)=0.00092c. per lb., based on a $22.50 market price. Therefore, the factor 0.00092 will be used as the premium iron unit value for "special iron." Using the base price of $22.50 per ton, f.o.b. cars at furnace, for standard No. 2 Southern iron, the iron unit value will be found to be ($17.76÷1930)=0.0092c. per lb.; and for "special iron" (0.0092+0.00092)=0.0101c. per lb. Therefore, these factors will be used for iron unit values, including carbon and sulphur.

Calculation of Metalloid Factors

The factors for silicon, manganese and phosphorus values are computed as follows: Electrolytic ferrosilicon (50 per cent silicon), selling at $72 per ton, shipping point, is equivalent to $63 for contained silicon, or ($63÷1000)=0.063c. per lb. for contained silicon, therefore the factor 0.063 will be used for the silicon unit value. It requires about six and one-half times the amount of high silicon iron (12 per cent silicon) to supply the same amount of silicon to a mixture as will obtain by the use of 50 per cent ferrosilicon, hence it is more economical to use this grade of ferroalloy in foundry mixtures.

Ferromanganese (80 per cent manganese), selling at $100 per ton, c.i.f. seaboard, is equivalent to ($100÷1600)=0.0625c. per lb. for contained manganese, therefore the factor 0.0625 will be used for the manganese unit value. It requires more than five times the amount of high manganese iron (12 to 15 per cent manganese) or four times as much spiegeleisen (20 per cent manganese) to supply the same amount of manganese to a mixture, as will be obtained from the use of ferromanganese. Hence it is more economical to use this high grade of ferroalloy in foundry mixtures.

Ferrophosphorus (20 per cent phosphorus) iron selling at $47 per ton, shipping point, is equivalent to $32.25 for contained phosphorus, or ($32.25÷400)=0.08c. per lb. of contained phosphorus, therefore the factor 0.08 will be used for the useful phosphorus unit value. The element phosphorus, however, may be stated as having a dual valuation. That is: its presence has a value for certain work, and its absence creates a value for certain other work, therefore a valuation "down" may be given this element.

With standard Southern iron (approximately 1 per cent phosphorus) selling at $22.50 per ton at the furnace, and low phosphorus iron (0.03 to 0.04 per cent phosphorus) selling at $26 per ton at the furnace, there is created a premium of $3.50 per ton for decrease in phosphorus. Comparing the phosphorus present in the two irons, there is a decrease of (20—0.60)=19.40 lb. per ton of metal, or ($3.50 ÷ 19.4) = 0.18c. per lb. for decreased phosphorus; therefore the factor 0.18 will be used for the "down" phosphorus unit value, in addition to the small amount of useful phosphorus present and needed.

Following factors, summarized from data given above, will be used in valuing elements in standard pig irons:

0.0630c. per lb. for silicon,
0.0800c. per lb. for phosphorus,
0.0625c. per lb. for manganese,
0.0092c. per lb. for iron, carbon and sulphur.

Following factors, summarized from data given

above, will be used in valuing elements in special pig irons:

0.0630c. per lb. for silicon,
0.0800c. per lb. for useful phosphorus,
0.1800c. per lb. for decreased phosphorus below 1 per cent,
0.0625c. per lb. for manganese,
(0.0092 + 0.00092) = 0.0101c. per lb. for iron, carbon, sulphur, etc.

Of course, these factors will vary with change in prices of ferroalloys, and low phosphorus, or "acid Bessemer" iron, but the principle of valuation will remain the same, and the foundryman will be enabled to figure at all times whether it will be more economical to use ferroalloys or to purchase a "premium iron" which will supply the desired elements and eliminate the undesirable elements, or keep them within casting specifications. The principles involved in the calculations are as follows, the price of iron being $22.50 per ton f.o.b. furnace for standard Southern iron:

Assumed average analysis:

	Per Cent	Lb. per Ton
Si	2.00	= 40
P	1.00 max.	= 20
Mn	0.50 min.	= 10
S	0.05 max.	1
C	3.75	75
Fe	92.70	1854 = 1930
		2000

Valuation of elements:

Si	=	40 × 0.0630 =	$2.52
P	=	20 × 0.0800 =	1.60
Mn	=	10 × 0.0625 =	0.62
Fe + C + S	=	1930 × 0.0092 =	17.76
			$22.50 f.o.b. furnace

The principle involved in the calculation of the unit values of special analysis iron is as follows:

Assumed average analysis:

	Per Cent	Lb. per Ton
Si	2.00	= 40
P	0.40	= 8
Mn	1.25	= 25
S	0.05 max.	1
C	3.75	75
Fe	92.55	1851 = 1927
		2000

Valuation of elements:

Si	=	40 × 0.0630 =	$2.52
P	=	8 × 0.0800 =	0.64
P (20—8)	=	12 × 0.1800 =	2.16
Mn	=	25 × 0.0625 =	1.56
Fe + C + S	=	1927 × 0.0101 =	19.46
			$26.34 f.o.b. furnace

With each advance of 0.50 unit of silicon, 10 lb. of silicon will be added to the ton of metal, and a lowering of 10 lb. of iron, for which the foundryman pays (10x 0.063)=0.63c. per ton for increased silicon and has deducted (10x0.0092)=0.092c. per ton for iron, or about an average of 0.53c. net advance per ton of pig iron for each 0.50 point advance in silicon, as follows:

	Silicon Range	Aver. Si	Value Si	Value P+Mn	Value Fe+ C+S	Total
	1.25 to 1.74	1.50	$1.89	$2.22	$17.85	$21.96
	1.75 to 2.24	2.00	2.52	2.22	17.76	22.50
Standard	2.25 to 2.74	2.50	3.15	2.22	17.66	23.03
S 0.05 max.	2.75 to 3.24	3.00	3.78	2.22	17.57	23.57
P 1.00 max.	3.25 to 3.74	3.50	4.41	2.22	17.48	24.11
Mn 0.50 min.	3.75 to 4.00	4.00	5.04	2.22	17.39	24.65
	1.25 to 1.74	1.50	$1.89	$4.35	$19.57	$25.81
	1.75 to 2.24	2.00	2.52	4.35	19.47	26.33
Special	2.25 to 2.74	2.50	3.15	4.35	19.36	26.86
S 0.05 max.	2.75 to 3.24	3.00	3.78	4.35	19.26	27.39
P 0.40	3.25 to 3.74	3.50	4.41	4.35	19.16	27.92
Mn 1.25	3.75 to 4.00	4.00	5.04	4.35	19.06	28.45

The principle involved in calculating the cost of a ferroalloy mixture as compared with straight pig iron used as a base metal is given below. The following alloy mixture was used by certain shell manufacturers during the war. Metal prices per pound f.o.b. shipping point are based on April, 1921, market prices:

Mix	Si	P	Mn	Per Cent	Lb.	Lb. Price		Ton Price
Pig iron ...	2.00	0.60	0.70	32.00	640	× 0.0126	=	$8.06
Steel	0.10	0.04	0.75	30.00	600	× 0.0070	=	4.20
Scrap fdy...	1.30	0.30	0.75	37.00	740	× 0.0060	=	4.40
Ferrosilicon	50.00	...	...	0.70	14	× 0.0630	=	0.88
Ferromangan.	...	...	80.00	0.30	6	× 0.0625	=	0.37
				100.00	2000	× 0.08955	=	$17.91
Cast. analysis	1.263	0.311	0.749					

The following pig mixture would answer the same purposes:

Mix	Si	P	Mn	Per Cent	Lb.	Lb. Price		Ton Price
Pig iron	2.75	0.60	1.25	30	600	× 0.0135	=	$8.10
Steel	0.10	0.04	0.75	30	600	× 0.0070	=	4.20
Scrap fdy...	1.30	0.30	0.75	40	800	× 0.0060	=	4.80
				100	2000	× 0.08605	=	$17.10
Cast. analysis	1.256	0.0312	0.739					

In addition to saving $0.81 per ton by using the latter mixture, a more uniform casting may be expected, by reason of a more equal distribution of the elements silicon and manganese, which are inherent constituents of the metals used in the mixture.

Boston Chapter, Society for Steel Treating, Holds Laboratory Meeting

Through the courtesy of the Massachusetts Institute of Technology, the Boston chapter, American Society for Steel Treating, held its initial laboratory meeting at the institute on the evening of Dec. 9. A large number attended. Irving H. Cowdrey, chairman, presided and introduced Harrison W. Hayward, professor of materials of engineering at the institute. For the benefit of those not familiar with a testing materials laboratory, Professor Hayward explained first its functions—routine, research, testing of structural steel, and just what constituted each kind of work under these headings. This was followed by an explanation of the relation of the laboratory to industry, a lesson in the proper use of terms used in connection with laboratory work, and finally, useful information regarding the preparation of specimens to be presented for laboratory testing.

Following Professor Hayward's remarks, the members visited various laboratory divisions of the institute, and with the aid of laboratory result sheets, witnessed tests made on a large number of specimens furnished by various steel companies. For the institute, A. C. Fales and I. N. Zavarine conducted tests in the heat treating laboratory; Victor Homerberg in the metallographic laboratory; R. G. Adams in the autographic testing, hardness and shock testing laboratory; and C. A. Chayne and E. M. Brickett in the commercial testing laboratory. In the shock tests, Mr. Adams was assisted by Mr. Cowdrey. An open discussion followed the testing, many questions being asked and answered by Mr. Cowdrey, and those in charge of the testing machines. Members attending agreed the meeting was the most interesting held by the Boston chapter and an effort will be made to hold another meeting at the institute.

Drill Prices Reduced

Another price reduction has been made on high speed and carbon steel twist drills, effective Dec. 7. The reduction ranging from 10 to 30 per cent on various items. New prices to large consumers are 65 per cent off list for carbon drills and 30 to 40 per cent off list, depending on sizes, for high speed drills. Drill manufacturers report that the large stocks of drills that consumers have carried during the present year show signs of being used up and that the demand recently has shown a little improvement.

Secretary of Commerce Hoover will open a conference of constructors, architects and engineers in the assembly room of the Department of Commerce Thursday morning, Dec. 15, to consider the adoption of standard contract forms for all classes of construction work. The meeting has been called to consider the suggestion of the Hoover report on the elimination of waste in the building industry, that present contract forms need revision.

The J. L. Collins Machine Co., doing a general foundry and machine shop business in Haverhill, has incorporated under Massachusetts laws with a capital of $25,000. Jay L. Collins, 49 Webster Street, that city, is president, and Herman C. Leschke, 7 Lincoln Street, Bradford, treasurer.

CONTENTS

Tramrail Reduces Labor Force to Half 1523
Japanning Department of Globe Machine & Stamping Co. Uses One Oven in Place of Seven—Old Elevator Shaft Carries Away Fumes

Piette By-Product Coke Ovens at St. Louis 1526
Modification of Design, Just Patented, in the Interest of Fuel Economy Through Better Combustion

Double Helical or Herringbone Gears 1531
Use of Long Addenda in the Pinion and Short Addenda in the Driven Gear to Increase the "Follow Through"

Steel Revival Depends on Ore Rate Reduction 1535
Chicago Hearing on Upper Lake Iron Ore Rates Brings Out Pointed Testimony from Steel Trade Leaders

Modern Rolling Mills for France 1542
Interchangeability and Labor Saving Are Features—Both Reversing and Three-High Mills Included

Trend of British Machine Tool Exports 1545
Not Keeping Pace with American Machine Tools in Spite of Being Cheaper—German Pre-War Predominance More Apparent Than Real

Calculating a Foundry Iron Value 1547
Unit Valuation of Elements in Foundry Pig Irons—Silicon, Manganese and Phosphorus Considered as Metalloids

Engineers Discuss Waste Prevention 1554
Machine Shop and Management Wastes and Material Handling Equipment Considered at Meeting in New York

High Rates in Iron Ore to Be Restored 1557
Interstate Commerce Commission Declines to Permit Railroads to File Tariffs on Short Notice for Extension to March 31

Attaching Wire Rope to a Socket..... 1525
German Bauxite Supplies..... 1525
Department of Commerce Report..... 1529
Federal Trade Commission Report..... 1530
Standardization in Industry..... 1530
British Pig Iron and Steel Output..... 1530
Steel Exports from Germany..... 1533
Studying Industrial Mobilization..... 1533
Vertical Broaching Press..... 1534
Muskegon Foundry Co. to Open New Unit 1534
Cast Iron Storage Tank..... 1539
To Reduce Unemployment..... 1539
Evolution of the Heavy Rail..... 1540
Gases in Metals..... 1540
Steel Corporation's Unfilled Orders..... 1541
Tin Plate for British Columbia..... 1541
November Steel Ingot Output..... 1541
To Buy Ashland Iron & Mining Property 1543
Navy Awards Bar and Shape Tonnages.. 1543
Plant to Make Larger Guns..... 1543
Yale & Towne Plant in Germany..... 1543
Reaming and Chamfering Machine..... 1544
New Form of Planer Motor Drive..... 1544
Screw-Blade Propeller Blower..... 1544
Sheet Metal Products Association Meeting 1546
Boston Steel Treaters Meet..... 1548
Drill Prices Reduced..... 1548
Editorials 1550
Reworking Steel—Numbers of workers—Patent Office Distress—Our Share in Exports—Life of Heavier Rails.
Heavy Shipments by Water..... 1552
Foreign Trade Conditions.....1553, 1579
Great Southern Steel Co..... 1553
Disposing of Shipping Board Steel..... 1553
Tin Plate Rate to Coast..... 1553
Seeking Advice in Salvaging Ships..... 1559
Automobile Body Makers Combine..... 1575
Engineering Honors to Marshal Foch... 1575
Plans of New Companies..... 1576
Cost Reporting Case..... 1578
Book Reviews..... 1587

Iron and Steel Markets..... **1560**
Comparison of Prices **1561**
Prices Finished Iron and Steel, f. o. b. Pittsburgh..... **1572**
Non-Ferrous Metal Markets **1573**
Personal Notes **1574**
Obituary Notes **1575**
Machinery Markets and News of the Works..... **1580**
New York Jobbers' Prices..... **1588**

ESTABLISHED 1855

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Reworking Steel

Scrap is likely to play a more important part in the manufacture of steel in the next few years than ever before. Except for material that is destroyed or dissipated there is a return for reworking at one time or another. An attractive concept has been that there is an average period. This is not precise, but it is a convenient assumption for purposes of discussion. Roughly speaking, the quantity of scrap that comes out at any time is determined by the period in which the material has been in employment, and by the rate of production of steel at the time it was put into employment.

For a long time the production and consumption or employment of steel increased very rapidly, in a geometrical progression. The current outcome of scrap was in proportion to the production at some earlier time, when the tonnage was much less. Now the production of steel is increasing less rapidly. The record year for output was 1917, and as 1922 is unlikely to show as large an output one may speak of there being five years without a new production record being made.

Sometimes it is assumed that scrap comes back in 15 years, on an average. That is probably too short a period, but it will do for illustration. In any of the next few years the steel production of 15 years earlier will be a larger percentage of the production in those years than used to be the case. In 1906, for instance, the production of steel ingots and castings was six times the production in 1891, 15 years earlier, while the production of pig iron more than tripled in those 15 years. Similar multiplications will not be shown comparing 1907 with 1922 or 1910 with 1925. Other things being equal, the proportion of scrap developing to new steel being made will increase over the proportions obtaining in recent years.

As to the factor of the length of return, industry has passed into a highly competitive period, where efficiency will be the watchword. Industry will not stand still, but will employ its resources of brains and capital in improving processes and lowering costs rather than in swelling output. Obviously that will mean ruthless scrapping of equipment if something better can be put into use. Incidentally there was much construction during the war of doubtful value thereafter, and the three years since the ending of hostilities have been years of such uncertainty that little could be settled as to what should be done with the equipment. Thus, on the whole, the indication is that for the next few years new material is going to become scrap sooner than was formerly the case, and that again will tend to increase the proportion of scrap to new steel made.

It may be asked why, if these are the trends, there is not more evidence now at hand to this effect. There have been two deterrent influences. There have been large quantities of iron ore at blast furnaces and on lower lake docks, which the owners desired to liquidate, and for more than a year there have been very high freight rates on scrap, higher in many cases than on pig iron. These high rates have caused scrap to be held back, while there are fair-sized accumulations of scrap in dealers' yards. Thus the development of the scrap situation is delayed.

About three-quarters of a billion tons of pig iron has been made in the United States up to date, and more than half of this total has been made in the past 15 years. Undoubtedly the major part of this iron is in employment or is capable of being taken up for use as scrap. Merely a small percentage of this total store, returned for re-working each year, will provide a very substantial tonnage of scrap.

If proof were needed that Germany is working hard, it would be afforded by her heavy buying of American copper. This has reached proportions never equaled. For the ten months ended with October, exports of refined copper to Germany have been 39.50 per cent of the total and more than the combined exports to France, Great Britain and Japan. Out of total exports of 468,215,221 lb., Germany has taken 184,739,354 lb., while 177,852,061 lb. went to the three other countries mentioned. If the American exports to Holland of nearly 21,000,000 lb. are in part for German consumption, then Germany's share of the total ex-

ceeds 40 per cent. In 1913 exports to Germany were larger than to-day, but the percentage then was only one-third of the total. The larger percentage now in spite of the smaller actual total is impressive through proving the high state of operations in the one country when business in the rest of the world is depressed. In 1913 every effort was being made in Germany to gather up stocks in preparation for war; to-day metal purchases are made in spite of the almost vanishing purchasing power of the mark.

The Number of Workers

In connection with the 1920 census a preliminary report has been issued on the number of persons gainfully employed, and thus material is furnished for a fresh appraisal of the disposition to work. Hitherto it has been necessary to depend upon the 1910 census and make estimates for changes that may have occurred since then. The census dates are April 15, 1910, and Jan. 1, 1920. The persons gainfully employed are not, of course, merely those who were actually engaged on the census dates but are those who were normally employed.

Comparing 1910 and 1920, total population of continental United States increased from 91,972,266 to 105,710,620, or 15 per cent; population ten years of age and older increased from 71,580,270 to 82,739,315, or a trifle more than 15 per cent, and the number gainfully employed increased from 38,167,336 to 41,609,192, or only 9 per cent.

It is necessary to revise the view often expressed of late, particularly in connection with estimates of "unemployment," that an abnormally large proportion of the population was in employment in 1920. The reverse was the case. Of those ten years old and older, 50.3 per cent were gainfully employed in 1920, against 53.3 per cent in 1910, 50.2 per cent in 1900, and smaller proportions in earlier years. The high proportion was in 1910. The census report suggests that part of the decrease in proportion from April 15, 1910, to Jan. 1, 1920, may be due to farm labor not being employed on the winter date, but as the commonly expressed view was that farm labor had gone to the cities this does not begin to explain the divergence. Another respect in which some views must be revised is that of female labor. Of females ten years of age and over, 21.1 per cent were gainfully employed in 1920, against 23.4 per cent in 1910, 18.8 per cent in 1900 and smaller proportions in earlier years. In other words, the report of a female invasion is true, but the matter has become ancient history. The trend from 1910 to 1920 was the other way.

The reduction in the proportion of persons gainfully employed from 1910 to 1920 is presumably attributable in very considerable part if not wholly to increased attendance at school in the years following the tenth, in grade school, high school and college. Such a change is highly satisfactory. It is quite improbable that the number of habitual loafers, without proper means of support, has increased, while neither our social system nor our disposition to spend money encourages men to retire from gainful employment with a small competence such as would be attainable by any considerable proportion of the population.

From the viewpoint of business, the matter is one which concerns our working strength. The number of workers has not increased in proportion to the population. What business men want to know in looking to the future is, at what rate can an industry or a line of employment be expected to grow? The decennial growth in population, in percentage, has been decreasing almost constantly. Prior to 1890 it was at various rates in excess of 20 per cent. From 1890 to 1900 and again from 1900 to 1910, it was 20 per cent, while from 1910 to 1920 it was 15 per cent. There has not been a geometrical progression, while from 1880 to 1920 there was practically only an arithmetical progression.

Anyone whose views as to the expansion of business were based upon the conception of the population's increasing by 20 per cent per decade must revise his basis, observing that in the last decade reported upon the number of workers increased only 9 per cent. If the nation prospers, the proportion of workers to population is unlikely to increase in the future. One cannot count upon an increase of as much as 1 per cent per annum in the number of workers, too small an amount to be given much weight in ordinary business calculations. The total amount of effort made by the nation, therefore, is now almost constant. For business and industrial expansion, reliance must be chiefly upon increase in efficiency, taking efficiency in the broadest sense, covering not merely personal efficiency but efficiency in appliances used. Beyond this, there may be extra growth in one line of activity at the expense of other activities. To illustrate, coal mining may be made more efficient whereby one miner will produce more tons of coal in a year and fewer miners may then be required. The time thus released may be spent in making electrical apparatus whereby the quantity of coal required to produce given results may be reduced.

Patent Office Distress

The lamentable conditions in the Patent Office and the importance of passing the legislation now pending in Congress are emphasized by the report of the Commissioner of Patents for the year ended June 30, 1921. It is shown that the patent office lost 163 examiners, scientifically trained and members of the bar, from July, 1919, to June 30, 1921. These men were replaced by inexperienced men, fresh from college, without any knowledge of patent law or legal training. In the same period, the number of applications for patents increased 34 per cent, while applications for trade-marks increased 85½ per cent. At the end of the fiscal year approximately 50,000 patent applications awaited action, as compared with 18,000 in July, 1919.

It appears also that a number of divisions are over 11 months behind in their work, and to illustrate the large turnover in the personnel, one of the

chemical divisions is cited where five out of nine of the examiners have been appointed in the last few months. At the close of the fiscal year, one of these had been in the office only one week, another three weeks, another seven weeks and another two months. One out of every four examiners has resigned in 16 months and more than one-half have resigned in 32 months.

The report points out that there are many industries which cannot enter into development work on account of the doubtful status of their applications for patents. The number of these unacted upon continues to increase and conditions have become steadily worse.

Any business concern having such a large turnover of employees and failing to such a large extent in meeting demands upon it would be considered a failure, and it is to the credit of the Patent Office that it has done as well as it has under adverse conditions. In a period of serious depression, when the business of the country needs all the help it can obtain, it is high time for Congress to take some action that will bring about a reasonable increase of Patent Office salaries and increase efficiency, so that pending applications can be disposed of with reasonable expedition.

Our Share in Exports

American exporters of steel are confronted with two important facts which recent developments have brought to the surface. One is the decision of the associated British steel makers to release mills from the export price agreement and the other is the rapid increase in British and German exports.

As to the former, while there has been for some time certain cutting of the prevailing fixed prices for export, the general release from this binding agreement will have a marked effect on competition for international business in that British prices are constantly declining and British sellers are eagerly anxious to recover their overseas business.

British steel exports are now considerably larger than the American and have been for each of the months of August, September and October. These were analyzed in THE IRON AGE Dec. 1. The British increase is likely to be larger rather than smaller in the succeeding months.

As to Germany, the latest data from *Stahl und Eisen* show that in August, Germany exported 240,035 tons of steel and pig iron, against only 75,827 tons for the United States and only 79,163 tons for Great Britain in the same month. While German mills are reported as oversold and in arrears on deliveries, that country's exports have maintained a consistent regularity since early in 1920 as contrasted with irregularity in both American and British. Germany's competition may undoubtedly be regarded as severe as it can be. The low cost of the mark will not keep orders from other nations on an expansion of world demand, for Germany cannot take care of the world. What applies to Germany applies broadly; business will come to the United States as well as to Great Britain when the world begins to buy. Much of the financing must be done by America and foreign buyers have less of the uncertain element of fluctuating exchange in dealing with this country. The improved mental state of the world augurs well for a gradual betterment in American exports.

The Life of Heavier Rails

That the weight of a steel rail is an important factor in the life of the rail, but in an entirely different ratio from what might be expected, has been established by the experience of one large Eastern railroad. In the last few years the New York Central Lines has gradually replaced its 80-lb. rails with 105-lb. rails. The evolution in the design of the rails used by this system is referred to elsewhere in this issue. A careful record of the life of the heavier rails has shown that the 105-lb. rail, with chemical composition little changed, lasts in the regular roadbed 2.7 times longer than the 85-lb. rail.

But the ratio of increased life is not the same above or below the weights cited. It has been found that the 130-lb. rail lasts only 40 per cent longer than a 100-lb. rail, while a rail of the 80-lb. class lasts only about twice as long as the 60-lb. rail.

In 1910, the country's rail production was 12.18 per cent of the total finished steel output; in 1913 it was 14.12 per cent. But in 1919 and 1920 rail production was 8.77 per cent and 8.05 per cent respectively of the finished steel total. This wide difference, it is suggested, is not due altogether to Government railroad control nor to lack of funds, nor to any special expansion in other than railroad uses of steel. It is the conclusion of the New York Central engineers that the extensive adoption by the large railroad systems of the 100-lb. and 105-lb. rail, with its much longer life, is already having its effect upon the volume of new rail requirements.

Heavy Steel Shipments by Water

BIRMINGHAM, ALA., Dec. 13.—Movements of Birmingham iron and steel products for the Orient and Pacific Coast out of Mobile this month are breaking prior records. The steamers Steel Importer and Steel Scientist, of the Isthmian Steamship Co., are preparing to load 10,000 tons of rails and track accessories and a large tonnage of ammonium sulphate from the Ensley by-product works for China and Japan. Five ships have either gone or will move during the month for the Pacific Coast with wire, nails, staples, fencing, galvanized iron and sanitary pipe, making practically all ports. Honolulu is taking both wire mill products and pipe via Mobile and San Francisco. The high pressure pipe tonnage for Los Angeles and interior points amounts to 5000 to 6000 tons.

Inasmuch as green is the recognized safety color, and not red, attention has been called to the Industrial Board of Pennsylvania to the desirability of changing the red colors designating exits in theaters and other public gathering places to green. In other words, exits are features of safety, not of danger.

The annual Christmas entertainment of the Pittsburgh Foundrymen's Association will be held at the General Forbes Hotel, Pittsburgh, Monday evening, Dec. 19.

JAPAN ONLY ACTIVE MARKET

Buys in Both the United States and Germany—Chilean Rails Go to German Mill

NEW YORK, Dec. 13.—As the year draws to a close, Japan continues to be the only foreign market showing activity in purchasing in the United States. Undoubtedly a large percentage of current Japanese purchases is being placed in the German market. Besides black sheets, purchasing of which continues fairly active in small tonnages, buying of light and medium section rails is noted. One exporter recently shipped a total of about 1000 tons of 50-lb. rails to Japan. Although Japanese buyers have inquired recently for small and large tonnages of wire and wire nails, shipments of these products are being received from German mills on orders placed during the second and third quarters of the year.

Germany's position in exports seems to be growing worse rapidly, excepting on large orders, where a special effort is made to obtain the tonnage involved. Railroad congestion is so great that it takes from five to six weeks in some instances to move material from interior mills to ports of shipment. Prices, with the exception of quotations on particularly desirable orders, are high. One of the representatives of German mills in the United States was recently offered nails at $4 per 100-lb. on a fairly large tonnage. Contrasted to this, it is reported that American wire nails have been sold as low as $2.25 per keg of 100-lb., c.i.f. Japanese port. Wire is not only high in price but difficult to obtain from German mills, which are engaged in filling old orders. Germany's inability to supply material at present is illustrated in a recent order placed by a Holland company with a large interest in the United States totaling about 250 tons of sheets.

The inquiries beginning to appear in the American market from the Far East for wire shorts are quite evidently being forced here by the German regulation against exports of scrap of all kinds. One inquiry from China calls for 300 tons of wire shorts and to date no mill has been found by the exporters handling this inquiry to accept the order either in full or in part.

German exports are finding their way into other Far Eastern markets than Japan. A medium sized contract for cars was recently placed by the Indian State Railways in India with the Hannoversche Wagon Works and another German car builder has been awarded an order for cars to the value of about 17,000,000 m. from China. One half of the stipulated amount was paid in advance. About 1000 railroad cars have been placed with the Linke-Hofmann Works by the Russian Soviet Government.

Rails for Chile

The order for heavy rails for the Chilean State Railways, inquiry for which was in the American market for several months, has been placed in Germany. A total of about 20,000 tons was involved, of A. S. T. M. specifications and specially rolled to the standards of the Chilean railroads. It was first intended to place this order in Belgium, but German quotations were lower. This is the first time in about 20 years that the annual requirements of the Chilean State Railways have gone to a German mill, although some small orders were placed with a German mill several years prior to the war. These rails involve special rolls, mills in both the United Kingdom and the United States keeping them in stock. The car contract for the Chilean railroads, which after some paring down totaled 500 cars, was divided between the Pressed Steel Car Co. and the American Car & Foundry Co.

Specifications will be issued soon for the steel bridge to be erected at Sydney, Australia. The bridge will be 2600 ft. long with a clearance of 156 ft. The estimated cost is about £6,000,000. When issued, the complete specifications will be available through the United States Bureau of Foreign and Domestic Commerce.

Electrification plans for about 5000 miles of French railroads adds another country to the list which is either engaged in electrification or considering projects for electric railroads. Japan, South Africa and Chile are among the countries which have either let contracts or are receiving bids for performing electrification work.

Great Southern Steel Co. Will Develop Ore Lands

CHICAGO, Dec. 13.—The Great Southern Steel Co., incorporated under the laws of Delaware with $100,000,000 capital stock, was formed by Chicagoans and others to develop 101,000 acres of iron ore and coal lands located 65 miles from Muscel Shoals. The company has taken over none of the existing iron or steel making capacity in the South and is not a part of any of the mergers now under discussion. In the section where the new company has its property, there are 146,000 acres of undeveloped iron ore and coal fields which, according to Robert W. Hunt & Co., engineers, Chicago, will yield 3,000,000,000 tons of iron ore and 1,700,000,000 tons of coking coal. Necessary fluxing material is available in the vicinity. Out of this tract, 45,000 acres have been acquired by Henry Ford and the remaining 101,000 acres are the property of the Great Southern Steel Co. Charles E. Pain, First National Bank Building, Chicago, is attorney for the company, but the names of those financially interested in the project have not been divulged. The incorporation papers were drawn up by the Corporation Trust Co., Chicago, and the incorporators are S. E. Dell, M. A. Bruce and C. H. Blaske, all of Wilmington, Del.

Disposing of Shipping Board Steel

WASHINGTON, Dec. 13.—The Shipping Board has made much progress in disposing of its surplus steel consisting chiefly of plain and fabricated tonnage. It has sold practically all of this material except 110,000 tons at Hog Island. At one time the board had about 350,000 tons located at steel and shipbuilding plants throughout the country.

Plans are being made to dispose of Hog Island tonnage, freeing the board of all of its steel which, being exposed to the weather, is deteriorating in value. The highest price obtained for plain material has been $30 f.o.b. cars, paid for a lot of about 700 tons. Other sales of this grade have been made at prices ranging between $15.60 and $18.50. Fabricated material has brought scrap prices, running from $9 to $11. The Hog Island tonnage is about evenly divided between assembled material and fabricated steel which is not assembled.

Tin Plate Rate to Coast

It has been officially announced that the new rate of $1.20 per 100 lb. on tin plate to Pacific Coast points from Pittsburgh and Eastern mills will become effective Dec. 31. This rate already is in effect from Chicago. It is considered doubtful that the new rate from Pittsburgh and the East will benefit railroads much for the reason that there is a rail and water rate from Pittsburgh, via the Panama Canal, including handling, dockage charges and insurance, of $1.06½ per 100 lb.

The freight haul from Pittsburgh to Baltimore is 33½c. and the water charge from Baltimore to the Pacific Coast is 60c. per 100 lb.

The New England Iron League will hold its annual Christmas dinner on the evening of Dec. 29, at the Boston Athletic Association.

Engineers Discuss Waste Prevention

Machine Shop and Management Wastes Considered—Material Handling Equipment a Topic of Last Week's Meeting of Mechanical Engineers

ELIMINATION of waste was the keynote of the forty-second annual meeting of the American Society of Mechanical Engineers, held in New York, Dec 5 to 9 inclusive. Simultaneous sessions both in the morning and in the afternoon considered power waste; machine shop waste; railroad waste in locomotive and car operation; waste in management; waste in forest products; waste in material handling; fuel waste and aeronautic, textile and ordnance waste.

The session devoted to machine shop waste was held under the auspices of the machine shop division of the society, with F. O. Hoagland, general manager. Reed-Prentice Co., Worcester, in the chair.

All phases of the salvaging of factory wastes including not only scrap metal and other material, but also salvage work in maintenance and repairs, was outlined by J. A. Smith, general superintendent General Electric Co., Schenectady, N. Y., in a paper on "Salvaging Industrial Wastes." Taking up metal wastes first, he gave it as essential that a system should be maintained whereby various grades of metal chips and turnings would be kept separate in the shops during the machine processes, in order to save time and labor sorting and segregating in the scrap or salvage department. He advocated pressing chips and turnings into briquets of suitable cupola size where the tonnage is large, saying that it not only results in higher market value, but also saves in transportation charges. Sheet metal punching scrap, metal strips, trimmings, wire, etc., should always be put up in bundle form and in cupola size for the same reason, he added.

Attention was called to laboratory processes as often productive of valuable wastes, either in the form of metals, such as tungsten, etc., or in the form of various chemical residues which may, through conversion or combination, become the basic elements of new preparations.

A careful system of segregation, he emphasized, should be carried without defeating the purpose of securing the highest market prices by undue expenditure for labor and equipment. It is well, he held, to have all scrap weighed and credited to departments, for the twofold purpose of correct accounting and inculcating an interest in salvage work by all department heads.

Repairing Machine Tools at Right Time

He advocated carrying salvage work into other branches of shop activity, such as maintenance of property, repairs to machinery and tools, handling of stocks, and upkeep of all the various classes of small tools. "Systems must be set up governing the distribution and repairs of the various classes of small tools so that the consumption of these will be regulated within certain defined limits of economy and efficient service, in accordance with the production requirements of the shop." Mr. Smith further advocated monthly inspection of machine tools of which records should be kept, in order that repairs may be made at a minimum cost and to avoid costly breakdowns that follow neglect in the matter.

In the supply of small tools to the shop he pointed out that much can be accomplished in reducing expense by efficient methods of distribution and collection. A system of regular inspection of tool rooms, tool cupboards, benches and areas around machine tools should be established in all departments. Tools not needed for current use should be cleared up promptly and returned to stock, and those needing repair put in shape for further requirements. "By a proper system of distribution and collection, the inventory of tool stocks carried may be greatly reduced, expenditures for new tools curtailed, and those in use in the shops kept more constantly in active service."

In the matter of lubrication both of machine tools and of cutting tools, he pointed out that there is opportunity for valuable reduction in the operating expense of the shop. "Selection of oils is most important. Attention needs to be given to the handling and distribution of oils in order to avoid waste. Reclaiming oil from production parts and from chips and turnings is a part of the salvage work of every up-to-date plant," he said.

Salvaging Left Over Material

In reference to reducing inventory he said that the present is the time to make thorough investigation of every department and storage space, and to gather up all surplus or idle materials and make an effort to put them into service, or otherwise dispose of them to advantage. Analysis must be made of the methods of handling and distributing materials with a view of establishing the most economical system and special attention should be given to cutting raw materials to required dimension or multiple thereof. Attention should also be given, he continued, to the salvaging of left-over pieces and parts for further use in some portion of the factory, wherever practicable. For this purpose the central storehouse could figure as a clearing house and thus aid in the general work of salvaging.

As to the human element in the matter, Mr. Smith said, "If we can get department heads, and employees as well, interested in saving everything of inherent value we will perform a valuable service in helping to re-establish industry on a firm and stable basis."

In the discussion L. D. Burlingame industrial superintendent, Brown & Sharp Mfg. Co., Providence, emphasized the idea of impressing foreman, executives and others with the importance of scrap and what money could be saved by salvaging. Employers should take them into their confidence he said, and from time to time let them know the actual money value of the material salvaged. In his closure, Mr. Smith pointed out that it was possible to go too far in the elaboration of waste prevention. In the small shops especially was it to be tempered with common sense. In speaking further of the segregation of scrap he said that he found that it pays in the shops to have properly marked cans, segregating different brasses, babbitts, etc., and this right in the department rather than at the scrap heap.

The human element in the matter of waste was emphasized by J. J. Callahan, Employee's Service, New York, who said that the supreme factor in industry is men and the biggest thing in men is spirit. He gave from his experience several instances of enlisting the co-operation of men and preventing waste to an unusual extent.

What Constitutes an Efficient Milling Cutter

The paper "On the Art of Milling" by John Airey, Ann Arbor, Mich., and Carl J. Oxford, Detroit, presented by the former at this session was a departure from the general topic of the meeting. The paper which was of a comprehensive character and contained numerous illustrations, graphs and tables was available in pamphlet form prior to the meeting. It gives particulars of an investigation undertaken at the University of Michigan through a desire of the National Twist Drill & Tool Co., Detroit, to find a rational basis for the action of a milling cutter, so far as this could be removed from the region of empiricism.

"It is shown," the authors state, "that metal is

removed more efficiently with thick chips than with thin chips. It follows from this that, other conditions being equal, including speed and feed per minute, the cutter with the fewest teeth gives the greatest efficiency. However, it is evident that the efficiencies of two cutters with different numbers of teeth are equal provided the table feeds be adjusted so that the same feed per tooth is affected. This gives a definite working theory on the influence of spacing.

"It is definitely established that for a given material, tooth shape and sharpness, thickness of chip is the sole criterion of the efficiency with which metal is removed in milling and that increase of spacing over that required for free cutting is a handicap. Present day high-powered cutters have several times the chip space needed. Limitation of machine power had doubtlessly been the chief factor in giving a false bias to the influence of spacing."

Formulas for determining the number of teeth for a known diameter of cutter and for determining the depth are included in the paper, as well as a geometrical construction for obtaining the best shape of tooth.

A plea was made that engineering schools devote the same attention to shop processes that is devoted to design topics. The economic results would be greater though not so spectacular, it was pointed out, improvements in basic shop processes affecting the cost of all finished products whereas improvements in design benefit only a limited field. A. L. De Leeuw, consulting engineer, New York, stated in the discussion that the paper was, on the whole, a valuable contribution to the subject, but that some of the points in the second part might be open to objection. Others taking part in the discussion were R. Poliakoff, New York; Carl G. Barth, consulting engineer, Philadelphia; Earle Buckingham, engineer of standards, Pratt & Whitney Co., Hartford; Frank B. Gilbreth, consulting engineer, Montclair N. J.

Making Monotonous Work Fascinating

"Management Waste" was the topic of a session held under the auspices of the management division, with L. P. Alford, vice-president of the society, as chairman. Monotony of work and the "failure to recognize true human nature and its fundamental natural power constantly and forcibly seeking self-expression," as the basic cause of an alarming extent of industrial waste, was a view expressed by W. N. Polakov, consulting engineer, New York, in his paper on "Reducing Waste by Making Work Fascinating." "The task before the engineer of today," he said, "is to overcome the ill effects of automatization and mechanization of industry."

Increasing production by devising labor-saving machinery, while in itself productive of results, had two "by-effects" which greatly reduced the advantages anticipated, he said. These were that automatic high-speed machinery, sold at a high price, increases overhead often in excess of reduction in payroll, materially increasing the capital charges; and that automatic, semi-automatic, high-speed and single-purpose machinery makes work monotonous. "The workers," he continued, "failing to get stimulation and satisfaction from work as mere parts of automatic machinery, demand shorter hours of this drudgery and higher compensation with which to buy the interest, stimulation and pleasure which they fail to find in the work itself."

He did not advocate, however, scrapping existing machinery or putting a ban on further invention or improvement, but indicated that the solution was to be sought in "the development of means of abolishing the industrial monotony and drudgery of work by introducing into it intelligent, self-expressive, creative motives.

He arraigned the Taylor system of management, especially the features of functional foremanship, central planning office, time studies and instruction cards, as contributing to monotony of work, driving the creative element out of his work and lowering the workman to the level of an automaton. "Recognition of these fatal mistakes," he continued, "has prompted industrial engineers to concentrate on the shortcomings of management itself. These efforts have decentralized the detached intelligence of the planning department by establishing manufacturing offices in the shops; have re-united the instructing and inspecting functions of foremanship; and have substituted for time-study clerks the direct interchange of worker's skill and intelligence. Further, these efforts have stimulated interest in the work by training and providing instruments for intelligent control of processes; liberated the suppressed creative instincts of workers by providing them with means for observing their own progress, and finally, devised a charting method permitting the accurate measurement of managerial efficiency separately from the efficiency of the workers."

Why Welfare Work and Incentive Payments Fail

Mr. Polakov outlined the effect of monotony in causing unnecessary fatigue, and therefore waste. In speaking of recreational welfare work, he said that "this movement is obviously directed along the wrong course. It attempts to divert the attention from work to recreation," the moral effect being degrading because of the silent admission for one thing, that special reward and entertainment is to be looked for outside of one's vocation. As to the incentives to higher production, he characterized profit sharing, differential piece rates, incentive payments, etc., as obviously unfit, from the point of view of securing the worker's interest in the work itself, because they merely create interest in securing larger pay.

He held further that "Any wage system in order to comply with human nature should not confuse incentives for acquisitive passion with adequate provisions enabling wage earners to reach a higher plane of cultural and productive development. This aim can be attained by a two-rate wage, as developed and practised by the author; it consists substantially of a fixed rate of wage based on time and class of work, and a secondary rate of wage based on actual exercise of skill, knowledge and intelligence."

The hopes aroused by the claim that careful selection of workers to fit the work will eliminate dissatisfaction created by the poor fitting of men to jobs, he characterized as another notable attempt to combat the evils arising from the lack of interest caused by mechanized work, and as a waning hope. "The correct course," he said, "would be to fit the jobs to the men, in other words, to elevate the work to human dimensions, requiring not mere physical or animal power, but an exercise of creative intelligent faculties as well."

"In order to eliminate a major part of our industrial losses," Mr. Polakov said, in concluding, "the creative intelligent impulses of men should be given the fullest opportunity of self-expression. As an ideal we may foresee a complete abolition of monotonous, automatic, repetitive operations performed by men. These should be relegated to machines, while men should assume the part of directors and supervisors of processes. The greatest source of waste is to be found in the idleness of our available knowledge and creative capacities of men, which are not liberated and applied under the mechanistic, formal organization."

Mr. Polakov's paper was discussed enthusiastically and disagreement expressed with many of his views. Samuel Gompers, president American Federation of Labor, was unable to be present as scheduled, but telegraphed a statement which read in part as follows:

"Mr. Polakov's paper presents fundamentals in such a cogent way that Labor is anxious to have his statement widely discussed. The human element in production is that which is most important, though it has long been ignored. It was the organized labor movement that forced consideration for it by focussing attention on wages and hours. We forced higher valuation of human work as expressed in terms of money. But demands for higher wages and reasonable work periods were only means to an end. Higher wages mean increased opportunities for living and shorter hours mean control over time. It is ability to use time in all its dimensions that distinguishes man from lower classes of life.

"Labor realizes that upon management devolves the responsibility of developing the technique necessary to

provide the method whereby the creative ability we seek to conserve shall be released through the opportunity to use brain, skill, and human power in production."

To Improve Processes by Visualizing Them

A method of visualizing processes in their entirety, for the purpose of improving them, was outlined in a paper on "Process Charts," by F. B. and L. M. Gilbreth, consulting engineers, Montclair, N. J. The process chart, it was explained, is a record of present conditions, presenting in simple and compact form the data necessary before improvements in existing conditions and methods are undertaken. It was characterized as not only the first step in visualizing the one best way to do work, but as useful in every stage of deriving it.

The procedure for making, examining and improving a process was given to be preferably as follows: 1. Examine the process and record with rough notes and stereoscopic diapositives the existing process in detail. 2. Have a draftsman copy rough notes for blueprinting, photographic projection and exhibition to executives and others. 3. Show the diapositives with stereoscope and lantern slides of process charts in executives' theatre to executives and workers. 4. Improve the present methods by the use of a suggestion system; written description of new methods; standards; standing orders; motion study; and micromotion studies and chronocyclegraphs for obtaining and recording the one best way to do the work. 5. Make a process chart of the process as finally adopted, as a base for still further and cumulative improvement.

The various steps in the process were taken up in detail and standard symbols, standard change order blanks and other components illustrated. In conclusion the authors pointed out that while the process-chart methods will be helpful in any kind of work and under all forms of management, the best results can come only where there is mechanism of management that will enforce and make repetitive the conditions of the standards.

In a paper on the Rochester shoe wage arbitration, presented by the author, Sanford E. Thompson, Boston, who was chairman of the Arbitration Board, particulars were given regarding the proceedings. An interesting feature of this case was that the workers presented as a substitute for the 25 per cent wage reduction asked for by the shoe manufacturers, a plan designed to lead up to the elimination of waste in manufacture through scientific methods and the adjustment of wages on a scientific basis involving job analysis and time study.

In summarizing, Mr. Thompson said, "The Board was particularly impressed with the evident sincerity of the officers of the Union in advocating treatment by scientific methods. The author believes that if there can be fostered the spirit of our inquiring into facts and the substitution of facts for opinion in settling disputes, and further, if disputes can be prevented by study of facts, a long step forward will have been taken."

In outlining the proceedings the facts considered in reaching the decision, including cost of living, earnings of workers, possibilities of reducing costs through other means than wage reductions, etc., were given, as well as the text of the decision finally rendered.

When Material Handling Machinery is Justified

Elimination of industrial waste in material handling was discussed on Thursday under the auspices of the Materials Handling Division, R. M. Gates, presiding. The speaker was E. V. Coes, Philadelphia, chief engineer, Deere & Co., Moline, Ill. He strongly urged the informing of the manufacturer, engineer and the public on material handling equipment lines. The job of the engineer, he said, is the co-ordinating of various types of equipment for a given purpose. What the material handling industry needs is analysis; the economic functions should be defined and the co-relation of various types of equipment should be taken up.

R. H. MacLain, author of an article on material handling equipment, which appeared in the April issue of the *General Electric Review*, was introduced by Mr. Coes and exhibited and explained a number of stereopticon slides, showing the development and use of material handling equipment from the hand truck to the power driven industrial truck and overhead cranes and hoists.

Mr. Coes pointed out the formula of William F. Hunt in "Handling Materials in Factories," which he had quoted in his paper and discussion centered about this method of arriving at a satisfactory figure for the investment justified by the saving in an installation of material handling machinery. This formula suggests that the variables in the investment value may be classed as follows:

A = interest charges on investment, per cent
B = interest to provide for upkeep of apparatus installed, per cent
C = interest to provide for depreciation due to age, per cent
D = interest to provide for progress in the art of the particular device proposed (subsequent inventions), per cent
E = interest to provide for extensions to service, per cent
H = additional superintendence and overhead expenses due to change in method, per cent
K = interest to provide for taxes, per cent
F = cost of power, supplies and other variable items in dollars per year

Let S = yearly saving in labor in dollars
and Z = investment in dollars justified by these considerations

then $$Z = \frac{S\ (X \text{ per cent}) - F}{(A + B + C + D + E + H + K) \text{ per cent}}$$

Working this out for an assumed set of conditions, assume that the work which under the present methods of moving materials requires four men employed at $3 per day, 300 days per year, at a yearly cost of $3600, can be done according to the new method by one man, costing $900, thus saving $2700 per year. The plant operates on shift, men employed 80 per cent of the year.

Then $X = 80$ per cent; $S = \$2{,}700$; $A = 6$ per cent; $B = 20$ per cent; $C = 15$ per cent; $D = 10$ per cent; $E = 3$ per cent; $H = 3$ per cent; $K = 3$ per cent; $F = \$400$

and $$Z = \frac{(\$2{,}700 \times 0.80) - 400}{0.60} = \$2{,}933.33$$

James H. Shepard, Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., in a short written discussion of Mr. Coe's paper said that as the factor H in the formula might be either + or — he doubted its value and suggested the addition of still another factor G concerning the saving accomplished by using the equipment. Mr. Shepard commended the formula and suggested that it might with only slight improvement be used commercially. He also urged the standardization of costs.

Another speaker in the discussion, H. M. Lane, industrial engineer, Detroit, Mich, who specializes in foundry construction, pointed out that it has been his experience in laying out foundries that one of the greatest obstacles to overcome in the installation of material handling equipment in a new building is the objection of the architect and builder to changing their plans sufficiently to allow room for a successful installation. The question of perhaps one foot more of headroom than has been provided in the plans is sometimes opposed so convincingly by the architect and builder from the standpoint of additional cost as to prevent the engineer from arranging for proper equipment installation. W. C. Brinton, consulting engineer, New York, said that the formula prepared by Mr. Hunt appeared to be of value only in a plant already operating, and objected that in the case of a new plant it was still entirely up to the engineer. Among other speakers in the discussion were William F. Hunt, author of the article which contained the formula under discussion, and S. H. Libby, Sprague Electric Works of the General Electric Co.

New York Steel Treaters' December Meeting

At the regular December meeting of the New York Chapter of the American Society for Steel Treating, in the Engineering Societies Building, 29 West Thirty-ninth Street, New York, on Wednesday evening, Dec. 21, F. P. Gilligan, president of the national organization, will deliver an illustrated lecture on "What Happens to Steel When You Heat and Quench It." Non-members are invited.

High Rates on Iron Ore to Be Restored

Interstate Commerce Commission Declines to Permit Railroads to File Tariffs on Short Notice for Extension of Reduced Rates to March 31

BY L. W. MOFFETT

WASHINGTON, Dec. 13.—Freight rates on iron ore from Lake Erie ports to interior furnaces are to be restored by Jan. 1 to their high levels prevailing before they were lowered 28 per cent on Oct. 18. Decision to this effect was announced yesterday afternoon by the Interstate Commerce Commission. It came in the form of a refusal to permit the railroads to file tariffs on short notice under the sixth section of the Interstate Commerce Commission for the extension of the reduced rates from Jan. 1 to March 31. In consequence the railroads will be unable to make good their promise to interior furnaces, given at a recent meeting in New York, to extend until March 31 the tariffs on file which lowered the rates.

Victory for Lake Interests

The action of the commission is a victory for lake front iron and steel interests which had asked that the old ore rates be restored on Jan. 1 and that the commission decline the request of the carriers to file short notice tariffs in order to extend the date to March 31. Informal hearing on the sixth section application was held before members of the second division of the commission last Wednesday. The lake front interests maintained that the lowering of rates on iron ore in the absence of reduction in rates on coal and coke to the plants on the lake front constituted discrimination. Interior furnace interests contested this theory and claimed that there is no relationship between rates on iron ore and rates on coal and coke. Apparently the commission in refusing to grant the extension to March 31 has accepted the contention that such a relationship does exist, and some have interpreted the ruling as meaning support of the often cited argument in favor of the assembly cost of raw materials entering into the manufacture of pig iron. Aside from claiming that such a relationship does not exist, interior furnace interests also maintained that the extension of the lower rates should be granted because some of the tariffs fixing lower rates on ore from Lake Erie ports are made permanent, while others would expire automatically on Jan. 1 unless extended. Such a condition would prove chaotic. They further pointed out that lower rates on imported ore are made permanent, and that this would further confuse the situation and be the source of discrimination. No mention, however, was made of the fact that the rates on ore in Southern territory have been lowered without limitation, and apparently the subject was not brought up because the item of competition may not have been thought to be sufficiently important.

Lower Rates on Imported Ore

It is assumed, however, that where tariffs have been filed on the regular 30 days' notice extending the lower rates to March 31 the commission will order suspension and that it will have to take similar action with regard to lower rates on imported ore.

In making its ruling the commission specifically states that its action "is in no sense to be interpreted as a disinclination to approve justifiably lower rate levels, but is based upon the continuance of premature reductions confined to certain rates, the outcome of which is to unduly prejudice iron and steel manufacturers on the lake front to the advantage of competing interior furnaces."

Interior furnace representatives say that the effect of the commission's ruling will be to stop shipments of iron ore from Lake Erie docks after Jan. 1, but that meanwhile the movement, greatly stimulated under the lowered rates, will be further increased until that time.

The final outcome of the ruling on the rate structure of fuel and ore is purely problematical. It is believed, however, that this case, along with requests for reductions in rates on manufactured iron and steel, will be brought before the commission in the course of the general rate investigation which begins to-morrow.

The Commission's Statement

The commission issued the following statement relating to its ruling refusing the request of the carriers to file short notice tariffs:

The commission to-day declined to issue special permissions under the sixth section of the interstate commerce act to allow carriers in Eastern territory to continue from Jan. 1 to March 31, 1922, inclusive, reduced rates on iron ore. The commission's action is based upon protests of shippers located at Buffalo, Cleveland, Erie, Chicago and other lake ports alleging that the proposed rates result in undue discrimination against them and preference for competing furnace interests at Pittsburgh and other interior points.

Coal and iron ore are two of the important elements entering into steel manufacture. Most of the iron ore used in the East comes from Minnesota by lake. Lake front furnaces, therefore, pay no rail freight charges on ore, but transport their coal by rail from Pittsburgh and other interior points. Interior furnaces, on the other hand, while paying rail freight from Lake Erie ports on ore, are in most cases located in close proximity to the coal fields and pay only short haul rates on coal.

In 1917 iron ore was transported from Lake Erie ports to Pittsburgh for 82c. per ton of 2000 lb., whereas coal was charged $1.40 per ton from Pittsburgh to Buffalo, a difference of 58c. per ton. Iron ore rates in the East were not increased during federal control, but coal rates were increased approximately 25 per cent. Rates on both commodities were increased in August, 1920, resulting in rates on ore and coal of $1.14 and $2 51, respectively.

Under the adjustment now proposed by Eastern railroads the ore rate would be 82c., or the same as in 1917, whereas the coal rate would continue $2.51, including the increases of 1918 and 1920 and being higher by $1.69 per ton, or 206 per cent, than the ore rate. The rates on iron ore which will apply after Jan. 1, 1922, will include materially less increase over the pre-war basis than rates on commodities generally—even less than the reduced rates on farm products soon to be made effective.

The action of the commission is in no sense to be interpreted as a disinclination to approve justifiably lower rate levels, but is based upon the continuance of premature reductions confined to certain rates, the outcome of which is to unduly prejudice iron and steel manufacturers located on the lake front to the advantage of competing interior furnaces.

Proceedings at the Hearing

Commissioner Daniels, head of the second division, with Commissioners Esch and Campbell, and Director of Traffic Hardie, presided at the informal hearing last Wednesday, concerning the sixth section application of the railroads asking permission to continue the lowered rates on iron ore until the period mentioned by being granted permission to file tariffs to this effect on short notice.

Attorney Francis B. James, representing the lake front interests, strongly combatted the granting of the application, claiming that his clients are being dis-

criminated against because they have not been granted lower rates on coal and coke, while interior furnaces are getting the advantage of reduced rates on iron ore. Representatives of the railroads and interior furnaces were equally as vigorous in their support for the granting of the application.

Speaking for the eastern interior iron and steel interests was Charles S. Belsterling, commerce counsel for the United States Steel Corporation. L. C. Bihler, traffic manager of the Carnegie Steel Co., Pittsburgh, appeared for that company, the National Tube Co. and the American Steel & Wire Co. F. A. Ogden, traffic manager of the Jones & Laughlin Steel Co., Pittsburgh, represented independent iron and steel interests in the Pittsburgh district, the Mahoning and Shenango Valleys, Wheeling district, and surrounding territory. N. L. Moon, traffic manager of the Alan Wood Iron & Steel Co., spoke for the Eastern Pig Iron Association. The chief spokesman for the railroad was W. S. Kallman, assistant counsel for the New York Central Railroad.

Why Ore Rates Were Lowered

Broadly, the position of the railroads and interior producing interests was that the ore rates were lowered in order to stimulate the iron and steel industry, involving the movement of iron ore and for the purpose of providing immediate revenue to the carriers. Mr. Kallman said that coal and coke rates had not been reduced because, unlike the situation as it applies to ore, the reduction could not be confined to the steel industry but would involve the entire traffic of fuel and he contended that the railroads could not afford the loss of revenue which he claimed would result from such a cut in rates. The interior iron and steel people agreed with Mr. Kallman as to the purpose of reducing iron ore rates, but made it plain that they distinctly were in favor of a reduction of rates on coal and coke. They maintained, however, that the reduction in ore rates has not constituted a discrimination against lake front interests. Mr. Ogden said that relatively rates on ore from Lake Erie ports to interior furnaces still are higher than are rates on coal and coke from the Pittsburgh and Connellsville district, respectively, to Buffalo.

Hauled Under New Tariffs

As evidence of the justification of reducing ore rates, Mr. Ogden stated that the railroads had hauled 250,000 tons of ore under the new tariffs. This, he explained, was an unprecedented movement during the period involved, from Oct. 18 to Dec. 1, and compares with an average movement of 50,000 tons. He said that unless the lower rates remain in effect the furnaces will stop these shipments, which, because of the depressed condition in the iron and steel industry, are not needed, but are being stocked at furnace yards. The stimulated movement is explained by both representatives of railroads and the interior producers as having two principal objects in view, one of them being the movement of ore from the docks before it becomes frozen, and the other to have the docks cleared when the lake navigation season opens. Railroad representatives stated that there are 1,800,000 tons of ore on the docks of Ashtabula Harbor, Ohio.

It was stated that it is hoped the iron and steel industry will have revived by that time, and if it does, there will be large shipments of ore originating from Lake Superior mines, and it would be impossible to handle them unless the docks provided space, and also by reason of the fact that the railroads would be short of cars, inasmuch as they have an unusually large amount of rolling stock in bad order.

Another argument which the railroads made for granting of the application was that some of the tariffs would automatically restore the old rates on Jan. 1, unless extension of time was specifically granted while others are made permanent. This would result in chaotic conditions, they stated.

Rates on Imported Ore

Mr. Belsterling also pointed out that the reduced rates on imported ore over the Lehigh Valley Railroad from Constable Hook, N. J., to South Bethlehem, Pa., and over the Chesapeake & Ohio Railroad from Newport News, Va., to Virginia furnaces, have been made permanent. These rates, which were reduced before the domestic rates were cut, Mr. Belsterling pointed out, would constitute discrimination against Eastern users of New Jersey and eastern Pennsylvania ores. The rate to eastern Pennsylvania, Mr. Belsterling said, is $1 per gross ton, and he added that, if that were a proper rate to South Bethlehem and other points, a proportionate rate for Buffalo ought to be $1.55. Mr. Belsterling said that the imported ore is brought in at low prices and that it would be impossible for the Eastern furnaces to exist if the rates on ore from the docks were not down. He said that he did not think there was any relation between coal and coke and ore, but maintained that Buffalo has the lowest relative rate on bituminous coal out of a number of places he had chosen at random. This rate, he said, was 49.7 per cent of the New England sixth classification rate. He said the same situation applies largely as to coke. He further stated that the rate on coke to Buffalo and in the Connellsville region, is 65 per cent of the New England sixth class rate.

Cost of Making Pig Iron

Replying to a statement by Mr. James that it costs Buffalo furnaces $24 to make a ton of pig iron and that it is selling at $20 a ton, Mr. Belsterling said it would cost $28.50 a ton to manufacture pig iron at Eastern furnaces, paying $1.55 a ton on ore.

Mr. Bihler said that the companies which he represented have 78 blast furnaces, of which 10 are located on the lake front, pointing out that these 10, although not getting any advantage from the lowered ore rates, want to see them continued. He also said, in reply to a statement that the Bessemer & Lake Erie Railroad, a Steel Corporation subsidiary, benefited from ore traffic, that this carrier handles ore for only 31 of the 78 furnaces. He told the commissioners that if they granted the request of the Buffalo producers it would be an undue hardship against the steel industry, which he described as being "already sick." He said that shipments amounting to 50,000 tons of ore had been made to the Carnegie Steel Co. since the reduced tariffs went into effect.

Like his colleagues, Mr. Bihler was unable to say how old rates could be restored without causing confusion.

Commissioner Daniels asked Mr. Bihler why there should be a reduction in rates on one commodity, the outcome of which would be to lessen costs for some furnaces, while there were no reductions on other commodities to lessen the cost on other furnaces. It was considered significant that Commissioner Daniels expressed the belief that if the adjustments of rates between coal and coke on the one hand, and ore on the other was equitable before the ore rates were reduced, then the relationship would be disturbed. The answer of representatives of the railroads and interior producers was that there is no proper relationship.

Claim of Buffalo Producers

Mr. James, however, insisted that there is a relationship between these commodities and that the Buffalo producers are being strongly discriminated against. He even charged that interior producers were trying to drive Buffalo manufacturers out of business. He pointed out that when ore rates were increased 28 per cent during the war, amounting to 30c. per ton, the burden was shifted to the head of the lakes so that the lake front interests had to pay this added transportation because, while there was no additional charge for the interior furnaces from Lake Erie ports. Rightfully, the railroads carrying ore from the mines to the upper docks should have been allowed an increase of only 8c., and railroads from the lower docks allowed 22c. of the increased rate. He said that the reduced rates to interior furnaces gives these interests an advantage of 71c. per ton in the cost of producing pig iron and that regardless of what action may be done on the sixth sec-

tion of the application, these furnaces have derived a big benefit because of the large tonnage they have moved after the reduced rates, and stocked at their yards.

For the purpose of showing the so-called inequitable relationship in rates, Mr. James stated that the ore rate from Buffalo to the Reynoldsville district in Pennsylvania is only 26 per cent of the coal rate from the Pittsburgh district to Buffalo, despite the fact that ore is twice as valuable as coal. He said that the Buffalo interests are not opposed to the lower ore rates themselves, but do vigorously object to the discrimination they have to suffer because of the fact that coal and coke rates have not been reduced.

In asking the commission to deny the sixth section application, he requested it to suspend tariffs and to have the question of ore rates taken up in connection with all other rates at the general investigation which the commission has ordered to begin tomorrow. Interior steel interests announced that they intend to press for lower rates on coal, coke and iron and steel products at the investigation when the shippers' side is taken up in January.

WILL INSPECT SHIPS

Navy Department Seeks Advice of Experts as to Disposing of Tonnage

WASHINGTON, Dec. 13.—Desiring to get practical ideas in connection with the creating of a ship salvage industry in this country, Rear Admiral Potter, Paymaster General of the Navy, has arranged for a meeting at Philadelphia, Friday of the present week, between the naval officials and financiers, steel manufacturers, scrap dealers, shipbuilders, representatives of chambers of commerce, and presidents of trade paper publishing companies. The delegation will inspect obsolete ships which have been advertised for sale on Jan. 16. Among those at the Philadelphia yard are the battleships Maine, Missouri and Wisconsin, the cruiser Columbia, the monitors Ozark and Tonopah, and the destroyer Smith. Other cruisers included in the list of obsolete vessels advertised for sale are the Colorado, Memphis and Brooklyn. The displacement of the cruisers range from 7,000 to 15,000 tons each, of the battleships approximately 13,000 each, and of the monitors, 4 in number, about 6,000 tons each.

Tonnage to Be Scrapped

Estimates have been made that the ships advertised for sale represent about 100,000 tons of metal. The total quantity would be brought up to about 700,000 tons, according to calculations made, if the ship scrapping program as suggested at the Conference on Limitation of Armament is adopted. This takes into account old battleships still in the naval service, nine being built and six battle cruisers under construction. However, there is a growing sentiment in favor of laying the question of disposition of these vessels before experts outside of the Conference, to be handled through diplomatic negotiations or otherwise. Should this be determined upon, it is probable that a number of old ships as well as some of those being built, would be converted into merchant vessels. It has been suggested, for instance, that three of the six American cruisers being built could be made into fast passenger liners. These three ships have been completed up to the waterline and naval experts say that it would be possible to continue construction so as to produce a purely passenger vessel instead of a potential cruiser.

An Important Point

In the event it is finally determined to convert the ships instead of scrapping them, it is assumed that this would have a vital bearing on any program as to the establishing of a salvage industry. Necessarily the latter would take on a more limited operation, requiring less finance, and yielding smaller tonnages of old material to be consumed by the steel trade. Such a limitation might discourage those who otherwise would be willing to enter into financial arrangements connected with the salvaging plan, although some naval officials do not expect such a development. They say that steel makers, scrap dealers and ship builders have shown interest in the proposed salvaging industry and are hopeful that concrete suggestions will grow out of the meeting in Philadelphia, not alone as it relates to the proposed scrapping program but as it relates to merchant and other ships in the future.

The fact that such an industry has been established in England has encouraged the belief that it could be operated in the United States, although obviously the geographical and industrial conditions are dissimilar and probably would call for a modified plan in this country. At the same time, steel manufacturers have expressed the belief that it is feasible either to beach the ships at points nearest consuming steel centers or where the facilities are available to place them in dry docks in preparation for dismantling through the use of the acetylene torch or some other practicable method. Naval officials have indicated that they hope to get at least $10 per ton for displacement of the dismantled ships, but particularly in view of the present condition of the steel market, it is not believed that this expectation is well founded. Offers so far made by steel producers have not exceeded $8 per ton for the steel itself, which in tonnage represents about 75 per cent of the displacement.

It has been pointed out that it would be a costly operation to remove the steel, boilers, engines and other equipment, some of which will be practically without value, and that after this is done, it will be necessary in the case of metal to be used for scrap, to sort it and cut it to charging size, preliminary to transportation to the mills.

Camden Iron Works Sold

The Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., has purchased from the receivers of the Camden Iron Works, Camden, N. J., all patent rights, patterns, etc., used in the manufacture of hydraulic tools and high-pressure valves. The Camden Iron Works has sold for many years through R. D. Wood & Co. of Philadelphia and others. The purchase of the Birdsboro Steel Foundry & Machine Co. includes the machinery, jigs, templets, etc., required for the production of operating valves and all stock which was in process of manufacture at the time of purchase. This deal places the Birdsboro Steel Foundry & Machine Co. in a position to supply hydraulic equipment of every character.

A part of the plant of the Camden Iron Works has been purchased by the U. S. Cast Iron Pipe & Foundry Co., Philadelphia.

The United States Cast Iron Pipe & Foundry Co., Philadelphia, has purchased from the receivers of the Camden Iron Works the patterns, patents, etc., covering the line of gas producers, Thiessen scrubbers, gas holders and miscellaneous work, with the exception of the hydraulic machinery units which were purchased by the Birdsboro Foundry & Machine Co. The United States Cast Iron Pipe & Foundry Co. has organized a new department to take care of this work, in charge of C. D. Mathews, who was manager of the Camden Iron Works, for the receivers.

The November wage distribution of $3,645,873 at Youngstown, Ohio, compares with $3,441,761 in October and a low of $3,323,982 in July. Total disbursement for the first 11 months of the year is approximately $46,500,000, and for the year will approximate $50,000,000. This will compare with $95,247,736 in 1920, the largest yearly payroll.

A general specification of alternating current motors for the main roll drive of a rolling mill has been compiled by and is available in pamphlet form from the Association of Iron and Steel Electrical Engineers, 1007 Empire Building, Pittsburgh.

Iron and Steel Markets

YEAR-END UNCERTAINTY

Buying Waits on 1922 and Freight Rate Readjustment

Pig Iron Lower in the East—Reduced Operation Likely in Holiday Time

In both pig iron and finished steel markets the near approach of the year-end is evident in two respects. Producers have been more disposed to make concessions to improve their cash position and consumers have limited their buying so that inventory might be brought down to its lowest terms. These influences have created fresh uncertainties as to the prices at which the larger business looked for in the new year will be done.

The belief is widespread in the trade that reductions in freight rates will come early in the new year and that the decision by the Commerce Commission to restore the higher iron ore rates on Jan. 1 does not mean opposition to a reasonable reduction. It may prepare the way for a general rather than piecemeal reduction.

Some contraction in mill operations is seen in the Pittsburgh and Ohio districts. The banking of a number of blast furnaces in the mid-holiday week is probable and some steel plants may run at a correspondingly reduced rate.

Irregularities in prices attract more attention under a reduced volume of new business. Rather more deviations from Pittsburgh basing appear in the Chicago district and Pittsburgh manufacturers who would take Eastern business in the heavier products find that they must compete with less than 1.50c., Pittsburgh.

In bars business with jobbers has been done at 1.45c., Pittsburgh, and in wire nails Southern Ohio mills have gone well below $2.75. Production tin plate has sold at $4.65 per base box.

There is better adherence to usual prices for sheets than in other lines, also a somewhat steadier market for wrought pipe,

Some plate orders have been taken at 1.45c., Pittsburgh. There is also the incident of German plates offered for tank work in Texas at the equivalent of 1.16c., Pittsburgh, but low German prices are more than offset by uncertainties as to product and delivery.

The failures of German mills on deliveries are illustrated in the placing of an order by Holland in the United States for 250 tons of sheets. Meanwhile 20,000 tons of rails for Chile have gone to Germany and also railroad cars for India. Two American builders divided 500 cars for Chile.

The Norfolk & Western has placed 40,000 tons of rails, 24,700 tons going to Bethlehem and the remainder to Johnstown and Pittsburgh district mills. The Burlington order now promises to be less than the 38,000 tons first considered.

New car orders are dealt out with a sparing hand, but repair business is offered again in volume. The Norfolk & Western is considering repairs to 4000 cars, the Seaboard Air Line to 1500 and the Union Pacific to 500. Repairs on 1000 have been ordered by the Chesapeake & Ohio. The Central Railroad of New Jersey is in the market for 25 locomotives and the Central of Georgia for 300 cars.

Strong competition of furnaces in New York State and Pennsylvania have developed a marked weakness in the pig iron market in the East. On sales aggregating 7500 tons to a Massachusetts melter, recent quotations were sharply shaded, $19.30, eastern Pennsylvania furnace, being made. In the South, $17.50 is now the fully recognized quotation. Fair activity has taken the place of the extreme dullness which existed in the Pittsburgh market, where prices are being maintained. This is also true in the Chicago district. There are signs that good buying of pig iron may come after Jan. 1, also that ore liquidation will continue to influence prices.

A Detroit automobile plant is out for 5000 tons of soft steel bars and 2000 tons of cold drawn wire for January-February delivery. In general foundries making automobile castings are going at 20 to 30 per cent.

Structural work continues an encouraging feature in volume, but prices remain low. Of awards for the week, about 17,000 tons, three-fourths went to the East; and of the 12,000 tons of fresh projects the greater part is in New York in spite of threatened labor troubles there in the building trades.

In the export field improved exchange, events at Washington and the prospect of an economic conference on European problems have brought a better outlook. Continued buying from the Orient is indicated.

November steel ingot production showed a slight gain, and 20,000,000 tons may be reached for the year, compared with nearly 41,000,000 tons in 1920.

British iron and steel output increased in November. The year's pig iron total is now put at 2,650,000 tons, or one-third of last year's. In steel 3,750,000 tons is the estimate for 1921, against 9,050,000 tons last year.

Pittsburgh

PITTSBURGH, Dec. 13.

Demand for steel products still is on a tapering scale, particularly on those lines which reach ultimate consumers through jobbers. The latter, of course, want to avoid building up stocks with inventories so close at hand, but this does not explain the lack of buying by those who manufacture further, these interests being influenced by the development of fresh uncertainties in prices. Observance of the Pittsburgh basing point by companies outside the Pittsburgh district is limited, and this condition finds reflection in numerous reports of prices considerably below those named by Pittsburgh district mills. It is reported that a price of 1.40c., Chicago, was done on the plates required on a big order for tanks recently placed, while southern Ohio wire mills are credited with having taken business in nails at $2.50, base, per 100 lb., Ironton. Pittsburgh manufacturers who would do business in the major products in the East find they must compete with less than 1.50c., Pittsburgh, on these lines. There is closer adherence to regular quotations on sheets than on any other line of finished material and the market is somewhat steadier on tubular goods than it was recently,

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 13, 1921	Dec. 6, 1921	Nov. 15, 1921	Dec. 14, 1920
No. 2X, Philadelphia‡	*$22.26*	$22.34	$22.84	$34.79
No. 2, Valley furnace†	20.50	20.50	20.50	36.00
No. 2 Southern, Cin'ti†	22.00	22.00	22.50	42.50
No. 2, Birmingham, Ala.†	17.50	17.50	18.00	38.00
No. 2 foundry, Chicago*	20.00	20.00	21.00	35.00
Basic, del'd, eastern Pa.	21.00	21.00	20.50	33.86
Basic, Valley furnace	19.00	19.00	19.00	33.00
Bessemer, Pittsburgh	21.96	21.96	21.96	36.96
Malleable, Chicago*	20.00	20.00	21.00	35.50
Malleable, Valley	20.00	20.00	20.00	36.00
Gray forge, Pittsburgh	21.46	21.46	21.96	36.96
L. S. charcoal, Chicago	31.50	31.50	31.50	51.00
Ferromanganese, del'd	60.00	60.00	60.00	110.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. sheet bars, P'gh	30.00	30.00	30.00	47.00
Forging billets, base, P'gh	32.00	32.00	35.00	51.00
O.-h. billets, Phila	34.74	34.74	34.74	49.24
Wire rods, Pittsburgh	38.00	38.00	40.00	57.00
Skelp, gr. steel, P'gh	1.50	1.50	1.60	3.00
Light rails, Pittsburgh	1.55	1.55	1.55	3.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	1.95	3.85
Iron bars, Chicago	1.65	1.65	1.65	3.25
Steel bars, Pittsburgh	1.50	1.50	1.50	2.35
Steel bars, Chicago	1.60	1.60	1.75	2.73
Steel bars, New York	1.88	1.80	1.80	2.73
Tank plates, Pittsburgh	1.50	1.50	1.50	2.65
Tank plates, Chicago	1.60	1.60	1.75	3.03
Tank plates, New York	1.83	1.88	1.88	3.03
Beams, Pittsburgh	1.50	1.50	1.50	2.45
Beams, Chicago	1.65	1.65	1.75	2.83
Beams, New York	1.88	1.88	1.88	2.83
Steel hoops, Pittsburgh	2.00	2.00	2.25	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Dec. 13, 1921 Cents	Dec. 6, 1921 Cents	Nov. 15, 1921 Cents	Dec. 14, 1920 Cents
Sheets, black, No. 28, P'gh	3.00	3.00	2.75	4.35
Sheets, galv., No. 28, P'gh	4.00	4.00	3.75	5.70
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	3.55
Wire nails, Pittsburgh	2.75	2.75	2.90	3.25
Plain wire, Pittsburgh	2.50	2.50	2.60	3.25
Barbed wire, galv., P'gh	3.40	3.40	3.55	4.10
Tin plate, 100-lb. box, P'gh	*$4.65*	$4.75	$4.75	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$16.00	$16.00	$17.00	$24.00
Carwheels, Philadelphia	*16.50*	17.00	17.00	27.00
Heavy steel scrap, P'gh	14.00	14.00	14.50	17.00
Heavy steel scrap, Phila	11.50	11.50	12.00	16.00
Heavy steel scrap, Ch'go	*11.00*	11.50	12.00	16.50
No. 1 cast, Pittsburgh	*16.00*	16.50	17.50	27.00
No. 1 cast, Philadelphia	*16.50*	17.50	17.50	26.00
No. 1 cast, Ch'go (net ton)	*12.50*	13.00	13.75	18.50
No. 1 RR. wrot., Phila	*14.50*	15.50	16.50	20.00
No. 1 RR. wrot., Ch'go (net)	10.50	10.50	12.50	14.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$3.00	$6.00
Foundry coke, prompt	*3.75*	4.00	4.25	7.00
Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	13.75	13.75	13.25	14.00
Electrolytic copper, N. Y.	13.50	13.50	13.00	14.00
Zinc, St. Louis	*4.85*	4.87½	4.72½	5.90
Zinc, New York	*5.20*	5.37½	5.22½	6.00
Lead, St. Louis	*4.40*	4.45	4.35	5.00
Lead, New York	4.70	4.70	4.70	4.85
Tin, New York	**32.75**	31.75	28.50	33.00
Antimony (Asiatic), N. Y.	4.50	4.50	4.65	5.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 13, 1921, Finished Steel, 2.135c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Dec. 6, 1921,	2.135c.
Nov. 15, 1921,	2.113c.
Dec. 14, 1920,	3.146c.
10-year pre-war average,	1.684c.

Composite Price, Dec. 13, 1921, Pig Iron, $19.46 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Dec. 6, 1921,	$19.47
Nov. 15, 1921,	19.81
Dec. 14, 1920,	34.47
10-year pre-war average,	15.72

due to the fact that orders are coming along steadily and in volume sufficient to make most manufacturers a little less eager for business at the prices which recently have been done.

Actual business has been done in production tin plate at $4.65 per base box, Pittsburgh, and while this price is considerably below cost, there evidently is not enough business to go around, and this remains a quotation on attractive orders.

In keeping with the lighter demand for steel, is a further contraction in the activities of most of the companies in the Pittsburgh and nearby districts. The Carnegie Steel Co., for the first time in several weeks, will probably drop below 50 per cent of ingot capacity this week, and among the independent companies the pulling off of some active steel making capacity has been fairly general. Among the finishing mills those engaged on tin plate are the most fully employed, closely followed by the pipe furnaces. American Sheet & Tin Plate Co. has every one of its tin plate plants running with close to 90 per cent of the hot mills in operation. There has been considerable falling away in sheet mill activities, and not enough business is developing to keep plate, structural and bar mills at all well employed. No change is noted in the number of active blast furnaces in this and nearby districts, 53 out of a total of 140 being in blast. It is probable that some furnaces will be banked during Christmas week and a low rate of operation of steel plants also is likely during that week.

The scrap market, temporarily at least, is firmer in the open-hearth grades, as a result of some recent purchases by some of the Steel Corporation subsidiaries. Activity still is lacking in coke and coal and prices remain easy. The pig iron market is showing a fair degree of activity in foundry iron, but no advance over recent prices.

Pig Iron.—A number of moderate sized lots of foundry iron both for prompt and early 1922 shipment have been closed in the past week, the demand coming chiefly from the radiator and sanitary ware manufacturers. Generally a price of $20.50 furnace has been maintained on No. 2 foundry, but there was one lot of 250 tons which moved at $20.25. A little No. 3 iron is included in the week's business, this grade selling at $20, furnace, and the same price ruled on a fair sized tonnage of standard malleable iron for shipment during the first six weeks of 1922. Bessemer iron holds at $20, Valley furnace, on such business as has recently been done, and there has been no business in this district to warrant any change in the Valley basis of basic iron. There have been no inquiries from consumers of basic iron to whom Valley iron could be

shipped, except in competition with furnaces having a much more favorable freight rate. The only inquiry of any size for this grade was one of 1000 tons from the Follansbee Bros. Co. Considerable comment is heard about the action of the Interstate Commerce Commission in rescinding the extension of the present rail-rates on ore from lower Lake docks after Jan. 1 to March 31. Interior furnaces have not been generally benefited by the October reduction since they previously had brought down about all the ore they required and now will be deprived of any help which the extension of the rate over the first quarter of the year would have meant. Lake furnace interests are blamed for this development because of their activity in trying to secure a cut in coal and coke freight rates. Valley furnace interests assert that the per mile rate on fuel to the Lake furnaces is relatively lower than that to the Valley districts.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.00
Gray forge	19.50
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	20.00

Ferroalloys.—Not much interest is observed in this immediate territory in spiegeleisen, but inquiries for most of the other ferroalloys are better than they have been, with a number of consumers seeking to line up supplies of 50 per cent ferrosilicon for the first quarter of 1922. Actual business remains rather limited, but because of the increase in interest by consumers in the market, there is a slightly firmer tendency to prices. Both domestic and English makers of ferromanganese are quoting 80 per cent material at $58.35 c.i.f. Atlantic seaboard, or $63.37 delivered, Pittsburgh, common rate points. The last business done by Carnegie Steel Co. was on a basis of $60, Pittsburgh, but there is now some question whether it would accept any more business at that price. On 50 per cent ferrosilicon the negotiation price is $60, furnace, freight allowed, but while offerings of this material are moderate, it is probable that less will be accepted to start business going. We note the sale of one carload at $58 delivered, to a West Virginia steel company. Small sales of ferrochrome have been done on a basis of 16c. per lb. Pittsburgh, and small lots of ferrovanadium at $4.55 per lb. Pittsburgh.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $63.67 delivered; 78 to 82 per cent foreign ferromanganese, $58.35, c.i.f. Atlantic seaboard; German, $54, seaboard. Average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $58 to $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market remains extremely inactive; indeed there is so little going on that prices are entirely nominal. Most makers of sheet bars have contracts for shipments over the remainder of the year, priced at $30, and are not inclined to consider a lower price. It is reported, however, that a Pittsburgh district sheet maker recently was able to secure a round tonnage at $28.50, Pittsburgh, but confirmation is lacking. There is practically no demand for billets or slabs and what the makers would quote against attractive business is entirely conjectural.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $28 to $30; 2 x 2 in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $32 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The market is definitely back to a base of $38 Pittsburgh, for soft rods and that price is based on only small sales as current demands are extremely light. There is an impression that the prices of rods will be lower after the turn of the year, and for that reason consumers are not showing much interest in their early 1922 requirements. Prices are given on page 1572.

Steel Skelp.—Based on actual business, the market on steel pipe skelp no longer is quotable at above 1.50c. Pittsburgh, although the quotation against such inquiries as are coming out usually is 1.60c.

Structural Material.—Prices are irregular and easy, since only a moderate amount of new business is coming out, and there is considerable competition for part of it. On very small tonnages, 1.60c. still is being obtained, but on lots of 100 tons or more 1.50c. is the going price. Structural awards are seasonably few and small. The American Bridge Co. has been awarded the contract for the lock gates at Ohio River Dam Nos. 30 and 32, between Portsmouth and Cincinnati, which will take about 600 tons. The McClintic-Marshall Co. has taken 165 tons of stringers for the Brooklyn Bridge and the Jones & Laughlin Steel Co. will furnish 70 tons of bridge material for the Wayne County, Mich., Board of Road Commissioners. Other recent awards included 250 tons for an addition to the plant of Koppel Industrial Car & Equipment Co., Koppel, Pa., to the Pittsburgh Bridge & Iron Co., and one of 250 tons to the Riverside Bridge Co., Wheeling, W. Va. Plain material prices are given on page 1572.

Plates.—Inquiries are good because of a continued demand from the oil companies for storage tanks, but Pittsburgh and Valley mills are not getting much business, in competition with mills located in other centers. The minimum on plates here and at Valley mills is 1.50c., and some of them still are quoting $2 per ton above that price. Some ⅛-in. plates recently were taken by a Valley maker at 1.65c., base.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.60c. f.o.b. Pittsburgh.

Iron and Steel Bars.—Competition between mills in different centers for a share in the very moderate amount of business is keeping prices in buyers' favor, and 1.50c. mill is a more common basis than 1.50c. Pittsburgh. High carbon or reinforcing bars are even weaker than mild bars because of the keen competition of makers for passing orders. As low as 1.45c., Pittsburgh, is reported to have been done recently. Alloy steel bars are firm at recent prices. Eastern mills are said to be offering common iron bars at 1.50c., delivered, Pittsburgh, but 2c. is the minimum price named by Pittsburgh district mills, this being on a bar which it is claimed is of better quality than those produced in the East.

We quote steel bars rolled from billets at 1.50c.; reinforcing bars, rolled from billets, 1.45c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.40c. to 1.45c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Steel Rails.—Only scattering demands are coming out for light rails and there is so much eagerness for orders that the quotation of 1.60c. base for these rails rolled from new billets is largely an asking price. On such business as has been closed, the common price has been 1.55c. Light rails, rolled from old standard section, no longer are quotable at above 1.50c. base, mill.

We quote 25 to 45-lb. sections, rolled from new steel, 1.55c. to 1.60c. base; rolled from old rails, 1.50c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Sheets.—Business steadily is dropping off, but there continues to be remarkably close adherence to the regular quotations. Buyers do not seem interested, and makers are not urging purchases. The American Sheet & Tin Plate Co. this week is operating about 60 per cent of its sheet mills. This is considerably above the independent rate, which does not exceed 40 per cent. Prices are given on page 1572.

Tin Plate.—The first tangible evidence of a non-observance of the regular market quotation of $4.75 per base box, Pittsburgh, for production plate, has come to light in the past week in the booking of a good sized order on a basis of $4.65. Since this price is acceptable to some makers, especially on contracts running over the first half of next year, it must be recognized as a quotation, and we revise our prices accordingly.

We quote standard production coke tin plate at $4.65 to $4.75 per base box f.o.b. Pittsburgh for carload lots.

Wire Products.—Current demands still are for small lots sufficient to meet the immediate needs of buyers. Some inquiries still are coming out for first quarter tonnages, but actual business is small and specifica-

tions against orders already in are difficult to secure. The drive for business a few weeks ago, on the basis of a possible advance in prices and the failure of the advance to materialize, have made buyers cautious and also created an impression that even lower prices are likely before spring. Pittsburgh district mills are running into lower prices in some consuming districts from mills having a freight advantage on delivery over them.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Hot-Rolled and Cold-Rolled Strips.—The approach of the end of the year is resulting in an increased tendency on the part of consumers to keep down their purchases. There is no special change in prices, with makers generally asking 2.25c. base on hot-rolled and 4c. base on cold-rolled, but not much actual business is being placed at higher than 2c. and 3.75c. respectively, and instances are not lacking in which even these prices are being shaded.

Coke and Coal.—Business is almost at a standstill in coke and prices are rather indeterminate. On standard 48-hr. fuel the spot market appears to be about $2.75 per net ton at oven on fresh production, but sales of loaded cars are reported to have been done as low as $2.50. Those shipping on contracts, on the other hand, claim that they are obtaining a net price of $3.40. One or two inquiries have come out for first quarter tonnages from furnaces now being supplied from a steel works by-product plant, but the common belief is that the present supply arrangements will be extended. Beehive oven operators are talking anywhere from $3.25 to $3.75 against first quarter business, but probably would accept less against an actual order. Foundry coke is easier and while $4.50 per net ton oven still is being obtained on choice brands, the more common range is from $3.75 to $4. The coal market is inactive and unsettled, with steam coal available as low as $1.50 for non-union mine run grade and this is all that is to be considered since the non-union fields are well able to take care of current demands. Mine run by-product coal is quotable from $1.60 to $1.85, and the same grade of gas coal from $2 to $2.35.

Iron and Steel Pipe.—Although lacking in spectacular sales, the market in both steel and wrought iron pipe still is relatively active and the close proximity of the end of the year has not yet brought any material slowing up in shipping orders. There is better observance of the card discounts on merchant pipe than on oil country goods and line pipe, although lately there has been a slight firming up in prices of the last-named product. The spread between prices of merchant and line pipe still is unusually wide and the belief is fairly common that either line pipe must advance or merchant pipe come down, in the stabilization of the market. It is reported that the Tidewater Oil Co., which recently put out an inquiry for 150 miles of 6-in pipe, has scaled it down to about 10 miles and instead of constructing a line will put up a number of storage tanks. Discounts are given on page 1572.

Boiler Tubes.—Outside of moderate buying by the railroads incidental to locomotive repairs, the market is entirely lacking in activity and prices continue very irregular with the advantage in favor of buyers. Discounts are given on page 1572.

Cold-Finished Steel Bars and Shafting.—Almost no demand is developing for shafting and orders for screw stock generally are for small lots, although fairly frequent and usually, immediate delivery is wanted. Prices hold within the recent range of from 2c. to 2.25c. base, Pittsburgh, but the bulk of the orders is being placed at from 2.15c. down to 2c., and the higher figure refers entirely to retail quantities. Ground shafting is unchanged at $2.50 base, mills, for carloads.

Hoops and Bands.—Current demands are extremely light and there is very little interest on the part of consumers in tonnages for the early part of next year. The official quotation on both products is 2.25c. base, but on new business 2.15c. is maximum, and on orders at all desirable, buyers rarely have to go above 2c. base.

Nuts and Bolts.—It it impossible to chronicle any improvement in business as far as makers in this district are concerned. The railroads are practically out of the market at present and such demands as are coming out from other sources are entirely for small lots. Makers here claim to be adhering firmly to quotations, although this attitude is costing them the loss of some business. Discounts are given on page 1572.

Rivets.—Activity still is lacking, although makers are getting a fair number of small orders for quick delivery. On carload lots, the going prices are $2.25 base for large structural and ship rivets and $2.35 base for large boiler rivets. These prices, however, are not being done on less than carload lots, on which makers are holding firmly at $2.40 and $2.50. Prices and discounts given on page 1572.

Spikes.—The market is seasonably dull with very little interest being observed either by the railroads or jobbers. The market is quoted at $2.25 base per 100-lb. for large spikes and $2.40 base per 100-lb. for the smaller sizes, but mills outside the Pittsburgh district are reported to have taken the equivalent of $2.35 Pittsburgh on small spikes and less than $2.25 probably could be done on large spikes. Prices are given on page 1572.

Old Material.—Some fair sized purchases recently by several of the subsidiary companies of the Steel Corporation have temporarily, at least, checked the downward trend of prices and given some firmness to the market in the heavier grades of open-hearth material. Purchases by these companies have been of the better grades of railroad material and the delivered price has been $15.50 and in one or two instances slightly more. On strictly heavy melting grade only small lots of say, a carload or two, are available as low as $14. On lots of 1000 tons or more, no sales have been done recently at less than $14.25 and there are few dealers who will take on a tonnage at $15. On light material, such as turnings, the market is dull and inclined lower. The general market, however, is rather firm, because offerings are moderate from producing sources and present prices are too low to tempt dealers to offer yard material.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast, cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	11.50 to 12.00
Bundled sheets, sides and ends	10.50 to 11.00
Railroad knuckles and couplers	15.00 to 15.50
Railroad coil and leaf springs	15.00 to 15.50
Low phosphorus standard bloom and billet ends	18.00 to 19.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	25.00 to 26.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	15.50 to 16.00
Cast iron wheels	15.00 to 15.50
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	9.00 to 9.50
Sheet bar crop ends	14.00 to 14.50
Heavy steel axle turnings	11.00 to 11.50
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	14.00 to 14.50
Stove plate	13.00 to 13.50
Cast iron borings	9.50 to 10.00
No. 1 railroad wrought	11.50 to 12.00

Plans are being completed by the Youngstown Welding Co., 536 West Rayen Avenue, Youngstown, Ohio, for construction of a new plant on a site of three and one-half acres along the Youngstown & Austintown Railroad. The company's new capacity will be devoted to welded metal products, principally truck and storage tanks. It proposes to specialize in truck tanks, elliptical and rectangular, built in all standard sizes and capacities. According to present plans, the initial unit of the plant will consist of a building 100 x 200 ft., others to be added later as the business warrants. The company's present property will be continued in operation. Walter D. McKay is president of the concern.

Chicago

CHICAGO, Dec. 13.

The market is generally quiet as the end of the year approaches and is entirely devoid of spectacular features. The attitude of buyers is characterized by extreme caution for which various explanations are offered. The desire to keep inventories at a minimum so that the final balance sheet of the year may look as favorable as possible from the standpoint of the banks is believed to be one motive for restricted purchases, particularly by those who will find it necessary to borrow in the near future. The cancellation of the war tax on freight effective Jan. 1 may also be a factor influencing the attitude of consumers and it is not unlikely that the necessity of gathering funds to pay the last installment of the 1920 taxes due this week has tended to accentuate the conservatism already marked.

Of less immediate import but nevertheless of far-reaching effect on the program of purchasing departments is the feeling that liquidation in transportation charges has not yet begun, and that further cuts in railroad labor costs must be made so that lower rates on the movement of ore, coal, pig iron and finished material can be put into effect. The testimony of Messrs. Topping, Dinkey and others in the Interstate Commerce Commission hearing on ore rates brought out in bold relief the sharp liquidation which has taken place in iron and steel products in contrast with practical immobility of railroad rates and wages.

Notwithstanding the slackening aspect of the market, it is notable that mills and furnaces have not lost any of the gains they have made over the low-operating records of August. This is probably accounted for by heavy specifications which are now being received from railroad carbuilders and oil storage tank fabricators. One local mill, in fact, reports bookings of 20,000 tons of plates, shapes and bars during the past week. The Illinois Steel Co. continues to operate 11 blast furnaces and is producing steel at the rate of 45 per cent of ingot capacity. The Inland Steel Co.'s operations have improved, being at the rate of over 50 per cent of ingot capacity. This producer has 10 open hearths active and most of its mills running.

Perhaps the main source of better sentiment in the trade is to be found in the increasing prospects of a successful outcome of the Arms Conference. The rapid rise of sterling exchange which has accompanied the progress of deliberations at Washington is welcomed as an important step in the direction of conditions which will tend to remove present obstacles to export business. The depressing picture of the economic situation in Europe recently drawn by certain publicists of great prominence is now regarded as a gross exaggeration.

Pig Iron.—The Federal furnace recently blown in is now producing iron, so that there are now three merchant stacks in operation which were idle only a few weeks ago. While consumption is slowly growing in volume, as evidenced by increased production, the market still has a quiet aspect and is lacking in interesting features. Prices appear to be fairly firm at $20, base, local furnace, for foundry, malleable and basic, although some resale material has been offered at concessions and some furnace tonnage also has moved at a slightly lower figure. The St. Paul Railroad has bought 500 tons of malleable for its Milwaukee shops at a reported price of $20.50, delivered. This represents a slight concession in freight when figured back to a Chicago furnace basis, as the rate from here to Milwaukee is 84c. Current inquiries include one from a western Michigan melter for 1000 tons of malleable, a second from a Chicago railroad equipment manufacturer for 500 tons of foundry, and a third from a western Illinois jobbing foundry for 300 tons of foundry, all calling for first quarter delivery. Inquiries for 200 tons of foundry and several carload lots have been received from the Twin Cities and adjacent points in Minnesota. A sale of 400 tons of Southern foundry at $17.50, base Birmingham, has been made at a point in Indiana where the freight disadvantage of Southern producers is not so decided as in Chicago. A carload sale at the same price is also reported. A local railroad equipment manufacturer has bought 400 tons of 14 per cent Bessemer ferrosilicon. Some charcoal is said to have been sold at slight concessions under the ruling price of $28, base furnace. An inquiry for two carloads of 8 per cent silvery is before the trade. A recent survey of foundry operations in this territory showed the following averages: Agricultural implement manufacturers, 10 per cent of normal; makers of building supplies, 50 per cent; manufacturers of heating equipment, 34 per cent; jobbing foundries, 17 per cent; malleable plants, 18 per cent; automotive foundries, 20 to 30 per cent; ornamental and structural iron and steel manufacturers, 34 per cent; steel jobbing foundries, 34 per cent; railroad equipment manufacturers, 75 per cent.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos.	20.00
Southern foundry, sil. 1.75 to 2.25	24.17
Malleable, not over 2.25 sil.	20.00
Basic	21.00
Low phos., Birmingham	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	33.00
Silvery, sil. 8 per cent	32.02

Ferroalloys.—Outside of an inquiry for two carloads of 16 per cent spiegeleisen and two carloads of 50 per cent ferrosilicon, the market is without features.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Railroad Equipment.—The Northern Pacific has awarded 1200 center constructions for freight cars requiring 2000 tons of steel, to the Western Steel Car & Foundry Co. The Pere Marquette, which last week let 1000 steel underframe box cars with an option on 1000 additional to the same car builder, has cut its order in half. The Union Pacific has let repairs on 500 freight cars to the Pacific Car & Foundry Co. The Central Railroad of New Jersey is in the market for 25 mikado type locomotives.

Rails and Track Supplies.—Both of the local rail producers received part of the New York Central rail order. The Illinois Steel Co. will roll from 35,000 to 40,000 tons, depending on whether the road takes up its option on additional tonnage, while the Inland Steel Co. will supply from 8000 to 9000 tons. The Illinois Central contemplates placing from 20,000 to 30,000 tons for its 1922 requirements. The plans of other Western lines are still in the formative stage. It is interesting to note that those roads which have been accustomed to give part of their tonnage to the Colorado mill will have to pay the old price of $47 for open-hearth rails, as that producer has not yet followed the reductions of other mills. There is little activity in track materials, but tie plates are unsteady and are available at from 1.90c. to 2c.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.20c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.90c. to 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Bars.—Business in soft steel bars remains light with the price situation unchanged. There have been few lettings of reinforcing work, although there are a number of attractive jobs in prospect. The Corrugated Bar Co. will furnish about 100 tons for a 30-apartment building at 6 Prospect Avenue, Milwaukee. Bids have been taken on a vocational school at St. Paul requiring 200 tons and figures will be taken on the Bryant School, Minneapolis, involving 470 tons, on Dec. 15. Another Minneapolis project on which bids will soon be taken is the Lincoln School requiring 500 tons. The Arnold Co. engineer, Chicago, is taking figures on 200 tons for the Standard Dry Goods Co. building, Huntington, W. Va. Considerable reinforcing work is expected to develop after the first of the year. In Iowa the individual counties will contract for their requirements in steel for highway purposes, which will aggregate 5000 or 6000 tons, if as large as those of this year. Demand for bar iron is still spasmodic and insufficient in volume to warrant continuous mill operations. One bar iron mill which has been idle for 12 days is resuming oper-

ation this week, while another important mill remains inactive. Outside of an order from one of the leading railroads for 500 tons, little new business is reported. Prices appear to be steady at 1.65c., Chicago. The situation on the hard steel bars is similar, with going prices at 1.65c., Chicago.

Mill prices are: Mild steel bars, 1.60c. to 1.75c., Chicago; common bar iron, 1.65c., Chicago; rail carbon, 1.65c., mill or Chicago.

Jobbers quote 2.68c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.28c.

Wire Products.—In the absence of active demand, the market has weakened and prices have dropped back to the levels effective before the advance of Sept. 12; namely, $2.75 base per keg on wire nails and $2.50 on plain wire. Cement coated nails are now rather commonly quoted at $2.25 to $2.35, while as low as $2.20 has been reported. Railroad buying is the only promising feature in the market.

We quote warehouse prices f.o.b. Chicago; No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.65 per 100 lb.; cement coated nails, $3.05 per keg.

Sheets.—Buyers continue to delay buying, but prices appear to be firm at the figures quoted below. The local independent still has a substantial backlog which will probably sustain capacity operations until the end of the year.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Plates.—Mills are fairly busy on orders for car and tank steel recently placed. Specifications from car builders are gradually being received, one local producer having received rolling instructions on 5000 tons during the past week. Business from other sources is still light. The price situation remains substantially unchanged.

The ruling mill quotations range from 1.60c. to 1.75c. Chicago. Jobbers quote 2.78c. for plates out of stock.

Bolts and Nuts.—Except for railroad inquiries which are bringing out low quotations, there is little activity in the market. Discounts are generally unsteady and in some cases quotations are being made f.o.b. Chicago. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1572.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ⅞ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to ⅞ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4 off; coach or lag screws gimlet points square heads 65 and 5 per cent off. Quantity extras are unchanged.

Cast Iron Pipe.—Buying is light, as is usual at this time of the year, but there are still a number of large tonnages unclosed which, if let this month, will bring up December sales to a respectable level. One of these is 1000 tons for the Baldwin Reservoir, Cleveland. James B. Clow & Sons was the successful bidder on 450 tons for Galesburgh, Ill., and the United States Cast Iron Pipe & Foundry Co. has taken 200 tons for Canton, Ohio. The National Cast Iron Pipe Co. will furnish 250 tons for Flushing, Mich. Five hundred tons for Broadview, Ill., is pending.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $47.10 to $48.10; 6-in. and above, $43.10 to $44.10; class A and gas pipe, $4 extra.

Warehouse Business.—As the end of the year approaches, the general dullness increases. But little business is reported, and judging the month by the first two weeks, it will probably make the poorest showing of any month this year. Although prices are generally unchanged, there is a tendency among small dealers to shade prevailing quotations, in the case of steel bars ignoring the differential on sizes, either partially or entirely. Sheets are unchanged at 3.28c. per lb. base for blue annealed; 4c. per lb. base for black and about 4.85c. per lb. base for galvanized, with small lots of a 100 lb. or less selling at slightly higher figures. Charcoal tin plate is off about 25c. per box. The brass and copper market shows no change and reports business dull. Dealers in wrought iron and steel pipe see but little prospect of improved business before February or March, but anticipate some change in prices early in the coming year. We quote prices on page 1588.

High-Speed Steel.—The market continues dull, with the average price for 18 per cent tungsten high-speed steel 90c. per lb. and special grades ranging up to $1.05 per lb.

Structural Material.—Although the week's list of fabricating awards is the longest reported for some time, this is regarded as a temporary turn for the better in a dull market. Keen competition among both mills and fabricators is still the rule and much more construction work must make its appearance before any material change in the situation will be effected. Prices of plain material still lack stability, but are on about the same level as heretofore. Fabricating awards include:

Kennedy Sales Co. Building, Kansas City, 100 tons, to Kansas City Structural Steel Co.

Webber's Falls bridge and St. Louis-San Francisco bridge, Muskogee County, Okla., 1574 tons, to Vincennes Bridge Co.

Kansas, Oklahoma & Gulf Railroad bridge, Muskogee County, Okla., 473 tons, to Pan-American Bridge Co., New Castle, Ind.

Whitefield bridge, Haskell County, Okla., 469 tons, to Virginia Bridge & Iron Co.

Illinois Life Insurance Building, Chicago, 462 tons, to Union Foundry Co.

Polar Wave Ice & Fuel Co., Victor Plant, St. Louis, 264 tons, to American Bridge Co.

Northern Illinois Fair and Exposition, grandstand roof, Aurora, Ill., 130 tons, to Union Foundry Co.

Glen Oaks School, Peoria, Ill., 100 tons, to Decatur Bridge Co.

Cananea Consolidated Copper Co., plant additions, Cananea, Mex., 275 tons, to Worden-Allen Co.

Coal tipple, Eagle Pass, Tex., 150 tons, to Worden-Allen Co.

United States Gypsum Co., panel board plant, Southard, Okla., 175 tons, to Worden-Allen Co.

East wing addition to Sheridan Plaza Hotel, Chicago, 441 tons, reinforced concrete substituted for structural steel.

Pending business includes:

Power house for city of Lansing, Mich., 700 tons, bids being taken by Woodwell & Resler, engineers, Lansing.

J. L. Taylor Co., building, Chicago, 1000 tons, revised bids asked by George A. Fuller Co.

Y. W. C. A. Building, Dallas, Tex., 400 tons.

Medical Arts Building, Dallas, 2000 tons.

The mill quotation on plain material ranges from 1.65c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Old Material.—A local steel mill has placed a number of small orders for heavy melting and allied grades at prices ranging from $11 to $11.50 per gross ton delivered. With this exception there has been no consumptive buying of consequence and prices are generally weaker, a number of grades having definitely dropped 50c. a ton. Railroad offers are light. The Soo Line has issued two lists, one of 700 tons and the other of 470 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$16.50 to $17.00
Relaying rails	23.00 to 27.50
Cast iron car wheels	16.00 to 16.50
Rolled or forged steel car wheels	13.50 to 14.00
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.50 to 11.00
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.50 to 9.00
Axle turnings	8.50 to 9.00
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	11.00 to 11.50
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.50 to 20.00
Steel car axles	13.00 to 13.50
No. 1 busheling	8.00 to 8.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.50 to 11.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.50 to 11.00
Steel knuckles and couplers	11.50 to 12.00
Coil springs	12.50 to 13.00
No. 1 machinery cast	12.50 to 13.00
No. 1 railroad cast	12.00 to 12.50
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.50 to 6.00
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	11.00 to 11.50
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.50 to 12.00

Philadelphia

PHILADELPHIA, Dec. 13.

Marked weakness in foundry pig iron has developed within the past week and prices as low as $19.30, furnace, for No. 2 plain iron have been made on a large tonnage for a New England interest. On smaller lots, $20, furnace, has been quoted for No. 2 plain, $21 for No. 2X and $22 for No. 1X, but some furnaces are asking prices at least 50c. per ton above these.

In steel products there is very little of interest. The mills are making an effort to run up until Christmas, at which time there will probably be a general shutdown until after New Year's.

Pig Iron.—In sharp competition for the foundry iron orders placed by the H. B. Smith Co., Westfield, Mass., amounting to 7500 tons, there was cutting of prices by eastern Pennsylvania furnaces, one of which took an order for 3000 tons and the other an order for 1500 tons at $23.36, delivered Westfield, for No. 2 plain iron, which works back to $19.30, furnace. A New York State furnace, which also was awarded a 3000-ton order, set the pace by quoting on a basis of $17.90, Buffalo, or $23.36, delivered, and the furnaces in this district met this quotation on their share of the business. The Sessions Foundry Co., Bristol, Conn., has also bought 2000 tons, according to report, but whether this business came to a furnace in this district is not known here. A pipe company has bought 2000 tons of No. 2 plain iron for early delivery. There have been other smaller purchases and a considerable tonnage, possibly 10,000 tons or more, is still pending. For shipment to points in eastern Pennsylvania it is not apparent that furnaces represented here would go below $20, furnace, for No. 2 plain, $21 for No. 2X and $22 for No. 1X, but these prices have been quoted on inquiries received within the past week. Gray forge iron is obtainable at $20, furnace, malleable at $22, furnace, standard low phosphorus at $36.50, furnace, and copper bearing low phosphorus at $35, furnace, but in all of these grades there is no activity worth mentioning.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.26 to $21.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.26 to 22.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	21.00 to 21.50
Gray forge	22.25 to 23.00
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Domestic producers of ferromanganese and British selling agents continue to quote $58.35, seaboard. Lower prices are being made in the Pittsburgh district by the Steel Corporation. Spiegeleisen is not in demand and is quoted at $25 to $27, furnace.

Billets.—There is very little inquiry for billets, which are quoted at $29, Pittsburgh, for rerolling quality, and at $33 to $34, Pittsburgh, for forging quality.

Rails.—The Norfolk & Western Railroad, which recently opened bids on 40,000 tons of heavy rails for 1922 delivery, has divided this tonnage among three makers. The Bethlehem Steel Co. was awarded close to 25,000 tons and the remainder was divided between the Steel Corporation and the Cambria Steel Co.

Plates.—The order for 10,000 tons of plates to be fabricated into pipe for the New York City aqueduct by the Merchant Shipbuilding Co., Chester, Pa., was divided about equally between the Bethlehem Steel Co. and the Midvale Steel & Ordnance Co. Aside from these contracts, which involve deliveries running throughout the next year, there has been no plate business of importance taken by Eastern mills. Plates are nominally quoted at 1.50c., Pittsburgh, but it continues fairly easy to shade this price on desirable tonnage.

Structural Material.—A number of projects involving a few hundred tons of steel each are pending in this district, but on the whole the market is very quiet, and there is no change in price. Plain material is quoted at 1.50c., Pittsburgh, but this is occasionally shaded.

Bars.—Steel bars appear fairly firm at 1.50c., Pittsburgh, despite reports of shading $1 a ton. Jobbers are buying very little this month, being mostly concerned with reduction of inventories. Bar iron is quoted at 1.60c., Pittsburgh, but buyers are taking so little interest that the price is not being tested.

Sheets.—Two small eastern Pennsylvania mills are reported to be shading prices on sheets, but the larger mills are adhering to 2.25c. on blue annealed, 3c. on black and 4c. on galvanized, base Pittsburgh. Business is very light.

Warehouse Business.—Bar iron has been advanced to 2.65c. by local jobbers to put it on the same level as steel bars. Local jobbers quote as follows for Philadelphia delivery:

Soft steel bars and small shapes, 2.65c.; iron bars (except bands), 2.65c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.50c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.25c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Coke.—Furnace coke contracts for first quarter have been made at $3.30 to $3.40, Connellsville. Foundry coke is quoted at $4 to $4.50, Connellsville, according to quality.

Old Material.—Consumers of scrap are buying very little material and in some instances are trying to cancel contracts. Prices are weak and largely nominal. We note lower figures on several grades. Quotations for delivery to consumers in this district are as follows:

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	16.25 to 16.75
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.50 to 17.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.00 to 12.50
No. 1 forge fire	9.50 to 10.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.00 to 9.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	13.50 to 14.00
No. 1 cast	16.50 to 17.00
Railroad grate bars	13.50 to 14.00
Stove plate (for steel plant use)	13.50 to 14.00
Railroad malleable	13.50 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	17.00 to 18.00

Cleveland

CLEVELAND, Dec. 13.

Iron Ore.—A further wage reduction of 10 per cent is being considered by independent ore mine operators in the Lake Superior district. With four reductions previously made this year, wages of miners employed by the leading independent mining companies are still 63.44 per cent higher than in 1915. This percentage is based on the wage scales of independent companies in the Gogebic range, but wages in other districts have declined in about the same proportion. However, there is at present considerable irregularity in miners' wage scales. During the year, 52,145 tons of ore was shipped from the Michipicoten, Ontario, district which was not included in the total shipments from American ports. With this Canadian ore, the total lake shipments are 22,352,871 gross tons. All rail shipments for the year will amount to between 400,000 and 425,000 tons. The amount of ore on Lake Erie docks at the close of the season of navigation, Dec. 1, was nearly 2,000,000 tons less than on the same date a year ago. The amount on Dec. 1 was 9,032,595 tons as compared with 10,955,868 tons on the same date last year. Ore receipts at Lake Erie ports during the season were 15,554,341 tons as compared with 44,224,263 tons last year. Shipments from Lake Erie ports during the season were 12,195,679 tons as compared with 32,016,654 tons for the previous 12 months. Receipts at lake front furnaces located at Lake Erie ports were 2,712,433 tons for the season as

compared with 9,132,175 tons for 1920. Receipts at other than Lake Erie ports for the season were 6,560,139 tons as compared with 13,091,384 tons for the previous 12 months. Receipts at these ports for the season were as follows: Detroit, 253,458 tons; Indiana Harbor, 779,478 tons; Gary, 2,350,580 tons; South Chicago, 2,655,114 tons, including 21,435 tons shipped to the St. Louis district; Milwaukee, 20,552 tons; East Jordan, 10,892 tons; Sault Ste Marie, Ontario, 315,874 tons; Point Edward, Ontario, 174,191 tons.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—There is some activity in foundry iron, but the demand is almost wholly outside of this immediate territory. The market is not firm and various reports of concessions in the outlying districts have made the price situation very uncertain. To the East, quotations of $18.50 are reported on Buffalo foundry iron at Erie and from the western part of the territory there are reports of low prices either from brokers or on resale iron, some of the latter having come on the market recently. While lake furnaces generally quote $20 as a minimum price on foundry iron, some orders have been taken at $19.50. There is a disposition to name a price that will take the order, the quotation depending on the tonnage required and delivery point. One lake furnace reports sales during the week aggregating 3200 tons, all in small lots, the largest order being for 250 tons. Some of these orders were for deliveries extending through the first quarter. A local interest sold 1000 tons for shipment to western Pennsylvania on the basis of $20 Valley. If this iron is shipped from Cleveland, it will mean a furnace price of about $19.10. Furnaces in the Valley appear to be holding to $20.50 for foundry iron for shipment to Valley points. Two inquiries for basic iron came out during the week, one from the Trumbull Steel Co. for 3000 to 4000 tons of iron and the other from the Follansbee Bros. Co. for 1000 tons.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic		$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$19.50 to	20.00
Southern fdy., sil. 2.25 to 2.75		25.17
Ohio silvery, sil. 8 per cent		32.86
Standard low phos., Valley furnace	34.00 to	35.00

Finished Iron and Steel.—Mills are getting a fair volume of small orders, but the aggregate tonnage is light. Consumers are reducing their stocks to a minimum and are buying only what they actually need. The price situation shows virtually no change. On steel bars, plates and structural material 1.50c. is the minimum quotation for desirable orders, and the usual price range is up to 1.60c. However, local mills are holding to 1.75c. for plates unless the material specified carries good extras. Oil tank and car work are helping the plate and structural material demand materially. An additional 900 tons of tank plates has been placed by a lake shipyard for repair work. Tank shops are figuring on oil tank work for the Southwest and Mexico involving large plate tonnages. Reports from the Texas oil fields state that German plates are being offered at 2.08c., delivered at Port Arthur, Tex., or equivalent to 1.135c., Pittsburgh. On the inquiry for 3000 tons for steel re-inforcing bars for the Baldwin Reservoir, Cleveland, all mill quotations were 1.50c., Pittsburgh, and the contractor is trying to get a 1.35c. price. A Cleveland automobile part manufacturer has placed 500 tons of spring steel and a Canton consumer is inquiring for 400 tons of strip steel. The structural outlook has improved and considerable work is expected to come out early in the year. The Berger Iron Works, Akron, has taken 500 tons of steel for a foundry for the National Sulphur Co., Akron. The American Bridge Co. has taken a subcontract for fabricating steel for car repair work for the Wheeling & Lake Erie Railroad, requiring 800 tons. The Osborne Engineering Co., Cleveland, has asked for bids for 2500 tons of structural steel for a grandstand for the American League baseball grounds, New York. The approval by the Interstate Commerce Commission of the public square site for the union depot, Cleveland, is expected to lead to a start on that long delayed project, but the railroads do not expect to come out for any steel requirements for at least six months. There is still considerable irregularity on hoops and bands, a 1.75c. quotation appearing on the wider sections, but sales are being made up to 2.25c.

Jobbers quote steel bars, 2.54c.; plates and structural shapes, 2.64c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.14c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Some consumers are trying to place first quarter contracts at lower than the regular price of 3c. for black, 4c. for galvanized and 2.25c. for blue annealed sheets, but mills are apparently holding firmly to these prices. Consumers' requirements for the remainder of the year are well supplied and sales are unusually light. Some of the leading independent sheet mills have adopted a new form of irrevocable contract under the terms of which the buyers will be obligated to take the quantity named at the contract price.

Alloy Steels.—Prices on chrome vanadium steel have stiffened. One mill has advanced its price from 3.90c. to 4.75c. per lb., Pittsburgh, and another maker is now quoting this steel at 5.25c., an advance of 0.25c. per lb.

Warehouse Business.—Local jobbing houses report an improvement in warehouse business in some lines over November, but sheets are quieter. Prices are holding fairly firm.

Bolts, Nuts and Rivets.—Some of the bolt and nut manufacturers report an improvement in the number of orders, but orders are all for very small lots. The price situation shows no change. The demand for rivets improved somewhat during the week. A few orders ranging from car lots up to 100 tons have come in from tank and car shops. These orders were placed at the regular price of 2.40c. for structural and 2.50c. for boiler rivets, but some makers continue to shade these prices from $1 to $3 a ton.

Coke.—The market is very dull. Price quotations on standard Connellsville foundry coke range from $4 to $4.75 per ton.

Old Material.—The market has again quieted down after recent purchases by dealers to cover against the order for 5000 tons of heavy melting steel scrap placed by the Lorain plant of the National Tube Co. The only activity reported is the purchase of a few small lots of turnings by a local plant for its blast furnaces at $8.75. One Valley district consumer is offering $13.50 for heavy melting steel scrap, but probably will be unable to buy very much at that price. Local dealers bought heavy melting steel at $13.50 delivered to fill the Lorain contract and are understood to have sold this scrap at $14 to $14.25 to the dealer who took the order from the mill. Little activity is expected until after the holidays. In spite of the dullness, the market is firm and there are no changes in quotations.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$11.50 to	$12.00
Steel rails, under 3 ft	12.50 to	13.00
Steel rails, rerolling	14.00 to	14.50
Iron rails	12.00 to	12.50
Iron car axles	18.00 to	19.00
Low phosphorus melting	13.00 to	13.50
Cast borings	8.50 to	8.60
Machine shop turnings	7.50 to	7.60
Mixed borings and short turnings	8.50 to	8.60
Compressed steel	9.00 to	9.25
Railroad wrought	12.00 to	12.50
Railroad malleable	12.50 to	13.00
Light bundled sheet stampings	6.00 to	7.00
Steel axle turnings	9.00 to	10.00
No. 1 cast	15.00 to	16.00
No. 1 busheling	8.25 to	8.75
Drop forge flashings, over 10 in.	7.50 to	8.00
Drop forge flashings, under 10 in.	7.50 to	8.00
Railroad grate bars	12.75 to	13.00
Stove plate	13.00 to	13.25
Pipes and flues	8.50 to	9.00

An injunction restraining the United States Railroad Labor Board from publishing a decision to the effect that the Pennsylvania Railroad System has violated an agreement with its employees, was issued at Chicago on Dec. 9, by Federal Judge K. M. Landis. Arguments on a plea for a permanent restraining order will be subsequently heard. Attorneys for the railroad contended that the board is authorized to act only when a road and its employees are unable to agree.

Boston

BOSTON, Dec. 13.

Pig Iron.—Sales in this district the past week are estimated at 13,000 tons. Of this amount 7500 tons of No. 2 plain iron was taken by a Westfield, Mass., melter from three furnaces. Details are lacking, but indications are an eastern Pennsylvania furnace took part of the business at $23.36 delivered, and that a New York furnace met this price to secure a part of the tonnage. A Framingham, Mass., heater maker bought 1200 tons No. 2 plain central Pennsylvania iron at about $24 delivered, while a Bristol, Conn., melter took 2000 tons No. 2X at a comparatively low figure. These three tonnages, all for first half delivery, developed fresh weakness in Buffalo and eastern Pennsylvania irons, the former being quoted as low as $18.50, and the latter at slightly more than $19, furnace. Some furnaces sent direct representatives into New England to secure the business. The rest, 2500 tons, was largely No. 2X and No. 1X Buffalo and eastern Pennsylvania, some charcoal, and a little Virginia and Alabama. One melter took 300 tons Alabama at $28.66 base delivered, the largest sale of Alabama iron reported in some time. The best price paid for eastern Pennsylvania No. 1X iron was $21 furnace, but some small lots sold at $20.50, the furnaces, like those in the Buffalo district, disregarding the silicon differentials, especially on first quarter deliveries.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75	$24.36 to $25.56
East. Penn., silicon 1.75 to 2.25	23.36 to 25.06
Buffalo, silicon 2.25 to 2.75	23.68 to 25.68
Buffalo, silicon 1.75 to 2.25	23.68 to 25.18
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	29.16
Alabama, silicon 1.75 to 2.25	28.66

Finished Material.—The Boston & Maine Railroad Co. has awarded 2300 tons of structural steel for the Newburyport bridge to Shoemaker-Satterthwaite, Pottstown, Pa. Bids closed yesterday on 250 tons for a Providence, R. I., machine shop. A Boston-New York firm was the low bidder on 430 tons for the Everett, Mass., high school. Figures for estimating purposes are being supplied on a considerable tonnage held over this year, for 1922 fabrication. The market on shapes, plates and bars is 1.50c., Pittsburgh, with occasional sales of small tonnages at 1.55c. and 1.60c. on plates and shapes. These is nothing certain about New England buying of rails. It is possible the Boston & Maine Railroad will not buy a large tonnage this year—not more than 15,000 tons—because it will carry over 6000 to 7000 tons of 1921 rails. The New York, New Haven & Hartford Railroad management is reported as not having made up its tonnage. The company recently bought 100,000 tie plates, about one-third its original inquiry, and it is believed rails will be taken in about the same proportion. It is understood buying by the Maine Central, Bangor & Aroostook and Central Vermont railroads will be under 10,000 tons. The Laconia Car Co. has received an order from the Boston & Maine Railroad for repairs on approximately 1000 wooden freight cars, aggregating more than $1,000,000. This order involves little, if any, steel, but does involve considerable hardware.

Warehouse Business.—The movement of iron and steel bars out of local warehouses is better than it was a week ago but is by no means active. Sheets and structural steel are selling relatively better. More seasonable weather has made for larger sales of blacksmith's supplies of all kinds. The market on brass has advanced another ½c. per lb., making a total advance of 1½c. per lb. since October. Wood screws have declined 5 points to a basis of 82½ per cent discount from print on flat head bright.

Jobbers now quote: Soft steel bars, $2.71½ per 100 lb. base; flats, $3.21½; concrete bars, $2.20 to $2.71½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.31½ to $3.78; steel hoops, $3.31½; toe calk steel, $5; cold rolled steel, $3.75 to $4.25; structural steel, $2.71½; plates, $2.81½ to $2.99; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.71½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Coke.—Further bookings for first half by-product foundry coke at price ruling date of shipment have served to keep interest alive the past week. The total tonnage booked for next year delivery by the two New England coke producers is far below that for the corresponding period last year. In justice it should be said, however, that 1922 business was not accepted until well into November, whereas last year 1921 bookings were taken as early as October. Production and shipments of coke of the New England Coal & Coke Co. and the Providence Gas Co. are just about holding their own, one offsetting the other, but business is very largely confined to domestic and commercial cokes. Both companies quote foundry on a delivered base of $10.66 for December fuel.

Old Material.—Aside from its quietness, the old material market was without special feature the past week. New England foundries are withholding purchases of machinery cast, stove plate, etc., until after the inventory period is passed, and holders of other materials apparently are not milling to accept prices offered by the large dealers.

The following are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.00 to $19.00
No. 2 machinery cast	16.00 to 17.00
Stove plate	15.50 to 16.00
Railroad malleable	13.50 to 14.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$8.00 to $8.25
No. 1 railroad wrought	12.00 to 12.50
No. 1 yard wrought	9.50 to 10.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	7.50 to 8.00
Machine shop turnings	3.50 to 4.00
Cast iron borings, rolling mill	5.50 to 6.25
Cast iron borings, chemical	6.50 to 6.75
Blast furnace borings and turnings	3.50 to 4.00
Forged scrap and bundled skeleton	4.50 to 5.00
Steel car axles and shafting	11.50 to 12.00
Car wheels	11.00 to 12.00
Rerolling rails	10.50 to 11.00

Buffalo

BUFFALO, Dec. 13.

Pig Iron.—Foundries not ordinarily interested in Buffalo iron because of prohibitive freight rates continue to inquire in this district. Not very much of this inquiry is reduced to orders, but it is apparent that distant buyers believe furnaces here are disposed to make concessions not obtainable elsewhere. One furnace has 21,000 tons inquired for and another 16,000 tons, but of course in many instances the same inquiry is considered by both furnaces. Much of the activity is from the New England region and some from eastern Pennsylvania. One company has sold 1500 tons at $20 base, and this seems to be this company's price at furnace for iron to be delivered in New York State. Reports persist of lower prices for delivery in New England, and other distant points, but the low priced iron sold to brokers by a steel company some time ago seems to have been disposed of. One company sold 4000 tons made up of various lots of basic, malleable and No. 2 plain. A furnace which is practically withdrawn as a selling factor quoted $20 base on an inquiry for 1000 tons.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.00 to $21.00
No. 2X foundry, 2.25 to 2.75 sil.	19.50 to 20.50
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic	20.00 to 21.00
Malleable	20.00 to 21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—The Lackawanna Steel Co. has been given a portion of the 125,000-ton rail order awarded by the New York Central Railroad, and while definite information is not available, it is understood between 50,000 and 75,000 tons will be rolled here. An improvement is noted in the call for prices on plates and bars and one inquiry for 200 tons of plates for a Buffalo interest is receiving attention. There is a dearth of large structural business, and while a number of enterprises are planned, fabricators generally report a slackening of prospects. The city viaduct work requiring 1800 tons has been awarded to the Lackawanna Bridge Co. Some carload business for pipe has been entered. The inventory period is having an effect on shipments and because of tax conditions, whatever business is placed at this period is not to be shipped until after Jan. 1. While sheet prices have generally been firm, 200 tons of black sheets sold at 2.80c. A price of 1.50c. for carload lots or lower of bars has

been made several times within recent weeks. In plant operation, a wire interest is now operating all its equipment except blast furnaces on a full-time basis.

Warehouse Business.—Sheet orders have been more frequent because of intermittent mill operation and warehouse delivery is more speedy. Structural demand has fallen off and whatever is sought in this line now are mostly "fill-in" orders.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.80c.; plates, 2.80c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.70c.; hoops and bands, 3.30c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.80c.

Coke.—Very little demand is noticed and the best grades are still obtainable at prices ranging from $4.25 to $4.75 ovens.

Old Material.—Livelier demand for steel at $13.50 has appeared and two mills are eager to buy more than is available at the time. The same disposition to reduce stocks to the lowest extremity is apparent as in former years since tax legislation made such a condition desirable.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

Birmingham

BIRMINGHAM, ALA., Dec. 13.

Pig Iron.—Business of the week ending Dec. 10 was done on the $17.50 base as a rule. Some car lots brought $18, but the base was $17.50 on usual transactions. No large tonnage was taken. Pipe shops in the district bought lots of 2000 to 2500 tons uniformly at $17.50. There were less than half a dozen deals of that size. Car lots for prompt shipment came continuously and point to immediate need of iron. It is reported that two makers have offered $17.50 for first quarter, but this could not be confirmed. Inquiry for January and February shipment, especially January, has been brisk and covered considerable tonnage. Inquiry for entire first quarter is negligible. Consumers seem determined not to be hurried. Stocks status at the beginning of the month was again good. Iron on Alabama furnace yards, Nov. 1 and Dec. 1, were as follows: Foundry, 54,000 and 51,000; machine cast, 33,000 and 27,000; warrants, 5900, no change; basic, 50,000 and 42,000; totals, 144,000 and 127,000. The largest individual holding is around 25,000 tons compared with 75,000 tons before furnaces commenced blowing out. The largest active interest shipped production as did two other interests. Makers incline to look for earlier resumption of buying than is usual following the holidays, but cannot foresee large business in competitive fields at present freight rates.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$17.50
Basic	16.50
Charcoal, warm blast	35.00

Cast Iron Pipe.—Sanitary shops received an unexpected flurry of orders for December delivery. Practically all shops will work until Chrisumas and take the usual holiday only, resuming by the first of the year. They will manufacture for stock piles in anticipation of good spring trade, whether new business is heavy or not. Cargoes of pipe for Pacific Coast points move regularly out of Mobile. Honolulu has taken 300 tons of water pipe by the same route. High pressure pipe makers forecast a good year in 1922. Independents are at about 60 per cent to capacity. Base of high pressure is $34 to $35 and sanitary pipe is $40.

Coal and Coke.—Coal production has fallen from 300,000 tons a week the latter part of October to 250,000 tons now. De Bardeleben Coal Co. has begun shipment of bunker coal to Galveston via Mobile in ocean-going barges. It is expected to develop return cargoes of sulphur for Steel Cities Chemical Co., Graselli Co. and other Birmingham acid works.

Old Material.—The scrap market could not be more listless. Little is done even at the lower quotations made in the past two weeks.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

New York

NEW YORK, Dec. 13.

Pig Iron.—The week has been one of moderate activity and very low prices. Quotations in eastern Pennsylvania, central Pennsylvania, and also at Buffalo, for delivery in New England and other Eastern points have declined to less than $19, furnace, and in some cases to about $18.50, furnace, for No. 2 plain. The H. B. Smith Co., Westfield, Mass., has contracted for 7500 tons from New York State and eastern Pennsylvania furnaces at $19.30, furnace, for the Pennsylvania iron and on the basis of $18 Buffalo. A furnace company has purchased 2500 tons for first quarter at $20 to $20.50 for No. 2 plain eastern Pennsylvania iron. The National Radiator Co. has purchased 1500 tons for its Johnstown, Pa., plant and the Sessions Foundry Co. 1000 to 2000 tons from an eastern Pennsylvania furnace. A cast iron pipe company has purchased 2000 tons. The Central Foundry Co. is in the market for 2000 to 5000 tons for first quarter for New Jersey and Pennsylvania plants. A Brooklyn melter is inquiring for 300 tons for first quarter delivery, but there are few large tonnages pending and the market is very quiet.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	23.96 to 24.46
No. 2 Virginia, sil. 1.75 to 2.25	27.16 to 28.16

Ferroalloys.—The inquiries noted a week ago aggregating about 1200 to 1500 tons have not yet developed into orders and other new business is practically at a standstill. Quotations are unchanged although one representative of a British producer calls attention to the possibility of higher prices for the British alloy because of the sharp advance in the pound sterling. The Sheridan furnace of one of the American producers of ferromanganese will blow in this month on ferromanganese. There have been sales of a few carloads of spiegeleisen, 20 per cent, at $26, furnace; otherwise the market is inactive. There is no demand for high grade foreign ore and quotations are nominally unchanged. The 50 per cent ferrosilicon market is inactive and there are no indications yet of contracting for 1922 delivery. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton	$60.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	10c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	45c. to 50c.

Finished Iron and Steel.—Structural steel lettings and inquiries and prospective railroad work feature an otherwise dull December steel market. Though much

of the railroad inquiry, particularly for cars, comes from the Central West, Eastern roads are showing some interest. A prospect, as yet rather indefinite, is that the Norfolk & Western will repair 4000 cars, which would require about 25,000 tons of steel. The Seaboard Air Line has inquired for prices on 1000 box cars, 300 phosphate cars and 200 flat cars. The Central of Georgia has inquired for 500 box cars, and will shortly ask for prices on 200 gondolas and 100 stock cars. The Chesapeake & Ohio has placed 1000 freight cars for repair, of which 500 all-steel cars go to the Liberty Car & Equipment Co., 300 composite cars to the American Car & Foundry Co. and 200 composite to the Ralston Steel Car Co. The Pere Marquette has placed 500 box cars with the Western Steel Car & Foundry Co., with an option on 500 additional. Bids close this week on 500 "more or less" gondolas and hopper cars for the Chesapeake & Ohio Railroad. The distribution of 125,000 tons of heavy rails by the New York Central Lines has been completed. The Lackawanna Steel Co. receives the largest order, 51,500 tons, while the Steel Corporation receives 50,500 tons, divided between Illinois Steel Co., with 34,000 tons, and Carnegie Steel Co., 16,500 tons. Inland Steel Co. receives 8000 tons, Bethlehem Steel Co., 6000 tons, and the Algoma Steel Corporation of Canada, for Canadian lines, 9000 tons. Each order was accompanied by an option for 20 per cent additional tonnage and the required amount of track fastenings. Despite the prospect of labor troubles in the New York building trades, a considerable volume of new structural work is up for bids, including the following: Bank of North America, building at 44 Wall Street, 4000 tons; addition to the Princeton Club in Thirty-ninth Street, New York, 300 tons; Pier 44, North River, New York, 300 tons; factory for Max Aronson, West Thirty-sixth Street, New York, 1100 tons; schoolhouse in Brooklyn, 700 tons. About 12 Brooklyn school buildings, totaling about 8000 tons of steel, have recently been let. Prospective work in other cities includes 500 tons for a hospital building at Johns Hopkins University, Baltimore; a city bridge at Forty-ninth Street, Philadelphia, 200 tons; a building in Albany, N. Y., 1000 tons, and an addition to a store in Richmond, Va., 400 tons. Bids will close this week on 1400 tons of shapes and 700 tons of counterweights for the new South Street bridge, Philadelphia, and next week on 1200 tons of shapes for caissons for the new Philadelphia-Camden bridge. Recent awards include 1000 tons for an apartment building at Broadway and Eighty-fifth Street, New York, to Hedden Iron Construction Co.; 900 tons for the Herald Square Press Building, 1800 tons for a loft building in Seventh Avenue near Thirty-fifth Street, and 300 tons for a telephone exchange building in Boston, all to the Levering & Garrigues Co.; 200 tons for a hotel at Middletown, Ohio, to American Bridge Co.; 2600 tons for a bridge at Newburyport, Mass., to Shoemaker-Satterthwait Co. The Standard Oil Co. of Louisiana has let the contract for five tanks involving 700 tons of steel. A New York State public service company is in the market for 5000 tons of steel gas pipe in four sizes. Prices are weak but substantially unchanged. Fabricated steel work has been sold for delivery in New York at less than $45 per ton. Structural shapes are figured at 1.50c., Pittsburgh, but it is reported that this price has been shaded. Plates, it is known, have been sold at 1.45c., Pittsburgh, and less, and 1.50c. does not seem low enough to take desirable business. Bars are quotable at 1.50c., Pittsburgh. It appears that with the closing of the New York State barge canal to traffic, which will take place shortly, Buffalo mills are no longer quoting 1.80c., delivered New York, on bars, but are again naming prices on a Pittsburgh basis, with full railroad freight rate.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.80c. to 1.88c.; plates, 1.83c. to 1.98c.; structural shapes, 1.88c. to 1.98c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Cast-Iron Pipe.—The city of Syracuse, N. Y., awarded the contract of furnishing and laying 6200 tons of 36-in. pipe to the Warren Foundry & Machine Co., Phillipsburg, N. J., shipments to be made throughout the winter. The total contract involved $342,206. The award was won over a bid for furnishing and laying steel pipe for $334,970 because of the assumed greater durability of the cast-iron material. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—A wider range has developed in market prices due to the fact that the higher prices of a few weeks ago are still being paid by brokers who are filling old contracts, whereas new mill orders are bringing out lower prices. The price tendency is downward. A New York broker has reduced buying prices on seven items during the week, ranging from 25c. to $1.50.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.50 to $8.50
Steel rails, short lengths, or equivalent	8.50 to 9.50
Rerolling rails	9.50 to 10.50
Relaying rails, nominal	30.00 to 35.00
Steel car axles	11.00 to 12.00
Iron car axles	18.50 to 19.50
No. 1 railroad wrought	11.00 to 11.50
Wrought iron track	8.50 to 9.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Cast borings (clean)	6.50 to 7.00
Machine-shop turnings	4.00 to 5.00
Mixed borings and turnings	4.00 to 5.00
Iron and steel pipe (1 in. diam. not under 2 ft. long)	7.50 to 8.50
Stove plate	9.00 to 10.00
Locomotive grate bars	9.00 to 10.00
Malleable cast (railroad)	8.00 to 9.00
Car wheels	10.50 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Cincinnati

CINCINNATI, Dec. 13.

Pig Iron.—While the market continues dull, there are a few inquiries before the trade. The L. & N. Railroad will close Wednesday on 250 tons of Southern. The Standard Sanitary Mfg. Co. is inquiring for 500 tons for shipment to its Louisville plant and the National Cash Register Co. is in the market for 300 tons for January shipment. The Indiana Reformatory is inquiring for 400 tons of foundry iron for first quarter and a Terre Haute malleable shop is interested in 500 to 1000 tons for first half. Another inquiry, for 450 tons, comes from an unnamed melter in this district. During the week, sales were confined almost entirely to carload lots. A Dayton melter took 100 tons and a Michigan melter a similar amount. Among other sales reported was one for 300 tons of Virginia iron to an Eastern melter. Prices are inclined to be softer and it is said that in competitive territory southern Ohio iron can be had at $19.50. Brokers are offering Chicago and Valley irons on the basis of $19.50, furnace. In the South, $18 is sometimes quoted on carload lots, but the usual price is $17.50 on business of fair tonnage. While it is not expected that much business will be done during the remainder of this year, the prospects for first quarter are very much better and sellers are looking to the future with more confidence than has been the case for some months.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$22.00 to $22.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	22.50 to 23.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52 to 23.52
Basic, Northern	22.02
Malleable	23.52

Finished Materials.—The market on finished materials shows very little activity, although several orders of 200 tons each were placed for bars, shapes and plates. These orders are being booked usually at 1.50c., but in the case of small orders 1.60c. is still the general asking price. The sheet market is quiet, but a spurt is looked for shortly after the first of the year, as stocks in jobbers and manufacturers' warehouses at the present time are very light. Some activity is apparent in the structural field. The Danis-Hunt Construction Co. has been awarded the contract for an addition to the Soldiers' Home at Dayton, Ohio. This will take approximately 200 tons of reinforcing

bars, which has been placed with an Ohio mill. Hetherington & Berner, Indianapolis, are low bidders on the Roosevelt office building in that city, which will take about 850 tons of steel. The Insley Mfg. Co., Indianapolis, will fabricate 200 tons of steel for a building for the Rose Polytechnic Institute at Terre Haute. The Virginian Bridge Co. has been awarded a contract for the construction of additional stands for the Memphis, Southern League, baseball club, requiring 200 tons. The American Bridge Co. will fabricate 200 tons for a hotel at Middletown, Ohio. Bids will be received until Jan. 9 for an auditorium and office building at Memphis, Tenn. It is reported that the steel involved will amount to approximately 3500 tons. Bids are in for a hotel at Johnston City, Tenn., about 600 tons of structural steel being involved. There will be no change in plant operations; the last week's schedules being adhered to for the coming week.

Warehouse Business.—Warehouse business is quiet and very little is expected during the remainder of the month. Prices are unchanged.

Iron and steel bars, 2.90c. base; hoops and bands, 3.50c. base; shapes and plates, 3c. base; reinforcing bars, 2.97½c. base; cold rolled rounds, 1½-in. and larger, 3.70c.; under 1½-in. and flats, squares and hexagons, 4.20c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3 per 100 lb.

Tool Steel.—Tool steel is showing a gradual improvement. A reduction of 5c. per lb. in high-speed steel became effective on Dec. 1, and 18 per cent tungsten high-speed steel is now quoted at 85c. per lb.

Coke.—Several inquiries for one to two hundred tons are active in the coke market, but as a general thing the market is dull. Prices continue unchanged, though it is said Connellsville furnace coke can be had at $2.90 on an attractive tonnage. Foundry is quoted at $3.75 to $4.25. Wise County and New River prices remain at $5.25 and $7.50 respectively. By-product producers quote $6.50, Connellsville basis.

Old Material.—The scrap market is very dull and nothing is expected to develop until after the new year. Very little scrap is coming out and dealers are inclined to hold yard stocks for anticipated higher prices. Quotations are unchanged.

We quote dealers' buying prices, f.o.b. cars:

	Per Gross Ton	
Bundled sheets	$3.50 to	$4.00
Iron rails	12.00 to	12.50
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.50 to	11.00
Heavy melting steel	9.00 to	9.50
Steel rails for melting	9.00 to	9.50
Car wheels	12.00 to	13.00
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	3.00 to	3.50
Steel turnings	2.00 to	2.50
Railroad cast	12.00 to	12.50
No. 1 machinery	13.50 to	14.50
Burnt scrap	7.50 to	8.00
Iron axles	15.50 to	16.50
Locomotive tires (smooth inside)	9.50 to	10.00
Pipes and flues	4.00 to	4.50

St. Louis

ST. LOUIS, Dec. 12.

Pig Iron.—The demand for pig iron has been better than for several weeks past, and there has been some increase in shipping instructions against contract. A sale was made of 150 tons of charcoal iron for first quarter delivery. There was a fair sprinkling of carload orders. A western Iowa melter wants 300 tons and a Texas melter 300 tons of foundry iron. The inventory period is causing a slowing down of orders, however. Stove manufacturers are doing very little. The largest plant in the district is operating only two days a week, while the two next largest are closed down. Jobbing foundries are doing little. There is an inquiry out in this district for four carloads of spiegeleisen. Preparations were being made for blowing in the furnace of the St. Louis Coke & Chemical Co., Granite City, early in the week. The market continues at $20 and $21, Chicago, for Northern iron, and $17.50 and $18, Birmingham, for Southern iron.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$22.88 to $23.88
Northern malleable, sil. 1.75 to 2.25	22.88 to 23.88
Basic	22.88 to 23.88
Southern foundry, sil. 1.75 to 2.25	23.41 to 23.91

Finished Iron and Steel.—The railroad and oil tank business constitutes the greatest part of the steel trade for the present, the structural demand being off until there is a settlement of the wage question. The 14,000 members of the unions represented in the building trade council are now voting in a referendum as to whether there shall be a reduction of 20 per cent in the present base wage of $1.25 an hour. The Union Pacific Railroad, whose inquiry for 1500 cars was reported in THE IRON AGE last week, has an additional inquiry out for 25 69-ft. baggage cars, 20 all-steel coaches, and 18 all-steel observation cars. The Kansas City Terminal Railway is in the market for 1000 tons of 90-lb. rails and 3000 angle bars. A jobber has inquired for prices on 2000 kegs of spikes and 1500 kegs of track bolts for a Southern railroad. A street railway in this district is in the market for a carload of wheels. New orders for oil tanks include 20 55,000-bbl. tanks placed by the Magnolia Petroleum Co., 10 with the Mount Cooper Boiler Co., Tulsa, Okla., and 10 with the Warren City Tank & Boiler Co., Warren, Ohio. This, in addition to 50 80,000 steel top tanks placed by the Sinclair Oil Co. with the Chicago Bridge & Iron Co.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The demand for coke during the last week has been only moderate. The market is at from $4 to $5 for Connellsville brands, which is being met by local producers. One Connellsville producer has withdrawn for the first half of next year, and limited all quotations to Feb. 1 only—for December and January shipments, indicating belief in a stronger market. There is one inquiry for 1500 to 2000 tons of foundry coke a month through the first half, and another for 600 tons for December-January shipment. Domestic coke is showing slight improvement after several weeks of light sales due to the mild weather.

Old Material.—The market for old material is inactive, and the price tendency is lower. One large consumer is reported to have quietly bought a tonnage of iron car wheels and cast scrap, but there has been no other buying of consequence. Consumers are not inclined to swell their inventory; so there will be very little buying during the remainder of this year. The only railroad offering before the market is a list calling for about 9500 tons issued by the Southern Railway.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Old iron rails	$15.50 to	$16.00
Steel rails, rerolling	12.50 to	13.00
Steel rails, less than 3 ft.	13.00 to	13.50
Relaying rails, standard section	25.00 to	30.00
Cast iron car wheels	15.00 to	15.50
No. 1 heavy railroad melting steel	11.00 to	11.50
No. 1 heavy shoveling steel	10.50 to	11.00
Ordinary shoveling steel	10.00 to	10.50
Frogs, switches and guards cut apart	11.00 to	11.50
Ordinary bundle sheet	4.00 to	4.50
	Per Net Ton	
Heavy axles and tire turnings	6.50 to	7.00
Iron angle bars	13.00 to	13.50
Steel angle bars	10.00 to	10.50
Iron car axles	20.00 to	21.00
Steel car axles	14.00 to	14.50
Wrought iron arch bars and transoms	15.00 to	15.50
No. 1 railroad wrought	10.50 to	11.00
No. 2 railroad wrought	9.50 to	10.00
Railroad springs	11.50 to	12.00
Steel couplers and knuckles	11.50 to	12.00
Locomotive tires, 42 lb. and over, smooth inside	9.50 to	10.00
No. 1 dealers' forge	9.00 to	9.50
Cast iron borings	6.50 to	7.00
No. 1 busheling	10.00 to	10.50
No. 1 boilers cut in sheets and rings	8.00 to	8.50
No. 1 railroad cast	14.50 to	15.00
Stove plate and light cast	12.50 to	13.00
Railroad malleable	10.00 to	10.50
Agricultural malleable	9.50 to	10.00
Pipes and flues	7.50 to	8.00
Heavy railroad sheet and tank	6.50 to	7.00
Light railroad sheet	4.50 to	5.00
Railroad grate bars	10.00 to	10.50
Machine shop turnings	6.00 to	6.50
Country mixed iron	7.50 to	8.00
Uncut railroad mixed	8.50 to	9.00
Horseshoes	11.00 to	11.50
Railroad brake shoes	9.50 to	10.00

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $2.95; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots; 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads ..... 65 and 10 to 70 per cent off list
Longer and larger sizes ..... 65 and 10 to 70 per cent off list
Lag bolts ..... 70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads .... 60 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter ..... 65 and 5 per cent off list
Larger and longer sizes ..... 65 per cent off list
Hot pressed sq. or hex. blank nuts ..... $5.50 off list
Hot pressed nuts, tapped ..... $5.00 to $5.25 off list
C.p.c. and t. sq. or hex. blank nuts ..... $5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped ..... $5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive ..... 80, 10 and 10 per cent off list
Small sizes S. A. E. ..... 80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E. 70, 10, 10 and 10 per cent off list
Stove bolts in packages ..... 80, 10 and 5 per cent off list
Stove bolts in bulk ..... 80, 10 and 7½ per cent off list
Tire bolts ..... 65, 10 and 10 per cent off list
Track bolts, carloads ..... 3.25c. to 3.50c. base
Track bolts, less than carloads ..... 4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under ..... 75 and 10 to 80 and 10 per cent off list
9/16 in. to ¾ in. ..... 75 and 10 to 80 and 10 per cent off list

Upset Set Screws

½ in. and under ..... 80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in. ..... 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes ..... 70 and 10 per cent off list

Milled Set Screws

All sizes ..... 70, 10 and 5 per cent off list

Rivets

Large structural and ship rivets ..... $2.25 to $2.40 base
Large boiler rivets ..... 2.35 to 2.50 base
Small rivets ..... 70, 10 and 5 to 70, 10 and 10 per cent off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38; chain rods, $38; screw stock rods, $43; rivet and bolt rods and other rods of that character, $38; high carbon rods, $46 to $50, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.40 base; 5/16-in., $2.40 base. Boat and barge spikes, $2.40 to $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20	Nos. 11 and 12	2.30
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.35
		Nos. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Dec.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
7.....	13.75	13.50	31.50	4.70	4.40	5.37½	4.87½
8.....	13.75	13.50	31.50	4.70	4.40	5.30	4.87½
9.....	13.75	13.50	32.00	4.70	4.40	5.25	4.90
10.....	13.75	13.50	....	4.70	4.40	5.25	4.90
12.....	13.75	13.50	33.50	4.70	4.40	5.20	4.85
13.....	13.75	13.50	32.75	4.70	4.40	5.20	4.85

New York

NEW YORK, Dec. 13.

The markets continue moderately active and strong. The tendency of the copper market is higher with the volume of sales increasing. Prices of tin have advanced with the spectacular rise in the exchange market and because of other conditions. The lead market is quiet and firm. Demand for zinc is light but the price situation is steady.

Copper.—The principal change in the electrolytic copper market which has developed during the week is the gradual tendency of the minimum price of 13.75c., delivered, for early delivery to disappear. While some metal for this position at this price is still available, consensus of opinion is to the effect that within a very short time at least 13.87½c., if not 14c., delivered, will be the minimum for early or 30-day delivery. The first quarter position is still a minimum of 14c., delivered, or 13.75c., refinery. In the last few days there had been more buying for prompt delivery than has been anticipated, indicating more activity among manufacturers and limited stocks for early use. Domestic buying for first quarter is moderately active and demand from foreign countries continues brisk. Deliveries into consumption in November are known to have been larger than those for October and it can be stated that stocks have been correspondingly reduced. The price for foreign consumption is at a minimum of 14c., f.a.s.

Tin.—The feature of this market is the large advance made in the last few days in the pound sterling and this has of course had its effect on the price of tin. An advance of 14 points in the British pound means 1c. per lb. in the price of tin and as the pound sterling has advanced considerably more than this the higher price for tin is partially explained. The London tin market has also gone higher, which has been another factor in the price situation. Spot Straits tin to-day is quoted at 32.75c., New York, which is 1c. higher than a week ago, and the London market to-day was £169 15s. for spot standard, £171 10s. for future standard and £170 7s. 6d. for spot Straits, all about £2 per ton higher than last week. Generally the market has been quiet so far as sales are concerned, these having been moderate to light in volume, with here and there fair orders reported. Late last week profit taking parcels appeared which had a slightly disturbing influence, but these have been cleared up; they are, however, likely to appear periodically under present conditions. Since much of the business in the past has been with consumers, it is expected by some that the December deliveries into consumption will be larger and that the stocks on Jan. 1 will be small. It is also the opinion that considerable tin is on the way to meet the spot and nearby needs. Another opinion is to the effect that there will be a shortage for the greater part of the month with a premium on spot tin in case there develops any demand for the metal. The advance in sterling and the higher price in London on Friday and yesterday were so sharp as to temporarily choke off buying on this side. To-day there was reaction in exchange but very little buying. A sale of 120 tons on the New York Metal Exchange is noted. Arrivals thus far this month have been 1695 tons with 4740 tons reported afloat.

Lead.—There has been very little change, the market remaining firm with a steady demand. The leading interest continues to take business at 4.70c., New York and St. Louis, while independents are asking 4.75c., New York, and 4.40c., St. Louis. The London market has advanced, and this together with the higher value of the pound sterling made London prices of lead for spot and future delivery 15 to 18 points per lb. higher.

Zinc.—Demand is moderate for early delivery but there is more inquiry for first quarter. The new freight rates on prime Western from St. Louis to Eastern points of 35c. per 100 lb., instead of 50c., went into effect yesterday, which modifies the New York differential. Prime Western for early delivery is but little changed from a week ago at 4.85c., St. Louis, but the New York price is now 5.20c. as against 5.35c. a week ago, due to the new freight rate. Quotations for first quarter are about five points up for each month, with the delivery for the entire quarter quoted at 4.95c. to 5c., St. Louis.

Antimony.—Wholesale lots for early delivery are quoted at 4.50c., New York, duty paid, with prompt metal at 4.55c.

Aluminum.—The leading interest continues to quote 19c., f.o.b. plant, for wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery with the same grade sold by importers at 17c. to 18c. New York, duty paid.

Old Metals.—The market continues strong but business is moderate. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.25
Copper, heavy and wire	12.25
Copper, light and bottoms	10.00
Heavy machine composition	10.25
Brass, heavy	7.75
Brass, light	6.00
No. 1 red brass or composition turnings	8.25
No. 1 yellow rod brass turnings	6.25
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

DEC. 13.—Tin has advanced, principally on account of exchange, while the prices of other metals remain unchanged. There has been some activity in tin during the advance, but on the whole the market is quiet. A number of grades of old metal have advanced in sympathy with recent changes in new material. We quote in carload lots: Lake copper, 13.75c.; tin, 34.50c.; lead, 4.45c.; spelter, 4.95c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 8c.; red brass, 8c.; yellow brass, 5.25c.; lead pipe, 3.25c.; zinc, 2.37½c.; pewter, No. 1, 23c.; tin foil, 24c.; block tin, 26c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Dec. 12.—Lead is practically unchanged while zinc is slightly higher than last week. We quote lead at 4.40c. to 4.45c., carlots, and zinc at 4.90c. to 4.92c. We quote Lake copper, 14.48½c. in carlots; tin, 33.11c., and antimony, 5.23½c. to 5.28½c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Secretary of Commerce Herbert Hoover made the interesting statement recently that he was the second engineer in the 155 years of the history of the United States to hold a high office under the Government, George Washington having been the first. He regards the engineer as particularly fitted to render service to the public by virtue of his training and his ideals. He is accustomed to dealing with facts, and incidentally Mr. Hoover's ambition is to have the Department of Commerce known as a fact procuring department, and not necessarily with controlling functions.

PERSONAL

H. M. Thompson will represent the Quigley Furnace Specialties Co., 26 Cortlandt Street, New York, manufacturer of Hytempite, high temperature cement, Insulbrix and other heat insulation products in the Chicago territory. He was formerly identified with the Thomas Moulding Brick Co. He succeeds Bell & Gossett, former agents for the Quigley company. His headquarters will be at 105 West Monroe Street, Chicago.

C. F. Meyer, assistant secretary Landis Machine Co., Waynesboro, Pa., manufacturer of bolt and pipe threading machines, has returned from a year's trip around the world. His itinerary included India, Java, China, Japan and the Hawaiian Islands. J. M. McNeal, sales engineer Landis Machine Co., has returned after a year and three months in England and the Continent.

Charles H. Bromley, formerly technical director Richardson-Phenix Co., Milwaukee, is now manager and chief engineer of the newly formed Richardson-Phenix division of S. F. Bowser & Co., Inc. This division will conduct the filtration and lubrication appliance business of the consolidated companies, with main office at Fort Wayne, Ind.

S. H. Schachtel has succeeded S. W. Platt as manager of the Pittsburgh office of the David J. Joseph Co., Cincinnati, iron and steel scrap.

A. A. Albaugh, formerly general superintendent Jacobson Machine Mfg. Co., has been appointed vice-president and general manager of the Barnhart-Davis Co., Warren, Pa., iron and brass works.

C. B. Adams has been appointed vice-president and sales manager of the Maher Engineering Co., contracting engineer, with offices in Chicago, Detroit and Cleveland. C. H. Peterson has been appointed secretary-treasurer and general manager.

Andrew Fletcher, president American Locomotive Co., has been elected a director of the American Car & Foundry Co., filling the vacancy on the board caused by the resignation of Walter G. Oakman.

W. J. Priestly, metallurgical engineer Naval Ordnance Plant, South Charleston, W. Va., has been elected chairman of the board of registration for engineers of West Virginia. The board was provided by a recent act of the legislature of that state, its duties being to examine credentials and register all engineers practising in the state. Mr. Priestly is not able to serve in this capacity because of Civil Service law. C. S. MacCalla, vice-president and general manager Virginia Power Co., was appointed in his stead for the term ending June 30, 1922. Other members of the board are: George E. Taylor, Anderson & Taylor, consulting engineers, Charleston-Kanawha, W. Va., who is also president of the Charleston chapter of the Association of American Engineers; Frank Haas, Fairmont, consulting engineer Consolidation Coal Co.; H. C. Cooper, Clarksburg, general superintendent Hope Gas Co.; N. H. Manakee, Bluefield, W. Va.

James D. Erskine, formerly manager of the Eastern branch of the American Radiator Co., New York, has been made vice-president in charge of sales of the Fitzgibbons Boiler Co., Inc., Oswego, N. Y., which has now established a branch in New York with offices in the Bryant Arcade Building, 47 West Forty-second Street.

Charles F. Smith, chairman board of directors Landers, Frary & Clark, New Britain, Conn., has been made temporary chairman of the board of directors of the New Britain Machine Co., automatic screw machines. He will hold office during the absence of F. G. Platt, who is at Johns Hopkins Hospital, Baltimore.

John L. Artmaier has been appointed sales manager of the railroad department of the Buda Co., Harvey, Ill., with headquarters in the Railway Exchange Building, Chicago. J. E. Murray, formerly assistant to Mr. Artmaier, will be Eastern sales manager, and J. H. Maher, formerly the company's representative at Buenos Aires, Argentina, has been appointed Eastern export manager, both with headquarters at 30 Church Street, New York.

Charles M. Power, vice-president and general manager of sales, United States Chain & Forging Co., Pittsburgh, since its organization in 1919, has resigned, effective Jan. 1, 1922. He has made no definite plans for the future. Mr. Power was born in Franklin, Pa., Feb. 2, 1868, and has been identified with the chain business since 1904, when he became secretary and general manager of the Seneca Chain Co., Kent, Ohio, which grew materially under his management. In 1909 he severed that connection to become general manager of sales of the Standard Chain Co., which was absorbed by the American Chain Co. in 1916, and with which company he continued as sales manager until January, 1919. During the war Mr. Power was active in the Chain Manufacturers Association which was charged with securing for the various governmental departments a sufficient amount of chain for war purposes. He is chairman of the executive committee of the American Hardware Manufacturers Association.

Frank L. Cone, Windsor, Vt., has been elected president of the Coates Clipper Mfg. Co., 237 Chandler Street, Worcester, Mass. J. W. Watson continues as general manager.

J. J. Andrews, Boston Bridge Works, Boston, is convalescing at a local hospital from an appendicitis operation.

Thomas Hoope, Jr., has resigned as general manager of the Wilcox, Crittenden & Co., Middletown, Conn., marine hardware. He was associated with the company for more than 20 years.

Nils Anderson, president Debevoise Anderson Co., New York, has returned from a trip to England, Norway, Sweden, France and other countries of Europe. He found strong sentiment in favor of helping Germany to improve its industrial condition, as the belief is general that world prosperity will not be restored until Germany becomes much stronger as a manufacturing nation.

William J. O'Toole, Gary, W. Va., who has been appointed American Minister to Paraguay, is the son of Col. Edward O'Toole, general superintendent of the United States Coal & Coke Co., a subsidiary of the H. C. Frick Coke Co.

In the list of officers of the Eastern States Blast Furnace and Coke Oven Association, recently organized in Pittsburgh, published in THE IRON AGE Dec. 8, the name of E. T. Vogel, superintendent by-product plant, Youngstown Sheet & Tube Co., Youngstown, was inadvertently omitted. Mr. Vogel is vice-president.

Thomas A. McGinley, vice-president and general manager Duff Mfg. Co., Pittsburgh, recently was elected to the board of directors of the Westinghouse Air Brake Co., Pittsburgh, taking the place of his father, John R. McGinley, who recently resigned.

Samuel P. Broome has been appointed Pittsburgh district manager for Naylor & Co., New York, succeeding George C. Mills, who resigned to go into business for himself under the firm name of Lippincott & Mills, New York and Cleveland. Mr. Broome recently had been affiliated with Stalnaker & Co., and previously for a number of years was with the A. M. Byers Co., and before that with the Republic Iron & Steel Co.

Louis A. Mertz, who has been for the past six years, assistant to James L. Cox, treasurer Dravo Contracting Co., has been appointed secretary of the company in place of the late John J. Nolan.

A settlement of the wage scale in the building industries of Cincinnati has been arrived at whereby the workers will receive increases of from 5 to 12½c. an hour over the scale recently made by the umpire in arbitration proceedings. The wage scale will go into effect immediately and will expire December 23, 1922. The wage agreement with all crafts in the buildings trade will terminate on the same date.

OBITUARY

THOMAS G. FITZSIMONS, president Fitzsimons Co., Youngstown, Ohio, and a pioneer in the manufacture of cold-drawn steel, died at his home in Cleveland on Dec. 9, aged 73 years. He is credited with developing the process for manufacturing cold-drawn steel about 40 years ago at the plant in which he was associated with his father in Cleveland and where he obtained his preliminary training as a molder. The foundry was conducted under the name of Fitzsimons & Son. Mr. Fitzsimons did the experimental work on cold-drawn steel in this foundry. He succeeded to the business on the death of his father, and 18 years ago purchased a plant in Youngstown for the manufacture of cold-drawn steel. This business was later incorporated under the name of the Fitzsimons Co. However, Mr. Fitzsimons continued to reside in Cleveland. He has had three sons associated with him in the business. These are Robert R. Fitzsimons, vice-president and secretary; James R. Fitzsimons, manager, and Thomas G. Fitzsimons, superintendent. Mr. Fitzsimons was active in civic and political affairs, particularly in a tax reform movement and recently was a member of the executive committee of the Cleveland Foundation. He ran twice for mayor in Cleveland as an independent candidate.

EDGAR W. SUMMERS, 63 years old, president Summers Steel Car Co., Pittsburgh, and designer of numerous devices for loading and unloading ore cars and ore boats, died Dec. 8, at the home of his daughter, Mrs. Charles L. Baker, Glenshaw, Pa. Mr. Summers was born in Bellebrooke, Ohio. He became chief engineer of the Wellman-Seaver-Morgan Co., Cleveland, where he developed the modern type of car dumper and ore unloader now in use on the Great Lakes boats. In later years he developed many improvements on freight car equipments, particularly of value in the handling of ore. In 1908 he organized the Summers Steel Car Co. He was a member of the Engineers Society of Western Pennsylvania.

FRANK B. CHOLLAR, 70 years old, Pittsburgh representative Morse Twist Drill & Machine Co., New Bedford, Mass., died Dec. 9.

JAMES SAUNDERS, president Saunders Machine Co., Dayton, Ohio, manufacturer of general and milling machinery, died at his home in that city on Nov. 28. He was 66 years old.

JOHN A. SKIFF, traveling salesman for the Geuder P. Paeschke & Frey Enamelware Co., Milwaukee, died of heart failure in New Orleans on Dec. 3. He was well known in the hardware trade.

ALBERT H. CHAPMAN, secretary-treasurer Walsh & Weidner Boiler Co., Chattanooga, Tenn., died suddenly of ptomaine poisoning recently. He had been with the Walsh & Weidner company for 29 years. He was prominent in church and fraternal circles.

CLARENCE E. ROOD, vice-president and sales manager Gould Coupler Co., New York, died Dec. 12 at the Algonquin Hotel in that city at the age of 67. Early in life he became a member of Rood & Brown, car wheel builders, Buffalo. For the past 12 years he has been associated with the Gould Coupler Co. in the New York office.

JOHN MCCLARY, founder McClary Mfg. Co., one of the largest stove manufacturing concerns in the British Empire, died at his home in London, Ont., Dec. 11, at the age of 93.

HENRY CLAY EVANS, a manufacturer of iron, steel and railroad cars at Chattanooga, Tenn., a former Commissioner of Pensions and one time Consul General at London, died at his home in Chattanooga on Dec. 12. He was born in Juniata County, Pennsylvania, June 18, 1843. He was prominent in Republican politics and held many high offices.

Keystone Coal & Coke Co. Takes Over Jamison Properties

PITTSBURGH, Dec. 13.—Negotiations have been practically concluded and an official announcement is expected about Jan. 1 whereby the Keystone Coal & Coke Co., Philadelphia, will take over the properties of the Jamison Coal & Coke Co., Greensburg, Pa., in the so-called Greensburg Basin, Westmoreland County. About 3000 acres of coal land and 1309 beehive coke ovens comprise the holdings of the Jamison company involved in the deal, the consideration for which is understood to be around $10,000,000. The Keystone company has extensive areas adjacent to the Jamison properties, negotiations for the purchase of which have been started several times previously but never concluded. Dominant interests in the Jamison company for several years have been trying to sell. Other properties of this company located in Westmoreland and Washington counties in Pennsylvania and in West Virginia are not included in the transfer.

The Bethlehem Steel Corporation some time ago purchased a large part of the West Virginia coal lands of the Jamison company, and that company also takes the bulk of the output of coal from the mines still held by the Jamison company under a long-time contract. Because of this fact, there have been reports that the Bethlehem Steel Corporation was behind the Keystone-Jamison deal with an idea of taking over the combination, but such reports find little credence here, and it is believed that the Keystone Coal & Coke Co. will remain independent.

Automotive Body Manufacturers Combine

The L. C. Graves Co., Springboro, Pa., manufacturer of commercial car and truck bodies, has purchased the Moore Motor Co. plant and will operate it under the name of United Automotive Body Co., Danville, Ill. The new company will be capitalized at $1,250,000 and will employ 500 men. It will embody the present L. C. Graves Co., the Danville plant and the United Automobile Body Co., Cleveland, the latter company having been purchased by the Graves company a short time ago. The large assembly floor at the Danville plant will be used exclusively for steam and electric railroad body equipment, such as is required for gasoline-driven railroad coaches, which are becoming extensively used for branches, extensions and short runs on both steam and electric lines. The Pennsylvania plant will supply the Eastern demand and the Danville plant will take care of Ohio and States west.

Richardson-Phenix Co. and S. F. Bowser & Co., Inc., Consolidate

The Richardson-Phenix Co. and S. F. Bowser & Co., Inc., have consolidated. The filtration and lubrication appliance business of both companies will be conducted by the Richardson-Phenix division, S. F. Bowser & Co., Inc., with main offices at Fort Wayne, Ind. J. William Peterson, president Richardson-Phenix Co., will assume the office of vice-president of S. F. Bowser & Co., Inc., and will be in charge of the Richardson-Phenix division. The highly specialized personnel and factories of the Richardson-Phenix Co. are retained. The assets of the consolidation are valued at $10,000,000.

Engineering Honors Conferred on Foch by Four Societies

Honorary membership was conferred by all four of the founder engineering societies on Marshal Ferdinand Foch of France on Tuesday afternoon, Dec. 13, at the Engineering Societies Building, New York. For the four societies jointly to confer this honor is unprecedented. The ceremonial was in charge of representatives of the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers.

SHORT TRADE ITEMS

The R. H. Beaumont Co., Philadelphia, contractor for coal, coke and ash-handling systems at boiler houses and gas plants, is increasing its sales force as follows: P. K. Reed, formerly chief engineer, will enter the sales department and will be located at Philadelphia. H. D. Williams, a former engineer, will enter the sales department and will be added to the New York office force. The company's Pittsburgh office will move to the Oliver Building and will be in charge of Charles W. Ross, formerly New York manager.

Manning, Maxwell & Moore, Inc., New York, have installed a power transmission department as a subdivision of the supplies department. Dallas W. Clem, formerly of the Reeves Pulley Co., has been placed at the head of this new division. He has spent his entire business life in the mill supply field, more particularly in the line of power transmission. As a transmission engineer he has had eight years of practical experience and has made installations of all kinds of transmission appliances in almost every type of manufacturing industry. He has specialized in installations for giving variable speeds.



D. W. CLEM

The New York office of the Blaw-Knox Co. will be removed Dec. 15 from the City Investing Building to the Carbide & Carbon Building, 30 East Forty-second Street.

The Andrews-Bradshaw Co., sales engineer, formerly located on the third floor of the B. F. Jones Building, Pittsburgh, has moved to the eighth floor of the same building, thereby doubling office space. This company is the Pittsburgh office for the Copes boiler feed regulators and pump governors, the Falls automatic engine stops, steam motor turbines, Wyoming traps, eliminators and separators, Coppus turbo blowers, Coppus turbines, Coppus Vano and propeller type blowers, Tracy steam purifiers, Bradshaw blast furnace gas burners, Dravo superheaters and Ellison draft gages and Liptak double suspension arches.

Russell, Holbrook & Henderson, Inc., 30 Church Street, New York, have been appointed exclusive sales representatives of the Diamant Tool & Mfg. Co., Inc., of 91-97 Runyon Street, Newark, N. J., in connection with Diamant standard punch and die sets covering the territory in New Jersey north of Trenton, all of New York City and New York State, south of Kingston, and all of Connecticut west of the Connecticut River.

The Detroit Range Boiler Steel Barrel Co., Detroit, will transfer its bilge barrel and drum department from Detroit to its Toledo plant, where additional room is being obtained through the erection of a portable steel building. The machinery will be transferred before Jan. 1.

John H. Lloyd, who has been associated with the Rivetless Chain & Engineering Co., Avon, Pa., for the past five years, in charge of all drop forge work, has resigned and organized the Lloyd Forge Co., Lebanon, Pa., to manufacture patented drop forged hexagonal turnbuckles. The new company has leased part of the Weaver machine shop and is already equipping it. Mr. Lloyd, the patentee and inventor of this and several other drop forged devices, will take entire charge as secretary and general manager. Other officials of the company are W. L. Beyerle, president and treasurer, and Joseph F. Lloyd, vice-president.

The Whiting Corporation, Harvey, Ill. (Chicago suburb), has purchased a controlling interest in the Grindle Fuel Equipment Co., manufacturer of complete powdered coal plants for use in connection with malleable furnaces, annealing ovens, steam boilers, billet heating and various other types of furnaces. The Grindle company has moved its offices to Harvey, Ill., and will continue its business under the same name. The Whiting Corporation will manufacture all Grindle equipment. The following officers have been elected: President, B. H. Whiting; secretary and treasurer, T. S. Hammond; vice-president and general manager, A. J. Grindle; board of directors, J. H. Whiting, B. H. Whiting, T. S. Hammond, A. J. Grindle, R. H. Bourne, N. S. Lawrence and A. H. McDougall.

Two Milwaukee tool manufacturing companies—the Wetmore Reamer Co., making a line of expanding reamers, including cylinder reaming sets, and the Wisconsin Tool & Supply Co., manufacturer of special tools, jigs, dies, fixtures and thread gages—have been consolidated and will hereafter be operated under the name of the Wetmore Reamer Co. The Wetmore company will specialize in the manufacturing of expanding reamers for high speed and quantity production work; also expanding machine reamers under 1 in. which have been developed within the last six weeks. It will continue the building of tools, dies, fixtures and special thread gages. The officers of the consolidated corporation elected at a recent reorganization meeting are as follows: President and general manager, Edward J. Waltzer; vice-president, Charles G. Forster; secretary, Charles F. Puls, Jr.; treasurer, Carl A. Forster; general superintendent, Edward D. Johnson. The direct management of this company is under the supervision of the Wisconsin Tool & Supply Co.'s men who have had experience in the building of small tools.

The Koppel Industrial Car & Equipment Co., Koppel, Pa., has opened a district office at Kansas City, Mo., in the Railway Exchange Building. Harry C. Kraft, formerly with the New York office, has been appointed manager of the Kansas City district.

The Orton & Steinbrenner Co., Chicago, manufacturer of locomotive cranes, clam shell and orange peel buckets, has made arrangements with the F. C. Richmond Machinery Co., 117 West Second Street, Salt Lake City, Utah, to represent it.

The Rich Tool Co., Chicago, has appointed the Busch Corporation, St. Louis, its representatives in the St. Louis territory.

Manning, Maxwell & Moore, Inc., New York, have taken new office quarters in Philadelphia, having moved from the Lincoln Building to the Pennsylvania Building, Fifteenth and Chestnut streets, rooms 905 and 906. New quarters have also been taken in Boston, the company having moved from 10 High Street to the Textile Building, 99 Chauncey Street, rooms 802 and 803.

The Exeter Machine Works, Inc., West Pittston, Pa., has appointed the H. M. Stark Machinery Co., Detroit, Mich., exclusive sales agent for its rotary pump line in the Detroit district. The Stark company specializes in the marketing of pumps and general power plant equipment. It has appointed Vickers & Co., Seattle, Wash., exclusive sales agents in the Seattle district. Hodgart & Co., Chicago, have been appointed exclusive sales agents in the Chicago district.

The Calcos Steel & Iron Co., Philadelphia, has moved its offices to the Weightman Building.

The Seneca Iron & Steel Co., steel sheets, Buffalo, has removed its Detroit offices from the Hammond Building at 2-108 General Motors Building. Harry J. Ward is district sales manager. The New York office has been moved from 30 Church Street to room 1108, Woolworth Building, and is in charge of Henry G. Massey, district sales manager.

The Harrold Tool & Forge Co., Columbiana, Ohio, recently changed its corporate name to the Colonial Tool & Forge Co., manufacturer of mechanics' hand tools, screw drivers and drop forgings. The selling representatives are Wiebusch & Hilger, Ltd., New York.

Lippincott, Mills & Co., Inc., have been established, with offices in the Whitehall Building, 17 Battery Place, New York, telephone Whitehall 0996, and Hippodrome Building, Cleveland, telephone Cherry 61. Business will be transacted in ores, coal, coke, scrap, iron and steel, alloys, and a general importing and exporting business will be conducted. The officers are: G. W. Lippincott, president; W. H. Mills, vice-president and treasurer; A. L. Irwin, vice-president, and P. L. Smith, secretary.

The Progressive Wire Goods Co. has removed to its new plant at Williamstown, N. J. It has purchased a factory building of modern construction, located on the Philadelphia & Reading Railroad and has installed a large modern tinning and galvanizing plant which will give increased facilities for the handling and manufacture of Prowico stationers' wire goods, wire hardware and other specialties in the wire forming and metal stamping field.

The Barbee Steel & Iron Co., Milwaukee, has been organized by Donald C. Barbee to serve as exclusive jobbing representative of the Ludlum Steel Co., Watervliet, N. Y., tool and special steels, in Wisconsin and Minnesota. Mr. Barbee is the owner and president of the Badger Belt & Rubber Co. Both concerns have headquarters and offices at 329 East Water Street, Milwaukee.

The Harriman Industrial Corporation, 542 Fifth Avenue, New York, will assume the duties of sales agent for the Merchant Shipbuilding Corporation, Chester, Pa., for structural and general engineering work.

A. Milne & Co., who formerly represented the FJAB and AMC brands of steel in Canada and the United States, are now the sole representatives of these two brands in North America, Mexico, Central America and South America.

The Upton Machine Co. has moved its general offices from Benton Harbor to St. Joseph and increased its authorized capital from $75,000 to $250,000.

The United Smelting & Aluminum Co., Inc., New Haven, Conn., has appointed Theodore L. Dodd manager for Chicago and surrounding territory. New and enlarged office quarters have been taken in the Railway Exchange Building, 80 East cmfwy etacmfwe ta vbgek ta xzfietaoxzfiffffe t xzfiffffffl ffij Jackson Boulevard, Chicago.

The name of the Crossley Mining Co. has been changed to the United Clay Mines Corporation. It was deemed appropriate to adopt a name which is more descriptive of the firm's position in the clay mining industry. The company deals in clay of all kinds and for every purpose. It is planned to have a warehouse at Trenton, N. J., and a similar storage plant at East Liverpool, Ohio. The company's own ceramic laboratory will be established at Trenton.

J. Earl Myers has resigned as sales manager of the Westmoreland Fuel Co. and has formed a corporation, known as the J. Earl Myers Co., coal and coke, 451-4 Union Arcade Building, Pittsburgh, Pa.

William Swindell & Brothers, Pittsburgh, have established an electric furnace department under the direction of Frank W. Brooke, until recently vice-president and chief engineer Electric Furnace Construction Co., Philadelphia. This department offers the latest design in furnaces for melting steel, gray iron and non-ferrous metals, and also a complete line of electric heating furnaces from 30 kw. upward. A license to operate under the Marsh patents has been granted this firm.

Consolidation of the small tool and drill divisions has been accomplished by the Greenfield Tap & Die Corporation, Greenfield, Mass. P. T. Irvin, formerly manager of the drill division, has been placed in charge of the consolidation, which will be called the small tool division. For the past three years Mr. Irvin has been sales manager of the Lincoln Twist Drill Co. and prior to that was sales manager of Wells Bros. Co., Greenfield.

The Cincinnati Shaper Co. and its subsidiary, the Cincinnati Gear Cutting Machine Co., have arranged for a branch sales office in Indianapolis, with headquarters at 940 Lemcke Annex. T. C. McDonald has been appointed local representative and from this office he will handle all matters pertaining to the use and sale of the machines manufactured by these companies in the Indianapolis and Louisville districts and also cover certain states in the Southwest. Mr. McDonald will also continue as local representative of the Reed-Prentiss Co.

William H. Wilson, secretary and general manager J. E. Moss Iron Works, structural steel, Wheeling, W. Va., has resigned. He will leave Jan. 1 for Los Angeles, Cal., where he will engage in structural steel contracting, specializing in steel joist construction under the style of the Wilson Steel Co.

Plans of New Companies

The Hoffmann Mfg. Co., Paterson, N. J., has been in business for three years, but it only recently incorporated. It manufactures art metal goods of soft white metal.

The Poole-Wetz Mfg. Co., Columbus, Ind., does not contemplate building, as it is already housed, but it may be in the market for additional equipment. It manufactures tools, hardware, etc.

The Electric Draft Heater Corporation, Chicago, Ill., is putting a hot draft auto heater on the market and is having the work done by contract in Chicago.

The Thomas Pump Co., 37 West Van Buren Street, Chicago, was organized to distribute the products of the Aurora Pump & Mfg. Co., Aurora, Ill., in several adjacent states. The company is having several devices manufactured under its name, and does not contemplate doing its own manufacturing.

The Shoppe Flush Valve Co., 10014 Railroad Place, Newark, N. J., was incorporated to take over the partnership business of Frank L. Shoppe, Edward G. Hedges and Walter W. Heroy. Distributing agencies have been established throughout the country.

The Universal Wire Machinery Co. is a New Jersey corporation with its factory located at New Haven, Conn. The company is organized for the purpose of manufacturing wire machinery such as stranders; closing machines for electric conductors and wire rope; bunching machines; cotton wrapping machines; twinning, pairing and tripling machines; taping machinery for taping conductors with paper, varnished cambric or steel tape; saturating equipment for impregnating cables; spooling, winding and reeling equipment; wire drawing machinery for steel wire; continuous copper wire drawing machinery and any special wire machinery designing or building problems. The working organization consists of J. P. Barclay, president and general manager; C. F. Liedke, treasurer and general superintendent; and L. I. Canfield, vice-president and chief engineer. Mr. Barclay formerly served in the capacity of chief engineer of a large wire machinery company. Mr. Liedke has been general superintendent of a wire machinery concern. Mr. Canfield is a designing engineer of 15 years experience on wire machinery.

The Midgley Steel Products Corporation, 30 Church Street, New York, N. Y., has been formed to sell the steel which was recently purchased from the United States Shipping Board. H. F. Midgley is president.

The Detroit Boiler & Welding Co., 2024 E. Atwater Street, Detroit, is specializing in boiler repairs and small tank work. It has a portable welding plant installed on a truck, the welding outfit consisting of a 150-ampere direct-connected Lincoln arc welder and a 6 by 6 direct driven Ingersoll air compressor.

D. & O. G. Heyen, Inc., 126 Atkins Avenue, Brooklyn, which was incorporated on Nov. 1, is engaged in building an improved corrugating ash can machine, fire extinguisher brackets, parts of automobile signal lamps and toy novelties. The company engages in die making, tool making and general machine work. It is capitalized at $75,000. The business was started in 1915. Last spring the present site was acquired, one block from the Long Island Railroad freight station. The new quarters were remodeled and improved extensively.

The Atlas Vise Co, Lowville, N. Y., has been incorporated by Foster M. Stricklan, Champlain, N. Y. E. W. Fulton, G. L. Fulton, Henry Pettie and H. W. Green of Lowville, N. Y. The authorized capital is $25,000 and its purpose is to manufacture, buy, sell, import and export vises and tools of all kinds. The new company has opened executive and sales offices in the Bowen Block, Lowville, N. Y. It has manufacturing and selling rights under patents owned by E. W. Fulton, who was formerly president and general manager of the Fulton Machine & Vise Co., Lowville, as well as similar rights to the trade name and patents of the Velox Vise Co. The company now has under consideration the advisability of securing its own factory for the manufacture of plain types of vises, clamps, etc.

J. P. Van Dyke inventor of the Van Dyke fountain brush, and John McMillan, an automobile man, have bought the entire capital stock of the Art Hardware & Manufacturing Co., 308 First Avenue, Seattle, and will manufacture brass specialties, including builders' hardware, marine hardware, brass finishing and nickel plating. The manufacture of the fountain brush will constitute a dominant feature.

N. H. Medbury, inventor of an automatic hot-water injector and ranch pump for irrigation, announces plans for the formation at Yakima, Wash., of a half million dollar corporation and the construction of a $100 000 plant for the manufacture of the pump. W. F. Miller is president of the company.

The R. I. V. Co., Inc., 1755 Broadway, New York, is the sole selling agent in the United States for the R. I. V. imported ball bearings, which are manufactured in Italy.

The Baltimore Pipe & Nipple Co., Inc., Baltimore, Md., has been organized to manufacture nipples, bolts and rods and other pipe fittings, but at present it is renting a small place. It expects in about a year or so to be in the market for equipment, if it decides to build.

The Long-Wear Tire & Rubber Co., Anderson, Ind., recently incorporated, is composed of stockholders originally interested in the Quality Tire & Rubber Co., bankrupt, and it is the intention of the stockholders to buy the property of the Quality Tire & Rubber Co. from the creditors. The property has not as yet been taken over and the organizers have no definite plans to give out until they know whether or not the property will be bought.

The Mor-Air Auto Pump Co., Aurora, Ill., will manufacture its products. It is not now in the market for equipment except some minor additions to tool room and punch press departments.

Year of Losses at Youngstown

YOUNGSTOWN, OHIO, Dec. 13.—While 1921 will go down as one of the most unfortunate years in the history of the iron and steel industry in the Mahoning Valley, from the standpoint of operations and earnings, leading executives are confident that better conditions are in store for 1922. Without exception all of the major producers sustained operating losses this year, which has been marked by many distracting influences. The industry has gone through a period of readjustment which waits upon freight rate revisions for completion. Usual seasonal dullness is noticeable at this time of the year, affecting sheets in particular. Inquiries in most finished lines now before the trade are for 1922 delivery.

COST REPORTING CASE

Attorneys for Companies Move to Strike Out Answer of Federal Trade Commission

A motion was filed on Wednesday of the present week in the Supreme Court of the District of Columbia, Washington, by attorneys Levi Cooke and Leo Weil, representing the Claire Furnace Co. and 20 other iron and steel makers, asking the court to strike out the entire amended answer of the Federal Trade Commission in connection with the attempt of the latter to compel the producers to make monthly cost reports to it. Hearing in the case will follow arguments on the motion. The steel interests will seek to make permanent while the commission will attempt to have the court dissolve the temporary injunction restraining the commission from compelling the producers to present their books for the purpose of obtaining cost figures.

Redundant and Argumentative

In the motion, Attorneys Cooke and Weil ask that the amended answer be stricken out for the reason that the commission set forth many alleged presumptions of law. It is further claimed that the amended answer lacks sufficient, specific and separate admissions or details of the material allegations of the bill, or specific and separate material averments of new matter, causing confusion of statement and substance with impertinent, redundant and argumentative matter so as to violate the rules of pleading. Additionally, it is charged that the amended answer tenders issues that were not raised by the bill of complaint and are "confusing, feigned and false both in fact and law," and that the answer sets forth no defense to the bill of complaint. These reasons for striking out the entire amended answer are preceded by requests for eliminating particular portions, which cover all of the main points incorporated in the commission's answer.

May Strike Out Parts

The court is asked, however, if it is of the opinion that the motion to strike out certain of the points on this subject is too broad, it strikes out those portions about it not being necessary for the steel interests to change their form of bookkeeping in order to supply the information; that the commission has issued questionnaires in accordance with law and for uses and purposes expressed; that the action of the commission in demanding answers to orders and questionnaires will be presumed to be constitutional unless the contrary is established by a court of competent jurisdiction; the steel producers cause to be published in trade publications, etc., many of the facts called for.

One of the new and most important paragraphs in the commission's amended answer by inference charged that alleged high prices of steel started the buyers' strike of last year and that steel prices are out of line with prices of agricultural products. The attorneys ask that this paragraph along with others be stricken out because among other things it is argumentative.

LOW PLATE PRICES

Mahoning Valley Mills Compete with the East—Little Sheet Buying

YOUNGSTOWN, O., Dec. 13.—Buying is largely against current requirements. Prices are generally unsatisfactory from producers' standpoint. Some sheet tonnage is being placed for 1922 delivery at the going market of 2.25c. for No. 10 gage blue annealed, 3c. for No. 28 black and 4c. for No. 28 galvanized. Makers are encouraged by the firmness which these quotations are showing. Basic pig iron is pegged for the time being at $19.

Considerable finished steel tonnage is moving to automobile manufacturers, though decline in specifications from this source has had a corresponding weakening effect on the steel market. Sheets, strips, stamped and pressed parts are taken regularly in sizable tonnages by the automobile industry.

Competition From Eastern Plate Mills

While the plate market continues to show more life, prices are still so far out of line that only one interest in the Mahoning Valley is producing merchant plate, the Brier Hill Steel Co. The Youngstown Sheet & Tube Co., which has been out of the market indefinitely, has no intention of re-entering it under present conditions. Plate production of the Republic Iron & Steel Co. consists wholly of material for pipe manufacture. A sales executive states that 1.50c. represents the top and not the bottom of the plate market and that tonnage is being freely placed at this figure. A number of interests which have been regular buyers of plates from Valley producers have been obliged, under these circumstances, to purchase tonnage elsewhere. One of the most striking instances recently involved 20,000 tons of plates sought by a Shenango Valley fabricator which had been a consistent buyer from a Valley maker for many years. An Eastern interest, however, offered to produce the plates at a price which the Valley maker could not touch and for that reason the business went elsewhere. Most of the current inquiry in the plate market emanates from builders of oil storage tanks and from car repair plants.

Sheet buying is sagging and little or no improvement is looked for until after the first of the year, when conditions are expected to show appreciable betterment. Galvanized is probably in most active demand for roofing and construction. Demand for common sheets has fallen off, but several 500-ton lots were placed last week in this district and a number of others involving smaller tonnage. A copper-bearing sheet produced by a Valley interest is meeting with much satisfaction because of its rust-resisting qualities. Formed roofing products are moving in small amounts. A metal furniture interest at Youngstown has placed a sizable order with a Valley maker whose plant is located at Niles for full finished sheets. Sheet production generally shows signs of further weakness.

Operations in the Wheeling District

WHEELING, Dec. 13.—The operating schedule of the Wheeling Steel Corporation calls for the full operation of the pipe furnaces, three butt-weld and two lap-weld, at Benwood, W. Va., this week for the first time this year. The Portsmouth plant of this company is maintaining a gait of more than 50 per cent and the Steubenville works are averaging close to 50 per cent, while the Belmont plant is operating 35 per cent of capacity. Other steel works and rolling mills of the company are idle. Two of its six blast furnaces are making iron.

The American Sheet & Tin Plate Co. units in Wheeling, Martins Ferry and Bridgeport, Ohio, are running close to normal capacity. The Mingo Works, Carnegie Steel Co., has two blast furnaces and a portion of the steel works operating. The Bellaire, Ohio, works of this company and Riverside works of the National Tube Co., Benwood, W. Va., still are down.

Farmers and Manufacturers Will Co-operate

WASHINGTON, Dec. 13.—President James A. Campbell, Youngstown Sheet & Tube Co., has been selected one of seven members of an executive transportation committee for agriculture and industry which was formed here at the conclusion of a meeting last Friday between representatives of agriculture and the basic industrial, construction and fuel industries, the first of the kind ever held. They met with a special committee appointed by railroad executives.

British Iron and Steel Market

Quietness in Steel Still Undisturbed—German Fuel Shortage Hampers Deliveries—Tin Plate and Galvanized and Black Sheets in Fair Demand

(By Cable)

LONDON, ENGLAND, Dec. 13.

There is more inquiry for Cleveland pig iron, but no substantial business is yet moving. Two basic blast furnaces have been transferred to foundry irons. Four additional hematite furnaces are now blowing, but with steel works' demand slow, the iron makers are cutting prices.

Some small demand for foreign ore has developed. Sellers of Bilbao Rubio are asking 27s. ($5.64) ex-ship, Tees. Durham blast furnace coke is obtainable at 28½s. ($5.96) delivered.

While the steel position is still unimproved, there is a fair amount of export inquiry; but steel manufacturers are obliged to make concessions to obtain orders. The home trade buying has lessened. Scotch steelmakers have reduced the price of boiler plates 30s. to £14 10s. (2.71c. per lb.) delivered.

Germany is now complaining of a shortage of fuel supplies, which is held responsible for delays in deliveries. Continental pig iron is consequently dearer. Belgian No. 3 foundry iron is being sold at £4 5s. ($17.76) f.o.b. Sellers are now asking £4 7½s. to £4 15s. ($18.29 to $19.85) f.o.b. for January and February shipment. French Luxemburg basic iron, January and February, is being offered at £4 5s. to £4 6s. ($17.76 to $17.97) f.o.b. Belgian basic iron, also January and February, is held at £4 10c. ($18.81) f.o.b.

German round and square bars are quoted at £8 (1.49c. per lb.) f.o.b., January and February shipment; German merchant bars, £7 15s. (1.45c. per lb.) f.o.b. Belgian and French Luxemburg merchant bars are held at £7 15s. to £8 (1.45c. to 1.49c. per lb.) f.o.b., all for shipment in six to eight weeks. Czecho-Slovakian merchant bars are being sold at £8 (1.49c. per lb.) f.o.b., for shipment in a period from three to five weeks.

French wire rods are quoted up to £9 10s. (1.77c. per lb.) f.o.b., for May delivery. German wire rods are quoted at £8 15s. to £9 (1.63c. to 1.68c. per lb.) f.o.b., for February and March. German wire nails are being sold at 24s. ($5.01) per picul keg ($3.76 per 100 lb. kg.) cost and freight to Japan.

German sheet bars are being done at £6 10s. ($27.17) c.i.f., United Kingdom, for January and February delivery.

Tin plate is easier for prompt shipment. On forced liquidations, speculative purchases of 28 x 20 in. tin plates brought 42s. ($8.78) f.o.b., prompt shipment. There is a fair export demand, and business is being done with Italy and the Near East. Merchants are endeavoring to cover their open position. Quarter wasters at 20¾s. ($4.34) has been done f.o.b., ex-stock. Welsh output is steady at 75 per cent of capacity.

Galvanized sheets are in fair demand, and further sales are on the basis of £17 (3.17c. per lb.) f.o.b. Sellers of Far Eastern specifications of black sheets are getting £18 (3.36c. per lb.) f.o.b., for February and March delivery.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.18 per £1 as follows:

Durham coke, delivered	£1	8½	to	£1	10		$5.96	to $6.27
Cleveland No. 1 foundry	5	5	&	5	10*		21.94	& 22.99*
Cleveland No. 3 foundry	5	0	&	5	5*		20.90	& 21.94*
Cleveland No. 4 foundry	4	15					19.85	
Cleveland No. 4 forge	4	10					18.81	
Hematite	7	0*					29.26*	
East Coast mixed	5	2½	&	5	5*		21.42	& 21.94*
Ferromanganese	15	0	&	14	10*		62.70	& 60.61*
Rails, 60 lb. and up	9	0	to	10	10		37.62	to 43.89
Billets	7	5	to	8	5		30.30	to 34.48
Sheet and tin plate bars, Welsh	7	15					32.39	
Tin plate base box	1	0½	to	1	1¼		4.28	to 4.44
							C. per Lb.	
Ship plates	10	10					1.96	
Boiler plates	14	0	to	14	10		2.61	to 2.71
Tees	10	10	to	11	10		1.96	to 2.15
Channels	9	15	to	10	15		1.82	to 2.01
Beams	8	10	to	10	10		1.59	to 1.96
Round bars, ¾ to 3 in.	10	10	to	12	0		1.96	to 2.24
Galvanized sheets, 24 g.	17	0	to	17	5		3.17	to 3.22
Black sheets	14	10	to	15	0		2.71	to 2.80
Steel hoops	12	0	&	12	5*		2.24	& 2.29*
Cold rolled steel strip, 20 g.	24	10					4.57	

*Export price.

Coal Prices Lower—Tin Plate and Galvanized Sheet Markets Bright Spots—Less Continental Competition

LONDON, ENGLAND, Nov. 30.—There has been a noticeable improvement in the coal position and in South Wales especially export demand has broadened. Prices, too, have fallen considerably and supplies are being offered at from 30s. down to 12s. 6d., according to size and quality. These prices are down to less than a quarter of what was being asked a year ago. Some mine owners, however, are only accepting these figures to clear their stocks, and state that then they will close down rather than pay the wages asked.

Recovery in iron and steel continues, though at a slow rate. Cleveland ironmasters have decided to cut prices once more and have dropped quotations 10s. a ton for home and export, except in the case of No. 1 and No. 3 where an export premium is retained of 10s. No. 3 G. M. B., therefore, becomes 100s. for home consumption and 110s. for shipment. Though it is somewhat early to state whether buyers will be attracted, it is noticeable that inquiry has already shown signs of broadening. In the Staffordshire district the production of cold blast pig iron has been resumed but so far no prices for this commodity have been formulated. Continental competition in pig iron is not so keen of late. Prices are lower than ours, but whereas our makers can offer practically prompt delivery, continental makers are still in arrears with the contracts they have already booked. Hematite is fairly steady at 110s. for East Coast mixed numbers both for home and export. The demand is increasing, though only slightly, and four additional furnaces have been put in blast. At the present time the biggest consumer is South Wales, while some odd parcels have been sold for Italy in spite of the adverse exchange rate in that country.

The brightest spots in the finished steel trades are the tin plate and galvanized sheet markets. The turnover in tin plate is good and a recent placing of substantial oil parcels, followed by the securing of Welsh makers of the packing order for British Columbia in face of competition from your side, has been followed by home consumers, who have made some fairly heavy purchases of odd sizes and, in fact, are still showing quite a fair amount of interest. Galvanized sheets are rather slow but most works are pretty well booked on their present output up to January. In other branches a breaking away from the Joint Association for fixing prices of ship plates and shapes by the Scottish works has resulted in a drop in the Scotch quotations, and North Eastern works are endeavoring to get orders from the Scotch districts. More orders are coming in but plants are only partially employed.

Keen competition continues for export business and prices have been cut, £9.15s. f.o.b. having been accepted for a moderate order for ship plates. Far Eastern demand is only meagre, due, no doubt, to the depreciation in the exchange. The Clyde output for November is reported as seven vessels, totalling 15,850 tons, which is the lowest monthly output this year with the exception of January.

In the test data given on the Mezzo drills of the Cleveland Twist Drill Co., Cleveland, page 1336, THE IRON AGE, Nov. 24, the feed per revolution in inches should read 0.032 in.

Machinery Markets and News of the Works

MORE BUYING INTEREST

Further Evidence of Prospective Purchasing of Machine Tools Is Noted

It Is Apparent, However, That a Considerable Part of the Business in Sight Will Be Held Until New Year

While new evidences of buying interest are coming to light almost every day, most of the current activity in machine tools is confined to inquiries and in all probability orders will not be forthcoming, in a majority of instances, until after the first of the year.

The machine-tool trade, however, is well pleased with recent developments, and while there are few who expect a capacity business in 1922, the feeling is general that there will be a marked improvement over the lean months of 1921.

In much of the prospective business, railroad and equipment companies are prominent. The Louisville & Nashville Railroad has taken bids on a list of shop tools, the Rock Island Railroad, the Haskell & Barker Car Co. and the American Locomotive Co. are expected to close shortly on their recent lists. The Erie is buying second-hand tools against its recent inquiry.

Lists of the Illinois Central, Chicago & Northwestern and Burlington roads, which have been expected at Chicago for some weeks, may be held back until it develops whether the Rock Island obtains what the railroads consider satisfactory prices.

Automotive industries show more signs of life. The White Co., Cleveland, will equip about 40 service stations for trucks with repair tools, about four machines to each shop. The Post-Whitney Co., Cleveland, is in the market for 12 to 15 tools, preferably used, for a tractor plant. The General Motors Corporation is expected to close soon on a list of tools for its Dayton, Ohio, laboratories. Among its requirements are 11 turret lathes.

The New York Board of Education has closed for about $60,000 worth of tools for vocational training schools and other business is pending.

The European market does not present many opportunities for American tool manufacturers. France has recently bought German tools quite heavily at prices fully 60 per cent below those quoted on similar American tools. The American Chamber of Commerce in London reports that in Great Britain a market for American tools, once very good, now "scarcely exists."

An order has been placed by an Erie, Pa., company for eight 5-ton cranes.

New York

NEW YORK, Dec. 13.

The New York Board of Education has informally awarded orders for about $60,000 worth of machine tools for vocational training schools. Formal orders will be issued within a few days, or as soon as bids have been checked up to determine whether the proposals carrying the low bids are correct in all details. These purchases will apply against the list on which bids were closed Dec. 6. Proposals will be accepted up to Dec. 16 on another list of more than 100 tools for continuation schools. THE IRON AGE is informed that all orders for machine tools will be placed before Jan. 1 so as to come within the 1921 appropriations. Purchases for schools, including small tools, supplies, etc., will total several hundred thousand dollars, quotations having been received on several different lists.

The Erie Railroad has been buying second-hand tools against its recent inquiry, but other railroads are doing little or nothing. The Merchants Despatch Transportation Co., Rochester, N. Y., has bought several fabricating machines for its car building plant. The American Locomotive Co., New York, has not bought against its recent list, but is expected to do so shortly.

Export business in machine tools shows no marked improvement, but there is a little activity in Japan and other countries of the Far East. In Europe there seems to be little opportunity for American manufacturers to compete with low German prices. Several fairly large lots of German tools have recently been bought by French companies at prices fully 60 per cent below those quoted on similar American tools. The American Chamber of Commerce in London, England, reports that the market in Great Britain for American machine tools, once a very good one, now scarcely exists. A report published after thorough investigation reviews the state of the British machine tool industry and discusses the effect of German competition both in Great Britain and in Europe. Hints as to marketing American machine tools are given, and United States manufacturers are advised to consult the American Chamber of Commerce in London. Copies of the report may be obtained as long as they last by writing to the American Chamber of Commerce, London, England, and referring to THE IRON AGE.

The United States Shipping Board will receive bids up to Dec. 29 at the office of the International Mercantile Marine, New York, on reconditioning of the steamship Leviathan. New York shipyards are figuring on the work, which will require about a year to complete.

The market in cranes continues exceedingly dull and few new inquiries are noted. One of the largest inquiries that has appeared for some time is being handled by J. E. Woodwell, 501 Fifth Avenue, New York, consulting engineer, who is issuing the blue prints and drawings for the locomotive crane to handle 80 tons of coal an hour, an electric overhead traveling crane and ash and coal conveying machinery for a new power plant in Lansing, Mich., noted last week in the Detroit machinery market. A contract including a 15-ton, 33-ft. span hand power crane has been let by the Passaic Valley Sewage Commission to the H. S. Jones Building Co., 280 Madison Avenue, New York. Bids were opened Dec. 9, by the city of Camden, N. J., on a 3-ton, semi-portal, revolving jib crane with a 33-ft. boom. The bids, including generators were as follows: Orton & Steinbrenner, $11,240; Browning & Co., $14,450; Dravo Contracting Co., $15,290; McMyler-Interstate Co., $15,295; Link Belt Co., $16,350, and Heyl & Patterson, $18,100.

Among recent sales are: Industrial Works, a 25-ton, 50-ft. boom locomotive crane to the Pennsylvania Sugar Co., 135 South Second Street, Philadelphia, for use in Florida; Milwaukee Electric Crane & Mfg. Co., a 5-ton, 27-ft. span, overhead traveling crane to the West Penn Power Co., Pittsburgh; Arthur Appleton, 29 Broadway, New York, a 10-ton, 24-ft. span Reading hand power crane to Takata & Co., 50 Church Street, New York, for Japan; Shepard Electric Crane & Hoist Co., a 1-ton, single I-beam crane to the Boynton Furnace Co., Jersey City, N. J., and a 1½-ton, single I-beam crane to the Heckla Iron Works, Brooklyn, N. Y. The Worthington Pump & Machinery Corporation, recently in the market for a 2-ton electric crane of special design, has purchased of Manning, Maxwell & Moore.

The Manhattan Vehicle Co., 518 East Eightieth Street, New York, will make extensions and improvements in its automobile and automobile body manufacturing building, 75 x 100 ft., at 529-33 East Eightieth Street, to cost about $20,000. Peter Damm is president.

The Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, has asked for preliminary estimates for equipment for the proposed electrification of about

40 miles of road in the vicinity of Scranton, Pa., estimated to cost in excess of $5,000,000. Complete figures and plans are expected to be ready in March.

The State Hospital Commission, Albany, N. Y., is taking bids until Dec. 21, for a new cold storage plant at the Marcy Hospital, Marcy, N. Y.

The H. P. Snyder Mfg. Co., Sixth and West Main streets, Little Falls, N. Y., manufacturer of bicycles and parts, has awarded the contract to Edward K. Fenno, 404 North Berch Street, for a new building, estimated to cost about $110,000. Carl Haug & Sons, Main Street, are architects.

The International Harvester Co., 17 Battery Place, New York, with headquarters at 606 South Michigan Avenue, Chicago, has leased the new factory building just completed at Thirteenth Street and Ely Avenue, Long Island City, for local works.

Conveying equipment, loading and unloading machinery, etc., will be installed in the new building to be erected by the Sterling Salt Co., 29 Broadway, New York, at Cuylerville, N. Y., contract for which has been let to Dwight P. Robinson & Co., 125 East Forty-sixth Street.

The Sterling Tool & Machine Works, 205 West Nineteenth Street, New York, will discontinue business and has arranged for the disposal of its machine shop and equipment to other interests.

The New York Central Railroad Co., Grand Central Terminal, New York, is said to be planning to lease its car repair shops at West Albany, N. Y., similar to the arrangements made for the operation of its shops at East Buffalo and Toledo by private interests. The West Albany shops have been closed for a number of months.

The Bronx Equipment Co., Concord Avenue and 143d Street, New York, has awarded contract to the W. I. Grange Construction Co., 800 Keenan Building, Pittsburgh, for a new two-story and basement plant at Thirty-second Street and Sassafras Alley, Pittsburgh, to cost about $185,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect.

Loading and unloading machinery, conveying equipment, etc., will be installed on the new pier to be constructed at the foot of Forty-fourth Street, North River, plans for which have been completed by the Commissioner of Docks and Ferries, Pier A, North River, New York. It is estimated to cost about $500,000.

A vocational department will be installed in the new high school to be erected at Nutley, N. J., at a cost of $350,000. Starrett & Van Vleck, 8 West Fortieth Street, New York, are architects.

On petition of the Standard Underground Cable Co., Perth Amboy, N. J., the Board of Alderman has passed an ordinance providing for the vacating of property in the vicinity of the plant to permit proposed expansion. A number of buildings will be increased in size, with main cable department, wire works, etc., to have about 100,000 sq. ft. of additional space. The working force will be increased. The work is estimated to cost close to $200,000. C. C. Baldwin is vice-president and general manager.

The Cockburn Corporation, Monmouth Avenue and Twelfth Street, Jersey City, N. J., operating a machine shop, boiler works, foundry, etc., will retire from business and will dispose of the machinery to other interests. The land and buildings have been purchased by the Ault-Wiborg Chemical Co.

The Stanwood Rubber Co., Newark Avenue, Elizabeth, N. J., recently reorganized, will be placed in operation early in January for the manufacture of automobile tires, etc. Machinery will be installed and set up at once. S. P. Woodward is president.

The Weehawken Dry Dock Co., Weehawken, N. J., has leased property on the tidewater basin, Jersey City, N. J., for the construction of a new shipbuilding and repair plant, designed to give employment ultimately to about 2000 men. The plant will cost about $300,000, including machinery. A clause in the lease provides that it shall be void after 36 months if the company has not expended at least $250,000 in plant and improvements. It is said that work on the plant will be commenced at an early date. Richard B. Rodermond is president, and Christopher M. Verdon, vice-president and treasurer.

A vocational department will be installed in the three-story junior high school to be erected at Bergen and Bostwick avenues, Jersey City, N. J. It is estimated to cost about $800,000. Plans are being completed by John T. Rowland, Jr., architect, 100 Sip Avenue.

John Keavey, 375 Palisade Avenue, West Hoboken, N. J., is completing plans and will soon take bids for a one-story automobile service and repair building, 75 x 100 ft., at Palisade Avenue and Malone Street, estimated to cost about $50,000. McDermott & Binda, 582 Bergenline Avenue, are architects.

The Department of Streets and Public Improvements, City Hall, Newark, Thomas L. Raymond, director, is taking bids until Dec. 19, for high pressure fire hydrants, repair parts for valves and hydrants, etc., for the water system.

The Passaic Valley Sewerage Commissioners, 128 Market Street, Newark, will take bids until Jan. 3, for the construction of the superstructure and appurtenances of the Yantacaw Pumping Station, including crane runway, vent stack, electrical work, etc.

A vocational department will be installed in the three-story high school on Lathrup Avenue, Boonton, N. J., now under construction. It will cost about $190,000.

New England

BOSTON, Dec. 12.

The slight spurt in business last week was of short duration. The market has again fallen into a quiet rut, with competition keener than ever. The tendency of the few prospective buyers is to hold off as long as possible before giving an order as it is often found advantageous to do so. Dealers admit their willingness to stretch a point to make a sale is hurting rather than helping the market. Realizing this, manufacturers of tools, in a few instances, are taking a more decided stand regarding prices. In one case the past week an attractive order was assured a manufacturer provided his price was shaded another 10 per cent, but this was flatly refused and the business went elsewhere.

The bulk of orders closed last week was confined to lathes. The inquiry for 10 lathes from a large Massachusetts manufacturer, previously reported, dwindled to eight, the other two being transferred from subsidiary plants. A Brighton, Boston, maker of tools and dies purchased a 16 in. x 8 ft. straight bed lathe with chuck equipment, bench sensitive drill, Cincinnati electric bench grinder and a 20-in. Silver drill press. A local garage purchased a 16-in. x 8-ft. gap bed lathe, and a western Massachusetts manufacturer, a Stark bench lathe with full equipment. A Manchester, Conn., concern closed on a 13-in. x 8-ft. quick change lathe, and a Portland, Me., garage on a 13 in. x 6 ft. lathe. Other sales include an 800-lb. bored drop hammer to a textile machinery maker, pipe machine to another textile equipment interest and a key seater to an Orange, Mass., jobbing shop.

A few live crane prospects are reported, some of which may close before Jan. 1. The American Woolen Co. is said to have closed on a 30-ton Pennsylvania made crane. A better inquiry for hoists is also noted and a few New England foundries are asking for quotations on hand power and jib cranes. In fact, foundry equipment prospects, while not numerous, are more encouraging than in several months. Inquiries include sand blast machines, ladles, and practically everything except cupola and charging equipment, but in this market, as in the machine tool, buyers are shopping. The Union Machine Co., Fitchburg, Mass., has purchased a 10-ton hoist.

The gage business is holding up well, some comparatively good sized orders going to local machine tool houses recently.

Manufacturers of carbon drills have reduced prices 10 per cent, high speed drills 20 per cent, and ratchet and high speed reamers 15 per cent.

The Storms Drop Forging Co., Springfield, Mass., is exceptionally busy. It received an initial order for 1,000,000 tire chain links for pleasure automobiles, and recently was given an additional 12,000,000 link order. It will also start production on a large order for truck tire chain links. Production of tire chain links began on a basis of 10,000 per day, but has been increased to more than 50,000. Schedules call for a further increase to 100,000 per day. The company is figuring on installing three additional hammers, one 1200-lb. and two 5000-lb., bringing the number in operation to 15. Other equipment installed includes oil tempering machinery, tumbling barrels and presses. It is operating 10½-hr. per day, with a full number of employees. The manufacture of tire chains has in no way infringed on the company's regular contract work, of which it has a satisfactory amount on its books.

G. A. Olson, 83 Somerset Street, Springfield, Mass., will erect a 30 x 62 ft. shop and foundry on Page Boulevard.

The Thomas Laughlin Co., 143 Fore Street, Portland, Me., marine hardware, is receiving bids for a one-story, 60 x 60 ft. forge shop.

The Charter Oak Machine Co., recently incorporated to manufacture automobile parts, has secured the co-operation of the Chamber of Commerce, East Hartford, Conn., with the result that a plant, 60 x 100 ft., will be erected at an estimated cost of $30,000 for the company.

The Edison Electric Co., Boston, has purchased additional land adjoining the Weymouth River, Weymouth, Mass., for

a new power station. It now owns sufficient property for the complete equipment of a 300,000-kw. turbine station. Plans will be immediately prepared for the first section, but construction will not begin for some time.

The Southbridge Foundry Co., Inc., Southbridge, Mass., capitalized for $30,000, has been granted a charter with a capital stock of $5,000. Frank S. Mills, 15 Dresser Street, is president, and Arthur A. Allard, 130 Main Street, treasurer.

The Boott Mills, Amory Street, Lowell, Mass., has had plans prepared for a new hydroelectric power plant estimated to cost $40,000. Arthur P. Safford, 66 Broadway, is engineer. F. A. Flather is treasurer.

A. A. Geisel, Pecousic Street, Springfield, Mass., manufacturer of automobile parts, has taken bids for a one-story addition, 40 x 400 ft. E. C. and G. C. Gardner, 33 Lyman Street, are architects.

The Waterbury Ice Corporation, 74 Watertown Avenue, Waterbury, Conn., has acquired property at Walnut and Cherry streets for an ice manufacturing plant.

The Northwestern Expanded Metal Co., Sidney and Henry streets, Cambridge, Mass., has filed plans for a one-story addition to its plant.

The Blackstone Valley Gas & Electric Co., Woonsocket, R. I., has filed plans for a branch power house at Second Avenue and River Street.

Chicago

CHICAGO, Dec. 12.

Aside from prospective railroad business, there is little inquiry in the market and few sales are reported. Orders for individual machines constitute the bulk of current bookings, among the largest being purchases of a No. 2 vertical milling machine and a 4½-in. horizontal boring mill by local users. Much interest is manifested in the Rock Island list published in this column a week ago. There appears to be every prospect that these machines will be placed, unless it develops that the road expects to buy at lower prices than it has represented to the local trade to be satisfactory. The Santa Fe continues to receive revised quotations on its outstanding list, but the other lines, including the Northwestern, the Illinois Central and the Burlington are said to be holding their lists back until they learn the terms under which the Rock Island is able to place its orders.

The Haskell & Barker Car Co., Michigan City, Ind., is expected to close soon for the fabricating equipment listed in this column on Nov. 24, as well as for a number of overhead traveling cranes.

The Aurora Automatic Products Co., 52-56 River Street, Aurora, Ill., has been incorporated with $50,000 capital stock to manufacture automobile accessories, including luggage carriers, radius rods, auxiliary radius rods, sun visors, four point wrenches, tire carriers, brake rods, battery boxes, mufflers, automobile pumps, rear fender brace rods, Ford fans and Ford valves. The new corporation has taken over the assets and business of the Mor-Air Auto Pump Co., and has provided capital for the extension and development of the business carried on by its predecessor. The company will be in the market in the next two or three months for drill presses and also for motors. The officers are: President, V. O. Winkenweder; vice-president, E. Fagan; secretary and treasurer, H. W. Cudding.

The Keenan Boiler Co., Danville, Ill., has let contract for a new plant, 50 x 100 ft., to cost $10,000. This will enable the company to conduct all its operations under one roof, whereas it is now using two buildings on Griggs Street.

Harry E. Bartlett, formerly vice-president Ampco Metal Products Co., Springfield, Mo., has purchased from that company the foundry patterns, equipment and materials, and is doing jobbing work in a part of the Ampco Building. The Ampco company will confine its operations to the making of stove pipes and metal fence posts.

John B. Foote, of the Foote Brothers Gear & Machine Co., 213 North Curtis Street, Chicago, has purchased 35 acres at the southwest corner of Sixty-fifth Street and Keeler Avenue.

Joseph M. Mrazek, 1239 South Tripp Avenue, Chicago, is preparing plans for a two-story reinforced concrete factory with 120-ft. front and two wings 900 ft. deep, at Seventy-seventh Street, Western Avenue and the Baltimore & Ohio tracks, for the Morand Cushion Wheel Co., Joseph L. Morand, presdent, 818-32 South May Street. The project, which is now being financed, is expected to cost $500,000, and work is scheduled to begin next spring.

Charles W. Kallal, city architect, City Hall, Chicago, is preparing plans for a two-story pumping station near Western Avenue and Forty-third Street, to cost about $3,165,000. Work is scheduled to begin when an appropriation is made next year.

The Dental Metal Products Co., Chicago, has had plans drawn by Ralph H. Oliver, 115 South Dearborn Street, for a two-story factory, 42 x 71 ft., and warehouse, 28 x 42 ft., for manufacturing metal products. The plant will be located at 7512-18 Greenwood Avenue and will cost $30,000.

The Cuneo-Henneberry Co., 455 West Twenty-second Street, Chicago, has let contracts for a six-story printing plant, 122 x 221 ft., at 2242-54 Grove Street, to be used exclusively for printing Western editions of the *Saturday Evening Post*.

Holton, Seelye & Co., contractors, 140 South Dearborn Street, Chicago, will construct a one-story factory, 106 x 175 ft., to manufacture sheet metal advertising specialties, to cost $20,000.

The Story & Clark Piano Co., Grand Haven, Mich., plans to erect a one-story power house.

The N. W. Race Mfg. Co., Billings, Mont., plans to construct a factory for the manufacture of steam specialties, to cost $50,000.

The Crane Co., 836 South Michigan Avenue, Chicago, has plans under way for a two-story foundry, 160 x 500 ft., at 4100 Kedzie Avenue, estimated to cost $800,000. Graham, Anderson, Probst & White, 8 East Jackson Boulevard, are architects.

A vocational department will be installed in the three-story and basement junior high school to be erected at Twenty-fifth and Nebraska streets, Sioux City, Iowa, estimated to cost about $350,000. It will be 120 x 230 ft. Beutler & Arnold, 235 Grain Exchange Building, are architects.

The Elgin Watch Co., 10 South Wabash Avenue, Chicago, has awarded a contract to Charles E. Gertz & Son, Elgin, Ill., for additions to its Elgin plant, estimated to cost close to $1,000,000, including equipment. Charles H. Hulburd is president.

Oven equipment, power apparatus, conveying machinery and other equipment will be installed in the three-story plant to be erected by the Vienna Model Bakery, 1040 Vernon Park Avenue, Chicago, estimated to cost $150,000.

The Wyoming Refining Co., Midwest Building, Casper, Wyo., has acquired over 300 acres near Casper, to be used in part for the erection of a new refinery, with initial daily capacity of about 7000 bbl., and to be increased at a later date to about 20,000 bbls. A pipe line to the Salt Creek oil fields, about 40 miles distant, will also be constructed. The entire project is estimated to cost in excess of $3,000,000. W. A. Blackmore is president.

Savage & Whitney, 914 Pioneer Building, St. Paul, Minn., are planning the construction of additions to their power plants at Devil's Lake, Oakes and Enderlin, N. D., with the installation of new machinery. Work will commence early in the spring. A. H. Savage is head.

The Omaha Semi-Steel Foundry Co., 1409 Jackson Street, Omaha, Neb., has awarded contract to the Peter Kiewits Sons Co., 754 Omaha National Bank Building, for a one and two-story foundry, 60 x 100 ft., at Eleventh and Grace streets, estimated to cost about $15,000, exclusive of equipment.

The Morand Cushion Wheel Co., 818 South May Street, Chicago, manufacturer of automobile wheels, will soon call for bids for the erection of a two-story plant at Western Avenue and Seventy-seventh Street, estimated to cost $500,000, including machinery.

Buffalo

BUFFALO, Dec. 12.

Fire, Dec. 6, destroyed a portion of the foundry of the Pratt & Letchworth Co., 189 Tonawanda Street, Buffalo, manufacturer of iron and steel castings, etc., with loss estimated at about $15,000.

The Federal Ice & Refrigerator Co., 76 West Monroe Street, Chicago, has completed plans for a one-story ice-manufacturing plant at Buffalo, 160 x 300 ft.

The Karge-Baker Corporation, Phoenix, N. Y., manufacturer of flexible couplings, transmission equipment, etc., has removed its plant to 658 Ellicott Street, Buffalo, for increased operations.

Charles L. Cadle, Superintendent of Public Works, Albany, N. Y., will receive bids until Jan. 4, for furnishing and installing two 2-ton electric overhead traveling cranes for service on the barge canal terminal at Rochester, N. Y.

The Buffalo, Rochester & Pittsburgh Railroad Co., Rochester, has preliminary plans under way for a new repair shop, probably at Rikers, near Punxsutawney, Pa.

The Merchants Dispatch Transportation Co., East

Rochester, N. Y., will build a one-story addition to its steel fabricating plant, 80 x 560 ft. L. F. West is head.

A vocational department will be installed in the two-story and basement high school, 80 x 180 ft., to be erected by the Board of Education, Syracuse, at Solvay, N. Y. M. L. King, Snow Building, is architect.

Louis Gaband, 1352 East Main Street, Rochester, N. Y., has revised plans under way for a one-story automobile service and repair building, 35 x 145 ft., on Franklin Street. Hutchison & Strutz, Cutler Building, are architects.

The Triumph Motor Truck Co., Medina, N. Y., manufacturer of assembled motor trucks, has acquired property at DuBois, Pa., for a second plant, to be operated in conjunction with the Medina works. Plans will be prepared at once and it is expected to have the works ready for service early in the year.

The storehouse of the Mayer Coating Machine Co., containing machinery, patterns and other equipment, was destroyed by fire on Dec. 8, the loss amounting to $25,000.

The William H. Wilson Iron Works, 551 Lyell Avenue, Rochester, N. Y., which recently suffered a severe loss by fire, will be in the market soon to replace equipment that was destroyed or damaged.

Pittsburgh

PITTSBURGH, Dec. 12.

Machine tool business the past week has been fairly good with some but extremely quiet with others. One company reports the sale of four squaring shears to a sheet metal shop outside of Pittsburgh and two Fay & Egan wood-working machines to a Pittsburgh buyer. Another dealer took an order for a number of presses for the Wheeling Steel Corporation. The Pittsburgh Valve Foundry & Construction Co., Pittsburgh, which is erecting an addition, last week closed for a 5-ton, 55-ft. 8-in. span overhead traveling crane with the Champion Engineering Co., Kent, Ohio, and is expected to close shortly for a large face grinder. The crane market does not show much activity in sales, but requests for revised quotations against old projects are coming in daily and occasional new inquiries are received. The Erie Malleable Iron Co., Erie, Pa., recently closed for eight 5-ton, 40-ft. span cranes, the business going to the Erie Steel Construction Co., Erie, Pa. Max Solomon, scrap iron and steel, Oliver Building, Pittsburgh, is seeking one 25-ton locomotive crane for his new yard at Wheatland, Pa., and not two 25-ton overhead cranes as previously reported. It has been learned that the recent inquiry for a 75-ton crane from an undisclosed buyer is for a 50-ton overhead with 10-ton auxiliary, but the identity of the prospective purchaser still is withheld.

The Jones & Laughlin Steel Co. recently closed with the Worthington Pump & Machinery Corporation for a 60 x 48-in. jaw crusher for its ore mining subsidiary, the Interstate Iron Co.

The Pittsburgh Malleable Iron Co., Pittsburgh, advises that it does not contemplate erecting a plant in Ellwood City, Pa., as previously stated.

The American Gas & Electric Co., 30 Church Street, New York, has plans under way for the erection of its new electric power plant at Wellsburg, W. Va. Sargent & Lundy, 72 West Adams Street, Chicago, are architects and engineers.

A vocational department will be installed in the two-story and basement high school, 60 x 190 ft., to be erected at Princeton, W. Va., estimated to cost $150,000. Wysong & Jones, Charleston, W. Va., are architects.

Mechanical blowing equipment, fitters, crimpers, pipes, etc., will be installed in the new plant to be established by the Salem Flint Glass Co., Salem, W. Va., recently organized. R. F. Davis is president, and J. O. Burkhart, manager.

The Highway Department, Beckley, W. Va., has been directed to erect a garage, service and repair building for county automobiles, trucks and road-building equipment.

A vocational department will be installed in the two-story and basement high school, 60 x 218 ft., to be erected at Charleston, W. Va., estimated to cost $125,000. H. Russ Warner, Masonic Building, is architect. Bids will be asked for in January.

The Frick & Lindsay Co., Sandusky and Robinson streets, Pittsburgh, manufacturer of railroad and mine equipment, etc., has filed plans for a brick and steel addition, estimated to cost $90,000.

Bids are being taken by the Board of Education, Pittsburgh, for the Samuel P. Langley high school at Chartiers and Hutton avenues, to include a vocational department. It will be two-stories and basement, 87 x 300 ft., estimated to cost $500,000. McClure & Spahr, Keystone Building, are architects.

The Robert Talbott Coal Co., Lowsville, W. Va., will install new loading, conveying and other equipment at its plant.

The International Harvester Co., 606 South Michigan Avenue, Chicago, has awarded contract to Plate & Vogel, Parkersburg, W. Va., for a two-story and basement addition to its Parkersburg works, 45 x 75 ft.

Cincinnati

CINCINNATI, Dec. 12.

Local manufacturers of machine tools are well pleased with recent developments, and as a result are more optimistic than for nearly a year. Inquiries are coming in steadily for one and two machines with the total fairly large. What lends more encouragement to the situation is that inquiries are from bona fide buyers, some of whom have not been active for many months. It is not expected that much buying will develop this year, but prospects for the early months of the new year are good. The Louisville & Nashville Railroad closed bids last week on a sizable list of tools, and it is expected that purchases will be made shortly. The General Motors Corporation is also expected to close soon on tools for its Dayton laboratories, 11 turret lathes being on the list. With hardly an exception, orders booked the past week were for single machines, but the number was slightly in excess of the previous week, making it one of the best for many months.

The Oakley Machine Tool Co., manufacturer of tool grinders, has moved its office and plant from Cincinnati to Middletown, Ohio, where it has taken over part of the works occupied by the Willard-Middletown Machine Co. The greater part of the equipment has been installed and manufacturing operations are under way.

The Studebaker-Wulff Co., a reorganization of the Rotary Tire & Rubber Co., Zanesville, Ohio, has been formed to manufacture tires. It is expected that production will start about the first of the year. Temporary offices of the company have been established at 66 East Broad Street, Columbus, Ohio. Peter E. Studebaker is president.

The Advance Foundry Co., Dayton, Ohio, is in the market for a second-hand 24-in. tumbler in good condition.

Baltimore

BALTIMORE, Dec. 12.

The McHenry-Millhouse Co., South Bend, Ind., manufacturer of roofing products, has awarded contract to the Hydraulic Steelcraft Co., Hydraulic Avenue, Cleveland, for a one-story addition to the plant of the Electrolytic Zinc Co., Second Avenue and South Sixteenth Street, Baltimore, recently acquired, 70 x 100 ft. J. L. Kittinger is general manager.

Electric cranes, loading and unloading machinery and other equipment will be installed on the proposed new railroad piers to be constructed by the Western Maryland Railroad Co. and the Port Development Commission, Baltimore. Two piers will be built at a cost of $10,000,000.

Thomas E. Waggaman and J. Edgar Leonard, Easton, Md., have acquired the plant of the Easton Ice Co. and have organized the People's Ice Co., to operate the property. Plans are under way for remodeling the building and the installation of new ice-making machinery.

V. G. Eisel, 2306 Reisterstown Road, Baltimore, is organizing a company for the establishment of a plant to manufacture automobiles and equipment.

The Irvington Ice Co., care of Joseph Stienacker, 28 Sanford Road, Catonsville, Md., architect, has preliminary plans in progress for a one-story ice plant at Irvington, near Baltimore, to cost about $25,000.

The Hagerstown & Frederick Railway Co., Hagerstown, Md., has preliminary plans under consideration for a new electric generating plant at Confluence, Pa., with initial capacity of about 40,000 kw. The project will be held in abeyance for a number of months, with details of equipment and operation developed in the meantime. The entire plant and transmission system is estimated to cost $1,000,000.

The Easton Utilities Commission, Easton, Md., is planning for the installation of a new turbine, engine and auxiliary electric equipment at the city power plant.

The White Garage Co., Dillon, S. C., is planning to rebuild its machine and repair shop, recently destroyed by fire.

A vocational department will be installed in the junior high school to be erected at Richmond, Va., estimated to cost $341,000. Charles M. Robinson, Times-Dispatch Building, is architect. C. P. Walford, 803 East Marshall Street, is superintendent of the board.

Vocational departments will be installed in the two new

high schools to be erected next year by the Board of Education, Baltimore, Henry S. West, superintendent. Each building is estimated to cost about $500,000. Plans are being prepared by Parker, Thomas & Rice, Union Trust Building, and Smith & May, Calvert Building, architects.

Fire, Nov. 30, destroyed the mill of the Wentworth Lumber Co., Savannah, Ga., with loss estimated at about $225,000, including machinery.

The Heaton Coal Co., Tacoma, Va., will install electric motors and other equipment at its properties.

The Crystal Ice & Transfer Co., North Avenue and Chester Street, Baltimore, has plans under way for a two-story addition to its automobile service and repair building, 80 x 180 ft., estimated to cost about $30,000.

Detroit

DETROIT, Dec. 12.

The Signal Motor Truck Co., Detroit, has been reorganized and will continue to manufacture trucks under the name of the Signal Motor Corporation. The officers are: President and treasurer, M. B. Hoagland; vice-president, H. S. Sternberg; secretary, H. H. Emmons, and assistant treasurer, J. C. Dibsball.

C. H. Wills & Co., Marysville, Mich., have taken over the branch plant in Marysville of the Illinois Tool Co., which has been devoted exclusively to the manufacture of steering gears, speedometer drives and accessories for the Wills company. No changes except in personnel will be made.

The City Commission, Battle Creek, Mich., has authorized the preparation of plans and estimates for a new municipal electric light and power plant to be submitted next spring.

The Port Huron Sulphite & Paper Co., Port Huron, Mich., has let contract for an addition, 70 x 100 ft.

The Tirrell Mfg. Co., Bridgman, Mich., recently organized to manufacture nozzles, air pumps, rotary water pumps and other power spraying machinery, has completed its plant and production is under way. L. L. Tirrell is president.

The Aetna Portland Cement Co. will erect a new plant at Bay City, Mich., on a site of 33 acres, to cost more than $1,000,000. The first unit will be started in the spring. The administration offices, repair shops, laboratories and garage will be erected south of the main plant at a cost of $750,000. The general offices of the company are in the Union Trust Building, Detroit, with O. J. Lingeman, secretary-treasurer and general manager in charge. Edmund M. Bunce, now manager of the Fenton plant will take charge of the Bay City works.

A one-story power house will be erected in connection with the new school in the Oak Grove district, Flint, Mich., bids for which are being received until Dec. 28. Malcomson, Higginbotham & Palmer, 409 Flint P. Smith Building, Flint, are architects. A. J. Wildanger is secretary of the Board of Education.

The Washtenaw Auto Sales Co., Detroit, has tentative plans under way for a one-story service and repair building, 60 x 180 ft., to cost about $65,000. Cuthbert & Cuthbert, 327 East Huron Street, are architects.

Fire, Nov. 29, destroyed the tipple and other equipment at the Beaver mine of the Robert Gage Coal Co., Bay City, Mich., with loss estimated at about $50,000. It will be rebuilt.

Cleveland

CLEVELAND, Dec. 12.

Dealers' inquiries are largely for small machines, but in most cases orders against these will not be placed until after the first of the year. The only inquiry of any size is from the Post-Whitney Co., Society for Savings Building, Cleveland, for 12 to 15 machines, mostly second hand, for equipping a tractor plant. The White Co., Cleveland, is inquiring for machinery for fitting up motor truck service stations. The equipment of these stations will include an 18-in. geared head engine lathe, tool post grinder, sensitive drill and arbor press. It is stated that the company plans eventually to equip 40 stations. Local manufacturers are working on an inquiry for five turret lathes, included in the list recently issued by the Rock Island Railroad.

The amount of used machinery offered in this section is greater than ever before, according to local dealers. In addition to 1500 or more machines being placed on the Detroit market by the General Motors Corporation, large quantities of used machinery in various sized lots are being offered by other interests anxious to dispose of surplus equipment and have taken the end of the year before inventory time, to place it on the market.

Crane manufacturers report some improvement both in inquiries and in orders. The largest crane order placed for some time was awarded the past week by the Erie Malleable Iron Co., Erie, Pa., for eight 5-ton electric traveling cranes.

Plans for the re-organization of the Spencer Metal Products Co., Medina, Ohio, have been worked out and tentatively accepted by the creditors' committee and will be submitted to the stockholders. The company is now in the hands of John P. Childes, receiver.

The Massillon Wire Basket Co., Massillon, Ohio, has commenced the erection of a plant to manufacture wire baskets and crates.

The Lima Woolen Mills, Inc., Lima, Ohio, will shortly begin the erection of a foundry and power plant.

The Wilton Tool Co., now operating a foundry in Detroit, will erect a new plant in Sharon, Pa., for the manufacture of gage blocks, measuring and precision tools and cutting tools. Tentative plans provide for a building 100 x 150 ft.

The Cyclone Drilling Co., Orrville, Ohio, manufacturer of mechanical drilling equipment, will soon commence the erection of a one-story addition to cost about $70,000.

The Jeannin Electric Co., 110 Eleventh Street, Toledo, Ohio, manufacturer of electrical products, has acquired property for the erection of a new one-story plant, estimated to cost $25,000.

The Cree-Becker Oil Tool Co., Essex and Indiana streets, Newark, Ohio, manufacturer of oil tools, is operating at capacity and is preparing to install a considerable amount of new machinery. It is particularly in need of a milling machine and drill press.

Philadelphia

PHILADELPHIA, Dec. 12.

The Lyster Body Co., 330 North Fifth Street, Philadelphia, manufacturer of automobile bodies, has acquired the four-story factory at 408-14 North Randolph Street, 58 x 85 ft., and the one-story building at 407-11 North Randolph Street, for a new plant.

Plans for the erection of a one-story machine shop addition have been filed by the Hulton Dyeing Co., 3819 Frankford Street, Philadelphia. The building contract has been let to F. Crompton & Brother, 4614 Oakland Street.

The Velie Sales Co., 29 West Harvey Street, Germantown, Philadelphia, is taking bids up to Dec. 20, for a one-story automobile service and repair works, 50 x 105 ft., estimated to cost $60,000.

J. M. White, 1116 Olive Street, Philadelphia, operating a wire and wire brading works, is planning the erection of a two-story and basement addition, 60 x 95 ft., at 1124-32 Olive Street, estimated to cost $25,000.

Christopher Offenhouser, 3430 Powelton Street, Philadelphia, has filed plans for an addition to his machine shop at Wensley and Allen streets.

The Howe Scale Co., 806 Arch Street, Philadelphia, has leased the entire five-story and basement building, 21 x 140 ft., at 415 Arch Street, for local headquarters. Improvements and alterations will be made.

The Fanning-Schuett Engineering Co., 502 Ruscomb Street, Philadelphia, manufacturer of engineering specialties, has taken title to property on Third Street, 90 x 120 ft., for a one-story machine and engineering works. Plans for the building have been prepared.

Morganthaler Brothers, Second and Snyder streets, Philadelphia, ice manufacturers, have awarded contract to the William F. Koelle Co., Twenty-sixth and Oxfords streets, for a two-story addition, 60 x 100 ft., on Philip Street, to cost $12,000.

The Lower Paxton Township School Board, Paxton Township, Pa., will soon commence the erection of a one-story vocational school near Livingston, to cost about $50,000. The contract has been let to J. Frank Saussman, Paxton, Pa. Frank G. Fahnestock, Patriot Building, Harrisburg, Pa., is architect. John Swartz is president of the board.

Fire, Dec. 7, destroyed a portion of the plant of the Sheldon Axle Works, Wilkes-Barre, Pa., manufacturer of automobile axles, with loss estimated at about $75,000. The forge shop was practically ruined. The company is a subsidiary of the Spicer Mfg. Co., Plainfield, N. J.

The Delaware Seamless Tube Co., Auburn, Pa., will soon commence the erection of the superstructure for a new building at its plant.

A vocational department will be installed in the new high school to be erected at Mercerburg, Pa., the first unit of which is now under way. Hirsch & Sheller, Chamber of Commerce Building, Altoona, Pa., are architects.

The Ohio Generator Co., Red Lion, Pa., has been chartered under State laws to manufacture isolated electric power plant equipment, etc. A site has been selected and plans are nearing completion for a four-story factory, 65 x 110 ft. Joseph Dise, Glen Rock, Pa., is architect. Clayton C. Meads is treasurer.

The Consumers' Auto Supply Co., 375 Bennett Street, Luzerne, Pa., has awarded contract to William Whitebell, 91 Goodwin Street, Kingston, Pa., for a one-story automobile service and repair building, 70 x 130 ft., estimated to cost about $50,000.

A vocational department will be installed in the three-story and basement junior high school to be erected at Thirteenth and Marion streets, Reading, Pa.

The Chamber of Commerce, Carlisle, Pa., is negotiating with the Champion Motor Co., represented by Henry Crowthers, Philadelphia, relative to a site for the establishment of an automobile assembling plant, primarily for export trade.

The Harrisburg Stanley Spring Co., Harrisburg, Pa., has filed plans for a one-story factory, 50 x 100 ft., at Cameron and Calder streets, for the manufacture of special self-oiling springs. Harry D. Delmotte, Twelfth and Herr streets, secretary, is in charge.

Milwaukee

MILWAUKEE, Dec. 12.

Supplementing the improvement noticeable in the machine-tool market the last four to six weeks, more evidence of renewed buying is coming to light. The prospect of an active demand from railroads is probably the most encouraging feature. Milling machine manufacturers report better business, although the automotive industries are engaged in the annual inventory and buying practically nothing beyond necessities. This is housecleaning time for most industries and it is expected that while it will result in the offering of considerable used equipment, requirements of new tools will be broader after Jan. 1.

The Clarkson Coal & Dock Co., Superior, Wis., will build a two-story brick and concrete office and machine shop, 64 x 100 ft. It will require considerable miscellaneous equipment, which, however, will not be purchased until early next spring. R. C. Buck, Superior, is architect. J. J. Davidson is general superintendent.

The Western Malleables Co., Beaver Dam, Wis., has let the general contract to the Austin Co., Cleveland, for a one-story factory and warehouse addition, 40 x 120 ft.

The National Brass Co., Milwaukee, has been incorporated with a capital stock of $10,000 and proposes to establish a brass and aluminum foundry in leased quarters. The incorporators are John Jacoby, president, and Paul Daehling, secretary-treasurer Jacoby & Daehling, Ltd., pattern manufacturer, 758-760 South Pierce Street, and William N. Leininger, 888 Thirty-third Street, formerly superintendent of the Milwaukee Die Casting Co.

The Chippewa Wood Mfg. Co., Chippewa Falls, Wis., recently incorporated, has taken over the plant and business of the Northern States Casket Co. in the same city and will start work at once on a two-story brick and concrete addition, 32 x 76 ft., estimated to cost $30,000 with equipment. F. Sterzik is president and general manager.

The Cudahy Brothers Co., Cudahy, suburb of Milwaukee, will build a new box and crating factory, 80 x 190 ft., one-story, of brick and concrete, to replace the plant destroyed by fire recently. E. F. Lawler is general manager.

The Bailey-Shippert Mfg. Co., Milwaukee, has been incorporated with a capital stock of $25,000 by George Bailey, 600 Murray Avenue; O. C. Weber and Lyman G. Wheeler, attorney, 78 Loan and Trust Building, Milwaukee. It intends to manufacture automatic milling machinery and similar dairy appliances and devices, but no definite details are now ready for publication.

The Board of Education, Eagle River, Wis., expects to take bids about Jan. 15 for the construction and equipment of a new high school, with vocational training departments. It will be two-stories and basement, 76 x 115 ft., and was designed by Parkinson & Dockendorff, architects, LaCrosse, Wis. The cost is estimated at $125,000. Charles Adams is secretary of the board.

The George J. Meyer Mfg. Co., 576-598 Clinton Street, Milwaukee, has let the general contract to Charles B. Danielson, 638 Mineral Street, for a brick and steel addition, 60 x 100 ft., two stories, to its machine shop. The concern manufactures bottling machinery and conducts a jobbing machine shop business. George J. Meyer is president.

The Board of Education, Oregon, Wis., has engaged Edward B. Tough, architect, Madison, Wis., to design a new high and vocational training school, 85 x 120 ft., two stories and basement, estimated to cost $100,000. Bids will be taken Feb. 1. E. F. Kramer is secretary of the board.

Indiana

INDIANAPOLIS, Dec. 12.

F. R. Chandler, 3817 North Pennsylvania Street, Indianapolis, has plans under way for a five-story automobile service and repair building, 60 x 200 ft., estimated to cost in excess of $200,000. Vonnegut, Bohn & Mueller, Indiana Trust Building, are architects.

The Indiana Power Co., Vincennes, Ind., has arranged for a bond issue of $1,100,000, the proceeds to be used for general operations, extensions in plants and system, etc. It has completed a new plant at Edwardsport, costing about $500,000.

The Studebaker Corporation, South Bend, Ind., is arranging to manufacture closed and other bodies for its cars and will remodel plant No. 1, heretofore devoted to wagon manufacture for this purpose.

The Pennsylvania Lines West of Pittsburgh, Union Station, Pittsburgh, have awarded contract to the Dwight P. Robinson Co., 125 East Forty-sixth Street, New York, for a two-story machine and boiler shop at Fort Wayne, Ind., to cost about $400,000. It is said that construction will be held in abeyance until after the first of the year.

A one-story power house will be erected by the Mutual Milk Co., Bethel Avenue and Minnesota Street, Indianapolis, in connection with the construction of an addition.

D. M. Crawford, head of the Crawford-McCrimmon Machine Co., Brazil, Ind., is interested in a company being formed at Terre Haute, Ind., to manufacture a safety device for air drills, air hammers, etc., to be known as the Hicks-Crawford safety device.

George Tucker, Evansville, Ind., has leased a building at Shelbyville, Ind., which will be used as a machine and woodworking shop after the first of the year.

J. W. Johnson, Kokomo, Ind., and C. T. Byrne, Chicago, have bought the Liberty Pressed Metal Co., Kokomo, from the Federal trustee for $65,000.

The Central South

ST. LOUIS, Dec. 12.

The Polar Wave Ice & Fuel Co., Grand and Olive streets, St. Louis, has awarded a contract to the Fruin & Colnon Construction Co., Merchants Laclede Building, for a two-story ice-manufacturing plant.

A vocational department will be installed in the three-story high school, 78 x 125 ft., to be erected at Humboldt, Kan., and estimated to cost about $125,000. T. W. Williamson & Co., 312 Central National Bank Building, Topeka, Kan., are architects.

The Missouri, Kansas & Texas Railroad Co., Railway Exchange Building, St. Louis, has awarded contract to T. H. Johnson, South Ohio Street, Sedalia, Mo., for a new one-story machine shop at Parsons, Kan., estimated to cost $50,000.

Fire, Dec. 5, destroyed the plant of the Greenwood Compress & Storage Co., Greenwood, Miss., with loss estimated at about $700,000, including building, machinery and stock.

A vocational department will be installed in the two-story and basement high school to be erected at Lawrence, Kan., 120 x 210 ft., estimated to cost close to $500,000. Work will commence at an early date.

The Arctic Ice Co., 205 Lee Building, Kansas City, Mo., A. L. Williams, head, is planning the erection of a two-story factory at Second and Delaware streets.

The Muskogee Vitrified Brick Co., Muskogee, Okla., is planning to rebuild the portion of its plant recently destroyed by fire with loss estimated at about $50,000, including equipment.

The White Eagle Oil & Refining Co., 418 Dwight Building, Kansas City, Mo., has plans under way for a new three-story oil refinery at Armourdale, Kan.

The Western Tie & Timber Co., 915 Olive Street, St. Louis, is completing plans for its new hydroelectric generating plant on the Current River, near Eminence, Mo.

The Thirty-Six Coal Mining Co., Branch, Ark., is planning the installation of electrical and other machinery at its property, estimated to cost about $30,000. Allen Pinkerton is president and manager.

The War Department, Washington, will build a new aeroplane hangar, with repair shops and mechanical depart-

ment, on the Scott Field, near St. Louis, estimated to cost close to $1,000,000.

The Standard Sanitary Mfg. Co., Pittsburgh, Pa., has plans nearing completion for a one-story addition at Sixth and A streets, Louisville, 56 x 375 ft., estimated to cost about $100,000. O. P. Ward, Lincoln Building, Louisville, is architect.

The Welborn Corporation, Kansas City, recently organized as the Welborn Tractor Co., with capital of $4,000,000, has acquired the plant and business of the Coleman Tractor Co. Operations will be continued at the works under the new name. F. I. Welborn is president, and A. Coleman, secretary.

The Missouri Utilities Co., Mexico, Mo., is planning for extensions and improvements in its local electric power plant to cost about $25,000.

A vocational department will be installed in the two-story and basement high school, 64 x 170 ft., at Peabody, Kan., estimated to cost about $150,000. It is expected to call for bids early in the coming year. Mann & Gerow, Hutchinson, Kan., are architects. W. P. Reese is superintendent of schools.

The Fort Smith Compress Co., Fort Smith, Ark., has plans under way for a new plant, 200 x 400 ft., to replace its works recently destroyed by fire with loss reported at $500,000, including machinery and stock. E. F. Creekmore is vice-president.

The Standard Brake Shoe & Foundry Co., Pine Bluff, Ark., is contemplating extensions and improvements in its plant to double, approximately, the present output.

The new one-story and basement plant to be erected by C. M. Byrd, 2319 South Ohio Street, Sedalia, Mo., will be used for the manufacture of lawn mowers and similar products. Plans will be prepared at an early date.

The United Railway Co., Thirty-ninth Street and Park Avenue, St. Louis, will defer the erection of its new three-story car repair plant, to cost about $150,000, until early in the spring. The main works will be 80 x 208 ft., with adjoining structure, 60 x 72 ft.

The Producers' & Refiners' Corporation, Tulsa, Okla., is arranging for enlargements in its oil refinery at West Tulsa, to include the installation of a wax lubricating and grease manufacturing plant.

The Gulf States

BIRMINGHAM, Dec. 12.

The American Automotive School, Main and Haskell streets, Dallas, Tex., has plans under way for a one and three-story building, estimated to cost about $150,000. The one-story portion, 75 x 92 ft., will be equipped as a school and shop. J. A. Pitzinger, Dallas, is architect.

The Prairie Pipe Line Co., Mertens, Tex., has acquired about 15 acres of land for a new electrically-operated pumping plant, estimated to cost about $100,000, including machinery.

The Alexandria Refining Co., Alexandria, La., recently organized, has perfected plans for a new refinery. E. M. Talley is manager.

The Standard Oil Co. of Louisiana, New Orleans, is planning for extensions in its plant at Baton Rouge, La., including additional storage facilities to provide for 1,000,000 barrels of oil. Steel tanks will be used for the latter service. The company is said to be negotiating for the purchase of the plant of the Export Oil Corporation at Avondale for a consideration of about $950,000.

H. D. Dean, Tuscaloosa, Ala., manufacturer of shuttle blocks and kindred equipment, has acquired property at Brewton, Ala., for a new plant to manufacture similar products.

The Texas Utilities Co., Plainview, Tex., has tentative plans under consideration for rebuilding its electric power and ice-manufacturing plants at Lubbock, Tex., recently destroyed by fire with loss of about $100,000. H. Wurdack is president, and H. C. Randolph, vice-president.

The Double Seal Ring Co., Fort Worth, Tex., manufacturer of piston rings, has arranged for a bond issue of $600,000, the proceeds to be used for general operations, extensions, etc. The company is planning to manufacture a new automotive invention, to be known as the double seal kerofier.

The St. Andrews Bay Machine & Garage Co., Panama City, Fla., recently organized, has plans under way for three buildings for automobile and marine engine machine and repair work, 30 x 60 ft., 30 x 50 ft. and 20 x 60 ft., respectively. J. T. Stansel is secretary.

The shipbuilding plant of Doullut & Williams, New Orleans, La., located on Lake Pontchartrain, will be offered at public sale on Jan. 9, under the direction of Harry Fitzpatrick, New Orleans. The plant represents an investment of $2,000,000, and is the largest shipyard in the South.

A vocational department will be installed in the high school to be erected by the Board of Education, Albany, Ala., estimated to cost close to $200,000.

The Copeland Garage, Gadsden, Ala., is planning to rebuild its automobile service and repair works recently destroyed by fire with loss estimated at about $35,000. Fred Lucy is head.

California

LOS ANGELES, Dec. 6.

J. J. Ferlin, Modesto, Cal., operating a machine shop and foundry, has completed negotiations with the Chamber of Commerce, Turlock, Cal., for a site for the establishment of a new plant. The present works will be removed and about $30,000 expended for additional equipment and improvements.

The Board of Education, Colton, Cal., is having plans prepared for a one-story manual training building for the high school department, 45 x 270 ft., estimated to cost close to $200,000, including equipment. Allison & Allison, 1405 Hibernian Building, Los Angeles, are architects.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is planning for extensions and improvements in its power house at Manteca, Cal., to cost about $35,000.

The Pacific Fruit Express Co., 65 Market Street, San Francisco, a subsidiary of the Southern Pacific Railroad Co., has completed plans for an addition to its ice-manufacturing plant at Calwa, Cal., to cost about $55,000. The company engineering department is in charge.

The Universal Pump & Mfg. Co., Redding, Cal., recently organized with a capital of $50,000, is perfecting plans for the operation of a local foundry and machine shop, with adjoining works to manufacture deep-well pumping machinery. The company is headed by I. J. Johnson, who has been operating a foundry in the city, and S. F. Henderson.

The Eastman Welding Co., Los Angeles, is having plans prepared for a one-story factory on Los Angeles Street, 100 x 150 ft. Bids will be asked at an early date. Albert C. Martin, 430 Higgins Building, is architect.

The Merced Irrigation District, Merced, Cal., is arranging for a bond issue of $12,000,000, a portion to be used for the construction of a hydroelectric power plant at Exchequer.

The Joseph Musto Sons-Keenan Co., Twenty-sixth Street and Los Angeles River, Los Angeles, is arranging for the immediate rebuilding of its tile and marble finishing shops, recently destroyed by fire.

Seattle

SEATTLE, Dec. 6.

The Johnson Eureka Combination Spray Co., Yakima, Wash., manufacturer of spraying machinery, has acquired property in the Millview district for the erection of a new plant. Plans will be drawn at an early date.

The Columbia Wood Products Co., 508 Couch Building, Portland, Ore., recently organized with a capital of $250,000, has acquired property at Astoria, Ore., for a new plant. The first unit, with machinery, will cost about $200,000.

G. W. Osgood, 612 Tacoma Building, Tacoma, Wash., port engineer, is completing plans and specifications, and will call for bids early in the coming year for dock equipment, including four 3 to 5-ton cranes, loft and boom type; about 4000 ft. of monorail trackage and one 2-ton electric monorail hoist; conveyor equipment; loading and unloading machinery; stacking machines, etc.

N. H. Medbury and W. F. Miller, Yakima, Wash., are organizing a company with capital of $500,000 to construct a plant to manufacture a special automatic pump for irrigation service, invented by Mr. Medbury. The initial works are estimated to cost close to $100,000, including machinery. Mr. Miller will be president of the company.

The Northwestern Electric Co., 58 Sutter Street, San Francisco, is planning to rebuild its electric power house at Camas, Wash., recently destroyed by fire with loss estimated at about $75,000.

The Ingram Air Locked Rim Co., Walla Walla, Wash., is arranging a list of equipment for installation in a building, recently leased, to manufacture automobile wheel rims.

The Artificial Ice & Cold Storage Co., Billings, Mont., has completed plans for an addition to its ice plant, 30 x 150 ft., at First Street and Avenue S.

The Ohio Match Co., Spokane, Wash., will build a new one-story planing mill at Yardley, Wash., to be equipped for a daily capacity of about 50,000 ft. of lumber. It is estimated to cost close to $45,000, including machinery. Fred A. Shore is manager.

The Ingram Air Locked Rim Co., Walla Walla, Wash., Oscar Ingram, president, is negotiating for a site for the erection of a plant to manufacture tire rims for automobile wheels.

Canada

TORONTO, Dec. 12.

Some very good machine-tool business is being closed and dealers are well satisfied with conditions. Inquiries for equipment are numerous, but many are not expected to develop into sales until after the first of the year. Prospective business for 1922 is exceptionally bright. Announcements regarding the construction of new plants are still appearing and as a consequence the general outlook in the machine-tool market is better than at any time since the close of the war. There is no talk of a revision in prices and most dealers expect present quotations to hold for the next two or three months at least.

The Beaver Truck Co., 369 Wilson Street, Hamilton, Ont., will build an addition to cost $50,000.

Latour & Dupuis, Inc., St. ohns, Que., will build a planing mill to cost $30,000 and has awarded the general contract to Pierre Trahan, St. Johns, Que.

The Peninsular Sugar Co., is preparing to start work in the early future on the erection of beet sugar factory at Petrolia, Ont., to cost $1,200,000. The Honolulu Iron Works Co., 8047 Hamilton Boulevard, Detroit, Mich., is engineer.

C. J. Brown, city clerk, Winnipeg, will receive bids until Jan. 9, for two 310 k.v.a., three-phase alternators. Specifications may be obtained from the manager of the Hydro Electric System, 55 Princess Street, Winnipeg.

The Moncton Tramway Gas & Electric Co., Ltd., Moncton, N. B., has awarded the general contract for the construction of a power plant to cost $35,000 to T. E. Gilbert, 15 Ralph Street.

The mill of the Reid Lumber Co., Toronto, was destroyed by fire Dec. 8 with a loss of $50,000. Machinery valued at $35,000 will be a total loss.

The Malleable Castings Co., Smiths Falls, Ont., has reopened a portion of its plant giving employment to 50 men.

The Colonial Motors, Ltd., has purchased the Canadian plant of the Detroit Lubricator Co., Walkerville, Ont., and will install additional equipment. The transfer includes land, buildings and machinery.

Guelph, Ont., is preparing to purchase equipment for the waterworks plant in connection with the decision to supplement the present steam equipment with that of electrical driven centrifugal pumps. The city will purchase one Imperial 3,000,000 gal. electrically driven centrifugal pump and one 3,000,000 gal. electrically driven booster pump as an auxiliary. Two 3,000,000 gal. gasoline or Diesel driven units will also be bought.

The Bell Piano & Organ Co., Guelph, Ont., is considering the installation of two new boilers to replace the three at present in use.

J. R. Baxter, 102 St. Antoine Street, Montreal, will start work in the near future on a factory, 60 x 200 ft. on Pearl Street East, Brockville, Ont., to manufacture abrasive wheels, etc.

BOOK REVIEWS

Employment Methods. By Nathan W. Shefferman. Pages, xx + 573, 5½ x 8½ in.; numerous illustrations. Published by Ronald Press Co., New York.

In an effort to cover in all its ramifications the subject of employing this book is divided under five general heads. Under the first is treated the employment department itself, showing why such a department has come into existence, how to establish one, how it should function, and what manner of man (or woman) should be chosen to manage it.

Under the second and third heads comes the getting and holding of employees. Many examples of forms used in various establishments for recording the employee's qualifications before employing him are shown, as well as those for checking him afterward. Methods for securing applicants, as well as hiring, selecting, assigning, and identifying are given. The charting of labor turnover, the training of employees and the methods of wage payments are also here discussed.

Under the fourth head are given the methods of employing for offices, stores, banks and similar institutions. Typical forms and methods of such institutions as the Metropolitan Life Insurance Co. and the National City Bank are given in considerable detail. Under the fifth head called the "human element," the larger matters that have a bearing on employment are taken up. Such include service work, that is, the follow up of the worker to see that he is contented, the visiting nurse to see why he is absent, house organs, bonuses of various kinds, and profit sharing. Housing and that large subject of to-day, industrial democracy, are discussed. Plans of such institutions as the Standard Oil, Bridgeport Brass Co., Rockefeller, Willys-Overland and Studebaker are outlined. There are also several appendices which give in detail the employment schemes of large concerns referred in the main text. E. C. R.

Time Study and Job Analysis. By William O. Lichtner. Pages, xvii + 397, 6 x 8½ in.; 81 forms and illustrations. Published by Ronald Press Co., New York.

As the application of science in management progresses, and at the same time stern necessity requires greater savings in production costs, the value of job analysis and time-study methods becomes more and more apparent. At the same time the use of time-study results in rates of payment and anything involving payment must be carefully and properly applied. So perhaps the chief value of Mr. Lichtner's book is not so much in its recommendations as to technique, valuable as they are, but in the author's stress on the finality of the findings of time-studies. He insists upon the proper investigation (and correction where necessary) of conditions prevailing when and where the time-studies are made.

For this reason undoubtedly, the first four chapters are devoted to job standardization. The effect upon the worker, the manager, the industry itself, is described. Applications ranging from shoe shining to repair work in a machine shop are covered. The saving of material, time and overhead is discussed. Then three chapters are devoted to the organization of a staff to start and carry on the work. The recommendations in this part are based on the author's own experience and offer some excellent ideas to those about to undertake such work.

From then on the major portion of this book is devoted to actual time-study methods. Some thirteen chapters cover such matters as the paving of the way for studies by the observer or analyst, with both the foreman and the worker; the things to be covered in a preliminary study; the taking, computing and analyzing of time values; the determination of the standard time, including all necessary allowances; the determination of and follow up of rates based on time-studies; and finally the perpetuation of the standards established.

The book concludes with interesting discussions of the application of all its findings to such things as increased production, the balancing of manufacturing to selling, and the possibilities of using job standardization as a basis for labor mediation. There are also several appendices in which concrete examples from actual practice are given. E. C. R.

New Books Received

Personnel Research Agencies. Bulletin No. 299 of the United States Bureau of Labor. By J. David Thompson. Pages 207, 6 x 9 in. Published by the Government Printing Office, Washington.

Les Metallurgies Electrolytiques et Leurs Applications. By Albert Levasseur, professor of electrochemistry and electrometallurgy at l'Ecole d'Electricite et de Mecanique Industrielle de Paris. Pages 256, 5½ x 8½ in. Published by Dunod, 47 Quai des Grands-Augustins (vie), Paris, France.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.68c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.68c.
Hoops, base price	3.53c.
Bands, base price	3.28c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.78c.
Channels, angles and tees under 3 in. x ¼ in., base	2.68c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.65c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.85c.
Toe calk, ½ x ⅜ in. and larger	3.25c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.75c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.78c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c.	.....
Nos. 22 and 24	3.85c.	4.10c.
No. 26	3 90c.	4.15c.
No. 28	4.00c.	4.25c.
No. 30	4.25c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.95c. to 4.10c.
No. 16	4.10c. to 4.25c.
Nos. 18 and 20	4.25c. to 4.40c.
Nos. 22 and 24	4.40c. to 4.55c.
No. 26	4.55c. to 4.70c.
No. 27	4.70c. to 4.85c.
No. 28	4.85c. to 5.00c.
No. 30	5.35c. to 5.50c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—55	—40	¾-in. But.	—30	—13
¾ in. Butt	—60	—46	1½-in. Butt.	—32	—15
1-3 in. Butt.	—62	—49	2-in. Lap.	—27	—10
3½-6 in. Lap.	—59	—45	2½-6-in. Lap.	—30	—15
7-8 in. Lap.	—55	—41	7-12-in. Lap.	—23	— 7
9-12 in. Lap.	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 17½c.
High brass wire	17¼c. to 17½c.
Brass rod	14¼c. to 15 c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18 c. to 19 c.
Copper tube, seamless	21 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$6.05	$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC	$10.00	$8.50	IC	6.40	6.15
IX	11.25	10.00	IX	7.40	7.15
IXX	13.00	11.50	IXX	8.40	8.15
IXXX	14.75	13.25	IXXX	9.40	9.15
IXXXX	16.25	15.00	IXXXX	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	34c.
Bar	40c. to 42c.

Copper

Lake ingot	16 c.
Electrolytic	15¾c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7 c.
Solder, ½ and ½ guaranteed	25c.
No. 1 solder	23c.
Refined solder	20c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	29c. to 31c.

Old Metals

Business is quiet but prices are steady. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.50
Heavy machine composition	8.00
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.00
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

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Fuels Used in Open-Hearth Practice

The 1920 Ingot and Castings Production Analyzed—Producer Gas Chiefly Employed for Ingots and Oil for Castings

BY EDWIN F. CONE

EARLY in the history of the open-hearth steel industry, producer gas was practically the only fuel, but to-day six different mediums are in use. Natural gas was available almost from the beginning in the Pittsburgh district. Fuel oil in more recent years has had widespread use and still later have been the developments in the employment of coke oven gas, tar and powdered coal. To ascertain the extent to which each of the fuels figures in open-hearth steel operations, THE IRON AGE sent a questionnaire to the producers of open-hearth steel ingots and steel castings in the United States, using the 1920 production as a basis. The scope of the investigation is shown in the questions reproduced on this page and the results are discussed below. These are taken up in two sections: Fuels used in producing open-hearth ingots and fuels used in making open-hearth steel castings. Replies were received from 83 companies producing open-hearth ingots and from 71 open-hearth steel foundries. In some cases single returns represented several companies, as in the case of the Steel Corporation.

Practice of Producers of Steel Ingots

IN the canvass of the steel ingot output of the country for 1920 less than six of the open-hearth producers failed to send replies. The data collected represent 94.41 per cent of the 1920 total ingot output or 29,931,485 gross tons out of 31,685,495 tons, the figures published by the American Iron and Steel Institute. A table on another page shows the relative production of steel ingots by the respective fuels and the percentages.

Coke Oven Gas and Tar

While producer gas is credited with the leading rôle, having been used to produce 55.14 per cent of the total ingot output last year, thus maintaining its old supremacy, there has been in recent years a development of vital importance. It is the burning of coke oven gas and tar, preferably in combination. The use of these by-products as open-hearth fuels has grown extensively in favor, but it is confined to the large steel producing companies which have their own by-product coke plants.

The general practice of these companies is to burn the coke oven gas with the tar in certain proportions, usually in the ratio of their relative production from the ovens, but there are several cases where the coke oven gas or the tar are used separately. Where the two are used together the tar furnishes the luminosity, whether the proportion of the latter be large or small. The results of this practice have been most satisfactory, and it is likely to increase wherever circumstances warrant.

These four questions brought out the information which is summarized in this article:

1. *What was your open-hearth steel output (ingots or castings) in* 1920?
2. *What proportion of this was made with:*
   (*a*) *Coke-oven gas and tar*
   (*b*) *Fuel oil*
   (*c*) *Producer gas*
   (*d*) *Powdered coal*
   (*e*) *Natural gas*
3. *How much was basic and how much acid open-hearth?*
4. *Brief comments on the merits of fuels used.*

From the data collected, coke oven gas and tar in combination ranked next to producer gas in the ingot steel output last year, being credited with 13.72 per cent of the total. While coke oven gas alone represents only 5.84 per cent and tar only 4.85 per cent of the total, the two fuels in their general use represent 24.41 per cent. The growing importance of these fuels is emphasized when it is recalled that ten years ago they were a very small factor and were more a waste product than a useful one, so far, at least, as direct steel production was concerned.

Of the companies reporting, 5 used in 1920 coke oven gas and tar, 2 used coke oven gas alone and 12 used tar only.

Fuel Oil

Next in importance to producer gas and coke oven gas and tar is fuel oil. Our investigation shows that of the total reported, 13.62 per cent or 4,075,351 tons of ingots were made in 1920 with oil as a fuel. It has been used much longer than coke oven gas or tar, but the latter is fast outstripping it in the case of the larger companies. In the steel casting industry, however, it is much more extensively used in the latter than in the former.

In the majority of cases, fuel oil has either been the original installation, due to the necessity of having a low sulphur fuel or because of the high cost of coal, or it has been substituted for producer gas for various operating and metallurgical reasons.

Natural gas has been and is an ideal fuel but its gradual diminution has caused several companies to turn to one of the other heat-producing agents. In 1920 natural gas was used in the production of 1,824,447 tons of ingots or 6.09 per cent of the total reported, ranking fourth on the list of the various fuels.

Powdered Coal

There have been several attempts to use powdered coal in open-hearth furnaces, not all of which have been successful. So far as our data throw light on this subject only 0.74 per cent of the total quantity of ingots reported upon was made with powdered coal.

Comments on the Fuels

The question asking for comments on the relative merits of the various fuels brought out a few interesting replies, some of which are abstracted as follows:

Coke Oven Gas and Tar Most Efficient

The vice-president and general superintendent of a large company in the Middle West states that he is "absolutely sold on the proposition that coke oven gas with tar is the best and most efficient fuel for the production of steel that there is, and that fuel oil ranks next. We do not have the blast furnace so cannot use the former fuel, but find that oil is the fuel for making quality steels, particularly alloy steel."

Another large Eastern steel producer states that his use of tar as an open-hearth fuel has been confined almost entirely to two small tilting acid furnaces for making steel castings, although the company has at various times used tar on one of its 75-ton basic furnaces in its main open-hearth plant. The general manager of the company also states that one of the main advantages in the use of tar lies in the ability to produce lower sulphur steel than is possible with the average supply of producer gas coal which has been available during the last several years. Tar burns with a much sharper flame than producer gas and care must be exercised when this is used on a basic furnace in order to prevent melting down the silica brick in the upper portion of the walls and roof resulting in more frequent trouble with the basic bottom. This bottom trouble does not occur, of course, where tar is used on acid furnaces.

Table of Steel Ingot and Castings Production of the United States in 1920 According to Fuel Used

Fuels	Ingots—Gross Tons	Ingots—Per Cent	Castings—Gross Tons	Castings—Per Cent
Coke oven gas and tar	4,107,387	13.72	381	0.04
Coke oven gas	1,751,027	5.84	...	...
Tar	1,454,333	4.85	6,000	0.62
Fuel oil	4,075,351	13.62	634,862	67.10
Producer gas	16,492,384	55.14	164,178	17.36
Natural gas	1,824,447	6.09	131,182	13.85
Powdered coal	226,556	0.74	9,779	1.03
Totals	29,931,485	100.00	946,382	100.00
Total output in 1920	31,685,495		986,400	
Percentage covered by replies	94.41		95.98	

A large producer of tin plate and sheets states through its vice-president and general manager that fuel oil and natural gas are used with practically the same satisfactory results but that coke oven tar is not entirely acceptable from a metallurgical standpoint. Powdered coal is as yet apparently in its experimental stage.

Fuel Oil Preferred

The general manager of a large sheet steel company in the Middle West asserts that fuel oil is better adapted to that company's conditions for melting purposes but that it is in a position to use only fuel oil and producer gas for melting purposes. Of the two, local conditions have demonstrated that the company can use fuel oil to much better advantage and with more economical results, taking into consideration all the different phases of production.

A large maker of tubes in the East states through its fuel engineer that it has found fuel oil very satisfactory, using heavy Mexican high sulphur oil after the heat has been melted down and low sulphur distillate at the beginning. "In our particular case this proves a cheaper fuel. Producer gas has worked out with equal satisfaction as far as fuel properties are concerned."

A large steel and wire company in the Middle West testifies that the cost of fuel per ton, using fuel oil, has been lower than that of producer gas. The cause of this is the fact that the same furnaces (basic) produce approximately 8 per cent more steel per hour on fuel oil than producer gas.

A large producer of basic open-hearth ingots for sheets and tubes states through its vice-president that he experiences a slight increase in the tonnage per turn when liquid fuel is used, whether fuel oil, tar or pitch. There is also obtained a lower sulphur content in the steel when pitch or tar is used. He also states that the company experiences a slight increase in repairs and rebuilding costs on furnaces using liquid fuel. The majority of the ingot output of this company has been made with producer gas.

A large producer of basic ingots for forging steel, tin plate, black plate, etc., in the East, on the authority of its president, says that he would very much prefer to use fuel oil rather than producer gas were it not for the prohibitive cost of the former. "The quality of the steel is better and the output of the furnace is larger with fuel oil and there is no doubt but that the life of the furnace is longer with this fuel." The company produced last year 90 per cent of its ingots with producer gas.

A company operating in Missouri, producing acid steel ingots, states that fuel oil is cheap in that territory and affords a nice, clean heat and is best adapted to small plants. Another small company in Massachusetts asserts that coal is cheaper but that fuel oil is easier to handle, while a large producer of basic open-hearth ingots, using fuel oil exclusively, asserts that this fuel is very satisfactory but that the company expects to use coke oven gas and tar in the near future.

Merits of Natural Gas

The assistant to the vice-president of a large company, producing basic open-hearth ingots in the Middle West using producer gas, fuel oil and natural gas, states that natural gas as a fuel for steel making produces the best grade of steel specially from a sulphur standpoint; that natural gas aud fuel oil are very much cleaner as a fuel, furnace repairs being much less than on other fuels and also that it means a much simpler furnace construction. "Due to scarcity it is practically impossible to obtain natural gas at this time for steel making. Fuel oil is very high in cost at any time, it being the consensus of opinion that it is more or less a gamble when purchasing it. In the use of fuel oil there is much less danger of tapping cold steel than there is with other fuel. In producer gas we find the cheapest fuel, but it does not produce a steel as low in sulphur as does either natural gas or fuel oil."

A large steel company in Pennsylvania which produces basic steel ingots with producer gas and natural gas, states through its president that "our preference is for natural gas but, owing to the scarcity and high price of this fuel, we are obliged to use producer gas, which is naturally cheaper than any other fuel for

us, since it is made from coal from our own mine."

A small company in Pennsylvania which made both acid and basic ingots, the former with fuel oil and the latter with producer gas, says that natural gas was used as the auxiliary fuel both for the acid and basic furnaces. Its experience in the basic practice has shown that producer gas is the most economical fuel. In its acid practice more production can be had by the use of fuel oil, but natural gas has the advantage of less oxidation in melting and lower cost per ton production.

Another company whose output is about equally divided between producer gas and natural gas as a fuel states that natural gas is faster but harder on the furnace.

Table of the Total Output of Steel Ingots and Castings in 1920 as Made with Different Fuels

	Ingots and Castings	
	Gross Tons	Per Cent
Coke oven gas and tar	4,107,768	13.59
Coke oven gas	1,751,027	5.60
Tar	1,460,333	4.69
Fuel oil	4,710,213	15.20
Producer gas	16,656,562	53.93
Natural gas	1,955,629	6.28
Powdered coal	236,335	0.71
Total	30,877,867	100.00
Total production of steel in 1920	32,671,895	
Percentage covered by the replies.	94.50	

Powdered Coal Most Economical

Discussing powdered coal, the president of a large company which produces acid and basic open-hearth ingots and which used last year producer gas and fuel oil, states that he has had no experience with the use of coke oven gas and tar, but says powdered coal is the most economical as far as fuel is concerned, shortening the time of heats materially, but the coal has to be very low in sulphur and very low in ash. "Furnace repairs have been excessively high and the difficulty with the ash was so great that we are forced to abandon the use of that process. If means can be found to handle the ash successfully and economically, powdered coal would be an ideal fuel. In our experience oil has been the most satisfactory fuel, but its cost is so great as to make it impossible in producing steel for the competitive market. We have now arranged to discontinue the use of fuel oil. The most practical and most economical fuel has been producer gas.

Another company in the South, which used last year both producer gas and powdered coal, the latter to the extent of about 35 per cent of its output, states that in general it prefers producer gas to powdered coal, and another company, which last year used coal tar, fuel oil and producer gas, states that the first two fuels were used early in 1920 to supplement producer gas because of a fuel shortage at that time. "In using tar about 46 gal. per ton of steel were necessary. In using fuel oil about 61 gal. per ton of steel, while for producer gas 700 lb. of coal per ton of ingots."

Practice of Producers of Steel Castings

THE striking feature of the analysis of the replies covering the open-hearth steel foundry industry is the very extensive use of fuel oil. The data received were from companies which made about 96 per cent of the country's total open-hearth steel castings and included all the largest producers. The table on another page shows that fuel oil was the medium used in producing 67.10 per cent of the total reported upon, as against only 13.62 per cent in the case of open-hearth steel ingots. This is a striking showing.

Producer Gas Secondary to Fuel Oil

Producer gas was instrumental in making 17.36 per cent of the total, ranking second to fuel oil and contrasting with its leading position in the ingot industry. The predominance of fuel oil in the steel casting industry in 1920 is due largely to its rapid substitution for coal. During the war the quality of the latter deteriorated and it was difficult to get. There was also the consideration that sulphur, particularly in acid open-hearth practice, could be kept down more effectively with oil than with gas from coal. On the Pacific Coast fuel oil predominates as a fuel both for castings and ingots. Only seven of the 71 companies reporting used producer gas in 1920; some of these used fuel oil also.

Natural Gas and Powdered Coal

Next to fuel oil and producer gas, natural gas accounts for 13.85 per cent of the output of open-hearth castings. The large steel foundries around Pittsburgh account for a majority of this, but even this fuel is practically being supplanted by fuel oil or producer gas. Of the foundries reporting 14 used natural gas in 1920; of the 14, there were 9 using both natural gas and fuel oil.

Powdered coal as a fuel for steel castings in open-hearth furnaces was used by but one company which produced 1.03 per cent of the total output reported on. This contrasts with 0.74 per cent in the ingot output.

Tar Used by One Foundry

Coke oven gas and tar played but a small rôle last year in the steel casting output. This is natural because the use of these fuels depends almost entirely on the proximity of a large by-product coke oven plant. Castings made with coke oven gas were insignificant, amounting to nearly 381 tons or 0.04 per cent of the total. As to tar, 0.62 per cent of the total was made by the use of this as a fuel. For 10 years or more a basic open-hearth steel foundry has been using tar as a fuel with eminent success.

Relative Merits of the Fuels

Some interesting testimony relative to the various fuels was given as follows by various companies producing open-hearth steel castings:

The vice-president of a large acid open-hearth steel foundry in the East states that several years ago, when the price of fuel oil was approximately 2½c. per gal., the gas producers were discontinued and the furnaces changed over for the use of oil, since which time oil has been used exclusively. The company has had no experience with coke oven gas and tar or powdered coal, but it is the belief that the former combination presents a very desirable and economical fuel where these materials are available as by-products. "The use of fuel oil has several advantages over producer gas, but the relative merits of the two depend upon the relative economies, which in turn depend upon relative prices of coal and fuel oil."

Another large acid open-hearth steel foundry in the Middle West gives the following testimony:

> The fuel oil which we use averages approximately 28 gravity and we have always found it very satisfactory. Our main supply comes from the Oklahoma fields. We have had comparatively little experience with any other fuel, but operated for a short period on producer gas, which we found very much less satisfactory than fuel oil

The assistant to the general manager of a large acid open-hearth steel foundry in the East states that the use of fuel oil for melting makes possible a grade of steel which meets the specifications better than any other process of melting.

A small acid open-hearth plant in the East, operating a 5-ton furnace, states that in a plant of its size fuel oil is entirely satisfactory, as there is practically no outlay in producers or other equipment.

A steel foundry in the Middle West operating basic

open-hearth furnaces on a small scale reports that it uses fuel oil exclusively for melting and finds it not only satisfactory but the most economical fuel that can be procured in that locality (Ohio). Good service on the brick work in the furnace is one result, together with general satisfaction in most other respects.

Natural Gas Preferred

A small steel foundry in the Pittsburgh district operating acid open-hearth furnaces reports that fuel oil is a very satisfactory melting medium for its purposes, but that natural gas is more satisfactory when available because easier to handle than fuel oil and not so hard on the furnaces.

A small acid open-hearth steel casting plant in Pennsylvania, commenting on fuel oil, reports that the greatest difficulty encountered was the presence of moisture in the fuel oil in the cold weather. Another small plant in Wisconsin uses fuel oil from the Tulsa fields which has proven very satisfactory, and another acid plant in Pennsylvania characterizes fuel oil as much cleaner and as giving a longer run on the furnace. Still another plant in New York State, producing acid open-hearth castings, states that the advantages of fuel oil for melting are low sulphur content and convenience, while a plant in California, producing both acid steel castings and basic ingots by the open-hearth process, states that fuel oil is much more economical than any other fuel obtainable in that territory.

Natural Gas and Fuel Oil Compared

The president of one of the largest steel foundries in Pennsylvania making a general run of acid open-hearth steel castings comments as follows:

> We find that natural gas is the most satisfactory fuel for us to use, but the supply is gradually failing and we are able to secure it in ample quantities only during the summer months and have to resort to fuel oil during a considerable part of the year. We find, however, that greater speed without sacrifice of quality can be obtained in melting with fuel oil than with natural gas. One disadvantage in fuel oil as compared with natural gas is the tendency of the bath to take up sulphur in proportion to the amount in fuel oil.

The president of another large foundry in the same district, comparing natural gas and fuel oil, gives the following testimony:

> Natural gas is, in our opinion, the ideal fuel for melting steel when it can be obtained. We realize that its exhaustion is approaching and we are investigating thoroughly the relative merits and costs of substitutes. From present indications we will probably use fuel oil when necessary on our open-hearth furnaces and install powdered coal in the remainder of our plant.

A company operating basic open-hearth furnaces in California states that, if it had its choice between fuel oil and natural gas, it would prefer natural gas, although it is compelled to use fuel oil in that district.

Producer Gas Cheaper than Oil

A prominent Ohio company, which in 1920 made about 50 per cent of its output with fuel oil and the rest with producer gas, operating both basic and acid, the greater proportion being acid steel, comments as follows:

> In our opinion, with coal at $7.75 per ton and fuel oil at 11½c. per gal., we effected a saving of 54 per cent when we changed from fuel oil to producer gas. Of course, if the price of coal and fuel oil varied, it would alter the percentage of saving somewhat, but in no case is it possible to produce steel castings as cheaply with fuel oil as with producer gas.

A small basic open-hearth steel foundry in Wisconsin reports entire satisfaction with producer gas as a fuel.

The following interesting testimony by the president of a small acid open-hearth company in one of the Northern States is to the effect that "oil has been used exclusively as the preferred fuel, but powdered coal will come into use soon, since the company has a malleable department operating alongside of its steel foundry."

Open-Hearth Output as a Whole

Analyzing the industry as a whole, another table shows that the replies represented 94.50 per cent of the country's total production of open-hearth steel ingots and castings combined. Producer gas predominates at 53.93 per cent, with fuel oil second at 15.20 per cent. Coke oven gas and tar, used together or separately, accounts for 23.88 per cent of the total. Powdered coal has not yet attained a prominent position at less than 0.75 per cent, while the use of natural gas is not a large proportion of the total at 6.28 per cent.

The predominance of producer gas in the open-hearth steel ingot as contrasted with the greater use of fuel oil in the open-hearth steel casting industry is explained partly by the fact that producer gas has long been the leading fuel for ingots where the operation of furnaces is generally without intermission from week end to week end. In the steel casting industry fuel oil accommodates itself to the more intermittent periods of operation which are a large factor. There are also other reasons for its use as already brought out by the opinions of some of the steel makers.

Comparing the two branches of the industry, this investigation shows that, of the two predominating fuels, 49 companies used fuel oil last year and 46 used producer gas, while 17 of these companies used both fuels, whereas in the open-hearth foundry industry 65 companies used fuel oil and only seven used producer gas, four of them using both. Total companies reporting, as stated before, were 83 ingot and 71 steel casting producers.

It is evident that location plays an important part in the selection of the fuel used, whether for ingots or castings, though individual preferences also have their effect. There is no doubt, however, but that the comparatively recent introduction of coke oven gas or tar or both in American open-hearth plants is a development of far reaching importance, primarily because of the reductions in costs which are a consequence. It involves the use of a by-product which takes the place of a purchased fuel and it also means one more elimination of waste. Large companies having their own coke oven plant possess therefore a marked advantage.

Carnegie Steel Co. Buys Land

The Carnegie Steel Co. was the successful bidder for 108 acres on Neville Island, in the Ohio River near Pittsburgh, at an auction sale by the Government in Pittsburgh, Dec. 16. This land was taken over by the Government during the war as a site for a huge ordnance plant which was to have been erected and operated by the United States Steel Corporation. Sudden termination of the war before construction had far progressed led to its abandonment. The property adjoins that on which is located a blast furnace built and owned by the American Steel & Wire Co., but which for some time has been operated by the Carnegie Steel Co. What the latter proposes to do with the land just purchased has not been definitely decided, but there are intimations that it contemplates ultimately to consolidate several rolling mill plants in the Pittsburgh city limit on the Neville Island site.

The Fuller & Johnson Mfg. Co., Madison, Wis., maker of farm gas engines and power tools, has increased its working schedule from three days to six days a week to accomodate an improved demand for its products. It is employing between 150 and 175 workmen and expects to make further additions to the force immediately after Jan. 1 to fill orders for spring delivery.

SILICA BRICK

Refractories Manufacturers' Association Issues New Charts

THE IRON AGE of July 7, last, published a chart giving production, shipments, stocks and unfilled orders of silica brick covering a period from Jan. 1, 1918, to May 31, 1921. These figures were compiled from reports from all manufacturers by the Refractories Manufacturers' Association. It developed that in the compilation of the figures some errors crept in, notably regarding production, which tended to invalidate the picture of the industry as set forth in the chart. The errors were the result of giving the gross production without regard to kiln losses and breakage and occurred at a time when a good many manufacturers were engaged in manufacturing by-product oven

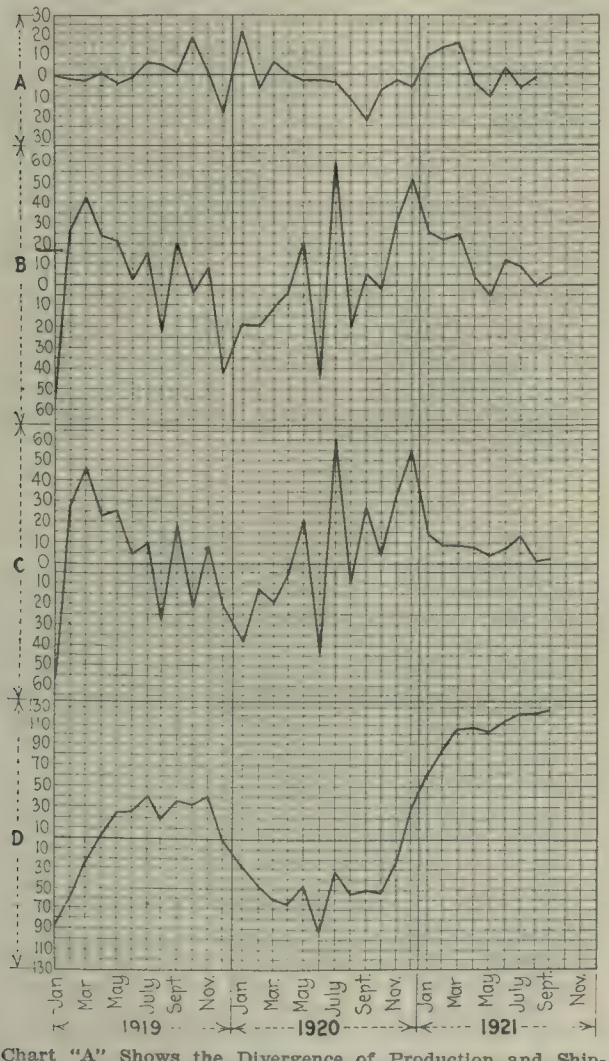


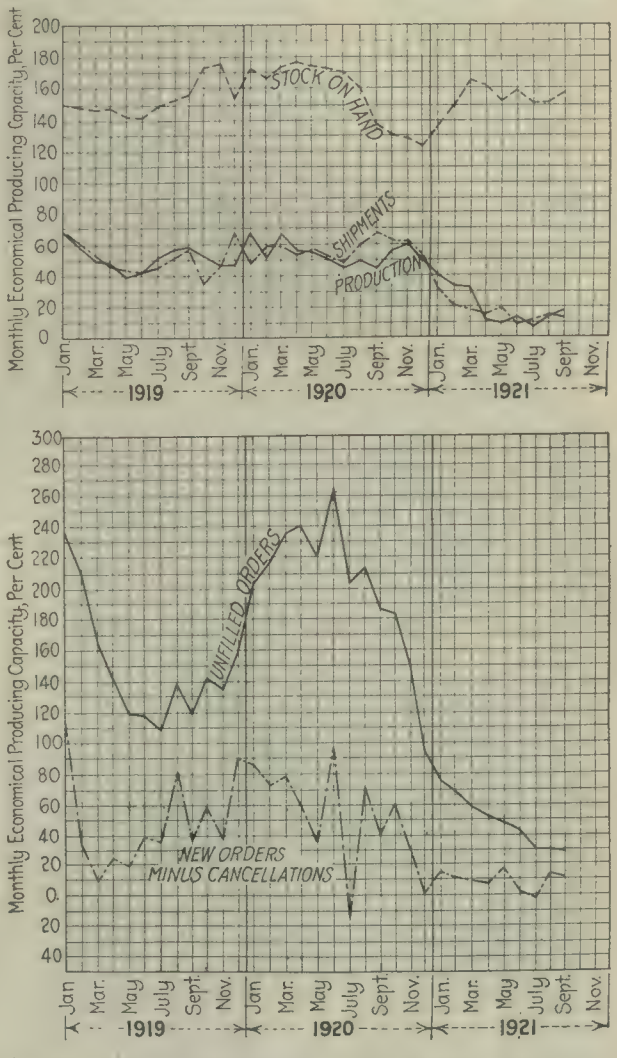
Chart "A" Shows the Divergence of Production and Shipments. Where production exceeds shipments, the degrees of divergence are shown above the zero line and vice versa. Chart "B" shows the divergence of production and new orders. Where production exceeds new orders, the degrees of divergence are shown above the zero line and vice versa. Chart "C" shows the divergence of shipments and new orders. Where shipments exceed new orders, the degrees of divergence are shown above the zero line and vice versa. Chart "D" shows the divergence of stock and unfilled orders. Where stock exceeds unfilled orders, the degrees of divergence are shown above the zero line and vice versa

shapes, which are classified as specials, and the losses ran up as high as 33 1/3 per cent.

Production properly is the net number of good brick, and to the end that the chart should not be misleading the Refractories Manufacturers' Association has revised its figures and prepared a new chart, which is published herewith. This chart differs from the former one in that it embraces merely the reports of the members of the Refractories Manufacturers' Association. Since a large percentage of the silica brick capacity is embraced in the association, however, it provides a clear picture of the industry and moreover is brought down to Sept. 30, last. The association also has prepared a chart running from Jan. 1, 1919, to Sept. 30, 1921, showing the degrees of divergence in production and shipments of silica brick, in production and new orders, shipments and new orders and stocks and unfilled orders. This chart also is based upon reports exclusively of members of the association.

More Steel Workers at Higher Wages

Iron and steel plants, according to figures of the Bureau of Labor Statistics, show for November a gain of 5152 employees over October in 119 establishments. This gain of 4.3 per cent is accompanied by a gain of



6.2 per cent in the amount of the payroll, and by an advance from $41.89 to $42.63, or 1.8 per cent, in the average pay envelope. Automobile building, on the other hand, has fallen off, there being a drop of 3546 men, or 3.5 per cent, and a drop of 8.5 per cent in the payroll. This means that the average pay envelope has shrunk 5.1 per cent. There has been a shrinkage, also, in the average envelopes of the men engaged in building and repairing railroad cars, amounting to 0.7 per cent; but the number of men at this work has increased 5.9 per cent. In the table, comparison will be found not only between October and November for these three branches of industry, but also between November of this year and November of 1920.

Period	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
November, 1920.	118	185,547	$14,720,283	$79.33
November, 1921.	119	123,920	5,282,658	42.63
October, 1921....	119	118,768	4,974,236	41.89
Automobiles				
November, 1920.	53	114,027	3,295,077*	28.90
November, 1921.	52	96,838	2,702,234*	27.91
October, 1921....	52	100,384	2,953,210*	29.42
Car Building and Repairing				
November, 1920.	62	71,960	5,232,200	72.71
November, 1921.	63	53,964	3,251,901	60.26
October, 1921....	63	50,943	3,091,352	60.68

*Weekly.

PAST PRESIDENTS' NIGHT

New England Foundrymen's Association Has Unusual Program

The December meeting of the New England Foundrymen's Association, at the Exchange Club, Boston, Wednesday evening, Dec. 14, this year, took the form of a past presidents' night. Last year the association rounded out a quarter century's existence, and at that time plans were made to entertain in 1921 the past executives. More than 100 attended the dinner, at which C. S. Lovell, president, presided.

Thirteen past presidents attended. Following is a list of these, the companies which they represented at the time they served as presidents of the association, and the years they served: George H. Gibby, Condor Iron Foundry, 1895-1898; Henry A. Carpenter, A. Carpenter & Sons Foundry Co., 1902-1903; B. M. Shaw, Walker-Pratt Mfg. Co., 1904; Henry F. Arnold, American Tool & Machine Co., 1908; William A. Viall, Brown & Sharpe Mfg. Co., 1909; H. E. Wetherbee, James Hunter Machine Co., 1911; Charles L. Newcomb, Deane Steam Pump Co., 1912; Robert C. Bird, Broadway Iron Foundry, 1913; Charles L. Nutter, Old Colony Foundry Co., 1914; T. R. Scott, Brown & Sharpe Mfg. Co., 1917; George P. Aborn, Blake & Knowles Steam Pump Works, 1918; Robert L. Newcomb, Deane Steam Pump Works, 1919, and A. B. Root, Jr., Hunt-Spiller Mfg. Corp., 1920. Letters of regret were received from John Magee, Magee Furnace Co., 1905; Walter B. Snow, B. F. Sturtevant Co., 1906; William H. Bense, Kinsley Iron & Machine Co., 1907, and A. F. Corbin, Union Mfg. Co., 1915. Fred F. Stockwell, Barbour-Stockwell Co., Cambridge, Mass., who has been secretary of the association since its formation, sat at the table with the past presidents.

First Organized to Combat Labor Troubles

George H. Gibby, the first president, explained how the association happened to be formed. In 1895 the iron molders' union made demands on Boston foundries for $2.50 per day, the abolition of piece work, and the limiting of apprentices to one to each eight molders. At that time the molders received $2 to $2.25 a day. Owners of nine foundries met by appointment to consider the demands of the union. After the trouble was adjusted these same nine foundry owners organized the association.

Charles L. Newcomb acted as spokesman for the past presidents in expressing their appreciation of the courtesy and honor shown by the association. He introduced each past executive, who addressed the members. He also paid tribute to Mr. Stockwell, whom he described as the backbone and mainstay of the association, while the members rose in a body. Dr. Richard Moldenke, a guest of the evening, who in the past has addressed the association members many times, was introduced "to the younger members present."

In a short business session held immediately after dinner, A. B. Root, Jr., Boston, A. F. Corbin, New Britain, Conn., and William A. Viall, Providence, R. I., were appointed a committee by the chair to make nominations for officers to be balloted on at the annual meeting in January. Arthur D. Little, Inc., Cambridge, Mass., engineer and chemist, was made a member of the association.

Richard H. Rice, works manager General Electric Co., Lynn, Mass., was the chief speaker of the evening. He spoke on the present-day need of establishing and maintaining mutual confidence between employees and management and on what the General Electric Co. has done to meet these conditions.

Mr. Rice first pointed out the progress made by industry in perfecting products the past 100 years or more, and the lack of progress in the relationship between management and employee during the same period. He stated that, if management had given the same thought and effort to the welfare of employees during that period as to development of products, industry would be better off to-day. He then and subsequently went on record as in favor of unions, bringing out the point that unions should exist in shops and plants where management does not give proper consideration and fair play to the employee. He maintained workmen are fair when they have the same facts to reason on that management has, and he outlined the method adopted by the General Electric Co. in dealing with the men and their troubles. This method has sufficient flexibility to be applicable, in modified form, to factories having as few as 150 employees.

Mr. Rice does not advocate the General Electric Co.'s plan as something to beat the unions, but he does as something which gives the ambitious workman a chance.

Lead Too Pure for Cathedral Roofing

There is such a thing as too pure lead for roofing purposes. The ancient Gothic cathedrals of Europe were topped with this gray metal that blended well with the stone work and the style of architecture. Lead was specified for the roof of the Episcopal cathedral of Washington, which is now being built, but after it had been applied for some time, it was found that sheet lead on the steep roof slopes had a tendency to flow downward of its own weight and the heat of the sun.

The nail holes enlarged and allowed the metal to slip partially off. Metallurgists of the Bureau of Standards of the Department of Commerce were called upon and they found that the grade of commercial lead used was 99.9 per cent pure, far too pure for satisfactory roofing. They recommended the use of what is technically called hard lead, which contains approximately 6 per cent of antimony. Lead roofs on European cathedrals have lasted for 300 to 500 years, and the metallurgists are of the opinion that lead as manufactured in those days had impurities sufficient to harden it for roofing use.

Extensive School Building

Figures made public by the President's Conference on Unemployment show that an enormous amount of school construction is under way and that a large additional amount has been authorized as one of the means to give immediate relief to the nation's unemployed. According to the National Education Association, new school buildings are going up, or contracts about to be let, to the amount of $20,553,250, will provide much needed seating capacity.

Commenting upon these figures, Col. Arthur Woods, chairman of the Committee on Civic and Emergency Measures, said: "Hundreds of new school buildings are needed in every State in the Union. Hundreds of thousands of school children in the leading cities are in school only half time for want of seating space. Other hundreds of thousands are seated in buildings whose light and sanitation are a menace to health. Millions are in buildings ill suited to the purpose and requirements of educations as it is now conceived and organized. Many such buildings added to the larger building programs of the cities can be made to create a great tide of employment which must certainly mean better times for the nation and its people."

New Ore Distribution Map

The Lake Superior Iron Ore Association, Kirby Building, Cleveland, has issued a map showing the distribution of Lake Superior iron ores and Eastern and foreign ores during 1920 with the location of the consuming furnaces. A similar map was issued in 1918 but that covered only the Lake Superior ores.

A. L. DeLeeuw, New York, consulting engineer, spoke on "Notions in Machine Shops That Should Be Scrapped" before a joint meeting last week of the machine shop section Providence Engineering Society, and the Rhode Island section American Society of Mechanical Engineers, in Providence. The talk was based on experiences in the shops of the Singer Sewing Machine Co., the Cincinnati Milling Machine Co. and other manufacturing plants.

Adjustable Speed With Motor Driven Mills

Two Satisfactory Systems Described, with Comments on Their Relative Characteristics and the Particular Work for Which Each Is Most Adaptable—Discussion

BY K. A. PAULY*

ECONOMIC considerations demand that steel be rolled at the maximum speed possible without adversely affecting the quality of the product. The speed at which the steel will enter the rolls is affected by the diameter of the rolls, the weight and cross-section of the piece, and the extent to which the rolls are ragged. For the same pair of rolls, the smaller the section and the lighter the piece, the higher the speed at which the rolls will grip it. Once the piece has entered, the maximum speed at which it can be rolled is determined by its section and by the draft. It is essential with large drafts, especially for cast ingots, that the speed be low, to allow time for the steel to flow. The speed is also affected by the type of mill,

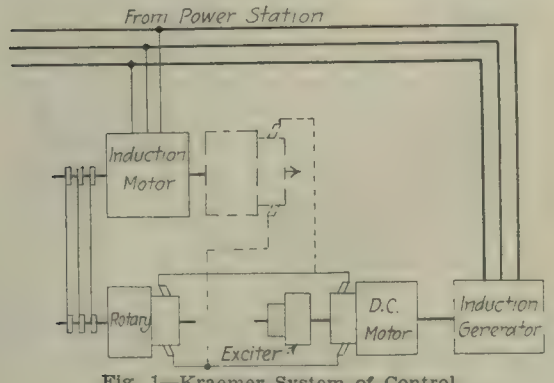


Fig. 1—Kraemer System of Control

the method of handling the steel and the weight of the piece.

In rolling certain shapes, the amount of waste is greatly affected by the speed. If the speed is too high, the steel will not flow into the corners, and if it is too low it will flow out between the rolls, producing a "fin" which cannot be rolled in by subsequent passes. Increasing the speed for smaller sections not only increases the production, but decreases the power consumed per ton rolled, because of the higher average temperature maintained during rolling.

Obviously, the best speed is frequently a compromise between opposing factors, and differs with almost every section, making it advantageous, and often necessary, to provide adjustable-speed control for mills rolling a variety of shapes. While the installation of large mills, making a comparatively small range of sections, has tended to reduce the advantages of adjustable-speed operation, the ever increasing roll speeds have had the opposite effect, and we find a constantly increasing demand for equipments capable of being operated over a considerable range in speed. Not only this, but the speed requirements become more and more exacting as to refinement of control.

The difficulties encountered by the electrical engineer in obtaining an adjustable-speed motor are not always appreciated by the man familiar with the characteristics of the steam-engine. The latter is naturally a variable-speed machine, to which special control devices must be applied to give it constant or adjustable-speed characteristics, while electric motors of the type applicable to steel mill main rolls are essentially constant-speed machines. The following definitions are given by the Standards Committee of the American Institute of Electrical Engineers:

Adjustable-speed motors are those in which the speed can be varied gradually over a considerable range, but when once adjusted, remain practically unaffected by the load.

Varying-speed motors are those in which the speed varies with the load, ordinarily decreasing when the load increases.

Multi-speed motors are those which can be operated at any one of several distinct speeds (these being practically independent of the load), but which cannot be operated at intermediate speeds.

Adjustable-speed motors should embody all the characteristics, strength, rigidity, reliability, safety and

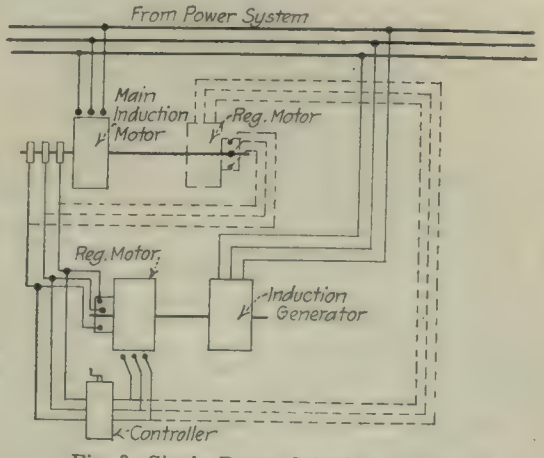


Fig. 2—Single Range Scherbius System

accessibility of the constant-speed induction motor, which have been such large factors in the success which has attended the application of these motors to rolling mills. When adjusted for any speed throughout the range of control, the speed should be only slightly affected by wide variations in load. The motor should be capable of carrying high overloads, 125 to 150 per cent, throughout the full speed range.

Its efficiency should be highest over the range of speeds required for the greater part of the production. If any of the alternating-current types is used, the power-factor should be high. Its cost must not be excessive.

At the time when motors were first applied to main rolls there were available four methods of obtaining adjustable-speed control, all of which had been thoroughly tried out in other fields:

Adjustable-speed control with direct-current motor, in which the speed of either a shunt- or compound-wound machine, taking power from a constant potential source, is changed by varying the strength of its field.

Adjustable-speed operation by the so-called Ward-Leonard system of control, in which the speed of a shunt- or compound-wound, direct-current motor is varied by varying the voltage impressed on its armature, at the same time maintaining its field constant.

Multi-speed control with changeable pole motors, in which are used induction motors having two or more independent windings designed for different synchronous speeds, or with a single winding so arranged that the number of poles can be changed at will through switches external to the machine.

Multi-speed control with induction motors operating in concatenation. As applied to main rolls, concatenated motors consist of two mechanically connected single-speed or multi-speed induction motors, so connected electrically that the mill may be driven at the synchronous speed of either, or at a speed corresponding to the synchronous speed of a motor having a number of poles equal to the sum of the poles of both machines.

From the standpoint of speed control alone, the adjustable speed direct-current motors, with motor field or with Ward-Leonard control, meet steel mill requirements, but they are usually expensive and low in ef-

*Power and Mining Engineering Department, General Electric Co., Schenectady, N. Y. This is an abstract of the paper, which was read before the Engineers' Society of Western Pennsylvania.

ficiency, as they require a motor generator or synchronous converter to transform the alternating current of the general supply system to direct current. The loss in power due to the conversion varies from

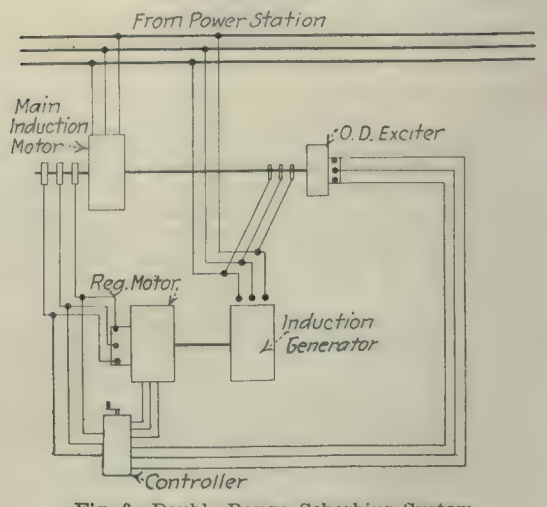


Fig. 3—Double Range Scherbius System

10 to 20 per cent, depending upon the size and type of converter and the nature of the rolling load cycle.

While direct-current motors can be, and have been, so designed as to operate entirely successfully when driving main rolls, the commutation problem is a difficult one, and the vibration and dirt which are always present aggravate the sparking at the high overloads, and make it difficult for the commutator to take on a polish. On the other hand, the use of the single-speed induction-motor under the most adverse conditions of load and dirt has demonstrated its superiority as a main roll drive.

It was not strange, therefore, that mill men a few years ago made every effort to adapt their mills to induction-motor speed characteristics. Where the range of sections was such as to require different speeds, two or three compromise speeds were chosen and multi-speed motors purchased. But, at best, these motors are inflexible; their use almost always entails a sacrifice and, especially with 25-cycle power, it is difficult to obtain speeds which are sufficiently near those desired.

Appreciation of these facts led many of the leading engineers, throughout Europe as well as in America, to devote considerable time and expense to studying the problem of making an alternating-current motor which would embody the mechanical characteristics of the induction-motor, the speed characteristics of the direct-current, adjustable-speed motor, and an efficiency which would approach that of the multi-speed induction-motor. Many systems were suggested and a few actually found their way into steel plants, although by far the greater number have passed into history with only a patent office record.

Of the systems developed, two embody to a greater or less degree the desirable characteristics of an adjustable-speed mill motor. These are commonly known as the Kraemer, or synchronous converter, system, and the Scherbius system. In both of these systems the slip energy of the induction-motor, which is ordinarily thrown away as heat in the rheostat, is returned either as electrical energy to the general power supply system, or converted to mechanical power through a motor mounted on the same shaft with the main induction-motor. These two systems are shown diagrammatically

The Kraemer system requires one additional machine over the corresponding Scherbius equipment. The effect of this unit on the price and efficiency makes it imperative to adopt the drive with the smaller number of parts, and we find that, with a single exception, installations of this system are of the type having the regulating machine mounted on the main motor shaft. Developing direct-current motors mounted on the main roll shafts for conserving slip energy has materially reduced the costs of the expensive element of this system. Obviously, the capacity of the regulating equipment in either system is determined by the amount of power transmitted through it; that is, by the capacity of the main roll motor and its range of control. However, in addition to this, its design is affected by the maximum rotor voltage and frequency.

The tendency of the synchronous converter to fall out of step, at low frequencies, makes the main roll motor with the Kraemer system unstable when carrying heavy overloads near synchronism. A rolling load, with its rapid fluctuations over wide ranges, aggravates this tendency toward instability. The addition of a flywheel, because it decreases the rates of change in the roll motor speeds and frequently reduces the slip, tends to stabilize the roll motors around synchronism.

An example will serve to illustrate this. The curve in Fig. 4 shows the effect of the weight of the flywheel on the time torque curves of a 1200-hp. motor driving a mill. This torque curve is typical of many of those to which adjustable-speed motors are subjected, and is less severe than one for a single-stand mill, in which the load is either all on or all off. The full line curve is that for the motor without flywheel having $WR^2 = (901{,}700 \text{ lb.-ft.})^2$; the dot dash curve corresponds

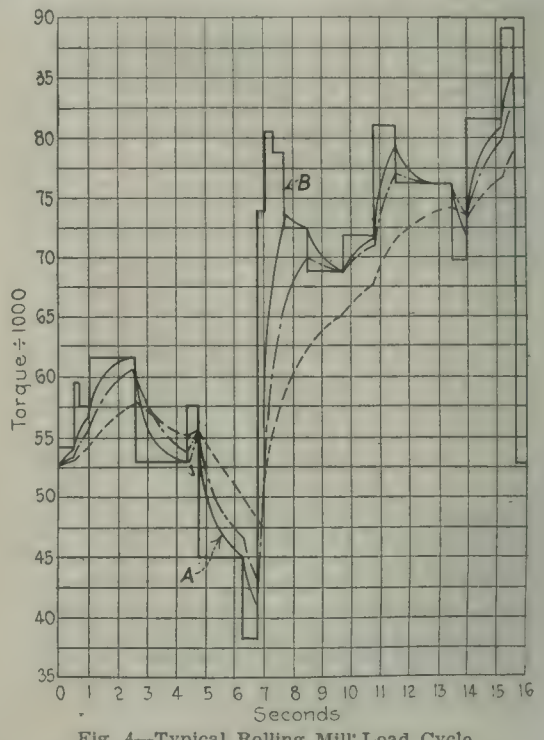


Fig. 4—Typical Rolling Mill Load Cycle

to a flywheel effect of $WR^2 = (1{,}726{,}500 \text{ lb.-ft.})^2$; the dotted curve corresponds to a flywheel effect of $WR^2 = (4{,}500{,}000 \text{ lb.-ft.})^2$. Referring to the full line curve, the slip at point *A* is 6.5 per cent, which corresponds to a rotor frequency of 1.65 cycles. The slip at point *B* is approximately 11.6 per cent, and the corresponding secondary frequency is 2.9 cycles.

A motor of this size, with a normal range of speed control, will require about a 300-kw., 25-cycle, synchronous converter, which will run 750 rpm. at rated frequency. At 1.65 cycles, it will run 49.5 rpm., and at 2.9 cycles, 87 rpm., or nearly double its former speed. The time available for making this change in speed is 0.9 sec. Obviously the change in speed of the synchronous converter increases with increased fluctuations in load, and will be a maximum for a single-stand mill, where the load varies from mill friction to rolling peaks.

If the synchronous converter is successfully to follow these rapid changes in speed, as the load and speed of the main motor fluctuate, its synchronizing torque must be sufficient to overcome the inertia of its armature. This torque is a function of the impedance of the rotor circuit of the main motor, including the armature of the synchronous converter and the line connecting them. At the normal frequencies at which synchronous converters are operated, 25 and 60 cycles

and even at the reduced frequencies met with in the Kraemer system, when the main roll motor is operating considerably above or below synchronism, the reactance component of the impedance of the converter circuit predominates, and the synchronizing torque, which is large, is very nearly constant for considerable changes in frequency and voltage.

But as the speed of the main motor approaches synchronism, and the rotor frequency and voltage are correspondingly reduced, we reach a point, depending upon the constants of the converter circuit, when the resistance become an important factor in reducing the synchronizing torque of the converter. As the main motor approaches still further toward synchronism, we reach a critical speed beyond which the synchronizing torque of the converter is not sufficient to drag its armature in synchronism with the fluctuations caused by the load on the main motor, and the converter becomes unstable, falls out of step, and the main motor goes up to synchronism.

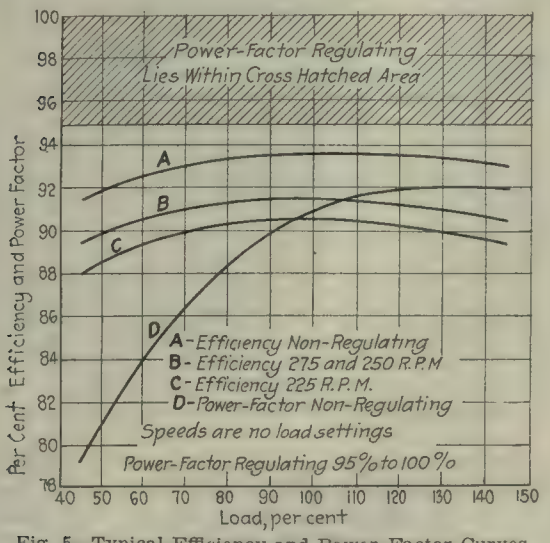


Fig. 5—Typical Efficiency and Power-Factor Curves for Adjustable-Speed Induction Motor with Double Range Scherbius Control

Obviously, the synchronizing torque required to keep the converter in step (and, therefore, the critical slip of the main motor) increases with the magnitude and rate of fluctuation in the load, and vice versa. As previously stated, the addition of a heavy flywheel to the main motor will reduce both the slip and the rate of change in the main motor speed, and, therefore, that of the controlling converter, and improve the stability of the main motor by reducing the critical slip or raising the critical speed.

In the Scherbius system the changes in the regulating set which follow changes in the main motor are purely electrical. The set runs at practically constant speed, independent of any changes in the speed of the main motor, and the main motor is entirely free from any instability at all loads up to its break-down point near synchronous speed, as well as at all other speeds. This system, however, has its limitations. As the frequency and voltage are increased, it becomes more and more difficult to design the commutator motor of the regulating set to commutate properly under the severe rolling mill load. The practical commercial limit is reached at about 20 cycles, and as this is entirely too low to meet the requirements of mill motors, if the control is all below synchronism operating on 60-cycle circuits, engineers have devoted their attention to ways and means of reducing the frequency.

Obviously, if the roll motor can be controlled above as well as below synchronism, the rotor frequency for a given speed range will be greatly reduced, and approximately halved if the synchronous speed of the main motor is midway in the range of speed control. In addition, the capacity of the main motor will be lowered somewhat, and that of the regulating equipment reduced to approximately half that required with single range control, and the overall efficiency will be improved by the reduction in the losses.

That the Scherbius regulating equipment would function equally well above or below synchronism was realized from the beginning, but the problem of getting the main motor through synchronous speed remained unsolved, on a practical basis, until the advent of the well known double range Scherbius system, which has been so extensively used since the development of the first equipment, early in 1916, for the Bethlehem Steel Co. Saucon works.

At synchronous speed, the rotor current and voltage across the slip-rings of an induction motor are zero, and at this speed the roll motor can neither carry load nor provide excitation for the regulating set. If, however, we provide an auxiliary excitation for the regulating motor, which is automatically effective at and near synchronous speed, and which does not interfere with the proper functioning of the regulating set at roll motor speeds remote from synchronism, we can drive the main motor up to synchronous speed, where it will operate as a synchronous motor, and on through this speed to a point where the regulating set, without the assistance of the auxiliary exciter, will control the speed as it does below synchronism in the single range system. This is accomplished by means of the ohmic drop exciter driven from the main roll motor. When operating above synchronism, the action of the regulating set is reversed, power being transferred by it to the main motor. However, this reversal of the flow of power has no effect on the functioning of the system.

The number of poles, and therefore the synchronous speed of the ohmic drop exciter, are the same as for the main motor. As its slip-rings are connected to the general supply system, the frequency of the current drawn from the commutator follows exactly the law governing the frequency of the current from the rotor of the roll motor, and the voltage at the commutator is approximately constant. At synchronous speed, the ohmic drop exciter produces direct current. In appearance it resembles the armature of a synchronous converter.

The main roll drive does not differ from the standard induction-motor for this service, except for the addition of the ohmic drop exciter, which, as previously stated, provides excitation for the regulating motor when carrying the roll motor through synchronous speed.

The starting and regulation of a motor equipped with double range Scherbius control is very simple. Two controllers are needed, one for starting and one for speed control. With the speed controller set at the position corresponding to synchronous operation for the roll motor, and the starting controller in the off position, the regulating set is started through the induction generator by a compensator, in the ordinary way for induction-motor generators. With this up to speed, the main motor is started in the usual way, and when the starting resistance is all cut out, the armature of the regulating motor is connected to the slip-rings, and its field circuit closed automatically through an interlock on the last contactor of the starting control for the main roll motor. The speed of the rolls is then adjusted to any desired value by the regulating controller.

With this system it is possible to meet most exacting rolling speed requirements, without exceeding the limiting frequency for the regulating set, and to carry the maximum overloads at all speeds from minimum up through synchronism to maximum. In fact, without instruments in the rotor circuit, an observer can not tell when the motor passes the synchronous speed. A very interesting experiment frequently tried with this equipment to illustrate this feature is, with the motor running slightly loaded just above synchronism, to increase the load gradually and watch the rotor frequency approach zero and then the phase rotation of the rotor voltage reverse and the frequency increase as the machine passes below synchronism.

With the Kraemer system the main motor may be forced through synchronism at comparatively light load and then controlled above as below, but the gap in the speed range caused by the instability of the roll motor when loaded around synchronous speed, both above and below, and the difficulty of forcing it through syn-

chronism, make this system impracticable for double range operation. This gap is obviously much greater with 25 cycles than with 60 cycles.

In addition to reduced first cost and generally higher efficiency over the whole range of control, the double range Scherbius system provides a maximum efficiency about midway in the speed range, which is usually the zone in which the greater part of the mill output is rolled. The system is also quite flexible in this respect, and the synchronous speed may frequently be arranged at other points if production warrants it. If it is found desirable to increase the speed of a mill over that originally contemplated, this can readily be done, with almost no interruption in production, by substituting a larger regulating set in the double range system. For either the Kraemer system or the single range Scherbius system, this would usually require a much more expensive change in the main roll motor, which might delay the mill several weeks.

In Fig. 5, which shows a set of typical efficiency and power-factor curves for the double range Scherbius system, attention is called to the high efficiency from half load to approximately 50 per cent overload (curves *A*, *B*, and *C*); also to the increase in power-factor when running regulating at all speeds, as compared with the power-factor when running non-regulating at nominal full-load speed (curve *D*).

Choice of the system of control to meet any specific mill requirements can be made only after careful consideration of all conditions affecting the problem. However, the more general conditions having a bearing on the choice are, range of speed control, frequency of supply circuit, maximum load at all speeds, production of mill at different speeds, and whether or not the control is to be automatic.

The double range Scherbius system can readily be designed to meet all except the most extreme speed ranges, for both 25-cycle and 60-cycle supply circuits; while the Kraemer system is rather handicapped if the supply frequency is 25 cycles. When automatic control is required, the direct-current systems with motor generator will usually give better results. There are, however, a number of important advantages in favor of the double range Scherbius system which must be considered in making a choice:

Generally higher efficiency and correspondingly lower power consumption throughout the entire range of control.

Possibility of rolling a considerable part of the output of a mill by the motor without the regulating set, due to the motor speed falling intermediate between the upper and lower limits of the range. This is a very great advantage over any single range system. With single range control, if the regulating set fails, the high speed of the roll motor limits the production of the mill to small sections while the regu lating equipment is being repaired.

Freedom from instability at any speed, and ability to carry its high overloads at all speeds throughout the range.

Cost usually lower than that for the other systems, when compared on the same basis; that is, range of speed control over which the maximum roll motor loads may be carried without the roll motor becoming unstable.

In common with the other systems, a large number of speed points may be provided, the power factor of the main motor may be raised, and the equipment is thoroughly reliable and readily maintained by the operating department.

The Kraemer system is essentially a constant-horsepower drive, but we must not permit this to influence us in analyzing the load conditions of a mill. The Scherbius system is usually at its best at constant torque, but it is not out of line when it is designed for constant horsepower, and many such equipments are now operating. Also, if conditions warrant, the commutator motor may be put on the main motor shaft and give the system constant-horsepower characteristics, and save one machine over the Kraemer system. It may be given constant-torque characteristics by substituting a motor generator for the direct-current motor on the main roll shaft. Giving either system constant-horsepower characteristics is simply a matter of converting the slip energy to mechanical power, and delivering it to the roll shaft, constant horsepower not being peculiar to either system.

Experience from tests, and discussions with mill men, indicate that normal mill requirements are neither constant torque nor constant horsepower, but lie between these limits. Comparisons which we have made within the limits of the Scherbius system have shown it to be as high in efficiency as the Kraemer system, or even higher, and lower in first cost.

Discussion

BY G. E. STOLTZ*

One point, which is very important from a power and speed standpoint, is the flow of metal which takes place when rolling deformed or irregularly shaped sections. Fig. 6 shows a typical section of this kind—a deformed tie-plate. The arrow shows the normal direction of rolling, but it could also be rolled in the other direction, at right angles to the arrow.

This tie-plate would probably be rolled from an 8 x 8-in. bloom. It would be rolled down in eight or

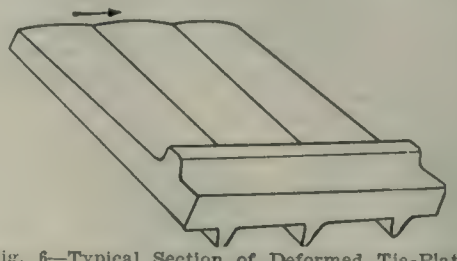


Fig. 6—Typical Section of Deformed Tie-Plate

ten passes to a rectangular section, with a thickness approximately equal to that of the ultimate section over the lugs, the final form being given it entirely in the last pass. This means that, in the last pass, certain parts of the bar are given very large reductions, and other parts are reduced very little. This condition requires a considerable flow of metal in some of its sections if the structure of the section is to be kept uniform, and the operation is in reality one of die forming. A low speed is required to get this effect.

With an ordinary adjustable-speed drive the speed is set for a certain rolling schedule, and remains there until a change in schedule requires a different speed. However, on some mills it is an advantage to be able to change the speed rapidly, while the steel is in the rolls. This enables the operator to drop the speed down so the piece will enter readily, and then increase the speed and get the steel through the roll quickly. This method of rolling increases the tonnage output of the mill, and also enables the steel to be finished at a higher temperature.

A drive of the Ward-Leonard or Ilgner type is required for this service, and the equipment is the same as for reversing-mill drive. A separately excited direct-current motor drives the mill, and is supplied with power from a separately excited direct-current generator. The generator is driven by a wound motor induction-motor. Speed adjustment up to a certain value is obtained by varying the field of the generator and beyond this value by varying the field of the motor. Fig. 7 shows values of voltage, current and speed on an equipment of this type driving a 28-in., three-high, structural mill. It will be noted that most of the rolling on this schedule was done by varying the motor field, the voltage applied to the armature being at nearly maximum value at all times.

On some installations, adjustable-speed or two-speed driver are put in—not so much to obtain the advantages of speed adjustment on different schedules, as with the idea of being able to speed up the mill after it has been in use for a while, and more skill is developed in handling the steel. Some two-speed motors were operated on the low-speed winding for the first few months, and were then speeded up, and have been operating on the high-speed winding practically ever since.

Rotary-converter adjustable-speed sets are built either for constant torque or constant horsepower throughout the speed range, depending on which characteristic appears to fit the mill conditions. However,

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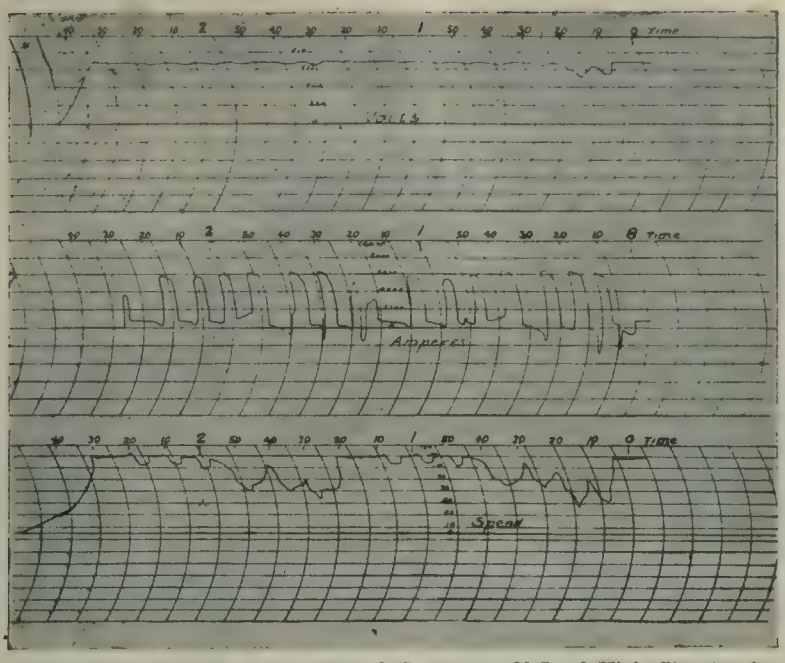


Fig. 7—Voltage, Current and Speed Curves on 28-In. 3-High Structural Mill Driven by Ward-Leonard Equipment

we have found that in most cases constant horsepower is required—that is, higher torques at the lower speeds—and in fact on several installations considerably higher horsepowers are required at low speed than at high speed.

Curves which illustrate this condition were taken on a 10-in. continuous skelp mill at the Mark plant of the Steel & Tube Co. of America.* The first seven stands are driven by a 2000-hp., 2200-volt, three-phase, 60-cycle, constant horsepower, rotary converter, adjustable speed set, with speed adjustment from 350 to 234 r.p.m. The three finishing stands are driven by a similar 2000-hp. set, with speed adjustment from 234 to 160 r.p.m. Fig. 8

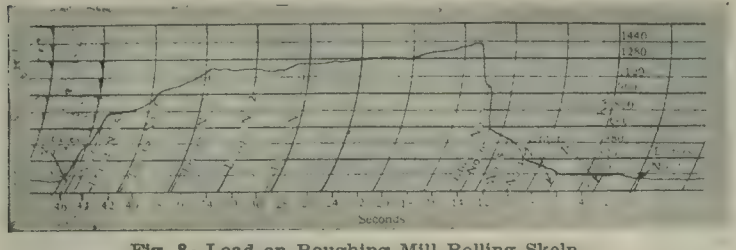


Fig. 8—Load on Roughing Mill Rolling Skelp

shows the load on the roughing mill and Fig. 9 the load on the finishing mill, when rolling the widest skelp—7⅞ in. Figs. 10 and 11 show the load on the roughing and finishing mills, respectively, when rolling 2⅝-in. skelp.

It has been found that the roughing mill can be run at high speed on all schedules. The finishing mill, however, when the above curves were taken, was operating at 163 r.p.m. on the wide skelp, and at 221 r.p.m. on the narrow skelp. It will be seen from the charts that the roughing mill carried average peaks of approximately 1250 kw. when rolling wide material and 650 kw. when rolling narrow material.

Electric Journal, September, 1920, pages 367-371.

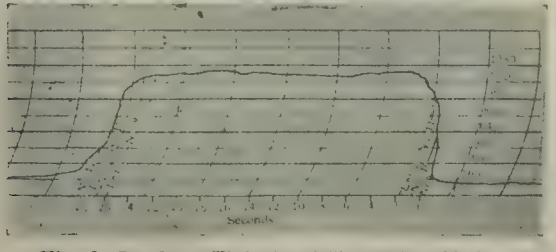


Fig. 9—Load on Finishing Mill Rolling Skelp

The finishing mill required 1175 kw. when rolling wide material at low speed and 750 kw. when rolling narrow material at high speed.

On most merchant mills rolling a variety of sizes, the per cent reduction taken per pass is approximately the same, regardless of the size of the billet started in the mill. This means that when rolling from a 4 x 4-in. billet, approximately four times as much material is displaced per pass as when rolling from a 2 x 2-in. billet, with a corresponding increase in torque. The facts that the speed in the first case is lower, and that the smaller piece cools more rapidly, offset this difference to some extent, so that the horsepower required to roll the larger billet at low speed would probably be only slightly greater than that required to roll the smaller size at the high speed.

The rotary-converter system can be built to run above synchronism, as well as below, and, in fact, steel has been rolled under this condition. However, we believe that simplicity and reliability are two of the chief considerations in the design of rolling-mill equipment, and have been unwilling to complicate un-

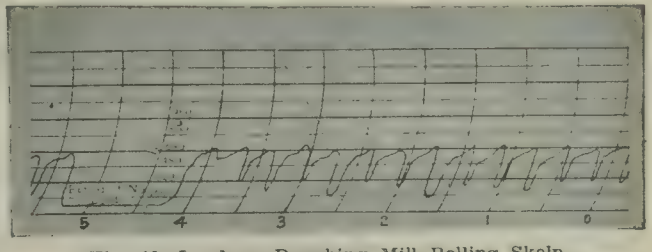


Fig. 10—Load on Roughing Mill Rolling Skelp

necessarily an inherently simple system of control.

The reliability of this system is shown by delay reports on some of these sets. On two 1500-hp., constant-horsepower sets installed at the Duquesne works of the Carnegie Steel Co., more than three years ago, there has been one delay chargeable to the speed-adjusting equipment. This was caused by a short-circuit in the roughing mill rotary converter. The Atlas Crucible Steel Co. installed a 700-hp. constant-horsepower, rotary-converter system 3½ years ago, and has not experienced a single

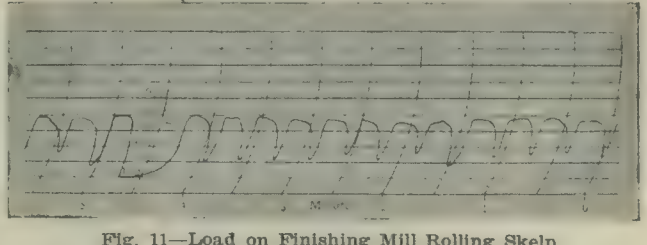


Fig. 11—Load on Finishing Mill Rolling Skelp

delay due to the electrical equipment. A year later, the same company installed a similar set of 450 hp. capacity, upon which it has had one delay, due to a poor connection on one of the commutator risers of the rotary converter.

One rotary-converter, adjustable-speed set, driving a mill with no flywheel, is subjected to loads of 300 per cent at every pass when rolling certain schedules, and there are no signs of instability, even at this load. Over 40 per cent of these sets are driving mills without flywheels. Whether a flywheel should be used or not depends entirely upon the nature of the load and the capacity of the power station, and not at all upon the

type of electric drive.

When a flywheel is not used, the speed regulation of the set is made as flat as possible. When a flywheel is installed on the mill, additional slip is provided for in order to allow the mill to slow down under heavy loads, and give up part of its energy. This effect is obtained on a rotary-converter set by proper design of the direct-current motor field, which gives the set a drooping speed characteristic, with no loss of power in resistance. Continuous running slip resistance is supplied, to be inserted in the secondary circuit when the main motor is operating alone at the high speed.

BY F. M. VAN DEVENTER*

We recently made an analysis comparing some present steam-engine-driven mills with what we considered an ideal installation, embodying a motor-driven mill supplied with power from a modern central power generating station equipped with high efficiency boilers and efficient turbo-generators. It was indicated that we could obtain a brake hphr. at the motor coupling for about 13,000 B.t.u. in the steam, or about 16,000 B.t.u. in the coal.

When we came to the efficiency of the mill motor, we had no definite test data, and it was necessary to estimate. The figure used was 85 per cent, which is intended to represent the efficiency of conversion from the mill coupling back to the high-tension line. The losses indicated by this figure are supposed to include transmission losses, those occurring in the speed regulation equipment, and motor losses. They are supposed also to cover the average operating condition for regular service, including idling periods, as well as conditions of full loads.

*Engineer National Tube Co., Pittsburgh.

Edison Medal Awarded to C. C. Chesney

The Edison medal, "for meritorious service in electrical science or electrical engineering or electrical art," has been awarded for 1921 to Cummings C. Chesney, chief engineer and general manager of the Pittsfield Works of the General Electric Co. This award was made by a committee of 24 members of the American Institute of Electrical Engineers for his work in the development of transmission apparatus, generators, condensers, transformers and converters during his association with the late William Stanley of the Stanley Electric Mfg. Co., Pittsfield, Mass,, which was amalgamated some years ago with the General Electric Co.

Mr. Chesney was born at Selingsgrove, Pa., Oct. 28, 1863, and received his bachelor of science degree from Pennsylvania State College. After teaching mathematics and chemistry he became associated with Mr. Stanley in 1888. The next two years he was with the U. S. Electric Lighting Co., Newark, N. J., and then became one of the incorporators of the Stanley Electric Mfg. Co. He was vice-president and chief engineer of that company from 1904 to 1906, becoming chief engineer and manager of the Pittsfield plant of the General Electric Co. in 1906, which position he now holds. He is a fellow of the American Institute of Electrical Engineers and a member of the Society of Arts, London, England.

The Edison medal has been awarded to the following: 1909, Elihu Thomson; 1910, Frank J. Sprague; 1911, George Westinghouse; 1912, William Stanley; 1913, Charles F. Brush; 1914, Alexander G. Bell; 1915, no award; 1916, Nikola Tesla; 1917, John J. Carty; 1918, Benjamin G. Lamme; 1919, W. L. R. Emmet; 1920, Michael I. Pupin; 1921, C. C. Chesney.

A commercial and industrial fair is to be held in conjunction with the Manila Carnival Feb. 4 to 12, 1922. The Carnival Association, through George L. Logan, manager of the Philippine district office of the United States Bureau of Foreign and Domestic Commerce at Manila, has extended an invitation to American companies to attend and participate in this fair. Space will be available for exhibits of American products.

EXPORT FREIGHTS COMPARED

Under Proposed Rail Rates, Chicago Will Have Advantage in Shipping to Pacific Coast

A reduction of 21c. per 100-lb. on iron and steel shipped by rail from Chicago and Pittsburgh to the Pacific coast has been authorized by the Chicago, Milwaukee & St. Paul Railroad, says Caldwell & Co., Inc., 50 Broad Street, New York, foreign freight contractor and forwarder. The new rate for these shipments, destined for Japanese, Chinese, Phillippine or other Far Eastern ports, is 50c. per 100 lb. from the Chicago district and 59c. per 100 lb. from the Pittsburgh district. An analysis of the proposed and present rail rates on iron and steel shipped from the Chicago, Pittsburgh, Youngstown and Birmingham districts to the Far East, via Atlantic and Gulf and Pacific ports, has been made by Caldwell & Co. These rates are figured on an ocean freight basis of $8 per gross ton from Atlantic and Gulf ports and $5 per net ton on shipments from Pacific coast ports. Rates are given in cents per 100 lb.

Via	From Chicago, Ill.	From Pittsburgh, Pa.	From Youngstown, Ohio	From Birmingham, Ala.
New York—				
Rail.....	47.5	28.5	31.5	48.5
Ocean.....	35.5	35.5	35.5	35.5
Through..	83	64	67	84
Philadelphia—				
Rail.....	45.5	26.5	29.5	45.5
Ocean.....	35.5	35.5	35.5	35.5
Through..	81	62	65	81
Baltimore—				
Rail.....	44.5	25.5	28.5	43.5
Ocean.....	35.5	35.5	35.5	35.5
Through..	80	61	64	79
New Orleans—				
Rail.....	46.5	51.5	40	21.5
Ocean.....	35.5	35.5	35.5	35.5
Through..	82	87	75.5	57
Mobile—				
Rail.....	46.5	51.5	40	19
Ocean.....	35.5	35.5	35.5	35.5
Through..	82	87	75.5	54.5
Pacific Coast (Present)—				
Rail.....	71	80	80	71
Ocean.....	25	25	25	25
Through..	96	105	105	96
Pacific Coast (Proposed)—				
Rail.....	50	59	59	50
Ocean.....	25	25	25	25
Through..	75	84	84	75

Large Decrease of Inventories of Canadian Car & Foundry Co.

The annual statement of the Canadian Car & Foundry Co., Montreal, Que., shows combined profits for the year of $1,188,853, as compared with $1,515,712 a year ago. Provision for depreciation amounted to $365,800 as against $516,800, leaving profits before charging interest of $823,053, compared with $998,912 in the previous year. These left net profits for the fiscal year of $107,603, compared with $539,397. The profits, added to the total surplus carried forward, made the total amount available for distribution $6,351,207. Surplus to be carried forward into the new year amounted to $3,251,207. The company's current assets are set at $8,360,807, as against $20,720,183 a year ago, and this reduction is almost entirely due to a large decrease in inventories which are set at $4,646,501, as against $14,788,960. The company's reserves are shown at a total of $5,377,246, as against $5,032,922 a year ago.

The American Palestine Co., 874 Broadway, New York, has decided to open a permanent exhibit of American manufactured products in Palestine. The company is capitalized at $5,000,000, holding charters of two financial institutions of Palestine, the Urban Mortgage Co. and the Industrial Credit Co. S. C. Lamport is president of the American Palestine Co.

Reinvestment a Present Need in Industry

The Disastrous Attempt to Substitute the Government for the Individual Investor—The Remedy Has Proved Itself Worse Than the Disease

BY STERLING H. BUNNELL*

IF there is any one point on which all, whether employers or workmen, are in agreement, it is that present business conditions are far from satisfactory. Factories have few orders, men are out of work, needed homes are not being built, farmers cannot make a fair profit, and wages in some industries are going down faster than the cost of living, while in other lines wages stick disproportionately at the very top.

It was to prevent just such a general and disastrous business situation that attempts were made in this and other countries, by the taxation of large incomes, to check the accumulation of capital in the hands of the few. None of the men responsible for the imposition of graduated income and excess profit taxes seem to have realized that the effect would be to check the accumulation of capital, without greatly hindering the few who wastefully use great wealth. No one seems to have thought of the desirability of the reinvestment of capital obtained from profits, and the effect of the new tax laws to check the orderly increase of industries necessary to meet the wants of a growing population.

Reinvestment of Highest Importance

The fact is that the manner and amount of reinvestment of capital has always been the greatest economic question of the world. The rate of wages concerns only to-day; but unless some men save part of their production and invest it in repairs, new buildings, equipment, and the reclamation of land, the coming generation will suffer from unemployment and scarcity. Within each industry there are two classes of people only: those who spend all their personal receipts for their immediate wants, and those who set aside a portion of their receipts for investment. The real questions for debate are, how much profit shall an industry make for reinvestment and for what ends shall the reinvestment be made.

Only blind, haphazard attempts have been made hitherto to hit upon answers to these old questions, and these attempts were by men manifestly without the slightest knowledge of the principles behind the superficial conditions they thought they were going to affect. Entire systems of government are determined by the attitude toward the citizens' savings. The pure communist theory would permit no individual to save and reinvest. The State, therefore, must own all means of production, provide a fair living for each citizen, and maintain all who may be unable to work. This system, though many times tried, never had more than a limited success in small groups held together by some strong idealism, such as religious faith. Applied to a great nation it has just scored the most stupendous and deplorable failure in all history.

In contrast to the obstinate bigotry of communism, socialist theories are of all degrees, but may fairly be said to center on state ownership of industries of national scope, and control of all others so that no individual may be able to obtain an income in excess of his immediate personal necessities. State support necessarily must be provided for all unable to work, since none may save for the future. A large part of the socialistic scheme is actually in effect to-day as a result of the war, in all countries which were engaged, including the United States. The result of the experience has been the pronounced weakening of the socialist parties in all countries, and the conversion of increasing numbers of citizens to the determined support of even reactionary governments, because in that way only is there assurance of the right of every one to "life, liberty and the pursuit of happiness," without hindrance from tax-supported bureaus of officials.

Reinvestment Discouraged

The operation of the half-way socialistic tax measures is easy to analyze. Citizens with large incomes, if not deprived of their surplus by heavy taxation, will (as always in the past) invest their excess in productive industries. That is, they normally use their money to pay workmen to build factories and machinery by which other workmen may produce goods for the general supply; and reclaim and develop land on which other men may live and produce food for the increasing population. This procedure has been severely checked by taxation which may take half of an income obtained from the risks and uncertainties of manufacturing or agriculture. It is now profitable for the best brains in industry to avoid business cares and enjoy a fixed income from investments in city buildings or State roads, which, to reduce taxes for the community, were made non-taxable so as to be attractive even at only four or five per cent interest. The manufacturer who by hard work and good judgment makes a large profit may be allowed as little as half of his income to reinvest. But if he sells his factories at a sacrifice, probably to men less able in management, and lends his funds to city or state governments, he can spend the rest of his life in the pursuit of pleasure, with an absolutely certain net income of 4 or 5 per cent.

Right Investment of Savings and Profits

Beyond a doubt it would be to the advantage of the nation if the national savings should be made by the many rather than by the few. But the savings must be made, if we are to have homes, farms and workshops for the children who are growing up. It is conceivable, though wholly impracticable, that the factory owner might pay the workmen partly in cash, partly in securities representing invested savings. It is wholly practicable for the workman to save and invest part of his earnings for himself. Very possibly, better wages could be granted if the workmen would accept a portion in shares representing profit which has been expended in plant improvement. A little education in the matter of profit and its profitable use for investment could hardly fail to be of advantage to management and workers alike.

The fundamental question is not who shall get the profit, but how shall the profit be invested. It is, of course, undesirable that some man holding nine-tenths of the stock of a great works shall expend nine-tenths of the earnings in villas, private parks, game preserves and yachts which he rarely visits or uses. It is highly desirable, however, that some one shall reinvest that profit in factories and farms to furnish the means of living in future for the workmen's children who are growing up. If the workmen themselves would spend any surplus on the movies and other delights, refus-

*Consulting engineer, Bunnell, Macy & Henriques, New York.

ing to restrict present pleasures to provide for future needs, better let the boss get the profit as at present, because in nine cases out of ten he does spend his surplus for the land, building and equipment that some one must furnish.

The attempt to confiscate large incomes by heavy taxation has only resulted in pouring money into the hands of governments for the support of hordes of officials, clerks and other non-producers. The flood of tax money has already been checked by the diversion of reinvestment funds from productive industry to non-productive government loans, putting a complete stop to the development of industries. Regardless of bad tax laws, the millions of common people (who do not pay the higher surtaxes) have it in their own power to continue development, by saving and investing for themselves. If such a process could be set in motion, the general education in economics that would result would do more for the common good than all the altruistic schemes that ever pretended to make it possible for the shiftless man to live free on the surplus of the thrifty.

HEATING WITH FUEL OIL

Machine Designed for Factory and Domestic Use—May be Used to Generate Steam for Power

With a simple, practical and durable machine for burning it, ordinary fuel oil is the cleanest, most convenient and most satisfactory form of fuel for heating. The market price of fuel oil has remained around 5c. per gal. But even at 10c. per gal., heating with fuel oil will be found a much more desirable proposition, and no more costly, than the old method of heating with coal.

For instance, one of the smaller sized Hardinge Brothers (Ravenswood, Chicago) oil burning machines (capable of heating the average ten room residence) can be turned down so low that its fire will consume ½ gal. of fuel oil per hour. On a mild winter's day, when the fire is turned low, it would require only about 12 gal. of oil for 24 hr. heating. At 4c. per gal. this would be less than 50c. for fuel.

On the other hand, when a large, hot fire is needed it can be had quickly, and as simply as turning on the electric light. It takes only two or three minutes to light the fire when the boiler is equipped with this machine, and the fire is hot as soon as it is lighted. Therefore, it can be completely extinguished without any of the previous dread of rebuilding it.

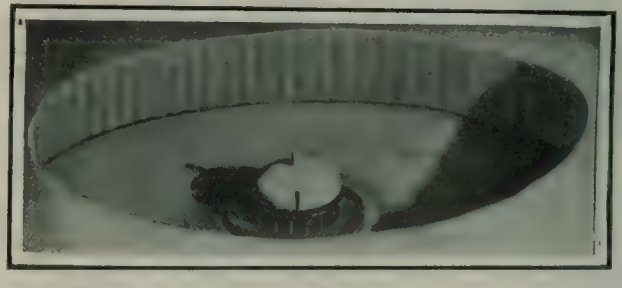
How the machine does its work can be best shown by following the course of the oil from the time it enters the machine until it is burned.

Oil is drawn from the supply tank, under the floor, up through the strainer and through the pump at "A." It is then forced into the pressure chamber at "B," and is kept under pressure by the pump.

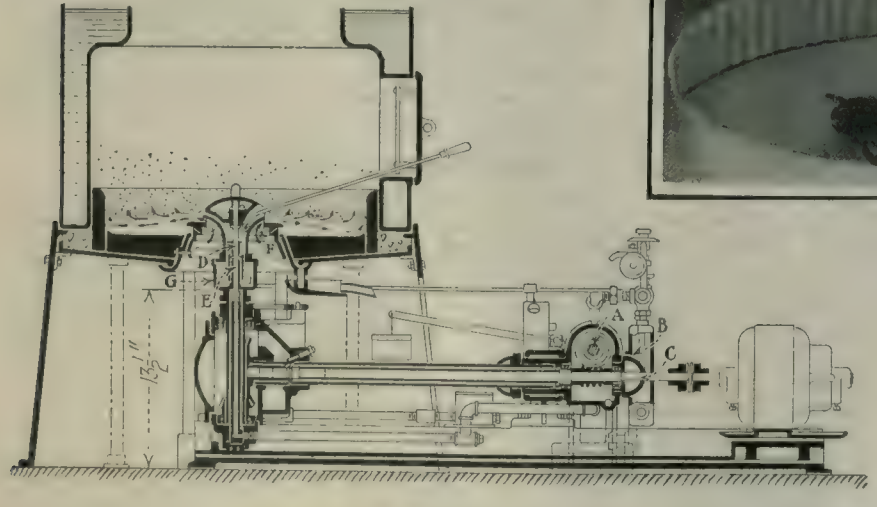
Oil now passes upward through the revolving needle valve seat, which regulates the quantity of oil to be burned, and follows up to the standpipe openings "C." From this point it flows downward to the bottom of the revolving cup of the atomizer, where centrifugal force throws it through the tube of oil, which is held in the diameter "D" by centrifugal force. The oil thus reaches the bottom of the cup, where it is constantly emulsified by the agitator.

While traveling upward through the cup the oil has time to separate from the dirt, water and other substances, and all find their logical positions according to their specific gravities. The space behind the tube of oil receives the débris constantly extracted from the oil by this treatment. The oil, which is the lightest, comes up to the smallest diameter and passes out over the atomizer into the fire box. The dirt, water and other substances, all of which are heavier than oil, constantly pass off under the oil and are consumed.

This constant treatment of the oil to be burned eliminates possibility of dirt accumulating anywhere in the



Combustion Chamber, Atomizer and Air-Control Ring, Shown Above, Take the Place of Ordinary Boiler Grates. This apparatus is the portion which appears in upper right corner of the lower view



In the Section Is Shown How the Oil, Entering the System at *A*, Travels to *D* and Thence into the Combustion Zone at the Bottom of the Heater, Where It Is Mixed Intimately with Air Entering at *F*. The illustration at lower right corner of page is of the complete outfit, without the hearth plates, ready for installation under a boiler. The dome-shaped portion at extreme right is the atomizer and air-control ring, which replaces the boiler grates





Installation of Oil Burning Equipment with 6-In. Burner Under a 5400-Ft. Pacific Boiler. This equipment is the size used for a four-story factory building measuring 40 x 165 ft.

machine up to this point. The only place where dirt can collect is on the convex curve of the atomizer bell, and this is cleaned by the simple process of drawing the small steel poker over the bell's surface while the machine is in motion. Intervals for cleaning the atomizer bell may vary according to the kind and amount of oil to be burned.

For instance, a small sized burner in a home ordinarily need not be cleaned oftener than once in two weeks; a commercial heating machine might need cleaning once a week; and in the case of tractors or locomotives, where hundreds of gallons of fuel oil are burned daily, the atomizer bell may need cleaning twice daily during constant operation.

Cleaning the atomizer bell is such a simple task that it can be performed daily, or whenever the fire is adjusted, and can be done in less than a minute, while the fire is burning. A clean atomizer bell means perfect atomization.

As the oil leaves the bell shaped atomizer, it is thrown by centrifugal force into the fire box and formed into millions of globules. The whirling air vanes "E-E" force a volume of air out under and up through the oil.

This machine can be applied to any boiler by removing the old fire grates to make proper room for the oil burning atomizer or burner head. To arrange any heating system for burning ordinary fuel oil means merely to place fuel oil tanks, inside or outside underground, and place a machine in the present boiler. There are proper sized burners all applicable to and interchangeable with these machines, made to heat all sizes of homes and other buildings, as well as to generate steam for motive power.

Permanent low cost of operation is one of the great claims for this machine. It will burn all fuel oils from the heaviest and cheapest up to kerosene. It is capable of successfully burning oils of all gravities; heavy, low gravity, Mexican fuel oils. The previous objection to using heavy oils has been overcome through the simple expedient of so treating them that they will flow freely over the atomizer. A simple process of water jacketing the oil supply pipe, to maintain the free flow of the heaviest oil to and from the supply tank, even in the coldest weather, will easily overcome the only objection to using such oils.

Extra strength has everywhere been considered, and all superfluous parts eliminated. Bearing and wearing parts are designed for 100 to 500 per cent greater capacity than will ever be required of them during operation. Sturdy construction guarantees reliable, dependable service.

Cast Iron Railroad Car Wheels

New specifications for cast iron wheels are reported from the office of engineer of tests, Delaware, Lackawanna & Western Railroad. Four sizes are represented, weighting 650, 700, 750 and 850 lb. It is specified that the chill at middle of tread shall be not less than ½ in. nor more than 1 in. (1 1/16 in. in the two larger sizes). At the throat, the chill for the two larger sizes shall be not less than ½ in. nor more than 15/16 in; for the two smaller sizes, not more than ⅞ in. and not less than ⅝ in., and 7/16 in. for the 650-lb. and 700-lb. wheels. The depth of pure white iron shall not vary in any wheel more than ¼ in. around the tread on the rail line. The blending of white and gray iron shall be without any distinct line of demarcation.

Chemically, the total carbon shall be not under 3 nor over 3.65 per cent, with combined carbon not exceeding 0.85 per cent. Manganese shall be not under 0.50 nor over 0.85 per cent; silicon, not under 0.45 nor over 0.75 per cent; phosphorus, not over 0.32 per cent; sulphur, not over 0.16 per cent. These analyses are to be made from drillings taken from the center of the back plate, midway between the core holes.

Cost of Living Slowly Falling

Monthly figures of the Bureau of Labor Statistics show the wholesale price of all commodities during November to be 49 per cent above the average for 1913, compared with 50 per cent in October. There was a drop of 2 per cent in metals and metal products, of 5 per cent in farm products and 4 "points" in cloths and clothing. Building materials are up 5 points to 197 and fuels are up 4 points.

Our table shows the figures for the two most recent months, for November, 1920, and the peak of 1920. It shows also the amount of liquidation, between the peak price and the present, of the excess of the peak price over the average of 1913. Metals have been liquidated 80 per cent, only one group (farm products) showing a higher degree of liquidation.

Index Numbers of Wholesale Prices, by Groups of Commodities

(1913 equals 100)

	1920		1921		
	Peak	November	October	November	Liquidation, Per Cent
Farm products	246	165	119	114	90.4
Food, etc.	287	195	142	142	77.5
Cloths and clothing	356	234	190	186	66.4
Fuel and lighting	284	258	182	186	53.3
Metals and metal products	195	170	121	119	80.0
Building materials	341	274	192	197	59.8
Chemicals and drugs	222	207	162	162	49.2
House-furnishing goods	371	369	218	218	56.5
Miscellaneous	247	220	145	145	69.4
All commodities	272	207	150	149	71.5

Largest Electric Steel Melting Furnace

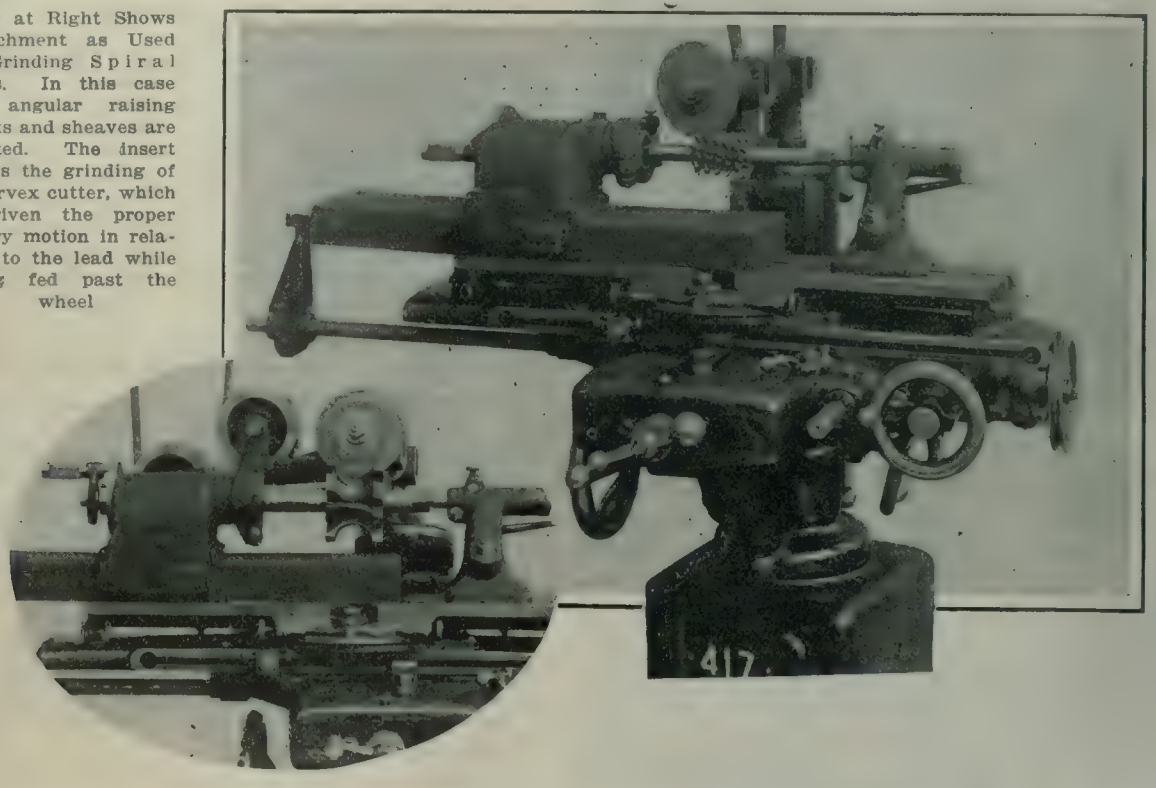
The Ford Motor Co. has placed an order for the largest electric steel melting furnace ever designed. Its capacity will be 9000 kva., which is claimed to be three times the size of any previously installed furnace. It will have six electrodes and will be of the Greaves-Etchells bottom conducting type, sold by the Electric Furnace Construction Co., Philadelphia. This furnace will be the principal melting unit of the new battery of electric furnaces for the Ford company's River Rouge works.

All 30 of the hot tin mills at the Farrell, Pa., works of the American Sheet & Tin Plate Co. now are in operation, six mills which hitherto had been idle having been started at midnight, Dec. 18.

Cutter and Hob Grinding Attachment

An attachment developed primarily for grinding spiral hobs and the Curvex cutters of the Pratt & Whitney Co., Hartford, but which can also be used on any work requiring regrinding on the face of the teeth, has been brought out by the R. K. Le Blond Machine Tool Co., Cincinnati. It is designed for application to the Le Blond universal tool room grinder, as shown in the illustration, although it can, by making the necessary adapting parts, be used on other similar machines.

The cutter to be ground is mounted on an arbor between the centers of the attachment, the machine table is set to zero, and from the chart of leads and angles provided, the taper guide bar of the attachment is set to the required angle. As the table of the grinder is fed horizontally the cutter spindle is automatically revolved in the proper relation to lead and spiral angle, which is stamped on each cutter by the manufacturer. The cutter is indexed, successively bringing each tooth to the grinding plane by means of a plunger and index plate.



View at Right Shows Attachment as Used in Grinding Spiral Hobs. In this case the angular raising blocks and sheaves are omitted. The insert shows the grinding of a Curvex cutter, which is given the proper rotary motion in relation to the lead while being fed past the wheel

The wheel head is mounted on an angular raising block, giving the wheel spindle an angle of 15 deg. from the horizontal center line. A special wheel is used, the front face of which is dressed vertically. This provides a single line of contact between the wheel and work and enables the work to be fed vertically on to the wheel to the depth of the tooth, eliminating drawing of the temper by attempting to grind the entire tooth depth at one traverse of the table. The knee is swiveled on the stump to an angle corresponding to the helix angle of the cutter and the table reciprocated past the wheel by the regular rack and pinion movement, while the work is being rotated in proper relation to lead and spiral angle. The attachment is designed so that the grinding plane is always on a true radial line of the cutter, and the wheel always clears itself in the work.

For grinding spiral hobs the angular raising block and belt sheaves are not required, the attachment being furnished simply as a hob grinder, omitting those parts, as shown in the illustration. The hob is mounted on an arbor between centers. The knee is swiveled to the spiral angle of the flute of the hob, the swivel guide bar is set to the proper angle corresponding to the lead of the spiral and the hob is given the proper rotation while being reciprocated past the grinding wheel. The hob is indexed for grinding each successive flute by the index plate and plunger at the rear of the spindle, after the principle of the dividing head. Any spiral cutters, within the range of the machine and the attachment, requiring grinding on the radial faces can be ground in the same manner.

Refractories Manufacturers' Association

Members of the Refractories Manufacturers' Association listened to several interesting papers at the quarterly meeting of the association at the William Penn Hotel, Pittsburgh, Dec. 6 and Dec. 7. "The Effect of Furnace Draft on Heat Penetration," was the subject of a paper by Raymond M. Howe, senior fellow of the association at the Mellon Institute of Industrial Research, Pittsburgh, who contrasted the effects of forced and natural furnace drafts. "Fuel Conservation," which was the subject of S. M. Kier, president Kier Fire Brick Co., Pittsburgh, was a report based upon recent investigation into the types of kilns and fireboxes and the question of the tonnage of coal consumed per 1000 brick. The data were compiled to furnish the association with a base upon which to start elimination of waste and ultimately for the standardization of practice.

The activities of the association in connection with freight rates and its co-operation with the Federal Trade Commission in the developing of foreign markets for refractories and the furnishing of the commission with production statistics by the association also were discussed. Other speakers and subjects were Ernest F. DuBrul, general manager, Machine Tool Builders' Association, Cincinnati, "The Effect of Good and Bad Combinations of Production and Orders;" Heiskell B. Whaling, consulting economist and statistician, Cincinnati, "Fundamental Economics Underlying Price Changes in the Refractories Industry;" A. F. Greaves-Walker, production engineer, American Refractories Co., Pittsburgh, "A Preliminary Study of the Railroad Tunnel Kiln;" E. R. Weidlein, M. A., director, Mellon Institute of Industrial Research, "Extending the Work of Research in Refractories," and E. W. McCullough, manager, Fabricated Production Department, Chamber of Commerce, U. S. A., "Co-operation With the Chamber of Commerce of U. S. A. on Matters Affecting Depreciation."

The next general meeting of the association will be held at the William Penn Hotel, Pittsburgh, Jan 25, and the annual meeting and election of officers will be held in Chicago, March 15 to 17 inclusive.

Navy's Plans for Scrapping Battleships

Representative Meeting at Philadelphia Does Not Indicate the Forming of a Salvaging Industry—Much Uncertainty Exists

BY L. W. MOFFETT

PHILADELPHIA, Dec. 20.—No specific plan for the establishing of a ship salvaging industry in the United States developed at the meeting held for that purpose last Friday at the Philadelphia navy yard. Attended by about 100 people, it soon was made evident that the majority of them came as observers with the possibility that they might become interested either in a scrapping industry, or by purchasing some of the vessels to be sold by the Navy Department without attempting to engage in dismantling work as a continuous operation.

While the meeting was not fruitful of definite results, it is looked upon as having accomplished some desirable purposes. It was informative in that it provided those present with the plans of the Navy Department in more detail than previously announced. Briefly, these show that the department is open to negotiations with prospective buyers on lenient terms as to payment, and that the method of selling by bids is only tentative. It was indicated that private negotiations might be preferable. This was the view also of some possible buyers who apparently were not willing to disclose any detailed plans they had in mind. Joseph G. Hitner of Henry Hitner's Sons Co., Philadelphia, however, said his company is equipped to scrap naval vessels, has done such work and was ready to handle vessels offered by the department. It is hoped by the Navy Department that the meeting will prove the entering wedge to future and specific plans by which it can dispose of all of its ships now offered for sale and others to be placed on the market, which, it has been urged, would provide a substantial foundation for a permanent salvaging industry.

Meeting of Preliminary Character

The meeting is looked upon as being essentially of a preliminary character, and one that did not yield definite results, for several reasons. Among them are (1) lack of knowledge, with certain exceptions, of salvaging on a big scale, (2) absence of any explanation of practical operation of such an industry, based on experience in foreign countries, particularly England, (3) uncertainty of the financial success of such an operation, which would involve large capital, (4) uncertainty as to the practicability of establishing beaching space or using dry docks, (5) no assurance as to what tonnage might be available except that coming from the Navy, because of the lack of a program as to the establishment of an American merchant marine, and (6) the depressed condition of the steel trade and its low absorption of scrap.

The meeting, however, was representative. It included representatives of the Carnegie Steel Co., the Bethlehem Steel Co., the Lukens Steel Co. and the Jones & Laughlin Steel Co., financial interests, shipbuilders, scrap dealers, acetylene torch interests, salvaging interests and machine tool representatives, as well as representatives from various Government departments. The steel representatives, while not desiring to be quoted, said they had come as spectators at the invitation of the Navy Department and indicated that they probably would not take up negotiations either to engage in a scrapping industry or to purchase a number of ships for purposes of salvaging. Some shipbuilding representatives said they might offer to buy vessels largely for the purpose of employing labor that would be engaged in dismantling them. Many of those present inspected some of the ships which are offered for sale on Jan. 16. These and their tonnage displacements for normal load, include the battleships Maine, 12,500; Missouri, 12,500; Wisconsin, 11,550; the cruiser Memphis, 14,500; ex-monitor Puritan, 6060; monitor Ozark, 3225; ex-monitor Miantanomoh, 3990 tons, and monitor Tonopah, 3225. Of this list the battleships and the monitor Tonopah are at the Philadelphia yard.

Admiral Nulton's Statement

Presiding at the meeting was Rear Admiral Louis M. Nulton, commandant at the Philadelphia yard. The principal address was made by Capt. J. J. Cheatham of the Bureau of Survey, Appraisal and Sale, who said it was hoped by the Navy Department to engage interest in the organization of a scrapping program.

"While there is only a small percentage of the ships here for sale that you will see to-day and which we are discussing," he said, "due to the decisions of the Conference on Limitation of Armament, there doubtless will be several hundred thousand tons of additional ships to be disposed of. There are now battleships on the West Coast soon to be disposed of.

"The magnitude of the problem of ship salvage has begun to present possibilities of a permanent and profitable industry, and as there is no specialized industry at present in this country designed to do such work at a minimum cost, it is the hope of the department that some such organization could be effected to break up these vessels with the greatest profit to the Government as well as to yourselves.

"In the event of such a responsible organization being developed, the Navy Department would rather, I believe, do business with it by direct negotiation than by the present system of competitive bids. We hope the shipbuilders and the steel industry, those who have the experience and equipment to undertake such work, will interest themselves in the possible formation of such a salvage organization. The proposition is big from the standpoint of the cuts both in old ships and in new unfinished ships that will come later."

The conference was supplied with a table of weights, dealing with the steel, and various types of equipment, in the main to enable calculation as to the general weights by classes and the costs of breaking up the vessels. Captain Cheatham said the department was open to any suggestions as to means and terms of sales, pointing out that the idea of deferred payments would be considered.

Conditions to Be Imposed

Capt. W. P. Robert, construction officer of the yard, related in some detail the conditions under which the ships would be turned over to purchasers. Of chief importance in this connection was the announcement that the ships will be sold minus 22 flat side armor plates between frames 28 and 72, the bidder submitting alternate bids on each vessel. One bid would be for the amount to be paid for the vessel without the plates, the cost of removal to be borne by the purchaser and delivered f.o.b. cars at the point designated, and the other bid for the amount to be paid for the vessel minus the plates, the cost of removal to be borne by the department and the plates removed before delivery of the vessel is made. The guns are to be destroyed. It is understood that the Navy Department requires the return of the armor of the sizes indicated so that it may be either re-melted and made into new armor at the Charleston naval ordnance plant, or be used as a target to test projectiles at the Indian Head, Md., proving grounds.

One of the most interesting features of the discussions was contributed by Mr. Hitner, who assured Captain Cheatham that his organization engages in large salvaging operations and has handled ships, though no battleships, which never before have been offered for sale. Mr. Hitner said the company's plant

at Torresdale had broken up former naval vessels and that it was equipped to handle all the navy desired to dispose of. This was the most concrete offer made.

Mr. Hitner urged that, as a matter of protection to responsible bidders, the Navy Department should require a cash deposit or acceptable security of 10 per cent of the amount of the bid at the time it is submitted and payment of at least 15 per cent more within 30 days. Mr. Hitner said that the price will depend largely upon the cost of dismantling and breaking up, and stated that it would be helpful if the navy would specify the thickness of the armor and the weight of each ship. Captain Cheatham said this and any other data desired would be provided by the navy in circulars. He said, however, that the department will guarantee nothing as to weights and that it is proposed to sell the ships "as is." It is not believed the department will entertain the idea suggested by some after the meeting that it is better equipped to handle the entire program of dismantling and scrapping and should undertake the work. It is evident the department is anxious to turn the ships over to buyers in their present condition without devoting any attention to them. One scrap dealer said that the navy would be unable to get more than $1 per ton of displacement for the vessels, though admittedly this was an estimate only and did not accord with the views of others, but none thought the department would get anything like what it has been hoping to obtain.

Will Be Great Tonnage

One naval officer said the tonnage to be sold will be larger than was expected.

"Due to the decision of the Conference on the Limitation of Armaments to allow Japan to keep her recently completed super-dreadnought Mutsu," he said, "and the completion of two of our latest super-dreadnoughts, Colorado and Washington, to maintain the balance, the subsequent 'cut from underneath' in our active battle fleet will throw the total to be scrapped by this country into gigantic figures.

"The Colorado and Washington, added to the top of our fleet column, will add 65,200 tons that must be taken from the bottom. This will entail the probable cut of three of the four oldest ships now active, the Delaware and North Dakota, 1909, 20,000 tons and the Florida and Utah, 1910, 21,825 tons. For a gain of 16 16-in. guns we scrap 30 12-in. guns, which are now regarded as obsolete.

"If the ships of this class are scrapped in accordance with the disarmament agreements, their predecessors automatically will be abandoned as obsolete, aside from the fact that they still swell our capital ship total."

It was stated that between the Missouri, to be sold next month, and the Utah, which would be scrapped by the conference, there is an age difference of 10 years, represented by six successive classes of battleships.

"In these six classes," the naval officer said, "the United States now has out of commission 18 battleships with an aggregate tonnage of 289,000 that must be sent to the scrap heap. This is in addition to cruisers and auxiliaries totaling 200,000 tons. In the new construction that probably will be scrapped are six battle cruisers totaling 258,000 tons and six superdreadnoughts of the same tonnage. Thus our total to be scrapped will approximate something over 1,000,000 tons, enough work to keep a salvage plant busy for some time."

There was expressed considerable doubt, however, that a salvage organization would have much success under present market conditions in disposing of such scrap as is available for steel works use. It was also observed by a steel man that dumping such a quantity of scrap would further depress the scrap market itself, with a questionable effect on the steel market, the former being the commodity bought and the latter the commodity sold by steel producers.

PAY FOR OVERTIME

United States Railroad Labor Board Makes Decision Affecting Half a Million Men

New rules, effective Dec. 16, for railway maintenance of way employees, were announced on Dec. 13 by the United States Railroad Labor Board at Chicago. The outstanding feature of the decision, which affects 585,000 men, is that it provides for the payment of time and a half for overtime after the tenth hour instead of the eighth hour of work, as provided in the old national agreement. Estimates of the saving effected for the railroads cannot be made because of varying conditions of weather and business, it is pointed out, but it is added that in normal times the roads have paid hundreds of thousands of dollars a month for this overtime.

While the change is considered an important one, the principle of paying overtime only after the tenth hour was recognized in the national agreement for a large class of maintenance of way employees, such as laborers employed in extra or floating gangs, whose employment is of a seasonal or temporary character. In the recent decision the board extends the principle to apply to regular track laborers.

The new rules define maintenance of way employees in such a manner that employees engaged in the maintenance of telephone, telegraph and signal equipment are not excluded from the classification as under the national agreement. It is now possible to bring them under the ten-hour overtime rule.

Hours, Instead of Working Forces, Reduced

The decision allows the railroads and their employees to make agreements for the reduction of the number of hours worked and paid for for each day, in order to avoid reducing forces. Under the national agreement the roads were compelled to pay such employees as were retained a minimum of eight hours' wages, which necessitated lay-offs.

Time and one-half for Sunday work is eliminated under the new rules, but employees called for special work on Sundays get three hours' pay for the first two hours when called for less than a day's work.

Rigid rules of the national agreement fixing the beginning and the end of the working day are replaced by provisions that starting time for all shifts may be arranged by mutual understanding of railroad officers and employees' committees based on service requirements. Similar elastic rules have been provided for determining the time for meals, and the national agreement requirement that overtime paid for meal times consumed in working is changed to provide that pro rata pay must be paid for such periods worked.

Judge Anderson Not Sustained

The recent decision of Federal Judge A. B. Anderson of Indianapolis forbidding the use of the check-off system of collecting union dues among coal miners was ordered revised in an opinion handed down by the United States Court of Appeals at Chicago, Dec. 15. It was held that the Indianapolis District Court had erred in enjoining the performance of the existing check-off contract in West Virginia coal fields. Rehearing of the case by Judge Anderson was ordered. In disapproving the action of the lower court, the Court of Appeals pointed out the following errors:

In not confining the injunction to the Borderland Coal Corporation which asked the injunction.

In not limiting the prohibition against attempts at unionizing at the mines.

In not limiting the prohibition against sending money to West Virginia for union purposes.

In enjoining the performance of the existing check-off contract in the central competitive field.

At the December meeting of the Cincinnati Chapter of the American Society For Steel Treating, held at the Ohio Mechanics Institute on Dec. 16, S. J. Felton, metallurgist of the Lunkenheimer Co., Cincinnati, read a paper on "The Hardness of Steels and Cast Iron." The reading of the paper was followed by a very interesting discussion.

NEW FELLOWS GEAR SHAPER

Roughs and Finishes Automatically in One Setting With Same Cutter—Other Features

A new high-speed gear shaper designed to meet the requirements of manufacturers having a large number of gears of one particular size to cut and which, although essentially a standard machine, can be adapted to many classes of work, has been brought out by the Fellows Gear Shaper Co., Springfield, Vt.

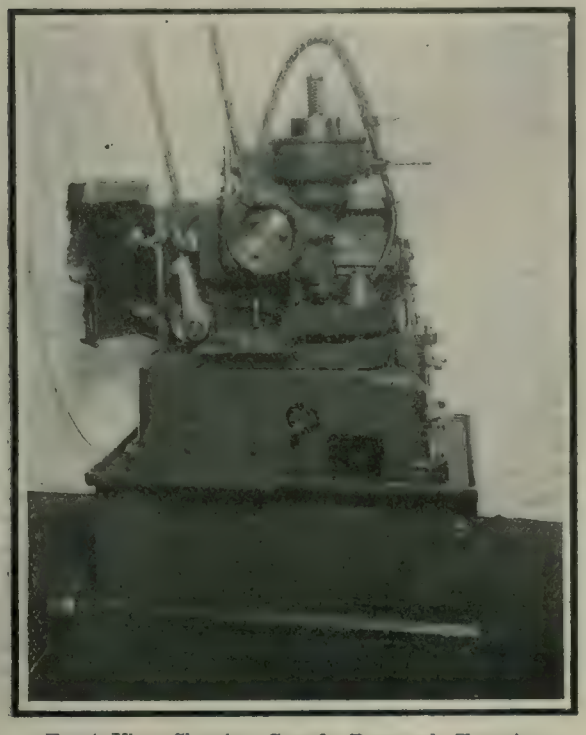
It is said to be applicable to special needs and to fulfill them as well, if not better than a special-purpose machine, and, therefore, at considerable less expense. It is a production tool in that a large variety of gears can be handled simply by using suitable work-holding fixtures. Provision has been made also for handling both external and internal work; and to secure feeds and speeds best suited to the work in hand. A special feature is that it can take roughing and finishing cuts, automatically, in one setting and with the same cutter.

The machine is designated the No. 7, and the principle of operation is the same as the standard gear shaper in that a gear-type cutter is used, which works on the generating principle. The improvements incorporated in the new machine, however, are said to make possible the application of the old principles in a more effective way. Because of the high speed of the cutter, and also the short strokes, ganging of gears, excepting very thin ones, is unnecessary. Several advantages are claimed for this, among which is that from the standpoint of accuracy it is better to cut one gear at a time, it being difficult to secure accurate gears when holding a large number on an arbor or fixture at one time. Another advantage lies in the fact that the cutter, having a comparatively short stroke, can be operated at high speed so that it remains in contact with the work for so short a time that the cutter does not heat up, nor does the work. As a result the cutting edge remains keen and the same cutter can be used for both roughing and finishing cuts. Cutting compound is pumped to the cutter and the work, keeping them cool and permitting the rapid cutting of alloy-steel gears. Instead of using heavy feeds and slow speeds for roughing, and higher speeds and finer feeds for finishing, the new machine is designed to operate at exceptionally high speeds, so that by taking fine feeds the life of the cutter can be increased and its cutting edge not impaired, allowing the use of the same cutter for roughing and finishing. This, it is pointed out, is the fundamental reason why this is eminently a high production machine.

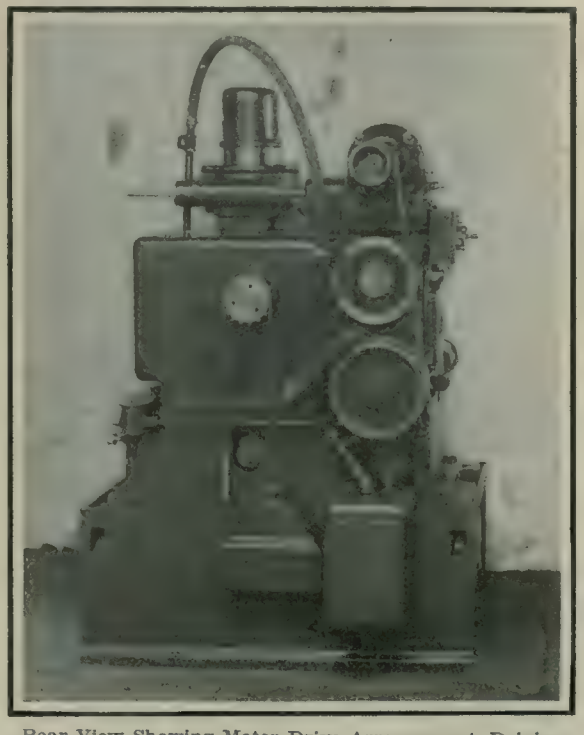
The cutter spindle is of light weight and guided in a straight path by guides, in a manner similar to the standard machine. It is reciprocated by a connecting rod and crank arm of light weight, as shown in the illustration, the operating end of the crank arm having a hardened steel segment gear meshing with rack teeth in the cutter slide. The crank arm is bronze bushed at the fulcrum point, and provided with ball bearings where the connecting rod attaches. The connecting rod operates through a crank shaft carrying an adjustable crank pin, the position of which governs the length of stroke of the cutter. The lower end of the connecting rod is mounted on a self-aligning ball bearing on the crank pin, an arrangement permitting high reciprocating speeds.

One-Hp. Motor Sufficient for Single Machine

The crank shaft is made from an alloy-steel forging and driven from the rear by a single-pulley drive, so that several machines can be grouped and driven through a jack shaft, no countershaft being necessary. Provision has been made for individual motor drive, and a 1-hp. motor provides sufficient power for operating a single machine. When a group is installed the bases are bolted together and the machines operated as a unit, one 6-hp. motor furnishing power for ten machines.



Front View Showing Guards Removed, Exposing Operating Members



Rear View Showing Motor Drive Arrangement, Driving Mechanism and Cutting Compound Tank

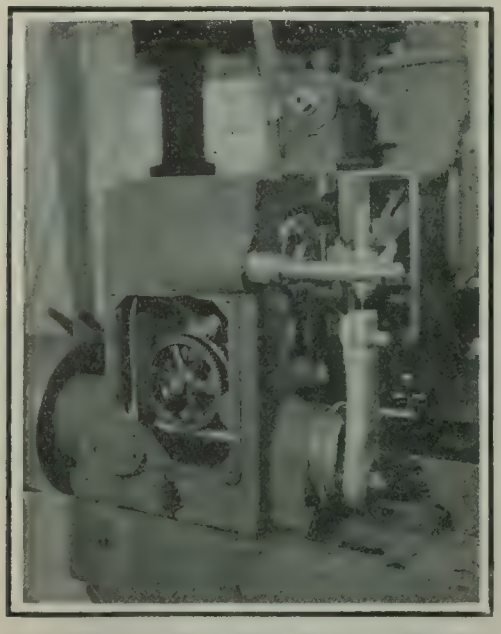
The saddle carrying the cutter slide is adjustable for different diameters of gears through a worm, worm wheel, pinion and rack, and can be withdrawn for locating and removing the work. It is held on guides on the face of the bed as shown. For the depth feed, the saddle carrying the cutter is advanced toward the work by means of a feed cam, on which provision has been made for automatically taking roughing and finishing cuts. The cutter is gradually fed into depth as the blank and cutter are rotated together, the cutter overlapping on the finishing cut so as to eliminate the possibility of variations in the thickness of the teeth.

The work spindle is the same as in the standard gear shaper in that it carries a reverse taper work arbor, and is rotated by means of a worm and index wheel, which are directly connected through gears, vertical and horizontal shafts to the upper worm and index wheel operating the cutter. It is held in an apron, in a seat in the bed. The work is withdrawn from the cutter on its return stroke by a relieving mechanism,

which differs entirely from that used on the regular machine in having a cam located at the rear which operates the apron lever through a connecting rod.

The proper relation between the number of teeth in the cutter and that in the work is secured through change gears. The upper and lower worm wheels have the same number of teeth, the ratio between the cutter and work spindles being therefore 1 to 1.

On the new machine the time for completing a gear is governed by the speed at which the cutter spindle is operated, in conjunction with the feed gears located inside the machine, the latter being accessible by removing a plate. The rotary feed is expressed as so many strokes of the cutter per revolution, and the gears provided give seven different feeds, ranging from coarse to fine. The coarsest feed is 435, which means that the cutter would make 435 strokes per revolution of the cutter. The finest feed is 1735, the feeds between be-



Close View Showing Plate Removed, Exposing Feed Gears, Crank Shaft, Connecting Rod, Crank Arm and Feed Cam

ing 730, 893, 1088, 1162, and 1418. Roughing and finishing cuts are taken at the same feed and speed.

Careful provision has been made for adequate lubrication. High-speed shafts are mounted on ball bearings and are automatically lubricated. A reservoir holding 2½ qt. is located in the bed from which oil is pumped to additional reservoirs, and from these the oil is carried down to the different bearings by wicks. The cutter-spindle shoe and guide are oiled by a reservoir in the saddle housing, which is exposed by removing the helmet. This reservoir in turn has wicks leading from it to the various bearing points. Another reservoir is located on the apron and is filled by unscrewing the cap. There are only three grease cups used, because, for a slight oscillating movement, grease is more satisfactory than oil.

This high-speed gear shaper will handle any form of gear entering into a standard automobile transmission, as well as some of the special designs. In adapting it to cutting internal gears, a slight modification is necessary. The cutter must work on the right-hand side of the center of the work spindle instead of on the left-hand side, and for this reason, a special crank arm is necessary. All the other members of the machine, however, are the same, and this is pointed out by the makers as showing the possibilities of this type of machine, which, up to a certain point, is a special-purpose machine, but by modifications may be increased in range and retain its unusual production possibilities.

Helical and herringbone gears may be produced quickly and accurately by slight modification. The alterations involve the use of helical in place of spur guides, helical instead of spur cutters, and provision in the machine for changing over for cutting right and left-hand helices.

Research Investigations on Molybdenum, Cerium and Zirconium Alloy Steels

The United States possesses the largest known deposits of molybdenum ores, but it is relatively poor in high-grade deposits of some other important alloying elements used in alloy structural steels such as automobile steels, says the Federal Bureau of Mines. Nickel, chromium and vanadium are the standbys in present-day alloy steels. Of these we have very little nickel; some chromium, mostly in relatively low-grade ores; and only small deposits of vanadium. It is of utmost importance to know to what extent molybdenum can replace any of these elements. According to tests made by H. C. Chandler and C. H. Willis, given wide publicity by producers of molybdenum, that element as an alloying material ranks with nickel, chromium and vanadium in preparing steel of high quality. Molybdenum steels found some use during the war.

In order to corroborate the published tests, to extend them and to study in detail the shock and fatigue-resisting properties of molybdenum steels, a co-operative agreement was entered into by the Bureau of Mines with the Vanadium Corporation of America, producers of molybdenum, by which the services of R. J. Thompson, metallographist, were made available. The co-operation of the Wyman-Gordon Co., Worcester, Mass., was enlisted in making impact and repeated-impact tests.

A comprehensive series of molybdenum steels, and of other steels for comparison, has been made in the electric furnace laboratory of the department of chemistry at Cornell University and rolled at the Halcomb Steel Co.'s plant, Syracuse, N. Y., and test bars were machined, heat treated and given tensile and fatigue tests in the shops and laboratories of the Sibley School of Mechanical Engineering at Cornell University.

Attention has been paid to the effect of molybdenum on the critical cooling ranges of steel. These investigations are well under way, though much of the fatigue-testing work remains to be done. Since it was begun, a good deal of information, all favorable to molybdenum steel, has been published by steel makers, but very little has been published on impact tests and nothing on fatigue tests. This work should add materially to the knowledge of the properties of these steels.

Cerium compounds are a by-product of the gas-mantle industry. They find limited use as an ingredient in the cores of flaming-arc carbons and, reduced to metallic form, in the pyrophoric alloys used in cigar lighters. In order to study the effect of cerium on steel and non-ferrous alloys, a co-operative agreement has been made by the Bureau of Mines with the Welsbach Co. The work on cerium steels has been carried along with that on molybdenum steels and in a similar manner. It has been established that cerium can exert a desulphurizing action. There are, however, some difficulties in the preparation of these steels and no final conclusions can yet be drawn as to their value. The effect of the addition of cerium to various non-ferrous alloys is also being tried.

In the work on special alloy steels conducted at the Ithaca, N. Y., office of the Bureau of Mines, situated at Cornell University, under the direction of H. W. Gillett, chief alloy chemist, the co-operative work with the Navy has been completed, and considerable progress made in the investigations on molybdenum and cerium steels.

In the past fiscal year the work done on the preparation of zirconium and other steels for the Navy was mainly analytical and was performed for the most part by Lieut. R. McLane and Lieut. J. P. Jenkins of the Navy Department, working with the advice of Dr. E. L. Mack of the Ithaca office. The results brought out the advisability of some changes in methods of analysis for zirconium.

The data on recovery and segregation of various alloying elements in steel has been incorporated in Bulletin 199, now in course of publication. The work for the Navy was finished in the late fall of 1920. The Navy's ballistic tests of the plates made from these steels are still in progress.

Labor Troubles of the Colorado Fuel & Iron Co.

Unshaken Faith in Collective Bargaining as Provided in the Industrial Representation Plan—Colorado Industrial Commission Sustains Employer

DENVER, Dec. 8.—Owing to the fact that an employee representation plan is in force at the plants of the Colorado Fuel & Iron Co., much interest has been felt throughout the country in the recent troubles of the company with some of its employees. A statement of the facts is, therefore, in order.

Late in the summer, after curtailments of operations at the steel works and lack of orders, particularly for commercial coal, had made it necessary for the company to shut down several of its mines and reduce the working time at others, a number of employees in the Trinidad district circulated petitions for a return to the wage scale of 1917-1919. These petitions were signed by a majority of the employees at all the operating mines in the Trinidad district and at some of the mines in the Walsenburg district. In the latter stages of this process, superintendents at some of the mines were active in circulating the petitions. After these petitions had been signed, the employees' representatives from the mines concerned held a meeting and signed a resolution asking the company to put the new wage rate into effect. The reduction was accordingly announced effective Sept. 1.

Union Ordered Strike

Officers and organizers of the United Mine Workers of America ordered a strike in protest against this reduction and at the same time complained to the Colorado Industrial Commission that the company had violated the law in that it did not give 30 days' notice before changing the wages. This strike was partially effective at some of the mines.

The industrial commission held a hearing and issued an interim order, under which the former scale of wages was restored, pending the final award, which upheld the action of the company and the methods of collective bargaining including in the industrial representation plan. Acting under this decision, the company, on Nov. 17, again put into effect the reduced wage scale at the mines where it had been agreed to by a majority of the employees before the industrial commission hearing.

The union again called a strike, not only in the mines affected by this reduction, but at all the other mines of the company. This strike was at first quite largely effective in the mines of Huerfano County and much less effective in Las Animas County. Since then the men have been returning to work until the working force in Las Animas County is practically normal and that in Huerfano County is very considerable, being entirely normal at one or two mines.

Rather oddly, the strike was much more effective at the mines where no reduction in wages had been proposed than at the mines directly affected by the wage decrease.

At about a half dozen mines where no reduction in wages had been made, most of the men were still out several days after the strike had been called and these mines have been closed by the company, as the now operating mines give all the coal needed for all purposes. A few days after the strike was called, one of the mines at which no wage reduction had been made and at which the strike had been moderately effective, the men held a meeting and by a large majority voted to ask the company to reopen the mine at the reduced wage scale. Later, at another mine under similar circumstances, the men voluntarily circulated a petition to the same effect.

The Company's Position

The company justified its action in reducing miners' wages by agreement with its employees for the following, among other reasons:

1. The need for reduced costs at the steel works in order to enable the company to accept orders in competition with Eastern plants, many of which are operating on a fuel cost basis at least as low as that brought about by our wage reduction. In this connection, the company considered the fact that several thousand steel workers in its Minnequa plant have been out of work or working very unsteadily for a number of months.

2. The need of the public for cheaper domestic and commercial fuel.

3. The fact that in many of the mines, the reduced wage rates will result (and in fact have already resulted) in more work for the miners and consequently higher earnings than they would have made if the old rates had remained unchanged.

The strike, insofar as it has been effective at all, has been entirely peaceful and seemingly there has been little hard feeling on the part of anyone.

"We believe," says an official of the company, "that the decision of the industrial commission wholly justifies the action of the company in negotiating a wage decrease by agreement with its employees and vindicates the methods of collective bargaining provided in the industrial representation plan. We also believe that the fact that most of our men either refused to go on strike or returned after a very brief period, indicates that the workmen are satisfied with their relationships with the company."

The Open Shop Policy in Dallas

Two years ago, building was at a standstill in Dallas, Tex., because of the closed shop discriminating policies of radical union leaders. These policies helped increase building costs and caused unemployment. The laboring man and his family suffered. So did the Dallas public.

At the urgent demand of local building contractors and others this situation was presented to the members of the Chamber of Commerce who recommended practically unanimously that Dallas declare for the open shop and that an organization be perfected to establish and maintain open shop principles. This was done.

The open shop in Dallas means no discrimination against, or in favor of, union or non-union men. It means equal employment opportunities for both. It has given the laborer steady employment, has freed the building contractor from discouraging domination by walking delegates, has reduced building costs thus encouraging property owners to proceed with building projects, and has protected the public from injurious effects of strikes and other "labor disputes." Dallas is now one of the two leading cities of America in per capita building construction.

Sixty-five per cent of the total building operations during the past year has been built on the open shop basis. Production to the value of $93,650,000 comprised the record of Dallas factories for the year 1919, as announced by the bureau of census. Ninety-eight per cent of the manufacturing interests operate on the open shop basis.

The Dautrick-Johnson Mfg. Co., 5065 Rohns Avenue, Detroit, has installed machinery to manufacture hardware and woodwork for the over-head door. The contract for channel track and pulleys has been awarded. The company expects to have representatives or distributors in every part of the United States.

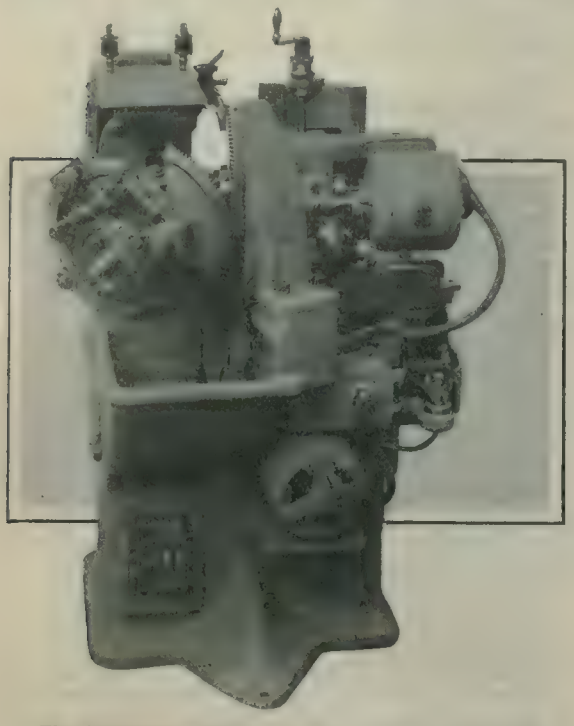
The Autoware Corporation, Detroit, has changed its name to the Metalware Corporation.

Four-In. Spiral Bevel Gear Generator

The Gleason Works, Rochester, N. Y., has developed a small size gear generator intended primarily for the production of small spiral bevel gears in manufacturing quantities. The accompanying illustration shows the machine, which may be noted as differing in many respects from the same type of machines previously brought out by the Gleason Works.

In this design the number of parts has been reduced to a minimum, which was possible because of the fact that it is intended chiefly for manufacturing purposes.

Among the outstanding features are: The generating motion or roll is all on the work spindle and its carrier; the feed motion is on the cutter spindle carrier only; and the relative roll between the work spindle



The Generating Motion or Roll Is All on the Work Spindle and Its Carrier

and the cutter is controlled by a crown gear and segment. Two motors are used to drive the machine, one for the cutter, the other for the feed and roll. Indexing is automatic and is actuated from the roll motion.

The machine is primarily intended for finishing from the solid, finishing both sides of a tooth space with one generating cut by the duplex spread blade method. The feed cam used is what is known as a "completing cam." The cycle of operations controlled by this cam are as follows: The cutter just before reaching the top of the up roll of the work starts to withdraw. On the down roll, the cutter is swung clear of the work, while the indexing takes place and then is gradually advanced into the work during the remainder of the down roll. The cutter does not reach the full depth of the tooth until just after the beginning of the up roll. The remainder of the up roll finishes the profile. Although the motion of the cam described is best adapted for use with a spread blade cutter for finishing from the solid, it can also be used with reduced roll to rough out gears of the larger pitches, and finish the roughed blank by either the duplex spread blade method or single side method.

The time per tooth ranges from 5 to 26 seconds. The cutters range from 1 1/10 to 3½ in. in diameter. The small cutters are made solid and have four blades, two cutting on the inside and two the outside, the larger cutters having eight adjustable blades, four cutting inside and four outside.

The machines are regularly furnished with a set of 8 cutter speed change gears; a set of 12 feed change gears; a set of 11 segments; one index plate; a cutter gage; and the necessary wrenches. An automatic stop and a gear-driven cutting-oil pump are also included. The net weight is 2000 lb.; floor space, 33 x 46 in.

Fabricated Steel Improvement Maintained

The November volume of contracting in fabricated structural steel work totaled 99,800 tons, so that the improvement noted in October, for which the total was 97,800 tons, has been maintained. The figures were supplied by George E. Gifford, secretary Bridge Builders and Structural Society, New York, and show that in November contracting throughout the country was equivalent to 55½ per cent of the capacity of the bridge and structural shops.

The volume of business in both October and November was better than that of any other month of 1921, but the two month average, 98,800 tons, is barely any better than the monthly average for all of 1918 and 1919. The monthly average for the eleven months of 1921 is 62,400 tons, contrasted with 89,150 tons, the monthly average for the two lean years of 1913 and 1914.

George W. Upton Again Named

WASHINGTON, Dec. 20.—President Harding recently re-submitted the name of George W. Upton to the Senate to be a member of the Federal Trade Commission. This was necessary because no action was taken on this nomination at the special session. There is considerable opposition in the Senate to Mr. Upton on the ground that residence near Pittsburgh, at Warren, Ohio, might make him favorable to maintaining the Pittsburgh base.

Safety Code Grinding Wheel Guards

The Builders Iron Foundry and the Diamond Machine Co., Providence, R. I., have placed on the market wheel guards of the type shown in the illustration, especially adapted for use on the machine department's grinding machines, but applicable also to any standard make of grinder.



The Guard Is Adjustable to the Decrease in Wheel Size

The guards are known as the Safety Code Wheel Guards and are said to have been designed in strict accordance with the recommendations of the May, 1919, safety committee report of the National Tool Builders Association. Careful study was given to proper materials, correctly sized openings, sufficient thickness of walls, protection for spindle ends, means of easy removal of the wheel, means of adjusting the guard to correspond with the decrease in wheel diameter, rigid attachment of all parts, proper exhaust connection and neat appearance.

In producing the guards, a close grained high tensile strength gray iron is used. They are made to apply to grinding wheels having 10, 12, 14, 16 and 20-in. diameter, but can be furnished in fabricated steel for larger sizes, according to specifications. The thickness of the guard side wall on the regularly manufactured sizes ranges from 5/16 to ⅝ in.; the thickness of the circumferential wall from ⅜ to ¾ in.; and the inside width from 2⅜ to 5⅛ in. The approximate weight of the size for a wheel with a 10-in. diameter is 28 lb.; for a 12-in. wheel, 38 lb.; for a 14-in. wheel, 62 lb.; for a 16-in. wheel, 80 lb.; and a 20-in. wheel, 175 lb.; while the area of each exhaust opening is 6, 11, 11, 14 and 27 sq. in., respectively.

All of the 23 hot tin mills at the Laughlin plant of the American Sheet & Tin Plate Co., Martins Ferry, Ohio, are in operation for the first time since last April. Three idle mills were started up Dec. 18, at midnight.

CONTENTS

DECEMBER 22, 1921

Fuels Used in Open-Hearth Practice 1589
1920 Ingot and Castings Production Analyzed—Producer Gas Chiefly Employed for Ingots and Oil for Castings

Adjustable Speed With Motor Driven Mills 1595
Two Satisfactory Systems Described, with Comments on Their Relative Characteristics and Work for Which Each Is Most Adaptable

Reinvestment a Present Need in Industry 1601
Disastrous Attempt to Substitute the Government for the Individual Investor—Remedy Worse Than Disease

Navy's Plans for Scrapping Battleships 1605
Meeting at Philadelphia Does Not Indicate the Forming of a Salvaging Industry—Much Uncertainty

Arguments Made in Cost Reporting Case 1617
Attorneys for Iron and Steel Producers Oppose Those of Federal Trade Commission on Motion to Strike Out Amended Answer

Government Aid in Machinery Exporting 1619
What the New Division of the Bureau of Foreign and Domestic Commerce Is Prepared to Do to Help Manufacturers Sell Abroad

Open Price Associations Declared Illegal 1621
Supreme Court Holds That Competitors Who Exchange Information Violate Law

Carnegie Steel Co. Buys Land..... 1592
Silica Brick Production Statistics..... 1593
Labor Notes.....1593, 1606
New England Foundrymen's Meeting... 1594
Lead Too Pure for Cathedral Roofing... 1594
Extensive School Building..... 1594
Ore Distribution Map..... 1594
Edison Medal Award..... 1600
Export Freights Compared..... 1600
Heating With Fuel Oil..... 1602
Cast Iron Railroad Car Wheels..... 1603
Cost of Living Slowly Falling..... 1603
Largest Electric Steel Melting Furnace. 1603
Cutter and Hob Grinding Attachment... 1604
Refractories Manufacturers' Meeting.... 1604
Railroad Wage Decision..... 1606
New Fellows Gear Shaper..... 1607
Research Investigations on Molybdenum, Cerium and Zirconium Alloy Steels... 1608
Labor Troubles of Colorado Fuel & Iron Co. 1609
Open Shop Policy in Dallas..... 1609
Spiral Bevel Gear Generator..... 1610
Fabricated Steel Business..... 1610
Safety Code Grinding Wheel Guards.... 1610

Editorials 1612
Open Competition Unlawful—More Use of Coke-Oven Gas—Price Readjustments—Steel for the Farm
Rate Hearing in St. Louis..... 1615
Arizona Law Invalid in Part..... 1615
Output of By-Product Coke..... 1615
Vertical Spindle Disk Grinder..... 1616
Marking Machine for Small Tubing..... 1616
Status of Problems of Rail Failures.... 1616
Attitude of Railroads Toward Freight Reductions 1618
Mobilization Plan..... 1618
Reduced Rates to Coast..... 1618
Tariff Hearings in Senate Committee.... 1620
Hudson City Steel Corporation..... 1622
Coming Meetings..... 1622
Standard Parts Co. Sell Forge Plant.... 1622
Stevens Institute Celebrates 50th Anniversary 1623
Export Market Inactive..... 1637
American Engineering Council to Meet.. 1637
U. T. Hungerford Honored..... 1642
Manufacturers to Co-operate with Department of Commerce..... 1642
Industrial Finance 1600, 1650
Book Reviews..... 1651

Iron and Steel Markets **1624**
Comparison of Prices..... **1625**
Prices Finished Iron and Steel, f. o. b. Pittsburgh..... **1638**
Non-Ferrous Metal Markets **1639**
Personal Notes **1640**
Obituary Notes **1641**
Machinery Markets and News of the Works..... **1643**
New York Jobbers' Prices..... **1652**

ESTABLISHED 1855

THE IRON AGE

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"Open Competition" Unlawful

The decision of the Supreme Court of the United States against the so-called open price competition plan of the American Hardwood Manufacturers' Association will have far-reaching effects on all business organizations which seek directly or indirectly to stabilize prices. It is not surprising that it has been received with enthusiastic commendation by investigators who have been looking into the methods of numerous associations with a view to prosecution under the Sherman anti-trust act. It seems most improbable, however, that the opinion of the association's counsel that the decision will render it impossible for industrial groups to study their economic problems will be borne out. While the full opinion is not yet available, the main points were clearly stated by Justice Clarke. One effect will be to make it necessary to depend to a greater extent than ever upon trade paper quotations, which will be virtually the only source of general information among manufacturers and distributers as well as buyers.

It is noteworthy that in the dissenting opinion, Justice Brandeis, who was ranked as a radical before he was appointed to the Supreme bench, is associated with Justice Holmes, who has had similar leanings, and with Justice McKenna, an old-fashioned conservative. The dissenting opinion of Justice Brandeis takes a strong position in favor of permitting information as to prices and of sanctioning research rather than gambling and piracy. He also sees no harm in manufacturers and dealers prophesying as to what prices will be. He is right in holding that often small concerns bring about disastrous competition on account of their ignorance of costs.

Justice Holmes, in adding his observations to the dissenting opinion, goes even further than his associates as to the extent to which the decision will prohibit activities of business men in association with one another. Whether the fear of Justice Brandeis will be realized, that the decree will lead to further consolidation and centralized control of industries, time alone can tell. For some months there have been plentiful signs of a new crop of consolidations like that of the late eighteen-nineties. It is more probable that for a time at least the principal effect of the decision will be to encourage keener competition and lower prices on many products.

Justice Brandeis, in his dissenting opinion, holds it to be extraordinary that in this Hardwood Association case the Supreme Court should alter its decision in the United States Steel Corporation case, where 50 per cent of the industry is controlled, and in the United Shoe Machinery case, where nearly all the shoe machinery of the country was controlled, holding them not in violation of the Sherman law, and should hold that 319 out of many thousand hardwood operators "cannot exchange information without running counter to the provisions of the Sherman law." It must be said that the Supreme Court decisions in cases brought under the Sherman law have left the act with most of the ambiguity that has inhered in it from the beginning. The rule of reason, as laid down in the Standard Oil decision of 1911, has taken a wide range, so that each case has been found to differentiate itself in some particular from all others. It is plain that the administration of anti-trust laws is still far from such a basis of dependability as will make it possible for business, big or little, to know in advance that an intended course of conduct will not end in fine or imprisonment or both.

Increased use of the inland waterways is making a strong appeal to Pittsburgh district steel companies as a means of offsetting the freight rate advantage enjoyed by farther western plants on western and southwestern business. Now that the Pittsburgh basing price is being more recognized in the breach than in the observance in the Chicago district, producers there have been passing along to customers in the West and Southwest all or a part of their advantage of more than $7 per ton. It is some time, indeed, since "f. o. b. Pittsburgh" has appeared in sales contracts, except of companies in the Pittsburgh district. One Pittsburgh company in the past two months has made two large shipments of finished

steel down the Ohio River, the first amounting to 3500 tons and the second to 12,000 tons, while another independent in that district has made a good-sized shipment by the river route. The use of the waterways has been the subject of considerable investigation also by the Steel Corporation, in the Pittsburgh district, not only with a view to long-distance shipments, but for inter-plant transfers and for supplying Pittsburgh district customers located on or close to the rivers.

More Use of Coke-Oven Gas

The substitution of coke-oven gas and tar for other fuels in open-hearth steel operations is one of the most important of recent metallurgical developments. The extent to which both have been used in this manner is discussed on other pages. From the viewpoint of elimination of waste, such substitution is of large importance, since coke-oven gas and tar are by-products. In the determination of cost they are a vital consideration, as they are substitutes for other fuel costing much more. In efficiency they are not surpassed. From small beginnings a few years ago, the two by-product fuels accounted for nearly 25 per cent of the ingot production of 1920, being second only to producer gas.

A recent analysis of the British coke-oven industry is of interest in this connection. According to the London *Ironmonger*, "the coke-oven gas evolved in one year in Great Britain is 145,000,000,000 cubic feet. While much of this is used for heating the ovens themselves, as well as for steam raising and the generation of power in gas engines, no less than 805,000,000 cubic feet is wasted by discharge into the atmosphere." What the general use of coke-oven gas would mean in eliminating waste and in lowering cost of production of British steel can be readily computed.

Before the war the production of by-product coke was considered to be more general in Germany than in any other country. It was the basis of the color and other industries. Though it is not known to what extent by-product fuel was a factor in the German steel output, it is not unreasonable to suppose that this advantage was not lost sight of and that its effect on costs was far-reaching.

Thus far the employment of coke-oven gas and tar at steel works in this country is confined to the large companies which operate their own coke ovens. These fuels may become available for smaller steel plants, however. There are signs that the more general production of coke and coal gas in smaller industrial by-product units may be a development in the near future. The location of such units near smaller open-hearth plants would be of mutual advantage.

Japanese buying of black sheets has been for some months a feature of American export trade. Of the total of sheet exports to Nov. 1, this year, 122,120 gross tons, Japan has taken 66,250 tons, or 54 per cent. And of this total about 45 per cent was exported in September and October. The movement has been far more extensive than ever before, Japan's purchases of this product having been only about 38 per cent of the total exported in 1920 and much less in the war years. In 1913, when exports of sheets alone were 140,637 tons, Japan took only 7258 tons of sheets and plates together. It is understood that the sheets that have been going over the Pacific in recent months are being galvanized by the Japanese for building and other uses. The increased galvanizing operations yonder are indicated by the fact that of the small exports of zinc from this country in the first ten months of the year, Japan has taken 68 per cent. The story as to sheets could be duplicated in other products, all pointing to the increasingly important place Japan is taking as a customer of the United States.

Price Readjustments

It would be very agreeable to business interests as a whole if prices of the various classes of commodities were adjusting themselves to a normal and natural relationship, such as would represent stability and thus furnish a basis upon which business could proceed with confidence. As has often been pointed out, not only lately, but before the war, what business requires, in order to maintain confidence, is not so much a given price level as an assurance that prices are going to be reasonably stable. Furthermore, it has been urged often of late that in these post-war times it is not necessary that there should be a return to any particular price level of pre-war times, the important thing being that there should be reasonable relationships between prices. Business can adjust itself to a lower or higher purchasing power of the dollar, provided the dollar is of substantially equal value whether one thing or another is bought. The point applies particularly to one's sales and purchases. Thus, to use the most common illustration, the farmer wants to buy and sell in dollars of the same value.

The Bureau of Labor's indices of commodity prices at wholesale are carefully conceived and compiled and are considered trustworthy. The statement for November has just been issued. Using 1913 average prices as 100, the index number for all commodities has shown scarcely any fluctuation since last May, being reported as follows:

May	151
June	148
July	148
August	152
September	152
October	150
November	149

Thus the variations in the average price of all commodities have been trivial. It might be guessed that one of two things had occurred—that the various commodities individually had fluctuated but little in the six months, or that the commodities that had had the greatest decline had recovered part of the decline, this being balanced by declines in commodities that were far too high last May. Neither guess, however, would be correct. There has been no such consistency,

as the following comparison of index numbers by groups of commodities will show:

Index Numbers in 1921	May	November
Farm products	117	114
Food, etc.	133	142
Cloths and clothing	181	186
Fuel and lighting	194	186
Metals and metal products	138	119
Building materials	202	197
Chemicals and drugs	166	162
House-furnishing goods	262	145
Miscellaneous	151	145
All commodities	151	149

Generally speaking, the lower priced goods have stayed down and the higher priced goods have stayed up. The lowest priced group of all last May, assuming that 1913 prices showed proper relations with each other, was farm products, standing at 117, and they declined still further, to 114 in November. Well down in the list in May was "metals and metal products" and they likewise declined further in the following six months. It is true that the groups that were highest priced of all in May did decline, but they did not decline to anything like the general average, the two highest groups being building materials and house-furnishing goods. Even now one is practically double priced, as compared with 1913, while the other is more than double priced, when commodities as a whole are at one and a half prices.

Of course there are reasons for these failures to adjust, though the reasons may not be in all cases easy to discern. One thing is clear, that there has been a better demand for building materials than for metals, and building materials, high last May, have stayed up, while metals, relatively low last May, have declined still further.

This exhibit runs counter to the argument sometimes made that steel products, already low priced, would be in better demand if they were lower priced still.

Steel for the Farm

A quarter in which demand for steel has been conspicuously light in the past year is the farm. Normally the farm has furnished a very important outlet for the steel mills. A substantial proportion of all the wire and sheets produced passes to the farm, which also requires respectable quantities of pipe, while agricultural implements represent a wide variety of steel mill products. Since the total amount of steel produced varies greatly from year to year, and the proportionate distribution to different quarters also varies widely, it is not practicable to attempt an estimate of the "normal" steel requirements of the farm. The frequent statements made of the proportion of the total steel output "normally required" by the railroads furnish a horrible example to any who might contemplate attempting to make an estimate for the farm, for no period of years in railroad work can be accepted as representing a normal condition. The railroads buy steel and steel goods as circumstances require and permit, and it is much the same with the farmer.

Sometimes the farmer has money to spend, sometimes he has not. When he has money he can elect whether he will spend the money in improving his farm or adding to his household goods or buying a flivver.

As to the farmer having no money to spend at the present time, the news has been very thoroughly circulated that farm products have had a greater "liquidation" in prices than commodities in general; but that is not the whole story by any means. In 1917, 1918 and 1919 farm products were much higher than commodities in general, taking 1913 as a basis, in accordance with the practice of the United States Bureau of Labor. It follows that if, instead of taking 1913 as basis one should take the average 1913 to 1919 inclusive as basis, present prices of farm products would appear still more out of line with prices generally. The intervening years were full of events, giving men new ideas and viewpoints. A wave of the hand will not cause the farmer to revert to the mental attitude he held in 1913. As is well known, he is not particularly prone to take gratuitous advice. The farmer thinks in terms of 1918 and 1919, as to what he could secure in exchange for a given quantity of his product, and by this comparison the return now offered is particularly poor, decidedly poorer even than appears by a comparison with conditions in 1913.

The extreme of the disparity was reached in May, 1919, according to the Bureau of Labor's compilation of wholesale prices. Using 1913 average prices as base, or 100, farm products stood at 240 and commodities in general at 207 in May, 1919. The divergence steadily lessened until in January, 1920, farm products passed below the general average, being 246 against 248 for all commodities. Since then, as every one knows, the farmer has been worse off than in 1913 as to the purchasing power of his products, but an important point is that for three years previous he had been better off, and in those three years he acquired habits and viewpoints.

The farmer is now indisposed to spend money, if indeed he has it. He is not disposed to make nice distinctions. It might be argued with him that, while commodities in general stand at 50 per cent above their level in 1913, steel products are up only 27 per cent, so that he should buy steel at any rate. The 27 per cent, however, is computed by the use of prices at Pittsburgh. Prices delivered on the farm in steel and manufactured wares would undoubtedly show a considerably greater advance, on account of advanced freight rates and much higher costs in the conversion of steel into wares for actual consumption. The steel industry suffers now from a lack of farm demand for steel, although it is not responsible for the situation.

The 1921 British pig iron output promises to establish a record of unemployed capacity never equaled by any other large producing country. The total production will be so small that one must go back 70 years to find a parallel. Probably the final figures will not exceed 2,500,000 gross tons, matching the 2,249,000 tons of 1850, the days before the Crimean war, or not more than American blast furnaces did in a single

month in the early part of so bad a year as 1921. Reckoning Great Britain's annual capacity at 12,000,000 tons, 1921 is about a 20 per cent year. Chief among causes for this pronounced falling off are labor troubles, particularly the coal strike, with its prohibitive prices for coke. British exports of pig iron have dwindled and imports have been on a scale never before known, amounting to no less than 121,700 tons in September and 92,000 tons in October. Of the latter total 15,000 tons came from Germany, while France and Belgium supplied about 70,000 tons.

Rate Hearing at St. Louis

J. R. Stroh, manager of the mining and transportation departments of the Brier Hill Steel Co.; William H. Welsh, assistant traffic manager of the Youngstown Sheet & Tube Co. and H. D. Rhodehouse, traffic manager of the Youngstown, Ohio, Chamber of Commerce, represented Mahoning Valley steel companies last week at a hearing conducted by the Southwestern Freight Association, held in St. Louis. These representatives and others from Pittsburgh contended that rate concessions demanded by Chicago, St. Louis and Birmingham steel manufacturers to Texas common points will react to the disadvantage of producers in the Youngstown and Pittsburgh districts, unless there is a proportionate reduction in the differential between these districts and St. Louis. The rates apply to a variety of finished and semi-finished products, except pipe and wire.

Chicago, St. Louis and Birmingham interests requested that the present rate on plates, bars, angles, sheets and other products between St. Louis and Texas common points be reduced from $1 per 100 lb. to 74c. Manufacturers at Pittsburgh and Youngstown have no objection to this revision in the base rate, provided there is a proportionate cut in the differential of 25½c. from Pittsburgh to St. Louis. Under the proposed rate, Birmingham and St. Louis steel manufacturers will be able to ship to Texas points at a rate of 75c. per 100 lb., and Chicago interests at a rate slightly higher. Representatives from Pittsburgh and the Valleys asked for a reduction in the differential between Youngstown or Pittsburgh and St. Louis, which would restore the original relationship between the rate east of St. Louis to that applying from St. Louis to Southwestern points.

Arizona Law Invalid in Part

WASHINGTON, Dec. 20.—The Supreme Court yesterday in a decision read by Chief Justice Taft held the Arizona law prohibiting injunctions against labor boycotts except where actual violence occurred to be invalid in part. The finding was similar in some respects to the recent decision of the Supreme Court, read recently by the Chief Justice, in the American Steel Foundries case.

The opinion of yesterday arose from the test case brought by William Truax, who conducted a restaurant in Bisbee, Ariz., and who was boycotted because he refused to accept an eight-hour day demand. Truax had asked the Supreme Court, in an appeal, to declare the law null and void and to reverse the decision of the Supreme Court of Arizona which had refused to issue an injunction as the result of the action of the local union of cooks and waiters in beginning a secondary boycott, with picketing, of the eating house. The Chief Justice held that Truax was injured in his property rights.

Dissenting opinions were delivered by Justices Holmes, Pitney and Clarke who held that the State court interpretation of the statute should be affirmed because State legislatures have the right to enact laws dealing with strikes and boycotts without invading the Federal constitution. It was held by them that the Arizona State law did not discriminate against classes of citizens.

DECREASED ACTIVITY

Operating Schedules of Steel Plants in Mahoning Valley Show Reduced Output

YOUNGSTOWN, Dec. 20.—Operating schedules of steel plants in the Mahoning Valley clearly indicate the declining state of activity, with 22 of 51 independent open-hearth furnaces charged, and but 37 of 113 sheet mills under power. Production of tubular goods departments constitutes the one outstanding exception. Two sheet mill plants, that of the Newton Steel Co. at Newton Falls and the six-mill works of the Mahoning Valley Steel Co. at Niles, are wholly idle and will not resume until after Jan. 2.

Plate mill departments of the Brier Hill Steel Co. are idle this week. Bar mill capacity of the Republic Iron & Steel Co., which has been occupied for several weeks, is again on the inactive list.

The Youngstown Sheet & Tube Co. is operating seven open-hearth furnaces, Brier Hill Steel Co., three, Sharon Steel Hoop Co., three, Republic Iron & Steel Co., six, and Trumbull Steel Co., three.

Sheet mills are operating on the following basis—Sheet & Tube company, 15; Brier Hill Steel Co., 4; Sharon Steel Hoop Co., 6; Trumbull Steel Co., Republic Iron & Steel Co., and Falcon Steel Co., 4 each.

Plans of R. D. Wood & Co.

From an item in THE IRON AGE of Dec. 15 it might be erroneously inferred that R. D. Wood & Co., Philadelphia, were no longer to continue in the line of business which the firm has conducted for years. The firm is not, however, affected by the sale of the Camden Iron Works and will continue to sell hydraulic machinery and design, build and install Wood gas producers.

R. D. Wood & Co., as heretofore, will continue to manufacture gas producers and machinery at the Florence, N. J., works, where new shops have been built and specially equipped for this work. The personnel and engineering force are in no way affected by the transfer of work to the Florence shops.

R. D. Wood & Co. have been prominent in the hydraulic machinery field for over 30 years and were pioneers in the construction of the present form of gas producer. The business of the company extends back 118 years and during this long time only two generations have been in charge of it. Walter Wood is the present active head. In 1803, when the business was established, its product was pig iron made from the bog ores of New Jersey. When Philadelphia began to substitute iron pipe for the wooden log pipe of early days, a pipe foundry was established at Millville, N. J., the pipe being shipped to Philadelphia in schooners. About 1868 a larger works was built at Florence, N. J., the Millville plant being continued. About 1883 the company added to the Millville and Florence works by buying the shop at Camden previously owned by J. W. & J. F. Starr.

Output of By-product Coke Increases

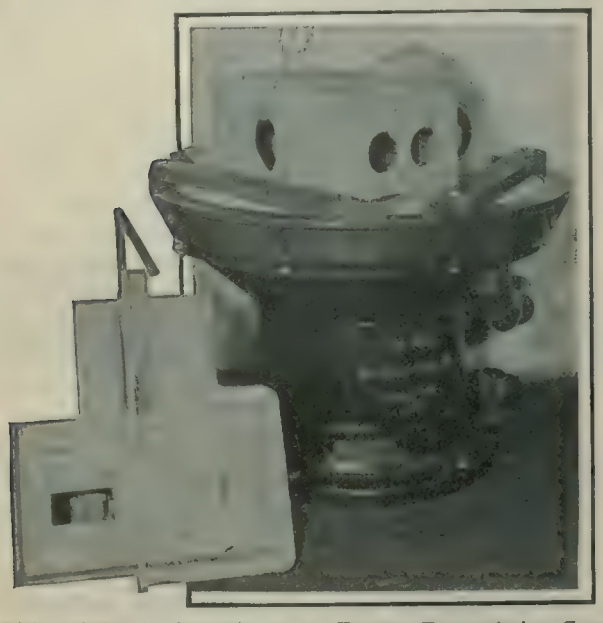
WASHINGTON, Dec. 20.—The output of by-product coke in November showed a slight increase, but was still 31 per cent short of the 1920 average, according to the Geological Survey. The total production for the month was approximately 1,766,000 net tons, as against 1,734,000 tons in October. The average production per day in November—a 30-day month—was 59,000 tons, an increase of 5 per cent over the daily rate for the preceding month. The percentage of capacity in operation during the month averaged 50.9, as against 85 or 90 per cent when the demand for coke is more active. Fifty-eight plants reported production, and 13 plants were idle throughout the month.

The Central Vermont Railway has announced a reduction in wages of all employees "to meet the general and insistent demand for reduction of railroad costs."

Vertical Spindle Disk Grinder

The accompanying illustration shows the new vertical spindle type of disk grinder of the Badger Tool Co., Beloit, Wis., in use for surface grinding the face of a large tractor transmission case and cover. The casting shown in place on the disk wheel is approximately 32 in. long by 28 in. wide and weighs 300 lb. The flange to be surfaced clean and flat is 2 in. wide, the total area to be surfaced being 250 sq. in. Stop bars are attached to the guard ring to prevent the work revolving with the wheel. The actual grinding time on this piece was 8 min., but by altering the pattern of the casting to conform to correct disk grinding principles, it is estimated that grinding time could be substantially reduced.

In this machine, known as the No. 142, the steel disk wheel is 42 in. in diameter and is faced with a special abrasive compound ½ in. thick, molded directly to the wheel. Direct motor drive is used, the shaft of



Disk Grinder in Operation on a Tractor Transmission Case and Cover. The shaft of the motor serves as the spindle of the machine

the motor serving as the spindle of the machine. The motor used is 20 hp., operating at 600 r.p.m. Special dust-proof motor end yokes are provided, and positive forced-feed lubrication supplied to both radial and thrust ball bearings. A circular dust channel surrounds the periphery of the wheel, terminating in two openings to which the dust exhaust system is attached. Removing the outside guard ring exposes completely the dust channel. The machine is accessible from all sides, which in the case of smaller parts permits more than one operator to work on the machine simultaneously. The weight, complete, is 3800 lb.

Status of Problems of Rail Failures

WASHINGTON, Dec. 20.—W. P. Borland, chief of the Bureau of Safety of the Interstate Commerce Commission, in his annual report for the fiscal year ended June 30, 1921, says in part that "transverse fissures have not come to notice in the rails of street and trolley lines nor in the rails of elevated railways. Wheel loads of 15,000 lb. represent an ordinary maximum in the latter class of roads, while loads of 35,000 lb. are exceeded in steam-railway equipment. Without doubt some rails will endure greater stresses than others, due in part to chemical composition and in part to structural state. Therefore a joint inquiry into chemical and structural conditions, together with those which relate to wheel pressures, is desirable in the comprehensive investigation of this subject.

"It is the part of good engineering practice to adjust the working stresses on structural members so as to retain a margin of safety against usual variations in the properties of the materials which are being used. Such a precept should find place in designs of motive power and equipment, which establish what the wheel pressures shall be. Increase of weight of rail, while possessing advantages, is not the final solution of the problem. The intensity of the impinging pressures between the wheel and the rail is a prime factor in certain types of failures and a factor which increase of weight of rail doese not fully provide for. The practical difficulties which obstruct a return to lower wheel pressures are obviously very great. But no grade of steel has been found capable of enduring present wheel pressures without loss or impairment of physical properties.

"The rail situation during the past year has been characterized by one unusual feature, namely, an effort has been made by means of heat treatment to impart to a moderately hard steel superior endurance against abrasion and wear. A change in the microstructure of the steel is effected by the heat treatment employed, which has given promise of increasing its endurance against abrasive action. The accomplishment of such a result is an economic feature of importance. Heat treatment of steel involves the proper control of internal forces, particularly during certain stages of quenching. Questions pertaining to safety are thus associated with the results on the modifications in physical properties having for their object increased durability against wear.

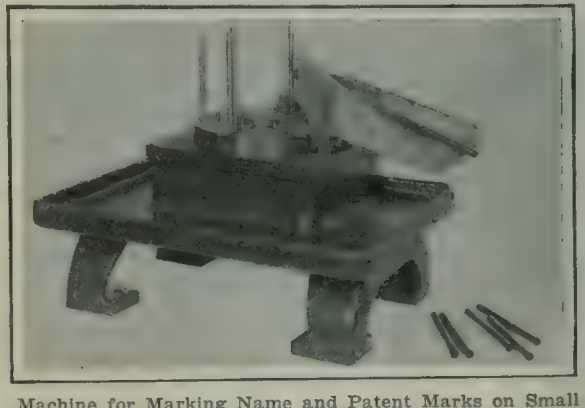
"The past year has been comparatively free from serious accidents which have attended the failure of rails in earlier years. A well-maintained track, with sound ties and well-driven spikes, furnishes visible evidence of safety against rail fractures, such as do not give warning of the approach to rupture."

The report states that the Tri-City Steel Tie Co.'s ties as installed on approximately one mile of track on the Pennsylvania Railroad near Atglen, Pa., were inspected in July, 1920, shortly after their installation, and again in April, May, and July of 1921. Further observations are necessary to determine the effect of service upon these ties.

Marking Machine for Small Tubing

A new machine for marking the name and patent marks on the tubing of pencils or other small tubing and which is said to represent a slight departure from the usual method of handling such work, has been placed on the market by the Noble & Westbrook Mfg. Co., Hartford.

As shown in the illustration, the top or table is di-



Machine for Marking Name and Patent Marks on Small Tubing

vided into six equal parts, each having a mandrel upon which the work is fed by hand. The table revolves, passing the die over the work and making the mark, after which a cam raises a small lever and takes the work from the machine automatically. A production of over 10,000 per day is estimated by the makers. The machine weighs approximately 90 lb. and is made special for the job. It can also be furnished for marking on the end of any size tubing of short lengths.

Arguments Made in Cost Reporting Case

Attorneys for Iron and Steel Producers Oppose Those of Federal Trade Commission on Motion to Strike Out Amended Answer

WASHINGTON, Dec. 19.—Arguments were made last Thursday before Justice James Bailey of the Supreme Court of the District of Columbia on the motion filed the day previous by attorneys for the Claire Furnace Co., et al., to strike out the entire amended answer or certain portions of it, filed by the Federal Trade Commission in this cost reporting case. The arguments by Attorneys Levi Cooke of Washington and A. Leo Weil of Pittsburgh, representing the Claire Furnace Co., and 20 other coke and iron and steel producers, and by Attorney William Wallace, Jr., counsel for the Midvale Steel & Ordnance Co., had as their object the simplification of the issues so that the underlying principle of the case, the right of the commission to require the desired data from producers, might be determined quickly and the matter fought out in the courts. It is believed that regardless of the outcome of the proceedings before Justice Bailey, the case will be taken to the Supreme Court of the United States. Justice Bailey is expected to make a ruling within a few days on the arguments on the motion to strike out, but it is not believed that the hearings will be begun before January. The character which they take will depend upon the ruling on the motion to strike out.

Merely for the purpose of clarifying the issue and reducing it to its main points, attorneys for the producers conceded that the expense of compiling and submitting monthly reports to the commission will not be unduly burdensome. However, this point no doubt would be combatted should it appear as one of the factors in the case.

Claims of Steel Interests

As stated in the motion to strike out, attorneys for steel interests based their arguments on the claim that the amended answer of the commission contained improper allegations, introduced new and contradictory defenses, and set up claims as to the rights of the commission to get the data required that went outside of those which were made in the original complaint. Contentions to this end were made by Attorney Weil in opening the arguments. Moreover, he pointed out that every question of law set up had been decided by the courts against the Federal Trade Commission which had not taken appeals. The cases in which these decisions were made, Attorney Weil pointed out, were those relating to the Maynard Coal Co., and the Basic Products Co. But in spite of the denial by Congress of the authority of the commission to compel the facts it desired in these two cases, Attorney Weil said, the commission is still attempting to force his clients to submit data which the commission has no authority to require. He said that he did not think it was right that his clients should be asked to submit to a long and tedious trial, the outcome of which will almost assuredly be decided against the commission.

It was indicated by Justice Bailey that he has not changed his opinion that the authority of Congress to regulate interstate commerce cannot be used by the commission in compelling monthly reports as to costs. This caused Attorneys Jesse C. Adkins and William T. Chantland, of the commission, to cite the power of Congress to levy taxes and to gather data through census reports, etc. The attention of the court also was called to the filing by steel producers during the war of detailed reports.

Four Distinct Processes

Attorney Wallace claimed that the commission was seeking to establish the authority of Congress to be informed of and regulate commerce and said that there are four distinct processes, including the assembling of raw materials, their manufacture into steel and marketing the steel in intrastate and interstate commerce. He stressed the point that manufacturing does not constitute any part of commerce and that for this reason authority of Congress bearing upon the regulation of commerce does not have any bearing on the present case. It was stated that the assembling of raw materials by the carriers involves commerce so far as the railroads are concerned, but not as it relates to the producers.

Commission Has No Authority to Learn Costs

Attorney Wallace insisted that the commission is attempting to learn production processes and costs and maintained that it has no authority to do this. He had reference to paragraph 20 of the amended answer of the commission, when he said that it charges "that disalignment of steel prices with the prices of other commodities has seriously affected business and asserts that it is desired to 'ascertain the true facts and to disseminate such true facts.'" This, according to Attorney Wallace, indicated the inquisitorial power claimed by the commission.

"The entire steel industry, intrastate and interstate," said Mr. Wallace, "would become the subject of investigation. If based solely upon public interest, then the publicity concerning intrastate business would be equally as important as interstate. The commission would regulate by publicity; it would do indirectly through molded public opinion what the court inherently has not the power to do."

Attorney Cooke made arguments similar to those of his colleagues, with supplemental observations, in which he insisted emphatically that the commission does not have the authority to do what it is attempting.

The Census Cited

Attorney Adkins for the commission stated that the census requested statements which are as detailed as those called for by the questionnaire of the commission. He claimed that the power of the Government applied in this case and that Congress has the authority to learn the capacity and condition of certain plants, together with the other data that have been required. It was charged by Attorney Adkins that the attorneys for the producers are making every attempt possible to put obstacles in the way of the commission and to frustrate its legitimate purposes. He maintained that subpoenas requiring the commission to bring their books into court still are effective and said that if attorneys for the producers continue in their claim that officials of the manufacturers cannot be compelled to come to Washington for the hearing, he would ask that the case be assigned to a master and testimony be taken in the larger steel centers.

Attorney Chantland cited various legal authorities which he claimed applied in the present case, to prove that the commission has the right to get monthly cost reports from the steel producers and denied that its amended answer set up contradictory claims as compared with the original complaint. Instead he said that it only amplified citations in the original answer as to the authority of the commission.

While the point was not brought out in the arguments, it is known to be the attitude of the counsel for the steel producers that the commission really is attempting to fix prices by an indirect process, although it has no such authority even in the remotest sense.

During October the Mahoning Foundry Co., Youngstown, Ohio, shipped and sold more furnaces than in any other month in its history. The company is a substantial consumer of galvanized sheets.

OPPOSED TO REDUCTIONS

Attitude of Railroads as to General Action Stated at Hearing

WASHINGTON, Dec. 20.—Of outstanding importance, testimony presented before the Interstate Commerce Commission at its general rate investigation, the first part of which was concluded last Saturday, shows that the railroads are as strongly opposed as ever to general reductions in freight rates. Insistence of the iron and steel and other industries that a widespread leveling of transportation charges is essential to a recovery of business has not been accepted by the carriers as a sound policy to pursue. This attitude was reflected throughout the proceedings, which are to be resumed on Jan. 9, when the carriers will present supplemental statistics, after which the shippers will submit their side of the case. As yet the carriers have not prepared data required by the commission, some of which will deal with the relationship between prices paid for iron and steel and other materials at present as compared with those in effect on Aug. 31, 1920. Reply to statements brought out on this and associated subjects is expected to develop considerable interest because of claims made in railroad and other circles that despite the deflation in the iron and steel industry, prices still are out of alinement.

The hearing so far has not developed anything of a particularly illuminating character, unless it be the emphatic attitude of the carriers against a general reduction in rates, which they claim would not at this time increase business. The position of the railroads on this subject was exemplified by George M. Shriver, senior vice-president of the Baltimore & Ohio Railroad.

"The railroads of the United States are in no financial position at present to conduct experiments in reducing rates other than already contemplated, and to force such action on them at this time might result in an impairment of the transportation systems of the country to the hardship of the public," he said. "Lowered rates and reduced traffic have already resulted in the failure of the railroads to earn more than one-half of the 5½ per cent on their valuation contemplated under the transportation act, with nothing for the additional one-half per cent intended for railroad betterments."

Howard Elliott, chairman of the board of the Northern Pacific Railway Co., in opening the hearing, also explained the attitude of the railroads when he stated that "there is danger of giving too much weight to the freight rate itself and its effect on business. Reductions below the limit of adequacy may do the country more harm than good." He stated, however, that the railroads are anxious to co-operate in every reasonable way, through readjustment of rates, with agriculture, industry and labor so as to bring about better economic conditions. Like other witnesses, Mr. Elliott urged the commission to exercise the greatest speed consistent with the complete examination of the facts and conditions in conducting the hearings, so that a prompt decision may be reached. The present uncertainties, it was declared, and the "constant talk about reduced rates are having a very substantial influence in deterring business more than the rate itself."

Touching on deflation and the labor question, Mr. Elliott said:

"Manufacturing enterprises are also deflating and the same may be said about the jobbing and distributing business. What is called 'labor' has already been hurt by unemployment and by some reduction in wages, which, however, has not affected the great transportation interests to the extent that it should. A sound policy with the great labor leaders would seem to be to admit that deflation must come and allow lower wage scales on the railroads, in the mines and in the building trades, all of which would mean greater employment of men and a lower unit price on many articles that are used by all, this reducing the cost of living and helping to break the present endless chain of expense.

"Particularly would the recognition of such a policy be helpful to the railroads in their operations, because of necessity, their direct labor bill is so great and because they are such heavy buyers of various raw materials where the labor cost is a very large part of the total."

While the railroads denoted their strong opposition to a general reduction of freight rates affecting all lines, it was announced by Alfred P. Thom, general counsel of the Association of Railway Executives, that it is the intention of the carriers to make a 10 per cent general reduction in rates on products of the range, farm, orchard and garden, effective Jan. 1. It also is reported that the carriers are prepared to make a reduction in rates on coal for export, in response to the pressure that has been brought to bear by coal operators and Government representatives, in order to meet British competition, which has almost destroyed American markets for bunkering coal and for the West Indies trade.

Secretary Weeks' Mobilization Plan

WASHINGTON, Dec. 20.—Mobilization of men, money and manufactories under a conscription law in the event of a future war as urged by Secretary of War Weeks, at the second annual reunion here last Saturday night of the War Industries Board, has aroused considerable interest. It is believed that the War Department is working out a plan reflecting the principles expressed by the Secretary, and that it may be submitted to Congress in the near future.

One of the underlying ideas is to hold down prices and wages by placing the producer and laboring interests under a stricter control than obtained during the World War. It is reported that the principles of the War Industries Board as they related to allocations, priorities and procurement orders, probably would be maintained, but that prices would not be fixed on a flat basis, but would be adjusted according to actual costs of given units of output, with only the slightest allowances over the cost of production being made.

Secretary Weeks stated that he would conscript every person in the United States from 18 to 60 years of age and compel every man to serve where he would be best suited. Such a plan of conscription, he pointed out, would "keep down prices during war, reduce profiteering, and prevent wages from reaching untold heights." He said that had such a course been followed in the past war, we would have avoided difficulties through which we are now going and with which we are not yet through.

Among those present at the reunion were Bernard M. Baruch, formerly chairman of the War Industries Board, and J. Leonard Replogle, who was head of the Iron and Steel Division.

Reduced Rates to the Coast

SEATTLE, Dec. 13.—Freight rate reductions on machinery from Chicago and Western territory effective Jan. 15 have been announced to buyers here by the traffic officials of the transcontinental lines. Present rates of $2.95½ from Chicago to Puget Sound common points will fall to $2.53. The reduced rate of $1.20 on tin plate to Puget Sound common points from points north of the Ohio River will become effective Dec. 31. The reduction in minimum carload weight horse-drawn vehicles and motor vehicle freight bodies in carload lots from 30,000 to 20,000 lb. will be made effective Thursday.

The increased volume of business orginating in the Wenatchee, Wash., fruit valley may cause the Great Northern Railway to lay a second track between Harrington and Wilson Creek, a distance of 35 miles, at an estimated cost of $20,000 per mile.

The Dravo-Doyle Co., Pittsburgh, has been awarded the contract by the city of Cleveland for eight steam turbine driven centrifugal pumping units for installation at the new Fairmont pumping station. These units will be capable of pumping 300,000,000 gallons of water daily.

Government Aid in Machinery Exporting

What the New Division of the Bureau of Foreign and Domestic Commerce Is Prepared to Do to Help Manufacturers Sell Abroad

BY W. H. RASTALL*

IN organizing the commodity divisions in the Bureau of Foreign and Domestic Commerce it was found that, according to the 1919 census, there are more than 4000 factories in the United States producing industrial machinery. The value of the products of these factories exceeds $2,200,000,000 per year, of which huge total about 17 per cent, or nearly $400,000,000, is exported. Obviously this is a very large business, but it is also a very important business because these 4000 plants have more than 400,000 employees whose income represents the livelihood of, say, 1,500,000 of our people, and the export business is of such volume as to represent the difference between profit and loss in the operation of many or most of these plants. It represents the difference between good times or depression, between a job and unemployment.

The Industrial Machinery Division was developed to defend and promote this trade, and there is every reason to believe that the volume of these foreign orders, this imported prosperity, can easily be increased to a very much larger total because the Bureau of Foreign and Domestic Commerce can do much more than has been done to assist the individual manufacturer to develop his foreign business. It will be noted that the above figures indicate an export business equal to about $1,000 per employee. This figure should be doubled, and the application of American salesmanship and good business methods can do this.

The figures given above are obtained by combining the returns of the census and the customs, and there are differences in the classifications which are apparent in the details as published in the following table, but it is still felt that the general impression conveyed by these figures is substantially correct:

1919 *Returns*

	Plants	Production	Exports	Per Cent
Air compressors	57	$57,454,000	$3,761,200	6.5
Concrete mixers	62	9,579,000	246,631	2.6
Elevators and elevator machinery	195	54,052,000	2,601,543	4.8
Engines	371	464,770,000	48,370,483	10.4
Excavating machinery	34	6,641,000	1,165,763	17.5
Flour and grist mill machinery	86	16,366,000	2,375,802	14.5
Power laundry mach'y	30	10,341,000	796,053	7.7
Machine tools	403	212,225,000	22,627,477	23.6
Metal working machinery (other than machine tools)	155	36,348,000	35,880,465	
Meters, gas and water	39	*20,572,000	763,691	3.7
Mining machinery:				
Oil well	61	22,219,000	3,613,972	16.2
Other	124	43,028,000	9,265,319	21.5
Paper and pulp mill machinery	121	16,198,000	3,958,873	24.4
Printing presses	45	15,520,000	3,827,038	24.7
Pumps and pumping machinery	204	*65,360,000	9,067,458	13.9
Refrigerating mach'y.	84	29,901,000	2,141,110	7.1
Railway cars	121	403,517,000	60,748,946	15.0
Road-making machinery	43	13,915,000	987,912	7.1
Shoe machinery	58	7,459,000	2,839,828	38.0
Sugar mill machinery.	49	13,249,000	13,805,940	†
Textile machinery	431	126,006,000	14,986,369	11.9
Typesetting machines.	92	24,531,000	3,932,544	16.0
Saw mill machinery	69	10,046,000	1,141,248	11.4
Other wood working machinery	172	19,536,000	2,603,407	13.3
Others	1,198	570,738,000	138,202,092	24.2
Total	4,304	$2,269,571,000	$389,711,154	17.2

*Includes value of all products of establishments engaged primarily in the manufacture of machines specified.
†Evidently a difference in classification (Editor).

Aims of the Industrial Machinery Division

This division has been instructed to give attention to industrial machinery. The kinds of equipment coming within this classification are suggested by the items given in the above table, which may be more generally described as including every kind of machinery used in any kind of a factory, power plant or mine, or that runs on a railway, or is used in the construction of engineering enterprises.* The division has been placed in the hands of men who are qualified engineers and have sold a great variety of machinery in South America and Asia during a considerable number of years, and are personally familiar with conditions existing in many of the cities of those sections, in order that the division may be thoroughly practical in its work. These men are experienced exporters of American machinery and have faced world-wide competition in those foreign markets.

The division aims to be of the greatest possible service to American manufacturers and exporters of machinery and feels that the best way to accomplish this is to establish close contact with those interests, hoping thereby to learn as much as possible about their particular export problems, and the information manufacturers actually need regarding the various foreign markets. Having developed these problems it will be possible to secure help in their solution from the 600 representatives the Government maintains in foreign countries or, should circumstances justify, arrangements could be made to send special investigators into those fields and such tasks would be assigned to experts peculiarly qualified for the work. No problem is too large or too small for this service. Where practicable the division hopes to establish this contact with the manufacturers through committees appointed by their trade associations or in some similar way.

Services the Division Offers

In the various markets of the world different sales methods are employed in marketing machinery, and the experts of the division are familiar with these methods. Where it is wisest to sell through agents or dealers, they have reasonably complete lists of all available candidates in each of the important cities abroad and these can be passed on to interested manufacturers when desired. In those cases where it is practicable to visit Washington, it is possible also to furnish a great deal of additional information regarding these dealers which has been collected in the bureau from time to time, and with which manufacturers would be in position to concentrate their attention on those qualified to handle their special products.

Through the oversea representatives of our Government the division is constantly receiving word of new engineering enterprises and is notifying our manufacturers of the locations where business is developing. There is a good deal of this sort of information that is really important and ordinarily it is distributed to those firms that are listed in the bureau's "Exporters' Index," a compilation of those firms known to be American in their nationality. Manufacturers or exporters wishing to be placed on this index should communicate with the Industrial Machinery Division.

This division is also constantly making studies of the various foreign markets and export problems and these are published in Commerce Reports, the news-

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*Agricultural and farm machinery, including tractors, etc., is handled by the Implements and Vehicles Division; automobiles and aircraft by the Automotive Division; electrical equipment by the Electrical Division; plumbing supplies by the Specialties Division, etc. When a given problem seems to be on the border line the two divisions co-operate cordially, the organization being sufficiently elastic to meet all requirements.

papers, or technical papers, as circumstances justify. An important number of these reports have been published recently, including information regarding the export of railway cars, locomotives, machine tools, German and British competition, etc. The division is also preparing a report on the machinery markets of Asia, which is the result of a special investigation that has involved a personal visit to every important city between Yokohama and Bombay, requiring about thirty months.

Other Divisions Can Assist

In cases where problems arise in connection with tariffs, foreign patents, trade marks, copyrights, agency agreements or other legal matters, a great deal of assistance can be furnished through the co-operation of the Commercial Laws Division and the Foreign Tariffs Division. In cases where disputes are involved, the bureau can frequently assist in the making of an adjustment and this co-operation has been found an important service in the past. In cases where the circumstances make it necessary, through co-operation with the Department of State, it will be possible to arrange to have the representatives of that department intervene to prevent discrimination and injustice.

The Industrial Machinery Division has just started to collect the laws and regulations of all foreign countries covering the inspection, construction and operation of steam boilers, air receivers and similar containers. In co-operation with the Electrical Division it plans to secure a similar collection of the electrical regulations of the whole world. These will be available for the use of American manufacturers and exporters of machinery, as circumstances show this is necessary. A general survey of the railway mileage and rolling stock of the world is in preparation, and an effort will be made to have this indicate extensions in prospect during 1922 and, if possible, 1923. In co-operation with the Automotive Division a similar survey of the highways of the various countries of the world is being made, including such returns as will indicate the prospective market for automobiles and trucks as needed by that division, and the market for construction machinery, as needed by the Industrial Machinery Division. A similar survey of the steam, water power and other electric stations of the world is being prepared in co-operation with the Electrical Division, for similar purposes.

Additional Work Planned

The Industrial Machinery Division is new and there is a great deal of important work to do, but in making plans for this work the division wishes to have advice from manufacturers, in order to have the benefit of their contact with specific problems in the various foreign markets. The methods that have been established for collecting and distributing this information should prove of inestimable value to each of the above 4000 machinery manufacturers. The division wishes to handle these facilities in such a way that manufacturers secure actual sales in many widely distributed markets. The division will welcome advice and suggestions from interested manufacturers in preparing its plans. The division will make every effort to have the contact between the manufacturers and the markets abroad as direct and perfect as possible.

One such opportunity that will soon develop will be in connection with the Centennial Exposition to be held at Rio de Janeiro, Brazil, in September, 1922, which is to emphasize the possibilities of industrial development there, and in which a number of our manufacturers will undoubtedly wish to be represented.

TARIFF HEARINGS

Senate Committee on Finance Hopes to Complete Bill at an Early Date

WASHINGTON, Dec. 20.—The Senate Committee on Finance has almost completed hearings on the permanent tariff bill. While it is uncertain as to when it will have the actual rates and administrative provisions of the measure completed and the bill ready for introduction in the Senate, the committee proposes to complete the legislation as soon as possible.

It is conceded, however, that because it will be the object of prolonged debate by its proponents and opponents, several months at least likely will be required before the measure is finally passed. The outstanding object of discussion will be the proposed American valuation plan which has been both strongly supported and vigorously opposed. The committee is to form its conclusion on this principle of assessment with perhaps arrangements for a flexible tariff, as suggested by President Harding, after studying the report to be submitted on the American valuation plan by J. B. Reynolds, assistant to the Secretary of the Treasury in the Customs Division.

Senator Smoot, a member of the committee, has introduced four amendments to the tariff bill. One of them is designed to effectuate the principle of American valuation to be applied by executive order on recommendation by the Tariff Commission, and another would permit the President to modify ad valorem rates of duty by proclamation on account of depreciation of currency or other unstable conditions in the country of origin. A third amendment would apply the same principle to depreciation in exchange, while the fourth amendment would make it the duty of the President to ascertain differences in conditions of competition in trade in the United States and competing foreign countries, and authorize certain courses of action in such circumstances. It seems to be a foregone conclusion that the American valuation plan will be adopted by the committee "in principle" at least, despite the propaganda that has been instituted against it.

Apparently it is the intention of the committee to modify the plan as proposed by the House, but without making such a change as to cause its rejection by that branch of Congress. Leading Republican members of the House Committee on Ways and Means have stated flatly that they will not, under any circumstances, forego the principle of American valuation.

The attitude of manufacturing interests toward the American valuation plan is emphasized by the result of the vote on the subject growing out of the questionnaire for and against the plan, issued by the National Association of Manufacturers. Of the ballots received on this referendum, 77.7 per cent voted in favor of the principle of American valuation and 20.7 per cent voted against it. Defective ballots amounted to 1.6 per cent, which accounts for the remainder.

Prominent members of the Committee on Finance have indicated that the adoption of a principle embodying the American valuation plan will mean the lowering generally of rates carried in the tariff bill as passed by the House. With regard to the steel schedule, however, it has been admitted that the requests made by independent producers for rates have been moderate. This has given the inference that there will not be a general and sharp lowering of rates in the steel schedule as a whole. Modifications, of course, are expected and were urged by steel producers both as they relate to certain increases and decreases of rates. The steel producers are hoping that there will be decided changes in the ferroalloy section. They have asked the committee to lower the rates greatly in some instances, and to remove them entirely in others, particularly those relating to manganese ore and ferromanganese. Domestic manufacturers of ferroalloys have earnestly requested the commission to establish protective rates and have asserted that unless they are granted they will be put out of business by foreign competition.

Effective from Dec. 15 to 31, clerical employees of the Erie Railroad except those in the traffic department, are on a half-time basis in the Ohio region, according to announcement by W. A. Baldwin, regional manager. The action follows slackening business.

Open Price Associations Declared Illegal

United States Supreme Court Renders Decision in Hardwood Case, Holding That Competitors Who Exchange Information Violate Law

WASHINGTON, Dec. 20.—Interpreted as uprooting practically all of the fundamental principles of trade association activities which aim in any way to affect prices, a majority opinion of the United States Supreme Court was delivered yesterday by Justice Clarke in the so-called open price competition plan of the American Hardwood Manufacturers' Association. By a divided opinion of six to three, the highest tribunal affirmed the decision of the lower courts, holding that competitors who exchange information as to past transactions, and touching prices or production, are doing that which is prohibited by the Sherman anti-trust law. So sweeping is the decision, in the estimation of attorneys who have closely followed the case, that it will force the dissolution of many trade associations in every branch of industry, and may develop a widespread change in methods of doing business.

Doubt exists as to the complete effect of the decision because Justice Clarke contented himself with reading only a few excerpts. The majority opinion was not made available, as is the ordinary custom, inas much as it was necessary for Justice Clarke to make numerous minor revisions and amplifications.

Effect on Department Activities

While the decision is a distinct victory for the Department of Justice, which prosecuted the case, and a sharp blow to trade associations throughout the country, it raises the question whether it will be possible for the Department of Commerce in particular to assist the various industries in the gathering and compilation of data such as those collected by hardwood manufacturers. By some it is believed the decision will stop further cooperation, including that contemplated between this Federal agency and manufacturers in all of the leading lines.

The case for the first time presented legal question as to the practices of those organizations in industry which are known as "open price associations." The court upheld the contention of the Government that this plan was invented and adopted by the industrial world to circumvent the provisions of the Sherman anti-trust act as to co-operation and exchange of information in trade. The Government insisted that the operation of the plan is far more efficacious in controlling prices than an actual price-fixing agreement between the same persons. Justice Clarke held that the plan "constituted a joint conspiracy to restrict lumber production in the country and keep prices up." He declared that the arrangement was nothing more than calling an old scheme by a new name. According to the opinion there was no evidence presented showing the existence of a "gentlemen's agreement," but the result was "a harmonious individual action among large groups of natural competitors."

Declared a Combination

Justice Clarke said that while the plan to all appearances on paper provided for data on past performances, or transactions which it was claimed could not be used in fixing prices, the detailed discussion and predictions in the trade, coupled with the analysis by statistical experts, indicated to the court that the plan was a combination which primarily had a tendency to restrict production, and consequently it was a concerted effort to increase prices. It was the contention of Justice Clarke that detailed argument of the purposes of the plan was not necessary because the effect of the combination could be easily ascertained in the market columns of daily newspapers and Government publications. Considerable stress was placed upon the employment of an expert statistician by the hardwood organization as an assistant to the secretary, which the court described as "an authoritative voice of the organization."

Attorney General's Statement

It is a source of speculation as to whether the Government will proceed against other trade associations in other industries unless they either voluntarily dissolve or restrict their activities. This point arises from the statement of the Attorney General in the supplemental brief filed in the Hardwood Case in October, in which it was said:

"Manifestly, the results of the co-operation of this open price scheme are different when applied to different industries, and under different economic conditions. This court will become fully informed as to its various effects unless the disposition of this case be such as to render future actions of this character useless. By considering the motives which control human conduct, we can reach a reasonably correct conclusion as to what some of the results have been, and will be, if the activities of these associations are not restrained, under the varying conditions incident to the industries and the commerce of this country."

That the only alternative for the continuation of trade association work such as that carried on by the hardwood producers lies in legislative action is the opinion of L. C. Boyle of Washington, general counsel for the American Hardwood Manufacturers' Association. In his opinion the decision makes it absolutely impossible for industrial groups to study their economic problems, and as a consequence "it is a stranglehold upon progress." Attorney Boyle said he probably would ask for a rehearing of the case, but admits that motions of this kind are very rarely granted.

The Government's bill in this case was devoted almost exclusively to the distribution of information through market letters and the acquiring of trade data by means of questionnaires. In the opinion of Justice Clarke, the market letters were not the controlling influence, but the plan whereby statistics were exchanged as to past transactions.

Weekly Market Letters

The market letters of which the Government complained were sent to the membership weekly and as prepared by the manager discussed various subjects of interest to the trade. The Government insisted that they were devoted principally to conditions affecting production and other elements which control prices. The questionnaires which were sent out were declared by the court to have much to do with future sales and production. In connection with the employment of statistical experts to analyze market conditions from actual data gathered from the membership, the court upheld the contention of the Government that "it is the exchange of information as to real facts that is most effective; and not expressions of intentions, or even agreements as to what the parties concerned will do."

The decision in upholding this and other basic

points made by the Government is so broad that, in the opinion of Attorney Boyle, "it will destroy every industrial association in America, because all of them are doing things which come within the purview of the decision." In brief, it is maintained, the court took the position that industries in competition should not tell each other of their affairs.

This decision is the outcome of an appeal from the Federal District Court for the Western District of Tennessee, where the case is known as the American Column & Lumber Co. et al. vs the United States. In affirming the action of the lower courts, the Supreme Court sustained the permanent injunction which restrained 329 hardwood manufacturers from compiling, exchanging and discussing prices, production, stocks, and market conditions.

Dissenting Opinions

Justice Brandeis and Justice Holmes delivered carefully written dissenting opinions. These were forceful and developed the situation as contended by the industry. Justice Brandeis's opinion was exhaustive. Justice McKenna joined Justice Brandeis and Justice Holmes in the dissent.

Delivering the dissenting opinion, Justice Brandeis pointed out that "It may be that the distribution of trade data, editorial comment, and conferences enabled the producers to obtain on the average higher prices than would otherwise have been possible. But there is nothing in the Sherman law to indicate that Congress intended to condemn co-operative action in the exchange of information merely because prophecy resulting from comment on the data collected may lead, for a period, to higher market prices." He declared that the plan had a tendency to promote desirable competion "by substituting knowledge for ignorance, rumor, guess and suspicion. It tends also to substitute research for gambling and piracy, closing the door to adventure or lessening the value of prophetic wisdom. In making such knowledge available to the smallest concerns, it creates among producers equality of opportunity, making it available also to the purchasers and general public. It does all that can actually be done to protect the community from extortion." Furthermore, Justice Brandeis said: "The refusal to permit a multitude of small rivals to co-operate as they have done here in order to protect themselves and the public from the chaos and havoc wrought in their trade by ignorance, may result in suppressing competition in the hardwood industry. Keen business rivals, who sought through co-operative exchange trade information to create conditions under which alone rivalry and competition is possible, produced in the aggregate about one-third of the hardwood lumber of the country." Justice Brandeis directed attention to the decision of the court in the Steel Corporation case, in which it was held "that it was not unlawful to invest in a single corporation control of 50 per cent of the steel industry of the country, and in the United Shoe Machinery case, where the court held it was not unlawful to vest in a single corporation control of practically the whole shoe machinery industry." Justice Brandeis fears that the decree will lead to consolidation and centralized control of industries.

Justice Holmes' Dissent

Justice Holmes pointed out that a combination to get and distribute such knowledge, notwithstanding its tendency to equalize, not necessarily to raise prices, is very far from a combination in unreasonable restraint of trade. It is true that it is a combination of sellers and owners, but the knowledge acquired is not secret —it is public to the buyers, who are not less active in their efforts to know the facts. Justice Holmes stated that he saw nothing in the conduct of the appellants that binds the members, even by merely social sanctions, to anything that would not be practiced by an all-wise socialistic government acting for the benefit of the community as a whole. The parties to the combination are free to do as they will.

It is significant to note that Justice Holmes considers the decree as it stands an amazing thing in a country of free speech that affects to regard education and knowledge as desirable. In his opinion it prohibits the distribution of stock production or sales efforts, the discussion of prices, as at social meetings, and the exchange of predictions of high prices. Furthermore, he does not believe that the decree should be so drastic as to exclude operators in the backwoods from obtaining information as to market conditions. He agreed to the most elaborate discussion by Justice Brandeis.

Ground to Be Broken for Cold-Rolled Strip Mill at Beacon, N. Y.

Ground will be broken at Beacon, N. Y., the first week in January for the cold-rolled strip mill of the Hudson City Steel Corporation, the plans of which were published in THE IRON AGE of Aug. 19, 1920. It will roll strips from 2 to 14 in. wide and from 0.01 to ¼ in. thick and will sell to the general trade. The corporation owns another site at Hudson, N. Y. It is the plan to first manufacture strips, later building open-hearth furnaces, thereby making it unnecessary to buy billets and sheet bars.

The mill will have a cold-rolled strip capacity of 1000 tons per month on a 10-hr. day. The equipment will consist of five 10-in. mills, five 12-in. mills, two 25-ton General Electric annealing furnaces, two slitters and two straighteners. Dwight P. Robinson, Inc., New York, will erect the building and install the equipment. Offices of the Hudson corporation are at 2302-4 Woolworth Building, New York, in charge of James S. Landers, vice-president and general manager. The corporation was formed in May, 1920, the capitalization being $500,000.

Forge Plant of Standard Parts Co. Sold

The Canton, Ohio, forge plant of the Standard Parts Co., Cleveland, has been sold by Frank A. Scott, receiver, to Fred A. Poor and Phillip Moore, president and vice-president, respectively, of the P. & M. Co., Chicago. The purchase price was $293,500. The purchasers will organize a new company to continue the operation of the plant. The sale has been approved by the Federal Court. The equipment of the American Ball Bearing plant, Cleveland, of the Standard Parts Co., will be sold at public auction between Jan. 15 and Jan. 30. This plant has been used by the Standard Parts Co. as an axle plant and some of its machinery equipment has already been sold at private sale. The policy of the receiver is to dispose of some of the smaller plants of the Standard Parts Co. and concentrate activities in the larger plants.

COMING MEETINGS

December

American Association for Labor Legislation. Dec. 27, 28 and 29. Annual meeting, William Penn Hotel, Pittsburgh. Secretary, Dr. John B. Andrews, 131 East Twenty-third Street, New York.

January

American Engineering Council. Jan. 5 and 6. Meeting at Cosmos Club, Washington. Secretary, L. W. Wallace, Washington.

February

American Institute of Mining and Metallurgical Engineers. Feb. 20-25. Spring meeting. Engineering Societies Building, New York. Secretary, Frederick F. Sharpless, 29 West Thirty-ninth Street, New York.

INQUIRY FOR COKE

Warren and Pittsburgh Companies in the Market —Reports as to Sheets Investigated

YOUNGSTOWN, Dec. 20.—Iron and steel activity in the Mahoning Valley is on a declining basis and operations are proportionately receding. Just what the first quarter of 1922 holds in store for the industry is a matter of some speculation, though the general impression is that the average will show betterment. A leading Valley executive doubts, however, whether gross business in the first three months of next year will equal that of the final quarter in 1921, owing to the favorable showing made in October and November. A Valley interest is rolling merchant plate for the first time in several months, though such capacity has been engaged for about ten weeks in producing plate for larger sizes of steel pipe.

In addition to the coke inquiry put forth by the Trumbull-Cliffs Furnace Co., Warren, the A. M. Byers Co., Pittsburgh, is seeking 15,000 tons for its Mattie blast furnace at Girard, Trumbull county, delivery to commence Feb. 1. The company seeks prices on deliveries covering three months, and also on five months. Its present coke contract with the Youngstown Sheet & Tube Co. expires Feb. 1 and it is not improbable that it may be extended. That by-product coke may be purchased on contract for forward delivery at $3.25 per ton is the belief of several interests here.

The sheet market is quiescent and current buying has been reduced to a low scale. In face of this decline, attributed to year-end slowup, producers in the Valley are endeavoring to hold prices firm at current levels of 2.25c. for No. 10 gage blue annealed, 3c. for No. 28 gage black and 4c. for No. 28 gage galvanized. In pursuance of its intention to hold the market, if possible, to these base quotations, a large interest is taking the trouble to investigate all reports submitted by buyers of price concessions These investigations are made promptly by telegraph and long distance telephone. Among makers generally there is therefore a tendency to observe these quotations, though it would not be surprising, in view of the absence of business and keen competitive conditions, if some tonnage should be booked at concession figures.

The little sheet business trickling through is mainly for small lots of common and galvanized grades.

Basic Pig Is Less Firm

Basic pig iron is less firm at $19 than it has been and $18.75 could probably be done on an attractive tonnage. This price is reported to have been accepted by the maker on a recent iron transaction through a brokerage interest, the buyer, however, paying $19. Some foundry business for first quarter delivery is being taken in this territory. Since the period of enlarged production beginning in August, substantial inroads have been made into accumulated iron stocks held by steelworks makers. An interest which has been operating its single blast furnace since July 1, however, has accumulated about 10,000 tons of iron, representing the excess output above the requirements of its steel-making departments.

Among the secondary plants in the Youngstown district, car repair interests present the most active schedules and a number are booked well into the first quarter. The latest order to be placed in this territory calls for the repair of 250 freight cars, placed by the New York Central Railroad with the Petroleum Iron Works. It represents heavy repairs to open top cars. The Standard Tank Car Co., Sharon, Pa., is working off an order for the repair of 300 freight cars, emanating from the same source.

Range on plate prices is from 1.50c. to 1.65c., though reports of business below the minimum figure are heard here. District interests maintain they can make no profit on such business at 1.50c. or less.

Lower full finished sheet demand reflects lessened automobile production and substantial decline in requirements from this source. The principal independent maker of full finished will ship from stock during the next few weeks, while its rolling equipment is being overhauled preparatory for a steady run in 1922. No. 22 gage automobile body stock is still quotable at 4.35c per lb.

Strip steel is considerably weaker, and going prices are 2c. for hot rolled and 3.75c. for cold rolled, in comparison with quotations of certain makers averaging $5 per ton higher.

Open-hearth sheet bars have dropped a peg and are now obtainable under contract at $29, though some unattractive business would probably command $30.

Stevens Institute Celebrates Its 50th Anniversary

Stevens Institute alumni and their friends joined in a 50th anniversary celebration at a notable dinner at Hotel Astor, New York, Thursday evening, Dec. 15. Among the 400 in attendance were a number of engineers who have won national distinction. At each guest's place was a brochure, well illustrated, recounting the 50 years of progress and service in the life of the Hoboken institution founded by Edwin A. Stevens and fostered by the members of his family. Stevens has had but two presidents, Henry Morton serving until 1902 and Alexander C. Humphreys immediately following him. The story of 50 years tells of the gifts made to Stevens in more recent years, including $125,000 from Andrew Carnegie and alumni subscriptions of $507,000.

A noteworthy feature of the dinner was the presence of the entire class of 1877. The 10 men who graduated in that year were applauded roundly as they answered to the call of the roll. They are named below:

A. G. Brinckerhoff, secretary Nash Engineering Co., South Norwalk, Conn.

M. I. Coster, vice-president Westinghouse Electric International Co., New York.

W. E. Geyer, Boonton, N. J.

F. E. Idell, mechanical engineer, 50 Church Street, New York.

L. H. Nash, president Nash Engineering Co., South Norwalk, Conn.

J. B. Pierce, Mercer County, Pa.

J. Rapelje, Hopewell Junction, N. Y.

E. P. Roberts, special consultant and manager Engineering Society of Akron, Akron, Ohio.

E. A. Uehling, president Uehling Instrument Co., Passaic, N. J.

F. VanWinkle, consulting engineer and associate editor *Power*, New York.

President Humphreys, in an address emphasizing some of the things for which Stevens Institute stands, challenged a statement made at a recent joint conference of the American Society of Mechanical Engineers and the American Society for the Promotion of Engineering Education. One of the speakers at that conference, a university professor, stated that colleges to-day are aiming at "quantity production" rather than quality of product. This speaker quoted the secretary of the second named society, who is dean of the engineering school of a university, to the effect that "there is no first-class engineering school in America." President Humphreys suggested that the pessimistic opinions of these professors may be attributable in part to the observed results of faulty teaching. To the charge of quantity production the speaker held that Stevens Institute is well justified in pleading not guilty. While there are no perfect institutions, "when we speak of 'first class,' that is relative, and so speaking I disagree with these men and claim there are a number of first class engineering schools in America, of which Stevens is one.

"These men, as do too many educators, as I have often had occasion to observe, seem to forget or fail to recognize that education does not end with the school and college. All graduates still have ahead of them the post-graduate training to be had only in the exacting school of experience. The school and college by themselves cannot produce practically qualified engineers."

Other speakers were Dr. John H. Finley and Hon. Job E. Hedges. A pleasant incident of the evening was the recognition given to Prof. Charles Frederick Kroeh, who for 50 years, or from the beginning, has occupied the chair of languages at Stevens and is still carrying his full duties. A feature of the testimonial was the presentation of a loving cup by the alumni.

Iron and Steel Markets

LESSENED SHIPMENTS

Mill Operations Slightly Reduced

Rail Buying Conservative—Structural Work of Good Volume—Pig Iron Lower

Producers of steel are not concerned over the recent slackening in demand. They look on it rather as a promise of renewed buying early in the new year, seeing that stocks have been drawn down to a low point, following the replenishment movement of the fall months.

At the same time it is recognized that next to the unsettled question of freight rates, uncertainty as to prices is the chief influence now working on consumers of steel, insuring a continued policy of careful buying.

With the shrinkage in new business has come some letting down in mill shipments. In addition to the inventory reason, some buyers are asking the holding up of shipments until after Jan. 1, awaiting the taking off of the war tax on freight charges.

In the Pittsburgh and nearby districts independent plants are now running at about 35 per cent of capacity while the Steel Corporation's percentage is close to 45. At Chicago the Illinois Steel Co.'s output is slightly reduced, being now at 43 per cent.

Railroads are proceeding conservatively in placing rails. The Pennsylvania Railroad, which had considered 150,000 tons for 1922, is inquiring for 100,000 tons. The Rock Island, which still has 13,000 tons unshipped on its 1921 quota, will probably take 30,000 to 40,000 tons for next year. The Chicago & Northwestern order is expected to be 10,000 tons.

More car repair work is pending and the outlook is fair for new car orders, but in general the railroad programs are not as definite as had been hoped. Announcements by the Illinois Central and other western lines are looked for in January.

Following recent low dips in line pipe prices on some of the large contracts recently reported, the Steel Corporation made a reduction of $5 per ton in standard and oil country pipe and of $6 on line pipe, effective Dec. 15. In other respects the price situation is not definitely changed. The wire market is under observation in view of recent irregularities and buyers look for developments early in the new year.

The Humble Oil Co. contract, the latest in an unusual run of tank orders, represents 2700 tons of plates. The oil tanks for the Mexia, Texas, field alone will require 60,000 to 75,000 tons of steel and altogether the tank shops have saved the situation for the plate mills in the flatness of shipyard work.

Fabricated steel projects show no letting up. Fresh proposals involve 35,000 tons, several large buildings included, and the whole averaging 2500 tons. About 8000 tons of awards is noted. In the face of maintained building activity, the quest for plain material tonnage is yet so keen that bidders figure on every advantage of the fabricating-in-transit privilege, so that a mill situated to favor a fabricator can thus deliver at a minimum price to the erector.

November slightly bettered the October total of bridge and building awards, at nearly 100,000 tons. Both months exceeded any others in 1921.

Further weakness has developed in leading pig iron markets. In the South a sale of 1000 tons has been made to a sanitary company at $17, Birmingham; but $17.50 is still generally quoted. At Pittsburgh basic iron has declined 75c. on a sale of 2500 tons, and foundry has been marked down by 50c. to $1. Chicago prices on foundry, malleable and basic irons are down about 50c., while in Philadelphia on a sale of 5000 tons of basic the market declined 75c. and foundry iron has also declined about 50c. The general disposition of buyers is to stay out of the market until after the holidays.

The week's developments indicate progress on the plan for a three-company Youngstown-Chicago district consolidation. The larger merger may take considerably more time. Several new projects are afoot.

Pittsburgh

PITTSBURGH, Dec. 20.

The past week not only has seen a further shrinkage in business but also in shipments. In addition to the inventory reason for not wanting to take in much material, buyers also are asking for the holding up of shipments until after Jan. 1, to escape the war tax on freight, which ceases Dec. 31. Steel plant activities naturally reflect the smaller volume of business and deliveries. Steel Corporation plants in the district show no appreciable decline in the number of active units, but since they are not being forced there has been some decline in production. Practically all of the independents in this and nearby districts have put off some capacity since a week ago, and we now estimate their operations at about 35 per cent of steel making capacity, which compares with about 45 per cent by the Steel Corporation plants. The market does not reflect a great deal of interest on the part of buyers in their early 1922 requirements.

Price changes have not been numerous in the past week. Real firmness is apparent in sheets, which are holding rigidly to the bases announced by the American Sheet & Tin Plate Co. as of Nov. 25. Reports are common about concessions from these prices, but substantiation is lacking. The tin plate market seems to have firmed up again after a brief period during which some makers took business at below the regular quotation of $4.75. Suggestions that less than 1.50c., Pittsburgh, can be done on plates, shapes and bars are heard, but in a general way that price is minimum and the counter claim is made that only on good sized tonnages will the mills go even to that figure. Considerable uncertainty exists in the market for wire products, due to the fact that some mills outside the Pittsburgh district lately have been accepting business on a mill rather than a Pittsburgh base.

The most important change in prices in the week was a reduction by the National Tube Co. of $5 per ton in standard and oil country pipe, and of $6 per ton in line pipe, this reduction being effective Dec. 15. Independent makers met this change but there has been no change in the discounts on wrought iron pipe, which still is being sold on a card dated Sept. 1.

The pig iron market has been enlivened by one good sized purchase of foundry iron by a sanitary

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 20, 1921	Dec. 13, 1921	Nov. 22, 1921	Dec. 21, 1920
No. 2X Philadelphia†	*$21.34*	$22.26	$22.84	$34.79
No. 2, Valley furnace†	*19.50*	20.50	20.50	35.00
No. 2 Southern, Cin'ti†	*21.50*	22.00	22.50	42.50
No. 2, Birmingham, Ala.†	17.50	17.50	18.00	38.00
No. 2 foundry, Chicago*	*19.50*	20.00	20.00	34.00
Basic, del'd, eastern Pa.	*20.25*	21.00	21.00	33.86
Basic, Valley furnace	*18.25*	19.00	19.00	33.00
Bessemer, Pittsburgh	21.96	21.96	21.96	36.96
Malleable, Chicago*	*19.50*	20.00	20.00	34.50
Malleable, Valley	20.00	20.00	20.00	35.00
Gray forge, Pittsburgh	*20.96*	21.46	21.46	35.96
L. S. charcoal, Chicago	31.50	31.50	31.50	43.50
Ferromanganese, del'd	60.00	60.00	60.00	110.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. sheet bars, P'gh	30.00	30.00	30.00	47.00
Forging billets, base, P'gh	32.00	32.00	32.00	51.00
O.-h. billets, Phila	*33.74*	34.74	34.74	49.24
Wire rods, Pittsburgh	38.00	38.00	40.00	57.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh	1.50	1.50	1.60	2.65
Light rails at mill	1.55	1.55	1.55	3.00

Finished Iron and Steel				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*1.85*	1.95	1.95	3.85
Iron bars, Chicago	*1.60*	1.65	1.65	3.25
Steel bars, Pittsburgh	1.50	1.50	1.50	2.35
Steel bars, Chicago	1.60	1.60	1.60	2.73
Steel bars, New York	1.88	1.88	1.80	2.73
Tank plates, Pittsburgh	1.50	1.50	1.50	2.65
Tank plates, Chicago	1.60	1.60	1.60	3.03
Tank plates, New York	1.83	1.83	1.88	3.03
Beams, Pittsburgh	1.50	1.50	1.50	2.45
Beams, Chicago	*1.60*	1.65	1.60	2.83
Beams, New York	1.88	1.88	1.88	2.83
Steel hoops, Pittsburgh	2.00	2.00	2.00	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Sheets, Nails and Wire	Dec. 20, 1921	Dec. 13, 1921	Nov. 22, 1921	Dec. 21, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.00	3.00	2.75	4.35
Sheets, galv., No. 28, P'gh	4.00	4.00	3.75	5.70
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	3.55
Wire nails, Pittsburgh	2.75	2.75	2.75	3.25
Plain wire, Pittsburgh	2.50	2.50	2.50	3.25
Barbed wire, galv., P'gh	3.40	3.40	3.55	4.10
Tin plate, 100-lb. box, Pgh.	**$4.75**	$4.65	$4.75	$7.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	*$15.50*	$16.00	$17.00	$22.00
Carwheels, Philadelphia	16.50	16.50	17.00	25.00
Heavy steel scrap, P'gh.	**14.50**	14.00	14.00	15.00
Heavy steel scrap, Phila.	11.50	11.50	12.00	14.50
Heavy steel scrap, Ch'go.	11.00	11.00	12.25	15.50
No. 1 cast, Pittsburgh	16.00	16.00	16.50	25.00
No. 1 cast, Philadelphia	16.50	16.50	17.50	22.50
No. 1 cast, Ch'go (net ton)	12.50	12.50	13.25	17.50
No. 1 RR. wrot, Phila.	14.50	14.50	15.50	20.00
No. 1 RR wrot, Ch'go (net)	10.50	10.50	12.00	14.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$3.00	$5.50
Foundry coke, prompt	3.75	3.75	4.00	6.50

Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**13.87½**	13.75	13.50	13.75
Electrolytic copper, N. Y.	**13.62½**	13.50	13.25	13.50
Zinc, St. Louis	**4.90**	4.85	4.65	5.75
Zinc, New York	**5.25**	5.20	5.15	5.75
Lead, St. Louis	4.40	4.40	4.35	4.60
Lead, New York	4.70	4.70	4.70	4.60
Tin, New York	**33.00**	32.75	29.62½	34.00
Antimony (Asiatic), N. Y.	4.50	4.50	4.50	5.50

Composite Price, Dec. 20, 1921, Finished Steel, 2.098c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Dec. 13, 1921,	2.135c.
Nov. 22, 1921,	2.099c.
Dec. 21, 1920,	3.082c.
10-year pre-war average,	1.684c.

Composite Price, Dec. 20, 1921, Pig Iron, $18.85 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Dec. 13, 1921,	$19.46
Nov. 22, 1921,	19.64
Dec. 21, 1920,	34.30
10 year pre-war average,	15.72

ware manufacturer and also by a purchase by a Valley steel maker of 2500 tons of basic, both transactions developing lower prices than recently had prevailed. In the case of the foundry iron, there was a decline of from 50c. to $1 per ton from recent quotations, while the sale of basic iron was at a decline of 75c. per ton from last week's base.

The scrap market shows less activity, but the effect of recent buying by some of the Steel Corporation subsidiaries, as well as by a large independent, still is seen in prices. Fuel market activities are restricted and with no indications of the early blowing in of any of the idle merchant furnaces, negotiations for first quarter tonnages at the price named by producers are not progressing very rapidly.

Pig Iron.—A sanitary ware manufacturer in the past week closed for slightly more than 2000 tons of foundry iron for early delivery, on which a price as low as $19.50, Valley furnace, was developed on iron of 1.75 to 2.25 silicon content, as compared with $20.50, the recent minimum of Valley furnaces on this grade. Small sales of this grade have been made at $20, and the quotable market is $19.50 on sizable lots, and $20 for the less pretentious tonnages. After frequent intimations that less than $19 Valley furnace could be done on basic grade, there has been a sale in the past week confirming such statements. A Valley steel maker has closed for 2500 tons of this grade for prompt delivery at $18.25, the iron to be shipped from another steel works. There is a possibility that less than $20 could be done on Bessemer iron on a sizable order, but that price could not be shaded against such inquiries as are coming out, which usually are for carload lots. Some of the foundries are beginning to sound out the market against first quarter tonnages, but so far no business has developed.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.25
Bessemer	20.00
Gray forge	$19.00 to 19.50
No. 2 foundry	19.50 to 20.00
No. 3 foundry	19.00 to 19.50
Malleable	20.00

Ferroalloys.—Recent increase in the inquiries for 50 per cent ferrosilicon have served to bring out lower prices than makers hitherto have been quoting. A West Virginia steel maker has closed for a carload of this material at approximately $55 per ton delivered, this price having been named by one American maker and a Canadian producer, the business going to the former. It is believed that this price could be done on

additional tonnages, although the asking or negotiating price of most producers is $60 furnace, freight allowed. Moderate sized inquiries for ferromanganese are reported, but with steel works operations slowing down, few consumers are urgently in need of supplies, and the inquiries are believed to be for material wanted after the turn of the year. No sales of importance lately have been made in this district. Domestic and British makers continue to quote $58.35 c.i.f. Atlantic seaboard on 80 per cent material, while German ferromanganese is quoted at $54. It is reported here, however, that some recent business in the latter in the East was done at a price of $52.25 seaboard. The market on spiegeleisen remains extremely dull, but stocks, notably of 20 per cent material, are pretty low and there is no disposition on the part of makers to cut prices to secure orders.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $63.67 delivered; 78 to 82 per cent foreign ferromanganese, $58.35, c.i.f. Atlantic seaboard; German, $54, seaboard. Average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $55 to $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The market is dull and nominal. There is practically no interest in billets and slabs, and inquiries for sheet bars are small and scattering, because of the light order books of sheet makers who buy their sheet bars. Only an appraisal of price possibilities can be given. Makers quite generally are quoting $30 for 4-in. billets, and for slabs and sheet bars, but on billets and slabs these prices are so much out of line with those for the finished products that it is more than probable they would be shaded against sizable orders. It is known that billets can be bought at $29 and sales are reported of sheet bars at $29.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $28 to $30; 2 x 2 in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $32 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Prices remain easy in the lack of important demands. The asking price on common soft rods is $38 base, but slightly less is known to have been done by some makers who wanted some tonnage to round out a rolling schedule. Screw stock rods are fairly well sustained at $43, but on carbon rods there has been some modification of the premium over soft rods, more of the lower carbon content having been sold at $45 recently, against a recent minimum of $46. Prices are given on page 1638.

Steel Skelp.—The market here is holding rather well on a basis of 1.50c. on steel pipe stock. Not much business is coming out, but makers here and nearby still are working on a good-sized order placed a short time ago for Western shipment.

Structural Material.—Some of the local shops have had a fair run of orders in the past week, but none of them involve work in this immediate district. The American Bridge Co. will fabricate 2200 tons of steel for the new South Street bridge over the Schuylkill River, Philadelphia, the general contract for which recently was awarded to the Dravo Contracting Co., Pittsburgh. The McClintic-Marshall Co. has taken 27 plate girder bridges for the Interstate Railroad Co., Norton, Va., requiring 1800 tons, Public School No. 187, Brooklyn, for which 800 tons will be needed, a storehouse for the Navy Department, Pearl Harbor, Hawaii, taking 500 tons, a building for Joseph Bancroft & Sons Co., Wilmington, Del., taking 265 tons, and a building for the Knickerbocker Ice Co., New York, taking 100 tons. In this district structural work is seasonably quiet and not much improvement is looked for until after the turn of the year. Plain material is only moderately active, but recent prices appear to be well maintained. Prices are given on page 1638.

Steel Rails.—Business in light sections is seasonably small and as users appear to be well covered against their immediate requirements, makers realize the futility of trying to force sales. The result is that the market is slightly steadier within the same range of prices as a week ago.

We quote 25 to 45-lb. sections, rolled from new steel, 1.55c. to 1.60c. base; rolled from old rails, 1.50c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Plates.—While a number of oil storage tank inquiries are pending, there has been no important business of this character in the past week, and the plate market consequently is somewhat quieter than it was recently. Possibly less than 1.50c., Pittsburgh, might be done on an order of some size, but makers in this immediate district disclaim having shaded that price.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.60c. f.o.b. Pittsburgh.

Iron and Steel Bars.—The market is even duller than it has been, but, if anything, there seems to be less pressure to sell and prices are somewhat steadier than they have been. On soft steel bars, makers in this and nearby districts are disinclined to consider less than 1.50c., Pittsburgh, although it is well understood that in competitive territory less than this price would have to be done to secure orders. Iron bars are slow of sale, but makers are not shading quotations, because they do not believe that this would result in orders.

We quote steel bars rolled from billets at 1.50c.; reinforcing bars, rolled from billets, 1.45c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.40c. to 1.45c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Wire Products.—Business has fallen to very slim proportions in the past week, not only because of the desire on the part of buyers to avoid large stocks for the year end, but because of the development of fresh price uncertainties, which have made for caution until the situation becomes more settled. Makers in this district are still quoting nails at $2.75 base, per keg, and plain wire at $2.50 base per 100-lb., but admit losing business at these prices. Nails have been sold by some makers outside this district at a price equivalent to $2.35 Pittsburgh, but this cannot be considered the Pittsburgh price because mills here as yet will not meet that figure. On wire, orders and specifications are almost impossible to obtain at $2.50 and to secure business it probably would be necessary for Pittsburgh mills to go as low as $2.25.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Tin Plate.—The market presents a much stronger front this week than it did a week ago, as those mills which were then disposed to accept tonnages at less than $4.75 per base box, Pittsburgh, have generally withdrawn the lower quotation. The official quotation of makers representing the great bulk of the production, is $4.75. The export market also is stronger, due to the fact that Welsh makers are better off in the matter of orders than they have been before in some time and the rise in exchange has made it impossible for them to quote as low as they did recently. A few orders are coming in for shipment to Japan and China and the price has advanced from $4 per base box, Pittsburgh, to $4.25. (Make the price $4.75 flat.)

We quote standard production coke tin plate at $4.75 per base box f.o.b. Pittsburgh for carload lots.

Iron and Steel Pipe.—Effective, Dec. 15, the National Tube Co. issued new cards reducing prices on standard pipe, except on ⅛-in., large outside diameter, water well casing and oil country goods $5 per ton, and line pipe $6 per ton. New cards meeting this reduction have been issued by the independent companies, but makers of wrought iron pipe have made no change and still are holding to the schedules which became effective Sept. 1, last. The new card discount on base sizes of butt weld black steel pipe is 71 per cent off list. With no change in wrought iron pipe, the spread between the two kinds now is 26½ points or $53 per ton in the base sizes. New steel cards except in line pipe, give public affirmation of prices which recently have been quietly done. Pipe demands still are relatively good, although there has been a slight falling away as compared with recent weeks, due to the proximity of the end of the year. A number of promising line pipe inquiries are before makers, but the common impression is that none of them will be closed until after the turn of the year. The most recent business of this sort was of seven miles of 6-in. pipe, or about 350

tons, placed by the Tidewater Oil Co. with a Pittsburgh independent. The original inquiry of this company was for 150 miles, or 7500 tons, but this was scaled down to the seven miles just placed. Discounts are given on page 1638.

Boiler Tubes.—The National Tube Co. did not issue a new card of discounts on boiler tubes, when it set up new quotations on steel pipe, Dec. 15. The old discounts still are in effect and apparently are being more closely observed than was the case recently. This is explained less by the size of the demand, which, although better than it was a short time ago, is not really good, than by the fact that production is low and stocks are showing signs of exhaustion. Firmness in charcoal iron boiler tubes is due to much the same causes. The National Tube Co. has not yet resumed publication of discounts on seamless tubes. Discounts are given on page 1638.

Cold-Finished Steel Bars and Shafting.—Trade is seasonably quiet, but there seems to be a slightly better demand for shafting than for screw stock. We note the placing of one order for cold-rolled shafting involving about 150 tons of desirable sizes, at 2c. base, Pittsburgh. This is as low as makers are disposed to go, even on what might be termed attractive orders, and some are still adhering to a base of 2.15c. Since the first of the year, this class of material has declined from 3.60c. base, or $72 per net ton, to 2c. base, or $40 per ton, as compared with a decline in the same period in hot-rolled bars, of $17 a ton, or from $47 to $30. Prices of cold-finished steel today not only reflect the decline in hot-rolled bars, but also a reduction in the conversion differential from $25 to $10 per ton. Pending further reductions in labor and freight costs, it is asserted that the present price of 2c. base is as low as makers of these bars can go safely. Ground shafting is quoted at $2.50 base per 100 lb., f.o.b. mills, for carloads.

Hoops and Bands.—There is no improvement in the demand, or in prices. The regular quotation of makers is 2.25c. base, Pittsburgh, but 2c. is the basis of practically all business that is being done.

Spikes.—Demands are seasonably light and as price concessions would not create business, the more common tendency of makers is to hold to the recent bases of $2.25 per 100-lb. for standard spikes and $2.40 on small sizes. These prices probably will be shaded when there is any business to be secured. The Missouri Pacific Railroad is reported to have bought 1000 kegs of standard spikes recently, the business going to a Western maker. Prices are given on page 1638.

Nuts and Bolts.—Makers in this district still report business as slack with buyers confining purchases very closely to actual requirements and showing little interest in their future needs. The complaint still is common that adherence to quotations is costing local makers orders from outside points. Discounts are given on page 1638.

Rivets.—There has been no change in the official quotations of the larger makers, but it is admitted that on large rivets concessions have been made to buyers willing to place attractive orders and accept immediate delivery. On the great bulk of orders, which are for small lots, quoted prices prevail. Discounts and prices are given on page 1638.

Sheets.—Thus far all makers have successfully resisted attempts of buyers to force concessions from the regular prices, on black and galvanized sheets, of 3c. and 4c. base, respectively. The base price of 2.25c. on the lighter gages of blue annealed sheets also is well observed, but on the heavier gages some business still is being taken on the plate base. Business is seasonably light which makes the strict adherence to quotations all the more remarkable. The American Sheet & Tin Plate Co. is maintaining operations in excess of 60 per cent, but not more than 40 per cent of the independent mills are running. Prices are given on page 1638.

Hot-Rolled and Cold-Rolled Strips.—Inquiries are slightly more numerous and some makers actually have enjoyed an increase in orders, but in a broad way there still is considerable room for improvement. Prices show no change, the bulk of business carrying a price of 2c. for hot-rolled and 3.75c. for cold-rolled. Regular or asking quotations range $5 above those prices, but the chief effort of makers now is to maintain the lower figure.

Coal and Coke.—Negotiations are in progress covering the coke requirements of two merchant furnaces and two steel works furnaces in the Valley district for first quarter of 1922. Three of these furnaces now are in blast and owners of the other one are figuring on blowing it in after the turn of the year. Price ideas of beehive oven operators against such business range from $3.25 to $3.50, but it seems doubtful whether, if the business is placed with Connellsville producers, more than the lower figure will be paid. Steel works by-product plants can make pretty attractive prices on coke on the present price of coal, high grade by-product coal being offered at around $2 per ton. There is almost no spot market in coke and such lots as come on the market are hard to dispose of. The common quotation on spot beehive oven furnace coke is $2.75 per net ton, oven and on spot foundry grade $3.75. One or two choice brands of foundry coke command up to $4.25, but on the bulk of passing business the range is $3.75. One or two choice brands of foundry coke command up to $4.25, but on the bulk of passing business, the range is $3.75 to $4. The coal market is inactive except for some inquiries for by-product grade for first quarter shipment. On spot tonnages that grade is available anywhere from $1.50 to $1.85, with most sales right around $1.65. Non-union steam coal is not hard to pick up at $1.50 for immediate delivery. Mine run gets coal holds at $2 to $2.35.

Old Material.—The market is quieter than it has been, but retains much of the firmness created by the purchases of the Steel Corporation subsidiaries and a large independent interest. This may be explained by the fact that some dealers, who took Corporation business sold short on a portion of the tonnage and since they cannot ship from yard stocks, except at a loss, at the prices at which they sold, they are a little anxious to cover against these sales. This condition, rather than the demand from melters, is holding up prices. No recent sales of heavy melting grade have been done at less than $14.50, save a few carloads which had to be moved, and some tonnage has been sold at $14.75, while dealers have paid $15. Slowing down of some steel works operations in other centers is releasing some tonnage and steel makers here lately have had offers of material from points which hitherto have been shipping elsewhere. A local melter had a call from the East recently for the first time in several weeks, and since Youngstown steel companies are taking little material, Pittsburgh consumers no longer have much competition from that point. There is little reason for changing prices much from those of a week ago. Almost no market exists for turnings and borings and prices are nominal. If a dealer had to sell turnings, the price would not be over $8.50, but if a buyer wanted some $9 would be minimum.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.50 to $14.75
No. 1 cast, cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	11.50 to 12.00
Bundled sheets, sides and ends	10.50 to 11.00
Railroad knuckles and couplers	15.00 to 15.50
Railroad coil and leaf springs	15.00 to 15.50
Low phosphorus standard bloom and billet ends	18.00 to 19.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	25.00 to 26.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	15.50 to 16.00
Cast iron wheels	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Machine shop turnings	8.50 to 9.00
Sheet bar crop ends	14.00 to 14.50
Heavy steel axle turnings	11.00 to 11.50
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	14.00 to 14.50
Stove plate	13.00 to 13.50
Cast iron borings	9.00 to 9.50
No. 1 railroad wrought	11.50 to 12.00

Chicago

CHICAGO, Dec. 30.

Little interest is manifested in any commodity except pig iron. As the New Year approaches, melters are looking to their first quarter and first half needs. A few have already bought for that delivery and others have issued inquiries for their requirements, five good-sized inquiries which have been issued within the past week aggregating more than 4000 tons. While the pig iron market is more active, prices have settled to a lower level, as low as $19.50 base local furnace having been done.

Other iron and steel products are inactive and but for the fact that tonnage in heavy products is still coming in from carbuilders and tank fabricators, mill operations would be adversely affected. This business, however, promises to tide the mills over until the New Year. The Inland Steel Co. remains on a 50 per cent basis, while the Illinois Steel Co. is operating at 43 per cent of ingot capacity, or slightly below its recent rate.

Most buyers, and the jobbers in particular, have withdrawn from the market until January. The opening of the New Year, however, is expected to bring out better business in some products, such as bolts and nuts and wire products, the jobbers' stocks of which are seriously depleted. In the heavier products, further tonnage is expected for the tank fabricators and car builders. It is to be noted, however, that orders for cars and car repairs have been few of late. General building prospects are regarded as favorable and fabricators believe that much work pigeon-holed by the architects will be sent out for bids.

Pig Iron.—Numerous foundries are shutting down during the holiday period, with the result that spot buying has fallen off appreciably. Greater activity in the New Year is forecasted by several recent purchases, and a number of attractive inquiries received by selling agencies. A western Michigan melter has closed for 500 tons of malleable for first quarter delivery at $19.50, base, local furnace, while a northern Indiana consumer has bought 750 tons of foundry for first half shipment. Five good-sized inquiries for foundry, all calling for first half delivery are before the trade. Duluth, Milwaukee and Indiana users want 1000 tons each, whereas a Michigan consumer is in the market for 600 tons and a local melter for 500 tons. A sale of 100 tons of charcoal has been made at $28, base furnace. Jackson County silvery makers are holding more rigidly to their official quotation of $29.50, furnace, or $34.82 delivered, Chicago, but resale material has been changing hands at from $2 to $3 under that price. The price situation is substantially unchanged except that local foundry, malleable and basic appear to be slightly weaker than a week ago. On an attractive tonnage it is probable that buyers will experience no difficulty in placing business at $19.50, base furnace, while smaller lots are moving at $20. The quotation on local by-product foundry coke remains $11.25, delivered in the Chicago switching district, and some business for delivery early in 1922 has been taken on that basis.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago		$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	$20.00 to	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	19.50 to	20.00
Northern high phos	19.50 to	20.00
Southern foundry, sil. 1.75 to 2.25		24.17
Malleable, not over 2.25 sil	19.50 to	20.00
Basic	19.50 to	20.00
Low phos., Birmingham		32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free		33.00
Silvery, sil. 8 per cent	32.02 to	34.82

Ferroalloys.—The Commonwealth Steel Co., St. Louis, has bought a car of 12 per cent Bessemer ferrosilicon at approximately $35, delivered. The Haskell & Barker Co., Michigan City, has purchased a carload of ferromanganese at the ruling price. 76 per cent ferromanganese has been offered at $62 delivered, Chicago.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Rails and Track Supplies.—The Burlington, reported two weeks ago as having tentatively closed for its 1922 rail requirements, has made definite reservations for 25,000 tons, divided between the Illinois and Colorado mills. On the whole, the rail market is unusually quiet for this time of the year, the plans of most roads still being in the formative stage. The Rock Island will buy less than 45,000 tons, probably from 30,000 to 40,000 tons. This line still has 13,000 tons coming on its 1921 contract. The Chicago & Northwestern does not expect to order more than 10,000 tons. The Santa Fe, the Northern Pacific, the Great Northern and the Minneapolis & St. Louis expect to place orders but have not determined on the tonnages they will place. Track supplies are quiet. Small sales of track bolts and spikes have been made, some spikes having been placed at as low as 2.15c., Pittsburgh.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.15c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.90c. to 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Railroad Rolling Stock.—The Illinois Central has deferred action on its car inquiry until January and the Burlington will not close for its cars before that time. The Great Northern is expected to buy its freight cars this week, and an unconfirmed report is current to the effect that it has already placed 500 refrigerator cars with the General American Car Co.. The same road has let repairs on 50 passenger cars to the Pullman Co. The Grand Trunk, Western lines, is inquiring for repairs on 500 hopper cars. The Western Maryland is asking for figures on the repair of 1000 hopper cars, and the Lehigh Valley is inquiring for repairs on 1000 gondola and hopper cars.

Bars.—Except for tonnage coming from car builders, little is being added to the books of merchant bar mills. Jobbers are notably absent from the market and other buyers show little interest in it. In the reinforcing field, there are few new jobs to report. The Paul J. Kalman Co. will furnish 200 tons for the Standard Dry Goods Co. Building, Huntington, W. Va., while the Inland Steel Co. will supply 300 tons for the Philipsborn's Inc. Building, Chicago. Bids have been taken at Davenport on 150 tons for highway work in Scott county, Iowa. Demand for bar iron is still of a spasmodic character and in the aggregate light. One local mill has booked an order for 900 tons from a railroad, the largest individual tonnage placed for some time. Prices are slightly weaker, the market being quoted from 1.60c. to 1.65c., Chicago. The hard steel bar situation is unchanged.

Mill prices are: Mild steel bars, 1.60c. to 1.75c., Chicago; common bar iron, 1.60c. to 1.65c., Chicago; rail carbon, 1.65c., mill or Chicago.

Jobbers quote 2.68c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.28c.

Wire Products.—Buying has fallen off appreciably during the past fortnight and current purchases are confined to imperative needs on which immediate shipment is asked. Jobbers' stocks are known to be generally low, however, and as soon as the inventory-taking period is past, better business is expected to develop. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 1638.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.65 per 100 lb.; cement coated nails, $3.05 per keg.

Sheets.—Buyers generally are holding aloof from the market and in some cases those who have orders on mill books have asked that delivery be deferred until after Jan. 1. Prices appear to be firm and notwithstanding the lull in buying the local independent is operating 17 out of 18 mills with every prospect of closing the year at that rate.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Plates.—Except for tonnage coming from the car builders and the tank fabricators, there is little plate business moving. Jobbers have apparently withdrawn from the market until next year and orders from miscellaneous sources are practically nil. The price situation is unchanged.

The ruling mill quotations range from 1.60c. to 1.75c. Chicago. Jobbers quote 2.78c. for plates out of stock.

Bolts and Nuts.—The market shows no signs of strength. Jobbers' stocks, however, are scraping bottom in many instances and for that reason sellers expect better business next month. There continue to be some railroad inquiries before the trade and these are bringing out concessions, some makers quoting f.o.b. Chicago. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1638.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ⅞ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to ⅞ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Cast-Iron Pipe.—The market is dull as the holidays draw near and almost no new inquiries are reported. Sellers, however, look ahead to January hopefully, as many municipalities that have been unable to go ahead with improvements, because of the numerous high interest bearing industrial securities issued during the past year, now find that they can market their bonds without difficulty. Springfield, Ohio, has let 760 tons to the United States Cast Iron Pipe & Foundry Co. and 80 tons of 6-in. to James B. Clow & Sons. Hammond, Ind., took bids on 40 tons of 6-in. yesterday.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $47.10 to $48.10; 6-in. and above, $43.10 to $44.10; class A and gas pipe, $4 extra.

Structural Material.—Fabricators look forward hopefully to the new year, believing that the time is approaching when other elements in building costs will decline in proportion to steel with the result that the numerous projects still in the hands of architects will be released for bids. A recent investigation of the building situation by a committee appointed by the mayor of St. Louis disclosed the fact that many large jobs in that city will be started as soon as certain factors entering into construction costs, notably labor, coal and transportation, have undergone liquidation commensurate with other elements. The largest new inquiry to come before the trade is warehouse No. 12 for the Belknap Hardware & Mfg. Co., Louisville, Ky., which will require about 5000 tons. Graham, Anderson, Probst & White, Chicago, are the architects. Plain material is available at about the same prices as plates and soft steel bars, small lots bringing a maximum of 1.75c., Chicago, while large tonnages can be bought at from 1.60c. to 1.65c. Recent fabricating awards include:

J. L. Taylor Co. building, Chicago, 1000 tons, to Duffin Iron Works.

Bank of Italy building, Los Angeles, 1500 tons, to Llewellyn Iron Works.

Tiffin Theater building, Chicago, 336 tons, to Hansell-Elcock Co.

Pending business includes:

Illinois Central Railroad, freight car repair shop, McComb, Miss., 700 tons.

Hotel at Johnson City, Tenn., 550 tons.

Federal Reserve Bank, Nashville, Tenn., 200 tons.

Cell house F for new State penitentiary, Lockport, Ill., 200 tons.

The mill quotation on plain material ranges from 1.60c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Warehouse Prices.—The recent reduction in mill prices on pipe has been reflected in lower warehouse price. Standard black 3-in. pipe was reduced from $30.60 to $28.69 per 100 ft. and the same size in galvanized from $41.31 to $39.40. Other sizes were reduced in proportion.

Old Material.—Except for a purchase of about 1500 tons of heavy melting and miscellaneous grades, including some No. 1 busheling, the market has been inactive. The heavy melting is reported to have been bought at $11 delivered and the busheling at $10 per gross ton delivered. Several inquiries for cast scrap have been received from foundries, but all of them ask for January shipment. The market is generally quiet and weak, some grades having definitely dropped another notch down the scale. Railroad lists include the Rock Island, 4500 tons, and the Grand Trunk, Western Lines, 5700 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Relaying rails	23.00 to 27.50
Cast iron car wheels	15.50 to 16.00
Rolled or forged steel car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.50 to 11.00
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	8.00 to 8.50
Hydraulic compressed sheet	8.00 to 8.50
Axle turnings	8.50 to 9.00
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	11.00 to 11.50
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.50 to 20.00
Steel car axles	13.00 to 13.50
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.00 to 6.50
Cut forge	10.50 to 11.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	10.50 to 11.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.00 to 11.50
Coil springs	12.50 to 13.00
No. 1 machinery cast	12.50 to 13.00
No. 1 railroad cast	12.00 to 12.50
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.50 to 6.00
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.50 to 12.00

Birmingham

BIRMINGHAM, ALA., Dec. 20.

Pig Iron.—Iron makers come to the close of the year with less concern over the present price base than with reference to 1922 demand. General feeling is rather buoyant. With only 50,000 tons of merchant iron on yards, the strategic position is regarded as exceptionally strong. Southern foundry operations will, as a rule, continue to eve of Christmas and suspend until Jan. 3. Indications point to increase of melt in 1922. The aggregate of sales during the week was small. Several hundred tons was taken by Indiana melters and was an agreeable surprise in view of the little business done in competitive fields. The base is $17.50. The Sloss-Sheffield company, having reduced large yard holdings to comparatively small, has decided to blow in a Sheffield stack Jan. 1 and is now preparing it for blast. Sheffield enjoys a freight advantage over Birmingham to competitive markets. The outstanding feature of the week was the shipment of 1300 tons of iron to Los Angeles by way of ship out of Mobile, which affords a rate of about half of the all-rail rate, which is $20. This iron was among the first lots sold when the market receded from a base of $19 to one of $18. Inquiry for 1922 iron is meager and seldom for the entire first quarter. Current business has been almost exclusively for carloads of prompt iron.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$17.50
Basic	16.50
Charcoal, warm blast	35.00

Finishing Mills.—Tennessee company is on a 66 2/3 ingot capacity and Gulf States Steel Co. 50 per cent. Conners Steel Co. has resumed at its Woodlawn hoop and band mill. Wire and nails are slow. Sheet steel for galvanized roofing and small sizes of steel pipe are active. Nine hundred tons of steel plates was shipped to Los Angeles and San Francisco last week via Mobile.

Cast Iron Pipe.—Shops will work to eve of Christmas and resume Jan. 3. Sanitary pipe makers are receiving a fair amount of new business and feel confident of good business in 1922. San Juan and Ponce, Porto Rico, took 600 tons via Mobile this week. Pacific Coast shipments both of sanitary and high pressure pipe were heavy, destinations being Los Angeles, San Francisco, Seattle and San Diego. Sanitary pipe base

is $40, but trade is asking for lower prices following cut in steel and wrought pipe. No concessions have been made.

Coal and Coke.—Local coal yards have cut prices $1 to $2 a ton following loss of business to wagon mines and dull business incident to warm weather. Best coals now retail at $7 to $7.50. Steam coal is very dull. The first shipment of Alabama bunker coal to Galveston by ocean-going craft out of Mobile was made this week. Return cargoes of sulphur for acid plants are expected.

Old Material.—The scrap market is without feature. Dealers are holding in hope of better prices and because consumers have quit buying.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Dec. 20.

Pig Iron.—Business took a decided slump here this week, the aggregate sales being 1500 to 1600 tons, as contrasted with 13,000 for the previous week. With the disappearance of large prospective orders, most of those eastern and central Pennsylvania and Buffalo furnaces heretofore willing to shade prices to secure business have raised quotations, while those not securing business recently have lowered quotations, resulting in a narrower range of prices. One eastern Pennsylvania furnace, heretofore not having a regular New England representative, is understood to have arranged for one and will make an official announcement to this effect shortly. The market on Buffalo iron is $19 to $20 base, with little attention paid silicon differentials. Three or four 100-ton lots of silicon 3.25 to 3.75 and higher sold this week at $20.50 furnace. Other sales of No. 2X are reported at approximately $25 delivered. Central Pennsylvania No. 2X also sold on the same delivered base. One furnace in this district has raised its base price from $19.50 to $20. The few lots of eastern Pennsylvania iron sold this week were largely resale of $20 furnace base and higher. The only important inquiry in the market is for 500 tons, half No. 2 plain, and half No. 2X, with special sulphur content, January delivery, from a textile machinery maker.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75	$24.56 to $25.06
East. Penn., silicon 1.75 to 2.25	24.06 to 24.56
Buffalo, silicon 2.25 to 2.75	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25	24.46 to 25.46
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	29.16
Alabama, silicon 1.75 to 2.25	28.66

Cast Iron Pipe.—The city of Salem, Mass., on Dec. 22, 10 a.m., will open bids for 1200 to 1300 ft. 8-in. pipe and a small amount of specials. The city of Providence, R. I., on Dec. 27, 2.15 p.m., will open bids on 400 tons 6 to 16-in. pipe and three tons of castings. In both instances deliveries are for 1922. Indications are more cast iron pipe business will be closed in New England between now and the end of spring than ever before. Several of the largest cities already are quietly sounding out the market. The pipe makers so far are holding closely to prices quoted last month, as follows: Per net ton f.o.b. Boston and district, in carload lots, 3-in., $66.70; 4-in., $56.70; 6-in., $50.70; 10-in. and larger, $49.70, with $4 differentials on class A and gas pipe.

Finished Material.—A Cambridge, Mass., fabricator this week was awarded about 100 tons of structural steel for a Boston school. The market otherwise is quiet at 1.50c. f.o.b. Pittsburgh. Bids will be opened Dec. 22 on 300 tons of plates for an Arlington, Mass., water tower. Going and prospective business otherwise is confined to carload and smaller lots, with the market 1.50c., Pittsburgh, on attractive tonnages and 1.55c. and 1.60c. on ordinary tonnages. Boiler makers are cutting prices materially in order to secure what little business is available. The demand for bars and other steel products is quiet on a basis of 1.50c., Pittsburgh, for bars. An inquiry for a carload of one size of bolts features that market. The warehouse business has fallen off noticeably since last reports.

Jobbers now quote: Soft steel bars, $2.71½ per 100 lb. base; flats, $3.21½; concrete bars, $2.20 to $2.71½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.31½ to $3.78; steel hoops, $3.31½; toe calk steel, $5; cold rolled steel, $3.75 to $4.25; structural steel, $2.71½; plates, $2.81½ to $2.99; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.71½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Coke.—The New England Coal & Coke Co. reports a falling off in shipments of by-product foundry coke from the ovens due to a desire on the part of consumers to have as little stock on hand as possible during inventory taking. The tonnage booked by the company for first half of 1922 shipment at prices ruling date of shipment, has materially improved since last reports, however, due to several of the largest consumers covering their requirements. The Providence Gas Co. is operating and shipping at 100 per cent of capacity, and also has booked attractive tonnages for first half shipment this week. Both companies continue to quote spot foundry coke at $10.66, delivered, or 21c. or more above the Connellsville base.

Old Material.—Going business continues limited and prices on several kinds of old material are easier under their own weight. Cast iron borings are an exception, however. Offers by dealers to purchase round tonnages suitable for chemical purposes at $6.25 have been turned down, the owner finally letting go at $8. The average dealers' price is $7 to $7.25, or 50c. above last week. Rolling mill borings are in light demand, but firmer in sympathy with chemical. Turnings, on the other hand, are easier, and the same is true of car wheels and rerolling rails. A sale of 500 tons No. 1 heavy melting steel to a Massachusetts consumer at $11, delivered, is reported. The market on No. 1 machinery cast holds at $18 to $19, delivered, with car lots of textile machinery reported sold at $18.65 and $18.95. It is difficult to find a market for stove plate at any price. While the market can be considered all of $1 lower, quotations are purely nominal.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.00 to $19.00
No. 2 machinery cast	16.00 to 17.00
Stove plate	14.50 to 15.00
Railroad malleable	13.50 to 14.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.50 to $8.00
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	7.00 to 7.50
Machine shop turnings	3.50 to 3.75
Cast iron borings, rolling mill	5.75 to 6.50
Cast iron borings, chemical	7.00 to 7.25
Blast furnace borings and turnings	3.50 to 3.75
Forged scrap and bundled skeleton	4.50 to 5.00
Steel car axles and shafting	11.50 to 12.00
Car wheels	11.00 to 11.50
Rerolling rails	10.00 to 10.50

Working on Proposed Merger

YOUNGSTOWN, Dec. 20.—Accounting and auditing departments of a number of Valley steel interests active in current merger negotiations are working overtime—at night, Saturday afternoons and occasionally Sundays—compiling data and necessary information. It is the impression that plants located in the Mahoning Valley will reveal substantial property valuations, both in conversion equipment and in holdings of raw materials.

The twenty-sixth annual winter mining session of the College of Mines, University of Washington, Seattle, Wash., will be held during the 12 weeks from Jan. 5 to March 22. This session is open to any interested man who can read and write English. The expenses will be limited to a tuition fee of $15, laboratory deposits to cover materials actually used and the cost of the necessary text books. The training consists of lectures with laboratory practice, for which the laboratories of the College of Mines are equipped.

Cincinnati

CINCINNATI, Dec. 20.

Pig Iron.—Lower prices developed during the week on Southern iron, and a sizeable tonnage can now be negotiated on the basis of $17, Birmingham. It is said that this price has already been done on a purchase of 1000 tons by a Kentucky sanitary manufacturing company, the order being split between two furnaces. The same company is reported to have made an offer of 500 tons to a third furnace at the same figure. A Southern furnace has intimated that a $17 price would be acceptable on a sizeable tonnage for prompt shipment, and while $17.50 is still being quoted on carload business, the market is gradually working toward the lower figure. In the North more is heard of $19, and it is reported that this figure has already been reached in sales to consumers with high priced contracts, but $19.50, furnace, seems to be the minimum open quotation, and silicon differentials are being given away in many cases. There is almost no inquiry from this district. A radiator company is inquiring for 1000 tons and a northern Ohio melter for 200 tons of low phos. Sales include, besides the one mentioned above, 250 tons to the Louisville & Nashville Railroad, and 300 tons to the Indiana Reformatory. The Norfolk & Western Railroad was also a purchaser, taking 250 tons of malleable from a southern Ohio producer. The trade, while unusually dull, at this time, is looking for better things with the turn of the year, and it is expected that business during the month of January will greatly exceed any month this year.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$21.50 to $22.00
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	22.00 to 22.50
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.02 to 22.52
Basic, Northern	22.02
Malleable	22.52

Finished Material.—A slight improvement is noticed in the demand for sheets and reinforcing bars, and several 100-ton orders have been placed during the week. The sheet market is firm at 3c. for black and 4c. for galvanized. On blue annealed, some mills are quoting on the plate basis. The regular quotation on blue annealed is 2.25c. On reinforcing bars, 1.50c. is the common quotation, and practically all of the orders are being placed at this figure, although occasionally carload lots are moving at 1.55c. to 1.60c. There is little activity in plates and shapes and 1.50c. represents the market. A reduction of 2½ points on base prices of standard pipe, black and galvanized, and 3 points on base prices of line pipe, became effective Dec. 15. On wire nails it is said that some mills in this territory are willing to accept business on the basis of $2.60 per keg, but so far few orders have been placed. This offer, it is said, refers only to orders for immediate shipment and will not be effective after Jan. 1. Plain wire is generally quoted at $2.25 per 100 lb., hoops and bands at 2c. to 2.15c. and cold-rolled shafting at 2c. to 2.15c. On light rails, orders are scarce, as most of the mining companies in operation in this section of the country are running only two days a week. There are a large number of mines closed down entirely. There is little activity in the structural field. The largest proposition is for a municipal auditorium and market building at Memphis, Tenn. This will take approximately 3000 tons of structural steel and 400 tons of reinforcing bars. Bids will close on Jan. 3 with C. O. Pfeil, Union & Planters Bank Building, Memphis, Tenn. The Southern Railway is inquiring for one 100-ton bridge span, and the Procter & Gamble Co. has an inquiry out for 50 tons of structural steel for a building at its Port Ivory, New York, plant. No award has yet been made on the building for the Standard Sanitary Mfg. Co. at Louisville. The American Bridge Co. will fabricate a small tonnage for an addition to the Soldiers' Home at Dayton, Ohio. The Knights of Pythias, Dayton, Ohio, are contemplating the erection of a 10-story hotel and club building in that city and it is likely the proposition will take definite shape after the first of the year. The Illinois Car Co., with head offices in Chicago, and a plant at Urbana, Ohio, is understood to be contemplating dismantling its present plant and erecting a new one, 600 by 200 ft. Plant operations do not materially change. The East-side Plant of the American Rolling Mill Co. will run at capacity during the week, and the Whitaker-Glessner Co. at Portsmouth will continue last week's schedule. The Ashland Iron & Mining Co. is running at 50 per cent of capacity. The plants of the Andrews Steel Co. and the Newport Rolling Mill Co. at Newport, Ky., where a strike is in progress, resumed operations during the week and it is expected that this week they will be on a 50 per cent basis. The plants are being operated on an open shop basis.

Warehouse Business.—There is very little to report. Business is very quiet and it is not expected that much improvement will be shown until the first of the year. Prices of galvanized sheets have been advanced $5.00 a ton, these now being quoted by local jobbers at 5.25c.

Iron and steel bars, 2.90c. base; hoops and bands, 3.50c. base; shapes and plates, 3c. base; reinforcing bars, 2.97½c. base; cold rolled rounds, 1½-in. and larger, 3.70c.; under 1½-in. and flats, squares and hexagons, 4.20c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3 per 100 lb.

Coke.—In the coke market, there are evidences of increased activity. Some West Virginia producers are understood to be preparing to light some ovens, and one operator has already fired about 60. Fair inquiries for first half are current, but the spot market continues dull. Prices are quotably unchanged.

Old Material.—The scrap market is standing still as regards sales, but dealers are buying sparingly at prices so low that they can afford to speculate a little. Better things are looked for after the first of the year. In the meantime, all consumers in this district remain out of the market.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	$3.50 to $4.00
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.50 to 11.00
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 9.50
Car wheels	12.00 to 13.00
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	3.00 to 3.50
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	13.50 to 14.50
Burnt scrap	7.50 to 8.00
Iron axles	15.50 to 16.50
Locomotive tires (smooth inside)	9.50 to 10.00
Pipes and flues	4.00 to 4.50

Buffalo

BUFFALO, Dec. 20.

Pig Iron.—Most furnaces continue to announce firm adherence to the $20 base price for New York delivery, notwithstanding information from the East that Buffalo iron is quoted as low as $18. An interest, which quoted $19 on the Westfield, Mass., business, announces it did not get any portion of the order. Total sales for the week are less than 3000 tons. Inquiry has likewise fallen off. The one producer who has sold no iron in more than 30 days sees no immediate change in sight and 80 per cent of its iron production is now utilized in its steel-making departments. The Donner Steel Co. will blow out one of the two furnaces in blast to make repairs and the stack will be blown in again shortly after Jan. 1. A group of inquiries engaging one furnace consists of 7500 tons and with the exception of one for 3000 tons, the rest is for small lots.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$20.00 to $21.00
No. 2X foundry, 2.25 to 2.75 sil	19.50 to 20.50
No. 2 plain, 1.75 to 2.25 sil	19.00 to 20.00
Basic	20.00 to 21.00
Malleable	20.00 to 21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—Apathy usual at the holiday season is more pronounced and the lack of interest in bars is especially marked. Reduction in pipe prices of two and a half points on base or the equivalent of $5 per ton has not had a noticeable effect on business. Sheet demand is fair and prices are firm. An order for approximately 500 tons for a buyer outside Buffalo, taken by a sheet maker at $3 for No. 28 black, is in-

dicative of the acceptance of this schedule. On bars, shapes or plates 1.50c. is a common quotation and there is no difficulty in placing business at that figure. Little of moment is in prospect in structural business. The Statler Hotel interests have decided to add two stories to the new building now under construction and it is likely the additional fabricating will be done by the Fort Pitt Bridge Co., now doing the original job. The new Ford hotel for Delaware Avenue, Buffalo, is to be awarded in the spring. Several attractive plate inquiries appeared within the week, but prices quoted by one agency were said to be out of line and the business was not placed here. Elimination of the transportation tax Jan. 1 is believed to have an effect on business. Although stocks are low, a number of buyers have indicated that one objection to ordering now is that a saving by waiting until this tax is lifted is worth while. Some inquiry for prices on January business has appeared, but little of importance with respect to future business is engaging any interest.

Warehouse Business.—With the exception of a fair structural demand, which continues because of open weather, there is a general lull in warehouse business. The usual lack of interest at this time is more noticed this year.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.80c.; plates, 2.80c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.70c.; hoops and bands, 3.30c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.80c.

Old Material.—Low production in turnings and borings keeps dealers from quoting on inquiries for these products. Steel orders are being filled at $13.50, but the supply is limited and mills are buying what is offered readily. The matter of shipping becomes important as the end of the year approaches and every effort is made by dealers to keep stocks at the lowest ebb by delivering as quickly as possible.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

Cleveland

CLEVELAND, Dec. 20.

Iron Ore.—The refusal of the Interstate Commerce Commission to allow the railroads to extend the present rail rates on iron ore from lower lake ports to interior furnaces from Jan. 1 to March 31 has not had the effect of increasing dock shipments. After the 28 per cent reduction was made on ore rates Oct. 20, there was a marked increase of shipments from docks, as consumers wanted to take their ore in before Jan. 1 when the higher rates were to be restored. They also wanted to move what ore they needed before the cold weather set in that would interfere with handling. Dock shipments during November were fairly heavy, the amount shipped from Lake Erie docks during that month being 1,001,252 tons. Most of the furnaces now have all the ore in their yards that they will need up to April 1 and the attempt of the railroads to extend the lower rail rates to April 1 and the refusal of the Interstate Commerce Commission to permit the extension was of little immediate interest to consumers.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Competition for business at competitive points has resulted in a further weakening of the pig iron market and in several cases a $19 quotation has been made on No. 2 foundry iron by one or two lake furnaces where the inquiry has not been within the immediate territory of the furnace naming that price. Lake furnaces that have been getting above $20 for foundry iron for nearby shipment where there is no competition are now quoting $20 as a minimum. In the Mahoning Valley, prices have settled back to $20 for foundry iron, a decline of 50c. a ton on a purchase at that price of 3000 tons by the Standard Sanitary Mfg. Co. for early shipment, 2000 tons from a Valley furnace of a Cleveland interest and 1000 tons from another Cleveland producer. The same buyer purchased 1500 tons of Southern foundry iron at $17 for No. 2. An Ohio stove manufacturer during the week purchased 1000 tons of foundry iron from a Cleveland furnace. On the whole, the market continues quiet, buying being mostly in small lots for immediate requirements. One lake producer sold 1500 tons during the week, all in small lots. For Cleveland delivery, local furnaces continue to quote foundry iron at $20 to $20.50 at furnace. A new low price on basic iron has appeared in the purchase of 2500 tons at $18.25 by a Valley district steel maker from a Valley producer. We note the sale of 250 tons of low phosphorus iron at $34 but a local consumer has purchased a small lot of resale low phosphorus iron at under $33. We also note the sale of two car lots of Ohio silvery iron at $28 for 7 per cent, this being the regular price.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.21 to $20.71
Northern No. 2 fdy., sil. 1.75 to 2.25	19.00 to 20.00
Southern fdy., sil. 2.25 to 2.75	24.67 to 25.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	34.00

Mining Operations.—Although many mining companies have unusually large stock piles there is a disposition to resume mine operations in order to provide work for the miners. In some of the mining districts, the men have had little work this year and with the long period of unemployment their situation is growing very serious. Although mining companies have no need for the ore, they are starting up some mines to prevent suffering during the winter among the miners and their families. Following this policy, M. A. Hanna & Co. are resuming operations at four mines, the Fay, Thorne, Leonard No. 3 and Harold in the Mesabi district. This firm recently resumed operations in two mines in the Menominee district.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is very light with orders confined to small lots. Local makers are holding to regular prices. There is little activity in rivets. Some makers are still granting concessions of from $1 to $3 per ton from the regular quotations of 2.40c. for structural and 2.50c. for boiler rivets. Some inquiries have come out for first quarter contracts, but the leading local maker has declined to quote prices for that delivery.

Semi-Finished Steel.—Sheet bars are being offered at $29, although $30 is the usual quotation. Some inquiry is coming out and a fair buying activity is looked for early next month. Slabs are quoted at $29, Youngstown, but there are reports that this price has been shaded.

Finished Iron and Steel.—While there is virtually no inquiry for round lots of steel, the volume of small orders is holding up well for this season of the year. Buyers are showing no disposition to contract for the first quarter. Plates are more active than other items. One order was placed for 300 tons of plates for oil still bottoms. In this territory there is apparently no shading of the 1.50c. price on steel bars, plates and structural material and the price has become more general, although small lot sales are still being made at 1.60c. Ohio tank shops are reported to be well filled with work and some of the recent orders for oil tanks have gone to other districts. It is stated that the oil tank work that has been placed for the Mexia, Tex., field will require, 60,000 to 75,000 tons of plates. A local mill is quoting light plates on a 1.75c. basis, making a 2.10c. price, or $3 a ton lower than blue annealed sheets. Hard steel reinforcing bars are very dull and weak. Lower prices on soft steel bars have forced hard steel bars down to 1.45c. and a 1.40c. price would probably be named on a desirable order. Light rail prices are weak with quotations ranging from 1.45c. to 1.50c. Hoops and bands in the wider sections continue weak with reports of quotations as low as 1.70c. made by strip mills. In structural lines, architects are working

on a number of projects and more activity is expected early in the year. The Canton Bridge Co. has taken 200 tons for a plant for the Sanderson Cyclone Drill Co., Orrville, Ohio, and the Moss Iron Works, Wheeling, 125 tons for a school in Ravenna, Ohio. Inquiries are out for 200 tons for the Broadway Bank of the Union Trust Co., Cleveland, and for 175 tons for a bank building for the Elyria Savings & Trust Co., Elyria. The Cuyahoga County Commissioners are taking steps to go ahead with the Huron-Lorain bridge, Cleveland, which will take 6000 tons or more of steel if all-steel construction is decided upon.

Jobbers quote steel bars, 2.54c.; plates and structural shapes, 2.64c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.14c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—The demand for sheets has fallen off, as consumers wish to keep their stocks low at inventory time. The regular prices of 3c. for black, 4c. for galvanized and 2.25c. for blue annealed sheets are being maintained.

Warehouse Business.—Some of the jobbing houses report that warehouse sales are still in better volume than last month. However, warehouse orders for sheets have become very light. Prices are unchanged.

Coke.—The coke market continues dull. Some car lot sales are reported, the more common prices being $4 to $4.25 for standard Connellsville makes, although one maker is asking $4.75.

Old Material.—The market is very dull, but prices are fairly firm and quotations are unchanged. No new demand has come from consumers and two mills using scrap from this territory have held up on shipments. There is little trading between dealers although there is some activity in machine shop turnings. The trade expects consumers to come in the market again early in January.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$11.50 to $12.00
Steel rails, under 3 ft	12.50 to 13.00
Steel rails, rerolling	14.00 to 14.50
Iron rails	12.00 to 12.50
Iron car axles	18.00 to 19.00
Low phosphorus melting	13.00 to 13.50
Cast borings	8.50 to 8.60
Machine shop turnings	7.50 to 7.60
Mixed borings and short turnings	8.50 to 8.60
Compressed steel	9.00 to 9.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet stampings	6.00 to 7.00
Steel axle turnings	9.00 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in	7.50 to 8.00
Drop forge flashings, under 10 in	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

New York

NEW YORK, Dec. 20.

Pig Iron.—After several weeks of very fair activity, the holiday lull has come and nearly all buyers seem to be postponing taking any action until after the new year. The Central Foundry Co., which has been inquiring for 2000 tons, half No. 2X and half No. 2 plain, has not yet placed its order. A Tennessee car works is in the market for 400 tons of high silicon iron. An inquiry concerning which details are not available includes from 3000 to 4000 tons. Prices show no change and there is no disposition to go under the recent very low quotations on iron for delivery into New England.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	23.96 to 24.46
No. 2 Virginia, sil. 1.75 to 2.25	27.16 to 28.16

Finished Iron and Steel.—A considerable volume of structural steel business is pending, and while some work may be held back pending the adjustment of wages in the New York building trades, the prospect for continued building activity early in the new year appears fairly bright to fabricators and structural steel companies. One of the largest buildings being figured on is the proposed office structure for the Equitable Life Assurance Society on Seventh Avenue near the Pennsylvania station; steel requirements will be 9000 tons. A department store building for R. H. Macy & Co., requiring 8000 tons, is also being figured, and a new office building for Pershing Square, Forty-second Street and Fourth Avenue, 5000 tons. The steel required for the stadium for the New York (American League) baseball park will total 3000 to 4000 tons; bids close Dec. 22. The Dravo Contracting Co., Pittsburgh, is low bidder on the South Street bridge, Philadelphia, and the American Bridge Co. will furnish the steel, about 3000 tons. An office building for the Neumont Realty Co. at 49 West Forty-fifth Street, New York, requiring 600 tons, is up for bids; also a Masonic Temple at New Britain, Conn., 300 tons, and another building for Johns Hopkins University, Baltimore, 350 tons. An inquiry for a 500-ton building was mentioned last week. There will be a letting this week by the New Jersey State Highway Commission for work at Fernwood, N. J., 500 tons. The American Bridge Co. has been awarded 350 tons of steel for Public School No. 58, New York. The Paterson Bridge Co. will fabricate 1400 tons for a factory building at 242 West Thirty-sixth Street, New York. Oil tank work continues to figure in current steel lettings. The Humble Oil Co., Baytown, Tex., has let a contract for tanks requiring 2700 tons of plates. The Sinclair Consolidated Oil Corporation has awarded 50 tanks in all to the Chicago Bridge & Iron Works, the steel totaling about 13,000 tons. A part of this work was mentioned in a recent issue as having been awarded. The Thomas Crimmins Contracting Co., which will do a portion of the Catskill aqueduct work, has awarded to the New York Engineering Co., New York, the contract for fabricating 8000 tons of plates into pipe. The steel will be furnished by the Bethlehem Steel Co. from its Sparrows Point plant and transported to Yonkers by water. Fabrication of 2000 tons of plates into pipe for Rice & Ganey, another aqueduct contractor, will be done by the American Bridge Co. These projects are almost the only features of the pre-holiday steel market. Jobbers and consumers of steel are buying very sparingly. Prices are virtually unchanged. Plates, shapes and bars are being quoted at 1.50c., Pittsburgh, but on desirable business this figure is being shaded, particularly on plates and shapes.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c.; plates, 1.83c. to 1.98c.; structural shapes, 1.88c. to 1.98c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—The settled dullness of the market continues. Reports of price shading are still current, but, in general, orders are not sufficiently large or numerous to produce any inclination to make lower prices. There have been offers of black sheets at lower than the prevailing quotation of 4c. per lb. base, and some shading of plate and bar prices. In most instances the middle of January or first of February is felt to be the earliest prospect of any improvement. In accordance with the recent mill reductions in prices of standard steel pipe, warehouses handling this product have reduced quotations about $5 per ton. The brass and copper market is as dull as iron and steel, but warehouses look forward to considerably better business early in 1922, based upon fairly large orders now on the books for delivery in January, February and March. We quote prices on page 1652.

High-Speed Steel.—The market is dull and although some makers of special brands maintain prices of 90c. to $1 per lb., prices generally range from 85c. to 95c. per lb. for 18 per cent tungsten high-speed steel.

Cast-Iron Pipe.—The demand for pipe from private companies is greater than normal for this time of year, many shops being booked ahead with orders for two or three months. In going over their books, several makers have discovered that their volume of business has been greater this year than last. Providence, R. I., will open bids Dec. 28 on 600 tons; New Bedford, Mass., will consider bids on 500 tons on Dec. 27; sizes range from 8 to 16 in. for both cities. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and

larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Ferroalloys.—The ferromanganese market is more active both as to sales and inquiries. It is understood that an Ohio consumer has contracted for about 1000 tons for first half delivery at about $60, delivered, the leading steel producer being credited with the sale. Inquiries from three or four other consumers total about 600 tons. There is no change in the prevailing quotations. There are inquiries for small lots of spiegeleisen, the quotations for which remain firm. An interesting development is the inquiry for several hundred tons for export, the movement being one of the largest in years. There is no demand for manganese ore. While some producers of 50 per cent ferrosilicon continue to quote $60, delivered, the material can be obtained at concessions considerably below this level, or at $57 per ton, delivered. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$57.00
Ferrotungsten, per lb. of contained metal	40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	10c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	45c. to 50c.

Old Material.—The stiffening market on heavy melting steel in the Pittsburgh district has tended to halt the downward march of prices here. Prices are nearly at a standstill, though the tendency is toward a drop. One broker has marked up buying prices of grate bars 50c., offering $13.50, delivered, Phoenixville. He has marked down on four other items. New York scrap dealers and brokers are not keenly interested in the scrapping of Navy vessels. They believe the supply, so afforded, would not depress the market because of the comparatively small amount of tonnage and the length of time before it would be placed on the market. The market may rise and fall many times before this supply becomes a factor, they say. They also believe that it will be difficult to interest parties in forming a company to dismantle war vessels because of the temporary nature of the business.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.50 to $8.50
Steel rails, short lengths, or equivalent	8.50 to 9.50
Rerolling rails	9.50 to 10.50
Relaying rails, nominal	30.00 to 35.00
Steel car axles	10.50 to 11.00
Iron car axles	18.50 to 19.50
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	8.50 to 9.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Cast borings (clean)	6.50 to 7.00
Machine-shop turnings	4.00 to 5.00
Mixed borings and turnings	4.00 to 4.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	6.75 to 7.25
Stove plate	9.00 to 10.00
Locomotive grate bars	9.00 to 10.00
Malleable cast (railroad)	8.00 to 8.50
Car wheels	10.50 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

Steel Rates Again Suspended

WASHINGTON, Dec. 20.—The Interstate Commerce Commission has further suspended until Feb. 8 the operation of tariff schedules which proposed the cancellation of the existing carload and less than carload commodity rates on iron and steel products from Boston, Chelsea, Davenport, Gloucester, Cambridge, Clinton, Fitchburg and Worcester, Mass., to destinations on the Maine Central Railroad. The schedules indicate the application of class rates.

Philadelphia

PHILADELPHIA, Dec. 20.

The year is drawing to a close with marked weakness in all markets—pig iron, steel products and scrap. In foundry iron there has been a drop of at least 50c. a ton during the week and on a sale of 6000 tons of basic iron the delivered price was about 75c. a ton below that of the last important transaction. In steel products there is not enough business to bring out a general trend toward lower levels, but where tonnages are desirable, Eastern mills have shown no hesitancy in quoting delivered prices which put Pittsburgh base prices out of the reckoning.

Mill operations over the holidays are apt to be somewhat reduced, as the steel companies are finding it difficult to obtain sufficient accumulations of orders for any continuity of rollings. There is a degree of optimism that buying of steel will be better after the turn of the year. Jobbers are known to have worked their stocks to a very low point, and many of them will undoubtedly place new stock orders after inventory. One New York jobber is now inquiring for 3000 to 5000 tons of structural shapes and small angles.

Pig Iron.—Further weakness in pig iron prices has developed within the past week, both foundry and steelmaking grades having sold below last week's quotations. An Eastern steel maker has bought 6000 tons of basic, divided equally between two furnaces, at $20.25, delivered, which represents a decline of 75c. per ton since the last important basic sale. In foundry iron there is marked weakness and prices have eased off for first quarter shipment fully 50c. a ton or more during the week. No. 2 plain iron is to be had, where the tonnages are attractive, at $19.50, furnace, and No. 2X at $20 and $20.50, furnace. No. 1X has been sold at $21 and $22, furnace. All sales are not being made at these low prices, some furnaces asking and sometimes obtaining 50c. to $1 higher, but this usually occurs in cases where the foundryman desires a particular brand to which he has grown accustomed through long use. Low phosphorus, malleable and gray forge grades are inactive and prices quoted are nominal. While the market has not been active during the week, one or two sellers have booked a fair quantity of business. One sales office figures its total in foundry iron sales for the week at 7500 tons. A cast iron pipe company has closed for a total of 5000 tons of No.2 plain at $21, delivered, the order being split among three furnaces. There have been a few other good-sized sales.

The following quotations are, with the exception of those on low phosphorus iron for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to $20.76
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	20.25
Gray forge	21.00 to 22.00
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Very little inquiry for ferromanganese has originated recently in the Eastern steelmaking district, but one sale of 1000 tons is reported from Ohio. It is reported that the order went to the Steel Corporation at $60 a ton, delivered. Spiegeleisen is nominally quoted at $25 to $27, furnace, with few sales.

Billets.—While demand for billets is limited, a few sales have been made recently. Prices are weak, $28, Pittsburgh, having been done by buyers on rerolling quality and $32, Pittsburgh, on forging quality.

Plates.—Plate mills, if operating at all, continue on a hand-to-mouth basis, seldom knowing what their rolling schedules will be for more than a few days ahead. Some small orders are being placed, but aside from one lot of 8000 tons placed with a Sparrows Point mill for the Catskill aqueduct job, New York, no large tonnages are coming out. Prices are weak, but the situation is complicated by the willingness of Eastern mills to quote f.o.b. mill rather than on a Pittsburgh basis on desirable lots. On a Pittsburgh basis it is

easy now to do 1.45c., and some quotations by Eastern mills, if figured back to Pittsburgh, work out to lower figures than this.

Structural Material.—The Keystone State Construction Co. was low bidder on the foundations for the Philadelphia-Camden bridge, which will require about 1200 tons of shapes, in addition to tonnages of reinforcing bars and sheet steel piling. About 1500 tons of steel will be required for a new Museum of Arts, Philadelphia, on which quotations are now being made. Fabricators are figuring work very closely and in numerous instances are obtaining prices on shapes below 1.50c., Pittsburgh.

Bars.—Makers of bar iron are now quoting 1.50c. to 1.55c., Pittsburgh, and even these prices could be shaded on attractive lots, but such have not been forthcoming. Steel bars are quoted at 1.50c., Pittsburgh, but on reinforcing bars this has been shaded. Very little business is being done and prices are not thoroughly tested.

Sheets.—Despite rumors of shading of prices on sheets, the leading makers say that 2.25c. on blue annealed, 3c. on black and 4c. on galvanized, Pittsburgh base, are fairly firm.

Rails.—No inquiry for rails has come from the Pennsylvania Railroad, but one is expected soon. This road is reported to have scaled down its anticipated requirements for 1922 from 150,000 to 100,000 tons.

Wire Products.—A reduction in the prices of wire nails and other wire products is anticipated by consumers, who have been advised to this effect by one of the leading makers. There has been some shading of $2.75 per keg on wire nails.

Warehouse Business.—Demand for steel out of stock has continued on an even keel this month, but without improvement over the November sales. Jobbers' stocks are running low and there will be considerable replenishment required after inventory. Prices are unchanged and for Philadelphia delivery are as follows:

Soft steel bars and small shapes, 2.65c.; iron bars (except bands), 2.65c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.50c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.25c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Coke.—Furnace coke for first quarter contract delivery is quoted at $3.10 to $3.25, Connellsville, but distress furnace coke has been offered within the past few days at $2.75, Connellsville. Foundry coke is available at $4, Connellsville.

Old Material.—Demand for scrap has dropped almost to nothing and prices are weak. One Eastern mill came into the market for stove plate and grate bars, but otherwise there has been no buying of moment. This buying immediately strengthened prices of these grades, though other prices remain weak. We quote for delivery to consumers in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	¾-¾ 16.25 to 16.75
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.50 to 17.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.00 to 12.50
No. 1 forge fire	9.50 to 10.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.00 to 9.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	13.50 to 14.00
No. 1 cast	16.50 to 17.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	13.50 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications)	11.50 to 12.00
Iron car axles	No market
Steel car axles	17.00 to 18.00

St. Louis

ST. LOUIS, Dec. 20.

Pig Iron.—An improvement is reported in the demand for pig iron. Sales were better, there were more inquiries and shipping instructions on contracts were heavier. There was no outstanding order or inquiry of consequence, business being largely in carloads and up to 300 tons for immediate or first quarter shipment. The sale is reported of 300 tons of foundry iron to a southern Illinois radiator manufacturer and of considerable tonnage of Lake Superior charcoal iron in this district. A Louisville melter wants 200 tons of foundry iron, and there is an inquiry from a local melter for 200 tons of malleable. The St. Louis Coke & Chemical Co. is now operating its furnace at Granite City, Ill. The market seems fixed now at $20, Chicago. Inquiries for four carloads of spiegeleisen came from three different concerns and there also was an inquiry for a carload of ferro-manganese.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$22.88
Northern malleable, sil. 1.75 to 2.25	22.88
Basic	22.88
Southern foundry, sil. 1.75 to 2.25	$23.41 to 23.91

Coke.—The demand for coke is only moderate, and sales are confined to carload lots, consumers not being disposed to close any big tonnages. The only inquiry of note is for 3000 tons of foundry coke for shipment through the first half of next year. Mild weather has cut the consumption of domestic coke.

Old Material.—The old material market is irregular and spotty. Steel foundry grades, such as couplers, knuckles, springs and solid steel wheels, are stronger, while rolling mill grades are decidedly weaker. Some of the dealers are short on steel specialties, and as the mills in this district are demanding this material, the tendency of these grades is upward. Rerolling rails also are in demand, and this item has advanced 50c. a ton, but relaying rails are slow and very few inquiries are before the market. There are no railroad offerings of consequence this week.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Old iron rails	$14.50 to $16.00
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft	13.00 to 13.50
Relaying rails, standard section	23.00 to 28.00
Cast iron car wheels	15.50 to 16.00
No. 1 heavy railroad melting steel	11.50 to 12.00
No. 1 heavy shoveling steel	11.00 to 11.50
Ordinary shoveling steel	10.50 to 11.00
Frogs, switches and guards cut apart	11.50 to 12.00
Ordinary bundle sheet	4.50 to 5.00
Per Net Ton	
Heavy axles and tire turnings	6.00 to 6.50
Iron angle bars	13.50 to 14.00
Steel angle bars	10.50 to 11.00
Iron car axles	20.00 to 21.00
Steel car axles	14.00 to 14.50
Wrought iron arch bars and transoms	14.50 to 15.00
No. 1 railroad wrot	10.00 to 10.50
No. 2 railroad wrot	9.00 to 9.50
Railroad springs	12.00 to 12.50
Steel couplers and knuckles	12.00 to 12.50
Locomotive tires 42 in. and over, smooth inside	9.00 to 9.50
No. 1 dealers' forge	8.00 to 8.50
Cast iron borings	6.00 to 6.50
No. 1 busheling	9.50 to 10.00
No. 1 boilers cut in sheets and rings	7.50 to 8.00
No. 1 railroad cast	14.00 to 14.50
Stove plate and light cast	12.00 to 12.50
Railroad malleable	9.50 to 10.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	6.50 to 7.00
Light railroad sheet	4.50 to 5.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	5.50 to 6.00
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	8.50 to 9.00
Horseshoes	11.00 to 11.50
Railroad brake shoes	9.50 to 10.00

Finished Iron and Steel.—The railroad business continues to be the center of interest in the trade here. In addition to the inquiries pending, purchasing agents are busy preparing additional lists of requirements. The Union Pacific has an inquiry out for 20 69-ft. steel baggage cars and 20 70-ft. steel passenger cars. The Wabash wants two steel diners and ten steel coaches. The Missouri Pacific and Missouri, Kansas & Texas each want a carload of plates, and the former road also wants 1000 kegs of track spikes. The market for sheets is firm and full prices are being obtained on the few

sales that are being made here. A fair demand is reported from the South. Some sales of wire rods are being made in this territory, one concern reporting 250 tons within the last two weeks. The demand for structural steel is virtually dead, pending a readjustment of the wage situation.

For stock out of warehouse we quote: Soft steel bars, 2.77½c. per lb.; iron bars, 2.77½c.; structural shapes, 2.87½c.; tank plates, 2.87½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, $3.52½ per 100 lb.; boiler rivets, $3.65; tank rivets, 7/16 in. and smaller, 60-10-10 per cent off list; machine bolts, large, 60-10 per cent; small, 60-10 per cent; carriage bolts, large, 55-5 per cent; small, 55 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, $4; and tapped, $3.75 off list.

San Francisco

SAN FRANCISCO, Dec. 7.

Pig Iron.—The tendency to limit operations in foundry work to routine needs, with a consequent curtailment of demand for pig iron, has become more manifest in the past fortnight period. Actual sales, accordingly, have been very few, and principally involving small lots. One large handler reported selling three cars of Belgian material at $30, ex-ship, San Francisco. The grade was No. 1. In view of present conditions, this price is considered very good, as the general market level is conceded to be somewhat below $30. Lower grades are still freely offered around $25, with virtually no takers. There are several prospects around at the moment from certain foundries and machine companies, it being reported that there is some interest in an aggregate of about 1500 tons of Belgian and German iron. No business, however, has resulted yet. Competition is very keen for the few prospects that arise.

Coke.—As has been the case this year, the Southern Pacific Co. provides the chief buying feature in this commodity, that road now being in the market for 600 tons of standard quality domestic coke. It is estimated that from 8 to 10 cars have moved into consumptive channels during the past week or so. There has been noted a slight increase in imports of foreign coke and a fair business has been done at approximately $21, ex ship, for No. 1 English foundry.

Old Material.—By far the largest and most interesting transaction in the scrap market on the Coast of recent date is the purchase of 5000 tons of heavy melting steel by a big scrap interest. This material came from the old cruisers Marblehead and Minneapolis, and was taken on the basis of $10 a gross ton, f.o.b. cars, Oakland, which is considered the market price. Otherwise, there is little, if any, change in the scrap situation here, the regular business being done each week. Cast iron material is rather quiet at from $20 to $22.

Cast-Iron Pipe.—After a period of relative dullness, municipal demand for pipe shows improvement, and at the same time business from private sources is very satisfactory at present. In spite of this, however, the market has developed a slight softening tendency, the base price now being quoted from $30 to as high as $35, although $33 represents the general top. On Dec. 6 Los Angeles received bids on 1040 tons of 4-in., 800 tons of 6-in. and 57 tons of 8-in. pipe. The city of Sacramento called for bids on Dec. 1 for 42 tons of 6-in. pipe. Anaheim is in the market for 397 tons of 10-in., 31 tons of 12-in. and 7 tons of 6-in. pipe. Alhambra asked bids on Dec. 5 for 30 tons of 4-in., 9 tons of 6-in. and 34 tons of 8-in., and Holtville closed bids to-day for 78 tons of 4-in. pipe.

Finished Iron and Steel.—There is very little to report in the Coast steel market at present. Except for a routine movement of mixed materials, the situation is exceedingly quiet here, and operators are expecting this general condition to prevail until the holiday season is over. Buyers are holding off in view of the inventory period being at hand. An unsettled condition still prevails in prices of plates and sheets, but there is hardly enough actual business being done to establish a reliable idea of values. It appears that galvanized sheets are around 3.75c., Pittsburgh.

British Iron and Steel Market

Galvanized Sheets the One Active Element—Continental Competition in Bars Has Forced a Drastic Cut—Billets Higher

(By Cable)

LONDON, ENGLAND, Dec. 20.

As a substantial drop in railroad freight rates is confidently expected for early in January, the tone of the Cleveland pig iron market is consequently improving, though demand is naturally quiet, owing to the near approach of the Christmas holidays. Fourteen East Coast hematite furnaces are now in blast and prices are weak. Bilbao Rubio is held at 26½s. to 27s. ($5.56 to $5.67) ex-ship, Tees.

There is a fair export demand for steel generally, but works managers are anxious for actual orders. Beams have been sold at below £8 (1.50c. per lb.) f.o.b. Prompt rails are quoted at £8 10s. ($35.70) f.o.b. Guest, Keen & Nettlefolds, Ltd., of Birmingham, is building a new mill for making steel railroad ties.

Tyne shipbuilding output this year has amounted to 373,959 tons gross register. Walter Runciman has purchased a fleet now building on the Tyne, for delivery early in 1922, at about a pre-war price, for Eastern, Australian and Pacific trades.

There is some improvement in sales of Continental material. India has bought German merchant bars at £8 10s. (1.59c. per lb.) c.i.f. German wire rods have been sold to Japan at £8 15s. to £9 ($36.75 to $37.80) f.o.b. for February and March delivery. Czecho-Slovakian merchant bars are being sold at £8 (1.50c. per lb.) f.o.b., for shipment in three to five weeks. Belgian bars are quoted by merchants at £8 12½s. (1.62c. per lb.) c.i.f. India. Luxemburg bars are quoted by the works at £7 10s. (1.41c. per lb.) f.o.b., for shipment in eight weeks. Belgian rails are offered at £9 10s. ($39.90) delivered in the Midlands. French rounds and squares are offered at £8 5s. (1.55c. per lb.) f.o.b.

Tin plates are depressed on forced liquidation and prices have declined to below cost. Far forward sales are being done at below 20s. ($4.20) basis f.o.b. Some makers, in consequence, are doubtful of being able to continue rolling. Present Wales output is about 75 per cent. Home trade demand is quiet. Odd sizes are being sold at 20¼s. ($4.25) f.o.b., for January and February shipment. The Far Eastern demand is stagnant.

Galvanized sheet makers are booking more orders, especially to Indian specifications. Most of the works are full until the end of January. Black sheets are easier.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.20 per £1 as follows:

Durham coke, delivered...	£1 8½ to £1 10	$5.98 to $6.30
Cleveland No. 1 foundry..	5 5 & 5 10*	22.05 & 23.10*
Cleveland No. 3 foundry..	5 0 & 5 5*	21.00 & 22.05*
Cleveland No. 4 foundry..	4 15	19.95
Cleveland No. 4 forge....	4 10	18.90
Hematite	7 0*	29.40*
East Coast mixed.....	5 0 & 5 2½*	21.00 & 21.52*
Ferromanganese	15 0 & 14 10*	63.00 & 60.90*
Rails, 60 lb. and up.....	9 0 to 10 10	37.80 to 44.10
Billets	8 0 to 8 5	33.60 to 34.65
Sheet and tin plate bars, Welsh	7 15	32.55
Tin plate base box.....	1 0 to 1 1	4.20 to 4 41
		C. per Lb.
Ship plates	9 10 to 10 10	1.78 to 1.97
Boiler plates	14 0 to 14 10	2 62 to 2.72
Tees	10 0 to 11 0	1.87 to 2.06
Channels	9 5 to 10 15	1.73 to 2.02
Beams	8 0 to 10 0	1.50 to 1.87
Round bars, ¾ to 3 in....	8 10 to 10 0	1.59 to 1.87
Galvanized sheets, 24 g...	17 0	3.19
Black sheets	14 0	2.62
Steel hoops	12 0 & 12 5*	2.25 & 2.30*
Cold rolled steel strip, 20 g.	24 10	4.59

*Export price.

EXPORTS INACTIVE

Japanese Buying a Question of Price—Chinese Blast Furnaces Recently Completed

NEW YORK, Dec. 20.—Although stocks of iron and steel in Japan are now about normal and the economic situation of the country much improved, buying is still largely a question of price. This condition is true, not only of Japan, but of China and other Far Eastern markets. To meet this condition, at least partially, American sellers have evidently shaded quotations in many instances considerably, resulting in a rather wide range between export and domestic prices. A Shanghai buyer, recently inquiring for 1000 tons of Apollo sheets, offered as a price 4.10c. per lb., c.i.f. Shanghai. Heavy tin plate has been obtained at $5.20 per box of 90 lb., and checkered head, counter-sunk wire nails at $4 per 100-lb. keg, all c.i.f. Shanghai. This was American material.

South American ports, Mexico, South Africa, Australia and other purchasing markets of iron and steel have largely reduced the heavy stocks of cancelled and surplus material that had accumulated in the early part of this year but the depressed condition of exchange and other factors have prevented any large purchasing as yet. A number of large projects are contemplated by foreign governments. The Argentine Government is considering the construction of about 866 km. (538 miles) of railroad connecting Cordoba and Bahia Blanca. The Rivadavia Oil Co., Buenos Aires, Argentina, has purchased and is still buying equipment for the oil fields in Argentina. Bids were opened this week in New York on an electric or hand-power crane for this company, which is partly government controlled.

A new smelting plant of the Han-Yeh-Ping Co., on the Yangtze River, which was built by Japanese engineers, is reported to be completed and ready for operation. Contracts have been let for the construction of a blast furnace for the Lung-Yen Co., near Peking, according to the Bureau of Foreign and Domestic Commerce, and another furnace is planned at Chingwangtao.

American Engineering Council to Meet in January

Plans for the development of the work of the Federated American Engineering Societies were under discussion at a series of conferences and meetings held in New York last week. President Mortimer E. Cooley and Executive Secretary L. W. Wallace met with the American Engineering Council's committee on procedure Friday evening, Dec. 16, and with the secretaries of the national founder societies on Saturday evening.

The Washington meeting of the council will be held on Jan. 5 and 6. On Jan. 4 at 2 p.m. the executive board will hold a preliminary session at the Cosmos Club, where the council will meet. The business of the council will include the election of three new officers, two vice-presidents and a treasurer. On the evening of Jan. 5 an informal dinner will be given at the University Club, to which the engineers of Washington will be among those invited. Herbert Hoover has been asked to attend and he has accepted provisionally. Secretary Hoover is to spend the holidays in California and his presence is contingent upon his ability to arrange for his return to the capital by this day. In addition to Secretary Hoover, other prominent speakers are expected to deliver addresses.

On Jan. 6 the council will again meet in business session at 10 a.m., and on the afternoon of that day there will be a meeting of the executive board, the new members of which will be elected by the delegates from the national organizations and the regional areas. Each region will choose one member of the board. Representation of the national societies will be determined by membership, the A. S. M. E., for example, electing five.

At the Washington meeting the work of the past year will be reviewed and plans for the ensuing year discussed. Among the important reports to be received will be that of the special committee on unemployment. Other leading topics will be industrial waste, National Department of Public Works, Patent Office conditions and licensing. Proposed constitutional changes also will be acted upon.

Carnahan Tin Plate & Steel Co. Changes Ownership

YOUNGSTOWN, OHIO, Dec. 20.—The Carnahan Tin Plate & Sheet Co., Canton, Ohio, producer of coke tin plate, has been purchased by Paul Wick and Lloyd Booth, controlling interests in the Falcon Steel Co., operating an 8-mill sheet plant at Niles, Ohio. The new owners will take possession in January. The Canton property is to be reincorporated as the Falcon Tin Plate Co. and eventually merged with the Niles company.

The original Carnahan plant was created and equipment installed several years ago, but in the meantime has been rebuilt and substantial additions made. The plant has a yearly capacity for about 800,000 base boxes of tin plate. It is well booked ahead, having shared in business placed recently. Mills of the Canton property are convertible, making it possible to roll either tin plate or sheets. When operating normally, it employs about 700 men.

To Sell Ferromanganese Direct

E. J. Lavino & Co., Bullitt Building, Philadelphia, manufacturers of ferromanganese and other ferroalloys, have announced to their trade that after Jan. 1 they will sell direct instead of through brokers, as has been their custom. They will soon open a sales office in Pittsburgh, but definite arrangements have not been completed.

Will Sell "Swede" Iron in New England

The Alan Wood, Iron & Steel Co., Philadelphia, has appointed Arthur Tutein, Inc., Boston, as selling agent for "Swede" pig iron in New England. Park & Williams, Philadelphia, will continue to sell "Swede" iron in the remainder of the Eastern territory.

The Chamber of Commerce of Youngstown, Ohio, is making a bid for light manufacturing plants along the Youngstown & Austintown Railroad, completed Dec. 5 by the New Industries Co. of Youngstown. The company has made available more than 1200 acres, with 40,000 ft. of railroad frontage. This industrial center provides sites for 100 manufacturing plants, each with abundant railroad facilities, supplying full reciprocal switching rights with five trunk line railroads.

The Bethlehem Steel Co., Baltimore, has preliminary plans under way for extensions in its Sparrows Point plant, to be inaugurated as soon as conditions warrant. It is proposed to utilize the plant of the Baltimore Dry Docks & Shipping Co., recently acquired, for another line of iron and steel working, soon to be announced, and shipbuilding operations at what is known as the South Plant will be discontinued.

The Associated Contractors of Massachusetts have gone on record for reduced wages in building trades and have unanimously voted not to allow labor unions to dictate working conditions in 1922. Such action is backed by the Associated Industries of Massachusetts.

The Anderson Iron Works, Marinette, Wis., is enlarging its working force to fill orders for a patented brick conveyor system used largely by brick manufacturers, contractors, etc.

The Bates Machine & Tractor Co., Joliet, Ill., has arranged for a note issue of $300,000, for general operations, extensions, etc.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingnam	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $2.95; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots; 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads ..... 65 and 10 to 70 per cent off list
Longer and larger sizes ..... 65 and 10 to 70 per cent off list
Lag bolts ..... 70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads ..... 60 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter ..... 65 and 5 per cent off list
Larger and longer sizes ..... 65 per cent off list
Hot pressed sq. or hex. blank nuts ..... $5.50 off list
Hot pressed nuts, tapped ..... $5.00 to $5.25 off list
C.p.c. and t. sq. or hex. blank nuts ..... $5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped ..... $5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive ..... 80, 10 and 10 per cent off list
Small sizes S. A. E. ..... 80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E. 70, 10, 10 and 10 per cent off list
Stove bolts in packages ..... 80, 10 and 5 per cent off list
Stove bolts in bulk ..... 80, 10 and 7½ per cent off list
Tire bolts ..... 65, 10 and 10 per cent off list
Track bolts, carloads ..... 3.25c. to 3.50c. base
Track bolts, less than carloads ..... 4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under ..... 80 and 10 per cent off list
9/16 in. to ¾ in. ..... 80 and 10 per cent off list

Upset Set Screws

½ in. and under ..... 80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in. ..... 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes ..... 75 and 10 per cent off list

Milled Set Screws

All sizes ..... 70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets ..... $2.25 to $2.40 base
Large boiler rivets ..... 2.35 to 2.50 base
Small rivets ..... 70, 10 and 5 to 70, 10 and 10 per cent off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38; chain rods, $38; screw stock rods, $43; rivet and bolt rods and other rods of that character, $38; high carbon rods, $45 to $50, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.40 base; 5/16-in., $2.40 base. Boat and barge spikes, $2.40 to $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	60	33½	½	36½	18½
½	65	50½	¾	42½	27½
¾	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20	Nos. 11 and 12	2.30
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.35
		Nos. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Zinc	
Dec.	Lake	Electrolytic	Tin New York	New York	St. Louis	New York	St. Louis
14.....	13.75	13.50	33.00	4.70	4.40	5.17½	4.82½
15.....	13.87½	13.62½	33.75	4.70	4.40	5.20	4.85
16.....	13.87½	13.62½	33.75	4.70	4.40	5.20	4.85
17.....	13.87½	13.62½	.....	4.70	4.40	5.20	4.85
19.....	13.87½	13.62½	33.00	4.70	4.40	5.22½	4.87½
20.....	13.87½	13.62½	33.00	4.70	4.40	5.25	4.90

New York

NEW YORK, Dec. 20.

Buying in all the markets is moderate, but the price tendency is strong. Actual buying of copper has temporarily slackened, but prices are higher. Moderate activity pervades the tin market with prices higher. Quiet demand at firm prices features the lead market. Prices for zinc have advanced on prospective buying for next year.

Copper.—The electrolytic copper market grows gradually stronger both in demand and prices as the weeks pass. Actual buying for either prompt or future delivery is less active than recently, due largely to the desire of consumers to keep stocks down for inventory purposes, but both actual and prospective demand is of large enough proportions to result in a strong undertone and a slight advance in price. Electrolytic copper for prompt and early delivery is now at a minimum of 13.87½c., delivered, or 13.62½c., refinery, with first quarter at 14c., delivered, and 13.75c., refinery. It is still possible to buy a little January metal at 13.87½c., delivered. The features of the generally quiet market are actual demand for December delivery and large inquiries for January and first quarter which are expected to develop into orders, at least soon after the first of the year. Demand for foreign consumption continues excellent. Active preparations are being made for the more general resumption of mining operations which were drastically curtailed some months ago.

Tin.—The market has been moderately active in a quiet way, with dealers the principal buyers. Consumers, while not actively interested, are carefully following developments. The principal business during the week, outside of that referred to, was done on the New York Metal Exchange. On Dec. 13, 125 tons of Straits tin was sold there, varying from 32.50c. for December-January to February-March shipment from the East to 32.75c. for December shipment. On the following day, Dec. 14, 50 tons of January-February shipment from the East was sold at 33c., with the same price bid for more, sales earlier in the day having been made at 32.87½c. On Dec. 16, 25 tons of January shipment from the East went at 33.50c., with futures at the same price and even down to 33.25c. Yesterday and to-day the market has been quiet, spot selling at 33c., yesterday, with future positions obtainable at the same price. Spot Straits tin was quoted to-day at 33c., New York, and the London market to-day was about £2 per ton higher than a week ago at £171 10s. for spot standard, £173 5s. for future standard and £172 10s. for spot Straits. Arrivals thus far this month have been 2608 tons, with 4215 tons reported afloat.

Lead.—The market continues quiet but firm, with a steady demand for both December and January shipment, the latter being obtainable at December prices. Quotations are unchanged with 4.70c., New York and St. Louis, quoted by the leading interest and with independents asking 4.70c. to 4.75c., New York, and 4.35c. to 4.40c., St. Louis. Scarcity of lead in London continues the feature as well as higher prices, and there are prospects of export shipments to that country in the near future.

Zinc.—Interest in first quarter delivery on the part of consumers is broadening and is the principal factor in the market, being sufficiently strong to cause a gradual stiffening of prices. Prime Western for early delivery is quoted and has been sold at 4.90c., St. Louis, or 5.25c., New York. For first quarter the quotation ranges from 4.95c. to 5c., St. Louis, moderate sales having been made at the lower level and prospects of 5c. per lb. the minimum before the end of the year. There is an inclination on the part of some consumers to purchase at the 4.90c. level in order to save the 10 points differential ruling for January or first quarter delivery.

Antimony.—The market is quiet and unchanged at 4.50c., New York, duty paid, for wholesale lots for early delivery, with jobbing lots quoted at 4.70c. to 4.90c.

Aluminum.—Wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery, are quoted by the leading interest at 19c., f.o.b. plant, with the same grade sold by importers at 17c. to 18c., New York, duty paid.

Old Metals.—Business is quiet but values are firm. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	13.25
Copper, heavy and wire	12.50
Copper, light and bottoms	10.00
Heavy machine composition	10.25
Brass, heavy	8.00
Brass, light	6.00
No. 1 red brass or composition turnings	8.25
No. 1 yellow rod brass turnings	6.25
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

DEC. 20.—Following a further advance late last week, tin has reacted and declined below the level of a week ago. Other metal prices remain unchanged and the market is generally quiet. We quote in carload lots: Lake copper, 13.75c.; tin, 34c.; lead, 4.45c.; spelter, 4.95c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.25c.; copper bottoms, 8c.; red brass, 8c.; yellow brass, 5.25c.; lead pipe, 3.25c.; zinc, 2.37½c.; pewter, No. 1, 23c.; tin foil, 24c.; block tin, 26c.; all buying prices for less than carload lots.

St. Louis

DEC. 19.—Lead for the week was steady and about unchanged around the 4.40c. level, car lots, while slab zinc was steady at 4.85c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

A special compilation of industrial accidents in Wisconsin in 1920, issued by the Industrial Commission, shows that 34.4 per cent of all accidents occurred in Milwaukee County. Of the total number reported, namely, 16,246, Milwaukee County is charged with 5580. These figures apply to cases settled under the State Workmen's Compensation Act. The total disbursement by Milwaukee County employers was $821,830, of which $189,636 was for medical attention and $632,194 for indemnity.

Foreign trade of the United States for the ten months of this year, combining imports and exports, was greater with the countries bordering on the Gulf of Mexico and the Caribbean Sea than with all other regions, while Atlantic Europe came second, Atlantic Canada third, and the United Kingdom fourth.

The Texas Heavy Hardware Co. and the Peden Iron & Steel Co., both of Fort Worth, Tex., are perfecting plans for consolidation, to become effective on Jan. 1. E. H. Beall, now president of the first noted company, will become manager of the merged concern.

PERSONAL

George A. Mason, manager of sales wire department, Jones & Laughlin Steel Co., for the past 11 years, has resigned that position, effective Jan. 1, and is retiring from active business. He has been identified actively with the steel and wire business since 1885 when he became affiliated with the H. P. Nail Co., Cleveland, in its sales department. In 1890 he took charge of the Chicago office of that company. In 1900 the H. P. Nail Co. was absorbed by the American Steel & Wire Co. and Mr. Mason went with the latter, being connected with the general sales offices in Chicago. In 1901 he became Kansas City district sales manager of the company and held this position until 1910, when he resigned to become manager of sales of the wire department, Jones & Laughlin Steel Co. He was one of the traveling salesmen who helped to introduce wire nails. This was in the early 80's, prior to which time cut nails monopolized the field. Mr. Mason will remain with the Jones & Laughlin Steel Co. until his successor is thoroughly acquainted with the duties of the position, after which he and Mrs. Mason will do considerable traveling.



GEORGE A. MASON

E. D. Batchelor, for the past 10 years district sales manager in St. Louis for the Jones & Laughlin Steel Co., has been appointed manager of sales of the company's wire department, to succeed George A. Mason,and will go to Pittsburgh to assume his new duties Jan. 1. Mr. Batchelor has been with the Jones & Laughlin Steel Co. for more than 32 years, having served in several departments in the general offices in Pittsburgh, and for ten years was attached to the Pittsburgh district sales office. Mr. Batchelor is a member of the Chamber of Commerce of St. Louis, Missouri Athletic Club, Algonquin Golf Club, the Sunset Hill Country Club and the Rotary Club of St. Louis.



E. D. BATCHELOR

Frank K. Bull, president J. I. Case Threshing Machine Co., Racine, Wis., has tendered his resignation, effective Dec. 31, and will retire to his estate at Camden, N. C. He is the eldest son of the late Stephen Bull, one of the founders of the Case company, and entered its employ in 1877 at the age of 19 as an apprentice in the repair department. In 1881 he was elected secretary and in 1897, president. Mr. Bull retains his extensive holdings in the company.

E. H. Farrell, formerly general manager Phillip Smith Mfg. Co., Sidney, Ohio, has became Central Western representative of the publication *El Commercio.*

Garrett DeF. Kinney, president Metal Barrel Corporation, Peoria, Ill., was re-elected president of the Steel Barrel Manufacturers' Association at its recent annual convention in Chicago.

Harvey B. Prescott is calling on the northern New Jersey coal consumers for Pilling & Co., iron, steel, ores, coal and coke, 71 Broadway. Until recently he had charge of the Pittsburgh office of W. J. Rainey, Inc.

E. A. Mayhew, formerly chief engineer Damascus Brake Beam Co., Cleveland, and more recently plant engineer of the Ohio Body & Blower Corporation, Cleveland, has been appointed assistant mechanical engineer of the Great Northern Railroad, with headquarters at St. Paul.

John J. Murray, for more than four years in the New York district sales office of the Morgan Engineering Co., at 120 Broadway, is now associated with K. I. Clisby & Co., 233 Broadway, New York, representatives of the Ohio Electric Controller & Mfg. Co., Atlas Car & Mfg. Co., Cincinnati Tool & Lathe Co., R. S. Newbold & Sons Co., Alfred Box & Co. and the Magnetic Mfg. Co., Milwaukee. Mr. Murray will handle sales of Box cranes.

George Darris, general manager Gilbert & Barker Furnace Co., Springfield, Mass., is to speak on coal, gas and oil fuel, at a meeting of the American Society for Steel Treating at the rooms of the Providence Engineering Society, Providence, R. I., on Jan. 4.

Albert U. Widman has been promoted to the position of manager of manufacturing of the Cadillac Motor Car Co., Detroit. He succeeds George H. Laying, who was vice-president in charge of manufacturing for the Cadillac company. Mr. Laying goes to take up similar duties with the Peerless Motor Car Co. of Cleveland.

J. M. Robinson, Peoria, Ill., has been elected president of the U. S. Tractor & Machinery Co., Menasha, Wis., and assumed his new duties Dec. 15.

W. C. Minier resigned as Pittsburgh district sales manager of the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., effective Jan. 1. His successor is N. P. Farrar, formerly Baltimore district manager of the company.

Carl A. Johnson, president Gisholt Machine Co., Madison, Wis., was re-elected president of the Wisconsin Manufacturers' Association at the annual meeting in Milwaukee, Dec. 15 and 16. Judson C. Rosebush, Appleton, Wis., was elected vice-president, and George B. Ingersoll, general manager Fairbanks, Morse & Co., Beloit, Wis, treasurer. George F. Kull, Madison, Wis., was re-elected secretary and executive director.

Hiram Winternitz, formerly with H. P. Pearl & Co., scrap dealers and brokers, Widener Building, Philadelphia, has become associated with George S. Gates in the management of the Philadelphia office of Charles Dreifus & Co., scrap dealers, Pittsburgh.

William Frank Uhl, formerly of the engineering department of the Allis-Chalmers Mfg. Co., and now of Chas. T. Main Co., Boston, will address the Providence section of the American Institute of Electrical Engineers on the evening of Jan. 3 at the rooms of the Providence Engineering Society, Providence, on hydro-electric development for the Belgian Congo.

Meeting of Labor Legislation Association

The annual meeting of the American Association for Labor Legislation, which will be held at the William Penn Hotel, Pittsburgh, Dec. 27, 28 and 29, will devote itself to the labor problem in the morning of Dec. 28, to business forecasting on the afternoon of that day and to unemployment on the evening of that day. On Dec. 29 industrial accidents will be considered in the morning and the annual business meeting will occur at luncheon. In the afternoon one of the mills of the United States Steel Corporation is to be visited. Thomas L. Chadbourne is president, and Dr. John B. Andrews, 131 East Twenty-third Street, New York, is secretary.

The Public Service Corporation of New Jersey, Newark, has arranged for a bond issue of $10,000,000, for general operation of electric and other utilities, extensions, etc. Thomas N. McCarter is president.

OBITUARY

JOHN BINDLEY, chairman Pittsburgh Steel Co., Pittsburgh, and for more than 50 years identified with the hardware and steel industries, died at his winter home, El Jardine, Miami, Fla., Dec. 16, death being due to disabilities of age. Prior to becoming chairman of the company, Mr. Bindley had been its president, having been elected in March, 1919, to succeed the late Wallace H. Rowe. He was born in Pittsburgh 75 years ago and had always lived in that city, his larger interests always having been centered in the Pittsburgh district. At the age of 16 he entered the employment of John England, who conducted a hardware store and file factory in Liberty Street, near Ninth Street. Upon reaching his majority, he became a partner in the business, under the firm name of John England & Co., which later was changed to England & Bindley. A few years later Mr. Bindley purchased the interest of Mr. England, and the firm name was changed to the Bindley Hardware Co. The company was liquidated in 1910. While engaged in the hardware business, he became interested in manufacturing, first in the Neely Nut & Bolt Co., of which he was president at the time of his death, and in 1901 in the Pittsburgh Steel Co., of which he was one of the organizers and an original director. Upon the death of his brother, Edwin Bindley, in 1906, he succeeded him as vice-president of that company. He was also one of the organizers and a director of the Pittsburgh Steel Products Co. For many years he had been connected with the Duquesne National Bank, of which he was president at the time of his death. He was also a vice-president of the Dollar Savings Bank, Pittsburgh, and a trustee of the Allegheny Cemetery. Mr. Bindley served several terms as president of the Pittsburgh Chamber of Commerce, and was a former president of the National Hardware Association. He is survived by one son, Edward H. Bindley, and a daughter, Mrs. George Davidson, Los Angeles, and three grandsons, also a sister, Mrs. Mary B. McMillin, Pittsburgh. He was a member of the following clubs: Duquesne, Union, Oakmont Country, Pittsburgh Country, Pittsburgh Golf and Pittsburgh Athletic Association, Pittsburgh; Bankers' Club of Pittsburgh, Automobile Club of Pittsburgh, Bankers' Club of America, Automobile Club of America, New York Yacht Club, Biscayne Bay Yacht Club and Miami Motor Club.



JOHN BINDLEY

JOHN WHEELER DUNTLEY, founder Chicago Pneumatic Tool Co., was killed by an automobile truck in Chicago on Dec. 15. Mr. Duntley was one of the first to bring into use the pneumatic tool, working with Charles M. Schwab to place it on the market. He began his career as a foundryman and established the Chicago Pneumatic Tool Co. in 1884. He was president of that company until 1909, and at the time of his death was head of the Duntley Automobile Accessories Co., Chicago. He was 55 years of age.

JOHN W. ROELKER, for more than 30 years a valued and trusted executive of B. F. Avery & Sons, Louisville, Ky., died at the home of his daughter in Joliet, Ill., on Dec. 14. He was born in Cincinnati in 1849, and was for many years engaged in the manufacture of plows at Evansville, Ind. During his long service as head of the purchasing department of B. F. Avery & Sons, he enjoyed an extensive acquaintance among manufacturers of supplies. He had been in failing health for several years and retired from active business in January, 1921. He is survived by three sons and a daughter.

ARTHUR JONES, secretary William Pattison Supply Co., Cleveland, machinery dealer, since the organization of that company 24 years ago, died Dec. 14, aged 46 years. He had been in poor health for several years.

RICHARD W. FROHWEIN, secretary and purchasing agent M. H. Treadwell Co., engineers, New York, died at his home in Elizabeth, N. J., Dec. 14. He had been confined to his bed since Thanksgiving Day, suffering from ptomaine poisoning. He had been associated with this company for about 18 years, and was 38 years old when he died.

REUBEN L. LINDSTROM, superintendent Point St. Charles plant, Canadian Steel Foundries, Ltd., died Dec. 12 at his home in Montreal. He left the Bettendorf Co., Bettendorf, Iowa, four years ago, to become metallurgist with the Canadian Steel Foundries, Ltd., which position he filled until appointed to this last position 18 months ago.

Repairing Canadian Cars

TORONTO, Dec. 20.—Within the past week or two several large-sized contracts have been placed with Canadian concerns for car repair work by the various railroads. The Canadian Car & Foundry Co. has secured a contract for repairing 2000 cars for the Canadian National Railways, half of which will be done at the Fort William, Ont., plant and the rest at the Montreal, Que., and Amherst, N. S., works. The National Steel Car Co., Hamilton, Ont., reports a large amount of business on hand. The Lehigh Valley Railway Co. has let a contract to the National Steel Car Co. for repairing 1000 cars. The C. N. R. has placed a tentative order for the repair of 500 cars, and 2000 for the Grand Trunk. It is reported that there is enough business to be done on the repairing of cars in the Dominion to guarantee two years of activity for all car repair shops of the Dominion.

Amalgamated Members Enjoined

A temporary injunction has been issued by the U. S. District Court at Covington, Ky., restraining members of the Amalgamated Association of Iron, Steel and Tin Workers from interfering with the employees of the Newport Rolling Mill Co., Newport, Ky. The claim of the company was that employees were interfered with while delivering materials from their warehouses to points in Kentucky and Ohio. No agreement has yet been reached regarding working conditions and wages at this plant, but the company officials state that about half of their old employees are ready to come back to work at the propositions made to them. It is expected that the mills will resume operations shortly after the first of the year.

Rates Declared Unreasonable

WASHINGTON, Dec. 20.—Recommendation has been made by Attorney Examiner Charles F. Gerry that the Interstate Commerce Commission condemns as unjust and unreasonable the legally applicable car demurrage charges collected at New York and Philadelphia on carload shipments of steel plates for export in the period from June 1 to Sept. 30, 1920, the report covering complaints of A. G. Kidston & Co., and Hawthorne & Co., Ltd., against the Delaware, Lackawanna & Western, Pennsylvania, et al. Hawthorne & Co. are shipbuilders of Leith, Scotland.

The Cadillac Motor Car Co., Detroit, this month will distribute 81 gold and 247 silver medals to employees. The gold medals are for employees in the company's service for 10 consecutive years, and the silver medals for those in service five years. This will be the first distribution of medals since 1917. Eighteen women workers are eligible to medals, but will receive rings, four of gold and 14 of silver.

Celebration of 80th Birthday of U. T. Hungerford

U. T. Hungerford, president U. T. Hungerford Brass & Copper Co., New York, was the guest of honor at a dinner given by Bernard Ris, secretary of the company, and attended by friends prominently identified with the copper industry, at Hotel Biltmore, New York, Dec. 14, in celebration of his eightieth birthday. The arrangements for the event were elaborate and were carried out in a delightful manner. Mr. Hungerford is still vigorous and is found in his office every day. Each guest was presented a cartoon of himself and an excellent photograph of Mr. Hungerford.



U. T. HUNGERFORD

Mr. Hungerford was born in Torrington, Conn., Dec. 14, 1841, one of 12 children of John and Charlotte Austin Hungerford. He comes from New England stock dating back to 1639. The name has been intimately associated with the brass industry in Connecticut where his father, John Hungerford, in 1834 built the first brass mill in Torrington.

In 1865 he became associated with Wallace & Sons Brass and Copper Rolling Mills, Ansonia, Conn., acting as their New York representative and manager until 1895, when he established the U. T. Hungerford Brass & Copper Co. He is also president of the Hungerford Securities Corporation, founder of the Hallenbeck-Hungerford Realty Corporation, and other companies in the copper and allied industries. Endowed with a rugged constitution and generously equipped with mental attainments, Mr. Hungerford's capacity for work seems almost inexhaustible. Although residing at Briarcliff, N. Y., it is rare indeed that he misses his daily visits to the company over which he presides and maintains a close supervision over all its activities.

Mr. Hungerford has always maintained an active interest in the place of his birth and on May 28, 1917, presented to the town the large and completely equipped Charlotte Hungerford Hospital in memory of his mother.

Those who attended the dinner were:

New York: U. T. Hungerford; H. H. Powell, president Importers' and Traders' National Bank; M. S. Lott, Lincoln Trust Co.; Lewis E. Pierson, chairman Irving National Bank; Willard H. Platt, president Greene, Tweed & Co.; Alfred D. Clinch, Underhill, Clinch & Co.; Edward Stagg, Patterson Brothers; Russel A. Cowles, president Ansonia Clock Co.; B. Lissberger, B. Lissberger & Co.; A. L. Salt, vice-president Western Electric Co.; Thomas B. Kent, vice-president American Brass Co.; M. H. Crego, Phelps-Dodge Corporation; W. A. Locke, Taunton-New Bedford Copper Co.; J. W. Taussig; E. F. Byrne; Joseph Clendenin, vice-president Guggenheim Bros.; Edward Savage, Guggenheim Bros.; W. A. Willis, Copper and Brass Research Association; W. S. Eckert, Copper and Brass Research Association; George Smart, editor THE IRON AGE; J. H. Kennedy, editor *Hardware Dealers' Magazine;* L. R. Conklin; J. R. Van Brunt; C. H. Krueger, Bernard Ris; Kenneth B. Ris; George Ris; George C. St. John; E. H. Madison; A. H. Dodd; W. J. Conroy, A. P. Swoyer.

Taunton, Mass.: H. F. Bassett, president Taunton-New Bedford Copper Co.

New Britain, Conn.: W. C. Hungerford.

Detroit: L. H. Jones, president Detroit Copper & Brass Rolling Mills.

Kenosha, Wis.: C. J. Hackett.

Philadelphia: G. W. Heyser, U. T. Hungerford Brass & Copper Co.

Baltimore: A. F. Miller, U. T. Hungerford Brass & Copper Co.

Boston: F. H. Barton, U. T. Hungerford Brass & Copper Co.

Ansonia, Conn.: Charles F. Brooker, chairman American Brass Co.; W. A. Cowles, vice-president American Brass Co.; H. Mitchell Wallace, Roy S. Wildman; Arthur S. Brown.

Waterbury, Conn.: E. L. Frisbie, vice-president American Brass Co.; Gordon W. Burnham, secretary American Brass Co.; A. M. Dickinson; Franklin E. Weaver; John A. Coe, Jr., president American Brass Co.; H. T. Montague; H. M. Steele; John P. Elton, treasurer American Brass Co.; Charles Hungerford; W. H. Bassett.

Torrington, Conn.: F. L. Braman; Robert Swayze; James A. Doughty.

Rome, N. Y.: Barton Haselton, vice-president Rome Brass & Copper Co.; H. J. Rowland, general sales manager Rome Brass & Copper Co.

Buffalo: George H. Allen; Joseph J. Lockwood.

Will Co-operate with Department of Commerce

WASHINGTON, Dec. 20.—On the invitation of Secretary of Commerce Hoover, President Edgerton, of the National Association of Manufacturers, has named an advisory committee of manufacturers representing different lines of industry to co-operate with the Department of Commerce and to afford an agency for co-ordinating the work of committees and trade associations which are concerned with the particular problems of their trade, and to be of service to industry and the Department of Commerce in problems of common interest, both to industry and the Government departments. Some of the associations may not be able to co-operate or continue to function in any way owing to the Supreme Court decision in the hardwood case.

As pointed out by Secretary Hoover in his conference with the committee, on Dec. 2, one of the important problems to which the committee will give immediate consideration is the matter of reorganization of government departments, with a view to bringing to various lines of industry the importance of this subject and the need for prompt legislation relating to the question.

Among the committees selected to co-operate with the Department of Commerce are the following:

Iron and Steel: D. A. Burt, La Belle Iron Works, Steubenville, Ohio; J. H. Frantz, American Rolling Mill Co., Middletown, Ohio.

Electric Furnace Products: A. Cressy Morrison, Electro Metallurgical Co., New York, who is chairman of the committee.

Agricultural Machinery: Findley P. Mount, Advance-Rumely Co., Chicago.

Automobiles: J. Walter Drake, Hupp Motor Car Corporation, Detroit.

Electrical Machinery: C. N. Wheeler, Crocker-Wheeler Co., Ampere, N. J.

The following are among the trade association committees of co-operation, selected by trade associations:

Iron and Steel: American Iron and Steel Institute, 61 Broadway, New York; National Founders' Association, 29 South La Salle Street, Chicago; National Association of Tin Plate Manufacturers, Oliver Building, Pittsburgh; Steel Barrel Manufacturers, 855 Leader Building, Cleveland; Bolt, Nut and Rivet Institute, Oliver Building, Pittsburgh; Eastern Bar Iron Institute, 103 Park Avenue, New York; Hydraulic Society (pumps), 50 Church Street, New York.

Agricultural Implements: National Association of Farm Equipment Manufacturers, 72 West Adams Street, Chicago.

Electrical Products: Electrical Manufacturers' Council, 522 Fifth Avenue, New York.

At the annual meeting of the Engineers' Club of Cincinnati on Dec. 15, Frank L. Raschig, Edgar K. Ruth and Charles Paquette were elected directors for a three year period. The meeting was the largest ever held by the club, 250 members being present. John Harrington of New York, vice-president of the American Society of Mechanical Engineers, was the principal speaker at the dinner. He urged the members to take a more active interest in civic affairs. The officers of the club will be elected at a meeting of the directors to be held shortly.

As a mark of courtesy, the Chamber of Commerce of Niles, Ohio, arranged to send a delegation Dec. 21 to visit Joseph G. Butler, Jr., at his residence, 525 Wick Avenue, Youngstown, on the occasion of his 81st birthday. Mr. Butler was born Dec. 21, 1840, in Temperance Furnace, Mercer county, Pa. For many years he has been prominently identified with the iron and steel industry of the Mahoning Valley.

Machinery Markets and News of the Works

ENGINE BUILDER BUYS

American Locomotive Co. Places Orders Totaling About $40,000

Otherwise Machine-Tool Markets Are Quiet—Prospective Purchases Held Up Until After Jan. 1

The American Locomotive Co., New York, last week closed for about $40,000 worth of machine tools for its Schenectady works. The machines are for the manufacture of mechanical stokers. The quickness with which this business was negotiated—the inquiry having been issued about Dec. 1—was in contrast to the usual dilatory methods employed by buyers throughout this year.

While considerable railroad business is pending, it is unlikely that orders will be placed until after Jan. 1, except possibly in the case of the Delaware, Lackawanna & Western Railroad, which is understood to be ready to buy against its recent list. At Chicago the Santa Fe and Rock Island requirements are still pending. The Chesapeake & Ohio, which took bids recently on about $100,000 worth of shop tools, has as yet done no buying.

The Seaboard Air Line has issued a small list, which includes two turret lathes. The Pennsylvania Railroad is at work on its 1922 list of tool requirements, and it is expected that the inquiries will be sent out soon.

Buying for vocational training schools continues. Indianapolis has bought about $20,000 worth of tools for a high school and South Bend, Ind., is getting figures on several lathes and other tools for a school.

It is reported from Chicago that the Johns-Manville Co., New York, has revived an old list of tools for its Waukegan, Ill., factory.

New York

NEW YORK, Dec. 17.

The American Locomotive Co., New York, last week placed orders for machine tools totaling $40,000 or more, the equipment to be used in the manufacture of locomotive stokers at its Schenectady plant. The inquiry for the tools was issued about Dec. 1 and the placing of orders followed much more quickly than has been usual in this year of business hesitation. The orders were split up among a number of manufacturers and dealers.

The Delaware, Lackawanna & Western Railroad, which inquired in October for about 40 machines, is reported to have decided to buy and orders are expected soon.

Otherwise the local machine-tool market is quiet, with fewer inquiries and orders this month than in November. Indications point to some improvement after Jan. 1.

The crane market shows no improvement. Although a few small orders have been placed, there is evidence that good business will develop early in 1922. A locomotive crane is about to be purchased by the Ulen Contracting Co., Allaben, N. Y. An inquiry is in the market through Japanese exporters, including the China-Japan Trading Co., 110 William Street, New York, calling for quotations on three 50-ton and three 75-ton, 65, 70, 75-ft. span overhead traveling cranes for Japan. Only two will be purchased, the others being alternates. The Passaic Valley Sewage Commission, 128 Market Street, Newark, N. J., is receiving bids on a construction contract involving another 15-ton hand power crane. One of the bidders is George B. Spearin, 90 West Street, New York.

The Dirección General Explotación del Tetroleo de Comodoro Rivadavia, 50 Church Street, New York, opened bids Dec. 20, on a 10-ton, 31-ft. span electric crane with an alternate hand power crane. The Pawling & Harnischfeger Co., was low on the electric crane and the Northern Engineering Works low on the hand power crane.

Among recent sales are: Pawling & Harnischfeger Co., a 5-ton overhead traveling crane to William Bradley & Sons, Long Island City, New York; Shepard Electric Crane & Hoist Co., 10-ton electric hoist to the Union Machine Co., Fitchburg, Mass.; Sprague Electric Works, a 3-ton and a 5-ton, 20-ft. span, one motor crane and two 1-ton monorail hoists to the Driver-Harris Co., Harrison, N. J.; Champion Engineering Co., a 5-ton, 55-ft. 8-in. span overhead traveling crane to the Pittsburgh Valve, Foundry & Construction Co., Pittsburgh.

Reginald Steel, Long Island City, manufacturer of heavy drop forgings, etc., has acquired about 15,000 sq. ft. on Vernon Avenue for a new plant for the production of marine and architectural iron products. Plans will be drawn at once.

The Queens Borough Gas & Electric Co., Far Rockaway, L. I., will make extensions and improvements in its electric power plant on Clifton Street, estimated to cost about $35,000.

Alexander Pelli & Co., New York, operating a marble and stone works at 509 East 120th Street, will soon take bids for a new plant, 105 x 270 ft., at Elmhurst, L. I., to include marble handling equipment, finishing machinery, etc. L. P. Fluhrer, 280 Madison Avenue, New York, is architect.

Electric motors and other equipment will be installed in the four-story plant to be erected on Washington Avenue, Long Island City, by the National Printing & Engraving Co., 136 West Fifty-second Street, New York, estimated to cost $400,000.

F. M. Schildwachter, 4130 Park Avenue, New York, is having plans prepared for a four-story ice-manufacturing plant, 76 x 110 ft., on Webster Avenue to cost close to $1,000,000, including machinery. Koch & Wagner, 32 Court Street, Brooklyn, are architects.

The Enterprise Tinware Co., Inc., 1425 Avenue A, New York, has leased the three-story building, 100 x 100 ft., at 426-32 East Ninety-first Street for extensions. Improvements will be made.

The New York Edison Co., 30 East Fifteenth Street, New York, is having plans prepared for a one-story power house, 50 x 100 ft., at Park Avenue and 168th Street. William Whitehill, 12 Elm Street, is architect.

The State Ice Mfg. Co., care of Alexander Brociner, 110 West Fortieth Street, New York, engineer, will commence the immediate erection of a two-story ice-manufacturing plant, 100 x 200 ft., at Stanton and Tompkins streets, estimated to cost $100,000, including machinery. Contract has been let to the Eastern Construction Co., 110 West Fortieth Street.

The U-Need Ice Co., 2150 Amsterdam Avenue, New York, will commence the immediate erection of a two-story ice-manufacturing plant, 158 x 215 ft., at Inwood and Mt. Eden avenues, estimated to cost $175,000 with machinery. Felix D'Allesandro is president.

The new two-story plant to be erected by the Bronx Equipment Co., Concord Avenue and 143rd Street, New York, at Pittsburgh, will be used for the manufacture of automobile bodies. It will cost about $185,000. C. B. Comstock, 110 West Fortieth Street, New York, is architect.

The Thomas Wright Co., 71 Colden Street, Jersey City, N. J., manufacturer of wagons, parts, etc., is having revised plans prepared for a one-story addition, 100 x 100 ft., estimated to cost about $27,000. Robert Shannon, 1 Bernius Court, is architect.

A vocational department will be installed in the new high school to be constructed by the Board of Education, Palmyra, N. J. Plans have been drawn.

The Driver-Harris Co., Middlesex Street, Harrison, N. J., manufacturer of electrical and other wire products, has filed plans for a new one-story building to cost about $10,000. Work is under way on a new rolling mill, 100 x 275 ft.

A vocational department will be installed in the high school addition to be erected by the Board of Education, East Orange, N. J., to cost about $200,000. Guilbert & Betelle, 546 Broad Street, Newark, are architects.

Freight handling machinery will be installed at the proposed municipal piers and warehouses to be constructed by the Board of Aldermen, Perth Amboy, N. J. Preliminary details are being considered and bonds will be provided for the project.

The Ivers-Lee Co., 38 Littleton Avenue, Newark, manufacturer of automatic packing machinery, has leased the second floor of the building at Central Avenue and Lock Street, totaling about 26,000 sq. ft. of space, where it will remove its plant shortly after the first of the year. Extensions will be made in different operating departments to provide for the manufacture of all machine parts and equipment, considerable of which, heretofore, have been produced in outside shops. All parts will be manufactured with the exception of electrical equipment and motors.

A vocational department will be installed in the three-story high school, 200 x 300 ft., to be erected by the Board of Education, Bayonne, N. J., at Avenue A, Twenty-seventh to Twenty-ninth streets, estimated to cost approximately $450,000. D. G. Anderson, 472 Broadway, is architect.

The Bates Mfg. Co., Lakeside Avenue, West Orange, N. J., manufacturer of numbering machines, will use two of the three floors of the factory at 33 North Day Street, Orange, recently acquired, and for a time will lease the third floor to other interests. The building aggregates about 15,000 sq. ft. of space. The company has passed from the control of Thomas A. Edison, Inc., after about 25 years of operation. It is headed by C. S. A. Williams, president and treasurer, and Stanley M. Babson, vice-president, for about 10 years past connected with the National Lead Co.

Philadelphia

PHILADELPHIA, Dec. 19.

The Hamilton R. Marsh Corporation, 210 South Eleventh Street, Philadelphia, manufacturer of printers' machinery and parts, has leased the first floor of the factory at Eleventh and Race streets for immediate occupancy.

The Keystone Lantern Co., Tacony and Cottman streets, Philadelphia, has filed plans for the erection of a one-story addition.

The Walton Auto Supplies, Inc., 754 South Broad Street, Philadelphia, has awarded contract to T. J. & J. R. Whelan, 1011 Chestnut Street, for a three-story repair works and service building, 80 x 100 ft., at Broad and Bainbridge streets.

The Mackin Motors, Inc., Philadelphia, has leased the two-story building at 855 Broad Street for an automobile service and repair works.

The William Amer Co., 452 North Third Street, Philadelphia, will build a one-story power house on Willow street.

Jacob G. Troescher, 1706-8 West Venango Street, Philadelphia, operating a general machine works, has filed plans for a one-story addition.

Electric motors and other power equipment will be installed in the two-story addition, 75 x 200 ft., to be erected by the Lester Piano Co., 1306 Chestnut Street, Philadelphia, at Lester, Pa., estimated to cost about $35,000.

Edward R. Huddy, Cass Street, Trenton, N. J., manufacturer of sheet metal, etc., has purchased property, 100 x 100 ft., at Lexington Avenue and Coates Street, for two one-story buildings, each 40 x 100 ft., estimated to cost about $25,000. The present works will be removed to the new location.

The State Highway Department, Trenton, N. J., is taking bids until Dec. 27 for a one-story automobile service and repair building, 100 x 400 ft., on Scotch Road, Fernwood, for State automobiles and trucks, estimated to cost about $150,000. R. J. Wasser, Broad Street Bank Building, is State engineer for the Department.

The Borough Council, Lansdale, Pa., is considering plans for the expenditure of about $250,000 for an addition to the municipal electric power plant and installation of new machinery.

The General Gas & Electric Co., Hanover, Pa., manufacturer of lighting equipment and other electrical products, will establish a new plant, to replace its former works recently sold to the Hanover Motor Car Co. Additional machinery will be installed.

J. A. Rudy, 1808 Derry Street, Harrisburg, Pa., manufacturer of skid treads known as Caterpillar treads, is planning for enlargements in his plant and the installation of new machinery. Following the dissolution of the partnership of Brackney & Rudy, recently arranged, other features of the business, including automobile repair work, etc., will be discontinued.

The Board of Education, Harrisburg, Pa., will receive bids until Jan. 6 for the construction of vocational shop units at the new senior co-educational high school at Third and Division streets. A power house will also be erected. D. D. Hammelbaugh is secretary.

The Easton Auto Co., Third and Snyder streets, Easton, Pa., has foundation work under way for a new one-story service and repair building, 65 x 150 ft., estimated to cost about $75,000 with equipment.

The Dunlap & Jones Foundry Co., Pottsville, Pa., has completed the rebuilding of its foundry, destroyed by fire several months ago, and will place the new structure in service immediately.

New England

BOSTON, Dec. 19.

New England machine-tool dealers have put through very little business the past week. The few sales largely concern lathes and include a 16-in. x 8-ft. to a local garage to replace another lathe, a 9-in. x 3-ft. to a manufacturer of woolen fabrics, a used 18-in. x 9-ft. and another 14-in. x 6-ft. to a Pawtucket, R. I., manufacturer, and a 36-in. x 22-ft. lathe to a New York State paper maker, the latter tool passing through two brokers' hands.

There is, however, considerable business pending which has indications of closing soon, including a list put out by a Massachusetts textile interest and numerous individual tools. The list includes one 200-lb. power hammer, one 28-in. upright drill, a sensitive drill, 30-in. planer, 30-in. gear cutter, centering machine, keyseater, wet tool grinder, speed lathe, 1½-in. bolt cutter, 20-in. shaper, power hack saw, two 14-in. lathes, one 18-in. and one 36-in. lathes, universal tool grinder and one No. 2 universal milling machine. Included in the individual tools are a new No. 11 Brown & Sharpe cylindrical grinder wanted by the Waterhouse Welding Co., Boston; a small bench drill for the Northern Industrial Co., South Boston, and one 18-in. x 8-ft. double back geared lathe required by the Boston Elevated Railway. A Massachusetts manufacturer of cutlery is considering the purchase of special milling or slotting equipment. In addition, some crane business is anticipated within a few days.

While quiet conditions are looked for the remainder of the year, dealers are hopeful of early 1922 business. The last few days have been featured by prospective buyers sounding the market on lathes, pipe machines, milling machines, upright drills and shapers, with a view to making purchases shortly after inventory taking is out of the way. In some instances buyers find it difficult to find just what they want and in such cases dealers are looking elsewhere for supplies, having the assurance that the tools will be taken if they can be found. Prices on both new and used machines still favor the buyer.

Plans are being prepared by Monks & Johnson, Boston, engineers, for a group of five manufacturing buildings to be erected for the Mason & Hamlin Piano Co., Boston, at Broadway and Third Street, Cambridge, Mass.

The Segal Metal Products Co., New York, locks and other hardware specialties, has purchased the foundry of Conrad A. Lund, Springdale, Conn., where it is expected a new plant will eventually be erected.

The H. L. Judd Co., Wallingford, Conn., small metal products, is having plans prepared by Lockwood, Greene & Co., Boston, for a five-story building to add to its manufacturing facilities. Plans call for the completion of the structure by July 1.

The Rufus Crowell Co., 2 Somerville Avenue, Somerville, Mass., engineer, is considering the erection of a plant in Cambridge, Mass. Details have not yet been worked out.

The Rumford Press is erecting a four-story 80 x 180 ft. plant, at Concord, N. H.

The finishing, tool and machine shops of the New England Tank & Tower Co., Everett, Mass., were badly damaged by fire last week.

The Fitzgerald Forging & Heat Treating Co., Springfield, Mass., recently organized as a partnership by M. V. and T. J. Fitzgerald, will operate a plant at 576 St. James Avenue.

A vocational department will be installed in the new high school to be erected at Stoughton, Mass., estimated to cost about $150,000. Bids will be taken until Dec. 31. Charles G. Loring, 7 Water Street, Boston, is architect.

Fire, Dec. 8, destroyed the repair shop at the woolen mill of A. L. Sayles & Sons, used for metal-working, woodworking, etc. It will be rebuilt.

The Charter Oak Machine Co., 438 Asylum Street, Hartford, Conn., has awarded contract to the Austin Co., 217 Broadway, New York, for its one-story plant, 60 x 100 ft., at East Hartford, to manufacture automobile parts.

Fire, Dec. 11, destroyed a portion of the plant of Walter

W. Field & Son, Inc., 51-53 Hayward Street, Cambridge, Mass., operating as general machinists and manufacturers of contractors' equipment, with loss reported at $18,000.

H. Dick, 140 Main Street, Danbury, Conn., is planning for a one-story machine repair works and automobile service building, 100 x 100 ft., estimated to cost about $45,000.

Baltimore

BALTIMORE, Dec. 19.

The Continental Service & Garage Corporation, 715 Gaither Building, Baltimore, will soon call for bids for its new automobile plant at Monument and Eutaw streets, to be five stories, 180 x 225 ft., to cost in excess of $400,000. J. B. Hyatt and George Lamke head the company.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has acquired property at Nanticoke and Bayard streets, 276 x 479 ft., to be used for power house operations at a later date.

The West Penn Railway & Power Co., Pittsburgh, is reported to be negotiating for the purchase of the municipal power plant at Oakland, Md., through its subsidiary organization, the West Virginia & Maryland Power Co., and for extensions in the existing plant.

The Frederick Motor Co., Frederick, Md., has acquired the property of the Frederick City Garage and will utilize the building in connection with its proposed automobile works on East Patrick Street, to be erected on sites recently purchased, and to be ready for occupancy about April 1. Roy L. Warfield is president.

The Bethlehem Shipbuilding Corporation, Wilmington, Del., operating at the former plant of the Harlan & Hollingsworth Co., will utilize a portion of the plant for steel railroad car production, and has taken a contract for the construction of 30 all-steel passenger cars for the Philadelphia & Reading Railway Co., Philadelphia.

The Treasury Department, Washington, will take bids until Dec. 27 for the installation of an electric light and power plant at the United States Quarantine Station, Baltimore. James A. Wetmore, Washington, is acting supervising architect.

The Florence Silver Plate Co., 108 West Lombard Street, Baltimore, manufacturer of metal products, will build a one-story addition to the factory at 408 Hanover Street, and make improvements in the present building, estimated to cost about $20,000. It will remove its works to this location about Feb. 1, and dispose of its Lombard Street building.

A vocational department will be installed in the new Eastern High School to be erected by the District of Columbia Commissioners, 427 District Building, Washington, at East Capitol and Seventeenth streets, S. E., to be four stories, 217 x 500 ft., estimated to cost $950,000.

The City Council, Danville, Va., is planning the erection of an addition to the municipal electric power plant to cost about $100,000, including steam turbine, boilers and auxiliary operating equipment.

W. N. Drake, Pelham, Ga., is organizing a company to construct and operate a hydroelectric generating plant in the vicinity of Herndon, Ga., estimated to cost about $200,000, including machinery.

The Richmond Car Works, Richmond, Va., recently organized, has acquired the Government plant at South Richmond, designed for the manufacture of marine boilers but never operated. The new company will remodel the works for the manufacture of steam and electric cars, with fabricating department for the manufacture of architectural and other steel work. A branch will also be devoted to the manufacture of tools and implements. It will operate with a capital of $500,000, and is headed by Lewis C. Williams, president.

Electric motors, power equipment, ovens and kindred apparatus will be installed in the two-story baking plant, 80 x 90 ft., to be erected by Herman Hecht, 28 Sixth Street, Bristol, Va., estimated to cost about $75,000. Richard Griesser, 64 West Randolph Street, Chicago, is architect.

The City Council, Augusta, Ga., is considering preliminary plans for a municipal hydroelectric generating plant on the canal, with initial capacity of about 12,000 hp., and estimated to cost $1,000,000. It is proposed to issue bonds for $2,500,000 to provide for all features of the project, including a later addition to cost about the same amount.

W. A. Thompson, Cordele, Ga., is organizing a company to establish a plant for the manufacture of electric batteries and other electrical products.

A vocational department will be installed in the new high school to be erected at Leesburg, Va., estimated to cost $78,000. Plans will be drawn at an early date.

A. M. Kistler, Morganton, N. C., is organizing a company to construct and operate a hydroelectric generating plant in the vicinity of Lenoir, N. C., estimated to cost close to $100,000.

Electric pumping machinery will be installed at the municipal waterworks by the Town Council, Frostburg, Md., to replace present steam-operated pumps. Electric service will be furnished by the Hagerstown & Frederick Electric Railway Co.

The Farmville Machinery & Repair Co., Farmville, Va., is planning the establishment of a one-story machine works for which purchases will be made about Jan. 1. The company was organized recently under State laws. Jerome E. Virgie, Crewe, Va., is president.

The Valley Light & Power Co., Woodstock, Va., is planning to immediately rebuild the portion of its power plant destroyed by fire Dec. 11.

Chicago

CHICAGO, Dec. 19.

No action has yet been taken on the Rock Island and Santa Fe lists and other prospective railroad business is not yet beyond the budget stage. Machine-tool sales the past week have been exceedingly light and the largest individual purchase reported was made in Indianapolis, which is outside of the territory served by most local houses. In that city $20,000 worth of miscellaneous equipment, including several engine lathes, a milling machine, planer, upright drills, etc., was bought for the Arsenal and Technical High School. For a junior high school at South Bend, Ind., figures are now being taken on four engine lathes and other tools. Manufacturers of plumbers' brass goods are fairly busy, and one local seller reports individual sales of three hand screw machines to this class of trade. Another dealer recently sold a turret lathe to a manufacturer of ice machines. The Johns-Manville Co., Madison Avenue and Forty-first Street, New York, is said to have revived a list of machine-tool requirements for its new Waukegan, Ill., plant.

The Cole Storage Battery Co., 2437 Indiana Avenue, Chicago, has let contract for a one-story addition, 40 x 97 ft., to cost $10,000.

The M. Metzger Co., manufacturer of metal advertising products, 209 South Green Street, Chicago, has purchased the one-story factory, 110 x 175 ft., now being erected by Holton-Seelye & Co., at 3300-38 West Lake Street.

The Dearborn Truck Co., 2515 West Thirty-fifth Street, Chicago, has let contract for a one and two-story addition, 60 x 400 ft., to its plant at Cicero, Ill., to cost $80,000.

The Nemo Dye Works has let contracts through Paul Gerhardt, architect, 64 West Randolph Street, Chicago, for a one-story plant, 103 x 115 ft., 4203-4209 West Grand Avenue, to cost $200,000.

J. J. Novy, 2434 South Ridgeway Avenue, Chicago, has prepared plans for a one-story garage and service station, 72 x 125 ft., at Turner Avenue and Twenty-sixth Street, for Charles Fivak to cost $35,000.

Bids will soon be taken on a one-story pumping station, 65 x 95 ft., and boiler house, 65 x 70 ft., with a 150-ft. water tower, for the Hammond, Ind., waterworks. John Erickson, 30 North La Salle Street, Chicago, is the engineer.

E. J. Bahe, 4734 Magnolia Avenue, Chicago, has let contract for a one-story wood-working factory, 50 x 56 ft., 2342-44 Nelson Street, to cost $8,000.

The Warren W. Edwards Co., 19 South Wells Street, Chicago, has let a contract for a public garage at 3731-39 Broadway, to cost $60,000.

Oscar Roen has purchased a site near the Gunderson blacksmith shop, Brodhead, Wis., and expects to erect a machine repair shop in the spring.

R. J. Teetor, Muskegon, Mich.; C. T. Mitchell, W. L. Saunders and J. C. Ford, Cadillac, have formed a company which is laying foundations for a malleable foundry at the latter city. It is expected to be completed by July 1 and will produce malleable castings entirely from charcoal iron for automotive, railroad and general uses. Frank D. Chase, Inc., Chicago, is architect and engineer.

The Russell, Burdsall & Ward Bolt & Nut Co., Rock Falls, Ill., has let contract for a one-story addition to cost $35,000.

The Charter Gas Engine Co., Sterling, Ill., plans to construct a one-story machine shop to cost $25,000.

The Chicago, Rock Island & Pacific Railroad has let contract for a one-story repair shop at Pratt, Kan., to replace a structure destroyed by fire. It will cost $100,000.

The Board of Education, Lincoln, Neb., is having plans drawn for a one-story shop, 101 x 170 ft., in connection with a three-story school. The total cost of the school will be $750,000.

The Leshnick Directory Co., Peoria, Ill., has let contract for a two-story printing shop, 50 x 150 ft., to cost $100,000.

The Monarch Mining Co., Louisville, Col., is planning to rebuild the tipple at its coal properties, recently destroyed by fire.

The City Council, Corning, Iowa, will call for bids about Jan. 15, for its municipal electric power plant, estimated to cost about $60,000. C. K. Munn is engineer.

The Electro-Magnetic Tool Co., 2902 Carroll Avenue, Chicago, has acquired property at Cicero, Ill., for $50,000, heretofore held by G. S. Blakeslee & Co., to be used for a new plant.

A vocational department will be installed in the two-story and basement high school to be erected at Clarinda, Ill., estimated to cost $200,000. Keffer & Jones, 204 Masonic Temple, Des Moines, Iowa, are architects.

The Henry Artificial Ice Co., Henry, Ill., has preliminary plans under way for a one-story ice-manufacturing plant. B. L. Huisebus, 1232 Jefferson Building, Peoria, Ill., is architect. C. N. Lucas is president.

The Dennison Garage Co., Mason City, Iowa, has plans under way for a two-story service and repair building, 50 x 130 ft., estimated to cost $55,000. G. L. Lockhart, 1353 University Avenue, St. Paul, Minn., is architect.

A vocational department will be installed in the two-story and basement high school to be erected at Aledo, Ill., estimated to cost $150,000. Foundation work is under way. Whitsitt & Schulske, People's Bank Building, Moline, Ill., are architects.

A one-story gravel screening and washing plant, estimated to cost about $40,000 with machinery, will be constructed by the Kampeska Materials Co., Watertown, S. D.

Cleveland

CLEVELAND, Dec. 19.

The demand for machinery is still confined almost entirely to single tools and indications are that the volume of December orders will not keep up to that of November. Some prospective business will be withheld until January. Dealers are getting a few inquiries, but some are believed to be for inventory purposes. The Seaboard Air Line is inquiring for two turret lathes and other small inquiries have come from railroads which advise that they are getting prices in order to include the machines inquired for in their 1922 budgets. Buyers who are inquiring for used machinery are shopping around considerably and are apparently able to place orders at attractive prices.

Inquiry for locomotive cranes is light and prices still show a downward tendency. Builders have not yet received new specifications for the 34 locomotive cranes for which New York received bids in October, later rejecting all bids.

The Cleveland Wire & Cable Co., recently organized, has established a plant at 1679 Collamer Avenue, East Cleveland, for the manufacture of weather-proof wire and cable. The company was formed largely by concerns interested in the electrical industry in Cleveland. W. H. Staring, of the Peerless Motor Car Co., is president; P. C. Clark, vice-president of the Electric Controller & Mfg. Co., vice-president; W. Hard, Cleveland Light & Power Co., secretary, and E. H. Smith, electrical contractor, treasurer. The directors include J. F. Lincoln, Lincoln Electric Co.; H. L. Martien, Martien Electric Co., and H. C. Gillie, Cleveland Electric Illuminating Co.

The National Razor Mfg. Co., which has been operating a plant in Fremont, Ohio, will move to Lisbon, Ohio, where a new organization has been effected with J. J. Bennet, president; J. J. Hinchliffe, vice-president; T. C. Williams, secretary; W. C. Bellinger, treasurer, and Howard Petty, general manager.

The Sanderson Cyclone Drill Co., Orrville, Ohio, manufacturer of deep well drilling machines, has placed contract for the erection of a new plant, 170 x 320 ft., and office building, 40 x 60 ft.

The Illinois Car Co., Urbana, Ohio, has placed contract for the erection of a new plant and will dismantle its present shops. The new buildings will include an erecting shop, 200 x 300 ft.; wood-working mill, 60 x 160 ft.; blacksmith shop, 60 x 100 ft., and a machine shop, 60 x 80 ft., of steel, concrete and glass construction. With the new plant the company will double its present capacity. The general contract has been placed with the Bellefontaine Bridge & Steel Co., Bellefontaine, Ohio.

The Ladel Mfg. Co., New Philadelphia, Ohio, has begun operations in its new foundry and machine shop which occupies a floor space, 88 x 326 ft. The present buildings will be used for a pattern shop and storage.

The Cleveland Copper Co., Cleveland, has been incorporated to operate the works of the Parish-Pool Co., Cleveland, which went into the hands of a receiver some time ago when its plant was under construction. The new company will operate under a lease. R. R. Parish, one of the organizers of the old company and its vice-president and general manager, is president of the new company. Copper and brass ingots will be manufactured.

The Rundle Mfg. Co., maker of children's vehicles, including coaster wagons, velocipedes, etc., which has been operating a factory in Columbus, Ohio, has purchased the plant of the Lehr Agricultural Co., Fremont, Ohio, and will move to the latter city shortly. The Rundle company is owned by Fremont men. C. J. Miller is president, and George W. Rundle, treasurer and general manager.

The Vapo Stove Co., Lima, Ohio, has completed a plant for the manufacture of oil stoves which will be equipped with a new type of burner. It was recently organized with a capital stock of $500,000. Joseph T. Kaufman is president, and Fred Ash, general manager.

The Giant Tire & Rubber Co., Findlay, Ohio, has placed contract for the erection of a factory, 45 x 125 ft.

The Lomar Mfg. Co., which was formed in Texas, will establish a plant in Middletown, Ohio, to manufacture automobile shock absorbers. An Ohio corporation will be formed with a capital stock of $50,000. C. W. Shartle, Jr., is president and treasurer.

Pittsburgh

PITTSBURGH, Dec. 19.

The only important machine-tool business done here recently was the purchase by the Pittsburgh Railways Co. of one No. 2 Oakley grinder; one 13 x 16-in. Peerless hack-saw and two No. 2 Defiance heavy duty drills. This company also was the buyer of a Fay & Egan planer and joiner and an automatic rip and cut-off Fay & Egan saw, reported last week. New inquiries have been fewer in the past week than recently, probably due to the close of the year. Occasional crane orders are being placed. The past week the Champion Engineering Co., Kenton, Ohio, secured through the Laughlin & Barney Machinery Co., its Pittsburgh district agent, a 5-ton, 32-ft. span overhead crane for installation at the plant of Union Tool Co., Carnegie, Pa. The Kelly & Jones Co., Pittsburgh, which is building a new warehouse in Chicago, has closed for a 5-ton, 56-ft. span crane, with the Pawling & Harnischfeger Co., Milwaukee. Very low prices are said to have been named against impending crane business, it being reported that a price figuring back to about 9c. per lb. has been quoted. This practically puts prices back to the pre-war basis. The inquiry for a 50-ton crane, with 10-ton auxiliary, about which there has been so much mystery, is for the Elliot Co., Jeannette, Pa. This crane is expected to be let this week. The Youngstown Sheet & Tube Co., Youngstown, recently inquired for a 10,000-kw. steam turbo alternator and surface condenser with cooling tower.

The Wilton Tool Co., manufacturer of master gage blocks, measuring and precision tools, will soon move its plant from Detroit to Sharon, Pa., according to an announcement by the Trade and Industrial Bureau, the Chamber of Commerce of Pittsburgh. The company will enlarge its line of products and erect a plant containing about 20,000 sq. ft. of floor area.

E. Stotz, Monongahela Bank Building, Pittsburgh, architect, has plans under way for the proposed technical high school, with vocational department, to be erected at McKeesport, Pa., estimated to cost about $300,000.

The Bluefield Ice & Cold Storage Co., Bluefield, W. Va., has completed plans for a new ice-manufacturing and cold storage plant, with initial capacity of about 80 tons per day. The storage department will provide for about 2500 tons.

A vocational department will be installed in the two-story and basement high school to be erected by the Board of Education, Burch, W. Va., to be 47 x 120 ft. Bids are being taken until Dec. 31. L. J. Dean, Foster Building, Huntington, W. Va., is architect.

The Pleasant Valley Auto Co., Wheeling, W. Va., will defer the construction of its automobile service and repair works until spring. It is estimated to cost about $100,000, including equipment. H. R. Markell is president.

Freight handling and conveying machinery will be installed in the five-story warehouse, 130 x 250 ft., to be erected by the Johnstown Terminal Warehouse Co., Johnstown, Pa., estimated to cost about $450,000. The William Steele & Sons Co., Sixteenth and Arch streets, Philadelphia, are architects.

The United Engineering & Foundry Co., Farmers' Bank Building, Pittsburgh, is planning the erection of a one-story addition on Fifty-fourth Street, 65 x 220 ft.

The Wilkinsburg Ice Co., Centre Street, Wilkinsburg, Pa., will expend about $125,000 for the erection of its new one-story ice-manufacturing and power plant, 85 x 105 ft., at Turtle Creek, Pa.

The Wilton Tool Co., Detroit, has plans for a new factory at Sharon, Pa., and will break ground at an early date. The present plant will be removed to the new location.

The Seyler Mfg. Co., Undercliff, Pittsburgh, manufacturer of bolts, nuts, etc., has plans under way for the erection of a new one-story factory, 60 x 180 ft.

The Landstreet-Downey Coal Co., Robson-Prichard Building, Huntington, W. Va., recently organized, is planning for the installation of machinery at its properties at Burch, W. Va., including hoisting equipment, undercutting machines, mining locomotive, motors, etc. F. S. Landstreet, Jr., is vice-president, and C. F. Downey, Jr., general manager.

Buffalo

BUFFALO, Dec. 19.

The City Council, Dunkirk, N. Y., has preliminary plans under way for a municipal electric power plant to cost about $500,000. F. W. Ballard, Swetland Building, Cleveland, is engineer.

The addition to be erected by the Merchants Dispatch Transportation Co., East Rochester, N. Y., will be used for the manufacture of railroad car equipment and considerable car shop machinery will be installed. L. F. West is head.

The American Car & Foundry Co., 165 Broadway, New York, has awarded contract to the Austin Co., Euclid Avenue, Cleveland, for a one-story addition to its plant at Depew, N. Y., 60 x 200 ft., to cost about $35,000.

John T. Andrews & Son, Pen Yan, N. Y., are considering plans for rebuilding the one-story machine shop at their paper mill, 40 x 80 ft., recently destroyed by fire with loss estimated at close to $25,000.

The Morley Machinery Co., Rochester, N. Y., manufacturer of planers, special machinery, etc., has acquired the plant of the Defiance Check Writer Corporation, 299 State Street, for extensions. Occupancy will be taken at once.

A vocational department will be installed in the new three-story junior high school to be erected by the Board of Education, Syracuse, N. Y., in the Seventeenth Ward. A. L. Brockway, Third National Bank Building, is architect.

The National Lamp Works will erect a boiler house at 757 East Ferry Street, Buffalo, to cost $20,000.

The Gulf States

BIRMINGHAM, Dec. 19.

The Humphreys-Pure Oil Co., Mexia, Tex., is considering the erection of a new refinery at Houston, Tex., with initial daily capacity of about 30,000 bbl. It will also build a refinery in the Mexia district. The project is estimated to cost over $1,000,000. Col. E. A. Humphreys is head.

The Common Council, Wellington, Tex., is planning for a bond issue of $50,000 for the erection of a municipal electric power plant.

The Consumers' Ice Co., El Paso, Tex., is completing plans for an addition, 35 x 100 ft., estimated to cost about $50,000.

The Houston Power Co., Dothan, Ala., has commissioned the Southern Engineering Co., Albany, Ga., to prepare plans for a hydroelectric generating plant on the Choctawhatchee River, estimated to cost about $300,000, including transmission system to connect Newton, Hartford and other points in this part of Alabama.

Fire, Dec. 10, destroyed a portion of the plant of the General Automobile Co., New Orleans, with an estimated loss of $50,000.

The National Petroleum Co., Hibernia Bank Building, New Orleans, is planning for the construction of a new refinery in the vicinity of Kenner, La. P. A. Leslie is general manager.

The Southern White Cedar Pole Co., Blountsville, Fla., is considering the establishment of a new plant for the manufacture of ice-cream freezers, pails, buckets, etc. C. C. Beattie is general manager.

The Southwestern Power & Light Co., Fort Worth, Tex., a subsidiary of the Fort Worth Power & Light Co., is planning the erection of an addition to increase the capacity from 25,000 to 45,000 kw.

A vocational department will be installed in the John Herbert Phillips High School to be erected at Seventh Avenue and Twenty-fourth Street, Birmingham, estimated to cost about $1,000,000. D. O. Whilldin, Title Guarantee Building, is architect.

The Mo-Jo Filter Co., Rockdale, Tex., recently organized with a capital of $50,000, has plans under way for the establishment of a factory to manufacture filtering equipment and parts. R. S. Moore heads the company.

The Common Council, Abbeville, La., will take bids until Jan. 5 for equipment for the municipal electric power plant, to include oil engines, electric generator, switchboard, exciter, etc. J. Camille Broussard is secretary.

The Chihuahua Electric & Railway Co., Chihuahua, Mex., has been acquired by new interests and plans are under way for extensions in the electric power plants and system. New equipment will be installed. R. Lopez Negrete heads the organization.

A vocational department will be installed in the new high school to be erected at Sulphur Springs, Tex., estimated to cost $150,000.

Cincinnati

CINCINNATI, Dec. 19.

Contrary to general expectations the machine-tool market the past week showed fair activity. Several manufacturers booked orders exceeding in number those of any week during the past several months and December is expected to be one of the most active months this year. No large orders were booked, however, the majority of sales being one and two machines from widely scattered points. The American Locomotive Co., New York, has closed on its recent list, but no information is available locally as to where the business was placed. The Chesapeake & Ohio and the Delaware, Lackawanna & Western have not taken any action on their recent lists, which is also true of the Rock Island. It is reported that the Pennsylvania Railroad will shortly issue a list of requirements for 1922. Practically all railroad shops in this section have been closed until Jan. 1. This is a customary procedure at this time with most roads, but this year it is being practiced more generally, as appropriations for the year have already been expended and the lack of business has enabled the shops to catch up on repair work of rolling stock.

The Pfau Mfg. Co., Cincinnati, manufacturer of sanitary ware, is putting on the market an issue of $300,000 worth of gold notes, the proceeds to be devoted to contemplated extensions, and to provide additional working capital to care for expanding business.

Plans are under way whereby the London Motor Plow Co., London, Ohio, tractor manufacturer, will move its plant to Springfield, Ohio. The company is negotiating for space in the Shuey Factories Building and it is expected the installation of machinery will commence about Jan. 1. Fifty men will be employed on production, which will begin Feb. 1. E. H. Daniel is president and general manager.

The U. S. Radiator Corporation will shortly open a storage warehouse in Cincinnati, having leased from the Ferro-Concrete Construction Co. a building which it will erect at McLean Avenue and Exeter Street. It will be two stories, 100 x 114 ft., with direct railroad switching facilities.

The Sterling Mine Supply & Mfg. Co., Cincinnati, was recently incorporated with a capitalization of $100,000. It manufactures electrical appliances for coal mining with a plant at Cleveland. The head offices are at 1334 Union Trust Building, Cincinnati. L. B. Turnbull, Jr., is president.

The city of Dayton, Ohio, will shortly commence the erection of a new pumping station on Idlewild Avenue. It will be equipped with three pumping units, two having capacities of 1800 gal. per min. and the third, 1400 gal. The estimated cost, including equipment, is $100,000.

Detroit

DETROIT, Dec. 19.

The United Engine Co., Lansing, Mich., is receiving material for the construction of an addition from the plant of the Aktebolaget Cream Separator Co., St. Louis, recently merged with the United Engine Co. Plans are under way for a new factory in Lansing to manufacture cream separators. Other products formerly made by the Aktebolaget company will also be manufactured.

The Crary-Granzow Machine Co., Benton Harbor, Mich., is considering plans for the construction of an addition or a new plant, to take care of its increasing business.

A dredge manufacturing company is being organized in Homer, Mich., by Walter and Early M. Dryer. More than $10,000 worth of machinery has been purchased from the Walcott Lathe Co., Jackson, Mich.

The Detroit Marine Aero Engine Co., recently organized, is having plans prepared for a new factory in Highland Park, Mich.

The Northrup Lock Co., Orion, Mich., will start the erection of a new one-story plant in the spring.

The Kaslite Co., Detroit, manufacturer of aluminum utensils, has started construction on a new plant at 3359 Gratiot Avenue. William A. Burns heads the company,



THE RUPTURED SECTION OF THE RUDDER FRAME OF THE FRENCH S. S. CORDILLERE, INDICATED BY THE CROSSED CHALK LINES AND 9 X 5 IN. IN SIZE, WAS WELDED AT SHANGHAI IN 4 HR. BY CHINESE LABOR. WELDING IS BECOMING MORE WIDELY UNDERSTOOD IN THE ORIENT, ACCORDING TO THE EXPORT DEPARTMENT OF THE OXWELD ACETYLENE CO., NEW YORK, THE CHINESE EASILY MASTERING THE MANIPULATION OF THE BLOWPIPE AND SHOWING KEEN INTEREST IN APPROVED PRACTICES AND APPLICATIONS

which was recently organized with a capitalization of $25,000.

The Fisher Body Corporation, Detroit, will erect a two-story machine shop, 30 x 60 ft., at a cost of approximately $30,000.

The Motor Wheel Corporation, Lansing, Mich., has awarded contract for its one-story 120 x 240 ft., plant unit.

The Beach Mfg. Co., Charlotte, Mich., is erecting a one-story addition.

The Universal Wrench Co., Ltd., Windsor, Ont., has been organized with $250,000 capital to do a general machine and foundry business. The incorporators are D. C. Munro, W. C. Fillmore and others.

The Citizens Light & Power Co., Adrian, Mich., is planning the installation of a 2000-kw. turbo-generator and condenser, to be ready for operation next summer.

The Stearns Lighting & Power Co., Ludington, Mich., expects to have its new $225,000 power plant completed Feb. 1.

The Buick Motor Car Co., Flint, Mich., has taken out a permit for the erection of an addition to No. 1 plant, at a cost of $97,000.

The Belding Gas & Oil Co., Belding, Mich., is planning the erection of new storage tanks to care for increased business.

The State Board of Correction, Lansing, Mich., is considering plans for the construction of a new industrial school estimated to cost close to $2,500,000, including equipment.

The Simons Sales Co., 436 West Willis Avenue, Detroit, has taken bids for a one-story automobile service and repair building, 50 x 175 ft., estimated to cost about $85,000. Albert Kahn, 1000 Marquette Building, is architect.

A vocational department will be installed in the new three-story high school to be erected at Highland Park, Mich., estimated to cost $125,000. W. S. Holmes, Tussing Building, Lansing, Mich., is architect.

The Rieber-Kolz Mfg. Co., Adrian, Mich., manufacturer of automobile lighting equipment, has secured property at Blissfield, Mich., and plans for the early removal of its works.

Milwaukee

MILWAUKEE, Dec. 19.

Beyond an occasional order for one or two tools, manufacturers expect but few sales in the next two weeks. The trade, however, will enter the new year with more substantial support of an expectancy of good business than it did a year ago. Inquiry has been moderately active since the latter part of November, and while only a small quantity of business is passing it appears certain that some fair-sized orders will be placed soon after the first of the year. Milling machine makers sold more tools the first half of December than the last half of November, but other classes of equipment ran about even. A great deal of confidence is held in the prospect of good buying by railroads and railroad equipment shops early in the new year, and inquiry from these sources is increasing steadily. Automotive industries have been only quiet buyers recently and a resumption of demand is looked for hopefully.

The Western Malleable Co., Beaver Dam., Wis., has let contracts for a power plant addition to be equipped for pulverizing coal to meet the requirements of a change in its fuel system. The work also embraces laying pipe lines for distribution of fuel to the three plants operated by the company in Beaver Dam, and other mechanical changes in boilers, furnaces and ovens. The Elm Street plant resumed production Dec. 15, re-employing 250 men on a large order for railroad castings which will require several weeks to execute. H. L. Kirsh is general manager.

The Ackerman Oil Co., 301 Majestic Building, Milwaukee, which recently acquired a three-acre site in Cudahy, has plans for a small refinery, warehouse and distribution group and office building, estimated to cost about $50,000. Bids will be taken Dec. 23. David Ackerman is president and general manager.

The Cataract Mfg. Co., Milwaukee, incorporated recently with $50,000 capital stock to manufacture pumps and other mechanical appliances, has purchased equipment and opened a machine shop at 262-264 Fifth Street. The corporate style has been changed to the Lueck Mfg. Co. Frank R. Lueck is president and general manager.

The Board of Education, Kaukauna, Wis., will proceed with its plans for erecting a new junior high and vocational training school. Parkinson & Dockendorff, architects, La Crosse, Wis., are designing a brick, tile and steel building, two stories and basement, T-shaped, 100 x 185 and 60 x 62 ft., estimated to cost about $175,000. Bids will be taken in January. T. A. Towsley is secretary of the board.

The Alliance Investment Co., 115 Wisconsin Street, Milwaukee, has let the general contract to the W. W. Oeflein Co., 86 Michigan Street, for a brick, steel and concrete public garage and service building, 60 x 120 ft., two stories and part basement. It will cost about $60,000 complete. M. Tullgren & Sons are the architects.

The Otto Pietsch Dye Works, 254 West Water Street, Milwaukee, is taking bids through the Birkholz Engineering Co., 216 West Water Street, for the boilers, motors and other equipment of the power plant for its new plant under construction at Third Street and Atkinson Avenue. The power house will be 40 x 60 ft., and the main plant, 100 x 120 ft.

The Stoughton Wagon Co., Stoughton, Wis., has decided to remodel the manure spreader department of its works into a motor truck factory to provide facilities lost through the burning of the truck shop early in November with a loss of $250,000. This will be a temporary measure, for the company expects to start work in the spring on a fireproof building for the motor truck division. F. J. Vea is president.

The Fort Howard Paper Co., Green Bay, Wis., advises THE IRON AGE that the report published in the issue of Dec. 1 that it has let a contract for the construction of a new paper mill is incorrect. The general contract, the company advises has not yet been let to anyone.

Indiana

INDIANAPOLIS, Dec. 19.

The J. A. Huetter Machine Co., 545 Kentucky Avenue, Indianapolis, is completing plans for a one-story machine shop at 537 Kentucky Avenue, 55 x 85 ft., estimated to cost about $25,000.

The Indiana Refining Co., Lawrenceville, Ind., is planning the construction of a pipe line from Lawrenceville to Owensboro, Ky., estimated to cost approximately $1,000,000.

The Southern Indiana Power Co., Williams, Ind., has plans under way for a new electric power plant, estimated to cost $75,000. Holland, Ackerman & Holland, 106 Liberty Avenue, Ann Harbor, Mich., are architects.

A vocational department will be installed in the two-story and basement high school to be erected at Butler, Ind., 55 x 125 ft., estimated to cost $100,000. Bids are being taken until Dec. 28. A. H. Elwood & Son, 201 Haynes Building, Elkhart, Ind., are architects.

Mayer & Mayer, 443 Sciota Street, Indianapolis, have plans in preparation for a one-story machine shop, 50 x 120 ft., on Ellsworth Street, estimated to cost $25,000.

Plans are being prepared for the construction of a one-story power house at the Indiana State Normal School, Terre Haute, Ind. Shourds & Stoner, 511 Tribune Building, are architects.

Electric motors and other power equipment will be installed in the five-story printing plant, 100 x 135 ft., to be erected by C. E. Pauley 112 East Maryland Street, Indianapolis, estimated to cost $200,000.

The J. C. McFarland Co., 3551 Parnell Street, Chicago,

manufacturer of art metal doors, metal windows, etc., has preliminary plans under way for a one-story addition to its branch plant at Laporte, Ind., 100 x 200 ft., to cost close to $75,000.

Seattle

SEATTLE, Dec. 13.

The Todd Dry Docks, Inc., Seattle, Wash., has plans under way for the construction of a new dry dock, with shop facilities, at its Harbor Island yards.

The Coy Valve Co., Chehalis, Wash., recently organized with a capital of $1,000,000 to manufacture valves and other steam specialties, is negotiating for a site for its new plant, estimated to cost $150,000. George Graham heads the company.

The Northwestern Power & Mfg. Co., Port Angeles, Wash., is considering preliminary plans for a new hydroelectric generating works on the Lyre River, Clellam County, estimated to cost about $400,000. Headquarters are in the New York Building, Seattle.

The Prouty Lumber & Box Co., Warrenton, Ore., has acquired a local site and plans the erection of an electrically-operated box factory and sawmill. The latter will be equipped for a daily capacity of about 125,000 ft. of lumber.

The Menasha Woodenware Co., North Bend, Ore., has plans under way for the first unit of a new works, estimated to cost $50,000. A. J. Lustif, Lewis Building, Portland, Ore., is engineer. Herbert Armstrong is local manager.

The Mack Motor Truck Co., Seattle, Wash., has concluded arrangements for leasing a new building to be erected at Roy Street and Ninth Avenue, at an estimated cost of $100,000. It will be used for local headquarters and operations. Henry Bittman, Seattle, is architect.

The Central South

ST. LOUIS, Dec. 19.

The Haynes-Langenberg Mfg. Co., 4045 Forest Park Boulevard, St. Louis, manufacturer of steam, hot-water and other furnaces and heaters, etc., has awarded contract to Charles B. McCormack & Sons, Columbia Building, for rebuilding the portion of its plant recently destroyed by fire. The work is estimated to cost about $125,000.

The Chicago, Rock Island & Pacific Railroad Co., 139 West Van Buren Street, Chicago, will commence the immediate rebuilding of its car repair shops at Pratt, Kan., recently destroyed by fire, estimated to cost about $100,000.

The Independent Glass Co., Chattanooga, Tenn., will commence the immediate erection of a new two-story plant, 50 x 190 ft., to manufacture automobile windshields and kindred products. A. R. Williams is president.

The Cumberland & Manchester Railroad Co., Barbourville, Ky., will make enlargements in its car shops at Heidrick, Ky., including improvements in present works and equipment, to cost about $250,000. F. M. Heidrick is president.

The Elkfield Coal Co., Garth, Ky., recently organized is planning for the installation of equipment at its local properties, to include electrical apparatus, locomotive, coal cars, mining tools, rails, etc. J. G. Bowman is president, and R. Q. Young, manager.

Electric motors and other equipment will be installed in the addition to be erected by the Standard Printing Co., 218 First Street, Lexington, Ky., estimated to cost about $95,000. D. B. Rose is president.

The Consumers Ice & Cold Storage Co., Eldorado, Ark., recently organized, with a capital of $100,000, is planning the erection of a new ice-manufacturing factory with initial capacity of about 60 tons per day. E. L. Pye is president, and H. M. Johnson, secretary and treasurer.

A vocational department will be installed in the new one-story and basement high school, 118 x 160 ft., to be erected at Mt. Pleasant, Tenn., estimated to cost $75,000. George Waller, Independent Life Building, Nashville, Tenn., is architect. Bids will be asked at an early date.

Mercer Reynolds, Chattanooga, Tenn., is perfecting plans for the organization of a company to establish a plant at Nashville, Tenn., for the manufacture of bond papers and other paper products. A site for the mill has been selected. It is estimated to cost in excess of $75,000 with machinery.

The Seymour Packing Co., Topeka, Kan., is having plans drawn for a new five-story cold storage plant, 50 x 150 ft., estimated to cost about $100,000. The Tait-Nordmeyer Engineering Co., St. Louis, is engineer.

The Oklahoma Burner Co., Tulsa, Okla., manufacturer of gas burners and gas-burning equipment, is considering plans for a new plant with increased capacity. D. Ruark is secretary.

A vocational department will be installed in the proposed three-story and basement junior high school to be erected at Joplin, Mo., estimated to cost about $400,000.

The White Co., 2443 Lindell Avenue, St. Louis, is completing plans for the erection of a one-story automobile service and repair building, estimated to cost about $75,000. Preston J. Bradshaw, International Life Building, is architect.

A. B. Banks, Little Rock, Ark., and associates, are developing plans for works at White Cliffs, Ark., recently acquired to manufacture fertilizers, etc. A company with capital of $1,000,000 will be organized, and the proposed plant, it is said, will cost in excess of $250,000, including machinery.

The Kentucky Block Coal Co., Hazard, Ky., is considering rebuilding its machine shop and other departments, recently partially destroyed by fire, with loss estimated at close to $50,000.

The Liberty Electrical & Mfg. Co., 95 North Third Street, Memphis, Tenn., has filed plans for a one-story factory, 50 x 150 ft.

Canada

TORONTO, Dec. 19.

Dealers report very limited activity in the machine-tool market the past week. Inquiries are in good volume, however, the majority of which are expected to turn into sales, and as a consequence a strong feeling of optimism prevails with regard to early 1922 business. The automobile industry is again preparing for active operations and as it has been buying equipment only in a limited way, considerable business is looked for in the future. Municipal governing bodies are preparing to go ahead with new construction work and are having plans prepared for electric plants, waterworks and sewage systems for which equipment will be required. Railroads have been ordering rails more freely of late and in addition several good-sized contracts have been let for car repair work. On the whole dealers consider the outlook for the coming year is brighter than it has been since the close of the war. The demand for small tools is quiet, with users buying only what they require for immediate use.

The Continental Electric Co., 505 King Street East, Toronto, recently incorporated to manufacture suction cleaners, etc., has commenced operations. It is the intention of the company to extend the operating capacity in the early future by installing additional machinery.

The Dominion Steel Corporation, Sydney, N. S., has specifications ready for a large machine shop, to be erected in Sydney. The company has in view the centralization of all machine work and repairs for its railroads, colliers and steel plants. It is stated that construction will start in the near future.

The American Optical Co., Nicolet, Que., will build a glass factory to cost $75,000.

The Hamilton Tar & Ammonia Co., Caroline Street North, Hamilton, Ont., will build a factory and warehouse to cost $50,000 at Ottawa, Ont. W. M. Currie, president of the company, will receive bids for tar stills and all equipment, including tanks, etc.

The Mid-Western Tractor Wheel Co., Ltd., Amherstburg, Ont., recently formed with a capital stock of $1,000,000, is establishing works for the manufacture of tractor wheels, with a daily capacity of 150 sets. The plant will be 200 x 400 ft., one-story, of steel and concrete, and is expected to be completed and in operation by July 1. The officers include E. Edmiston, president; T. H. Fox, first vice-president; Charles A. Cuddy, second vice-president; J. G. Prance, treasurer; A. E. Carpenter, secretary. Glen J. Walker, who has had many years' experience in motor factories, will be production manager and chief mechanical engineer. H. H. Lane is a director.

The Alliance Brass Co., Ltd., recently formed with a capital stock of $75,000, has rented a building on Hunter Street East, Peterborough, Ont., and is installing machinery and preparing to go into the manufacture of valves and other brass goods.

Construction has been started on the erection of a plant at Peterborough, Ont., for the Red Arrow Tires, Ltd., recently incorporated with a capital stock of $2,000,000. The factory, which is under construction, will be 205 x 90 x 60 ft., two stories and basement, and will have a capacity of 500 tires and 500 tubes per day. The plant will be rushed to completion and is expected to be in operation by April next. The officers are J. J. Turner, president; G. A. Gillespie, vice-president; J. R. McDonald, secretary; P. P. Westbye, treasurer. Joseph Rath, of Durant Motors, Buffalo, N. Y., is a director.

The Birmingham Motors, Ltd., has leased a building on Monaghan Road, Peterborough, Ont., with an option to pur-

chase, where it proposes to install machinery and carry on manufacturing operations. Jamestown, N. Y., interests are behind the new enterprise.

The Frontenac Floor & Wall Tile Co., Kingston, Ont., is building a grinding plant for feldspar for the manufacture of floor and wall tile.

The general contract for the construction of car cleaning shops costing $50,000 for the Canadian Pacific Railway, at Glen yards, has been awarded to D. G. Loomis & Son, 211 McGill Street, Montreal.

The I. T. S. Rubber Co., 26 Alpine Avenue, Toronto, Ont., will build an addition to its tire plant to cost about $60,000. W. Jeffries is superintendent.

The F. B. Coombs Furniture Co., Kincardine, Ont., is in the market for additional wood-working machinery.

The Acton Canning Co., Acton, Ont., is in the market for grinding equipment, vats, etc., to replace that recently destroyed by fire.

California

SAN FRANCISCO, Dec. 13.

The Doble Motors Corporation, Call Building, San Francisco, Cal., manufacturer of steam-driven automobiles, is negotiating with the Chamber of Commerce, San Mateo, Cal., with view to building a new plant in the Burlingame section, estimated to cost $300,000, including machinery. G. H. Landfield is representing the company.

The Brown-Bevis Co., Inc., Los Angeles, machinery merchant and manufacturer of rebuilt machinery has acquired the property of the Madsen Iron Works, 2416 East Sixteenth Street, comprising about 30,000 sq. ft. of land and buildings totaling 20,000 sq. ft.; the purchase includes a 150-ft. and 24-ft. traveling crane. The new owner will take possession in January, when the Madsen company will remove to its new plant at Huntington Park.

A. B. Atkinson, 3526 Fifth Avenue, Sacramento, Cal., is having plans prepared and will soon take bids for the erection of a one-story ice-manufacturing plant, 80 x 160 ft., at Thirteenth and S streets, estimated to cost about $75,000. F. A. S. Foale, Sacramento, is architect.

The County Board of Supervisors, Oakland, Cal., will call for bids early in January, for a one-story power plant; one-story ice and refrigerating plant; shops and other buildings at the County Infirmary grounds. H. H. Meyers, Kohl Building, San Francisco, is architect.

The State Department, Sacramento, Cal., will soon call for bids for a six-story warehouse at San Francisco, 122 x 812 ft., and estimated to cost close to $2,000,000, with equipment. Frank G. White, Ferry Building, San Francisco, is architect in charge.

A vocational department will be installed in the two-story high school to be erected by the Board of Education, Tustin, Cal., 80 x 220 ft., and estimated to cost $135,000. Mott M. Marston, 535 I. W. Hellman Building, Los Angeles, is architect.

The Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, is contemplating the erection of a new electric generating plant on the Pit River, Shasta County, estimated to cost $100,000.

The M. & M. Mfg. Co., Wilmington, Los Angeles, recently organized with a capital of $200,000 to manufacture machinery and parts, and now operating a local factory, is planning the erection of permanent works on Mormon Island, Los Angeles Harbor. D. G. McGregory is president, and B. L. Morgan, general manager.

The Sacramento Brick Co., Sacramento, Cal., is planning for the installation of new machinery to develop an annual capacity of about 30,000,000 brick. Equipment will also be installed for the manufacture of roofing tile. H. H. Bartells is general manager.

Delmore Motors Corporation, 58 West Thirty-ninth Street, New York City, will go into the production of the parcelmobile. The passenger end of the business will be gradually developed. The parcelmobile is designed to carry light freight and packages up to 500 lb. The company is now completing arrangements for the manufacture of the first 100 parcelmobiles.

The International Harvester Co., Hamilton, Ont., has resumed operations in its malleable iron foundry, giving employment to 35 men. It is also expected that the gray iron foundry will re-open in about a month's time.

The Kalamazoo Steel Products Co., manufacturer of steel chairs and stools for office and factory purposes, has resumed operations with 20 men employed.

IRON AND INDUSTRIAL STOCKS

Conflicting Conditions Make for Narrower and Irregular Price Changes

On the one hand, we have had a slowing up in general business since November, with prospects of further curtailment after the turn of the year in many lines of industry. On the other hand, we have a continually improving money situation, with a strong likelihood that conditions existing before the war will return in 1922. As a result of such conflicting economic conditions we have a tendency on the part of the investor to go slower in purchases of iron and industrial stocks, especially now that the available supply of high yielding shares and bonds has narrowed down to a relatively small amount. In addition, holders of railroad shares, in a large number of cases, have been uneasy over the prospects of trouble arising from further reductions in wages and the unwillingness of the carriers to lower freight rates. Their feeling is that the case of the railroads, in the event of labor troubles, would not have the public sympathy. Speculative interest aroused by the initial announcements of proposed mergers of steel properties has lagged recently, and unless there is a turn for the better in the stockyard strike situation, some investors fear unfavorable developments in allied industries. All of which explains in a large measure some of the recent selling of stocks. The movement of security values naturally has been narrower and attended by more or less irregularity.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	37⅞ - 39½	Lackawanna Steel.	45⅝ - 47⅜
Allis-Chalm. pf...	88 - 90	Midvale Steel.....	28 - 29⅜
Am. Can com.....	32⅛ - 35½	Nat.-Acme	11⅜ - 12
Am. Can pf.....	94½ - 97	Nat. E. & S. com.	37⅛ - 41⅜
Am. C. & F. com.	145 - 148⅞	N. Y. Air Brake..	60 - 61
Am. Loco. com...	97½ - 101	Nova Scotia Steel.	23¼ - 23¾
Am. Loco. pf.....	111 - 115	Press. Steel com..	65¼ - 68⅛
Am. Radiator com.	88½ - 89½	Press. Steel pf....	92½ - 93
Am. Steel F. com.	33⅞ - 34⅜	Ry. Stl. Spg. com.	91 - 94
Am. Steel F. pf...	95 - 95¼	Ry. Stl. Spg. pf...	— - 106⅜
Bald. Loco. com..	94⅞ - 98⅜	Replogle Steel.....	26½ - 30
Bald. Loco. pf....	— - 104	Republic com.....	52¾ - 54⅜
Beth. Steel com..	52¼ - 55	Republic pf.....	84 - 86⅝
Beth. Stl., Cl. B..	57 - 59½	Sloss com.....	37½ - 39
Beth. Stl., 8% pf..	105¼ - 106½	Sloss pf.....	— - 74½
Chic. Pneu. Tool..	55 - 62¾	Transue-Williams.	31½ - 32¼
Colorado Fuel.....	25 - 26¼	U. S. Pipe com...	17¼ - 17½
Cruc. Steel com...	64½ - 69⅛	U. S. Pipe pf.....	51⅞ - 52⅞
Cruc. Steel pf.....	87 - 89¼	U. S. Steel com...	83¾ - 85
General Electric..	140 - 143	U. S. Steel pf.....	112½ - 113⅞
Gt. No. Ore Cert..	31⅜ - 32	Vanadium Steel...	31⅛ - 22½
Gulf States Steel.	47 - 49	Westingh'se Elec.	49⅝ - 51½
Int. Har. com.....	82 - 85½		

Industrial Finances

The American Seeding Machine Co., Springfield, Ohio, has declared quarterly dividends of 1¼ per cent on the common and 1½ per cent on the preferred stock, payable Jan. 15 to stock of record Dec. 31.

A reorganization of the Walden-Worcester, Inc., Worcester, Mass., wrenches, has been completed. J. Verner Critchley is president and will act as agent for the receivers until discharged by the court. Warren S. Bellows and Lewis E. Bellows retain a financial interest and active management. The reorganized company has a capital of 2500 shares common stock, no par value; $300,000 first preferred stock and $250,000 second preferred stock.

The Gorman-Brown Engineering Corporation, Boston, has incorporated under Massachusetts laws with Ernest N. Brown, 163 Dorchester Street, Boston, as president; John R. Honors, 57 Monument Avenue, Swampscott, vice-president; and William F. Forman, 163 Dorchester Street, Boston, treasurer. The capital consists of 500 shares of no par value, all of which are issued.

Edmund S. Wolf, Bridgeport, Conn., has been appointed temporary receiver for the Coe-Stapley Mfg. Co., West Haven, Conn., automobile and bicycle pumps and sheet metal goods. The company was incorporated in 1918 and is capitalized for $950,000. R. E. Carpenter, Boston, is president and Robert R. Adams, Bridgeport, treasurer.

Directors of the Youngstown Sheet & Tube Co., Youngstown, Ohio, have declared a dividend of 50c. per share on the 800,000 shares of non-par value common stock outstanding and $1.75 on the preferred, both payable Jan. 2 to holders of record Dec. 20. The dividends represent payment for the fourth quarter of 1921. The company paid dividends on common at the rate of $1.50 per share on Jan. 1, 1921, $1 on April 1 and 50c. on July 1 and Oct. 1 each.

Directors of the Newton Steel Co., Youngstown, Ohio, have authorized the regular quarterly preferred dividend of $1.75 per share, payable Jan. 2 to stock of record Dec. 20. It has $705,000 of preferred outstanding. Though the com-

pany has never paid a dividend on common stock, a sizable surplus against that issue has been accumulated.

Industrial issues at Youngstown, Ohio, stimulated for a Time by current merger reports, have registered recessions within the past two weeks. Common stock of the Youngstown Sheet & Tube Co., most frequently mentioned in connection with consolidation gossip, has declined from a recent high of $70 to $65. Trumbull Steel common is now listed at $21, as compared with a recent listing at $23, while the junior issue of the Brier Hill Steel Co. is quoted at $20.75, as compared with a recent listing at $23.50. Sheet & Tube preferred is quoted at $104, Brier Hill preferred at $100 and Trumbull preferred at $96. Last sale of common stock of the Newton Steel Co. was negotiated at $75, and of Falcon Steel Co. at $80. United Engineering & Foundry Co. common is listed at $158 bid and $160 asked.

The Dalton Adding Machine Co., Cincinnati, is issuing $750,000 worth of 8 per cent sinking fund 10-year convertible gold notes. The proceeds from the issue will be used to place on the market several new types of calculating machines which the company recently has perfected. It is not contemplated, at the present time, to make any extensions to the plant.

Directors of the Brier Hill Steel Co., Youngstown, Ohio, have declared the regular quarterly preferred dividend of $1.75 per share, payable Jan. 2 to holders of record Dec. 20. The company has omitted the common dividend for several quarters.

The O. K. Giant Battery Corporation, Gary, Ind., has been placed in the hands of a receiver. The total assets are given at $125,000 and are exceeded by the total indebtedness.

Representatives of 40 per cent of the outstanding stock of the American Brass Co. have formulated and approved a plan by which there will be offered to all the stockholders of the American Brass Co. the opportunity to dispose of their shares to the Anaconda Copper Mining Co. for $150 in cash and three shares of Anaconda stock against each share of American Brass Co. stock.

The petition of creditors of the John Obenberger Forge Co., Milwaukee, bankrupt, for permission to reorganize the corporation as the United States Forge Co., has been denied by John F. Harper, referee in bankruptcy. The liabilities of the Obenberger company were scheduled at approximately $890,000 and assets of $1,250,000 were claimed.

The W. W. Sly Mfg. Co., Cleveland, maker of foundry equipment, has increased its capital stock from $35,000 to $175,000.

A temporary organization of a Cleveland section of the Industrial Cost Association, which aims to standardize cost finding methods, was effected Dec. 7. Robert E. Belt, secretary and treasurer American Malleable Castings Association, Cleveland, was selected as temporary chairman and L. J. Flynn, auditor Van Dorn & Dutton Co., was chosen temporary secretary and treasurer. A membership campaign will be conducted and another meeting will be held Jan. 19, when a permanent organization will be effected.

The National Acme Co., Cleveland, has sold $5,000,000 7½ per cent first mortgage 10-year bonds to bankers, who in turn have sold the issue to investors.

The report of the Laconia Car Co., Laconia, N. H., discloses net earnings before federal taxes amounting to $133,945, contrasted with $146,877 for the previous year, ending Sept. 30, 1920. At the close of the year there was a surplus of $120,550, as against $131,975 at the close of the previous year.

The net profits before inventory adjustment and Government tax, as reported by the Canadian Car & Foundry Co. for the year ended Sept. 30, last, were $107,603, equivalent to $1.43 a share on the corporations $7,500,000 preferred stock. The profits for the previous year were $539,337, or $7.19 a share on the same amount of stock. The profit and loss surplus, after providing for inventory shrinkage, taxes, etc., and after deducting preferred scrip dividends, amounted to $3,251,207, contrasted with $6,243,603 for the preceding year.

S. W. Platt, for several years Pittsburgh district manager for a number of large scrap iron and steel firms, has gone into business for himself under the firm name of S. W. Platt & Co., with offices at 604 First National Bank Building, Pittsburgh.

The Cal Hirsch & Sons Mercantile Co., St. Louis, is now in its new offices in rooms 1101-1129, Central National Bank Building.

The Illinois Copper & Iron Mfg. Co. has changed its address to 1830 West Grand Avenue, Chicago.

BOOK REVIEWS

United States Steel: A Corporation with a Soul. By Arundel Cotter. Pages 312, 5½ x 8 in., illustrated. Published by Doubleday, Page & Co., Garden City, N. Y.

Mr. Cotter's book, "Authentic History of the United States Steel Corporation," was published January, 1916. Glancing through the new volume, which has a slightly different title, brings one to a keen realization of how much has happened in the past six years. Two truly great events affected the Steel Corporation; the decision in the dissolution case and the Great War, while the steel strike of 1919 was an event of no small importance.

As was said in THE IRON AGE of Feb. 17, 1916, when Mr. Cotter's original book was reviewed, there can be no question about his friendly attitude toward the Steel Corporation, and this is shown in his summary of the dissolution suit, which necessarily is rather brief. There is ample reason for issuing the new volume, which will be an addition to the library of anyone who wishes to be informed in regard to industrial history. A number of chapters are rewritten and others are added. Nothing of first importance seems to have missed the author's attention and he has made a valuable contribution to the list of books on business topics.

The story of how the Steel Corporation helped to win the war bristles with facts and figures, but is lacking in some features which would have made it more interesting. The account of the dissolution suit and of numerous investigations of the steel industry, is necessarily very much curtailed. The history of the Steel Corporation in recent years shows it has fully lived up to the principles so rigidly insisted upon by Judge Gary, especially as to co-operation with the independent companies and his opposition to unreasonable demands of labor unions. Mr. Cotter's discussion of "Questions of Policy" will be perused with much interest as will also the chapter on "United States Steel from an Investor's Viewpoint."

New Trade Publications

Steam Condensation Tables.—Wheeler Condenser & Engineering Co., Carteret, N. J. 1921 edition of a booklet entitled, "Steam Tables for Condenser Work." This is the sixth edition of a work which for many years has been widely used by engineers dealing with the condensation or evaporation of steam. The tables are in handy book form, pocket size. The properties of saturated steam are tabulated from 29.8-in. vacuum to atmospheric pressure in increments of tenths of an inch referred to a 30-in. barometer. The values were especially calculated for this book by Prof. Marks. As it is customary in vacuum work to read vacuum in inches of mercury, this is said to be superior to the old method of giving absolute pressures in lb. per sq. in. Above atmospheric pressure the increments are in pounds gage. The book explains how measurements are made by means of the mercury column and barometer, and gives constants and tables for making corrections. Corrections for the thermal expansion of mercury, for the relative expansion of mercury and brass scale, and other corrections are included.

Factory Flooring.—Carter Bloxonend Flooring Co., 1303 Long Building, Kansas City, Mo. Booklet P, 20 pp. 3¼ x 6¼, with the title "Bloxonend Flooring." Describing Bloxonend Flooring, its uses, its adaptability to concrete, wood or steel construction and its advantages over loose wood blocks. It goes into some detail regarding the various methods of installing Bloxonend and contains a partial list of installations.

Effective Jan. 1, the Acme Fancy Wire Works, Detroit, will be known as the Acme Wire & Iron Works. This change is made so that the name may give some indication of the company's output. Some years ago, when the concern was started, it manufactured fancy iron designs, but since the business has expanded so that wire and iron and metal products generally are manufactured. No changes will be made in personnel. The company has a thoroughly modern plant at 3527 East Canfield Avenue, Detroit, and is enjoying the largest business in its history.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.68c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.68c.
Hoops, base price	3.53c.
Bands, base price	3.28c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.78c.
Channels, angles and tees under 3 in. x ¼ in., base	2.68c.

Merchant Steel

	Per Lb.
Tire, 1½ x ⅛ in. and larger	2.65c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.85c.
Toe calk, ½ x ⅜ in. and larger	3.25c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.75c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.78c.

Sheets

Blue Annealed	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c.	.....
Nos. 22 and 24	3.85c.	4.10c.
No. 26	3.90c.	4.15c.
No. 28	4.00c.	4.25c.
No. 30	4.25c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	3.95c. to 4.10c.
No. 16	4.10c. to 4.25c.
Nos. 18 and 20	4.25c. to 4.40c.
Nos. 22 and 24	4.40c. to 4.55c.
No. 26	4.55c. to 4.70c.
No. 27	4.70c. to 4.85c.
No. 28	4.85c. to 5.00c.
No. 30	5.35c. to 5.50c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—56	—40	¾-in. But.	—30	—13
¾ in. Butt	—61	—47	1½-in. Butt.	—32	—15
1-3 in. Butt.	—63	—49	2-in. Lap.	—27	—10
3½-6 in. Lap.	—60	—46	2½-6-in. Lap.	—30	—15
7-8 in. Lap.	—56	—34	7-12-in. Lap.	—23	— 7
9-12 in. Lap.	—55	—33			

Steel Wire

Based Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 17½c.
High brass wire	17¼c. to 17½c.
Brass rod	14¾c. to 15 c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18½c. to 19 c.
Copper tube, seamless	21¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb.	$6.05	$5.80
			90 lb.	6.15	5.90
			100 lb.	6.25	6.00
IC	$10.00	$8.50	IC	6.40	6.15
IX	11.25	10.00	IX	7.40	7.15
IXX	13.00	11.50	IXX	8.40	8.15
IXXX	14.75	13.25	IXXX	9.40	9.15
IXXXX	16.25	15.00	IXXXX	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	35c.
Bar	40c. to 45c.

Copper

Lake ingot	16 c.
Electrolytic	15¾c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7 c.
Solder, ½ and ½ guaranteed	27c.
No. 1 solder	25c.
Refined solder	21c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	29c. to 31c.

Old Metals

Business has taken on the usual holiday dullness. Values continue firm. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.50
Heavy machine composition	8.00
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.00
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

FOR YOUR CONVENIENCE IN BUYING

All Advertisements Are Grouped According to Products

You can refer direct from this page to each group by referring to section numbers at top of following pages

For additional reference, see Buyers' Index and Advertisers' Index on last pages (Sections Nos. 55 and 56)

BEGINNING WITH PAGE SIX

	SECTION
IRON and STEEL *Generally classified under Rolled Products*	1
PIG IRON, IRON ORE, COAL, COKE, FIRE-BRICK REFRACTORIES	2
FERRO-ALLOYS	3
BRASS, COPPER, NICKEL, SILVER, BABBITT, ALUMINUM, ZINC, SPELTER and OTHER NON-FERROUS METALS	4
FORGINGS	5
CASTINGS	6
STAMPINGS, PRESSED METAL WORK	7
SCREWS, SCREW MACHINE PRODUCTS	8
BOLTS, NUTS, NAILS, SPIKES, RIVETS, WASHERS	9
SPRINGS *Wire Shapes and Parts*	10
WIRE *Wire Rope, Wire Fence, Wire Cloth, Wire Screen*	11
PERFORATED METALS	12
PIPE, TUBING	13
GEARS	14
BEARINGS	15
BUSHINGS	16
ELECTRICAL APPARATUS *Motors, Generators*	17
TRANSMISSION MACHINERY	18
BELTING, BELT FASTENERS, DRIVING CHAIN and CHAINS	19
MATERIAL HANDLING MACHINERY and APPARATUS *Conveyors, Elevators, Grab Buckets, Cranes, Hoists, Industrial Railways, Factory Trucks, Motor Trucks, Wagon Loaders*	20
FOUNDRY MACHINERY EQUIPMENT and SUPPLIES	21
FURNACES, OVENS, FORGES and HEAT TREATING EQUIPMENT	22
POWDERED COAL EQUIPMENT	23
INDICATING and RECORDING INSTRUMENTS *Pyrometers, Thermometers, Meters, Counters, etc.*	24
WELDING MACHINES, APPARATUS, OXY-GEN WELDING	25
GALVANIZING, ELECTRO PLATING EQUIPMENT and SUPPLIES	26
OILS, OIL EQUIPMENT and CLEANING COMPOUNDS *Fuel Oils, Cutting Oils, Lubricants, Oil Filters, Oilers, Oil Systems*	27
TANKS and STEEL PLATE WORK	28
ENGINEERS, STRUCTURAL WORK, BRIDGES, BUILDINGS *Flooring, Roofing, Sash Operating Devices, Apparatus for Ventilating, Lighting and Heating*	29
SAFETY and SANITARY APPLIANCES	30
BOOKS	31

FOLLOWING EDITORIAL PAGES

	SECTION
MACHINE TOOLS *Arranged in following order: Drilling Machines, Lathes, Manufacturing, Automatic Screw Machines, Machines for Boring, Planing, Shaping, Milling, Grinding*	32
GRINDING WHEELS *Wheel Dressers, Abrasives, etc.*	33
SAWING MACHINES and SAWS	34
FACTORY and MILL EQUIPMENT *Shop Furniture and Supplies, Baling Presses, Blue Printing Machinery, Scales, Steel Stamps, Box Strapping*	35
TWIST DRILLS, REAMERS, MILLING CUTTERS, TAPS, DIES, SCREW CUTTING TOOLS	36
SPECIAL MACHINERY, GAGES, JIG, FIXTURE and TOOL WORK	37
CHUCKS, TOOL HOLDERS	38
FILES, WRENCHES, VISES, ANVILS, CLAMPS	39
PNEUMATIC and ELECTRIC TOOLS and EQUIPMENT	40
PIPE THREADING and CUTTING MACHINERY and SWAGING MACHINES	41
WIRE WORKING and FORMING MACHINERY	42
BOLT, NUT, NAIL, RIVET and SCREW MAKING MACHINERY	43
RIVETERS, PUNCHES, SHEARS	44
SHEET METAL WORKING MACHINERY	45
PRESSES	46
HAMMERS	47
ROLLING MILL MACHINERY, ROLLS	48
POWER PLANT EQUIPMENT, APPLIANCES, and SUPPLIES *Boilers, Pumps, Engines, Air Compressors, Gas Producers Steam and Pipe Specialties, Packings, Felts and Insulating Material*	49
CLEARING HOUSE SECTION *Contains a large Selection of Used Machinery, Materials and Equipment*	50
WANTED TO BUY SECTION *A Place Where Buyers Advertise Their Wants*	51
CONTRACT WORK SECTION *Outside Work Wanted on Contract Basis; the Market Place for the Disposal of Surplus or Idle Manufacturing Capacity*	52
BUSINESS OPPORTUNITIES SECTION *Opportunities to Buy or Lease Factories, Mills, etc. Boards of Trade Opportunities, Capital and Agencies Wanted, etc.*	53
THE WEEKLY MEETING PLACE OF EMPLOYER and EMPLOYEE *For Help and Situation Wanted Advertisements*	54
BUYERS' INDEX SECTION *Where All Materials and Products Advertised Herein Are Classified Under Their Proper Headings*	55
ADVERTISERS' INDEX *About 1900 Names of Regular Advertisers*	56

THE IRON AGE, published Thursday of each week by the Iron Age Publishing Co., 239 West 39th Street, New York City. Charter Member of the Audit Bureau of Circulation and Associated Business Papers, Inc. Subscription Price: United States and Possessions, Mexico, Cuba, Shanghai, $6.00; Canada, $8.50; Foreign, $12.00 per year. Single copy, 50 cents.

Entered as second-class matter, June 18, 1879, at Post Office at New York under the Act of March 3, 1879. Vol. 108. No. 26.

BUYING UNITS*
CIRCULATION of THE IRON AGE ILLUSTRATED



THE WILLIAM H. HASKELL MANUFACTURING CO., Pawtucket, Rhode Island, are large manufacturers of Bolts, Nuts, Cap Screws, Coach Screws, Punchings, and Bolt and Nut Machinery. This company operates one plant which covers an area of 4½ acres and contains 106,878 sq. ft. of floor space. Total number of employees 280.

This concern is a large consumer of Steel, Brass and other Metals, Fuels, etc.; the annual consumption of these items is as follows: Hot rolled steel, 6,000 tons; Cold Drawn Screw Stock, 1,000 tons; Brass, Copper and Bronze Rods, 100 tons; Coal, 1,500 tons; Fuel Oil, 250,000 gal.

Products bought from The Iron Age Advertisers

Iron and Steel—Raw, wrought and finished.

Machine Tools—Machinery and Plant Equipment.

Production Tools—Drills, Reamers, Taps, Dies and Cutting Tools.

Power Plant Equipment — Dynamos, Motors, Engines, Boilers and Power Transmission Appliances.

Non-Ferrous Metals.

Products Not Metal—Paints, Grinding Wheels.

Metal Goods—Roller Bearings.

Fuels.

The following men read The Iron Age

Wharton Whitaker, Vice-Pres. & Gen'l Mgr.

E. Shirley Greene, Secretary

Chester Hacking, Superintendent

**This is No. 351 of a series of advertisements showing the various classes of manufacturing firms which subscribe to The Iron Age*

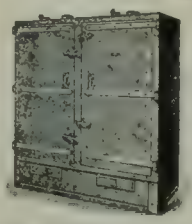
BUYING RESULTS*
ADVERTISING POWER of THE IRON AGE ILLUSTRATED

Are You Using These Sales Leads?

If you're looking for business in the metal-working fields — the machinery, automotive, railroad, shipbuilding, farm implement, foundry, iron, steel and other industries which produce or consume iron and steel, metals and metal-working machinery — be sure to regularly follow the sales leads mentioned by Mr. Rupprecht in his letter alongside.

The "Machinery Markets and News of the Works" section is, of course, only one of the many important editorial features of The Iron Age.

All Agreements Contingent upon Strikes, Accidents and other Causes beyond our Control



TELEPHONE

E. E. STEINER & CO., Inc.
BUILDERS OF
Japanning, Enameling and Drying Ovens
OF ALL DESCRIPTIONS

HEATED BY GAS, ELECTRICITY OR FUEL OIL

2-16 Avenue C.
Newark, N. J.

November 9th.1921.

Iron Age Publishing Co.,
239 West 39th Street,
New York City.

Att: Mr. Charles S. Baur, Gen.Adv.Mgr.

Gentlemen:

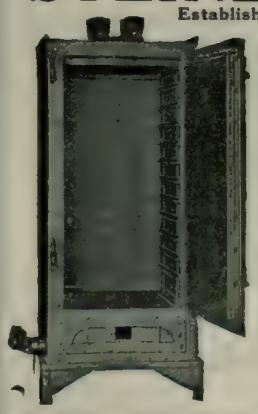
We have been subscribers to, and advertisers in the Iron Age for many years, and would not be without either.

We are glad to state that we have had some very good results from our advertisements in the Iron Age, and surely will continue to advertise in the future.

The column "Machinery Markets and News of the Works", we find very beneficial to us, and we always follow up possible leads, which have often resulted in orders for us.

Very truly yours,
E. E. STEINER & CO., Inc.
Otto Rupprecht
VICE PRES.

STEINER OVENS
Established 1889—32 years



SECTIONAL AND PORTABLE

Direct or Indirect Heated, using Gas, Electricity or Oil, Superior Construction, Economical Operation. For Japanning, Lacquering, Drying and adaptable for many other purposes.

Oven Trucks
Saw Dust Boxes
Dip-Tanks

Send for Catalogue

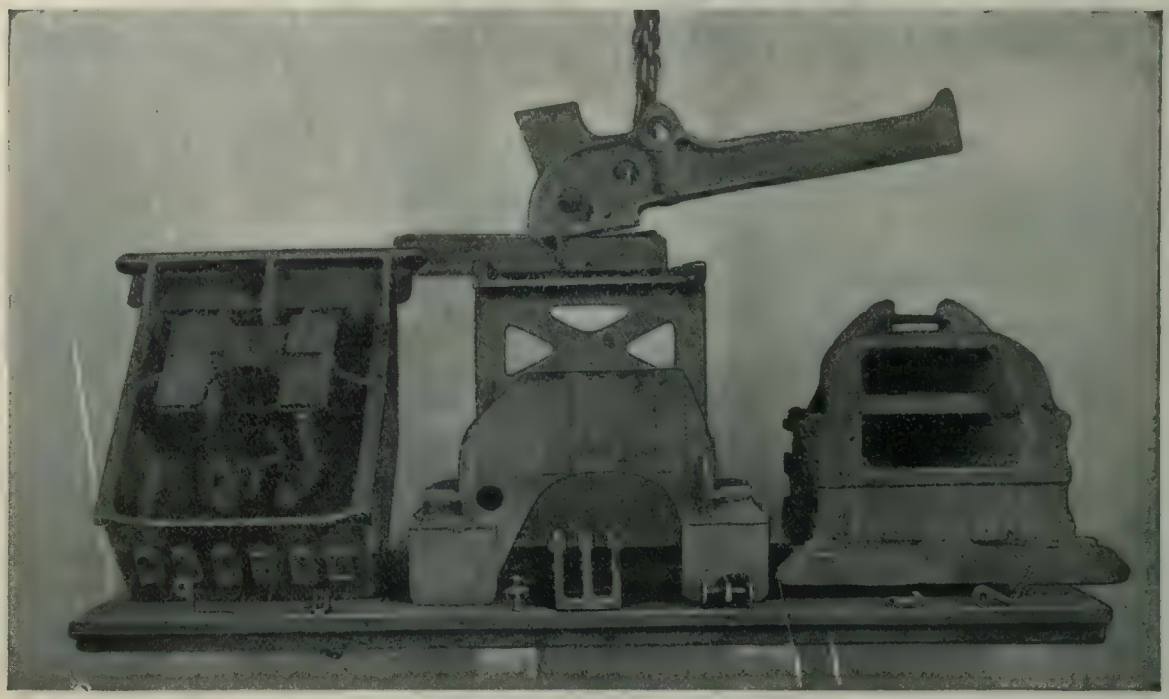
E. E. Steiner & Co., Inc.
2-16 Avenue C NEWARK, N. J.

To put yourself in line to cultivate business direct, be represented regularly with the other 1700 concerns in the advertising pages of The Iron Age.

THE WORLD'S GREATEST INDUSTRIAL PAPER
A.B.C. A.B.P. CHARTER MEMBERS

*This is No. 187 of a series of advertisements indicating concrete results obtained by advertisers in The Iron Age.

"STANDARD"



Steel Castings—1½ pounds Fulcrum to 3400 pounds Foot Plate

Steel Tires **Steel Tired Wheels**

Solid Rolled Steel Wheels

O. H. Steel and Malleable Iron Castings

Solid Forged Gear Blanks

Steel Forgings **Iron Forgings**

Forged and Rolled Steel **Pipe Flanges**

Ring Dies **Rings**

Roll Shells **Steel Springs**

USS BRAND

"The 'Standard' Brand on your material is an assurance of eventual economy."

USS BRAND

STANDARD STEEL WORKS CO.

GENERAL OFFICES:

500 NORTH BROAD ST., PHILADELPHIA, PA.

CHICAGO
ST. LOUIS
HAVANA, CUBA
HOUSTON, TEXAS
PORTLAND, ORE.

RICHMOND
SAN FRANCISCO
NEW YORK
ST. PAUL, MINN.

PITTSBURGH, PA.
BOSTON
MEXICO CITY
LONDON, ENGLAND
PARIS, FRANCE

STEEL PRODUCTS BY RIVER

In order to overcome the handicap of excessive railroad freight rates, the JONES & LAUGHLIN STEEL COMPANY has established a River Transport Department and is prepared to deliver its products in quantity by water to all points on the Ohio River, and the Mississippi River from St. Louis to New Orleans.

Two tows of steel barges carrying a total of more than 12,000 tons (about 400 freight carloads) of various J. & L. steel products have already been shipped to customers in Huntington, Louisville, Evansville, St. Louis and Memphis. Other tows will be scheduled to follow, as the business warrants, and the opportunity is presented to consumers of steel products to effect economies and insure good service by the river route.

With three-quarters of a century's experience in making steel, Jones & Laughlin manufacture steel pipe, bars, plates, structural material, wire nails barbed wire, woven wire fencing, annealed and galvanized wire, tinplate, black sheets, cold-finished steel, track spikes, billets, sheet bars, slabs and other commodities.

Inquiries will have immediate attention

JONES & LAUGHLIN STEEL COMPANY

PITTSBURGH

COLUMBIA
Steel & Shafting Co.

Cold Drawn Special Shapes

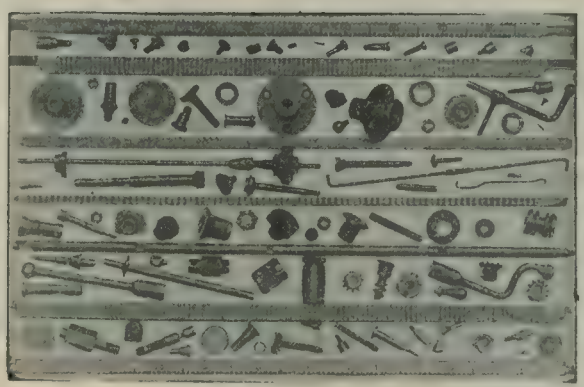
Angles, Tees, Cutter Bars, Knife Backs, Bevel Edge and Cam Sections
Typewriter, Automobile and Special Machine Part Sections

We are prepared to furnish, in the shortest possible time consistent with perfection in quality, a great many special shapes in accordance with specifications furnished. The accompanying illustrations will convey some idea of the irregular shapes we have made. The illustrations are intended only to show possibilities in the line of cold-drawn steel bars special shapes for manufacturing purposes.

Inquiries should be accompanied by drawing or sample section (The latter preferred), together with advices as to grade of material required, or the purpose for which it is to be used, and quantity involved.

MILLS AND GENERAL OFFICES: PITTSBURGH, PA.

Warehouses: Boston, Cleveland, Detroit, Philadelphia
Sales Offices: New York, Philadelphia, Chicago, Dayton
Sales Representatives: Atlanta, Denver, Portland
European Representatives: Columbia Steel & Engineering Co., Ltd., London, Eng.



Cold Facts on Steel

Bessemer Screw, Open Hearth, Chrome Vanadium, Chrome Nickel, Nickel, in Rounds, Hexagons, Squares, Flats and every conceivable shape for use in

Motors, Automobiles, Screw Machine Parts and for all Types of Machinery is the work of the

UNION DRAWN STEEL COMPANY

Our facilities permit prompt attention

Send us your blueprints for estimates today.

UNION DRAWN STEEL COMPANY

Works: Beaver Falls, Pa., and Gary, Indiana **General Offices: Beaver Falls, Pa.**

Warehouses
New York Philadelphia Chicago
Detroit and Cincinnati

Branch Offices
BOSTON BUFFALO CLEVELAND

COLD WYCO STEELS DRAWN

SCREW STOCK

(Rounds—Squares—Hexagons)

We are prepared to quote on
your requirements in either

Bessemer or Acid Open Hearth Grades

Wyckoff Drawn Steel Company

Mills: Ambridge, Pa. **General Offices: Frick Bldg., Pittsburgh, Pa.**
Sales Offices: Detroit—58 Cadillac Square. Boston—Little Bldg.

Sooner or Later—

gears find their way to the scrap heap. Gears cut from Carnegie Blanks are the "later" kind—a great deal later than most gears, too.

Carnegie Steel Gear Blanks

are the result of untiring efforts to produce only the best that can be made. Control of their manufacture from quarry to finished product makes your satisfaction our responsibility.

Leading gear cutters carry Carnegie Blanks in stock in sizes ranging from 6 to 44 inches in diameter, 25 pounds minimum weight. To insure that your gears are the kind that need not be replaced till "later"—on your next order

Specify Carnegie Blanks

Carnegie Steel Company

General Offices: Carnegie Building, Pittsburgh, Pa.

1418

IMMEDIATE SHIPMENT

From Stocks at

CHICAGO, ST. LOUIS and ST. PAUL

ANGLES, Structural and Small.
BEAMS, Structural.
CHANNELS, Car Truck, Ship Building, Structural and Small.
COLUMN H SECTIONS.
TEES, Structural and Small.
ZEES, Structural.
PLATES, U. M., Sheared and Checkered.
FLATS, Mild and Forging.
HALF OVALS, Mild.
HEXAGONS, Free Cutting.
ROUNDS, Mild, Forging, Free Cutting, Welding, Hammer, Drift Pin, Cold Drawn Screw Stock, Nickel, Chromium Nickel, Polished Shafting and Rivet.
SQUARES, Mild, Forging and Cold Twisted.
BANDS, Scrolled and Straight Lengths.
HOOPS, Scrolled and Coiled.
SHEETS, Blue Annealed and American Bessemer.
AUTOMOBILE SPRING STEEL, Round Edge-Concave.
BARK RACK BARS, Double Bevel.
FORGING BILLETS.
RAILS, Heavy and Light.
RAIL FITTINGS, Splices, Rail Clips, Track Bolts and Track Spikes.
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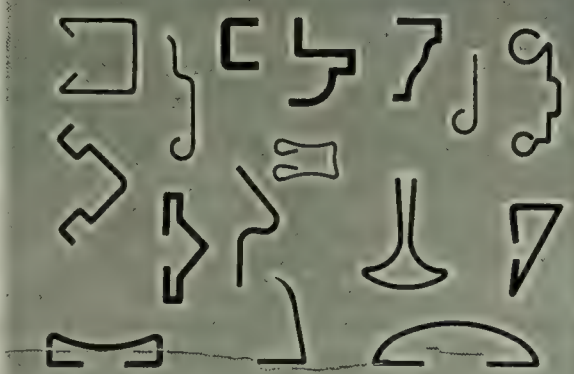
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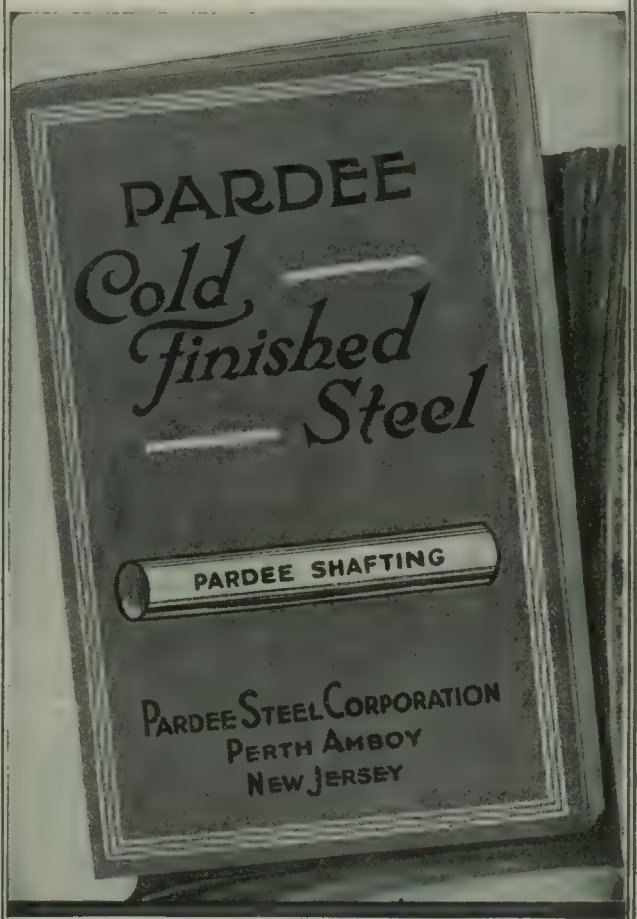
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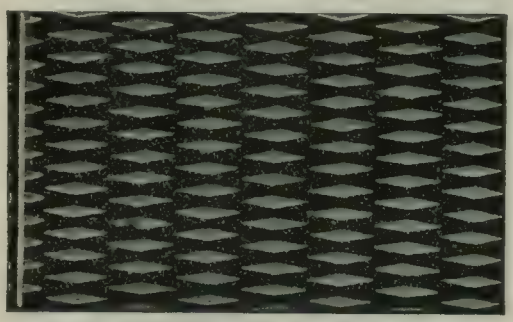
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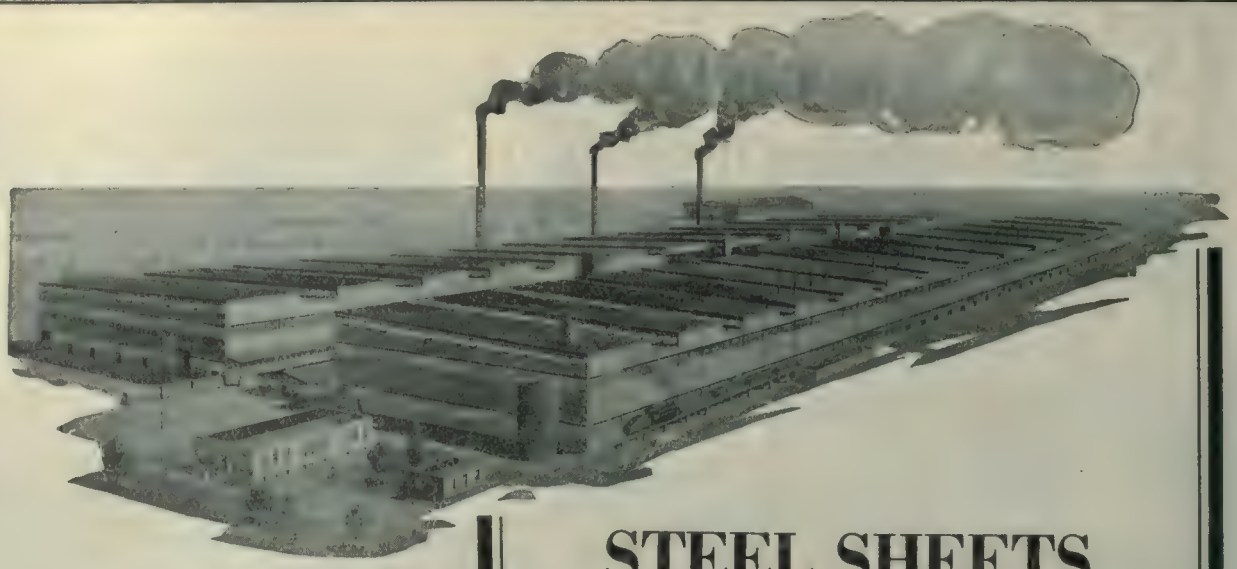
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Low carbon: for punching and stamping.
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All material thoroughly annealed for sharp bends and deep drawing operations.

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Flat Steel of Every Description

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PLATES

UNEXCELLED FOR ACCURACY TO GAUGE
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Sizes: 1/4" to 12 5/8" wide; .001 to 3/8" Thick

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Hot and Cold Rolled Strip Steel

Made in any degree of tempers to suit the most accurate requirements for difficult stamping and forming work. Our specialty—"The best and most uniform Drawing Steel manufactured."

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HOT AND COLD ROLLED

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Silvery Pig Iron (Silicon 6% to 10%)
Bessemer Ferro Silicon (Si 10-20%)
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⅝" to 1½" wide, No. 28 to 20 gauges, inclusive; Blue, Black, Painted or Galvanized, in coils, or cut to length.

Large Stock on Hand

These hoops are box band quality, dead soft, suitable for packing hoops, baling cloth, waste, etc.; bundling lumber, shingles, etc.; reinforcing baskets, boxes and hampers, and kindred purposes.

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BASIC AND MALLEABLE PIG IRON
BASIC OPEN HEARTH STEEL
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Bituminous and Anthracite Coal in every grade and size.
An organization of experts to assist in selecting the proper fuel.
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Performance possible only by a producer-wholesaler.
That's What Our Trademark Guarantees.

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MADE FROM CELITE
INSULATION
Brick Block, Powder, Cement
Saves 60% to 70% of Heat Loss. Secures better temperature control. Send for engineering data and Bulletin D-6A.
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HYTEMPITE
For bonding and repairing fire clay or silica brick work, tile, retorts, lining and patching cupolas, cupola spouts, ladles, pit furnaces, etc. It air sets, stands high temperatures and has great binding strength.
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Made from the famous Sciotoville Clays
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Fifty-seven years at making High Grade Refractories for Rolling Mills, Forge, Malleable Iron, Air and Steel Furnaces.

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Fire Brick, Fire Clay
For all purposes
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"IRONTON STEEL"
HIGH GRADE
HAND MADE
FIRE BRICK
THE IRONTON FIRE BRICK CO.
IRONTON, OHIO

DAILY CAPACITY 150,000
A.P.Green Fire Brick
MEXICO, MISSOURI

ORES
Iron
Chrome
Manganese
ALLOYS
Chrome
Manganese
Silicon
PYRITES
Cupreous
Non-Cupreous
ALTEMUS and PRINDLE
Grand Central Terminal New York
Sole U. S. Agents: Compagnie Belge des Mines, Minerais et Metaux, Antwerp, Belgium.

HARBISON-WALKER REFRACTORIES CO.
Manufacturers of
High Grade Silica, Chrome, Magnesia, and Fire Clay Brick,
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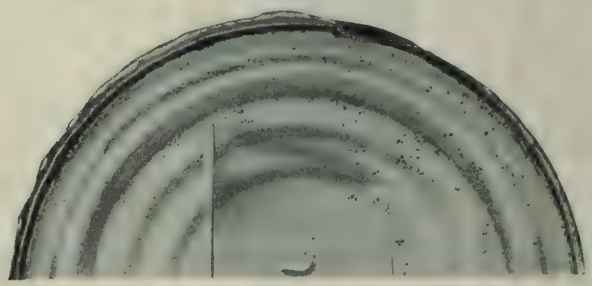
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Fire Clay Brick for All Needs
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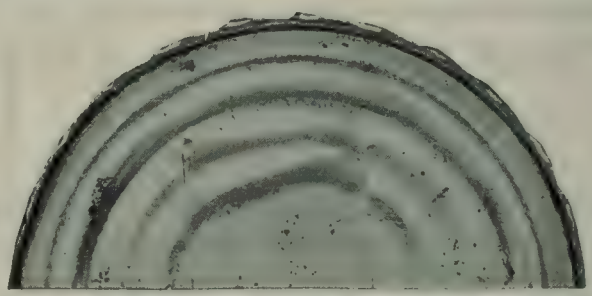
No. 11

Now About Tin Plate!



Here are reproductions of the inner surfaces of two of six 3⅜" diameter tin can ends recently sent us for examination—to determine if possible the cause of numerous rust spots, some of which had gone through the plate, resulting in perforations. These cans had been filled with corn and failed after about six months.

Talks Nos. 12 and 13 will refer to our findings in this examination.



HERE AGAIN IT'S APPARENTLY THE STEEL BASE THAT COUNTS

Read White's "A Metallurgical Study of the Steel Base as Related to Galvanizing."

The Titanium Alloy Mfg. Company

Niagara Falls, **New York.**

Pittsburgh Office, Oliver Building
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T. Rowlands & Co., Ltd., Sheffield, England, Agents for Great Britain and Europe

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CHROME . FERRO SILICON

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50% ELECTROLYTIC
BESSEMER GRADES (10% to 20%)

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FERRO MANGANESE
C. W. LEAVITT & COMPANY
SOLE AGENTS
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IN
THIN GAUGES
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Walter-Wallingford & Co.
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Pig Iron
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Coke
CINCINNATI PITTSBURGH CHICAGO

Brass, Copper, Bronze, Phosphor Bronze, Nickel Silver
in
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"We study trade requirements, anticipating your wants with a large assortment of regular and special sizes. Carrying a carefully selected stock of from one to two million pounds. We will be glad to quote price on receipt of specifications."

T. E. Conklin & Co.
61 and 63 Duane St., New York, N. Y.
Established 1860

Thomas R. Heyward Co.
Ferro Manganese, Fluor Spar
Pig Iron Coal and Coke
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IN
SHEETS, RODS and WIRE
Seamless Brass and Copper Tubing
CAP and MACHINE SCREWS
Manufactured Articles to Order
SCOVILL MANUFACTURING COMPANY
Established 1802
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A Bridgeport Product
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It's Tested

Ledrite Brass Rod is made of carefully selected materials, by exclusive processes that make it possible to test the free-cutting qualities of the metal while the "heat" is still in the molten state.

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Ledrite Brass Rod therefore offers the advantages of—
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BRASS
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BAUSH METAL
DURALUMIN

A Few Advantages

MACHINING

Better than aluminum.

Cost greatly reduced when compared with iron or steel.

Taps and threads well.

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Weight reduced without loss of strength.

Acceleration increased.

Inertia decreased.

Polishes easily.

Resists atmospheric conditions.

No plating required.

Can be rolled, forged, drawn, heat treated and annealed.

Hot and cold worked.

A QUALITY METAL

Duralumin is an alloy produced after years of systematic endeavor to meet the demand for a metal which shall be as light as Aluminum and as strong as mild steel, yet without the many disadvantages of Aluminum in its pure state.

Duralumin is the only light metal that can replace steel in forgings. With a two-thirds saving in weight, heat treated Duralumin Forgings approximate mild steel forgings in strength.

Wherever weight is a deciding factor Duralumin is the most satisfactory metal for most articles made by hot working or forging. Naturally, Duralumin Forgings are especially desirable for reciprocating or moving parts where inertia, due to their own weight, forms a large part of the total stress.

Minimum Physical Properties of Rolled or Sheet Metal (heat treated) and of Forging Metal are:

Tensile .....55,000 lbs. per sq. inch
Elastic Limit ...30,000 lbs. per sq. inch
Elongation.....18%

BAUSH MACHINE TOOL COMPANY

Metals Division

SPRINGFIELD, MASS., U. S. A.

Manufacturers of

BAUSH
DURALUMIN

BLOOMS—SLABS—BILLETS—SHEETS—FORGINGS

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Aluminum Alloy of High Tensile Strength

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NICKEL—SILVER

Trade CHASE Mark

CHASE METAL WORKS
CHASE ROLLING MILL COMPANY
WATERBURY, — CONNECTICUT. U.S.A.

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INCO NICKEL SHOT AND INGOTS

Lap Welded Steel, Charcoal Iron, Seamless Steel
BOILER TUBES
NICKEL RODS — MONEL METAL — BRASS
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Distributors of Shelby Tubing for Western Penna. and West Va.

ROME QUALITY Sheets, tubes, rods, strips, shapes

BRASS **ROME** COPPER

ROME BRASS AND COPPER COMPANY—ROME, N. Y.

BRIGHTEST GALVANIZING

is obtained by using SILVER METAL, an efficient flux-alloy, which thins the bath, makes a brilliant, clean finish, besides reducing skimmings and ashes to minimum. Makes better galvanizing at decreased cost owing to conservation of spelter.

Free Descriptive Booklet

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NICKEL
"MOND"
Analysis 99·8 %Ni.
SOLE AGENTS FOR U. S. A.
LEWIS LAZARUS AND SONS
61 Broadway, New York

PURE ALUMINUM, ALUMINUM ALLOYS
ALL NON-FERROUS METALS

Babbitt Metals, White Metal Alloys, Solders

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Main Office: New Haven, Conn. *New York, Chicago, Detroit*

Self-Fluxing Solder

Kester Acid-Core Wire Solder

The solder consists of a hollow wire filled with acid flux in a series of cells. This feature economizes time, labor and material and insures a strong weld. Ask your dealer or write us for samples.



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Nickel (formerly German) Silver — Pure Nickel
Wide Sheets Polished and Patent Levelled — Sheets, Wire and Rods
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ELECTRIC RAILWAY SUPPLIES
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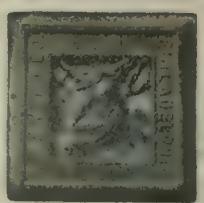
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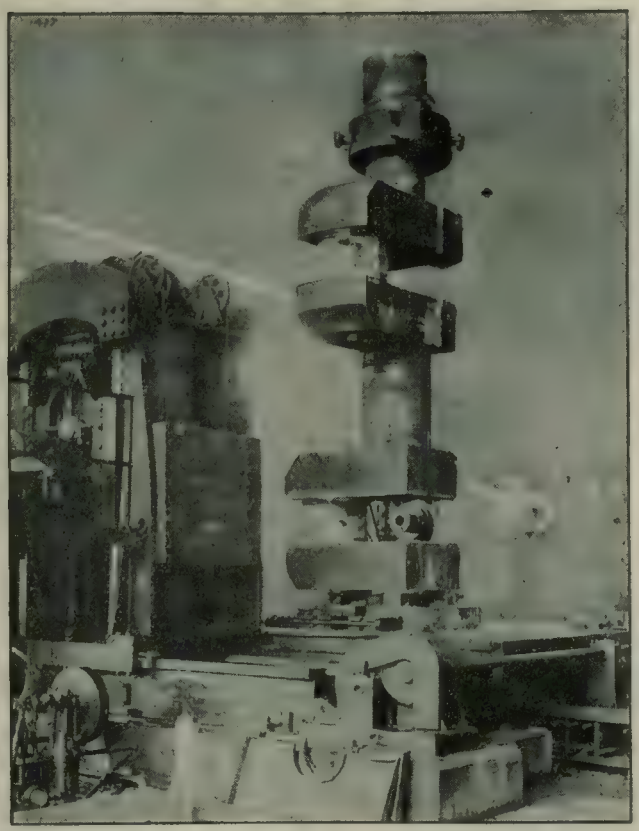
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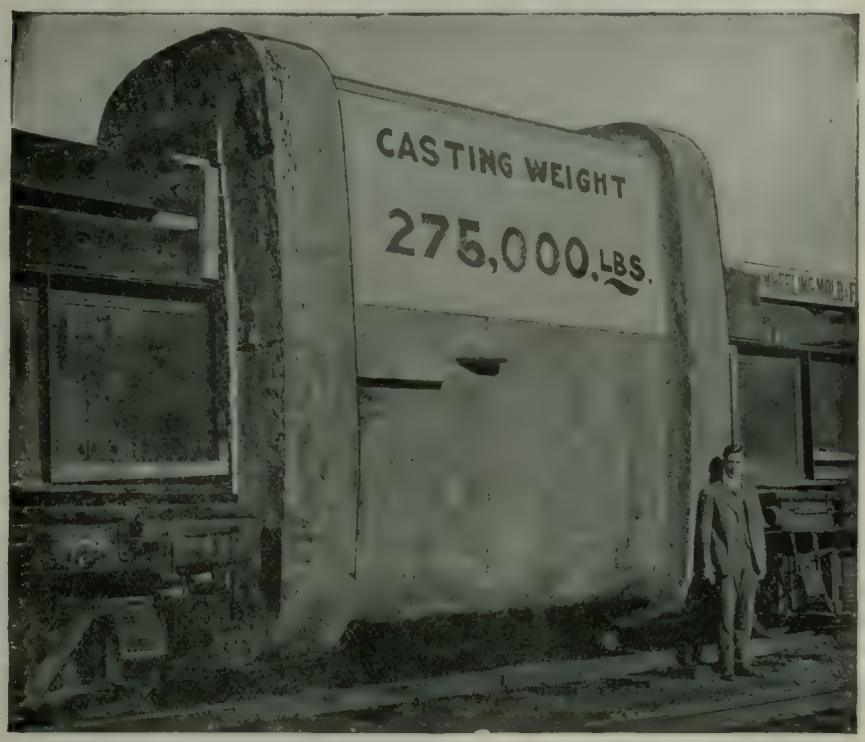
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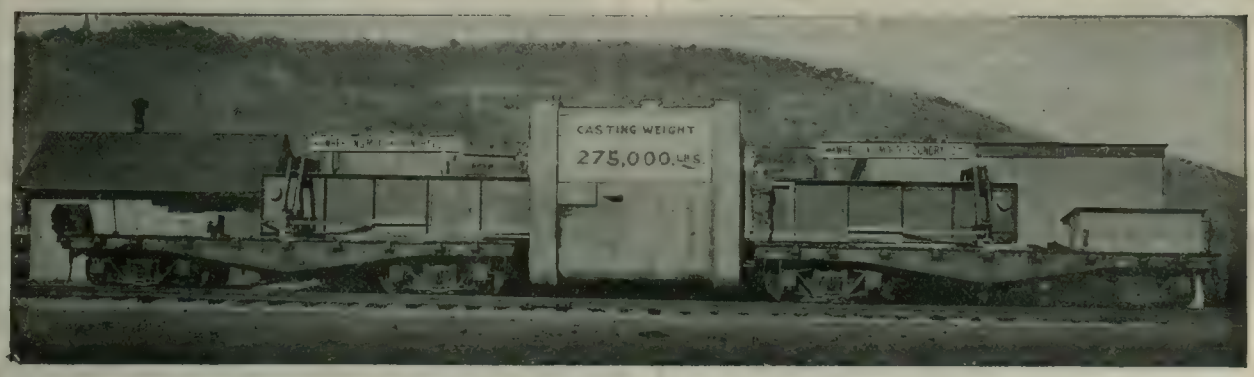
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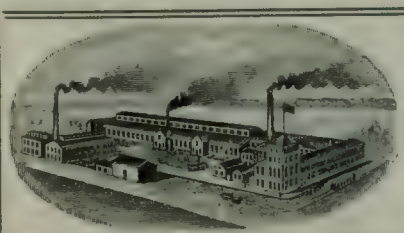
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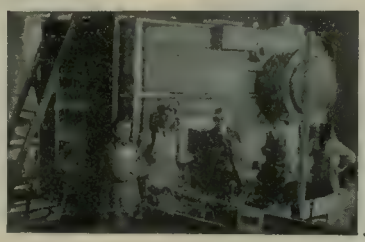
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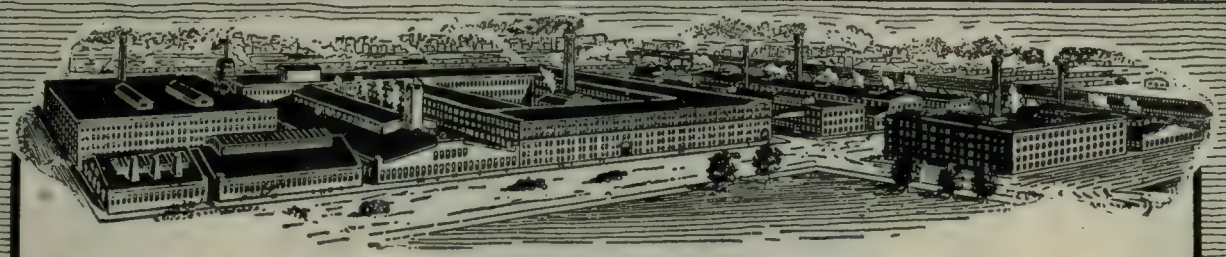
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CINCINNATI, Union Trust Bldg. BUFFALO, Marine Bank Bldg. ST. LOUIS, Boatmen's Bank Bldg.
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Made to your order and design

Geuder, Paeschke & Frey Co.

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"KNOWING HOW SINCE '81"

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Automobile, Motorcycle and Bicycle Parts Our Specialty

During our twenty-three years in the stamping business we have specialized in making Automobile, Motorcycle and Bicycle parts.

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The H. A. Matthews Mfg. Co., Seymour, Conn.



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Drawn Work
for
AUTOMOBILES
TRUCKS
TRACTORS

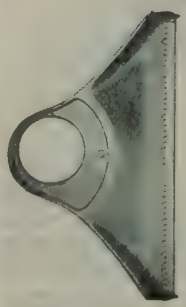
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Alliance, Ohio

NEW YORK OFFICE
2 RECTOR ST.

DETROIT OFFICE
1612 FORD BLDG.

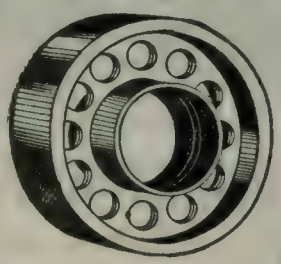
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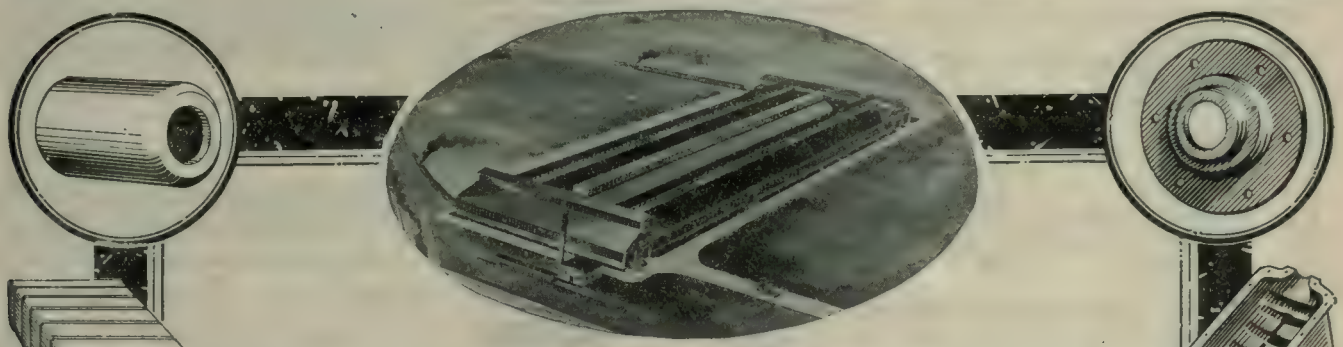
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With exceptional equipment for swaging, grinding, turning, stamping and drawing, we will give you *prompt service* in Quality Small Metal Parts.

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EXCELSIOR PLANT
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ALLEN Safety Set Screws

30% extra strength over broached hollow screws—the only other kind made. By a patented process we increase the density of the steel around the socket-holes, so that even the smaller sizes will stand all the strain the best made wrench can apply. The Allen process makes deep, perfectly-formed socket-holes—no chips in the bottom. The entire length of the ALLEN is utilized either for solid metal at the point, or depth of socket for the wrench. All sizes in stock from ⅛ to 1½ in.; any length, point or thread. Also Pipe Plugs, Socket-Head Cap Screws, Tap Extensions and Tire Wrenches—Allen process. Complete descriptive catalogue on request.

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ANY QUANTITY
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Cut thread Hexagon Hd. Cap Screws

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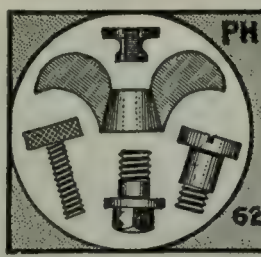


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STANDARD, OR MADE TO YOUR DESIGN

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Manufacturers of All Kinds of Special Machine Screws, Studs, Pins and Nuts and All Articles Turned from Iron or Brass Rod

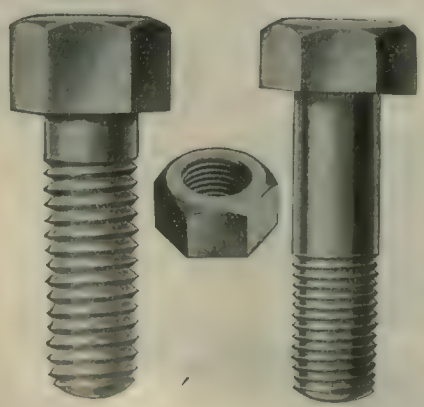
624-626 RACE STREET.
PHILADELPHIA, PA.

Screw Machine Products



CAP and SET SCREWS

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Pattison St. and M. & P. R. R., York, Pa.



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SCREW MACHINE PRODUCTS
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ALL CAP SCREWS AND NUTS MILLED FROM THE STEEL BAR

SEND BLUE PRINTS OR SAMPLES FOR QUOTATIONS

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Eliminate Breakage—Buy *Ferry Heat Treated* Screws!

At No Extra Cost

Brittleness in the steel from which screws are fashioned is the most dangerous condition that users of cap screws have to contend with.

It is the cause of screws breaking when under unusual strain. Probably you have experienced this and know the risk in buying a cold headed product that is not heat treated.

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Wood Screws



Machine Screws
Stove Bolts, Tire Bolts

American Screw Company

Providence, Rhode Island

WESTERN DEPOT:
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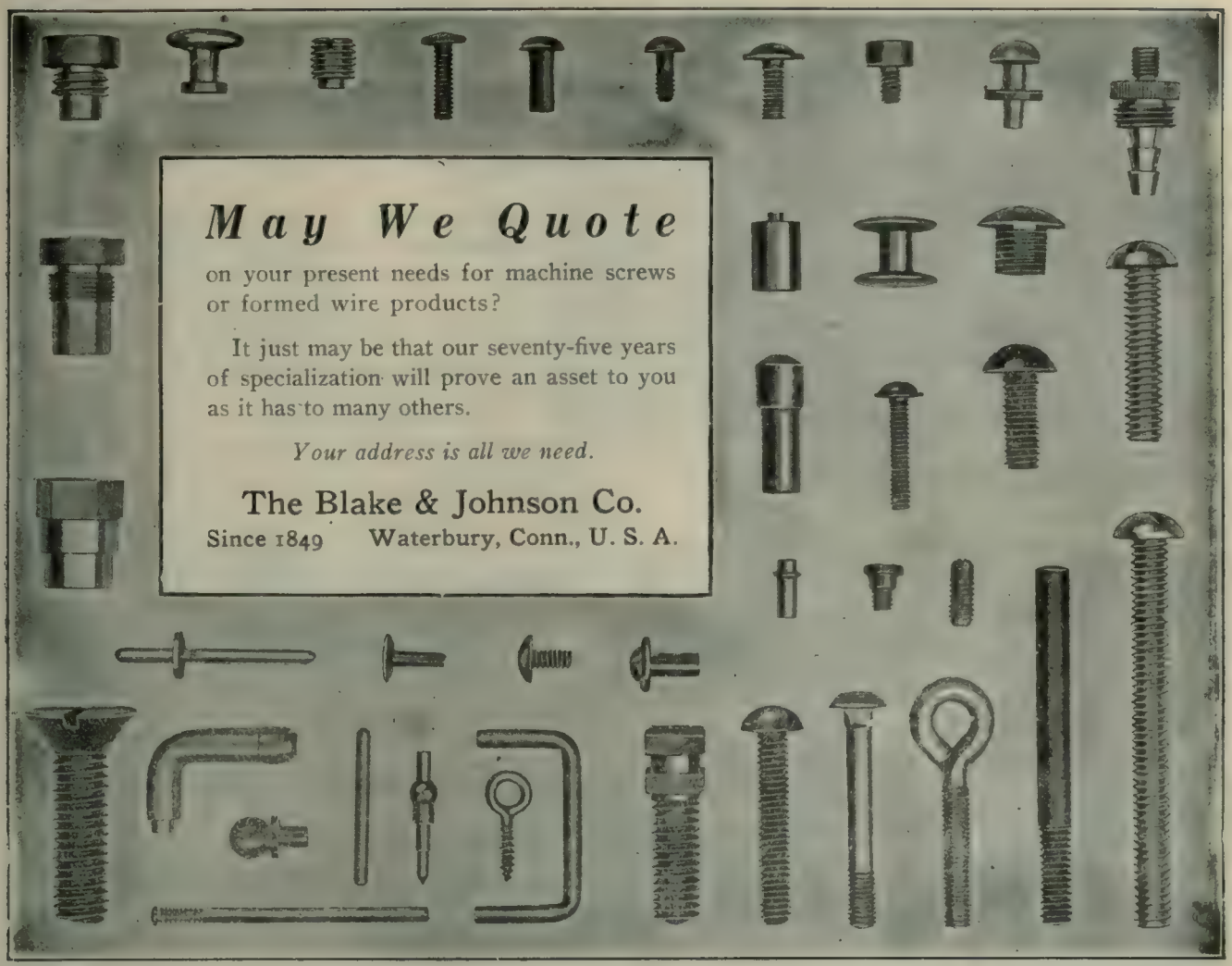
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Iron, Steel, Brass, Bronze and Monel
Iron Rivets—Any Style Head **Tinners and Coopers Rivets**
Pipe Couplings

Bessemer and Basic Steel Wire
Resistance Wire

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Trade Mark

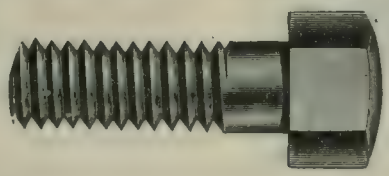
Steel and Brass Fine Wire
Monel Wire
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THE BRIDGEPORT SCREW CO. Bridgeport, Conn.



SHIMER DUPLICATE PARTS—the Satisfaction —of Assembling Machines—





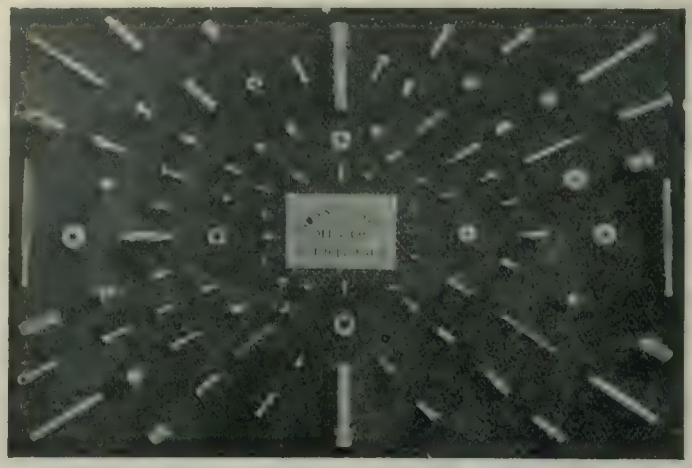
Whether you build machines by the hundred or by the thousand your problems of machine building are practically the same and are best solved by using Shimer Duplicate Parts.

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SAMUEL J. SHIMER & SONS, Inc.

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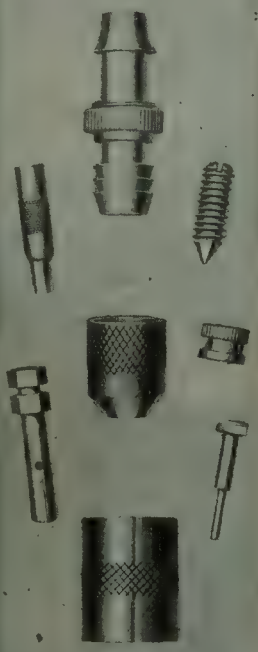
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These samples are typical of the work we make in sizes up to 1¼ inch diameter.

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Special Screw Machine Products—accurately machined. Any material, any finish, prompt deliveries.

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WE STRIVE TO SATISFY

We make Screw Machine Parts on order.
We have the organization.
We have the equipment.
We have the complete facilities to give your order courteous and prompt attention.
Our endeavors will satisfy you.

The BROWN BAG FILLING MACHINE CO.
FITCHBURG, MASS.

Prompt Deliveries on Small Accurate Parts

Our modern plant is equipped with new and up-to-date machinery for the rapid production of small accurate parts.

We have a full quota of experienced workmen and can guarantee promptness and precision work.

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Successors to Took Screw Machine Products Corp.
LONG ISLAND CITY, N. Y.

AUTOMATIC SCREW MACHINE PRODUCTS

Send for Catalogue No. 212



We are Growing

HARTFORD MACHINE SCREW CO.

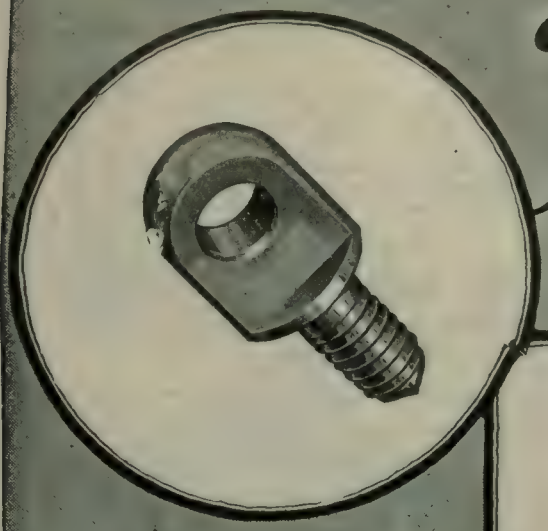
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Main Office and Works: Hartford, Conn.

QUALITY — SERVICE — ECONOMY

SCREW PRODUCTS

THE NEW BRITAIN MACHINE COMPANY, NEW BRITAIN, CONNECTICUT



Mattatuck Products

A New Year Economy

Mattatuck Screw Machine Products do reduce the cost of assemblies—and they assure a better mechanism. They are made with utmost care and precision in strict accord with specifications. Brass, steel or nickel silver—from "rod" up to 1⅝" in diameter.

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Send blue prints or samples when seeking quotations.

The Mattatuck Mfg. Co.
WATERBURY, CONN. U.S.A.





Progressive Machine Screws
The Quality Line

Machine screws are a small item in the manufacture of your product, *but it's a very important one.* It's essential that they be accurate, made to gauge, properly inspected, in order to insure you against loss of time in your assembling. Our modern equipped plant, with every facility for producing a *Quality product,* insures you of a service that will be a new experience if you have not already enjoyed it. In addition to our line of Standard Machine Screws we manufacture special screws of all varieties and from all standard materials. You are not asked to pay a premium for our quality or service. Write us, stating quantities, and we will send you an estimate promptly. Keep in mind that quantity insures you a satisfactory price.

The Progressive Mfg. Company
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The illustration shows special parts that we have made for other manufacturers.

Screw Machine Products

Made to Drawings or Samples

Standard S. A. E. Plain and Castle Nuts

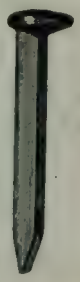
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Spikes — Bolts

TRACK, BOAT, DOCK TRACK, MACHINE



Bar Iron, Rail Splice Bars, Tie Rods, Nuts, Washers

Prompt Shipment from R. R. Terminals, or Steamship Piers at New York City or Jersey City.

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SCREW MACHINE PRODUCTS and Service

THE FOSTORIA SCREW CO.

FOSTORIA, OHIO, U.S.A.

A Complete Line of

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ALL SIZES—COMPLETE LINE

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BAYONNE BOLT & NUT CO.

BAYONNE, N. J.

(on New York Harbor)

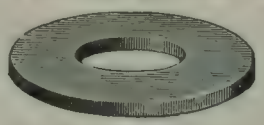


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205 and 207 Quarry St., Philadelphia

Rockford Bolt Company



ALL KINDS OF BOLTS

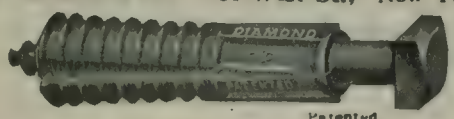
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Prompt Shipments Everywhere.

200 RUBY STREET ROCKFORD, ILLINOIS

DIAMOND EXPANSION BOLT CO.

90 West St., New York



Patented

For fastening to Brick, Stone and Concrete

"They hold everlastingly"

In Addition we carry stock of Falls Hollow and Solid Staybolt Iron-Track Bolts—Spikes—Nuts.

BOLTS

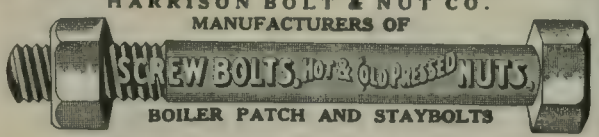
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Special and Odd Shape Bolts, Washers, Rivets

Harrison Brass and Galvanized Bolts New Jersey

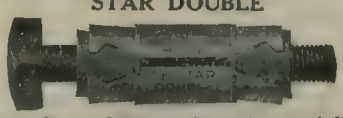
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EXPANSION SHIELD

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"You Can Always Rely on EMPIRE Bolts and Nuts"



Nothing can be worth more to you than the knowledge that you can put an Empire bolt or nut in place and leave it there—in the full confidence that it will never be a source of trouble.









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BOLT & NUT COMPANY
PORT CHESTER, N.Y.
PEMBROKE, CONN. CHICAGO - SAN FRANCISCO ROCK FALLS, ILL.
Makers of Bolts, Nuts and Rivets Since 1845

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Studs
Rough or Milled

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They **know** that **every stud** they order from us will meet their specifications to the **minutest detail** of size, quality and finish.

We offer you the same dependable service.

Our large stock of Studs, Nuts, Cap Screws, U.S.S. Head Cap Screws, Wrenches, Turnbuckles, Eye Bolts, etc., are ready for immediate **delivery.**

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RHODE ISLAND TOOL CO.
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Established 1863

Bolts, Forgings, Rivets, Washers, Crow Bars, Picks, Wedges, Wagon Irons and Singletree Irons, Telephone and Telegraph Pole Line Hardware, Screw Railroad Spikes and Boat Spikes, Steel Bars and Concrete Reinforcement Bars.

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Thomas Devlin Mfg. Co.
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for quick assembly where permanence and nicety of adjustment is essential

Prove it with a sample

DRAKE LOCK NUT COMPANY
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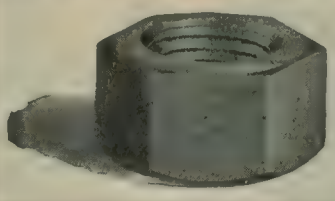
ROLLED THREAD **BOLTS**

5/8" and smaller, bolts and nuts.

THE OHIO NUT & BOLT CO.
Berea Ohio

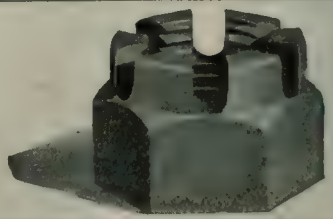
GARLAND MANUFACTURING CO.

Successor to Garland Nut & Rivet Co.
MANUFACTURERS OF
NUTS—RIVETS
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West Pittsburgh, Lawrence Co., Pa.



Our C. P., C. & T. Nuts now carried in stock for immediate delivery are perfect specimens of a milled-from-the-bar product. Semi-finished lines also always ready to ship.

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Sandusky Ohio



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SPECIALIZING SOLELY

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We feel we are in better position than any manufacturer in this country to take care of your requirements in this line.

Try us out once in a while and see if our statements are not borne out by facts.

Service - at times - counts more than Price.

Don't keep your men waiting for Rivets - There is no occasion.

Our rivets are as perfect as their Pictures.

THE CHAMPION RIVET COMPANY

D. J. Champion

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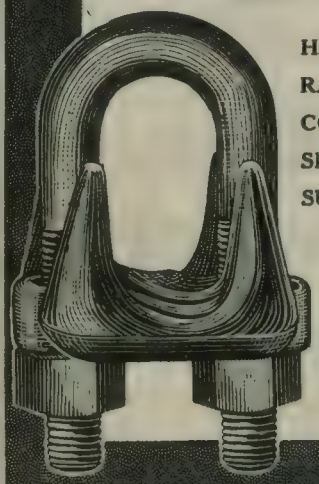


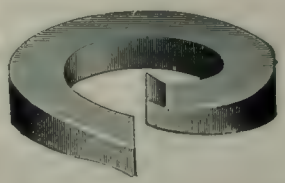
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RIVETS ALL SIZES. ALL KINDS WIRE AND WIRE NAILS

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HEAVY & MARINE
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New York City


Here Is the Point
The body of the washer carries the compression strain. The tapered ends are therefore free and under constant spring. Thus, the result of vibration is that the barbs bite into the nut and plate. The lock is POSITIVE.
The POSITIVE LOCK WASHER CO.
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Look for the *corrugated* gripping surfaces.
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in all sizes and styles.
Quality—Service
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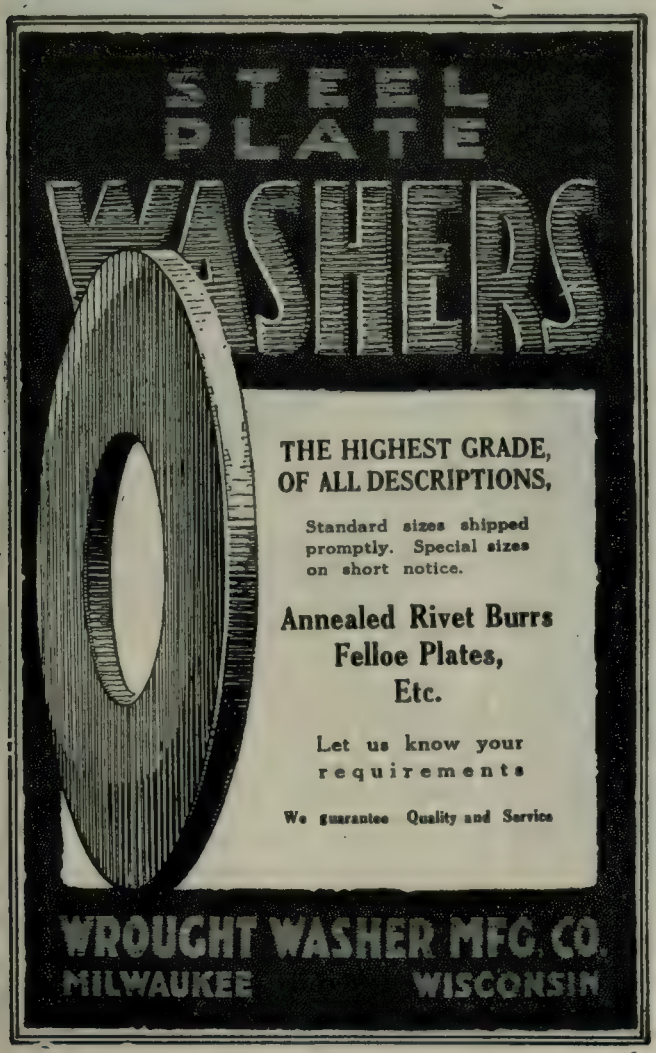

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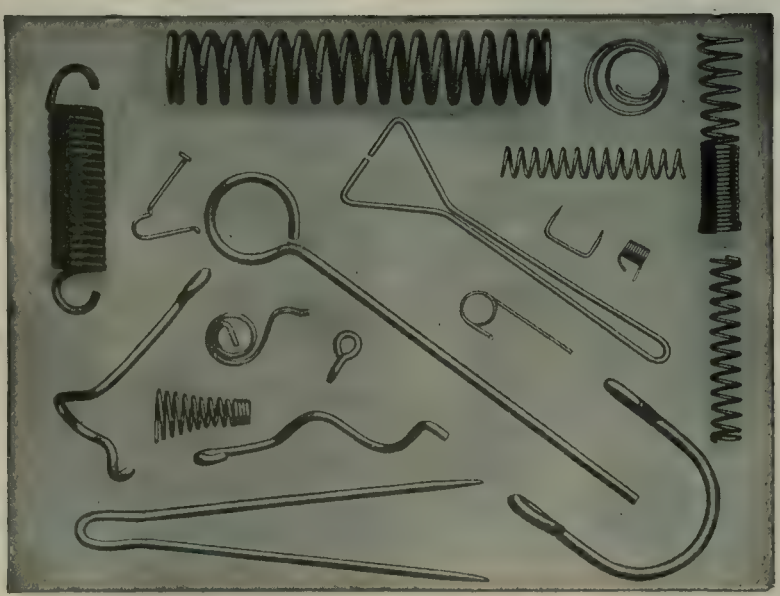
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Grand Central Palace, January 7th-14th, 1922



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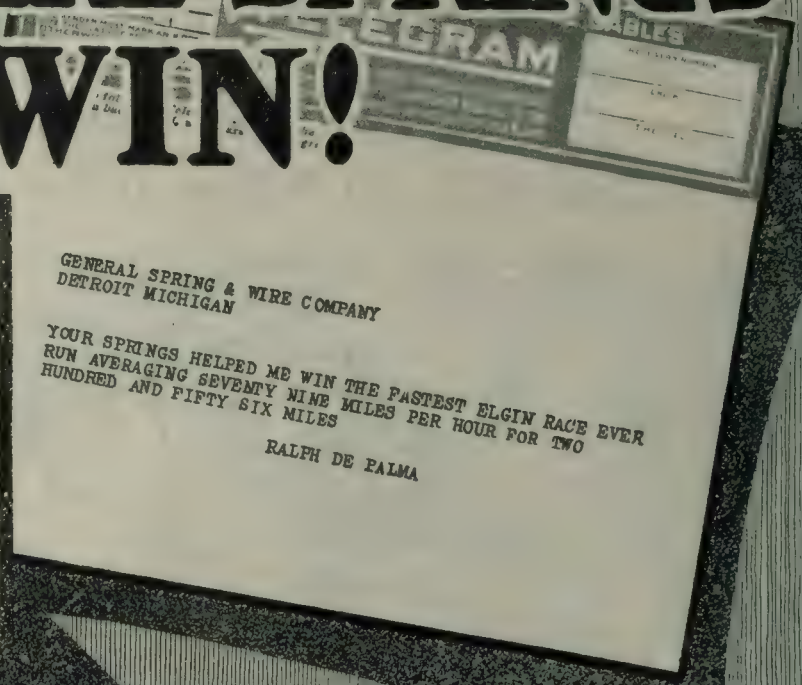
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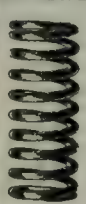
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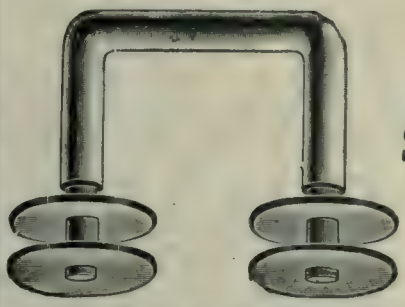
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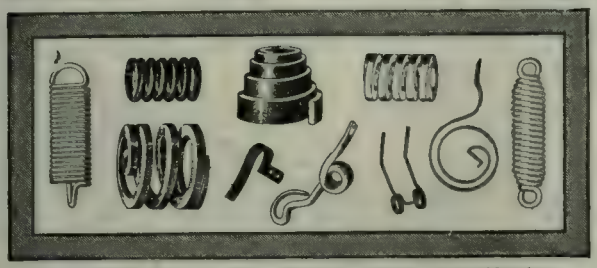
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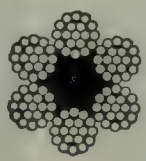


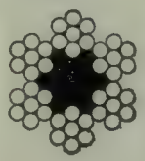
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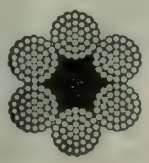
MERRILL BROTHERS, Maspeth, New York, N. Y.

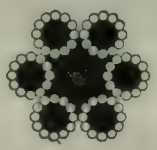
Leschen Wire Rope for Every Requirement



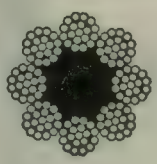


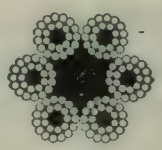
In successful Wire Rope usage construction is a factor quite as important as the proper selection of material.



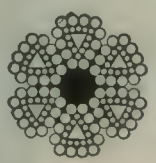


The accompanying illustrations show cross section views of some of the various constructions we furnish. Every construction is made according to the "Leschen" standard.





If you are experiencing any Wire Rope trouble, probably either the construction or the quality is not suited to your particular work. Our Engineering Department will gladly advise with you, without putting you under any obligation.





Established 1857

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HERCULES (Red-Strand) WIRE ROPE

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QUALITY, SERVICE and SATISFACTION

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and see that you get it. It will pay you.

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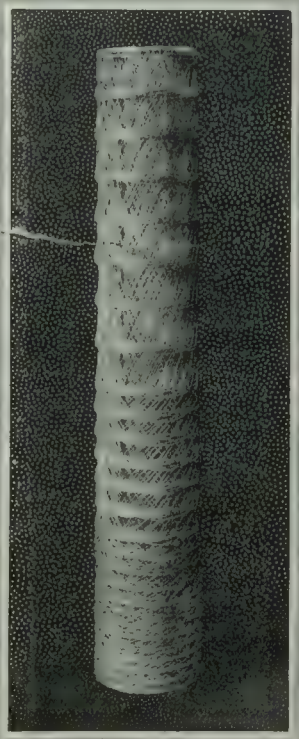
WIRE CLOTH

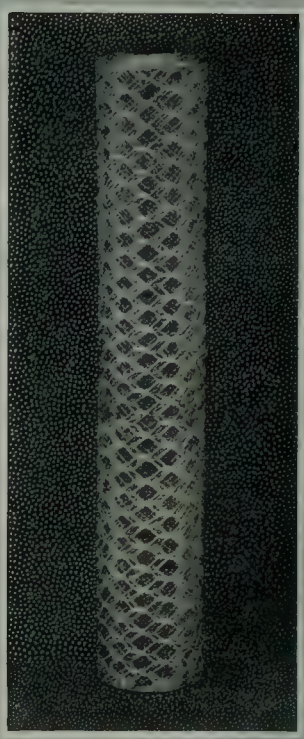
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Wire Screens and Dipping Baskets

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Established 1842

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"WICKWIRE" FENCING AND NETTINGS

(ALL GALVANIZED)

Enable you to supply your trade with a fencing or netting that is *Durable, Rustproof* and *Attractive*

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The New Form of Mesh

WILL hang straight and tight from post to post. Requires no rail at top or bottom. Will not stretch out longer at the expense of width as is generally the case with the ordinary forms of mesh. W. W. Poultry Fence is made full width and always remains so. The horizontal wires where the strain comes are a full size heavier than the cross wires. The truss formation takes care of the contraction and expansion problem.

WICKWIRE GRADUATED POULTRY FENCE

Combines both Large and Small Fences All in One

HAS eight spaces of one and one-eighth inch mesh at the bottom, graduating through one and one-half, two and one-quarter to three and three-quarters inch mesh at the top. Acts both as a barrier against the straying away of the poultry and stock as well as a protection to them against prowling animals. Woven and galvanized on the same principle as W. W. Poultry Fence with no ends of wire to rust nor sharp bends to crack the galvanizing.

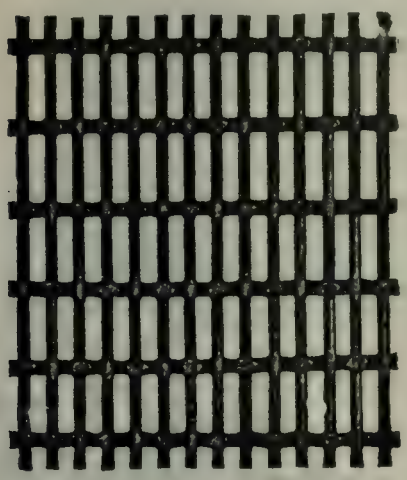
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The Perfect Formed Mesh

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THEY HAVE A GREATER PRODUCING POWER

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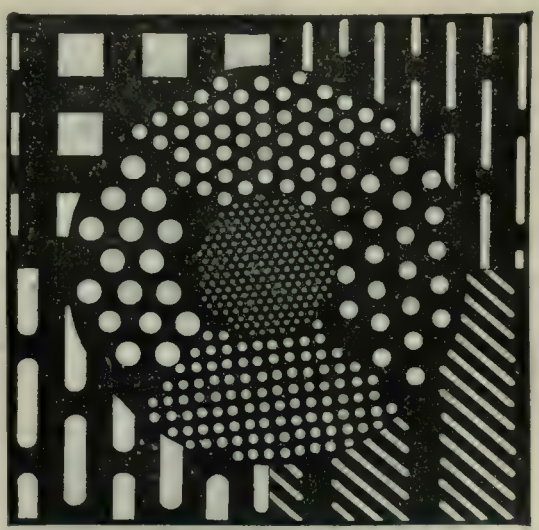
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Any Metal
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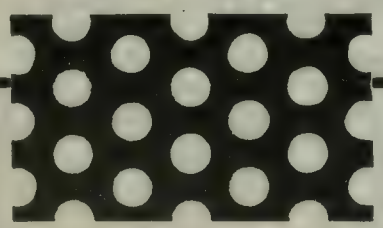
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ALL PURPOSES



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Cross Screens are made right. We have been in the business long enough to know how. And when you are in a hurry we can generally make quick shipment and will tell you frankly if we can't.

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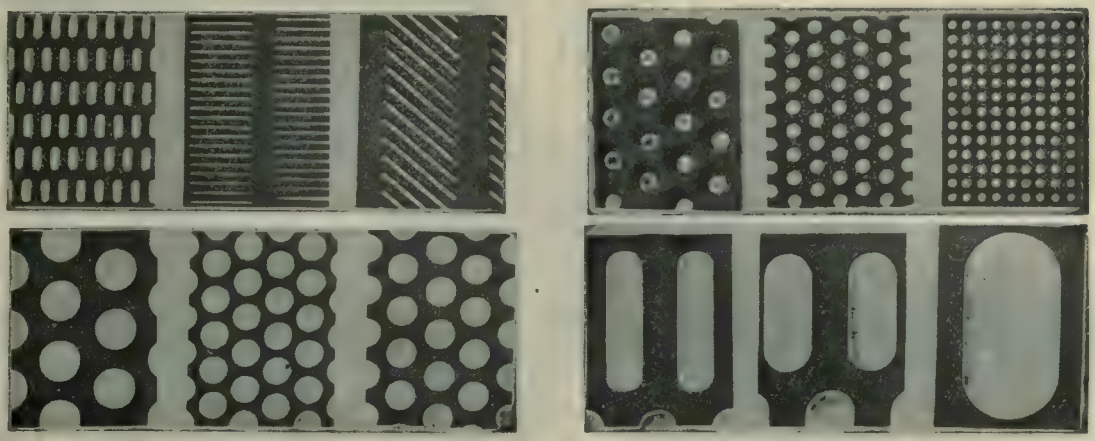
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For all Screening—Ventilating and Draining Purposes
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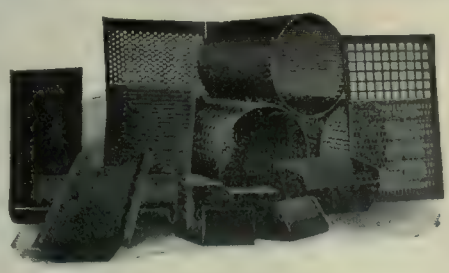
Our Products Include

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PROMPT SHIPMENT

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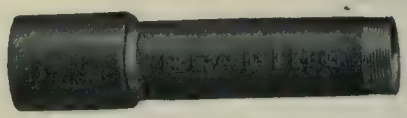
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One-fifth the weight of cast iron pipe.
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Abendroth & Root Mfg. Co.
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Genuine Wrought Iron Pipe

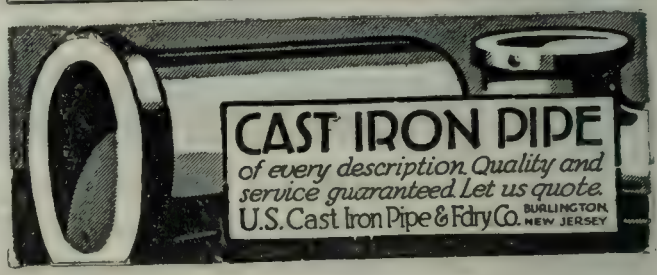
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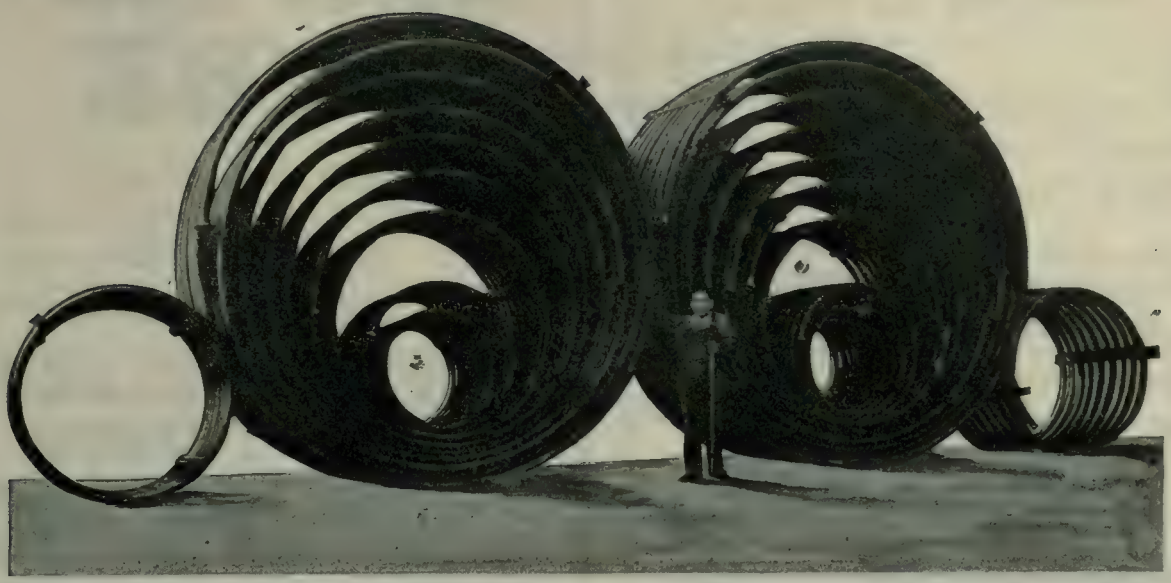
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Close up of steam hammer showing method of driving Pipe.
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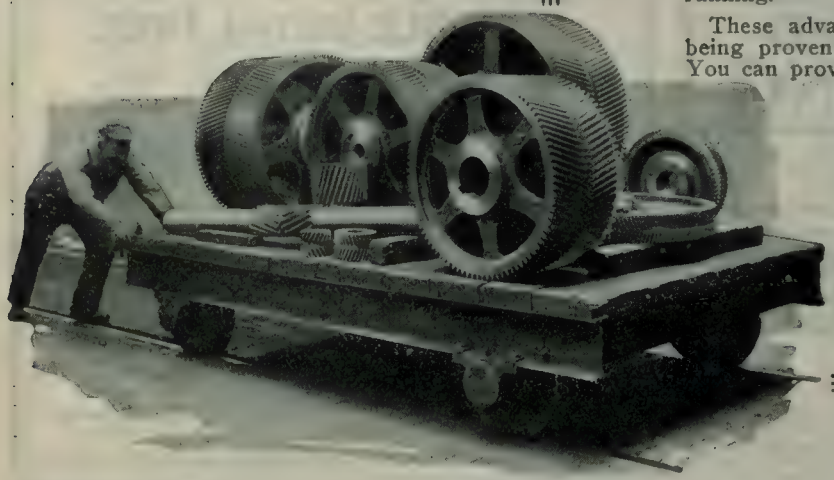
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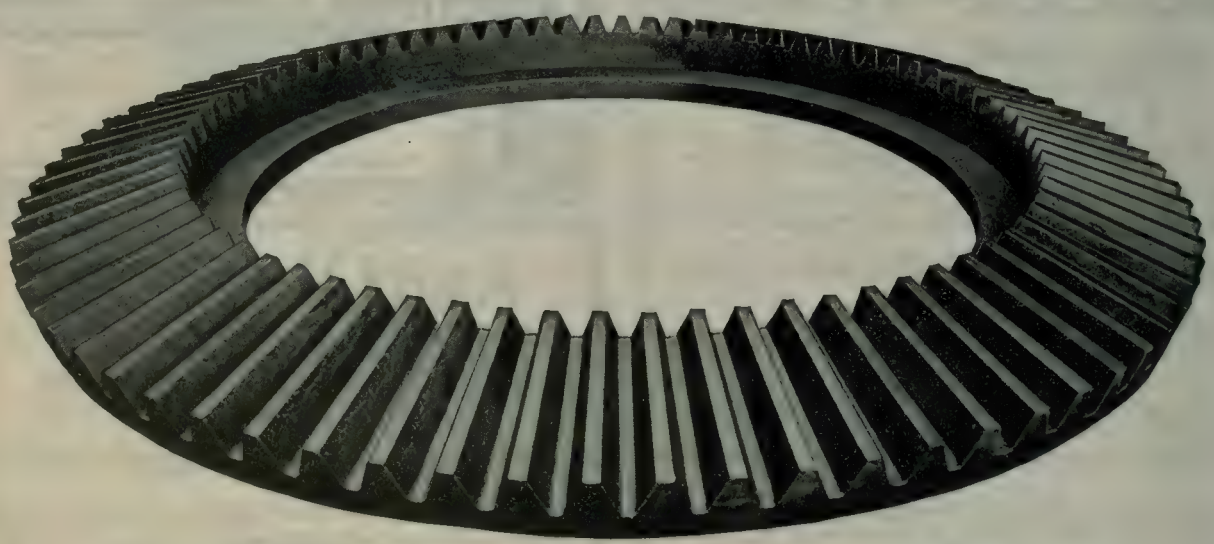
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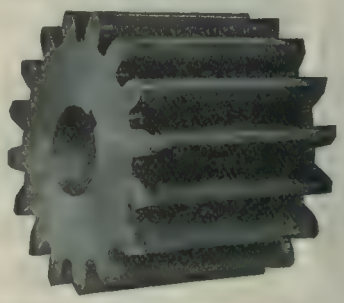
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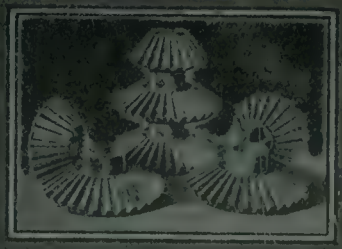
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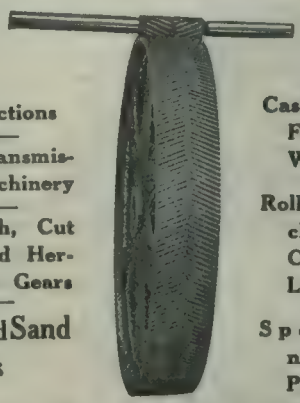
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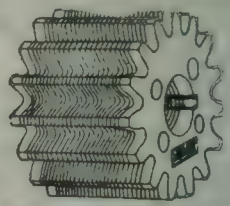
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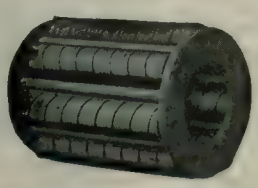


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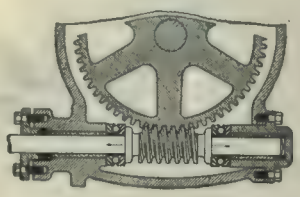
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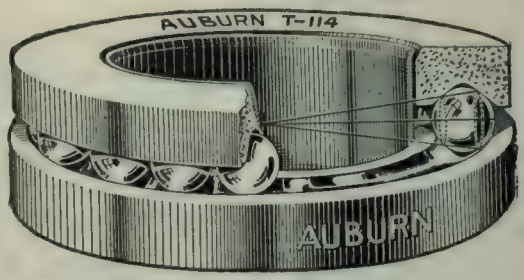
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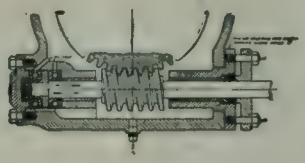
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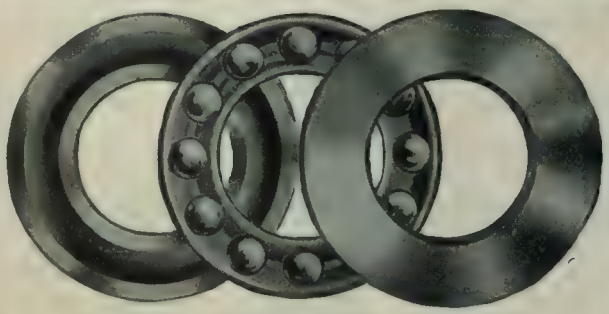




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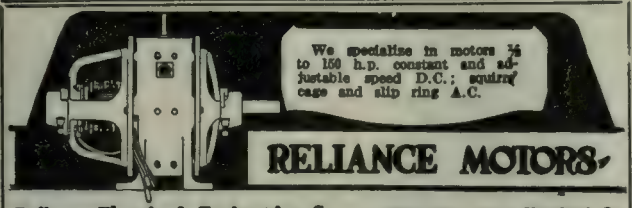
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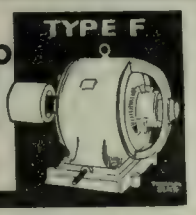


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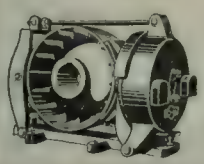




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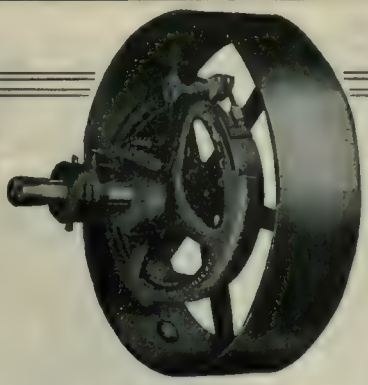


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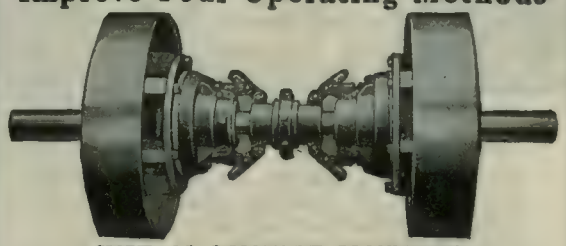
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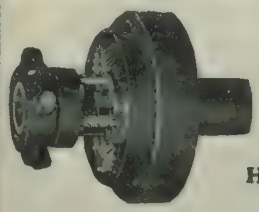
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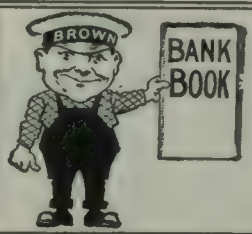


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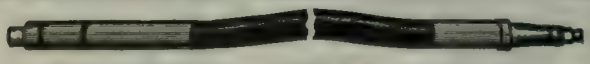
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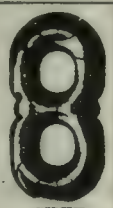
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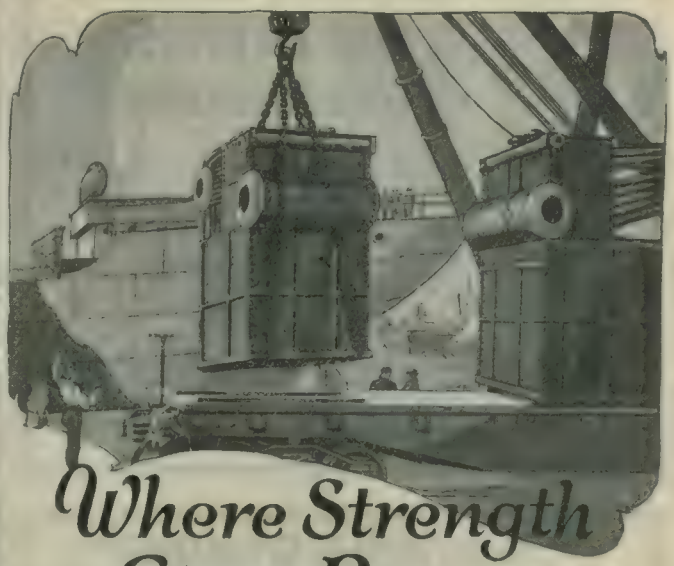
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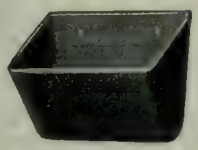
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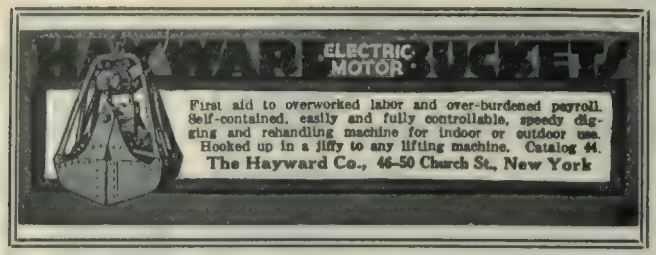
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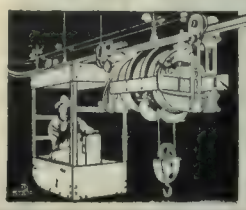
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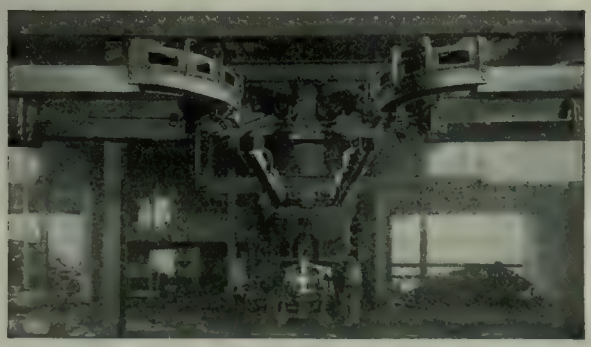
Another great advantage we notice is that our workmen are better satisfied. In fact, they would rather run a ladle on this Trolley than work at anything else during pouring off time as they consider it an easy job. Our expense of maintenance has been very light.

Yours very truly,
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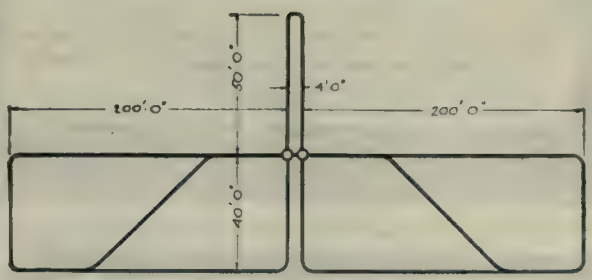
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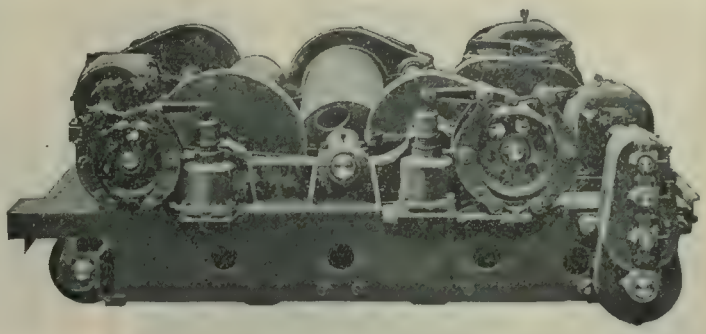
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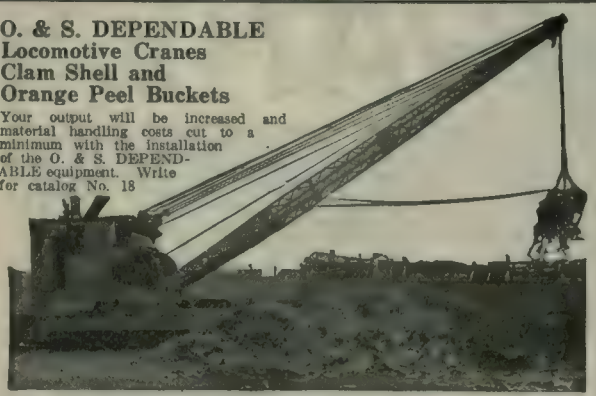
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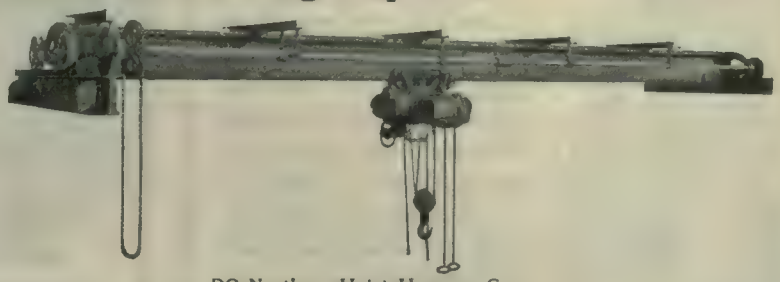
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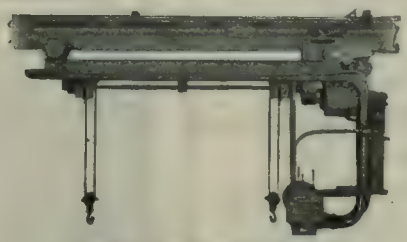
Will Cut Your Handling Expense!



Cage Type DQV Hoist
½ to 10 Tons



DQ Northern Hoist Hung on Crane
(Can replace slow hand block)



Double Hook and Cage Hoist



The little "Type B" 500 lbs. to 1000 lbs.

Here is a group of just a few Northern designs. All top-notch quality. Fully enclosed. Cut-hardened gears, ground shafts, etc.

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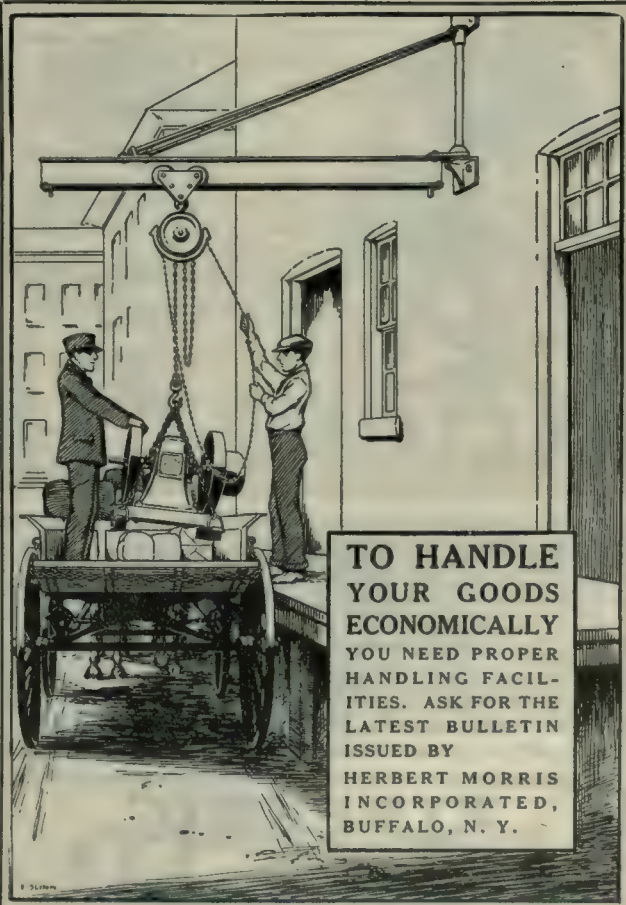
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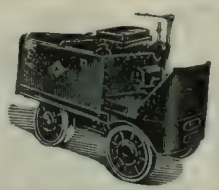


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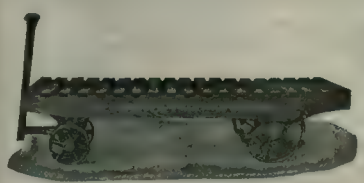
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Light—rigid—durable



The corrugations give strength with lightness, and support the sand well at the sides and ends.

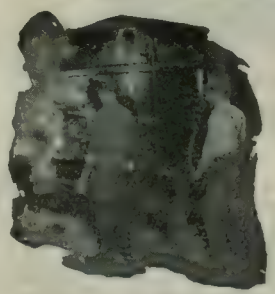
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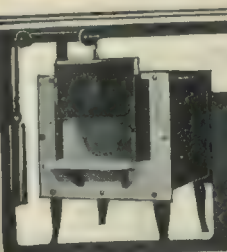


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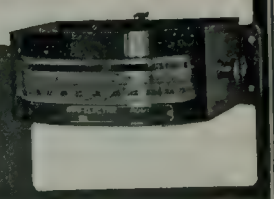
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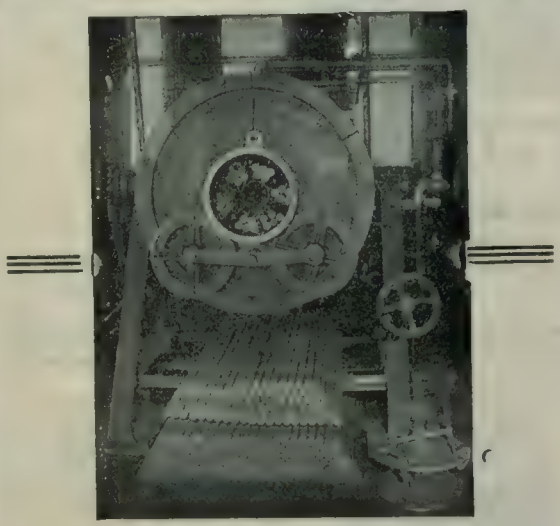
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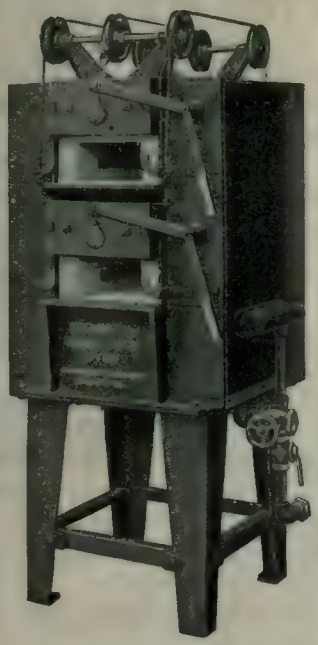
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Moore Rapid Lectromelt Furnaces

Built in Eight Standard Sizes from ⅛ to 12 Tons. Remarkable Overload Capacity.

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Exceptionally efficient in the handling of high speed steels, which require quick heats and high, accurate temperatures.

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Lower chamber fitted with carbofrax slab and supports to withstand the high temperatures and severe service necessary in handling high speed steels.

4½" linings with 1" special insulation. Construction strong and rugged—built to give real service.

Five standard sizes.

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Quality—Only high grade materials used, assembled by expert workmen, coupled with efficient design.

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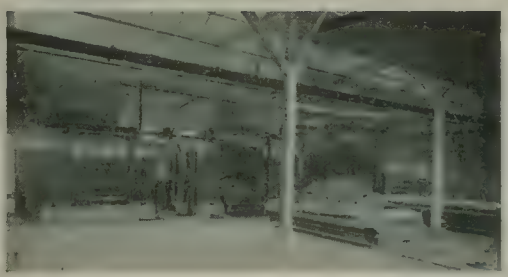
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For Heat Treating, Annealing and Carburizing

Opening, 12"x20"; depth, 48".

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Durable, efficient, economical—a result-getter in accurate heat treating—proved by its splendid record in many industries.



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WE HEAT OR MELT ANYTHING IN INDUSTRY

READ THIS LETTER IF YOU HAVE ANNEALING PROBLEMS

LEBANON STEEL FOUNDRY
Electric Furnace Steel Castings
LEBANON PENNA

April 12, 1921

F. J. Ryan & Company,
Franklin Building,
Philadelphia,
Pa.

Gentlemen:

We have your letter of April 11th and take pleasure in advising that the furnaces which were designed and installed for us by the Mircs Fuel Oil Equipment Company have been, if possible, more satisfactory than any other operation in our shop.

The furnaces did everything that was claimed for them and more. The repairs have been so far below what we were accustomed to that there was no comparison. The temperature in them has been commercially perfect.

It has been our pleasure to recommend them to people who are interested in furnaces from time to time without any reservations.

In regards to Mr. Beach, we have consulted him about our oil burning problems from time to time and have the highest regard for his qualifications and ability, as he has never fallen down on any job that he has undertaken.

Trusting this is along the lines of the information you desire, I am

Yours very truly,
LEBANON STEEL FOUNDRY,

T.S.&M.B.

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HEAT TREATING FURNACES for brass, iron and steel

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If you have BRASS to melt either chips or heavy scrap the BOOTH Rotating Electric Furnace will save you money. For melting STEEL or IRON the BOOTH Direct Arc furnaces have no equal. Capacities of furnaces 250 lbs. to 20,000 lbs.

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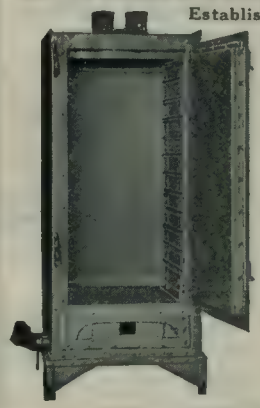
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Established 1889—32 years



Gas, Electricity Or Oil

These sectional and portable ovens will be found best adapted to your Japanning, Lacquering, Drying or miscellaneous baking requirements.

You should know about them.

OVEN TRUCKS, SAW DUST BOXES, DIP TANKS.

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To secure 100% Economy and 100% Efficiency use W. N. Best oil and tar burners and furnaces for Annealing, Case Hardening, Tempering, Forging, Heat Treating, etc. Send for Catalog.

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FOR IRON AND STEEL MELTING AND REFINING
Sizes: ⅛, ¼, ½, 1½, 3, 6, 12, 25 Tons

Scientifically Shaped for Uniform Heat Distribution—Preheating Scrap—Cupola Duplexing—Better Electric Grey Iron Cheaper than from Cupola Alone.

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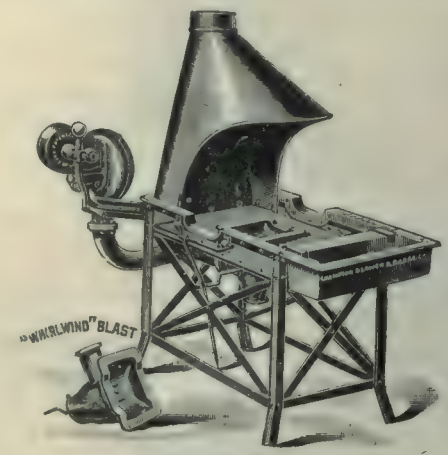
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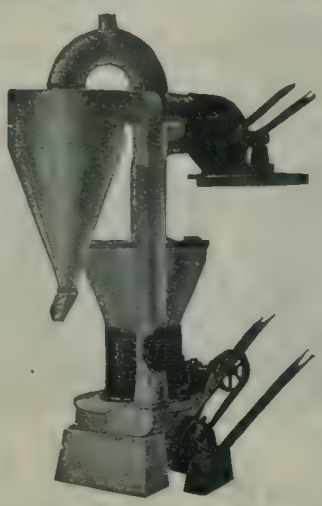
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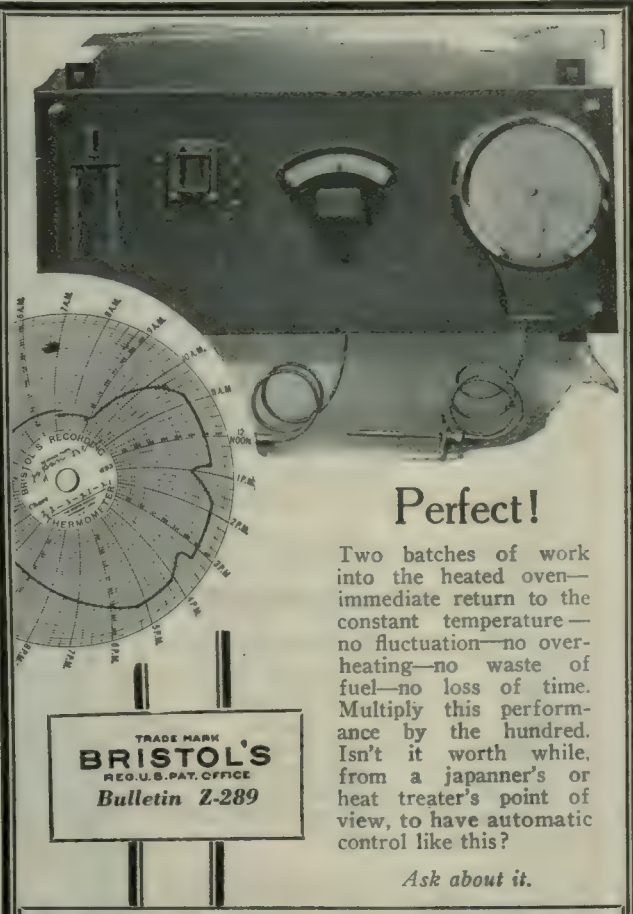
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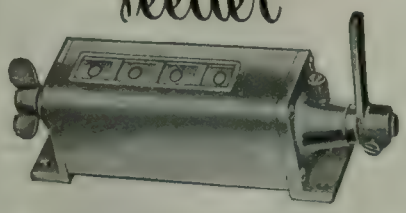
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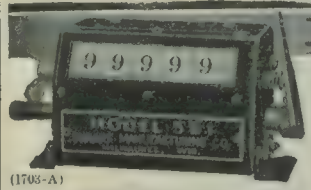
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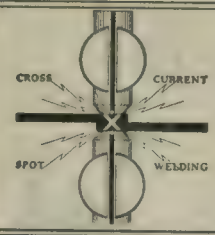
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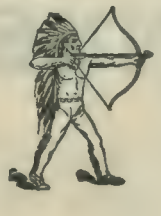
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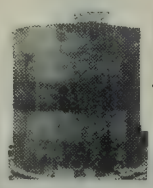

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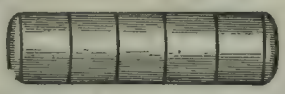
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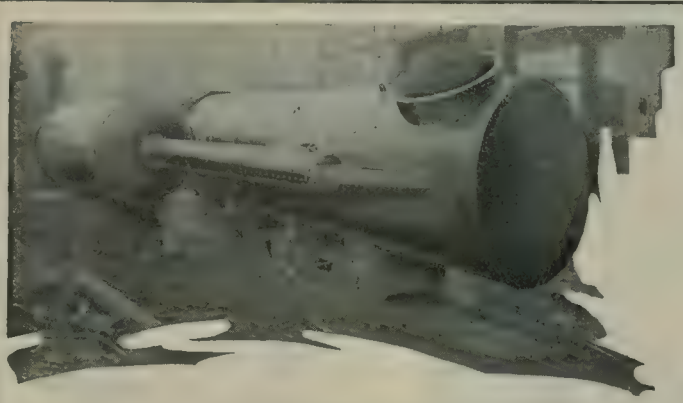
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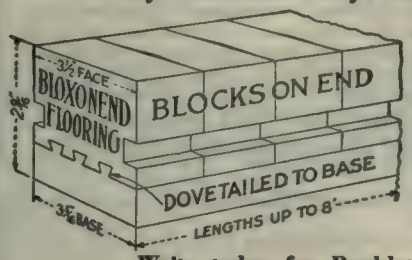
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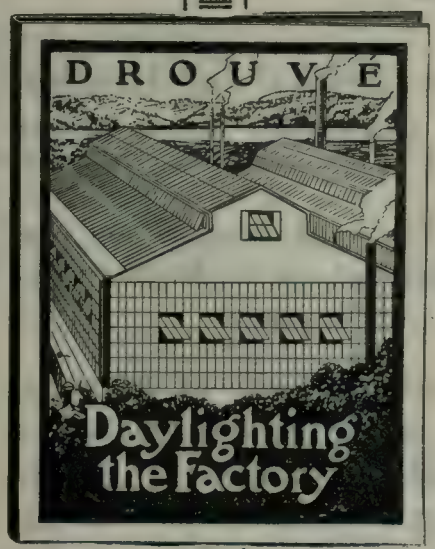
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PAGE THREE
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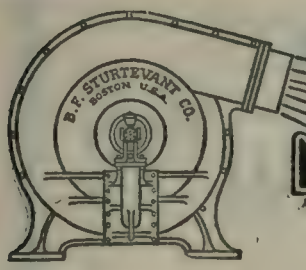
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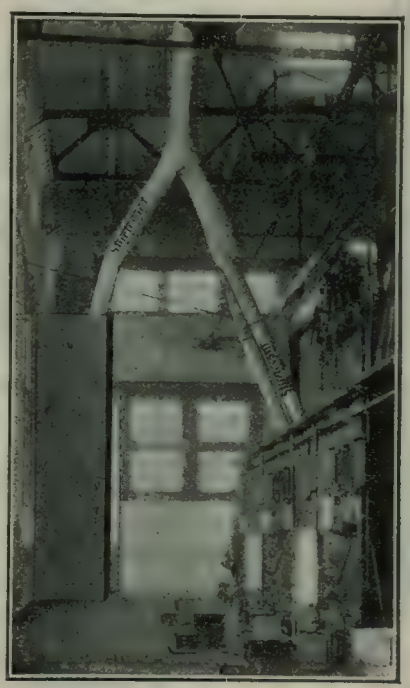
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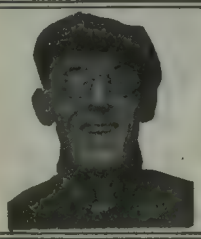
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*By Frank R. Wadleigh**

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NATIONAL COAL MINING NEWS
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(*) New head of the Coal and Coke Department of the Bureau of Foreign and Domestic Commerce, Washington, D. C.



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What The Iron Age is doing to help its readers

See Page Three

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They will pay you cash for equipment and materials you have for disposal.

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See top of page 177 for rates.

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THE IRON AGE
Established 1855
239 W. 39th St., New York City

Where Business Is Improving

The November gain in employment in 119 iron and steel plants was 4.3 per cent over October, according to figures of the Bureau of Labor Statistics. In 63 car building and repairing establishments the gain was 5.9 per cent.

* * * * *

Contrary to general expectations, the Cincinnati Machine Tool market the past week showed fair activity. Several manufacturers booked orders exceeding in number those of any week during the past several months, and December is expected to be one of the most active months this year.

* * * * *

Employment records of 21 Grand Rapids members of the National Metal Trades Association show a net gain of 116 employees for the week ending Nov. 26th as compared with week ending Oct. 8. At the present rate of increase, the metal plants of Grand Rapids will be back to normal shortly after the first of the year.

* * * * *

Building trade in Hartford, Conn., still continues busy, all high-grade men being employed, with first-class men still in demand. All indications point to a big business in the spring.

* * * * *

About 800 former employees of the Goodyear Tire & Rubber Co., Akron, returned to work this week to care for increased orders.

* * * * *

During October the Mahoning Foundry Co., Youngstown, Ohio, shipped and sold more furnaces than in any other month in its history.

* * * * *

Fabricated steel products show no slowing up. Fresh proposals involve 35,000 tons, several large buildings included, and the whole averaging 2500 tons.

* * * * *

An improvement is reported in the demand for pig iron in the St. Louis district. Last week sales were better, there were more inquiries and shipping instructions on contracts were heavier.

* * * * *

The American Locomotive Co., New York, last week closed for about $40,000 worth of machine tools for its Schenectady Works. Machines are for the manufacture of mechanical stokers.

* * * * *

November sales of the S. S. Kresge Co. 5 and 10-cent stores were $5,098,229, as compared with $4,651,860 for the corresponding month last year.

* * * * *

The Storms Drop Forging Co., Springfield, Mass., is exceptionally busy. It received an initial order for one million tire chain links for passenger automobiles, and recently was given an additional twelve million link order. The company is considering the installation of additional manufacturing equipment. It is operating 10½ hrs. per day, with a full number of employees. The manufacturer of tire chains in no way infringes on the company's regular contract work, of which it has a satisfactory amount on its books.

* * * * *

Members of the National Metal Trades Association in the Jackson, Mich., district report the first increase in months in the number of employees for week ending Dec. 3. The net gain of the number of employees was 539.

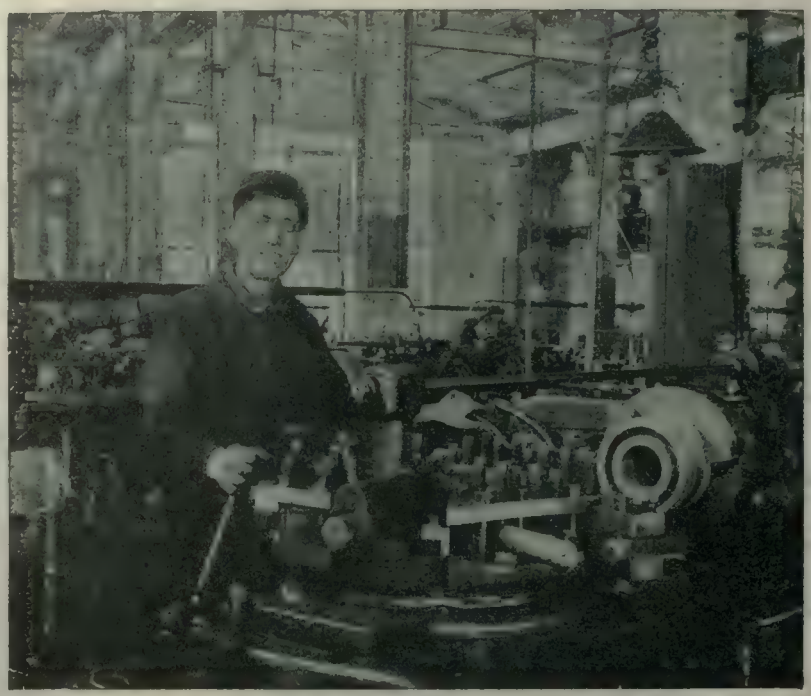
* * * * *

Business is not remarkably good, nor remarkably bad. It is moving in the right direction, and those firms that cultivate their trade now will later have no reason to regret their action.

THE WORLD'S GREATEST INDUSTRIAL PAPER
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THE IRON AGE

New York, December 29, 1921

ESTABLISHED 1855 VOL. 108: No. 26

Casting Small Parts in Production Foundry

Short Side Movements Supplement Continuous Forward Progress in New Gilbert & Barker Mfg. Co. Plant—Ample Distance from Bed to Charging Door

BY GERARD FRAZAR

IN designing the new foundry of the Gilbert & Barker Mfg. Co., Springfield, Mass., the engineers not only arranged the various working departments with a view to quantity production at a minimum operating cost, but embodied ventilating and lighting features that insure maximum comfort and health of employees. The plant is equipped for continuous pouring and when run at capacity will give employment to approximately 300.



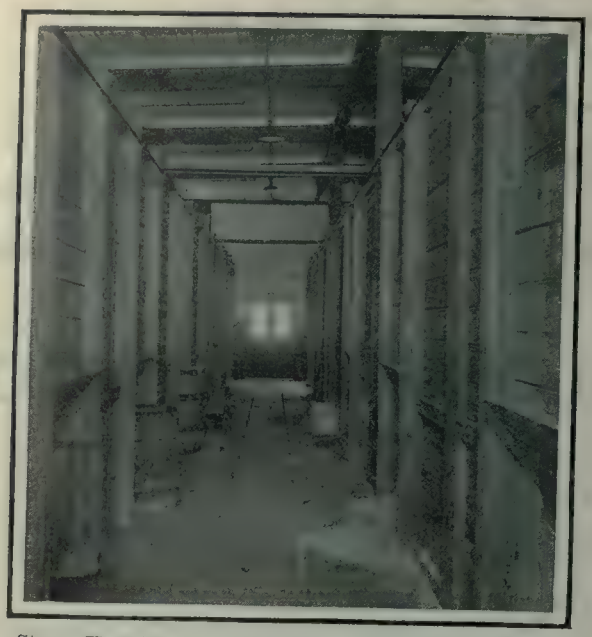
Light Is Provided for the Foundry Proper, Not Only by Windows in Side and End Walls and Monitors, but Also by the White Paint on the Inner Wall

Briefly, it is composed of a 60 x 450 ft. main foundry, with executive offices on one end, and cleaning room and pattern storage, galvanizing department, sand storage, cupolas, core rooms and brass melting department arranged in sequence adjoining one side of the foundry proper. In the arrangement of these subsidiary units, the continuous forward movement of products in the process of manufacture was kept in mind, as has been common practice in foundry design recently. In this instance, however, the forward movement is accompanied by a series of short side movements related to core baking, so timed, by location of working positions, as to minimize lost motion in the general forward movement of products. The plant is strikingly compact for one of its proportions.

In the main foundry and in many of the subsidiary units the flooring is laid with approximately 300,000 creosoted wooden blocks, costing about $25,000. This flooring expedites the movement of electric trucks, eliminates to a great degree wet working areas, and has other well known advantages. Wherever possible, large wall windows are installed. In addition, practically every department is provided with generous overhead natural light and ventilation through monitors and doors leading outside each department, as well as to the foundry proper. The plant is heated by steam throughout. The foundry walls are 37 ft., 6 in. high, being 32 ft. to the bottom of the trusses. All windows in the top of the main foundry are mechanically operated and can be tipped to an angle of 90 deg.

The main foundry is served by one 10-ton and one 5-ton Shepard electric traveling crane. In addition, there are six one-ton Curtis pneumatic wall cranes at convenient points. With such crane equipment and with electric trucks the handling of sand, flasks and castings ranging from ½ lb. up is speeded. No wooden flasks are used, the foundry being equipped with Sterling steel and Adams snap flasks especially adapted for Gilbert & Barker Mfg. Co. products, which are principally gasoline and oil measuring pumps. Castings for these products do not run much above 300 lb. The crane equipment is adapted for much larger castings in anticipation of changed requirements.

All mold-making is mechanical, 21 shockless and 31 jar and squeeze type—a total of 52 Tabor machines—



Steam Heat Keeps the Sand from Freezing in Winter. The track for the sand cars is set in a concrete floor in the sand storage department

constituting the equipment. The molding machines are, as is usual, arranged along both sides of the long walls of the main foundry and are air-operated. Air, steam, water and oil are delivered to the plant through an underground conduit from the power house, some distance away. All delivery piping inside the plant is contained in metal-covered, cement trenches extending along inside walls, easily accessible in case repairs are necessary. At one end a spur from the general yard switching trackage enters the main foundry, which provides for one car at a time to be loaded and unloaded under cover.

The core room, 60 x 100 ft., is located in the lower end of the plant. Here the arrangement of the equipment provides liberal space for the movement of cars. The oven equipment design is of the latest of the W. W. Sly Mfg. Co., Cleveland. There are 14 ovens in all, seven draw and the balance two-car type. The small or draw ovens are 6 ft., 5 in. x 3 ft., 10½ in., and the others 5 ft., 8 in. x 14 ft., 6 in. each. All are oil-heated and are provided with Gilbert & Barker burners. Two Spencer turbo blowers serve these ovens as well as two brass melting furnaces in an adjoining unit. The two-car ovens are the double-end style, the cars being pushed into the ovens from one end and subsequently out the other end, where the cores are trimmed, inspected, etc., on the main foundry molding floor.

The Gilbert & Barker products involve light brass parts. To provide for these, two oil-burning, brass-melting furnaces equipped with the company's burners, each with a capacity of 1800 lb. per eight-hour running time, are installed in a separate unit, 19 x 40 ft., at the right of the extreme lower end of the main molding floor and in close proximity to the core oven room. Cement, instead of wooden blocks, constitutes the flooring in this, as well as the core oven unit. Though molding of brass castings is distinctly apart from other molding, the arrangement of the units allows the two classes of work to dovetail.

Mixing of sands is done by two direct motor-driven Beystone Mfg. Co., Cambridge Springs, Pa., mixing machines in a separate unit within the sand storage department. In this mixing room is located also the electric control, not only for the mixing machines, but for two 5 hp. a.c. skip hoists, as well. These skip hoists operate above 14 sand storage bins in the department proper, each of which have a capacity of 60 tons, or a total of 840 tons. The storage department being steam heated, an adequate supply of workable sand can be maintained in the coldest weather. The sand is unloaded from cars on a railroad siding outside this department. Skips operate through swinging doors, over inclined wooden tressles to the cars where they are loaded, and returned to the bins. By the electric control the skips can be stopped at any predetermined point or bin, and automatically unloaded, thereby reducing handling charges. The flooring in the sand storage is of cement in which tracks and turntables are inserted for transporting sand in push cars, an auxiliary system for use only when electric trucks become incapacitated or overloaded. Each bin has its individual card on which is a record of the grade of sand, the car number and from whom the sand is purchased, dates of storage and usage.

An extremely satisfactory distance between the bed and the charging door, which gives maximum efficiency, is the outstanding feature of the cupola installation. This installation consists of a No. 9½ and a No. 8 Whiting cupola, the former having a shell diameter of 90 in. and an inside diameter of 70 in., while the shell diameter of the No. 8 is 78 in. and the inside 60 in. Combined, these two cupolas have a capacity of 30 to 35 tons per hour. Their total height is 51 ft., and



There Are 14 Core Ovens, Seven Draw and the Remainder Two-Car Type. The latter are of the double-end style



The Distance from the Bed to the Charging Doors of the Cupolas Is 21½ Ft.

from the bed to the charging door is 21 ft., 6 in. It is therefore possible to charge each of the cupolas heavily before turning on the air.

Air for the No. 9½ cupola is furnished by a No. 7A Wilbraham-Green rotary positive pressure blower, direct-connected to motor, having a displacement of 55 cu. ft. per revolution. The No. 8 cupola is served by a No. 6A blower, of the same make and similarly connected, having a capacity of 35 cu. ft. per revolution. These blowers are stationed in an intermediate brick room below the charging floor, together with a system for heating water used in washrooms. Adjoining this room is the laboratory, which is comparatively small, but excellently equipped for all requirements. The proximity of this laboratory to the cupolas is a favorable feature.

The cupola charging equipment is mechanical and also is furnished by the Whiting Corporation. It consists of 3-ton iron charging cars, and combination coke and scrap charging cars, each having a capacity of 600 lb. of coke and 3000 lb. of scrap. The iron, scrap and coke are delivered to the charging floor by a 3-ton electric elevator with scales mounted on the floor of the elevator car. A cinder mill for reclaiming purposes is installed on the lower floor of the cupola house, from which a recovery of 500 lb. to 1000 lb. per day is possible. The present pouring equipment consists of Whiting ladle trucks of 1500-lb. capacity each, from which hand ladles are supplied.

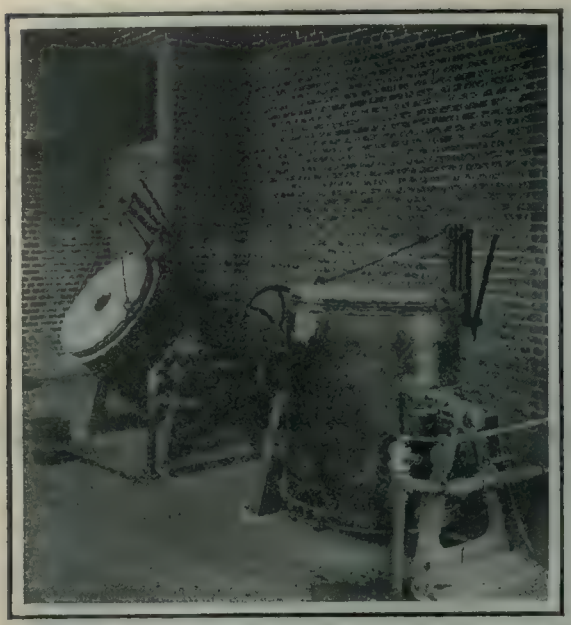
The cleaning room, 40 x 100 ft., is built parallel and adjacent to the spur track leading into the upper or office end of the foundry proper. It is thus possible to care economically for dust delivered through pipes on the outside of the unit leading from a dust arresting system inside, by inserting these dust converters in flat cars used for yard refuse purposes. Along one of the 100-ft. walls of the cleaning room are arranged two Sly sand blasts and three Sly tumbling barrels. Eight double-end United States Electric Tool Co. grinders are positioned across the lower end of this room, while finishing and inspecting benches extend along the other long wall. The flooring in the cleaning room is of wooden blocks, but each piece of equipment rests on a concrete foundation.

From the cleaning room a large elevator runs to the pattern storage above. The elevator doors are fireproof and mechanically-operated by the elevator alone, consequently are fool-proof, as well. Patterns are stored on fireproof racks made of steel tubing with diamond plate shelving. These racks are arranged with ample space between them to permit free movement of trucks and employees. The foundry layout does not include a new pattern making shop, which, in this instance, comes under the direct supervision of the foundry superintendent. For the present, patterns will continue to be made in the company's old shop, located some distance from the new plant.

When necessary, castings are transferred by electric trucks from the cleaning room to the galvanizing department adjacent, the wooden block flooring in both units facilitating such work. This galvanizing depart-



Both Cupolas Are 51 Ft. in Height. Their shell diameters are 90 in. and 70 in., respectively



Two Oil-Burning Brass Melting Furnaces Are Installed in a Separate Unit. Each has a capacity of 1800 lb. in 8 hr.

ment is 40 x 100 ft. There are two galvanizing tanks at the lower end, one each side of the unit, set on concrete foundations, of 15-ton capacity each, and seven wooden pickling vats. The latter and the tanks are served by an elaborate overhead track system with generous headroom, on which six one-ton Curtis electric hoists and two hand hoists operate.

Two large washrooms are provided for employees, with accommodations for 150. Both hot and cold water are available, together with shower baths and individual lockers. These rooms are so constructed as to be easily and effectively flushed out.

Inasmuch as the Gilbert & Barker Mfg. Co. property covers 18½ acres, ample storage space for the foundry's raw materials is available.

Drawing as a part of engineering education and the layout and equipment of drafting rooms are to be discussed on Jan. 10 by Prof. Walter H. James, department of mechanical engineering, Massachusetts Institute of Technology, at a meeting of the Providence Engineering Society, Providence, R. I.

Proper Recognition of Employee a Factor in Success of Suggestion System

In connection with the question as to why some industrial managers are reluctant to adopt an employee's suggestion system, S. DeHart of the R. K. LeBlond Machine Tool Co., Cincinnati, in a monograph on the subject, states that suggestion systems are an unqualified success when the employee making the suggestion is given proper recognition by the management. This recognition, he adds, may be in the form of money; honorable mention in the factory magazine; or merely a pat on the back. "It is short-sighted policy to receive a good suggestion without giving the person who made it proper credit. Even though the suggestion cannot be used, the employee should be told the reason and encouraged to make other suggestions.

"Not long ago I visited a factory in the Middle West and while there saw a condition which obviously needed improvement and which could have been made by any employee having the slightest mechanical training. I spoke to one of the employees about it, thinking that perhaps it had not occurred to him that such a condition could be improved. He informed me that he was fully aware that the defect could easily be remedied, but had long since stopped suggesting improvements as he had never received any credit for those he had previously made. This company had a large box, labeled 'Suggestions,' placed conspicuously in the shop, but it had long since passed into desuetude for lack of interest of both employee and employer.

As an instance of the proper recognition of employees, the monograph in question mentions one large concern which names machine safeguards after the employee who suggests it. Another company rewards its employees for finding defective links in crane and sling chains, presenting a pocketbook to the employee who discovers one defective link and a gold watch to the employee finding the largest number of defective links.

"There is no question that there is good psychology in having the employee understand that his efforts along these lines are appreciated. It reacts favorably on the employee and also benefits the management."

The recent development in the southwestern oil fields has created such a demand for oil well tools that the Cree-Becker Oil Tool Co., Newark, Ohio, has been obliged to put on a night force to take care of it.

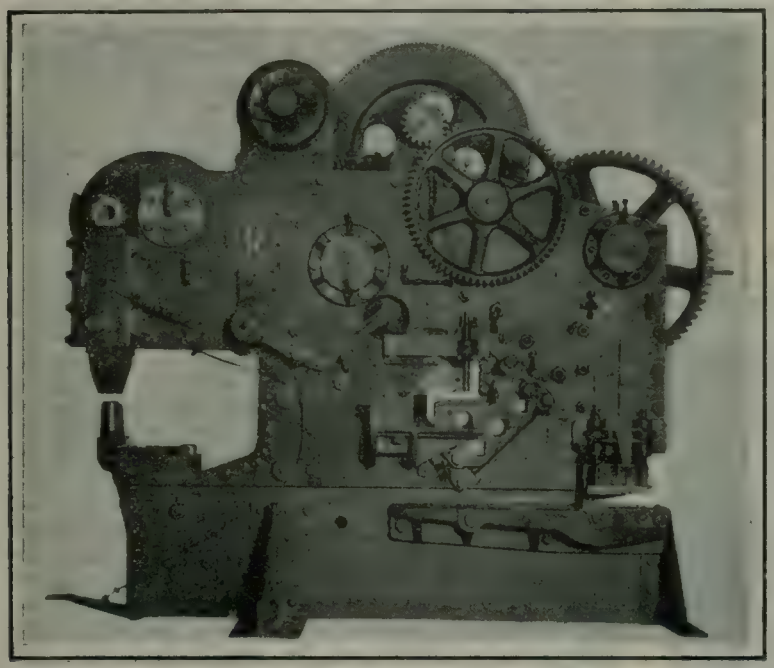


Cement Foundations Are in Readiness for Additional Tumbling Barrels. Where equipment does not stand the flooring is of wooden blocks

Improved Punch, Shear and Bar Cutter

To obviate tilting the piece in making beveling or mitering cuts (inconvenient to say the least in handling large rolled sections), the Buffalo Forge Co., Buffalo, has developed the machine shown in the accompanying illustrations. It is known as the new Buffalo armor-plate No. 26 universal, diagonal-stroke punch, shear and bar cutter. The makers state that after extensive experiment it was found that by inclining the shearing end at an angle mitering could be accomplished with the work held in a horizontal plane, allowing heavy sections to be cut without any lifting.

The machine is designed to take care of every punching, shearing and bar cutting requirement of a steel fabricating shop. The various operating points are located so that these operations can be performed simultaneously. The equipment includes two sets of punch holders and dieblocks for punching beams, channels, girders and H-columns of any size in both flange and web. Special attention is called by the makers to the fact that holes can be punched in any part of the web without turning the section over.





Universal Diagonal-Stroke Punch, Shear and Bar Cutter. Full front view is shown at left. The arrangement for cutting left-hand miter is shown above and the head for punching in flange is shown below

All gears are machine cut. Bearings are of ample proportion, bronze lined, and the flywheel bearing is of the ring oiling type. Power is furnished by a 7½ hp. motor.

The frame is of the Buffalo "armor-plate" type, consisting of two rolled-steel plates with cast steel throat pieces, a construction permitting of considerable reduction in weight as compared with cast iron and steel-frame construction.

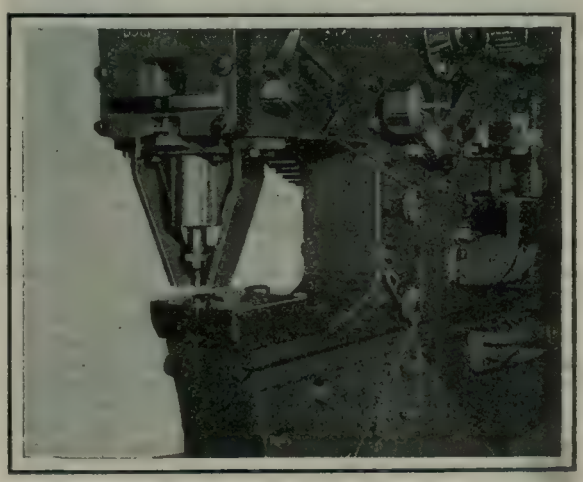
The punch has a 24-in. throat, 19 in. high. It is engaged by handle or foot treadle and is provided with a gag, making it semi-floating. The shear is engaged by means of a jaw clutch. The bar cutter is operated by shifting a ram by means of a counter-weighted lever. Stops for shearing angles square on 45 deg. miter are fixed, making it unnecessary to work the angles. The speed of the flywheel is 320 r.p.m. The strokes per minute of the punch and the bar cutter are 20.5; and of the shear, 21.5.

The following capacities are given: Punch, 1¼x¾ in. or 1x1 in. The standard dieblock and long punch holder punches flat material, the flanges of 8 to 26 in. girder beams; the flanges of 5 to 14 in. H-columns, with straight die; and the flanges of 7 to 30 in. I-beams, with bevel die. The additional dieblock and short punch holder punches flat material; the webs of 8 to 26 in. girder beams; (limited by the throat); the webs of 5 to 14 in. H-columns; and the webs of 5 to 26 in. I-beams (limited by the throat). All of the foregoing can be punched without turning the beams or columns over. For smaller beams the special dieblock is required.

The shear capacity includes ¾-in. plates and 3½ x1-in. flats. Flats 8x5/16-in. or 2¾x1-in. can be handled with special upper knife. The throat is of special height to allow angles up to 6 in. to be trimmed.

Equipped with standard knives the bar cutter will handle 2¼-in. rounds; 2-in. squares; 6x6½-in. angles square; 4 x 4 x ¾ angles, 45 deg. miter; and 4 x 4 x ½, tee-square. With special knives 8-in. I-beams, 18 lb.; 9-in. channels 20 lb.; and 5-in. H-columns, 18.7 lb.; can be handled.

The capacity of the machine for coping is given as 5 to 10 in. beams in flanges; 5 to 9 in. channels in flanges; and up to 5x5x½ in. angles square. The width



of the coping tool is 1 in. The capacity for 90 deg. miter notching is 3½x3½x¾-in. angles.

Working Force Reduced

The Chicago, Milwaukee & St. Paul R. R. materially reduced its working forces on Dec. 17. At the seven shops of the road, 12,000 men were laid off. A 10 per cent reduction in the forces maintained at 400 roundhouses was made. About 50 per cent of the clerical employees were also dismissed for an indefinite period. In commenting on the order, H. E. Byram, president of the railroad, said: "Our employees have been asked to work half time and some to cease work entirely until the dull period is over. During the holidays, there is little freight traffic. This season of the year affords an opportunity to reduce forces temporarily. The order will be revoked immediately when business increases."

Sulphur and Oxides in Ordnance Steel*

Comparison of Open-Hearth and Electric Practice —Lower Sulphur Insures Superior Toughness—Details of Methods at Charleston Plant

BY WILLIAM J. PRIESTLEY

IN the manufacture of gun forgings and other steel parts that, in service, are subject to sudden high stresses and shocks, it is desirable to use steel possessing the greatest toughness and ductility possible without sacrific of strength. In order to obtain this, it is necessary to procure steel that shows the highest possible elongation and reduction of area without lowering the tensile strength and elastic limit. Proper heat treatment of the steel can control this condition within certain limits. When heat treatment has failed to produce the desired results, metallurgists have used steels containing molybdenum, zirconium, vanadium, chromium, tungsten, etc.

The purpose of this paper is to describe a method by which these desired physical properties may be procured, by the elimination of certain impurities that inherently exist in steel made by the open-hearth process, and without the use of expensive alloys.

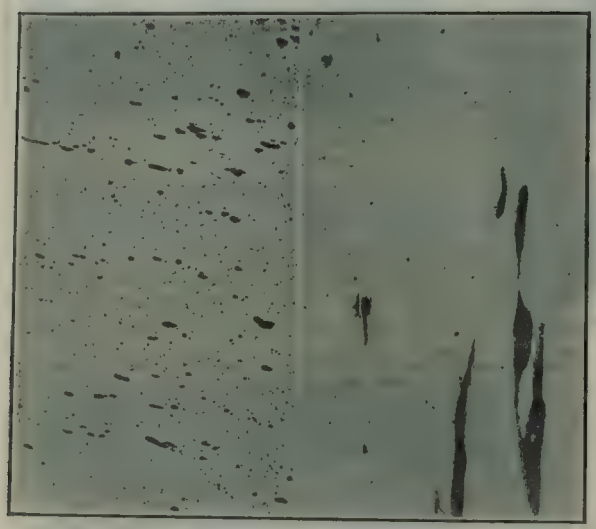


Fig. 1—Acid Open-Hearth Steel, Left, Unetched, × 25; Right, Unetched, × 200, Both Reduced About One-Third. This represents a longitudinal section taken from an acid open-hearth steel forging 11 in. in diameter, 28 ft. long, 7½-in. bore, weighing 6000 lb.

The carbon was 0.35; manganese, 0.68; silicon, 0.240; phosphorus, 0.040; sulphur, 0.053, and nickel 3.00 per cent. The physical tests (given in detail in the paper) show normal tensile strength and elastic limit but poor elongation and reduction of area, although meeting the specifications.

The forging was green annealed at 1600 deg. Fahr., rough machined and quenched at 1450 deg. Fahr. and drawn to 1200 deg. Fahr.

Design of Gun Forgings

In the manufacture of gun forgings, a certain elastic limit is fixed by the designer, and the walls of the gun are made of the proper thickness, allowing a suitable factor of safety for the high stresses and sudden shocks that occur during gun firing. The elastic strength of the gun is about 1.4 times the stress set up at any point along the bore of the gun during firing with the maximum powder charge.

As the stresses set up in the walls of the gun during firing are mostly "tangential," all physical tests are taken in this direction, or transverse to the direction of flow of the metal in forging. Furthermore, test bars taken across the grain of the metal will more frequently expose defects and foreign inclusions in the steel than will bars taken in the direction of flow of the metal in forging. Impurities in the steel will also be more readily detected by transverse test bars.

With a fixed tensile strength and elastic limit, a steel with higher elongation and reduction of area is more desirable for service where sudden stresses and great shocks are encountered. The high elongation denotes ductility and the high reduction of area denotes toughness.

Results Obtained with Electric Steel

Some interesting results were obtained recently in the manufacture of heavy ordnance forgings at the U. S. Naval Ordnance Plant, South Charleston, W. Va. The steel was made by the duplexing process, in which cold charges of pig iron and scrap were melted in a 75-ton basic open-hearth furnace, where the dephosphorizing was done, and subsequently the deoxidizing and desulphurizing was done in two 40-ton basic-lined electric furnaces. A comparison of the physical results obtained from forgings made by this process with similar forgings made directly in an acid open-hearth furnace at the works of one of the leading industrial steel plants, noted for high-grade open-hearth steel, shows that the steel with the lower phosphorus and sulphur has the greater toughness and ductility. Transverse tensile test bars from electric steel, though having the same tensile strength and elastic limit as the bars from the open-hearth steel, have a much greater elongation and reduction of area.

The results given in the table were obtained on tangential tensile test bars. All forgings received a green annealing before machining; after machining they were quenched and drawn. The first impression on comparing these results is that the higher elongation and reduction of area are due to the low phosphorus and sulphur, as shown by the chemical analysis; all the other elements are approximately alike.

Effect of Phosphorus

It would be difficult to draw any comparison between the open-hearth and electric steel in regard to the phosphorus content. This element is in solid solution with the iron as a phosphide and the percentages are too small in both the open-hearth and the electric steel to denote any difference even with a microscope. The lower phosphorus in the electric steel might have a slight effect on the elongation, due to producing a somewhat smaller grain and decreased brittleness in the steel.

Effect of Sulphur

It has been stated by a recognized authority on the manufacture of steel that "the effect of sulphur on the cold property of steel has not been accurately determined but it is certain that it is unimportant. In common practice, the content varies from 0.02 to 0.10 per cent. and, within these limits, it has no appreciable influence on the elastic ratio and the elongation or the reduction of area." This statement probably relates to commercial steels tested longitudinally. In this case the sulphur, in the form of manganese sulphide, has been drawn out into thin shreds in the direction of forging or rolling and is not so easily noticed in the results of longitudinal test bars as it would be in the case of transverse bars. With the overbalancing

*Abstract of a paper to be presented at the February, 1922, meeting of the American Institute of Mining and Metallurgical Engineers in New York. The author is steel superintendent U. S. Naval Ordnance Plant, South Charleston, W. Va.

amount of manganese present in all the steels referred to in this article, probably no iron sulphide is present in the steel for none of the ingots showed any signs of tearing during forging. Steel containing iron sulphide is known to tear in forging and is termed "hot short" by steelworkers. Manganese sulphide has been described as being present in the ingot in the form of small globules between the grains of the metal. Having about the same fusing point as the metal, these inclusions become equally plastic when the ingot is heated for forging and are drawn out into long thin shreds—just as slag is drawn out in wrought iron. If, however, the amount of manganese sulphide present is not enough to form these globules, these shreds will not be developed in forging and transverse test bars will show as good results in elongation and contraction as longitudinal bars.

The following test bars were taken from a piece of steel resembling that shown in Fig. 3. Two of the bars were drilled longitudinal with the forging and the other two tangential. They were given exactly the same heat treatment, quenched at 1425 deg. Fahr., and drawn at 1200 deg. Fahr.; the results were as follows:

	Tensile Strength, Lb. Per Sq. In.	Elastic Limit, Lb. Per Sq. In.	Elongation, Per Cent	Reduction of Area, Per Cent	
Tangential..	111,500	55,500	21.3	44.5	Fracture
Tangential..	108,500	58,000	20.9	40.2	Silky lipped
Longitudinal	109,600	58,500	24.1	55.8	Irregular and woody
Longitudinal	109,400	59,700	24.1	56.3	One-half cupped silky Three-fourths cupped silky

It will be noted that the tensile strength and elastic limit are practically equal in the tangential and longitudinal bars, but the non-metallic inclosures in the steel caused the tangential bars to show a lower elongation and lower contraction than the longitudinal bars.

Table of Tangential Tensile Tests of Various Sized Gun Forgings of Open-Hearth and Electric Steel

	Phosphorus, Per Cent	Sulphur, Per Cent	Nickel, Per Cent	Tensile Strength, Lb. Per Sq. In.	Elastic Limit, Lb. Per Sq. In.	Elongation, Per Cent	Reduction in Area, Per Cent
Open-hearth steel*	0.04	0.039	2.98	98,013	57,720	20.4	36.9
Electric steel	0.012	0.008	1.16	95,435	64,010	24.5	58.3
Physical requirements				80,000	50,000	21.0	30.0
Open-hearth steel	0.040	0.044	3.02	104,785	73,162	19.6	39.4
Electric steel	0.012	0.009	2.81	96,995	67,785	24.2	55.9
Physical requirements				90,000	55,000	18.0	30.0
Open-hearth steel	0.039	0.040	3.09	103,185	73,231	19.2	39.9
Electric steel	0.014	0.012	2.87	100,340	72,610	23.2	52.5
Physical requirements				90,000	55,000	18.0	30.0
Electric steel*	0.020	0.026	2.66	110,182	67,067	17.8	37.1
Electric steel	0.006	0.008	2.91	108,681	77,038	20.2	49.3
Physical requirements				95,000	65,000	18.0	30.0
Electric steel*	0.020	0.025	2.65	95,245	64,979	19.3	37.0
Electric steel	0.014	0.012	2.87	100,340	72,610	23.2	52.5

*These ingots were made by a private industrial plant during the war.

The results in each case represent the average of 15 to 40 bars from 5 to 10 forgings.

Effect of Oxygen

There is nothing in the usual chemical analysis to show how much oxygen is present in steel. It exists in small amounts in even the best steel and has bad results. In large amounts, it produces tearing during forging or rolling, and when cold is brittle under shock. If present, it is probably in the form of iron and manganese oxide and silicates. Oxygen is most prevalent in basic open-hearth steel. In the acid open-hearth furnace a more effective reaction between the slag and the steel tends to deoxidize the steel more thoroughly. This cannot be done completely on account of the air present in the acid open-hearth furnace.

A condition exists in the basic electric furnace which cannot exist in the basic or the acid open-hearth furnaces. With a reducing atmosphere in the furnace, it is possible to form a calcium carbide slag free from metallic oxides; with constant rabbling of the bath, any oxides in the steel will rise to the slag, where they are reduced by the carbon present. The iron and manganese are returned to the bath, and the resulting carbon monoxide is liberated to the atmosphere of the furnace. Unless the slag and bath are free from oxygen, it would be impossible to maintain a carbide slag; and unless the slag and bath were thoroughly deoxidized, it would be impossible to retain the sulphur in the slag as calcium sulphide.

Hence, the conditions that bring about the elimination of sulphur from the steel guarantee that oxides and other metallic impurities have also been eliminated. This is demonstrated in the case of the last two forgings in the table. While the forgings were made by the electric refining process in different steel plants, the test bars of steels containing the higher sulphur, show no better results than the forgings made by the acid open-hearth process. The photomicrograph of the

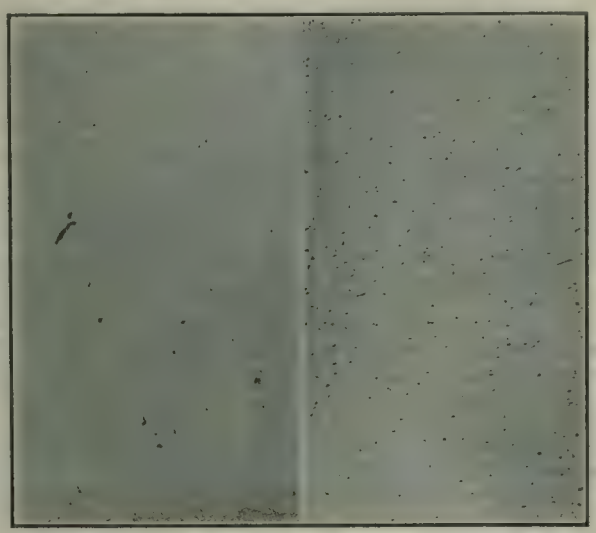


Fig. 2—Electric Steel with Low Sulphur, Left, Unetched, × 25; Right, Unetched, × 200, Both Reduced About One-Third. This represents a longitudinal section taken from a low sulphur electric steel forging 11 in. in diameter, 28 ft. long, 7½-in. bore, weighing 6000 lb.

The carbon was 0.28; manganese, 0.74; silicon, 0.140; phosphorus, 0.011; sulphur, 0.006, and nickel, 2.81 per cent. The physical tests (given in detail in the paper) showed superior results, particularly on tangential bars.

The forging was green annealed at 1600 deg. Fahr., rough machined and quenched at 1450 deg. Fahr. and drawn to 1190 deg. Fahr.

electric steel with high sulphur, Fig. 3, reveals more inclosures than the electric steel with low sulphur.

Photomicrographs of the Two Steels

Photomicrographs have been taken of bars picked at random from each of the three classes of steels described. The polished surface of these bars was parallel to the direction of forging. One set of photomicrographs was taken at 25 diameters, so as to include as many inclosures as possible and to show their distribution. A second set was taken at 200 magnifications, to show the formation of the inclosures. It will be noted that the non-metallic inclosures in the steel with low sulphur and highest elongation and reduction of area are smaller than in the steel with higher sulphur content and the lowest elongation and reduction of area. All the inclosures in the low-sulphur steel seem to be of the same kind, whereas, in the acid open-hearth and electric steel with higher sulphur, there are two types—the small round ones and those that were elongated and drawn out in forging. The light colored elongated inclosures in the acid open-hearth steel are

probably a mixture of manganese sulphide, oxides and silicates.

Manufacture of Steel at the Ordnance Plant

From the foregoing physical results and substantiating data, it is evident that the presence of sulphur, oxides, and other non-metallic inclosures are detrimental to the ductility and toughness of steel. Where the best quality of steel is required, it is necessary to keep these impurities to a minimum. The basic open-hearth furnace eliminates the phosphorus but only slightly reduces the sulphur; the oxides must be eliminated by the addition of deoxidizers, such as ferromanganese, ferrosilicon, aluminum, etc., which are sometimes added to the open-hearth furnace and rabbled after the air is shut off but more frequently are added to the metal in the ladle. If added in the ladle, the reactions are incomplete and the products of combustion remain suspended in the steel, forming harmful non-metallic inclusions.

Gun forgings and other ordnance material, where transverse tests are required, have never been successfully made from basic open-hearth steel. The bars generally fail in elongation and reduction of area tests, because of the presence of these inclusions. They generally break with a laminated and woody fracture.

The acid open-hearth furnace is better for making steel free from oxides and non-metallic impurities, and ordnance forgings have been obtained from acid open-hearth steel. While neither phosphorus nor sulphur can be eliminated in this furnace, the amount of these impurities may be kept down by the selection of high-grade scrap and pig iron. The oxides may be largely eliminated by the effective reaction between the slag and the steel.

The method of making steel at the U. S. Naval Ordnance Plant aims for the elimination of phosphorus, sulphur and oxides. The metallic charge of the open-hearth furnace consists of 40 per cent basic pig iron and 60 per cent miscellaneous scrap, including turnings, crop ends, etc., up to 8 per cent of limestone is added with the charge and sufficient ore to lower the carbon to approximately 0.20 to 0.25 per cent., which is slightly below the amount required in the finished steel.

The average analysis of the final slag taken from the open-hearth furnace on 19 consecutive heats just before tapping is as follows:

SiO_2, 15.43 per cent; FeO, 19.27 per cent; Al_2O_3, 3.66 per cent; MnO, 8.02 per cent; CaO, 45.02 per cent; MgO, 6.37 per cent; P_2O_5, 1.80 per cent; S, 0.031 per cent.

The average analysis of the steel prior to tapping these same heats was as follows:

Carbon, 0.23 per cent; manganese, 0.26 per cent; silicon, 0.010 per cent; phosphorus, 0.007 per cent; sulphur, 0.015 per cent; nickel, 0.66 per cent; chromium, 0.00 per cent

After it is tapped from the open-hearth furnace into a 75-ton ladle, the steel is teemed through a 2½-in. nozzle into two 40-ton basic electric furnaces for deoxidizing and finishing. Usually 2 lb. of 50 per cent ferrosilicon and 3 oz. of aluminum for every ton of steel tapped from the open-hearth are added to the ladle, to take up any oxygen present, which might lower the carbon content while the steel was in the ladle.

An average analysis of the slag left in the ladle from the nineteen heats, after teeming into the 40-ton furnace was as follows:

SiO_2, 17.27 per cent; FeO, 18.32 per cent; Al_2O_3, 5.75 per cent; MnO, 7.84 per cent; CaO, 42.79 per cent; MgO, 8.15 per cent; P_2O_5, 1.65 per cent; S, 0.028 per cent.

The average analysis of the metal as teemed into the electric furnaces from the open-hearth on the same heats was as follows:

Carbon, 0.20 per cent; manganese, 0.23 per cent; silicon, 0.037 per cent; phosphorus, 0.007 per cent; sulphur, 0.016 per cent; nickel, 0.67 per cent; chronium, 0.00 per cent.

A comparison of the steel analysis will show that the silicon increased slightly; also, that there was a slight drop in carbon and manganese while the steel was in the ladle. The average phosphorus content of the charge into the open-hearth was about 0.08 per cent, because of the comparatively low phosphorus in the crop ends.

After teeming the molten open-hearth steel into the 40-ton electric furnaces, a new slag is made up of burned lime, fluorspar, and ground coke. This represents, in weight, about 3 per cent of the metal charged and is added from time to time, depending on the condition of the bath and the consistency of the slag. The operation from now on is a deoxidizing one. Under normal conditions the bath is held from 3 to 5 hr. in a reducing atmosphere.

The finished steel on six heats showed the following analysis:

Carbon, Per Cent	Manganese, Per Cent	Silicon, Per Cent	Nickel, Per Cent	Phosphorus, Per Cent	Sulphur, Per Cent
0.32	0.71	0.250	0.36	0.022	0.009
0.36	0.74	0.241	3.03	0.013	0.008
0.29	0.74	0.238	2.78	0.010	0.007
0.35	0.71	0.200	0.31	0.013	0.008
0.38	0.67	0.210	2.97	0.010	0.008
0.30	0.78	0.215	2.83	0.013	0.010

The low sulphur in the final slag denotes the possibility of removing a greater amount from a steel of higher sulphur content from the open hearth. This would result from using a lower grade of scrap and pig iron with higher sulphur content in making up the charge for the open-hearth furnace. This might occur in plants where miscellaneous scrap is purchased in the open market and where crop ends are not so low in sulphur as those at this plant.

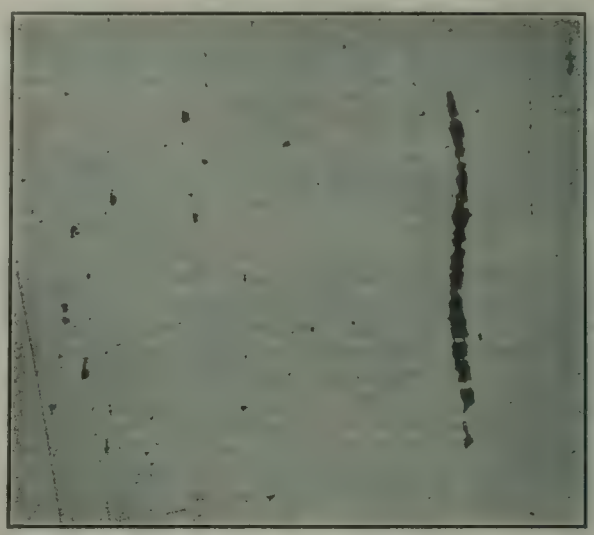


Fig. 3—Basic Electric Steel Made During the War in a Private Industrial Plant; Left, Unetched, × 25; Right, Unetched, × 200, Both Reduced About One-Third. This represents a longitudinal section taken from a basic electric steel forging 9 in. in diameter, 28 ft. long, 5½-in. bore, weighing 4000 lb.

The carbon was 0.41; manganese, 0.48; silicon, 0.168; phosphorus, 0.026; sulphur, 0.029, and nickel, 2.60 per cent. The physical tests (given in detail in the paper) show results inferior to the other electric steel, particularly in ductility.

The forging was green annealed at 1600 deg. Fahr., rough machined and quenched at 1450 deg. Fahr. and drawn at 1220 deg. Fahr.

[A discussion of the reactions involved is given in the original paper.]

Conclusions

The manufacture of ordnance forgings from electric steel is not an innovation. It was tried, during the war, in a number of plants. Some of these plants were not as successful as others, probably because the managers were not sufficiently experienced in the many other phases of manufacture necessary in the making of ordnance forgings.

Steel made in an electric furnace will not be of the best quality unless all operations and reactions are performed completely and satisfactorily. Electric steel with its greater freedom from oxides and non-metallic impurities is more uniform, more homogeneous and more dense than ordinary open-hearth steel, and if it is cast at too high a temperature or chilled beyond a certain point in the mold, incipient cracks will develop. These minute cracks are radial and are most frequently

found near the center of the ingot or forging. Numerous electric steel plants working on ordnance material, during the war, were troubled with these defects, which from their physical appearance in test bars were called "snow flakes."

A diversity of opinion has always existed between the leading ordnance steel plants regarding the method of teeming steel into the molds. Some have consistently adhered to bottom pouring while others have claimed better results from top pouring direct, or through funnels or boxes. The method apparently makes little difference if the steel is placed in the mold at the proper temperature and has been properly cleansed before teeming. Top pouring direct obviates the danger of getting runner brick into the ingot, which frequently occurs in the case of bottom pouring. It also obviates the danger of sand washing into the molds with the metal from the funnel or box. Bottom pouring will give a better surface on the ingot and for some purposes may be more desirable.

FRICTION IN ROLLING MILLS*

Effects of Proper Lubrication Shown in Reduced Power Losses

Increased production as high as 1½ per cent has been secured [under proper lubrication] with reductions of 10 to 12 per cent in the power necessary to drive the mill. In straight mechanical engineering practice, increasing the speed of the mill to secure greater productiveness must always be accompanied by forced increase of power. Forcing machines to operate at higher speed, by changing the size of the pulleys or even by putting dressing on belts so that they will have greater traction, always places an extra load on the main engine. In lubrication engineering, however, the savings are all made up of reductions of losses of friction and resistance, and of the loss or slippage in belt transmission.

Illustrating an extreme case of friction losses, a test on a 10,000-hp. reversing rolling mill engine in Germany is cited. It is only necessary to say here that lubrication of this large unit, as found, was representative of conditions which existed in steel mill practice some years ago, and unfortunately are sometimes found to-day. Changing the manner and method of lubrication gave the following results:

	Friction Losses			
Original r.p.m.	44.7	56.4	88	88
Original I. hp.	485.88	725.98	1,239.50	1,239.50
Later r.p.m.	42.8	57	79	88
Later I. hp.	148.49	178.72	224.39	249.95
Reduced I. hp.....	337.39	547.26	952	989.66
Per cent	69.4	75.4	76.03	79.84

Analyzing these figures, it is seen that the original method of lubricating this unit gave results which approached the laws of solid friction; that is, while the surfaces were not apparently actually in contact, there was interspersed between them material of such a heavy nature that the resistance was so great as to approach the resistance of solid masses working upon themselves. As soon as lubrication was changed, the condition approached that given by consideration of the laws of fluid friction. It is, of course, quite impossible to secure, in a unit of this kind, either purely solid friction or perfect fluid friction. This test, however, indicates quite clearly a possible near-approach to each of these conditions, and represents what takes place in an extreme degree when lubricants are used that are entirely unsuited.

In this particular case the great resistance in the engine itself was reflected in the difficulty of handling the reversing levers. The reversing was done by auxiliary steam cylinders as well as by hand levers. It required a full opening of the throttle to the auxiliary cylinder and all of the power possible for one man to exert on the hand levers. After the change in lubrication was made, only partial opening of the throttle to the auxiliary cylinders was necessary, and the men operated the hand levers with the utmost ease. Further, it was observed and noted by the operators that the speed of the entire mill was increased. The engine was handled very quickly on the reverse, and would get up speed in a fraction of the time formerly required, and this mill was put from an ordinary, average production unit to where it would make production records.

In this case all of the various rules shown in lubrication of spindles applied, as far as general lubrication was concerned. The lubrication of the steam cylinders, however, was handled through a new set of factors. The change which was made, and results obtained, in reducing the load of this part of the unit were entirely due to securing a better distribution of the lubricant, through having it properly atomized and carried with the steam where it could be spread upon all the surfaces with which the steam came in contact; whereas formerly large quantities of a heavy lubricant, not entirely suited for the work, were forced on the surfaces some seconds after the machine was placed in motion, and this oil would be worked back and forth on these surfaces in that form, resulting in much fluid friction. The oil fed in this manner would not spread to the upper part of the cylinders, which were undoubtedly, in consequence, operating metal to metal. Of the total 1250 hp. friction in this unit when it was turning 88 r.p.m., at least 50 per cent would be charged to cylinder and valve lubrication; the balance to the main bearings, pins, guides and connections.

*From a paper by William F. Parish, consulting lubrication engineer, Chicago, before the American Society of Lubrication Engineers, at its first annual convention, Chicago, Oct. 13.

The New Way to Success—A New Year's Address

The following is in part a New Year's address given before the employees of the Chapman Engineering Co., by William Brewster Chapman, president:

The old way of attaining success was by taking *advantage* of others. The new way is by taking *thought* of others. The psychology of success is the psychology of human brotherhood. The most successful companies of the future will be those that express the most sympathetic human understanding, thus insuring the best team-work and producing the most power with the least friction.

The first step in success is co-operation and co-operation starts with tolerance. The best thing I've heard on tolerance was from a modern minister who said to his congregation "Leave off trying to make other people like yourself; one's enough." It's novel advice from the pulpit, but it's good.

Next to co-operation comes "Pep." It can be kept alive only by exercise, play, good food and a happy state of mind. Important as it may be what food we eat, of vastly more importance is the state of mind in which it is eaten. Joy is a great creative power, it is the keynote to a successful life. Act as though you were glad to be alive and the response will be a new realization of life itself.

My final suggestion is that if you want to get on, you must study more. A vast amount of special information is quite as necessary as special experience. If you neglect either one you impose a limit on your future.

The Surface Combustion Co., Inc., industrial furnace engineer and manufacturer, 366-368 Gerard Ave., Bronx, New York, have been awarded the contract for an automatic heat treating furnace to be installed at the naval ordnance plant, South Charleston, West Va. This is a furnace for heat-treating 16 in. armor piercing shells as per Navy Department schedule and specifications 8996 opened Nov. 22, 1921.

S. L. Fuller, chief engineer, John F. Casey Co., Pittsburgh, was the speaker at the regular monthly meeting of the Engineers' Society of Western Pennsylvania, at the William Penn Hotel, Pittsburgh, Tuesday evening, Dec. 20. His subject was "Construction of the Monongahela River Bridge at Fairmount, W. Va." This bridge is of reinforced concrete with three 250-ft. arches.

New Horizontal Boring Machine

The Universal Boring Machine Co., Hudson, Mass., has placed on the market a new horizontal machine designed primarily for railroad shop and heavy work in general. It is offered as incorporating several features of improved design.

A conspicuous departure from the usual design is in the construction of its wide bed with three flat ways. The front and center ways serve as guiding surfaces, and the one at back supports the long carriage and correspondingly long and heavy standard table, the latter being 30 in. wide and 63 in. long. The machine derives its name, the original Tri-Way universal (horizontal) boring machine from this bed. The bed is rectangular and is so ribbed and braced, it is said, that even a slight degree of spring is prevented if the machine is not placed on a good foundation and properly leveled.

Large overhang on the table is eliminated, the electric motor and gear box, usually supported on brackets or overhanging, being embodied in the new machine. The generous width of the bed is intended to support the overhang of the work as well. The bed is also designed to accommodate the coolant system, the top sloping to the head end and the coolant running into a settling tank concealed in the end of the bed. From the settling chamber the coolant overflows into another tank, from which it is pumped direct, from the driving motor, to the work. In addition, the bed is provided with chip chutes from which the chips can be removed at the back of the machine.

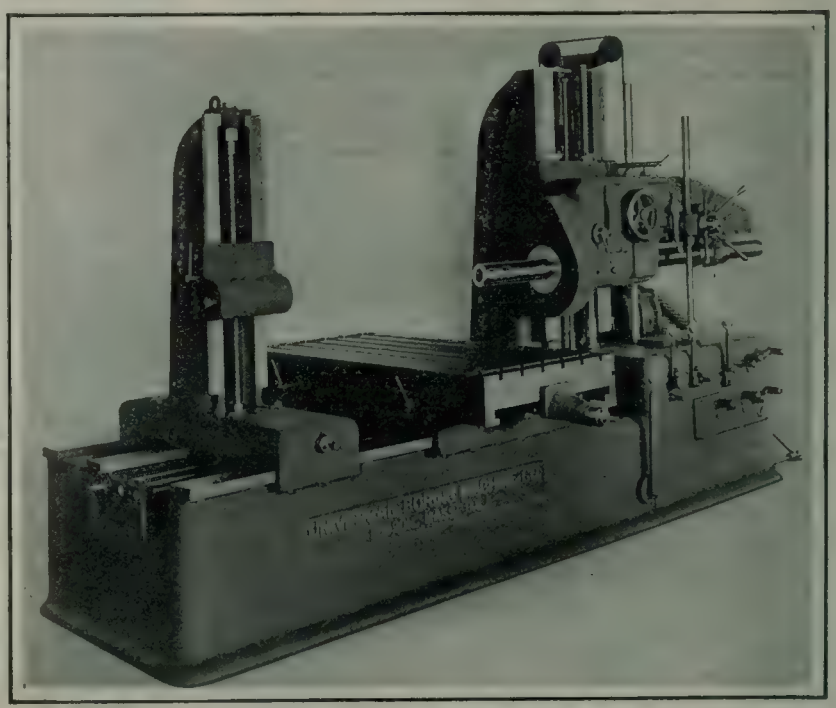
All of the working mechanism is contained in the bed in two trays in one box, readily accessible in case any repairs are needed. The lower tray contains the speed mechanism, and the upper the feed gears. In the bottom tray the gears run in a bath of oil, the tray being provided with exterior oil gages as well as drain plugs. Oil is forced into the upper tray by the action of the gears in the lower tray. All changes are made on the sliding gear principle. The operation of the speed and the feed gears are identical, there being three levers arranged in a horizontal line for each tray, for locating speeds and feeds and for operating same.

The starting and stopping lever, shown in front of the bed, is within easy reach of the operator's right hand. All levers are provided with ball handles. Both the feed and the gear mechanism is arranged in geometrical progression, a proper ratio of speed and feed for any kind of work being thus assured. There are twenty-four spindle speeds with a range of approximately 7 to 285 r.p.m., and twelve feeds, in either direction. Milling feeds run from ¼ in. to 5⅝ in., and boring feeds from ⅛ in. to 2 13/16 in. per minute. The driving gears are provided with a friction safety clutch, which can be adjusted to a certain horse power; which when reached, causes the clutch to slip out of place thereby releasing gears from excessive strain. All feeds are equipped with automatic stop motion.

In the company's other boring machines a rear post with the box travel in the center has been used, and more or less difficulty has been experienced in applying attachments on certain kinds of work. In the new machine the rear post is constructed along the same lines as the head, the box being on the side and having two bearings, as against four heretofore. The screw rod for raising and lowering the box in the old type of machines, is in one side of the rear post, whereas on the new machine it is in the center, thereby giving greater strength and accuracy. The compensating nuts for taking up wear in the elevating screw are shown at the upper end of the screw. The beam post is in two parts, consisting of the base, which never need be taken from the bed, and the post itself, held in place by four bolts and two pins, and easily removable. A ring is provided in the top to facilitate removal of the post by hoist.

The head is simple in design, and is similar to the head on the company's No. 3 A machine. The new head, however, has a reversing lever for the boring bar, and a lever for throwing in the high or the low speed gear for the boring bar. The head rests on two ways having extra wide wearing surfaces.

The bar carrier on the bar is adjustable throughout and is equipped with ball bearings. The forward bearing in the spindle has an adjustable take-up sleeve and is lined with felt to assure continued clearance from dirt. The diameter of the main boring bar is 4½ in.



The Front and Center Ways Serve as Guiding Surfaces, the One at Back Supporting the Carriage and Table

The taper hole in the main boring bar is a No. 6 Morse. The automatic travel of this bar is 30 in., but by resetting it can travel 60 in. and the length of the bar is 110 in. The power cross feed to the table is 48 in. and the power vertical feed to the head 30 in. The maximum distance from the table to the center of the bar is 30 in.

The machine occupies a floor space of 17 ft. by 9 ft. 5 in., is 8 ft. high and weighs approximately 20,000 lb. It is driven by an 18 in. x 4 in. pulley drive having 230 r.p.m. It can be driven either by belt or by motor.

Presentation to A. N. Flora

In recognition of his services during the past five years as president of the Western Sheet and Tin Plate Manufacturers' Association, A. N. Flora, vice-president in charge of sales of the Trumbull Steel Co., Warren, Ohio, was presented a chest of silver Dec. 23 by representatives of the organization. The gift consisted of a set of flat ware and a tea service. Charles B. Cushwa, general manager of the Brier Hill Steel Co., Youngstown, made the presentation, as chairman of the special committee handling the event. Other members of the committee were W. W. Lewis, general superintendent of the Falcon Steel Co., Niles; Warren F. Perry, assistant to the president of the Brier Hill Steel Co., in charge of industrial relations; D. R. Fithian, a superintendent of the Sharon Steel Hoop Co., Sharon, Pa.; L. E. Jurey, assistant to the second vice-president of the Republic Iron & Steel Co., Youngstown, and James H. Nutt, of Youngstown, for many years secretary of the association.

Electrification of Steel Plant Railroad

Difficulties Include Protection of Third Rail from Hot Metal Spills—Saving in Cost 50 Per Cent —Investment Offset by Low Operating Cost

BY R. B. GERHARDT*

ELECTRIFICATION of the steel plant railroad probably offers the largest field for development of any existing to-day in our plants, and should carry attractive possibilities. Most of our plants use to some extent electric locomotives or motor cars, but this use has been limited to some particular piece of transportation, such as handling hot coke from the coke ovens to quenchers and screening plants, or handling hot ingots from soaking pits or heating furnaces to the mills. In all these cases great benefit results over steam operation, but it is the scope of this paper to consider the complete displacement of the steam locomotive and do all transportation and shifting with electric locomotives, which in the larger plants approximates regular railroad yard operation.

Electrification of main line railroads in this country has, in general, been for special purposes, such as to relieve congestion or for terminal work. Only a very few roads have electrified with the view of handling general freight and passenger traffic.

In practically all cases where roads have been electrified, a considerable economy of operation has resulted, and in all cases the electrification has permitted more dense traffic. Considering the electrification of steam railroads in general, the following items as regards economy of operation, in addition to the fixed charges on any investment undertaken, have to be considered:

Fuel and other operating materials.
Repairs.
Operating labor.
Locomotive depreciation.
Hostler or station service.

Fuel

Under this item the greatest saving can be shown in yard service, due to the fact that the steam locomotive in yard service is idle a much longer time than in any other class of service, and during this time the losses, figured back into fuel, are very considerably greater than with the electric locomotive, particularly where the energy for such electric locomotive is obtained from a general system of power. It has been pointed out also, under this heading, that there is no creeping paralysis gradually impairing the efficiency of the electric locomotive, until temporary relief is obtained through frequent boiler washings and shifter house tinkering, as the efficiency of this unit remains very nearly constant over the entire life of the equipment.

In addition to the above, the steam locomotive efficiency gradually drops off from wear in the piston rings, piston and cylinder walls. With electric operation, however, there are some chances of inefficient operation, due to transmission, distribution and track bonding losses, and it is essential that as careful inspection be given these points as is given the locomotive itself. From results obtained by the New Haven Railroad it has been shown that for every 106.8 lb. of coal required by a steam locomotive in yard service, 38.3 lb. of coal will do the same work after electrification.

This gives a ratio of 36 per cent for this class of service, but for yard work recent tests have shown that this ratio drops to 18 per cent, not taking into account coal lost in the steam locomotives by banking the fires.

With electric locomotives receiving their energy from a central power system, the cost of electric power has to be compared with the cost of fuel for the steam locomotive. However, there are no coal and ashes to be handled; likewise, in the case of yard service no water. There is, however, some operating material, such as oil, grease and sand, required in both cases, but the items of oil and grease are much less with the electric locomotive. Along with the elimination of fuel, ashes, and water, there can be discarded, in favor of electrification, the plants required to handle these materials.

Repairs

Under this item the fundamental difference between the two classes of locomotives is the length of time required to make major repairs, except possibly in the cases of turning tires and painting. Spare parts can be so easily and quickly substituted in the case of the electric locomotives, that the time for so doing will greatly overbalance that required for most repairs on the steam locomotive. An armature, motor, gear or controller on the electric locomotive can almost be changed in the time required to cool down and empty a locomotive boiler safely for boiler repairs, not to speak of engine cylinder repairs.

With electric operation, where power is taken from the general power system, the cost of additional apparatus required for supplying current to electric locomotives, of course, has to be taken into account; likewise, an item under repairs to be considered, which does not enter into steam operation, is the maintenance of transmission, distribution and contact line systems. With electric locomotives, however, there are no restrictions imposed by outside boiler inspection. The following figures† indicate the locomotive repair cost for main line freight service:

	Steam Mallet	C., M. & St. P. Electric
Weight on drivers	240 tons	225 tons
Cost repairs per mile	60c.	14.65c.
Cost repairs per 100 tons locomotive weight on drivers	25c.	6.52c.

Operating Labor

In general yard work the train crews under electric operation do not differ from those under steam operation, except that the wages of the man taking the place of the fireman are usually somewhat less. For steel plant operation considerable additional economy can be effected as follows:

Each of the various departments, such as the coke ovens, open-hearth and mills, having considerable local shifter service, would be supplied an electric locomotive of its own to take care of such service, and the operating crews on these locomotives could be one man less than on locomotives in general service. These department locomotives would receive cars at a certain specified point from the yard department, deliver them to their destination in their own department, and return empty or loaded cars to the designated point again, for outbound or interdepartment handling by the yard department.

Locomotive Depreciation and Retirement

In the case of steam this is at an appreciably higher rate than in the case of electric operation. It is generally conceded that the life of a steam locomotive averages between 15 and 20 years, as against the life of an electric locomotive of 25 to 30 years. Substantiating this, I wish to point out that the electric locomo-

*Electrical superintendent Bethlehem Steel Co., Sparrows Point, Md. The paper was presented at the Chicago convention of the Association of Iron and Steel Electrical Engineers.

†From paper read Oct. 22, 1920, before joint New York meeting of A. S. M. E. and A. I. E. E.

tives on the Baltimore & Ohio tunnel, in Baltimore, are already in their twenty-sixth year of operation.

Hostler or Station Service

With electric operation this service is reduced almost to a minimum. As a matter of fact if the locomotives are so designed as to allow easy accessibility for inspection and oiling, the inspector can look after his work without necessitating the locomotive being sent to the station or shop, and the only requisite in the usual course of operation would be that the locomotive go to a specified point for taking on sand, when the supply is exhausted. No fire cleaning and rebuilding is necessary; likewise, fueling, watering and washing are done away with. The electric locomotive is always ready to run, and pull its maximum load, with the turning on of the current; while it is first necessary, with the steam locomotive, to get up steam pressure to do this work.

In the above conditions the electric storage battery type of locomotive has not been included, for the reason that a greater saving of electric operation over steam is shown by the use of straight electric locomotives only. If the storage battery machine is considered, each of the above items would be increased over straight electric locomotive operation except the item—operating labor.

For yard work the storage battery machine, especially since it can now be secured in fairly large size units, offers attractive possibilities due to the fact that no overhead or rail contact systems are required. But it is not able to withstand such rough treatment as the straight electric machine; it can not maintain continuous service, since during certain periods it must be idle for charging the battery, or else exchanging batteries, and there is a high depreciation on the battery itself. A combination machine using both line contact system and battery may be used, and considerable benefits derived over the straight battery machine.

Practically all of the steel plants use direct current power at a potential of 250 volts, and it is very essential, for simplicity and economy, to use this same voltage for the electric locomotive. In most plants it should be entirely feasible to do this, for the reason that direct current generating or converting apparatus is so distributed that long distances of transmission are not encountered. In many cases the combination of the general plant load, which is highly diversified, due to crane and mill operations, with the railway load will considerably improve the load factor on the direct current apparatus, so that, to handle the yard electrification, it would not be necessary to install such apparatus to the full capacity required for this work.

The principal objection to the overhead trolley in the electrification of steel mill yards is from the interference with the work of locomotive cranes. This machine is so essential in the yard that it is almost impossible to pick out any section of track where the crane will not be required to work, at some time or other. It may be proved, however, that such construction can be used to advantage in the general classification yards, and this is a matter for further study.

One other objection to the overhead trolley is that it does not lend itself very readily to heavy operation at as low a voltage as we propose to use, and we, therefore, feel that the most satisfactory system would be the third rail. After reaching this conclusion, the first question that naturally presents itself is the feasibility of a third rail in the yard from the following standpoints:

Safety.
Blocking the free passage of switchmen or other employees through the yard.
Danger from material or hot metal spilling or falling on the third rail.
Methods of crossing frogs and switches.
Methods of construction through buildings or special places where conductor rail is objectionable.
Tie-up from wrecks.

Safety

The best answer to the question of safety is to refer to the operation on blast furnace trestles, where we have had electrified tracks with third rail construction for many years, operating at the same voltage as proposed for yard electrification. Looking over our records during this time, I find that there has not been a single accident from contact with the live rail. There have been accidents on the trestle due to other causes, but none can be attributed to the electrified condition of these tracks.

Two hundred and fifty volts is the common plant voltage which our workmen are thoroughly familiar with, and particularly the yard department employees who have anything to do with locomotive cranes or handling of lifting magnets. If we should go to any higher voltage, then the proposition would be considerably more hazardous.

There are essentially two kinds of third rail contact systems, one using the over-top contact and the other underneath contact. We prefer the latter for steel plant work, due to the fact that it can be better insulated and more substantially protected from material falling into the rail and causing trouble. With this type of construction, it is almost impossible for anyone to come into contact with the live rail, except by getting down underneath the guard on either side and touching the head of the rail, which extends slightly below the guard; whereas, with the overtop contact there is not formed nearly as good a support for the guard and anyone stepping on this guard or anything falling on it is apt to break through and come in contact with the live rail. Also, it is entirely possible to come in contact with the rail from the side toward the track, where it is entirely exposed.

The underneath contact system lends itself more readily to a very close fitting guard, thus taking up considerably less space than the overtop contact rail with guard, and this close fitting guard can be purchased on the market, made up of impregnated insulating material in sectional lengths, which fit the rail exactly and require no supporting straps or brackets. The labor of installing or repairing such a guard is, therefore, reduced to a minimum. Such construction has been in satisfactory use for quite a number of years on the New York Central electrification in New York, also on the Philadelphia Rapid Transit system.

Blocking Free Passage of Switchmen or Other Employees Through the Yard

The type of third rail construction described above makes it very feasible to step over the rail without hazard of shock and without strenuous effort. Also, in crossing the rail, there is no danger in actually stepping on the guard, which will easily support just as much weight as the rail itself. At any point where it is desirable to do so, a gap of approximately 40 ft. can be left in the rail without interfering in any way with operation. Thus at road crossings there will be no difficulty, and at other necessary points such gaps can be allowed.

Where two or more tracks run parallel, the conductors' rails are located toward the inside of these tracks, so as to leave the outside area free of obstructions to the switchmen and brakemen. With electric operation the locomotive has operating control equipment on each side of the engineer's cab, so that he can use either side of the locomotive as desired.

Danger from Material or Hot Metal Spilling or Falling on Rail

With the type of third rail construction described above no material falling on the conductor rail guard will do any damage, unless it is actually heavy enough to cut through ½-in. impregnated insulation. To do such damage a piece of steel falling from an ordinary flat car would have to weigh between 1000 and 1500 lb.

As regards hot metal spillage, unless the metal should build up a sufficient puddle to burn the railroad ties, no damage would be incurred to the third rail, except in a case where a stream of hot metal might pour direct from a ladle continuously down over the guard, the ladle standing in one spot. Even this would not prevent the locomotive from operating, as the guard only would be burned off, and inasmuch as the trouble would be in a particular spot, repairs would necessitate only renewing the guard at this point.

We should not propose running the conductor rail up alongside of any of the blast furnace cast houses, where hot metal and slag messes often occur, but would stop the rail at the end of the cast house. It would be necessary for locomotives in this class of service to use an idler car, the same as under present operation, to reach ladles standing under pouring troughs.

Methods of Crossing Frogs and Switches

On a general first glance at a steel plant railroad yard, the complicated track system, with numerous switches and cross-overs, would seem to make third rail operation not practical. However, one needs only slight study of the situation to overcome these doubts. On many furnace trestle electrified tracks we have solved these difficulties, and we can easily improve on such systems, as there are considerable difficulties to contend with there, due to spillage of all kinds of raw materials and scrap down over the tracks, which would not be the case in general yard work.

By using four collector shoes, one at each corner of an electric locomotive, and by the use of the side approach conductor rail fitting at switches, it is entirely possible to keep current on the locomotive, even at most difficult track positions. Where gaps must necessarily occur in the conductor rail, it is only a matter of getting the proper distance between collector shoes, to solve the problem.

Methods of Construction Through Buildings or Special Places Where Conductor Rail is Objectionable

It is easy to provide on each electric locomotive a cable reeling device or power driven take-up reel, with about 500 ft. of flexible cable to be used in buildings or special places where conductor rail is objectionable or prohibited. At such places a receptacle should be mounted where one of the train crew could plug in the end of this flexible cable, and the locomotive would proceed on its way to deliver or remove a train from such buildings, as in the case of a locomotive maneuvering in the open-hearth pit, or going into any one of the other plant buildings.

In the open-hearth scrap yard, one track, the running track straight through the yard, would be provided with the third rail, with a guard construction over it, made of steel. The other track up against the scrap pile would not be electrified, but cars would be handled on this track in a train as far as possible, or by poling them from the running track, so as not to make it necessary for the locomotive to run along the track, which is apt to be blocked up with scrap metal. In the cinder dump, the pay-out reel and flexible cable described above would be used on the dumping track, and as regards steam for dumping the cinder ladles, air would be supplied instead from the locomotive, which would be equipped with a reservoir sufficient to handle the cinder ladle dumping cylinders.

Tie-up from Wrecks

The extent to which any section of the yard might be tied up from a wreck causing damage to the third rail depends entirely upon the degree to which the conductor rail system is sectionalized. These sections, in a dense traffic zone, might be slightly less than 500 feet, so that by using the pay-out reel with flexible cable described above, the locomotive could easily maneuver, in case of a wreck, over the dead conductor rail section. The only time the system would be out of power would be long enough to close a circuit breaker and switch in the power house, or any of the sub-stations.

To make a comparison between steam and electric operation on any particular proposition, accurate results require a service data test on one or more of the steam locomotives to be replaced in each class of service. Such a test, lasting three days last February, and made with a 115-ton locomotive having 75 tons on drivers, gives data on a steel mill yard locomotive in typical service of handling incoming and outgoing freight. This work is of a variable nature, as cars are spotted and collected all over the yard.

The heaviest trailing load handled was 1,330.5 tons, while most of the work consisted of considerably lighter shifts. The number of shifts per day is 88, while the per cent of time idle, lost in throwing switches and making couplings, is only 40 per cent of total time. From comparison with other tests, it has been found that a locomotive working its maximum all day will vary its per cent time lost inversely with its length of shift. The average length of shift on this work was 1,682 ft.

Since the average load was only 199 tons, the trailing load could have been larger, and more work or ton miles could have been accomplished, but the time lost would have remained no less and probably some greater. The total mileage per day averaged 26.6 miles, which gives the average speed per shift at 5.1 mph. The trailing ton miles, which represent the effective work accomplished by the locomotive, were 3,530.4, while the locomotive ton miles expended to accomplish the effect were 3,064. The locomotive ton miles represent 46.5 per cent of the gross or total ton miles.

As the locomotive ton miles are ineffective ton miles, the shifting may be said to be only 53.5 per cent efficient. The tender ton miles averaged 1,010.3, and are the ton miles necessary only to supply fuel to locomotive. Trailing ton miles should be used as a basis for any calculations, since this value is the effective work, hence the amount of coal used to accomplish a trailing ton mile was 1.122 lb.

To give some idea as to what results might be secured after electrification, the figures below represent a case under study for some time past. They give actual steam operation costs averaged over a period of several years, against estimated costs with electric operation:

	Steam	Electric	
		Battery Locomotives	Straight Electric Locomotives with Third Rail
Number of locomotives...	27	27	23
Investment charges, including shop and service facilities, converting apparatus, transmission and contact systems	$850,000	$1,220,000	$1,376,000
Fixed charges per annum	99,300	105,300	164,800
Locomotive depreciation..	20,400	163,400	23,700
Fuel or power.....	116,100	28,000	18,900
Repairs	140,700	36,000	28,800
Operating labor	147,500	89,500	89,500
Station service, including miscellaneous operating material	43,000	16,000	9,400
Totals	$567,000	$438,200	$335,100
Annual saving, compared with steam		$128,800	$231,900
Return on investment, in addition to normal interest included in fixed charges		10.5%	16.9%

This proposition covers a steel plant railroad yard having a total of 57 miles of single track. There are 27 steam locomotives ranging in size from 75 tons down to 25 tons, and it is assumed that 27 battery locomotives with extra battery units, or 23 straight electric locomotives, using third rail, would be required to do the same work. For standardization purposes and flexibility of operation it is assumed that electric locomotives would either be 40-ton or 80-ton units, each of the latter being made up of two of the 40-ton machines. This would mean a total of 37 of the 40-ton battery locomotives or 33 of the 40-ton straight locomotives to be considered. The figures given under electrification for investment charges really represent the net cost after an allowance has been made for the salvage value of the steam locomotives displaced.

These figures really show only part of the saving that can be made by electrification. After the yard is electrified (with third rail system) the next step is to equip the locomotive cranes for motor operation, and these machines could work in any part of the yard through the full 24 hr. of the day, if desired. The greatest item of saving in this case shows up in the additional amount of work which can be secured from these units, for with steam operation, present experience has shown that a general average of 50 per cent of the time is lost, due to the cranes having to drop their work and go for fuel or water. In some cases it is true that these items can be secured without any great movement, and in other cases many hours are lost for the same purpose, but in either event it is

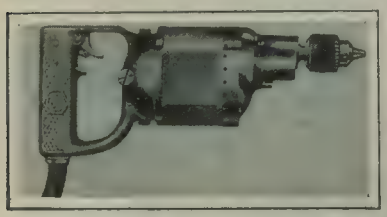
true that the cranes cannot continue with their work while taking on these requirements. It is rather hard to figure just what saving can be effected, without making an extensive investigation over quite a period of time, but for the case cited it is estimated that $70,000 annually would be conservative for an average of ten cranes in operation. This would bring the annual saving in favor of electrification up to over $300,000, cutting the cost over the present method of operation by almost one-half.

It would appear, therefore, that the general subject of electrification of the steel plant railroad is one which merits investigation and study, and the writer predicts that the electric motor will displace the steam engine on mill transportation systems just as it has in rolling mills.

Light-Weight Portable Electric Drill

A lightweight, ¼ in., portable electric drill of the type shown in the accompanying illustration and designed for drilling in metal or wood has been added to the line of the Black & Decker Mfg. Co., Baltimore.

The drill has an aluminum-alloy housing and weighs but 5 lb. It has double reduction gearing giving a no-load speed of 1600 r.p.m. Gears are stub toothed, cut from chrome nickel steel, heat treated and run in grease. Bearings are removable and renewable. The drill is equipped with a pistol grip and trigger switch, with the switch located in the handle to enable close corner work. The brushes can be renewed from the outside of the case and by removing four screws the motor commutator, switch mechanism, field leads and cord terminals may be exposed. The commutator end bearing of the motor armature is carried in a spider, which is integral with the motor case, keeping the armature in alinement and facilitating inspection and cleaning of the commutator while the drill is running, as the removal of the cover plate does not interfere with the operation of the tool.



The Spindle Is Arranged to Enable Drilling to Within About an Inch of Any Obstruction

A light weight rubber covered cable is supplied and a clamp provided in the handle so that strains on the cable have no tendency to pull the terminals loose from the switch. A 3-jawed chuck, flexible cord and attachment plug are supplied with the tool.

Will Dispose of Hog Island Scrap

Washington, Dec. 27.—With the 110,000 tons at Hog Island the only considerable lot of surplus steel it has on hand, the Emergency Fleet Corporation has begun plans to dispose of this tonnage. It has announced that it will receive bids until Jan. 5, on a private competitive basis, for all fabricated and partly assembled material included in what is known as group 8 at the Hog Island yard. This involves 6,000 tons, of which 95 per cent is built-up members, the remaining 5 per cent being fabricated but not assembled material. The other portions of the 110,000 tons at Hog Island will be sold in groups from time to time.

The steel is to be sold "as is" and no claim for condition or quality will be allowed after the opening of bids. Bids are to be addressed to the United States Shipping Board Emergency Fleet Corporation, Nineteenth and B streets, N. W., Washington.

The National Association of Cost Accountants has inaugurated a drive for 400 new members by March 1, 1922. The organization has local chapters in the principal cities of the United States. The chapters meet monthly to hear papers on cost and accounting problems. S. C. McLeod, 130 West Forty-second Street, New York, is the national secretary and business agent.

Metals for Aeronautics

In the seventh annual report of the National Advisory Committee for Aeronautics, reference is made to the report of the sub-committee on materials for aircraft. Many subjects have been studied, including streamline wire, screw threads, steel strip and light alloys, etc. Some of the difficulties mentioned relate to the effect of vibration, the difficulty or practical impossibility of obtaining proper heat treatment of thin steel sheets or strip on a commercial scale, and certain difficulties in connection with welding.

Progress made during the past year in the development of all metal aircraft has not been altogether satisfactory. The trouble seems to be that, as yet, we have not developed suitable and economical methods of producing and fabricating aluminum alloys. The Bureau of Standards expects to conduct a series of investigations on the rolling and shaping of duralumin for aircraft construction, and has been equipped for this purpose. Heat treatment of the material will also be carefully studied, in connection with the results of cold working. Fatigue tests are to be continued, and vibration tests to be made on various types of airplane, to obtain some idea of the character of vibration to be expected.

A most serious drawback of the present type of airplane is the cost of manufacture and the short life. This cost is excessive, even in quantity production. If construction materials consisted entirely of metal, the parts would lend themselves better to quantity production, longer life would be assured and storage conditions improved.

The committee's estimates for carrying out its program total $265,000. Additions for publications and the collection, classification and dissemination of scientific and technical reports and data, together with administration of the Washington office, will add $76,000, making a total for the fiscal year 1923 of $341,000. This compares with the appropriations for 1921 and 1922 of $200,000 each year.

Long Range Planning of Public Works

Washington, Dec. 27.—Announcement has been made by Senator Kenyon, chairman of the committee on Education and Labor, that he will attempt to get action soon after Congress reconvenes in January on his bill embodying a portion of the recommendations made by the national unemployment conference. It deals chiefly with long-range planning of public works to overcome cyclical periods of business and industrial depression.

The bill was reported to the Senate last Thursday by unanimous action of the committee following a brief hearing on the measure. Members of the committee are of the opinion that it provides a partial remedy toward offsetting the slumps in employment and giving more stability to the situation.

All witnesses who appeared before the committee gave strong support to the measure. Among them was L. W. Wallace, secretary of the Federated Engineering Societies. Brig. Gen. R. C. Marshall, Jr., former head of the construction division of the Army, now general manager of the Associated General Contractors, pledged the support of that organization.

Portland Cement Production High

Figures of the United States Geological Survey show that the production of cement for the first eleven months of 1921 amounted to 91,734,000 bbl., and shipments to 91,354,000 bbl. This latter figure is about 1 per cent under the record shipments for the first eleven months of 1920, and about 9 per cent greater than the average for the first eleven months of years 1917 to 1921. Production of cement during November, amounting to 8,921,000 bbl., is a falling off from the record figure of October, 10,506,000 bbl., but is about 17 per cent higher than the average November of years 1917 to 1921 inclusive. Production for eleven months was only one-half per cent below the high record of 1920, and is 11 per cent greater than the average.

BRAZILIAN CONDITIONS

W. Vernon Phillips Comments on Situation in That Country as Affecting Our Trade

W. Vernon Phillips of F. R. Phillips & Sons Co., Pennsylvania Building, Philadelphia, who has just returned from a trip to Brazil, comments as follows on conditions there as affecting the demand for American products:

"During a three weeks' stay in Brazil (that is Rio Janeiro and Sao Paulo) I gathered no outstanding impression. I came in reasonably close contact with Brazilians of the better class, English, American and Italian merchants and manufacturers.

"I am most impressed by the evident independence of the Brazilians in so far as foreigners are concerned. They feel sufficient unto themselves as, in fact, they will be in a very short time. Unlike Europeans (except in the case of importers and exporters) they find no need to learn other languages. In this they are like Americans. They have comparatively few visitors and the bulk of the population resides very far from the borders. Curiously, while her neighbors all speak Spanish, the Brazilian with his rather unpleasant Portuguese tongue thoroughly dislikes Spanish and while he can probably read enough of it to understand, he absolutely refuses to read catalogs, letters, etc., sent him in Spanish; in fact, feels quite indignant. Americans endeavoring to trade in Brazil should bear this in mind.

No Color Line

"The population is principally negro, but no color line is drawn and it is difficult to tell what proportion is pure white. This blending of color, however, has not been as serious in its consequences as we regard the possibility in the United States as in a large measure the colored element, given equal opportunity, has arisen to the occasion and many black men occupy most important positions with great credit. However, the rank and file throughout the country are much like our Southern negroes, working only as long as they need money, which is not often. The climate requires but little change in clothing and food is often to be had for the effort of picking it. So that probably the greatest need is emigration of Europeans. Germans are particularly welcomed for their thrift and ambition.

"The next important need is increased railroad facilities tapping the rich lumber, ore, rice and cotton sections, and it is only the lack of capital and the present international depression which prevent this expansion, as the government is ambitious and has very far reaching plans which include the development of water power which they have in great abundance to electrify their railroads and operate their manufactories, which are extensive, in Sao Paulo and Rio Grande du Sul. This will free them from the yoke of coal which must all be imported, though they do mine a couple of hundred thousand tons of very low grade coal per year.

Shipping Facilities

"The shipping facilities in Rio de Janeiro and Santos are splendid and can take care of a heavy trade movement, Santos for the enormous copper export and Rio for general cargo, but they are also developing an excellent port in the North, namely Ceara which will take care of cotton, cottonseed oil, rice and lumber when finished. Also the banking facilities are adequate; in fact, more than can possibly be properly occupied excepting when business is at its apex. Foreign banks predominate and every country is amply represented. The banks, however, are strong as during the collapse last year only one bank (French) had to close its doors, though many scores of merchants were forced to the wall through the terrific fall in exchange and loss in values.

"The American naturally looks upon the milreis as depreciated currency, but the Brazilians continue to regard it as a unit of value and blame the high cost of the dollar and with certain good reasons. The milreis still has approximately the same purchasing power that it had before the war, wages have not advanced much and a milreis still brings a pound of food and three of them normally purchased one American dollar, but to-day it requires eight of them, whereas it will buy 1.85 in francs as against 1.75 normally and three lire as against 1.75 normally, though it takes 33 milreis to buy a pound of sterling as against 15 milreis normally. So the pound costs them twice as much and the dollar three times as much, whereas they can buy a larger number of French and Belgian francs and Italian lires than formerly. Thus trade is naturally drawn by the countries whose exchange is most greatly depreciated. Moreover, Brazilians seem to prefer dealing with the Continent. The United States has, of course, suffered severely in reputation from the actions of unscrupulous exporters and indifferent manufacturers during the war, and we not only have to live this down but overcome a natural prejudice also. Present conditions give no opportunity to do this in the bulk of their purchases, as the Belgians, Germans and French can undersell us so greatly that the Brazilian thinks it hardly worth while asking us for prices. However, this will be overcome in time by readjustment in exchange and the Americans should not let up for a moment in keeping before the buying public, as it offers one of the greatest natural opportunities in the world with its great potential possibilities.

Governmental Protection

"One thing will be all important in the development of this trade and that is good governmental protection, particularly for those making long time loans, bond issues, etc., and this protection may have to be in the form of a demonstration of strength—a strong show of naval force will do much more than all the argument in the world with these people who are used to being kept in order by a show of force.

"The political situation is very unsettled and street disturbances are of frequent occurrence. The president is popular and is generally respected, but his proposed successor is very unpopular. They have no fixed parties in Brazil, so the administration always has a very great advantage with its great host of hangers on and petty officials, including the principal railroads, steamship lines, etc., so that the opposition is unorganized, is without authorized leaders and can only voice a protest through street demonstrations and the uncontrolled newspapers. The administration always has the army and police and very effectively controls the opposition. Thus the only effective way of ousting the party in power is to successfully engineer a revolution, which is not as bad as it sounds, as it simply changes those in control, but is pretty sure to result in some loss of life. The present situation will probably be saved by the selection of a third and acceptable candidate but without a revolution the change in the presidency means no change in the control, which is, as usual, held by a few strong men."

Grain Side of Belts More Efficient

Under reasonable shop tension, the flesh side of a leather transmission belt, when placed in contact with the pulley, will average only 50 to 60 per cent as much horsepower as the grain side. At higher tensions the flesh side will do better, averaging from 50 to 100 per cent as much power as the grain, depending on the belt, the tension and the conditions of service. This is the conclusion of the Leather Belting Exchange, Philadelphia, which conducted experiments in the research laboratory at Cornell University.

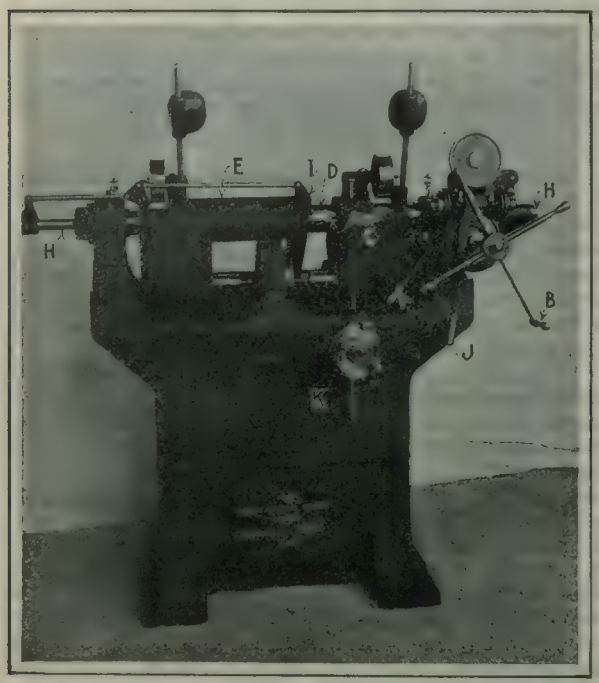
For more than two months continuous tests were performed. Use was made of five 4-in. single belts, 30 ft. long, of different manufacture. They weighed from 16 to 18 oz. Conditions were standardized. All belts were run long enough before the experiments to insure that they had become thoroughly "run-in."

Illustrating the less degree of efficiency of a new belt, one belt under test transmitted 12 hp. when first put on the pulley at a slip of 1.2 per cent; after five hours running it reached 19 hp. with the same percentage of slip and same tension; at the end of 13 hours it transmitted 24 hp.; after 20 hours, 31 hp., with a slip of 1.6 per cent. According to horsepower tables its scheduled transmission should have been 26 hp.

Double-Head Grinder for Finishing Wrist-Pin Holes in Engine Pistons

A double-head internal grinder designed for finishing wrist-pin holes in engine pistons, but adaptable also to the grinding of holes in opposite ends of long pieces not conveniently handled with a single long wheel spindle, has been brought out by the Bryant Chucking Grinder Co., Springfield, Vt.

The machine, designated the No. 2, resembles in its main features the company's other grinders. Two separated grinding wheel heads, carried on the same wheel slide, operate to grind simultaneously the two holes in opposite sides of pistons. The grinding wheels are dressed by a diamond, absolute duplication in size of both the ground holes being guaranteed. Both wheels grind at the same time. A single motion of the pilot wheel serves to separate the grinding wheels clear of the work, which permits of swinging the wheels back



Two Separated Grinding Wheel Heads Operate to Grind Simultaneously the Two Wrist-Pin Holes in Opposite Sides of Pistons

out of grinding position and gives ample room for plugging and chucking the work.

Grinding the separated holes in pistons in this manner, at a single chucking of the work, assures absolute alinement of the ground surfaces, it is claimed, and also maintains a maximum length of bearing surface in each hole. Each hole is straight, there being no bell mouth at either end. Both sides of the piston are available for plugging or sizing the holes. The net result of this method of grinding two holes at the same time is to increase production; it is said to give higher accuracy and a piston capable of longer service.

In the illustration of the front view, the wheels are shown withdrawn from the hole preparatory to swinging the wheel head to the rear for gaging or changing the work. In the work fixture, shown at about the middle of the bed, the piston is located in V's and held by a clamp which operates against the inner surface of the piston over its contact points with the V's. The clamp is operated by a half turn of a wing screw. In the body of the fixture there is a ball race which serves as a control for the rotating part of the chuck. The rotating ring is held in place by a ball-thrust bearing which in turn is held in place by a ring. The work is driven from the countershaft by a round belt.

The open side of the chuck with the piston removed, showing the clamp in position for gripping the work is shown in a separate illustration. To locate the piston the skirt is slipped under the clamp. The hand-centering, plug shown, which fits the hole in the closed space of the fixture, is put in place and passed through the wrist-pin holes, the plug being of a size to fit the holes before they are ground.

With the piston in place ready for grinding, the wheel heads are swung down in position. To bring the wheels into position for simultaneous operation, it is merely necessary to turn hand wheel "B" shown in the front view. Slide "C" is attached rigidly to slide bar "D". Slide "E" moves longitudinally on the slide bar and is prevented from rotating on the latter by a bar at the rear. This bar allows longitudinal movement between the two wheel head carriers but keeps the wheels in line. This relative movement of the slides is obtained by means of racks which operate through bar "H".

As the wheels are advanced toward each other the crank arm "I" strikes a stop and clamps the slide to the bar in proper position—all this being obtained by one movement of the handwheel. Dropping the lever "J" throws out one rack, the two wheel heads then being operated as a single unit.



Open Side of Chuck with Piston Removed Showing the Clamp in Position for Gripping the Work. To locate the piston the skirt is slipped under the clamp



Open Side of Chuck with Piston in Place for Grinding. Both sides of the piston are available for plugging or sizing of holes

The wheel traverse when grinding is provided for by a "load and fire" mechanism with reversing stops adjustable to give the desired length of stroke, the same as used on the standard Bryant grinders.

The cross feed is obtained in the manner usual with Bryant internal grinders, by means of handwheel "K" at the front of the machine. This operates against the control plate clamped to an arm on the wheel slide at the back of the machine. The cross feed is utilized also for cross feeding the wheel when trueing.

The chuck range includes pistons up to 4½ in. in diameter by 4½ in. in length. The work spindle runs at 250 r.p.m. and the drive pulley on the countershaft at 750 r.p.m. The motor recommended is 3 hp. 1720 r.p.m. The weight, with countershaft, is 2300 lb. net and the floor space occupied, 3 x 6 ft.

The Otis Steel Co., Cleveland, is installing at its Riverside plant, complete galvanizing equipment, including sheet galvanizing machines, two galvanizing pots, cooling wheel, pickler, etc., furnished by the Erie Foundry Co.

The American Supply and Machinery Manufacturers' Association has accepted an invitation to meet with the Southern Supply and Machinery Dealers' Association at Birmingham, Ala., April 24 to 26, 1922.

Declaration of Government Policy Expected

Attorney General Daugherty and Secretary Hoover Giving Close Study to Supreme Court Decision in Hardwood Association Case

WASHINGTON, Dec. 27.—Determination of a definite policy by the Government toward trade associations is expected to be reached in the near future as the result of the Supreme Court decision in the case of the American Hardwood Manufacturers' Association. This is based on the statement by Attorney General Daugherty that the formulation of such a policy has been awaiting the decision. He is engaged in studying it carefully and has said that it affords a "clear path" for the conduct of such associations, but has not as yet given it sufficient analysis to announce a detailed policy. In co-operation with Secretary of Commerce Hoover, the Attorney General has for some time been considering the subject, but it was concluded to await the decision before mapping out a program which would provide a safe guide as to the conduct of such association.

Secretary Hoover's Attitude

Secretary Hoover, while attempting no interpretation of the decision, inasmuch as this does not come within his province, has expressed the belief that the Supreme Court's opinion will make it possible to work out a concrete program at an early date. The Secretary does not consider the decision to be so sweeping as do some attorneys who closely followed the case and thinks it will not interfere with co-operation between his department and trade associations. He stated that a survey conducted by the department showed that of the 1700 or 1800 trade associations of the country less than 10 per cent were shown to be engaged in "trade recruiting" in violation of the law.

His view is not shared by those attorneys who consider that the decision has such a range that it destroys the very principles of trade associations as to the handling of trade information, other than that relating to prices. There is no doubt on the latter point, in the opinion of legal authorities. Exchange of price information is held to be clearly in violation of the Sherman anti-trust law. But some of them go much further and maintain that the opinion handed down through Justice Clarke is much more restrictive.

Declared a Misnomer

They point to the following portion of the decision:

> To call the activities of the defendants, as they are proved in this record, an "Open Competition Plan" of action is plainly a misleading misnomer. Genuine competitors do not make daily, weekly and monthly reports of the minutest details of their business to their rivals, as the defendants did; they do not contract, as was done here, to submit their books to the discretionary audit and their stocks to the discretionary inspection of their rivals for the purpose of successfully competing with them; and they do not submit the details of their business to the analysis of an expert, jointly employed, and obtain from him a "harmonized" estimate of the market as it is and as, in his specially and confidentially informed judgment, it promises to be. This is not the conduct of competitors, but is so clearly that of men united in an agreement, express or implied, to act together and pursue a common purpose under a common guide that, if it did not stand confessed a combination to restrict production and increase prices in interstate commerce and as, therefore, a direct restraint upon that commerce, as we have seen that it is, that conclusion must inevitably have been inferred from the facts which have been proved.

It is the opinion of some attorneys that the foregoing reaches far beyond the question of price, although leading up to it, and that it implies violation of the law in handling data such as those bearing upon stocks, production, etc., where the figures are used to restrain trade and fix prices. Concession is made that a test will prove that in individual cases there will be shown a marked difference in methods of conducting trade associations and that many will not come under the ban of the law. Meanwhile, however, there is widespread opinion that until the Government has mapped out a definite policy, many associations will feel so uncertain as to their legal standing in the light of the decision that they may decline to co-operate with the Department of Commerce or engage in any further activities. Despite the confidence they may have, based on their own opinions, as to their legality, it is contended that they will want assurance from the Government before proceeding further.

Favors Trade Associations

The Attorney General himself, in commenting on the decision, said he was unqualifiedly in favor of trade organizations which confined their operations to improving their services to the public, but he stated they would not be permitted to fix prices or apportion territory among themselves, resulting as it does, he asserted, in restricting competition. This plainly is a broad view and it is confidently believed, if left to itself, would mean that the decision would affect a decidedly small percentage of trade associations, as Mr. Hoover claims is the situation. But attorneys are insistent that the decision itself is much greater in its scope than the dealing with prices, apportioning of territory, etc., and think legislation will be necessary to insure the associations of their legality, a view that indicates a policy announced by the Department of Justice might even be insufficient.

The Attorney General proceeded to state that trade associations generally are showing a commendable willingness to confine their activities to the lines broadly suggested by the Department of Justice as in conformity with the law. Where the department's advice has been disregarded, however, it was pointed out, it has been necessary to proceed under the Sherman law. As a matter of fact, there are those who think the decision lacks in comprehensiveness and that consequently it will be necessary to try a number of other cases on their merits, although it is hoped that this will not be necessary and that it may be avoided either by the announcement of a definite governmental policy or through legislation.

It is no surprise, but it is interesting to note the remarks in the majority opinion where it makes a distinction between the exchange of information among sellers only and between sellers and buyers. The decision says:

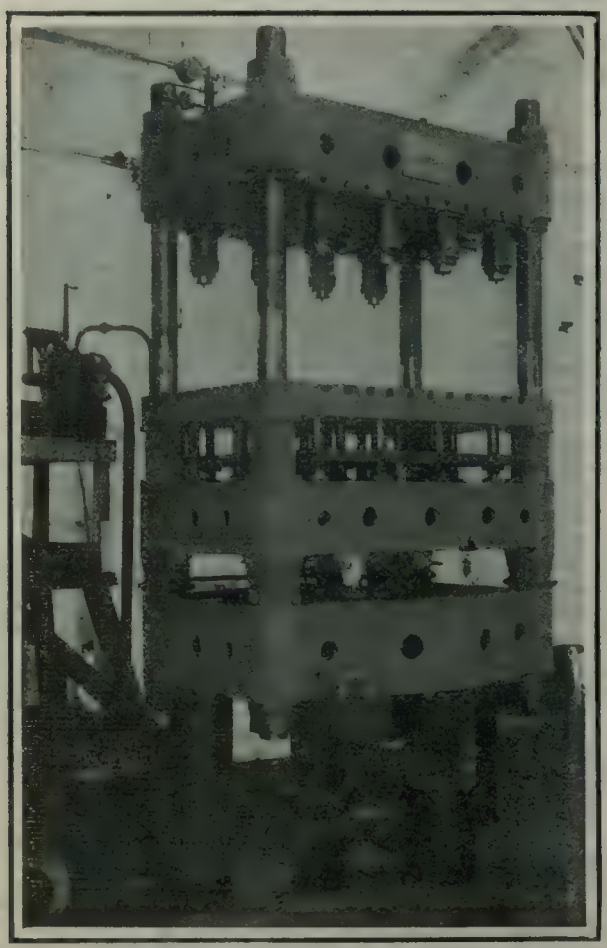
> In the presence of this record it is futile to argue that the purpose of the "Plan" was simply to furnish those engaged in this industry, with widely scattered units, the equivalent of such information as is contained in the newspaper and Government publications with respect to the market for commodities sold on boards of trade or stock exchanges. One distinguishing and sufficient difference is that the published reports go to both the seller and buyer, but these reports go to the seller only; and another is that there is no skilled interpreter of the published reports, such as we have in this case, to insistently recommend harmony of action to prove profitable in proportion as it is unitedly pursued.

Obviously, as was to be expected, the decision does not affect publication of trade information in the lay and class press, nor does it have any bearing upon boards of trade and stock exchanges. Nevertheless the point has its value. This is particularly so because the Department of Justice in its proceedings in the so-called Southern Pine case, similar in many respects to the Hardwood case, made certain lumber publications defendants. The finding of the Supreme Court would indicate plainly that the Government's case as it applies to these publications will fall flat.

Hydraulic Automobile Body Press of 450 Tons Capacity

The Southwark Foundry & Machine Co., Philadelphia, has recently developed an all-steel automobile body press having a capacity of 450 tons. It is shown in the accompanying illustration.

With the intention of providing exceptionally sturdy construction the main ram is located in the lower base, to which are secured the four press columns. One clamping platen and one stripper platen are provided. The stripper platen is heavily made and carries four hydraulic cylinders, which act upon a forged steel plate which in turn carries 60 stripper pins 1½ in. in diameter. These stripper pins project through the clamping platen. The clamping platen is a solid steel casting and is provided with Tee slots. The top platen



The Stripper Platen Carries Four Hydraulic Cylinders Which Act Upon a Forged Steel Plate.

carries eight hydraulic jacks which are used for clamping and which have 5-in. diameter rams with 5-in. stroke. The top platen itself is adjustable to meet conditions of the various size dies which may be employed under the press.

The control of the press is by a single lever operating valve which first admits low pressure to the four jack cylinders and at the same time admits low pressure to the main ram. As soon as the dies come together high pressure is admitted through the steam operating valve, thus completing the work on whatever shape is to be formed in the dies. The clamping cylinders are controlled automatically from a low-pressure filling tank and are capable of standing a hydraulic press of 5000 lb. per sq. in.

The press has a die space of 7 ft. x 5 ft. The minimum vertical opening between the platens is 18 in., and the maximum, 4 ft.

Executive offices of the Engineers' Society of Western Pennsylvania have been removed from the Union Arcade, Pittsburgh, to the William Penn Hotel, also in Pittsburgh.

Michigan Foundrymen's Association

KALAMAZOO, MICH., Dec. 27.—Foundries in Michigan are operating about 25 per cent capacity, and have enough pig iron on hand to run for close to three months without any additional purchases. That was disclosed at a meeting of the Michigan Foundrymen's Association, held at the Park-American Hotel, recently. The report on business conditions was prepared by A. W. Blodgett, secretary, and was based on 21 answers to questionnaires mailed to state plants. These answers showed that while the normal monthly melt of these 21 foundries is 9385 tons of pig, only 2337 tons were used in October and that the concerns have 6893 tons of pig in yard. October production compared with September showed an increase of 5 per cent.

The session in Kalamazoo was really the second of the organization's gatherings. Established only a few months ago, this association boasts 31 concerns enrolled to date. Six memberships were added the past month. Secretary Blodgett reports there are over 200 foundries in Michigan eligible for membership in the State association and that efforts are now being made to round them all up.

A large portion of Tuesday's meeting was devoted to the consideration of problems and troubles met by foundrymen. The question box promises to assume an important place on all programs. A discussion of trade conditions and the welfare of the association also occupied much time. Immediately following luncheon, John C. Hoekje, registrar of Western State Normal College, addressed the gathering.

The next session will be held in Battle Creek, Tuesday, Feb. 14. A. W. Blodgett, J. C. Jensen and H. J. Hartman, all of Grand Rapids, were empowered to arrange the program. Battle Creek has no members and it is believed the meeting there will induce many of that city to enroll.

Officers of the Michigan Foundrymen's Association are: President, J. Edgar Lee, Grand Haven; vice-president, W. O. Adams, Ann Arbor; secretary, A. W. Blodgett, Grand Rapids; treasurer, E. N. Turner, Manistee; directors, W. W. Sherman, Muskegon; A. K. Hanchett, Big Rapids; Henry J. Hartman, Grand Rapids; Charles Clarage, Kalamazoo; C. L. Pearce, Marquette.

Baltimore Tank Maker Expands

The Novelty Steam Boiler Works Co., Baltimore, is building another factory building, two stories, brick and steel, 110 x 155 ft., in the 900 block, South Howard Street. The concern specializes in the manufacture of steel tanks for the storage of air, water and oil. The company has 50 men working day and night and enough contracts to maintain full operation for a year or more. The company started in 1905. In August, 1920, it was reorganized, five former employees of a well-known manufacturing plant in Decatur, Ill., having secured the controlling interest. Each came from a different department and each is now head of a department in the Baltimore company to-day. Oscar S. Jennings is president; C. C. Lanman is vice-president and general manager; Raymond J. Kitchen is secretary.

Freyn, Brassert & Co., Chicago, have recently shipped boiler and hot blast stove burner equipment to the Rochester & Pittsburgh Coal & Iron Co., Punxsutawney, Pa., and the Chateaugay Ore & Iron Co., Standish, N. Y. The Shenango Furnace Co. has recently installed this company's Mathesius hot blast gate valve equipment. Freyn, Brassert & Co. have also been retained by the Mitchell-Diggins Iron Co., Cadillac, Mich., in reference to power plant matters.

Clinton E. Woods, receiver for the Bethlehem Motors Corporation, Allentown, Pa., manufacturer of automobile trucks, is developing plans for a sale of the property. It is said that an offer of $400,000 has been made for the plant and equipment, with a creditors' committee asking not less than $750,000 for the property.

Fuel Saving in Modern Gas Producers*

Avoiding Present Wastes of Fuel in the Industries Using Gas Producers, Producer-Gas Furnaces and Industrial Furnaces

BY W. B. CHAPMAN†

THERE are about 10,000 gas producers in the United States, divided approximately as follows: 6500 in the steel industries; 1500 in the glass industries; 500 in the chemical industries; and 1500 in miscellaneous industries. Under "miscellaneous" are included the ceramic industries, lime burning and about 200 gas producers used for power.

Engineers have given much attention to the engine room, some to the boiler room, a little to industrial furnaces, and least of all to the making of raw producer gas. Hence the backward condition of the gas house.

No definite data have been compiled by the Government on the amount of coal used in gas producers; but, with the assistance of such figures as are available, it is estimated roughly that in the steel industries about 15,000,000 tons of bituminous coal are transformed annually into raw producer gas for use, and in the glass industries about 2,000,000 tons.

In the steel industries about the same amount of coal is used for making gas to heat furnaces as for making steam. In glass making, three-fourths of all the fuel is used in gas producers. But wherever producer gas is used it is apt to be the most backward part of the business. A given amount of time and money, if spent on improving conditions in the gas house, will usually bring larger returns than in any other department. In most industries requiring large heating operations, more trouble arises in that department than in any other part of the business.

Savings with Mechanical Producers

With the usual more or less unskilled and indifferent handling, any of the four American mechanical producers can make a gas averaging 150 B.t.u. (low values), instead of the customary 125 B.t.u. obtained in hand-poked producers if operated with zeal. With skilled handling the best mechanical producers will average from 160 to 175 B.t.u., provided the coal is fair and the rate of gasification does not exceed 25 or 30 lb. per sq. ft. per hr., which is about twice the capacity of hand-operated producers.

A Duff producer, operating originally at 10 tons a day and making gas having 125 B.t.u., was fitted with a Chapman agitator and automatic feed, and at 36 tons a day gave an average of 163 B.t.u.

As there are more Duff producers in use in the United States than any other type of hand-poked producer, the test made by the engineers at one of the largest steel works will be of special interest. This producer was rebuilt to a diameter of 10 ft. 6 in. No hand-poking was done during the test, and no clinkers were made. A standard gas temperature of 62 deg. Fahr. was used. The West Virginia coal used had 37 per cent volatile matter. Data are given in Table I.

Similarly, a Von Kerpley producer, the most popular mechanical type in Europe, gasifying 20 lb. per sq. ft. per hr., making about 135 B.t.u gas, was equipped with Chapman agitator and automatic feed and changed to 34 lb. gasified per sq. ft. per hr. and 178 B.t.u. This was maintained without difficulty, and without any hand poking. Data are given in Table II.

Like other European producers, the Von Kerpley producer has continuous ash removal and continuous agitation of the ash bed and lower part of the fire bed, and there is no agitation of the upper part of the fire bed and no automatic feed. Before installing the Chapman automatic feed and floating agitator, the capacity was 12 cwt. per hr., and in spite of an enormous amount of hand poking the producer was usually full of clinkers. After the new equipment was added, the capacity was increased considerably over 50 per cent, no hand poking was required and no clinkers were made. The works engineer estimated that the saving in labor alone was sufficient to pay for the equipment in nine months. The B.t.u. content of the gas was increased about 30 per cent.

Properly operated, the best modern producers will usually save about 25 per cent of the coal and an equal amount of labor. These savings should amount to the total cost of the installation in from one to four years.

The temperature in a gas producer is highest at the bottom of the fire, and the thicker the fire, the cooler the top. The temperature at the bottom should be as high as the fuel will stand, without running too much risk of melting the ash. The melting point of the ash in all the good Pittsburgh gas coals is well above 2500 deg. Fahr.; and of the ash in Illinois coals, about 300 deg. lower. The temperature at the top of the firebed should be as low as will permit the gas to be conducted to the place of use without forming objectionable tar deposits, and also as low as possible without making the top too sticky and difficult to blow through.

Usually a "top temperature" of 1000 deg. Fahr. is about right, but, if the gas is to pass through a water-cooled reversing valve located some distance away, 1200 deg. would be better. A "hot top" destroys some of the richest gases and thus wastes fuel. More fuel is wasted in a producer, from running with a hot top, i.e., over 1300 deg., than from any other cause.

The Furnace Part of the Problem

But gasifying the fuel is only half the problem of conserving it. The other half lies in its utilization in the furnace. The two halves of the problem are inseparable. Space is too limited to take up more than one kind of furnace—the kind that holds the most promise for fuel conservation, and the kind that, until the last decade, has largely been a failure—the recuperative furnace.

A recuperative furnace is never "reversed" and, except in rare instances, only the air is preheated. It costs much less to build and to repair, is easier to operate and gives practically the same efficiency, as the expensive and cumbersome regenerative furnace.

Its field of application is very broad, and it can be used effectively in both large and small operations, for furnace temperatures as high as 2700 and as low as 1400 deg. Fahr. About the only uses to which it is not suited are for operations which periodically require a large overload, such as the open-hearth process and large forgings over 32 in. in diameter, also for large glass melting tanks. For almost all other purposes the recuperative furnace can be used with great economy.

In many operations, where the air is not now preheated, it will be found that from 20 to 40 per cent of the fuel can be saved by using a good recuperator—one that preheats the air to within 500 deg. Fahr. of the temperature of the furnace.

Table I—Test of Duff-Bradley Producer with New Blowers and Chapman Automatic Feed Floating Agitator

Analysis of Seven-Hour Continuous Sample of Gas
Rate of gasification per 24 hr. = 87.36 tons.
Rate of gasification per hr. per sq. ft. = 36 lb.
Percentage Analysis of Gas Samples

CO_2	Cn H_{2n}	O_2	CO	CH_4	H_2	N_2
4	1.4	0.2	26.8	3.0	10.4	54.2

Calorific power of gas per min..... 552,750 B.t.u.
Sensible heat of gas per min..... 94,100 B.t.u.
Total useful heat of gas per min..... 646,850 B.t.u.

*Abstract of paper presented before the American Society of Mechanical Engineers, Dec. 6.
†President Chapman Engineering Co., New York.

Average coal fed per hr., by weight..... 3,114 lb.
Average coal fed per hr., calculated from above analysis ..... 3,081 lb.

Difference ..... 33 lb.

External Heat Balance

Dr.	B.t.u.	Per Cent	Cr.	B.t.u.	Per Cent
B.t.u. per lb. coal	13,039.0	97.5	Calculated power of gas	10,660.0	79.7
B.t.u. steam and air.....	336.5	2.5	Sensible heat of gas.....	1,803.0	13.5
			Loss unburnt coal	146.5	1.1
			Other loss (radiation, etc.)	716.0	5.7
	13,375.5	100		13,375.5	100

Total losses, 6.8 per cent.
Efficiency of producer, 93.2 per cent.
Steam pressure, 52 lb. per sq. in.

Table II—Test of Von Kerpley Producer with Chapman Agitator and Automatic Feed

Test on 9 ft. 7 in. inside diameter Von Kerpley gas producer, fitted with a Chapman agitator with automatic feed.
Duration of test, 49½ hr.
Average percentage analysis of gas samples taken hourly:

CO_2	C_2H_4	O_2	CO	H_2	CH_4	N_2
4.74	0.30	0.30	24.6	12.80	5.26	52.00

Net English heat values used:
CO—345, H_2—290, CH_4—975, C_2H_4—1590

Heat Balance

Dr.	B.t.u.	Per Cent	Cr.	B.t.u.	Per Cent
B.t.u. per lb. coal 13,906.0		97.2	Calculated power of gas.	11,498.9	80.34
Sensible heat of coal.....	13.2	0.09	Sensible heat power	1,925.0	13.50
Sensible heat of steam...	328.8	2.3	Loss in unburnt coal..	46.3	0.33
Sensible heat of air.....	54.0	0.41	Sensible heat of ash.....	1.8	0.01
			Sensible heat of water passed through agitator	55.46	0.38
			Other losses (radiation, etc.)	774.54	5.45
	14,302	100		14,302	100

Total losses, 6.16 per cent.
Efficiency of producer, 93.84 per cent.
Producer equipped with Chapman 5-stage blower with 7/16 in. nozzle.
Coal used: Florence beans 17.62 per cent, Florence nuts 30.65 per cent, Stafford cobbles 20.73 per cent, Florence cobbles 31.00 per cent.
Average coal fed per hour, 2408 lb.
Coal gasified per sq. ft. per hr., 34.01 lb.
Total combustibles in gas produced, 42.90 per cent.
Steam used, 0.278 lb. per lb. of coal.
Gas per lb. of coal, 64.6 cu. ft.

Mining Experiment Station at Minneapolis

Work is now under way on the construction of a mine experiment station laboratory at the University of Minnesota at Minneapolis. It will house the north central experiment station of the United Sates Bureau of Mines. The superintendent of the station says it will be without exception the best laboratory in the world for the study of iron and manganese ores. The building, which is of factory type construction, is 60 x 280 ft. in plan, partly two stories and basement in height, partly five stories in height and the whole enclosing 1,000,000 cu. ft. The building and equipment will cost approximately $300,000, not including $20,000 additional for laboratory apparatus. Ground was broken Dec. 17 and the specifications call for completion on Sept. 1, 1922.

The Goodyear Tire & Rubber Co., 123 West Sixty-fourth Street, New York, with main plant at Akron, Ohio, has negotiations under way with the Brazilian Government for continuance of concessions previously granted on State property for the erection of a rubber manufacturing plant on the site. The project was planned, initially, some time ago but has been held in abeyance owing to conditions.

The Hoover Wagon Co., York, Pa., has arranged for a change of name to the Hoover Body Works, and in the future will concentrate operations on the manufacture of automobile bodies, with considerable expansion in production. A two-story factory on Webster Avenue, Long Island City, recently has been acquired, and will be equipped for a branch plant. It will provide about 18,000 ft. of floor space.

Results of Studies of Coal-Washing

Organic sulphur constitutes a larger proportion of the total sulphur in coal than is generally recognized, according to a report of the investigation of bituminous coal-washing practice in the Middle Western states by the United States Bureau of Mines, the mining department of the University of Illinois and the Illinois Geological Survey. Sulphur occurring in organic combination with the coal substance and finely disseminated pyritic sulphur can not be removed by washing. Of 110 face samples taken in four beds, two in Kentucky, one in Illinois and one in Alabama, in 53 samples the organic sulphur made up more than 50 per cent of the total sulphur.

In co-operation with the mining companies, the coal washeries at Issaquah, Grand Ridge, Ravensdale, and Wilkeson, in Washington, and at Beaver Hill, Ore., have been studied. All experimental work, except the supplementary laboratory tests, was done in the plants.

The principal results of the tests show: (1) The raw coal as it comes to the surface contains much bone, shale and clay, most of which must be removed before the coal is marketable; (2) the present washeries are inefficient, the washed coal containing avoidable impurities, and the refuse an excessive proportion of good coal. Proper adjustment of the washers not only improved the quality of the washed coal but also greatly reduced the loss of good coal in the refuse; (3) by re-arranging present flow sheets and replacing many old machines now in use with improved coal-washing equipment, the practice at each plant could be greatly improved.

Since the completion of these studies two coal companies have remodeled their plants and another company has started work on a new plant to replace its present one. Based largely on results of experiments by the Bureau of Mines, one mine is building a table-washing plant to treat a pile of refuse amounting to more than 1,000,000 tons, estimated to contain approximately 200,000 tons of recoverable coal of coking quality.

Two papers are being prepared for publication by the Bureau of Mines, one on the subject of "Specific gravity studies of Washington coals and their associated impurities," and the other on "Study of coal-washing problems in the Northwest."

Tests of the froth-flotation process, now widely used in concentrating various ores, showed that clean coal can be separated from ash in material passing a 20-mesh sieve, or finer. A great many coals, however, contain bone, or bony coal, in which the carbonaceous matter is so intimately mixed with ash that 200-mesh grinding does not separate them. As the bony coal is not as easily floated as the clean coal, re-treating the froth concentrate of coal yields clean coal, the bone forming a "middling." By the use of this method 95 to 98 per cent of the carbonaceous matter in the coal can be recovered in the concentrate and middling, and from 30 to 70 per cent of the ash discarded as tailing.

Puddling Rate Reduced to $6

The Reading Iron Co., Reading, Pa., has reduced its rate for puddling from $6.75 to $6 per gross ton. Other tonnage rates are reduced in the same proportion and wages for workmen, aside from those paid on a tonnage basis, will be cut 10 per cent.

The Anderson Stove Co., recently organized at Anderson, Ind., will begin operations with the new year. It will make kitchen ranges for a Chicago mail order house. The directors of the company are John S. Keefe, Indianapolis; Jacob Keller, Belvidere, Ill., and Joseph McGinn, Louisville, Ky.

Harry W. Voss, head of the Evansville Association of Credit Men, Evansville, Ind., has been appointed receiver for the Hoosier Ice Machine Works, following a suit filed in the court by the Orr Iron Co.

Wesley Fleming, receiver for the Cornish Co., Washington, N. J., manufacturer of talking machines, etc., has been granted permission by the Court of Chancellory to continue the operation of the plant.

PULVERIZED COAL-BURNING

Aero Pulverizer Breaks Up Coal and Blows It Into the Furnace

At the plant of the Brier Hill Steel Co., Youngstown, Ohio, a new equipment for burning powdered fuel has been installed experimentally which has some points of interest. The installation includes an aero pulverizer furnished by the Erie City Iron Works, Erie, Pa., which has a capacity of 3000 lb. of coal per hour. This unit, which is shown in two views, is being used to provide fuel for a continuous heating furnace supplied by Alex. Laughlin & Co. for heating slabs for the 84-in. plate mill. The furnace measures 9 ft. wide and 44 ft. 6½ in. long outside, including the combustion chamber.

The pulverizer consists of a cylindrical case resting upon a bed plate and with the rotating parts driven by a 40-hp., 900 r.p.m. motor. These rotating parts consist of paddles on the entering end and fan at the delivery end, both mounted on the same longitudinal shaft. Coal is received at the end opposite from the fan in pieces of regular crusher size. The paddles break it up to such effect that it is pulverized when it reaches the fan. This permits the fan to lift it and blow it into the furnace, together with the proper amount of air for combustion.



Pulverizer Assembled for Delivering Coal, Through Self-Contained Blower, to Distributing System

Crushed coal is delivered into a hopper above the pulverizer by a conveyor belt with a magnetic head pulley, the latter removing stray particles of iron from the coal The pulverized coal is discharged into a pipe 18 in. in diameter, which carries it about 20 ft. and then branches into two 10-in. pipes, which enter the furnace 2 ft. 5¼ in. each side of the center line.

When this piping was first installed, it was not possible to obtain an equal distribution of the fuel because of curves in the pipe. This was easily remedied, however, by placing a deflector plate at the point where the pipe branches. As slack coal has been used, with a certain moisture content, the question of artificial drying has not been settled. As the installation has been run only a portion of the time, because of slack business, its future is not definitely determined, but reports indicate that it has given good service so far as it has been used.

Foreign Trade Council to Meet in Philadelphia

The ninth annual convention of the National Foreign Trade Council will be held in Philadelphia on May 10, 11 and 12, 1922. Previous meetings have been held in St. Louis, New Orleans, Pittsburgh, Cincinnati, Chicago, San Francisco, and Cleveland.

Referring to the impression in some quarters that the foreign trade of the United States has all but disappeared, Secretary O. K. Davis of the Foreign Trade Council says: "I wonder how many people in this country realize that our exports for the last six months have been 63 per cent greater in value than in 1913, and about 15 per cent greater in volume; and that in the six months ending September, 1921, we have exported commodities valued at $2,025,236,000 and have imported goods valued at $1,197,850,000.

"The truth of the matter is, that the productive capacity of the United States has been so greatly increased during the war that our former 'normal' exports are not nearly great enough to enable our factories and farms to operate profitably at full capacity. It is certain that our foreign trade, considerable as it is even at present, must be expanded if the United States is to enjoy real domestic prosperity. The National Foreign Trade Council believes that our foreign trade can and will be so expanded, even in the face of present difficulties, provided all elements of American industry, agriculture and finance will co-operate to that end."



Cover Lifted to Show Paddles and Fan Blower, by Which Coal Is Handled

Will Not Build Warehouse

Reports that the Jones & Laughlin Steel Co., Pittsburgh, would build a large warehouse at Evansville, Ind., to be used in distributing steel products unloaded from barges being sent down the Ohio river by the company, are untrue, as the company has no such project in mind. However, the Jones & Laughlin Steel Co. has suggested to the proper authorities in the different communities at which its steel products are unloaded from the barges sent from the Pittsburgh and Alliquippa mills, that these different communities should provide proper unloading facilities. In any event, these would not consist of more than unloading equipment and possibly a covered platform from which delivery could be made to customers in these communities by truck or wagon.

Buy a Ton of Iron!

It would be lovely this Christmas season if someone could start an effective movement with the slogan "Buy a Ton of Iron," says the current trade bulletin of the Matthew Addy Co. "That worked all right in cotton. And there were hundreds who bought a bale of cotton and made a good thing out of it. Now if the general public would take notice of the low prices prevailing for iron and of the hard conditions that the furnaces face and would start buying iron in a kindly benevolent but speculative way, it would help. The only thing the iron market needs is more liberal buying. It is the small volume of trade that worries the iron master."

John A. Ortel, safety engineer Carnegie Steel Corporation, Pittsburgh, last week talked on Educating the Workman, at the Y. M. C. U., Boston, under the auspices of the Massachusetts Safety Council.

Leroy S. Starrett, president L. S. Starrett Co., Athol, Mass., machinists' tools, has organized the Metropolitan Air Goods Co., capitalized for $200,000, to manufacture pneumatic and waterproof goods.

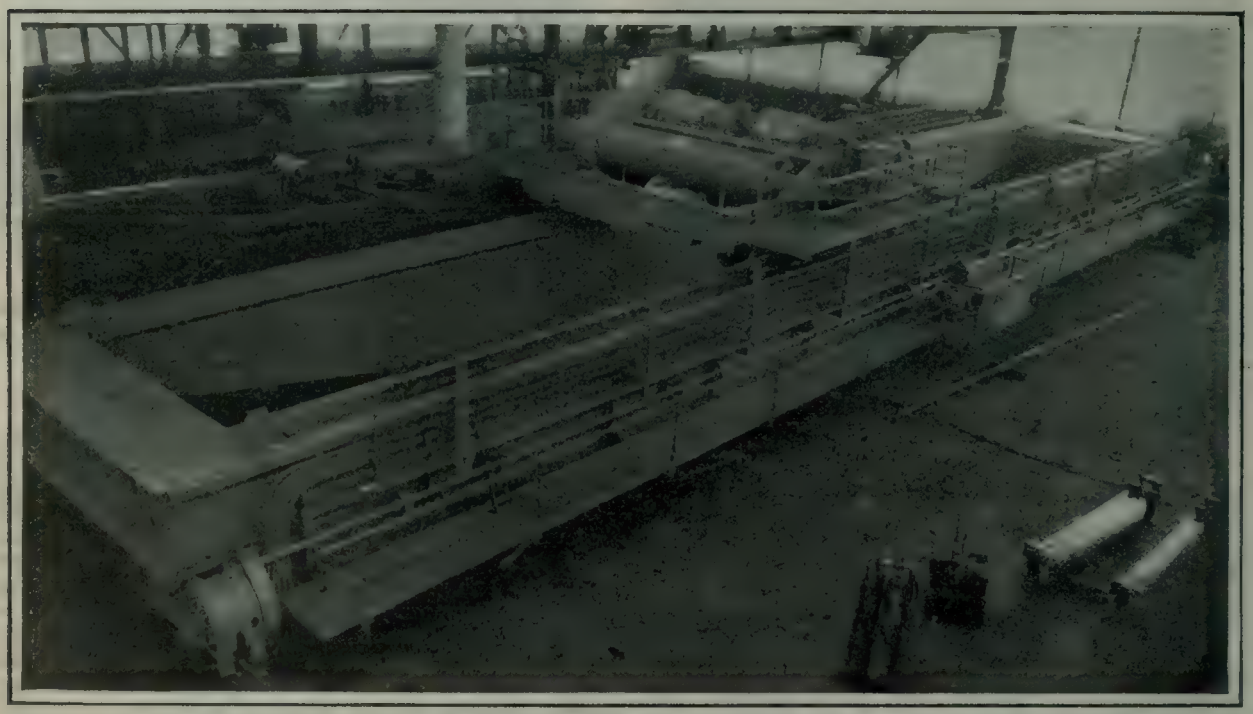
Special Crane for Ordnance Plant

A 75-ton electric traveling crane having features to meet unusual conditions including a runway 165 ft. above the ground, which is believed to be the highest lift ever provided in a crane of this type, has been completed by the Cleveland Crane & Engineering Co., Wickliffe, Ohio, for the government naval ordnance plant at Charleston, W. Va. It will be installed in the heat-treating department for handling large naval guns during the heat treating operations.

An unusually high lift is required as it is necessary to handle, in a vertical position, naval guns that, with their test piece, are 87 ft. long. A gun will be brought into the plant on a railroad car, placed in a vertical position in a heat-treating furnace, and, after being heated will be lifted from the furnace and placed vertically in a tempering tank 108 ft. deep. These tanks extend into a pit 54 ft. below the floor and 48 ft. above the floor. Consequently the upper end of the gun must be raised over 135 ft. to permit the lower end to clear the top of the tank.

The crane runway being the height of a 15-story office structure required a building of unusually massive construction to carry the load. A locomotive crane with a 250-ft. boom was used in handling steel during the erection. In addition to the high lift the predominating features of the crane include an unusually long span for its capacity, the span being 104 ft., and the high speed of the lift. The hoist speed is 50 ft. per min. and the lowering speed 100 ft. per min. both with a full load. These speeds enable quick handling of a gun from the furnace to the quenching tank. Another interesting feature is that when lowering at full speed with a full load the braking equipment that is provided, will stop the load within one foot. The crane has an automatic limit switch that stops the load 110 ft. below the crane rail. If the gun is to be lowered further, its lowering movement is continued by the operation of a push button.

The trolley travel and bridge travel are each 50 ft. per min. Rapid bridge travel is not required as the crane runway is comparatively short, being only of sufficient length to cover the furnaces and tempering tanks. The crane is operated from a pulpit, and magnetic control is provided throughout. Five motors aggregating 550 hp. are used in its operation. It has a double bridge drive. There are two 200 hp. motors on the main hoist, a 50 hp. motor for the trolley travel and two 50 hp. motors for the bridge travel, there being one motor on each bridge girder. The hoist has a brake on each motor and on the second reduction shaft, making four brakes on the hoist. Because of the high lift, the hoist required 2600 ft. of 1⅛-in. rope.



Crane for Handling Large Naval Guns in Heat-Treating Department of Naval Ordnance Plant, South Charleston, W. Va. The capacity is 75 tons, span 114 ft., and runway 165 ft. above the ground

Purchase of Ashland Iron & Mining Co. Ratified

Shareholders of the Ashland Iron & Mining Co., Ashland, Ky., at a meeting on Dec. 21, ratified the negotiations for the purchase of the property by the American Rolling Mill Co., and the assets of the Ashland company now become those of the Rolling Mill company. Besides the steel plant, consisting of two blast furnaces, six open-hearth furnaces, a modern electrically driven blooming mill, slab, billet, bar and sheet mills, the deal also includes the Ashland Coal, Iron & Railway Co., operating 48 miles of track, and the Interterminal Transit Co., which handles a large part of the industrial switching of Ashland. Some 22,000 acres of coal and timber are also included.

The purchase of the Ashland properties gives the American Rolling Mill Co. combined assets valued at $55,000,000, according to a statement of President George M. Verity. The plans of the American Rolling Mill Co. at present are to continue operations at the same scale now in effect.

The Rolling Mill company has paid the equivalent of $1,000,000 for $6,000,000 net assets of the Ashland corporation. The Rolling Mill company also assumes the bonded indebtedness of the Ashland company, amounting to $4,000,000. In the deal the Ashland stockholders received 39,875 shares of the common stock of the American Rolling Mill Co. for their properties. This stock is to be held in the corporate treasury until Oct. 1, 1923. Each shareholder of the Ashland company is entitled to one share of Rolling Mill common, par value $25, for every 2½ shares of common stock of the Ashland company, the par value of which is $50 per share.

The Kelley Island Lime & Transport Co., Cleveland, will absorb the Dolomite Products Co., Narlo, Ohio, the merger becoming effective Jan. 1. Howard P. Eels, president of the Dolomite Co., will become vice-president of the merged organization.

SERIOUS STRIKE TROUBLES

Governor of Kentucky Orders Troops to Maintain Order at Newport

The strike now in progress at the plants of the Andrews Steel Co. and the Newport Rolling Mill Co., at Newport, Ky., has been marked with much shooting during the past ten days. About two hundred men are at present employed in the plant, and many of the men on their way to work have been waylaid and beaten, and at times revolver shots have been fired at automobiles carrying employees. The union officials disclaim all knowledge of these shootings. On a night recently it is estimated that about 200 shots were fired in the vicinity of the mills, and many houses were hit. An injunction restraining union members and sympathizers from interfering with the employees of the company engaged in the interstate commerce has been handed down by U. S. Judge Cochran, but mill officials claim that it is only observed in the breach.

Governor Morrow, of Kentucky, has ordered four companies of the Kentucky National Guard, numbering 160 men, to Newport. This action was taken following a request of the mill officials for protection to their workmen while going to and from the mill. The civic officials of Newport and Campbell County, refused to sign a requisition for troops to maintain order, stating that they were capable of handling the situation. The Governor's action came after an investigation conducted by two State officials who had been sent to inquire into conditions prevailing at Newport.

In the Field of Labor

The New York, New Haven & Hartford Railroad has practically closed its repair shops at Readville, Mass., and at East Hartford, New Haven and Norwich, Conn., for an indefinite period. The layoff at the Readville shops involves 1000 men, at New Haven as many, at East Hartford 400, and at Norwich in the neighborhood of 100. The action of the New York, New Haven & Hartford Railroad management followed the laying off of 400 employees at the Boston & Albany Railroad's West Springfield, Mass., locomotive repair shops for two weeks beginning Dec. 22. The car repair shops at West Springfield continue in operation.

The Boston & Maine Railroad has posted notices of a substantial wage reduction applying to all classes of railroad employees over the entire system. No date has been set for the wage reduction to go into effect, but the management proposes to confer with the men beginning Jan. 15. For shopmen, including machinists, boiler-makers, blacksmiths, etc., the proposed scale will be 52c. to 67c. per hour according to classification of the workman, as contrasted with 72c. to 82c., the present range of wages. Such a wage reduction will bring the pay of machinists and such classes of workmen down to the scale existing prior to May 1, 1920.

The Quincy, Mass., branch, an assembling plant, of the Waltham Watch Co., Waltham, Mass., has resumed operations after having been closed since July last.

The Hartford Machine Screw Co., Hartford, Conn., has reduced wages 10 per cent.

The plant of the Colt's Patent Fire Arms Mfg. Co., Hartford, Conn., employing about 950, closed Saturday, Dec. 24, for inventory purposes. It will reopen Jan. 7.

The Laconia Car Co., Laconia, N. H., which has $1,500,000 car repair work for the Boston & Maine and the Central railroads on its books, is employing 350 men, but anticipates increasing this number after the turn of the year when the plant will be operated at capacity.

F. H. Payne, president Greenfield Tap & Die Corporation, Greenfield, Mass., in behalf of the company, last week presented annual Christmas checks to members of the Old and Junior Guards, employees, who have served the company more than ten and five years, respectively.

Refractories Prices Still Weak

PITTSBURGH, Dec. 26.—Refractories prices still are slipping because of the keen competition for orders generated by the fact that there is not enough business to give all a share. On high duty Pennsylvania and Ohio fire clay brick, the common basis of sales now is $30 per 1000, f.o.b. works, though public quotations still range $2 to $5 above that figure. Kentucky makers of this grade of brick are holding rather well to $32, but it is admitted that some shading would be developed by the appearance of a sizable inquiry. Missouri makers are reported to be seeking business in nearby districts, giving basis to a suspicion that they are not holding firmly to quotations in view of the much higher freights than those from Pennsylvania and Ohio plants.

We are revising down our prices of fire clay brick in all districts save Kentucky. At least four makers of Pennsylvania silica brick are taking business at $27, and in the Chicago district no business to speak of now is being done at above $35. There is little firmness in magnesite or chrome brick. Demand for all grades is purely hand-to-mouth and shipping instructions usually accompany every order. Stocks in consumers' hands are reported to include only a few standard sizes, for which there is daily use, but there are some pretty big stocks of special sizes.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$30.00 to $35.00	$28.00 to $30.00
Ohio	30.00 to 35.00	28.00 to 30.00
Kentucky	32.00 to 35.00	30.00 to 32.00
Illinois	32.00 to 35.00	30.00 to 32.00
Missouri	32.00 to 35.00	28.00 to 32.00
Silica Brick:		
Pennsylvania		28.00
Chicago		35.00
Birmingham		40.00
Magnesite Brick:		
Standard size, per net ton		52.00 to 55.00
Chrome Brick:		
Standard size, per net ton		46.00 to 48.00

Officials of Falcon Tin Plate Co.

The Falcon Tin Plate Co., which has been organized to operate the plant of the Carnahan Tin Plate & Sheet Co., Canton, Ohio, following the purchase of the latter plant by Paul Wick and Lloyd Booth of Youngstown, who control the Falcon Steel Co. in Niles, has elected Lloyd Booth president and treasurer and Paul Wick vice president and secretary. The board of directors consist of these officers and W. A. Thomas, formerly president of the Brier Hill Steel Co., C. H. Booth, formerly associated with the United Engineering & Foundry Co., Youngstown, and J. E. Carnahan, Canton, formerly principal owner of the Carnahan company. The Falcon Tin Plate Co., through a Cleveland investment house is offering $750,000 in first mortgage 8 per cent sinking fund gold bonds.

May Buy Steel Common at $84

In accordance with the stock subscription plan heretofore adopted by the finance committee, the employees of the United States Steel Corporation and its subsidiaries have been given the privilege of subscribing, during the month of January, for 100,000 shares of common stock at $84 per share. In January of this year the stock was offered at $81 per share and in 1920 at $106.

The Butler-Edwards Electric Co., Easton, Pa., has arranged for a change in company name to the Butler Automotive Steel Co., to provide for expansion in manufacture in the line of automobile products, to include shafts, axles, gears, propellers and automotive electrical devices. Parke H. Davis has been elected president to succeed William H. McCammon. W. E. Butler is vice-president and treasurer.

The Universal Machine Co., Boston, has incorporated under Massachusetts laws to manufacture and deal in machinery for cooling and conditioning textile fabrics, paper, etc. Manufacturing will be done on the other side of the water. Ivar L. Sjostrom, North Andover, Mass., is president and treasurer.

Further Gains in Iron and Steel Exports

Larger Outward Movement of Steel Sheets and Rails—Year's Figures to Date Are Less Than Half of 1920—Imports Fall Off

WASHINGTON, Dec. 27.—Further improvement was made in iron and steel exports in November, the total for 28 items being 122,290 tons, valued at $28,543,142. This was a gain of 15,708 tons over October, with a movement of 106,582 tons, valued at $29,706,437. For the 11-month period ending with November of this year exports aggregated 2,075,674 tons, valued at $577,924,704. This is less than half the 4,402,056 tons, valued at $1,170,722,938, exported during the same period of 1920.

Imports of Iron and Steel—Gross Tons

	November		Eleven Months End'g November	
	1920	1921	1920	1921
Ferromanganese	7,091	270	53,830	8,818
Ferrosilicon	710	1,456	13,592	6,698
Pig iron	35,313	2,193	153,381	23,126
Scrap	5,642	2,777	136,513	39,550
Bar iron	112	80	4,682	1,676
Structural steel	225	53	1,479	657
Billets, without alloys	447	1,034	19,165	4,559
All other billets	264	51	4,252	1,261
Steel rails	309	2,406	44,061	21,154
Sheets and plates	203	38	1,697	1,942
Tin and terne plates	22	54	344	393
Wire rods	654	198	5,246	775
Total	50,992	10,610	438,242	110,609
Manganese ore and oxide	74,477	8,620	542,189	386,454

Imports of 12 items for November showed a decline, amounting to 10,610 tons, valued at $2,041,772, as compared with October imports of 13,565 tons, valued at $2,388,987. For the 11-month period ending with November of the current year, imports totaled only 110,609 tons, valued at $26,787,570. This compares with imports amounting to 438,242 tons, valued at $47,185,447, which came in during the same period of 1920.

Exports, January, 1920, to November, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
September	95,169	3,078	1,318
October	106,582	2,830	153
November	122,290	1,299	1,869
Eleven months	2,075,674	25,755	10,113

Manganese ore imports for November were 8,620 tons, valued at $49,681, as compared with 36,760 tons, valued at $214,748, imported in October. For the 11 months of the present year imports of manganese ore totaled 386,454 tons, valued at $3,289,962, as compared with 542,189 tons, valued at $11,071,228, for the 11-month period of 1920. Imports for November, 1920, amounted to 74,477 tons, valued at $1,080,429. It will be noted that the average import value per ton was $5.76 in November, 1921, and $14.51 in November, 1920.

Machinery exports for November showed a decline when compared with October, the respective totals being $14,436,849 and $16,814,995. For the 11 months ending with November, 1921, the total exports of machinery were valued at $275,346,019, as compared with $593,612,060 for the same period of last year. Exports for November of last year were valued at $41,659,329.

The gain in exports of iron and steel is reflected in the comparatively large shipments of steel sheets. The outgoing movement of this product in November totaled 36,954 tons, compared with 20,930 tons exported in October. For the 11-month period the total exports of sheets were 159,069 tons.

Exports of Iron and Steel—Gross Tons

	November		Eleven Months Ending November	
	1920	1921	1920	1921
Ferromanganese	760	26	2,903	640
Ferrosilicon	2	..	603	318
Pig iron	13,167	1,273	203,267	24,797
Scrap	15,809	2,384	206,395	32,878
Bar iron	4,584	198	58,770	12,207
Wire rods	6,141	2,310	104,998	15,615
Steel bars	56,872	6,036	523,953	173,681
Billets, ingots, blooms	7,042	1,869	213,458	10,113
Bolts and nuts	3,349	883	34,606	23,106
Hoops and bands	5,318	1,174	49,034	18,640
Horseshoes	58	69	1,793	578
Cut nails	699	124	3,268	1,035
Wire nails	10,023	121	81,041	21,137
All other nails, including tacks	1,580	314	10,982	4,376
Cast pipe and fittings	6,819	2,152	55,898	46,998
Welded pipe and fittings	25,317	11,911	245,133	332,375
Radiators and cast house boilers	594	205	6,827	3,275
Railroad spikes	1,776	366	15,190	7,792
Steel rails	67,708	15,026	541,648	307,164
Galvanized sheets and plates	8,137	3,426	97,120	52,055
All other sheets and plates	2,557	821	27,297	11,994
Steel plates	79,424	8,835	806,404	327,496
Steel sheets	16,064	36,954	151,513	159,069
Ship plates, punched and shaped	5,480	283	40,696	9,532
Structural steel	42,839	11,005	430,159	287,600
Tin and terne plates	15,424	3,381	205,456	98,557
Barb wire	15,508	2,939	115,779	29,099
All other wire	21,246	3,178	167,865	63,547
Total	434,297	122,290	4,402,056	2,075,674

It is interesting to observe that of the exports of sheets during the 11-month period, approximately 64 per cent, or 97,710 tons, went to Japan. Of November sheet shipments, those to Japan represented a little more than 80 per cent of the total, 31,565 tons going to that country. Among other exports of sheets for the 11-month period and for November, respectively, were Canada, 31,516 and 2,196 tons; Argentina, 4,072 and 689 tons; and the Philippine Islands 2,742 and 504 tons.

Steel rail shipments for November totaled 15,026 tons, and for the 11-month period, 307,164 tons. Japan also was the largest single purchaser of this product for both the 11-month and the single-month periods, taking 32,589 tons for the 11 months, and 4,777 tons in November. Shipments of rails to other countries included: Canada, 20,790 and 2,502 tons; Honduras, 11,914 and 1,144 tons; Argentina 11,182 and 1,549 tons, and Philippine Islands 6,630 and 1,034 tons. Japan also was the chief market for welded pipe exports in November, taking 3,549 tons of the 11,911 ex-

ported. For the 11-month period exports of welded pipe amounted to 332,375 tons, of which Japan took 24,553 tons. Other shipments of this product in November and during the 11-month period were as follows: Argentina, 1,927, and 11,817 tons; Mexico 1,868 and 110,979 tons; Peru, 799 and 16,069 tons; Cuba, 603, and 9,295 tons; and British India, 571 and 32,588 tons.

Exports of cast iron pipe in November amounted to 2,152 tons and for the 11-month period 46,998 tons. Canada took 874 tons in November, and 4,179 tons during the 11 months; Mexico, 271 and 16,289 tons; and Cuba 231 and 7,974 tons.

Japan was also the chief exporting market in November and for the 11-month period for tin plate. Of the 8,381 tons exported in November, Japan took 5,695 tons, and of the exports of 98,557 tons for the 11 months, Japan took 24,102, or 24½ per cent.

Exports of steel plates in November amounted to 8,835 tons and during the 11 months, 327,486 tons. Canada took 698 tons in November and 100,441 tons during the 11 months, while the United Kingdom took 668 and 54,511 tons, respectively. Of the structural steel exports of 11,005 tons in November, and 287,600 tons during the 11 months, Canada took 4,911 and 55,949 tons, respectively.

The largest single item of steel imports in November related to rails, the inbound movement of this product being 2,406 tons. Scrap ranked next with 2,777 tons and pig iron third, with 2,193 tons.

Exports of metal working machinery in November amounted to $672,810, and for the 11 months $18,862,988. Exports of lathes for these respective periods totaled $67,911 and $2,857,688; of machine tools, $270,923 and $4,554,586.

Develops New Milling Cutter

It is announced as the result of several years of research work, covering every phase of design and operation, the National Twist Drill & Tool Co., Detroit, has placed on the market a new type of milling cutter, known as the "parabolic" cutter.

A group of the cutters is shown in the accompanying illustration. The name "parabolic" is intended to characterize the distinctive construction of the teeth.



The Shape of Tooth Is that of a Parabola, Slightly Modified at One End

It was found that in order to make a milling cutter tooth of uniform strength throughout its length, its shape would be that of a parabola slightly modified at the small end. This shape was then adopted. The number of teeth used is nearer to that of the conventional fine tooth cutter than to that of the coarse tooth type. In order to get the most efficient chip thickness per tooth without excessive peripheral speed a fairly large number of teeth was found desirable.

Plain-side and end-mill types are made, and also cutters for special purposes.

The entire sales force of the National Cast Iron Pipe Co. will convene at a banquet at the Tutwiler Hotel, Birmingham, Ala., on Jan. 5. The salesmen will be the guests of the management of the company for the entire week.

OLD RATES RESTORED

Tariffs Extending Temporary Schedule on Iron Ore Suspended

WASHINGTON, Dec. 27.—Railroad tariffs which had been filed with the Interstate Commerce Commission on statutory or 30 days' notice extending beyond Jan. 1 the operation of reduced rates on iron ore from Lake Erie ports to interior blast furnaces have been suspended by action of the commission. These tariffs were three in number, two of them having been filed by the Erie Railroad and one by the Pennsylvania Railroad and applied to rates from Cleveland, Lorain and Toledo, Ohio. They had been filed to become effective today, and were to remain in force until April 26.

This procedure of the commission means that all rates on iron ore from Lake Erie ports beginning with Jan. 1 will return to the old and higher level prevailing prior to Oct. 18. It was taken to establish uniformity in the rates by supplementing the recent action of the commission in declining to grant to other railroads the right to extend the lower rates to April 30 on short notice and under a sixth section application. Interior blast furnace interests, which, with the railroads, urged the granting of this application based their plea partly on the ground that unless this was done the rate situation as it applies to iron ore would be chaotic after Jan. 1 because the three suspended tariffs having been filed upon due notice would become effective to-day. The action of the commission overcomes this situation.

The reduced rates on imported iron ore, however, continue in effect and this has been the cause of complaint also. These rates cannot be suspended except by voluntary action of the railroads which have them in effect or through formal complaint.

The re-establishing of the old rates on ore from Lake Erie ports is the result of complaint by the lake front interests which maintained that by reason of the fact they did not benefit by the reduction, they were being discriminated against because they had received no benefit through lower coal, coke and limestone rates. Failure to obtain this relief, they pointed out, also upset the relationship between rates on raw materials used in the manufacture of pig iron. Interior blast furnace interests maintained that there is no relationship in rates between these commodities.

In any event the restoration of old ore rates is accepted by some of those in the iron and steel trade as an opportunity to seek a general rather than a piecemeal reduction in all commodities which they consume and manufacture. Preparations toward this end have been made and representatives of the trade will present their case before the commission at the general rate investigation, hearings on which will be resumed Jan. 9.

Jones & Laughlin Did Not Buy Chicago Tract

The 15 acres of lake shore property just east of and adjacent to the Illinois-Indiana State line purchased last April from Frederick and Ernest Eggers for $322,500, and generally supposed to have been bought by the Jones & Laughlin Steel Co., Pittsburgh, was actually acquired by the Commonwealth Edison Co., Chicago, as disclosed by a recent announcement by Samuel Insull, president. The land includes three acres skirting Lake Michigan for 2700 ft. and will be improved with one of the largest power plants in the world to supply current to the steel mill district. No definite date has been set for the construction of the plant, however.

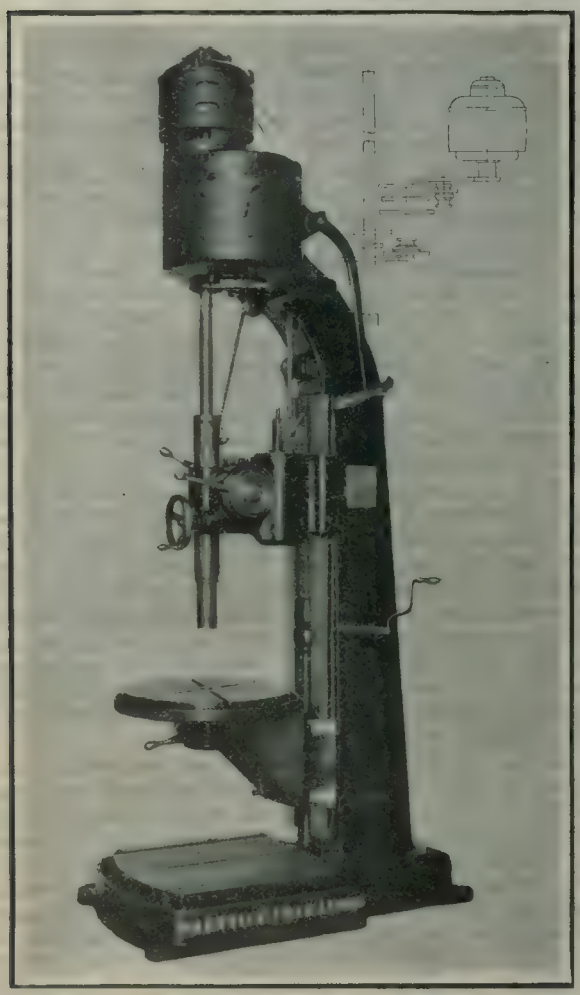
Rates Not Unjust

WASHINGTON, Dec. 27.—A tentative report prepared by Examiner Frank R. Mullen recommends that the Interstate Commerce Commission dismiss the complaint of the National Rolling Mill Co., vs. the Baltimore & Ohio, et al., against the rates on bar iron from Vincennes, Ind., to destinations in Indiana, Illinois, Missouri, Wisconsin, and Iowa, applied to shipments made between Dec. 5 and Aug. 25, 1920. The examiner states that the rates were neither unjust nor unreasonable.

Vertical Drill with Direct Motor Drive

A 32-in. vertical drilling machine, the chief feature of which lies in the direct application of the motor drive as shown in the illustrations, has been brought out by Prentice Conradson, Green Bay, Wis. Cone pulleys, belts, vertical shafts and other usual components have been eliminated. In this arrangement, it is claimed, tests show that no measurable loss takes place in the gearing and that smaller motors can be used, working at a higher power factor. The advantages resulting are said to include economy as to the cost of motor and in operating efficiency, as well as the saving in cost of the machine made possible by the elimination of many parts necessary in other designs.

The armature of the motor is built on a sleeve which



The Armature of the Motor Is Built on a Sleeve Supported in Ball Bearings Top and Bottom. The diagrammatic view shows the arrangement of the gearing.

is supported in ball bearings top and bottom. Mounted on this sleeve there is a pinion which engages with a gear mounted on the first intermediate shaft, as shown in the diagrammatic view. Sliding on splines on the intermediate shaft there is a cluster gear engaging with gears on the second intermediate shaft, the engagement of these gears being effected by means of a lever.

The cluster gear on the second intermediate shaft engages with gears keyed to the spindle driving sleeve, which drives the spindle through a key. The intermediate shafts and the spindle sleeve are mounted on ball bearings and oiled continuously by an oil bath. All gears on the shafts are of alloy steel, heat-treated.

There are nine speed changes, controlled by conveniently located levers. Six feeds are provided, ranging from 0.006 to 0.035. The thrust due to drilling is taken on a ball bearing. Rapid hand traverse is provided, also the usual hand feed, stop motion and depth gage. For tapping, the motor is reversed, acting as rapidly as if fitted with reversing clutches.

The motor shown in the illustration is the Watson, built especially for the drill by the Mechanical Appliance Co., Milwaukee. The controller is also built especially for the drill, being developed by the Allen-Bradley Co., Milwaukee. The controller is designed to give snappy start and reverse and at the same time to protect the motor against accidental overloads. The controller is automatic in that the small master drum operates a clapper switch through a magnet, and at the same time the inverse tine-element protective device prevents abuse without stopping the motor when called on for a short overload. No voltage protection is included.

Either alternating current or direct current motors are provided, attached to the machine. A 3-hp. motor at 1200 r.p.m. is recommended for ordinary work and a 5-hp. motor at 1800 r.p.m. for very rapid work.

The frame of the machine is cast integral with the headstock, the column and base being one casting. The table has the usual adjustments, and rectangular and sliding tables can be provided. The distance from the floor to the top of the machine is 10 ft. 2 in., and to top of spindle, 11 ft. 8 in. The capacity is 3 in. high-speed drill in steel and 4 in. pipe tap in cast iron. The weight is 3700 lb. net and the floor space occupied 30x54 in.

The drill will be made also in 25-in. and 36-in. sizes.

January Meetings of Mechanical Engineers

Among meetings scheduled by branches of the American Society of Mechanical Engineers for the immediate future may be mentioned the following:

New Britain, Conn., Jan 3, address on the development and use of precision gages by Major W. E. Hoke, consulting engineer, Baltimore.

Worcester, Mass., Jan 3, at Higgins Hall, Boys Trade School address on "Mechanical Heating Problems Solved Electrically" by C. L. Ipsen, General Electric Co.

Buffalo, Jan. 4, "Patents and the Patent Law" by A. M. Halcombe, Emery, Booth, Janney & Varney, Washington.

Norfolk Va., Jan. 6, at the Chamber of Commerce, addresses on "Engineers as Industrial Managers."

New Haven, Conn., Jan. 16, "Labor and the Present Industrial Situation" by Dr. Magnus W. Alexander, managing director National Industrial Conference Board, New York.

New York, Jan. 17, at the Engineering Societies Building, 29 West Thirty-ninth Street, "A Modern Automobile Plant," by P. L. Battey, Willys Corporation.

Toledo, Ohio, Jan. 19, at the Toledo Commerce Club, "Influence of the Automobile on the Design of Presses and Dies" by Neal W. Dorman, Toledo Machine & Tool Co.

Chicago, Jan. 20, at the Hotel Sherman, addresses by Prof. Dexter S. Kimball, Cornell University, and Dr. S. W. Stratton director Bureau of Standards, Washington, following a dinner meeting.

New York, Jan. 24, Engineering Societies Building, "Industrial Power Requirements" with D. B. Rushmore, General Electric Co., presiding.

Worcester, Mass., Jan 24, in recreation room of the North Works of the American Steel & Wire Co., illustrated talk on "Manufacture and Use of Die Castings" by A. M. Brewster, president Atlas Die Casting Co., and "A Close-up of Stoker Combustion" by F. Harold Daniels, Sanford Riley Stoker Co., employing motion pictures.

Extensions at LaBelle Works

The Wheeling Steel Corporation, Wheeling, W. Va., contemplates making some large extensions to present equipment at its LaBelle Iron Works plant at Steubenville, Ohio. The company has inquiries out for a 35-in. two-high reversing blooming mill, together with tables, three heavy shears, transfers and other accessory equipment to be installed at LaBelle Works. It is expected that this contract will be placed very early in the new year, and possibly some other large equipment will be added to the LaBelle plant.

CONTENTS

DECEMBER 29, 1921

Casting Small Parts in Production Foundry 1653
Short Side Movements Supplement Continuous Forward Progress in Gilbert & Barker Plant

Sulphur and Oxides in Ordnance Steel 1658
Comparison of Open-Hearth and Electric Practice—Lower Sulphur Insures Superior Toughness

Electrification of Steel Plant Railroad 1663
Difficulties Include Protection of Third Rail from Hot Metal Spills—Investment Offset by Low Operating Cost

Declaration of Government Policy Expected 1669
Attorney General and Secretary of Commerce Studying Supreme Court Decision in Hardwood Association Case

Fuel Saving in Modern Gas Producers 1671
Avoiding Present Wastes in the Industries Using Producers, Producer Gas Furnaces and Industrial Furnaces

Further Gains in Iron and Steel Exports 1676
Larger Outward Movement of Sheets and Rails—Year's Figures to Date Are Less Than Half of 1920

Recognition of Employees in Shop Suggestion System 1656
New Punch, Shear and Bar Cutter 1657
Labor Notes 1657, 1675
Friction in Rolling Mills 1661
Success by Taking Thought for Others 1661
Horizontal Boring Machine 1662
Chest of Silver Presented to A. N. Flora 1662
Light Weight Portable Electric Drill 1666
Metals for Aeronautics 1666
Long Range Planning of Public Works 1666
Portland Cement Production High 1666
Foreign Trade Conditions 1667, 1695, 1696
Grain Side of Belts More Efficient 1667
Double Head Grinder for Finishing Wrist Pin Holes 1668
Hydraulic Press for Automobile Bodies 1670
Michigan Foundrymen's Association Meets 1670
Results of Studies in Coal Washing 1672
Pulverized Coal Burning Equipment 1673
Foreign Trade Council to Meet in Philadelphia 1673
Special Crane for Naval Ordnance Plant 1674
American Rolling Mill Co. Buys Ashland Iron & Mining Co 1674
New Milling Cutter with Parabolic Teeth 1677
Old Railroad Rates Restored on Iron Ore 1677
Vertical Drill with Direct Motor Drive 1678
January Meetings of Mechanical Engineers 1678
Editorials 1680
The Normal in Pig Iron—Thrift and Progress—Hardwood Association Case—A Poor Coal Year—Wage Settlement on Industrial Prospects—Sulphur in Ordnance Steel
Correspondence 1683
Making a Gage to Signal Danger
Experimental Work of the Bureau of Mines 1696
Open Price Association Case 1697
Industrial Health Measures in Cincinnati 1699
Book Reviews 1702
Short Trade Items 1702
Industrial Finance 1709

Iron and Steel Markets 1684
Comparison of Prices 1685
Prices Finished Iron and Steel, f. o. b. Pittsburgh 1698
Non-Ferrous Metal Markets 1699
Personal Notes 1700
Obituary Notes 1701
Machinery Markets and News of the Works 1703
New York Jobbers' Prices 1710

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The Normal in Pig Iron

If there were such a thing as a normal need or a normal output, as of pig iron, it would be proper to refer to current production as a percentage of this normal. Then industry might take comfort in the arithmetical argument that business must soon be better, when the percentage is low, or it might note the signal, though it rarely does, that business cannot long remain active when the percentage is much over 100. However, the nearest approach to such a mode of measurement is to express operations in percentage of capacity. Coming close to 100 is naturally regarded as satisfactory, while a very low rate has only one element of satisfaction—the belief that wear and tear requirements take roundly 50 per cent of capacity and cannot long be ignored. One fault there seems to be, that buyers do ignore necessity, as they have been doing this year's or it may be that the tradition as to the minimum consumptive rate at which the country can maintain its life needs redetermination. After an upswing of business is under way again we shall be able to reappraise what is the wear and tear basis.

If attempts are ever made to consider operations in relation to so-called normal needs, it will be necessary to establish what is the normal. The term continually creeps into financial analyses of the industrial situation and gives the casual reader an incorrect conception.

The normal production of a basic material might be judged from the amounts shown over a term of years as going into consumption. In pig iron this has been an ever increasing tonnage, dependent not merely on the population but on the increasing uses demanded by what we call the advance of civilization. In the light of the records of production, we should need 780 lb. of pig iron per person for 1921, yet the year's output will be less than 45 per cent of this amount. Seeing that in 1920 production was 2 per cent above the apparent normal for that year, and that in 1919, the first full year after the swollen output of the war period, production was only 11 per cent below the apparent normal, it is perhaps hardly surprising that demand has been relatively so low this year. Disregarding surface conditions, the relatively heavy per capita outputs of 1919 and 1920 left for 1921 a slowing up until supplies could be absorbed and until demand and production could approach a parity.

Normal needs of pig iron for 1921 may be put at 37,000,000 gross tons, so that the year's theoretical deficiency is about 20,000,000 tons, or several times what we regarded as the theoretical surplus on Jan. 1, 1921, resulting from the stimulated pig-iron making of the war period and afterward. Figures leave the conclusion that under long continued depression there is a storing up of needs against a new intensity of manufacture once the change of sentiment in business occurs, for the theoretical requirements of 1922 are 38,500,000 gross tons and there can hardly be a theoretical surplus to-day.

Thrift and Progress

The buying activities of a people fall into two categories, those represented by current consumption, the consumption of materials and the utilization of service, and those represented by the accumulation of facilities of lasting character, which will continuously furnish comfort or enjoyment. In the household, a can of tomatoes or a pound of coffee falls in the first category, an electric smoothing iron or a carpet in the second category. In governmental affairs the Congressional Record falls into the one category, a new postoffice building into the other. In industry generally, mining coal, once the mine is equipped, is similarly distinguished from the erection of a modern economical power plant.

What is commonly known as "progress" in the affairs of a people is represented by additions like these to private, semi-public or public facilities. The aim of all peoples is, or should be, to make progress. It has been well understood in the past year that progress along these lines has not been at a normal rate. Much thought has been given, and many words have been used, in an effort to indicate the impediments that have stood in the way of normal progress being made. Upon two impediments much stress has been laid, while a third impediment has received little attention.

The first of the two much-mentioned impedi-

ments is high cost. Inasmuch as new facilities are installed for the purpose of rendering service in future, perhaps for many years, they represent an investment and the investor does not wish to see his investment greatly depreciate in replacement value by the cost declining in future. The principle applies similarly, though in varying degree, to an electric smoothing iron, a carpet, a power plant or an office building.

The second of the two much-mentioned impediments is the high income surtax in the federal taxation system, whereby the large investor or possible investor is not only taxed very heavily on his last dollar of taxable income but is prevented from securing an average return in a period of years because the good years are taxed heavily while in the poor years there is no refund.

These two impediments are important, but there is a third of no small importance, one that large investors no doubt have been taking into account. That is the change in the habits and ambitions of the people at large, whereby there is a disposition to spend more money than formerly on articles of current consumption and services of transient value, and less upon permanent facilities. Two impressive illustrations are the automobile and the cinema exhibition. There is current consumption of gasoline and tires and depreciation of the car itself, while the average film is old a few days after its release. It may be argued that when the people actually have the money to spend it really does not matter, but one can see that it does matter by reflecting on the large amount of the nation's productive labor that is expended in producing gasoline, tires and automobiles and in producing and exhibiting films. We are not working correspondingly harder than when we did not produce many automobiles and films, probably not nearly as hard.

The stress laid upon the two impediments to progress just mentioned would suggest that if the investor were offered a lower cost and a reduced tax, he would at once proceed to create great new facilities, but the investor might balk, on the ground that perhaps the public would not patronize his investment.

In other words, the habits of thrift of pre-war times are now not so much in evidence. Thrift is necessary if progress is to be made. For a time after the war, the absence of thrift was much commented upon and the condition was attributed to a psychological reaction from war-time conditions. It was assumed that the feeling would wear off. It is high time now to reflect that even in three years there has not been a full return to the pre-war attitude.

Business is pleased to note the activity taken by more than one agency looking to establish a demand for an international economic conference. Those on the outside think the executive department of the Government ought to take the initiative, as it did in the present political diplomatic conference. So far, the view obtains in Washington that either such a step is unwise or events have not proceeded far enough for a decision to be reached. Put in a nutshell, world problems, after settling the question of naval disarmament, are economic and the help of men engaged in business, including finance and possibly farming, is needed. The political representatives are making the radical move of reducing naval expenditures, but it is vital, if the restoration of international credit be hastened, that the other expert be called to his responsibility and to his obligation. Selfish as well as altruistic reasons call for the economic conference and call for it as early as possible.

Hardwood Association Case

A study of the complete text of the decision of the Supreme Court of the United States in the so-called Hardwood Lumber case strengthens the opinion expressed in these columns last week that there is nothing in the decision to prevent trade associations from carrying on their work, provided they do not attempt, directly or indirectly, to influence prices. It would indeed be unfortunate if, at this time when the Government and business are co-operating more closely than ever, anything should interfere with that co-operation. One of the latest efforts in that direction has been represented by a meeting of Secretary Hoover with engineers, architects and contractors in an effort to bring about standardization of construction contracts. At this meeting it was pointed out that there are in common use over 250 different forms of contract throughout the construction industry and that no one State or section has been able to establish any one form as standard or customary. Secretary Hoover expressed the belief that standardization offers a great field not only in protection to the public but in the general improvement of ethics in the industry itself. There is not the slightest suggestion of attempting to control prices and it is difficult to see how, except in the imagination of interested attorneys, the decision in the Hardwood case can have any relation to such efforts.

The Hardwood association had a very able and energetic "manager of statistics" and it is clear that he lost no opportunity to show the members of the association the advantages of keeping down production and keeping up prices, as Justice Clarke pointed out in his decision. Constantly throughout the minutes of the various meetings of the association there is shown a discussion of the stock and production reports in which the shortage of supply was continually emphasized with the implication, not disguised, that higher prices must result. "Men in general are so easily persuaded," said Justice Clarke, "to do that which will obviously prove profitable that this reiterated opinion from the analyst of their association, with all obtainable data before him, that higher prices were justified and could easily be obtained, must inevitably have resulted, as it did result, in concert of action in demanding them." Repeatedly at the meetings, in the strongest possible terms, the danger of operating mills to such an extent as to affect prices is dwelt upon.

Letters of the manager of statistics threw a

flood of light on his activities. For example, in one stock report he tells how it can be said "to the eternal credit of the hardwood producers, that they have maintained a stout heart and stiff backbone; with the result that there has been exhibited a strength in the market which has been little short of remarkable in the face of the light demand and the vigorous efforts which have been steadily made to hammer down prices." Evidently, not merely a comparison of prices but also the comments upon the price charts and production played an important part in bringing the court to its decision, which indicates very clearly what business associations ought not to attempt to do.

A Poor Coal Year

In the fortnight ended December 10 the production of bituminous coal was at the lowest rate since last April, whereas in normal times the highest rate of production in the year would be seen. It may be worth while to reflect that circumstances have failed to justify the cry made earlier in the year that consumers should stock coal in the summer, lest they be freezing at this time. The existing condition also furnishes a commentary on the seasonal coal freight rate plan, whereby rates were to be lower in summer than in winter, to furnish the consumer a pecuniary reason for laying in stocks. The consumer has been looking for a general reduction in freight rates and is also in expectation that coal prices will be lower on account of revision in the union mining scale. Also, he was in the mood last summer to feel that if the state of his business required him to consume much coal this winter, he would be able to pay the necessary price, while if he accumulated coal that he found he could not use he would be in an unfortunate position. It is plain in the retrospect that the seasonal coal freight rate system would not have worked advantageously this year.

The present estimate is that production of bituminous coal this year will not prove in excess of 405,000,000 tons, and such an output is regarded as representing a very great recession. It is, as a matter of fact, 150,000,000 tons or 27 per cent less than the output in 1920 and 175,000,000 tons or 30 per cent less than the record output, made in 1918, in which year there was a very material accumulation of stocks.

Some industries show greater fluctuations in activity than others and it may be interesting to compare coal with steel. The steel ingot output this year will probably prove to be a trifle under 20,000,000 tons, representing about double the recession shown by coal. By another method of comparison, the 1921 steel output is equal to the output in 1905, then a record tonnage, representing a 16-year recession, while the coal output represents a recession to a point between 1909 and 1910, or a recession of between 11 and 12 years.

Such a difference is to be attributed to coal being more an article of ordinary every day consumption than is steel. Both are used for the separate purposes of current operation and of improvement, but steel runs proportionately more to the latter than does coal.

The general activity of the country can be observed from various viewpoints. One is the freight ton-mileage of the railroads. That index shows the current year to be one of about 335 billion ton-miles of revenue and non-revenue movement, representing a recession of only about 25 per cent from the record, which was made in 1920, while in point of time it represents a recession only to a period between 1915 and 1916, or say five and a half years, against about 11½ years for coal and 16 years for steel.

Thus the railroad industry is a steadier one than the coal industry, and the coal industry is steadier than the steel industry. One is inclined to assume that it is on account of its sensitiveness that iron or steel is so frequently looked upon as the barometer of trade.

Wage Settlement on Industrial Prospects

Wage readjustments which take into account not only the cost of living factor but the conditions facing the specialized industry are arranged periodically by certain of the printing crafts of New York. Presumably the cost of living items could be based on the findings regularly published by the National Industrial Conference Board. It remains to ascertain what is the outlook factor. In the case cited, 200 employers are concerned. A questionnaire was sent to them to learn the promises of the future. The investigation was delegated to three accountants, one representing the employers, the second the employees, with the third serving as a neutral. Nearly 65 per cent of the questionnaires were returned, but 24 was the final number which could be used as throwing light on the question. These replies were considered sufficiently representative and therefore valid.

So far, the plan is claimed to work and it is worth reporting as a suggestion for like co-operation in the wage settlement of a local group of craftsmen. However, when the cost of living ceases to be widely fluctuating, there would then remain as the only basis of settlement the estimate of what the industry may or may not afford to do. Prophecy, difficult even for the economists, puts the scheme on a shaky footing. Dependence largely on the cost of living basis is not likely to become the vogue any more than it was before living costs were a thing of concern. If the attempt is to approach a scientific base, factors may well be included to compensate the individual worker. There is his proficiency, resourcefulness, punctuality, reliability, experience and possibly the term of his employment. Such a basis has been tried by a single employing company and no recourse was necessary to any arbitration board of accountants, which is likely to amount in operation to the conference of a judge flanked by two advocates. At best, the wage adjustment

system calling for the three arbitrator plan is not likely to remain satisfactory, no matter what is the basis of the briefs the arbitrators are to consider.

Sulphur in Ordnance Steel

New light is thrown on the subject of sulphur in steel by an abstract, elsewhere in this issue, of a paper on naval ordnance steel. There is also clearly brought out the difference between good and bad electric steel. The entire paper is a valuable contribution to the literature of the possibilities of the electric furnace when operated as it should be.

The meeting of the specifications for ordnance gun steel has for a long time been a *bête noire* of steel makers. This has been particularly true of even acid open-hearth steel as well as of some electric steel. The great difficulty has been, not so much the tensile strength or elastic limit of the ductility as measured by the elongation and reduction of area, especially on the tangential tests. The author shows that, in properly made electric steel, a lowering of the presence of sulphides and oxides contributes a product which, even in the severest tests, such as tangential, has ductile and other qualities which are superior.

On the subject of snowflakes in steel, which were a source of so much controversy and so many rejections during the war, the author states that electric steel can develop these, unless properly made. His explanation for them is: casting at too high a temperature. If this is the true solution, then genuine snowflakes are not likely to develop in carefully made acid open-hearth steel. In fact, one plant making large guns of acid open-hearth steel during the war claims to have had no trouble from such defects.

One of the future possibilities of the electric furnace is quality steel in quantity, especially with the advent of the larger units. A conclusion to be drawn from the author's paper, however, is that no matter what the process, electric or open-hearth, the product may be quantity and not quality, unless the best possible practice rules.

St. Louis Labor Conditions

ST. LOUIS, Dec. 27.—The labor situation in this district is reflected in the following table compiled by the Eighth Federal Reserve Bank from 210 leading employers in 21 of the largest cities of the district.

	Wage Earners					
	Men	Women	Total	Normal	Per Cent of Normal	Pay Roll
Nov. 1, 1921.	150,727	21,813	172,540	208,163	—17.1	$12,572,110.67
Oct. 1, 1921..	148,492	18,753	167,245	203,219	—17.7	12.572,533.84
Nov. 1, 1920.	180,156	22,120	202,276	208,163	— 2.8	16,981,748.17

From the above tabulation it will be noted that the number of employees of the reporting interests decreased 29,736 or 14.7 per cent (men 16.3 per cent and women 1.4 per cent) between Nov. 1, 1920, and Nov. 1, 1921. On Nov. 1, 1920, the number was 2.8 per cent under normal and on Nov. 1, 1921, the total was 17.1 per cent under normal. Wages, figures on a semi-monthly basis, decreased $4,409,637.50, or 25.9 per cent, between Nov. 1, 1920, and Nov. 1, 1921.

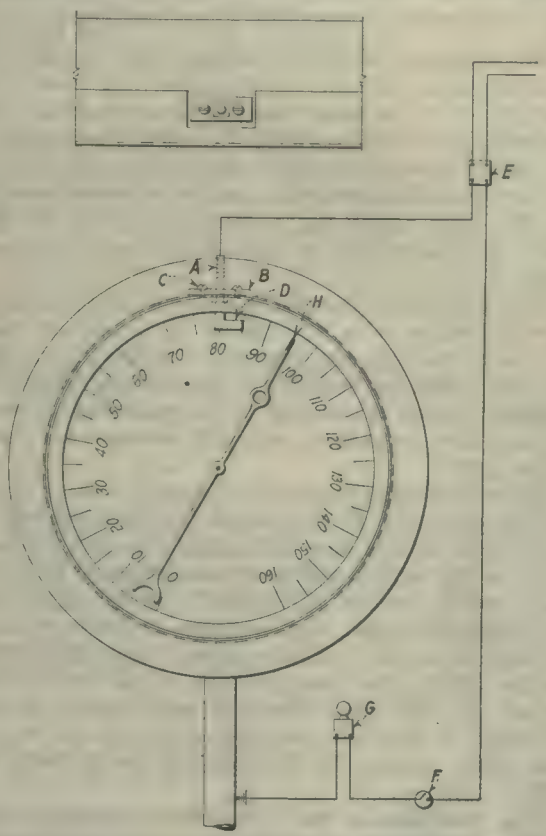
On July 1, 1921, the total of wage earners was 27.4 per cent under normal, on Aug. 1, 1921, 23.1 per cent under normal and on Sept. 1, 1921, 16.4 per cent under normal.

CORRESPONDENCE

Making a Gage to Signal Danger

To the Editor:—The accompanying sketch shows how I connected an air gage in my office to a buzzer, so that when the air pressure goes down to 80 lb. the buzzer will attract attention. It is a common thing for the superintendent or master mechanic to have gages showing pressure of steam, air, water, oil, etc., in his office, but they do not mean anything unless there is something to tell him when pressures are down.

It can be arranged so that a buzzer or bell will give warning when any certain pressure has been reached.



A Buzzer Gives Warning When the Pressure Drops to 80 Lb.

A slot was cut in the cast-iron base opposite the 80 lb. pressure mark to take a fibre (B). A ⅛-in. piece of copper wire (A) was threaded and one end soldered to a piece of 0.005 sheet copper (D). A hole was drilled in the fibre (B) and the copper wire was pushed through the fibre and a nut run down to hold it in place. Then the fibre was fastened to the base with two small screws (C), as shown. The hand (H) was soldered slightly on the end to make a good contact with (D), which was bent to give just enough tension to make contact and to hold the hand (H) only while the pressure is between 75 and 85 lb.

The power was taken off the lighting circuit to a small General Electric transformer (E) which reduced the voltage so that the current in the secondary circuit is 12 amperes. One wire extended from the transformer (E) to the copper wire (A) and one wire from (E) to the snap switch (F); then continued from (F) to the buzzer (G) and from (G) to the air pipe, which is the ground wire.

The snap switch (F) was arranged conveniently near my desk so that when the pressure would dance around 80 lb. and ring the buzzer continually, it could be shut off until the pressure was brought up again.

This has saved a great deal of time and trouble as sometimes the men in the shop would not know what was wrong with their machines until the pressure would get so low that they could hardly operate at all.

E. J. EDWARDS,
Superintendent foundry maintenance, Erie Works, General Electric Co.

Iron and Steel Markets

PIG IRON BUYING

Year End Activity at Expense of Prices

Steel Operations Low—Promise Lies in Construction Lines, Tin Plate and Pipe

Encouraging activity in pig iron in several centers marks the end of the year. In steel, the condition is a reduced demand accounted for by deferring of deliveries until after Jan. 1. The buying of pig iron has been at the expense of prices, but so far as that goes the year end shows an average for steel prices not merely the lowest of the year, but lower than at any time since January, 1916.

The new year is promising at the outset chiefly in continued activity in construction lines, and also in a sustained demand for pipe and tin plate. By Jan. 15 a definite betterment in mill operations is expected, which is nothing to be wondered at, seeing that now operations generally average not over 30 per cent.

Many are the comparative terms in which 1921 may be described to emphasize the position which it will take in iron and steel annals for low production. In pig iron it will be necessary to go back 17 years except for the 12 months' interval after the 1907 financial panic, but whereas in 1904 production was 15 per cent below what was then the normal and the 1908 output was perhaps 30 per cent below normal, in 1921 the deficiency will amount to 55 per cent. To secure a tonnage parallel to the year's steel ingot output, it is necessary to go back to 1905.

Pig iron sales in the Philadelphia district in the past two weeks have amounted to 50,000 tons and some of the tonnage went as low as $18, furnace, although most of it was sold at $19 to $19.50. On sales of fair volume in the Chicago market, prices receded 50c. and prices of Southern iron are down 50c., or to $17, Birmingham. Lower prices have also been made in the Cleveland market.

The immediate effect of the Steel Corporation's reduction of $5 a ton on wire products in the few days since it was made, on Dec. 21, has been to stop buying. Wire makers generally have met the price. Its reduction of $3 per ton in wire rods brings the corporation price to that which has been named for some weeks by independent producers.

Tin plate makers do not expect to stock as much product as usual in the first quarter, can companies showing a disposition to anticipate needs and prices remaining firm.

The prices on pipe, reduced Dec. 15, are holding well, but so little business is there in steel boiler tubes that an extra 5 per cent is allowed by several of the smaller makers. Practically all charcoal boiler-tube plants suspended operations several weeks ago.

Little encouragement was given to the rail makers. Not only have few new orders been entered, but specifications against existing contracts are not supplied with much freedom, and a good deal of production is being stocked. The Erie has placed 7000 tons with two mills, and the Kansas City Southern 6000 tons, and fresh inquiries have appeared or are promised covering 67,500 tons, of which 50,000 tons is for the Louisville & Nashville.

In comparison with the diminished scale of shipments on domestic orders, exporting is proportionately larger. Japan is largely responsible. On the record of the first 11 months of this year 64 per cent of the steel sheets went to Japan. That country took more rails than any other country, probably buying 50,000 tons, and was third to Mexico and India in the absorption of welded pipe. It is now actively negotiating for 16,500 tons of rails, 13,000 of these for Government railways and the remainder for an electric railroad line.

An American company will provide some $12,000,000 worth of machinery and equipment for removing a hill in Rio de Janeiro.

With 5000 tons of fabricated steel awards and only 2500 tons in new projects, structural mills nevertheless look for a continuance of the fair buying rate of the last three months. Reinforcing bars from new steel have sold at a price corresponding to 1.45c., Pittsburgh, and some fabricators have covered plates, shapes and bars at an equivalent of 1.425c., Pittsburgh. Rivet prices of $1 a ton below the general market have been named.

THE IRON AGE finished steel composite price is now 2.062. per lb. The pig iron figure, $18.68, is lower than any other for the year, with the sole exception of that ($18.51½) for Aug. 9. These two figures are the lowest since September, 1916.

Pittsburgh

PITTSBURGH, Dec. 27.

The fag end of the year shows limited activity in iron and steel as regards both buying and plant operation. There is the seasonal factor embodied in the desire of all consumers that their year end inventories shall show a big cash item and a small one in materials.

The past week has been the lightest as far as business and mill operations are concerned since July. A number of independent plants both here and in the nearby districts shut down last Saturday night and will remain down until after Jan. 2. The general expectation is that not much activity will develop until along about the middle of January. Fairly steady operations are expected after that, as in the meantime the mills have had a chance of accumulate orders.

A relatively good business still is being done in steel pipe and a revival of Japanese buying of light gage sheets has somewhat enlivened that market, more especially as far as the American Sheet & Tin Plate Co. is concerned. The recent reduction of $5 per ton in wire products, which applies to unshipped orders as well as new business, has been without effect upon the demand. In heavier products, little is going on. Activity also is lacking in semi-finished steel and the pig iron market has developed little in the way of new features since a week ago. There seems to be an outlet at well sustained prices for the better grades of open-hearth scrap. Putting out of a number of ovens in the Connellsville district has resulted in a slightly steadier market in beehive oven coke.

Pig Iron.—Interest in the market on the part of consumers of all grades has been extremely low in the past week and in the absence of important transactions, it is impossible to make any change in prices. Most of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Dec. 27, 1921	Dec. 20, 1921	Nov. 29, 1921	Dec. 28, 1920
No. 2X, Philadelphia‡	$21.34	$21.34	$22.34	$34.79
No. 2, Valley furnace†	19.50	19.50	20.50	35.00
No. 2 Southern, Cin'ti†	21.50	21.50	22.50	42.50
No. 2, Birmingham, Ala.†	*17.00*	17.50	18.00	38.00
No. 2 foundry, Chicago*	*19.00*	19.50	20.00	33.00
Basic, del'd, eastern Pa.	20.25	20.25	21.00	33.86
Basic, Valley furnace	18.25	18.25	19.00	33.00
Bessemer, Pittsburgh	21.96	21.96	21.96	36.96
Malleable, Chicago*	*19.00*	19.50	20.00	33.50
Malleable, Valley	20.00	20.00	20.00	35.00
Gray forge, Pittsburgh	20.96	20.96	21.46	35.96
L. S. charcoal, Chicago	31.50	31.50	31.50	43.50
Ferromanganese, del'd	60.00	60.00	60.00	110.00

Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$40.00	$40.00	$40.00	$47.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. billets, Pittsburgh	29.00	29.00	29.00	43.50
O.-h. sheet bars, P'gh	30.00	30.00	30.00	47.00
Forging billets, base, P'gh	32.00	32.00	32.00	51.00
O.-h. billets, Phila.	33.74	33.74	34.74	49.24
Wire rods, Pittsburgh	38.00	38.00	40.00	57.00
	Cents	Cents	Cents	Cents
Skelp, steel, Pittsburgh	1.50	1.50	1.50	2.65
Light rails at mill	1.55	1.55	1.55	3.00

Finished Iron and Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.85	1.85	1.95	3.85
Iron bars, Chicago	1.60	1.60	1.65	3.25
Steel bars, Pittsburgh	1.50	1.50	1.50	2.35
Steel bars, Chicago	1.60	1.60	1.60	2.73
Steel bars, New York	1.88	1.88	1.80	2.73
Tank plates, Pittsburgh	1.50	1.50	1.50	2.65
Tank plates, Chicago	1.60	1.60	1.60	3.03
Tank plates, New York	1.83	1.83	1.88	3.03
Beams, etc., Pittsburgh	1.50	1.50	1.50	2.45
Beams, Chicago	1.60	1.60	1.60	2.83
Beams, New York	1.88	1.88	1.88	2.83
Steel hoops, Pittsburgh	2.00	2.00	2.00	3.05

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, *Per Lb. to Large Buyers:*	Dec. 27, 1921 Cents	Dec. 20, 1921 Cents	Nov. 29, 1921 Cents	Dec. 28, 1920 Cents
Sheets, black, No. 28, P'gh	3.00	3.00	3.00	4.35
Sheets, galv., No. 28, P'gh	4.00	4.00	4.00	5.70
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.25	3.55
Wire nails, Pittsburgh	*2.50*	2.75	2.75	3.25
Plain wire, Pittsburgh	*2.25*	2.50	2.50	3.25
Barbed wire, galv., P'gh	*3.15*	3.40	3.40	4.10
Tin plate, 100-lb. box, P'gh	$4.75	$4.75	$4.75	$7.00

Old Material, Per Gross Ton:				
Carwheels, Chicago	$15.50	$15.50	$16.50	$22.00
Carwheels, Philadelphia	16.50	16.50	17.00	25.00
Heavy steel scrap, P'gh	14.50	14.50	14.00	15.00
Heavy steel scrap, Phila.	11.50	11.50	11.50	14.50
Heavy steel scrap, Chicago	11.00	11.00	12.00	15.50
No. 1 cast, Pittsburgh	16.00	16.00	16.50	25.00
No. 1 cast, Philadelphia	16.50	16.50	17.50	22.50
No. 1 cast, Ch'go (net ton)	12.50	12.50	13.00	13.50
No. 1 RR. wrot, Phila.	14.50	14.50	15.50	20.00
No. 1 RR. wrot, Ch'go (net)	*10.25*	10.50	11.50	14.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$5.50
Foundry coke, prompt	3.75	3.75	4.00	6.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	13.87½	13.87½	13.50	13.75
Electrolytic copper, N. Y.	13.62½	13.62½	13.37½	13.25
Zinc, St. Louis	*4.82½*	4.90	4.65	5.60
Zinc, New York	*5.17½*	5.25	5.15	5.60
Lead, St. Louis	*4.37½*	4.40	4.35	4.50
Lead, New York	4.70	4.70	4.70	4.50
Tin, New York	*32.75*	33.00	29.87½	33.50
Antimony (Asiatic), N. Y.	4.50	4.50	4.50	5.25

The above prices are for domestic delivery and do not necessarily apply to export business.

Composite Price, Dec. 27, 1921, Finished Steel, 2.062c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Dec. 20, 1921,	2.098c.
Nov. 29, 1921,	2.135c.
Dec. 28, 1920,	3.082c.
10-year pre-war average,	1.684c.

Composite Price, Dec. 27, 1921, Pig Iron, $18.68 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Dec. 20, 1921,	$18.85
Nov. 29, 1921,	19.56
Dec. 28, 1920,	34.13
10-year pre-war average,	15.72

the steel makers in this district who buy their pig iron have shut down their plants for the holidays and are not much interested in the market. The foundries are taking on supplies only as needed and this means only carload lot buying of foundry iron. Sanitary ware and radiator manufacturers seem to have covered their immediate requirements, and also are only slightly interested. Producers of iron are not anticipating much contracting for the first quarter of the new year, but rather expecting that because of the effect upon prices of the expected reduction in railroad freight rates, melters will continue to buy closely to actual requirements.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.25
Bessemer	20.00
Gray forge	$19.00 to 19.50
No. 2 foundry	19.50 to 20.00
No. 3 foundry	19.00 to 19.50
Malleable	20.00

Ferroalloys.—There has been some activity in the local ferromanganese market in the last few days. The United Alloy Steel Corporation, Canton, Ohio, which has had out an inquiry for 1000 tons for next year's delivery, has finally closed with the local producer for that quantity at the price of $60 per ton, Pittsburgh, buyer to pay the freight to Canton. The Weirton Steel Co. has also closed for 150 tons 78 to 82 per cent material with the local producer at $60, Pittsburgh, plus freight of $1.82 to Weirton, making the delivered price $61.82 per gross ton. A local open-hearth steel concern is in the market for 100 tons of 50 per cent ferrosilicon, and this may be closed before the end of the year. There is considerable demand for ferroalloys, but it is believed that a good deal of the inquiry is to get correct ruling prices for inventory purposes. In regard to ferromanganese a local producer seems to be taking practically all of the new business offered in the Pittsburgh, Wheeling, Youngstown and other nearby districts. The delivered prices on ferromanganese of the local producer is from $2 to $3 per ton under the prices at which domestic and foreign material can be laid down at the various points of delivery. The fact that prompt shipments can be made by the local producer is also a factor, so that foreign and domestic, the latter made by producers away from Pittsburgh, have very little chance in this market at

the present time. Domestic and foreign makers are still quoting $58.35, c.i.f. Atlantic seaboard, and German, which, however, runs only 76 to 80 per cent, is still offered at $54 seaboard, and no sales are being made. The price on 50 per cent ferrosilicon seems to be a little weaker, and several small sales have been made at $54 delivered, or slightly under that price. The market on spiegeleisen and ferrosilicon on low percentages is very dull, but prices are held fairly firm. It is stated that stocks of consumers are lower now than for many months.

We quote 78 to 82 per cent domestic ferromanganese at $60 to $63.67 delivered; 78 to 82 per cent foreign ferromanganese, $58.35, c.i.f. Atlantic seaboard; German, for 76 to 80 per cent, $54, seaboard. Average 20 per cent spiegeleisen at $30 delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $54 to $57, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—There is so little going on that prices are very indefinite. The more common quotation is $30, Pittsburgh or Youngstown, for sheet bars, slabs and 4-in. billets, but that price has found little or no basis in sales recently and since billets are offered at $29 by some makers, that probably is as high as any business can be done. It is doubtful if a firm bid of $29 for sheet bars or slabs would be turned down.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $28 to $30; 2 x 2 in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $32 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The new schedule of prices of the American Steel & Wire Co., effective Dec. 22, reducing quotations $3 per ton, merely meets the prices which previously have been done by independent companies. All makers now are quoting a base of $38, Pittsburgh or Youngstown for No. 5 common soft rods, but since this is no reduction to customers of independent companies there naturally has been hesitation among these consumers. The market really is rather unsteady and the appearance of sizable inquiries probably would develop recessions.

Structural Material.—Few structural awards of any considerable size are being placed with shops in this district and this makes for a dull market in plain material. So little is going on that prices are poorly defined. Quotations still range from 1.50c. to 1.60c. on structural beams, but only retail lots are bringing more than the lower figure. The McClintic-Marshall Co. has taken 250 tons for a warehouse for the H. J. Heinz Co., Pittsburgh, and 300 tons for a coal handling plant for the Ashland Coal & Coke Co., Ashland, W. Va., placed through the Pittsburgh Coal Washer Co., Pittsburgh. The Jones & Laughlin Steel Co. will fabricate 225 tons of tramway towers for the United States Smelting, Refining & Mining Co., for shipment to one of the Mexican properties of that company. Prices are given on page 1698.

Steel Rails.—The railroads are not specifying with much freedom against such orders as they have placed and a good deal of the current production of the Steel Corporation subsidiary here is being stocked. Demand for light rails is still moderate. Makers are quoting 1.60c. base, but are not adhering firmly to that figure when there is an order at stake.

We quote 25 to 45-lb. sections, rolled from new steel, 1.55c. to 1.60c base; rolled from old rails, 1.50c. base; standard rails, $40 per gross ton mill for Bessemer and open-hearth sections.

Iron and Steel Bars.—Demand is still on a tapering scale, but there seems to be a steadier tone to the market because of a realization that further concessions at this time probably would not result in orders. We regard the market as steady at 1.50c., Pittsburgh, on such tonnages as are coming from points that are not in competitive territory. With the Pittsburgh basing point largely disregarded, Pittsburgh mills would have to shade prices to get business at sources near other steel making centers, which have a lower freight rate than Pittsburgh. Reinforcing bars made from new steel have sold at 1.45c., and this price can be done again on desirable tonnages. Iron bars are slow and the weaker tendency in other markets is not without effect upon local prices. As much as 2.25c. base is quoted on refined iron bars by Pittsburgh makers, but this is merely a negotiation quotation.

We quote steel bars rolled from billets at 1.50c.; reinforcing bars, rolled from billets, 1.45c. to 1.50c. base; reinforcing bars, rolled from old rails, 1.40c. to 1.45c.; refined iron bars, 2c. to 2.10c. in carloads, f.o.b. mill, Pittsburgh.

Plates.—There has been a decided decrease in the demand, which is directly traceable to the fact that tank builders are well protected against such orders as they have on their books, while new ones have been few in the past fortnight. Pittsburgh and Youngstown plate makers are not going below 1.50c. mill, but with makers in other centers ignoring the Pittsburgh basing point, business of the former is localized.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.50c. to 1.60c. f.o.b. Pittsburgh.

Wire Products.—The announcement on Dec. 21 of the American Steel & Wire Co. reducing prices $5 per ton, effective Dec. 22, was merely the public affirmation of prices which previously had been done by several of the independent companies, which apply also against unshipped orders. As yet the lower quotations have not been of much help to business. The new prices of the American Steel & Wire Co. are $2.50, base per keg for bright nails, $2.25 case 100 lb. for bright and annealed wire; $2.75 for galvanized wire; $2.15 for galvanized barbed wire and fence staples; $2.65 for painted barbed wire and polished fence staples and $2.10 for cement coated nails. One large independent is naming a price of $2 base per count keg on cement coated nails. Other makers, although quoting $2.10, are meeting competition.

We quote wire nails at $2.50 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.25 base per 100 lb., Pittsburgh.

Spikes.—Local makers say that the new demand is quiet, but some railroads are in the market with inquiries, probably largely for inventory purposes rather than with the idea of placing orders. Local makers say they have made practically no sales in the past week, and do not expect to do much until after the first of the year. Prices now in effect are given on page 1698.

Iron and Steel Pipe.—Although demands are smaller in all kinds of pipe as the end of the year approaches, business is good as compared with most finished products. Jobbers seem to be enjoying a good business in merchant pipe and find it necessary to specify pretty constantly to maintain their stocks. All of the large line pipe business for this year has been closed, but it is expected that soon after the turn of the year there will be additional awards against inquiries which now are pending. Business in oil well pipe could be better. There is very good observance of the Dec. 15 steel pipe card and no change in wrought iron pipe discounts, although the wide difference between steel and iron pipe occasions some anxiety among the makers of the latter, and there are intimations of a downward revision of prices after the turn of the new year. Discounts are given on page 1698.

Cold Finished Steel Bars and Shafting.—Makers report the local situation as extremely dull in demand, and one leading maker says he does not expect very much betterment in the new demand until April of next year. Practically no orders are coming in at this time from the automobile trade, and none is expected until pretty well after the turn of the year. It is stated that stocks held by automobile buyers, and also by the machinery trade, are sufficiently large to carry them over the next month or two, without any new buying. The severe declines in prices that have taken place in shafting and cold-finished steel bars, almost prohibit any lower prices, as makers say that even at present prices, there is no profit. Recently several sales of shafting were made at 2c at mill, but these were fairly desirable orders under the present dull situation, and less desirable orders still bring 2.10c. to 2.15c. We therefore quote cold-finished steel bars and shafting at 2c. to 2.15c. at mill, the lower price being made only on the larger orders. Ground shafting still is quoted $2.50 base per 100-lb. f.o.b. mill, in carload lots.

Boiler Tubes.—Demand for lap welded steel boiler tubes is steady enough, but apparently there is not enough business to give all makers a share and observance of the discount card is on the part of a few rather than the many. An extra 5 per cent is being given by several of the smaller makers. Charcoal iron boiler tubes are fairly firm, but practically all makers suspended operations several weeks ago and the only company active in this district is planning on an early shutdown. Discounts are given on page 1698.

Nuts and Bolts.—Local makers state that the quiet demand which has existed for some months has been accentuated by the inventory period, and almost no new business is being placed. There is no inclination on the part of large consumers or jobbers to anticipate their needs, and the present very light demand is only for small lots to meet current needs. Makers say that present discounts are holding firm, largely for the reason that not enough business is coming up to shade them, and further, that present prices are, and have been for some time, below actual cost of manufacture. Automobile makers are buying practically nothing, but are expected to come into the market early in the new year. On the present small orders being placed, discounts in the local market are holding fairly well and these are given on page 1698.

Rivets.—New demand is seasonably quiet, buyers not caring to place any new orders until after the turn of the year. Prices show no change, but on a very desirable order it is possible that the price of $2.25 per 100-lb. on large structural and ship rivets, and $2.35 on large boiler rivets might be shaded. However, local makers say they have not made any sales below these prices. Considerable buying is expected in rivets shortly after the first of the year. Prices are given on page 1698.

Sheets.—Business with all makers still is of moderate proportions because of the desire of consumers and jobbers to avoid heavy stocks and not much interest in future requirements is noted, presumably because of a desire to wait until the completion of the year end check up. The one bright spot in the situation is the revival of the Japanese demand for light gage sheets. This business calls for sheets of tin mill gages and dimensions and the bulk of it is going to the American Sheet & Tin Plate Co. because it possesses the best facilities for producing this material. In spite of the generally slow demand, there is remarkably close adherence to regular market quotations. The American Sheet & Tin Plate Co., last week, operated more than 65 per cent of its hot-sheet mills. Independents averaged about 40 per cent. This week's operations will be lower because of the holiday interruptions. Prices are given on page 1698.

Tin Plate.—New business does not amount to much, but orders covering the January requirements of container manufacturers are in and generally were accompanied by specifications. The first quarter of the year usually is a period of light consumption, but it is believed that the mills will not be obliged to stock as much production as usual during the next three months because it is doubtful that there will be any further decline in prices and the can companies are showing more of a disposition to anticipate their needs than they did a year ago.

We quote standard production coke tin plate at $4.75 per base box f.o.b. Pittsburgh for carload lots.

Hoops and Bands.—The market is dull and irregular. On hoops makers are trying to maintain a base of 2.10c., Pittsburgh, but find it necessary to go to 2c. in some districts in competition with mills having a lower freight rate to the point of consumption. On bands, no recent business has been done above 1.90c. base, although the negotiation price of most makers is 2c.

Hot-Rolled and Cold-Rolled Strips.—Real activity still is lacking, particularly with regard to early shipment tonnages. There are still some makers who are quoting 2.25c., base, for hot-rolled and 4c., base, for cold-rolled, but the more common quotations are 2c. and 3.75c., and even these prices are being shaded on desirable orders.

Coke and Coal.—Two first quarter contracts for furnace coke, one of 12,000 tons a month and the other of 10,000 tons a month, have been closed in the past week. The larger contract, made by a Valley steel maker, went to a Connellsville producing interest, and while the details as to prices have not been made public, the common impression is that it carries a price of about $3.25 per net ton oven. The other business went to a steel works by-product plant, but the price is withheld. Negotiations still are in progress covering the requirements of the furnace of the A. M. Byers Co., Girard, Ohio, calling for 15,000 tons per month, and for 18,000 tons a month for the Trumbull-Cliffs Furnace Co., Warren, Ohio. Negotiations also are in progress for several smaller lots of furnace coke, the price to be determined by THE IRON AGE quotation on prompt or spot tonnages. The company making this proposition feels that it is a more equitable plan than that of basing the price of coke on the price of pig iron. The spot market in furnace coke is slightly firmer, as the blowing out of a number of beehive ovens has considerably shortened the supply, and while some tonnages still are available as low as $2.75 per net ton, oven, some recent business has been done as high as $3. The spot market in foundry coke is quotable generally at $3.75 to $4, though choice brands still are selling up to $4.25. A shortage of slack grade of coal, due to the fact that there is not much demand for or production of screened coal, has resulted in some stiffening of the price, recent sales having been done at $1.80 to $1.90. Mine run steam coal for prompt delivery is offered at $1.40 to $1.50 and mine run by-product from $1.60 to $1.85 for spot shipment and $1.90 to $2 for first quarter delivery. The spot market on gas coal, mine run grade, is $2 to $2.30.

Old Material.—There has been some considerable activity in selected heavy steel scrap in the local market in the past week. The National Tube Co. is credited with having bought upwards of 15,000 tons of selected heavy steel scrap for its Lorain, Ohio, works, while the American Steel & Wire Co. is said to have bought 10,000 tons or more for its Donora, Pa., works. These transactions were closed about a week ago, but since that time, demand has slowed down very considerably and very little new business is being placed. Consumers do not want to buy scrap until after the first of the year, and in addition, some large consumers have suspended shipments until after Jan 1, among these being Republic Iron & Steel Co., Youngstown, Sharon Steel Hoop Co. for Sharon and Weirton Steel Co. for Weirton, W. Va., and probably others. Local dealers say they expect by Jan. 15 or Feb. 1, there will be considerable new movement in scrap, stocks in consumers' yards being reported as very low. There is very little demand for borings and turnings, and prices are largely nominal. Consumers will not pay over $8 to $8.50 for turnings and not over $8.50 to $9 for borings, prices quoted by dealers being about 50c. per ton higher. Prices, owing to the small amount of material sold in the past week or so, have shown no important changes.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.50 to $14.75
No. 1 cast, cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	12.25 to 12.50
Bundled sheets, sides and ends	10.25 to 10.50
Railroad knuckles and couplers	15.00 to 15.50
Railroad coil and leaf springs	15.00 to 15.50
Low phosphorus standard bloom and billet ends	18.00 to 19.00
Low phosphorus plates and other grades	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	25.00 to 26.00
Locomotive axles, steel	23.00 to 24.00
Steel car axles	15.50 to 16.00
Cast iron wheels	15.00 to 15.50
Rolled steel wheels	15.00 to 15.50
Machine shop turnings	8.50 to 9.00
Sheet bar crop ends	14.00 to 14.50
Heavy steel axle turnings	11.00 to 11.50
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	14.00 to 14.50
Stove plate	13.00 to 13.50
Cast iron borings	9.00 to 9.50
No. 1 railroad wrought	11.50 to 12.00

Chicago

CHICAGO, Dec. 27.

Mill operations are diminishing as the end of the year draws near, but this contraction in production does not reflect reduced demand so much as the desire of buyers to have deliveries deferred until January. In fact, one of the most important local producers reports that December bookings are larger than those of November. This is largely accounted for by the heavy individual tonnages which have been ordered by car builders and tank fabricators to apply against contracts which they secured some weeks ago. While some of this tonnage will not be rolled until January, enough of it has been released this month to sustain mill operations at a higher rate than would otherwise be possible, in view of the slump in general demand. Further business from the car and tank shops is not in immediate prospect, however, as the railroads have deferred action on pending inquiries for cars and no new tank work is reported. Notwithstanding this fact, the mills are not taking a gloomy view of the situation, as they expect jobbers and others who have withheld purchases during inventory taking to re-enter the market with the opening of the new year and close for a respectable tonnage. This buying will probably be confined to the replenishment of depleted stocks, as it is likely that caution will continue to actuate the policy of consumers until a general freight rate reduction has been made.

Except for a reduction in wire and wire nails announced by the leading producer, the price situation shows little change. Plates, structural shapes and bars are no weaker than heretofore and sheet prices remain firm. Whereas the situation in finished commodities, with the exception of wire products, remains in statu quo, pig iron has shown further weakness and has dropped another half dollar.

The Illinois Steel Co. still has 11 furnaces in blast, but has reduced its steel output to 40 per cent of ingot capacity. The Inland Steel Co. has shut down its sheet mills and its continuous bar mill between the holidays, but expects to resume at a 50 per cent rate early in the new year.

Pig Iron.—With spot buying at a low ebb, attention is centered on first quarter and first half business. Some good-sized tonnages for those deliveries have been closed and the terms of the transactions indicate further weakness in the market. A northern Indiana melter bought 1000 tons of foundry at $19 base furnace for first quarter delivery, while another Indiana consumer closed for 750 tons for first half shipment at less than that price. In fact, a local user who purchased 2000 tons of foundry for January delivery is reported to have placed the order at $18 base, local furnace. Considerable first quarter and first half tonnage is still pending and several new inquiries are reported, including one from a local manufacturer for 300 tons of malleable for delivery during January and February to a branch plant at Indianapolis and another of 300 tons of foundry from a northern Illinois melter for first quarter shipment. Sellers look for better business in the early months of the new year, as the stocks of most melters, except the implement manufacturers, are low and operations are sufficiently active to make some replenishment buying necessary.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	$19.50 to 20.00
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	19.00 to 19.50
Northern high phos	19.00 to 19.50
Southern foundry, sil. 1.75 to 2.25	24.17
Malleable, not over 2.25 sil	19.00 to 19.50
Basic	19.00 to 19.50
Low phos., Birmingham	32.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	33.00
Silvery, sil. 8 per cent	32.82 to 34.82

Ferroalloys.—The market is inactive.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $60, delivered; spiegeleisen, 18 to 22 per cent, $36 to $37, delivered.

Rails and Track Supplies.—Two more rail orders have been received by the Gary mill, one for 6000 tons from the Kansas City Southern and another for 4000 tons from the Erie. The railroads are evincing little interest in track fastenings for the time being. Among the few orders reported is one for 40,000 iron tie plates. The price situation shows little change, tie plates being slightly weaker as low as $37.50 per net ton, f.o.b. mill having been done.

Standard Bessemer and open-hearth rails, $40; light rails rolled from new steel, 1.70c. to 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.15c. to 2.25c., Pittsburgh; track bolts with square nuts, 3.20c. to 3.25c., Pittsburgh; tie plates, steel and iron, 1.875c. to 2c., f.o.b. mill; angle bars, 2.40c., f.o.b. mill.

Railroad Equipment.—The Illinois Central, Burlington, Great Northern and Union Pacific have deferred action on their inquiries for cars and locomotives until January. The Central of New Jersey has ordered 25 mikado type locomotives from the American Locomotive Co.

Bars.—Except for tonnage coming from carbuilders, little new business in mild steel bars has developed. In the reinforcing field, considerable work is in prospect, but it will not come up for bids until next year. An alternate all-reinforced concrete design of warehouse No. 12 for the Belknap Hardware & Mfg. Co., Louisville, Ky. will call for a large tonnage of bars. Even in the structural steel design now in the hands of fabricators some tonnage of reinforcing bars is specified. At Memphis, Tenn., a hospital and an auditorium and market building are proposed and both of these projects will require a round tonnage of reinforcing. Bids on the general contract for the Grant Park stadium Chicago, requiring 2700 tons of reinforcing, have been rejected. Bar iron mills report their bookings somewhat improved although the tonnage coming in is far from sufficient to put them on a satisfactory operating basis. In hard steel bars pending business includes:

Reinforcing bars for new tuberculosis sanatorium at National Soldiers' Home, Milwaukee, 500 tons. Bids being taken by H. Schmitt & Son, Inc., 430-432 Farwell Avenue, Milwaukee, successful bidder on general contract at $1,094,000.

Mill prices are: Mild steel bars, 1.60c. to 1.75c., Chicago; common bar iron, 1.60c. to 1.65c., Chicago; rail carbon, 1.65c., mill or Chicago.

Jobbers quote 2.68c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars and shafting is 3.55c. for rounds and 4.05c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base. Hoops and bands, 3.28c.

Wire Products.—The American Steel & Wire Co. has announced reductions in wire and nails the new quotations being $2.50 base per keg on wire nails, $2.25 per 100 lb. on bright Bessemer and basic wire, and $2.10 per count keg on cement-coated nails. The same prices have been adopted by a number of independents. New business is light both from the railroads and the jobbers. The stocks of the latter are very low, however, and they are expected to come into the market in January.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.13 per 100 lb.; No. 9 and heavier bright basic wire, $3.28 per 100 lb.; common wire nails, $3.25 per 100 lb.; cement coated nails, $2.65 per keg.

Sheets.—Mills are holding firmly to the quotations named below but they are booking little new business. The mills of the local independent have been shut down for the holidays to permit the plant to be cleaned up after several months of capacity operation. Consumers' stocks, and particularly those of jobbers, are seriously depleted and better buying is therefore expected early in the new year.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c.

Plates.—December steel bookings of local mills have been heavier than was generally supposed, one pro-

ducer reporting them larger than those of November. Much of this tonnage has been ordered to cover the needs of carbuilders and tank fabricators who secured large contracts several weeks ago. No new lettings of oil storage tanks are reported, however, and action on pending inquiries for freight cars has been deferred until next month. The price situation is unchanged and sellers find encouragement in the fact that no further weakness has developed. Attractive business in plates, shapes and bars is moving at about 1.60c., Chicago, while exceptionally desirable tonnages are still being placed at concessions of from $1 to $2 a ton.

The ruling mill quotations range from 1.60c. to 1.75c. Chicago. Jobbers quote 2.78c. for plates out of stock.

Bolts and Nuts.—A number of orders have been taken recently from manufacturers of bolted tanks who are busy supplying temporary oil storage in the new Mexia (Texas) field. Little business is coming from the automobile manufacturers and the jobbers, and railroad inquiries have dropped off. Word has been received from Detroit to the effect that the leading maker of cheap automobiles stopped production on Dec. 20, and will not resume until the second week in January. The price situation is still weak and confused. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 1698.

Jobbers quote structural rivets, 3.43c.; boiler rivets, 3.53c.; machine bolts up to ⅞ x 4 in., 60, 10 and 10 per cent off; larger sizes, 60 and 10 off; carriage bolts up to ⅞ x 6 in., 60 and 10 off; larger sizes, 55 and 5 off; hot pressed nuts, square and hexagon tapped, $3.75 off; blank nuts, $4 off; coach or lag screws, gimlet points, square heads, 65 and 5 per cent off. Quantity extras are unchanged.

Cast-Iron Pipe.—The market is exceedingly quiet with the arrival of the holiday period, but considerable business is expected to develop to the point of bid-taking early next year. One seller has a total of 50 miles of such work listed. Hammond, Ind., has awarded 40 tons of 6-in. to the National Cast Iron Pipe Co. Denver took bids Dec. 23, on 343 tons of 6, 8, 10 and 12-in. The Michigan Central Railroad received tenders Dec. 23 on one-half mile of 6-in.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $47.10 to $48.10; 6-in. and above, $43.10 to $44.10; class A and gas pipe, $4 extra.

Structural Material.—A holiday lull has settled over the fabricating market and there is little new business to report. Fabricators look forward hopefully to the new year and in the meantime are taking work at extremely low figures to tide their shops over the slack period. Successful bids recently named are practically on a pre-war basis, $47.50 per ton delivered having been quoted on one job recently placed and $64 per ton erected on another. Recent awards include:

Six hundred and seventy-five tons to the Decatur Bridge Co. for a car repair shop to be constructed at McComb, Miss., for the Illinois Central.

Milwaukee Central Continuation School, second unit, 100 tons, to C. Hennecke Co.

Wisconsin State Highway Commission, truss span at Black River Falls, Wis., 300 tons, to Worden-Allen Co.

State of Illinois, cellhouse for Lockport penitentiary, 150 tons, to Worden-Allen Co.

Contracts Pending

Structural steel for new tuberculosis sanatorium at National Soldiers' Home, Milwaukee, 100 tons. Bids being taken by H. Schmitt & Son, Inc., 430-432 Farwell Avenue, Milwaukee, successful bidder at $1,094,000.

The mill quotation on plain material ranges from 1.60c. to 1.75c., Chicago. Jobbers quote 2.78c. for materials out of warehouse.

Warehouse Prices.—Local jobbers have reduced wire and wire nails in proportion to the mills' price reductions. The new warehouse quotations are shown under the wire products.

Old Material.—Consumptive buying is at a low ebb and prices, although weak, have changed little. The Pullman Co., which started its rolling mill last week after a long period of idleness bought about 2000 tons of No. 1 wrought and other rolling mill grades. One recent sale of 250 tons of No. 1 wrought was made at $10.25 per net ton, delivered. Railroad offerings include the Burlington, 4000 tons; the Santa Fe, 3500 tons, and the Pennsylvania Northwestern Region, 2500 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Iron rails	$16.00 to $16.50
Relaying rails	23.00 to 27.50
Cast iron car wheels	15.50 to 16.00
Rolled or forged steel car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.50 to 11.00
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.50 to 8.00
Hydraulic compressed sheet	7.50 to 8.00
Axle turnings	8.00 to 8.50

Per Net Ton

Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	19.00 to 19.50
Steel car axles	12.50 to 13.00
No. 1 busheling	8.25 to 8.75
No. 2 busheling	6.00 to 6.50
Cut forge	10.25 to 10.75
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	10.25 to 10.75
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.00 to 11.50
Coil springs	12.50 to 13.00
No. 1 machinery cast	12.50 to 13.00
No. 1 railroad cast	12.00 to 12.50
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.00 to 10.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.50 to 6.00
Stove plate	12.00 to 12.50
Grate bars	10.50 to 11.00
Brake shoes	10.50 to 11.00
Railroad malleable	11.25 to 11.75
Agricultural malleable	11.25 to 11.75

Birmingham

BIRMINGHAM, ALA., Dec. 27.

Pig Iron.—Sales made during week ending on Christmas Eve were on a basis of $17. At the close of the week this was the admitted maximum. It is understood that one furnace interest had by that time made proffer of its make at around $16.50. However, the week closed with $17 the base as a general rule. Business of the week was a surprise to several makers. Radiator works came into the market for 1000 tons, a pipe maker took the same amount and sanitary manufacturing interests, which had already taken 1000 tons, purchased an additional tonnage. One maker booked 1500 tons and another 2500 compared with less than 1000 tons between the two the preceding week. The market is not capable of analysis and is so competitive that no price on a large tonnage would surprise. At the same time, the bookings of the past week have served to considerably stimulate the market and again there is consideration of what the eventual effect will be of the splendid position of the furnaces with regard to stocks. The Sloss-Sheffield Steel & Iron Co. blew in the Hattie Ensley furnace at Sheffield this week after months of total non-production by its furnaces, pending which the company worked off a large stock of pig iron. The Sheffield iron enjoys a differential of 40c. to 80c. over Birmingham in freight to Middle Western points of delivery. Indications point to fully as large melt by Southern foundries following the holidays as that of the fall and winter preceding. The general feeling is rather more optimistic than it has been in some time.

We quote per gross ton f.o.b. Birmingham district furnaces, as follows:

Foundry, silicon 1.75 to 2.25	$17.00
Basic	16.00
Charcoal, warm blast	35.00

Finishing Mills.—The Tennessee Company and Gulf States Steel Co. are taking the usual holiday of a week and will resume Monday. It develops from port records that the Tennessee company shipped during the year for export about 12,000 tons of rails, plates, structural steel and track accessories monthly. This accounts for the not less than 50 per cent operation of its

finishing mills in 1921. A large portion of the exports moved down the Warrior River in barges to Mobile at a saving of 20 per cent of the all-rail freight rate.

Cast Iron Pipe.—Pipe makers report a very quiet season and will be closed until probably Jan. 15. Sale of municipal bonds in the South is going on in volume and presages a large amount of water main laying. Atlanta will soon be in the market for water mains provided out of a portion of an $8,000,000 bond issue.

Coal and Coke.—Coke has weakened again and standard foundry is obtainable at $5.25 to $5.50 with furnace coke at $5.

Old Material.—The scrap market is listless and prices tend to sag with the lower base for pig iron. So little is going on, however, that quotations have not been officially changed.

We quote per gross ton f.o.b. Birmingham district yards as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	14.00 to 15.00
Car wheels	13.00 to 14.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	12.00 to 13.00
Stove plate	11.00 to 12.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Dec. 27.

Pig Iron.—No sales of importance are reported this week, business being confined to car lots, of which possibly half a dozen or so changed hands. A textile machinery maker this week is expected to close on 250 tons No. 2 plain, and a like amount of No. 2 X, January delivery, and the Framingham Foundries, Framingham, Mass., on 350 tons, silicon 2.75 to 3.25, and 150 tons, silicon 2.25 to 2.75, first quarter delivery. A Vermont foundry is in the market for 500 tons No. 2 X iron, second quarter delivery, but few furnaces apparently are willing to sell so far ahead. Eastern Pennsylvania furnaces are quoting firmer prices and in some instances making a $1 differential between No. 2 plain and No. 2 X, and a $1.50 differential between No. 2 X and No. 1 X. The market for Buffalo iron also is firmer, the available tonnage obtainable for less than $19.50 having dwindled to small proportions and at least 50c. differentials being insisted upon. Virginia and Alabama irons are still out of range with Buffalo and eastern Pennsylvania, but an occasional car lot is taken for mixture purposes.

We quote delivered at common New England points as follows, having added to furnace prices $4.06 freight from eastern Pennsylvania, $5.46 from Buffalo, $6.58 from Virginia and $10.66 from Alabama:

East. Penn., silicon 2.25 to 2.75	$24.56 to $25.56
East. Penn., silicon 1.75 to 2.25	24.06 to 24.56
Buffalo, silicon 2.25 to 2.75	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25	24.46 to 25.46
Virginia, silicon 2.25 to 2.75	30.08 to 31.08
Virginia, silicon 1.75 to 2.25	29.58 to 30.58
Alabama, silicon 2.25 to 2.75	29.16
Alabama, silicon 1.75 to 2.25	28.66

Finished Iron and Steel.—Mill representatives report little activity in iron and steel, some saying incoming business is back to the June, last, basis. The market on shapes, plates and bars is largely nominal at 1.50c., Pittsburgh. New England rolling mill interests are offered heavy bars at $19 per gross ton alongside dock, New Jersey. Plates are selling in small lots, but the aggregate tonnage for the week is fairly large. Competition for business among the boiler makers continues keen. A Chicago concern bid $71,800 on an Arlington, Mass., tank job, involving the destruction of one and erection of another 300-ton plate tank, while a Holyoke, Mass., firm bid $29,737. These bids represent the two extremes. Stone & Webster, Boston, are asking bids on 800 tons of structural steel for a Western Union building at Philadelphia, and bids will be opened Jan. 12 on 400 tons for a Hudson County, N. J., hospital. A Providence, R. I., fabricator is awarded 300 tons for a local machine shop, and 214 tons for a Brookline, Mass., high school will be awarded this week.

Jobbers now quote: Soft steel bars, $2.71½ per 100 lb. base; flats, $3.21½; concrete bars, $2.20 to $2.71½; tire steel, $4 to $4.40; spring steel, open hearth, $4.50; crucible, $11.50; steel bands, $3.31½ to $3.78; steel hoops, $3.31½; toe calk steel, $5; cold rolled steel, $3.55 to $4.05; structural steel, $2.71½; plates, $2.81½ to $2.99; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.50; No. 28 galvanized sheets, $5.50; refined iron, $2.71½; best refined, $4.25; Wayne iron, $5.50; Norway iron, $5.50 base.

Warehouse Business.—The demand for warehouse products shows a further shrinkage, which is seasonable. Local quotations on cold-rolled steel have been reduced 20c. per 100 lb. to $3.55 to $4.05. Wire nails from stock are now $3.75 per keg base, as against $4, heretofore. Certain houses are eliminating all extras on horse shoes and offering to break packages, in an effort to reduce stocks. Picks and mattocks have been revised downward 10 per cent.

Old Material.—The old material market during the past week has been practically at a standstill. Even the American Steel & Wire Co., Worcester, Mass., has stopped buying, and purchases of machinery cast by the New England foundries is confined to minimum lots from local scrap dealers. In the absence of trading, prices have had little opportunity to change. Better conditions are anticipated after Jan 1, when some of the eastern and central Pennsylvania steel mills are expected to enter the market for material.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.00 to $19.00
No. 2 machinery cast	16.00 to 17.00
Stove plate	14.50 to 15.00
Railroad malleable	13.50 to 14.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$7.50 to $8.00
No. 1 railroad wrought	11.00 to 11.50
No. 1 yard wrought	9.00 to 9.50
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.00 to 7.50
Machine shop turnings	3.50 to 3.75
Cast iron borings, rolling mill	5.75 to 6.50
Cast iron borings, chemical	7.00 to 7.25
Blast furnace borings and turnings	3.50 to 3.75
Forged scrap and bundled skeleton	4.50 to 5.00
Steel car axles and shafting	11.50 to 12.00
Car wheels	11.00 to 11.50
Rerolling rails	10.00 to 10.50

Buffalo

BUFFALO, Dec. 27.

Pig Iron.—The American Radiator Co.'s current requirements are 4000 tons for use at Buffalo plants and all furnaces with one exception are seeking the business. The one producer not interested is producing basic iron and is not in position to consider the order as one of the conditions is that shipping must be completed within three weeks. A falling off in inquiry is likely due to firmness in prices. About 10,000 tons has been sold by one furnace and some unusual tonnages are involved, the entire lot consisting of six sales. The $20 base price ruled except on one lot of 400 tons of off-grade iron which went at $19. The $20 figure prevailed on sales of 2500 tons by another furnace. Some inquiry has appeared for second quarter business, but no quotations have followed. Less than 15,000 tons of new business has been booked and, of course, this is all for first quarter delivery.

We quote f.o.b. per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.00 to $21.00
No. 2X foundry, 2.25 to 2.75 sil.	19.50 to 20.50
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic	20.00 to 21.00
Malleable	20.00 to 21.00
Lake Superior charcoal	31.75

Finished Iron and Steel.—Holiday apathy is showing an effect on sales, but every indication is at hand that business will move briskly after Jan. 1. There is a more determined stand against price concessions and plus assurances that with inventories out of the way, a number of large buyers will come into the market, the entire prospect is very bright. Bars, shapes and plates are uniformly quoted at 1.50c. and but one mill is known to have dropped below this figure on ordinary tonnages, and this interest has quoted 1.40c. on bars, Pittsburgh. The sheet market is firm and an inquiry for 250 tons of black sheets brought out the same quotation from a widely-scattered group of sellers—$3.

Pipe, which has been in satisfactory demand, is slower and bolt and nut orders have also shown the effect of holiday lack of interest. One order for half a minimum car—12 tons, of bolts and nuts, represents the high point in recent demand for this commodity. The Buffalo Steel Car Co. is operating at full capacity on New York Central and Lackawanna requirements and on Dec. 28 will begin construction of 1000 steel hopper and gondola cars for the Buffalo, Rochester & Pittsburgh Railroad. The Buffalo Structural Co. is fabricating 300 tons of shapes for the Empire State Ice Co., Buffalo. The New York Central Railroad has settled with city authorities the matter of grade crossing elimination at several streets and work involving 2000 tons of shapes will be started soon.

Warehouse Business.—All lines were sluggish but salesmen generally understand a buying movement will begin soon after the holiday season. Wire nails have been reduced $5 per ton. On the whole, there is more confidence and definite information as to the lifting of several buying embargoes is given.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.80c.; plates, 2.80c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.70c.; hoops and bands, 3.30c.; blue annealed sheets, No. 10, 3.55c.; galvanized steel sheets, No. 28, 5.25c.; black sheets, No. 28, 4.25c.; cold-rolled strip steel, 5.90c.; cold-rolled round shafting, 3.80c.

Coke.—About 2000 tons has been sold and some evidences are at hand that a livelier market is in prospect. Prices on best grades range from $4.25 to $4.75 ovens.

Old Material.—Production is very light and the slightest interest in any material would likely develop in advance in prices. The same two mills have been buying heavy melting steel but tonnages at $13.50 are scarce.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $14.00
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	15.00 to 16.00
Car wheels	16.50 to 17.50
Machine shop turnings	7.50 to 8.00
Cast iron borings	7.00 to 8.00
Heavy axle turnings	10.50 to 11.50
Grate bars	12.00 to 13.00
No. 1 busheling	10.00 to 11.00
Stove plate	15.00 to 16.00
Bundled sheet stampings	8.00 to 9.00
No. 1 machinery cast	17.00 to 18.00
Hydraulic compressed	10.50 to 11.50
Railroad malleable	13.00 to 14.00

New York

NEW YORK, Dec. 27.

Pig Iron.—Inquiries for 4000 tons heretofore announced are still pending, but no new inquiries of importance have developed. The American Locomotive Co. purchased 800 tons for January delivery and the Essex Foundry 1000 to 2000 tons. An unusual fact at the close of the year is that many foundries, particularly in New England, have not bought a ton of iron the entire year and still have high priced iron on their yards or due on deliveries. Prices are about the same Buffalo merchant furnaces seem to be holding pretty closely to the $20 base for delivery within the state, but steel companies are credited with shading the market. The company whose Southern iron was reported offered for sale at $16.50 has made the explanation, telegraphed to this city, that the broker was not authorized to name that low figure.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.02 to 23.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	22.52 to 23.02
Buffalo, sil. 1.75 to 2.25	24.46 to 24.96
No. 2 Virginia, sil. 1.75 to 2.25	27.16 to 28.16

Cast-iron Pipe.—The year will close in contrast to its beginning; then operations were very slight, the most active plants operating at no greater than 25 per cent, while those same plants are now operating at 75 per cent capacity. As many new municipal administrations will be coming into office on Jan. 1, it is expected that many pipe orders will be placed. Much business is in sight for next year, particularly from New England. Judging by recent buying for delivery during the winter months, the consumers of pipe are not expecting any great drop in prices. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $52.30, with $4 additional for Class A and gas pipe.

Ferroalloys.—Sales of ferromanganese are confined to carload lots and the inquiries, amounting to about 600 tons, reported as before the market a week ago, have not yet developed into orders. A sale of a carload of British alloy at the full price of $58.35, seaboard, is noted. Demand for spiegeleisen is also confined to small lots at prevailing quotations and the same is true of 50 per cent ferrosilicon, buying of this material being confined to the immediate needs of consumers who are operating at a much reduced capacity. There is absolutely no interest in high grade manganese ore. Quotations follow:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$55.00 to $57.00
Ferrotungsten, per lb. of contained metal	.40c. to 50c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr., delivered	.11c. to 14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$2.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	.45c. to 50c.

Warehouse Business.—The market is extremely quiet and no changes of prices are reported. There is a belief that the new year will mark a certain degree of stiffening in quotations on all materials out of warehouse and slight reductions in a few products. Practically all orders placed with warehouses this week are for delivery next month. We quote prices on page 1710.

High Speed Steel.—The prevailing dullness of this market is accentuated this week by the closeness of the new year. Prices on 18 per cent tungsten high speed steel continue at from 85c. per lb. to 95c. per lb. with special brands bringing up to $1.05 per lb.

Finished Iron and Steel.—The recent reductions by the Steel Corporation in pipe and in wire products have had the effect of stopping buying rather than anything else. Many consumers approaching the new year with little or no stocks are intimating purchases of such a scale that if half of them do as is expected, the January volume will be encouraging to the mills. As it is, the year closes with structural steel unusually active for the season and continuing business promised in tin plate and pipe. So relatively little has been the buying in December that exporting has been proportionately quite a little larger than domestic business and for this Japanese buying is largely responsible. The Atlantic Refining Co. building, noted three weeks ago as awarded, has definitely been given to the American Bridge Co. Other awards include the Neumont Realty office building, West Forty-fifth Street, 600 tons; the Gunpowder Creek bridge, 500 tons, and to the Hedden Iron Construction Co., an apartment on the southwest corner of Eighty-fifth Street and Broadway, 800 tons. Bids have been taken on 650 tons for new stringers for the Queensboro bridge and bids will be taken this week on 1300 tons for 15 bridges for the Baltimore & Ohio. The Western Union Telegraph Co. is in the market for a 1000-ton building in Philadelphia. The Great Northern is asking for bids on a 200-ft. single track bridge span. Rail orders for 1922 are as yet disappointing. It is understood that the Louisville & Nashville has bought 50,000 tons and that the Carolina, Clinchfield & Ohio is in the market for 5000 tons for the summer of 1922, the Buffalo, Rochester & Pittsburgh for a like tonnage and the Florida East Coast for 7500 tons.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c.; plates, 1.83c. to 1.98c.; structural shapes, 1.88c. to 1.98c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Old Material.—The buying price of railroad heavy melting steel has been lowered 50c., due to a corresponding drop made by an eastern Pennsylvania steel mill,

which is now offering only $12. The market is experiencing the usual holiday stagnation. Though one broker has raised buying prices slightly on four items, the general tendency is downward. The trade is still giving thought to the scrapping of war vessels. One proposition suggested is that the principal steel companies in eastern Pennsylvania combine in financing a company for dismantling such ships. A New York broker was offered some foreign steel vessels, but wrote back that we are not yet able to take care of our own war ships.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.50 to $8.50
Steel rails, short lengths, or equivalent	8.50 to 9.00
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	28.00 to 30.00
Steel car axles	10.00 to 10.50
Iron car axles	18.50 to 19.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	8.25 to 8.75
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Cast borings (clean)	6.50 to 7.00
Machine-shop turnings	4.00 to 5.00
Mixed borings and turnings	4.00 to 4.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	6.75 to 7.25
Stove plate	9.00 to 10.00
Locomotive grate bars	9.00 to 10.00
Malleable cast (railroad)	8.00 to 8.50
Car wheels	10.50 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.50 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.50 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 14.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to 10.50

St. Louis

ST. LOUIS, Dec. 27.

Pig Iron.—The demand for pig iron may be said to be not large enough to establish a market price. Prices are made for each piece of business, and it is a case of barter between buyer and seller. Sales ranged from a carload to 800 tons, a Texas melter buying 100 tons of foundry iron and 200 tons of malleable and 100 tons of foundry iron. Inquiries include several totaling 700 to 800 tons for first quarter shipment, 1000 tons of foundry iron for immediate shipment to a western Missouri melter, and 700 tons for a southern Illinois melter. Inquiries are out for several cars each of ferromanganese and ferrosilicon, and for a carload of spiegeleisen. The eight stove and range interests reporting to the Federal Reserve Bank show declines of from 12 to 31 per cent in November sales as contracted with the same month last year, and losses of from 2 to 16 per cent under October totals.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$21.88 to $22.38
Northern malleable, sil. 1.75 to 2.25	21.88 to 22.38
Basic	21.88 to 22.38
Southern foundry, sil. 1.75 to 2.25	22.40 to 23.40

Finished Iron and Steel.—The usual holiday quiet prevails in the markets for finished iron and steel. Jobbers' stocks in this district are reported low, and business from this source is expected after the first of the year. The Missouri Pacific has an inquiry out for two cars of plates and the St. Louis & San Francisco Railroad wants 50 tons of structural bars and plates. Locally there is nothing being done in the building line. The contract for the Medical Arts Building, Dallas, Tex., involving 450 tons of bars has been awarded to George Hewitt, that city. Contracts will be let Jan. 3 for the Auditorium and Market House, Memphis, Tenn., involving 3000 tons of structural steel and 400 tons of bars.

For stock out of warehouse we quote: Soft steel bars, 2.77½c. per lb.; iron bars, 2.77½c.; structural shapes, 2.87½c.; tank plates, 2.87½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.15c.; cold drawn rounds, shafting and screw stock, 3.65c.; structural rivets, $3.52½ per 100 lb.; boiler rivets, $3.65; tank rivets, 7/16 in. and smaller, 60-10-10 per cent off list; machine bolts, large, 60-10 per cent; small, 60-10 per cent; carriage bolts, large, 55-5 per cent; small, 55 per cent; lag screws, 65-5 per cent; hot pressed nuts, square or hexagon blank, $4; and tapped, $3.75 off list.

Coke.—There has been a stronger movement of coke the last week against existing contracts. Miscellaneous orders were placed for carloads to 100 tons of foundry coke, but no tonnage of consequence was placed. Domestic coke is in heavier demand because of colder weather. The inquiry noted last week for 3000 tons of foundry coke is still open.

Old Material.—Except for a purchase of about 2000 tons of special heavy melting steel by a large consumer, the market for old material has been inactive. Rolling mill grades continue weak. Rerolling steel rails are also off, and are now quoted at $12 to $12.50 per gross ton. There is very little trading between dealers, and as the mills will not accept any more material during the remainder of this year, there is nothing to do but mark time, although dealers look for a better market shortly after the turn of the year. Railroad offerings before the market this week are: Atchison, Topeka & Santa Fe, 3700 tons; Pennsylvania, Northwestern Region, 2800 tons.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$15.50 to $16.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	12.00 to 12.50
Relaying rails, standard section	23.00 to 28.00
Cast iron car wheels	15.00 to 15.50
No. 1 heavy railroad melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	10.50 to 11.00
Ordinary shoveling steel	10.00 to 10.50
Frogs, switches and guards cut apart	11.00 to 11.50
Ordinary bundle sheet	4.50 to 5.00

Per Net Ton

Heavy axles and tire turnings	$5.50 to $6.00
Iron angle bars	13.50 to 14.00
Steel angle bars	10.00 to 10.50
Iron car axles	18.00 to 18.50
Steel car axles	13.50 to 14.00
Wrought iron arch bars and transoms	13.50 to 14.00
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	11.50 to 12.00
Steel couplers and knuckles	11.50 to 12.00
Locomotive tire, 42 in. and over, smooth inside	8.50 to 9.00
No. 1 dealers' forge	7.50 to 8.00
Cast iron borings	6.00 to 6.50
No. 1 bushelings	9.00 to 9.50
No. 1 boilers cut in sheets and rings	7.50 to 8.00
No. 1 railroad cast	13.50 to 14.00
Stove plate and light cast	12.00 to 12.50
Railroad malleable	9.50 to 10.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.50 to 8.00
Heavy railroad sheet and tank	6.50 to 7.00
Light railroad sheet	4.50 to 5.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	5.00 to 5.50
Country mixed iron	7.00 to 7.50
Uncut railroad mixed	7.50 to 8.00
Horseshoes	10.00 to 10.50
Railroad brake shoes	9.50 to 10.00

Cleveland

CLEVELAND, Dec. 27.

Iron Ore.—With the restoration of the higher rail rates on ore from Lake Erie docks to interior furnaces, to become effective Jan. 1, dock shipments continue fairly heavy. These up to Dec. 22 aggregated 544,710 tons, or at the rate of about 700,000 tons for the month. The ore balance on Lake Erie docks and in furnace yards Dec. 1 was 38,300,000 as compared with 41,500,000 tons on the same date a year ago. The amount of lake ore consumed in November was 2,188,000 tons as compared with 1,833,000 tons in October.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Sales have kept up to about the recent volume in spite of the holiday period and inquiry is slightly more plentiful, particularly from the East. The market continues weak. While no lower prices are reported than have appeared during the past two weeks, lower quotations on foundry iron seem to have become more general. On this grade there is a spread of from $19 to $20 in quotations, depending upon the amount required and whether the inquiry comes from a competitive point having about the same freight rate from two or more furnaces. However, for No. 2 foundry iron $19.50 seems to have become the more common quotation. One local interest sold over 5000 tons during the week and another lake furnace 2800 tons. One order for 1000 tons was placed by a Pittsburgh district consumer with a Cleveland producer at $19.50 at a western Pennsylvania furnace. The Cleveland delivery local

furnace prices are unchanged at $20 to $20.50 at furnace for No. 2 foundry. Most sales are in small lots for early shipment, but some business has been taken for the first quarter delivery, including a 500-ton lot of foundry iron placed by a Springfield, Ohio, consumer. Two inquiries for malleable iron aggregating 1000 tons have come from Columbus and Indianapolis melters. There is no activity in steel-making iron. The Trumbull-Cliffs Furnace Co., Warren, expects to blow in its stack Jan. 15 and will have some surplus basic iron for the market. Stocks in many furnace yards are low and an improvement in shipment is expected in January.

Quotations below are f.o.b. local furnace for Northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.21 to $20.71
Northern No. 2 fdy., sil. 1.75 to 2.25	19.00 to 20.00
Southern fdy., sil. 2.25 to 2.75	24.67 to 25.17
Ohio silvery, sil. 8 per cent	32.86
Standard low phos., Valley furnace	34.00

Coke.—Some carlot sales of foundry coke are being made with $4 to $4.25 as the more common quotations for the better makes of Connellsville foundry coke.

Finished Iron and Steel.—With the holiday lull, the volume of new orders is very light. However, the leading interest reports that its December business will exceed that of November in this district. Generally prices are holding firm to 1.50c. as a minimum on steel bars, plates and shapes, although an Ohio fabricating shop is understood to have secured a lower price on part of an order for approximately 1750 tons of highway bridge material which was divided between two mills. Small lots of boiler plates are being booked at 1.60c. and on plates lighter than 3-16 in., 1.65c. seems to be the common quotation. Sales of hoops are reported at 1.90c., or $2 a ton lower than the recent minimum quotation. The purchase of 3000 tons of reinforcing bars for the Baldwin Reservoir of Cleveland has been deferred, as none of the steel will be needed before spring. In structural lines the Fort Pitt Bridge Works has taken the Warranty Secured Discount Co. building, Akron, requiring 1100 tons of structural steel. Lake shipyards are asking for prices on plates and shapes apparently for use in making estimates on the cost of boats with a view of interesting boat operating companies in placing orders. It is believed that the reduced cost of lake freighters will bring out orders for some boats next year. The large number of lake vessels damaged at Buffalo recently will necessitate repair work probably requiring a considerable tonnage of plates.

Jobbers quote steel bars, 2.54c.; plates and structural shapes, 2.64c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.14c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Warehouse Business.—Price concessions are appearing on round lots of steel from warehouse, but prices are well maintained on small orders. The demand is light.

Wire Products.—Independent mills have followed the lead of the American Steel & Wire Co. in reducing prices to 2.50c., Pittsburgh, on nails and 2.25c. on plain wire. Orders will be taken for the first quarter at the new prices, but so far the price reduction has done little to stimulate business. The leading interest has named $38 as its new price on wire rods.

Sheets.—Some carlot orders are being placed for January shipment, but as a whole the market is dull. Mills are maintaining regular prices, but a Valley district broker is offering black and galvanized sheets at a price concession of $3 a ton.

Bolts, Nuts and Rivets.—New orders for bolts and nuts are very light. There is some inquiry for rivet contracts for the first quarter, but the leading local maker is declining to make contracts for that delivery until after the first of the year. Prices as low as 2.20c. for structural and 2.30c. for boiler rivets are reported, but small lot sales are being made at regular prices.

Old Material.—A West Virginia mill has placed an order with a local dealer for 500 tons of compressed steel scrap for January delivery at $11.75 and a Cleveland consumer has purchased a small tonnage of heavy melting steel. Outside of these sales, the market was very quiet during the week, but considering the dullness, prices are firm. Shipments have slowed down owing to the holding up of deliveries by mills during the holiday season. In addition to temporary suspensions by other mills reported last week, the Sharon Steel Hoop Co. has held up deliveries. Cast borings and mixed borings and turnings are slightly firmer locally because of some recent Cleveland demand.

We quote per gross ton, f.o.b. Cleveland, as follows:

Heavy melting steel	$11.50 to $12.00
Steel rails, under 3 ft	12.50 to 13.00
Steel rails, rerolling	14.00 to 14.50
Iron rails	12.00 to 12.50
Iron car axles	18.00 to 19.00
Low phosphorus melting	13.00 to 13.50
Cast borings	8.60 to 9.00
Machine shop turnings	7.50 to 7.60
Mixed borings and short turnings	8.60 to 9.00
Compressed steel	8.75 to 9.00
Railroad wrought	12.00 to 12.50
Railroad malleable	12.50 to 13.00
Light bundled sheet stampings	6.00 to 7.00
Steel axle turnings	9.00 to 10.00
No. 1 cast	15.00 to 16.00
No. 1 busheling	8.25 to 8.75
Drop forge flashings, over 10 in	7.50 to 8.00
Drop forge flashings, under 10 in	7.50 to 8.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	8.50 to 9.00

Philadelphia

PHILADELPHIA, Dec. 27.

Pig Iron.—In an otherwise dead market, a flurry in pig iron buying during the past week is outstanding. Competition among furnaces for sufficient business to remain in blast without piling iron brought out such low prices that some buyers decided they could do no better by waiting and a few substantial tonnages were placed, the largest of which was 3000 tons bought by a cast iron pipe company at $18, furnace, for No. 2 plain. In this instance, however, the furnace company had a freight rate which brought the delivered price to more than $20, and this is not far out of line with delivered prices which have been made by other furnaces closer by. Most of the week's foundry iron business has been taken at $19 to $19.50, furnace, for No. 2 plain and $20 to $20.50 for No. 2X. The bulk of the low-priced business was taken by two furnaces, one of which has only recently gone in blast. It booked 9000 tons within 10 days and then advanced its prices to a minimum of $20 for No. 2 plain and $20.50 for No. 2X. Other furnaces are also quoting these prices, though some quotations at or around $19 for No. 2 plain are still outstanding. As the furnaces which have been making the lowest prices are now fairly well filled up for the present, there is a better tone in the market. In the past two weeks fully 50,000 tons of foundry iron has been sold by eastern Pennsylvania furnaces and the total of all grades for three weeks is about 75,000 tons. Some fairly good-sized inquiries are still pending, including one for 2000 tons from the Central Foundry Co. Buyers have become a bit hesitant because of the weakness in prices and on this account there has been delay in closing certain business for first quarter. An Eastern steel company last week bought 2000 tons of basic at $20.25, making a total of 8000 tons contracted for by this company within two weeks, delivered prices being identical, though three furnaces divided the business. Makers of low phosphorus iron have reduced prices in an effort to stimulate buying, copper free iron now being quoted at $30, furnace, and copper bearing iron at $28, furnace. Other grades are inactive and prices are nominal. The Brooke furnace was blown in to-day.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	20.25
Gray forge	21.00 to 22.00
Malleable	23.00 to 24.00
Standard low phos. (f.o.b. furnace)	36.00
Copper bearing low phos. (f.o.b. furnace)	28.00

Ferroalloys.—There is very little business and no changes in prices of ferromanganese or spiegeleisen. The former is quoted by Eastern makers at $58.35, seaboard, which is also the British price, and spiegeleisen is quoted from $25 to $27, furnace.

Coke.—Foundry coke is obtainable at $4, Connellsville, and furnace coke from $3.10 to $3.25 on contract, with distress coke offered at lower prices.

Billets.—Open-hearth rerolling billets have sold at $28 and forging billets at $32, Pittsburgh. There is very little demand.

Finished Steel.—Consumers and jobbers have been buying very sparingly in the past week. Some steel companies' local sales offices have taken almost no business worth mentioning. Prices nominally remain unchanged, 1.50c., Pittsburgh, for plates, shapes and bars, but as has been usual for several months, concessions are made on desirable business. On a round lot of plates, shapes and bars for an Ohio fabricator an Eastern steel company quoted 1.425c., Pittsburgh, and got part of the business at this price. One order for a few hundred tons of sheets for car work stands out as exceptional in the quietness of the steel market. An inquiry for 1200 tons of shapes for the proposed new Western Union Building is in the market.

Bar Iron.—Not enough business in bar iron has been done to test the current price of 1.50c., Pittsburgh, which is quoted by most of the Eastern mills.

Warehouse Business.—There have been no changes in prices on steel out of stock in the past week. Quotations for Philadelphia delivery are as follows:

Soft steel bars and small shapes, 2.65c.; iron bars (except bands), 2.65c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 2.95c.; round edge steel planished, 3.70c.; tank steel plates, ¼-in. and heavier, 2.75c.; tank steel plates, 3/16-in., 2.925c.; blue annealed steel sheets, No. 10 gage, 3.50c.; light black sheets, No. 28 gage, 4c.; galvanized sheets, No. 28 gage, 5c.; square twisted and deformed steel bars, 2.65c.; structural shapes, 2.60c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 3.25c.; squares and hexagons, cold-rolled steel, 3.75c.; steel hoops, No. 13 gage and lighter, 3.50c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.25c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Old Material.—Demand for scrap has fallen away almost to nothing. Prices are unchanged. The following quotations stand, in the absence of transactions, as nominally the market on the various grades for delivery at consumers' works in this district:

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	16.25 to 16.75
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.50 to 17.00
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	12.00 to 12.50
No. 1 forge fire	9.50 to 10.00
Bundled sheets (for steel works)	9.50 to 10.00
No. 1 busheling	12.00 to 13.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	9.00 to 9.50
Mixed borings and turnings (for blast furnace use)	9.00 to 9.50
Machine-shop turnings (for rolling mill and steel works use)	9.00 to 9.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for steel works and rolling mills)	11.50 to 12.00
Cast borings (for chemical plants)	13.50 to 14.00
No. 1 cast	16.50 to 17.00
Railroad grate bars	14.00 to 14.50
Stove plate (for steel plant use)	14.00 to 14.50
Railroad malleable	13.50 to 14.00
Wrought iron and soft steel pipes and tubes (new specifications)	11.50 to 12.00
Iron car axles	No market
Steel car axles	17.00 to 18.00

The Gehl Brothers Mfg. Co., West Bend, Wis., manufacturer of farm operating equipment, and conducting a foundry and machine shop business, has increased its capital stock from $200,000 to $350,000, of which $250,000 is common and $100,000 preferred stock. The new issue will be employed in the development of the business. No immediate enlargement of plant and equipment is contemplated.

Ralph A. Kellogg, secretary of the Lackawanna Bridge Co. and the Ferguson Steel & Iron Corporation, Buffalo, has called a special meeting of stockholders on Jan. 3, at the company's offices, 536 Ellicott Square, for approval of the proposed sale of both properties to the Lackawanna Steel Co., Buffalo.

Cincinnati

CINCINNATI, Dec. 27.

Pig Iron.—As was expected, the holiday week in the market was a quiet one. There were, however, occasional carload sales made, and in one case 500 tons of Southern iron was bought by an Ohio melter. This was the only sale of consequence in the Cincinnati district. Radiator interests are reported to have booked considerable tonnages of iron for first quarter delivery, the iron coming from Buffalo, Valley and Birmingham districts, and it is reported that the price on the Northern iron was $19, furnace, while that on Southern was $17. There is very little inquiry. An Indianapolis melter is in the market for 300 tons of malleable, a northern Ohio melter for 300 tons of foundry, and an Indiana melter for 100 tons of low phosphorus. A Cleveland district melter is inquiring for 1000 tons of Bessemer iron. An Illinois car wheel manufacturer is inquiring for 250 tons of high silicon iron and 200 tons of ferromanganese for shipment to its Michigan plant. There have been no price changes reported, Southern iron being quoted at $17, Birmingham and Northern at $19.50 to $20. The trade is rather expectant of some business developing during the month of January, and is very much encouraged over the prospects. Sarah Furnace of the Kelly Nail & Iron Co. in southern Ohio will blow in Jan. 1, while Jisco Furnace in Jackson County will go out during the present week. It is expected that the Portsmouth stack will be lighted soon after New Year's.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$21.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	22.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	$22.02 to 22.52
Basic, Northern	22.02
Malleable	22.52

Finished Material.—The market is passing through the customary quietness of the holiday period, and very few orders are being placed. Orders for wire products for delivery during the first quarter have been booked on the basis of the new prices quoted by the American Steel & Wire Co., effective Dec. 21. This new schedule makes the price of common wire nails $2.50 per keg base, Pittsburgh, and plain wire $2.25 per 100 lb., Pittsburgh. Corresponding reductions have been made on other wire products. An independent company reports receipt of an order for 300 tons of structural steel from a central Ohio fabricator. This business was placed on the basis of 1.50c., Pittsburgh. A number of inquiries for reinforcing bars are also before the trade. Prices on the heavier steel products show very little change, the usual quotations on bars, shapes and plates being 1.50c., Pittsburgh. In sheets there is very little inquiry and the prices are holding firmly at 3c. for black and 4c. for galvanized. Some activity is apparent in the structural field. The largest project up for bids is a warehouse for the Belknap Hardware Co. at Louisville, Ky. This will take 2200 tons of reinforcing bars and 3000 tons of structural steel. Bids will close on Dec. 29. Bids are also in for a Shriner's Temple at Charleston, W. Va., taking 600 tons. The Elks Temple, Cincinnati, taking 300 tons, will likely be awarded this week. An hotel in Johnston City, Tenn., taking 550 tons, will be up again shortly, as some revision has been made in the plans. Pending projects include an office building at Memphis, Tenn., 600 tons, and the Catholic Club at Memphis, Tenn., 900 tons. These are expected to come up shortly after the first of the year. Lettings include 300 tons to the Belfontaine Bridge Co. for an erecting shop for the Illinois Car Co. at Urbana, Ohio, and a hotel at Frankfort, Ky., 250 tons, to a Louisville fabricator.

Coke.—There is very little activity in the coke market. A southern Ohio furnace has closed on 2500 tons of furnace coke per month, for three months, at a reported price of $4.50, West Virginia ovens. A central Ohio melter also purchased 300 tons of foundry coke for February shipment. With these exceptions, sales are confined to carloads. There is practically no inquiry.

Warehouse Business.—Warehouse business is very quiet, due no doubt, to the holiday period. In view of the depleted condition of stocks, however, it is expected that much improvement will be shown after the first of the year. Prices are unchanged.

Iron and steel bars, 2.90c. base; hoops and bands, 3.50c. base; shapes and plates, 3c. base; reinforcing bars, 2.97½c. base; cold rolled rounds, 1½-in. and larger, 3.70c.; under 1½-in. and flats, squares and hexagons, 4.20c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3 per 100 lb.

Old Material.—Dealers report business as still stagnant. It is reported that a Valley consumer bought in the neighborhood of 2000 tons of heavy melting steel, at an unnamed price. Locally the market is very quiet, but prospects for the future are brighter, in the opinion of local dealers. Prices are unchanged.

We quote dealers' buying prices, f.o.b. cars:

Per Gross Ton	
Bundled sheets	$3.50 to $4.00
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.50 to 11.00
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 9.50
Car wheels	12.00 to 13.00
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	3.00 to 3.50
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	13.50 to 14.50
Burnt scrap	7.50 to 8.00
Iron axles	15.50 to 16.50
Locomotive tires (smooth inside)	9.50 to 10.00
Pipes and flues	4.00 to 4.50

Belgium Feeling British Competition

BRUSSELS, BELGIUM, Dec. 8.—The dullness in the Belgian iron and steel market continues, although there is some exporting to neighboring markets. Belgian bars are being consumed in fair quantities by the United Kingdom manufacturers of screws and bolts, and there is a more pronounced demand from English shipyards for iron of the quality used in making chains. Of late there has been a slight diminishing in the exports of Belgian and French irons to England, Cleveland makers having reduced quotations by about 10s.

With the approach of Christmas a heavy influx of cutlery and other metal utensils from Sheffield, England, has been noted to the detriment of the domestic product. Spanish speaking markets and the British colonies have inquired for, and purchased, sheet copper products, valves, filters, water meters, pressure and steam gages, small metal specialties of German and Austrian manufacture have almost completely displaced the British products in Belgium and in England. The British Board of Trade is considering protests of English manufacturers, who claim that this influx of Continental products constitutes dumping.

The strong effort of British rolling mills for export business is beginning to be felt by the Belgian export trade, which considered that it had gained a permanent and fairly secure foothold in many foreign markets. Much capital seems to be made by British sellers of the unsettled and disorganized conditions of Continental sellers and the consequent uncertainty of deliveries in view of strikes and other obstacles. The situation among Belgian rolling mills is not of the best, but one of the principal reasons has probably been the extremely independent attitude of many mills toward rolling any but specification material, which they consider sufficiently remunerative. The recent increase of 2s. to 5s. per ton on semi-finished material has resulted in the almost complete stoppage of English orders.

Among recent export contracts of size is about 5000 tons of rails sold to Japan at about $45 per ton, c.i.f. port. Belgian foundry iron has been offered at $25 per ton on the Pacific Coast of the United States.

It is announced from Wabash, Ind., that the Service Motor Truck Co. of that city has completed negotiations with the Polish Government for 1300 trucks, parts and tires, representing a value of $8,500,000, the first shipment of which has gone forward.

British Iron and Steel Market

Holiday Season Has Curtailed Business—Galvanized Sheets Weak—Railroad Rate Reductions Less Than Expected

(By Cable)

LONDON, ENGLAND, Dec. 24.

As there is a holiday until Wednesday (Dec. 28) most works are closing until after the new year begins. Railroad rates for raw materials and certain classes of manufactured iron and steel have been reduced 25 per cent. Traders, however, are not over hopeful, as a greater reduction had been anticipated.

There is more inquiry for Cleveland pig iron, but little business. Steel rails have been reduced 20s. ($4.20) for home buyers. There is more business moving, but not enough to keep the works employed.

German merchant bars have been sold to India at £8 7½s. (1.57c. per lb.) c.i.f. China bought merchant bars at £9 15s. (1.83c. per lb.) c.i.f., but is now offering £9 5s. to £9 7½s. (1.73 to 1.76c. per lb.) c.i.f.

German structural steel (beams) is being sold at £7 10s. (1.41c. per lb.) f.o.b., for January shipment. Belgian angles are quoted at £7 10s. to £7 15s. (1.41 to 1.45c. per lb.) f.o.b., for first half of January. German wire rods are being sold at £8 10s. ($35.70) f.o.b. for first quarter shipment.

Tin plates are weaker on the continuance of forced liquidation. Prompt 28 x 20's have sold at 40s. ($8.40) f.o.b. for December delivery. For far forward shipment, sales are done at less. Export demand has decreased. Home trade is buying odd sizes at 20s. ($4.20) basis for January delivery.

India has bought fair lines of 24-gage galvanized sheets at £16 12½s. and £16 10s. (3.12c. and 3.09c. per lb.) f.o.b. for January delivery. The market is weak.

We quote gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $4.20 per £1 as follows:

Durham coke, delivered	£1	8½	to £1	10		$5.98 to $6.30	
Cleveland No. 1 foundry	5	5	& 5	10*		22.05 & 23.10*	
Cleveland No. 3 foundry	5	0	& 5	5*		21.00 & 22.05*	
Cleveland No. 4 foundry	4	15				19.95	
Cleveland No. 4 forge	4	10				18.90	
Hematite	7	0*				29.40*	
East Coast mixed	5	0	& 5	2½*		21.00 & 21.52*	
Ferromanganese	15	0	& 14	10*		63.00 & 60.90*	
Rails, 60 lb. and up	8	10	to 9	10		35.70 to 39.90	
Billets	8	0	to 8	5		33.60 to 34.65	
Sheet and tin plate bars, Welsh	7	15				32.55	
Tin plate, base box	0	19¾	to 1	0¾		4.15 to 4.36	
						C. per Lb.	
Ship plates	9	10	to 10	10		1.78 to 1.97	
Boiler plates	14	0	to 14	10		2.62 to 2.72	
Tees	10	0	to 11	0		1.87 to 2.06	
Channels	9	5	to 10	15		1.73 to 2.02	
Beams	8	0	to 10	0		1.50 to 1.85	
Round bars, ¾ to 3 in.	10	5	to 10	10		1.92 to 1.97	
Galvanized sheets, 24 g.	16	10	to 17	0		3.09 to 3.19	
Black sheets	14	0				2.62	
Steel hoops	12	0	& 12	5*		2.25 & 2.30*	
Cold rolled steel strip, 20 g.	24	10				4.59	

*Export price.

Continental Competition in Pig Iron and Steel Rapidly Diminishing—Sentiment Better

LONDON, ENGLAND, Dec. 14.—The improvement in trade conditions, which has been eagerly looked for so long, has only made its appearance in a few branches of the iron and steel industry, such as the galvanized sheet and tin plate trades, though generally speaking all improvement is very gradual. However, sentiment is considerably better, based on settlement of the Irish question, the favorable progress which is being made at the Washington conference and the talk of some new conditions being arrived at in respect of payment of reparations by Germany. These factors, together with the fact that labor has more or less settled down, gives a generally more hopeful feeling. At the time of writing no strikes are threatened, though wages are being cut.

Business in pig iron does not expand. Makers keep cutting prices but buyers are shy at placing or-

ders for anything like substantial quantities while the uncertainty of values lasts and while there are reasonable hopes of railroad rates being considerably reduced. No. 3 Cleveland iron at 100s. per ton, delivered consumers' works, easily competes with Continental pig iron, and supplies of that material coming to this country are diminishing, especially as Continental prices have been raised, owing to shortage of fuel there. During the week two Cleveland furnaces, which were producing basic pig iron, have been transferred to foundry iron, making five furnaces producing the latter. The hematite market is weak. There is some scattered demand, but it is insufficient to absorb production, especially as four more furnaces have recently been started. Rather than put this iron into stock, makers are cutting prices. East Coast mixed numbers are now worth not more than about 102s. 6d.

Foreign ore is to all intents and purposes a dead market. Here and there one hears of small cargoes changing hands, but the Spanish mine owners are not at all inclined to reduce their selling prices. Best Bilbao rubio is nominally about 26s. to 27s., ex-ship Tees.

In finished and semi-finished iron and steel, Continental competition is out of the running for semi-finished material, but in finished steel competition from that source is still an important factor. Makers here, however, are, as far as they are able, taking steps to secure orders and very low figures are heard of in connection with special sales for export. How long they hope to be able to do so is uncertain, as selling at these figures entails considerable loss, and while some makers are adopting this policy, others would sooner curtail or cease production. Of course, if railroad rates came down, as indeed it is hoped they will, steel makers would have a chance to secure orders, but the general demand at the present time is totally inadequate.

Swan, Hunter & Wigham Richardson, Ltd., has secured contracts for two small vessels for use on Canadian lakes. The order is not an important one in respect of size, but it is distinctly encouraging.

Experimental Work of the Bureau of Mines

At the experiment station of the Bureau of Mines at Seattle, Wash., further studies of the carburization of iron have been made in connection with the production of synthetic gray iron from scrap steel or from sponge iron. This study includes the introduction of carbon in presence of varying amounts of silicon, manganese, sulphur, etc. New and interesting results bearing upon the carburization of iron are being obtained.

In a general study of drill steel problems, being conducted at the Mississippi Valley station of the bureau, a report on the results of rock drill tests in the Missouri-Kansas-Oklahoma zinc district has been completed. Another phase of the drill steel problem, to determine the best composition of a straight carbon steel for drilling in granite, has been assigned to two "fellows" in the Missouri School of Mines, with Prof. C. R. Forbes and C. Y. Clayton acting in an advisory capacity. Plans and specifications are being drawn for constructing an oil-fired furnace to heat drill steels.

Work formerly done at the Berkeley, Cal., station of the bureau on the reduction of iron oxides with various reducing gases (producer gas, oil gas, etc.), showed that methane probably does not function actively in the reduction of iron oxides at temperatures up to 1470 deg. Fahr. To check up this point and to find out at just what temperature it does begin to function actively, work is being done on the preparation of pure methane and its application to various oxides of iron.

In connection with the general study of Neumann bands in steel, being conducted at the station of the bureau at Minneapolis, Minn., a special study has been made of the results obtained in subjecting mild steel disks to sudden distortion by means of explosions of various velocities.

In the course of the experiments regarding the reduction of iron oxide, 75 experiments were recently performed at the Minneapolis station of the bureau on the resistance encountered by a stream of air in passing through a bed of ore and of coke. Fifty additional experiments on the transfer of heat from a gas to a solid were carried out, for the case of air passing through a bed of lead shot. These experiments on the resistance of gases, and the transfer of heat, constitute data necessary to the design of the experiments on the reduction of ore by gases, and are a particularly essential pre-requisite to any attempt at an engineering application of the results.

Investigations at the Pittsburgh experiment station of the bureau on the technology of aluminum, include studies of causes for and prevention of cracks in aluminum-alloy castings; disintegration of aluminum-manganese alloys; analysis of aluminum and aluminum alloys; the contraction and shrinkage of aluminum alloys; and the effect of remelting aluminum alloys.

BRAZIL BUYS MACHINERY

Excavating Machinery Will Be Supplied for Rio de Janeiro Contract—Japan Closing on Heavy Rail Tonnage

NEW YORK, Dec. 27.—There is but little change in the export situation as the year ends. Japanese buying continues at about the same level and Japanese export houses report numerous orders, principally for sheets, booked with American mills for delivery, c.i.f., Japanese ports, during the first quarter of 1922. Government purchasing of railroad material as well as private purchases is continuing up until the last days of the year. The Imperial Government Railways in Japan will decide this week upon the purchase of 13,000 tons of 60-lb. and 75-lb. rails and the Hanshin Electric Railways will close before Jan. 1 on 3500 tons of 100-lb. rails. Rails purchases in the United States by the Government railroads in Japan during the past year are estimated to have been in the neighborhood of 50,000 to 60,000 tons total.

Other foreign markets are generally quiet, although oil and other developments in South America have resulted in some inquiry from South American markets. Besides the development of the oil fields of the Comodoro Rivadavia in Argentina, discovery of some oil in the province of Antofagasta, Chile, has resulted in the formation of the Comunidad de Petroleos de Antofagasta. Oil fields in Santa Cruz, Bolivia, will probably be exploited by an American company formed for the purpose, according to the Bureau of Foreign and Domestic Commerce.

The Austin Machinery Corporation, 30 Church Street, New York, will supply the total equipment used in the removal of a hill in the city of Rio de Janeiro, Brazil. The work, which will be performed by Kennedy, Leonard & Co., New York, involves the removal of a hill in the city, covering about 145,000 square meters. The equipment used will total about $12,000,000 and includes coal handling machinery, steam shovels, excavators, concrete mixers, trenching machinery, back fillers, cranes and gasoline locomotives. The Austin corporation recently booked an order for $145,000 worth of road-making machinery for the city of Mexico, which included a tonnage of narrow gage track and six steam shovels.

In connection with the electrification of the Chilean State Railroad, operated by the Government of Chile, Santiago, Chile, the contract for which has been awarded to the Westinghouse Electric & Mfg. Co., 165 Broadway, New York, five electric power houses will be constructed for power supply, with estimated capacity of about 60,000, and feeder and operating lines for a distance of over 230 miles. The entire project is estimated to cost about $6,500,000, and will require close to 24 months to bring to completion. The line will operate between Santiago, Valparaiso, Llay Llay and Los Andes. A total of 59 electric locomotives will be provided, averaging from 39 to 112 tons each.

NOTHING IS SETTLED

Such Is the Opinion of the Attorney for the National Lumber Manufacturers' Association as to Recent Decision

L. C. Boyle, counsel for the National Lumber Manufacturers' Association, has made an extended statement in regard to the recent decision of the Supreme Court of the United States in what is known as the Hardwood Lumber case, in which the majority opinion was delivered by Justice Clarke, with Justices Brandeis, Holmes and McKenna dissenting. Mr. Boyle's statement in part was as follows:

"The majority opinion adopts the theory as outlined by the Government in its briefs. It would be an idle thing for me at this time to quarrel with the opinion. That the majority of the court has reached an erroneous conclusion is to me manifest. In the nature of things that would be my natural reaction. The great and disappointing thing to me, however, is that the decision does not settle anything. It is true the court holds that this group of hardwood lumber manufacturers were in a conspiracy to restrain trade. However, no yardstick is laid down whereby other groups may find guidance. The great and outstanding thing that we urged the court to decide, to wit, Would it be lawful to gather and distribute statistics covering records of past sales, stocks on hand and production? is left in a confused and doubtful position. In a word, the court assembles all of the activities in which our group indulges, to wit, the publication of the market letter, the distribution of the questionnaire, the collection of sales and stock data, the holding of monthly meetings, and holds that these things comprehend the conspiracy; whereas it was our earnest appeal to the court to indicate what would be legal touching any of these activities as distinguished from what might be illegal as to any of them.

The Vital Element

"There is language in the decision that would indicate that our conduct might have been held legal had we not indulged in certain activities. In other words, if all we did was to collect statistics and distribute the same, such course might not have been held illegal. However, this vital element is left undecided and uncertain.

"There still remains an opportunity to have this question further considered by the Supreme Court. The rules of the court permit the filing of a petition for a rehearing during the term in which a decision is handed down; therefore, we will have opportunity to challenge to the court's attention matters of fact and law wherein it will be pointed out the opinion is in error.

"It may be of interest to here and in a very brief way call attention to certain of these items; it will be noted that the opinion adopts the Government's charge that the plan was designated to and did achieve curtailment of production, whereas counsel representing the Government in the first oral argument frankly admitted to the court that there was no evidence in support of the charge of curtailment and in the Government's original brief this phase of the Government's charge is formally abandoned. Of course, the Government was driven to this position due to the unquestioned state of the record. Nevertheless, the court's opinion is largely devoted to this curtailment phase and the conclusion is definitely asserted that as a part of the conspiracy curtailment of production was involved.

May Grant Rehearing

"I cannot help but feel that when the court's attention is definitely called to its error of conclusion as to this all-important item the petition to rehear will be granted. Again, the Government in its original oral argument formally admitted that it would not be illegal for a group of operators to gather and disseminate statistical information when the same was done solely for informative purposes. Due to this admission, Mr. Todd and myself were justified in concluding that the court would at least recognize our right to gather and disseminate statistics when same was not done as a means for carrying out some kind of an illegal compact. However, as the court's opinion stands it is difficult to determine whether we would be permitted to do this thing and if it be the law that this would be permitted then the injunction of the lower court should be modified, whereas the lower court's injunction is sustained in all respects.

"One reading this opinion, and who is a stranger to the record would unquestionably get impressions that are not justified by the record itself, and it is just possible that the true state of this record has escaped the Court. To illustrate: In outlining the activities of the Association the Court reviewed the various items as stated in the paper plan as originally conceived. But the opinion does not in any place call attention to the fact that many of these activities were never put in play. For instance, the original plan provided for a daily shipping report; also for the exchange of price lists; also inspection reports. Now, none of these activities were ever indulged, and yet one who reads this opinion and who is not familiar with the facts would get the impression that these matters were involved in the working out of this claimed conspiracy.

Group Meetings

"Again, there were group meetings held throughout the territory wherein the members of the plan had their operations. In reading the opinion one would get the impression that all the members of the plan had gathered in group meetings once a week, or in other words, that the plan was so adjusted that there were constant elbow touch between all the co-operators, whereas the truth is, and concerning which there is no dispute, that during the whole life of the plan the 300 odd members never did meet in one meeting. These group meetings were held in the various territories for the convenience of the members. Those who lived close to one meeting place attended that meeting and not the others, and less than 50 per cent of the members attended any group meeting. However, one reading this opinion would get an entirely different understanding of this phase. It is possible that the Court itself has been misled.

"It may be recalled that in my oral argument I definitely stated that there were two items in which we were vitally concerned, to wit: the sale and stock reports. I urged the Court that if in its judgment it was illegal for an Association to send out market letters that sought to interpret statistics, would it be legal to gather and disseminate statistics without market letters or any comment? I conceived that this was a practical suggestion and as a lawyer I know I was entirely within my province in making same. Unfortunately, however, the Court does not directly and definitely decide the matter. In other words, it is difficult to determine, in the light of this decision, what the Court's opinion would be if there was nothing involved but the gathering and assembling of statistics covering past transactions. This was indeed the very heart of our law suit. The market letters, the questionnaire, the group meetings were but casual and of no moment.

Definite Guidance Lacking

"It is indeed unfortunate that the court did not give definite guidance so that those industries that have no common markets would know the legal limitations, because if the court did hold that under no circumstance could industry keep itself informed by means of associated effort, then Congress would have to relieve the situation.

"The problem will be carefully reviewed in our application for a rehearing and the members can depend upon it that all will be done that is possible. You can well understand that this opinion came as a distinct shock to me. The more I read the opinion the greater is my disappointment."

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Detroit	0.325	Jacksonville, all rail	0.555
Cincinnati	0.325	Jacksonville, rail and water	0.46
Indianapolis	0.345	New Orleans	0.515
Chicago	0.38		
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.50c. to 1.60c.

Sheared plates, ¼ in. and heavier, tank quality, 1.50c. to 1.60c.

Wire Products

Wire nails, $2.50 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.25 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.25; galvanized wire, $2.75; galvanized barbed wire, $3.15; galvanized fence staples, $3.15; painted barbed wire, $2.65; polished fence staples, $2.65; cement-coated nails, per count keg, $2.00 to $2.10; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots; 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts and Nuts

Machine bolts, small, rolled threads, 70, 10 and 5 to 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads, 70 and 5 to 70 and 10 per cent off list
Machine bolts, larger and longer, 65, 10 and 5 to 70 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads, 65, 10 and 10 per cent off list
Cut threads ..... 65 and 10 to 70 per cent off list
Longer and larger sizes ..... 65 and 10 to 70 per cent off list
Lag bolts ..... 70 and 10 to 70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads ..... 60 and 10 per cent off list
Other style heads ..... 20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter ..... 65 and 5 per cent off list
Larger and longer sizes ..... 65 per cent off list
Hot pressed sq. or hex. blank nuts ..... $5.50 off list
Hot pressed nuts, tapped ..... $5.00 to $5.25 off list
C.p.c. and t. sq. or hex. blank nuts ..... $5.25 off list
C.p.c. and t. sq. or hex. blank nuts, tapped ..... $5.00 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive ..... 80, 10 and 10 per cent off list
Small sizes S. A. E. ..... 80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E. 70, 10, 10 and 10 per cent off list
Stove bolts in packages ..... 80, 10 and 5 per cent off list
Stove bolts in bulk ..... 80, 10 and 7½ per cent off list
Tire bolts ..... 65, 10 and 10 per cent off list
Track bolts, carloads ..... 3.25c. to 3.50c. base
Track bolts, less than carloads ..... 4.25c. to 4.50c.

Upset Square and Hex. Head Cap Screws

½ in. and under ..... 80 and 10 per cent off list
9/16 in. to ¾ in. ..... 80 and 10 per cent off list

Upset Set Screws

½ in. and under ..... 80, 10 and 5 to 85 per cent off list
9/16 in. to ¾ in. ..... 80, 10 and 5 to 85 per cent off list

Milled Square and Hex. Cap Screws

All sizes ..... 75 and 10 per cent off list

Milled Set Screws

All sizes ..... 70, 10 and 10 per cent off list

Rivets

Large structural and ship rivets ..... $2.25 to $2.40 base
Large boiler rivets ..... 2.35 to 2.50 base
Small rivets ..... 70, 10 and 5 to 70, 10 and 10 per cent off list

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38; chain rods, $38; screw stock rods, $43; rivet and bolt rods and other rods of that character, $38; high carbon rods, $45 to $50, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.40 base; 5/16-in., $2.40 base. Boat and barge spikes, $2.40 to $2.50 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb. Angle bars, $2.40 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $9.30 per package; 8-lb. coating, I. C., $9.60; 15-lb. coating, I. C., $11.80; 20-lb. coating, I. C., $13; 25-lb. coating, I. C., $14.25; 30-lb. coating, I. C., $15.25; 35-lb. coating, I. C., $16.25; 40-lb. coating, I. C., $17.25 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.60c. from mill. Refined bar iron, 2c. to 2.10c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	60	33½	½	36½	18½
½	65	50½	¾	42½	27½
¾	69	56½	1 to 1½	44½	29½
1 to 3	71	58½			

Lap Weld

2	64	51½	2	39½	25½
2½ to 6	68	55½	2½ to 6	42½	29½
7 to 8	65	51½	7 to 12	40½	27½
9 to 12	64	50½			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	56	38½	½	35½	23½
½	62	50½	¾	42½	28½
¾	67	55½	1 to 1½	44½	30½
1 to 1½	69	57½			
2 to 3	70	58½			

Lap Weld, extra strong, plain ends

2	62	50½	2	40½	27½
2½ to 4	66	54½	2½ to 4	43½	31½
4½ to 6	65	53½	4½ to 6	42½	30½
7 to 8	61	47½	7 to 8	35½	23½
9 to 12	55	41½	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with supplementary discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.20	Nos. 11 and 12	2.30
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.35
		Nos. 15 and 16	2.45

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Dec.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
21.....	13.87½	13.62½	33.00	4.70	4.37½	5.25	4.90
22.....	13.87½	13.62½	32.62½	4.70	4.37½	5.25	4.90
23.....	13.87½	13.62½	32.62½	4.70	4.37½	5.20	4.85
24.....	13.87½	13.62½	....	4.70	4.37½	5.20	4.85
27.....	13.87½	13.62½	32.75	4.70	4.37½	5.17½	4.82½

New York

NEW YORK, Dec. 27.

As the year draws to a close practically all the markets are firm and the tone is optimistic. Buying of copper has slackened but prices are tending higher. The tin market is temporarily inactive but firm. A quiet demand pervades the lead market at steady prices. The zinc market is slightly easier, but the technical situation is satisfactory.

Copper.—While inquiries continue in good volume, buying has slackened temporarily, but the market maintains its strength both as to prices and sentiment. There are even indications of a possibility of a shortage developing in the not distant future, due to the heavy demand, both past and prospective, and to the extremely low operating rate of the mines. It will take some time for the mining of copper to develop and there is some fear that the rate may not equal the demand in the coming months. There has been no change in prices, electrolytic copper for prompt and early delivery being still quoted at a minimum of 13.87½c., delivered, or 13.62½c., refinery, with first quarter at 14c., delivered, or 13.75c., refinery. There are some producers who are out of the market even at these prices. Foreign demand continues excellent and the technical and statistical position of the market as a whole is reported as eminently satisfactory.

Tin.—The market for Straits tin has been extremely dull the past week and there has been practically no demand either from dealers or consumers. In fact some dealers have been offering the market down, but there is some question as to whether these have resulted in sales or whether those making the offers were really willing to sell. At any rate, no one appears eager to take up the offering. As a result of this situation quotations, while largely nominal, have been a little lower, with spot Straits quoted to-day at 32.75c., New York. The London market has been closed since Friday, including to-day, which is observed there as "boxing day," and the trend of the market on that side is impossible to ascertain. Arrivals thus far this month have been 3635 tons with 4765 tons reported afloat.

Lead.—Conditions are unchanged with demand steady and prices firm. Fair sized orders are reported for various lines of consumption and demand for January shipment has been better than usual at this time of the year. The leading interest continues to quote 4.70c., New York and St. Louis, while in the outside market the prevailing levels are 4.35c. to 4.40c., St. Louis, and 4.70c. to 4.75c., New York. Prospects of exports to England continue good.

Zinc.—Demand is very light, as is natural in the closing weeks of the year, and has resulted in offerings from one or two sources slightly under the market so that prime Western in limited amounts can be obtained as low as 4.82½c., St. Louis, or 5.17½c., New York. Interest in first quarter is of sufficient volume to warrant expectation of good business in the near future and there is even some prospect of exports to England. There has been a decided expansion of business in galvanized sheets in Great Britain, particularly for export, and there are indications that American zinc may be cheaper than some other for British makers of these sheets. The technical situation of the market here is, however, satisfactory and pessimism does not prevail.

Antimony.—Wholesale lots for early delivery are quoted unchanged at 4.50c., New York, duty paid, with demand exceedingly light.

Aluminum.—The leading producer continues to quote virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, at 19c., f.o.b. plant, but is probably meeting offerings of the same grade from importers at 17c. to 18c., New York, duty paid. Demand is very light.

Old Metals.—Business remains quiet but values are well sustained at the following quotations:

	Cents Per Lb.
Copper, heavy and crucible	13.25
Copper, heavy and wire	12.50
Copper, light and bottoms	10.00
Heavy machine composition	10.25
Brass, heavy	8.00
Brass, light	6.00
No. 1 red brass or composition turnings	8.25
No. 1 yellow rod brass turnings	6.25
Lead, heavy	4.25
Lead, tea	3.25
Zinc	3.00

Chicago

Dec. 27.—Tin and spelter have declined slightly while the other metals remain unchanged in a quiet market. Among the old metals brass and some grades of copper have advanced. We quote in carload lots: Lake copper, 13.75c.; tin, 33.75c.; lead, 4.45c.; spelter, 4.82½c.; antimony, 6.50c., in less than carload lots. On old metals we quote: Copper wire, crucible shapes and copper clips, 10.75c.; copper bottoms, 8c.; red brass, 8.25c.; yellow brass, 5.75c.; lead pipe, 3.25c.; zinc, 2.37½c.; pewter, No. 1, 23c.; tin foil, 24c.; block tin, 26c.; all buying prices for less than carload lots.

St. Louis

DEC. 27.—Lead has been slightly easier at 4.30c. to 4.40c. car lots, while slab zinc was about steady at 4.85c. On old metals we quote: Light brass, 3.50c.; heavy red brass and light copper, 7c.; heavy yellow brass, 4c.; heavy copper and copper wire, 7.50c.; zinc, 2c.; pewter, 15c.; tin foil, 16c.; tea lead, 2c.; aluminum, 9c.

Industrial Health Measures in Cincinnati

"Industrial medicine is preventative medicine practised on the firing line" was the key statement of an article by Dr. Otto P. Geier, Cincinnati Milling Machine Co., Cincinnati, in the December issue of *Nation's Health*. The author is brother of Frederick A. Geier, president of that company. The article describes the Cincinnati Health Exposition held in that city recently. The exhibit contained booths representing the proper kind of shop surroundings and those containing the wrong kind; also many charts and posters. Machinists were at work in the good and the bad booths drawing attention to their work by the sparks from their emery wheels.

In describing industrial health conditions in Cincinnati the author says: "The collected data showed that almost invariably the sickness rate and absence because of sickness was materially reduced, some instances being cut in half; that lost time from infected wounds after installation of medical service, with its prompt and proper treatment, reduced infection cases to the negligible point. The effort to collect comparable statistics proved to the co-operating medical departments the necessity for standardizing their records and in the interest of determining what may reasonably be considered the irreducible minimum of record that will still furnish sufficient information for intelligent deductions as to monetary and other values of health work in industry.

"It was useful, for instance, to contrast the fact that while eight industries furnished 11,800 men, convenient clinical facilities for 250,000 visits in 1920, the out-patient department of the Cincinnati General Hospital, with its score or more of physicians and nurses, afforded but 10,000 patients clinical facilities for 30,000 visits. Even with free medical service the cost approximated $20,000."

PERSONAL

Peter R. Foley, formerly general manager of sales Eastern Steel Co., and J. Harries Pritchard, at one time identified as operating superintendent of Republic Iron & Steel Co., have taken over the Slatington Rolling Mills at Slatington, Pa., and will start operation about Feb. 1. The mill will be operated under the name of Foley Steel Co., with general offices at Slatington, Pa., and have its branch office in the Harrison Building, Philadelphia. It is the intention to manufacture merchant steel and iron bars of the following range of sizes: Rounds and squares, ⅜ in. to 3 in.; flat bars, ¾ in. to 6 in. widths; reinforcing concrete bars, plain and deformed.



P. R. FOLEY

The company will also specialize on small steel special sections, low phosphorous muck bar for crucible steel mixtures, stay bolt iron, etc.

Mr. Foley has been connected with the iron and steel industry since boyhood and is widely known. He served 22 years with the pioneer bridge builders, Cofrode & Saylor, who operated the bridge works at Pottstown, Pa. (now owned by McClintic-Marshall Co.), also the Reading Rolling Mill Co., at Reading, Pa., rising with them from a minor position to treasurer of both companies. He was elected treasurer of the Eastern Steel Co. at its organization in 1902, served in that capacity until 1905, when he opened its sales office in Philadelphia, and subsequently, in 1915, was appointed general manager of sales, which office was recently abolished. He was in the service of the Eastern Steel Co. about twenty years.



J. H. PRITCHARD

Mr. Pritchard, the associate of Mr. Foley, descends from the early iron and steel men of the United States, his grandfather, John Pritchard, being a roller in the Pittsburgh mills back in the 40's and afterwards was one of the owners of the first rolling mill at Ironton, Ohio. Mr. Pritchard began his career in the Birmingham, Ala., district and was for many years superintendent of the Republic Iron & Steel Co. and the Tennessee Coal, Iron & Railroad Co.'s rolling mills.

James H. Hammond, for 24 years president Superior Steel Co., and for the past five years chairman of the board of directors Superior Steel Corporation, has resigned. Henry F. Devens, for many years associated with the Superior Steel Corporation, formerly vice-president and more recently as special agent, has severed that connection. Henry D. Sarge, secretary and assistant treasurer Superior Steel Corporation, has resigned from both positions and connection with the corporation. Frank R. Frost, assistant sales manager Superior Steel Corporation for the past few years, has severed his connection with the corporation. Messrs. Hammond, Devens and Frost have taken temporary offices at 565 Union Arcade Building.

Frank L. Campbell, formerly manager of sales of the roofing department of the Beaver Board Co., Buffalo, has resigned, and on Jan. 2, will accept the position of general manager of sales of the United States Chain & Forging Co., Union Arcade, Pittsburgh. He succeeds Charles M. Power, who recently resigned.

B. A. Tozzer, who has been traveling in the Far East for the past 14 months, investigating the business outlook in respect to machine tools for the Niles-Bement-Pond Co., has returned to Cleveland and resumed his former position as manager of the Cleveland office of the Pratt & Whitney Co. and the Niles Tool Works Co. During his travels he visited India, Java, China, Burma, Siam, the Straits Settlement and other Far Eastern countries.

H. A. Kimber, formerly of the Quigley Furnace Specialties Co., is now in charge of the sales of the Quigley pulverized fuel department of the Hardinge Co., 120 Broadway, New York. This change was made owing to the acquirement by the Hardinge company of the pulverized fuel department of the Quigley company. L. W. Marso, who is in charge of the branch office of the Quigley company, at 427 Oliver Building, Pittsburgh, has now become associated with the Hardinge Co., 120 Broadway, New York, and will continue in the Pittsburgh office under the name of Hardinge Co., but will specialize in the handling of the Quigley pulverized fuel systems, which department has been acquired by the Hardinge Co. from the Quigley company. O. M. Rau, formerly consulting engineer to the Philadelphia Rapid Transit Co., has also joined the Hardinge Co., and will specialize in the handling of Quigley pulverized fuel systems as applied to boilers. W. O. Renkin has affiliated with the Hardinge Co. as managing engineer of the Quigley pulverized fuel department.

George C. Calvert, purchasing agent of the American Road Machinery Co., Inc., Kennett Square, Pa., was installed president of the Purchasing Agents' Association of Philadelphia at the annual meeting held at Kuglers on Dec. 8. This association is in a thriving condition, having a membership of 250, although it was only organized about six years ago.

A. H. Bauman has been elected vice-president and director of the Cleveland Duplex Machinery Co., Cleveland. He was formerly general foreman of the gun division, the American Brake Shoe Works, Erie, Pa. For the past three years he has been associated with the Cleveland Duplex Machinery Co. as sales engineer.

Arthur J. McMasters, 819 Bessemer Building, Pittsburgh, has been appointed sales representative in the Pittsburgh district for the Storms Drop Forging Co., East Springfield, Mass., and the Brown Bag Filling Machine Co., Fitchburg, Mass. In addition to the above, Mr. McMasters is also sales representative in the Pittsburgh district for the Bickford Switzer Co., Greenfield, Mass.; Alert Tool Co., Philadelphia; Gammons Holman Co., Manchester, Conn.; Welded Products Mfg. Co., Milwaukee; Rigid Tool Holder Co., Washington; Arnold Electric Tool Co., New London, Conn.; Superior Saw Mfg. Co., Long Island, N. Y.; Velco Mfg. Co., Greenfield, Mass.; Van Keuren Co., Boston, and the Geneva Society of New York and Switzerland.

B. H. Anibal, formerly chief engineer Cadillac Motor Car Co., Detroit, has been appointed chief engineer of the Peerless Motor Car Co., Cleveland.

J. E. Holveck has been appointed district sales representative for the rotary pump line of the Exeter Machine Works, Inc., West Pittston, Pa., in the Pittsburgh district. Until recently he was with Crawford & Cameron, Pittsburgh, and was at one time designing engineer for the Aldrich Pump Co., Allentown, Pa. Mr. Holveck is a hydraulic engineer with extensive experience in the design and sale of pumping machinery, and is the patentee of novel and interesting improvements applicable to high-pressure pump work.

William S. Dickson has been appointed assistant manager of the Crane Machinery Co., Buffalo, N. Y. For many years he was with the Cincinnati Planer Co. and later became sales engineer of the Acme Machine Tool Co., and general manager of the Greaves-Klushman Tool Co. During the past two years he has been connected with the Cleveland office of W. K. Stamets.

OBITUARY

THOMAS MURRAY, assistant secretary, assistant treasurer and director of the United States Steel Corporation, died Nov. 27, aged 54, after a long illness. Mr. Murray was born in Jersey City, Dec. 14, 1867, attended public school and high school in Jersey City and began work in a law office at the age of 14. He became connected with the Federal Steel Co. in May, 1894, and was appointed assistant secretary of the United States Steel Corporation upon its organization in April, 1901. On Nov. 11, 1919, he was appointed assistant treasurer. He had been a director for about eight years and was also a director of many of the subsidiary companies of the Steel Corporation. On June 23, 1897, he married Miss Mary C. Flynn of Jersey City, who survives. He was a member of the Railroad Club and of a number of social clubs. Judge Gary said of him Tuesday: "He was a man of high character, more than ordinary ability, trusted and beloved by all his associates in the Steel Corporation and its subsidiaries."



THOMAS MURRAY

NELSON S. BARTLETT, retired iron merchant, died at the home of his sister at 227 Commonwealth Avenue, Boston, Dec. 23. He was born in Boston, April 11, 1848. During his earliest business life, Mr. Bartlett was associated with the Hondlette, Ellis & Co., Boston, iron and steel merchants. When the affairs of that company wound up, he started in business for himself as an importer of Scotch and English pig iron, rails, beams,, etc. Later, he formed a partnership with George H. Curtis, as N. S. Bartlett & Co., and employed John O. Henshaw, then secretary of the Boston Bridge Works, as salesman. Approximately four years later Mr. Henshaw was taken into the firm and a few years later Mr. Curtis retired from the partnership. At this time the firm sold Mary, Ohio, Scotch pig iron, made by the Mary furnace, Louisville, Ohio, in connection with Scotch irons. In addition, it sold Rebecca iron, made at Kittanning, Pa., by the Kitanning Iron & Steel Mfg. Co. The firm also acted as agents for other irons, notably Woodward and Crozier. The firm's office was at 126 State Street, Boston. In 1909, Mr. Bartlett retired from active business devoting his entire attention to the management of several estates. The firm was dissolved and the business absorbed by Hickman, Williams & Co. Mr. Bartlett was a member of Boston's oldest clubs.

DOUGLAS F. MCKEY, secretary-treasurer Durant Mfg. Co. and American Filter Mfg. Co., 655-665 Buffum Street, Milwaukee, died Dec. 13 after a brief illness with pneumonia, at the age of 33 years.

FRANK J. TURK, Joseph Turk Mfg. Co., Bradley, Ill., bedsteads, died on Dec. 12.

ANTON MILL, SR., president A. Mill Engineering Co., Cincinnati, died at his home in that city on Dec. 20, at the age of 72 years. He had been in the engineering business for more than 20 years. Previous to organizing the company which bears his name, Mr. Mill had an interest in the old Bickford Machine Tool Co., Cincinnati.

CHARLES M. BEGOLE, president of Chevrolet Motor Co. and one of the founders of the Buick Motor Co., died at St. Petersburg, Fla., Dec. 22. Mr. Begole, a son of the late Josiah Begole, former Governor of Michigan, was 73 years old. His home was in Flint, Mich.

THOMAS FINDLEY, president Massey-Harris Co., Toronto, Ont., died at his home, 146 Warren Road, Toronto, Dec. 19. He had been in poor health for the past year, and had been forced to take to his bed five weeks ago. A year and a half ago he resigned to Thomas Bradshaw the duties of general manager of the Massey-Harris Co. He became associated with the Massey-Harris Co. in 1890, at that time holding the position of telegraph operator. In 1895 he became chief accountant, in 1902 assistant to the president, in 1907 assistant general manager, in 1909 a director, in 1912 vice-president and in 1917 president and general manager. He was 52 years old.

Car Loadings Decline

Revenue freight loadings for the week ended Dec. 10 showed 742,926 cars in use, a decrease for the week of 4528 cars, 95,027 cars less than the same week last year, and 12,014 cars below the showing of two years ago. Were it not for the heavy traffic in grain and grain products and seasonal increase in merchandise loadings, the showing as compared with previous years would be much worse. The main losses are attributed to the coal movement, which is showing heavy losses, despite the reduced temperatures for a large part of the country. The output of the mines is small and stocks at terminal markets, while not regarded as heavy, appear sufficient for the time being. Every Western road is storing cars of all kinds; even box cars on a few roads are in excess supply, in the face of the big movement of corn which is the largest at this time in years.

Exports Decline

WASHINGTON, Dec. 27.—American exports to Europe declined $43,000,000 in November as compared with the previous month, according to an official summary of foreign trade issued to-day by the Department of Commerce. Imports from Europe increased in the same period about $3,500,000.

Only to Africa and Oceania was the outgoing trade of the United States greater in November than in October, the increase in the case of Africa being $700,000 and to Oceania $3,400,000.

Initiative Lies With Europe

WASHINGTON, Dec. 27.—Any initiative in the matter of economic conferences must come from Europe, it was indicated to-day by American officials. The American view is that European nations have the primary responsibility for their own reconstruction and that the United States cannot advisedly propose remedies or institute international negotiations unless the nations most chiefly concerned have acted.

"Underground Loading Devices in Metal Mines" by C. Lorimer Colburn, mining engineer of the United States Bureau of Mines, is the subject of a short bulletin issued by the bureau, in which are given descriptions, operating methods and the performances of mechanical shovels now in use in metal mines of the United States. The machinery considered includes the following: Hunt rotary shovel, Myers-Whaley shoveling machines, Conweigh digger belt-loader and Conweigh shovel loader, Shuveloder, Armstrong shovel, Thew underground mining shovel, Marion shovel, Hoar underground shovel, Keystone excavator and various developments of scrapers and slushers.

C. F. Yocum, general foreman Buckeye Traction Ditcher Co., Findlay, Ohio, has been appointed superintendent to succeed L. A. Krupp, who resigned to accept the position of manager with the North Baltimore Tractor & Machine Co., North Baltimore, Ohio.

Percival Johnson, president Pulaski Iron Co., Philadelphia, was elected president of the Virginia Pig Iron Association at its monthly meeting on Dec. 20.

BOOK REVIEWS

Waste in Industry. By the Committee on Elimination of Waste in Industry of the Federated American Engineering Societies. Pages 409, 6 x 9 in. Published by the Federated Engineering Societies, Washington, and for sale by the McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, $4.

This volume of over 400 pages presents the results of the first public service undertaken by the Federated American Engineering Societies. This service was a rapid, intensive study by Herbert Hoover and seventeen engineers appointed by him as the Committee on Elimination of Waste in Industry, of conditions making for inefficiency and lost production in a large number of representative plants in six typical branches of industry.

Waste, in the sense here used, is the complement of the efficiency ratio. If 100 per cent represents the maximum of productive capacity, and in a given plant but 70 per cent efficiency is attained, the lost 30 per cent represents the waste. In order to obtain a fair summary of the conditions, a standard questionnaire was first developed. This was classified under three heads. The first, organization, dealt principally with management and labor. The second, technical, dealt with the plant equipment, materials, and products, and the degree of accurate knowledge available to control these factors. The third, utilization, covered the operating practices with respect to financing, cost keeping and production control. The results are stated in "points" of waste, on a scale grading from excellent at zero through fair at 40, to bad at 80.

The summarized points of waste are for the building trades an average of 53; men's clothing trade, best plant, 27, and worst, 83; boot and shoe trade, best 12½, worst 71; printing shops, an average of 60; and textile trades, an average of 50. The showing in the metal trades is undoubtedly of the most interest to the readers of THE IRON AGE. The best of the shops studied showed only about 6 points of waste, and the highest figure was 56, with an average of 30.

The greatest cause of waste in industry appears to be fluctuation in the rate of work. This is seasonal, or due to changes in style or fashion, or to irregularity in receiving materials, or in working them through the departments, or to the various causes that make a labor turnover of 60 per cent remarkably good, and the condition of having to hire ten persons to keep one at work only too common. Overhead, interest and other charges are the same whether a machine works full time or only half time; and with the large proportion of idle machine time that exists in almost all shops, there is no more direct route to increased dividends than to find ways of keeping the machines at work.

The book contains also reports on general causes of waste in industrial production, such as unemployment, strikes, accidents and loss by ill-health of workers. Much useful information for the statistician and the student of economics is here available. But the practical manufacturer who takes up "Waste in Industry" in the expectation of finding a ready remedy for the waste within his own plant, is likely to be disappointed when he discovers that nowhere in the four hundred pages is there a chapter entitled "How to Reduce Waste in Industry." S. H. B.

Hendricks' Commercial Register of the United States.— Pages 2324, 8½ x 11½ in. Published by S. E. Hendricks Co., 70 Fifth Avenue, New York.

A conspicuous feature of the new issue of Hendricks' Commercial Register is the change in size to conform to 8½ x 11½-in. size. This gives a type page of 7 x 10 in., instead of 6 x 8 in., and allows 25 per cent more matter on each page than formerly. Under ordinary conditions this change in size would reduce the number of pages 25 per cent, or from 2800 to 2100. Sufficient material has been added, however, to make the total number of pages in excess of 2300. The resulting reduction in the thickness makes the book easier to handle, notwithstanding that it contains more material than any previous edition. The text matter has been opened up, leaving a space between columns, which contributes to easier reading and allows space for check marks and short memoranda.

The lists given cover the electrical, engineering, machinery, building and other industries. The lists covering twist drills, fire doors and electric lamp sockets have been handled more comprehensively than usual.

Books Received

Mineral Industry During 1920. Vol. xxix. Edited by G. A. Roush. Pages xx + 907; 6¼ x 9¼ in.; numerous tables and illustrations. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York. Price, $10.

Coal Manual. By F. R. Wadleigh. Pages 200, 4½ x 6 in. Published by *National Coal Mining News*, 834 Union Trust Building, Cincinnati, Ohio. Price, $2.50.

A Course in Mechanical Drawing. By Louis Rouillion. Pages 92, 6½ x 7½ in.; fully illustrated. Published by the Norman W. Henley Publishing Co., 2 West Forty-fifth Street, New York. Price, $1.50.

Short Trade Items

The Combustion Engineering Corporation, New York, has opened a new branch office at 806 First National Bank Building, Pittsburgh, in charge of W. C. Stripe, formerly manager of the Philadelphia office.

A new metal stamping company has just been formed under the name of The Winkler Mfg. Co., Inc., 248 Lafayette Street, New York. This company is in charge of Jack Winkler, formerly in charge of estimates of the Charles Fishers' Spring Co. Mr. Winkler has been specializing in combination dies for the past ten years, and is ready to estimate on metal stamping in all its branches. The Winkler Mfg. Co. also owns some patents, which it is manufacturing, among which are a sanitary tooth brush holder and a ticket dispensing machine.

The Wilson Welder & Metals Co., has moved its general offices and Bush Terminal factory to 132 King Street, New York, telephone Spring 7994. It has installed improved special equipment to handle certified plastic arc welding metals more efficiently, including a fully-equipped demonstration room where is displayed the Wilson plastic-arc system, the one that was used to repair the intentionally damaged interned German ships.

Sidney Norwood, who for a great many years has been selling in Michigan the product of the Interstate Iron & Steel Co., Griffin Mfg. Co. and Massillon Rolling Mill Co., is going into business for himself as a manufacturers' agent and will handle, among other lines, the account of the Elliott-Blair Steel Co., New Castle, Pa., in the state of Michigan. His office is at 912 Kresge Building, Detroit.

The Boston office of the Cutler-Hammer Mfg. Co., Milwaukee, has been moved from the Columbian Life Building to rooms 403 and 404 Harvey Building, Chauncy Street. C. W. Yerger is manager.

The York Modern Corporation, Unadilla, N. Y., incorporated with a capital of $30,000, will manufacture road building machinery. It will rent a factory for the first year.

The Lebanon Steel Foundry, Lebanon, Pa., has purchased the plant of the Rivetless Chain & Engineering Co. at Lebanon, which will be incorporated under the name of the Lebanon Drop Forge Co. The plant is complete in every respect and while the new owners have plans for enlarging it and adding to the equipment, they will not do so at the present time.

The Keller Pneumatic Tool Co., Grand Haven, Mich., has changed its name to William H. Keller, Inc.

A. Lewinsohn & Sons, 61 Broadway, New York, are having plans prepared and will soon take bids for the erection of a two-story automobile service and repair building, 50 x 60 ft., at Broadway and 185th Street, estimated to cost $90,000. John De Hart, 1041 Fox Street, is architect and engineer.

Machinery Markets and News of the Works

HOLIDAY PERIOD ACTIVE

Delaware & Hudson Has New Inquiry for Seven Machines

American Woolen Co. Purchased 18 Tools—New England Machinery Market Is Especially Active

The holiday period is proving to be less dull than in many years. It is reported from New England that sales the past week have been three times as great in volume as any other one week this month; furthermore, that December has been a better month than November and that August was decidedly the turning point of the year.

The Delaware & Hudson Railroad, Albany, N. Y., has put out an inquiry for seven tools. Purchases expected after Jan. 1 include those by the Rock Island, the Santa Fe and the Delaware, Lackawanna & Western railroads. The purchasing department of the last railroad has passed on the 40 tools asked for and approval must now be secured from the finance board. The Rutland, Bangor & Aroostook and the Maine Central each have small lists under consideration, but appropriations for their purchases have not been made.

The American Woolen Co. has bought 18 machine tools for its Shawsheen machine shop, the order having been placed with two houses. One of the largest orders in the Middle West was that placed by the Beatty Machine & Mfg. Co., Hammond, Ind., which company has a contract to supply complete equipment for the Richmond Car Co., Richmond, Va. The Junior High School of South Bend., Ind., closed for seven South Bend lathes. The Phoenix Horse Shoe Co., Joliet, Ill., has purchased three good-sized tools for its Poughkeepsie, N. Y., plant, and contemplates a boring mill.

A few inquiries from France are being turned to Cincinnati builders, but the unfavorable exchange has made immediate business unlikely. A New Hampshire city is making up a list of shop equipment for a new school involving about $30,000 worth of machinery.

New York

NEW YORK, Dec. 27.

The Delaware & Hudson Railroad, Albany, N. Y., has issued an inquiry for the following machines:

One 60-in. planer.
One 42-in. boring mill.
One 30-in. lathe.
One flanging press.
One forcing press.
One driving-wheel press.
One double-head shaper, 26-in. x 12-ft.

It is expected that purchases will be made by the Delaware, Lackawanna & Western Railroad within a week or two weeks. The purchasing department has passed upon the quotations received on its list of about 40 tools, and if the finance board approves of the purchase the orders will go out shortly. Additional inquiries for a few tools have been sent out, including a lathe, frog and switch planer.

Holiday dullness pervades the machine-tool market, but improvement is looked for after Jan. 1.

The Bullard Machine Tool Co., Bridgeport, Conn., reports a decided improvement in its business during December. A considerable number of orders have been received, including one early in the month for eight mult-au-matic machines.

The crane market is dull, but prospects for real activity in January and February are generally considered good. Second bids on the 34 gantry cranes for the New York city docks at Stapleton, S. I., were opened Dec. 21. The low bid was presented by the Wellman-Seaver-Morgan Co., which quoted $276,268 or $8,125 each against its former bid of $339,873 or $9,996.26 each. Heyl & Patterson, previously the low bidder with a price of $301,308 or $8,862 each, quoted on the new opening $280,228 or $8,242 each. Only three other companies submitted bids: McMyler Interstate Co., $317,934; the Niles-Bement-Pond Co., $345,950, and the Dravo Contracting Co., which was high, $350,710.

Among recent sales are: Cleveland Crane & Engineering Co., a 2-ton, 20-ft. span overhead traveling crane with hoist to the Laurel Lumber Co., Laurel, Del., and a 2-ton tramrail with 400-ft. travel to the John F. McGowan Marble Co., 23 East 107th Street, New York; Champion Engineering Co., a 5-ton, 32-ft. span overhead traveling crane to the Union Tool Co., Carnegie, Pa.; Shepard Electric Crane & Hoist Co., a 2-ton, 30-ft. span, single I-beam crane to the Burnham Boiler Works, Irvington, N. Y. Linde & Griffith, Inc., Newark, N. J., has purchased a 30-ton, 50-ft. boom, second-hand Browning locomotive crane from Philip T. King, 30 Church Street, New York. The Booth Brothers & Hurricane Isle Granite Co., 208 Broadway, New York, recently in the market for a locomotive crane has purchased a 15-ton second-hand Industrial for its Vermont quarry.

The Slattery Engineering & Construction Co., 10 East Forty-third Street, New York, has purchased property, 50 x 100 ft., on Inwood Avenue, for the erection of a new plant.

The J. L. Hammett Co., 55 Thirty-third Street, Brooklyn, manufacturer of school equipment, will soon take bids for a new four-story plant at Newark, N. J., estimated to cost $100,000. Arthur C. Holden, 101 Park Avenue, New York, is architect.

Vocational departments will be installed in the high schools to be erected by the Board of Education, 500 Park Avenue, New York, on Second Avenue, between Sixty-seventh and Sixty-eighth streets, and at Amsterdam Avenue and 183d Street, respectively. The first noted will be five-stories, 128 x 196 ft., estimated to cost close to $1,000,000; and the other, four-stories, 195 x 300 ft., to cost about $250,000. Anning S. Prall is president of the board. C. B. J. Snyder, Room 2800 Municipal Building, is architect.

The G. Piel Co., Steinway and Jackson avenues, Long Island City, manufacturer of automobile equipment, has leased the brick factory on an adjoining site for extensions.

The American Smelting & Refining Co., 120 Broadway, New York, has preliminary plans under way for the erection of a large metallurgical experimental plant at El Paso, Tex., to be used for ore testing, etc.

The Brooklyn Edison Co., 360 Pearl Street, Brooklyn, will call for bids early in February for its electric generating plant at the foot of Sixty-sixth Street, estimated to cost about $1,200,000. Plans are being prepared. G. L. Knight, company address, is engineer.

Albert Kellar, 1744 Garfield Street, Bronx, New York, will commence the erection of a one-story ice plant, 60 x 100 ft., at 409-15 East 108th Street, estimated to cost about $30,000.

Sutliff, Inc., Maiden Lane, Kingston, N. Y., will take bids at once for a two-story automobile service and repair works, 60 x 100 ft., estimated to cost about $42,000. W. Sutliff is president.

The Cornwall Industrial Corporation, Cornwall Landing, N. Y., has had plans prepared for a new one-story plant, 50 x 180 ft. E. L. Olson is superintendent.

Fire, Dec. 13, destroyed the forge shop and wagon works of Joseph J. LeCompte, 64-66 Hoosick Street, Troy, N. Y., with loss estimated at about $16,000. It is planned to rebuild.

The New York Central Railroad Co., New York, will continue in the direct management of its car and locomotive shops at Elkhart, Ind., and will not lease the plant to private interests. The shops have been giving employment to about 500 men.

The Keystone Tire & Rubber Co., 1877 Broadway, New York, will operate the new plant of its subsidiary organization, the Gryphon Tire & Rubber Co., now in course of erection, for the manufacture of Keystone cord tires with a daily output of about 1000.

The Long Island Lighting Co., 50 Church Street, New York, operating at Northport, L. I., and vicinity, has made application to build a new electric power plant at Southold, L. I. E. L. Phillips is president.

The Transcontinental Oil Co., 576 Fifth Avenue, New York, with refineries at Tulsa, Okla., is planning for extensions and improvements in its plants, including new machinery and the purchase of new properties. Stockholders have approved a bond issue of $10,000,000, and a portion of the fund will be used for this purpose.

Fire, Dec. 22, destroyed a portion of the five-story factory at 49-71 Clymer Street, Brooklyn, occupied by Charles Leffler & Co., machinists; the Kay Co., manufacturer of springs and other industrial interests with loss estimated at about $25,000.

The Pennsylvania Motors Corporation, care of H. W. Scofield, 1719 North Broad Street, Philadelphia, will take bids until early in January for its one-story plant at Pleasantville, N. J., 50 x 300 ft., with power plant. It is estimated to cost close to $125,000. C. Donehower, Pleasantville, is architect.

Christian Feigenspan & Co., 50 Freeman Street, Newark, N. J., have filed plans for a one-story ice plant at Bishop and State streets, Jersey City, N. J., estimated to cost $25,000. It is preliminary to a large plant.

Electric motors and other equipment will be installed in the one-story plant, 100 x 150 ft., to be erected by S. Denier & Son, 15 Crosby Street, New York, at West New York, N. J., for the manufacture of mirrors, etc., estimated to cost about $50,000.

Fire, Dec. 21, destroyed the plant of the Heidelberg Casket Co., Hudson Boulevard and Fifth Street, North Bergen, N. J., with loss estimated at $100,000, including machinery.

A vocational department will be installed in the three-story high school to be erected by the Board of Education, Madison, N. J., estimated to cost $500,000. Preliminary plans are being prepared by Guilbert & Betelle, 546 Broad Street, Newark.

Bids will soon be asked for the erection of a two-story high school, 150 x 370 ft., to include a vocational department, by the Board of Education, Elizabeth, N. J., estimated to cost about $700,000, including equipment. C. Godfrey Poggi, 275 Morris Avenue, is architect.

A manual training department will be installed in the addition being erected at the high school, Perth Amboy, N. J., and which is expected to be ready for the installation of equipment early in the spring. It will cost in excess of $150,000.

New England

BOSTON, Dec. 27.

The outstanding feature of the New England machine tool market the past week was the purchase of 18 tools by the American Woolen Co. for its Shawsheen machine shop. The order was given to two local houses, a 30 in. planer, keyseater, 1½-in. bolt cutter, two 14-in. lathes, one 36-in. lathe, one universal tool grinder and a No. 2 universal milling machine going to one firm, and a 200-lb. hammer, 28-in. upright drill, sensitive drill, a 30-in. gear cutter, centering machine, wet tool grinder, 20-in. shaper, power hack saw, small speed and an 18-in. lathe going to the other. This purchase, together with others the past week, served to put the aggregate New England sales for December well above those for November and substantiate the belief that a turning point in the machine-tool market came in August. Sales each month since then have shown an increase over the preceding month.

With few exceptions, other sales concern single tools, but in the aggregate amount to approximately three times those for any previous week this month, and cover a wider assortment of equipment. They are about equally divided between new and used tools, and include a used 22-in. planer and a 20-in. x 8-ft. lathe to a Lakeport, N. H., interest; a used No. 3 Becker milling machine to a Biddeford manufacturer; a used four-spindle drill to a Salmon Falls, N. H., shop; a new 15-in. x 6-ft. semi-quick change lathe to a Roxbury maker of bearings; a 9-in. x 4-ft. lathe to a greater Boston garage, this tool passing through the hands of two dealers; a used 26in. planer to a Brockton concern; two profilers to a western Massachusetts textile machinery maker; a used sensitive drill to a Worcester, Mass., manufacturer; a new 10½-ft. gap shear, weighing about 12 tons, to a Boston iron and steel company, and a set of gages, 80 blocks, costing close to $1,000, to a Massachusetts firm.

With the possible exception of some cranes, the consensus of opinion is that little machine tool business will be closed the last week of 1921. The local trade, at least, is hopeful regarding the outlook for the early part of 1922. It is believed the prospect of railroad buying early next year warrants serious consideration. The Rutland, the Bangor & Aroostook and the Maine Central railroads each have under consideration small lists of equipment, but appropriations have not been made. The most promising railroad list is that of the Boston & Albany, which is in formation. The company has made up a fairly large list of tools it desires to discard and is inquiring on machnies for replacement. Up to date it has practically decided on 16 or 18, including a driving wheel lathe, 2500-lb. hammer, shapers, and 16-in., 18-in., 20-in. and 27-in. lathes, some of the latter to be used on brass fittings work. During 1921, the Boston & Albany was practically the only New England carrier whose purchases of machine tools amounted to anything. It has taken no definite steps regarding much needed equipment for 1922, but machine tool dealers are reasonably certain the company will be forced to take on some new machinery.

The replacement of quantity production machine tools is strongly favored by some large New England industrial plants. In addition, quite a volume of prospective business is under consideration by small manufacturers, both new and old. School business also should develop within the next three or four months. One New Hampshire city is making up a list of shop equipment it will need for a new school, involving $30,000 of machinery, but the date for opening bids is yet remote.

No local sales of cranes are reported this week. For a small New Haven contract, namely, the placing of a new crane on the city dock, 12 firms submitted bids ranging from $575 to $1,100. Award was made to the New Haven Electric Co.

The Waltham Watch Co., Waltham, Mass., has secured a large order for speedometers, covering 1922 requirements, from the Packard automobile interests, for the new Little Six car. The watch company has covered on its die castings requirements for this order.

The Fire Chief Corporation, capitalized for $100,000 has been organized by J. Franklin Wilkinson, Herbert W. Blake, C. L. Rice, William E. Lee and Marcus E. Osgood, all of Gardner, Mass., to manufacture toys and novelties. Manufacturing operations will first be carried on at the plant of the F. W. Lombard Chair Co., South Ashburnham, Mass.

The three-story factory of the Lally Column Co., Cambridge, Mass., was recently badly damaged by fire. The upper part of the plant was ruined, while the lower floors, housing $30,000 to $40,000 worth of machinery were damaged by water.

The American Metal Co., Railroad Avenue, Attleboro, Mass., will move its plant to Janesville, Wis. Several of the employees will go West with the company.

The Thompson-Copeland Co., Worcester, Mass., metal specialties, recently incorporated under Massachusetts laws, has leased manufacturing quarters at 28 Cherry Street. It will produce lock washers, cotter pins, stamped metal, special screws and several other lines as soon as special machinery can be built.

The Peck, Stow & Wilcox Co., Southington, Conn., hardware, is planning to add three units to its works, comprising a hardening and annealing unit, 67 x 180 ft., grinding, 58 x 155 ft., and a forge shop, 65 x 100 ft.

The Bidwell Co., 1293 Main Street, Hartford, Conn., will build a two-story and basement garage and service station 75 x 122 ft., at East Hartford, Conn., to cost approximately $150,000.

W. J. Hyland, 153 Dwight Street, Springfield, Mass., plumbing contractor, will erect a two-story and basement manufacturing unit, 50 x 95 ft., at 128 Liberty Street.

The London Steam Turbine Co., Troy, N. Y., has incorporated under Massachusetts laws, having acquired the rights and property of the Steam Motors Co., Springfield, and will manufacture steam turbines and appliances. It has an authorized capital of 10,000 shares preferred stock, par $50, and 25,000 shares common, no par. William J. A. London, 70 Grenada Terrace, Springfield, is president, Carlos DeLeon, 303 Main Street, Springfield, vice-president, and Arthur J. Skinner, 46 Longmeadow Street, Longmeadow, treasurer.

The Service Engineering Corporation, capitalized for $50,000 preferred stock and 10,000 shares common, no par value, has been granted a Massachusetts charter to manufacture automobile accessories at 568 East First Street, South Boston. Arthur L. Lewis, Newton, is president; Carroll W. Prochaska, Norwalk, Conn., vice-president and Frederick J. Shepard, Jr., Auburndale, treasurer.

C. N. James, 139 Brookline Street, Cambridge, Mass., manufacturer of automobile wheels, has broken ground for a one-story brick addition, 100 x 122 ft., estimated to cost about $50,000. The machinery will be electrically operated, with individual motor and belt drive. Contract has been arranged for a supply of commercial power.

The New England Tank & Tower Co., Main Street, West Everett, Mass., is planning to rebuild the portion of its works destroyed by fire, Dec. 15, with loss estimated at about $25,000.

The Cumberland County Power & Light Co., Portland, Me., has tentative plans for a new steam-operated electric generating plant, for auxiliary service, estimated to cost close to $1,000,000.

A vocational department will be installed in the new

high school to be erected by the Board of Education, Winsted, Conn., estimated to cost $150,000. Coffin & Coffin, 522 Fifth Avenue, New York, are architects.

The Union Specialty Co., 138 Hurd Avenue, Bridgeport, Conn., has plans under way for a new two-story factory, 50 x 125 ft., estimated to cost about $50,000.

The Clark Power Co., Lewiston, Me., will commence the immediate erection of a new hydroelectric generating plant at the Union Falls on the Saco River. It will have an initial capacity of 22,300-h.p., which will be increased later. The entire development is estimated to cost in excess of $1,000,000.

A vocational department will be installed in the two-story and basement high school, 120 x 242 ft., to be erected at Greenfield, Mass., estimated to cost $500,000. L. C. Patton, 597 Fifth Avenue, New York, is architect.

The Clarendon Garage Corporation, Boston, has leased the three-story building at 48-58 Warren Avenue, totaling about 12,500 sq. ft., for the establishment of an automobile repair shop and service works.

Electric motors and other equipment will be installed in the two-story addition to be erected by the Acushnet Saw Mill Co., River Road, New Bedford, Mass., 60 x 80 ft., estimated to cost about $35,000 with machinery. C. C. Smith is superintendent.

Ground will be broken at once by the Board of Education, Everett, Mass., for a three-story high school, 176 x 209 ft., to include a vocational department, estimated to cost about $425,000.

Philadelphia

PHILADELPHIA, Dec. 27.

The Philadelphia Steam Heating & Engineering Co., Juniper and Cherry streets, Philadelphia, will take bids in about 60 days for a new two-story plant, 60 x 120 ft., at 3316-20 Lancaster Avenue, estimated to cost about $60,000.

The Roth-Buick Co., Frankford Avenue, Philadelphia, has awarded contract to George W. Crossley, Bridge and Tacony streets, for a one-story and basement automobile service and repair building, at 4653-4659 Paul Street. Work will commence at once.

The United States Shipping Board, Washington, will soon commence dismantling a portion of the plant of the Merchant Shipbuilding Corporation, Bristol, Pa. Cranes and crane runways, yard equipment and other machinery will be placed on the market, it is said, at an early date. The Merchant company will continue to operate at the plant for some time to come.

The Middletown Ice Co., North Union Street, Middletown, Pa., is considering plans for a one-story addition to its ice manufacturing plant.

Electric motors and other power equipment will be installed in the three-story printing plant, 50 x 100 ft., to be erected by the Central Publishing Co., 329 Market Street, Harrisburg, Pa., at Thirteenth and Walnut streets, estimated to cost about $150,000.

A one-story power plant will be constructed by the Taubel, Scott & Katzmiller Co., Shamokin, Pa., as its local textile mills. Plans have been completed.

The Vulcweld Rubber Co., Pottstown, Pa., manufacturer of automobile tires, has acquired property on West High Street, 300 x 392 ft., for a new two-story plant, 60 x 260 ft., plans for which are being prepared. A one-story storage building will be built also.

Fire, Dec. 22, destroyed a portion of the power house of the Pennsylvania Power & Light Co., Allentown, Pa., at Danville, Pa., with loss estimated at about $100,000, including equipment. It will be rebuilt.

Buffalo

BUFFALO, Dec. 27.

Freight handling, conveying machinery and other equipment will be installed in the five-story warehouse to be erected on the Niagara River, North Tonawanda, N. Y., at a cost of about $250,000, by the McDermott Steel Co., North Tonawanda. The company has been organized recently with a capital of $500,000 and is headed by T. J. McDermott, president; George Clinton, Jr., secretary, and H. M. Bone, treasurer.

A one-story automobile repair and service building, 40 x 140 ft., will be erected by the General Baking Co., 392 North Street, Rochester, N. Y. Gordon & Kaelberr, Sibley Building, are architects.

Fire, Dec. 20, destroyed a portion of the plant of the Stanford-Crowell Co., 1001 West Seneca Street, Ithaca, N. Y., manufacturer of cardboard specialties, with loss estimated at close to $100,000, including machinery.

The Electro Refractories Corporation, Ellicott Square, Buffalo, manufacturer of crucibles, etc., is completing foundation work and will soon commence the erection of the superstructure for its new plant at East Hamburg, 50 x 300 ft., with machine shop extension, 30 x 75 ft. It will cost about $200,000, and will replace works recently destroyed by fire. L. U. Milward is manager.

The Jamestown Metal Desk Co., Blackstone Avenue, Jamestown, N. Y., will soon break ground for a one-story addition, 80 x 100 ft., estimated to cost approximately $40,000. Beck & Tinkham, Frick-McGee Building, are architects.

Fire, Dec. 14, destroyed the plant of the J. B. Carr Co., Fourteenth Street, Colonie, N. Y., manufacturer of heavy chains and other mechanical products, with loss estimated at $40,000. Preliminary plans are said to be under way for rebuilding.

Chicago

CHICAGO, Dec. 27.

The Rock Island and the Santa Fe will not take action on their respective lists until January. The latter road has sent out an additional inquiry for a 48-in. x 48-in. x 12-ft. planer with two heads on the cross rail and one head on the side. It is reported that the Union Pacific is about to issue an extensive list, but this has not been confirmed. As the year closes the market is quiet, new inquiries being few and orders largely small and infrequent. One of the largest orders recently taken was booked by the Beatty Machine & Mfg. Co., Hammond, Ind. This company has the contract to supply complete equipment for the plant of the Richmond Car Co., Inc., Richmond, Va. Included are large plate shears and multiple, single, double and horizontal punches which will keep the Beatty plant running at capacity for three and one-half months. In addition, the Beatty company purchased to apply against the same order a 12-ft. Dreis & Krump bending brake, a large bulldozer, Bradley hammers, Landis bolt and pipe cutters, and a number of machine tools, including a Cleveland open-side planer, lathes, shapers and drill presses. A 1500-ton hydraulic press is yet to be bought as well as additional miscellaneous equipment which, however, has been practically all arranged for.

Among other orders recently reported is one from the Phoenix Horse Shoe Co., Joliet, Ill., for a 24-in. and a 30-in. engine lathe and a 32-in. shaper for its Poughkeepsie, N. Y., plant. The purchase of a boring mill is also contemplated. For the junior high school at South Bend, Ind., mentioned a week ago, the Board of Education is reported to have closed for seven South Bend engine lathes, but still has a number of other machines to buy. The H. W. Johns-Manville Co., Madison Avenue and Forty-first Street, New York, has revived the inquiry for its new Waukegan plant, which was published in this column on July 18. There are 15 items in the list.

The West Side Ice Co., 937 North Hoyne Avenue, Chicago, has let contract for a one-story plant, 49 x 220 ft., to cost $35,000.

The Anderson Stove Co., recently incorporated, Anderson, Ind., will re-open the Frazer Stove Co. plant in North Anderson about Jan. 10. The entire output, it is stated, has been contracted for by Montgomery-Ward & Co., Chicago. Kitchen ranges of various models will be manufactured. Directors of the company include John S. Keefe, Indianapolis, owner of the plant property, Jacob Keller, Belvidere, Ill., an experienced stove maker, and Joseph McMinn, Louisville, Ky., who has also been identified with the stove industry.

The Cornell Belting Co., Chicago, recently incorporated, has leased a plant at 162 West Austin Avenue, for a period of years. The company will confine itself to the manufacture of leather belting and has bought several leather working machines. The officers are E. H. Cornell, president; H. I. Fritts, vice-president; H. C. Schroeder, treasurer, and E. E. McGrath, secretary.

The Western Fixture Mfg. Corporation, manufacturer of store fixtures, 3039 Elston Avenue, Chicago, is receiving bids on a one-story addition, 80 x 119 ft., to cost $40,000.

The Dental Metal Products Co., A. D. Gray, manager, 623 South Wabash Avenue, Chicago, is taking bids on a two-story factory and warehouse, 42 x 71 and 28 x 42 ft., respectively, at 7512-7518 Greenwood Avenue, to cost $30,000.

The Paramount Knitting Co., Henry Polk, president, 337 West Madison Street, Chicago, has had plans prepared by Lockwood, Greene & Co., 38 South Dearborn Street, for a three-story reinforced concrete factory, 50 x 80 ft., at Kankakee, Ill., to cost $50,000.

The Auto Specialty Mfg. Co., St. Joseph, Mich., has had plans prepared by Davidson & Weiss, 53 West Jackson Boulevard, Chicago, for two one-story foundry additions, 80 x 325 and 80 x 162 ft., respectively, to cost $100,000. Bids will be taken after the New Year.

E. Wendle, 4629 West Madison Street, Chicago, has let contract for a one-story blacksmith shop, 25 x 102 ft., to cost $8,000.

The Elgin Watch Co., Charles H. Hubbard, president, 10 South Wabash Avenue, Chicago, has commenced work on

several four and five-story additions to its plant at Elgin, Ill., to cost $500,000. Plans were completed fully two years ago.

The Bassick Mfg. Co., 361 West Superior Street, Chicago, manufacturer of lubricating devices, grease cups, etc., has preliminary plans for a new two-story and basement factory, 80 x 420 ft., on Addison Street. Stone & Webster, 38 South Dearborn Street, are architects and engineers.

C. A. Starr, 137 Park Place, Decatur, Ill., is planning for a one-story machine repair and automobile service works, 75 x 160 ft., estimated to cost $42,000.

The Wyman-Gordon Co., 332 South Michigan Avenue, Chicago, manufacturer of forgings, has tentative plans for the construction of a new power plant at its works at Harvey, Ill., estimated to cost about $100,000. Erection will be held in abeyance for a time.

The Common Council, Muscatine, Iowa, is planning for the construction of a municipal electric light and power plant, estimated to cost about $250,000.

A vocational department will be installed in the two-story junior high school building, 150 x 150 ft., to be erected by the Board of Education, Minneapolis, Minn., estimated to cost close to $500,000. E. H. Enger, City Hall, is architect.

The Diamond Calk Horseshoe Co., 4620 Grand Avenue, Duluth, Minn., is planning the erection of a two-story and basement building, 50 x 100 ft., estimated to cost about $45,000. J. J. Wangenstein, Providence Building, is architect.

J. H. Baker and J. J. Clarke, Bedford, Iowa, are organizing a new company to construct an ice manufacturing and sold storage plant estimated to cost about $200,000, including equipment. Plans will be prepared soon.

A vocational department will be installed in the three-story and basement high school to be erected at Decorah, Iowa, to be 80 x 140 ft., and estimated to cost about $150,000. Temple & Burrows, 208 Main Street, Davenport, are architects.

Cleveland

CLEVELAND, Dec. 27.

While machine tool business continues dull, there is a better feeling in the trade which expects more activity early next year. The lack of interest on the part of buyers of machinery has to some extent disappeared and a few small inquiries have come from companies which advise that they expect to buy new equipment, but will do nothing definite about purchases before January. Although there is usually a little business during the holiday period, dealers made a number of sales in single machines the past week. Among the inquiries is one from the Herbrand Co., Fremont, which is in the market for milling machines for production work and is expected to purchase several of these machines.

The Williamson Hydraulic Clutch Co., Mt. Vernon, Ohio, recently organized to bring out a new type of clutch, has contracted with the Landis Tool Co., Waynesboro, Pa., for the use and manufacture of the clutch on a royalty basis.

The Urbana Tool & Die Co., Urbana, Ohio, has secured a large contract from an automobile company which, it is announced, will necessitate the operation of its plant at full capacity night and day for two or three months.

Cincinnati

CINCINNATI, Dec. 27.

The pre-holiday week, usually the dullest, is perhaps the exception this year in that the number of orders booked is on a par with the preceding weeks. The month of December will show a slight falling off, compared with November, but general conditions considered, manufacturers find much to encourage them. Inquiries for tools are coming from all parts of the country, and it is expected that after the first of the year, many will develop into orders. While most orders booked are for single machines, they are not confined to any one section and indicate that the gradual improvement is general. There has been little buying by the railroads and no action has been taken on any of the larger lists before the trade. It is expected that the Delaware, Lackawanna & Western Railroad and the Seaboard Air Line will close for equipment within the next week or two, and some action is also expected to be taken by the Rock Island. Industrial concerns in France are apparently picking up, as some inquiries were received from that country during the week. Export business, as a whole, however, is at a low ebb, and not much is expected from this source until exchange conditions are better.

The Illinois Car Co., Urbana, Ohio, has awarded contract to the Bellefontaine Bridge Co., for an erecting shop, 200 x 300 ft., of concrete, steel and glass. The company contemplates the erection of other buildings, but probably nothing will be done until after the completion of the erecting shop.

The International Derrick & Equipment Co., Columbus, Ohio, recently acquired the plant of the Columbus Structural Steel Co., which it will rearrange for the fabrication of steel derricks for oil, gas and artesian well industries. It also plans the installation of galvanizing works. The company is capitalized at $500,000 and is headed by Gordon Battelle and Harry M. Runkle.

The Held Tractor Co., Columbus, Ohio, manufacturer of tractors especially designed for use by truck gardeners, has purchased the building at 609-611 North Fourth Street, Columbus, and will make alterations preparatory to commencing operations on a larger scale. It has been operating in Columbus for over a year and increasing business makes larger quarters necessary.

Pittsburgh

PITTSBURGH, Dec. 26.

Due to the holiday season and inventory period, practically all pending inquiries are being held over until after the first of the new year. Several local dealers have some fair sized orders under negotiation, but do not expect to do anything definite until early next month. Railroads are buying very little and no important inquiries are out. Some time ago the Union Railroad of the Carnegie Steel Co., came into the market for a number of tools and later made some purchases, but it is still in the market for a heavy shaper, a heavy shear for cutting large channels and a radial drill. Orders for these tools are expected to be placed soon.

A local machinery house has definite inquiries for two monorail equipments for handling coal. These are nearly closed but the prospective buyers will not definitely place the contracts until next month. The local office of Manning, Maxwell & Moore has sold to the Sharpsburg Foundry Co., Sharpsburg, Pa., one 5-ton and one 10-ton Shaw electric crane, each 45-ft. span.

The Wheeling Steel Corporation has inquiries out for some heavy steel works equipment for its LaBelle Iron Works, Steubenville, Ohio. If this contract is placed the company will probably purchase a number of tools for the machine shops at the LaBelle works, or for a new machine shop that may be built.

The machinery market outlook for first quarter is regarded as fair, but it is not believed that any considerable amount of buying will set in until the second quarter. Prices of finished steel products are tending downward, and it will likely take all of the first quarter to stabilize the market. The railroads are not figuring in the market very largely.

The Elliott Co., Jeanette, Pa., has not yet closed on its inquiry for a 50-ton crane.

The Traver Engineering Co., Beaver Falls, Pa., has plans under way for the erection of a new one-story factory, 70 x 88 ft. Work will be commenced at an early date.

Fire, Dec. 21, destroyed the repair and service buildings of the Patton Automobile Co., Patton, near Johnstown, Pa., with loss estimated at close to $40,000, exclusive of automobiles.

The Hecla Park Association, Bellefonte, Pa., is planning the construction of a new one-story electric light and power plant, estimated to cost about $50,000. W. C. Rowe, Allegheny Street, is engineer.

The J. K. Davidson & Brother Sand Co., Pittsburgh, has awarded contract to the American Bridge Co., Ambridge, Pa., for the construction of twelve steel barges.

The Borough Council, Woodlawn, Pa., has preliminary plans under way for a two-story forge and blacksmith shop for municipal service, to be 50 x 75 ft. Carlisle & Sharer, 7119 Jenkins Arcade Building, Pittsburgh, are architects.

The Philadelphia Co., Pittsburgh, operating the Pittsburgh Railways, has tentative plans under way for extensions and improvements in car shops and car barns, additional track and line construction, power betterments, and for the purchase of about 200 new cars. Arrangements are being made to secure a fund of $5,000,000, to be used in part for the work.

The Wharton Motors Co., Johnstown, Pa., is planning for the erection of a three-story factory to manufacture automobile equipment, estimated to cost about $100,000. W. H. Lamborne is manager.

The United States Arsenal, Pittsburgh, Maj. Francis F. Jewett, commandant, is considering the establishment of an aviation station. Negotiations are under way with the Chamber of Commerce and the city regarding the land. The station will include a complete repair shop for general work and parts manufacture, hangars, etc., and will be under the direction of the United States Aero Service.

Struble & Riley, Turtle Creek, Pa., are having plans prepared for a two-story automobile service and repair building,

75 x 175 ft., estimated to cost about $150,000, including equipment. S. C. Richards & Co., 430 Library Street, Braddock, Pa., are architects.

A vocational department will be installed in the two-story high school to be erected by the Board of Education, Terra Alta, W. Va., estimated to cost about $125,000. Richard M. Bates, First National Bank Building, Huntington, W. Va., is architect.

The Babcock Coal & Coke Co., Fayetteville, W. Va., will install electric motors and other equipment at its No. 7 mine, Nuttall district, Cliff Top.

The Simons-Woodward Auto Co., Spencer, W. Va., is having plans prepared for a two-story and basement automobile service and repair building, 50 x 130 ft. Richard M. Bates, First National Bank Building, Huntington, W. Va., is architect.

A vocational department will be installed in the two-story and basement high school to be constructed at Sand Fork, W. Va., by the Board of Education of the Glenville District. J. A. Radcliffe, president, Linn, W. Va. It is estimated to cost in excess of $75,000.

The Board of Education, Wayne, W. Va., will install a vocational department in its new high school, estimated to cost about $250,000, plans for which will be prepared by Holmboe & Pogue, Clarksburg, W. Va., architects.

The Gulf States

BIRMINGHAM, Dec. 26.

The Greenwood Compress & Storage Co., Greenwood, Miss., is considering tentative plans for the rebuilding of its plant, recently destroyed by fire with loss reported in excess of $500,000, including machinery, stock, etc. J. T. Allen & Co., Jackson, Miss., operate the property.

The Mo-Jo Filter Co., Rockdale, Tex., recently organized to manufacture filters and filtering equipment, has closed an agreement with the Chamber of Commerce for a site for its proposed plant. It will install equipment and begin operations at the earliest possible date. R. S. Moore is head.

The Nacogdoches Iron Works, Nacogdoches, Tex., recently organized, is arranging for the immediate establishment of a local plant and proposes to begin operations early in February. It is headed by A. W. Simmons, Athens, Tex., and H. D. Minick, Jacksonville, Tex.

The Hastings Machine Co., Hastings, Fla., recently organized as a subsidiary of the Big Brick Garage Co., is planning to establish a general machine and repair plant, with department to manufacture farming implements and other products.

The Edna Light, Ice & Water Co., Edna, Tex., is planning the installation of new electrical equipment at its power plant. It is also proposed to increase the capacity of the ice-manufacturing plant with additional machinery.

The Wortham Refining Co., Wortham, Tex., recently organized, has acquired property in the northern section of the city for a new oil refinery. Ground will be broken soon for the first unit, to have a capacity of about 400 bbl. per day. H. G. Lemendes is president, and Roger Seeley, secretary and treasurer.

The Alexandria Refining Co., Alexandria, La., has acquired a site at South Alexandria for its proposed new oil refinery and will proceed with erection at once. E. M. Talley is manager.

A vocational department will be installed in the new high school to be erected at Amarillo, Tex., estimated to cost about $400,000. Parker & Rittenberry, Amarillo, are architects.

The Stacey Co., Dallas, Tex., manufacturer of cotton-cleaning machinery, is negotiating for a site for a new factory. It recently increased its capital to $50,000 for expansion.

The Board of City Commissioners, Terrell, Tex., has perfected plans for the installation of new engines and other equipment at the municipal electric power plant.

The Southern Utilities Co., Palatka, Fla., will make extensions and improvements in its electric power plant at Tarpon Springs, Fla., to cost about $25,000, exclusive of machinery. It is proposed to double the capacity. George A. Louden is general manager.

The Magnolia Petroleum Co., Dallas, Tex., will build a tank farm at Mexia, Tex., to comprise ultimately 135 steel tanks, with aggregate capacity of 7,000,000 bbl. of oil. An initial unit of 18 steel tanks is now in course of construction.

The Amarillo Iron Foundry & Planing Mill, Amarillo, Tex., is considering rebuilding the portion of its plant recently destroyed by fire with loss of about $25,000.

The Standard Gas & Electric Co., 208 South La Salle Street, Chicago, is considering the construction of an electric power plant in the vicinity of Mobile, Ala., estimated to cost in excess of $400,000.

The De Land Electric Light, Power & Ice Co., De Land, Fla., has completed plans for extensions and improvements in its electric power plant to cost about $75,000, and will commence work at once.

Milwaukee

MILWAUKEE, Dec. 26.

As usual, the machine tool trade the past week was very quiet, and no increase in activity is looked for this week, due to the general suspension of shop operations between holidays and taking of inventories. There has been a little inquiry which is expected to broaden, although the trade looks for no large materialization of purchases before Jan. 15. Prospects for 1922 are regarded as better than those of a year ago, as there has been a definite upturn in the metal-working industries which is being interrupted only by the holiday season.

The Forster Foundry Co., Menomonie, Wis., has been incorporated with a capital stock of $10,000 by H. L. Forster, S. A. Forster and G. A. Forster, all of Menomonie, and will leave an idle foundry building and engage in the production of gray iron, brass, bronze and aluminum castings.

The High Speed Steel & Tool Co., Green Bay, Wis., has been granted a charter to manufacture specialties, principally tool steel, tools for high-speed metal-working machines, etc. For the present it will not establish a plant, but this is in prospect. The principals are John T. Phillips, president Diamond Lumber Co., S. W. Mahaffey and F. T. Phillips, all of Green Bay.

Fairbanks, Morse & Co., Chicago, which recently completed a new gray iron foundry at its Eclipse works in Beloit, Wis., at a cost of nearly $1,500,000, on Jan. 1 will transfer its marine engine works from Three Rivers, Mich., to Beloit to take advantage of the enlarged casting and machining facilities. The Eclipse works heretofore specialized in farm gas engines and other power units, pumps, etc., principally for agricultural purposes. George B. Ingersoll is general manager at Beloit.

The Manitowoc Church Furniture Co., Waukesha, Wis., which recently accepted plans for a steam generating plant addition, has deferred construction until spring and will not be in the market for new equipment before March 15 or April 1. Charles F. Schuetze is general manager.

The Cudahy Brothers Co., meat packer, Cudahy, Wis., awarded the general contract to the American Contracting Co., 198 Milwaukee Street, Milwaukee, for a one-story brick and concrete box and crating factory, 80 x 190 ft., to replace a shop recently destroyed by fire. New equipment will be required throughout. Edward F. Lawler is general manager.

The Board of Education, Iola, Wis., has plans by Edward Tough, architect, Madison, Wis., for a two-story addition to the high school, for vocational training. The present building also will be remodeled. The work will cost about $85,000. E. C. Wipf is secretary.

The Manitowoc-Buick Co., Manitowoc, Wis., owned by Hamacheck & Bieser, will build a new garage to cost $50,000 complete. It will be 50 x 168 ft., part two stories and basement, with a machine shop and service department, 50 x 75 ft. The architects are Smith & Reynolds, local.

The Sparta, Wis., Board of Education has engaged Parkinson & Dockendorff, architects, La Crosse, Wis., to design a new high school and vocational training institute, for which purpose an appropriation of $200,000 is available. Dr. S. D. Beebe is president of the board.

The Pabst Corporation, 917 Chestnut Street, Milwaukee, formerly the Pabst Brewing Co., has reorganized its official personnel, with Frederick Pabst as president, to succeed Col. Gustave Pabst; Harry W. Marsh, formerly secretary, as vice-president and general manager; Hugo Kuechenmeister, treasurer, and Edward F. Loebl, secretary. Besides continuing the manufacture of malt syrups, cereals, etc., the new administration has plans for converting some of the unused capacity into metal-working industries, the first to be a machine shop for producing a patented design of valve rotator for internal combustion poppet-valve engines. A small experimental shop has been operated on this design for about 18 months. Details of other plans are withheld for the present.

The E. L. M. Tire & Rubber Co., Racine, Wis., is taking bids until Jan. 7 for a two-story brick and concrete addition, 80 x 144 ft., at Deane Boulevard and the Milwaukee road tracks. With equipment, the improvement will cost about $65,000. O. W. Dunham is secretary.

The Phono-Lamp Mfg. Co., Beloit, Wis., has been incorporated with a capital stock of $300,000 by interests identified with the American National Mfg. Co., St. Louis, manufacturer of combination talking machines and lighting fixtures, which recently acquired the brass foundry and machine shop of Slater & Tuck at Beloit. The incorporators are M. W. Wiegand, C. A. Riemer and E. R. Lucas.

Baltimore

BALTIMORE, Dec. 27.

The Union Shipbuilding Co., Fairfield, Baltimore, has revised plans under way for a two-story building, 70 x 200 ft., bids for which will be asked in about 60 days. F. C. Stauffen is manager.

Machinery to cost in excess of $100,000 will be installed in the three-story cooperage plant to be erected by the Brooklyn Cooperage Co., 142 Kent Avenue, Brooklyn, N. Y., in the Locust Point section, Baltimore, adjoining the plant of the American Sugar Refining Co., now in course of construction.

The Fort Avenue Garage, 725 Fort Avenue, Baltimore, will build a one-story repair and service works addition, 70 x 135 ft. Plans have been drawn.

The Smokeless Coal Corporation, Pulaski, Va., recently organized, is planning for the installation of electrical and other equipment at its properties. G. H. Snider is manager.

The Hagerstown & Frederick Electric Railway Co., Hagerstown, Md., is planning to double the capacity of its power house on Grant Street, Frostburg, Md. Power will be furnished to the Consolidation Coal Co. mines, as well as the mining properties of the Piedmont & Georges Creek Coal Co., both of which will install electrical equipment, motors, etc., for operation.

The City Council, Hagerstown, Md., will call for bids early in the spring for its proposed municipal electric power plant, preliminary plans for which are under way. It will cost about $300,000. C. E. Davis is clerk; A. B. Grubmeyer, 21 East Franklin Street, is engineer.

Fire, Dec. 19, destroyed four hangars, repair shop, tools, etc., at the aviation property of the War Department, Washington, at Langley Field, Newport News, Va., with loss estimated at about $200,000.

The Economy Tractor Co., Greenville, S. C., recently organized with a capital of $100,000 to manufacture motor-driven tractors and parts, has leased a building for a temporary plant. A new factory will be erected later. W. C. Cleveland is president, and J. P. Hughes, manager.

The Southern Power Co., Charlotte, N. C., is perfecting plans for the immediate construction of its new hydroelectric power plants at Mountain Island, N. C., and at Great Falls, S. C., both on the Catawba River. The first noted will have a capacity of 80,000 hp., and the other, 60,000 hp. Contracts for the buildings have been awarded to the Rhinehart & Dennis Co., Charlottesville, Va., and to Scott, Stewart, Jones & Co., Greenville, S. C. The plants are estimated to cost in excess of $5,000,000.

A vocational department will be installed in the two-story and basement high school to be erected at West Hickory, N. C., estimated to cost about $80,000. Benton & Benton, Wilson, N. C., are architects.

P. L. McCall, Cedartown, Ga., is organizing a company to establish a plant to manufacture cones, tubes and similar mechanical equipment for textile mills. A site will be selected at an early date.

William J. Eisenhardt, 108 West Lombard Street, Baltimore, operating a plant for the manufacture of plated metal products, has awarded contract to E. Eyring & Sons, 3501 Faith Avenue, for an addition, 26 x 120 ft., for general manufacture, estimated to cost about $25,000.

Fire, Dec. 18, destroyed the building of the Paul E. Blanford Co., Norfolk, Va., marine equipment, etc., with loss estimated at about $150,000.

The Williamson Mfg. Co., Homeland Avenue and York Road, Baltimore, manufacturer of automobile equipment, is planning for enlargements and the installation of new equipment. Plans are also under consideration for the establishment of new works in another location. John S. Williamson is president.

The Wilmington Sugar Refinery Co., Wilmington, Del., will soon break ground for the first eight buildings, to form its local plant, estimated to cost in excess of $2,500,000, including machinery, mechanical conveyors, machine repair works, etc.

F. E. Hatch, Albany, Ga., is organizing a company to construct a hydroelectric power plant at Banks Mill Pond.

The Triangle Motor Co., 3 New York Avenue, N. E., Washington, has completed plans and will commence the immediate erection of a two-story repair and service building, 66 x 100 ft., at 19 New York Avenue, N. E., estimated to cost about $35,000.

The Georgia Fullers Earth Co., Lumpkin, Ga., is planning for the installation of a mechanical conveying system at its property. Other field and operating machinery will also be installed. D. W. Bailey is head.

A vocational department will be installed in the new high school to be erected by the Board of Education, Raleigh, N. C., estimated to cost about $500,000, bonds for which are now being arranged. C. Gadsden Sayre, Raleigh, is architect.

The W. H. Winborne Co., Conway, S. C., is planning the erection of a two-story plant, 80 x 105 ft., to manufacture ceilings, moldings, etc. Work will commence at an early date. W. H. Winborne is president.

The Board of Commissioners, Pilot Mountain, N. C., has approved a bond issue of $40,000 for the construction of a municipal electric light and power plant. P. E. Simmons is secretary.

Indiana

INDIANAPOLIS, Dec. 27.

The Wayne Oil & Tank Co., 58 West New York Avenue, Indianapolis, is considering the erection of an addition to cost about $150,000, including machinery.

The Board of Education, Fort Wayne, Ind., has had plans prepared for a two-story and basement vocational shop at the central high school, estimated to cost about $200,000. A portion of the structure will be reserved for a gymnasium. Bids will be asked in the spring. Charles R. Weatherhogg, 405 Citizens' Trust Building, is architect. Byron Summers is president of the board.

The Lock Joint Tube Co., Mishawaka, Ind., manufacturer of metal tubing and other products, has plans under way for a new one-story factory, 45 x 90 ft., estimated to cost about $30,000.

The Kemp Machine Works, Muncie, Ind., will devote production in the future to pistons, piston rings, tools and kindred specialties, changing over from engine manufacture for marine and aeroplane service, as heretofore conducted.

The Common Council, Linton, Ind., has preliminary plans in preparation for a municipal electric light and power plant. The Shrouds-Stoner Co., Tribune Building, Terre Haute, Ind., is architect.

The American Coating Mills, Elkhart, Ind., manufacturer of coated paper products, will erect a five-story building, 100 x 125 ft., estimated to cost about $250,000.

The Model Machine Works, Frankfort, Ind., heretofore operated by Perry Goble, has been acquired by J. M. Neher, who will take immediate possession. Operations will be continued as heretofore.

The Central South

ST. LOUIS, Dec. 26.

The E. K. Campbell Heating Co., Kansas City, Mo., manufacturer of heating equipment, furnaces, etc., is planning the erection of a new one-story factory, 75 x 130 ft. Carl Bolb & Brother, Kansas City, are architects.

Fire, Dec. 15, destroyed the plant of the Pine Bluff Spoke Co., Pine Bluff, Ark., with loss estimated at about $50,000, including machinery. It is planned to rebuild.

The City Council, Woodward, Okla., is perfecting plans for a municipal electric light and power plant, estimated to cost about $100,000. Bonds will be provided.

The Caddo River Power & Irrigation Co., Little Rock, Ark., recently organized with a capital of $1,000,000, has been granted permission to construct a hydroelectric power plant near Arkadelphia, on the Caddo River, estimated to cost close to $800,000. H. L. Remmel is president, and H. C. Couch, secretary.

A. Y. Burrows, Knoxville, Tenn., and Jefferson Kinsel, Clearfield, Tenn., are organizing a company with capital of $500,000 to build a plant in the vicinity of Knoxville, to manufacture torpedoes, etc., for aerial service.

A vocational department will be installed in the junior high school to be erected at Cherryvale, Kan., estimated to cost about $100,000. J. H. Felt & Co., 800 Grand Avenue, Kansas City, Mo., are architects.

The Thomas Fruit Co., Joplin, Mo., has acquired an existing building and will remodel the structure for a new cold storage plant, estimated to cost about $75,000, including equipment. Charles A. Moore, 646 Plymouth Building, Minneapolis, Minn., is engineer. Abner Thomas is president.

The Russellville Compress Co., Russellville, Ark., recently organized, has taken title to about 12 acres of land as a site for new works, estimated to cost approximately $50,000, including equipment. Plans are being prepared. A. N. Falls is secretary.

The Seymour Packing Co., Topeka, Kan., has awarded a contract to F. M. Spencer & Son, Mulvane Building, for the erection of a three-story addition, 50 x 150 ft., to be equipped as a cold storage plant, estimated to cost close to $100,000. The Tait-Nordmeyer Engineering Co., St. Louis, is engineer.

A one-story power house will be erected at the plant of the United Casket Co., 3022 West Chestnut Street, Louis-

ville, in connection with the construction of an extension, 100 x 450 ft.

The Jenner-Woody Motor Co., Louisville, has tentative plans for new works at Twelfth Street and Broadway, estimated to cost about $100,000. John W. Jenner is president and general manager. Leslie V. Abbott, Thierman Apartments, is architect.

The Common Council, Columbia, Mo., will commence the immediate construction of a new municipal electric light and power plant, estimated to cost about $100,000. Plans have been completed.

The Osage Power Co., Lamar, Mo., is perfecting plans for its proposed hydroelectric generating plant on the Osage River, near Bagnell, Mo., with initial capacity of 40,000-hp. R. Williams, company address, is consulting engineer.

A vocational department will be installed in the two-story and basement high school to be erected at Bowling Green, Ky., estimated to cost about $100,000. Bids will be asked early in 1922. L. D. Hanes is president of the board.

The Joseph Forshaw Stove & Heating Co., 111 North Twelfth Street, St. Louis, is clearing the site for a new seven-story and basement building, 50 x 100 ft., contract for which has been awarded to the James Godfrey Co., Wainwright Building. It is estimated to cost about $75,000.

The Board of Education, Wichita, Kan., is arranging for a bond issue of $1,000,000 for the erection of a new high school, including vocational department. Lorentz, Schmidt & Co., 121 North Market Street, are architects.

Detroit

DETROIT, Dec. 27.

The Michigan Chandelier Co., 1745 Brush Street, Detroit, manufacturer of brass and other lighting fixtures, has tentative plans under way for the erection of a three-story factory on Chene Street, 20 x 110 ft., estimated to cost $75,000, including equipment. The Building Service Bureau, 1336 Brush Street, is architect.

Fire, Dec. 23, destroyed the power plant of the Consumers' Power Co., near Big Rapids, Mich., with loss estimated at $350,000, including equipment. It is planned to rebuild. Offices of the company are at Grand Rapids, Mich.

The Dry-Kold Refrigerator Co., Niles, Mich., manufacturer of electrically operated refrigerators, has construction under way on an addition to its plant.

The Crodius Steam Pressed Brick Co., Pontiac, Mich., has tentative plans for the erection of a new factory on Sanderson Street. It is proposed to call for bids in the spring. C. J. Crawford is president.

The West Michigan Steel Foundry Co., Muskegon, Mich., is considering rebuilding its plant, almost completely destroyed by fire, Dec. 14, with loss reported at $150,000.

A one-story power house, 38 x 60 ft., will be constructed at the plant of the Belle Isle & East Side Creamery Co., Detroit. Williams Brothers, 1111 Kresge Building, architects, have completed plans.

The Union Bag & Paper Co., Sheboygan, Mich., will make extensions and improvements in its plant, including the remodeling of the present mill, 60 x 100 ft., estimated to cost about $100,000. G. S. Witham is general superintendent.

Daniel J. Ryan, formerly sales manager of the Detroit Nickel Plating & Mfg. Co., Detroit, has organized the General Electro-Plating & Mfg. Co., 465 York Street, with a capital stock of $10,000, to do a general jobbing business and to manufacture brass, bronze and aluminum castings. The officers are Daniel J. Ryan, president and sales manager; James Kane, vice-president, and William Wallace, formerly connected with the Studebaker Corporation, secretary-treasurer. The company is in the market for foundry equipment and polishing lathes.

Dividend disbursement by industrial, commercial and banking interests at Youngstown, Ohio, largely representing fourth quarter payments, will approximate $1,500,000. In most cases the dividends are payable Jan. 2. In disbursing $575,000 on its common and preferred stocks, the Youngstown Sheet & Tube Co. will lead in the distribution, followed by the Trumbull Steel Co., which will pay a total of about $285,000 on both issues. The Sheet & Tube Company common payment is at the rate of 50c. per share, while the Trumbull Company will disburse 15c. per share on common. The Standard Textile Products Co. will pay $140,000 in dividends. Other dividend distributors at Youngstown will be the Brier Hill Steel Co., Newton Steel Co., Falcon Steel Co. and General Fireproofing Co.

The assets of the Federal Corporation, Westfield, Mass., have been sold by the trustee of the property to Richard J. Burton, Brookline, Mass. The real estate is not involved in the deal, since the property was taken over by the First National Bank, Boston, to satisfy its mortgage. The company manufactured spark plugs, rim tools, lamps, electric sockets and other accessories.

IRON AND INDUSTRIAL STOCKS

Values in General Have Shrunk During the Past Week or Ten Days

Values of securities in general have shrunk since last reports. The aggressive buying power which raised prices so substantially through November and early December is not in evidence. On the other hand, the pressure to sell stocks and bonds is not severe, and for the moment can be traced to higher money rates. People who heretofore borrowed money to buy securities are the chief sellers of securities to-day. There is comparaticely little liquidating by real investors, because it is felt the high money rates are temporary and that following the seasonable lull in commercial buying will come a gradual improvement in business. Security investors, as a rule, do not look for a business boom, however, but rather the long pull to prosperity. The liquidation of frozen credits is progressing favorably and should end within the next few months. Prices for staple commodities in a great many instances have been thoroughly liquidated. It only remains for a buying power to develop, and a buying power in a country with as much money as is contained in the United States cannot lie dormant indefinitely. Which explains why the real investor is not anxious to sell stocks and bonds. There are, of course, people who recently have sold stocks because they were uneasy over developments in certain industries, but this does not apply to iron and steel stocks. It is true that holders of some iron and steel stocks are uneasy due to curtailed plant operations with resultant negative earnings, but these conditions in a very large measure are offset by consolidations of properties possibilities, attractive from the economic as well as the conversion viewpoint.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	37½- 39¼	Lackawanna Steel.	43½- 46⅛
Allis-Chalm. pf...	87½- 89	Midvale Steel.....	26 - 28⅝
Am. Can com.....	32⅛- 35⅝	Nat.-Acme	10 - 12⅛
Am. Can pf.....	93⅜- 94¾	Nat. E. & S. com.	35¼- 38⅜
Am. C. & F. com.	142½-144½	N. Y. Air Brake..	— - 57½
Am. C. & F. pf...	— -113½	Nova Scotia Steel.	23 - 24
Am. Loco. com...	98¾-104	Press. Steel com..	63 - [illegible]
Am. Loco. pf.....	— -114¾	Press. Steel pf....	91½- 93
Am. Radiator com.	— - 88½	Ry. Stl. Spg. com.	89⅝- 91⅞
Am. Steel F. com.	31¾- 33⅞	Replogle Steel.....	24 - 26½
Bald. Loco. com..	94¾- 97⅝	Republic com.....	50 - 53⅛
Bald. Loco. pf....	— -104	Republic pf.....	82½- 84¾
Beth. Steel com..	52 - 53	Sloss com.....	— - 38
Beth. Stl., Cl. B..	55½- 57	Sloss pf.....	— - 72
Chic. Pneu. Tool..	58½- 62	Un. Alloy Steel...	25¼- 25⅝
Colorado Fuel.....	24⅜- 26⅜	U. S. Pipe com...	16⅛- 17¼
Cruc. Steel com...	64⅛- 67¼	U. S. Pipe pf.....	— - 52½
Cruc. Steel pf.....	86¼- 87	U. S. Steel com...	82⅞- 84¾
General Electric.	136½-140¾	U. S. Steel pf.....	113⅝-115
Gt. No. Ore Cert..	31⅝- 32	Vanadium Steel...	31 - 32¾
Gulf States Steel.	46¼- 47	Westingh'se Elec.	49¾- 51
Int. Har. com.....	82½- 83½		

Purchase of Haskell & Barker Car Co. Approved

At a special meeting at Chicago on Dec. 20, stockholders of the Pullman Co. voted to approve the purchase of the property and assets of the Haskell & Barker Car Co. and to increase the capital stock of the Pullman Co. from $120,000,000, consisting of 1,200,000 shares at $100 par to $135,000,000 consisting of 1,350,000 shares at $100 par each. Terms upon which the Pullman Co. will take over the Haskell & Barker interests are as follows: The Pullman Co. is to assume all debts and obligations of the Haskell & Barker Car Co. It will then issue to the directors of the other concern, 165,000 shares of Pullman stock. The Haskell & Barker Car Co. will have the right to declare and pay the stockholders out of its assets, before the purchase by the Pullman Co., an extra dividend of $1.25 per share upon present outstanding capital stock, amounting to $275,000. The stockholders of the Pullman Co. consent that the 150,000 shares of new stock of that company authorized by amendment to the charter, may be issued and delivered to directors of the Haskell & Barker Car Co., as part of the 165,000 shares called for by the terms of the purchase. Three new directors of the Pullman Co. were elected by the Pullman Co. stockholders: Edward F. Carry, president Haskell & Barker Car Co., Inc.; John R. Morrow and Arthur O. Choate, both of New York.

The report that the Lima Locomotive Co., Lima, Ohio, will be added to the consolidated car company, has not been confirmed up to date.

The Elwood Foundry Co., Elwood, Ind., has been declared a voluntary bankrupt in the federal court at Indianapolis. Liabilities amount to about $12,000 and the assets, including real estate, to a trifle more than that sum.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.68c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.68c.
Hoops, base price	3.53c.
Bands, base price	3.28c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.78c.
Channels, angles and tees under 3 in. x ¼ in., base	2.68c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.65c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.85c.
Toe calk, ½ x ⅜ in. and larger	3.25c.
Cold-rolled strip, soft and quarter hard	6.25c. to 7.25c.
Open-hearth spring steel	3.75c. to 6c.
Shafting and Screw Stock:	
Rounds	3.88c.
Squares, flats and hex	4.38c.
Standard cast steel, base price	12.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.78c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c.	.....
Nos. 22 and 24	3.85c.	4.10c.
No. 26	3.90c.	4.15c.
No. 28	4.00c.	4.25c.
No. 30	4.25c.	.....

No. 28 and lighter, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.95c. to 4.10c.
No. 16	4.10c. to 4.25c.
Nos. 18 and 20	4.25c. to 4.40c.
Nos. 22 and 24	4.40c. to 4.55c.
No. 26	4.55c. to 4.70c.
No. 27	4.70c. to 4.85c.
No. 28	4.85c. to 5.00c.
No. 30	5.35c. to 5.50c.

No. 28 and lighter, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	—56	—40	¾-in. Butt	—30	—13
¾ in. Butt	—61	—47	1½-in. Butt	—32	—15
1-3 in. Butt	—63	—49	2-in. Lap	—27	—10
3½-6 in. Lap.	—60	—46	2½-6-in. Lap.	—30	—15
7-8 in. Lap	—56	—34	7-12-in. Lap	—23	— 7
9-12 in. Lap.	—55	—33			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER — Per Lb.

Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	17¼c. to 17½c.
High brass wire	17¼c. to 17½c.
Brass rod	14¾c. to 15 c.
Brass tube, brazed	26 c. to 27½c.
Brass tube, seamless	18½c. to 19 c.
Copper tube, seamless	21¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14-20	Primes	Wasters
		80 lb.	$6.05	$5.80
		90 lb.	6.15	5.90
		100 lb.	6.25	6.00
IC	$10.00	$8.50	IC	6.40	6.15
IX	11.25	10.00	IX	7.40	7.15
IXX	13.00	11.50	IXX	8.40	8.15
IXXX	14.75	13.25	IXXX	9.40	9.15
IXXXX	16.25	15.00	IXXXX	10.40	10.15

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.00
IC	7.25
IX	7.50
Fire door stock	10.00

Tin

Straits, pig	35c.
Bar	40c. to 45c.

Copper

Lake ingot	16 c.
Electrolytic	15¾c.
Casting	15¼c.

Spelter and Sheet Zinc

Western spelter	6½c. to 7c.
Sheet zinc, No. 9 base, casks	10½c. open 11c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7 c.
Solder, ½ and ½ guaranteed	27c.
No. 1 solder	25c.
Refined solder	21c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 6¾c.

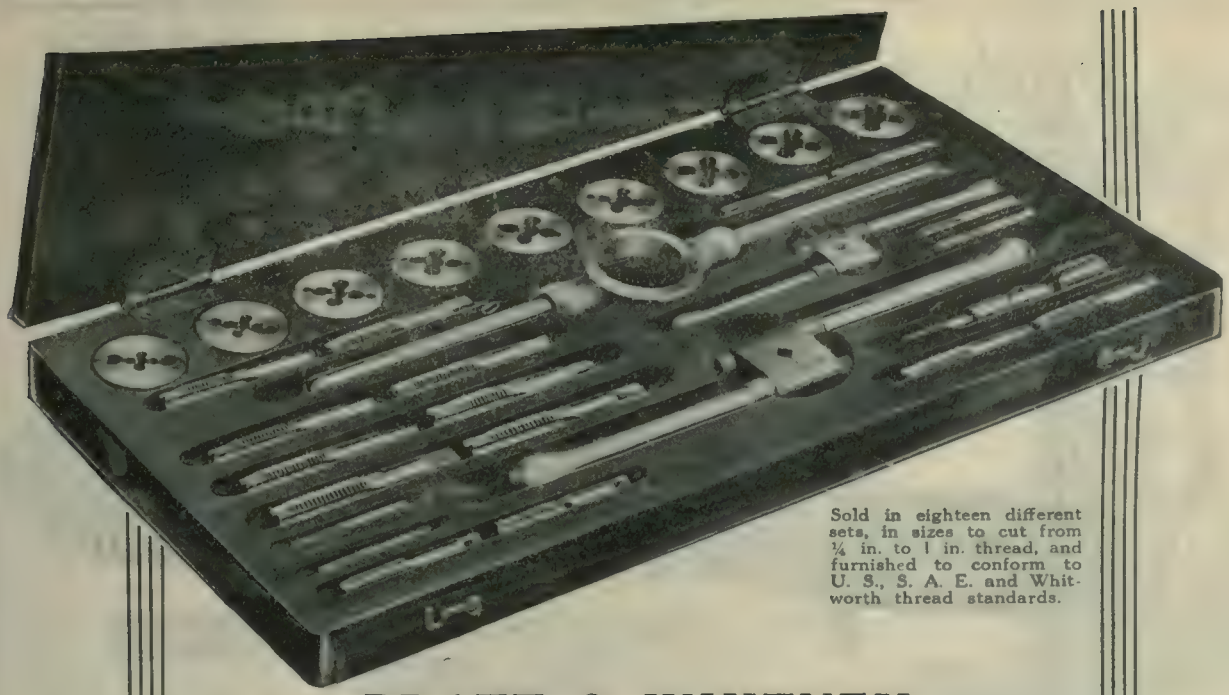
Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 29c. to 31c.

Old Metals

Prices are firm but business is quiet. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy crucible	11.25
Copper, heavy wire	10.75
Copper, light and bottoms	8.25
Brass, heavy	5.50
Brass, light	4.50
Heavy machine composition	8.00
No. 1 yellow brass turnings	5.50
No. 1 red brass or composition turnings	7.00
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50



Sold in eighteen different sets, in sizes to cut from ¼ in. to 1 in. thread, and furnished to conform to U. S., S. A. E. and Whitworth thread standards.

PRATT & WHITNEY

Screw Plate Sets

THESE reasonably-priced sets of standard P & W taps and dies, consist of our regular product made up in various combinations to meet the requirements of the small shop, garage, service station and general toolroom.

They are unequaled for fast, accurate threading of all metals and will be found invaluable whether used occasionally or for every-day work.

The taps and dies that go into P & W Screw Plate Sets are of a high quality unusual in such general purpose outfits.

The taps are all made with the famous "coneccentric" land—an exclusive Pratt & Whitney feature—that permits their resharpening on the face of the cutting edge without change in size.

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You can buy these tools at our Sales Offices in Boston, Philadelphia, Rochester, Birmingham, Cleveland, Detroit, Chicago, Cincinnati, St. Paul, St. Louis, San Francisco, Los Angeles, Seattle.

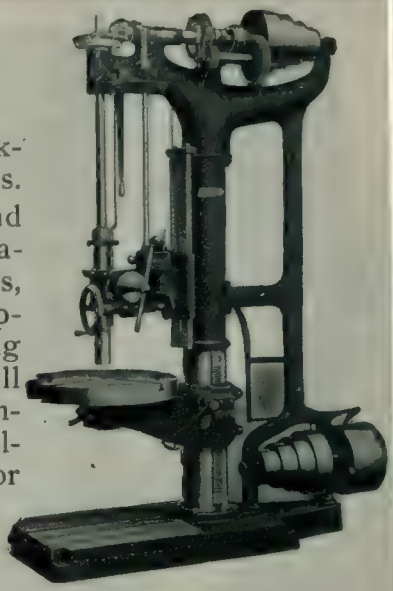
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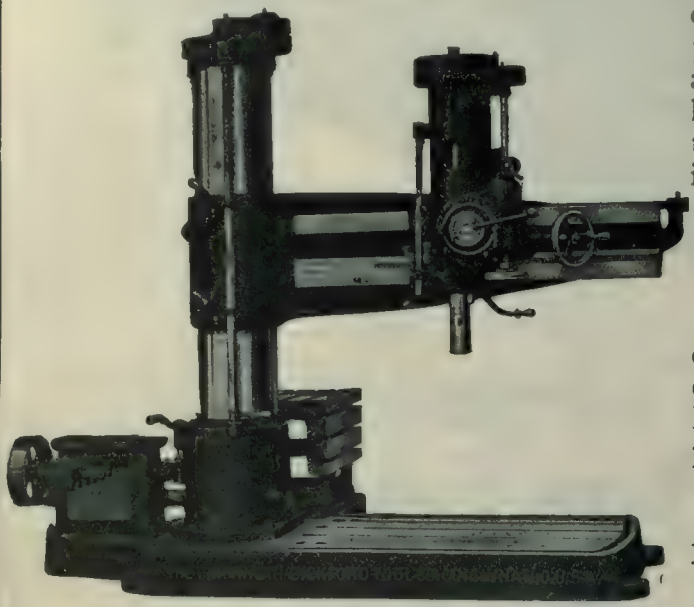


Production at Low Cost

The cost of producing is low on the Cincinnati Bickford Radial and Cincinnati Upright Drilling Machines.

They are designed and built with the knowledge and experience of over 47 years' specialization in drilling machine building. Metal is massed at the straining points, eliminating skipping, springing and vibration. All levers and controls are centralized, the operator need not leave his position.





They cut production time and costs because the essentials — Range, Rigidity, Speed and Accuracy — are prominent in their design.

Let us tell you what they can do for you.

THE CINCINNATI BICKFORD

The Cincinnati Bickford Tool Co.
Oakley, Cincinnati, Ohio, U. S. A.

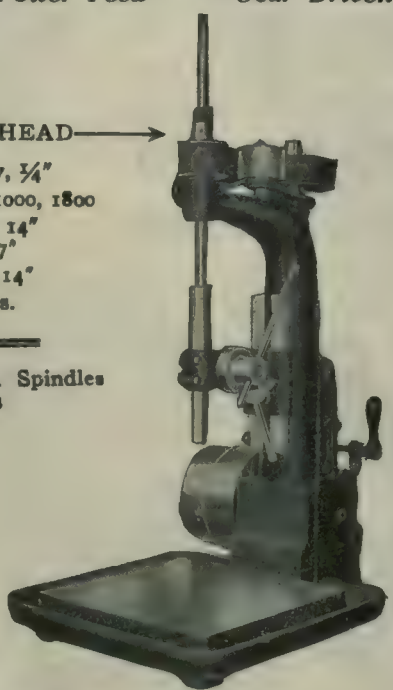
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FOR BENCH USE

Hand and Power Feed ***Gear Driven***

TYPE D HEAD ⟶

Drill Capacity, ¼"
R.P.M., 500, 1000, 1800
Spd. to Bed., 14"
Spd. to Col., 7"
Table, 14" x 14"
Wgt., 225 Lbs.

Chain Driven Spindles for ¾" Drills



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How Is This for Strength and Power?



24-inch Self-Oiled All Geared Machine

Drives a 2" pipe tap in cast iron without back gears.

At the same time, when so desired, the back gears may be instantly engaged.

Many exclusive features are described in Catalog "I."

Send for it today.

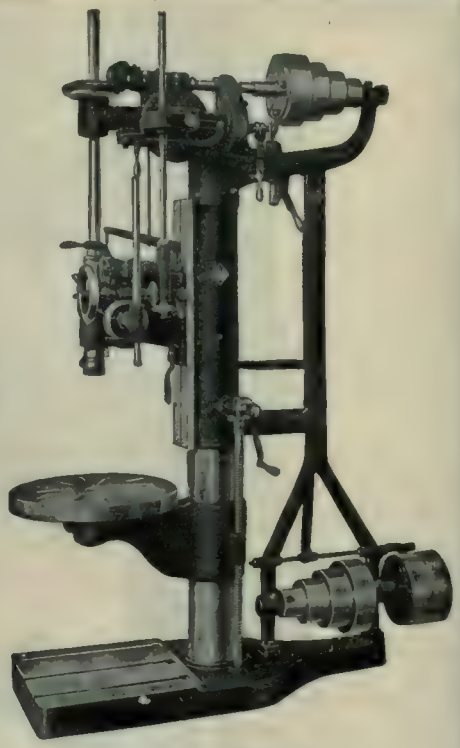
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Complete Line of 8 inch to 50 inch Swing (with or without Tapping Attachment)

Upright DRILLS
Horizontal DRILLS
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Convenience of Operation
Accuracy—Strength

Made by **Barnes Drills**

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Drilling Machines

Semi-Automatic Drilling Machines for small holes in small parts that are produced in large quantities.

Centerless Cylindrical Grinders

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COLBURN

HEAVY DUTY DRILL PRESSES AND VERTICAL BORING AND TURNING MILLS

THE COLBURN MACHINE TOOL COMPANY
CLEVELAND, OHIO
SEE FULL PAGE ADVERTISEMENT LAST ISSUE

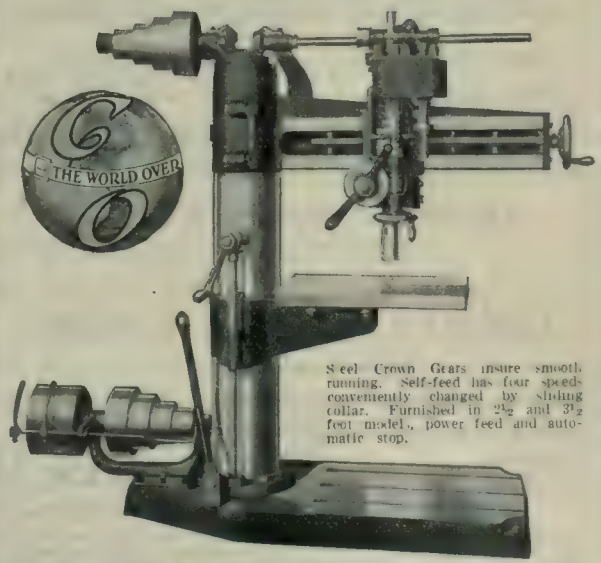
ROYERSFORD TWENTY-INCH BACK GEARED

This 20 inch back geared, vertical drill has a capacity of 1¼ inches.
Rigid, accurate, this drill is not only a big producer, but a machine for fine work.
Write for circular.



Royersford Foundry & Machine Co.,
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Royersford, Pa. U. S. A.

C-O Radial Drill



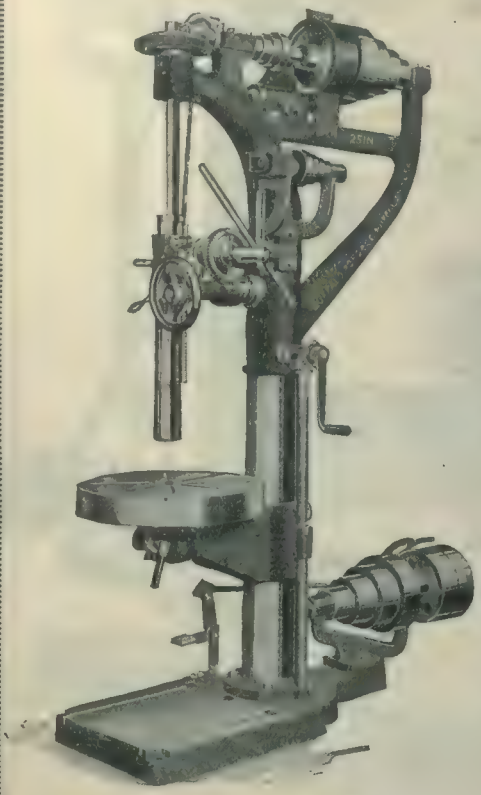
Steel Crown Gears insure smooth running. Self-feed has four speeds conveniently changed by sliding collar. Furnished in 2½ and 3½ foot model., power feed and automatic stop.

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This C-O Radial Drill handles the most accurate work with the utmost precision. Strong, rugged, simple, it delivers years and years of satisfactory service. Can be equipped with improved tapping attachment, operated with foot, leaving hands free for other work. Arm swings to any position desired and clamps securely. High carbon crucible steel spindle takes thrust on ball bearing. All bearings made with graphite cones, which increase life of babbited bearings 300 to 400 per cent. Write for catalog and unusually low prices.

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25 Inch Back Geared Upright Power Drill

This Drill is designed in every respect to do accurate and efficient work. It has eight speeds and four power feeds, also hand and lever feeds. Can be instantly changed from plain to back geared drive without using wrench by disengaging knurled knob in the top gear and throwing in back gears by means of hand lever. A locking screw is also provided to hold this in place.

SPECIFICATIONS

Height of Drill.....85 in.	Diameter of Table.....21 in.
1½-inch Hole to Center..25 in. circle	Size of Tight and Loose Pulley, 10 x 3⅛ in.
Greatest distance between base and spindle.....44⅜ in.	Speed of Drive Pulleys...300 R.P.M.
Greatest distance between Table and Spindle .....31 in.	Smallest Diam. of Cone Pulley..4 in.
Travel of Spindle.....14½ in.	Largest Diam of Cone Pulley..10 in.
	Depth of Cone Pulley Steps..3⅛ in.
	Four Feeds.....005-.007-.009-.016

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Buffalo, N. Y., U. S. A.

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ESTABLISHED 1902

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The Fosdick Machine Tool Co.

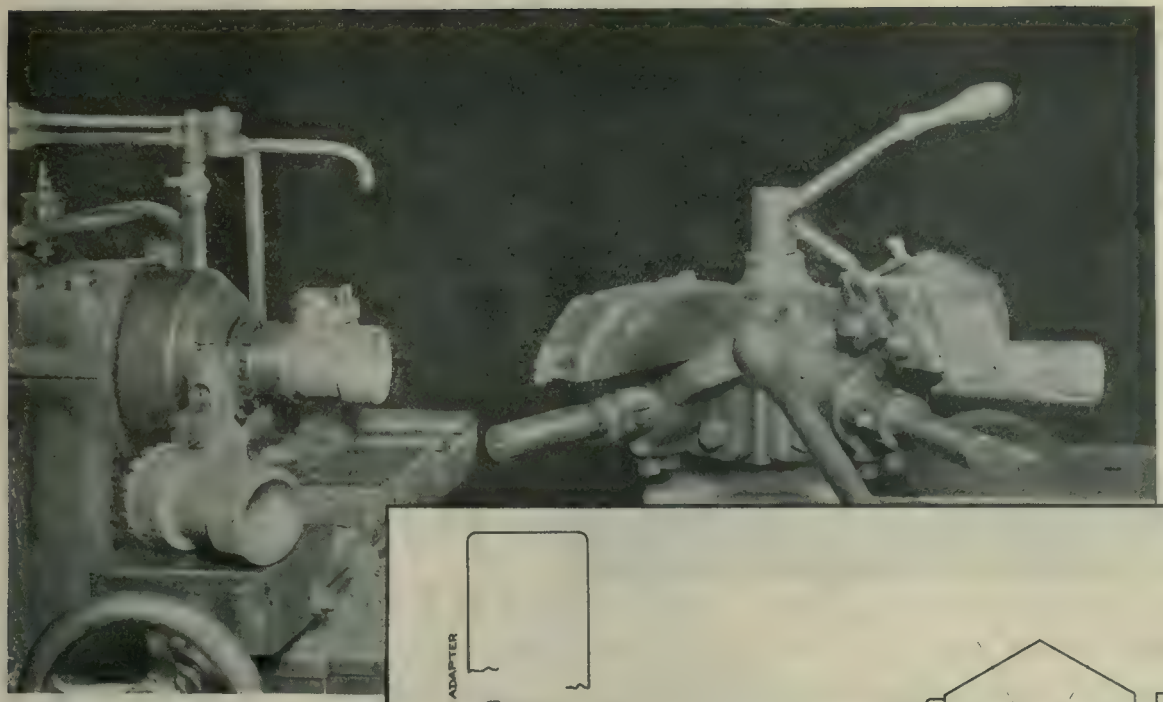
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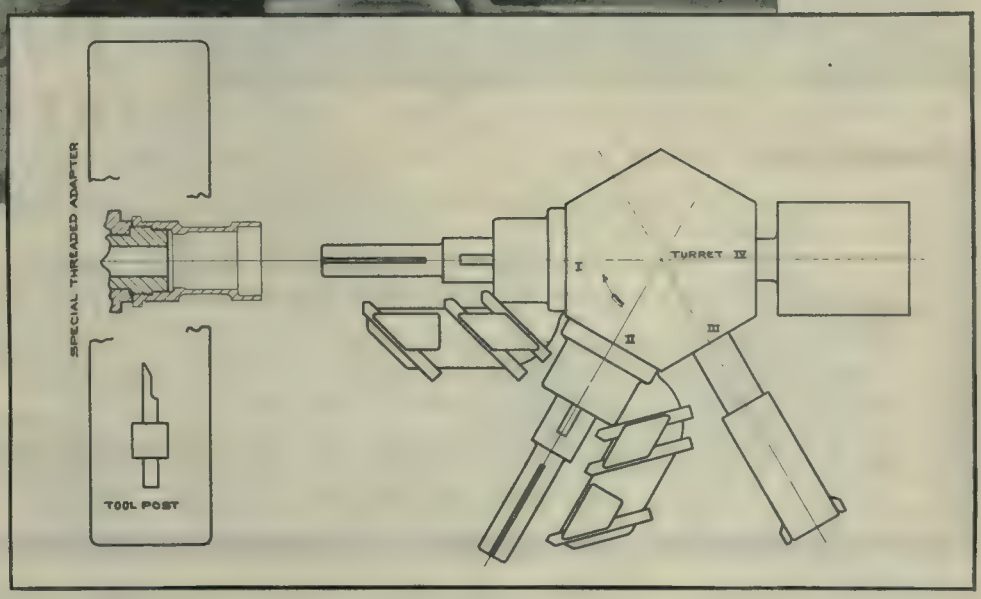
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AGENTS: Biggs-Watterson Co., Cleveland, Ohio; Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; Eccles & Smith Co., San Francisco, Calif., Los Angeles, Calif., Portland, Ore.; Barbour, Love & Woodward, New York, N. Y.; E. A. Kinsey Co., Cincinnati, Ohio, Indianapolis, Ind.; Peninsular Machinery Co., Detroit, Mich.; Homer Strong, Rochester, N. Y., Buffalo, N. Y.; H. A. Smith Machinery Co., Syracuse, N. Y.; Swind Machinery Co., Philadelphia, Pa.; (Somers, Fitler & Todd Co., Pittsburgh, Pa., for radials only); Stocker-Rumely-Wachs Machinery Co., Chicago, Ill., Milwaukee, Wis.; Taylor Machinery Co., Boston, Mass.; A. R. Williams Machinery Co., Toronto, Ont., Canada; Burton Griffiths & Co., London, England; Fenwick Freres & Co., Paris, France; Wynmalen & Hausmann, Rotterdam, Holland; Rylander & Asplund, Stockholm, Sweden; Wilh. Sonesson & Co., Malmo, Sweden, Copenhagen, Denmark; Alfred Herbert, Ltd., London, England, for Japan, Manchuria, Korea, Formosa, Burmah and Ceylon.

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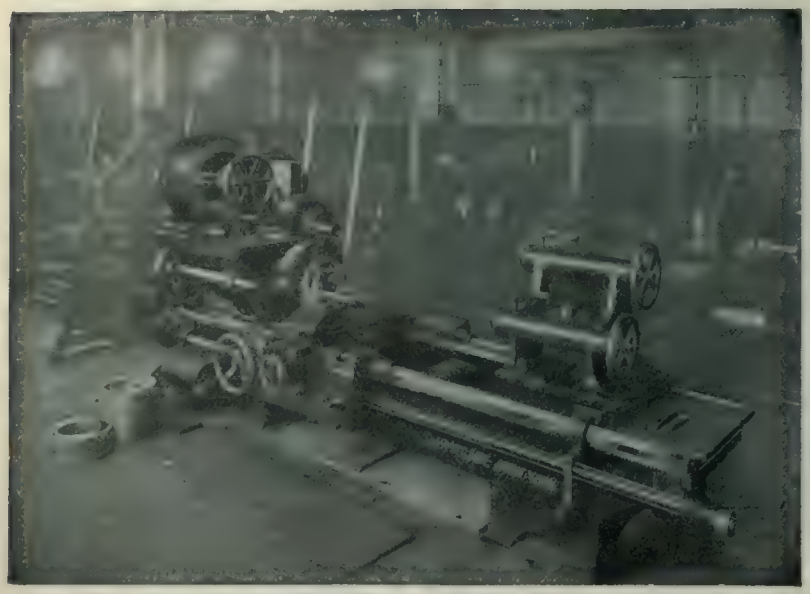
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As a 26-inch Lathe—Turning Piston-Ring on McCabe's "2-in-1" Double-spindle Lathe—when there's no big work to do.

There isn't any "next job"

Illustration shows "old style" Lathe at B. R. T. shops, Brooklyn, N. Y.

very often for big Lathes. They stop—because the work—the big work—is what you sometimes lack. And your Lathe's tied up doing nothing.

When you have nothing big to do, is when McCABE'S LATHE proves profitable to you.

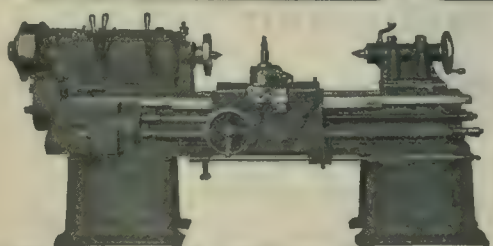
The 26-inch Swing is combined with the powerful 46-inch, merely because it gives you the Lathe to do everything that comes along.

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Ames Bench Lathes

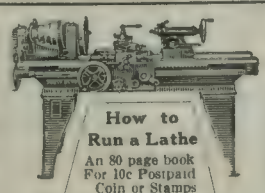


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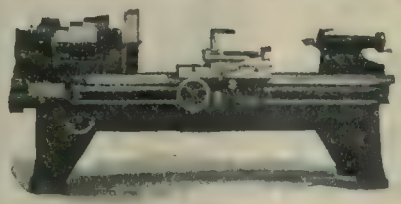
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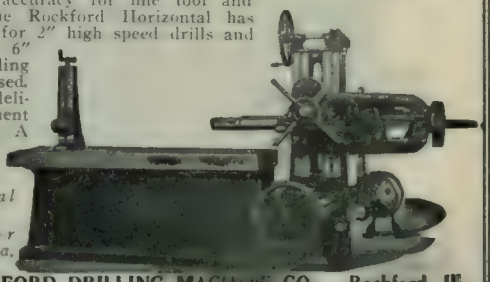
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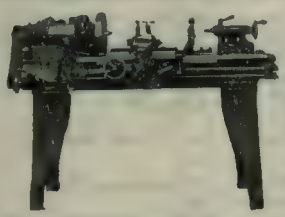
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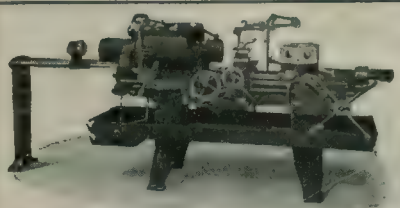
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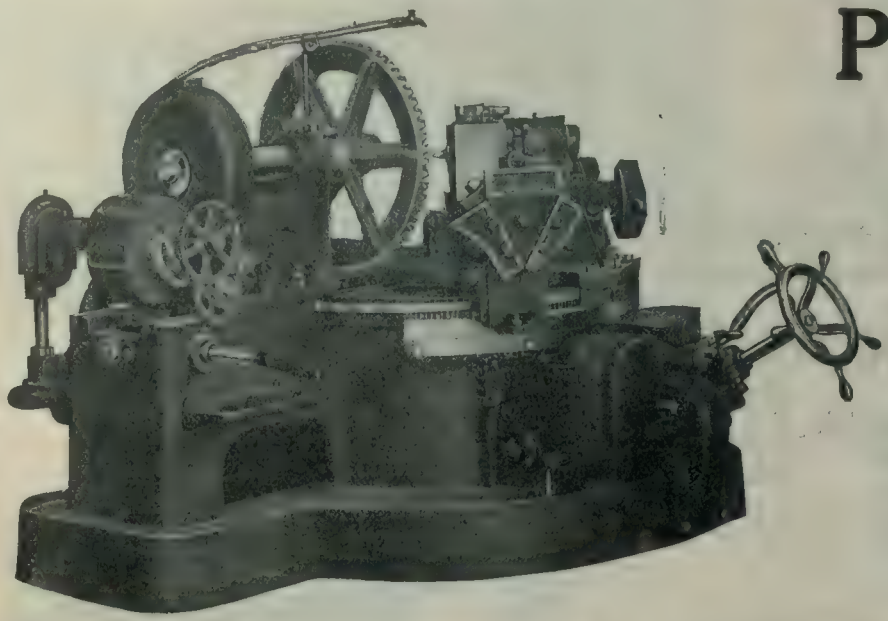
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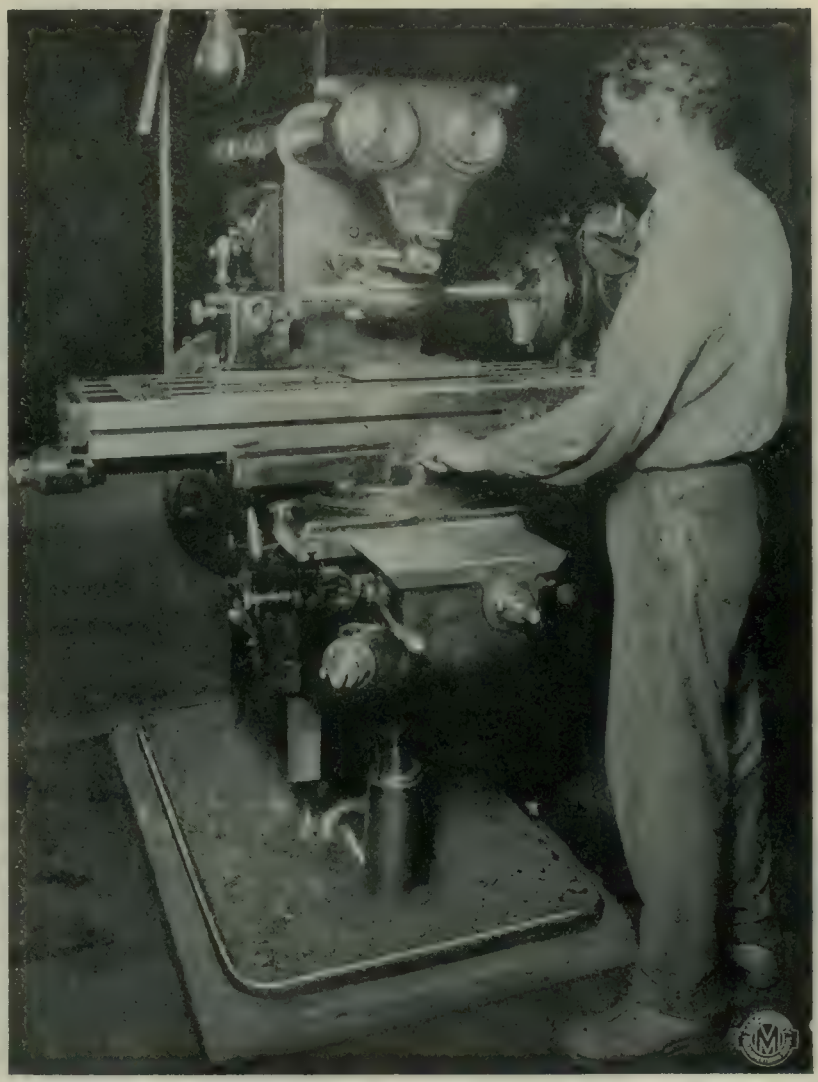
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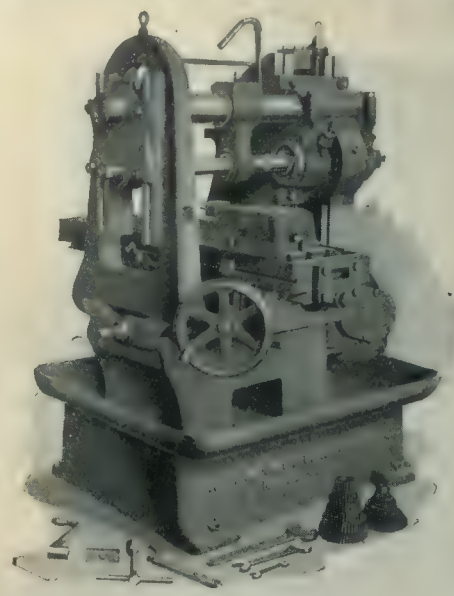
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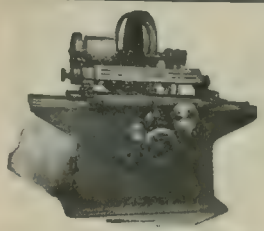
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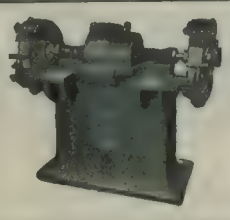
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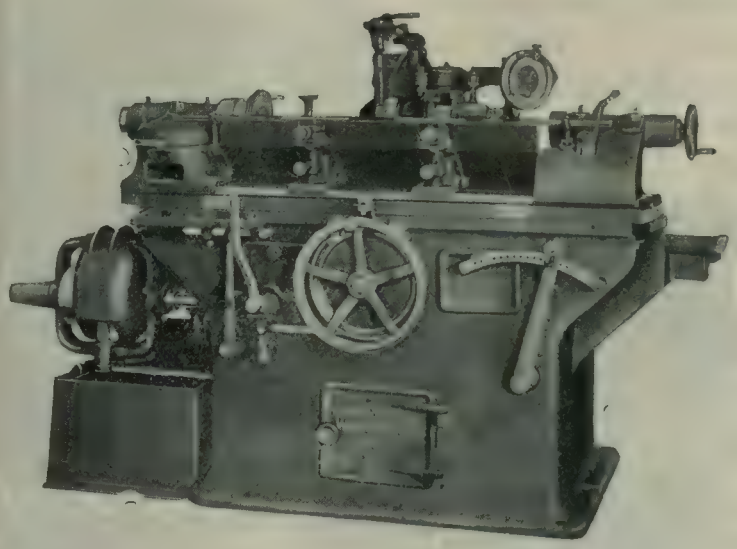
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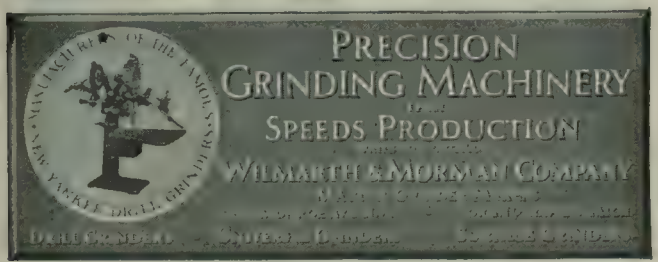
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Shop superintendents are beginning to realize that using poor hack saw blades quickly runs into real money—even though the cost of the blades themselves amounts to but little.

We believe that the more you know about hack sawing costs, the firmer you will put your faith in Star Saws.

That is why we welcome every opportunity to compare Star blades with other makes, by actual test. Write and let us tell you more about how to conduct a comparative test.

CLEMSON BROS., INC.
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Now Sold by
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Two Sizes Nos. 1-2

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We make the regular Huntington (Pattern) for all sizes. Roughing for No. 1 and 2. Paragon for No. 1 only.

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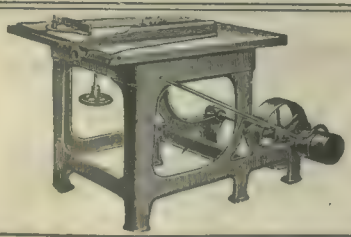
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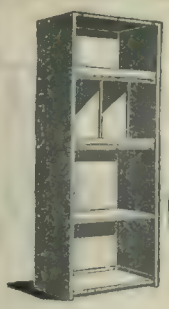
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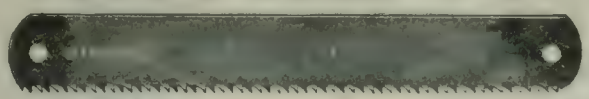
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The 25-ton size weighs 70 pounds, as against 136 and 170 pounds for other jacks of equal capacity. Cannot over-travel, back down, or rotate and "throw" the load. Sizes for 15 to 100 tons.
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METAL CUTTING SAWS
for cutting Hot & Cold Steel
Write for Catalog
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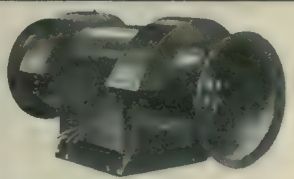
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The most durable and efficient broom for all classes of heavy work in factory, foundry and steel working industries.
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The perfect industrial doors—easy to operate—repaired without dismantling—protection against fire, elements, theft. Consult our engineering department.
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Its weird, penetrating scream gets instant attention. Low current cost only operating expense. Write for full particulars.
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In any plant using 25 rolls, or more, of blue print paper a month, the Pease Peerless Automatic-Continuous Blue Printing, Washing and Drying Machine will pay for itself in a short time. For smaller plants we have another type of machine—the Pease Vertical—which costs less and does equally good work, but not so rapidly. Write for literature and prices.
The C. F. Pease Co., 832 No. Franklin St., Chicago

THREE BIG AUCTION SALES

At Baltimore	At Schenectady	At Boston
January 5th, 1922	January 9th, 1922	January 12th, 1922

The War Department

Will offer for sale at public auction on the dates and at the places named in this advertisement both large and small lots of various kinds of merchandise. Goods will be offered in lots to suit attending bidders. Wherever possible samples of the merchandise to be sold or the actual merchandise itself may be inspected upon application to the SURPLUS PROPERTY OFFICER in charge of the sale. All goods will be sold "as is" and "where is" f.o.b. point of storage.

Much of the merchandise to be offered during these sales is seasonable and of a staple nature. A large part of it is new. Some of it has been thoroughly reclaimed and renovated and is ready for re-issue.

Merchandise to be sold at auction in

BALTIMORE,
January 5, 1922

Consists of: Cartridge Belts—Cartridge Boxes — Pouches — Awls — Anvils — Crow Bars — Bellows — Bits—Bolts—Drainboards — Buckles — Bowls — Bacon Cans — Tool Chests — Cups — Cutters — Canisters — Canteens — Carriers—Chains — Clamps — Cuspidores—Drills — Dies—Faucets — Files — Guides — Hammers — Handles — Burnishers—Coffee Mills—Nuts — Nails — Picket Pins — Range Parts—Rope — Scales—Shovels —Screws — Stencils — Drawing Tables — Tanks — Tools—Shipping Tags — Tripods — Trailers —Wrenches — Steel Bars—Machines — Lathes—Drill Press — Halters — Bridles — Bits — Buckles — Plates — Harness Rings—and a quantity of Motor and Vehicle material of various kinds.

Also large and small lots of various other commodities.

Merchandise to be sold at auction in

SCHENECTADY,
January 9, 1922

Consisting of: Ration Bags and parts for same—Tent Poles—Steel Bars — Carbide — Axle Grease—Russian Shell Grease —Expanded Metal—Oil—Nose Bags — Saddle Bags — Picket Pin Cases — Saddle Soap — Escort Wagons — Medical Wagons—Pick Axes—Boilers for Field Ranges—Galvanized Iron Buckets — Horse Brushes — Cleavers—Cans, various kinds—Tool Chests — Curry Combs — Shoe Dubbins—Pick Handles—Sanitary Huts—Kitchen Utensils —Shovels—Scales.

Also large and small lots of various other commodities.

Merchandise to be sold at auction in

BOSTON,
January 12, 1922

Consisting of: Sprinkler Wagons — Springs — Steps, Seats, Cushions and Trees for Ambulances—Jacks — Ratchet Brakes — Hinges — Chains— Parts for Escort Wagons—Varied lots of vehicle parts—Wire Desk Baskets—Mattresses — Rivet Sets — Rope—Webbing — Brassards — Barrack Bags — Blankets — Bridles.

Also large and small lots of various other commodities.

Full particulars as to terms of sale, detailed descriptions of the various lots and kinds of merchandise to be sold, where same are stored, and other particulars may be had without charge upon application to

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—or—

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CONTINUOUS ELECTRIC BLUE PRINTING MACHINE

Improved — Speedier — Heavier

The Wickes Blueprinting Machine is absolutely automatic and will print continuous rolls or separately cut sheets, the paper travelling with the feeding belt on an incline with the tracing, and is carried to the feed roller and around the printing cylinder, in which is mounted the lighting element.

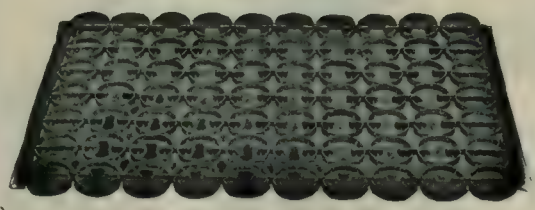
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Cary's Everlasting Flexible Steel Mats are made of the best quality cold rolled strip steel, thoroughly galvanized, which enables it to withstand severe usage without rusting; also outwears many times any other mat made. The United States Government specifies that our mat be used in all buildings within their jurisdiction. Made in twelve stock sizes, also in rolls of 50 feet, special shapes and sizes to order.

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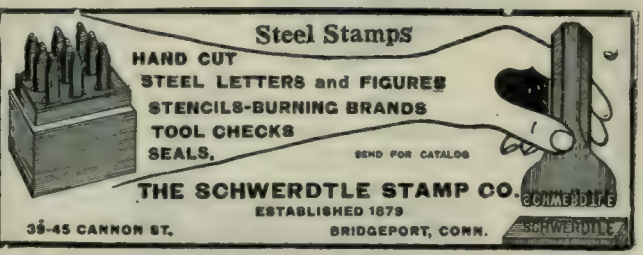


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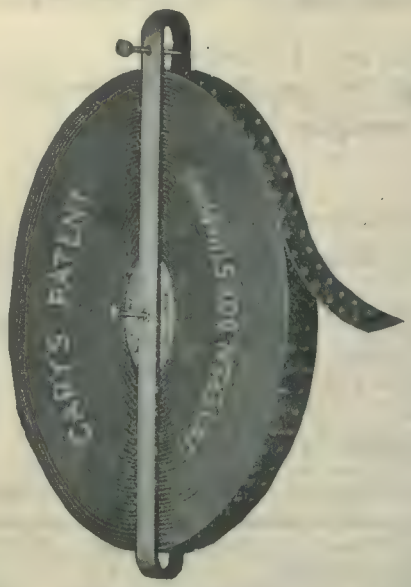
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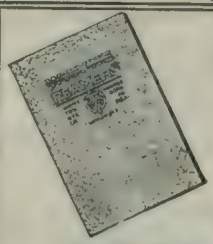
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See full page advertisement in second issue of each month.

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Floating Reamer Holders
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TAPS, DIES, REAMERS
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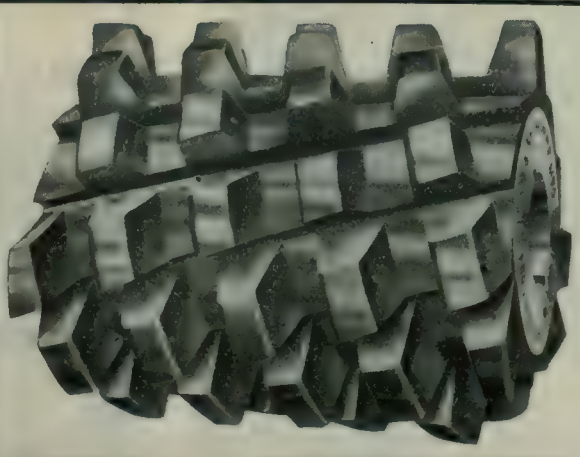
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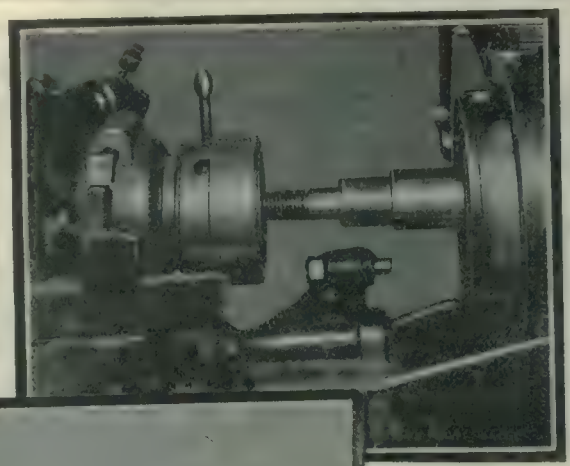


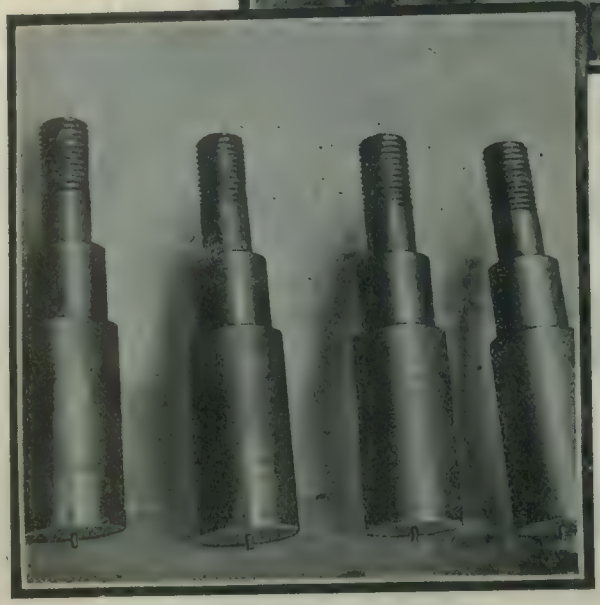
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What they have proved out in years of operation, it will at least pay you to investigate. If you have threading to do, write us to-day.

Our new catalog, "The Hartness Automatic Die," is gladly sent upon request. Write on company's letterhead and indicate official title.

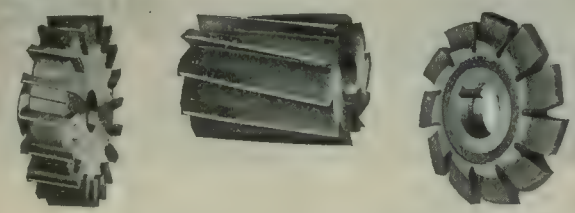
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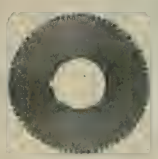
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Beyond your good-will it pays us no dividend. You, on the other hand, get a return for every day you use one.

No hogging, no binding, no broken taps all bring something to the credit side of your ledgers.

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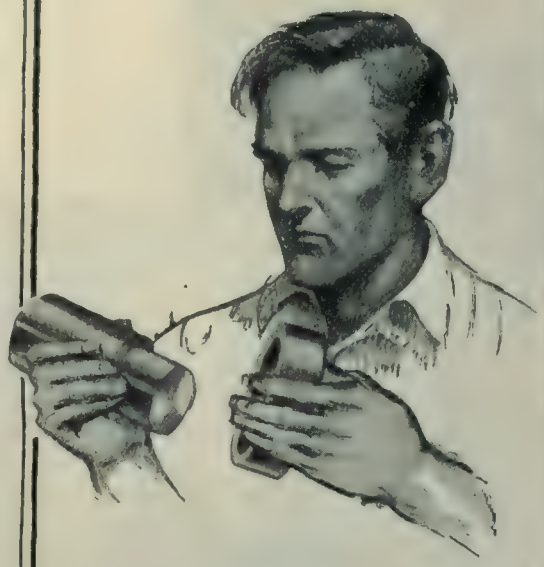
Factory, Millersburg, Pa.



Brubaker Staybolt Tap

The Tap with the Continuous Taper

Designed so you can't tell where the taper thread enters the straight, which distributes the cutting strain.



Errors in Measurements

may cost the machinist more than the price of a tool kit—especially these days. The dependable accuracy of Starrett Tools is cheap insurance.

Get catalog No. 22 "AA" in which 2100 Starrett Tools are described and illustrated. Copy free on request.

THE L. S. STARRETT CO.

The World's Greatest Toolmakers
Manufacturers of Hack Saws Unexcelled

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Starrett Tools

42-263



Put Your Tools on This Handy Shelf

No need to lay your tools on the floor if you're using a NICHOLSON ARBOR PRESS; the stand is fitted with this handy shelf for your convenience—an exclusive NICHOLSON advantage. Strength, endurance, convenience—all are combined in these Nicholson Arbor Presses. Made in five sizes for every kind of machine shop and garage work.

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Would you keep a separate wrench on hand for every nut that is used? Hardly! One monkey-wrench will handle dozens of different-sized nuts. Then why have a separate mandrel for each job? NICHOLSON EXPANDING MANDRELS (nine to a set) fit ANY hole, round or square, ⅛" to 7".

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Are They Very Special?

We have built a reputation through our ability to grasp quickly the required details in the construction of special machines.

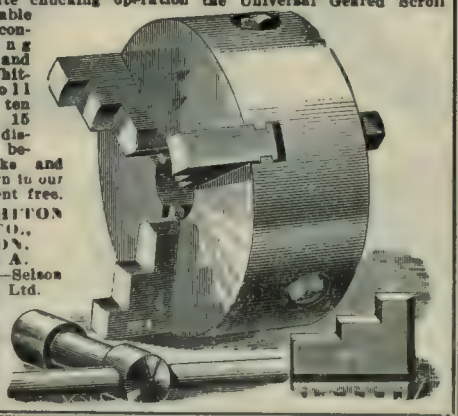
It might be well, on very particular orders, to consult, and derive benefit from, our wide and varied experience in this field.

Shall we help?

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1422 West Randolph St. CHICAGO, ILL.

WHITON Geared Scroll "SOLID BODY" CHUCKS

In all manufacturing where circular pieces are to be held in succession for duplicate chucking operation the Universal Geared Scroll Chuck is indispensable on account of its convenience, gripping power, durability and low price. The Whiton Geared Scroll Chucks are made in ten sizes, from 2½ to 15 in., inclusive. The distinctive difference between these chucks and other makes is shown in our catalog, which is sent free.



The D. E. WHITON MACHINE CO., NEW LONDON, CONN., U. S. A.
European Address—Selson Engineering Co., Ltd. 5 Queen Victoria St., London, E. C.
WHITON CHUCKS kept in stock and sold by principal dealers all over Europe.

LANGELIER MANUFACTURING CO.

Designers and Builders of

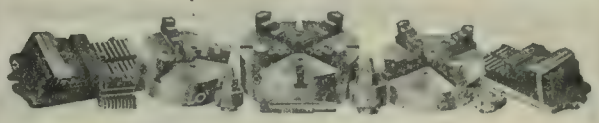
Special Machinery and Tools

Multiple and Single Spindle
Sensitive Drills and Tapping Machines
Multiple Drilling Heads

Cold and Hot Swaging and Hammering Machines

Special Airplane Machinery

ARLINGTON CRANSTON, R. I.
(Adjoining Providence)



THE SKINNER CHUCK COMPANY
NEW BRITAIN, CONN U S.A

An aid to Ready Reference

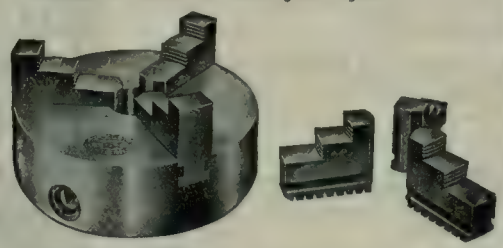
See Page Three

UNION

UNIVERSAL GEARED SCROLL CHUCKS ARE ACCURATE AND SUBSTANTIAL

We furnish this chuck regularly with iron or steel bodies in three or four jaw style

Two Sets of Jaws



UNION MANUFACTURING CO.
New York Office, 26 Cortlandt St. NEW BRITAIN, CONN.
Makers of a Complete Line of Chucks.



Trade Mark

Smooth, accurate finishing cuts, or roughing cuts on threads, are taken in the most efficient manner by this patented Spring Threading Tool. It's a great time saver.

Write for Our Latest Catalogue. It's Free.

Armstrong Bros. Tool Co.
"The Tool Holder People"
309 N. Francisco Ave. Chicago, U. S. A.

Horton-Morrow Chucks

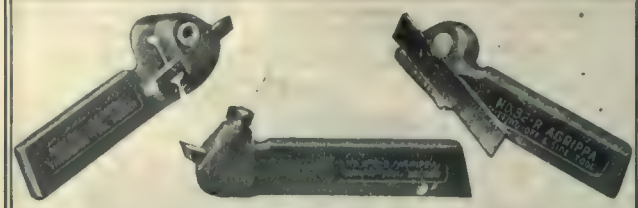
Hand-Operated Self-Tightening

Drill Chucks

Instant release by hand even after most severe driving strain. Drives high speed drills without slipping.



The E. Horton & Son Co., Windsor Locks, Conn.



Williams' "Agrippa" Tool Holders

for

TURNING BORING PLANING
THREADING KNURLING
CUTTING-OFF and SIDE WORK

J. H. WILLIAMS & CO., *"The Drop-Forging People"*

BROOKLYN 57 Richards St. | BUFFALO 57 Vulcan St. | CHICAGO 1057 W. 120 St.

Genuine Madden Files

Insure 100% cutting service.

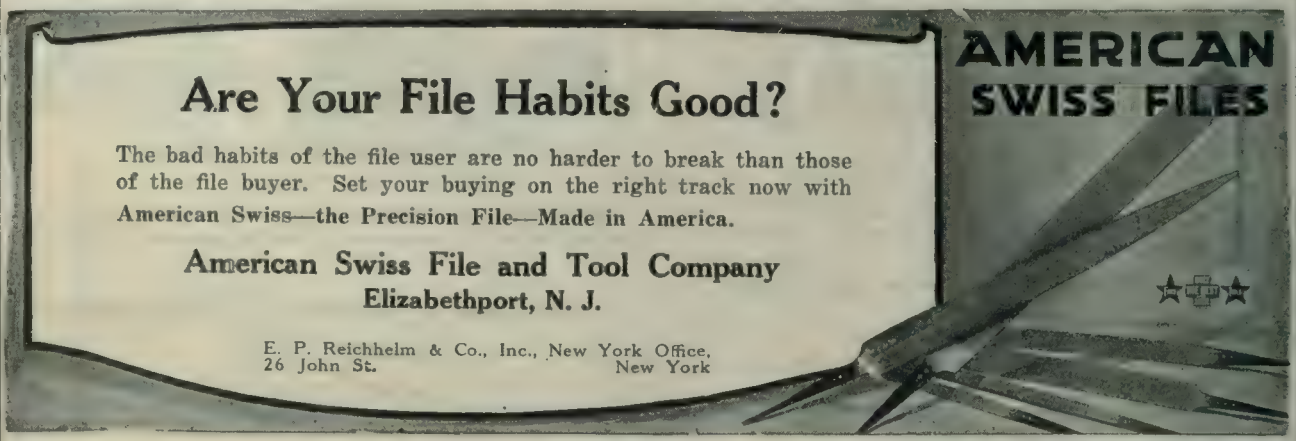
Madden & Morrison File Co.
Middletown, N. Y., U. S. A.

Are Your File Habits Good?

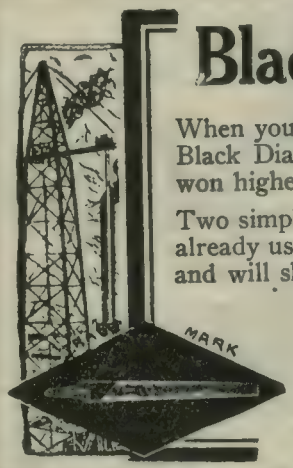
The bad habits of the file user are no harder to break than those of the file buyer. Set your buying on the right track now with American Swiss—the Precision File—Made in America.

American Swiss File and Tool Company
Elizabethport, N. J.

E. P. Reichhelm & Co., Inc., New York Office, 26 John St. New York



Black Diamond for Cutting



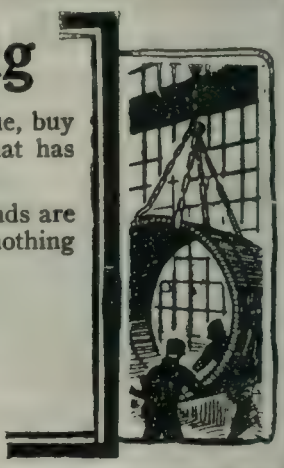
When you buy a file you buy cutting service. For extra cutting value, buy Black Diamonds. Made since 1863 to a standard of file quality that has won highest honors at expositions and at the bench.

Two simple steps will lead to better filing except where Black Diamonds are already used. Our catalog is free for the asking. A shop trial costs nothing and will show convincing results.

Black Diamond File Works

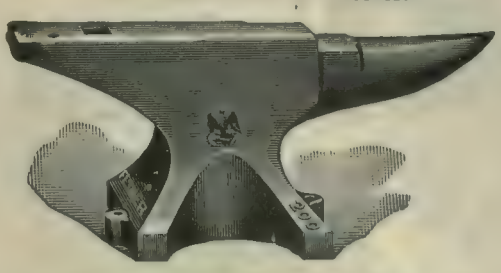
Established 1863

G. & H. Barnett Company, 1078 Frankford Ave., Philadelphia, Pa.
Owned and Operated by Nicholson File Co.



THE "EAGLE" ANVIL

First Anvil made in America



1843 FISHER & NORRIS 1921
"Eagle" Anvil Works **Trenton, N. J.**

EASY NEW EASY **BOLT CLIPPERS** O. K. ALLEN-RANDALL



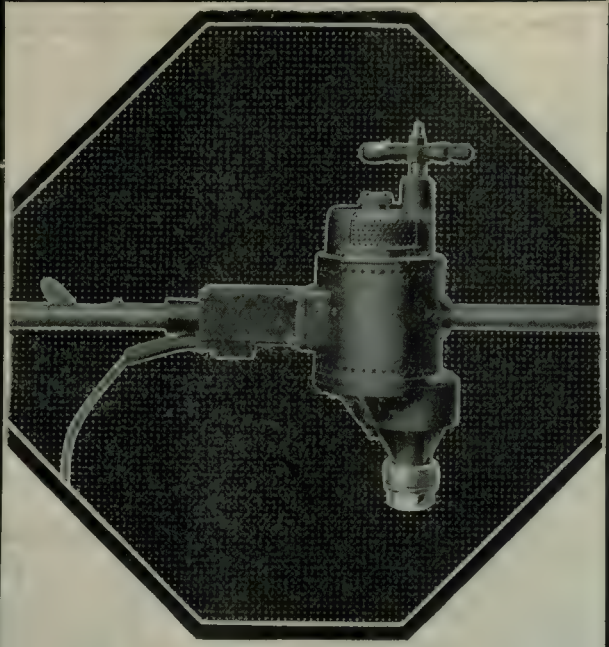
4 STYLES 7 SIZES
H. K. PORTER **Everett, Mass., U. S. A.**

STANDARD PORTABLE ELECTRIC DRILLS AND GRINDERS



Manufactured in all sizes for both A. C. and D. C. Eery tool guaranteed for one year, both electrically and mechanically. Write for Catalog and Price List.

THE STANDARD ELECTRIC TOOL CO.
Cincinnati, Ohio



LITTLE GIANT Portable Electric Drills speed up drilling, reaming, woodboring, screw-setting, nut and bolt tightening, etc. —*wherever there's a current outlet.* Variety of sizes. A. C., D. C., and Universal types. Ask for bulletin.

Chicago Pneumatic Tool Co.
6 East 44th Street New York
Sales and Service Branches all over the World
E146

CLEVELAND
Chipping and Calking Hammers

THE SPEED KING



They are Speedy

They are Dust Proof

They Work Without a "Kick"

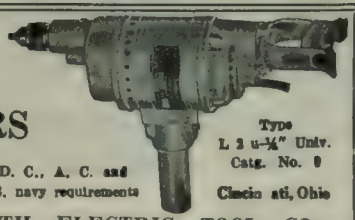
They Speed Up Output and Lower Cost of Cleaning

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OFFICES IN ALL LARGE CITIES

THE CLEVELAND PNEUMATIC TOOL CO.
CLEVELAND, O., U. S. A.

Portable Electric
DRILLS and GRINDERS



Complete line of sizes suitable for D. C., A. C. and universal current. Tested to U. S. navy requirements

Type L 1 u-¼" Univ.
Catg. No. 9
Cincinnati, Ohio

THE NEIL & SMITH ELECTRIC TOOL CO.

OLDHAM CHIPPING HAMMERS

Increase Production— Reduce maintenance cost



Made in full range of sizes—suitable for all classes of Chipping—Scaling or Calking.

EFFICIENT — DURABLE — ECONOMICAL

Tools Sent on Approval

George Oldham & Son Co., Baltimore, Maryland

Foundry Rammers—Riveters—Scalers



THE HAMMER THAT ELIMINATES ALL VALVE EXPENSE

CANTON PNEUMATIC TOOLS

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The Canton Pneumatic Tool Co.
Factory—Canton, Ohio

Sales Offices:
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Pneumatic Tools

Wire at our expense for a representative—or complete catalog describing

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Riveting Hammers	Valveless Drills
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KELLER-MADE MASTER-BUILT

KELLER PNEUMATIC TOOL CO.
GRAND HAVEN · MICHIGAN · U·S·A
BRANCHES EVERYWHERE

"NEW PROCESS" PUNCHES

do *double* the work of any other punch. They save you the time and inconvenience of broken punches.

Shipped on approval.



GEO. F. MARCHANT COMPANY

1422 So. Rockwell Street
Chicago



HUNTER
VANADIUM STEEL RIVET SETS

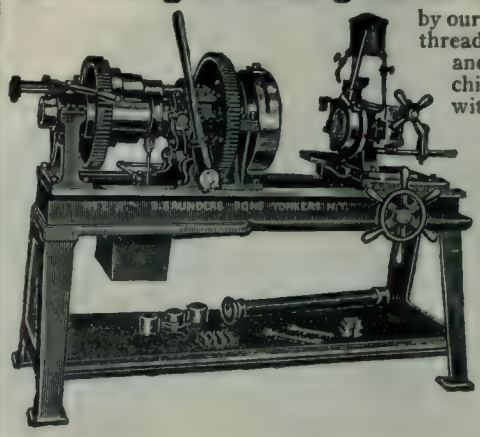
for long service. They pay in the end. Give them a chance to show their worth. Standard types and sizes, also a full line of

CHISEL BLANKS
CARRIED IN STOCK.

We also manufacture a complete line of Metal Cutting Circular Saw Blades.

Hunter Saw & Machine Co.
Pittsburgh, Pa.

Threading & Cutting Costs Reduced



by our No. 2A Pipe threading, cutting and nipple machine. Equipped with our Standard Adjustable Expanding Dieheads which require no changing of chasers.

Send for Catalogue A

D. SAUNDERS SONS
Yonkers N. Y.

CINCINNATI SLAG GUN digs Slag and Concrete in scores of the country's largest Sheet Mills daily.

CINCINNATI RIVET CUTTING GUN is cutting rivets cold and backing them out for over 100 of the biggest railroads.

Send for catalog of installations.

RIVET CUTTING GUN CO.
116 E. Third Street Cincinnati, Ohio

PIPE THREADING
HAND OR POWER AND CUTTING MACHINERY
The Merrell Manufacturing Co.
83 Curtis Street Toledo, O.

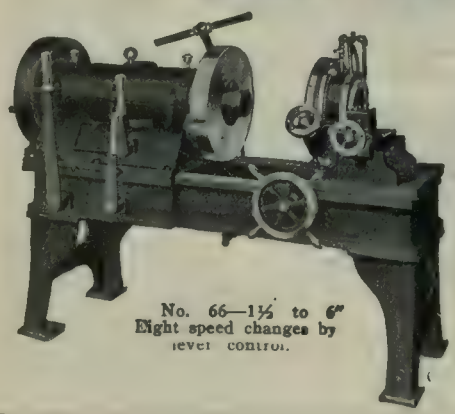
Pipe Threading, Tapping and Cutting Machinery
THE PIPE MACHINERY CO.
930 E. 70th St. Cleveland, Ohio

Spring and Wire Coiling, Forming and Winding Machines
Wire Straightening and Bundling Machines
Wire Reels

See display space in first issue of each month.

SLEEPER & HARTLEY, INC.
WORCESTER MASS.

JARECKI PIPE THREADING MACHINES



No. 66—1½ to 6" Eight speed changes by lever control.

Not the Cheapest, But the Most Efficient and Durable

You should adopt them as standard equipment. Hundreds of concerns have and found them entirely satisfactory. Why not you?

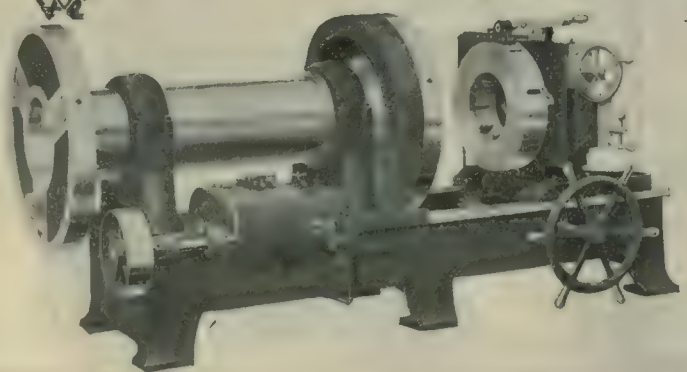
Information Cheerfully Furnished Upon Request

Jarecki Manufacturing Company
Erie, Penna., U. S. A.

PEERLESS B&K DUPLEX P.D.C.

B. & K. Pipe Machines

PEERLESS B&K DUPLEX P.D.C.

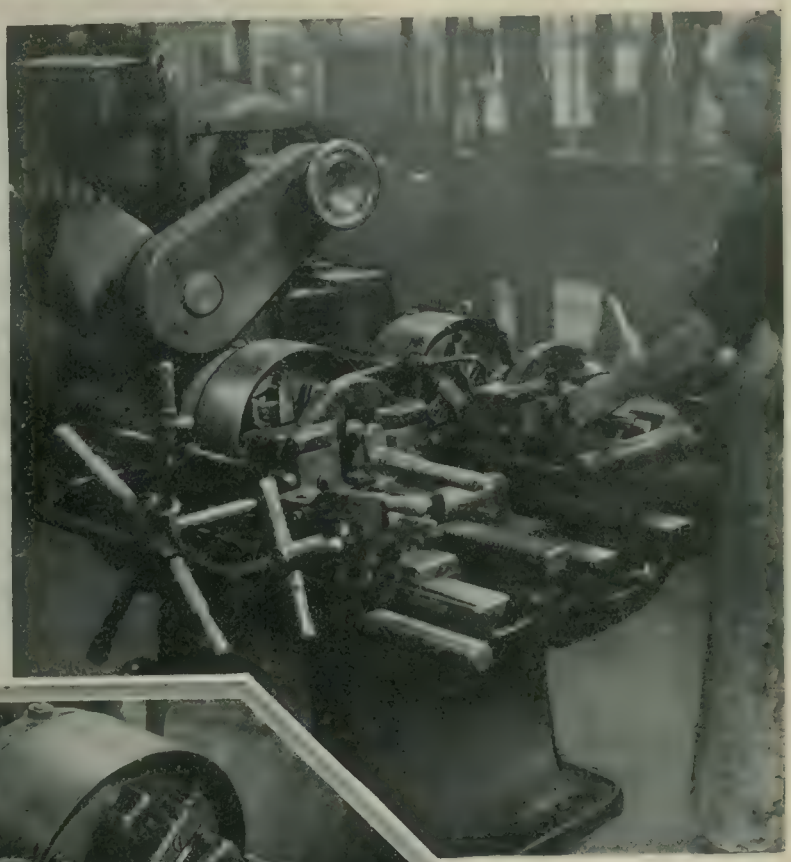


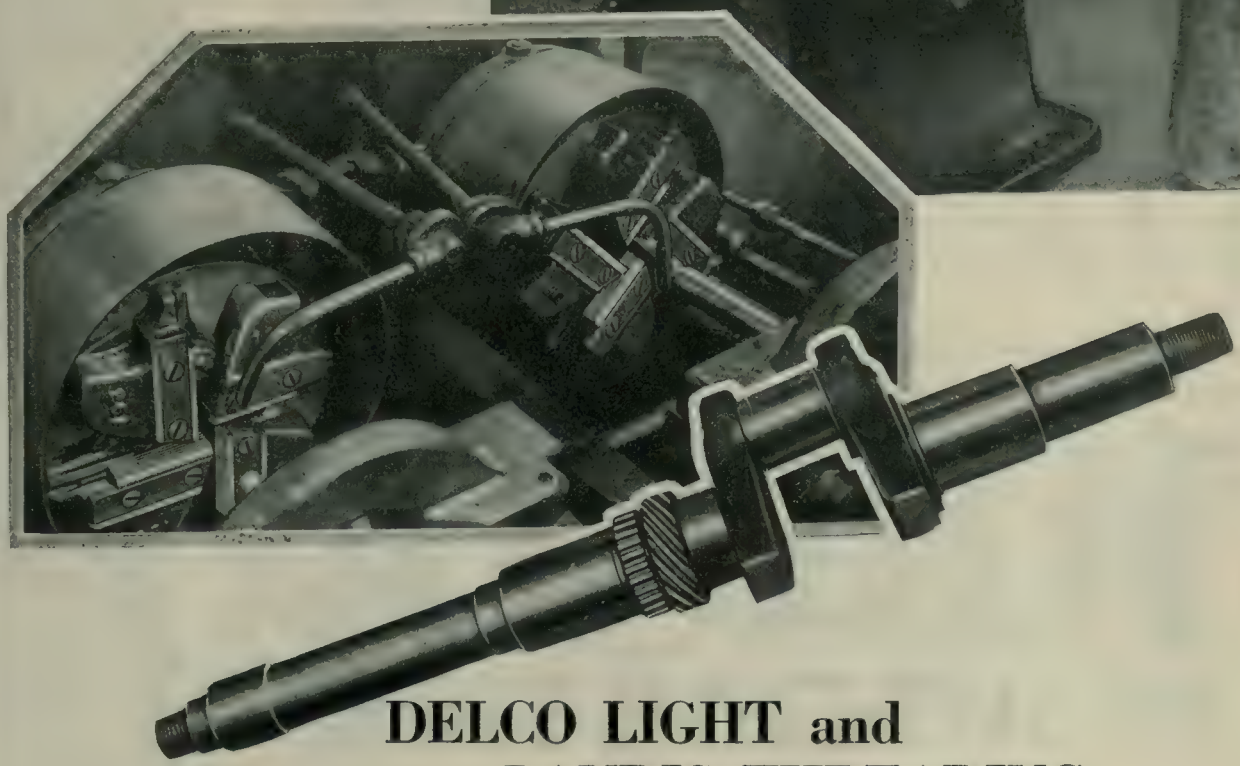
Are improved right up to present-day shop requirements. Their features enable the operator to save hard labor and time at every turn. Unlike hand work the threads they cut are sure to be accurate. One hundred and forty B. & K. Pipe Machines are in use in one city. Made to cut pipe from ¼-in. diam. to 18-in. diam.

SEND FOR NEW CIRCULAR

Bignall & Keeler Machine Works
EDWARDSVILLE, ILL.

LANDIS





DELCO LIGHT and LANDIS THREADING

Forged alloy steel crank shafts for Delco Farm Lighting Engines are being threaded on this two-spindle Landis. Both ends are threaded, one for the armature lock nut and one for the flywheel, threads are 1″ long x ¾″ dia. x 16 pitch, and production goes on at the rate of 80 complete crankshafts per hour.

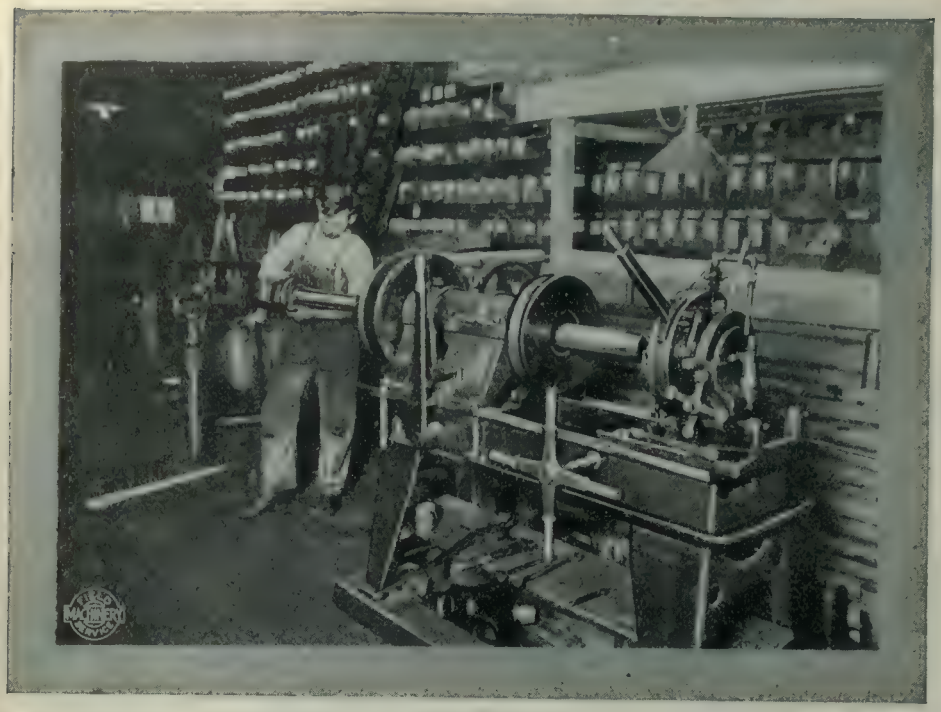
Excellent service? Ask any Landis user about that; and if you are governed by what they tell you, you'll have Landis threading in your plant before the month is out.

Ever do threading? You should have the Landis Hand Book. Yours for a line.

LANDIS MACHINE CO.

WAYNESBORO, PA., U. S. A.

LANDIS



THE WILLIAMS PIPE THREADING MACHINE
Scores Again!

"To thread pipe quicker, better and at lower cost"

CHILD & SCOTT, New York heating contractors, are among the latest converts to Williams Pipe Threading Machines. These people recently contracted to install the heating apparatus in a 26-story building. Instead of sending out pipe to be threaded, as previously, they installed a Williams No. 4 right on the job.

This Williams machine threaded all risers, drip lines and return pipes between 2″ and 4″ used in the new building. Not only was the delay of sending out pipe eliminated, which in itself meant a substantial dollar and cents saving, but the actual cost of threading was greatly reduced.

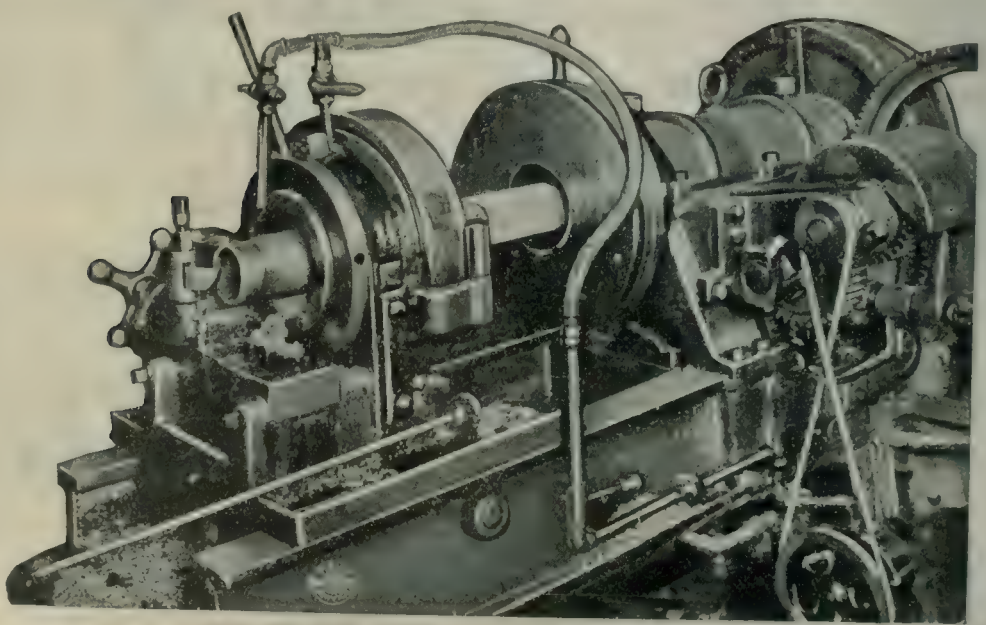
This experiment proved so profitable that a Williams installation will be a part of the regular equipment on future similar Child & Scott jobs.

Perhaps you are losing money by sending pipe out to be threaded. Quite possibly the Williams patent receding die-head may be the real answer to your pipe threading requirements. Write for complete description.

Williams Tool Corporation
ERIE, PA.
Canadian Plant: Brantford, Ontario

An exclusive new feature

The Williams patent receding die-head is the only head that cuts any degree of taper to any desired length, irrespective of the width of the dies.





Wire and Metal Forming Machines—Automatically feed, form, bend, cut, punch and otherwise operate upon round, half round; square or other shape wire and flat metal to produce articles requiring one or several operations.

Special Machines—Making all manner of products required in large quantity, as hooks and eyes, snap fasteners, paper clips, jacks and safety chain, clock and watch parts, electrical parts, novelties, jewelry, etc. Machines handle metal, wood, paper, composition material and combinations of such.

Wire Pointing Machines—Include all pin making machinery, toilet, safety, badge, hat, etc. Pin sticking machines to put pins in paper and various specials, as hair pins, cotter pins and novelties.

Spring Making—Machines that feed the wire and automatically drop out complete springs of the desired kind, wound springs, coiled, helical, and many special designed springs for particular purposes.

Hinge machinery and machines for producing different products of hardware.

Wire straightening and cutting, forming, stamping and ferruling machines.

PRESSES—All types, foot, bench, single and double action, open back, single and double action pillar pattern, cam, toggle and double gate or tandem. Baird presses are machined for attachments and can be quickly made over into full automatic, self-feeding machines that perform several operations upon the material passing once through the press. They take care of the future.

Eyelet Machines—or multiple press for eyelets, snap and glove fasteners, phone cord tips, curtain rings, collar buttons, pencil tips, umbrella shells, paper fasteners, bottle stoppers, cartridge work, thimbles, grommets, lamp sockets, electrical parts, button parts, caps, hollow rings, shells, oil burner parts, etc.

Tumbling Barrels—All kinds for all purposes. Oblique, horizontal, exhaust and non-exhaust, steam drying, japanning, coating, painting, mixing, heating, cooling, cleaning, grinding, rust proofing, lacquering. Standard machines adapted for all purposes with various types of barrel, as wood, cast iron, sheet iron, cast brass, sheet brass, copper, etc.

Burnishing Machines—Ball burnishing outfits for every purpose.

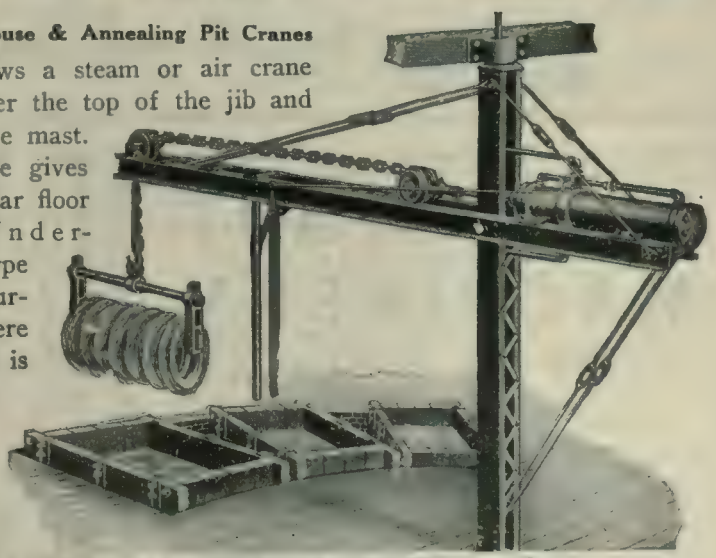
VAUGHN
WIRE MACHINERY

COMPLETE EQUIPMENT FOR THE WIRE INDUSTRY

Rod and Wire Draw Frames
Cleaning House Equipment
Galvanizing and Tinning Frames
Muffle Annealing Furnaces
Wire Bakers
Heavy Duty Draw Benches
Wire Mill Trucks and Reels
Horizontal Bull Blocks
Wire Pointers, etc.

Cleaning House & Annealing Pit Cranes

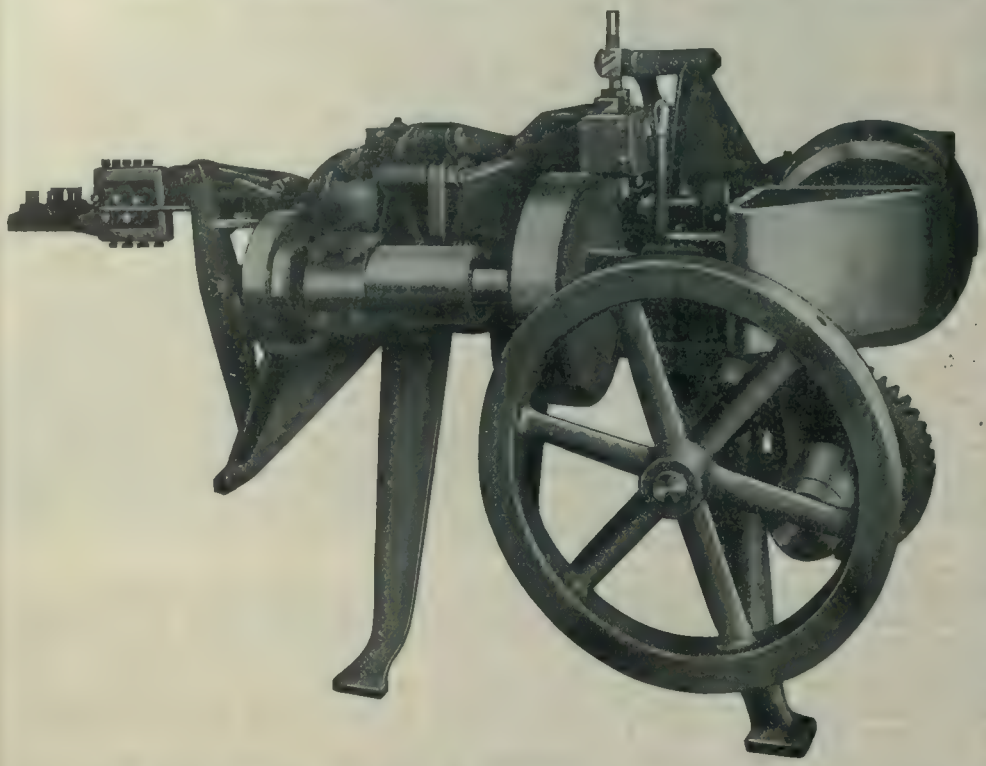
Cut shows a steam or air crane trussed over the top of the jib and back of the mast. This type gives large clear floor space. Under-trussed type can be furnished where headroom is lacking.



LET OUR ENGINEERS GIVE YOU THE BENEFITS OF 64 YEARS OF SPECIALIZATION IN THE WIRE INDUSTRIES

THE VAUGHN MACHINERY CO.
Formerly the Turner, Vaughn & Taylor Company
Cuyahoga Falls, Ohio, U. S. A.

The Nilson Four-Slide Wire Forming Machine



The Nilson Automatic Four-Slide Wire Forming Machine is just what manufacturers have wanted for a long time.

It's accurate and economical. That's due to the four equal-length slides.

The wire feed is applied in a straight line from crank disc, an exclusive Nilson feature that does away with the old cramping and binding.

The special lubricating system is automatic and continuous, no danger of overheating.

Standard roll straightener and rotary straightener are interchangeable, and the roll straightener is adaptable for both flat and round stock.

If you are interested in wire forming machinery write for full details. It will pay you well to examine the exclusive features of the Nilson.

The A. H. Nilson Machine Company, Bridgeport, Conn.

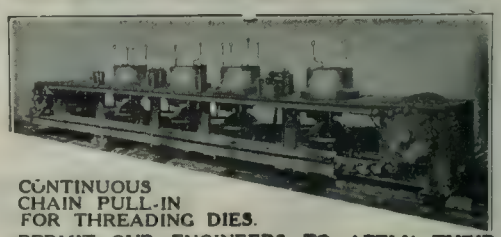
WIRE DRAWING EQUIPMENT

WE MAKE HEAVY AND LIGHT DUTY DRAW BENCHES FOR DRY AND WET FINISHING STEEL WIRE; CONTINUOUS DOUBLE SIDE MACHINES FOR LARGE, INTERMEDIATE AND FINE SIZES OF COPPER AND BRASS. WE ALSO BUILD GALVANIZING AND TINNING FRAMES, TRUCKS, REELS, DIE STRINGERS AND WIRE POINTERS.

ALSO

A COMPLETE LINE OF WIRE STRANDING AND INSULATING MACHINERY FOR ELECTRIC CABLES.

ALL IRON AND STEEL CONSTRUCTION.



CONTINUOUS CHAIN PULL-IN FOR THREADING DIES.

PERMIT OUR ENGINEERS TO APPLY THEIR EXPERIENCE IN SOLVING YOUR MACHINERY PROBLEMS.

THE NEW ENGLAND WIRE MACHINERY COMPANY
NEW HAVEN CONNECTICUT

BOLT and NUT MACHINERY

Send for our new Catalog.

Special Machinery Built from Prints or Specifications

General Machine Work

William H. Haskell Manufacturing Co.
Established 1856 Pawtucket, R. I.

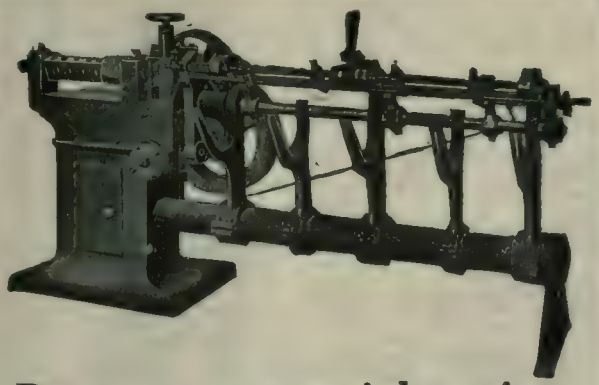
BOLT and NUT MACHINERY

MACHINE AND SPECIAL BOLTS
COLD PUNCHED NUTS
COACH SCREWS

Keyseating and Broaching Machines

SPECIAL MACHINERY BUILT TO ORDER

PAWTUCKET MANUFACTURING CO.
Established 1882 PAWTUCKET, R. I.



Do you use straight wire of any length or diameter?

If you do then you need at least one of the Shuster Wire Straightening and Cutting Machines. They take the wire from the coil, straighten it and cut it off accurately, to the lengths you require. They do this at high speed and low cost. Ideal for operation in battery because the only attention they require is changing coils and removing cut pieces.

We will be pleased to estimate production on your work. Send for Catalog J

THE F. B. SHUSTER CO.

NEW HAVEN, CONN.

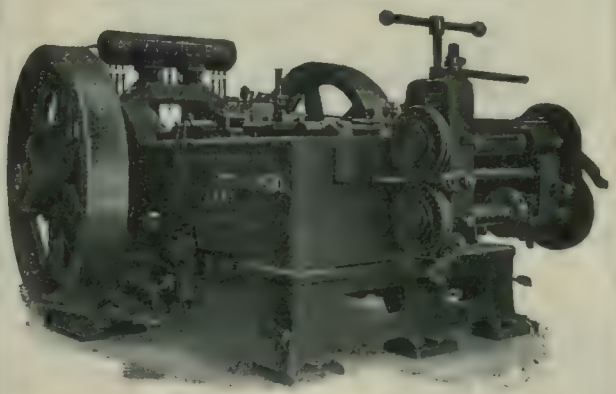
Formerly John Adt & Son Established 1866

Machines also for straightening hexagons, squares, etc.

MANVILLE

DIRECT-ACTING DOUBLE STROKE OPEN-DIE COLD HEADERS WITH FRICTION FEED

The Header You Will Ultimately Install



Manville No. 5 B—D.S.O.D. Header

This Powerful High Duty Machine is the latest Manville Cold Heading Machine for Upsetting Bolt, Rivet, Screw Blanks and other special headings by the Cold Process.

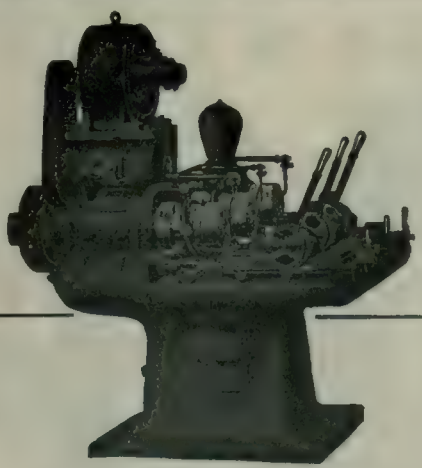
It has a maximum capacity of ¾ diameter by 7" long, 45 blanks per minute.

Write for Bulletin No. 14B.

E. J. MANVILLE MACHINE CO.

WATERBURY, CONN., U. S. A.

Builders of Cold Headers, Thread Rollers, Screw Slotters, Bolt Head Trimmers, Power Presses, Wood Screw Machines, Nut Blanking Machines, Wire Formers, and special automatic machinery.



NATIONAL BOLT CUTTERS

"Always Cut Accurate Threads"

Do not require skilled labor.

Dies can be changed or adjusted in a minute's time.

Die Head has a positive lock, hence insures uniform diameter and accurate thread, regardless of stock variations.

The National Interchangeable Case Die insures 30 to 50% less upkeep cost.

Thousands of satisfied users will attest the National has no equal.

Don't buy a Bolt Cutter without thorough investigation of the National.

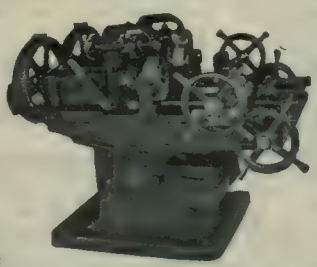
Built in 22 different sizes and styles.

THE NATIONAL MACHINERY COMPANY

TIFFIN - - OHIO

BOLT THREADERS, SHAPERS and NUT TAPPERS

Write to us for anything you want in this line.



The Acme Machinery Company, Cleveland, Ohio, U. S. A.

Cor. St. Clair and Hamilton Sts.

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Burton, Griffiths & Co., London, England. Glanzer & Perreaud, Paris, France. Societa Italiana Macchine Utensile, Milan, Italy. Henry W. Peabody & Co., Melbourne, Australia.

WATERBURY FARREL FOUNDRY AND MACHINE COMPANY

Rivet, Bolt and Nut Machines, Power and Hydraulic Presses, Multiple Plunger "Eyelet" Machines. Machines for cold rolling and drawing sheets, rods and wire.

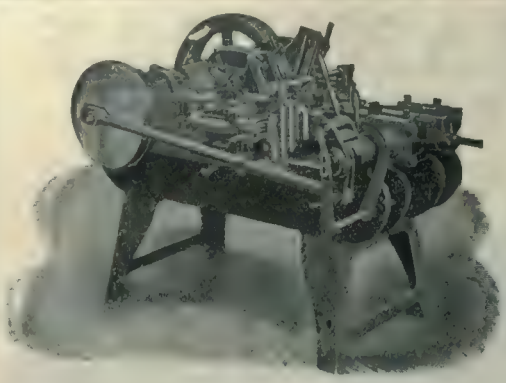
Home Office and Works: 465 Bank St., Waterbury, Conn.
Western Office: 1016 Williamson Bldg., Cleveland, Ohio.

FOREIGN AGENTS:

Geo. H. Alexander, Birmingham, England. For Rivet, Bolt, Nut, Wire Drawing and Collapsible Tube Machines.

Fenwick Frères, Paris, France. For Rivet, Bolt and Nut Machines.

D. Weil, Paris, France. For Wire Drawing Machines.



This Is The Machine for Heading Hexagon Bolts Faster Than Ever Before

LIKE all Burdict Bolt and Nut Machinery it is a *certain* production booster.

Many of the largest manufacturers use it and others of the Burdict line, which is ample testimony to their economic value as a means of meeting present conditions.

Send for the catalog of our entire line. In it you will find much to interest you concerning a variety of production machinery.

HOWARD IRON WORKS

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287 CHICAGO ST. BUFFALO, N. Y.

COOK'S WOOD-SCREW MACHINES
for making IRON AND BRASS WOOD-SCREWS

We furnish complete plant installation for starting Wood-Screw Factories

SECURE OUR HAND-BOOK 5-H

THE ASA S. COOK CO.
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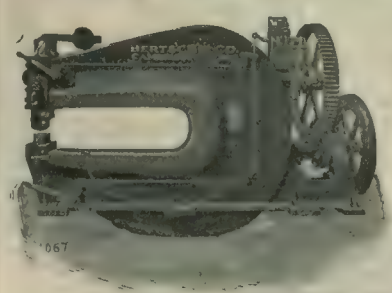
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"Whatever the Riveting, there's an ALLEN for the job."

Let us quote on your present needs

JOHN F. ALLEN CO. 172 GERARD AVENUE NEW YORK

PUNCH

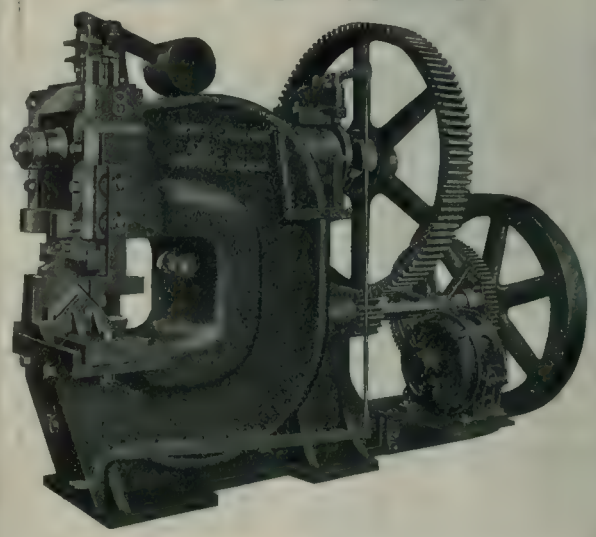


This cut shows one of our 72" throat Punches, with a full floating punch, and an electric solenoid controlled clutch, operated by means of an electric push button.

We have had forty years' experience designing and building Punches, Shears, Rolls and Presses; all sizes up to 150 tons in weight.

BERTSCH & COMPANY
Cambridge City, Ind., U. S. A.

Built for Service



Constant and lasting service is insured by the installation of

BEATTY

PUNCHES AND SHEARS

They are correctly designed and constructed.

Let us quote on your specifications.

BEATTY MACHINE & MFG. COMPANY
HAMMOND, INDIANA
Pittsburgh Representatives: Knox-Andresen Tool Co.

Typical Southwark Advantages



150-ton Hydraulic Riveter

Hydraulic Riveter

One quick squeeze draws up the seam tight and fills the hole. Rapid, efficient, economical. Built with flush tops in single, triple or six power types. In capacities to meet any requirements.

Double End Punch

This machine does the work of two. Each end has automatic clutch of an improved type that insures quick action after tripping the treadle.

Vertical Plate Bending Roll

Particularly suitable where floor space is at a premium. Notable for its power and simplicity of mechanism.

Pneumatic Straightening Press

Returns to usefulness bent sills, drawheads, truck frames, brake beams, etc. Also does original forming work. Can be installed anywhere on the shop air line.

Horizontal Plate Bending Roll

Like the vertical type, this machine's popularity is based on its great power and enduring qualities. Wide range of sizes and capacities.

Four-Column Flanging Press

The production of flanged shapes economically on this press is assured by our patented high speed control valve and low pressure filling system. Of massive construction, in capacities up to 10,000 tons, with clearance dimensions to suit the work done.

Hydraulic Driving Wheel Press

Built with scientific regard for lasting service, as well as for effective immediate work. Responds instantly to operator's every wish.

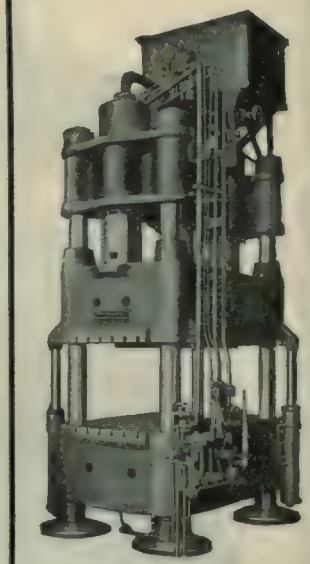
10,000-Ton Hydraulic Forging Press

This big press, specially designed for forming, blanking and punching of steel car wheels, all in one operation, is representative of Southwark's extensive line of hydraulic presses.

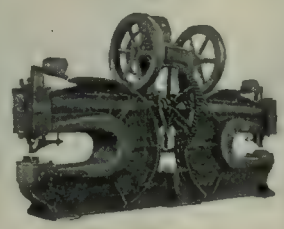
Universal Flue Welder

Makes longer s...e ends—better flues. Produces weld of same inside and outside diameters as flue. Better and faster work made possible by expanding mandrel.

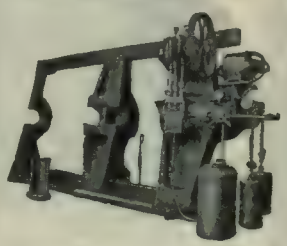
It will pay you to have us figure on your hydraulic and power tool and special machinery requirements.



2000-ton Flanging Press



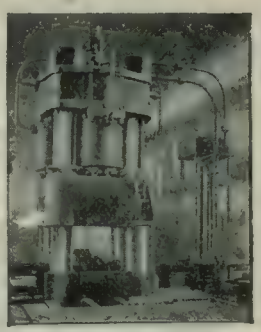
Double End Punch



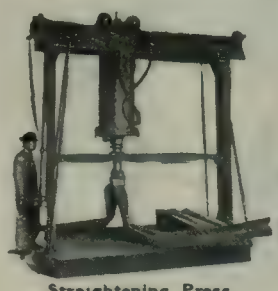
Hydraulic Driving Wheel Press



14-ft. Plate Bending Roll



10,000-ton Hydraulic Forging Press



Straightening Press

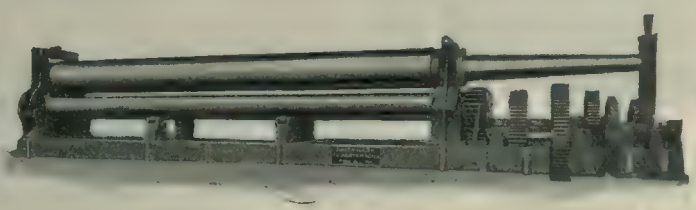


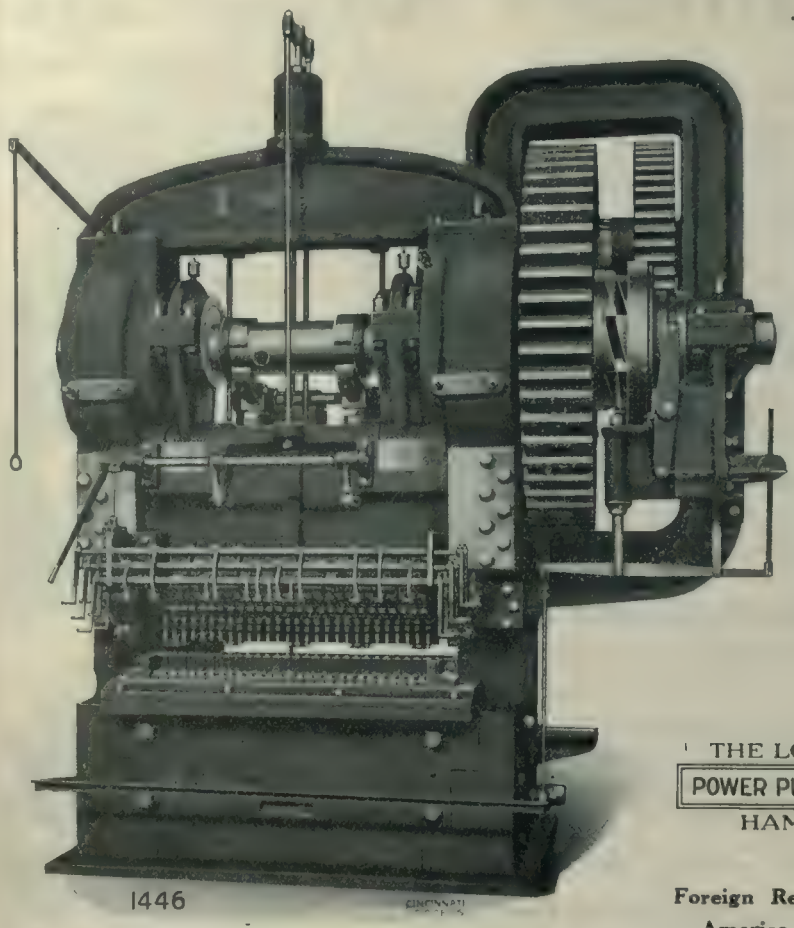
Plate Bending Rolls



Universal Flue Welder

SOUTHWARK
FOUNDRY AND MACHINE CO.
ESTABLISHED 1836
PHILADELPHIA, PA.

District Offices: Fisher Bldg., Chicago, Ill.; Swetland Bldg., Cleveland, Ohio



THREE **MILLION** POUNDS

PRESSURE

can be exerted by this L. & A. MULTIPLE PUNCH. To successfully direct and withstand this tremendous pressure every part must do its share; must be of the finest quality material and of the most scientific proportion and design.

The same consummate care in construction and design that of necessity enters into this particular machine has for over 60 years carried through in every L. & A. product, large and small, and has made the *Quality Line* of punching and shearing machinery a by-word for rugged reliability and consistent performance.

Write us your requirements.

THE LONG AND ALLSTATTER CO.
POWER PUNCHING & SHEARING MACHINERY
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Foreign Representatives: Allied Machinery Co., of America, 51 Chambers Street, New York, N. Y.

"As sturdy as the mountains in which they are made"



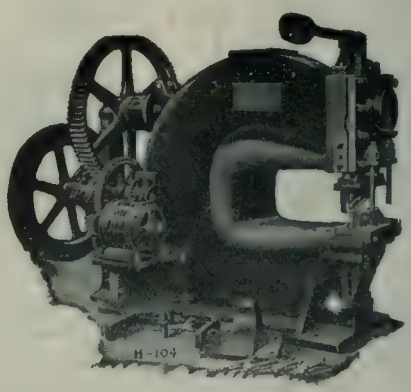
TRUE BLUE TOOLS FROM OLD VIRGINIA

Materials and design are right for service under heavy duty—and the result is a line of tools you can rely on after years of hard work.

Vertical Punches, Gate Shears, Alligator Shears, Plate Planers, Bending Rolls, Wall Radials, and Mining Machinery.

Bear Covington in mind when you need equipment of this kind.

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COVINGTON VIRGINIA, U. S. A.
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"IRONTON"

Punches, Shears and Rolls
30" Machine Motor Drive

Vertical Plate Punches or Shears, Bending and Straightening Rolls, Gate or Squaring Shears, Multiple and Horizontal Punches

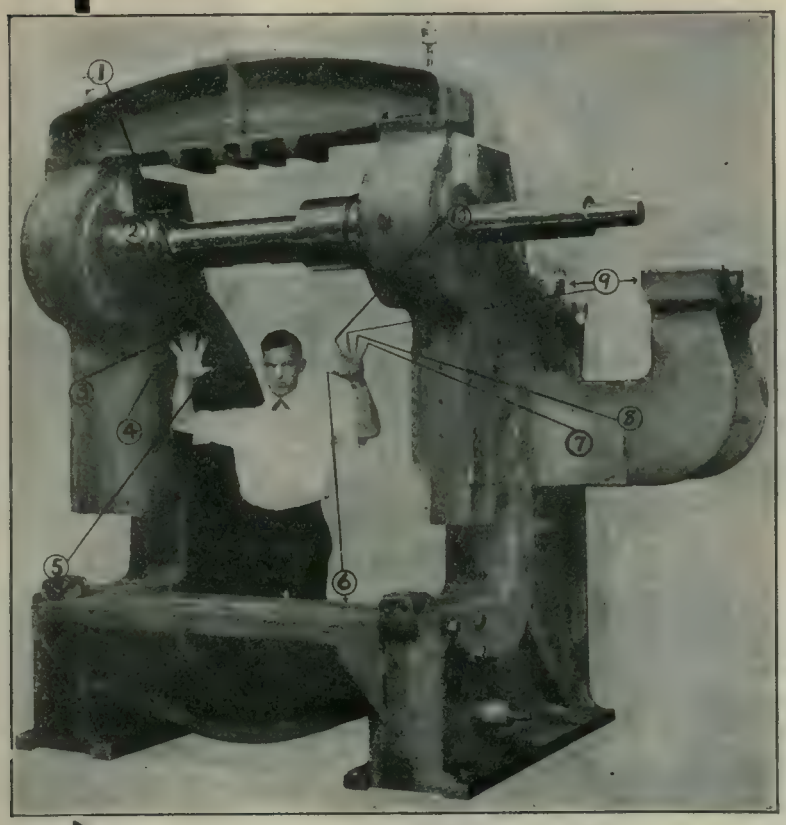
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Boiler, Structural, Locomotive and Steel Car Shops, Farm Implement and Safe Manufacturers. Plunger controlled by adjustable automatic stop.

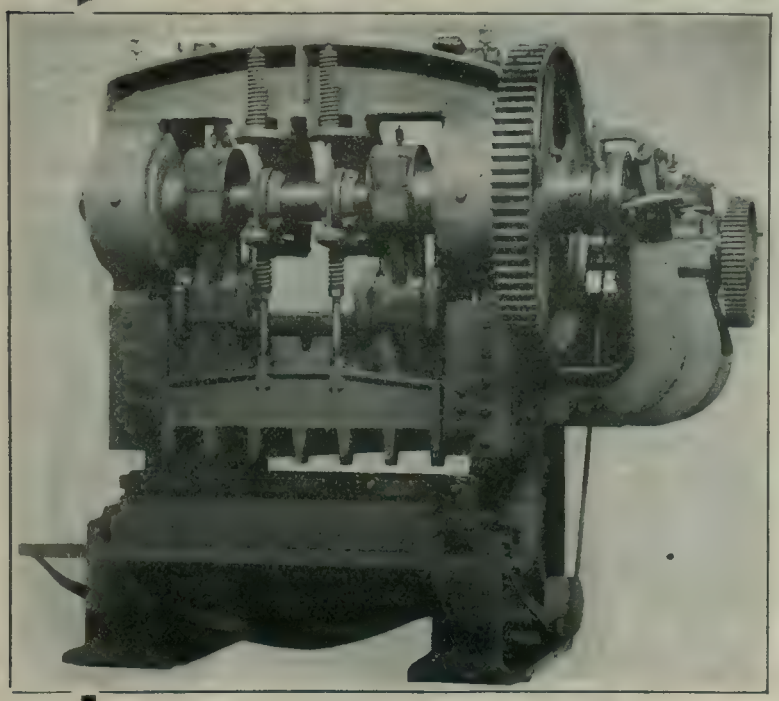
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The Ironton Punch & Shear Co.
Ironton, Ohio, U. S. A.

CLEVELAND SOLID STEEL



No. 1—Sight feed oil cups.
No. 2—Solid cam shaft.
No. 3 — Extremely long bearing surfaces for the sliding head.
No. 4—Bronze wearing strips.
No. 5—Lugs for adjusting the shear block and to take the thrust.
No. 6 — Clear drop for sheared material.
No. 7 — Extension for outboard bearing cast integral with housing.
No. 8 — Outboard bearing tongued and dowelled to housing extension.
No. 9 — Short stiff shafts for all lengths of machines.
No. 10—Main shaft bushings.



THESE two illustrations might be termed BEFORE and AFTER because the upper picture illustrates a Cleveland Gate Shear under construction while the lower picture illustrates the completed machine.

The ten points indicated on the upper picture are enumerated below the illustration and while these do not cover the entire range of points which could be enumerated they will serve to emphasize the fact that the hidden parts of Cleveland Gate Shears receive as much and in fact more attention than the visible parts because, we believe that while appearance is important it is secondary to performance and CLEVELAND GATE SHEARS ARE BUILT FOR PERFORMANCE.

Note particularly the massive rugged construction of this Gate Shear and the careful consideration that has been given to the little details such as the upper blade being set flush with the front face of the sliding head which insures a clear view of layout lines.

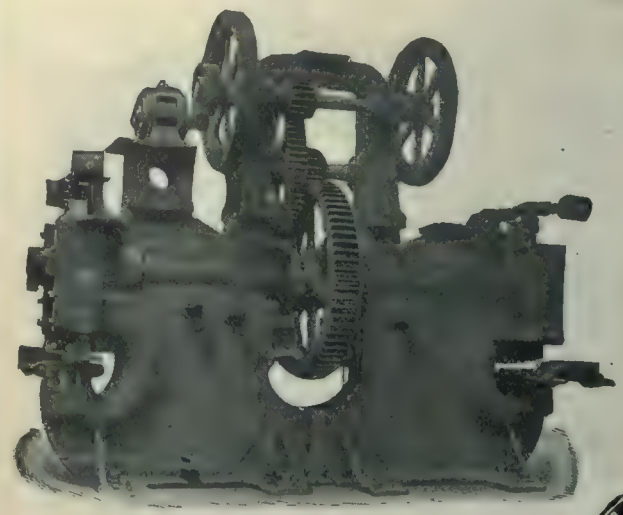
There are many other features that we would like to tell you more about, such as the counterbalance, drive, hold down, etc.

Write us for any information not covered; or if you have a punching or shearing problem, let our Engineering Dept. assist you with it.

PUNCHES—SHEARS—WALL
RADIAL DRILLS
Bending and Straightening Rolls

Punches—Dies—Rivet Sets—
Markers—Chisel Blanks—
Drift and Barrel Pins

THE CLEVELAND PUNCH & SHEAR WORKS CO.
Main Office & Works · CLEVELAND, OHIO
PITTSBURGH - CHICAGO - PHILADELPHIA - NEW YORK



The Broader Scope Which Means Economy

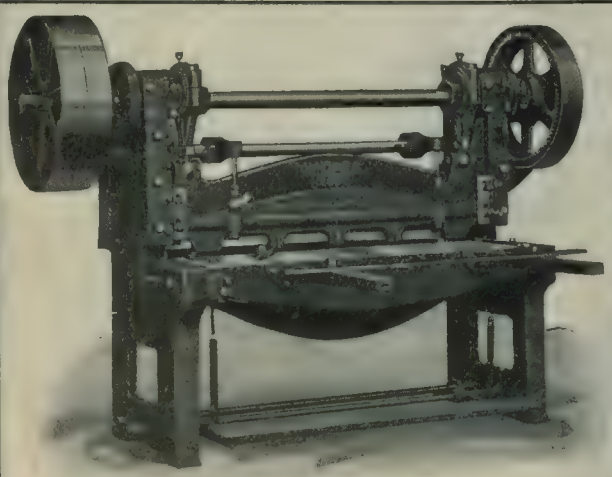
Often the value of shearing machinery from the standpoint of economy lies in the variety of work which can be performed on one machine. Each end of this double end shear can be operated independently and is usually arranged to perform different operations. It will cut flat bars up to 10 x 2½ inches or rounds up to 4½ inches and will punch holes 3 inches in diameter in 2-inch stock.

We make other types of punching and shearing machines. Ask us about them.

HILLES & JONES COMPANY

Church St. and Penn. Railroad,
Wilmington, Delaware, U. S. A.

Branch Offices:
Oliver Bldg., Pittsburgh, Pa.
L. C. Smith Bldg., Seattle, Wash.



No. 352 Power Squaring Shear

POWER SQUARING SHEARS

We manufacture a complete line of Presses, Punches, Squaring Shears, Ring and Circle Shears, Tinners' Tools and Machines, as well as equipments for special operations on Sheet Metal.

Many other styles and sizes of shears are shown in our shear catalog which will be sent on request. Also if interested request catalogs on Presses, Rotary Shears or Tinners' Tools and Machines.

NIAGARA MACHINE & TOOL WORKS

Established 1879

BUFFALO, N. Y. U. S. A.

NIAGARA

6054

QUICKWORK

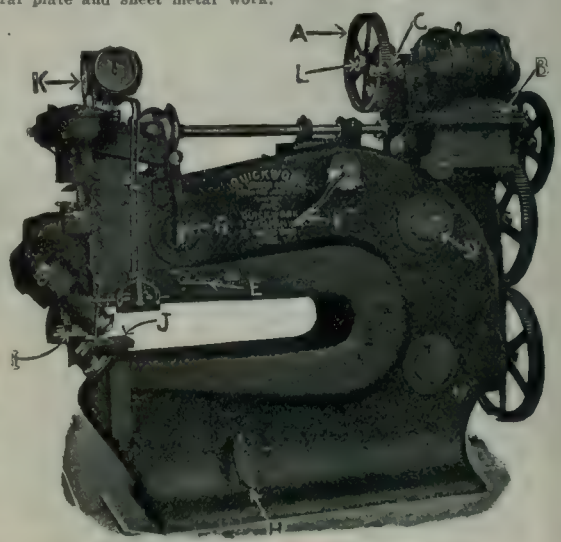
Registered in U.S.A. and Foreign Countries

ROTARY SHEARS

Made in 7 Sizes

Cut all gauges of sheet and plate metal up to 1 inch thick in straight or irregular shapes and openings, without cutting in from side of sheet. Leaves square, true edge that requires no finishing. Used in building ships, boilers, tanks, cars and general plate and sheet metal work.

PRICES REDUCED SEPT. 1st, 1921



Patented June 3rd, 1913—August 26th, 1919

SAVE 50% TO 90%

Eliminate Oxyacetylene Cutting and Plate Planing

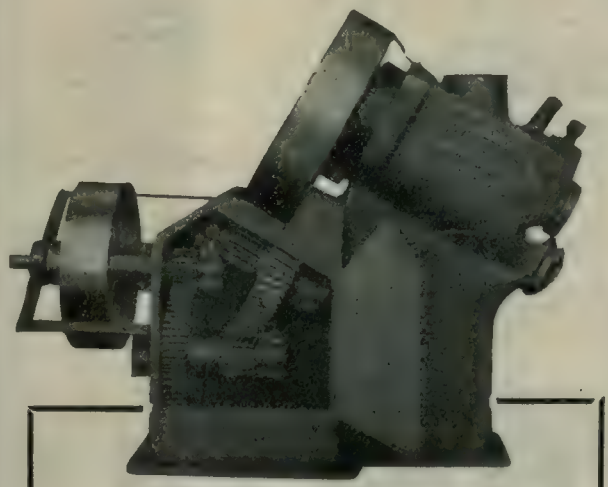
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THE QUICKWORK COMPANY

ST. MARYS OHIO, U. S. A.

Cable address: "QUICKWORK." Codes: W. U. and General.
New York Exhibit: Grand Central Palace.
Foreign Agents: British Isles, Oliver Machinery Company, Manchester, England; Japan, T. H. Ohyama, Tokio.

A Finished Bevel



The No. 34 Rotary Shear pictured above will bevel plate up to ¾" thickness.

The Marshalltown Rotary Bevel Shears produce a finished bevel at the first passage through the machine—one that is smooth, accurate and clean cut, regardless of whether the edge is straight, curved or irregular—one that requires no subsequent planing.

These shears are also fast, economical and easy to operate.

Write for details.

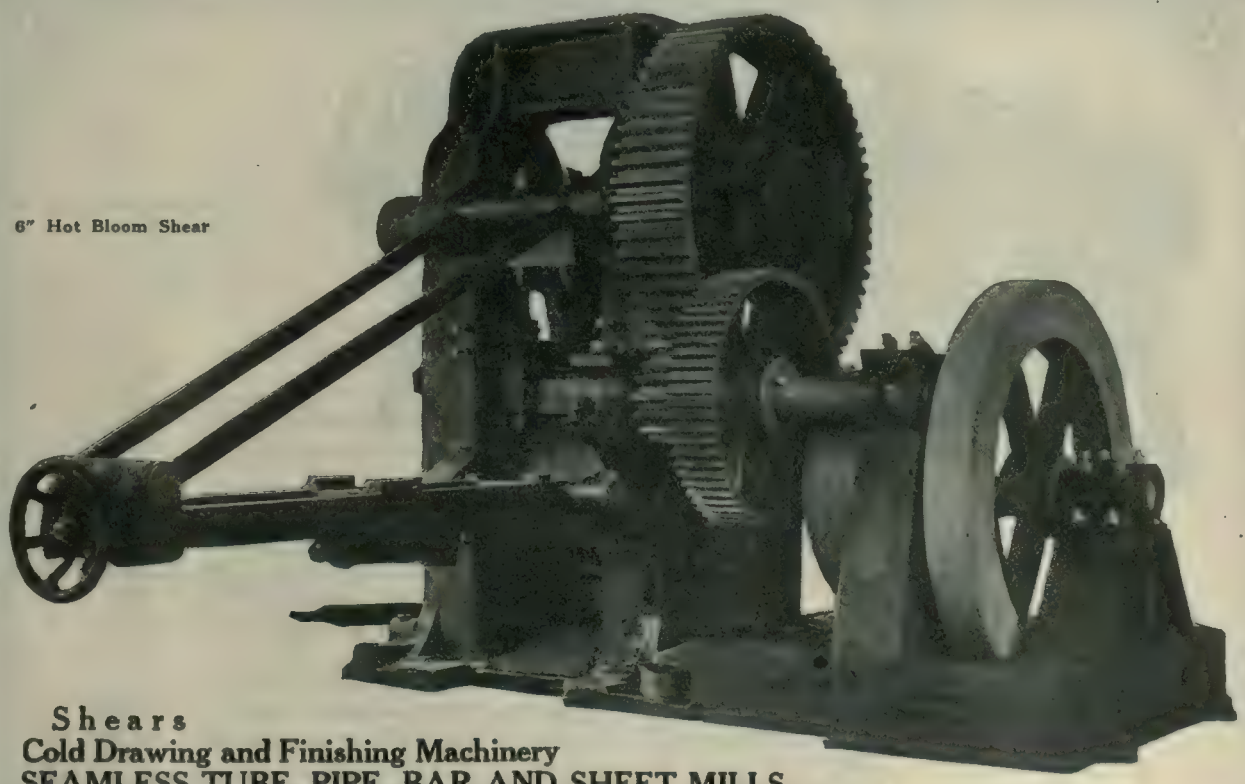
THE MARSHALLTOWN LINE

Pressure gauges of all kinds

We also manufacture all types of Circle Shear Blades

MARSHALLTOWN MANUFACTURING CO.

MARSHALLTOWN, IOWA



6" Hot Bloom Shear

Shears

Cold Drawing and Finishing Machinery

SEAMLESS TUBE, PIPE, BAR AND SHEET MILLS

(Sand)—Rolls—(Chilled)

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Designers and Manufacturers

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WILLIAMS, WHITE & CO.

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Forging Rolls
Drop Hammers
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Multiple Tapping Machines

THE BULLDOZERS

Presses
Plate Shears
Multiple Punches
Punches & Shears, Etc.

SHEAR BLADES Solid or Laid

Straight, circular or irregular

The Wapakoneta Machine Company
Wapakoneta, Ohio

Shear Blades

The Cleveland Knife & Forge Company
CLEVELAND, OHIO

Typical L. & N. Power Shear



Loy & Nawrath manufacture a complete line of Power Brakes or Presses and Squaring Shears in capacities from 16 gauge to ⅜" and from 4 to 12' in length. We also manufacture Mitre Presses, Special Sheet Metal Machinery and are experts in making forming and mitre dies.

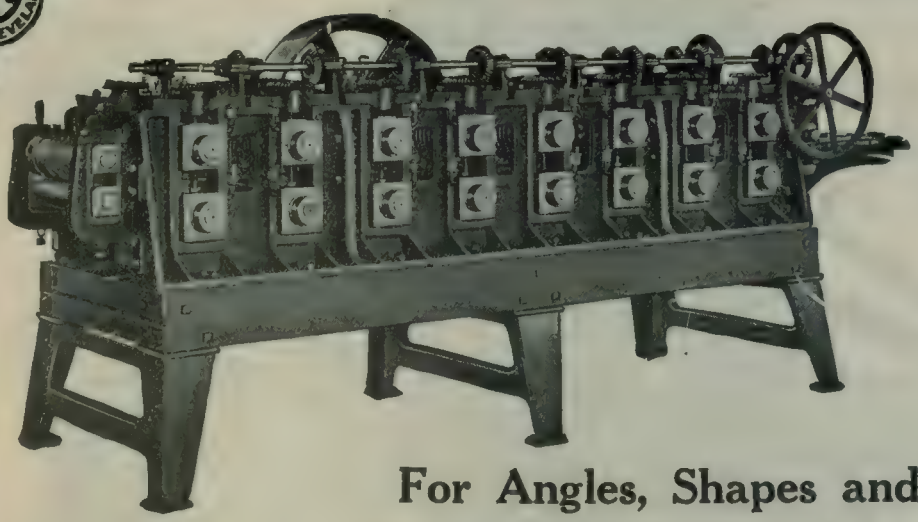
Loy & Nawrath Company
Factory: 21 Runyon St., Newark, N. J.
New York Office, 30 Church St. Tel., Cort. 6297

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Punches, Shears
and Bending Rolls
HENDLEY & WHITTEMORE CO. BELOIT, WIS.

CORRUGATING MACHINES
POWER SHEARS
OTHER SHEET METAL MACHINERY

See our advertisement in first issue each month

The Streine Tool & Manufacturing Co.
New Bremen, Ohio, U. S. A.



The Yoder Cold-Roll Forming Machine

For Angles, Shapes and Tubes

This is the machine sheet metal workers have been looking for. It will quickly and accurately roll flat stock of all lengths into mouldings, tubes, channels, angles and all kinds of metal shapes.

Operation is easy, power consumption low; and output accurately formed. If you are interested in making material cost reductions on this work, get acquainted with the Yoder Line!

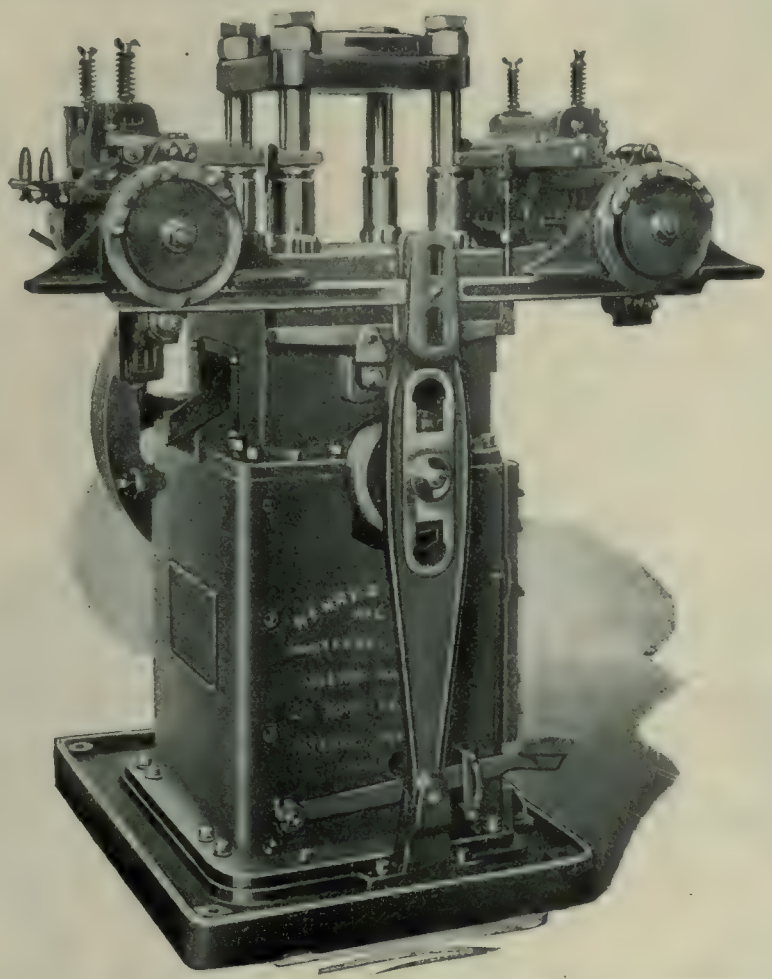
THE YODER COMPANY

"Machine builders to workers in sheet metal"

CLEVELAND, OHIO

THE WRIGHT DIEING MACHINE IS MEASURED IN TERMS OF DOLLARS EARNED

It Is by Far the Greatest Development of the Age for Punching, Blanking and Stamping Sheet Metals at Here-to-Fore Unheard of Profits.



The earning power of this machine is almost beyond belief yet the investment required is within reach of all.

By its use, the money saved and earned by increased die life, greater production and less operating cost, soon pays for the machine.

Seeing is believing, so arrange for a demonstration. Meantime, get the details of this revolutionary mechanism that supersedes the conventional type of power press.

THE HENRY & WRIGHT MFG. CO.

Makers of Dieing Machines and Drilling Machines

760 Windsor Street, Hartford, Conn., U. S. A.



Large Plate Bending Roll built for a large tank car manufacturing corporation. 34' 2" between housings. Capacity ¾" plate. Top Roll 29" diam.

Ryerson-Kling Heavy Duty Plate Bending Rolls

Ryerson-Kling Plate Bending Rolls speedily and accurately produce any boiler section that can be rolled.

They are made in a wide range of sizes and capacities, suitable for light tank and boiler shop work, car shop and shipbuilding work.

The smaller sizes are made with hand adjustment only and the larger sizes with power adjustment. In the latter arrangement the adjusting mechanism is provided with clutches so that either end of the upper roll can be raised or lowered independent of the other end. This feature is particularly desirable where tapered work is to be rolled larger in diameter at one end than at the other.

Steel cut gears and bronze bushed bearings are used throughout in the construction of Ryerson-Kling Plate Bending Rolls.

Equipment that speeds output and improves quality is the best investment you can make.

Investigate the "Ryerson - Kling Line" before purchasing new equipment. It will pay you.

The Ryerson-Kling Line includes Punches, Shears, Plate and Angle Bending Rolls, Coping Machines, Bulldozers, Bar Benders, etc.

Write for complete information and prices

JOSEPH T. RYERSON & SON

Established 1842 Incorporated 1888

CHICAGO ST. LOUIS DETROIT BUFFALO NEW YORK

RYERSON MACHINERY

SHEET METAL MACHINERY

CORNICE BRAKES
POWER BRAKES
BOX AND PAN BRAKES
SPECIAL BRAKES

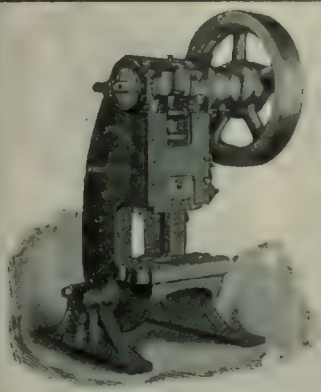
For bending, forming and flanging from light sheets up to ¾-inch steel plate cold.
Over 100 standard sizes from 3 to 16 ft. long.
Over 16,000 in use by tin shops, steel car shops, shipyards, structural shops, tank and boiler makers, etc.

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CHICAGO STEEL BENDING BRAKES

DREIS & KRUMP MFG. CO.

McKINLEY PARK STATION, CHICAGO



Sheet Metal Working Machinery and Dies.

Bench Power Presses

for Light Punching Blanking and Forming. Made as carefully as our largest presses.

CHAS. LEFFLER & COMPANY

61 Clymer Street BROOKLYN, N. Y.

THE WORLD'S STANDARD



"ADRIANCE"

Inclinable Power Presses

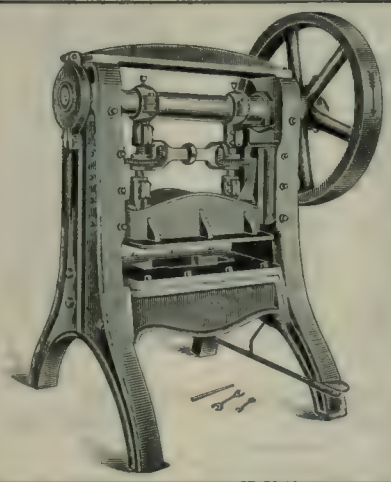
Built in five sizes to meet the demand for a general all purpose Power Press. Adaptable for a range of work that includes nearly every kind of cutting, piercing, forming and combination drawn work which can be produced by dies on single action presses, covering most of the operations necessary in the production of pieced tinware, cans, sheet metal boxes, stampings, trimmings and electrical goods, etc.

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Builders of Presses, Dies and Metal Working Machinery.
Established 1888
Incorporated 1913

82 RICHARDS ST. BROOKLYN, N. Y.



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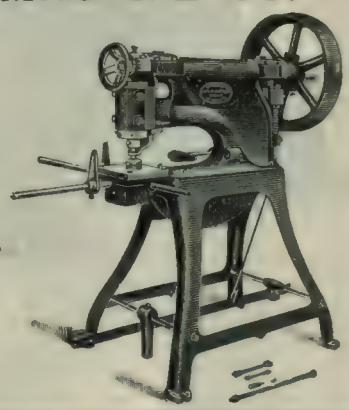
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Manufacturers of

PRESSES, SHEARS,
BRAKES, GRINDERS,
ANGLE IRON BENDERS,
and POLISHING MACHINES

Write and get our prices

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Any amount of power up to 20 tons.

The Flexible Power Press

is most excellent for broaching, pressing gears on shafts or bushings into holes, and for all kinds of difficult straightening work. *Send for our Booklet.*

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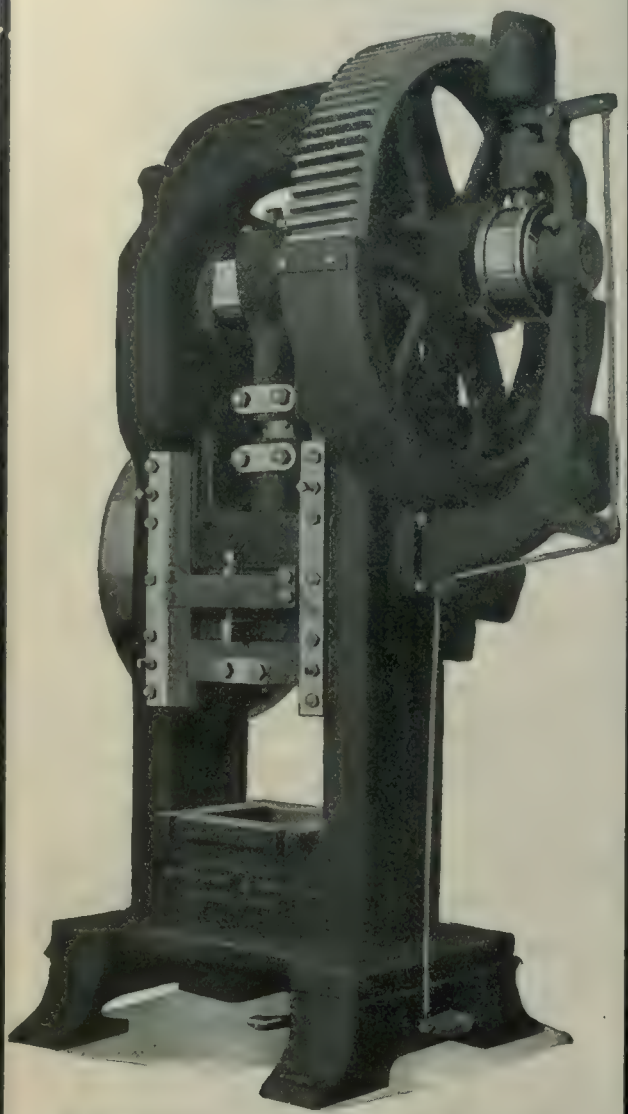
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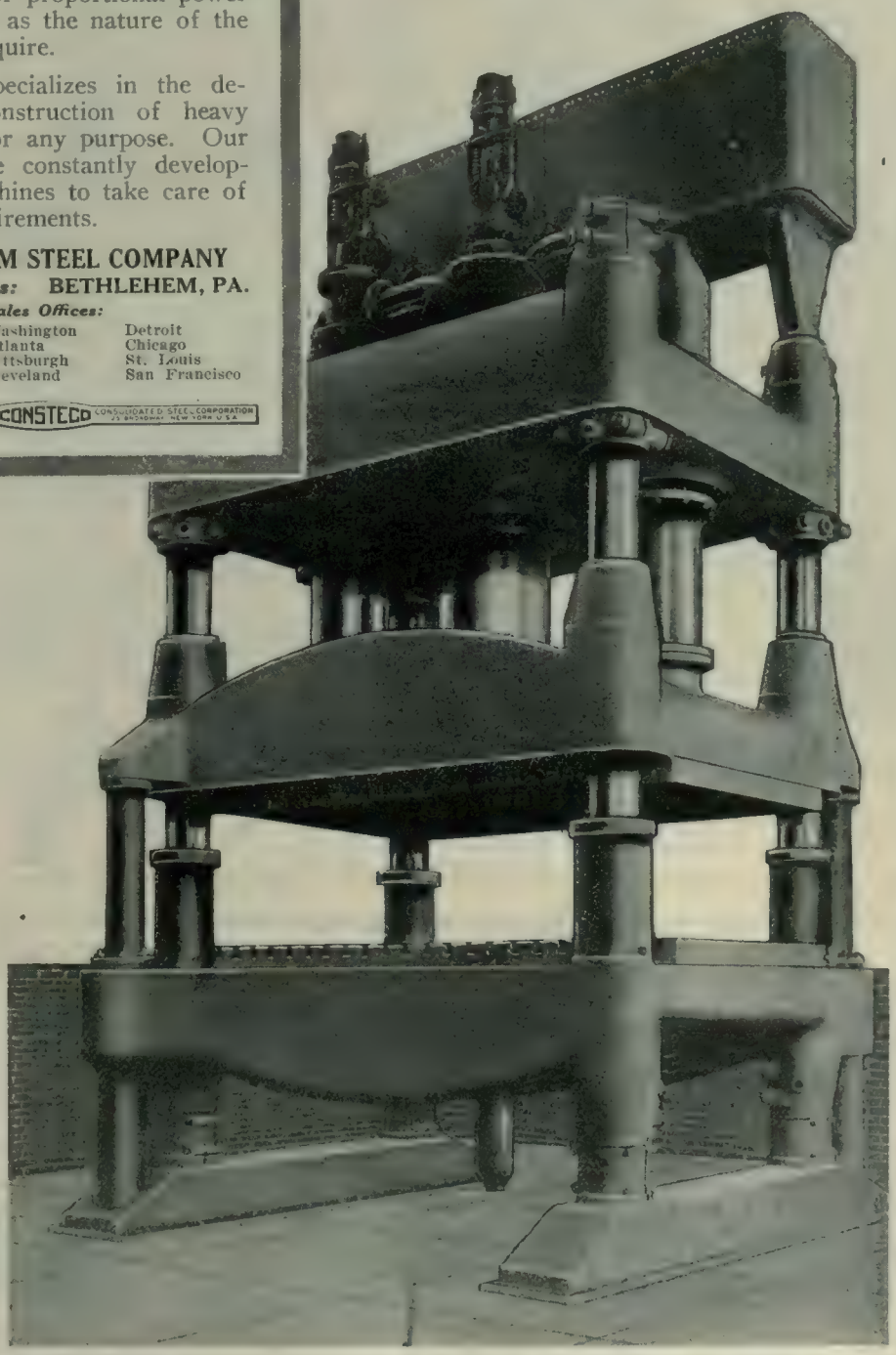
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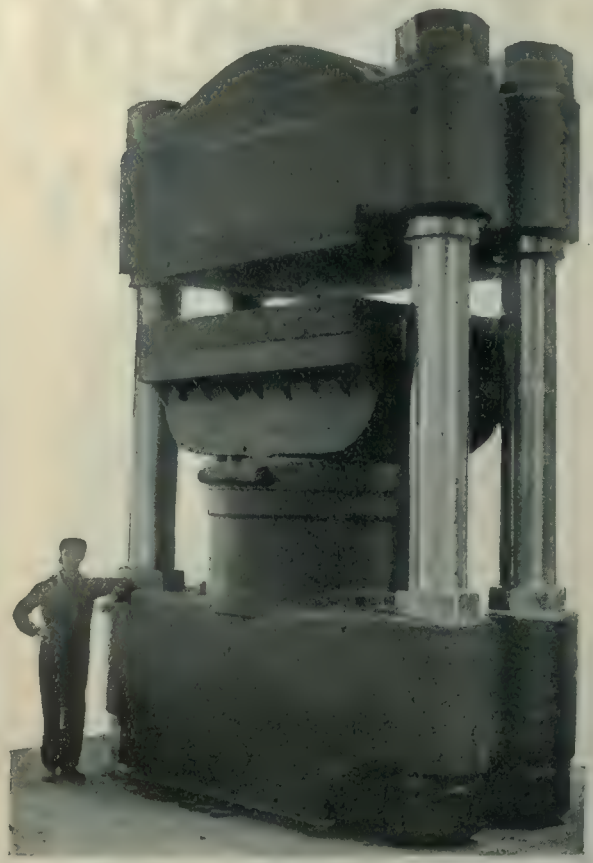
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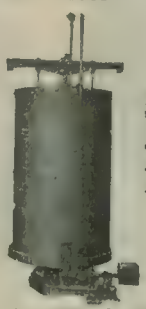
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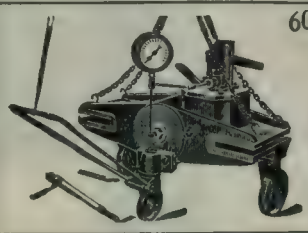
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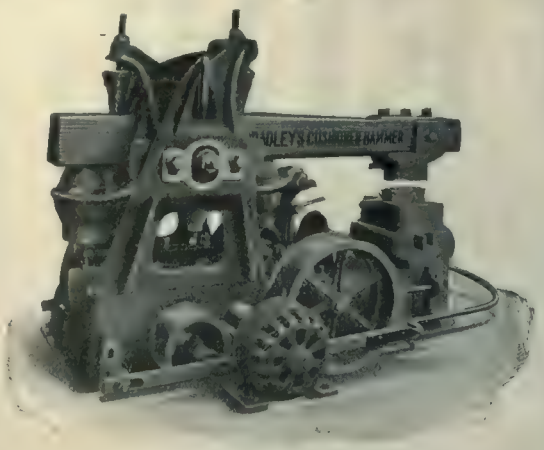
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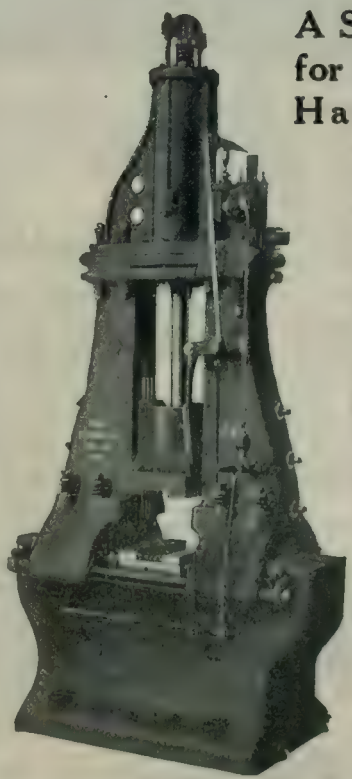
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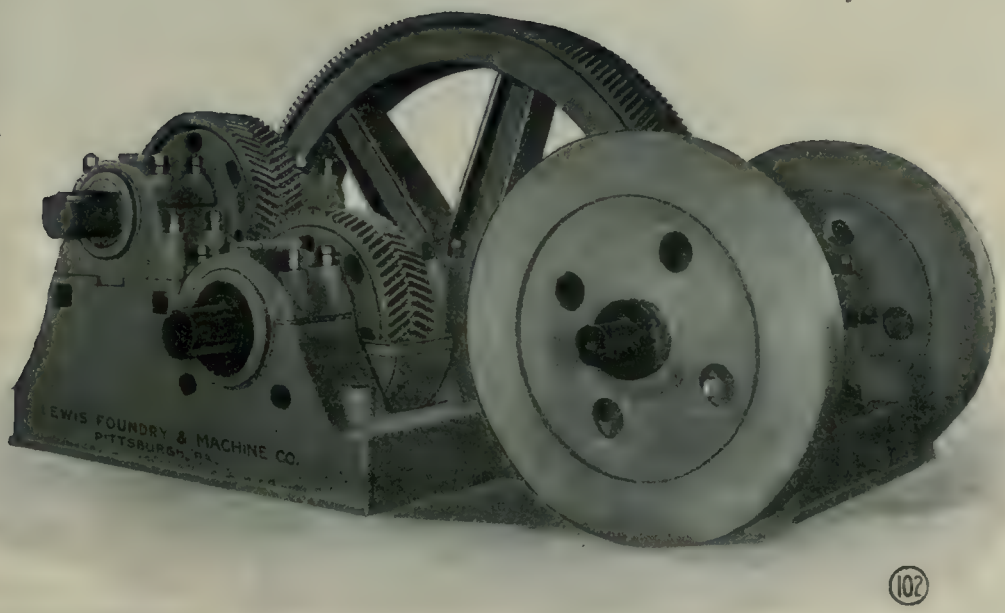
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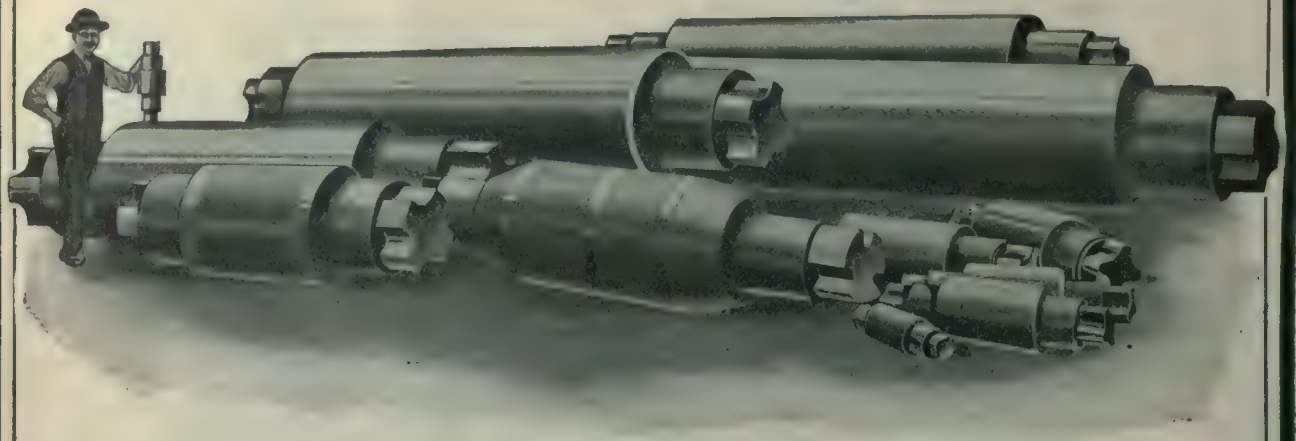
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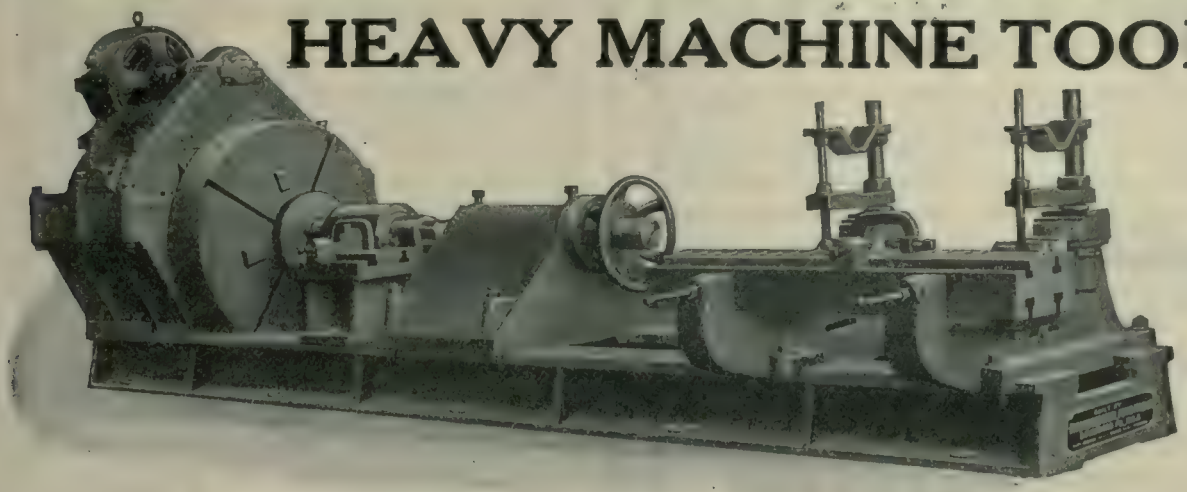
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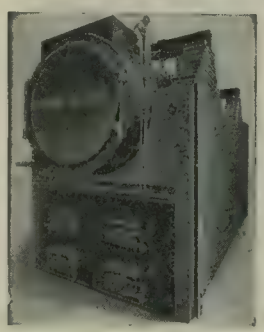
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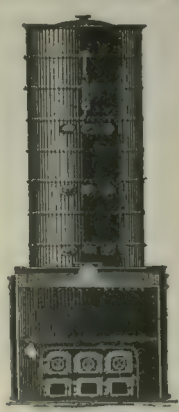
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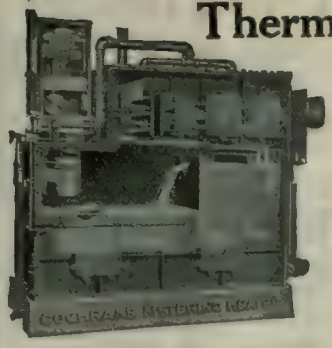
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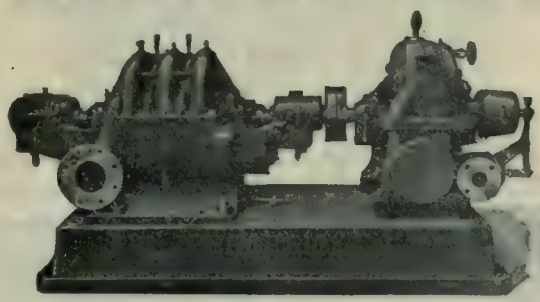
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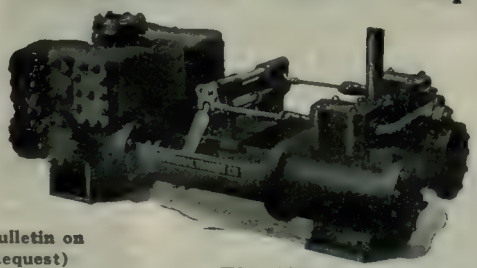


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Fig. 121

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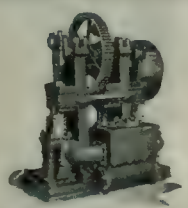
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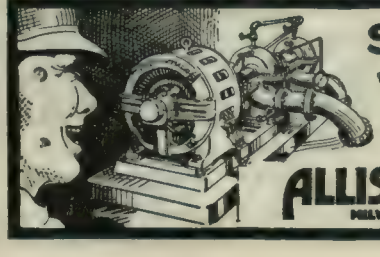
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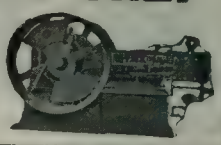
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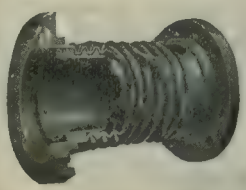
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ONLY Steam Engines Good Engines ONLY



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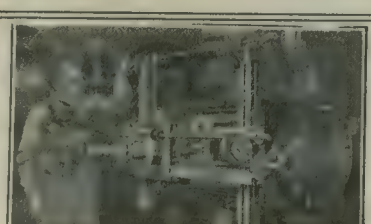
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Bury Compressor Co., 1800-1900 Cascade St., Erie, Pa., U. S. A.

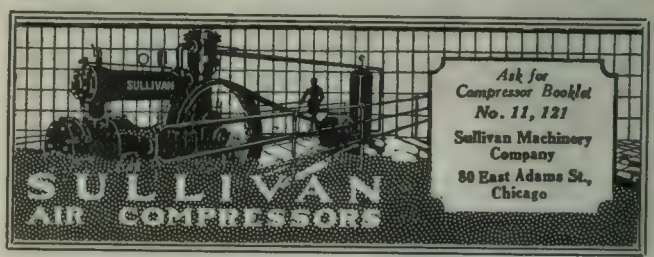


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A necessity for turbine protection, engine cylinder economy, and utilization of superheat for all its benefits.

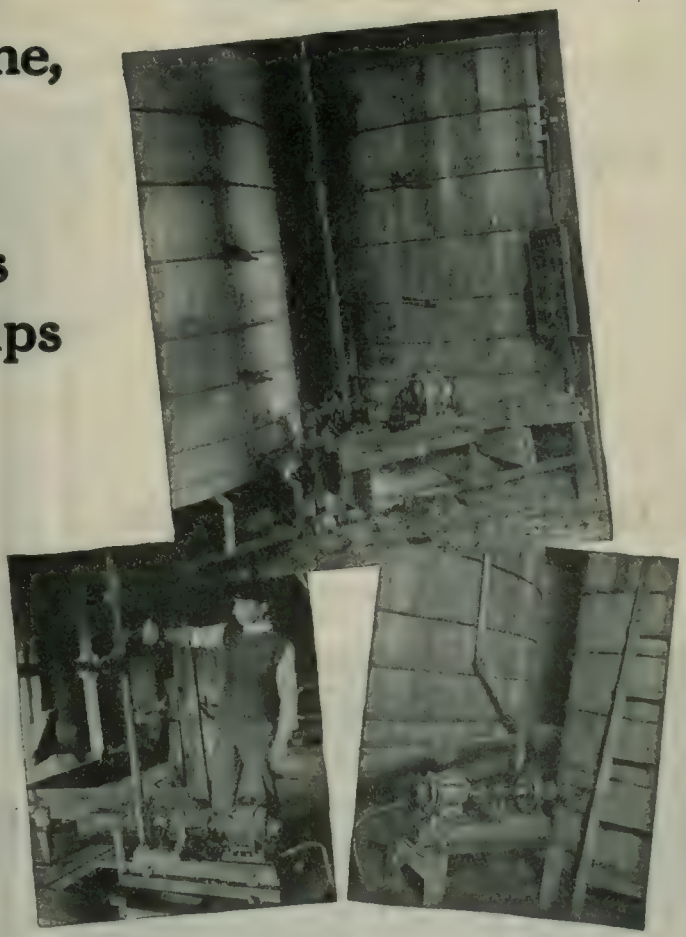
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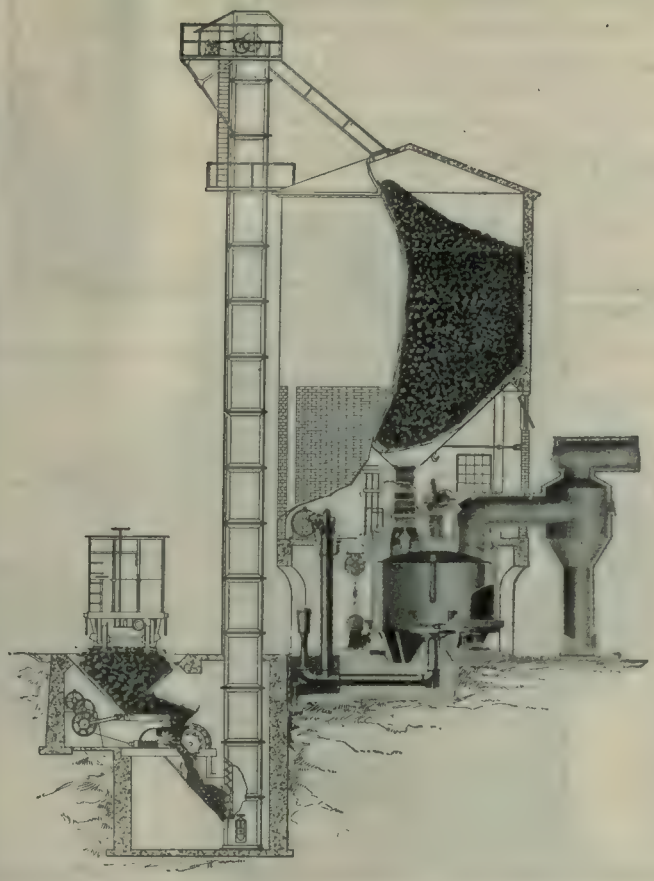
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Service, resistance to wear—their permanence in the line recommends them particularly for use on Power Equipment.

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Gate and globe patterns and check valves for handling steam, water, air, gas, oil and chemicals.

All-bronze, bronze mounted iron bodies and all-iron valves.

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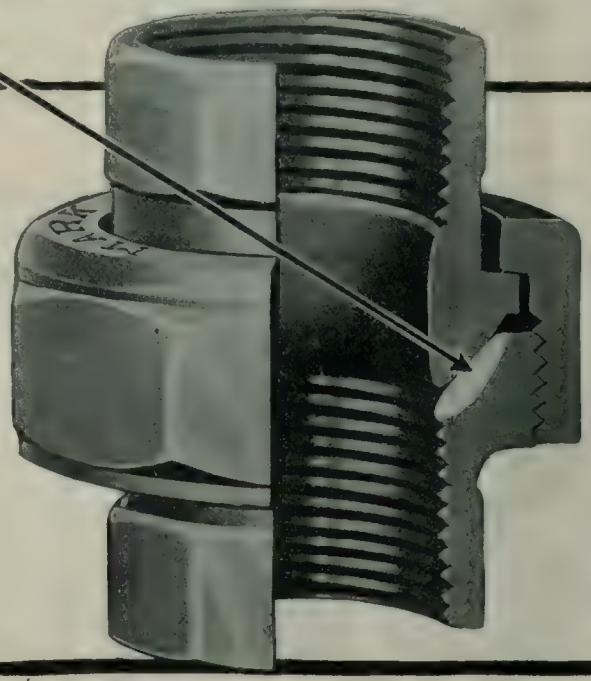
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Pipe fitters know that pounded-in seats work loose.

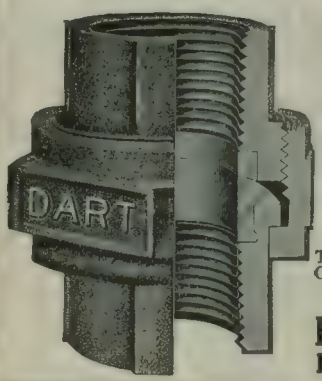
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For they know that pounding, temperature changes, or corrosion cannot loosen it.

Would you be interested in hearing more about this unusual union?



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Dart Unions give years of satisfactory service. They cannot leak, rust or corrode and can be used over and over again when changes in pipe line are made.

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The Road Map of the
ADVERTISING SECTION
Page Three



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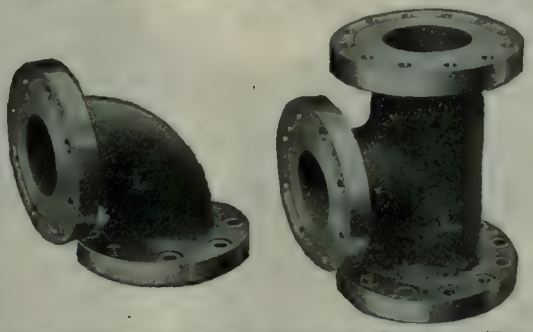
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Power Plant Piping, Fittings, Valves, Etc.
Ready to erect

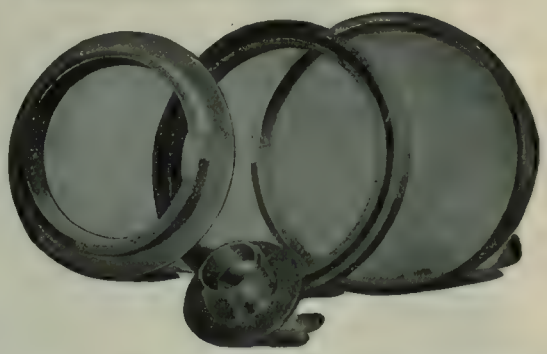
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ANY SIZE — ANY DESCRIPTION
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FOR HYDRAULIC PRESSURE, COMPRESSED AIR AND OTHER PURPOSES WHERE HIGH QUALITY PACKINGS ARE REQUIRED

We have been building hydraulic machinery for over 70 years and found early in our experience that a perfect packing could not be bought. We, therefore, experimented with various materials and designs in order to produce a satisfactory packing. These experiments have led to PAX-TITE packings, which we present to the trade with the assurance backed by our long business success that these packings are the best that perfect material plus careful workmanship has yet produced.

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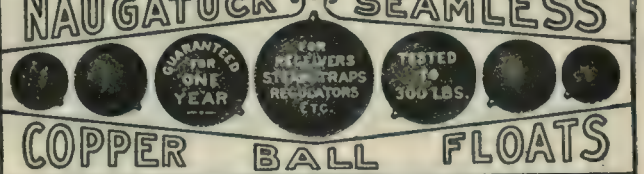
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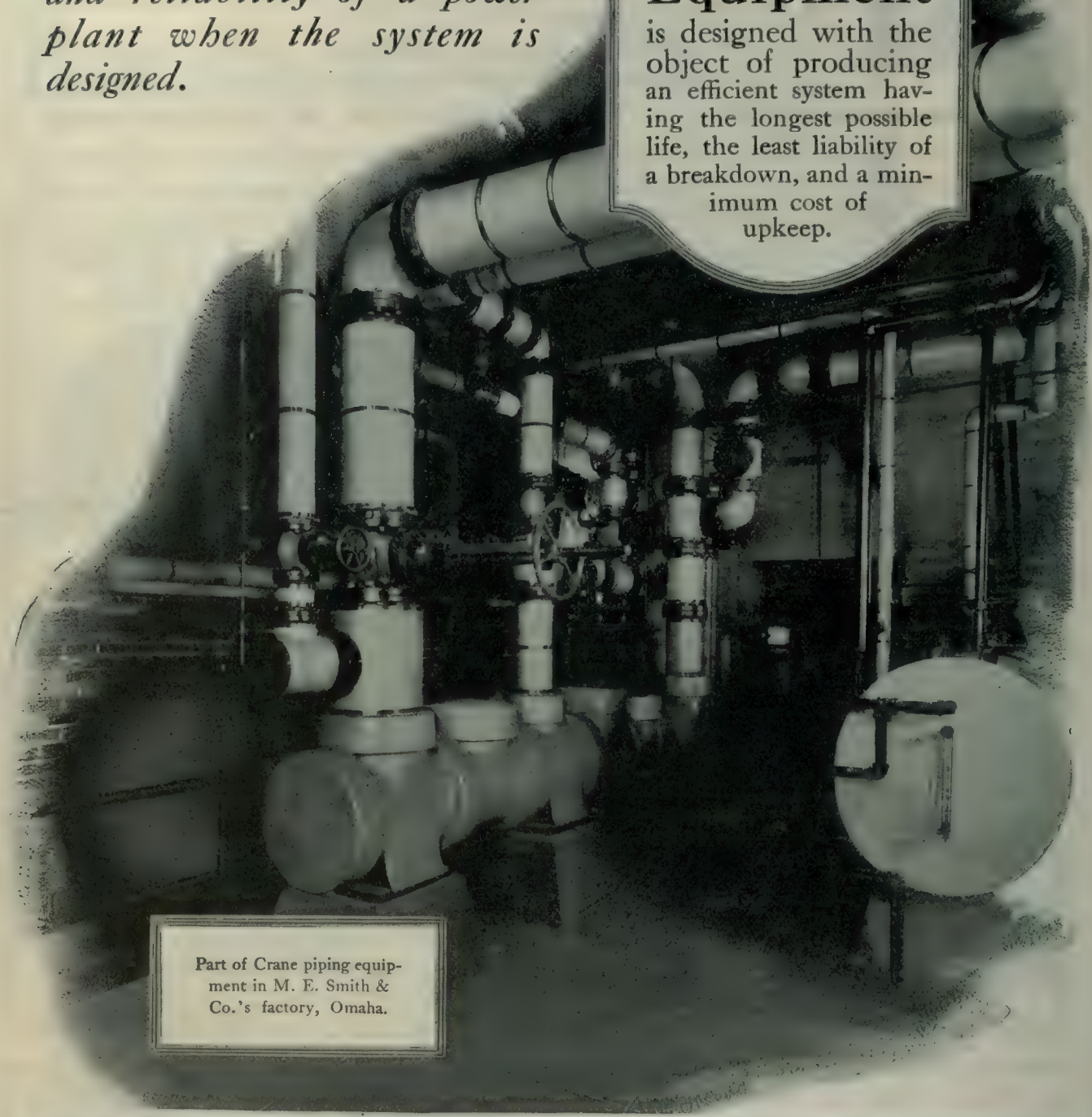
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is designed with the object of producing an efficient system having the longest possible life, the least liability of a breakdown, and a minimum cost of upkeep.



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Machine Tools, Electrical and Steam Power Equipment — Factory Equipment—Railroad Equipment — Material of all kinds.

RATES PRICE PER INSERTION

	1 Time	2 Times	3 Times	4 Times	52 Times
1 inch	$5.75	$5.25	$5.25	$4.75	$4.00
2 inches	10.50	9.50	9.50	8.75	7.75
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4 inches	19.00	17.50	17.50	16.50	15.00
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Tools all the time moving—

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The prices are made low enough to sell them quickly

Hard to say which is the New Tool if you inspect some of these Used as well as New Machines

SLIGHTLY USED McCABE "2-in-1" Double-Spindle LATHES

Latest "Improved" pattern—

26/48-in Swing—

3-Step Cone Double Back Geared also Triple-geared with large plain Face-plate-C-shaft and full equipment.

18-ft. bed turns 12-ft. between centers
22-ft. bed turns 16-ft. between centers
26-ft. bed turns 20-ft between centers
32-ft. bed turns 26-ft between centers

All of these Machines guaranteed like New and will be sent out with same guarantee as a New machine. And at about half the price of a New machine—

TRIPLE GEARED LATHES

54" Swing—21-ft. Bed—Pond Co.'s.
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50" Swing—30-ft. Bed—Johnson Co.'s Ex. Hvy. Pat.
48" Swing—13½-ft. Bed—American Tool Works, Latest—Quick Change.
26—48" Swing, Double Spindle, 18-ft. Bed, McCabe's, Triple Geared, Geared Face Plate.
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36" Swing, 14-ft. Bed, Bridgeford, Geared Head, Quick Change, motor drive, inc. motor.

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80" Swing, with quartering attachment, Bement Double Head, turning both wheels at the same time.

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3—½ x 60 Fitchburg, complete equip. Like new.

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28" Swing, Pond, Rigid Type.
21" Swing, Gisholt, Gap.
20" Swing, Potter & Johnson, Geared Head.
3 x 36" Jones & Lamson, Geared Head.
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48" x 48" x 15' Wm. Sellers, 3 heads.
48" x 48" x 14' Pond M.T. Co.'s, 2 heads.
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4—3" Bar, "Niles," 64" Swing, Power Raise to Table.
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5-ft. Arm, "Dreses," Cone Drive.
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4-ft. Arm, "Cincinnati-Bickford," Speed Box Drive.

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Vertical, Brown & Sharpe, No. 5, table fd. 5", with circular milling attach.
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Mfrs. Style-Hendey No. 5 with quick change.
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10-in. Stroke, "Betts" Cone Drive.

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22-in. Bevel Gear Planer, Gleason.
30-in. Gould & Eberhardt, for spur and bevel gears.
36-in. Fellows Gear Shaper.
56-in. Eberhardt Bros. for spur.

PUNCHES AND SHEARS

Horiz. Punch 60" Gap, Hilles & Jones, wt. 68,000 lbs. arranged for motor drive, no motor.
Punch and Shear, single end, 50" Gap, Weight 38,000 lbs.
Punch and Shear, single end, 42" Gap, with motor, Hilles & Jones.
Punch and Shear, double end, 36" Gap, Belt Drv., Long & Allstatter.
Portable Punch, Pels.

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14-ft., 2-in. bet. housings, drop end, Hilles & Jones, top roll 11" diam., two lower rolls 8" (one grooved), center support for lower rolls, friction clutch pulley drive.
10-ft., 2-in. bet. housings, drop end, top roll 10½" diam., two lower rolls 8" diam., wt. about 20,000 lbs. Motor or belt drive.

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Plain Roll Grinder, Table 66" x 12", takes 36" between centers, Bridgeport. Like new.
Universal Landis, Swings 16", 60" centers.
Universal Landis, Swings 10", 30" centers.
Universal Iroquois, Swings 12", 36" centers.

NEW LATHES

36" Swing, Quick Change, 18-ft. bed, 11-ft. centers.
32" Swing, 20-ft. bed, 13-ft. centers, Quick Change.
32" Swing, 14-ft. bed, 7-ft. centers, Quick Change.
29" Swing, 16-ft. bed, 10'-6" centers, Quick Change.
21" Swing, 8-10-12-14-ft. bed, Quick Change.
18" Swing, 8-10-12-14-ft. bed, Quick Change.
16" Swing, 8-10-12-ft. bed, Quick Change.
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2½-ft. and 4-ft. arm, single pulley drive.

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19" x 12" x 16" Ingersoll-Rand, two stage, belt driven Compressor. Capacity 888 cu. ft. air pressure 100 lbs. Complete with unloader and idler pulley for individual drive. Used about 60 days.
1—1200 cu. ft. Ingersoll, Class A, straight line steam driven Compressor, 80-100 lbs. air pressure. Complete with unloader and all fittings.

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1—50 K.W. Ft. Wayne, 115-125 volt, direct current, direct connected to Ball Auto Engine.
1—35 K.W. Burke Elec., 125 volt, direct current, direct connected to Ames Auto Engine.

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1—284 H.P. B. & W. Water Tube, 150 lbs. pressure.
1—250 HR.P. Erie City Water Tube, 150 lbs. pressure.
1—100 H.P. Locomotive Fire Box, 90 lbs. pressure.
1—40 H.P. Internal Fired, 90 lbs. pressure.
2—72" x 18' Horizontal Tubular, 115 lbs. pressure.
1—66" x 18' Horizontal Tubular, 115 lbs. pressure.

CONDENSERS AND PUMPS

2—2000 ft. Wheeler Surface Condensers.
1—1400 ft. Worthington Surface Condenser.
2—12" Morris Centrifugal Circulating Pumps. Direct connected to steam engines.
1—12" x 14" x 14" x 12" Worthington Vacuum Air and Circulating Steam Pump.
2—Row Davis Evaporators, steel shell, 28" diam., 75" high with copper coils.
2—Row Davis High Pressure Heaters, with copper coils.

MOTORS

1—50 H.P. Allis-Chalmers Induction Motor, continuous duty, 440 volts, 3 phase, 60 cycle, speed 965, 40 degrees, complete with Cutler-Hammer starting controller, oil circuit breaker, base and 14" x 9" belt pulley.
1—50 H.P. Allis-Chalmers Induction Motor, 440 volts, 3 phase, 60 cycle, speed 1160, 40 degrees, with potential starter, base and 12" x 8" belt pulley.
1—40 H.P. Allis-Chalmers Induction Motor, 440 volts, 3 phase, 60 cycle, speed 865, 40 degrees, with potential starter, base and 14" x 9" belt pulley.
2—40 H.P. Allis-Chalmers Induction Motors, 440 volts, 3 phase, 60 cycle, speed 1160, 40 degrees with potential starters, bases and belt pulleys, size 14" x 9".
1—7½ H.P. General Electric Induction Motor, Type KT, Form C, 220 volts, 3 phase, 60 cycle, speed 1200, with starting box, no pulley or base.
2—30 H.P. Allis-Chalmers Induction Motors, 440 volts, 3 phase, 60 cycle, speed 1150, 40 degrees, with potential starters, bases and belt pulleys, size 12" x 8".
1—7 H.P. Western Electric Co., Variable Speed Motor, Type KT, Form C, 440 volts, 3 phase, 60 cycle, speed 1800-1200-900-600, complete with reversing drum controller, no base or pulley, brand new.
1— 5 H.P. General Electric Induction Motor, 220-440 volts, 3 phase, 60 cycle, speed 1800, with starting switch and base, no pulley.
3—H.P. General Electric Induction Motor, 220-440 volts, 3 phase, 60 cycle, speed 3600, with starting switch, base and 4½" x 4½" belt pulley.

ANCHOR WINDLASSES AND CHAIN

4—Type W, 30 H.P. Dake Anchor Windlasses for 1⅛" anchor chain.
1—8" x 10". 30 H.P. Hyde Anchor Windlass for 1⅛" chain.
35—Shots 1⅛" anchor chain.
5—4875 lb. Stockless Anchors
4—1875 lb. Stockless Anchors.

PUNCHES AND SHEARS

1—No. 1 Hillis & Jones Single End Punch, 21" throat, capacity ⅝" hole in ⅝" plate, with architectural jaw, flywheel drive not geared, flywheel 50" dia., 7" face.

Write for Complete List No. SL2

HARRIS BROTHERS CO.

Slidell, La.

Material On Sale at ARMY AND NAVY CAMPS

CAMP MERRITT

TENAFLY, NEW JERSEY

BOILERS

2—Worthington 235 H.P. Vertical Water Tube Boilers, complete for forced draft.
1—Erie City Iron Works Horizontal Return Tubular Boiler, 72" dia., 18' long, 150 H.P., butt strapped, triple riveted, equipped with full fronts.

SMOKESTACKS

8—36" dia. steel Smokestacks 100' high.

Write for Complete List No. CM8

HARRIS BROTHERS CO.

TENAFLY, NEW JERSEY

GERSTNER AVIATION FIELD

LAKE CHARLES, LA.

CENTRIFUGAL PUMPS

2—Buffalo motor driven Centrifugal Pumps, 4" suction, 3" discharge direct connected to 5 H.P. Westinghouse Motor, 220 volts, 3 phase, 60 cycle.

OVERHEAD CARRIER

Overhead Carrier, 1000' long, track made of 6" I-Beams suported by hangers, complete with trolley, five turntables and eight switches, capacity 2000 lbs.

ELECTRIC TRANSFORMERS

50—Electric Transformers, 1 K.V.A. to 200 K.V.A., 2200 V. primary 220-110 V. secondary.

Write for Complete List No. GF2

HARRIS BROTHERS CO.

Lake Charles, La.

CAMP SHELBY

Hattiesburg, Miss.

AIR COMPRESSORS

19" x 12" x 16" Ingersoll-Rand, two stage belt driven Compressor. Capacity 888 cu. ft. air pressure 100 lbs. Complete with unloader and idler pulley for individual drive. Used about 60 days.
1—1200 cu. ft. Ingersoll, Class A, straight line steam driven Compressor, 80-100 lbs. air pressure. Complete with unloader and all fittings.
1—309 cu. ft. Chicago pneumatic fuel oil driven Compressor, 100 lbs. pressure, weight 13,000 lbs.

Write for Complete List No. JV10

HARRIS BROTHERS CO.

Hattiesburg, Miss.

CAMPS PERRY and DEWEY

North Chicago, Ill.

STEAM JACKETED KETTLES

50 Cast Iron Steam Jacketed Kettles, heavily constructed, 125 lbs. pressure, 22" diameter, 24" deep, capacity 80 gals., conical shape bottom. Made by Mott Iron Works.

SMOKESTACKS

Large quantity of smokestacks in splendid condition. The following sizes have been taken down and are ready for quick shipment:
30" diameter smokestack, 60' to 75' long.
36" diameter smokestack, 60' to 75' long.
20" diameter smokestack, 25' to 35' long.
A few smokestacks 48" diameter, 100' high; also several 54" diameter, 100' high. Write for prices.

TANKS

Six hot water feed tanks, 48" diameter, 10' long, made with 1 concave head and 1 convex head, manhole in head. Thickness of plate about ¼". Six heavily constructed filtered tanks, made of ½" plate strongly riveted, size about 66" diameter, 5' 6" high, with dished heads.

WORK BENCHES

85 work benches with extra heavy tops and heavily constructed bars. Good condition. Various sizes.

Write for Complete List No. GL1

HARRIS BROTHERS CO.

North Chicago, Ill.

Material On Sale at MAIN PLANT H'DQ'T'RS

CHICAGO, ILL.

ENGINE LATHES, TRIPLE GEARED SCREW CUTTING

96 x 40 Fifield, 30' centers.
68 x 40 Pond, 30' centers.
60 x 40 Fifield, 30' centers, with 2 carriages on bed (2).
42 x 24 Niles, 18' centers.
36 x 32 American Tool Works, 25' centers with two carriages on bed, compound rests have power angular feed—quick change—nearly new.
36 x 32 LeBlond 25' centers with two carriages on bed—compound rests—taper attachment—quick change—nearly new.

HAND 5 STEP CONE, SINGLE BACK GEARED STANDARD

27 x 10 Lodge & Davis, 5' centers with taper attachment.
24 x 12 Fitchburg, 7' centers.
20 x 20 Putnam, 15' centers.

3 STEP CONE, DOUBLE BACK GEARED, FULL QUICK CHANGE

33 x 14 LeBlond, 7' centers.
24 x 10 Whitcomb-Blaisdell, 4' centers.
20 x 8 American Tool Works, 4' centers (6).

ENGINE LATHES, NOT SCREW CUTTING

26" x 21' centers, Niles-Bement Heavy Duty, All Geared Head.
36" x 27' centers, Niles-Bement Heavy Duty, All Geared Head.
26" Davis Furber Pulley Turning.
42" Pond Pulley Turning.

TURRET LATHES AND SCREW MACHINES

24" Gisholt with 4-way turret tool post, on carriage through hex. turret on bed, with power rapid traverse, taper attachment, screw cutting, 2 step cone, triple geared, 6¼" hole in spindle (10).
21" Gisholt, same, 3⅛" bore.
Pratt & Whitney No. 1 Hand Screw Machines, 7/16" auto. chuck, capacity (6).
Gridley 3¼" single spindle automatics (16).
Gridley 4⅝" single spindle automatics.

LO-SWING LATHES

Fitchburg 8" Swing x 8 foot centers, with 3 carriages.
Fitchburg 8" Swing x 9 foot centers, with 2 carriages and taper attachment.
Fitchburg 8" Swing x 7 foot centers, with 2 carriages and taper attachment.
Above have tool equipment.
LeBlond 17" Swing x 6 foot bed, 27" centers Rapid Production Lathe, Friction Head, 3 step cone (Plain not B.G.), Compound Rest, semi-quick change.

MILLING MACHINES

No. 4 Hendey—(250).
No. 7H Becker (250).
6—Ingersoll (New), 24 x 24 x 12 Heavy Duty Horizontal Slab Milling Machines.
No. 6 Whitney Hand (10).
No. 3 Brown & Sharpe Universal.
No. 6 Becker Vertical.

BOLT CUTTERS AND PIPE THREADING AND CUTTING-OFF MACHINES

National 1" Single Head.
Greenfield 2" Single Head.
Landis 1" Double Head.
Acme 1" Quadruple Head.
Waterburg ¾" No. 60 Bolt Thread Rolling Machine.
Acme Spindle Vertical 1¼" Nut Tapper.
Ajax 1¼" Bolt and Rivet Forging and Heading Machine.
Forbes (Curtis & Curtis) 2", 4", 6" Pipe Threading Machine.
Hall 6" Pipe and Shaft Cutting-off Machines.
Buffalo 8" Pipe and Shaft Cutting-off Machines.
Higley Cold Metal Saw, 7" Rounds.
Wright Double Metal Band Saw Vertical.
Napier Horizontal Metal Band Saw, 10" x 10".

STORAGE TANKS

20—30,000 Gal., 20 ft. dia., 12 ft. high; 5/16 in. plate.
25—20,000 Gal., 10 ft. 6 in. dia., 31 ft. 2 in. long; ¼ in. plate.
10—15,000 Gal., 10 ft. 6 in. dia., 23 ft. 6 in. long; ¼ in. plate.
15—12,000 Gal., 10 ft. 6 in. dia., 18 ft. 6 in. long; ¼ in. plate.
30—11,500 Gal., 8 ft. dia., 30 ft. long; ⅛ in. plate.

GRINDERS AND SHAFT TURNING LATHES

Diamond 6" x 48" Plain External Cylindrical Grinder.
Ford Smith 9" x 15" Plain.
Fitchburg 12" x 36" Plain (3 Machines).
Landis 16" x 60" Crankshaft Grinder.

Our free Bulletin No. 205, lists over 100 pages of Industrial Plant Equipment and General Supplies, from our latest purchases. Your copy is waiting! Ask for it now! or for individual booklet on any of above operations.

HARRIS BROTHERS CO., Chicago, Ill.

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Sales Offices

ReMANUFACTURED
—(ORIGINATED BY US)—
MACHINE TOOLS

(REG. U. S. PAT. OFF.)

The approaching upward trend in the business cycle will evidence severe competition in many lines and only the fittest will survive. Are you prepared to meet this condition? REMANUFACTURED Tools at "NORMAL PRICES" will save you money and help meet this contingency.

WRITE FOR OUR PICTURE BOOK

LATHES

1—13" x 5' Willard
1—14" x 6' American
2—14" x 6' Carroll Jamison, Q.C.G.
30—14" x 6' Reed, Extra Heavy, Plain
1—Each 14" and 16" x 6' Flather, Q.C.G.
1—16" x 6' American, Geared Head
6—16" x 6' [illegible]
1—17" x 6' Sidney, Q.C.G.
8—17" x 6' LeBlond Mfg. Auto.
4—18" x 8' Mueller, Q.C.G.
3—18" x 8' Boye & Emmes, Q.C.G.
20—19" x 8' LeBlond, Heavy, Q.C.G.
13—20" x 8' LeBlond, Q.C.G.
89—20" x 8' American, Q.C.G.
3—20" x 10' Lodge & Shipley, Q.C.G.
26—21" x 10' LeBlond, Heavy, Q.C.G.
18—22" x 8' Davenport
8—25" x 10' LeBlond, Heavy, Q.C.G.
28—26" x 10' Niles-Bement-Pond
18—26" x 9' Bridgeford, Q.C.G.
70—26" x 10' Bridgeford, Q.C.G.
22—26" x 12' Bridgeford, Q.C.G.
1—26" x 20' Bridgeford, Q.C.G.
6—30" x 11' American, Geared Head
1—30" x 20' American, Geared Head
19—32" x 12' Pittsburgh, Q.C.G.
2—36" x 14' Johnson, Triple Geared
1—36" x 19' Johnson, Triple Geared
15—36" x 30' Pittsburgh, Geared Head
1—Each 36" x 36' and 42' LeBlond, Q.C.G.
4—36" x 37' Niles-Bement-Pond, Trip. Grd.
4—40" x 12' Fifield, Triple Geared
1—40" x 18' Fifield Triple Geared
2—45" x 24' Pond, Triple Geared

UPRIGHT DRILLS AND RADIALS

1—2-spindle Henry & Wright
3—3-spindle Allen.
4—4-spindle Allen.
17—6-spindle Allen
3—No. 6-B Henry & Wright Sens.
1—25" Silver, Sliding Head
3—34" W. F. & J. Barnes, Sliding Head
2—36" Cincinnati Sliding Head
3—3' American Sensitive
1—Each 3', 3½', 4', 5', 6' Western Radial, S.P.D.

BORING MILLS

1—30" Gisholt
1—42" Gisholt Vertical, 2 heads
1—10' Niles Vertical
1—4" bar Niles Horizontal
1—Beaman & Smith Horizontal, 2 heads.
1—2-spindle Espen-Lucas, 2 heads
1—3A Universal, Horizontal

GRINDERS

3—No. 1—4" x 20" Morse Plain
1—No. 1—10" x 20" Bath Univ.
4—6" x 32" Norton Plain
1—10" x 36" Thompson Univ.
1—No. 2—12" x 36" Cincinnati Univ.
2—12" x 36" Modern Plain
1—12" x 96" Landis Plain
1—14" x 50" Norton Plain
1—20" x 96" Norton Plain
3—No. 2 Brown & Sharpe Surface
1—No. 2 Bath Surface
1— 8" x 48" Thompson Surface
2—14" Pratt & Whitney Surface
1—No. 1 Wilmarth-Morman Univ. Cutter
1—No. 2 Oesterlein Univ. Cutter
1—No. 3 Oesterlein Univ. Cutter
3—No. 70 Heald Internal
1—No. 2 Garvin Hole
1—10" Bay State Ring
3—No. 2 Gardner Disc
1—Taylor & Fenn Wet
11—American Drill

MILLERS

1—No. 0 Brown & Sharpe
1—No. 38 Chicago Small
1—18" Cincinnati Miller
2—No. 20 Ohio Plain
1—No. 2 Ohio Plain
1—No. 24 Ohio Univ.
1—No. 1 Kempsmith Univ.
1—No. 2 Cincinnati Plain
1—No. 2-A Milwaukee Plain, S.P.D.
1—No. 2-B Milwaukee Plain, S.P.D.
1—No. 3 Brown & Sharpe Plain
1—No. 4 LeBlond Plain
1—No. 4 Cincinnati Plain, Cone
2—No. 4 Cincinnati Plain S.P.D.
3—Type B Briggs
1—17" x 10' Beaman & Smith, 3 heads
1—No. 1½ Newton Duplex
1—24" x 6' Ingersoll Slab
1—48" x 10' Newton Slab

SHAPERS AND PLANERS

20—16" Walcott, B.G.
9—20" Walcott, B.G.
11—24" Walcott, B.G.
2—26" Niles-Bement-Pond, B.G.
1—34" x 27" x 8' American
1—40" x 30" x 6' Gray
1—56" x 56" x 10' Gray
1—72" x 72" x 14' Niles
1—96" x 72" x 20' Bement, Miles

TURRET AND SCREW MACHINES

8—⅝" Pratt & Whitney
1—1" Pratt & Whitney
8—1" Warner & Swasey, No. 2
5—1" Foster, No. 2
5—1¼" Foster, No. 3
3—1½" Warner & Swasey, No. 4
3—No. 4 Warner & Swasey, Univ.
15—1½" Wood, No. 4
1—2" Brown & Sharpe, No. 6
2—2" Pratt & Whitney
1—2" Wood, No. 6
1—3½" Foster, No. 10
2—3" x 36" Jones & Lamson
1—2" x 24" Jones & Lamson
1—3" x 36" Acme
1—24" Gisholt

GEAR CUTTERS AND HOBBERS

1—No. 00 Schuchardt & Schutte Gear Hobber
4—No. 1 Schuchardt & Schutte Gear Hobbers
2—Lees-Bradner Gear Hobbers
1—No. 13 Brown & Sharpe Gear Cutter
1—30" Flather Gear Cutter
2—36" Cincinnati Gear Cutters

MISCELLANEOUS

1—No. 0 Mitts & Merrill Keyseater
1—No. 0 J. N. LaPointe Broach
2—No. 3 Double J. N. LaPointe Broach
1—No. 3 Niagara Inc. Press
7—No. 2 Loshbough & Jordan, Inc., Press
1—61 V & O Straight Sided Press
1—27½ Bliss Knuckle Joint Embossing Press

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Your money back if you return a machine within thirty days from date of shipment, freight prepaid. No Excuses Necessary.

HILL, CLARKE & CO.
OF CHICAGO
649 Washington Blvd.

EXCEPTIONAL VALUES

New and Used Machine Tools

Of the Better Kind

LATHES

2—14 x 6 Cincinnati, Q.C.G., C.R.
1—New 12 x 5 Davis close coupled tool room, oil pan, taper attachment.
10—New 16 x 6 Greaves-Klusman semi-Q.C.G., complete with standard equipment.
10—New 18 x 8 Greaves-Klusman heavy duty, D.B.G., Q.C.G., complete standard equipment.
1—20 x 10 Hendey yoke head, relieving attachment.
1—20 x 12 Lodge & Shipley Q.C.G., compound rest, also turret.
2—24 x 14 Boye & Emmes, Q.C.G.
2—26 x 14 Walcott, Q.C.G.
8—18 x 8 Cincinnati standard heavy duty, Q.C.G., D.B.G., C.R. and taper att.
3—20 x 12 Greaves-Klusman, Q.C.G., C.R.
3—NEW 24 x 10 Ryerson, Q.C.G., C.R., hollow spindle, belt drive, 3 step.
1—24 x 12 Reed-Prentice geared head, Q.C.G., C.R.
2—30 x 30 American geared head, standard, 2 carriages.
6—42 x 32 Bridgeford heavy duty, standard, all geared head, 2 carriages.
1—8 x 84 Lo-Swing, 3 carriages.

PLANERS

3—48" x 48" x 12' Putnam, 2 heads.
1—48" x 48" x 30' Putnam, 4 heads; belt drive.
1—26" x 26" x 10' Putnam, 2 heads; belt drive.
6—NEW 26" x 26" x 8' Putnam, 2 heads; belt drive.
1—36" x 36" x 42' Gray, 2 heads; belt drive.
1—Gray 30" x 30" x 8' single head.

MILLING MACHINES

1—No. 5 Cincinnati Universal—rectangular arm—latest type.
1—No. 5 Cincinnati Plain—rectangular arm—latest type
1—No. 3H LeBlond Universal.
1—No. 3B Milwaukee Plain.
1—No. 2 Rockford Universal.
1—No. 2C Cincinnati Universal
1—No. 2 Kempsmith Universal.
1—NEW No. 1 Kempsmith Universal.
1—NEW No. 1½ Valley City Universal.
ALSO 250 Hand Millers, such as Whitney, etc. Manufacturing Millers, such as Pratt & Whitney, Hendey No. 4.

BORING MILLS
Horizontal and Vertical

1—4" bar Dietrick & Harvey Hor.—floor type; latest model.
1—No. 0 Giddings & Lewis Hor.
1—No. 3-A Universal Hor. 3" bar
1—No. 2 Rockford Boring Machine.
1—34" King Ver. turret.
1—30" Rogers & Hemphill ver., 2 heads, belt drive.
1—48" Gisholt, 2 head, Ver., S.P.D.
1—42" New Era Bullard Ver.
1—42" Baush Ver., 2 heads, belt drive.
1—72" Niles Ver., 2 swivel heads, 6-step cone drive.

RADIAL DRILLS

1—4' Reed-Prentice plain, S.P.D.
1—4' Western plain, S.P.D.
1—5' Bickford, plain, S.P.D.
1—6' Baush plain, cone pulley drive.
1—6' Reed-Prentice plain, S.P.D.
1—5' Niles-Bement-Pond semi-universal, S.P.D.
1—6' Bickford Universal, S.P.D.

GRINDERS

1—14 x 84 Queen City plain, self contained; NEW
1—10 x 96 Norton plain, self contained
6—10 x 36 Norton plain, ceiling drive
8— 6 x 82 Norton plain, ceiling drive
12—10 x 36 Cincinnati No. 2, plain
1—12 x 36 Landis self contained
1—No. 11 Brown & Sharpe, plain
20—No. 1 Wilmarth & Morman surface
1—Springfield-Brandes hor. face grinder; 19 x 60 table
12—No. 20 Bryant chucking; NEW

TURRET LATHES AND SCREW MACHINES

12—No. 1B Foster Universal, geared head type
4—No. 2-A Warner & Swasey Universal, S.P.D.
8—No. 3-A Warner & Swasey Universal, S.P.D.
1—No. 6 Warner & Swasey friction back geared, power feed to turret
5—2¼" Gridley 4-spindle automatic
1—3 x 36 J. & L. geared head
20—3 x 36 Jones & Lamson, geared feed; latest model.
10—24" Gisholt, turret on carriage, standard machine without chuck, carriage slide and taper attachment; NEW
8—2¼ x 26 Greenlee rigid type flat, 3-step cone
40—No. 6-a Model 2 Potter & Johnston Manufacturing Automatic Chucking, with 4 and 5 hole turrets
25—No. 2 wire feed plain head screw machines, 1 1/16" cap.; NEW

POWER PRESSES

2—No. 57 Toledo double geared, straight column, solid frame, friction clutch, 16" stroke.
1—No. 58 Toledo double geared, straight column, solid frame, friction clutch, 14" stroke.
1—No. 59½ Toledo double geared, straight column, tie rod construction, friction clutch, stroke 8"

MISCELLANEOUS

2—NEW 18" Gould & Eberhardt Gear Hobbers.
1—6" Gleason Bevel Gear Generator.
1—No. 3 Ryerson high speed Friction Saw.
1—1100 lb. Erie Steam Hammer.
1—48" Rock River Punch.
1—No. 862 Niagara Gap Shear.
1—No. 11 Randall Combination Punch and Shear.
2—No. 4-B Quickwork Rotary Shears.

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SHERRITT & STOER COMPANY

INCORPORATED

USED MACHINERY DEPARTMENT

WEEKLY SPECIAL

1—Slightly used 27½"x14' Greaves-Klusman lathe, cone drive, friction, double back geared, quick change, hollow spindle, steady rest, follow rest, full swing rest with 22" 4-jaw chuck fitted, complete with double friction countershaft; of the late type; in excellent condition throughout.

BORING MILLS

1—16' Niles vertical, 2 heads, 11' under cross rail, friction feed, M. drive.
1—12' N-B-Pond, two heads, Q.C.G., M. drive.
1—10' Pond Plainfield, two heads, friction feed, M. drive.
1—96" Betts, two heads, positive feed, cone drive.
1—84" Betts, two heads, Q.C.G., rapid traverse.
1—72" Colburn, two heads, rapid traverse.
1—60" N-B-Pond, two heads, single pulley drive.
1—48" Gisholt, 2 swivel heads, rapid traverse, m. d.
1—48" Colburn, one turret and one swivel head, S. P. drive.
1—42" Bullard, new Era type, M. drive.
1—32" Rogers turret head, single pulley drive.

PLANERS

1—72x72x14' N-B-Pond, four heads, rev. M. drive.
1—60x60x16' N-B-Pond, four heads, belted motor.
1—48x48x12' N-B-Pond, two rail heads, M. drive.
1—48x48x12' N-B-Pond, three heads, rev. M. drive.
1—48x48x14' Flather, four heads, belt drive.
1—30x30x8' Detrick & Harvey open side, rail and side head.

MILLERS

1—No. 2 Cincinnati universal, cone drive.
1—No. 4 Cincinnati plain milling machine, cone drive.

LATHES

2—72"x26' Pond, geared head, M. drive.
1—36"x30' LeBlond heavy duty, Q.C.G., belt drive.
1—36"x30' American, Q.C.G., two carriages.
1—30"x12' American geared head, apron control, M. drive.
1—27"x12' Greaves-Klusman, Q.C.G., cone drive with 22" chuck.
1—24"x12' Hendey with tie bar, taper, pan feed.
3—24"x10' Greaves-Klusman, Q.C.G., cone drive.
1—12"x5' Hendey tie bar, taper attachment, pan bed.
1—24"x10' Lodge & Shipley, Q.C.G., B.G., cone drive.

RADIALS

2—7' Reed-Prentiss, M. drive thru gear box, tap. attachment.
1—6' American, S. P., gear box, tapping attachment.
1—5' American, S. P., gear box, tapping attachment.
2—4' Dreses plain motor drive, tapping attachment.
1—2½' Mueller plain motor drive, tapping attachment.

MISCELLANEOUS

1—20-24" Dill sliding geared head slotter, 10 H.P. motor.
3—18" Newton slotters, M. drive.
1—No. 2-B Lapointe double spindle broaching machine.
1—No. 2-A Warner & Swasey hollow, hexagon turret lathe.
1—48" Gould & Eberhardt standard spur geared cutter.
5—24" Gisholt turret lathes, belt drive.
1—4 spindle Moline Hole Hog Drill.
1—24" Wolcott rack shaper, old style, belt drive.

OFFICES AND EXHIBITION FLOOR

2006-2008 MARKET STREET PHILADELPHIA, PA.

"SIMMONS"

Rebuilt — Tested — Guaranteed

BORING MILLS

1—100" Betts Vertical Boring Mill.
1—10' Betts Vertical Mill, 15 H.P., Variable speed motor.
1—12' Bement Extra Heavy Boring—Turning Mill, two swivel heads.
1—37" Bullard Vertical Boring-Turning Mill.
1—36" Bullard New Era Type Vertical, Cutting Lub. System.
1—34" Bertram Vertical Turret Head Boring Mill.
1—24" Bullard New Era Type Vertical Turret Lathe.
1—Bement Horizontal Boring Mill.
1—36" Bridgeport Vertical Boring Mill.
1—No. 31 Lucas Precision Horizontal Mill.
1—Barrett Type Extra Heavy Horiz. Mill, 15' swing.

RADIALS

1—6' Pond Plain Radial Drill.
2—6' Reed Prentice Plain, one with tapping attachment.
1—5' Niles-Bement-Pond Semi-Universal.
1—5' Fosdick Full Universal Radial.
1—4' Prentice Plain with tapping attachment.
1—4' Bickford Plain Radial.
1—4' Bement-Miles 4' Plain Radial Drill.
1—4' Gang Plain Radial Drill.

PLANERS

1—60" x 60" x 20' Woodward-Powell, 4 heads, 35 H.P., motor Rev.
1—50" Sellers Rotary Planer.
1—48"x 48" x 20' Ridgeway High Duty, four heads.
1—48" x 48" x 28' Cincinnati, two heads (New).
1—42" x 42" x 12' Openside Simmons Planer, two heads (New).
1—36" x 36" x 20' Woodward-Powell, four heads.
1—30" x 30" x 8' Cincinnati, one head.
1—26" x 26" x 8' Gray Planer, one head.
1—24" x 24" x 12' American, two heads.
1—24" x 24" x 8' Cincinnati, one head.

LATHES

4—60" x 29'-56' Niles-Bement-Pond Motor Drive (New).
1—57" x 23' Putnam, 15' between centers.
6—48" x 29'-56' Niles-Bement-Pond Motor Drive (New).
6—48" x 24' Niles-Bement-Pond, Heavy Duty, Geared Head.
1—42" x 18' Bement Heavy Duty Engine Lathe.
6—36" x 34' Bridgeford, Geared Head, Q.C.G. (New).
1—36" x 28' Niles-Bement-Pond, Triple Geared.
1—36" x 18' Putnam, Heavy Duty, Triple Geared.
1—36" x 14' Putnam All Geared Head Lathe.
1—32" x 25' Recon Geared, Plain Turning Lathe.
4—30" x 12' American Geared Head, Motor Drive with motor.
1—28" x 18' Pond Lathe.
6—27" x 24' LeBlond, Heavy Duty, D.B.G., Q.C.G. (New).
5—27" x 18' LeBlond High Duty, All Geared Head.
1—24" x 10' American, High Duty, Geared Head.
1—22" x 12' Niles Lathe.

MILLERS

1—No. 3 Cincinnati High Power, Plain.
7—No. 3-S Cincinnati Geared Head, Universal.
2—No. 3 Cincinnati, Heavy Duty, Geared Head, Vertical.
1—No. 4 Cincinnati High Power, Vertical.

MISCELLANEOUS

1—No. 6 Leffler Inclinable Power Press.
1—250 ton Southwark Hydraulic Press.
1—8" Saunders Pipe Machine.
1—72" Niagara Power Squaring Shear.
1—15-18" Dill Slotter.
1—5 ton Pawling-Harnischfeger Crane, 38' span (New).
1—48" Ohl's Gang Punch, first class.
3—Pratt-Whitney No. 12 Two Spindle Profilers.
1—Gould & Eberhardt Spur and Bevel Automatic Gear Cutter.
1—72" Gould-Eberhardt Vertical Gear Hobber.
1—No. 1 and No. 4 LaPoint Broaching Machine.

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1—4' Morris Radial Drill, motor driven
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1—24" x 12" New Ryerson Lathe
5—18" x 8' New Greaves & Klusman Tables
2—36" x 32' American Engine Lathes, motor drive
1—78½ Bliss Tie Rod Press, geared
1—77½ Bliss Tie Rod Press, geared
1—76½ Bliss Tie Rod Press, geared
2—74½ Bliss Solid Frame, geared
1—850 lb. Erie Steam Hammer
2—BLANCHARD MOTOR DRIVEN VERTICAL GRINDERS. AS GOOD AS NEW
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3—Heald Surface Grinders
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1—No. 53 Ferracute Knuckle Joint Press, 250 ton pressure
1—No. 54 Ferracute Knuckle Joint Press, 400 ton pressure

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1—Monarch 14" x 6' Q. C. G. tool room lathe.
1—Prentiss 14" x 6' Q.C.G. Motor Driven Tool Room Lathe.
1—New Haven 34" x 34" x 8' Planer sgl. head.
1—Whitcomb 24" x 24" x 6' Planer.
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3—Baird 24" x 20" Tilting Tumbling barrels.
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2—No. 52, ¾" National Acme 4 spindle.
No. 00, No. 00G and No. 0 Brown & Sharpe, A-1 condition.
No. 1 and No. 2 P. & W. Hand Screw, new and like new.
No. 00 Hartford Automatic Horizontal Turret, fast and accurate.

Also a lot of other Screw Machines, Presses and Machinery new and used at bargain prices, also Auto Die Head and Collapsible Taps.

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1—20"x10' SPRINGFIELD GEARED HEAD QUICK CHANGE LATHE. NEW.
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1—32" x 12", 2½" Spindle, D.B.G. Lathe
1—32" Vertical Boring Mill
1—5' Fosdick Heavy Duty Plain Radial Drill
1—6' Cincinnati-Bickford Heavy Pattern Plain Radial Drill
1—No. 4 Cincinnati High Power Universal Milling Machine
1—42" x 36" x 16' Cincinnati Planer with two heads on cross rail
1—No. 2 Baker Bros. Keyseating Machine
1—32" Aurora Drill Press
1—60" x 20' New Haven Lathe
1—3¼" x 40" Greenlee Flat Turret Lathe
1—24" x 12' Lodge & Shipley Lathe
1—30" x 24' Lodge & Shipley Lathe
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96" x 96" x 37' Planer, 4 heads.
14' Hilles & Jones Plate planer.
72" x 72" x 14' Pond, four heads.
72" x 70" x 14' Sellers, three heads.
48" x 48" x 14' Patch, four heads, latest type.
42" x 42" x 14' Pond, four heads.
40" x 36" x 11' New Haven, one head.
36" x 36" x 20' Woodward Powell, two heads.
36" x 36" x 12' Bickett, heavy duty, two heads.
36" x 36" x 12' Bickett, heavy duty, one head.
16" x 16" x 42" Walter Bros., one head.
Two 28" Newton Plain index centers.

VERTICAL BORING MILLS

120" Niles, 2 swivel heads.
80" Niles-Bement-Pond, 2 swivel heads.
72" Niles, 2 swivel heads.
64" Poole, 2 swivel heads, thread cutting.
44" Niles, one swivel head, one turret head.
42" Putnam carwheel, hub facing attachment.
36" Niles carwheel with crane.
32" Rogers, swivel turret head, universal jaws.

HORIZONTAL BORING MILLS

Bement cylinder, 8" bar.
Barrett No. 2 cylinder, 5" bar.
Beaman & Smith No. 2 floor boring, drilling and milling machine, 4" bar.
Lucas "Precision" boring, drilling and milling machine, 3½" bar.
Niles boring drilling machines, 4" bar.
Betts boring drilling machine, 5" bar.
Bement boring drilling machine, 3⅞" bar.
Newark boring drilling machine, 3" bar.
Bement boring drilling machine, 3" bar.
Bement boring drilling machine, 2⅞" bar.
Barnes drilling tapping machine, 2 3/16" bar.
Underwood type 4½" bar, floor plate 8' x 9'.

LATHES

21' triple geared face plate drive Pit Lathe, for slotting, facing and boring.
60" x 30' Fifield, face plate drive, 22' centers.
62" x 22' Putnam, triple geared, internal face plate drive, 13' centers.
62" Pulley, triple geared, face plate drive.
45" x 21' Schumaker & Boye.
36" x 20' Putnam, triple geared, face plate drive.
36" x 20' Fay & Scott.
30" x 12' Niles-Bement-Pond, geared head, heavy duty, quick change.
24" x 14' Prentice, geared friction head, quick change.
No. 3 Niles-Bement-Pond double Axle Lathe.

NEW DOUBLE LEATHER BELTING

5".....$ .84 per ft.
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Pels Beam Shear, capacity 15" I beams.
Lennox Rotary Shear, 30" throat, ⅝" capacity.
Quickwork Rotary Shear, 48" throat, ¾" capacity.
Quickwork Rotary Shear, 36" throat, 3/16" capacity.
Two Stoll 11' Squaring Shears, will cut 133" No. 16 gauge.
156" Covington Gate Shear, cap ¼", 18" gap.
No. 121 Toledo Boiler Makers Punching & Riveting Machine.
Long & Allstatter Hor. Punch, capacity 1¼"-1".
Rock River Bulldozer, cross head 16" x 66", stroke 20".
No. 2 Williams & White Cold Bending & Straightening machine.
No. 6 Beatty S. E. Punch, 25" Throat, double gag.
No. 7 Beatty S. E. Punch, 15" Throat.
2" Acme Forging Machine.

PRESSES AND BRAKES

No. 5A Bliss adjustable bed, stroke 4½".
Two No. 4A Bliss adjustable bed, stroke 4".
No. 16 Bliss Horning & Wiring, stroke 2½".
DG 5, Ferracute geared, stroke 5", 8000 lb.
No. 2½ Manville, double acting, stroke plunger 1¼", stroke slide ¾".
No. 3 Manville double acting, stroke plunger 3", stroke slide 1½".
Two No. 666 Toledo knuckle joint, stroke 2½", 1000 tons pressure, 80,000 lb.
Three No. 60½ Bliss rack and pinion reducing adjustable stroke from 4" to 42".
Two 7' Geo. A. Ohl Power Brake, capacity ½".

MILLING MACHINES

36" x 30" x 10' Newton, two vertical spindles on adjustable rail.
Newton hor. duplex, 87" between centers, table 72" x 96".
No. 3 LeBlond universal.
No. 1 D Brown & Sharpe universal.
No. 4 Cincinnati vertical, high power.
No. 3 Cincinnati vertical, high power.
Three No. 2 Cincinnati vertical, high power.

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3 spdl. Henry & Wright ball bearing.
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4 spdl. Francis Reed.
20" Prentice Bros. Stationary head.
20" Prentice Bros. Sliding hd., B.G., P.F.
28" Rockford sliding hd., B.G., P.F., Tapping att.
24" Cincinnati-Bickford sliding hd., B.G., P.F.
28" Sibley sliding hd., B.G., P.F.
42" Cincinnati-Bickford sliding hd., B.G., Tapping att.
No. 12 Natco multiple spdl. tapping att.
No. 18 Natco multiple spindle drill.
No. 14 Natco multiple spdl.
No. 80 Bausch multiple spdl.
3' Cincinnati-Bickford radial, tapping att.
4' Dreses Radial, tapping att.
5' Cincinnati-Bickford full universal radial.
4' Western (Full universal) radial, tapping att.
Baker Bros. & Colburn manufacturing type drills.

Lathes

No. 5 Rivett Precision, with slide rest.
12" x 6' Prentice Bros. Tool Room, taper att.
14" x 6' Flather Tool Room, taper att.
16" x 6' Lodge & Shipley Tool Room, taper att.
16" x 8' Lodge & Shipley Tool Room, taper att., geared hd., M.D.
24" x 10' Lodge & Shipley, C.R., P.C.F. taper att.
26" x 12' Putnam, C.R., P.C.F.
32" x 14' Boye-Emmes, C.R., P.C.F.
32" x 14' Hamilton, C.R., P.C.F., triple geared.
38" x 20' New Haven, C.R., P.C.F.
50" x 22' Fifield, C.R., P.C.F., triple geared.

Boring Machines

3" dia. bar, Lucas hor., table type.
4" dia. bar, Detrick & Harvey, hor., floor type.
34" Colburn turret head, vertical.
38" Niles, 2 reg. heads.

Screw Machines and Turret Lathes

⅝" capacity Brown & Sharpe, wire feed.
1" capacity Acme, wire feed.
1¼" capacity Acme, wire feed.
1½" capacity Acme, wire feed.
2¼" capacity Acme, wire feed.
16" and 18" Acme Universal, Fox type.
2¼" and 3¼" Jones & Lamson bar or chucking.
No. 3 Acme Universal 3½" capacity flat turret.

Millers

No. 2, 3 and 4 Cincinnati, plain.
No. 2A, 5 and 9 Kempsmith, plain.
No. 3 and 4 Cincinnati, vertical.
No. 2A, 4B and 5 Becker, vertical.
No. 2 B. & S., Universal.
No. 1 Cincinnati, Type M, Universal.
No. 6 Whitney, hand.
36" x 10' Newton, face slab type.

Grinders

3", 6", 10", 18" swing Norton, pl. mfg. type.
10" x 30" Landis, pl. mfg. type.
12" x 120" Landis, pl. mfg. type.
12" x 36" and 48" Cincinnati, pl. mfg. type.
No. 2 Cincinnati 12" x 36" universal.
No. 3 Cincinnati 12" x 48" universal.
No. 1 Cincinnati cutter and reamer grinder.
No. 1 LeBlond cutter and reamer grinder.
No. 1 Norton cutter and reamer grinder, pwr. feed table.
No. 34 Van Norman internal.
No. 6 Rivett internal.
No. 60 Heald, cylinder (very good).
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Saxon face grinder.
10" Garrigus rotary, with magnetic chuck.
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No. 16 Blanchard grinders.
18" and 20" disc. grinders.

Shapers and Planers

14" Pratt & Whitney crank shaper.
14" Sprinfield crank shaper.
16" Ohio plain crank shaper.
16" and 20" Gould & Eberhardt crank shapers, back geared.
24" Stockbridge crank shaper, back geared.
15" and 24" Hendey Friction Shapers.
24" x 24" x 6' Flather planer, 1 hd.
26" x 24" x 7' Gray planer, 1 hd.
36" x 36" x 8' Pond planer, 2 hds.
36" x 36" x 12' Pond planer, 2 hds.
36" x 30" x 14' Cincinnati planer, 3 hds.
36" x 36" x 12' Cincinnati planer, 4 hds.
40" x 30" x 12' Cincinnati planer, 2 hds.
42" x 42" x 12' Cincinnati planer, 3 hds.
48" x 36" x 12' Cincinnati planer, 3 hds.
48" x 48" x 15' Sellers planer, 3 hds.
66" x 60" x 30' Bement planer, 3 hds.

Miscellaneous

No. 00 S. & S. Hobbing, gear cutter.
No. 000 S. & S. Hobbing, gear cutter.
36 in. B. & S. gear cutter.
36 in. Cincinnati gear cutter.
No. 3 Lapointe broaching machine.
3" P. & W. centering machine.
No. 72 Ferracute.
8" x 8" Air Compressor.
½" and 1", 6 Spdl. Acme nut tappers.
12 and 13 P. & W. Profilers.
No. 6A National Butt Welder.
4" Baker Bros. tapping machine.
¾" x ¾" Single End Punch and Shear.

We have a number of machines not mentioned in this list. Send us your inquiries.

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80" Bullard, 2 Plain Heads.

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6' Gang Radial Drill.
6' Prentice Radial Drill.

GRINDERS

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6" x 32" Norton Grinder.
8" x 40" Morse Grinder.
14" x 50" Norton Grinder.
No. 8 Besley Disc Grinder.
Wisconsin Tool & Cutter Grinder.
Gisholt Tool Grinder.
Madison Cylinder Grinder.

LATHES

13" x 5' Blount Speed Lathe.
14" x 6' Rockford, Q.C.G., Chuck.
18" x 10' Bradford, compound rest, double back gear.
32" x 18' Bradford, compound rest.
Porter-Cable Mfg. Lathe.

MILLING MACHINES

No. 5 Hendey-Lincoln Type Miller.
Taylor & Fenn Vertical Miller.
No. 18 Cincinnati Plain Miller.
No. 3-B Milwaukee Plain Miller.
No. 3 Becker Vertical Miller.
No. 13 Brown & Sharpe Miller.
12" P. & W. Automatic Miller.
Type "A" Briggs Miller.
No. 32 Kempsmith Miller.

PLANERS

24" x 24" x 6' Whitcomb-Blaisdell.
26" x 26" x 10' Whitcomb-Blaisdell.
30" x 30" x 6' Pond Planer.

SCREW MACHINES

No. 0 Brown & Sharpe, Automatic Chuck and Wire Feed.
No. 0 Foster, plain head, automatic chuck and wire feed.
No. 2 Foster, plain head, automatic chuck and wire feed.
No. 1 Pratt & Whitney, plain head, automatic chuck and wire feed.
No. 1 Bardons & Oliver, plain head, automatic chuck and wire feed.

TURRET LATHES

24" Gisholt.
2" x 24" Jones & Lamson.
Potter & Johnston.
14" Warner & Swasey.

PRESSES

No. 6 Eames Arbor Press.
No. 2-A Bliss Double Crank Geared Press.
No. 19 Bliss O. B. I.
No. 3 Geier Straightening Press.

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1—No 3-A W. & S. Universal Hollow Hex.
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3—SURFACE GRINDERS—No. 2 B. & S. Auto.
2—PROFILERS—No. 12 2 sp. P. & W.
1—GEARED PRESS—No. 406-A Adriance.
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30—HIGH SPEED DRILLS—2, 3, 4, 5 and 6 spindle ALLEN and HENRY & WRIGHT, very latest types, all over 95% new.
40—GOOD LATHES—all sizes, makes and types.
300 Absolutely new and good-as-new other MACHINE TOOLS, including a fine assortment of grinders, power presses, drill presses, millers, etc., etc.

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16" Smith & Mills Crank Shaper	385
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28" American B.G. Crank Shaper	850
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No. 3B Kearney & Trecker Plain Miller	900
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1	Bbl. Core Sand Mixer	$ 70
1	30" x 7' Heavy Tank with Iron Coil	50
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1	7 x 12 Self-Contained Steam Engine	250
1	Acme ¾ x 4 Screw Machine	350
1	Baker Bros. No. 3 Keyseating Machine	1000
1	Baker Bros. No. 1 Keyseating Machine	375
1	Baker Bros. No. 00 Keyseating Machine	275

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Just Reduced Prices!!

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1—16 x 6 Marvel Lodge & Shipley Lathe
1—16 x 6 Shaving Lodge & Shipley Lathe
1—18 x 8 3-Step, D.B.G. L. & S. Lathe
1—18 x 10 Sel. Head Mfg. L. & S. Lathe
1—18 x 8 Sel. Head Mfg. L. & S. Lathe
1—22 x 10 Sel. Head Mfg. L. & S. Lathe
1—22 x 12 Sel. Head Mfg. L. & S. Lathe
1—22 x 10 (30" swing) L. & S. Pat. Hd. Chucking Lathe
3—22 x 10 Pat. Hd. L. & S. Chucking Lathes
1—24 x 12 Sel. Head Mfg. L. & S. Lathe
1—24 x 10 3-Step, D.B.G. L. & S. Power Feed Turret Lathe
2—24 x 8 4-Step, D.B.G. L. & S. Turret Lathes
4—27 x 48 Sel. Hd. L. & S. Boring Lathes
1—30 x 12 Sel. Head L. & S. Lathe
1—30 x 12 5-Step, D.B.G. L. & S. Lathe
2—2½ x 36 Marvel L. & S. Lathes
1—Garvin Mach. Co. No. 1 Plain 4-Step Milling Machine
1—2" Model B Cleveland Automatic Screw Machine
1—Cincinnati No. 4 Plain Milling Machine, 3-Step Cone, D.B.G., with all power feeds
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Telephone Worth 819

1—1600 lb. Billings & Spencer, Latest Type D Board Drop Hammer, good as new.

1—850 lb. Merrill Board Drop Hammer, fair condition.

The Colonial Tool & Forge Company
Columbiana, Ohio

Our Job Lot
of
NEW BLISS PRESSES

Is Rapidly Becoming Exhausted And We Are Advancing Prices.

Get in on the Ground Floor.

Never Before Have Presses Like These Been Offered Regardless of Value.

This May Be Your Last Opportunity.

Mail Out Your Order TODAY.

Straight Side Reducing

No. 58, Approx. weight, 1250 lbs..$ 75.00
No. 59, Approx. weight, 3550 lbs.. 150.00
No. 61, Approx. weight, 2450 lbs.. 100.00

Cupping and Blanking
TOGGLE FRAME

No. 1, Approx. weight, 5000 lbs..$300.00

No. 1½, Approx. wgt., 10,000 lbs..$600.00

Prices Quoted F.O.B. New Cumberland, Pa. Subject to Change Without Notice

JOSEPH HYMAN & SONS
Tioga, Almond & Livingston Sts.
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SEE OUR AD IN IRON AGE DATED SEPT. 15th and OCT. 27th FOR SPECIFICATIONS

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MILL MACHINERY

NEW, SPECIAL AND USED

ROLLS DRAWBENCHES
OVERHAULERS, COILERS, ETC.

Several 15,000-lb. Drawbenches Just completed—For Sale Cheap

Waterville Machine Works
WATERBURY, CONN.

Heavy Duty Punches and Shears

Ch-9-B 1—30" and 36" throat Smith Bros. Double Camel Back Punch; capacity 1" thru 1"; motor drive by Westinghouse, type SK, 10 H.P., 230 V., D.C. motor and starter. Good condition.

Ch-8-B 1—33" throat Smith Bros. Double Camel Back Punch; capacity 1" thru 1"; motor drive by Westinghouse, type SK, 10 H.P., 230 V., D.C. motor and starter. Good condition.

L-13-B 1—36" throat Cleveland Ship Bldg. Co., foot operated Single Punch; with capacity of 1" thru 1"; driven by 4 H.P., 220 V., D.C. motor with switch; equipped with slipper, die block and dies. Good condition.

W-40-A 2—No. 5 60" throat Southwark Vertical Punch; capacity 1¼" thru 1"; architectural jaw; motor drive by 10 H.P., 220 V., D.C. motor, with controller. Excellent condition.

B-7-A —84" throat Long & Alstatter Size "A" Single Plate Punches; capacity 1¼" thru 1¼"; height of gap 18"; width of gap 21"; arranged for motor drive. Excellent condition.

S-23-B 1—54" Single End Punch; 60"; diameter by 7" face psur gear; 6' x 9" balance wheel; direct power type; capacity 1¼" thru 1¼"; belt drive, with single pulley and idler. Fair condition.

W-13-B 1—56" throat American Ship Vertical Punch; capacity 1" thru 1"; belt drive, with T. and L. pulleys. Good condition.

Ch-34-B 1—56" throat American Ship Single End Vertical Punch; capacity 1" thru 1"; arranged for motor drive, but not including motor. First-class condition.

W-16-B 1—12" throat Hilles & Jones type Bar Shears; height of gap 16"; 1¾" stroke; fitted with 10" shear blades for shearing round bar stock up to 1" in diameter; belt drive; T. and L. pulleys. Fair condition.

W-49-A 1—48" throat Southwark Plate Shear; equipped with 28" blade; capacity to shear 1" plate; architectural jaw; motor drive by 15 H.P., 220 .. D.C. motor and controller. Excellent condition.

B-6-A 1—84" throat Long & Alstatter No. 2 Single Plate Shear; complete with standard form of lower jaw; automatic stops; gears and covers for motor and brackets; set of splitting shears with blades 15¼" long at right angles to cam shaft. Arranged for motor drive, motor not included. Excellent condition.

W-17-B 1—14" throat Coping Shear; will cope flanges of 15" standard channels; belt drive; T. and L. pulleys. Good condition.

L-24-B 1—18" throat Channel Shear; will cut standard channels; driven by Westinghouse 5 H.P., 220 V., D. C. motor, with starter. Good condition.

The American Ship Building Co.
Foot of W. 54th St., Cleveland, O.
Department "B"

OUR GUARANTEE
Money Back If Not Satisfied

Grinders

3—No. 2 Oakley Univ. C. & T.
2—10 x 36 in. Thompson Full Univ.
1—Used No. 2 Woods Cutter
1—Grand Rapids Drill, 2½ in. cap.
1—No. 2 Manhattan Surface
1—No. 1 Wilmarth & Morman Surface
2—No. 75 Heald Internal
1—Gisholt Univ. Tool

Drills

8—14, 21, 24, 26 and 28 in. Drills
1—No. 4 Foote-Burt 6-spindle Rail Drill, Equipped with No. 5 Morse taper
1—Barnes 6-spindle 14 in.
10—2, 3 and 4-spindle Sensitive
4—Radials, Plain and Univ., 3 to 5 ft.
3—Multiple spindle Bausch, 12 to 24 spindles, Nos. 1, 2 and 3 Morse tapers in spindles. Write for details.

Miscellaneous

1—No. 2 Newton Keyseat Miller
1—No. 1 Newton Keyseat Miller
1—No. 1 Davis Keyseater
3—Bolt and Pipe Machines, 1 to 3 in. cap.
3—Grant Riveters, 3/16 in. cap.
1—No. 18 Lea Simplex Cold Metal Saw
1—No. 3 Long & Alstatter Tire Welder.

Send us your inquiries
We have over 1000 machines.

Wayne Machinery Co., Ft. Wayne, Ind.
Louisville, Ky. Dayton, Ohio

ALLIGATOR SHEARS

United Engineering & Foundry Company, Style BA. Capacity 4" x 4" square, 5" round. Cold soft steel. Arranged for motor drive.

Day Machinery Co.
64 Exchange St., Buffalo, N. Y.

MISCELLANEOUS

Higley Cold Saws, cap. 7" and 8" rd.
Morgan Plate Shear, cap. 96" x 1".
Carlin Alligator Shear, cap. 2¼".
Canton Alligator Shear, cap. 1½".
Niagara 36" Sq. Shear, 18 Gauge.
Reade Punch and Shear, 48" thr., 1¼" x 1".
L. & A. No. 6 Punch and Shear, ½" x ½".
Bliss No. 75½-76½ S.S. Press. No. 18 O.B.I.
Sellers 48 x 48 x 12' Planer, 4 hds., M.D.
Pond 48 x 48 x 22' Planer, 4 hds.
Betts 72" x 56" x 12' Planer, 2 hds.
Gleason Triple Geared Lathe, 60" x 26'.
Gisholt Turret Lathes, 24" x 6'.
Jones-Lamson Tur. Lathes, 2" x 24", 3" x 36".
Pond Triple Geared Lathe, 48" x 27'.
Lathes: 28" x 12', 26" x 10½', 18" x 8', 16" x 6.'
Cincinnati 24" and Stockbridge 24" Shapers.
Gould & Eberhardt 14", Sgl. Grd., Cr. Shaper.
Radial Drills: 3', 4', 6', 7', 9'.
Boring Mills: 30", 42", 51", 72", 90", 10'.
Upright Drills: 20", 30" 36", 40".
Sensitive Drills: 10", 14".
Pipe Mch., 3" Stoever, 4" Merrell, 8" Cox.
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Cleveland Straightening Rolls, 84" x 10".
National 3" Heading, Upsetting & Forg. Mch.
Bement-Miles 1500 lb. Steam Drop Hammer.
Chambersburg 2500 lb. Steam Forging Hammer.
Grinders; Blowers; Air Compressors; etc.

Russell Machine Company
Pittsburgh, Pa.

IMMEDIATE DELIVERY

Single Punches or Shears

36" throat; capacity 1" thru ⅞".
48" throat; capacity 1½" thru 1".

Horizontal Punches

12" throat; capacity 1¼" thru 1".
12" throat; capacity 1" thru 1".

Plate Straightening Rolls

7' 2" bet. housings, 6-14" rolls; cap. 1½" plate.
10' 8" bet. housings, 6-14" rolls; cap. ⅞" plate.

Guillotine Bar Shears

Capacity 5" square cold, 18" knives.
Capacity 3½" square cold, 14" knives.
Capacity 2½" square cold, 16" knives.

Rotary Bevel Shears

Capacity up to ¾" plate.

HILLES & JONES COMPANY
Wilmington, Delaware

1—No. 5 Williams & White Bulldozer.
5—No. 14 Toledo Horn Presses, Flywheel.
1—No. 59¼ Toledo Straight Side, double geared, tie rod frame, 8" stroke, weight 70,000 lbs.
1—No. 59 Toledo Straight Side, double geared, 12" stroke, weight 50,000 lbs.
1—No. 72 Consolidated Press, Flywheel.
1—No. 301-D Ferracute Press.
1—No. 75 Toledo Press, geared.
1—No. 47½ Bliss Punching Press.
1—No. 666 Toledo Knuckle Joint, 1000 tons P.
1—No. 84" Niagara Foot Shear.
1—24" Gould & Eberhardt High Duty Shaper.
1—Federal No. 118 "Junior" Spot Welder, capacity two pieces ⅛" steel.
1—Spot Welder, 12" throat, cap. 3/16" steel.
1—No. 27 Bliss Knuckle Joint Press, 1000 P.
1—No. 54 Toledo Straight Side Press, 9" stroke.
1—No. 8-B Rockford Double Crank Press.
1—No. 152-B Cleveland Double Crank Press.

D. C. OVIATT & COMPANY
947 Leader-News Bldg., Cleveland, O.

NEW CORLISS ENGINES

27—18 x 36 Heavy Duty, Allis-Chalmers Corliss Engines, both right hand and left hand. 350 H.P. at 125 r.p.m., 11' x 32". Band wheel. Operated on 140 lb. steam pressure, 1¼" gauge back pressure, double eccentric.

THE NASHVILLE INDUSTRIAL CORP.
Old Hickory, Tenn.

200 H.P. HIGH SPEED Automatic Engine

Center Crank, Twin Wheel, Heavy Duty. Complete Fittings; Condition Like New.

Gen'l Equip't Co., Drawer 45, Syracuse, N. Y.

Air Compressor, 1100' Sullivan WN-3, single angle, compound, complete with 225 H.P. synchronous motor, 2200 volt, 25 cycle, 3 phase and exciter. Like new.

Bar Shear, No. 2 Hilles & Jones, capacity 1¼" x 6".

Bolt Cutter, Landis, single head, complete with all standard equipment. Brand new.

Forging Machine, 7" Ajax, special, steel bed, modern design, stroke 15", stock gather 6⅞", condition A1.

Furnaces, 2000 lb. capacity Detroit Electric brass melting furnace. Excellent condition.

Gear Generator, 18" Gleason bevel gear generator, complete. Brand new.

Hammers, No. 5N Nazel; 500 lb. Standard drop hammer; 20,000 lb. Chambersburg double frame steam forging hammer.

Nut Tapper, 1½" National, 6-spindle, semi-automatic, complete. Brand new.

Pipe Machine, 6" Landis, complete. Brand new.

Shaper, 20" Cincinnati traveling head shaper, self-contained motor drive, including motor.

Squaring Shear, No. 32 Williams White, capacity ½" x 10', punching capacity seventeen ½" holes in ½" plate.

Testing Machines, 10,000 lb. capacity Olsen hand operated, 4-screw type, like new; 50,000 lb. capacity Olsen Universal, 3-screw type, like new; 100,000 lb. capacity Olsen Universal, 4-screw type, with autographic attachment.

Welding Machine, No. 126 Thomson spot welder, 220 volt, 60 cycle.

F. H. CRAWFORD
305 Broadway New York
Telephone Worth 819

AIR COMPRESSOR

One 1200 cu. ft. Laidlaw-Dunn-Gordon steam driven air compressor. Cross compound two stage. One hundred and forty-five lbs. steam pressure, one hundred lbs. air pressure. This machine is in excellent condition, is stored at our shop in St. Louis, Mo., and open to inspection at any time.

HEINE BOILER COMPANY
5319 Marcus Ave. St. Louis, Mo.

AIR COMPRESSORS

16 x 10 x 10 Belt Driven Bury 345 cu. ft.
12 x 12 x 16 Belt Driven Bury 600 cu. ft.
12 x 10 Belt Driven Ingersoll-Rand 304 cu. ft.
10 x 10 Belt Driven Ingersoll-Rand 182 cu. ft.
9 x 8 Belt Driven Ingersoll-Rand 146 cu. ft.
8 x 8 Belt Driven Ingersoll-Rand 113 cu. ft.
9 x 9 x 11 Steam Driven Chicago Pneumatic 130 cu. ft.
14 x 14 x 16 Steam Driven Chicago Pneumatic 450 cu. ft. *Rebuilt and Guaranteed.*

Address Box A-530
care *The Iron Age,* Park Bldg., Pittsburgh, Pa.

Any second-hand machinery or equipment for sale?

If so, see advertising rates on first page of Section 50.

Babcock & Wilcox Boilers

Two (2) 524 Horse Power (each) Babcock & Wilcox all steel inclined header type water tube boilers—180 pounds steam—single settings—offered at a sacrifice if purchased before removal from present location.

C. W. Prichard Co.
Incorporated
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PRE WAR PRICES

Our twenty-first business anniversary. Let us assume your worries. We purchase and sell a complete line of steam and electric equipment, valves, meters, etc.

WASHINGTON COMPANY
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STERLING BOILERS

44—823 H.P. Sterling Boilers, Type M-30, 200 pound pressure. Equipped with Westinghouse 8 retort stokers, Vulcan soot cleaners, flow meters, 100,000 cu. ft. capacity forced draft fan direct connected to turbine. Practically new. At a bargain.

THE NASHVILLE INDUSTRIAL CORP.
Old Hickory, Tenn.

2—Sterling Boilers

Set in a Battery

150 lbs. 50 degree Superheat

Pfannmueller Engineering Co.
First National Bank Bldg., Chicago

Battery of two new horizontal return tubular boilers, 72" x 18', A. S. M. E. specifications for 150 pounds working pressure and complete with fronts, grates, suspension and accessories. Cost $8700.00; bargain for cash $4500.00.

Apply Box "P," Passaic, N. J.

12—500 H.P. 200 lbs. pressure B. & W. Boilers.
12—275-550 volt direct connected Engine-Generator Sets from 800 to 1500 K.W.

NORTON-BROADWAY MACHINERY CO.
Cincinnati, O.

Have you read the letter on page 5 this week?

BOILERS

2—338 H.P. Heine Water Tube Boilers, 150 lbs. hand fired.
2—300 H.P. Babcock & Wilcox Water Tube, 150 lbs. pressure, hand fired.
1—250 H.P. Keeler Water Tube Boiler, 150 lbs. pressure, hand fired.
3—235 H.P. Keeler water tube, 150 lbs. pressure, hand fired.
5—210 H.P. 78" x 20' Casey-Hedges horizontal return tubular boilers, 150 lbs. pressure, hand fired, practically new.
2—200 H.P. 78" x 20' Robb-Mumford horizontal return tubular, 150 lbs. steel encased settings.
2—150 H.P. 72" x 18' horizontal return tubular 125 lbs. hand fired.
3—125 H.P. 66" x 18' Coatesville horizontal return tubular, 125 lbs.
1—100 H.P. 66" x 16' Phoenix horizontal return tubular, 125 lbs.
1—100 H.P. 66" x 11' International vertical ASME, 125 lbs.
1—100 H.P. Ames Empire Economic type, 115 lbs. pressure.
1—80 H.P. Locomotive Water Front Open Bottom 100 lbs.

Large stock of Vertical Boilers, all sizes, always on hand. Electric Motors at pre-war prices. Large stock of Generating Units, Air Compressors and Pumps.

The O'Brien Machinery Co.
113 North Third Street
PHILADELPHIA, PA.

Long Distance Bell Telephone: Market 0727.
Cable Address: OBRIEN PHILADELPHIA

Babcock & Wilcox Steel Header Boilers (In Stock)

2—524 H.P. each
1—409 H.P.
2—341 H.P. each
2—300 H.P. each
1—267 H.P.

180-200 lbs. Prompt delivery.

H. P. BREARLEY
90 West St. New York

Owing to power plant changes we have for sale:—

2—330 H.P. Heine Boilers.
2—Wicke Boilers, both equipped with stokers.

MONSANTO CHEMICAL WORKS
2nd St. & Lafayette Ave., St. Louis, Mo.

48" x 30' Vulcanizer

Used cylinder or steam box constructed of 5/16" plate, riveted and built to stand 200 lb. pressure. Heavy steel door at one end, easily opened and fastened; 18" industrial track inside and two industrial cars for same. Price upon request.

E. B. LEAF COMPANY
918 Real Estate Trust Bldg.,
Philadelphia, Pa.

Hydraulic Pumps
Steam Driven

14" and 20" x 2⅝" x 18" Worthington Compound Duplex, 3800 pounds pressure.
12" and 18" x 2" x 12" Worthington Compound Duplex, 3500 pounds pressure.
12" x 1½" x 10" Worthington Duplex, 4000 pounds pressure.
17 x 3 x 15" Snow Duplex, 1500 pounds pressure.
7½ x 2 x 6" Snow Duplex, 1000 pounds pressure.
6 x 2½ x 6" Snow Duplex, 500 pounds pressure.
Fifty other steam driven Hydraulic Pumps.

Send for our December list of the largest stock in the United States of slightly used or thoroughly overhauled MACHINE TOOLS, POWER, ELECTRICAL AND CONTRACTORS' EQUIPMENT. Satisfaction Guaranteed or Money Refunded.

WICKES MACHINERY CO.
Jersey City, N. J.
Established 1900

UNUSUAL OFFERING OF BOILERS

Taken over from Du Pont Powder Co.'s Plants

Used from Six Months to Three Years and

PRACTICALLY AS GOOD AS NEW

I am in a position to make contracts, at very attractive figures, to install these boilers, ready for service. Every boiler guaranteed. Write or wire for prices.

Write me when you have Boilers and other power plant equipment for sale.

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Long Distance Telephone:
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PUMPS

From Old Hickory Powder Plant

Motor Driven Centrifugal

8—14-in. Worthington, Class B, double suction, 8500 G.P.M. at 152 feet head, at 1170 R.P.M. direct connected to 300 H.P. G. E. 3 phase, 60 cycle, 2200 volt motors.
4—14-in. Allis-Chalmers, Type S, 7500 G.P.M. at 130 feet head, at 1760 R.P.M., direct connected to 300 H.P. General Electric 3 phase, 60 cycle, 2200 volt motors.
2—10-in. Allis-Chalmers, Type S, 3750 G.P.M., 130 feet head at 1765 R.P.M., direct connected to 150 H.P. Westinghouse 3 phase, 60 cycle, 2200 volt motors.

Steam Turbine Driven Centrifugal

6—16-in. Allis-Chalmers, Type S, 8500 G.P.M. at 90 feet head, direct connected to Type L, 300 H.P., 2000 R.P.M. G. E. Curtis steam turbine.
6—14-in. Allis-Chalmers, Type S, 6500 G.P.M. at 150 feet head, 8100 G.P.M. at 90 feet head, direct connected to 300 H.P., 2000 R.P.M. G. E. Curtis steam turbine.

Steam Actuated Hydraulic

5—14-in. and 20 x 7½ x 18 Worthington Compound Duplex, outside packed plunger pot valve, 400 G.P.M. at 300 lb. pressure.
8—25 and 38 x 4⅝ x 24 Worthington Tandem Compound Duplex, outside packed 3600 lb. pressure, 150 G.P.M. at 20 R.P.M.
1—20 x 12 x 16 Worthington Duplex Underwriters Fire Pump, 1500 G.P.M., 100 lb. pressure.
200—New and used Simplex and Duplex, steam driven Worthington Pumps, 4½ x 3¾ x 4, 5¼ x 4¾ x 5, 6 x 4 x 6, 7½ x 4½ x 10, 6 x 2½ x 6.
100—New and used belted 2½", 3", 4", 5" and 6" Centrifugal Pumps.

NASHVILLE INDUSTRIAL CORPORATION
Jacksonville, Tenn.

ESTABLISHED THE RANDLE MACHINERY CO. 36 YEARS

1772 POWERS ST. CINCINNATI, OHIO

A.C. MOTORS
3 Phase, 60 Cycle, Squirrel Cage and Slip-Ring

No.	H.P.		Make	Volts	RPM.
12	7½	New	General Electric	220	1800
8	10	New	General Electric	220	1200
2	15	New	Fairbanks-Morse	440	1750
10	15	New	General Electric	220	1200
1	20	Used	Fairbanks-Morse	220	1200
8	20	New	General Electric	220	1200
8	25	New	General Electric	220	1200
1	25	New	G. E. (slip-ring)	220	1200
5	30	New	General Electric	220	1200
1	30	Used	Westinghouse	220	1200
1	35	Used	G. E. (slip-ring)	220	1200
4	40	New	General Electric	220	1200
4	50	New	General Electric	220	900
1	50	Used	Western Electric	440	900
3	50	New	G. E. (slip-ring)	440	900
4	75	New	G. E. (slip-ring)	220	900
3	100	New	G. E. (slip-ring)	220	900
1	100	Used	Westinghouse	220	1200
2	150	New	G. E. (slip-ring)	440	720
1	200	New	G. E. (slip-ring)	440	600
3	250	New	G. E. (slip-ring)	440	600
1	300	New	G. E. (slip-ring)	440	600

Also many other sizes and types.
Any of the above 220 volts motors can be furnished for 440 volts and vice versa.

BOILERS
6—1040 H.P. Edgemore, ASME Code, 200 lb. pressure.
4—823 H.P. Sterling, ASME Code, 200 lb. pressure.
4—350 H.P. Sterling, 190 lb. pressure.
3—250 H.P. Franklin, Heine type, 150 lb. pressure.
1—207 H.P. Geary, Heine type, 170 lb. pressure.
2—175 H.P. Atlas, 150 lb. pressure.
1—200 H.P. 84 x 18 high pressure H.R.T.
4—150 H.P. 72 x 18 high pressure H.R.T.
5—125 H.P. 72 x 16 high pressure H.R.T.
2—100 H.P. 66 x 16 high pressure H.R.T.
1— 80 H.P. 60 x 16 high pressure H.R.T.
1— 60 H.P. 54 x 14 high pressure H.R.T.
1— 50 H.P. Standard Fire Box on skids.
1— 25 H.P. 42 x 95 new Vertical, 125 lb. pressure.
1— 15 H.P. 36 x 83 new Vertical, 100 lb. pressure.
1— 10 H.P. 30 x 83 new Vertical, 100 lb. pressure.

D.C. MOTORS

No.	H.P.		Make	Volts	RPM.
1	50	Used	Allis-Chalmers	250	800
3	30	Used	Jantz & Leist	250	600
1	20	Used	Triumph	220	965
1	15	Used	Minnpls.	110	850
1	12½	Used	Minnpls.	220	950
1	7½	Used	Triumph	220	835
2	5	Used	Triumph	220	1350
1	5	Used	Jantz & Leist	220	900
1	5	Used	Triumph	115	1000
1	5	Used	Minnpls.	110	725
2	4	Used	Triumph	110	1025

Also many other sizes and types.

A.C. GENERATORS
Belted and Direct Connected
1—5000 K.W. General Electric Vertical, 3 phase, 60 cycle, 4500 volts, Turbo Generator Set, with condenser and accessories.
1—3000 K.W. Westinghouse, 3 phase, 60 cycle, 4400 volts, Turbo Generator Set, condensing.
1—625 K.V.A. Westinghouse-Parsons, 3 phase, 60 cycle, 230 volt Turbo Generator Set, non-condensing.
1—500 K.W. Westinghouse, 3 phase, 60 cycle, 2300 volt Generator, direct connected to a 26 x 42 Hamilton heavy duty Corliss Engine, 125 R.P.M., complete.
1—250 K.V.A. Westinghouse, 2 phase, 60 cycle, 2400 volt Generator, direct connected to a 20 x 22 Erie Ball Corliss Valve Engine, complete. (Can be reconnected for 3 phase.)
1—300 K.W. General Electric, 3 phase, 60 cycle, 2300 volt Turbo Generator Set, condensing.
2—200 K.W. DeLaval-Bullock, 3 phase, 60 cycle, 220-440 volt Turbo Generator Sets, with condenser and accessories.
1—150 K.V.A. Allis-Chalmers, 3 phase, 60 cycle, 2300 volt, 150 R.P.M. Alternator, direct connected to a 14 x 30 heavy duty double eccentric Allis-Chalmers Corliss Engine.
1—125 K.V.A. Ft. Wayne, 3 phase, 60 cycle, 1100-2200 volt Generator, direct connected to an Erie Ball Automatic Engine, with accessories.
1—100 K.W. General Electric, 3 phase, 60 cycle, 220 volt, 3600 R.P.M., Horizontal Turbo Generator Set, with condenser and accessories.
1—75 K.V.A. Westinghouse, 2 phase, 60 cycle, 2400 volt Generator, direct connected to a 12 x 12 Skinner Automatic Engine, with accessories. (Can be reconnected for 3 phase.)
1—60 K.V.A. General Electric, 3 phase, 60 cycle, 480 volt Generator, direct connected to a 12 x 12 Skinner Automatic Engine, with accessories.

D.C. GENERATORS
Belted and Direct Connected
1—10 K.W. Wesche, 110 volt, 1000 R.P.M., compound wound, belted type Generator.
1—17½ K.W. Triumph, 125 volt, 140 amp., 1250 R.P.M., compound wound, belted Generator.
1—20 K.W. Western Electric, 1250 R.P.M., compound wound, 120 volt, belted Generator.
1—22½ K.W. Allis-Chalmers, 120 volt, 187.5 amp., 925 R.P.M., compound wound, belted Generator.
1—35 K.W. Triumph, 125 volt, compound wound, Generator, direct connected to a 9 x 12 Skinner Automatic Engine.
1—50 K.W. Allis-Chalmers, 250 volt Generator, direct connected to a 12 x 12 Ball Automatic Engine on sub-base.
1—75 K.W. Jantz & Leist, 250 volt, direct current, compound wound Generator, direct connected to a 15 x 13 Ideal Automatic Engine on sub-base.
1—100 K.W. Triumph, 125 volt, 675 R.P.M. compound wound, belted type Generator.
1—100 K.W. Bullock, 120 volt, compound wound Generator, direct connected to a 16 x 15 Skinner Automatic Engine on sub-base. (Can be rewound for 250 volts.)
1—125 K.W. Westinghouse Interpole, 250 volt, compound wound Generator, direct connected to a 16 x 16 Skinner Automatic Engine on sub-base.
2—150 K.W., each, Westinghouse, 275 volt, 200 R.P.M. Generators, each direct connected to an 18 x 19 Fleming-Harrisburg Automatic Engine, all on sub-base.
1—250 K.W. Crocker-Wheeler, 250 volt, 200 R.P.M. Generator, direct connected to a 22 x 22 Harrisburg Automatic Engine.

MOTOR GENERATOR SET
1—200 K.W. Allis-Chalmers, 275 volt Synchronous Motor Generator Set, 900 R.P.M., with a 225 K.V.A. Allis-Chalmers, 3 phase, 60 cycle, 2300 volts, 900 R.P.M. Motor, complete.

ROTARY CONVERTERS
2—1000 K.W. Westinghouse, 600 volt, D.C., 6 phase, 60 cycle, 900 R.P.M. Rotary Converters, with Transformers for 66,000 primary voltage.

STEAM ENGINES
1—38 x 60 Hamilton Heavy Duty, right hand, Corliss Engine.
1—17 x 34 x 48 Hamilton Cross Compound, Heavy Duty Corliss Engine, designed for rope drive.
1—24 x 48 Hamilton Girder Frame Corliss Engine.
3—18 x 36 Allis-Chalmers Heavy Duty Corliss.
1—16 x 18 Lane & Bodley Slide Valve.
1—14 x 18 Erie City Iron Works Automatic.
1—13 x 16 Erie City Iron Works Automatic.
1—13 x 16 Chandler & Taylor Slide Valve.
1—12 x 12 Brownell Automatic.
1—10 x 14 Houston, Stanwood & Gamble Slide Valve.
1—10 x 12 Chandler & Taylor Slide Valve.
Also many other sizes.

OUR SHOPS AND EXPERIENCE ARE AT YOUR SERVICE

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Special Offerings, A No. 1 Units—Immediate Delivery

HORIZONTAL TURBO UNITS
A. 1—10,000 K.W. 80% Power Factor Allis-Chalmers Condensing Turbo Alternator Unit, 60 Cycle, 3 Phase, 2300, 4600 or 11,000 Volts, 200 lb. I.S.P., 200 Degrees Superheat. Complete with Surface Condenser and all Auxiliaries.
B. 1—6500 K.V.A. Allis-Chalmers Condensing Turbo Unit 60 Cyc., 3 Ph., 2300 Volt, Complete layout including Jet Condenser and all Auxiliaries.
C. 1—3000 K.W. Westinghouse (Actual capacity approx. 4000 K.W.) 60 Cyc., 3 Ph., 2300 or 4400 Volt, Condensing Turbo Unit.
D. 1—1500 K.W. Westinghouse Complete Turbo Alternator Station 60 Cyc., 3 Ph., 2400 Volt, 3600 R.P.M., Including LeBlanc Jet Condenser, Boiler Plant and Building.
E. 1—2000 K.W. Allis-Chalmers Condensing Turbo. Actual capacity 3000 K.W., 60 Cyc., 3 Ph., 2300 Volt. Complete with Jet Condenser and Auxiliaries.
F. 2—1250 K.W. Westinghouse Condensing or Non-Condensing Turbo Units. Actual capacity 1500-1800 K.W., 60 Cyc., 3 Ph., 480, 2300 or 11,000 Volts, 1200 R.P.M. Complete with LeBlanc Condensers.
G. 2—600 K.W. Westinghouse Non-Condensing Turbo Units 60 Cyc., 2 or 3 Ph., 220, 480 or 2400 Volt. Units newly rewound and rebladed.
H. 1—500 K.W. Westinghouse Condensing Turbo Unit 60 Cyc., 2 or 3 Ph., 2200 Volt, 3600 R.P.M. Complete with Surface Condenser.

VERTICAL TURBO ALTERNATORS
I. 1—1000 K.W. General Electric-Curtis Turbo Unit 60 Cyc., 3 Ph., 2300 Volt, 1200 R.P.M. Complete with Jet Condenser.
J. 1—1500 K.W. General Electric (Actual capacity 2200 K.W.) 60 Cyc., 3 Ph., 2300 Volt, 900 R.P.M. Complete with Surface Condenser, Piping and all Auxiliaries.
K. 1—5000 K.W. General Electric-Curtis Condensing Turbo Unit 60 Cyc., 3 Ph., 2300 or 4500 Volt, 720 R.P.M. Complete with Surface Condenser, Piping and all Auxiliaries; Complete Installation.
L. 1—10,000 K.W. General Electric Condensing Turbo Unit 60 Cyc., 3 Ph., 6600 or 11,000 Volt, 720 R.P.M. Complete with Surface Condenser and Auxiliaries.
M. 1—10,000 K. W. General Electric Condensing Turbo Unit 25 Cyc., 3 Ph., 6600 Volt, Complete with Surface Condenser and all Auxiliaries.
N. 1—1500 K.W. General Electric Condensing Turbo Unit 25 Cyc., 3 Ph., 11,000 Volt.

DIRECT CURRENT UNITS
O. 1—240 K.W. General Electric M.P., Form L, 220-240 Volt, Generator Direct connected to Cross Compound semi-heavy duty Corliss Engine. Complete Unit.
P. 1—300 K.W. Triumph Multipolar Engine Type Generator, 225-250 Volt, Dir. Conn. to Cross Compound Corliss Engine.
Q. 1—425 K.W. General Electric M.P. Engine type Generator, 250 or 500 Volt, Dir. Conn. to Simple Heavy Duty Corliss Engine.
R. 1—600 K.W. General Electric Unit, consisting of: 2—300 K.W., D.C., 250-550 Volt Generators, Dir. Conn. to horizontal simple heavy duty Corliss Engine.
S. 1—800 K.W. General Electric M.P. Engine type Generator, 250-500 Volts, Dir. Conn. to Tandem compound heavy duty Corliss Engine.
T. 1—1200 K.W. Same as above.
U. 1—1500 K.W. Westinghouse Engine type Generator, 220-550 Volt, Dir. Conn. to Horizontal heavy duty Cross Compound Corliss Engine.

ALTERNATORS
V. 1—325 K.W. Westinghouse Engine type Generator, 60 Cyc., 3 Ph., 480, 570 or 2300 Volt, 164 R.P.M. Without Engine.
W. 1—400 K.W. Allis-Chalmers Revolving Field Engine type Alternator, Dir. Conn. at 200 R.P.M. to Horizontal Cross Compound 4 Valve Engine. Complete with Exciter and Condenser.
X. 1—600 K.W. General Electric Revolving Field Alternator 60 Cyc., 3 Ph., 2300 Volt, Dir. Conn. to Cross Compound Corliss Engine.

BOILERS
4—350 H. P. Stirling B. & W. Boilers., 200 lbs. Allowance. Without Grates or Stokers.
5—500 H.P. B. & W. Steel Header Water Tube Boilers. 12 Tubes Wide, 21 Tubes High. 200 lbs. Allowance. Complete with Stokers and all Fittings.
1—500 H.P. Stirling B. & W. Water Tube Boiler. 200 lbs. Allowance. Complete with Stokers and all Fittings.

CONDENSERS
1—Westinghouse LeBlanc No. 11 Jet Condenser Complete.
1—Westinghouse LeBlanc No. 14 Jet Condenser Complete.
1—Westinghouse Twin LeBlanc No. 19 Jet Condenser Complete.
1—5400 Sq. Ft., Wheeler Condenser & Engineering Co., Surface Condenser.
1—5700 Sq. Ft., Wheeler Condenser & Engineering Co., Surface Condenser.
1—8000 Sq. Ft. Wheeler Admiralty Type Surface Condenser. Without Auxiliaries.
1—11,000 Sq. Ft. Wheeler Admiralty Type Surface Condenser. Complete with all Auxiliaries.
1—20,000 Sq. Ft., Worthington Surface Condenser. Complete with all Auxiliaries.
1—15,000 Sq. Ft., Wheeler Admiralty Type Surface Condenser. Complete with all Auxiliaries.

Compare These Motor Prices

These are only a few of the bargains we offer, picked at random from our large stock

NEW MOTORS

H.P.	Make	Phase	Type	Cycle	R.P.M.	Volts	Price
550	Crock.-Whlr.	3	sl. ring	60	1170	2200	$1,875.00
60	Gener. Elec.	3	KT	60	1160	220	555.00
4— 50	Gener. Elec.	3	sl. ring	60	690	440	775.00
8— 50	Gener. Elec.	3	sl. ring	60	1200	220	600.00
12— 25	Gener. Elec.	3	KT	60	1200	220	302.00
5— 20	Gener. Elec.	3	Kt	60	1200	220	267.00
4— 15	Gener. Elec.	3	KT	60	1800	220	216.00
5— 10	Bell	3	Compen.	60	1800	220	216.00
6—7½	Bell	3	Compen.	60	1800	220	150.00
13— 5	R. & M.	3	Compen.	60	1700	220	94.00
15— 3	G. E.	3	KT	60	1800	550	75.00
6— 10	Gener. Elec.	2	KQ	60	1200	220	216.00
200—1/4	Western Elec.	1	SA	60	1725	110	17.75
55—1/4	Western Elec.	..	SD	..	1725	110	18.75

USED MOTORS

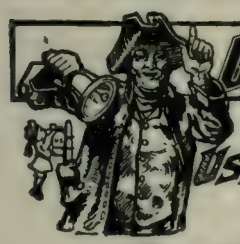
H.P.	Make	Phase	Type	Cycle	R.P.M.	Volts	Price
400	Whse.	3	synchro.	60	450	2300	$1,000.00
200	Gener. Elec.	3	sl. ring	60	600	2200	1,400.00
200	Gener. Elec.	3	wound.ro.	60	580	220	975.00
2—100	Gener. Elec.	3	sl. ring	60	514	440	1,100.00
75	Gener. Elec.	3	sl. ring	60	900	2200	825.00
2— 50	Fks. Mse.	3	sq. ca.	60	900	220	325.00
2— 50	Burke	3	sl. ring	60	1200	220	475.00
2— 37	G. E.	3	sl. ring	60	750	220	450.00
2— 30	Ideal	3	sq. ca.	60	1150	440	300.00
2— 25	Wagner	3	sl. ring	60	1150	440	375.00
3— 35	Lincoln	3	sq. ca.	60	1200	440	245.00
200	Whse.	2	sl. ring	60	580	220	1,275.00
133	Gener. Elec.	2	synchro.	60	900	2200	600.00
150	KVA Stanley	2	alterna.	60	900	2400	550.00
75	Burke	2	sq. ca.	60	360	220	750.00
90	Diehl	..	shunt	..	460	240	575.00
90	Gener. Elec.	..	compound	..	625	220	775.00
90	Whse.	..	compound	..	675	220	625.00
75	Diehl	..	shunt	..	340	220	575.00
4— 47	Whse.	..	compound	..	600	500	375.00

Some have not been used over 60 days.

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Since 1893 have been the leading dealers in second-hand electrical machinery, all rebuilt like new. An enormous stock of all kinds is always available. Electric motors and generators repaired. Armatures and stators rewound, field coils and rotors rewound, commutators refilled. Quick service by people who know how to do things right. Send for Monthly Bargain Sheet showing complete stock and net prices—now surprisingly low.

3-PHASE, 60-CYCLE GENERATORS

Kva.		Speed
1 45	Electric Machinery, rev. field, 2200 volt	1200
1 50	Gen. Elec., type ATB, rev. field, 240-480 volt	1200
1 50	Westinghouse, type G, revolv. field, 220 or 440 volt	1200
1 50	Crocker-Wheeler rev. field, 2300 volt	1200
1 50	Gen. Elec., type TRB, rev. field, 440 or 480 volt, to New York safety steam engine	300
1 55	Westinghouse, revolv. field, 2200 volt alternator to McEwen steam engine	257
2 60	Electric Machinery, rev. field, 2300 volt	900
1 70	Westinghouse, rev. field, 2400 volt to Harrisburg - Fleming steam engine	300
1 75	Ridgeway, revolving field, 220 volt to Ridgeway steam engine	300
1 75	Crocker-Wheeler, rev. field, 2300 volt, 2 or 3 phase to McEwen steam engine	275
1 100	Westinghouse, revolv. field, 2200 volt	900
1 150	Allis-Chalmers, rev. field, 2300 volt, direct con. to Buckeye steam engine	225
1 160	Electric Machinery Co., 220 or 440 volt, rev. field	600
1 225	Gen. Elec., type TRB, rev. field, 2300 volt	600
1 75	Westinghouse- Parsons, horiz. turbo Generator, 240 volt, 2 or 3 phase	1200

250 VOLT D.C. GENERATORS

Kw.		Speed
1 6	Browning	800
1 7½	Sturtevant	1150
1 15	Fairbanks-Morse, 125-250 volt, 3 wire	1325
1 15	Peerless	900
1 20	Holtzer-Cabot	1250
1 25	General Electric, to Ideal steam engine	325
1 25	Ft. Wayne	875
1 25	Milwaukee to Erie-Ball steam engine	340
1 25	Westinghouse to Buffalo vertical steam engine	325
1 30	Western Elec	1250
1 30	Northern	850
1 50	Ft. Wayne	750
1 45	Westinghouse	975
1 45	Westinghouse	850
1 45	Westinghouse	650
1 50	Northern	850
1 75	Allis-Chalmers	875
2 200	Westinghouse, 6 pole to Ideal engine	200
1 150	Gen. Elec. - Curtis Turbo Generator, 250 v. D.C.	2000

550 VOLT D.C. GENERATORS

Kw.		Speed
1 37½	Eddy, MP, type G	850
1 100	Gen. Elec., form H	600
1 100	Ft. Wayne, 6 pole	550
1 250	Gen. Elec., 6 pole	450

3-PHASE, 60-CYCLE MOTORS

Complete Stock, All Sizes and Speeds. Capacity 1 H.P. to 15 H.P. Included

H.P.		Speed
4 20	Gen. Elec., form K	1800
1 20	Westghse., type CS	1740
1 20	Gen. Elec., type KT	1200
1 20	Howell, 220 or 440 volt	1200
1 20	Gen. Elec., type MT, new, slip-ring	1200
1 20	Gen. Elec., type MT, new, slip-ring, variable speed	1200
1 20	Westinghouse, type CCL	1120
1 20	Gen. Elec., type KT	900
1 20	G. E. (wound rotor)	900
2 20	Otis	900
2 20	Westinghouse, type HF, slip-ring, var. speed	860
1 20	Crocker-Wheeler	850
1 20	Westinghouse, type CS	850
1 20	Wagner, type BP	850
1 22½	Lincoln	1200
1 22½	Lincoln	900
1 25	Crocker-Wheeler	1730
1 25	Fairbanks-Morse	1200
1 25	Crocker-Wheeler	1150
4 30	Gen. Elec., type KT	1800
1 30	Allis-Chalmers	1800
1 30	Wagner (wound rotor)	1140
1 30	Westinghouse, type CX	1120
1 30	Wagner (wound rotor)	850
1 30	Westghse., type HF, slip-ring, var. speed	850

H.P.		Speed
1 30	G. E., type MT, new, slip-ring, var. speed	720
1 35	Richmond	850
1 35	G. E., type I, form M, slip-ring, variable speed	1200
1 35	G. E., type I, form M, slip-ring, var. speed	720
3 35	Gen. Elec., form K	900
3 40	Gen. Elec., type KT	1800
2 40	Triumph	1750
1 40	Gen. Elec., type KT	1200
1 50	Gen. Elec., type KT	1800
1 50	Westinghouse, type CS	1750
2 50	Gen. Elec., type KT	1200
2 50	G. E., type KT, New	1200
1 50	Allis-Chalmers	1140
1 50	Allis-Chalmers	900
1 50	Westinghouse, type CX	850
1 50	Allis-Chalmers	690
1 60	Otis	1200
2 75	Gen. Elec., form K	1200
1 75	Westinghouse, type HF, slip-ring to Wilson-Snyder, 3 stage centrifugal pump	1750
3 100	Gen. Elec., form K	1800
1 150	Gen. Elec., type I, form M, slip-ring	900
1 150	Westinghouse, type CCL, 2200 volt	450
1 200	Westinghouse, CW, slip-ring, 440 volt	900
2 250	Gen. Elec., type I, form K, 550 volt	495
2 250	Fairbanks-Morse, slip-ring, 220 or 440 volt	900
2 300	Westinghouse, CW, slip-ring, 220 or 440 v.	450

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Rotary Converters

1—220 KW, 250 volt, 880 amp., 1200 rpm, type HCC6-220-1200, form P, 60 cycles, General Electric rotary, complete with type H. J. T. H., form DD, circular coil design General Electric transformer 11000 volts Y to 187, cycles 60, capacity 240 KVA.

1—330 KW, 250 volt, 1320 amp. 1200 rpm, type HCC6-330-1200, form P, 60 cycle, General Electric rotary, complete with H. J. T. H., form DD, circular coil design General Electric transformer 11000 volt Y to 187, cycles 60, capacity 360 KVA.

The above transformers could probably be changed to 13,200 volts. They are now "Y" connected and can be used on 6600 volts.

Motor Generator Sets

2—NEW 1000 KW, 250 volt no load, 260 volt full load, 3850 amps., 720 rpm, type MCF, General Electric generators direct connected to 1400 HP, 2300 volt, 3 phase, 60 cycle, synchronous motors. Standard outfits, mounted on sub-bases with rheostats and compensators.

1—100 KW, 125/250 volt Westinghouse generator with two 6/10 KW balancing transformers and a 150 HP, 220 volt, 3 phase, 60 cycle, type "CS" 1200 rpm induction Westinghouse motor, both mounted on cast iron base, complete with starter and switchboard.

Alternating Current Uniflow Outfits

2—Erie City Iron Works engines, Lentz Patent, 405 HP, Poppet valve, 200 rpm, 150 pounds pressure, 19x21, direct connected to General Electric generators, alternating current, P.F. .8, type ATB-36-312-200 form E, 312 KVA, 60 cycles, with belted exciter, General Electric, continuous current, compound wound, type CVC, 975 rpm, 9½ KW, 125 volts, 76 amps. The generators can be connected for any phase and voltage up to 600 volts.

1—300 KVA, 3 phase, 60 cycle, 2300 volt, 150 rpm, Westinghouse revolving field generator (can be reconnected for other voltages and phases) to a 25x24 Ridgway left hand, side crank, heavy duty engine, with switchboard, no exciter.

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25 and 40-cycle motors in stock from 1 to 200 H.P. Immediate delivery. We specialize in odd voltages and frequencies.

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New I-Beam Trolleys and Jibs

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1—350 KW. Westg. 250 v., 130 r.p.m., generator, dir. ctd. to 26 x 30" Porter Allen, 4 valve engine.
1—50 KW. Westg. 250 v., 300 r.p.m., generator, dir. ctd. to 11 and 19 x 11" Westg. engine.

Direct Connected to A. C. Units

1—200 KVA. Crocker Wheeler 3 ph. 60 cy. 2300 volt alternator, dir. ctd. to 20 x 20" Skinner engine, 200 r.p.m.
1—200 KVA. Crocker Wheeler, 3 ph. 60 cy. 600 volt alternator, dir. ctd. to 14 and 26 x 20" McEwen engine, 200 r.p.m.
1—125 KVA. Ft. Wayne, 3 ph. 60 cy. 2300 volt, alternator, dir. ctd. to 12 and 20½ x 16" Skinner engine, 257 r.p.m.

Direct Current Generators—Belted

1—400 KW. Allis-Chal., 230 v., 415 r.p.m.
1—200 KW. Westg., 125 v., 365 r.p.m.
1—200 KW. Bullock, 120 v., 300 r.p.m.
1—150 KW. Gen. Elec., 230 v., 450 r.p.m.

Motor Generator Sets

1—200 KW. Gen. Elec., 250 v., type MP, 900 r.p.m., generator dir. ctd. to 300 H.P. Gen. Elec., 2400 v., 2 or 3 ph., 60 cy., 900 r.p.m. form K motor.
1—100 Elec. Machy. Co., 250 v., 900 r.p.m., generator coupled to 150 H.P., 2 or 3 ph., 60 cy., 440 v., 900 r.p.m. motor.

250-Volt Rotary Converters

2—200 KW. Westinghouse, 250 volts D.C., 800 amp., 3 phase, 60 cycle, 185 volts A.C., 900 r.p.m., each complete with 3-75 KW. transformers.
1—150 KW. Westinghouse, 250 volts D.C., 3 phase, 60 cycle, 185 volts A.C., 720 r.p.m.

Send for full list of 25 and 60 cycle transformers.

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Several Bargains in "ODDS AND ENDS"

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1500 K.W. Allis-Chalmers Revolving Field, 60 Cyc., 3 Ph., 2300 V., 1800 R.P.M., Alternator suitable for operation as Synchronous Condenser. Self contained on Base and Two Bearings.
1500 K.W. Westinghouse. Same as above. 1200 R.P.M.
625 K.V.A. Crocker-Wheeler Revolving Feed Engine type Alternator, 60 Cyc., 3 Ph., 440 Volt, Amortisseur wound.

MISCELLANEOUS

1500 K.W., 25 Cyc., 3 Ph., 2300-6600 Volt, 450 R.P.M. Synchronous Motor of Generator.
2—300 K.W. Westinghouse, 25 Cyc., 3 Ph., 390-440 V. Alternators, Direct Connected to Allis-Chalmers Heavy Duty Cross Compound Bored Guide Corliss Engines @ 107 R.P.M.
325 K.V.A. Westinghouse Engine type Alternator, 60 Cyc., 3 Ph., 2300 V. for direct connection at 164 R.P.M.
400 K.W. Westinghouse 250-500 Volt, 3 Bearing Belted Generator.
625 K.V.A. Crocker-Wheeler Engine type Alternator, 60 Cyc., 3 Ph., 440 V., 225 R.P.M., or Synchronous Motor.
250 H.P. Heinie Steel Header Water Tube Boiler. Excellent condition. 150 lb. Non-Code Law Districts.
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2000 K.W.-300 K.W. Standard Panel for 60 Cyc., 3 Ph., 2300 Volt Alternator.
20 Ton Crane Bridge Only. 32' 1" Span.
20 K.W. **Motor Generator Set,** 60 Cyc., 3 Ph., 2300 V., A.C. End. 250 V., D.C. End.
50 K.W. **Westinghouse Turbo Exciter Set,** 250 Volt. Practically new.

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1—Fifteen Ton Browning.
1—Twenty Ton Industrial.

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A.C., 60-CYCLE UNITS

Kw.	Generator	Engine
1500	Allis-Chal.	Allis-Chal. Turbine
800	Allis-Chal.	Allis-Chal. Turbine
625	Wghse.	Parsons Turbine
600	G. E.	Rice-Sargeant-Corliss
500	Wghse.	Parsons Turbine
500	Wghse.	Hamilton Corliss
475	G. E.	Skinner, Uniflow
375	G. E.	Curtis Turbine
360	G. E.	Harris Corliss
300	Allis-Chal.	Skinner, 20 x 20
250	Allis-Chal.	Hamilton, non-releasing
200	Wghse.	Ridgway
150	Wghse.	Rice-Sargeant-Corliss
150	Allis-Chal.	Ideal Tandem
125	G. E.	Harrisburg
120	G. E.	Hamilton, 12 x 24
100	C.-W.	Harrisburg
75	G. E.	Harrisburg
50	G. E.	Erie Ball

230-250-VOLT, D.C. UNITS

Kw.	Generator	Engine
300	C.-W.	Watts-Campbell-Cor.
200	Wghse.	Erie Ball
100	Wghse.	Erie Ball
85	C.-W.	Erie Ball
75	G. E.	Skinner
75	Allis-Chal.	Erie Ball
60	G. E., 3-wire	Skinner, Uniflow
50	Wghse.	Ideal
50	Wghse., 3-wire	Ames

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20-ton Electric Traveling CRANE
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9 New Steel Oil Barges, 2 Twenty-Ton O & S Locomotive Cranes, 5 Portable Ship Cranes Complete, 3 Sullivan Air Compressors, 2000 cubic feet cap.; 4 Babcock & Wilcox, A & T 250 H. P. Boilers, 2 Tug Boats, 100 and 500 H.P.; New Curtis Hydroplane.

16 Pile Drivers, Complete with Lidgerwood, American and Lambert Double Cylinder Double Drum Hoisting Engine and Boilers with Turntables and Vulcan No. 1 and No. 2 Steam Hammers.

Radial Drills, Universal Millers, Sensitive Drill Presses, Bolt Threaders and Nut Tappers, Planers, Turret and Engine Lathes, Pipe Machines up to 9", Punches and Shears, Plate Tables, Steam Hammers, Grinders, Countersinking Machinery, Bull Riveters, Band, Swing and Rip Saws, Jointers, Saw Filers and other woodworking machinery, 3 Plate and Angle Furnaces.

35 Motors up to 40 H.P., 3 phase, 60 cycle, 440 volts. 8 Flat Cars, standard gauge, 5 Push Cars.

2 Steam and Gas Portable Air Compressors. Westinghouse Floating Air Compressor on Barge.

Hoisting Engines, Pumps, Floating Pile Drivers, Drop Hammers, Overhead and Jib Cranes, Steel Tower and Tanks up to 50,000 gal.

Lincoln Portable Welding Machines, Pneumatic Air Drills, Air Riveting, Chipping and Caulking Hammers, Air Hose, Dollies, Riveting Sets, Air Tool Repair Parts, 50 Bending Slabs, Hydraulic Jacks 30 and 50-ton, Acetylene Welding and Cutting Torches, Hauck Burners, 50 Chain Hoists up to 6-ton cap., High Speed Drills, Reamers, Taps and Countersinks, Vises, Blacksmith Tools, Forges, Anvils, etc.

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Ladders, Stanchions, Grab Rods, Shackles, Blocks, Thimbles, Sockets, Caulking Cotton, Linoleum, Mattresses, Cable Rope, Floodlights, etc.

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17 High Grade Steel, Brick and Wood Buildings to be sold for wrecking.

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Screw Machine Products
up to 1¼" diameter. Light metal stampings. Brass faucets.

Clark, Cadle, Harmon Corp.
1139 University Ave., Rochester, N. Y.

ACCURATE

Screw Machine and Turret Lathe Products

Can handle stock up to 2½" diam.

Gear Hobbing

Especially Spur Gears up to 10" diam.

Prompt service on new, high-grade machines. Quality guaranteed. Ask us for estimates.

CHICAGO FLEXIBLE SHAFT CO.
1146 S. Central Ave., Chicago

SCREW MACHINE WORK

of every kind in any quantity or metal. Bar work from 3/16" to 2⅛" our specialty.
Let us bid on your work.

Jackson Screw Products Co., Inc.
Jackson, Michigan

Any second-hand machinery or equipment for sale?

If so, see advertising rates on first page of Section 50.

MACHINE WORK

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

MACHINE WORK

High grade machine work, light or heavy. Complete machines made promptly and in quantity to your drawings. Our unusually well equipped plant is complete in every respect.

Forgings
Drop and Hammered

Special attention given to high grade steels and quality work.

If you have work that you want done well and quickly, write, wire, or call and see us.

THE NEW LONDON SHIP & ENGINE CO.,
NEW LONDON, CONN.

Machine Work Wanted:

By an ordnance and automotive plant with the best equipment both as to machinery and personnel, for producing work of the highest grade.

Let us solve your manufacturing and engineering problems.

Unusual facilities enable us to produce work of any size and any quantity promptly.

Large and Small Planers
Shapers and Slotters
Boring Mills
Millers
Grinders
Broaching Machines
Lathes
Heat Treating Equipment, Etc.

Driggs Ordnance & Manufacturing Corporation
52 Whitney Avenue, New Haven, Conn.

Have It Done by a Manufacturer of Machine Tools

When you have contract work to be done, either machine building or machine work, place it with a successful manufacturer of high grade machine tools. You are thus assured of getting a degree of accuracy which such work implies; or if extreme accuracy is not required, a high production rate and low cost. Our machine shop is equipped with all types of modern machines, including gear hobbers, planers, shapers, slotting machines, thread milling machines, etc.

We can effect you a saving worth while.

The Hercules Machine & Tool Co.
410 Broome Street
New York N. Y.

We can build and assemble complete machines for you, or manufacture special parts. Our factory consists of

Complete Machine Shops and Tool Rooms
Sheet Metal Shop
Wood Working Shop
Blacksmith Shop
Forge Shop for Small Drop Forgings
Complete Heat Treating Equipment

Ask us for quotation.

Buffalo Pitts Company

Buffalo, N. Y.

CAM CUTTING

All varieties of cams, from 36 in. diameter down to the smallest. Special prices on large quantities. Cam cutting machines in stock.
HEADQUARTERS FOR CAM CUTTING

THE GARVIN MACHINE CO.
Spring and Varick Streets
New York City

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

Quick Deliveries

General small machine work, tools, dies, screw machine parts, punchings, small blacksmithing, quantity, manufacture of small machine parts, enameling and japanning.

RAY MACHINE WORKS
Mount Vernon, N. Y.

HEAVY MACHINE WORK

SPECIAL MACHINERY
CONTRACT WORK

Established 1863

STEELE & CONDICT, Inc.

Manufacturing Engineers

JERSEY CITY, N. J.

ROLLING MILL MACHINERY
TUBE MILL MACHINERY
SPECIAL MACHINERY

Best facilities for handling your work.
Send us your inquiry and we will gladly quote.

H. J. RUESCH MACHINE CO.
401 Mulberry St. Newark, N. J.

GEARS

and Gear-Cutting of Every Description

FORGINGS

Steam Hammer and Hand Forgings

NILSON-MILLER CO.
HOBOKEN, N. J. Tel. 36 Hoboken

M-C GEARS

Let us cut your Spur and Spiral Gears of the smaller sizes.

Meisselbach-Catucci Mfg. Co., Inc.
51 Stanton Street
Near Frelinghuysen Ave. Newark, N. J.

General Machine Work

Large and small machine work, special machinery, patterns and casting and forgings contracted for. Send Blue Prints for Estimates or ask to have representative call.

PORTER MACHINE COMPANY, Inc.
113-115 Plymouth Street, Jersey City, N. J.
10 minutes from lower New York
Telephone number Montgomery 309

MACHINE WORK
GEAR CUTTING
SLOW SPEED ELEVATORS

Woodworking Machinery

B. M. ROOT CO.
York, Pa.

A Modern Machine Shop and Foundry

perfectly equipped and with an exceptional force of experienced mechanics—ready to handle a contract of any size for the production of medium or heavy work.

We can start work immediately and assure early deliveries. Write to the

Shepherd Engineering Co.
Williamsport Pa.

MACHINE WORK

We offer prompt service on medium and light work requiring more than ordinary care. We have a modern shop and skilled mechanics under the personal supervision of W. S. Giele, mechanical engineer. We can also handle your castings.

Lebanon Gear & Machine Works
Lebanon, Pa.

Let Us Furnish You With Our High Grade and Accurate MACHINE WORK

YORK ELECTRIC & MACHINE CO.
30-34 North Penn St. York, Pa.

Turn Your Machine Work Over To Us

Our equipment and men make it possible to offer you a real service on any of your machine work. We can also handle gray iron castings and many firms make use of our brass foundry, pattern and smith shops.
Send us your specifications or blueprints. We will do the rest.

KLOTZ MACHINE COMPANY
Sandusky, Ohio

Machine Work and Fitting Parts or Complete Machines

First Class Work
Moderate Prices

The Ceramic Machinery Co.
Hamilton, Ohio

Machine Work Wanted

for

Large Planers
10 ft. Swing Boring Mill
Milling Machines
Multiple Spindle Drills
Radial Drills
Engine Lathes
Gisholt and Warner & Swasey Turret Lathes
Universal Grinders

Prompt, Satisfactory Service Assured

VOGT BROTHERS MFG. CO., INC.
MAIN & 14TH ST.
LOUISVILLE, KY.

Machinery Manufacturing and Machining of Parts

A modern factory with new machine tools, Heat Treating Department, Tool Room and Pattern Shop, Foundry and Forging Service. Complete facilities from engineering to shipping. An experienced organization, manufacturers of high grade turret lathes, is ready to assist with your manufacturing problems, from machining parts to designing and building complete machines.

Quality work by modern methods.

Millholland Machine Company
1106 West Twenty-Third St.
Indianapolis, Indiana

Complete Machines or Parts Manufactured

Jigs—Fixtures—Tools—Patterns
Designed and Built.

REYNOLDS ENGINEERING CO.
101 3rd Ave., Moline, Ill.

SPECIAL MACHINERY

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

Special Machines

Tools Parts
Experimental Apparatus

We offer expert service in developing or building all kinds of machines, having a well equipped shop, skilled mechanics, and the engineering experience to solve your problems.

A. H. EMERY
Glenbrook Conn.

READY REFERENCE FOR THE REGULAR READER SEE PAGE 3

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

Kent-Owens
SPECIAL MACHINERY

SPECIALISTS IN SPECIALTIES

There are three distinct and important advantages in placing your orders for special machinery, or general machine work with Kent-Owens.

Your machine, or parts, will be mechanically perfect—they will be produced in minimum time—and the cost will be lower

Simply the result of our "specialization" in this line—building a plant and personnel for this work exclusively. No dissipated efforts, but concentration—which reflects itself to the big advantage of every Kent-Owens client.

Consult Kent-Owens Engineers

The KENT-OWENS MACHINE CO., Toledo, Ohio

We have the machinery and men for building

Special Machinery
of every description
Gear Cutting
in all its branches
Quantity Production
Machine Parts
on
Turner Turrets
Grey Iron Castings
Let us estimate on your blue prints, or, better yet, call for our representative.

Turner Machine Company
Danbury, Connecticut

Sell your second-hand machinery through the Clearing House Section of The Iron Age.

SPECIAL MACHINERY WORK

Equipped to handle planer work 40" x 20'
Boring capacity 72" turning 40" x 20' and 54" x 12'

Gray Iron Casting
and
Wood Patterns
casting up to 4 tons

Sheet Metal Work
Tanks, stacks, penstocks, smoke breeching, etc.

Structural Steel
Plain and fabricated Large stock

The Utica Steam Engine & Boiler Works
UTICA, N. Y.

Let Our Factory Be Your Factory

for manufacturing your SPECIALS, particularly in the line of SPECIAL MACHINES and PARTS, STEAM, GAS or HOT-WATER DEVICES, VALVES, CARBURETORS, or any product in manufacturing in which brass, iron or steel, cast or rolled, is required. Estimates given from samples or blueprints, preferably both.

Established 1894

Spindler & Deringer
Colgate and Mercer Sts., Jersey City, N. J.

SPECIAL MACHINERY
BUILT TO ORDER

We have splendid facilities for producing special machinery of all kinds, and are prepared to guarantee satisfaction—both as regards workmanship and price. We have foundry facilities and an up-to-date machine shop. Send us blueprints and give us an opportunity to quote you price. We can save you money.

LAMBERT & TODD MACHINE CO.
Camden, N. J.

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

Special Machinery Builders

Complete Machines or Finished Parts

THE equipment of our several plants forms in the aggregate most complete and diversified manufacturing facilities. We are thus able to do almost any class of work from the manufacture of parts to the building of complete machines; also tool and die work.

We are unusually well equipped for handling large work, having planers with capacities up to 12 x 10 x 26 feet, lathe up to 60 inch swing and 25 feet centers, and other machines of similar size.

BLISS 1857

We shall be glad to serve you.

BLISS 1921

E. W. Bliss Co.

Main Offices: BROOKLYN, N. Y., U. S. A.

American Factories: Brooklyn. N. Y.; Hastings, Mich.; Cleveland, O.; Salem, O.

SALES OFFICES

CHICAGO, People's Gas Bldg. DETROIT, Dime Bank Bldg. CLEVELAND, Union Bank Bldg. CINCINNATI, Union Trust Bldg. NEW HAVEN, 2nd Nat'l Bank Bldg. BUFFALO, Marine Bank Bldg. ST. LOUIS, Boatmen's Bank Bldg. PITTSBURGH, Keenan Bldg.

No. 164—FOREIGN SALES OFFICES *and* FACTORIES

London, England, Pocock Street, Blackfriars Road, S. E. Paris, France, 100 Boulevard Victor-Hugo, St. Ouen

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

SPECIAL MACHINERY
BUILT BY SPECIALISTS

Our facilities include a complete organization in each of the following shops:

Machine Shop	Pipe Fitting Shop
Boiler Shop	Plumbing Shop
Forge Shop	Electrical Shop
Pattern Shop	Welding Shop
Carpenter Shop	Copper Shop
Joiner Shop	Brass Foundry
Bolt & Rivet Shop	Iron Foundry

If you have a special machine to develop or build, we have—the staff to develop your designs—the shops to build every part, complete—the location to insure lowest shipping charges, both by rail and water—storage and show-room space and facilities for inspection, sales, etc.—the experience and reputation to insure the success of your Vulcan-built machine.

VULCAN
IRON WORKS, INC.
JERSEY CITY, N. J.

A Plant and An Organization

How long would it take you to erect a plant and build up an organization to get the manufacture of your product going on a production basis? Probably some time, and there is always the uncertainty of profitable results. You can avoid this delay and the element of chance by having us make your product. We have the plant and the organization.

Lippincott-Carwen Corporation
Erie Ave., east of Richmond St.
PHILADELPHIA

SPECIAL MACHINERY
BUILT TO YOUR ORDER
GEAR CUTTING
Immediate Delivery—Low Prices
Let us quote you.

THE EARLE
GEAR & MACHINE CO.
Philadelphia, Pa.

SPECIAL PARTS
Or Completely Finished Products

Most complete plant in the country for making and assembling anything in light metal. Large equipment of most modern machinery of all kinds.

We handle from start to finish the manufacturing problems of several large and nationally known companies, and make special parts for hundreds of others.

We can handle a few more complete manufacturing and assembling propositions and anything you may need in special parts.

Write for book describing our plant and send us your blue prints.

CASEY HUDSON COMPANY
361 E. Ohio St., Chicago, Ill.

Special Machine Tools Designed and Built

Conradson Machine Tool Company
Green Bay, Wis.

CASTINGS
ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

GRAY IRON CASTINGS
Can give prompt service and the right price

MACHINE WORK
F. R. PATCH MFG. CO.
Rutland, Vt.

Gray Iron Castings
15-ton daily capacity.
Machine or hand molded up to 2 tons each.

GRAY FOUNDRY, INC.
Poultney, Vermont

Hand or Machine Moulded
GRAY IRON CASTINGS
up to 10 tons.
Daily Capacity 50 tons.
Pattern Shop Connected

Chas. E. Davis Foundry Co., Inc.
Rutland, Vermont

FOUNDERS *and* MACHINISTS
WOLLASTON
FOUNDRY COMPANY
NORFOLK DOWNS, QUINCY, MASS.

CASTINGS
Brass, Bronze and Aluminum
Hand or Machine Molded
Metal Patterns—Machine Work
HAMPDEN BRASS CO.
Springfield, Mass.

FRANKLIN MACHINE CO.
Engineers—Founders—Machinists
Providence, R. I.
Gray Iron Castings
Harris-Corliss Engines
Ball Winding Machines
Shoe Lace Tipping Machines
Wool and Yarn Baling Presses
Special Machinery of all kinds
Eastern Representative for
Cleveland Worm Gears
And Worm Gear Reduction Units.

CASTINGS
Grey Iron, Brass, Bronze

Reputation for high grade work and service at Legitimate Prices

Turner & Seymour Mfg. Co.
Torrington Connecticut

1848 to 1921
Gray **CASTINGS** *Chilled*
Semi-Steel

Don't you think that 73 years has given us the necessary experience to handle your work right? Add to that experience the proper equipment and you have an ideal combination. We can make your castings any size up to 40 tons.

FARREL
FOUNDRY & MACHINE CO.
ANSONIA, CONNECTICUT

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

Buffalo Bronze Die Cast Corporation

100 Arthur St., Buffalo, N. Y.

SPECIALISTS IN
Aluminum Bronze Die Casting, Chilled Tin Bronze Castings, Brass and Aluminum Castings

Grey Iron Castings

up to 10 tons each.

Exceptional facilities for production work. Patterns—Machine work.

Fillmore Ave.
Foundry & Iron Works, Inc.
Established 1887 Buffalo, N. Y.

ESTIMATES FROM BLUE PRINTS ON
Gray Iron Castings
FROM 1 LB. TO 20,000 LBS. EA.
Rough or Machined
THE STRAIGHT LINE ENGINE CO., INC.
SYRACUSE, N. Y.

Gray Iron Castings

Pattern Work Machine Work

We make gray iron castings up to 40,000 pounds each
Modern Shop and Equipment
Baker Manufacturing Corporation
Saratoga Springs, N. Y.

E. G. MUNSON, Utica, N. Y.

GRAY IRON CASTINGS
PATTERN WORK (Wood & Iron)
MACHINE WORK

The building and mounting of patterns for moulding machines a specialty.

Castings and Machine Work

Gray Iron, Brass and Aluminum Castings, also heavy and light machine work, with a good equipment for both. Reasonable prices and prompt deliveries. First-class workmanship. Write us.

McKim Foundry & Machine Co.
Lockport, N. Y.

Soft Gray Iron Castings

CHARCOAL MIXTURE, FREE MACHINING BRASS AND BRONZE
MACHINE OR HAND MOULDED
SAND BLASTED OR TUMBLED
PRICES RIGHT + SERVICE RIGHT
SATISFACTION GUARANTEED

GLENS FALLS MACHINE WORKS
GLENS FALLS, N. Y.

ALUMINUM BRASS BRONZE
CASTINGS
Accurate, Clean
To Exacting Specifications
Metal & Alloy Specialties Company, Inc.
1877 Elmwood Ave., Buffalo, N. Y.

CHEMUNG FOUNDRY & SUPPLY CO., INC.

Gray Iron and Semi-Steel
CASTINGS
Brass, Bronze and Aluminum Castings
ELMIRA, N. Y.

Gray Iron Castings

Our up-to-date foundry in connection with our extensive machine shops puts us in position to do a great variety of high grade work. Our prices are reasonable and orders will be filled promptly.

A. L. SWETT IRON WORKS
Medina, N. Y.

GRAY IRON CASTINGS

With Patterns for Quantity Orders
Rigged Work a Specialty

Richey, Browne & Donald, Inc.
2101 Flushing Ave. Maspeth (L. I.), N. Y.

Brass–Bronze
White Metal–Aluminum
CASTINGS

Intricate precision work on contract from drawings to finished work, including plating and polishing, under one roof. Send us your specifications.

Jenkins Manufacturing Co.
BLOOMFIELD, N. J.

CASTINGS
GRAY IRON
BRASS
BRONZE
ALUMINUM

PATTERN WORK

RARITAN FOUNDRY CO.
RARITAN, N. J.

Small Soft Gray Iron Castings

In production quantities, for machining. General Class; Electrical Instruments, Textile Machinery, Automobile Parts, Toys, etc.

KLINE HARDWARE CO.
Allentown, Pa.

Grey Iron Castings

1 Ounce to 1500 Lbs. Large or small orders given careful consideration and attention. Machine or hand molded. Pattern and Machine Shop in connection.

Nute, McGehee, Geary Co., Inc.
Chambersburg, Pa.

Gray Iron Castings

of All Descriptions

Let us estimate on your requirements. Prompt deliveries.

Berks Foundry & Manufacturing Co.
Foundries: Hamburg, Pa.; Watsontown, Pa.
Office: Berks, Pa.

NON-FERROUS CASTINGS

Brass, Bronze, Aluminum

Castings up to 400 lbs. each; machining on small work. Jobbing work a specialty.

READING BRASS WORKS, INC.
104 Court St. Reading, Pa.

Our Specialties—Gray Iron Castings

Superior quality, machine or hand moulded, sand blasted, pickled or tumbled. On good tonnage we will make special moulding equipment that will warrant you the best price and most efficient service. Patterns made of wood, brass, aluminum or iron.

Grinding wheel machinery, hack saw machines, Huntington emery wheel dressers and cutters, drill press vises, wire rod cutters.

NORTH WALES MACHINE CO., Inc., North Wales, Pa.

EDWIN A. MOORE

Iron Founder (Grey Iron)

Reading, Pa.

Specialties: Art goods, Typewriters, Adding Machines, Ignition Systems, Talking Machines, Lighting Fixtures, and the like.

CASTINGS

Gray Iron or Semi-Steel

From 1 lb. to 50,000 lbs.
Rough or Machined

VALLEY IRON WORKS
Williamsport, Pa.

Certified Malleable Castings

LANCASTER FOUNDRY CO.
LANCASTER, PA.

Wm. Adams Foundry Co., Inc.
960-970 North Ninth St., Philadelphia

Iron Castings of all kinds up to 8000 lbs. each.
A few of our specialties are:
Builders Cast Iron Work—Drainage Castings, Flanges and Fittings,
Special Castings to order,
Machine and Pattern Work.

GRAY IRON CASTINGS

UP TO 1½ TONS
PROMPT SERVICE
Send blueprints for reasonable prices
Penn Foundry & Manufacturing Co.
Reading, Pa.

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

Gray Iron Castings

Machine and Hand Moulded

1 lb. to 3000 lbs.
Pattern and Machine Work
Send drawings for prices

The Samuel J. Creswell Iron Works
23d and Cherry Sts. Philadelphia, Pa.

Andes Foundry Company

SMALL GREY IRON CASTINGS

Ephrata, Pa.

Brass, Bronze, Aluminum Castings

Machining, Polishing, Buffing, Plating. Send sample castings or blue print for quotations.

LEBANON BRASS MFG. CO.
Lebanon, Pa.

GRAY IRON CASTINGS

1 lb. to 5 tons.
Pattern and Machine Shop Work.
Let us quote you on your casting and machine shop requirements.

Piedmont Foundry & Machine Co., Inc
Piedmont, West Va.

LEVERING BROTHERS
BALTIMORE, MD.

Grey Iron, Brass, Bronze, Aluminum Castings. Pattern Work
Sash Weights, Hard Iron Castings
Plants at Baltimore, Md.; Buffalo, N. Y.; York, Pa.; Hanover, Pa.

BRASS — BRONZE — ALUMINUM
MANGANESE — ACID RESISTING

CASTINGS

The John Harsch Bronze & Fdy. Co.
Cleveland, Ohio
Castings Up to 4 Ton for Steel Mill and Marine Engine Builders
Aluminum Match Plates a Specialty

Gray Iron Castings
Machine Work
SERVICE QUALITY

THE SIMPSON FOUNDRY AND ENGINEERING CO.
Newark, Ohio

Brass — Bronze — Aluminum

CASTINGS

The Anchor Brass & Aluminum Co.
9th and Freeman Cincinnati, Ohio
MOTTO: *"SERVICE AND QUALITY"*

Engineers Machinists
Founders

CASTINGS
CHEMICAL
SEMI STEEL
ACID RESISTING
HEAT RESISTING
GREY IRON
CONVERTER STEEL

Heavy Machinery
Blast Furnace Equipment
Steel Plant Equipment

We solicit your inquiries.

PULASKI
Foundry & Manufacturing Corporation
Works: Pulaski, Virginia
Sales Offices:
2422 Euclid Ave., Cleveland, O.

THE ADAMSON MACHINE CO.

Engineers, Machinists, Iron and Steel Founders

Rolling Mill Machinery, Blast Furnace Castings and Machine Work, Reduction Gear Drives, Shafting, Bearings, etc. Your inquiries are solicited.

THE ADAMSON MACHINE CO.

Akron, Ohio

THE SPRINGFIELD
Aluminum Plate & Castings Co.
Springfield, O.

Makers of Guaranteed Pattern Plates, Aluminum Castings and Wood and Metal Patterns.
We solicit your inquiries

PISTONS

We make a special iron for making automobile pistons. Send your patterns for trial order. No charge for trail orders. Light Grey Iron Castings.

Frank Foundries Corporation
Davenport, Iowa Moline, Ill.

Grey Iron Castings

Light and Medium. Welding Rods Grey Iron Heat Treated. Specializing in Automobile Work.

Gale Manufacturing Co.
Albion, Mich.

CHARCOAL IRON—SEMI-STEEL

CASTINGS

MACHINE MOLDED—SAND BLASTED
PATTERNS—METAL OR WOOD

BELDING FOUNDRY COMPANY
BELDING, MICH.

Machined Steel Castings

We make light steel castings up to 500 pounds and are prepared to do the machine operations. Send us blue prints for estimate.

Reed Foundry & Machine Co.
Kalamazoo, Mich.

Grey Iron Castings

of
unsurpassed strength—true to pattern
for
implement-automobile-machinery manufacturers
At Our No. 1 Foundry
hard iron engineering castings for severe wear requirements
At Our No. 2 Foundry

Motor Castings Co.,
No. 1 Plant
West Eckman St., South Bend, Ind.

Gray Iron Castings

Let us figure on your requirements.

Hartford Foundry & Machine Company
Hartford City, Indiana

CONTRACT WORK

SPECIAL MACHINERY
MACHINE WORK
PRESS WORK-FOUNDRY WORK
AUTOMATIC SCREW MACHINE WORK

Rates—One Inch Space $4.00 Per Insertion on Yearly Basis.
Rates for Shorter Runs or Other Spaces Furnished on Request.

HIGH GRADE
GRAY IRON
and
SEMISTEEL

Automotive Castings
also
Fine Gray Iron Castings for
Medium and Light Work

Connersville Foundry Corp.
Connersville Indiana

Gray Iron Castings

in quantities
10 lbs. to 7½ tons. Quick Deliveries

Vogt Brothers Mfg. Co., Inc.
Louisville, Ky.

Grey Iron Castings
Light and Heavy

Machinery Soft Castings
a Specialty

Green's Car Wheel Mfg. Co.
St. Louis, Mo.

PATTERNS

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

PATTERNS

WOOD and METAL

Production PLATES OUR SPECIALTY
Friendship Pattern Works
FRIENDSHIP, N. Y.
BRASS BRONZE ALUMINUM CASTINGS

PATTERNS

May we have your inquiries?

American Pattern Works Co.
York, Pa.

Get more use out of your floor space by selling used machinery and equipment you don't need, through the Clearing House Section.

MISCELLANEOUS

ALL ADVERTISEMENTS ARE GROUPED GEOGRAPHICALLY

William E. Buck Mfg. Co.
Eastport, Me.

Hardware Mfrs., Jigs, Fixtures, Tools, Sheet Metal Work. Machine Work.

Contracts Solicited.

Welded
Tanks, Boxes, Gearguards, Acid Pots, Annealing Tanks

Cave Welding & Mfg. Co.
62 Taylor St. Springfield, Mass.
303 Center St. Bridgeport, Conn.

Steel Tanks, Stacks, Etc.

We fabricate materials for steel tanks and stacks of all kinds and sizes or any special work requiring sheet steel 3/16" or lighter down to No. 16 gauge. First-class workmanship.

JOS. F. WANGLER BOILER & SHEET IRON WORKS CO.
St. Louis, Mo.

PLATE and SHEET METAL WORK

of any description. Attention given to special construction in copper and brass. Send us sample or blueprint.

BECKLEY PERFORATING CO.
North Avenue Garwood, N. J.

Small Special Steel Sections

Rolling Mill prepared to produce, will roll for reliable continuous customers. Address Box 641, care

THE IRON AGE, Widener Bldg., Philadelphia, Pa.

What Will Get That Trade—Sales Talk or Silence?

Take your pick—there is one thing certain—when you are sick, you go to a doctor—when you need money to push your business, you go to a banker—and so it goes.

NOW—there is no question that to get business you must go after it—it won't come to you unless you do.

Salesmen, direct-by-mail campaigns, etc., help put your story across, but tradepaper advertising gives it the entering wedge.

Think it over

THE IRON AGE
The World's Greatest Industrial Paper
Established 1855
239 WEST 39th STREET, NEW YORK CITY
Charter Member A. B. C. and A. B. P.

BUSINESS OPPORTUNITIES

Factory Sites and Factories for Sale—Agencies Wanted — Miscellaneous Advertisements

RATES PRICE PER INSERTION

	1 Time	2 Times	3 Times	4 Times
1 inch	$5.75	$5.25	$5.25	$4.75
2 inches	10.50	9.50	9.50	8.75
3 inches	15.75	14.25	13.13	13.13
4 inches	19.00	17.50	17.50	16.50
8 inches	35.00	33.00	33.00	32.00

Rates for other spaces furnished on request.

MANUFACTURERS ATTENTION!

Modern manufacturing buildings available in Long Island City, New York, Brooklyn and New Jersey, suitable for any manufacturing purpose.

These properties can be had on very attractive terms and full particulars will be sent to you upon request.

Write us your requirements.

HOLT & MERRALL, Inc.
Industrial Real Estate
342 Madison Ave., New York City
Vanderbilt 4699

FOR SALE

Modern Manufacturing Plant, in new condition, total area ground floor 45,000 square feet, together with eight acres of land. Located in live Manufacturing Town near Pittsburgh. Excellent labor and shipping conditions. Half Price for immediate sale. Principals only. Address Manufacturer, Box A-550, Iron Age Office, Park Bldg., Pittsburgh, Pa.

Go After the Business

Can you handle orders for

Machine Work
Castings
Forgings
Stampings
Dies, Jigs, Fixtures
Special Machinery
Patterns, etc.

If so, insert an announcement in the Contract Work Section and get your share of the orders placed by Iron Age subscribing plants.

The cost is low. Send your ad to the

CONTRACT WORK SECTION

THE IRON AGE
The World's Greatest Industrial Paper
Established 1855
239 W. 39th STREET, NEW YORK CITY
Charter Member A. B. C. and A. B. P.

Receiver Will Sell at Private Sale

Manufacturing plant at Newton Falls, Ohio. Building and Machinery in excellent condition. Equipped for general machine work, and light stamping work. Approximately 10,000 square feet of floor space, about 3 acres of land, frontage on two railroads and one interurban line. Very attractive price and terms can be offered.

D. N. ROSEN, Receiver
621 Second National Bldg., Akron, Ohio

Manufacturers Trustees Receivers

We know how to sell your plant. Let us show you our record as

LIQUIDATORS
APPRAISERS AUCTIONEERS

Write, wire or phone for quick action

Industrial Plants Corporation
25 Church St., N. Y. C.
'Phone, Rector 348

CHICAGO

Offers cheapest Industrial acres in U. S. Desirable sites 5 to 200 acres, well located, best transportation, wonderful labor market—prices one-half to one-third those of smaller cities. Come to the centre of Country's Industrial Activity. Buy now and solve your high freight problems. Prices on request.

WOODRICH BROTHERS
Industrial Acres
1142 East 75th Street, Chicago, Illinois

FOR SALE OR LEASE—Machine Shop in Eastern part of Ohio, located in the center of the steel industry. This Plant has 12,000 sq. ft. floor space and is equipped with all up to date machine tools, suitable for the manufacture of Special Machinery, up to about 2 tons in weight. Will consider the sale of this plant complete or the sale of machinery only and lease buildings; or will lease the whole plant. For further information write E. W. Perry, 326 Alameda Ave., Youngstown, Ohio.

We negotiate the sale and purchase of Manufacturing companies. What have you, and what do you want? Inquiries invited.

The National Business Bourse, Inc.
Confidential Negotiators
19 S. La Salle St., Chicago

BALTIMORE Factory Sites

WILLIAM MARTIEN & CO.
1413 Lexington Bldg.
Baltimore, Md.

STEEL CASTING PLANT WANTED

Want to obtain partial or complete control of foundry making small steel castings, which requires operating and developing ability.

Small or medium-sized plant preferred, either idle or going business.

ADDRESS BOX R-880
care *The Iron Age*, New York.

Attention, Manufacturers or Owners of large or small manufacturing plants.

Man with wide experience in manufacturing, is capable of taking charge of your plant and putting it on a good paying basis. Prefer taking plant on a percentage basis, but will lease plant or accept position to take full charge. Address Box R-893, care *The Iron Age*, New York.

SALES ENGINEER—Manufacturers representative will take line of meritorious products for reputable manufacturer, on sales agency basis in territory of Virginia, West Virginia and Maryland for power plants, industrial, utilities and municipal engineering. Government business expediently conducted. W. J. Spencer, 52 Century Building, Washington, D. C.

GENERAL MANAGER

desires connection with live Steel Foundry Company with the object of acquiring interest and making permanent connection. Has record of changing companies serious deficit to profitable business. Has large sales connections and can guarantee immediate business. At present general manager of large well known steel foundry operating every day.

ADDRESS BOX R-875
care *The Iron Age*, New York.

Wanted—Manufacturer's Agent

A live manufacturing company desires representation in New York City and Chicago. Representative must have a knowledge of Sheet Metal Stampings and Tumbling Equipment. State qualifications and experience.

ADDRESS BOX R-937
care *The Iron Age*, New York.

AGENCIES WANTED

Contractors, Railroad and Warehouse Equipment and Supplies. Cars, Trucks, Shovels, Cranes, Track Accessories, etc. St. Louis and south. Twenty years experience. Well appointed office maintained in St. Louis.

ADDRESS BOX R-927
care *The Iron Age*, New York.

Partners Wanted

A company located near New York City is manufacturing and marketing a special line of small drop-forged tools. Its business is rapidly increasing and its President desires a partner competent to take entire charge of the factory, leaving the President free to devote his time to the sales development. A man of the necessary ability and experience, who can invest $10,000 to $30,000, will find this a very valuable opportunity.

A New York financier owns a plant in central Ohio, ready to manufacture a new electric welded product, for which a broad market is assured. He wants a partner who is an experienced works manager, able to take entire charge of factory plant and to invest $25,000 to $100,000 in the business. To such a man a very attractive proposition will be made.

Address

The Engineering Business Exchange

Charles Whiting Baker, Director

30 Church St., New York City

A well known concern is in position to consider manufacturing a complete line of radial or thrust ball bearings and thrust roller bearings. Prefer consolidating with, or taking control of a small company established in this field. In reply give full details as to your present yearly output, sales possibilities and send your catalog. Correspondence confidential.

ADDRESS BOX R-898

care *The Iron Age*, New York.

Sales Accounts Wanted

Sales engineer of eight years experience, 32 years old, at present employed by one of the largest corporations, would like to handle one or two substantial accounts in the Pittsburgh district. The best of references furnished.

ADDRESS BOX A-549,

care *The Iron Age*, Park Building, Pittsburgh, Pa.

Can Take on the Sale of a Product of Merit Required by Detroit Manufacturers

It must be produced by a Competent Organization (not necessarily a large one) which is favorably located for delivery in this market.

ADDRESS BOX R-892

care *The Iron Age*, New York.

Desire to get in touch with parties who would be interested in the manufacture of a Taper Roller Bearing of improved design and low manufacturing cost.

ADDRESS BOX R-882

care *The Iron Age*, New York

NEW YORK SALES ORGANIZATION
in
MATERIAL HANDLING MACHINERY

Seeks Specialties to sell to Industrial and Transportation concerns.

ADDRESS BOX R-691

care *The Iron Age*, New York.

SALES ENGINEERS

If you have a product of merit and desire to be represented in California, we have a trained selling organization and will act as Agent for Elevators, Tanks, Special Machy., etc.

Address, AGENT,

507 Amer. Bank Bldg.. Los Angeles, Cal.

High grade established Chicago organization is seeking sales representations. Correspondence solicited with responsible companies handling advertised products and desiring Chicago or middle west representation.

Address Box R-925

care *The Iron Age*, New York.

Don't Stop Pedaling When Going Uphill—

If you are one of the wise manufacturers you will drive home your story now — today — tomorrow — next week—next month—next year, for constant reiteration will bring you your share of the present business and the greater business to come.

Whether your plant is large or small, tell folks what you are doing—what your product has done—will do.

Keep at it—now—always —don't waver—stay right on the road—the straight road to business.

THE IRON AGE

The World's Greatest Industrial Paper

Established 1855

239 WEST 39th STREET, NEW YORK CITY

Charter Member A. B. C. and A. B. P.

THE WEEKLY MEETING PLACE OF EMPLOYER AND EMPLOYEE

HELP WANTED

Are You This Manager?

A manager with an *established record* in developing sales for drop forge and grey iron casting products.

An old established manufacturing concern operating extensive departments for the manufacture of drop forgings and grey iron castings requires the services of a thoroughly capable manager who has made good in securing distribution for these products.

If you are this man, we have an interesting proposition for you. Don't waste your time and ours if you have not already demonstrated your ability.

ADDRESS BOX R-924
care *The Iron Age*, New York.

Thoroughly competent MECHANIC between 30 and 50 years of age, for MASTER MECHANIC, to take charge of machine shop and press room of large shop manufacturing household utensils; must be experienced designer of tools for the manufacture of steel and aluminum. Give full confidential details of past experience with references in first letter; also state salary expected. Address Box L-316, care *The Iron Age*, New York.

SALESMAN, one who is calling on power plants in any part of Pennsylvania, New Jersey, Delaware, Maryland, to sell on commission as side line high grade article that is needed and wanted by every power plant. Address Box R-557, care *The Iron Age*, New York.

SALES ENGINEER or REPRESENTATIVE—one who is calling on power plants in Boston, Mass. and vicinity, Buffalo, N. Y. and vicinity to sell on commission as side line high grade article that is needed and wanted by every power plant. Address Box R-867, care *The Iron Age*, New York.

PATTERN SHOP FOREMAN experienced in both wood and metal pattern work, for Pattern Department in our steel foundry engaged exclusively on car coupler and other duplicate work. Extensive experience in molding machine practice essential. THE McCONWAY & TORLEY CO., 48th St. & A. V. Ry., Pittsburgh, Pa.

A SALES MANAGER—Must have some mechanical experience, to put on the market and develop a new article for which there is a great demand. Must have a man that can earn $10,000 or more per year, to handle this proposition. Give full references and experience. Address Box R-916, care *The Iron Age*, New York.

FIRST-CLASS SALESMAN to solicit orders for bronze letter boxes among the Electrician and Hardware trade. Address Box R-923, care *The Iron Age*, New York.

Young man as SUPERINTENDENT of rolling mill manufacturing specialty, hollow and solid staybolt iron. Prefer experienced hand-round roller on bar and finishing mills, technical graduate and mechanical engineer, who thoroughly understands the maintenance and operation of electrically-driven machinery, and capable of handling men. State age, experience, references, wages expected, in own handwriting. FALLS HOLLOW STAYBOLT CO., Cuyahoga Falls, Ohio.

HELP WANTED

TRAVELING SALESMAN or MECHANICAL ENGINEER with specialized experience in the use of safety set screws. Must have both selling ability and mechanical knowledge. Write, describing education and experience. Address Box R-926, care *The Iron Age*, New York.

ELECTRIC FURNACE SUPERINTENDENT; should have tool steel (including high-speed) experience. State age, experience and salary required. Reply fully, in strict confidence, giving particulars of what you consider good melting, casting and shop practice, also references. Address Box R-929, care *The Iron Age*, New York.

SITUATIONS WANTED

Position wanted by technical graduate, having practical experience as CHEMIST, METALLURGIST, SUPERINTENDENT of open hearth and works manager. Experienced in melting, rolling, forging, heat treating, testing, inspection and handling men. Both carbon and alloy steels. Will accept any position on production, sales or executive, having future for one with ability. Good references from all former employers. Address Box R-911, care *The Iron Age*, New York.

MANAGER OF FOUNDRY, competent to handle all departments of the business, has a wide practical experience, can furnish best of references. Address Box R-909, care *The Iron Age*, New York.

M. I. T. GRADUATE MECHANICAL ENGINEER with six years' experience in Engineering, Selling and Management, wants employment with an Eastern Manufacturing Company where he can develop and expand along executive lines. Address Box R-874, care *The Iron Age*, New York.

MECHANICAL ENGINEER, age 32, technical and practical experience covering 12 years on design and manufacture of machine tools, special and automatic machinery, jigs and dies, experienced Plant Engineer and modern cost and production method desires position as engineer or assistant to executive. Address Box R-912, care *The Iron Age*, New York.

APPRENTICE SUPERVISOR for railroad or industrial, 12 years' shop experience; practical shop man and draftsman. Age 30. Address Box R-889, care *The Iron Age*, New York.

EXECUTIVE GENERAL or ASSISTANT GENERAL MANAGER, at present with large corporation, desires change for personal reasons. Experienced in the Design and Manufacture of Engines, Heavy Machinery, Machine Tools and in quantity production. Desires connection with corporation requiring a man of sound business ability and a producer of results.

Experienced in equipment and organization of plants, works management. Mechanical Engineer and a successful designer. Can bring or produce product in new connection. Thoroughly capable of assuming full responsibility for successful operation and management of plant. Address Box R-746, care *The Iron Age*, New York.

METALLURGIST with thorough automotive experience ferrous and non-ferrous, seeks executive position. Is experienced in all forms of heat treating, tool hardening and carbonizing and has installed several hardening plants. Fully trained chemist and capable of handling any form of physical testing. Address Box R-897, care *The Iron Age*, New York.

SITUATIONS WANTED

ACCOUNTING, COSTS, PLANNING PRODUCTION, time study. Permanent position desired with opportunity for future investment by Engineer graduate with factory experience. Age 30. Address Box R-866, care *The Iron Age*, New York.

PURCHASING AGENT—thoroughly experienced in buying methods, familiar with raw material markets, machine tools and supplies Ambitious, capable, good character, excellent references. Interview solicited. Address Box R-848, care *The Iron Age*, New York.

FOUNDRY SUPERINTENDENT or Foreman with clean record on loam, dry, green sand and up-to-date on moulding machine practise. Possesses tact, executive ability, can establish discipline and run department at highest state of efficiency. Highest credentials. Address Box R-864, care *The Iron Age*, New York.

WORKS MANAGER—Superintendent thorough business training; well balanced judgment, 22 years' experience embracing forge, machine shops, production plant, purchasing. Desires connection with a future. Not a floater. Address Box R-877, care *The Iron Age*, New York.

Twelve years' experience as an EXECUTIVE, with Metal Manufacturing concerns. Holding positions as Assistant Manager, Superintendent, Assistant Superintendent, Supervisor and foremanship. Mechanical education. Best of references if desired. Address Box R-884, care *The Iron Age*, New York.

DESIGNER, ENGINEER, age 31; 13 years' broad experience mechanical and industrial design and engineering. Design, executive or office position. Location immaterial. Address Box R-857, care *The Iron Age*, New York.

COST CLERK, age 30, experienced in pipe and rolling mill business desires position as same. Best of references. Address Box R-890, care *The Iron Age*, New York.

Position as STEEL WORKS EXECUTIVE or Open Hearth Superintendent, thoroughly experienced in operation, construction and design. Will furnish best of references at interview. Address Box R-780, care *The Iron Age*, New York.

YOU NEED ACCURATE COSTS. Expert Cost Accountant with eighteen years' experience in analytical and general accounting. Will guarantee to show leakages and improve conditions for the management. College graduate. Not particular as to location. Address Box R-903, care *The Iron Age*, New York.

CHEMIST AND METALLURGIST with ten years' experience, testing, research, heat treating, want position with FUTURE. Capable executive. Interview requested. Address Box R-922, care *The Iron Age*, New York.

GENERAL FOREMAN—20 years foundry experience; six as foreman. 2 years on brass; 4 years on gray iron. Knows and can apply up-to-date foundry methods, machines, etc. Address Box R-917, care *The Iron Age*, New York.

WORKS MANAGER OR SUPERINTENDENT BY A MAN WITH EXTENSIVE AND SUCCESSFUL EXPERIENCE WITH LARGE AND WELL-KNOWN PLANTS, THOROUGHLY FAMILIAR WITH MOST EFFICIENT METHODS, RESOURCEFUL, AND A GOOD ORGANIZER ABLE TO PRODUCE MOST SATISFACTORY RESULTS. ADDRESS BOX R-919, CARE *THE IRON AGE*, NEW YORK.

Help Wanted Rates

Set solid, minimum 50 words.....$3.00
Each additional word 6c
All capitals, minimum 50 words.....$4.50
Each additional word 9c
All capitals, leaded, minimum 50 words....$6.00
Each additional word 12c

Situations Wanted Rates

Set solid, minimum 25 words.....$ .75
Each additional word 3c
All capitals, minimum 25 words.....$1.50
Each additional word 6c
All capitals, leaded, minimum 25 words....$2.25
Each additional word 9c

Display Advertising Rates Given on Request

COUNT SEVEN WORDS FOR KEYED ADDRESS

ADDRESS MAIL CAREFULLY IN ORDER TO AVOID DELAY IN FORWARDING

Do not send original letters of recommendation in replying to advertisements—duplicates will answer the purpose. Letters forwarded without charge.

THE WEEKLY MEETING PLACE OF EMPLOYER AND EMPLOYEE

SITUATIONS WANTED

OPEN HEARTH SUPERINTENDENT or would take subordinate position. Better than twenty-five years' experience in carbon and alloy steel. Company now with being dissolved. Can give reference. Address Box R-918, care *The Iron Age*, New York.

PURCHASING AGENT or ASSISTANT, married, fourteen years' foundry experience buying pig iron, fuels, oils, sands, iron and steel, machine, pattern and all other shop and office supplies. Knowledge prices and sources. Locate anywhere or any line. Address Box R-921, care *The Iron Age*, New York.

INDUSTRIAL ENGINEERING, MAINTENANCE or CONSTRUCTION. Ten years' supervision on maintenance and construction. Seven years betterment work, on production, organization, operation, business administration. Age 35. Address Box R-920, care *The Iron Age*, New York.

SALES or MECHANICAL ENGINEER—Graduate mechanical engineer, until recently chief engineer of an organization engaged in the design, construction and operation of heat treating, enameling, forge and annealing furnaces; also experienced the engineering division of a prominent manufacturer of valves, fittings and power plant equipment; desires position in Chicago district. Thirty-three years of age; member of A. S. M. E., and able to furnish strictly high-grade references. Address Box 4038-A, care *The Iron Age*, Otis Bldg., Chicago.

COST and GENERAL ACCOUNTANT, 13 years' experience in stores department, costs, auditor, office manager. Public experience in cost and system work. Mining, metal working and allied lines. Willing to assume responsibility; successful in handling help. Age 34, married, no children; willing to travel; location no obect. Address Box R-934, care *The Iron Age*, New York.

STEEL FOUNDRY SUPERINTENDENT or Superintendent of melting department, open hearth or electric; 32 years old; 14 years' experience in metallurgical laboratory and steel foundry practice. At present employed as assistant superintendent of large foundry. Highest credentials. Address Box R-933, care *The Iron Age*, New York.

A hustling, experienced, wide-awake TRAVELING SALESMAN with several years' experience in general manufacturing and tool making; also experienced in Hardware and Plumbing business; employed at present as traveling salesman, but wishes to make a change and connect with an A-1 Tool, Hardware or Plumbing company as traveling salesman. Excellent reference. Address Box R-932, care *The Iron Age*, New York.

A high-grade manufacturing executive desires a new connection with some large corporation. Am a TECHNICAL GRADUATE, MECHANICAL ENGINEER, with 20 years' experience in gas engines, automobiles, valves, fittings and plumbing goods. My experience covers all the various manufacturing departments, as well as sales and office management. Address Box R-931, care *The Iron Age*, New York.

A RATHER UNUSUAL COMBINATION of selling and mechanical ability, with accomplishments in both fields. Now employed at $6,000. Will make change January 1st. Desire Salesmanagership or Head of Sales Promotion, Machine Tools, Grinding Machines or high-class Mechanical Product.. Location unimportant. Address Box R-906, care *The Iron Age*, New York.

SITUATIONS WANTED

CHEMIST, METALLURGIST, 15 years' experience in iron and steel. Broad experience in rolling mill practice, steel castings and forgings; capable of assuming responsibility. Moderate salary. Address Box R-930, care *The Iron Age*, New York.

PRODUCTION SUPERINTENDENT of stampings, hardware and metal products. Capable organizer, systematizer and promoter of production, open for immediate engagement at moderate salary. Reference. Address Box R-939, care *The Iron Age*, New York.

SITUATIONS WANTED

ENGINEERING SALESMAN or MANUFACTURERS' AGENT. Twelve years' selling experience in Middle Atlantic territory, three years as manager. Well versed in soft steels with special training in forgings and railway materials. College training. Address Box R-940, care *The Iron Age*, New York.

DROP FORGE SUPERINTENDENT. I have had long experience handling help in the general drop forge line and can manage all departments. Address Box R-938, care *The Iron Age*, New York.

Are You Making Use of the Section Numbers?

There's one at the top of every page. It's there for the purpose of guiding you quickly to Section 6, for example, if you are in the market for Castings—to Section 50 if you want to buy Power Plant Equipment, and to every other section, containing a wealth of buying information, all grouped according to products.

Section 3 contains a complete index of the section numbers. It's your starting point when looking for buying information.

Help Wanted Rates

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Each additional word 9c
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BUYERS INDEX

The firms listed here are also represented with an advertisement in this issue. See the advertisements for further information.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

ABRASIVE WHEELS—See Grinding Wheels

ACCOUNTANTS AND AUDITORS
Fielden & Co., Philadelphia, Pa.

ACCUMULATORS
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Blaw-Knox Co., Pittsburgh, Pa.
Elmes, Chas. F., Eng. Wks., Chicago, Ill.
Garrison, A., Fdry. Co., Pittsburgh, Pa.
Mesta Mach. Co., Pittsburgh, Pa.
Southwark Fdry. & Mach. Co., Phila., Pa.
Watson Stillman Co., 190 Fulton St., N. Y. C.
Wood, R. D., & Co., Philadelphia, Pa.

ACETYLENE—Dissolved
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.

ACETYLENE—In Cylinders
Prest-O-Lite Co., 30 East 42nd St., N. Y. C.

AGITATORS
Blaw-Knox Co., Pittsburgh, Pa.

AIR CONDITIONING SYSTEMS
Sturtevant, B. F., Co., Hyde Park, Mass.

AIR PRESSES—Power
Zeh-Hahnemann Co., Newark, N. J.

AIR TANKS AND CYLINDERS
Air-Tight Steel Tank Co., Pittsburgh, Pa.
Janney, Steinmetz & Co., Philadelphia, Pa.
Scaife, William B., & Sons Co., Pitts., Pa.

ALLOYS—Titanium
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

ALLOYS—Uranium
Standard Alloys Co., Pittsburgh, Pa.

ALLOYS—Vanadium
Standard Alloys Co., Pittsburgh, Pa.

ALUMINUM—Ingots
Erdle Perforating Co., Rochester, N. Y.
Leavitt, C. W., & Co., 30 Church St., N. Y. C.
Rogers, Brown & Co., New York City.
United Smelting & Aluminum Co., Inc., New Haven, Conn.

ALUMINUM—Sheets and Rods
Baush Mach. Tool Co., Metals Div., Springfield, Mass.

AMMONIA RECOVERY PLANTS
Semet-Solvay Co., Syracuse, N. Y.

ANCHORS—Marine
Star Expansion Bolt Co., 147 Cedar St., N. Y.

ANGLES, CHANNELS AND TEES
Interstate Iron & Steel Company, Chicago, Ill.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.

ANTI-FRICTION METALS—See Babbitt Metal

ANVILS
Engle Anvil Works, Trenton, N. J.
Potts, Horace T., & Co., Philadelphia, Pa.
War Dept., Ordnance Dept., Washington, D. C.

APPRAISERS
Standard Appraisal Co., 90 John St., N. Y. C.

ARRESTERS—Spark
Harrington & King Perforating Co., Chicago.
Pittsburgh Perforating Co., Pittsburgh, Pa.

ASH HANDLING EQUIPMENT
Green Eng. Co., East Chicago, Ind.

AUCTIONEERS
Smith & Jaffe, 68 West 45th St., N. Y. City.

AXLES—Car and Locomotive
Midvale Steel & Ordnance Co., Phila., Pa.
Standard Steel Works Co., The, Phila., Pa.

BABBITT METAL
Ajax Metal Co., Philadelphia, Pa.
Damascus Bronze Co., Pittsburgh, Pa.
United Smltg. & Aluminum Co., Inc., New Haven, Conn.

BALL FLOATS
Naugatuck Mfg. Co., Naugatuck, Conn.

BALLS—Steel, Brass and Bronze
Auburn Ball Bearing Co., Rochester, N. Y.
Bethlehem Steel Company, So. Bethlehem, Pa.
New Departure Mfg. Co., Bristol, Conn.
Philadelphia Steel & Iron Co., Phila., Pa.
Pruyn Bearings Exchange, Chicago, Ill.

BANDS—Steel
Akron-Selle Co., Akron, O.
Interstate Iron & Steel Company, Chicago, Ill.

BAR TWISTING MACHINES
Lewis Foundry & Machine Co., Pittsburgh, Pa.

BARGES—Steel
American Bridge Co., 30 Church St., N. Y. C.

BARRELS—Sand-Blast
Hoevel Mfg. Co., Jersey City, N. J.

BARS—Alloy
Bethlehem Steel Company, So. Bethlehem, Pa.
Witherow Steel Company, Pittsburgh, Pa.

BARS—Bronze
Lumen Bearing Co., Buffalo, N. Y.

BARS—Concrete, Reinforcing
American Steel & Wire Co., Chicago, Ill.
Barbour, R. W., 114 Liberty St., N. Y. C.
Bethlehem Steel Co., South Bethlehem, Pa.
Harrisburg Bar Mill Co., Harrisburg, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Witherow Steel Company, Pittsburgh, Pa.

BARS—Forging
Witherow Steel Co., Pittsburgh, Pa.

BARS—Iron and Steel
Ames, W., & Co., Jersey City, N. J.
Barbour, R. W., 114 Liberty St., N. Y. C.
Bethlehem Steel Co., South Bethlehem, Pa.
Betz-Pierce Co., The, Cleveland, O.
Carnegie Steel Co., Pittsburgh, Pa.
De Con, Richard, Company, Philadelphia, Pa.
Donner Steel Co., Inc., Buffalo, N. Y.
Egleston Bros. & Co., Inc., 166 South St., New York City.
Electric Steel & Forge Co., Cleveland, O.
Harrisburg Bar Mill Co., Harrisburg, Pa.
Harvey, Arthur C., Co., Allston 34, Boston.
Illinois Steel Co., Warehouse Dept., Chicago.
Interstate Iron & Steel Co., Chicago, Ill.
Lackawanna Steel Co., Lackawanna, N. Y.
Midvale Steel & Ordnance Co., Phila., Pa.
Morris, Wheeler & Company, Philadelphia, Pa.
Nicetown Plate Washer Co., Philadelphia, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Pardee Steel Corp., Perth Amboy, N. J.
Philadelphia Steel & Iron Co., Phila., Pa.
Pottstown Steel Co., Douglassville, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.
Taylor-Wason Corp., Boston, Mass.
Tioga Steel & Iron Co., Philadelphia, Pa.
War Dept., Ordnance Dept., Washington, D. C.
Witherow Steel Co., Pittsburgh, Pa.

BARS—Manganese Steel
Manganese Steel Forge Co., Philadelphia, Pa.

BEAMS, CHANNELS AND ANGLES
Bethlehem Steel Company, So. Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
De Con, Richard, Company, Philadelphia, Pa.
Egleston Bros. & Co., Inc., 166 South St., New York City.
Illinois Steel Co., Warehouse Dept., Chicago.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Lackawanna, N. Y.
Morris, Wheeler & Company, Philadelphia, Pa.
Phoenix Iron Co., Philadelphia, Pa.
Pottstown Steel Co., Douglassville, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.
Shippers' Car Line, Inc., 165 B'way, N. Y.
Taylor-Wason Corp., Boston, Mass.
Witherow Steel Co., Pittsburgh, Pa.

BEARINGS—Babbitt
Doehler Die Castings Company, Court & Huntington Streets, Brooklyn, N. Y.
Lumen Bearing Co., Buffalo, N. Y.

BEARINGS—Ball
American Roller Bearing Co., Pittsburgh, Pa.
Auburn Ball Bearing Co., Rochester, N. Y.
Bearings Company of America, Lancaster, Pa.
Fafnir Bearing Company, New Britain, Ct.
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
New Departure Mfg. Co., Bristol, Conn.
Norma Company of America, Anable Ave., Long Island City, N. Y.
Pruyn Bearings Exchange, Chicago, Ill.
Torrington Co., Torrington, Conn.

BEARINGS—Brass and Bronze
Bunting Brass & Bronze Company, Toledo, O.
Columbus Brass Company, Columbus, O.
Johnson Bronze Company, New Castle, Pa.
Wellman Bronze Co., Cleveland, O.

BEARINGS—Combination
Norma Company of America, Anable Ave., Long Island City, N. Y.

BEARINGS—Oilless
Metaline Company, Long Island City, N. Y.

BEARINGS—Roller
American Roller Bearing Co., Pittsburgh, Pa
Federal Bearings Co., Inc., Poughkeepsie, N. Y.
Hyatt Roller Bearing Co., 100 W. 41st St., New York City.
Norma Company of America, Anable Ave., Long Island City, N. Y.
Pruyn Bearings Exchange, Chicago, Ill.

BEARINGS—Shaft Hanger
Fafnir Bearing Company, New Britain, Ct.

BEARINGS—Thrust
Bearings Co. of America, Lancaster, Pa.
Mesta Mach. Co., Pittsburgh, Pa.
Norma Company of America, Anable Ave., Long Island City, N. Y.

BELT DRESSING
Gandy Belting Co., Baltimore, Md.
Schieren, Chas. A., Co., 37 Ferry St., N. Y.

BELT FASTENERS
Bristol Co., Waterbury, Ct.

BELTING—Chain
Link-Belt Co., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.

BELTING—Fabric
Gandy Belting Co., Baltimore, Md.
Stanley Belting Corp., Chicago, Ill.

BELTING—Leather
Chicago Rawhide Mfg. Co., Chicago, Ill.
Schieren, Chas. A., Co., 37 Ferry St., N. Y.

BELTING—Leather Link
Schieren, Chas. A., Co., 37 Ferry St., N. Y.

BELTING—Rubber
New York Belting & Packing Co., 91-93 Chambers St., N. Y.
Robins Conveying Belt Co., Passaic, N. J.

BENCH LEGS—Steel
Lupton's, David, Sons Co., Phila., Pa.

BENCHES—Draw
Vaughn Mchry. Co., Cuyahoga Falls, Ohio.

BENCHES—Saw
Kidder, R. E., Co., Worcester, Mass.

BENDING MACHINES—Hand and Power
Cleveland Punch & Shear Wks Co., Cleve., O.
Covington Mch. Co., Covington, Va.
Dreis & Krump Mfg. Co., Chicago, Ill.
Ryerson, Joseph T., & Son, Chicago, Ill.

BENDING AND STRAIGHTENING MACHINES—Rail
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Ryerson, Joseph T., & Son, Chicago, Ill.
Southwark Fdry. & Mach. Co., Phila., Pa.

BENZOL RECOVERY PLANTS
Semet-Solvay Co., Syracuse, N. Y.

BILLETS—Forging
Brier Hill Steel Co., Youngstown, O.
Interstate Iron & Steel Co., Chicago, Ill.
Ryerson, Joseph T., & Son, Chicago, Ill.
Steel Tube Co. of America, Chicago, Ill.

BILLETS—Nickel Steel
Bethlehem Steel Company, So. Bethlehem, Pa.

BILLETS—Steel
Bethlehem Steel Company, So. Bethlehem, Pa.
Brier Hill Steel Co., Youngstown, O.
Donner Steel Co., Inc., Buffalo, N. Y.
Eddystone Steel Co., Crum Lynne, Pa.
Electric Steel & Forge Co., Cleveland, O.
Midvale Steel & Ordnance Co., Phila., Pa.
Steel & Tube Co. of America, Chicago, Ill.
Tenn. Coal, Iron & R.R. Co., Birmingham, Ala.
Wheeling Steel Products Co., Wheeling, W. Va.
Wickwire Spencer Steel Corp., Buffalo, N. Y.
Wood, Alan, Iron & Steel Co., Phila., Pa.

BITS—Tool
Bethlehem Steel Company, So. Bethlehem, Pa.

BLANKS—Chisel
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

BLANKS—Gear and Pinion
Akron-Selle Co., Akron, O.
American Manganese Bronze Co., Holmesburg, Phila., Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Electric Steel & Forge Co., Cleveland, O.
National Forge & Tool Co., Irvine, Pa.
Standard Steel Works Co., The, Phila., Pa.

BLOCKS—Chain
Ford Chain Block Co., Philadelphia, Pa.
Morris, Herbert, Inc., Buffalo, N. Y.
Topping Brothers, 122 Chambers St., N. Y. C.
Wright Mfg. Co., Lisbon, O.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

BLOCKS—Heavy Rotating
United Engineering & Fdry. Co., Pitts., Pa.

BLOOMS—Steel
Steel & Tube Co. of America, Chicago, Ill.

BLOWERS—Centrifugal
Sterling Blower Co., Hartford, Conn.

BLOWERS—Pressure
Buffalo Forge Co., Buffalo, N. Y.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Chicago Flexible Shaft Co., Chicago, Ill.
Harris Bros. Co., Chicago, Ill.
Spencer Turbine Co., Hartford, Ct.
Sturtevant, B. F., Co., Hyde Park, Mass.

BLOWERS—Rotary
Connersville Blower Co., Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.

BLUE PRINT MACHINES—Automatic Continuous Washing and Drying
Pease, C. F., Co., Chicago, Ill.
Wickes Bros., Saginaw, Mich.

BLUE PRINT MACHINES—Vertical
Pease, C. F., Co., Chicago, Ill.

BLUE PRINT PAPER SENSITIZING MACHINES
Pease, C. F., Co., Chicago, Ill.

BOILER BRACES
Lukens Steel Co., Coatesville, Pa.

BOILER HEADS—Flanged and Dished
Lukens Steel Co., Coatesville, Pa.
Ryerson, Joseph T., & Son, Chicago, Ill.

BOILER MAKERS' SUPPLIES
Cleveland Punch & Shear Wks. Co., Cleve., O.

BOILER PLATES—See Plates

BOILER SETTINGS
Crescent Refractories Co., Curwensville, Pa.

BOILER SHELLS—Welded
Wood, John, Mfg. Co., Conshohocken, Pa.

BOILER SHOP TOOLS
Cleveland Punch & Shear Wks. Co., Cleve., O.
Covington Mch. Co., Covington, Va.

BOILER TRIMMINGS
Crane Co., 836 So. Mich. Ave., Chicago, Ill.
Lunkenheimer Co., Cincinnati, Ohio.

BOILERS—Return Tubular
Frost Mfg. Co., Chicago, Ill.
Lebanon Boiler Works, Phila., Pa.
Sotter Bros., Inc., Pottstown, Pa.

BOILERS—Second-hand
Davis, J. F., Chicago, Ill.
Harris Bros. Co., Chicago, Ill.
Randle Machinery Co., Cincinnati, O.
Stewart, Paul, & Co., Cincinnati, Ohio.

BOILERS—Waste Heat
Babcock & Wilcox Co., 85 Liberty St., N. Y. C.
Connelly, D., Boiler Co., The, Cleveland, O.
Heine Boiler Co., St. Louis, Mo.
Page Boiler Co., Chicago, Ill.
Sotter Bros., Inc., Pottstown, Pa.
Wickes Boiler Co., Saginaw, Mich.

BOILERS—Water Tube
Abendroth & Root Mfg. Co., Newburgh, N. Y.
Babcock & Wilcox Co., 85 Liberty St., N. Y. C.
Connelly, D., Boiler Co., The, Cleveland, O.
Erie City Iron Works, Erie, Pa.
Heine Boiler Co., St. Louis, Mo.
Keeler, E., Co., Williamsport, Pa.
Page Boiler Co., Chicago, Ill.
Pusey & Jones Company, The, Wilmington, Del.
Tudor Boiler Mfg. Co., Cincinnati, O.
Wickes Boiler Co., Saginaw, Mich.

BOLT AND NUT MACHINERY
Acme Machinery Co., Cleveland, O.
Haskell, Wm. H., Mfg. Co., Pawtucket, R. I.
Howard Iron Works, Buffalo, N. Y.
Landis Machine Co., Waynesboro, Pa.
Manville, E. J., Mach. Co., Waterbury, Ct.
National Machinery Co., Tiffin, O.
Pawtucket Mfg. Co., Pawtucket, R. I.
Stokvis, R. S., & Sons, 17 Battery Place, N. Y.
Waterbury Farrel Fdry. & Machine Co., Waterbury, Ct.

BOLT AND RIVET CLIPPERS
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Porter, H. K., Everett, Mass.

BOLTS—Connecting Rod
Ferry Cap & Set Screw Co., Cleveland, O.
Standard Screw Products Co., Detroit, Mich.

BOLTS—Expansion
Diamond Expansion Bolt Co., 90 West St., New York City.
Star Expansion Bolt Co., 147 Cedar St., N. Y.

BOLTS—Eye
Williams, J. H., & Co., 57 Richards Street, Brooklyn, N. Y.

BOLTS—Finished
Bell Company, The, Buffalo, N. Y.

BOLTS—Special
Standard Screw Products Co., Detroit, Mich.
War Dept., Ordnance Dept., Washington, D. C.

BOLTS—Spring and Shackle
Ferry Cap & Set Screw Co., Cleveland, O.
Fostoria Screw Company, Fostoria, O.

BOLTS—Toggle
Star Expansion Bolt Co., 147 Cedar St., N. Y.

BOLTS—Track
Ames, W., & Co., Jersey City, N. J.

BOLTS AND NUTS
American Screw Co., Providence, R. I.
Ames, W., & Co., Jersey City, N. J.
Atlanta Bolt & Steel Prod. Co., Atlanta, Ga.
Atlas Bolt & Screw Co., Cleveland, O.
Bayonne Bolt & Nut Company, Bayonne, N. J.
Bethlehem Steel Company, So. Bethlehem, Pa.
Brown Bag Filling Mch. Co., Fitchburg, Mass.
Clark Bros. Bolt Co., Millidale, Ct.
Drake Lock Nut Company, Cleveland, O.
Harrison Bolt & Nut Co., Harrison, N. J.
Haskell, Wm. H., Mfg. Co., Pawtucket, R. I.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette St., New York City.
Kirk-Latty Mfg. Co., Cleveland, O.
Merrill Bros., Maspeth, N. Y.
Ohio Nut & Bolt Co., The, Berea, O.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Pawtucket Mfg. Co., Pawtucket, R. I.
Rhode Island Tool Co., Providence, R. I.
Rockford Bolt Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Ryerson, Joseph T., & Son, Chicago, Ill.
Sandusky Nut Co., Sandusky, Ohio.
Standard Screw Products Co., Dertoit, Mich.
Topping Brothers, 122 Chambers St., N. Y. C.

BOLTS AND NUTS—Brass and Bronze
Everitt Co., The, Boston 9, Mass.

BORING BARS
Rooksby, E. J., & Co., Philadelphia, Pa.
Underwood, H. B., Corp., Philadelphia, Pa.

BORING, DRILLING AND MILLING MACHINES—Horizontal
Betts Machine Company, Rochester, N. Y.
Hill, Clarke & Co. of Chicago, Chicago, Ill.
Jones Mach. Tool Works, Philadelphia, Pa.
Landis Tool Co., Waynesboro, Pa.
Lucas Machine Tool Co., Cleveland, O.
McCabe, J. J., Lathe & Machry. Corp., 149 Broadway, New York City.
Milwaukee Electric Crane & Mfg. Co., Inc., Milwaukee, Wis.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Patch, F. R., Mfg. Co., Rutland, Vt.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Sherritt & Stoer Co., Inc., Philadelphia, Pa.

BORING, DRILLING AND MILLING MACHINES—Vertical
Baker Brothers, Toledo, O.
Jones Mach. Tool Works, Philadelphia, Pa.
Prentiss, Henry, & Co., Inc., 149 B'way, N.Y.C.

BORING MACHINES—Car Wheel
Betts Machine Company, Rochester, N. Y.
Manning, Maxwell & Moore, Inc., 119 West 40th St., New York City.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

BORING MACHINES—Cylinder
Baker Brothers, Toledo, O.

BORING MACHINES—Vertical
Betts Machine Company, Rochester, N. Y.
Colburn Machine Tool Co., Cleveland, O.
Gisholt Machine Company, Madison, Wis.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Pulaski Fdry. & Mfg. Co., Cleveland, O.
Sherritt & Stoer Co., Inc., Philadelphia, Pa.

BOX STRAPPING AND FASTENERS
Acme Steel Goods Co., Chicago, Ill.
Cary Mfg. Co., Manhattan Bridge Plaza, Brooklyn, N. Y.
Dehaven Mfg. Co., 50 Columbia Heights, Brooklyn, N. Y.
Stanley Wks., New Britain, Conn.

BOXES—Annealing
Blaw-Knox Co., Pittsburgh, Pa.
Mesta Machine Co., Pittsburgh, Pa.
Warren City Tank & Boiler Co., Warren, O.
Wilfong, M. F., Iron Wks. Co., Phila., Pa.

BOXES—Carbonizing
Driver Harris Co., Harrison, N. J.
Swedish Crucible Steel Co., Detroit, Mich.

BOXES—Case Hardening
Quigley Furnace Specialties Co., 26 Cortlandt Street, New York City.

BOXES—Core
Diamond Clamp & Flask Co., Richmond, Ind.

BOXES—Steel
Gem Stamped Steel Co., Boston, Mass.
Sterling Wheelbarrow Co., Milwaukee, Wis.

BRAKES—Electric
Electric Controller & Mfg. Co., Cleveland, O.

BRASS MANUFACTURERS
Baltimore Brass Co., Baltimore, Md.
Bridgeport Brass Corp., Bridgeport, Ct.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Ct.
Wheeler Condenser & Eng'g Co., Carteret, N. J.

BRASS SPECIALTIES
Everitt Company, The, Boston 9, Mass.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette Street, New York City.
Matthews Mfg. Co., Worcester, Mass.
Scovill Mfg. Co., Waterbury, Ct.
Spindler & Deringer, Jersey City, N. J.

BRICK—Fire
American Refractories Co., Pittsburgh, Pa.
Ashland Fire Brick Co., The, Ashland, Ky.
Crescent Refractories Co., Curwensville, Pa.
Davis Fire Brick Co., The, Oak Hill, O.
Eureka Fire Brick Works, Pittsburgh, Pa.
Green, A. P., Fire Brick Co., Mexico, Mo.
Harbison-Walker Refractories Co., Pitts., Pa.
Ironton Fire Brick Company, Ironton, O.
Pyro Clay Products Co., Oak Hill, O.
Savage Mountain Fire Brick Co., Frostburg, Md.
Stowe-Fuller Company, Cleveland, O.
Taylor, Charles, Sons Company, Cincinnati, O.

BRICK—Fire Clay
Stowe-Fuller Company, Cleveland, O.
Taylor, Charles, Sons Company, Cincinnati, O.

BRICK—Magnesite
Stowe-Fuller Company, Cleveland, O.

BRICK—Silica
Stowe-Fuller Company, Cleveland, O.

BRIDGE BUILDERS
American Bridge Co., 30 Church St., N. Y. C.
Kenwood Bridge Co., Chicago, Ill.
Lackawanna Bridge Co., 2 Rector St., N. Y. C.
McClintic-Marshall Company, Pittsburgh, Pa.
Phoenix Iron Company, Philadelphia, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Shoemaker-Satterthwait Bridge Co., Pottstown, Pa.
Virginia Bridge & Iron Co., Roanoke, Va.
Worden-Allen Co., Milwaukee, Wis.

BRIQUETTES—Coal
Alden Coal Mining Co., Inc., Grand Central Palace, New York City.

BROACHES
American Broach & Mch. Co., Ann Arbor, Mich.
Lapointe, J. N., Co., New London, Ct.

BROACHING MACHINES
American Broach & Mch. Co., Ann Arbor, Mich.
Lapointe, J. N., Co., New London, Ct.
New York Mchry. Exch., 50 Church St., N.Y.C.
Pawtucket Mfg. Co., Pawtucket, R. I.

BRONZE—Aluminum
Wellman Bronze Co., Cleveland, O.

BRONZE—Manganese
Bridgeport Brass Co., Bridgeport, Ct.
Wellman Bronze Co., Cleveland, O.

BRUSHES AND BROOMS
Lay, Joseph, Co., The, Ridgeville, Ind.

BUCKETS—Clam Shell
Blaw-Knox Co., Pittsburgh, Pa.
Brosius, Edgar E., Pittsburgh, Pa.
Haiss, Geo., Mfg. Co., 142d St. and Canal Pl., New York City.
Hayward Co., 50 Church Street, N. Y. C.
Vulcan Iron Works, Inc., Jersey City, N. J.

BUCKETS—Conveyor
Godfrey Conveyor Co., Elkhart, Ind.

BUCKETS—Dumping
Penn Fdry. & Mfg. Co., Box 182, Reading, Pa.

BUCKETS—Electric Motor
Hayward Co., 50 Church Street, N. Y. C.

BUCKETS—Elevator
Hendrick Mfg. Co., Carbondale, Pa.

BUCKETS—Grab
Brosius, Edgar E., Pittsburgh, Pa.
Brown Hoisting Machry. Co., Cleveland, O.
Browning Co., Cleveland, O.
Hayward Co., 50 Church Street, N. Y. C.
Link-Belt Co., Chicago, Ill.
Milwaukee Electric Crane & Mfg. Co., Inc., Milwaukee, Wis.
Orton & Steinbrenner Co., Chicago, Ill.
Pawling & Harnischfeger Co., Milwaukee.
Vulcan Iron Works, Inc., Jersey City, N. J.
War Dept., Ordnance Dept., Washington, D. C.

BUCKETS—Orange Peel
Hayward Co., 50 Church Street, N. Y. C.
Vulcan Iron Works, Inc., Jersey City, N. J.

BUCKLES—Bale Tie
Joliet Wrought Washer Co, Joliet, Ill.

BUILDINGS—Factory
Lackawanna Bridge Co., 2 Rector St., N. Y. C.
McClintic-Marshall Co., Pittsburgh, Pa.
Stone & Webster, Inc., Boston, Mass.
Worden-Allen Co., Milwaukee, Wis.

BULLDOZERS
Garrison, A., Foundry Co., Pittsburgh, Pa.
New York Mchry. Exch., 50 Church St., N.Y.C.
Williams, White & Co., Moline, Ill.

BURNERS—Combination Oil and Gas
Advance Furnace & Engineering Co., Springfield, Mass.
Anthony Co., The, Long Island City, N. Y.
Surface Combustion Co., 366-368 Gerard Ave., Bronx, N. Y.
Tate-Jones & Co., Inc., Pittsburgh, Pa.

BURNERS—Enclosed Flame Gas
Oven Equipment & Mfg. Co., New Haven, Ct.

BURNERS—Oil
Anthony Co., The, Long Island City, N. Y.
Best, W. N., Furnace & Burner Corp., 11 B'way, New York City.
Economy Furnace Co., The, Chicopee, Mass.

BURRS—Steel
Cobb & Drew, Inc., Plymouth, Mass.
Wrought Washer Mfg. Co., Milwaukee, Wis.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

BUSHINGS—Brass and Bronze
Bunting Brass & Bronze Company, Toledo, O.
Johnson Bronze Company, New Castle, Pa.
Wellman Bronze Co., Cleveland, O.

BY PRODUCTS COKE AND GAS OVENS
Semet-Solvay Co., Syracuse, N. Y.

CABLE—Auto Towing
American Steel & Wire Co., Chicago, Ill.

CABLE—Electric
American Steel & Wire Co., Chicago, Ill.

CABLE—Ignition
American Steel & Wire Co., Chicago, Ill.

CABLEWAYS AND TRAMWAYS — See Tramways

CALIPERS—Micrometer
Starrett, L. S., Co., Athol, Mass.

CALORIMETERS—Gas Recording
Smith Gas Engineering Co., Dayton, O.

CANS—Oil
Wall, P. Mfg. Supply Co., N. S., Pittsburgh.

CAR ROOFS—Pressed Steel
Sharon Pressed Steel Co., Sharon, Pa.

CARBIDE
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.

CARRIERS—Cut Bar
Blaw-Knox Co., Pittsburgh, Pa.

CARRIERS—Sheet Bar
Blaw-Knox Co., Pittsburgh, Pa.

CARRIERS—Sheet Pack
Blaw-Knox Co., Pittsburgh, Pa.

CARS—Charging
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Easton Car & Construction Co., Easton, Pa.

CARS—Dump
Atlas Car & Mfg. Co., Cleveland, O.
Penn Fdry. & Mfg. Co., Box 182, Reading, Pa.

CARS—Industrial and Mining
Atlas Car & Mfg. Co., Cleveland, O.
Chase Foundry & Mfg. Co., Columbus, O.
Easton Car & Construction Co., Easton, Pa.
Koppel Industrial Car & Equip. Co., Pitts., Pa.
McKee, Arthur G., & Co., Cleveland, O.
Penn Fdry. & Mfg. Co., Box 182, Reading, Pa.

CARS—Railroad (Second-hand)
Shippers' Car Line, Inc., 165 B'way, N. Y. C.

CASTINGS—Brass, Bronze and Aluminum
Ajax Metal Co., Philadelphia, Pa.
American Manganese Bronze Co., Holmesburg, Phila., Pa.
Anchor Brass & Aluminum Co., Cincinnati, O.
Bethlehem Steel Co., So. Bethlehem, Pa.
Buffalo Bronze Die Cast. Corp., Buffalo, N. Y.
Bunting Brass & Bronze Company, Toledo, O.
Columbus Brass Company, Columbus, O.
Cross Engineering Co., Carbondale, Pa.
Damascus Bronze Co., Pittsburgh, Pa.
Doehler Die Castings Company, Court & Huntington Streets, Brooklyn, N. Y.
Douglas & Lomason Co., Detroit, Mich.
Friendship Pattern Works, Friendship, N. Y.
Hampden Brass Company, Springfield, Mass.
Harsch, John Bronze & Fdry. Co., Cleve., O.
Jenkins Mfg. Co., Bloomfield, N. J.
Lebanon Brass Mfg. Co., Lebanon, Pa.
McKim Fdry. & Mach. Co., Lockport, N. Y.
Metal & Alloy Specialties Co., Buffalo, N. Y.
Raritan Foundry Company, Raritan, N. J.
Reading Brass Wks., Inc., Reading, Pa.
Spencer's Sons, I. S., Inc., Guilford, Ct.
Spindler & Deringer, Jersey City, N. J.
Springfield Aluminum Plate & Castings Co., Springfield, O.
Wellman Bronze Co., Cleveland, O.
Wing's, Chauncey, Sons, Greenfield, Mass.

CASTINGS—Carbonized
Driver Harris Co., Harrison, N. J

CASTINGS—Charcoal Iron
Fuller-Lehigh Co., Fullerton, Pa.

CASTINGS—Crucible
Crucible Steel Casting Co., Lansdowne, Pa.
Millbury Steel Fdry. Co., Millbury, Mass.
Riverside Steel Castings Co., Newark, N. J.

CAST'NGS—Die
Buffalo Bronze Die Casting Co., Buffalo, N. Y.
Doehler Die Castings Company, Court & Huntington Streets, Brooklyn, N. Y.

CASTINGS—Electric Steel
Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y.
American Radiator Company, Buffalo, N. Y.
Belle City Malleable Iron Co., Racine, Wis.
Bethlehem Steel Co., So. Bethlehem, Pa.
Chicago Steel Fdry. Co., Chicago, Ill.
Electric Steel Prod. Co., Turners Falls, Mass.
Industrial Steel Castings Company, Toledo, O.
Maynard Electric Steel Casting Co., Milwaukee, Wis.
Milwaukee Steel Fdry. Co., Milwaukee, Wis.
Monroe Steel Castings Co., Monroe, Mich.
Ohio Steel Fdry. Co., Springfield, O.
Sivyer Steel Casting Co., Milwaukee, Wis.
Smith, Geo. H., Steel Casting Co., Milwaukee.

CASTINGS—Gray Iron
Adams, Wm., Foundry Co., Inc., Phila., Pa.
Andes Foundry Co., Ephrata, Pa.
Baker Mfg. Corp., Saratoga Springs, N. Y.
Belding Foundry Co., Belding, Michigan.
Berks Foundry & Mfg. Co., Berks, Pa.
Bethlehem Steel Company, So. Bethlehem, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Bonnot Company, The, Canton, O.
Chemung Foundry & Supply Co., Inc., Elmira, N. Y.
City Foundry Co., Cleveland, O.
Connellsville Foundry Mach. & Steel Casting Co., Pittsburgh, Pa.
Connersville Foundry Corp., Connersville, Ind.
Covington Machine Company, Covington, Va.
Cresson-Morris Co., Philadelphia, Pa.
Creswell, Samuel J., Iron Works, Phila., Pa.
Davis, Chas. E., Fdy. Co., Inc., Rutland, Vt.
Excelsior Tool & Mach. Co., East St. Louis, Ill.
Fairmont Foundry Co., Philadelphia, Pa.
Farrel Foundry & Mach. Co., Ansonia, Conn.
Fillmore Ave. Fdry. & Iron Wks., Inc., Buffalo, N. Y.
Frank Foundries Corporation, Moline, Ill.
Franklin Machine Company, Providence, R. I.
Frederick Iron & Steel Co., Frederick, Md.
Gale Mfg. Co., Albion, Mich.
Glens Falls Machine Works, Glens Falls, N. Y.
Gray Fdry., Inc., Poultney, Vt.
Green's Car Wheel Mfg. Co., St. Louis, Mo.
Hartford Foundry & Machine Co., Hartford City, Ind.
Hilles & Jones Co., Wilmington, Del.
Howard Iron Works, Buffalo, N. Y.
Hubley Mfg. Co., Lancaster, Pa.
Hyde Park Fdry. & Mach. Co., Hyde Park, Pa.
Kline Hardware Co., Allentown, Pa.
Klotz Machine Co., Sandusky, O.
Lebanon Gear & Machine Works, Lebanon, Pa.
Levering Brothers, Baltimore, Md.
Lycoming Motors Corp., Williamsport, Pa.
McKim Fdry. & Machine Co., Lockport, N. Y.
Mesta Mach. Co., Pittsburgh, Pa.
Moore, Edwin A., Reading, Pa.
Motor Castings Company, South Bend, Ind.
Munson, E. G., Utica, N. Y.
North Wales Machine Co., North Wales, Pa.
Nute, McGehee, Geary Company, Inc., Chambersburg, Pa.
Patch, F. R., Manufacturing Co., Rutland, Vt.
Penn Fdry. & Mfg. Co., Box 182, Reading, Pa.
Penn. Engineering Works, New Castle, Pa.
Piedmont Fdry. & Mach. Co., Inc., Piedmont, West Va.
Portland Foundry Company, Portland, Ct.
Pulaski Foundry & Mfg. Corp., Cleveland, O.
Pusey & Jones Company, The, Wilmington, Del.
Raritan Foundry Company, Raritan, N. J.
Richey, Browne & Donald, Inc., Maspeth, L. I.
Robins Conveying Belt Co., Passaic, N. J.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sacks, Louis, Iron Foundry, Newark, N. J.
St. Louis Malleable Casting Co., St. Louis.
Sessions Foundry Company, Bristol, Ct.
Simpson Fdry. & Engineering Co., Newark, O.
Spencer's, I. S., Sons, Inc., Guilford, Ct.
Stowell Co., South Milwaukee, Wis.
Straight Line Engine Co., Inc., Syracuse, N.Y.
Swett, A. L., Iron Works, Medina, N. Y.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Troy Foundry & Machine Co., Troy, N. Y.
Turner Machine Co., Danbury, Ct.
Turner & Seymour Mfg. Co., Torrington, Ct.
Union Mfg. Co., New Britain, Ct.
U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
Utica Steam Engine & Boiler Works, The, Utica, N. Y.
Valley Iron Wks., Williamsport, Pa.
Vogt Bros. Mfg. Co., Inc., Louisville, Ky.
Warren Fdry. & Mach. Co., 11 B'way, N. Y. C.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.
Wollaston Fdry. Co., Quincy, Mass.

CASTINGS—Hard Iron
Motor Castings Company, South Bend, Ind.

CASTINGS—Heat Resisting
Hoskins Mfg. Co., Detroit, Mich.

CASTINGS—Malleable
Acme Steel & Malleable Iron Works, Inc., Buffalo, N. Y.
American Radiator Co., Buffalo, N. Y.
Belle City Malleable Iron Co., Racine, Wis.
Benton Harbor Malleable Foundry Co., Benton Harbor, Mich.
Decatur Malleable Iron Co., Decatur, Ill.
Devlin, Thomas, Mfg. Co., Philadelphia, Pa.
Kalamazoo Malleable Iron Co., Kalamazoo, Mich.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Lakeside Malleable Castings Co., Racine, Wis.
Lancaster Foundry Co., Lancaster, Pa.
Mal-Gra Co., The, Cambridge City, Ind.
Malleable Iron Fittings Co., Branford, Ct.
Meeker Foundry Company, Newark, N. J.
Northern Malleable Iron Co., St. Paul, Minn.
Richmond Malleable Castings Co., Richmond, Ind.
Rockford Malleable Iron Works, Rockford, Ill.
Ross-Meehan Foundries, Chattanooga, Tenn.
Sacks, Louis, Iron Foundry, Newark, N. J.
St. Louis Malleable Casting Co., St. Louis.
Standard Steel Works Co., The, Phila., Pa.
Stowell Co., South Milwaukee, Wis.
Temple Malleable Iron & Steel Co., Phila., Pa.
Vermilion Malleable Iron Co., Hoopeston, Ill.

CASTINGS—Malleable Iron
Link-Belt Co., Chicago, Ill.

CASTINGS—Manganese Steel
Bethlehem Steel Company, So. Bethlehem, Pa.
Smith, Geo. H., Steel Casting Co., Milwaukee.
Steele & Condict, Inc., Jersey City, N. J.

CASTINGS—Semi-Steel
Chemung Foundry & Supply Co., Inc., Elmira, N. Y.
Farrel Foundry & Mach. Co., Ansonia, Conn.
McLain's System, Inc., Milwaukee, Wis.
Malleable Iron Fittings Co., Branford, Ct.
Pusey & Jones Company, The, Wilmington, Del.
Troy Foundry & Machine Co., Troy, N. Y.

CASTINGS—Special Alloy
Driver Harris Co., Harrison, N. J.

CASTINGS—Steel
Adamson Mch. Co., Akron, O.
Atlantic Steel Castings Co., Chester, Pa.
Atlas Steel Casting Co., Buffalo, N. Y.
Bethlehem Steel Co., So. Bethlehem, Pa.
Birdsboro Steel Fdy. & Mch. Co., Birdsboro, Pa.
Chester Steel Castings Co., Philadelphia, Pa.
Chicago Steel Foundry Co., Chicago, Ill.
Connellsville Foundry Mach. & Steel Casting Co., Pittsburgh, Pa.
Crucible Steel Castings Co., Lansdowne, Pa.
Electric Steel Prod. Co., Turners Falls, Mass.
Falk Corp., The, Milwaukee, Wis.
Federal Steel Fdry. Co., Chester, Pa.
Industrial Steel Casting Company, Toledo, O.
Malleable Iron Fittings Co., Branford, Ct.
Maynard Electric Steel Castings Co., Milwaukee, Wis.
Mesta Mach. Co., Pittsburgh, Pa.
Millbury Steel Fdry. Co., Millbury, Mass.
Milwaukee Steel Fdry. Co., Milwaukee, Wis.
Modern Steel Casting Co., Milwaukee, Wis.
National Car Coupler Company, Attica, Ind.
National Steel Casting Co., Montpelier, Ind.
Ohio Steel Fdry. Co., Springfield, O.
Otis Steel Co., Cleveland, O.
Philadelphia Roll & Mach. Co., Phila., Pa.
Pulaski Foundry & Mfg. Corp., Cleveland, O.
Reading Steel Casting Co., Reading, Pa.
Riverside Steel Castings Co., Newark, N. J.
Sharon Foundry Co., Sharon, Pa.
Sivyer Steel Casting Co., Milwaukee, Wis
Smith, Geo. H., Steel Casting Co., Milwaukee, Wis.
Standard Steel Wks. Co., The, Phila., Pa.
Temple Malleable Iron & Steel Co., Phila., Pa.
United Eng. & Fdry. Co., Pittsburgh, Pa.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.

CEMENT MACHINERY
Fuller-Lehigh Co., Fullerton, Pa.

CEMENT—Fire Resisting
Bour, L. J., Refractories Co., Inc., Scranton, Pa.
Quigley Furnace Specialties Co., 26 Cortlandt Street, New York City.

CEMENT—Open Hearth
Bour, L. J., Refractories Co., Inc., Scranton, Pa.

CENTERING MACHINES
Niles Bement-Pond Co., 111 B'way, N. Y. C.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Whiton, D. E., Mach. Co., New London, Ct.

CENTERS—Index
Simmons Machine Co., Inc., Albany, N. Y.

CHAIN MACHINERY
Baird Machine Co., Bridgeport, Ct.
Vaughn Machinery Co., Cuyahoga Falls, Ohio.

CHAINS—Cable
Morton, Thomas, 245 Centre St., N. Y. C.

CHAINS—Coil
American Chain Co., Inc., Bridgeport, Ct.
Bradlee & Co., Philadelphia, Pa.
Bridgeport Chain Co., Bridgeport, Ct.
Columbus McKinnon Chain Co., Columbus, O.
Scully Steel & Iron Co., Chicago, Ill.
Woodhouse Chain Works, Trenton, N. J.

CHAINS—Conveyor
American Chain Co., Inc., Bridgeport, Ct.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Link-Belt Co., Chicago, Ill.
Woodhouse Chain Works, Trenton, N. J.

CHAINS—Crane
American Chain Co., Inc., Bridgeport, Ct.
Bradlee & Co., Philadelphia, Pa.
Columbus McKinnon Chain Co., Columbus, O.
Newhall Chain Forge & Iron Co., 90 West St., New York City.
Woodhouse Chain Works, Trenton, N. J.

CHAINS—Dredge
American Chain Co., Inc., Bridgeport, Conn.
Columbus McKinnon Chain Co., Columbus, O.

CHAINS—Furnace
Bridgeport Chain Co., Inc., Bridgeport, Ct.

CHAINS—Hoist
American Chain Co., Inc., Bridgeport, Conn.

CHAINS—Jack
Mattatuck Mfg. Co., Waterbury, Ct.

CHAINS—Machinery
Chain Products Co., The, Cleveland, O.

CHAINS—Power Transmission
Baldwin Chain & Mfg. Co., Worcester, Mass.
Morse Chain Co., Ithaca, N. Y.
Morton, Thomas, 245 Centre St., N. Y. C.
Union Chain & Mfg. Co., Seville, O.

CHAINS—Safety
Bridgeport Chain Co., Inc., Bridgeport, Ct.

CHAINS—Sash
Bridgeport Chain Co., Inc., Bridgeport, Ct.
Morton, Thos., 245 Centre St., N. Y. C.

CHAINS—Sling
American Chain Co., Inc., Bridgeport, Conn.
Columbus McKinnon Chain Co., Columbus, O.
Reading Chain & Block Co., Reading, Pa.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

CHAINS—Sprocket Wheel
Cullman Wheel Co., Chicago, Ill.
Link Belt Co., Chicago, Ill.
Stowell Co., South Milwaukee, Wis.
Union Chain & Mfg. Co., Seville, O.
Whitney Mfg. Co., Hartford, Ct.

CHAPLETS
Erdle Perforating Co., Rochester, N. Y.

CHASERS
Jones & Lamson Mach. Co., Springfield, Vt.

CHECKS—Metal
Matthews, J. H., & Co., Pittsburgh, Pa.
Schwerdtle Stamp Co., Bridgeport, Ct.

CHECKS—Time
American Railway Supply Co., 134-136 Charles St., New York City.

CHECKS—Tool
American Railway Supply Co., 134-136 Charles St., New York City.

CHEMICALS—Pickling
Addy, Matthew, Company, The, Phila., Pa.

CHUCKING MACHINES
Jones & Lamson Machine Co., Springfield, Vt.

CHUCKS—Drill and Lathe
Heald Machine Co., Worcester, Mass.
Horton, E., & Son Co., Windsor Locks, Ct.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Scully-Jones & Co., Chicago, Ill.
Skinner Chuck Co., New Britain, Ct.
Union Mfg. Co., New Britain, Ct.
Victor Tool Company, Inc., Waynesboro, Pa.
Whiton Mach. Co., S. E., New London, Ct.

CLAMPS—Flanging
Niles-Bement-Pond Co., 111 Broadway, New York City.
Ryerson, Joseph T., & Son, Chicago, Ill.

CLAMPS—Steel
Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

CLAYS—Refractories
Crescent Refractories Co., Curwensville, Pa.

CLEANER—Metal
Ford, J. B., Co., Wyandotte, Mich.
Oakley Chemical Co., 22 Thames St., N. Y. C.

CLEANING MATERIALS
Ford, J. B., Co., Wyandotte, Mich.
Oakley Chemical Co., 22 Thames St., N. Y. C.

CLEATS—Barrel
Hubbard Pressed Steel Co., Niles, Ohio.

CLUTCHES—Friction
Brown Engineering Co., Reading, Pa.
Caldwell, W. E., Co., 260 Brandeis St., Louisville, Ky.
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Hilliard Clutch & Mach. Co., Elmira, N. Y.
Johnson, Carlyle, Machine Co., Manchester, Ct.
Moore & White Co., Philadelphia, Pa.
Schultz, A. L., & Son, Chicago, Ill.
Wood's, T. B., Sons Co., Chambersburg, Pa.

CLUTCHES—Magnetic
Cutler-Hammer Mfg. Co., Milwaukee, Wis.

COAL
Addy, Matthew, Company, The, Cincinnati, O.
Alden Coal Mining Company, Inc., Grand Central Palace, New York City.
Bethlehem Steel Co., So. Bethlehem, Pa.
Cleveland-Cliffs Iron Company, Cleveland, O.
Hanna, M. A., & Co., Cleveland, O.
Heyward, Thomas R., Co., Pittsburgh, Pa.
Hickman, Williams & Co., Pittsburgh, Pa.
Peabody Fuel Co., Pittsburgh, Pa.
St. Louis Coke & Chemical Co., St. Louis, Mo.
Snyder, W. P., & Co., Pittsburgh, Pa.

COAL, ORE AND ASH HANDLING MACHINERY
Alliance Machine Co., Alliance, O.
Blaw-Knox Co., Pittsburgh, Pa.
Brown Hoisting Machry. Co., Cleveland, O.
Converse, F. S., Co., Inc., Johnson City, N. Y.
Freeman-Riff Co., Terra Haute, Ind.
Godfrey Conveyor Co., Elkhart, Ind.
Green Eng. Co., East Chicago, Ind.
Haiss, Geo., Mfg. Co., 142d St. and Canal Place, New York City.
Hanna Engineering Works, Chicago, Ill.
Hayward Co., 50 Church St., New York City.
Link-Belt Co., Chicago, Ill.
Northern Engineering Works, Detroit, Mich.
Orton & Steinbrenner Co., Chicago, Ill.

COAL POWDERING EQUIPMENT
American Industrial Eng. Co., Chicago, Ill.
Fuller-Lehigh Co., Fullerton, Pa.

COCKS—Air and Gas
Crane Co., 836 So. Michigan Ave., Chicago, Ill.

COCKS—Bronze
Lunkenheimer Co., Cincinnati, O.

COILING MACHINES — Flexible Shaft, Metallic Tube and Casing
Sleeper & Hartley, Inc., Worcester, Mass.

COILS—Pipe, Iron, Copper and Brass
Roessing Mfg. Company, Pittsburgh, Pa.

COKE—Metallurgical
Addy, Matthew, Company, The, Cincinnati, O.
Bethlehem Steel Company, So. Bethlehem, Pa.
Cleveland Cliffs Iron Company, Cleveland, O.
Crocker Brothers, 21 E. 4th St., N. Y. C.
Hanna, M. A., & Co., Cleveland, O.
Hickman, Williams & Co., Pittsburgh, Pa.
Hillman Coal & Coke Co., Pittsburgh, Pa.
Iron Trade Products Co., Pittsburgh, Pa.
Peabody Fuel Co., Pittsburgh, Pa.
Pilling & Co., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
St. Louis Coke & Chemical Co., St. Louis, Mo.
Snyder, W. P., & Co., Pittsburgh, Pa.
Stewart Furnace Company, The, Cleveland, O.
Straub-Atkinson Coal & Coke Co., Pitts., Pa.
Tenn. Coal, Iron & R.R. Co., Birmingham, Ala.
Tutlein, E. Arthur, Inc., Boston, Mass.
Wallingford, Walter, & Co., Cincinnati, O.

COKE-OVEN MACHINERY
Alliance Machine Co., Alliance, O.
Atlas Car & Mfg. Co., Cleveland, O.

COKE OVENS—By-Products
Semet-Solvay Co., Syracuse, N. Y.
Smythe, S. R., Co., Pittsburgh, Pa.

COLD DRAWING MACHINES—Bar & Wire
Vaughn Mchry. Co., Cuyahoga Falls, O.

COLD ROLLING MACHINES
Blake & Johnson Co., Waterbury, Ct.

COLLARS—Spacing for Milling Cutters
Detroit Stamping Co., Detroit, Mich.

COLUMNS—Safety Water
Lunkenheimer Co., Cincinnati, O.

COMPOUNDS—Case Hardening and Tempering
Anti-Borax Compound Co., Fort Wayne, Ind.

COMPOUNDS—Welding
Anti-Borax Compound Co., Fort Wayne, Ind.

COMPRESSORS—Air
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Air Compressor Wks., 25 Church St., New York City.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Curtis Pneumatic Mach. Co., St. Louis, Mo.
De Laval Steam Turbine Co., Trenton, N. J.
Fairbanks, Morse & Co., Chicago, Ill.
Ingersoll-Rand Company, 11 Broadway, N. Y. C.
Mesta Mach. Co., Pittsburgh, Pa.
Norwalk Iron Works Co., South Norwalk, Ct.
Pennsylvania Pump & Comp. Co., Easton, Pa.
Spencer Turbine Co., Hartford, Ct.
Sullivan Mchry. Co., Chicago, Ill.

COMPRESSORS—Gas
Ingersoll-Rand Company, 11 Broadway, N. Y. C.
Mesta Mach. Co., Pittsburgh, Pa.
Norwalk Iron Works Co., South Norwalk, Ct.

CONCRETE INSERTS
Star Expansion Bolt Co., 147 Cedar St., N. Y.

CONCRETE MACHINERY
Ideal Concrete Machry. Co., Cincinnati, Ohio.
Knickerbocker Co., Jackson, Mich.
Standard Scale & Supply Co., Pittsburgh, Pa.

CONDENSERS
Alberger Pump & Condenser Co., 140 Cedar Street, New York City.
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Ingersoll-Rand Company, 11 Broadway, N. Y. C.
Mesta Mach. Co., Pittsburgh, Pa.
U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
Wheeler Condenser & Eng. Co., Carteret, N. J.

CONDUITS—Flexible Metallic
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

CONTAINERS—Heat Treating
Driver Harris Co., Harrison, N. J.

CONTRACTORS—Blast Furnace and Open Hearth
Ingram, H. C., & Son, Steelton, Pa.

CONTRACTORS—General
Chase, Frank D., Inc., Chicago, Ill.
Lackawanna Bridge Co., 2 Rector St., N. Y. C.
Worden-Allen Co., Milwaukee, Wis.

CONTRACTORS' SUPPLIES—Second-hand
Albert & Davidson, Inc., Brooklyn, N. Y.
Eagle Pipe Sup. Co., Inc., 233 B'way, N. Y. C.

CONTROLLERS—Crane
Cutler-Hammer Mfg. Co., Milwaukee, Wis.

CONTROLLERS—Electric
Electric Controller & Mfg. Co., Cleveland, O.

CONTROLLERS—Electric Motor
Cutler-Hammer Mfg. Co., Milwaukee, Wis.

CONTROLLERS—Temperature
Engelhard, Chas., 30 Church St., N. Y. C.

CONVERTERS—Steel Side Blow
Whiting Corporation, Harvey, Ill.

CONVEYING AND ELEVATING MACHINERY
Caldwell, H. W., & Son, Co., Chicago, Ill.
Godfrey Conveyor Co., Elkhart, Ind.
Letson, T. H., Co., 50 Church St., N. Y. C.
Link-Belt Co., Chicago, Ill.
Payne, N. B., & Co., 25 Church St., N. Y. C.
Portable Machinery Company, Passaic, N. J.
Robins Conveying Belt Co., Passaic, N. J.

CONVEYORS—Portable
Converse, F. S., Co., Inc., Johnson City, N. Y.
Freeman-Riff Co., Terra Haute, Ind.
Haiss, Geo. Mfg. Co., 142nd St., & Canal Place, New York City.
Payne, N. B., & Co. 25 Church St., N. Y. C.
Portable Machinery Company, Passaic, N. J.

COPING MACHINES
Cleveland Punch & Shear Works Co., Cleve., O.
Hilles & Jones Co., Wilmington, Del.
Ryerson, Joseph T. & Son, Chicago, Ill.

COPPER
Baltimore Brass Co., Baltimore, Md.

CORDAGE—Cotton
Samson Cordage Works, Boston 9, Mass.

CORE BREAKERS—Pneumatic
Sullivan Mchry. Co., Chicago, Ill.

CORE MACHINES
American Fdry. Co., 366 Madison Ave., N.Y.C.

CORNICE BRAKES
Dreis & Krump Mfg. Co., Chicago, Ill.

CORRUGATING MACHINERY
Streine Tool & Mfg. Co., New Bremen, Ohio.

CORUNDUM WHEELS — See Grinding Wheels

COST ACCOUNTANTS
Fielden & Co., Philadelphia, Pa.

COTTER AND KEYS—Spring
American Steel Co., Pittsburgh, Pa.
Hindley Mfg. Co., Valley Falls, R. I.
Hubbard Spring Works, Pontiac, Mich.

COUNTERBORES
National Twist Drill & Tool Co., Detroit, Mich.

COUNTERSINKS
Whitman & Barnes Mfg. Co., Akron, O.

COUNTING MACHINES
Durant Mfg. Co., Milwaukee, Wis.
Hart, R. A., Mfg. Co., Battle Creek, Mich.
Redington, F. B., Co., Chicago, Ill.
Veeder Mfg. Co., Hartford, Ct.

COUPLINGS—Car
National Car Coupler Company, Attica, Ind.

COUPLINGS—Cut-off, Friction
Hilliard Clutch & Machry. Co., Elmira, N. Y.
Johnson, Carlyle, Machine Co., Manchester, Ct.
Moore & White Co., Philadelphia, Pa.

COUPLINGS—Flexible Shaft
Roots, P. H. & F. M., Co., Connersville, Ind.
Smith & Serrell, Newark, N. J.
Thompson Brothers, Philadelphia, Pa.

COUPLINGS—Friction Clutch
Caldwell, W. E., Co., 260 Brandies St., Louisville, Ky.
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Johnson, Carlyle, Machine Co., Manchester, Ct.

COUPLINGS—Hose
Cleveland Pneumatic Tool Co., Cleveland, O.

COUPLINGS—Rigid
Smith & Serrell, Newark, N. J.

COUPLINGS—Shaft
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Nicholson, W. H., & Co., Wilkes-Barre, Pa.
Smith & Serrell, Newark, N. J.

CRANES—Electric Traveling
Alliance Machine Co., Alliance, Ohio.
American Ship Building Co., Cleveland, Ohio.
Armington Eng. Co., Chardon Road, Euclid, O.
Barber-Foster Eng. Co., Cleveland, Ohio.
Bedford Fdry. & Machine Co., Bedford, Ind.
Box, Alfred, & Co., Inc., Philadelphia, Pa.
Champion Engineering Co., Columbus, Ohio.
Chesapeake Iron Works, Baltimore, Md.
Cleveland Crane & Engineering Co., Wickliffe, O.
Curtis Pneumatic Machy. Co., St. Louis, Mo.
Erie Steel Construction Co., Erie, Pa.
Euclid Crane & Hoist Co., Euclid, Ohio.
Green, L. A., Rail & Mchy. Co., Pittsburgh, Pa.
Link-Belt Co., Chicago, Ill.
Maris Brothers, Philadelphia, Pa.
Milwaukee Electric Crane & Mfg. Co., Inc., Milwaukee, Wis.
Morris, Herbert, Inc., Buffalo, N. Y.
N. J. Fdry. & Mch. Co., 140 Cedar St., N.Y.C.
Niles-Bement-Pond Co., 111 Broadway, N. Y.
Northern Engineering Works, Detroit, Mich.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Payne, N. B., & Co., 25 Church St., N. Y. C.
Roeper Crane & Hoist Works, Reading, Pa.
Scully-Jones & Co., Chicago, Ill.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
Terry Mfg. Co., Grand Central Terminal Bldg., New York City.
Toledo Crane Co., Bucyrus, Ohio.
Whiting Corporation, Harvey, Ill.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

CRANES—Gantry
Cleveland Crane & Engrg. Co., Wickliffe, O.
Toledo Crane Co., Bucyrus, Ohio.

CRANES—Hand Power
Alliance Machine Co., Alliance, O.
Armington Eng. Co., Chardon Road, Euclid, O.
Bedford Fdry. & Machine Co., Bedford, and.
Box, Alfred, & Co., Inc., Philadelphia, Pa.
Brown Hoisting Machry. Co., Cleveland, O.
Chesapeake Iron Works, Baltimore, Md.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Curtis Pneumatic Machy. Co., St. Louis, Mo.
Erie Steel Construction Co., Erie, Pa.
Euclid Crane & Hoist Co., Euclid, O.
Maris Brothers, Philadelphia, Pa.
Morris, Herbert, Inc., Buffalo, N. Y.
N. J. Fdry. & Mch. Co., 140 Cedar St., N.Y.C.
Niles-Bement-Pond Co., 111 Broadway, N.Y.C.
Northern Engineering Works, Detroit, Mich.
Reading Chain & Block Co., Reading, Pa.
Toledo Crane Co., Bucyrus, Ohio.
Whiting Corporation, Harvey, Ill.

CRANES—Jib
Horton, John T., Co., Inc., 242 Bradhurst Ave., New York City.
Morris, Herbert, Inc., Buffalo, N. Y.
Northern Engineering Works, Detroit, Mich.
Whiting Corporation, Harvey, Ill.

CRANES—Locomotive
Brown Hoisting Machry. Co., Cleveland, O.
Browning Co., Cleveland, O.
Byers Machine Co., The, Ravenna, O.
Hanna Engineering Works, Chicago, Ill.
Industrial Equip. Co., 149 B'way, N. Y. C.
Letson, T. H., Co., 50 Church St., N. Y. C.
Link-Belt Co., Chicago, Ill.
Ohio Locomotive Crane Co., Bucyrus, O.
Orton & Steinbrenner Co., Chicago, Ill.
Pawling & Harnischfeger Co., Milwaukee, Wis.

CRANES—Portable
Beatty Machine & Mfg. Co., Hammond, Ind.
Brown Hoisting Machry. Co., Cleveland, O.
Canton Foundry & Machine Co., Canton, O.
Morris, Herbert, Inc., Buffalo, N. Y.
Pawling & Harnischfeger Co., Milwaukee, Wis.

CRANES—Steam, Wire Cleaning
Vaughn Machry. Co., Cuyahoga Falls, O.

CRANK SHAFTS
Bethlehem Steel Company, So. Bethlehem, Pa.
Landis Tool Co., Waynesboro, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Switch & Signal Co., Swissvale, Pa.

CROSS ARMS—Creosoted
Jennison-Wright Co., Toledo, O.

CRUCIBLES—Metallurgical
McCullough-Dalzell Crucible Co., Pitts., Pa.

CRUCIBLES—Platinum
Baker & Co., Inc., Newark, N. J.

CRUSHERS—Coal
Fuller-Lehigh Co., Fullerton, Pa.

CUPOLAS—Foundry
Northern Engineering Works, Detroit, Mich.
Paxson, J. W., Co., Philadelphia, Pa.
Whiting Corporation, Harvey, Ill.

CUTTERS—Bolt
Landis Mach. Co., Waynesboro, Pa.
National Machry. Co., Tiffin, O.

CUTTERS—Gear
Whiton, D. E., Mach. Co., New London, Ct.

CUTTERS—Key Seating
Baker Brothers, Toledo, O.
Lapointe, J. N., Co., New London, Ct.
Whitney Mfg. Co., Hartford, Ct.

CUTTERS—Milling
Barber-Colman Co., Rockford, Ill.
Becker Milling Mach. Co., Worcester, Mass.
Brown Sharpe Mfg. Co., Providence, R. I.
Cowles Tool Co., Cleveland, Ohio.
Fastfeed Drill & Tool Corp., Toledo, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Tool Co., Cleveland, O.
National Twist Drill & Tool Co., Detroit, Mich.
Wayne Tool Mfg. Company, Waynesboro, Pa.

CUTTERS—Pipe
Mark Mfg. Co., Evanston, Ill.

CUTTING AND WELDING APPARATUS—Oxy-Acetylene
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.
Davis-Bournonville Co., Jersey City, N. J.
Imperial Brass Mfg. Co., Chicago, Ill.
Prest-O-Lite Co., 30 East 42nd St., N. Y. C.

CUTTING COMPOUNDS
Oakley Chemical Co., 22 Thames St., N. Y. C.

CUTTING-OFF MACHINES—Cold Saw
Espen-Lucas Machine Works, Philadelphia, Pa.
Vandyck-Churchill Co., 91-93 Liberty St., New York City.

CUTTING-OFF MACHINES—Pipe
Bignall-Keeler Mach. Works, Edwardsville, Ill.

CYLINDERS—Compressed Air, Gas, Etc.
National Tube Co., Pittsburgh, Pa.

DERRICKS
Bedford Fdry. & Mach. Co., Bedford, Ind.
Byers Machine Co., The, Ravenna, O.
Horton, John T., Co., Inc., 242 Bradhurst Ave., New York City.
Terry Mfg. Co., Grand Central Terminal Bldg., New York City.

DIAMONDS—Carbon and Bortz (Importers)
Desmond-Stephan Mfg. Co., Urbana, O.
Wheel Trueing Tool Co., Detroit, Mich.

DIAMOND TOOLS
Desmond-Stephan Mfg. Co., Urbana, O.
Dickinson, Thos. L., 34 Gold St., N. Y. C.
Wheel Trueing Tool Co., Detroit, Mich.

DIE BLOCKS
Bethlehem Steel Co., So. Bethlehem, Pa.
Electric Steel & Forge Co., Cleveland, O.
Heppenstall Forge & Knife Co., Pitts., Pa.
Tioga Steel & Iron Co., Philadelphia, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.
Wetherell Bros. Co., Cambridge 39, Mass.

DIE SINKING MACHINES
Walcott Lathe Co., Jackson, Mich.

DIEING MACHINES
Henry & Wright Mfg. Co., Hartford, Ct.

DIES—Drop Forging
Bethlehem Steel Company, So. Bethlehem, Pa.

DIES—Embossing and Stamping
Schwerdtle Stamp Co., Bridgeport, Ct.

DIES—Gripping and Heading
Marchant, Geo. F., Co., Chicago, Ill.

DIES—Pipe Threading
Bignall & Keeler Mch. Wks., Edwardsville, Ill.

DIES—Screw and Thread Cutting
Eastern Machine Screw Corp., New Haven, Ct.
Jones & Lamson Machine Co., Springfield, Vt.
Landis Machine Co., Waynesboro, Pa.
Mark Mfg. Co., Evanston, Ill.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

DIES—Self-Opening Adjustable
Eastern Machine Screw Corp., New Haven, Ct.
Jones & Lamson Mach. Co., Springfield, Vt.

DIES—Sheet Metal Working
Adriance Machine Works, Inc., 82 Richards St., Brooklyn, N. Y.
Bliss, E. W., Co., 11 Adams St., Bklyn., N. Y.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Fenton Machine Tool & Die Co., Fenton, Mich.
Ferracute Machine Co., Bridgeton, N. J.
Hoeft & Company, Inc., Chicago, Ill.
Loy & Nawrath Co., 30 Church Street, N. Y. C.
Toledo Mach. & Tool Co., Toledo, O.
V. & O. Press Co., Glendale, L. I., N. Y.
War Dept., Ordnance Dept., Washington, D. C.
Worcester Stamped Metal Co., Worcester, Mass.
Zeh & Hahnemann Co., Newark, N. J.

DIES—Steel Letters and Stamps
Matthews, J. H., & Co., Pittsburgh, Pa.

DIRECT SULPHATE PLANTS
Semet-Solvay Co., Syracuse, N. Y.

DOORS AND SHUTTERS—Fireproof
Kinnear Mfg. Co., Columbus, O.

DOORS AND SHUTTERS—Steel or Wood Rolling
Kinnear Mfg. Co., Columbus, O.

DRAFTING ROOM FURNITURE AND SUPPLIES
Pease, C. F., Co., Chicago, Ill.

DRILLING MACHINES—Bench
Barnes, W. F. & Jno. Co., Rockford, Ill.
Leland-Gifford Co., Worcester, Mass.

DRILLING MACHINES—Bench, Sensitive
Ames, B. C., Company, The, Waltham, Mass.

DRILLING MACHINES—Electric
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

DRILLING MACHINES—Horizontal
Baker Brothers, Toledo, O.
Langelier Mfg. Co., Arlington-Cranston, R. I.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Rockford Drilling Mch. Co., Rockford, Ill.

DRILLING MACHINES—Multiple Spindle
Baker Bros., Toledo, O.
Barnes Drill Co., Rockford, Ill.
Colburn Machine Tool Co., Cleveland, O.
Detroit Mch. Tool Co., Detroit, Mich.
Henry & Wright Mfg. Co., Hartford, Ct.
Langelier Mfg. Co., Arlington-Cranston, R. I.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

DRILLING MACHINES — Multiple Spindle, Adjustable
Barnes, W. F. & Jno., Co., Rockford, Ill.

DRILLING MACHINES — Multiple Spindle, Vertical
Barnes, W. F. & Jno., Co., Rockford, Ill.
Henry & Wright Mfg. Co., Hartford, Ct.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

DRILLING MACHINES—Portable
Cleveland Punch & Shear Wks. Co., Cleve., O.

DRILLING MACHINES—Portable Electric
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
General Electric Co., Schenectady, N. Y.
National Automatic Tool Co., Richmond, Ind.
Nell & Smith Electric Tool Co., Cincinnati, O.
Standard Electric Tool Co., The, Cincinnati, O.

DRILLING MACHINES—Portable Pneumatic
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Cleveland Pneumatic Tool Co., Cleveland, O.
Ingersoll-Rand Co., 11 B'way, N. Y. C.
Keller Pneumatic Tool Co., Grand Haven, Mich.

DRILLING MACHINES—Post
Canedy-Otto Mfg. Co., Chicago Heights, Ill.

DRILLING MACHINES—Radial
American Tool Works Co., Cincinnati, O.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Cincinnati Bickford Tool Co., Cincinnati, O.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Fosdick Machine Tool Co., Cincinnati, O.
Harrington, E., Son & Co., Inc., Philadelphia, Pa.
Henry & Wright Mfg. Co., Hartford, Ct.
Mueller Machine Tool Co., Cincinnati, O.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Ryerson, Joseph T., & Son, Chicago, Ill.
Sherritt & Stoer Co., Inc., Philadelphia, Pa.
Taylor & Fenn Co., Hartford, Ct.

DRILLING MACHINES—Rock
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Ingersoll-Rand Co., 11 B'way, N. Y. C.
Sullivan Machinery Co., Chicago, Ill.

DRILLING MACHINES—Second Hand
Harris Bros. Co., Chicago, Ill.
New York Mchy. Exch., 50 Church St., N. Y. C.

DRILLING MACHINES—Sensitive
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Henry & Wright Mfg. Co., Hartford, Ct.
Langelier Mfg. Co., Arlington-Cranston, R. I.
Leland-Gifford Co., Worcester, Mass.
Royersford Foundry & Mach. Co., Inc., Royersford, Pa.
Taylor & Fenn Co., Hartford, Ct.

DRILLING MACHINES—Vertical
Baker Bros., Toledo, O.
Barnes Drill Co., Rockford, Ill.
Barnes, W. F. & Jno., Co., Rockford, Ill.
Buffalo Forge Co., Buffalo, N. Y.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Champion Blower & Forge Co., Lancaster, Pa.
Cincinnati Bickford Tool Co., Cincinnati, O.
Colburn Machine Tool Co., Cleveland, O.
Fosdick Machine Tool Co., Cincinnati, O.
Harrington, E., Son & Co., Inc., Philadelphia, Pa.
Henry & Wright Mfg. Co., Hartford, Ct.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Prentiss, Henry, & Co., Inc., 149 B'way, N.Y.C.
Rockford Drilling Mch. Co., Rockford, Ill.
Ryerson, Joseph T., & Son, Chicago, Ill.

DRILLS—Star
Star Expansion Bolt Co., 147 Cedar St., N.Y.C.
War Dept., Ordnance Dept., Washington, D. C.

DRINKING FOUNTAINS
Crane Co., 836 So. Mich. Ave., Chicago, Ill.

DRIVES—Silent Chain
Link-Belt Co., Chicago, Ill.

DROP FORGINGS—See Forgings, Drop

DROP HAMMERS—See Hammers, Drop

DROP PRESSES—See Presses, Drop

DRYERS FOR ALL MATERIAL
Bonnot Company, The, Canton, O.

DRYERS—Mold
Mahr Mfg. Co., Minneapolis, Minn.

DRYERS—Rotary
Fuller-Lehigh Co., Fullerton, Pa.

DUST COLLECTORS
Knickerbocker Co., Jackson, Mich.
Sly, W. W., Mfg. Company, Cleveland, O.
Sterling Blower Co., Hartford, Ct.
Sturtevant, B. F., Co., Hyde Park, Mass.
Whiting Corporation, Harvey, Ill.

ECONOMIZERS—Fuel
Sturtevant, B. F., Co., Hyde Park, Mass.

EJECTORS—Water
Lunkenheimer Co., Cincinnati, O.

ELECTRIC WELDING—See Welding, Electric

ELECTRICAL MACHINERY—Second Hand
Gregory Electric Co., Chicago, Ill.
Mill Supply Co., Troy, N. Y.
Niles, F. H., & Co., Inc., Woolworth Bldg., New York City.
Power Mchry. Exch., Inc., Jersey City, N. J.
Randle Machinery Co., Cincinnati, O.
Sachsenmaier, George, & Co., Philadelphia, Pa.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

ELEVATOR GUIDES
Fitzsimons Co., Youngstown, O.
Standard Gauge Steel Co., Beaver Falls, Pa.

ELEVATORS—Steam Hydraulic
Ridgway, Craig & Son Co., Coatesville, Pa.

EMERY STANDS
Cleveland Punch & Shear Wks. Co., Cleve., O.

EMERY WHEEL DRESSERS AND CUTTERS
Calder, Geo. H., Lancaster, Pa.
Desmond-Stephan Mfg. Co., Urbana, O.
Diamond Saw & Stpg. Works, Buffalo, N. Y.
Dickinson, Thos. L., 34 Gold St., N. Y. C.
Wheel Trueing Tool Co., Detroit, Mich.

EMERY WHEELS—See Grinding Wheels

ENAMELING
American Flyer Mfg. Co., Chicago, Ill.
Geuder, Paesche & Frey Co. (Contract Mfg. Division), Milwaukee, Wis.

END MILLS
Cowles Tool Co., Cleveland, Ohio.
Fastfeed Drill & Tool Corp, Toledo, O.

ENGINE TRIMMINGS
Lunkenheimer Co., Cincinnati, Ohio.

ENGINEERS—Constructing
Chase, Frank D., Inc., Chicago, Ill.
Semet-Solvay Co., Syracuse, N. Y.

ENGINEERS—Consulting
Bedaux, Chas. E., Co., Cleveland, O.
Chase, Frank D., Inc., Chicago, Ill.
Day & Zimmermann, Inc., Philadelphia, Pa.
Ellis, Frank I., Pittsburgh, Pa.
Freyn, Brassert & Co., Chicago, Ill.
Gathmann Engrg. Company, Baltimore, Md.
Lane, H. M, Company, Detroit, Mich
McKee, Arthur G., & Co., Cleveland, O.
Moore, W. E., & Co., Pittsburgh, Pa.
Perin, C. P.—S. M. Marshall, 1107 B'way, N.Y.
Semet-Solvay Co., Syracuse, N. Y.

ENGINEERS—Foundry
Chase, Frank D., Inc., Chicago, Ill.
Lane, H. M., Company, Detroit, Mich.
Rathbone, John A., Detroit, Mich.

ENGINEERS—Heat Treating
American Industrial Furnace Co., Boston.

ENGINEERS—Industrial
Bedaux, Chas. E., Co., Cleveland, O.
Chase, Frank D., Inc., Chicago, Ill.
Day & Zimmermann, Inc., Philadelphia, Pa.
Lane, H. M., Company, Detroit, Mich.
Standard Appraisal Co., 90 John St., N. Y. C.

ENGINEERS—Metallurgical
Gathmann Engrg. Company, Baltimore, Md.
McLain's System, Inc., Milwaukee, Wis.

ENGINEERS—Powdered Coal Equipment
Quigley Furnace Specialties Co., 26 Cortlandt Street, New York City.

ENGINEERS—Steel Works
Moore, W. E., & Co., Pittsburgh, Pa.

ENGINEERS AND CONTRACTORS
American Industrial Engrg. Co., Chicago, Ill.
Bonnot Company, The, Canton, O.
Booth Electric Furnace Co., Chicago, Ill.
Chase, Frank D., Inc., Chicago, Ill.
Fuller Engineering Co., Allentown, Pa.
Kennedy, Julian, Pittsburgh, Pa.
Laughlin, Alex., & Co., Pittsburgh, Pa.
McKee, Arthur G., & Co., Cleveland, O.
Pennsylvania Engrg. Works, New Castle, Pa.
Smythe, S. R., Co., Pittsburgh, Pa.
Stone & Webster, Inc., Boston, Mass.
Swindell, W., & Bros., Pittsburgh, Pa.

ENGINES—Automobile
Lycoming Motors Corp., Williamsport, Pa.

ENGINES—Blowing
Mesta Machine Co., Pittsburgh, Pa.

ENGINES—Corliss
Mesta Machine Co., Pittsburgh, Pa.
United Engineering & Foundry Co., Pitts., Pa.

ENGINES—Gas and Gasoline
Chicago Pneumatic Tool Co., 6 E. 44th Street, New York City.
Fairbanks, Morse & Co., Chicago, Ill.
Mesta Mach. Co., Pittsburgh, Pa.
National Transit Pump & Mach. Co., Oil City, Pa.
United Engineering & Foundry Co., Pitts., Pa.

ENGINES—High Speed
Troy Engine & Mch. Co., Troy, Pa.

ENGINES—Oil
Chicago Pneumatic Tool Co., 6 E. 44th Street, New York City.
Fairbanks, Morse & Co., Chicago, Ill.
Ingersoll-Rand Co., 11 B'way, New York City.
National Transit Pump & Mach. Co., Oil City, Pa.

ENGINES—Second Hand
Archer & Baldwin, Inc., 114 Liberty St., N.Y.C.
Bath, Cyril J., & Co., Cleveland, O.
Harris Bros. Co., Chicago, Ill.
Pfaunmueller Eng. Co., Chicago, Ill.
Randle Machinery Co., Cincinnati, O.
Schultz, A. L., & Son, Chicago, Ill.
Washington Co., 39 Cortlandt St., N. Y. C.
Wickes Machry. Co., Jersey City, N. J.

ENGINES—Steam
Erie City Iron Works, Erie, Pa.
Pusey & Jones Company, The, Wilmington, Del.
Sturtevant, B. F., Co., Hyde Park, Mass.

ENGINES—Steam (Una Flow Type)
Mesta Machine Co., Pittsburgh, Pa.

EXHAUST HEADS
Sterling Blower Co., Hartford, Ct.

EXHAUSTERS—Gas
Connersville Blower Co., Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.
Spencer Turbine Co., Hartford, Ct.
Sturtevant, B. F., Co., Hyde Park, Mass.

EXPORTERS
Phillips, F. R., & Sons, Philadelphia, Pa.

EYE PROTECTION GLASSES
Safety Equip. Service Co., Cleveland, O.

EYELET MACHINES
Waterbury Farrel Fdry. & Mch. Co., Waterbury, Conn.

FACTORY FURNITURE
Chicago Wire Chair Co., Chicago, Ill.
Corry-Jamestown Mfg. Corp., Corry, Pa.

FACTORY AND PLANT SITES
Colorado Power Company, 120 B'way, N. Y. C.
Holt & Merrall, Inc., 342 Madison Ave., New York City.
Martien, Wm., & Co., Baltimore, Md.

FANS—Centrifugal
Pittsburgh Fan Mfg. Co., Pittsburgh, Pa.

FANS—Exhaust
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Sturtevant, B. F., Co., Hyde Park, Mass.

FASTENERS—Corrugated
Cary Mfg. Co., Manhattan Bridge Plaza, Brooklyn, N. Y.

FEEDWATER HEATERS AND PURIFIERS
Alberger Pump & Condenser Co., 140 Cedar Street, New York City.
Frost Mfg. Co., Chicago, Ill.
H. S. B. W.-Cochrane Corp., Philadelphia, Pa.
Scaife, William B., & Sons Co., Pitts., Pa.

FEEDERS—Clay
Hadfield-Penfield Steel Co., The, Bucyrus, O.

FELTS—Wool Mechanical
Booth Felt Co., Inc., Brooklyn, N. Y.
Monarch Felt Works, Brooklyn, N. Y.

FENCES—Chain Link Wire
Anchor Post Iron Wks., 52 Church St., N. Y. C.

FENCES—Woven Wire
American Steel & Wire Co., Chicago, Ill.

FENCING—Wire
Wickwire Spencer Steel Corp., Worcester, Mass., and Buffalo, N. Y.

FENCING—Woven
Page Steel & Wire Co., Grand Central Terminal Bldg., New York City.

FERRO ALLOYS—Chromium
Altemus & Prindle, Grand Central Terminal, New York City.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, Philadelphia, Pa.
U. S. Ferro Alloys Corp., 32 E. 42d St., N.Y.C.

FERRO ALLOYS—Manganese
Altemus & Prindle, Grand Central Terminal, New York City.
Bethlehem Steel Company, So. Bethlehem, Pa.
Crocker Brothers, 21 E. 40th St., N. Y. C.
Heyward, Thomas R., Co., Pittsburgh, Pa.
Iron Trade Products Co., Pittsburgh, Pa.
Leavitt, C. W., & Co., 30 Church St., N. Y. C.
Park & Williams, Inc., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, Philadelphia, Pa.
U. S. Ferro Alloys Corp., 32 East 42nd St., N. Y. C.

FERRO ALLOYS—Silicon
Crocker Brothers, 21 E. 40th St., N. Y. C.
Hickman, Williams & Co., Pittsburgh, Pa.
Keokuk Electric Metals Co., Chicago, Ill.
Rogers, Brown & Co., Cincinnati, O.
Samuel, Frank, Philadelphia, Pa.
Southern Ferro Alloys Co., Chattanooga, Tenn.
U. S. Ferro Alloys Corp., 32 E. 42d St., N.Y.C.

FERRO ALLOYS—Spiegeleisen
Crocker Brothers, 21 E. 40th St., N. Y. C.
Rogers, Brown & Co., Cincinnati, O.

FERRO ALLOYS—Titanium
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.

FERRULES
Cleveland Punch & Shear Wks. Co., Cleve., O.
Gem Stamped Steel Co., Boston, Mass.

FIBRE AND FIBRE PRODUCTS—Hard
Wilmington Fibre Specialty Company, Wilmington, Del.

FILES AND RASPS
American Swiss File & Tool Co., 24 John St., N. Y. C.
Barnett, G. & H., Co., Philadelphia, Pa.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Madden & Morrison File Co., Middletown, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.
War Dept., Ordnance Dept., Washington, D. C.

FILING MACHINES—Bench
Ames, B. C., Company, The, Waltham, Mass.

FILTER CLOTH—Metal
Ludlow-Saylor Wire Co., The, St. Louis, Mo.

FILTERING AND CIRCULATING SYSTEMS—Oil
Bowser, S. F., & Co., Inc., Fort Wayne, Ind.

FILTERS—Oil
Blaw-Knox Co., Pittsburgh, Pa.
Bowser, S. F., & Co., Inc., Ft. Wayne, Ind.

FIRE CLAY
Crescent Refractories Co., Curwensville, Pa.
Davis Fire Brick Co., The, Oak Hill, O.
Southwark Fdry. & Mch. Co., Phila., Pa.

FITTINGS—Hydraulic
Southwark Fdry. & Mch. Co., Phila., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

FITTINGS—Steam and Gas Pipe
Devlin, Thomas, Mfg. Co., Phila., Pa.

FLANGES
Adams, Wm., Foundry Co., Inc., Phila., Pa.
Jefferson Union Co., Lexington, Mass.
Philadelphia Steel & Iron Co., Phila., Pa.
Standard Steel Works Co., The, Phila., Pa.

FLASKS—Foundry
American Foundry Equipment Co., 366 Madison Avenue, New York City.
Diamond Clamp & Flask Co., Richmond, Ind.
Sterling Wheelbarrow Co., Milwaukee, Wis.

FLOATS—Seamless Copper
Naugatuck Mfg. Co., Naugatuck, Ct.

FLOORING—Creosoted Wood
Carter Bloxonend Flooring Co., Kansas City, Mo.
Jennison-Wright Co., Toledo, O.

FLOORING—Fireproof
Irving Iron Works Co., Long Island City, N. Y

FLOORING—Ventilated
Irving Iron Works Co., Long Island City, N. Y

FLOORING—Wood Block, Built-Up
Carter Bloxonend Flooring Co., Kansas City, Mo.

FLUORSPAR
Rogers, Brown & Co., Cincinnati, O.

FLUX—Soldering
Chicago Solder Co., Chicago, Ill.

FORGES
Buffalo Forge Co., Buffalo, N. Y.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Champion Blower & Forge Co., Lancaster, Pa.
Sturtevant, B. F., Co., Hyde Park, Mass.

FORGING MACHINES
Long & Allstatter Co., Hamilton, O.
National Machinery Co., Tiffin, O.
Stokvis, R. S., & Sons, 17 Battery Place, N. Y.
United Engineering & Foundry Co., Pitts., Pa.

FORGINGS—Alloy Steel
Electric Steel & Forge Co., Cleveland, O.
Endicott Frg. & Mfg. Co., Inc., Endicott, N. Y.
Mesta Machine Co., Pittsburgh, Pa.
National Forge & Tool Co., Irvine, Pa.
Philadelphia Steel & Iron Co., Phila., Pa.
Schuylkill Forge Company, Philadelphia, Pa.

FORGINGS—Automobile
Champion Machine & Forging Co., Cleve., O.
Cleveland Hardware Co., The, Cleveland, O.
Duff Mfg. Company, The, Pittsburgh, Pa.
Endicott Frg. & Mfg. Co., Inc., Endicott, N. Y.
Hammond & Irving, Inc., Auburn, N. Y.
Kropp Forge Company, Chicago, Ill.
Philadelphia Steel & Iron Co., Phila., Pa.
Schuylkill Forge Company, Philadelphia, Pa.

FORGINGS—Axle
Union Switch & Signal Co., Swissvale, Pa.

FORGINGS—Brass and Copper
Newport Rolling Mill Co., Newport, Ky.

FORGINGS—Bronze
American Manganese Bronze Co., Holmesburg, Phila., Pa.

FORGINGS—Car
Commercial Drop Forge Co., Warren, Pa.
Pittsburgh Knife & Forge Co., Pittsburgh, Pa.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

FORGINGS—Carriage and Wagon
Clapp, E. D., Mfg. Co., Auburn, N. Y.
Cleveland Hardware Co., The, Cleveland, O.
Eccles, Richard, Co., Auburn, N. Y.

FORGINGS—Commercial
Commercial Drop Forge Co., Warren, Pa.

FORGINGS—Drop
Allen, S. L., & Company, Inc., Phila., Pa.
Bearings Company of America, Lancaster, Pa.
Belden Machine Co., New Haven, Ct.
Benton Harbor Malleable Foundry Co., Benton Harbor, Mich.
Bethlehem Steel Co., So. Bethlehem, Pa.
Brooks Machine Company, York, Pa.
Champion Machine & Forging Co., Cleve., O.
Clapp, E. D., Mfg. Co., Auburn, N. Y.
Cleveland Hardware Co., The, Cleveland, O.
Columbus Forge & Iron Co., Columbus, O.
Commercial Drop Forge Co., Warren, Pa.
Drop Forging Co. of New York, J. C., N. J.
Duff Mfg. Company, The, Pittsburgh, Pa.
Dunbar Drop Forge Co., Chicago, Ill.
Eccles, Richard, Co., Auburn, N. Y.
Endicott Frg. & Mfg. Co., Inc., Endicott, N. Y.
General Drop Forge Co., Buffalo, N. Y.
Harrington, Robinson & Co., Boston, Mass.
Indianapolis Drop Forging Co., Indianapolis.
Keystone Drop Forge Works, Chester, Pa.
Kilborn & Bishop Co., New Haven, Ct.
Kropp Forge Company, Chicago, Ill.
Lakeside Forge Co., Erie, Pa.
Melling Forging Co., Lansing, Mich.
New London Ship & Engine Co., The, Croton, Conn.
Rhode Island Tool Co., Providence, R. I.
Richmond Frgs. Corp. (Acca.), Richmond, Va.
Schuylkill Forge Co., Philadelphia, Pa.
Scranton Forging Co., Scranton, Pa.
Storms Drop Forging Co., East Springfield, Mass.
Strieby & Foote Co., Newark, N. J.
Transue & Williams Steel Forging Corp., Alliance, O.
Union Switch & Signal Co., Swissvale, Pa.
Western Drop Forge Co., Marion, Ind.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.
Williams, J. H., & Co., 57 Richards Street, Brooklyn, N. Y.

FORGINGS—Electric Steel
Electric Steel & Forge Co., Cleveland, O.

FORGINGS—Hydraulic Press
Mesta Machine Co., Pittsburgh, Pa.
Philadelphia Steel & Iron Co., Phila., Pa.
Tioga Steel & Iron Co., Philadelphia, Pa.

FORGINGS—Iron and Steel
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Akron-Selle Co., Akron, O.
American Bridge Co., 30 Church St., N. Y. C.
Bethlehem Steel Co., So. Bethlehem, Pa.
Brooks Machine Co., York, Pa.
Champion Machine & Forging Co., Cleve., O.
Columbia Machine Works & Malleable Iron Co., Chestnut St. & Atlantic Av., B'klyn, N. Y.
Dyson, Joseph, & Sons, Cleveland, O.
Electric Steel & Forge Co., Cleveland, O.
General Drop Forge Co., Buffalo, N. Y.
Heppenstall Forge & Knife Co., Pitts., Pa.
Kropp Forge Company, Chicago, Ill.
McConway & Torley Company, Pittsburgh, Pa.
Melling Forging Co., Lansing, Mich.
National Forge & Tool Co., Irvine, Pa.
New London Ship & Engine Co., The, Groton, Conn.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Otis Steel Co., Cleveland, O.
Penn Fdry. & Mfg. Co., Box 182, Reading, Pa.
Philadelphia Steel & Iron Company, Phila., Pa.
Richmond Frgs. Corp. (Acca.), Richmond, Va.
Schuylkill Forge Company, Philadelphia, Pa.
Standard Steel Works Co., The, Phila., Pa.
Tioga Steel & Iron Co., Philadelphia, Pa.

FORGINGS—Machine, Railroad and Engine
Columbus Forge & Iron Co., Columbus, O.
Duff Mfg. Company, The, Pittsburgh, Pa.
Dyson, Joseph, & Sons, Cleveland, O.
Laclede Steel Co., St. Louis, Mo.
National Forge & Steel Co., Irvine, Pa.
Philadelphia Steel & Iron Co., Phila., Pa.
Richmond Frgs. Corp. (Acca.), Richmond, Va.

FORGINGS—Manganese Steel
Manganese Steel Forge Co., Philadelphia, Pa.

FORGINGS—Marine
Mesta Machine Co., Pittsburgh, Pa.

FORGINGS—Oil Well Supply
Commercial Drop Forge Co., Warren, Pa.

FORGINGS—Pipe Flange
Philadelphia Steel & Iron Co., Phila., Pa.
Tioga Steel & Iron Co., Philadelphia, Pa.

FORMS—Steel for Concrete Construction
Blaw-Knox Co., Pittsburgh, Pa.

FOUNDRY EQUIPMENT AND SUPPLIES
American Foundry Equipment Co., 366 Madison Avenue, New York City.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Diamond Clamp & Flask Co., Richmond, Ind.
Mahr Mfg. Co., Minneapolis, Minn.
National Engineering Company, Chicago, Ill.
Northern Engineering Works, Detroit, Mich
Paxson, J. W., Co., Philadelphia, Pa.
Pettinos, George F., Philadelphia, Pa.
Scully-Jones & Co., Chicago, Ill.
Shuster, F. B., Co., New Haven, Ct.
Sly, W. W., Mfg. Company, Cleveland, O.
Whiting Corporation, Harvey, Ill.

FOUNDRY SPECIALISTS
Lane, H. M. Co., Detroit, Mich.

FRAMES—Automobile and Truck
Sharon Pressed Steel Co., Sharon, Pa.

FRAMES—Rudder and Stern
Mesta Machine Co., Pittsburgh, Pa.

FROGS—Railway
Bethlehem Steel Co., So. Bethlehem, Pa.
Cincinnati Frog & Switch Co., Oakley, Cincinnati, O.
Easton Car & Construction Co., Easton, Pa.
Koch, Carl, Inc., 68 Beaver St., N. Y. C.
Koppel Industrial Car & Equip. Co., Pitts., Pa.

FURNACE APPLIANCES—Water Cooled
Blaw-Knox Co., Pittsburgh, Pa.

FURNACES—Annealing, Tempering & Metal Treating, Gas or Oil Fired
Advance Furnace & Engineering Co., Springfield, Mass.
American Gas Furnace Co., Elizabeth, N. J.
American Indus. Furnace Corp., Boston, Mass.
Anthony Company, The, Long Island City, N. Y.
Baush Mach. Tool Co., Metals Div., Springfield, Mass.
Bellevue Industrial Furnace Co., Detroit, Mich.
Best, W. N., Furnace & Burner Corp., 11 B'way, New York City.
Chicago Flexible Shaft Co., Chicago, Ill.
Economy Furnace Co., The, Chicopee, Mass.
Ferguson Furnace Co., Toledo, Ohio.
Fuller Engineering Co., Allentown, Pa.
Hagan, Geo. J., Co., Pittsburgh, Pa.
Smythe, S. R., Co., Pittsburgh, Pa.
Surface Combustion Co., 366-368 Gerard Ave., Bronx, N. Y.
Swindell, W., & Bros., Pittsburgh, Pa.
Tate-Jones & Co., Inc., Pittsburgh, Pa.

FURNACES—Automatic
Ferguson Furnace Co., Toledo, Ohio.

FURNACES—Billet Heating
Ryan, F. J., & Co., Philadelphia, Pa.
Swindell, W., & Bros., Pittsburgh, Pa.
Tate-Jones & Co., Inc., Pittsburgh, Pa.

FURNACES—Blast
Freyn, Brassert & Co., Chicago, Ill.
McKee, Arthur G., & Co., Cleveland, O.
Pennsylvania Engrg. Works, New Castle, Pa.
Riter-Conley Company, Pittsburgh, Pa.
Smythe, S. R., Co., Pittsburgh, Pa.

FURNACES—Crucible
Swindell, W., & Bros., Pittsburgh, Pa.

FURNACES—Electric
Booth Electric Furnace Co., Chicago, Ill.
Detroit Electric Furnace Co., Detroit, Mich.
Electric Furnace Company, The, Alliance, O.
Electric Furnace Construction Co., Phila., Pa.
Engelhard, Chas., 30 Church St., N. Y. City.
Hagan, Geo. J., Co., Pittsburgh, Pa.
Pittsburgh Electric Furnace Corp., Pitts., Pa.
Ryan, F. J., & Co., Philadelphia, Pa.
Vom Baur, C. H., 25 Church St., N. Y. C.

FURNACES—Electric Heat Treating
Electric Furnace Construction Co., Phila., Pa.
Hoskins Mfg. Co., Detroit, Mich.
Vom Baur, C. H., 25 Church St., N. Y. C.

FURNACES—Forging
Anthony Co., The, Long Island City, N. Y.
Chicago Flexible Shaft Co., Chicago, Ill.
Ferguson Furnace Co., Toledo, Ohio.
Fuller Engineering Co., Allentown, Pa.
Ryan, F. J., & Co., Philadelphia, Pa.
Swindell, W., & Bros., Pittsburgh, Pa.
Tate-Jones & Co., Inc., Pittsburgh, Pa.

FURNACES—Hardening in Cyanide & Lead
Bellevue Industrial Furnace Co., Detroit, Mich.
Chicago Flexible Shaft Co., Chicago, Ill.

FURNACES—Heat Treating
Electric Furnace Company, The, Alliance, O.
Swindell, W., & Bros., Pittsburgh, Pa.

FURNACES—High-Speed Steel
Chicago Flexible Shaft Co., Chicago, Ill.
Swindell, W., & Bros., Pittsburgh, Pa.

FURNACES—Industrial Heating
Gordon, Robert, Inc., Chicago, Ill.

FURNACES—Non-Ferrous Melting
Detroit Electric Furnace Co., Detroit, Mich.
Electric Furnace Company, The, Alliance, O.
Electric Furnace Construction Co., Phila., Pa.
Hawley Down Draft Furnace Co., Easton, Pa.
Pittsburgh Electric Furnace Corp., Pitts., Pa.

FURNACES—Open Hearth
McKee, Arthur G., & Co., Cleveland, O.
Swindell, W., & Bros., Pittsburgh, Pa.

FURNACES—Powdered Coal Burning
American Industrial Engrg. Co., Chicago, Ill.

FURNACES—Wire, Annealing & Galvanizing
Vaughn Mchry. Co., Cuyahoga Falls, Ohio.

FUSES—Renewable
Federal Sign System (Electric), Chicago, Ill.

GALVANIZING
Meaker Galvanizing Co., Chicago, Ill.

GALVANIZING EQUIPMENT
Addy, Matthew, Company, The, Phila., Pa.

GALVANIZING FLUX
Empire Metal Co., Syracuse, N. Y.

GALVANIZING PLANTS
Erie Foundry Co., Erie, Pa.
Meaker Galvanizing Co., Chicago, Ill.
Wilfong, M. F., Iron Wks. Co., Phila., Pa.

GALVANIZING PLANTS—Sheet
Aetna Fdry. & Mch. Co., The, Warren, O.

GALVANIZING & TINNING EQUIPMENT—Wire
Vaughn Mchry. Co., Cuyahoga Falls, Ohio.

GAS CLEANING PLANTS
McKee, Arthur G., & Co., Cleveland, O.
Smith Gas Engineering Co., Dayton, O.

GAS HOLDERS
Cruse-Kemper Co., Ambler, Pa.

GAS OIL
Sloan & Zook, Bradford, Pa.

GAS PRODUCERS
Chapman Eng. Co., Division of the C. & G. Cooper Co., Mt. Vernon, O.
Duff Patents Co., Inc., Pittsburgh, Pa.
Flinn & Dreffein Co., Chicago, Ill.
Laughlin, Alex., & Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Smythe, S. R., Co., Pittsburgh, Pa.
Swindell, W., & Bros., Pittsburgh, Pa.
Wood, R. D., & Co., Philadelphia, Pa.

GASKET MAKING MACHINES
V. & O. Press Co., Glendale, Long Island, N.Y.

GASKETS—Felt
Booth Felt Co., Inc., Brooklyn, N. Y.

GASOLINE
Empire Refineries, Inc., Tulsa, Okla.
Sloan & Zook, Bradford, Pa.

GATES—Blast
Roots, P. H. & F. M., Co., Connersville, Ind.

GATES—Fence
American Steel & Wire Co., Chicago, Ill.
Anchor Post Iron Wks., 52 Church St., N. Y. C.

GAUGE COCKS
Lunkenheimer Co., Cincinnati, Ohio.

GAUGES—Dial
Ames, B. C., Company, The, Waltham, Mass.

GAUGES—Machinists'
Starrett, L. S., Athol, Mass.

GAUGES—Pressure and Vacuum
Marshalltown Mfg. Co., Marshalltown, Iowa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

GAUGES—Thread Lead
Jones & Lamson Machine Co., Springfield, Vt.

GAUGES—Water
Lunkenheimer Co., Cincinnati, Ohio.

GEAR CUTTING
Acme Gear Co., Philadelphia, Pa.
Albaugh-Dover Co., Chicago, Ill.
Beatty Machine & Mfg. Co., Hammond, Ind.
Caldwell, H. W., & Son Co., Chicago, Ill.
Connecticut Gears, Inc., Waterbury, Conn.
Cresson-Morris Co., Philadelphia, Pa.
Earle Gear & Machine Co., Philadelphia, Pa.
Flather Mfg. Co., Nashua, N. H.
Gleason Works, Rochester, N. Y.
Hercules Machine & Tool Co., The, 410 Broome St., N. Y. C.
Hindley Gear Co., Philadelphia, Pa.
Horsburgh & Scott Co., Cleveland, O.
Lebanon Gear & Machine Works, Lebanon, Pa.
Link-Belt Co., Chicago, Ill.
Meisselbach-Catucci Mfg. Co., Inc., Newark, N. J.
Morgan Construction Co., Worcester, Mass.
Newark Gear Cutting Mch. Co., Newark, N. J.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Nilson-Miller Co., Hoboken, N. J.
Philadelphia Gear Works, Philadelphia, Pa.
Pittsburgh Gear & Mach. Co., Pittsburgh, Pa.
Pittsburgh Rolls Corp., Pittsburgh, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Turner Machine Co., Danbury, Conn.
United Engineering & Fdy. Co., Pittsburgh, Pa.

GEAR CUTTING MACHINES
Flather Mfg. Co., Nashua, N. H.
Gleason Works, Rochester, New York.
Gould & Eberhardt, Newark, N. J.
Hercules Machine & Tool Co., The, 410 Broome St., N. Y. C.
Morey & Co., Inc., 410 Broome St., N. Y. C.
Newark Gear Cutting Mch. Co., Newark, N. J.
New York Machry. Ex., 50 Church St., N.Y.C.

GEAR HOBBING MACHINES
Barber-Colman Co., Rockford, Ill.
Gould & Eberhardt, Newark, N. J.
Morey & Co., Inc., 410 Broome St., N. Y. C.
Newark Gear Cutting Mch. Co., Newark, N. J.
New York Machry. Ex., 50 Church St., N.Y.C.

GEAR PLANING MACHINES
Gleason Works, Rochester, N. Y.

GEARS—Bevel
Acme Gear Co., Philadelphia, Pa.
Earle Gear & Machine Co., Philadelphia, Pa.
Fawcus Machine Co., Pittsburgh, Pa.
Ganschow, Wm., Co., Chicago, Ill.
Horsburgh & Scott Co., Cleveland, O.
Mesta Mach. Co., Pittsburgh, Pa.
Newark Gear Cutting Mach. Co., Newark, N. J.
Philadelphia Gear Works, Philadelphia, Pa.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

GEARS—Double Helical Cut
De Laval Steam Turbine Co., Trenton, N. J.
Farrel Foundry & Mach. Co., Ansonia, Conn.
Fawcus Machine Co., Pittsburgh, Pa.
Kerr Turbine Company, Wellsville, N. Y.
Mesta Mach. Co., Pittsburgh, Pa.
Newark Gear Cutting Mach. Co., Newark, N. J.

GEARS—Enclosed Herringbone Transmission
Fawcus Machine Co., Pittsburgh, Pa.
Newark Gear Cutting Mach. Co., Newark, N. J.

GEARS—Heat Treated
Newark Gear Cutting Mach. Co., Newark, N. J.

GEARS—Herringbone
Earle Gear & Machine Co., Philadelphia, Pa.
Falk Corp., The, Milwaukee, Wis.
Fawcus Machine Co., Pittsburgh, Pa.
Gleason Works, Rochester, N. Y.
Mesta Mach. Co., Pittsburgh, Pa.
Newark Gear Cutting Mach. Co., Newark, N. J.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Philadelphia Gear Works, Philadelphia, Pa.
Woodard Mach. Co., Wooster, O.

GEARS—Machine Cut
Earle Gear & Mach. Co., Philadelphia, Pa.
Newark Gear Cutting Mach. Co., Newark, N. J.

GEARS—Machine Molded
Farrel Foundry & Mach. Co., Ansonia, Conn.
Mesta Mach. Co., Pittsburgh, Pa.

GEARS—Non-Metallic
Newark Gear Cutting Mach. Co., Newark, N. J.
Philadelphia Gear Works, Philadelphia, Pa.

GEARS—Rawhide
Albaugh-Dover Co., Chicago, Ill.
Chicago Rawhide Mfg. Co., Chicago, Ill.
Horsburgh & Scott Co., Cleveland, O.
Meachem Gear Corp., Syracuse, N. Y.
Newark Gear Cutting Mach. Co., Newark, N. J.
Philadelphia Gear Works, Philadelphia, Pa.

GEARS—Speed Reducing
Hindley Gear Co., Philadelphia, Pa.
Newark Gear Cutting Mach. Co., Newark, N. J.

GEARS—Spiral
Ganschow, Wm., Co., Chicago, Ill.
Newark Gear Cutting Mach. Co., Newark, N. J.

GEARS—Spur
Connecticut Gears, Inc., Waterbury, Conn.
Earle Gear & Mach. Co., Philadelphia, Pa.
Farrel Foundry & Mach. Co., Ansonia, Conn.
Fawcus Machine Co., Pittsburgh, Pa.
Ganschow, Wm., Co., Chicago, Ill.
Mesta Mach. Co., Pittsburgh, Pa.
Newark Gear Cutting Mach. Co., Newark, N. J.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Pittsburgh Gear & Mach. Co., Pittsburgh, Pa.

GEARS—Worm
Albaugh-Dover Co., Chicago, Ill.
Hindley Gear Co., Philadelphia, Pa.
Horsburgh & Scott Co., Cleveland, Ohio.
Newark Gear Cutting Mach. Co., Newark, N. J.
Philadelphia Gear Works, Philadelphia, Pa.

GENERATORS—Acetylene
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.
Imperial Brass Mfg. Co., Chicago, Ill.
Milburn, Alexander, Co., Baltimore, Md.

GENERATORS—Electric
Crocker-Wheeler Co., Ampere, N. J.
Fairbanks, Morse & Co., Chicago, Ill.
Klein, N., & Co., Centre & Howard Sts., N. Y.
Reliance Electric & Engrg. Co., Cleve., O.
Sturtevant, B. F., Co., Hyde Park, Mass.

GENERATORS—Electric, Second Hand
Archer & Baldwin, Inc., 114 Liberty St., N.Y.C.
Gregory Electric Co., Chicago, Ill.
Harris Brothers Co., Chicago, Ill.
Klein, N., & Co., Centre & Howard Sts., N. Y.
McCoy-Brandt Machinery Co., Pittsburgh, Pa.
Miller-Owen Electric Co., Inc., Pittsburgh, Pa.
Power Mchry. Exch., Inc., Jersey City, N. J.
Sachsenmaier, George, & Co., Philadelphia, Pa.
Stewart, Paul, & Co., Cincinnati, Ohio.

GENERATORS—Turbine Driven
Kerr Turbine Company, Wellsville, N. Y.

GLUE HEATERS
Dart, E. M., Mfg. Co., Providence, R. I.

GOGGLES FOR WORKMEN
Hardy, F. A., & Co., Chicago, Ill.
Safety Equip. Service Co., Cleveland, O.

GRAPHITE
Pettinos, George, F., Philadelphia, Pa.

GRATING—Flooring
Irving Iron Wks. Co., Long Island City, N. Y
Mitchell-Tappen Co., 15-17 John St., N. Y. C

GREASE CUPS
Lunkenheimer Co., Cincinnati, Ohio.

GREASES
Sun Company, Philadelphia, Pa.
Texas Co., The, 17 Battery Place, N. Y. C.

GRINDERS' SPECTACLES
Safety Equip. Service Co., Cleveland, O.

GRINDING AND POLISHING MACHINES
Badger Tool Co., Beloit, Wis.
Barnes, W. F., & John, Co., Rockford, Ill.
Besly, Chas. H., & Co., Chicago, Ill.
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Ct.
Calder, Geo. H., Lancaster, Pa.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Ransom Mfg. Co., Oshkosh, Wis.
Springfield Mfg. Co., Bridgeport, Ct.
Sterling Grinding Wheel Mfg. Co., Tiffin, O.
Strand, N. A., & Company, Chicago, Ill.
Stroud, Arva, 327 B'way, New York City.

GRINDING MACHINES—Camshaft
Landis Tool Co., Waynesboro, Pa.

GRINDING MACHINES—Cutter and Reamer
Oakley Machine Tool Company, Middletown, O.
Thompson Grinder Co., Springfield, O.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Cylindrical
Brown & Sharpe Mfg Co., Providence, R. I.
Detroit Machine Tool Co., Detroit, Mich.
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Prentiss, Henry, & Co., 149 Broadway, N. Y.
Queen City Shaper Company, Cincinnati, Ohio.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Die
Bignall & Keeler Mch. Wks., Edwardsville, Ill.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Discs for Metal Work
Besly, Chas. H., & Co., Chicago, Ill.

GRINDING MACHINES—Discs for Pattern Shop
Badger Tool Co., Beloit, Wis.

GRINDING MACHINES—Drill
Landis Tool Co., Waynesboro, Pa.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Flexible Shaft
Strand, N. A., & Company, Chicago, Ill.

GRINDING MACHINES—Internal
Heald Machine Co., Worcester, Mass.
Landis Tool Co., Waynesboro, Pa.
Lansing Stamping Company, Lansing, Mich.
Prentiss, Henry, & Co., Inc., 149 B'way, N.Y.C.
Rivett-Lathe & Grinder Co., Boston, Mass.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Machine Knives
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Ct.

GRINDING MACHINES—Portable Electric
Neil & Smith Electric Tool Co., Cincinnati, O.
Standard Electric Tool Co., The, Cincinnati, O.
Stroud, Arva, 327 B'way, New York City.

GRINDING MACHINES—Portable Pneumatic
Ingersoll-Rand Company, 11 Broadway, N. Y. C.
Keller Pneumatic Tool Co., Grand Haven, Mich.

GRINDING MACHINES—Roll
Farrel Foundry & Mach. Co., Ansonia, Conn.

GRINDING MACHINES—Second Hand
Harris Bros. Co., Chicago, Ill.
New York Machry. Ex., 50 Church St., N.Y.C.

GRINDING MACHINES—Surface
Blanchard Mach. Co., Cambridge, Mass.
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Ct.
Heald Machine Co., Worcester, Mass.
Metzler, Robt. J., Inc., Newark, N. J.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Swing Frame
Bridgeport Safety Emery Wheel Co., Inc., Bridgeport, Ct.
Pittsburgh Grinding Wheel Co., Rochester, Pa.

GRINDING MACHINES—Tool
Baird Machine Co., Bridgeport, Ct.
Landis Tool Co., Waynesboro, Pa.
Oakley Machine Tool Company, Middletown, O.
Ransom Mfg. Co., Oshkosh, Wis.
Taylor & Fenn Co., Hartford, Ct.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Universal
Landis Tool Co., Waynesboro, Pa.
Simmons Machine Co., Inc., Albany, N. Y.
Thompson Grinder Co., Springfield, O.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING MACHINES—Vertical Surface
Blanchard Mach. Co., Cambridge, Mass.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Wilmarth & Morman Co., Grand Rapids, Mich.

GRINDING WHEELS
New York Belting & Packing Co., 91-93 Chambers Street, New York City.
Pittsburgh Grinding Wheel Co., Rochester, Pa.
Springfield Mfg. Co., Bridgeport, Ct.
Sterling Grinding Wheel Mfg. Co., Tiffin, O.

GUARDS—Machinery
Buffalo Wire Works Co., Buffalo, N. Y.
Ransom Mfg. Co., Oshkosh, Wis.

GUARDS—Wire
Buffalo Wire Works Co., Buffalo, N. Y.

HACK SAW BLADES—See Saws, Hack Saw Blades

HACK SAW MACHINES
Armstrong Blum Mfg. Co., Chicago, Ill.
Diamond Saw & Stpg. Works, Buffalo, N. Y.
Hanna Engineering Works, Chicago, Ill.

HAMMERS—Air
Nazel Engrg. & Mch. Wks., Philadelphia, Pa.

HAMMERS—Belt and Motor Driven
Beaudry & Co., Inc., Boston, 9, Mass.
Bradley, C. C., & Son, Syracuse, N. Y.
Kidder, R. E., Co., Worcester, Mass.
Long & Allstatter Co., Hamilton, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Toledo Mach. & Tool Co., Toledo, O.
United Hammer Co., Boston 9, Mass.

HAMMERS—Doubling, for Sheet Steel
Aetna Fdry. & Mch. Co., Warren, Ohio.

HAMMERS—Drop
Chambersburg Eng. Co., Chambersburg, Pa.
Erie Fdry. Co., Erie, Pa.
Massillon Foundry & Mach. Co., Massillon, O.
Merrill Bros., Mapveth, N. Y.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
United Engineering & Foundry Co Pitts., Pa.
War Dept., Ordnance Dept., Washington, D. C.
Williams, White & Co., Moline, Ill.

HAMMERS—Pneumatic
Canton Pneumatic Tool Co., The, Canton, O.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Cleveland Pneumatic Tool Co., Cleveland, O.
Ingersoll Rand Co., 11 Broadway, N. Y. C.
Keller Pneumatic Tool Co., Grand Haven, Mich.
Oldham, Geo., & Son Co., Baltimore, Md.

HAMMERS—Pneumatic Forging
Nazel Eng. & Mach. Works, Philadelphia, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Sullivan Machinery Co., Chicago, Ill.

HAMMERS—Power
Beaudry & Co., Inc., Boston, 9, Mass.
Nazel Engrg. & Mch. Wks., Philadelphia, Pa.
United Hammer Co., Boston 9, Mass.

HAMMERS—Steam
Chambersburg Engrg. Co., Chamsburg, Pa.
Erie Foundry Co., Erie, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

HAMMERS—Steel
Massillon Foundry & Mach. Co., Massillon, O.

HANGERS—Ball Bearing
Medart Patent Pulley Company, St. Louis, Mo.

HANGERS—Factory Door
Myers, F. E., & Bro. Co., Ashland, O.

HANGERS—Shaft
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Hyatt Roller Bearing Co., 100 West 41st St., New York City.
Hyman, Joseph, & Sons, Philadelphia, Pa.
Wood's, T. B., Sons Co., Chambersburg, Pa.

HARDWARE—Wagon
Cleveland Hardware Co., The, Cleveland, O.

HARDWARE MANUFACTURERS
Buck, Wm. E., Mfg. Co., Eastport, Me.
Progressive Mfg. Co., Torrington, Ct.
Union Mfg. Co., New Britain, Ct.
Wagner, E. R., Mfg. Co., No. Milwaukee, Wis.

HEAT TREATING
Pittsburgh Gear & Machine Co., Pitts., Pa.

HEATING AND VENTILATING APPARATUS
Buffalo Forge Co., Buffalo, N. Y.
Gordon, Robert, Inc., Chicago, Ill.
Sturtevant, B. F., Co., Hyde Park, Mass.

HOBS—Formed and Ground
Barber-Colman Co., Rockford, Ill.

HOISTS—Air
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Curtis Pneumatic Mchry. Co., St. Louis, Mo.
Detroit Hoist & Mach. Co., Detroit, Mich.
Hanna Eng. Works, Chicago, Ill.
Northern Engineering Works, Detroit, Mich.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.
Whiting Corporation, Harvey, Ill.

HOISTS—Chain
Box, Alfred, & Co., Inc., Philadelphia, Pa.
Ford Chain Block Co., Philadelphia, Pa.
Harrington, E., Son & Co., Inc., Philadelphia, Pa.
Morris, Herbert, Inc., Buffalo, N. Y.
Reading Chain & Block Co., Reading, Pa.
Wright Mfg. Co., Lisbon, O.

HOISTS—Electric
Barber-Foster Eng. Co., Cleveland, O.
Box, Alfred, & Co., Inc., Philadelphia, Pa.
Detroit Hoist & Mach. Co., Detroit, Mich.
Euclid Crane & Hoist Co., Euclid, O.
Link-Belt Co., Chicago, Ill.
Milwaukee Electric Crane & Mfg. Co., Inc., Milwaukee, Wis.
Morris, Herbert, Inc., Buffalo, N. Y.
Northern Engineering Works, Detroit, Mich.
Reading Chain & Block Co., Reading, Pa.
Roeper Crane & Hoist Works, Reading, Pa.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

HOISTS—Electric Traveling
Barber-Foster Eng. Co., Cleveland, O.
Euclid Crane & Hoist Co., Euclid, Ohio.
Morris Brothers, Philadelphia, Pa.
Morris, Herbert, Inc., Buffalo, N. Y.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Northern Engineering Works, Detroit, Mich.
Pawling & Harnischfeger Co., Milwaukee, Wis.
Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.

HOISTS—Hand
Armington Engineering Co., Euclid, O.
Wright Mfg. Co., Lisbon, O.

HOISTS—Hydraulic
Watson-Stillman Co., 190 Fulton St., N. Y. C.

HOISTS—Mono-rail
Barber-Foster Engrg. Co., Cleveland, Ohio.
Milwaukee Elec. Crane & Mfg. Co., Inc., Milwaukee, Wis.
Northern Engineering Works, Detroit, Mich.

HOISTS—Second Hand
Harris Bros. Co., Chicago, Ill.
Payne, N. B., & Co., 25 Church St., N. Y. C.

HOOKS—Hoist
Williams, J. H., & Co., 57 Richards Street, Brooklyn, N. Y.

HOOP FORMING AND COILING MACHINES
Yoder Co., Cleveland, O.

HOOPS—Wire
American Steel & Wire Co., Chicago, Ill.

HOOPS AND BANDS
Acme Steel Goods Co., Chicago, Ill.
Cary Mfg. Co., Manhattan Bridge Plaza, Brooklyn, N. Y.
De Haven Mfg. Co., 50 Columbia Heights, Brooklyn, N. Y.
Ryerson, Jos. T., & Son, Chicago, Ill.

HORSE SHOES AND CALKS
American Steel & Wire Co., Chicago, Ill.
Old Dominion Iron & Steel Corp., Richmond, Va.

HOSE—Air, Oil, Steam and Water
American Metal Hose Co., Waterbury, Ct.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
New York Belting & Packing Co., 91-93 Chambers Street, New York City.
Oldham, Geo., & Son Co., Baltimore, Md.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

HOSE—Flexible Metallic
American Metal Hose Co., Waterbury, Ct.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

HOSE—Rubber
New York Belting & Packing Co., 91-93 Chambers Street, New York City.

HYDRANTS
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Wood, R. D., & Co., Philadelphia, Pa.

HYDRAULIC MACHINERY
Bethlehem Steel Co., So. Bethlehem, Pa.
Birdsboro Steel Foundry & Mch. Co., Birdsboro, Pa.
Chambersburg Eng. Co., Chambersburg, Pa.
Hydraulic Press Mfg. Co., Mount Gilead, O.
Mesta Mach. Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Southwark Fdry. & Mch. Co., Phila., Pa.
United Engrg. & Foundry Co., Pitts., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.
Wood, R. D., & Co., Philadelphia, Pa.

HYDRAULIC RAMS
Power Specialty Co., 111 B'way, N. Y. C.

HYDRAULIC TOOLS
Watson-Stillman Co., 190 Fulton St., N. Y. C.

HYDROGEN & OXY-HYDROGEN GENERATORS & EQUIPMENT
Davis-Bournonville Co., Jersey City, N. J.

HYPODERMIC NEEDLE
Summerill Tubing Co., Bridgeport, Montgomery County, Pa.

INFUSORIAL EARTH
Celite Products Co., Chicago, Ill.

INGOT MOLDS
Bethlehem Steel Co., So. Bethlehem, Pa.
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa
Penn Mold & Mfg. Co., Wheeling, W. Va.
Valley Mould & Iron Corp., Sharpsville, Pa.

INGOTS—Forging
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa.
Electric Steel & Forge Co., Cleveland, O.
Mesta Mach. Co., Pittsburgh, Pa.

INGOTS—Steel
Belle City Malleable Iron Co., Racine, Wis.
McConway & Torley Company, Pittsburgh, Pa.

INJECTORS
Lunkenheimer Co., Cincinnati, Ohio.

INSTRUMENTS—Electric Indicating
Engelhard, Chas., 30 Church St., N. Y. C.

INSTRUMENTS—Hardness and Temperature Measuring
Shore Instrument & Mfg. Co., Jamaica, N. Y.

INSTRUMENTS—Recording
Bristol Co., Waterbury, Ct.
Engelhard, Chas., 30 Church St., N. Y. C.

INSULATION—Boiler, Furnace, etc.
Celite Products Co., Chicago, Ill.

IRON—Bar
Interstate Iron & Steel Company, Chicago, Ill.

IRON—Chain
Bethlehem Steel Company, So. Bethlehem, Pa.

IRON—Staybolt
Atlanta Bolt & Steel Products Co., Atlanta, Ga
Old Dominion Iron & Steel Corp., Richmond, Va.
Ryerson, Jos. T., & Son, Chicago, Ill.

IRON AND STEEL—Corrugated
Mahoning Valley Steel Co., The, Niles, O.

IRON AND STEEL—Merchants
American Pressed Steel Co., Philadelphia, Pa.
Eglesston Bros. & Co., Inc., 166 South St., New York City.
Hawkridge Bros. Co., Boston, Mass.
Old Dominion Iron & Steel Corp., Richmond, Va.
Phillips, F. R., & Sons, Philadelphia, Pa.
Potts, Horace T., & Co., Philadelphia, Pa.

IRON AND STEEL—Swedish
Eglesston Bros. & Co., Inc., 166 S. St., N.Y.C.
Federal Tool & Alloy Steel Corp., Woolworth Bldg., New York City.
Harvey, Arthur C., Co., Allston 34, Boston.
Lowener, V., 114 Liberty St., New York City.
Milne, A., & Co., 745 Washington St., N. Y.
Potts, Horace T., & Co., Philadelphia, Pa.

IRONWORK—Ornamental
Snead Architectural Iron Wks., Louisville, Ky.

JACKS—Hydraulic
Watson-Stillman Co., 190 Fulton St., N. Y. C.

JACKS—Lifting
Duff Mfg. Company, The, Pittsburgh, Pa.
McKiernan-Terry Drill Co., 14 Park Row, New York City.

JIGS, FIXTURES, TOOLS, ETC.
Allentown Cable & Mach. Co., Allentown, Pa.
B. & W. Tool & Die Co., The, Cleveland, O.
Emery, A. H., Glenbrook, Ct.
Fenton Machine Tool & Die Co., Fenton, Mich.
Kent-Owens Machine Co., The, Toledo, O.
Koehler Mfg. Co., Inc., Marlboro, Mass.
Pennsylvania Tool & Mfg. Co., York, Pa.
Redin, Ekstrom & Company, Rockford, Ill.
Rose, Trudeau & Williamson, Chicago.
Steiner Bros., Lima, O.

KEROSENE
Sloan & Zook, Bradford, Pa.
Texas Company, The, 17 Battery Place, N. Y.

KETTLES—Galvanizing
Blaw-Knox Co., Pittsburgh, Pa.
Wilfong, M. F., Iron Wks. Co., Phila., Pa.

KEY SEATING MACHINES
Baker Brothers, Toledo, O.
Lapointe, J. N., Co., New London, Ct.
Morton Mfg. Co., Muskegon, Mich.
Pawtucket Mfg. Co., Pawtucket, R. I., N. Y.

KEYS—Machine
Moltrup Steel Products Co., Beaver Falls, Pa.
Morton Mfg. Co., Muskegon, Mich.
Standard Gauge Steel Co., Beaver Falls, Pa.

KEYS—Riveted
Hindley Mfg. Co., Valley Falls, R. I.

KNIVES—Machine
Cleveland Knife & Forge Co., Cleveland, O.
Wapakoneta Machine Co., Wapakoneta, Ohio.

LACING—Belt
Chicago Rawhide Mfg. Co., Chicago, Ill.

LACING—Rawhide
Schieren, Chas. A., Co., 37 Ferry St., N.Y.C.

LADLES
Northern Engineering Works, Detroit, Mich.
Riter-Conley Co., Pittsburgh, Pa.
Whiting Corporation, Harvey, Ill.

LATHE ACCESSORIES AND ATTACHMENTS
Steinle Turret Machine Co., Madison, Wis.

LATHE DOGS
Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

LATHE SPINDLES—Solid and Hollow Bored
National Forge & Tool Co., Irvine, Pa.

LATHES—Automatic
Conradson Mch. Tool Co., Green Bay, Wis.
Jones & Lamson Machine Co., Springfield, Vt.

LATHES—Axle Turning
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

LATHES—Bench
Ames, B. C., Company, The, Waltham, Mass.
Rivett Lathe & Grinder Co., Boston, Mass.
South Bend Lathe Works, South Bend, Ind.

LATHES—Boring
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

LATHES—Brass
Foster Machine Co., Elkhart, Ind.
Warner & Swasey Co., Cleveland, O.

LATHES—Car and Driving Wheels
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

LATHES—Chucking
Cleveland Crane & Engrg. Co., Wickliffe, O.
International Machine Tool Co., Ind., Ind.
Jones & Lamson Mach. Co., Springfield, Vt.
Warner & Swasey Co., Cleveland, O.

LATHES—Crankshaft
Wickes Bros., Saginaw, Mich.

LATHES—Engine
American Tool Works Co., Cincinnati, O.
Betts Machine Co., Rochester, N. Y.
Brownell Mchry. Co., Providence, R. I.
Canedy-Otto Mfg. Co., Chicago Heights, Ill.
Fulton Machine Tool Co., Chicago, Ill.
Harrington, E., Son & Co., Inc., Philadelphia, Pa.
Hill, Clarke & Co. of Chicago, Chicago, Ill.
La Pointe, J. N., Company, New London, Ct.
Lodge & Shipley Mach. Tool Co., Cincinnati, O.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
Manning, Maxwell & Moore, Inc., 119 West 40th St., New York City.
Monarch Machine Tool Co., Sidney, O.
Mueller Machine Tool Co., Cincinnati, O.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Osborne & Sexton Mchry. Co., Columbus, O.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Reed-Prentice Co., Worcester, Mass.
Ryerson, Jos. T., & Son, Chicago, Ill.
Sherritt & Stoer Co., Inc., Philadelphia, Pa.
South Bend Lathe Works, South Bend, Ind.
Walcott Lathe Co., Jackson, Mich.
War Dept., Ordnance Dept., Washington, D. C.
Wickes Bros., Saginaw, Mich.
Wickes Machry. Co., Jersey City, N. J.

LATHES—Extension Gap
Barnes Drill Co., Rockford, Ill.
Barnes, W. F., & Jno., Co., Rockford, Ill.

LATHES—Foot Power
Barnes, W. F., & Jno., Co., Rockford, Ill.

LATHES—Roll
Lewis Foundry & Machine Co., Pittsburgh, Pa.

LATHES—Screw-Cutting
Fulton Machine Tool Co., Chicago, Ill.
Rivett Lathe & Grinder Co., Brighton Dist., Boston, Mass.
Wickes Bros., Saginaw, Mich.

LATHES—Second-Hand
Bertolette Mach. Tool Co., Jersey City, N. J.
Botwinik Bros., New Haven, Conn.
Brownell Mchry. Co., Providence, R. I.
Erie Mfg. & Supply Co., Erie, Pa.
Graves Machinery Ex., 50 Church St., N.Y.C.
Harris Bros. Co., Chicago, Ill.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
New York Machry. Ex., 50 Church St., N.Y.C.
Russell Mch. Co., Pittsburgh, Pa.
Savage, W. H., Fitchburg, Mass.
Simmons Machine Co., Inc., Albany, N. Y.
Stokvis, R. S., & Sons, 17 Battery Place, N. Y.

LATHES—Turret
Foster Machine Co., Elkhart, Ind.
Fulton Machine Tool Co., Chicago, Ill.
Gisholt Machine Co., Madison, Wis.
International Machine Tool Co., Ind., Ind.
Jones & Lamson Mach. Co., Springfield, Vt.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Steinle Turret Mach. Co., Madison, Wis.
Warner & Swasey Co., Cleveland, O.

LATHES—Wood
Barnes, W. F., & Jno., Co., Rockford, Ill.

LEATHER—Cup
Schieren, Chas. A., Co., 37 Ferry St., N. Y. C.

LEATHER—Hydraulic
Schieren, Chas. A., Co., 37 Ferry St., N. Y. C.

LEVELLING MACHINERY
Aetna Fdry. & Mach. Co., Warren, O.

LIGHT-OIL DISTILLATION PLANTS
Semet-Solvay Co., Syracuse, N. Y.

LIGHTING SYSTEMS—Acetylene
Prest-O-Lite Co., 30 East 42nd St., N. Y. C.

LIGHTS—Carbide, Portable
Milburn, Alexander, Co., Baltimore, Md.

LIMESTONE DRYERS AND PULVERIZERS
Bonnot Company, The, Canton, O.

LINING—Converter
Edge Hill Silica Rock Co., New Brunswick, N. J.

LINING—Cupola
Crescent Refractories Co., Curwensville, Pa.
Edge Hill Silica Rock Co., New Brunswick, N. J.

LINKS—Connecting
Keystone Drop Forge Works, Chester, Pa.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

LOADERS—Wagon, Coal, Crushed Stone
Haiss, Geo., Mfg. Co., 142d St. & Canal Pl., New York City.
Portable Machinery Company, Passaic, N. J.

LOCOMOTIVES—Electric
Atlas Car Mfg. Co., Cleveland, O.
Koppel Industrial Car & Eqpt. Co., Pitts., Pa.

LOCOMOTIVES—Gasoline
Cummings Machine Co., Minster, O.
Whitcomb, Geo. D., Co., Rochelle, Ill.

LOCOMOTIVES—Industrial
Porter, H. K., Co., Pittsbugrh, Pa.

LOCOMOTIVES—Rebuilt
Southern Iron & Equipment Co., Atlanta, Ga.

LOCOMOTIVES—Steam
Porter, H. K., Co., Pittsburgh, Pa.

LOCOMOTIVES—Storage Battery
Atlas Car & Mfg. Co., Cleveland, O.
Baker R & L Co., Cleveland, O.
Koppel Industrial Car & Eqpt. Co., Pitts., Pa.
Whitcomb, Geo. D., Co., Rochelle, Ill.

LUBRICANTS
Sun Company, Philadelphia, Pa.
Texas Co., The, 17 Battery Place, N. Y. C.

LUBRICATORS—Hydrostatic
Lunkenheimer Co, Cincinnati, O.

LUBRICATORS—Mechanical
Lunkenheimer Co., Cincinnati, O.

LUBRICATORS—Oil Cups
Gits Bros. Mfg. Co., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.

LUMBER—Creosoted
Jennison-Wright Co., Toledo, O.

MACHINE SCREWS—See Screws

MACHINE WORK
Adamson Mach. Co., Akron, O.
Allentown Cable & Mach. Co., Allentown, Pa.
Baker Mfg. Corp., Saratoga Springs, N. Y.
Beatty Machine & Mfg. Co., Hammond, Ind.
Benton Harbor Malleable Foundry Co., Benton Harbor, Mich.
Buck, Wm. E., Mfg. Co., Eastport, Me.
Buffalo Pitts Company, Buffalo, N. Y.
Casey Hudson Company, Chicago, Ill.
Ceramic Machinery Company, Hamilton, O.
Cummings Machine Co., Minster, O.
Driggs Ordnance & Mfg. Corp., New Haven, Ct.
Emery, A. H., Glenbrook, Ct.
Fenton Machine Tool & Die Co., Fenton, Mich.
Frederick Iron & Steel Co., Frederick, Md.
Garvin Mach. Co., 255 Spring St., N. Y. C.
Hampden Brass Company, Springfield, Mass.
Hanna Engineering Works, Chicago, Ill.
Hercules Machine & Tool Co., The, 410 Broome St., N. Y. C.
Johnson, Carlyle, Machine Co., Manchester, Ct.
Kent-Owens Machine Co., The, Toledo, O.
Klotz Machine Co., Sandusky, O.
Lambert & Todd Mach. Co., Camden, N. J.
Lebanon Gear & Machine Wks., Lebanon, Pa.
McKim Fdry. & Machine Co., Lockport, N. Y.
Matthews, H. A., Mfg. Co., Seymour, Ct.
Millholland Mach. Co., Indianapolis, Ind.
Nazel Engrg. & Mach. Wks., Philadelphia, Pa.
New London Ship & Engine Co., The, Groton, Conn.
Patch, F. R., Manufacturing Co., Rutland, Vt.
Pennsylvania Tool & Mfg. Co., York, Pa.
Porter Machine Co, Inc., Jersey City, N. J.
Pulaski Foundry & Mfg. Corp., Cleveland, O.
Pusey & Jones Company, The, Wilmington, Del.
Ray Machine Works, Vernon, N. Y.
Reed Foundry & Machine Co., Kalamazoo, Mich.
Reynolds Engineering Co., Moline, Ill.
Root, B. M., Company, York, Pa.
Ruetsch, H. J., Machine Co., Newark, N. J.
Thompson Brothers, Philadelphia, Pa.
Troy Foundry & Machine Co., Troy, N. Y.
Vogt Brothers Mfg. Co., Inc., Louisville, Ky.

MACHINERY DEALERS
Bath, Cyril J., & Co., Cleveland, O.
Bertelette Mach. Tool Co., Jersey City, N. J.
Browneli Machinery Co., Providence, R. I.
Crawford, F. H., 305 Broadway, N. Y. C.
Day Machinery Co., Buffalo, N. Y.
Erie Mfg. & Supply Co., Erie, Pa.
Essley, E. L., Machinery Co., Chicago, Ill.
Federal Mchry. Sales Co., Chicago, Ill.
Graves Mchy. Exch., 50 Church St., N. Y. C.
Haetten, J. E., & Co., Inc., 50 Church St., N. Y. C.
Harris Bros. Co., Chicago, Ill.
Hill, Clarke & Co. of Chicago, Chicago, Ill.
Hitner's, Henry A., Sons Co., Phila., Pa.
Johnston, Wm. T., Co., Cincinnati, O.
Jones Machine Tool Co., Cincinnati, O.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
McMullen Machinery Co., Grand Rapids, Mich.
Manning, Maxwell & Moore, Inc., 119 West 40th St., New York City.
Metzler, Robt. J., Inc., Newark, N. J.
Mitchell-Tappen Co., 15-17 John St., N. Y. C.
Morey & Co., Inc., 410 Broome St., N. Y. C.
New York Mchy. Exch., 50 Church St., N. Y. C.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Niles, F. H., & Co., Inc., Woolworth Bldg., New York City.
O'Brien Machry. Co., Philadelphia, Pa.
Prentiss, Henry, & Co., Inc., 149 B'way, N.Y.C.
Purinton & Smith Co., Hartford, Ct.
Randle Machinery Co., Cincinnati, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Sachsenmaier, George, & Co., Philadelphia, Pa.
Simmons Machine Co., Inc., Albany, N. Y.
Smith & Jaffe, 68 West 45th St., N. Y. C.
Stewart, Paul, & Co., Cincinnati, Ohio.
Stocker-Rumely-Wachs Co., Chicago, Ill.
Stokvis, R. S., & Sons, 17 Battery Place, N. Y.
Swind Machinery Co., Philadelphia, Pa.
Wayne Machinery Co, Fort Wayne, Ind.
White, A. D., Machinery Co., Chicago, Ill.
Winterer, Herman L., Philadelphia, Pa.

MACHINISTS—Contracting
Hanna Engineering Works, Chicago, Ill.

MACHINISTS' TOOLS AND SUPPLIES—See Tools

MAGNESITE—Dead Burnt
American Refractories Co., Pittsburgh, Pa.
Harbison-Walker Refractories Co., Pitts., Pa.
Rogers, Brown & Co., Cincinnati, O.

MAGNETS—Lifting
Browning Co., Cleveland, O.
Cutler-Hammer Mfg. Co., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
Ohio Electric & Controller Co., Cleveland, O.

MANDRELS—Expanding
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

MANDRELS—Solid
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

MANUFACTURING SITES
Holt & Merrall, Inc., 342 Madison Ave., New York City.

MARKING DEVICES—Steel Stampings
Matthews, J. H. & Co., Pittsburgh, Pa.
Pfanmer Bros. Stamp Co., Pittsburgh, Pa.

MATS—Door, Flexible Steel
Cary Mfg. Co., Manhattan Bridge Plaza, Brooklyn, N. Y.

METAL—Bearings, Brass and Bronze
Ajax Metal Co., Philadelphia, Pa.
Bunting Brass & Bronze Company, Toledo, O.
Damascus Bronze Co., Pittsburgh, Pa.

METAL SPECIALTIES
B. & W. Tool & Die Co., The, Cleveland, O.
Beckley Perforating Co., Garwood, N. J.
Boston Pressed Metal Co., Worcester, Mass.
Bridgeport Brass Co., Bridgeport, Ct.
Bridgeport Chain Co., Bridgeport, Ct.
Bridgeport Metal Goods Mfg. Co., Bdgprt., Ct.
Buck, Wm. E., Mfg. Co., Eastport, Me.
Corry-Jamestown Mfg. Corp., Corry, Pa.
Cuyahoga Spring Co., Cleveland, O.
Fischer, Chas., Spring Co., 240 Kent Ave., Brooklyn, N. Y.
Gem Stamped Steel Co., Boston, Mass.
Geuder, Paeschke & Frey Co. (Contract Mfg. Division), Milwaukee, Wis.
Janney, Steinmetz & Co., Philadelphia, Pa.
Schoedinger, F. O., Columbus, Ohio.
Standard Stamping Co., Providence, R. I.
Thorn, J. S., & Co., Philadelphia, Pa.
Worcester Stamped Metal Co., Worcester, Mass.
Xardell Corp., The, Utica, N. Y.

METAL STRAIGHTENERS
Shuster, F. B., Co., New Haven, Ct.

METALINE—Oilless Bearing
Metaline Company, Long Island City, N. Y.

METALS—Ferro Silicon
Keokuk Electric Metals Co., Chicago, Ill.
Southern Ferro Alloys Co., Chattanooga, Tenn.
U. S. Ferro Alloys Corp., 32 East 42nd St., N. Y. C.

METALS—Non-Ferrous
Smith, Morton B., Co., 243 Front St., N. Y. C.

MICA SCHIST
Edge Hill Silica Rock Co., New Brunswick, N. J.

MILLING MACHINE ACCESSORIES AND ATTACHMENTS
Garvin Mach. Co., 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.

MILLING MACHINES—Bench
Ames, B. C., Company, The, Waltham, Mass.

MILLING MACHINES—Horizontal
Brown & Sharpe Mfg. Co., Providence, R. I.
Garvin Mach. Co., 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

MILLING MACHINES—Manufacturing
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.

MILLING MACHINES—Plain
Garvin Mach. Co., 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
Ryerson, Joseph T., & Son, Chicago, Ill.

MILLING MACHINES—Second Hand
Botwinik Bros., New Haven, Conn.
Graves, Machy. Exch., 50 Church St., N. Y. C.
Harris Bros. Co., Chicago, Ill.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
New York Mchy. Exch., 50 Church St., N. Y. C.
Russell Mch. Co., Pittsburgh, Pa.
Simmons Machine Co., Inc., Albany, N. Y.

MILLING MACHINES—Universal
Garvin Mach. Co., 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
Ryerson, Joseph T., & Son, Chicago, Ill.

MILLING MACHINES—Vertical
Becker Milling Mach. Co., Worcester, Mass.
Garvin Mach. Co., 255 Spring St., N. Y. C.
Kearney & Trecker Corp., Milwaukee, Wis.
Kempsmith Mfg. Co., Milwaukee, Wis.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Walcott Lathe Co., Jackson, Mich.

MILLS—Wire Flattening
Blake & Johnson Co., Waterbury, Ct.
Torrington Mfg. Co., Torrington, Ct.

MIXING MACHINES—Concrete
Blaw-Knox Co., Pittsburgh, Pa.

MIXING MACHINES—Sand
National Engineering Company, Chicago, Ill.

MIXING MACHINES—Sand and Ore
Hadfield-Penfield Steel Co., The, Bucyrus, O.

MOLDING MACHINES—Combination
American Foundry Equipment Co., 366 Madison Ave., New York City.

MOLDING MACHINES—Core
Grimes Molding Mach. Co., Detroit, Mich.
U. S. Molding Machine Co., Cleveland, O.

MOLDING MACHINES—Jarring (Air)
Grimes Molding Mach. Co., Detroit, Mich.
Hanna Eng. Works, Chicago, Ill.
Nicholls, Wm. H., Co., Inc., Brooklyn, N. Y.

MOLDING MACHINES—Rollover (Hand and Power Operated)
Grimes Molding Mach. Co., Detroit, Mich.

MOLDING MACHINES—Squeezer (Hand and Power)
Hanna Eng. Works, Chicago, Ill.
U. S. Molding Machine Co., Cleveland, O.

MOLDING MACHINES—Stripping Plate
Nicholls, Wm. H., Co., Inc., Brooklyn, N. Y.

MOTORS—Electric
Crocker-Wheeler Co., Ampere, N. J.
Fairbanks, Morse & Co., Chicago, Ill.
Klein, N., & Co., Centre & Howard Sts., N. Y.
Ohio Electric & Controller Co., Cleveland, O.
Reliance Electric & Eng. Co., Cleveland, O.
Sturtevant, B. F., Co., Hyde Park, Mass.
Triumph Electric Co., The, Cincinnati, Ohio.

MOTORS—Electric, Second Hand
American Ship Building Co., Cleveland, Ohio.
Archer & Baldwin, Inc., 114 Liberty St., N. Y.
Botwinik Bros., New Haven, Conn.
Gregory Electric Co., Chicago, Ill.
Harris Bros. Co., Chicago, Ill.
Klein, N., & Co., Centre & Howard Sts., N. Y.
McCoy-Brandt Machinery Co., Pittsburgh, Pa.
Mill Supply Co., Troy, N. Y.
Miller-Owen Electric Co., Inc., Pittsburgh, Pa.
O'Brien Machy. Co., Philadelphia, Pa.
Power Machry. Exch., Inc., Jersey City, N. J.
Randle Machinery Co., Cincinnati, O.
Sachsenmaier, Geo., & Co., Philadelphia, Pa.
Stewart, Paul, & Co., Cincinnati, Ohio.

NAILS—Cement Coated
American Steel Co., Pittsburgh, Pa.
Interstate Iron & Steel Company, Chicago, Ill.
Midvale Steel & Ordnance Co., Phila., Pa.

NAILS—Copper
American Steel & Wire Co., Chicago, Ill.

NAILS—Cut
Norton Iron Works, Ashland, Ky.
Reading Iron Company, Reading, Pa.

NAILS—Small Cut
Interstate Iron & Steel Company, Chicago, Ill.

NAILS—Upholstery
Mattatuck Mfg. Co., Waterbury, Ct.

NAILS—Wire
American Steel Co., Pittsburgh, Pa.
American Steel & Wire Co., Chicago, Ill.
Interstate Iron & Steel Company, Chicago, Ill.
Norton Iron Works, Ashland, Ky.
Townsend Co., New Brighton, Pa.
Wickwire Bros., Cortland, N. Y.

NETTING—Wire
American Steel & Wire Co., Chicago, Ill.
Ludlow-Saylor Wire Co., The, St. Louis, Mo.
New Jersey Wire Cloth Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.

NICKEL
Lazarus, Lewis, & Sons, 61 B'way, N. Y. C.
U. S. Nickel Co., New Brunswick, N. J.

NICKEL ANODES—Rolled and Cast
Seymour Mfg. Co., Seymour, Ct.

NITROGEN
Air Reduction Sales Co., 342 Madison Ave., N.Y.

NOVELTIES—Metal
Autoyre Co., Oakville, Ct.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

NUT FACING MACHINES
Victor Tool Company, Inc., Waynesboro, Pa.

NUT LOCKS
Reliance Manufacturing Co., Massillon, O.

NUTS—Castellated
Fostoria Screw Company, Fostoria, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Sandusky Nut Co., Sandusky, O.
Western Screw Products Co., St. Louis, Mo.

NUTS—Cold Punched
Atlas Bolt & Screw Co., Cleveland, O.
Garland Mfg. Co., West Pittsburgh, Pa.
Pawtucket Mfg. Co., Pawtucket, R. I.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

NUTS—Hexagon
Atlanta Bolt & Steel Prod. Co., Atlanta, Ga.
Atlas Bolt & Screw Co., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Standard Screw Products Co., Detroit, Mich.

NUTS—Hot Pressed
Ames, W., & Co., Jersey City, N. J.
Harrison Bolt & Nut Co., Harrison, N. J.

NUTS—Lock
Drake Lock Nut Company, Cleveland, O.

NUTS—Machine Screw
Drake Lock Nut Company, Cleveland, O.

NUTS—Milled
Ferry Cap & Set Screw Co., Cleveland, O.
Sandusky Nut Co., Sandusky, O.

NUTS—Semi-Finished
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Sandusky Nut Co., Sandusky, O.

NUTS—Thumb Malleable
Devlin, Thomas, Mfg Co., Phila., Pa.

OILERS—Sight Feed
Lunkenheimer Co., Cincinnati, Ohio.

OILING DEVICES
Lunkenheimer Co., Cincinnati, Ohio.

OILS—Cutting
Sun Company, Philadelphia, Pa.
Texas Company, The, 17 Battery Place, N. Y.

OILS—Fuel
Craig Oil Co., Toledo, Ohio.
Empire Refineries, Inc., Tulsa, Okla.
Petroleum Refining Co., Cincinnati, O.
Pure Oil Company, The, Columbus, O.
Sloan & Zook, Bradford, Pa.
Sun Company, Philadelphia, Pa.
Texas Company, The, 17 Battery Pl., N. Y. C.

OILS—Lubricating
Empire Refineries, Inc., Tulsa, Okla.
Sloan & Zook, Bradford, Pa.
Texas Company, The, 17 Battery Place, N. Y.

ORES—Chrome, Lump and Ground
Rogers, Brown & Co., Cincinnati, O.
U. S. Nickel Co., New Brunswick, N. J.

ORES—Iron
Cleveland-Cliffs Iron Company, Cleveland, O.
Hanna, M. A., Cleveland, O.
Oglebay, Norton & Co., Cleveland, O.
Pilling & Co., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
Savage, John A., & Company, Duluth, Minn.
Snyder, W. P., & Co., Pittsburgh, Pa.
Tod-Stambaugh Co., Cleveland, O.
Tutein, E., Arthur, Inc., Boston, Mass.
Witherbee, Sherman & Co., 2 Rector St., N.Y.C.

ORES—Manganese
Altemus & Prindle, Grand Central Terminal, New York City.
Rogers, Brown & Co., Cincinnati, O.
Savage, John A., & Company, Duluth, Minn.

OVENS—Baking
Gehnrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
Oven Equipment & Mfg. Co., New Haven, Ct.
Ryan, F. J., & Co., Philadelphia, Pa.
Steiner, Emil E., & Co., Inc., Newark, N. J.
Young Bros. Co., Detroit, Mich.

OVENS—Core
Gehnrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
Maehler Co., The, Chicago, Ill.
Ryan, F. J., & Co., Philadelphia, Pa.
Sly, W. W., Mfg Co., Cleveland, Ohio.
Whiting Corporation, Harvey, Ill.
Young Bros. Co., Detroit, Mich.

OVENS—Drying
Gehnrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
Maehler Co., The, Chicago, Ill.
Young Bros. Co., Detroit, Mich.

OVENS—Enameling and Japanning
Gehnrich Indirect Heat Oven Co., Inc., Long Island City, N. Y.
Maehler Co., The, Chicago, Ill.
Oven Equipment & Mfg. Co., New Haven, Ct.
Steiner, Emil E., & Co., Inc., Newark, N. J.
Young Bros. Co., Detroit, Mich.

OVENS—Lacquering
Steiner, Emil E., & Co., Inc., Newark, N. J.
Young Bros. Co., Detroit, Mich.

OXY-ACETYLENE WELDING & CUTTING EQUIPMENT AND SUPPLIES
Air Reduction Sales Co.,342 Madison Ave., N.Y.
Davis-Bournonville Co., Jersey City, N. J.
Milburn, Alexander, Co., Baltimore, Md.

OXYGEN
Air Reduction Sales Co.,342 Madison Ave., N.Y.

PACKING—Felt
Monarch Felt Works, Brooklyn, N. Y.

PACKING—Leather
Chicago Rawhide Mfg. Co., Chicago, Ill.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PACKING—Rubber
Jenkins Bros., 80 White Street, N. Y. C.
New York Belting & Packing Co., 91-93 Chambers Street, New York City.

PANS—Foundry
National Engineering Co., Chicago, Ill.

PANS—Grinding
Hadfield-Penfield Steel Co., The, Bucyrus, O.

PARTITIONS—Interior Wire
Anchor Post Iron Wks., 52 Church St., N.Y.C.

PATENT ATTORNEYS
Boyle, John, Jr., Washington, D. C.

PATTERN LETTERS
Chain Products Co., The, Cleveland, O.

PATTERNS—Wood and Metal
American Pattern Works Co., York, Pa.
Baker Mfg. Corp., Saratoga Springs, N. Y.
Friendship Pattern Works, Friendship, N. Y.
Hampden Brass Company, Springfield, Mass.
Portland Foundry Co., Portland, Ct.
Troy Foundry & Machine Co., Troy, N. Y.

PERFORATED METAL
Beckley Perforating Co., Garwood, N. J.
Chicago Perforating Co., Chicago, Ill.
Cross Engineering Co., Carboudale, Pa.
Erdle Perforating Co., Rochester, N. Y.
Everitt Company, The, Boston 9, Mass.
Harrington & King Perforating Co., Chicago.
Hendrick Manufacturing Co., Carboudale, Pa.
Mundt, Chas., & Sons, Jersey City, N. J.
Pittsburgh Perforating Company, Pitts., Pa.
Wickwire Spencer Steel Corp., Worcester, Mass., and Buffalo, N. Y.

PHOSPHOR BRONZE
Ajax Metal Co., Philadelphia, Pa.
Bunting Brass & Bronze Company, Toledo, O.
Wellman Bronze Co., Cleveland, O.

PHOSPHOR TIN
Empire Metal Co., Syracuse, N. Y.

PHOSPHORIZERS
McCullough-Dalzell Crucible Co., Pitts., Pa.

PICKLING ACCESSORIES
Addy, Matthew, Company, The, Phila., Pa.

PICKLING MACHINES
Aetna Fdry. & Mach. Co., Warren, O.
Howard Iron Works, Buffalo, N. Y.
Mesta Mach. Co., Pittsburgh, Pa.

PIG IRON
Addy, Matthew, Company, The, Cincinnati, O.
Bethlehem Steel Co., So. Bethlehem, Pa.
Brier Hill Steel Co., Youngstown, O.
Cleveland-Cliffs Iron Company, Cleveland, O.
Crocker Bros., 21 E. 40th St., N. Y. C.
Donner Steel Co., Inc., Buffalo, N. Y.
Hanna, M. A., & Co., Cleveland, O.
Hickman, Williams & Co., Pittsburgh, Pa.
Iron Trade Products Co., Pittsburgh, Pa.
Park & Williams, Inc., Philadelphia, Pa.
Rogers, Brown & Co., Cincinnati, O.
St. Louis Coke & Chemical Co., St. Louis, Mo.
Savage, John A., & Company, Duluth, Minn.
Snyder, W. P., & Co., Pittsburgh, Pa.
Southern Ferro Alloys Co., Chattanooga, Tenn.
Stewart Furnace Company, The, Cleveland, O.
Struthers Furnace Co., Cleveland, O.
Tenn. Coal, Iron & R.R. Co., Birmingham, Ala.
Tutein, E. Arthur, Inc., Boston, Mass.
Walter-Wallingford & Co., Cincinnati, O.
Wickwire Spencer Steel Corp., Buffalo, N. Y., and Worcester, Mass.
Witherbee, Sherman & Co., 2 Rector St., N.Y.C.

PIG TIN
Lazarus, Lewis, & Sons, 61 B'way, N. Y. C.

PILE DRIVERS
McKiernan-Terry Drill Co., 14 Park Row, New York City.
Vulcan Iron Works, Chicago, Ill.

PILE SHOES
Janney, Steinmets & Co., Philadelphia, Pa.

PILING—Sheet Steel
Lackawanna Steel Co., Lackawanna, N. Y.

PINIONS—Rawhide
Meachem Gear Corp., Syracuse, N. Y.

PIPE—Bent
Crane Co., 836 So. Mich. Ave., Chicago, Ill.
Limbert, George B., & Company, Chicago, Ill.
Roessing Mfg. Company, Pittsburgh, Pa.

PIPE—Butt-Welded Steel
Central Tube Co., Pittsburgh, Pa.
National Tube Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE—Cast Iron, B. & S. and Flanged
U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.
Warren Fdry. & Mch. Co., 11 B'way, N. Y. C.
Wood, R. D., & Co., Philadelphia, Pa.

PIPE—Lap-Welded Steel
American Spiral Pipe Works, Chicago, Ill.
Keating, E. F., Co., 452 Water St., N. Y. C.
National Tube Co., Pittsburgh, Pa.
Republic Iron & Steel Co., Youngstown, O.
Roessing Mfg. Company, Pittsburgh, Pa.
Wheeling Steel Products Co., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE—New and Second-Hand
Albert & Davidson, Inc., Brooklyn, N. Y.
Davidson Pipe & Iron Corp., Brooklyn, N. Y.
Davis, C., & Co., Pittsburgh, Pa.
Eagle Pipe & Sup. Co., Inc., 233 B'way, N.Y.C.
L. & D. Metal & Supply Co., Inc., Flushing Ave., Brooklyn, N. Y.
Lynch, F. B., 2 W. 45th St., New York City.
McDowell & Co., Pittsburgh, Pa.
Republic Pipe & Iron Corp., Brooklyn, N. Y.

PIPE—Riveted Steel
Abendroth & Root Mfg. Co., Newburgh, N. Y.
American Spiral Pipe Works, Chicago, Ill.
Blaw-Knox Co., Pittsburgh, Pa.
Keeler, E., Co., Williamsport, Pa.
Lancaster Iron Works, Inc., Lancaster, Pa.
Petroleum Iron Wks. Co., Sharon, Pa.

PIPE—Water and Steam
Abendroth & Root Mfg. Co., Newburgh, N. Y.
Foster-Songer Co., Pittsburgh, Pa.
Limbert, George B., & Company, Chicago, Ill.
Mark Mfg. Co., Evanston, Ill.
National Tube Co., Pittsburgh, Pa.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

PIPE—Wrought Iron
Crane Co., 836 South Mich. Av., Chicago, Ill.
Keating, E. F., Co., 452 Water St., N. Y. C.
Reading Iron Company, Reading, Pa.

PIPE CUTTING AND THREADING MACHINES
Bignall & Keeler Mch. Wks., Edwardsville, Ill.
Jarecki Mfg. Co., Erie, Pa.
Landis Mach. Co., Waynesboro, Pa.
Merrell Mfg. Co., Toledo, O.
New York Mchy. Exch., 50 Church St., N.Y.C.
Pipe Machinery Co., The, Cleveland, O.
Saunders' D., Sons, Yonkers, N. Y.
Standard Engineering Co., Ellwood City, Pa.
Taylor-Wilson Mfg. Co., McKees Rocks, Pa.
Williams Tool Corporation, Erie, Pa.

PIPE FITTINGS
Crane Co., 836 South Mich. Av., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Limbert, George B., & Company, Chicago, Ill.
Malleable Iron Fittings Co., Branford, Ct.
Pittsburgh Piping & Equip. Co., Pitts., Pa.
Pittsburgh Valve, Fdry. & Construction Co., Pittsburgh, Pa.
U. S. Cast Iron Pipe & Fdry. Co., Burlington, N. J.

PIPING CONTRACTORS
Pittsburgh Piping & Equip. Co., Pitts., Pa.

PLANING MACHINES—Metal
American Tool Works, Cincinnati, O.
Betts Machine Company, Rochester, N. Y.
Cleveland Planer Co., The, Cleveland, O.
Cleveland Punch & Shear Wks. Co., Cleve., O.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
Morton Mfg. Co., Muskegon, Mich.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Patch, F. R., Mfg. Co., Rutland, Vt.
Ryerson, Joseph T., & Son, Chicago, Ill.
Sherritt & Stoer Co., Inc., Philadelphia, Pa.
Whitcomb-Blaisdell Mach. Tool Co., Worcester, Mass.

PLANING MACHINES—Open Side
Automatic Machine Co., Bridgeport, Conn.
Cleveland Machine Tool Co., Cleveland, O.

PLANING MACHINES—Second Hand
Bertolette Mach. Tool Co., Jersey City, N. J.
Brownell Mchry. Co., Providence, R. I.
New York Mchy. Exch., 50 Church St., N.Y.C.

PLATERS' CLEANING COMPOUND
Oakley Chemical Co., 22 Thames St., N. Y. C.

PLATES—Alloy Steel
Eddystone Steel Co., Crum Lynne, Pa.

PLATES—Bullet Proof
Eddystone Steel Co., Crum Lynne, Pa.

PLATES—Cellar Door and Floor
American Pressed Steel Co., Philadelphia, Pa.

PLATES—Felloe
Wrought Washer Mfg. Co., Milwaukee, Wis.

PLATES—Iron and Steel
Allegheny Steel Co., Brackenridge, Pa.
American Pressed Steel Co., Philadelphia, Pa.
Bethlehem Steel Company, So. Bethlehem, Pa.
Canton Sheet Steel Co., Canton, O.
Carnegie Steel Co., Pittsburgh, Pa.
Donner Steel Co., Inc., Buffalo, N. Y.
Eddystone Steel Co., Crum Lynne, Pa.
Harvey, Arthur C., Co., Allston 34, Boston, Illinois Steel Co., Warehouse Dept., Chicago.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Lackawanna Steel Co., Lackawanna, N. Y.
Lukens Steel Co., Coatesville, Pa.
Midvale Steel & Ordnance Co., Phila., Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
Nagle Steel Co., Pottstown, Pa.
Otis Steel Co., Cleveland, O.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Shippers' Car Line, Inc., 165 B'way, N. Y. C.
Steel & Tube Co. of Amer., The, Chicago, Ill.
Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.
Wheeling Steel Products Co., Wheeling, W. Va.
Wood, Alan, Iron & Steel Co., Phila., Pa.
Youngstown Sheet & Tube Co., Youngstown, O.

PLATES—Manganese Steel
Manganese Steel Forge Co., Philadelphia, Pa.

PLATES—Match
Springfield Aluminum Plate & Castings Co., Springfield, O.

PLATFORMS—Industrial Truck
Powell Pressed Steel Co., Hubbard, O.

PLATING
Meaker Galvanizing Co., Chicago, Ill.

PLUGS—Core Hole
Hubbard Spring Works, Pontiac, Mich.

PLUMBING FIXTURES—Factory
Crane Co., 836 So. Mich., Av., Chicago, Ill.

PNEUMATIC TOOLS
Canton Pneumatic Tool Co., The, Canton, O.
Chicago Pneumatic Tool Co., 6 E. 44th St., N.Y.
Cleveland Pneumatic Tool Co., Cleveland, O.
Ingersoll-Rand Co., 11 B'way, N. Y. C.
Keller Pneumatic Tool Co., Grand Haven, Mich.
Oldham, Geo., & Son Co., Baltimore, Md.

PORCELAIN—Refractory
Engelhard, Charles, 30 Church St., N. Y. C.

POSTS—Steel Fence
American Steel & Wire Co., Chicago, Ill.

POTS—Grease
Blaw-Knox Co., Pittsburgh, Pa.

POTS—Lead and Cyanide
Monroe Steel Castings Co., Monroe, Mich.
Swedish Crucible Steel Co., Detroit, Mich.

POTS—Terne
Blaw-Knox Co., Pittsburgh, Pa.

POWDERED COAL PLANTS—Complete
American Industrial Engrg. Co., Chicago, Ill.
Baush Mach. Tool Co., Metals Div., Springfield, Mass.
Bonnot Company, The, Canton, O.
Fuller Engineering Co., Allentown, Pa.
Quigley Furnace Specialties Co., 26 Cortlandt Street, New York City.

POWER—Hydro-Electric
Colorado Power Company, 120 B'way, N. Y. C.

POWER TRANSMITTING MACHINERY
American Pulley Co., Philadelphia, Pa.
Caldwell, H. W., & Son Co., Chicago, Ill.
Caldwell, W. E., Co., 260 Brandies Street, Louisville, Ky.
Cresson-Morris Co., Philadelphia, Pa.
Falk Corp., The, Milwaukee, Wis.
Falls Clutch & Machinery Co., Cuyahoga Falls, O.
Link-Belt Co., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Schultz, A. L., & Son, Chicago, Ill.
Wood's, T. B., Sons Co., Chambersburg, Pa.

PRESS ATTACHMENTS
Littell, F. J., Machine Co., Chicago, Ill.

PRESSED STEEL PARTS
Sharon Pressed Steel Co., Sharon, Pa.

PRESSES—Arbor
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

PRESSES—Drop
Bliss, E. W., Co., 11 Adams St., Bklyn., N.Y.
United Engineering & Foundry Co., Pittsburgh, Pa.

PRESSES—Foot
Shuster, F. B., Co., New Haven, Ct.
Taylor & Fenn Co., Hartford, Ct.

PRESSES—Forging
Mesta Machine Co., Pittsburgh, Pa.
Toledo Machine & Tool Co., Toledo, O.
United Engineering & Foundry Co., Pitts., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PRESSES—Hydraulic
Birdsboro Steel Foundry & Mch. Co., Birdsboro, Pa.
Elmes, Chas. F., Eng'ing Wks., Chicago, Ill.
Farrel Fdry. & Mch. Co., Ansonia, Conn.
Hydraulic Press Mfg. Co., Mount Gilead, O.
Mesta Machine Co., Pittsburgh, Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Southwark Fdry. & Mach. Co., Phila., Pa.
United Engineering & Foundry Co., Pitts., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PRESSES—Hydraulic, Portable
Vulcan Iron Works, Chicago, Ill.

PRESSES—Power
Adriance Machine Works, Inc., 82 Richards Street, Brooklyn, N. Y.
Baird Machine Co., Bridgeport, Ct.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bliss, E. W., Co., 11 Adams St., Bklyn., N. Y.
Ferracute Machine Co., Bridgeton, N. J.
Haetten, J. E., & Co., Inc., 50 Church St., N. Y. C.
Henderson Machine Co., Philadelphia, Pa.
Henry & Wright Mfg. Co., Hartford, Ct.
Hyman, Joseph, & Sons, Philadelphia, Pa.
Leffler, Chas., & Co., Brooklyn, N. Y.
Loy & Nawrath Co., 30 Church St., N. Y. C.
Manville, E. J., Mach. Co., Waterbury, Ct.
Massillon Fdry. & Mch. Co., Massillon, O.
Niagara Machine & Tool Works, Buffalo, N. Y.
Rockford Iron Works, Rockford, Ill.
Stoll, D. H., Co., Buffalo, N. Y.
Streine Tool & Mfg Co., New Bremen, O.
Toledo Mach. & Tool Works, Toledo, O.
United Engr. & Fdry. Co., Pittsburgh, Pa.
V. & O. Press Company, Glendale, Long Island, N. Y.
Waterbury Farrel Fdry. & Machine Co., Waterbury, Ct.
Zeh & Hahnemann Co., Newark, N. J.

PRESSES—Power Forcing
General Mfg. Co., Detroit, Mich.
Lucas Mach. Tool Co., Cleveland, O.

PRESSES—Scrap Bundling
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PRESSES—Scrap Bundling, Wire
Vaughn Mchry. Co., Cuyahoga Falls, Ohio.

PRESSES—Steam Hydraulic
Mesta Mach. Co., Pittsburgh, Pa.

PRESSES—Wheel
Southwark Foundry & Machine Co., Phila., Pa.

PULLEYS—Friction Clutch
Caldwell, W. E., Co., 260 Brandies St., Louisville, Ky.

PULLEYS—Iron, Solid and Split
Caldwell, W. E., Co., 260 Brandels Street, Louisville, Ky.
Falls Clutch & Mchry. Co., Cuyahoga Falls, O.
Wood's, T. B., Sons Co., Chambersburg, Pa.

PULLEYS—Iron and Wood, Solid and Split
Medart Patent Pulley Co., St. Louis, Mo.

PULLEYS—Steel, Rim Solid and Split
American Pulley Co., Philadelphia, Pa.
Hyman, Joseph, & Sons, Philadelphia, Pa.

PULVERIZERS—Coal
Bonnot Company, The, Canton, O.
Fuller-Lehigh Co., Fullerton, Pa.
Raymond Bros. Impact Pulverizer Co., Chicago.

PUMPING MACHINERY
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Deming Co., The, Salem, Ohio.
Goulds Mfg. Co., Seneca Falls, N. Y.
Lea-Courtenay Co., Newark, N. J.
Myers, F. E., & Bro. Co., Ashland, O.

PUMPS—Boiler Feed
Dean Bros. Steam Pump Wks., Indianapolis, Ind.
Fairbanks, Morse & Co., Chicago, Ill.
Kerr Turbine Co., Wellsville, N. Y.
Lea-Courtenay Co., Newark, N. J.
Manistee Iron Works Co., Manistee, Mich.
Morris Machine Works, Baldwinsville, N. Y.

PUMPS—Centrifugal
Alberger Pump & Condenser Co., 140 Cedar Street, New York City.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
De Laval Steam Turbine Co., Trenton, N. J.
Earle Gear & Mach. Co., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Co., Frederick, Md.
Goulds Mfg. Co., Seneca Falls, N. Y.
Ingersoll-Rand Co., 11 Broadway, N. Y.
Kerr Turbine Co., Wellsville, N. Y.
Manistee Iron Works Co., Manistee, Mich.
Morris Machine Works, Baldwinsville, N. Y
Pennsylvania Pump & Comp. Co., Easton, Pa.
Platt Iron Works, Dayton, Ohio.
Wheeler Condenser & Engineering Co., Carteret, N. J.

PUMPS—Electric
Boyts, Porter & Co., Connellsville, Pa.
Deming Co., The, Salem, Ohio.
Goulds Mfg. Co., Seneca Falls, N. Y.
Ingersoll-Rand Co., 11 Broadway, New York
Myers, F. E., & Bro. Co., Ashland, O.

PUMPS—Force and Lift
Myers, F. E., & Bro. Co., Ashland, O.

PUMPS—Hydraulic
Deming Co., The, Salem, Ohio.
Elmes, Chas. F., Engrg. Wks., Chicago, Ill.
Goulds Mfg. Co., Seneca Falls, N. Y.
Hydraulic Press Mfg. Co., Mount Gilead, O.
Watson-Stillman Co., 190 Fulton St., N. Y. C.

PUMPS—Pneumatic Air Lift
Ingersoll-Rand Co., 11 Broadway, N. Y. C.
Sullivan Machinery Co., Chicago, Ill.

PUMPS—Rotary
Connersville Blower Co., Connersville, Ind.
Roots, P. H. & F. M., Co., Connersville, Ind.

PUMPS—Self-Measuring
Bowser, S. F., & Co., Inc., Fort Wayne, Ind.

PUMPS—Steam
Boyts, Porter & Co., Connellsville, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Nat'l Transit Pump & Mch. Co., Oil City, Pa.
Platt Iron Works, Dayton, Ohio.

PUMPS—Vacuum
Bury Compressor Co., Erie, Pa.
Goulds Mfg. Co., Seneca Falls, N. Y.
Sullivan Machinery Co., Chicago, Ill.

PUMPS—Well Cistern
Goulds Mfg. Co., Seneca Falls, N. Y.

PUNCH AND DIE WORK
Quinsigamond Pressed Steel Co., Worcester, Mass.

PUNCHES AND DIES
Cleveland Punch & Shear Wks. Co., Cleve., O.
Marchant, Geo. F., Co., Chicago, Ill.
Pennsylvania Tool & Mfg. Co., York, Pa.

PUNCHING AND SHEARING MACHINES
Armstrong-Blum Mfg. Co., Chicago, Ill.
Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Covington Machine Company, Covington, Va.
Excelsior Tool & Mch. Co., East St. Louis, Ill.
Hendley & Whittemore Co., Beloit, Wis.
Hilles & Jones Co., Wilmington, Del.
Ironton Punch & Shear Co., Ironton, O.
Long & Allstatter Co., Hamilton, O.
Niagara Machine & Tool Works, Buffalo, N. Y.
Royersford Fdry. & Mch., Co., Inc., Royersford, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.
Southwark Fdry. & Mch. Co., Phila., Pa.
Watson-Stillman Co., 190 Fulton St., N. Y. C.
Williams, White & Co., Moline, Ill.

PYROMETERS
Bristol Co., Waterbury, Ct.
Engelhard, Chas., 30 Church St., N. Y. C.
Hoskins Mfg. Co., Detroit, Mich.
Stupakoff Laboratories, Pittsburgh, Pa.

QUARTZ—Glass
Engelhard, Chas., 30 Church St., N. Y. C.

RACKS—Machine
Standard Gauge Steel Co., Beaver Falls, Pa.

RACKS—Material
Brown Engineering Co., Reading, Pa.

RAIL BONDS
American Steel & Wire Co., Chicago, Ill.

RAIL SPLICE BARS
Ames, W., & Co., Jersey City, N. J.

RAILS
Bethlehem Steel Co., Bethlehem, Pa.
Briddell, W. C. Co., Inc., Baltimore, Md.
Central Iron & Metal Co., Chicago, Ill.
Cohen, Louis, & Son, Wilkes-Barre, Pa.
Continental Iron & Steel Co., 2 Rector St., N.Y
Foster, H. M., Co., Baltimore, Md.
Foster, L. B., Co., Pittsburgh, Pa.
Frank, M. K., Pittsburgh, Pa.
Green, L. A., Rail & Mchy. Co., Pittsburgh, Pa.
Hyman-Michaels Company, Chicago, Ill.
Luria Bros. & Co., Inc., Woolworth Bldg., New York City.
Morrison & Risman Co., The, Buffalo, N. Y.
Richardson & Co., Pittsburgh, Pa.
Robinson & Orr, Pittsburgh, Pa.
Sherwood, E. C., 50 Church St., N. Y. C.
Tenn. Coal, Iron & R.R. Co., Birmingham, Ala.
Witherow Steel Company, Pittsburgh, Pa.
Zelnicker, Walter A., Supply Co., St. Louis, Mo.

RAILWAY EQUIPMENT AND SUPPLIES
Briddell, W. C., Company, Inc., Baltimore, Md.
Foster, L. B., Co., Pittsburgh, Pa.
Hyman-Michaels Company, Chicago, Ill.
Koch, Carl, Inc., 68 Beaver St., N. Y. C.
Pidgeon-Thomas Iron Co., Memphis, Tenn.
Shippers' Car Line, Inc., 165 B'way, N. Y. C.
Zelnicker, Walter A., Sup. Co., St. Louis, Mo.

RAILWAYS—Industrial
Easton Car & Construction Co., Easton, Pa.

RATCHET DRILLS
Armstrong Bros. Tool Co., Chicago, Ill.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

REAMER HOLDERS
Victor Tool Company, Inc., Waynesboro, Pa.

REAMERS—Adjustable and Expansion
Brown-McLaren Mfg. Co., Detroit, Mich.
Brubaker, W. L., & Bros. Company, 50 Church Street, New York City.
Buckeye Twist Drill Co., The, Alliance, O.
Butterfield & Co., Division, Union Twist Drill Co., Derby Line, Vt.
Fastfeed Drill & Tool Corp., Toledo, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Tool Co., Cleveland, O.
National Twist Drill & Tool Company, Detroit.
Pratt & Whitney Co., 111 Broadway, N. Y. C.
Wayne Tool Mfg. Company, Waynesboro, Pa.
Whitman & Barnes Mfg. Co., Akron, O.

REFRIGERATING MACHINERY
Norwalk Iron Works Co., South Norwalk, Ct.

REGENERATORS—Coke Oven
Crescent Refractories Co., Curwensville, Pa.

REGULATORS—Furnace Automatic Temperature
Engelhard, Chas., 30 Church St., N. Y. C.

REGULATORS—Pressure
Cash, A. W., Company, Decatur, Ill.
Crane Co., 836 S. Michigan Ave., Chicago, Ill.
Engelhard, Charles, 50 Church St., N. Y. C.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

RETAINERS—Ball
Bearings Company of America, Lancaster, Pa.

RHEOSTATS
Electric Controller & Mfg. Co., Cleveland, O.

RIDDLES—Foundry
Jelliff, George H., & Son, New Canaan, Ct.
Ludlow-Saylor Wire Co., The, St. Louis, Mo.

RINGS—Hardened Tool Steel
Auburn Ball Bearing Co., Rochester, N. Y.
Electric Steel & Forge Co., Cleveland, O.

RINGS—Iron and Steel
Akron-Selle Co., Akron, O.
Electric Steel & Forge Co., Cleveland, O.
Philadelphia Steel & Iron Co., Phila., Pa.
Standard Steel Works Co., The, Phila., Pa.

RIVET CUTTING GUNS
Rivet Cutting Gun Co., Cincinnati, O.

RIVET HEATERS—Electric
Taylor Welder Co., Warren, O.

RIVET MAKING MACHINERY
Acme Machinery Co., Cleveland, O.
Atherton, Jesse, Providence, R. I.
Cook, Asa S., Co., Hartford, Ct.
Manville, E. J., Mach. Co., Waterbury, Ct.
National Mchry Co., Tiffin, O.

RIVET SETS AND STANDS
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Dunbar Drop Forge Co., Chicago, Ill.
Hunter Saw & Mach. Co., Pittsburgh, Pa.
Marchant, Geo. F., Co., Chicago, Ill.

RIVETING MACHINES
Allen, John F., Co., 372 Gerard Ave., N. Y. C.
Hanna Eng. Works, Chicago, Ill.
New England Wire Machinery Co., New Haven, Conn.
Shuster, F. B., Co., New Haven, Ct.
Southwark Foundry & Machine Co., Phila., Pa.

RIVETS
American Screw Co., Providence, R. I.
Atlas Bolt & Screw Co., Cleveland, O.
Bayonne Bolt & Nut Company, Bayonne, N. J.
Bethlehem Steel Company, So. Bethlehem, Pa.
Champion Rivet Co., The, Cleveland, O.
Clark Bros. Bolt Co., Milldale, Ct.
Cobb & Drew, Inc., Plymouth, Mass.
Garland Mfg. Co., West Pittsburgh, Pa.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette St., New York City.
Interstate Iron & Steel Co., Chicago, Ill.
Keystone Screw Co., Yardley, Pa.
Kirk-Latty Mfg. Co., Cleveland, O.
Ohio Nut & Bolt Co., The, Berea, O.
Oliver Iron & Steel Co., Pittsburgh, Pa.
Progressive Mfg. Co., Torrington, Ct.
Rockford Bolt Co., Rockford, Ill.
Rome Brass & Copper Co., Rome, N. Y.
Ryerson, Jos. T., & Son, Chicago, Ill.
Topping Brothers, 122 Chambers St., N. Y. C.
Townsend Co., New Brighton, Pa.

ROD COILING MACHINES
Yoder Co., Cleveland, O.

ROD MILL MACHINERY
Vaughn Mchry. Co., Cuyahoga Falls, O.

RODS—Brass and Bronze
Bridgeport Brass Corp., Bridgeport, Ct.
Conklin, T. E., & Co., 61-63 Dunne St., New York City.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette St., New York City.

RODS—Brass and Copper
Chase Metal Works, Waterbury, Ct.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.

RODS—Connecting
Bethlehem Steel Company, So. Bethlehem, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.

RODS—Drill
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Halcomb Steel Co., Syracuse, N. Y.
National Drawn Steel Co., East Liverpool, O.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.

RODS—Nickel
Seymour Mfg. Co., Seymour, Ct.

RODS—Nickel Silver
Seymour Mfg. Co., Seymour, Ct.

RODS—Phosphor Bronze
Seymour Mfg. Co., Seymour, Ct.

RODS—Piston
Bethlehem Steel Co., So. Bethlehem, Pa.
Electric Steel & Forge Co., Cleveland, O.

RODS—Round and Flat
Washburn Wire Co., 118th St. & Harlem River, N. Y. C.

RODS—Welding
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.

RODS—Welding, Manganese Steel
Manganese Steel Forge Co., Philadelphia, Pa.

RODS—Wire
American Steel & Wire Co., Chicago, Ill.
Fitzsimons Co., Youngstown, O.
Interstate Iron & Steel Company, Chicago, Ill.
Midvale Steel & Ordnance Co., Phila., Pa.
Page Steel & Wire Co., Grand Central Terminal Bldg., New York City.
Roebling's, John A., Sons, Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.

ROLLING MACHINERY—Cold Forming
Streine Tool & Mfg. Co., New Bremen, Ohio.
Yoder Co., Cleveland, O.

ROLLING MILL MACHINERY
Aetna Fdry. & Mach. Co., Warren, O.
Birdsboro Steel Foundry & Mach. Co., Birdsboro, Pa.
Birmingham Iron Foundry, Derby, Ct.
Blake & Johnson Co., Waterbury, Ct.
Farrel Foundry & Mach. Co., Ansonia, Conn.
Garrison, A., Foundry Co., Pittsburgh, Pa.
Hyde Park Fdry. & Mach Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., Pittsburgh, Pa.
Long & Allstatter Co., Hamilton, O.
Mesta Machine Co., Pittsburgh, Pa.
Morgan Construction Co., Worcester, Mass.
Philadelphia Roll & Mach. Co., Phila., Pa.
Shuster, F. B., Co., New Haven, Conn.
Standard Engineering Co., Ellwood City, Pa.
United Engineering & Fdy. Co., Pitts., Pa.
Waterbury Farrel Fdry. & Machine Co., Waterbury, Ct.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.
Woodard Machine Co., Wooster, O.
Youngstown Fdry & Mch. Co., Youngstown, O.

ROLLS—Alloy Steel
Mesta Mach. Co., Pittsburgh, Pa.

ROLLS—Bending and Straightening
Bertsch & Co., Cambridge City, Ind.
Bethlehem Steel Company, So. Bethlehem, Pa.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Hendley & Whittemore Co., Beloit, Wis.
Hilles & Jones Co., Wilmington, Del.
Ironton Punch & Shear Co., Ironton, O.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
Niagara Machine & Tool Works, Buffalo, N. Y.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Southwark Foundry & Machine Co., Phila., Pa.
Wickes Bros., Saginaw, Mich.

ROLLS—Sand Chilled and Steel
Birdsboro Steel Fdry. & Mach. Co., Birdsboro, Pa.
Farrel Fdry. & Mch. Co., Ansonia, Conn.
Garrison, A., Fdry Co., Pittsburgh, Pa.
Hyde Park Fdry. & Mch. Co., Hyde Park, Pa.
Lewis Foundry & Machine Co., Pittsburgh, Pa.
Mesta Mach. Co., Pittsburgh, Pa.
Philadelphia Roll & Mch. Co., Phila., Pa.
Pittsburgh Rolls Corp., Pittsburgh, Pa.
Standard Eng. Co., Ellwood City, Pa.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.
Youngstown Fdry. & Mch. Co., Youngstown, O.

ROLLS—Special Hardened
Bethlehem Steel Company, So. Bethlehem, Pa.

ROLLS—Steel
Electric Steel & Forge Co., Cleveland, O.

ROOFING AND SIDING—Corrugated and Plain
American Sheet & Tin Plate Co., Pitts., Pa.
Apollo Steel Co., Apollo, Pa.
Brier Hill Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.

ROOFING AND SIDING—Iron and Steel
Apollo Steel Co., Apollo, Pa.
Wheeling Steel Products Co., Wheeling, W.Va.

ROPE AND CORDAGE
Leschen, A., & Sons Rope Co., St. Louis, Mo.
Samson Cordage Works, 88 Broad St., Boston 9, Mass.
War Dept., Ordnance Dept., Washington, D. C.

RUNWAYS—Crane
Blaw-Knox Co., Pittsburgh, Pa.

RUST PREVENTATIVES
Oakley Chemical Co., 22 Thames St., N. Y. C.

SAFETY DEVICES
Hardy, F. A., & Co., Chicago, Ill.

SAFETY SUPPLIES
Hardy, F. A., & Co., Chicago, Ill.

SAND—Molding
Pettinos, George, F., Philadelphia, Pa.

SAND—Sand Blast
Paxson, J. W., Co., Philadelphia, Pa.
Pettinos, George, F., Philadelphia, Pa.
Portage Silica Co., The, Youngstown, O.
U. S. Silica Co., Chicago, Ill.

SAND—Silica
U. S. Silica Co., Chicago, Ill.

SAND—Steel Molding
Portage Silica Co., The, Youngstown, O.

SAND BLAST EQUIPMENT & MACHINES
Hoevel Manufacturing Co., Jersey City, N. J.
Pangborn Corporation, Hagerstown, Md.
Paxson, J. W., Co., Philadelphia, Pa.
Sly, W. W., Mfg. Co., Cleveland, O.

SAND BLAST SHOT AND GRIT
Globe Steel Co., Mansfield, O.

SAND CUTTING AND SCREENING MACHINE
Whiting Corporation, Harvey, Ill.

SAND MILLS
Frost Mfg. Co., Chicago, Ill.
National Engineering Co., Chicago, Ill.

SAND RAMMERS
Chicago Pneumatic Tool Co., 6 E. 44th St., New York City.

SAND SIFTING MACHINES
Hanna Eng. Works, Chicago, Ill.

SASH CORD
Samson Cordage Works, Boston 9, Mass.

SASH OPERATING DEVICES
Drouvé, G., Co., Bridgeport, Ct.

SASH—Steel
Lupton's, David, Sons Co., Phila., Pa.

SAWING MACHINES—Band for Wood and Metal
Diamond Saw & Stpg. Wks., Buffalo, N. Y.
Espen-Lucas Mach. Works, Philadelphia, Pa.

SAWING MACHINES—Rail
Vandyck-Churchill Co., 91-93 Liberty St., New York City.

SAWS—Bands for Metal
Armstrong-Blum Mfg. Co., Chicago, Ill.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Simonds Manufacturing Co., Fitchburg, Mass.

SAWS—Circular Metal
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Hunter Saw & Machine Co., Pittsburgh, Pa.
Simonds Manufacturing Co., Fitchburg, Mass.

SAWS—Cold
Disston, Henry, & Son, Inc., Philadelphia, Pa.

SAWS—Friction
Ryerson, Joseph T., & Son, Chicago, Ill.

SAWS—Hack Saw Blades
Clemson Bros., Inc., Middletown, N. Y.
Diamond Saw & Stpg. Wks., Buffalo, N. Y.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Napier Saw Works, Inc., Middletown, N. Y.
Simonds Manufacturing Co., Fitchburg, Mass.
Starrett, L. S., Co., Athol, Mass.

SAWS—Hot Metal
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Hunter Saw & Machine Co., Pittsburgh, Pa.
Pittsburgh Saw & Mfg. Co., Pittsburgh, Pa.

SAWS—Inserted Tooth, Cold
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Hunter Saw & Machine Co., Pittsburgh, Pa.
Pittsburgh Saw & Mfg. Co., Pittsburgh, Pa.

SAWS—Metal Slitting
Cowles Tool Co., Cleveland, Ohio
Disston, Henry, & Son, Inc., Philadelphia, Pa.
National Tool Co., Cleveland, O.

SAWS—Screw Slotting
Disston, Henry, & Son, Inc., Philadelphia, Pa.

SCALES
Fairbanks, Morse & Co., Chicago, Ill.
Standard Scale & Supply Co., Pittsburgh, Pa.

SCHOOLS—Scientific
McLain's System, Inc. Milwaukee, Wis.

SCLEROSCOPES—Hardness Testing
Shore Instrument & Mfg. Co., Jamaica, N. Y.

SCRAP—Iron and Steel
Alloy Steel & Metals Co., Philadelphia, Pa.
Briddell, W. C., Co., Inc., Baltimore, Md.
Hitner's Henry A., Sons Co., Phila., Pa.
Leaf, E. B., Co., Philadelphia, Pa.
Luria Bros. & Co., Inc., Woolworth Bldg., New York City
Perry, Buxton, Doane Co., Boston, Mass.
Potts, Henry & Co., Philadelphia, Pa.
Smith & Jaffe, 68 West 45th St., N. Y. C.

SCREENS—Mining
Chicago Perforating Co., Chicago, Ill.
Harrington & King Perforating Co., Chicago.
Hendrick Mfg. Co., Carbondale, Pa.
Ludlow-Saylor Wire Co., The, St. Louis, Mo.
Morss & Whyte Co., Cambridge, Mass
Mundt, Chas., & Sons, Jersey City, N. J.
Pittsburgh Perforating Co., Pittsburgh, Pa.

SCREENS—Perforated Metal
Beckley Perforating Co., Garwood, N. J.
Chicago Perforating Co., Chicago, Ill.
Cross Engineering Co., Carbondale, Pa.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicgao.
Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas., & Sons, Jersey City, N. J.
Wickwire Spencer Steel Corp., Worcester, Mass., and Buffalo, N. Y.

SCREENS—Woven Wire
Ludlow-Saylor Wire Co., The, St. Louis, Mo.
Newark Wire Cloth Co., Newark, N. J.

SCREW MACHINE PRODUCTS
Automatic Products Co., Detroit, Mich.
Automatic Prod. Corp., Long Island City, N.Y.
Barnes, Wallace Co., Bristol, Ct.
Bell Company, The, Buffalo, N. Y.
Blake & Johnson Co., Waterbury, Ct.
Bridgeport Metal Goods Mfg. Co., Bridgeport, Ct.
Brown Bag Filling Mch. Co., Fitchburg, Mass.
Brown-McLaren Mfg. Co., Detroit, Mich.
Casey Hudson Company, Chicago, Ill.
Clark, Cadle, Harmon Corp., Rochester, N. Y.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

Day, William J., Estate, Forestville, Ct.
Driggs Ordnance & Mfg. Corp., New Haven, Ct.
Eastern Machine Screw Corp., New Haven, Ct.
Ferry Cap & Set Screw Co., Cleveland, O.
Fostoria Screw Company, Fostoria, O.
Hanson Bros. Screw Co., Plainville, Ct.
Hartford Machine Screw Co., Hartford, Ct.
Hubbell, Harvey, Inc., Bridgeport, Ct.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette St., New York City.
Jackson Screw Products Co., Inc., Jackson, Mich.
Jenkins Mfg. Co., Bloomfield, N. J.
Link-Belt Co., Chicago, Ill.
Lippincott-Carwen Corp., Philadelphia, Pa.
Mattatuck Mfg. Co., Waterbury, Ct.
Miles, F. S., Co., Philadelphia, Pa.
New Britain Machine Co., New Britain, Ct.
Newton Mfg. Co., Plainville, Ct.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Philadelphia Machine Screw Wks., Inc., Philadelphia, Pa.
Progressive Mfg. Co., Torrington, Ct.
Rhode Island Tool Co., Providence, R. I.
Scovill Mfg. Co., Waterbury, Conn.
Shimer, Samuel J., & Sons, Inc., Milton, Pa.
Torrington Co., Torrington, Ct.
Waltham Screw Co., Waltham, Mass.
Western Screw Products Co., St. Louis, Mo.

SCREW MACHINERY—Automatic

Brown & Sharpe Mfg. Co., Providence, R. I.
Cone Automatic Mch. Co., Inc., Windsor, Vt.
New Britain Mach. Co., New Britain, Ct.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

SCREW MACHINERY—Automatic Wood

Cook, Asa S., Co., Hartford, Ct.

SCREW MACHINERY—Hand

Garvin Machine Co., 255 Spring St., cor. Varick St., New York City.
Jones & Lamson Mch. Co., Springfield, Vt.
Warner & Swasey Co., Cleveland, O.

SCREW MACHINERY—Multi-Spindle

Cone Automatic Mch. Co., Inc., Windsor, Vt.

SCREW MACHINERY—Second-Hand

Harris Bros. Co., Chicago, Ill.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
Stokvis, R. S., & Sons, 17 Battery Place, N. Y.

SCREW PLATES

American Tap & Die Co., Greenfield, Mass.

SCREWS—Cap and Set

Atlas Bolt & Screw Co., Cleveland, O.
Automatic Products Co., Detroit, Mich.
Bristol Co., Waterbury, Ct.
Clark Bros. Bolt Co., Millidale, Ct.
F. P. Screw Company, Cleveland, O.
Ferry Cap & Set Screw Co., Cleveland, O.
Hartford Mch. Screw Co., Hartford, Ct.
Keystone Screw Co., Yardley, Pa.
Ottemiller, Wm. H., Co., Inc., York, Pa.
Rhode Island Tool Co., Providence, R. I.
Scovill Mfg. Co., Waterbury, Conn.
Shimer, Samuel J., & Sons, Inc., Milton, Pa.
Standard Screw Products Co., Detroit, Mich.
Western Screw Prod. Co., St. Louis, Mo.

SCREWS—Coach and Lag

Kirk-Latty Mfg. Co., Cleveland, O.
Pawtucket Mfg. Co., Pawtucket, R. I.

SCREWS—Cold Headed

F. P. Screw Company, Cleveland, O.
Standard Screw Products Co., Detroit, Mich.

SCREWS—Machine

American Screw Co., Providence, R. I.
Automatic Products Co., Detroit, Mich.
Blake & Johnson Co., Waterbury, Ct.
Brown-McLaren Mfg. Co., Detroit, Mich.
Hubbell, Harvey, Inc., Bridgeport, Ct.
Keystone Screw Co., Yardley, Pa.
Miles, F. S., Co., Philadelphia, Pa.
Philadelphia Machine Screw Wks., Inc., Philadelphia, Pa.
Progressive Mfg. Co., Torrington, Ct.
Scovill Mfg. Co., Waterbury, Conn.
War Dept., Ordnance Dept., Washington, D. C.

SCREWS—Safety Set

Allen Mfg. Co., The, Hartford, Ct.
Bristol Co., Waterbury, Ct.
Hartford Machine Screw Co., Hartford, Ct.
Progressive Mfg. Co., Torrington, Ct.

SCREWS—Thumb Malleable

Devlin, Thomas, Mfg. Co., Phila., Pa.

SCREWS—Wood

American Screw Co., Providence, R. I.
Bridgeport Screw Co., Bridgeport, Ct.
Topping Brothers, 122 Chambers St., N. Y. C.

SECOND-HAND MACHINERY

American Ship Building Co., Cleveland, Ohio.
Bath, Cyril J., & Co., Cleveland, O.
Bertolette Mach. Tool Co., Jersey City, N. J.
Botwinik Bros., New Haven, Conn.
Brearley, H. P., 90 West St., New York City.
Brenholts, Roy, Columbus, O.
Briggs, Marvin, Inc., 167 6th St., Brooklyn, N. Y.
Crawford, F. H., 305 Broadway, N. Y. C.
Day Machinery Co., Buffalo, N. Y.
Erie Mfg. & Supply Co., Erie, Pa.
Essley, E. L., Mchy. Co., Chicago, Ill.
Federal Mchry. Sales Co., Chicago, Ill.
Garvin Machine Co., 255 Spring St., N. Y. C.
Graves Machry. Exch., 50 Church St., N. Y.
Haetten, J. E., & Co., Inc., 50 Church St., N. Y. C.
Harris Bros. Co., Chicago, Ill.
Hill, Clarke & Co. of Chicago, Chicago, Ill.
Hitner's, Henry A., Sons Co., Phila., Pa.
Ideal Mchry. Co., E. Main St., Plainville, Ct.
Interstate Equip. Corp., Norfolk, Va.
Interstate Machinery Company, Troy, N. Y.
Johnson, Wm. C., & Sons, Mchry. Co., St. Louis, Mo.
Klein, N., & Co., Centre & Howard Sts., N. Y.
Lamberg, A., & Co., 241 Centre St., N. Y. C.
Lodge & Shipley Mch. Tool Co., Cincinnati, O.
McCabe, J. J., Lathe & Mchry. Corp., 149 Broadway, New York City.
McCoy-Brandt Machinery Co., Pittsburgh, Pa.
McMullen Machinery Co., Grand Rapids, Mich.
Metzler, Robt. J., Inc., Newark, N. J.
Morey & Co., Inc., 410 Broome St., N. Y. C.
Morris Machinery Co., Newark, N. J.
Nashville Industrial Corp., Old Hickory, Tenn.
N. Y. Mchry. Exch., 50 Church St., N. Y. C.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Niles, F. H., & Co., Inc., Woolworth Bldg., New York City.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
O'Brien Machry. Co., Philadelphia, Pa.
Osborne & Sexton Mchry. Co., Columbus, O.
Oviatt, D. C., & Company, Cleveland, O.
Prentiss, Henry, & Co., Inc., 149 Broadway, New York City.
Prichard, C. W., Co., Inc., 50 Church St., New York, N. Y.
Purinton & Smith Co., Hartford, Ct.
Randle Machinery Co., Cincinnati, O.
Russell Machine Co., Pittsburgh, Pa.
Ryerson, Joseph T., & Son, Chicago, Ill.
Savage, W. H., Fitchburg, Mass.
Scully-Jones & Co., Chicago, Ill.
Seyfert's, L. F., Sons, Inc., Philadelphia, Pa.
Sherritt & Stoer Co., Inc., Philadelphia, Pa.
Sherwood, E. C., 50 Church St., N. Y. C.
Simmons Machine Co., Inc., Albany, N. Y.
Smith & Jaffe, 68 West 45th St., N. Y. C.
Stewart, Paul, & Co., Cincinnati, Ohio.
Stickley, E. B., Mchry. Co., Detroit, Mich.
Stocker-Rumely-Wachs Co., Chicago, Ill.
Swind Machinery Co., Philadelphia, Pa.
Waterville Machine Works, Waterbury, Ct.
Wayne Machry. Co., Ft. Wayne, Ind.
White, A. D., Machry. Co., Chicago, Ill.
Wickes Machinery Co., Jersey City, N. J.
Winterer, Herman L., Philadelphia, Pa.
Zelnicker, Walter A., Supply Co., St. Louis, Mo.

SEPARATORS—Oil from Chips

Ideal Concrete Machry. Co., Cincinnati, O.

SEPARATORS—Steam and Oil

Crane Company, Chicago, Ill.
H. S. B. W.—Cochrane Corp., Phila., Pa.

SHAFTING—Cam, Worm, Turbine and Crusher

National Forge & Tool Co., Irvine, Pa.

SHAFTING—Cold Drawn

Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Bethlehem Steel Company, So. Bethlehem, Pa.
Columbia Steel & Shafting Co., Pittsburgh, Pa.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Drawn Steel Co., East Liverpool, O.
Pardee Steel Corp., Perth Amboy, N. J.
Peerless Drawn Steel Co., Massillon, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Union Drawn Steel Co., Beaver Falls, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAFTING—Flexible

Binghamton Flexible Shaft Co., Binghamton, N. Y.
Chicago Flexible Shaft Co., Chicago, Ill.
Stow Manufacturing Co., Binghamton, N. Y.
Strand, N. A., & Company, Chicago, Ill.

SHAFTING—Steel

La Salle Steel Co., Chicago, Ill.
Mesta Mach. Co., Pittsburgh, Pa.

SHAFTING—Tubular Material for

National Tube Co., Pittsburgh, Pa.

SHAFTING—Turned and Polished

Columbia Steel & Shafting Co., Pitts., Pa.
Fitzsimons Co., Youngstown, O.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Pardee Steel Corp., Perth Amboy, N. J.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Brass and Copper

Rome Brass & Copper Co., Rome, N. Y.

SHAPES—Cold Drawn

Columbia Steel & Shafting Co., Pitts., Pa.
Dahlstrom Metallic Door Co., Jamestown, N. Y.
La Salle Steel Co., Chicago, Ill.
Peerless Drawn Steel Co., Massillon, O.
Ward's, Edgar T., Sons Co., Boston, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

SHAPES—Pressed Steel

Prest-O-Lite Co., 30 East 42nd St., N. Y. C.

SHAPES—Steel

Ryerson, Jos. T., & Son, Chicago, Ill.
Shippers' Car Line, Inc., 165 B'way, N. Y. C.

SHAPING MACHINES

American Tool Works Co., Cincinnati, O.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Gould & Eberhardt, Newark, N. J.
McCabe, J. J., Lathe & Mchry Corp., 149 Broadway, New York City.
Morton Mfg. Co., Muskegon, Mich.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.
Osborne & Sexton Machry. Co., Columbus, O.
Queen City Shaper Company, Cincinnati, Ohio.
Ryerson, Joseph T., & Son, Chicago, Ill.
Smith & Mills Company, Cincinnati, O.
Stockbridge Machine Co., Worcester, Mass.
Streine Tool & Mfg. Co., New Bremen, O.
Walcott Lathe Co., Jackson, Mich.
Whipp Machine Tool Company, Sidney, O.

SHEAR BLADES

Cleveland Knife & Forge Co., Cleveland, O.
Heppenstall Forge & Knife Co., Pitts., Pa.
Pittsburgh Knife & Forge Co., Pittsburgh, Pa.
Tioga Steel & Iron Co., Philadelphia, Pa.
Wapakoneta Machine Co., Wapakoneta, O.

SHEARING MACHINES—Alligator

Canton Foundry & Machine Co., Canton, O.
Farrel Fdry. & Mch. Co., Ansonia, Conn.
Lewis Foundry & Machine Co., Pittsburgh, Pa.
Long & Allstatter Co., Hamilton, O.
Mesta Mach. Co., Pittsburgh, Pa.
Stoll, D. H., Co., Buffalo, N. Y.

SHEARING MACHINES—Angle, Hand and Power

Federal Bearing Co., Inc., Poughkeepsie, N. Y.
Hilles & Jones Co., Wilmington, Del.

SHEARING MACHINES — Doubling and Squaring

Aetna Fdry. & Mach. Co., Warren, O.

SHEARING MACHINES—Metal

Beatty Machine & Mfg. Co., Hammond, Ind.
Bertsch & Co., Cambridge City, Ind.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Covington Mch. Co., Covington, Va.
Garrison, A., Foundry Co., Pittsburgh, Pa.
Long & Allstatter Co., Hamilton, O.
Loy & Nawrath Co., 30 Church St., N. Y. C.
Marshalltown Mfg. Co., Marshalltown, Iowa.
Mesta Mach. Co., Pittsburgh, Pa.
Niagara Machine & Tool Works, Buffalo, N. Y.
Pawtucket Mfg. Co., Pawtucket, R. I.
Quickwork Company, St. Marys, O.
Ryerson, Joseph T., & Son, Chicago, Ill.
Southwark Foundry & Machine Co., Phila., Pa.
Streine Tool & Mfg. Co., New Bremen, Ohio.
Toledo Machine & Tool Co., Toledo, O.
Yoder Co., Cleveland, Ohio.

SHEARING MACHINES—Metal Slitting

Aetna Fdry. & Mach. Co., Warren, O.
Ironton Punch & Shear Co., Ironton, O.
Quickwork Company, St. Marys, O.
Yoder Co., Cleveland, O.

SHEARING MACHINES—Metal Slitting, Gang

Yoder Co., Cleveland, O.

SHEARING MACHINES—Plate

Aetna Fdry. & Mach. Co., Warren, O.
Cleveland Punch & Shear Wks., Cleveland, O.
Hilles & Jones Co., Wilmington, Del.
Long & Allstatter Co., Hamilton, O.
Marshalltown Mfg. Co., Marshalltown, Iowa.
Mesta Machine Co., Pittsburgh, Pa.
Quickwork Company, St. Marys, O.

SHEARING MACHINES—Plate Slitting

Quickwork Company, St. Marys, O.
Yoder Co., Cleveland, O.

SHEET BARS

Brier Hill Steel Co., Youngstown, O.

SHEET METAL MACHINERY

Adriance Machine Works, Inc., 82 Richards St., Brooklyn, N. Y.
Bliss, E. W., Co., 11 Adams St., Brooklyn, N. Y.
Dreis & Krump Mfg. Co., Chicago, Ill.
Excelsior Tool & Mch. Co., East St. Louis, Ill.
Ferracute Machine Co., Bridgeton, N. J.
Leffler, Chas., & Co., Brooklyn, N. Y.
Niagara Machine & Tool Works, Buffalo, N. Y.
Oviatt, D. C., & Company, Cleveland, O.
Shuster, F. B., Co., New Haven, Conn.
Streine Tool & Mfg. Co., New Bremen, O.
Toledo Machine & Tool Co., Toledo, O.
V. & O. Press Co., Glendale, L. I., N. Y.
Yoder Company, Cleveland, O.

SHEETS—Aluminum

Erdle Perforating Co., Rochester, N. Y.

SHEETS—Automobile

Brier Hill Steel Co., Youngstown, O.
Eastern Rolling Mill Co., Baltimore, Md.
Mahoning Valley Steel Co., The, Niles, O.
Newton Steel Company, Youngstown, O.
Seneca Iron & Steel Co., Buffalo, N. Y.

SHEETS—Black

Canton Sheet Steel Co., Canton, O.
Carnahan Tin Plate & Sheet Co., Canton, O.
Eastern Rolling Mill Co., Baltimore, Md.
Mahoning Valley Steel Co., The, Niles, O.
Newton Steel Company, Youngstown, O.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Seneca Iron & Steel Co., Buffalo, N. Y.
Wheeling Steel Products Co., Wheeling, W.Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

SHEETS—Blue Annealed

Eddystone Steel Co., Crum Lynne, Pa.
Republic Iron & Steel Co., Youngstown, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Wheeling Steel Products Co., Wheeling, W.Va.
Wood, Alan, Iron & Steel Co., Phila., Pa.

SHEETS—Brass and Copper

Chase Metal Works, Waterbury, Ct.
Conklin, T. E., & Co., 61-63 Duane St., N. Y.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette Street, New York City.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Ct.

SHEETS—Electrical

American Sheet & Tin Plate Co., Pitts., Pa.
Wheeling Steel Prod. Co., Wheeling, W. Va.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

SHEETS—Enameling Stock
Eastern Rolling Mill Co., Baltimore, Md.

SHEETS—For Drawing and Stamping
Allegheny Steel Co., Brackenridge, Pa.
Eastern Rolling Mill Co., Baltimore, Md.
Newton Steel Company, Youngstown, O.
Seneca Iron & Steel Co., Buffalo, N. Y.
Walker, Wm. J., Steel Co., Cleveland, O.
Ward's, Edgar T., Sons Co., Boston, Mass.

SHEETS—Galvanized, Flat and Corrugated
American Sheet & Tin Plate Co., Pitts., Pa.
Apollo Steel Co., Apollo, Pa.
Canton Sheet Steel Co., Canton, O.
Morris, Wheeler & Company, Philadelphia, Pa.
Republic Iron & Steel Co., Youngstown, O.
Scully Steel & Iron Co., Chicago, Ill.
Wheeling Steel Products Co., Wheeling, W.Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

SHEETS—Manganese Steel
Manganese Steel Forge Co., Philadelphia, Pa.

SHEETS—Metal Furniture
Eastern Rolling Mill Co., Baltimore, Md.

SHEETS—Nickel
Driver Harris Co., Harrison, N. J.

SHEETS—Nickel Silver
Seymour Mfg. Co., Seymour, Ct.

SHEETS—Phosphor Bronze
Seymour Mfg. Co., Seymour, Ct.

SHELVING—Steel
Lupton's, David, Sons Co., Phila., Pa.

SHERARDIZING
Bridgeport Chain Co., Bridgeport, Conn.
Globe Machine & Stamping Co., Cleveland, O.

SHIP BUILDERS' MATERIAL
Bethlehem Steel Company, So. Bethlehem, Pa.
Everitt Company, The, Boston 9, Mass.
Topping Brothers, 122 Chambers St., N. Y. C.

SHOT FOR SAND BLAST—See Sand Blast Shot and Grit

SHUTTERS—Steel and Wood Bi-Folding
Kinnear Mfg. Co., Columbus, O.

SIEVES
Jelliff, George H., & Son, New Canaan, Ct.
Newark Wire Cloth Co., Newark, N. J.

SIGNS—Safety
Hardy, F. A., & Co., Chicago, Ill.

SIRENS—Electric
Federal Sign System (Electric), Chicago, Ill.

SKIM GATES
Sterling Wheelbarrow Co., Milwaukee, Wis.

SKYLIGHTS
Drouvé, G., Co., Bridgeport, Ct.

SLOTTING MACHINES
Betts Machine Company, Rochester, N. Y.
Garvin Mach. Co., 255 Spring St., N. Y. C.
Jones Machine Tool Works, Phila., Pa.
Niles-Bement-Pond Co., 111 B'way, N. Y. C.

SOCKETS—Wire Rope
Chicago Steel Foundry Co., Chicago, Ill.
Williams, J. H., & Co., 57 Richards Street, Brooklyn, N. Y.

SOLDER—Aluminum
Janney, Steinmetz & Co., Philadelphia, Pa.

SOLDER—Manufacturing
Chicago Solder Co., Chicago, Ill.

SOLDER—Plumber's, Tinner's, Etc.
Chicago Solder Co., Chicago, Ill.

SOLDER—Self Fluxing Wire
Chicago Solder Co., Chicago, Ill.

SOLDERING AND BRAZING OUTFIT
Prest-O-Lite Co., 30 East 42nd St., N. Y. C.

SPECIAL MACHINERY
Arrow Tool & Manufacturing Company, Bridgeport, Ct.
Banfield, W. H., & Sons, Ltd., Toronto, Can.
Birdsboro Steel Fdry. & Mch. Co., Birdsboro, Pa.
Conradson Mch. Tool Co., Green Bay, Wis.
Driggs Ordnance & Mfg. Corp., New Haven, Ct.
Elmes, Chas. F. Engr. Wks., Chicago, Ill.
Emery, A. H., Glenbrook, Ct.
Faweus Mach. Co., Pittsburgh, Pa.
Fenton Machine Tool & Die Co., Fenton, Mich.
Haskell, Wm. H., Mfg. Co., Pawtucket, R. I.
Howard Iron Works, Buffalo, N. Y.
Kent-Owens Machine Co., The, Toledo, O.
Koehler Mfg. Co., Inc., Marlboro, Mass.
Langelier Mfg. Co., Arlington Cranston, R. I.
Leffler, Charles, & Co., Brooklyn, N. Y.
Lippincott-Carwen Corp., Philadelphia, Pa.
Littell, F. J., Machine Co., Chicago, Ill.
Millholland Mach. Co., Indianapolis, Ind.
Pusey & Jones Company, The, Wilmington, Del.
Ruetsch, H. J., Machine Co., Newark, N. J.
Shepherd Engrg. Co., Williamsport, Pa.
Southwark Foundry & Machine Co., Phila., Pa.
Steele & Condict, Inc., Jersey City, N. J.
Steiner Brothers, Lima, O.
Torrington Mfg. Co., Torrington, Ct.
Turner Machine Co., Danbury, Ct.
Utica Steam Engine & Boiler Works, The, Utica, N. Y.
Vulcan Iron Works, Inc., Jersey City, N. J.
Wheeling Mold & Fdry. Co., Wheeling, W. Va.
Yoder Co., Cleveland, O.
York Electric & Mach. Co., York, Pa.

SPECIAL TOOLS—See Tools, Special

SPIEGELEISEN
Bethlehem Steel Company, So. Bethlehem, Pa.
Rogers, Brown & Co., Cincinnati, O.

SPIKES
American Steel & Wire Co., Chicago, Ill.
Ames, W., & Co., Jersey City, N. J.
Bethlehem Steel Company, So. Bethlehem, Pa.
Topping Brothers, 122 Chambers St. N. Y. C.

SPINNING—Metal
Brass Fixtures Company, The, Plantsville, Ct.
Kilborn-Sauer Co., Fairfield, Ct.

SPRING MAKING MACHINERY
Baird Machine Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

SPRINGS—Coil
Standard Steel Works Co., The, Phila., Pa.

SPRINGS—Plate
Standard Steel Works Co., The, Phila., Pa.

SPRINGS—Wire
Advance Spring & Wire Co., Chicago, Ill.
American Steel & Wire Co., Chicago, Ill.
Barnes, Wallace, Co., Bristol, Ct.
Bridgeport Chain Co., Bridgeport, Ct.
Cook Spring Co., 106th St. & East River, New York City.
Cuyahoga Spring Co., Cleveland, O.
Dunbar Bros. Co., Bristol, Ct.
Fischer, Chas., Spring Co., 240 Kent Ave., Brooklyn, N. Y.
General Spring & Wire Co., Detroit, Mich.
Gibson, Wm. D., Co., Chicago, Ill.
Hubbard Spring Works, Pontiac, Mich.
Mattatuck Mfg. Co., Waterbury, Ct.
Miller & Van Winkle, Inc., Brooklyn, N. Y.
Page Steel & Wire Co., Grand Central Terminal Bldg., New York City.
Raymond Mfg. Co., Ltd., Corry, Pa.
War Dept., Ordnance Dept., Washington, D. C.
Washburn Wire Co., 118th St. & Harlem River, N. Y. C.
Wickwire Spencer Steel Corp., Worcester, Mass., and Buffalo, N. Y.

SPROCKETS
Baldwin Chain & Mfg. Co., Worcester, Mass.
Cullman Wheel Co., Chicago, Ill.
Link-Belt Co., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Pittsburgh Gear & Mch. Co., Pittsburgh, Pa.
Union Chain & Mfg. Co., Seville, O.

SPRUE CUTTERS
Hanna Eng. Works, Chicago, Ill.
Shuster, F. B., Co., New Haven, Conn.

STACKS—Steel
Heine Boiler Co., St. Louis, Mo.
Hendrick Manufacturing Co., Carbondale, Pa.
Lancaster Iron Works, Inc., Lancaster, Pa.
Lebanon Boiler Works, Phila., Pa.
New York Central Iron Works Co., Inc., Hagerstown, Md.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.

STAMPINGS
Acme Die & Stpg. Co., McKees Rocks, Pa.
Allegheny Steel Co., Brackenridge, Pa.
Allen, S. L., & Company, Inc., Phila., Pa.
Allentown Cable & Mach. Co., Allentown, Pa.
American Flyer Mfg. Co., Chicago, Ill.
American Tube & Stpg. Co., Bridgeport, Ct.
Autoyre Co., Oakville, Ct.
B. & W. Tool & Die Co., The, Cleveland, O.
Banfield, W. H., & Sons, Ltd., Toronto, Can.
Barnes, Wallace, Co., Bristol, Ct.
Barth Stpg. & Mach. Wks., Cleveland, O.
Bettcher Stpg. & Mfg. Co., The, Cleveland, O.
Blake & Johnson Co., Waterbury, Ct.
Boston Pressed Metal Co., Worcester, Mass.
Bridgeport Chain Co., Bridgeport, Ct.
Bridgeport Metal Goods Mfg. Co., Bridgeport, Ct.
Bridgeport Silverware Mfg. Corp., Bridgeport, Ct.
Burrows Metal Mfg. Co., 572 Greenwich St., New York City.
Crosby Co., Buffalo, N. Y.
Cummings Machine Co., Minster, O.
Cuyahoga Spring Co., Cleveland, O.
Detroit Stamping Co., Detroit, Mich.
Douglas & Lomason Co., Detroit, Mich.
Erdle Perforating Co., Rochester, N. Y.
Fischer, Chas., Spring Co., 240 Kent Ave., Brooklyn, N. Y.
Gem Stamped Steel Co., Boston, Mass.
Gender, Paeschke & Frey Co. (Contract Mfg. Division), Milwaukee, Wis.
Girard Steel Stamping Co., The, Girard, Pa.
Globe Mach. & Stamping Co., Cleveland, O.
Goyer Co., The, Willimantic, Ct.
Gray, Peter, & Sons, Inc., Cambridge, Mass.
Great Lakes Pressed Steel Corp., Buffalo, N.Y.
Hoeft & Company, Inc., Chicago, Ill.
Hubbard Pressed Steel Co., Niles, Ohio.
Hubbard Spring Works, Pontiac, Mich.
Indianapolis Pressed Steel Company, Indianapolis, Ind.
Jenkinson, R. C., & Co., Newark, N. J.
Keller Pneumatic Tool Co., Grand Haven, Mich.
Koehler Mfg. Co., Inc., Marlboro, Mass.
Konigslow, E., Stamping & Tool Works, Cleveland, O.
Lansing Stamping Company, Lansing, Mich.
Maryland Metal Prod. Co., Hagerstown, Md.
Mattatuck Mfg. Co., Waterbury, Ct.
Matthews, H. A., Mfg. Co., Seymour, Ct.
Matthews Mfg. Co., Worcester, Mass.
Metal Specialty Co., Cincinnati, O.
National Umbrella Frame Co., Phila., Pa.
Parker Wire Goods Co., Worcester, Mass.
Pennsylvania Pressed Steel Corp., Phila., Pa.
Powell Pressed Steel Company, Hubbard, O.
Quinsigamond Pressed Steel Co., Worcester, Mass.
Robinson Tool Works, Inc., Waterbury, Conn.
Rockford Iron Works, Rockford, Ill.
Sessions, J. H., & Son, Bristol, Ct.
Seymour Metal Goods Co., Seymour, Ct.
Standard Stamping Co., Providence, R. I.
Stanley Works, New Britain, Ct.
Superior Metal Products Co., Elyria, O.
Torrington Co., Torrington, Ct.
Transue & Williams Steel Forging Corp., Alliance, O.
Traut & Hine Mfg. Co., New Britain, Ct.
Wagner, E. R., Mfg. Co., N. Milwaukee, Wis.
Worcester Pressed Steel Co., Worcester, Mass.
Worcester Stamped Metal Co., Worcester, Mass.

STAMPS—Steel Alphabets and Figures
Matthews, J. H., & Co., Pittsburgh, Pa.
Pannier Bros. Stamp Co., Pittsburgh, Pa.
Schoder & Lombard Co., 202-204 Centre St., New York City.
Schwerdtle Stamp Co., Bridgeport, Ct.

STANDPIPES
Blaw-Knox Co., Pittsburgh, Pa.

STAPLE MACHINES
Sleeper & Hartley, Inc., Worcester, Mass.

STAPLES
American Steel & Wire Co., Chicago, Ill.
Cobb & Drew, Inc., Plymouth, Mass.

STEAM TRAPS
Crane Co., 836 So. Mich. Ave., Chicago, Ill.

STEEL—Alloy
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Allen, Edgar, Steel Co., Inc., Chicago, Ill.
Alloy Steel & Metals Co., Philadelphia, Pa.
Atlas Crucible Steel Co., Dunkirk, N. Y.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Eddystone Steel Co., Crum Lynne, Pa.
Electric Steel & Forge Co., Cleveland, O.
Firth-Sterling Steel Co., McKeesport, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
National Drawn Steel Co., East Liverpool, O.
Peerless Drawn Steel Co., Massillon, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.

STEEL—Automobile
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Halcomb Steel Co., Syracuse, N. Y.

STEEL—Bright Finished
Union Drawn Steel Co., Beaver Falls, Pa.

STEEL—Carbon
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Bethlehem Steel Company, So. Bethlehem, Pa.
Carnegie Steel Co., Pittsburgh, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Vanadium-Alloys Steel Co., Latrobe, Pa.

STEEL—Chrome
Electric Steel & Forge Co., Cleveland, O.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Chrome Nickel
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Electric Steel & Forge Co., Cleveland, O.
Interstate Iron & Steel Co., Chicago, Ill.

STEEL—Chrome Vanadium
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Electric Steel & Forge Co., Cleveland, O.
Interstate Iron & Steel Company, Chicago, Ill.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Cold Drawn
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Columbia Steel & Shafting Co., Pitts., Pa.
Fitzsimons Co., Youngstown, O.
Halcomb Steel Co., Syracuse, N. Y.
Interstate Iron & Steel Co., Chicago, Ill.
La Salle Steel Co., Chicago, Ill.
Moltrup Steel Products Co., Beaver Falls, Pa.
National Drawn Steel Co., East Liverpool, O.
Newman, C., Wire Co., 25 Church St., N. Y. C.
Peerless Drawn Steel Co., Massillon, O.
Pittsburgh Tool Steel Wire Co., Monaca, Pa.
Standard Gauge Steel Co., Beaver Falls, Pa.
Union Drawn Steel Co., Beaver Falls, Pa.
Union Spring & Mfg. Co., Pittsburgh, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.
Wetherell Bros. Co., Cambridge, 39, Mass.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

STEEL—Cold Rolled Strips
Acme Steel Goods Co., Chicago, Ill.
American Steel & Wire Co., Chicago, Ill.
American Tube & Stpg. Co., Bridgeport, Ct.
Athenia Steel Co., 135 William St., N. Y. C.
Columbia Steel Co., Elyria, O.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Driver Harris Co., Harrison, N. J.
Greer Steel Company, Dover, O.
Griffin Mfg. Co., Erie, Pa.
La Salle Steel Co., Chicago, Ill.
Midvale Steel & Ordnance Co., Phila., Pa.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

National Umbrella Frame Co., Phila., Pa.
Newman, C., Wire Co., 25 Church St., N. Y. C.
Stanley Wks., New Britain, Conn.
Superior Steel Corp., Union Arcade, Pittsburgh, Pa.
Walker, Wm. J., Steel Co., Cleveland, O.
Ward's, Edgar T., Sons Co., Boston, Mass.
Washburn Wire Co., 118th St. & Harlem River, N. Y. C.
West Leechburg Steel Co., Pittsburgh, Pa.
Wetherell Bros. Co., Cambridge, 39, Mass.
Wickwire Spencer Steel Corp., Buffalo, N. Y., & Worcester, Mass.
Worcester Pressed Steel Co., Worcester, Mass.

STEEL—Crucible

Allen, Edgar, Steel Co., Inc., Chicago, Ill.
Atlas Crucible Steel Co., Dunkirk, N. Y.
Bethlehem Steel Company, So. Bethlehem, Pa.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.

STEEL—Cutlery

Disston, Henry, & Son, Inc., Philadelphia, Pa.
Wardlow, S. & C., 278 Pearl St., N. Y. C.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Die

Atlas Crucible Steel Co., Dunkirk, N. Y.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.

STEEL—Electric

Bethlehem Steel Company, So. Bethlehem, Pa.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Electric Steel & Forge Co., Cleveland, O.
Firth-Sterling Steel Co., McKeesport, Pa.
Halcomb Steel Co., Syracuse, N. Y.
Old Dominion Iron & Steel Corp., Richmond, Va.

STEEL—High Speed

Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Allen, Edgar, Steel Co., Inc., Chicago, Ill.
Atlas Crucible Steel Co., Dunkirk, N. Y.
Bethlehem Steel Company, So. Bethlehem, Pa.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Electric Steel & Forge Co., Cleveland, O.
Firth-Sterling Steel Co., McKeesport, Pa.
Halcomb Steel Co., Syracuse, N. Y.
Hawkridge Bros. Co., Boston, Mass.
Ryerson, Jos. T., & Son, Chicago, Ill.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Hot Rolled Strips

Acme Steel Goods Co., Chicago, Ill.
American Tube & Stpg. Co., Bridgeport, Ct.
Barnes, Wallace, Co., Bristol, Ct.
Griffin Mfg. Co., Erie, Pa.
Hawkridge Bros. Co., Boston, Mass.
Laclede Steel Co., St. Louis, Mo.
Morris & Bailey Steel Co., Pittsburgh, Pa.
Stanley Works, New Britain, Ct.
Steel & Tube Co. of America, Chicago, Ill.
Superior Steel Corp., Union Arcade, Pittsburgh, Pa.
West Leechburg Steel Co., Pittsburgh, Pa.
Worcester Pressed Steel Co., Worcester, Mass.

STEEL—Manganese, Rolled or Forged

Manganese Steel Forge Co., Philadelphia, Pa.

STEEL—Manufacturers

Chester Steel Castings Co., Philadelphia, Pa.
Electric Steel & Forge Co., Cleveland, O.
Firth-Sterling Steel Co., McKeesport, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Lukens Steel Co., Coatesville, Pa.
Pacific Coast Steel Co., San Francisco, Cal.
Phoenix Iron Company, Philadelphia, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Wardlow, S. & C., 278 Pearl St., N. Y. C.
Wickwire Spencer Steel Corp., Buffalo, N. Y., and Worcester, Mass.
Wood, Alan, Iron & Steel Co., Phila., Pa.

STEEL—Nickel

Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Betz-Pierce Co., The, Cleveland, O.
Electric Steel & Forge Co., Cleveland, O.
Interstate Iron & Steel Co., Chicago, Ill.

STEEL—Open Hearth

Pacific Coast Steel Co., San Francisco, Cal.
Peerless Drawn Steel Co., Massillon, O.
Steel & Tube Co. of America, Chicago, Ill.

STEEL—Open Hearth, Low and High Carbon

Interstate Iron & Steel Co., Chicago, Ill.
Vulcan Crucible Steel Co., Aliquippa, Pa.

STEEL—Screw

American Steel & Wire Co., Chicago, Ill.
Barbour, R. W., 114 Liberty St., N. Y. C.
Betz-Pierce Co., The, Cleveland, O.
Columbia Steel & Shafting Co., Pitts., Pa.
Pardee Steel Corp., Perth Amboy, N. J.
Peerless Drawn Steel Co., Massillon, O.
Union Drawn Steel Co., Beaver Falls, Pa.
Wyckoff Drawn Steel Co., Beaver Falls, Pa.

STEEL—Special Analysis

Electric Steel & Forge Co., Cleveland, O.
Interstate Iron & Steel Co., Chicago, Ill.
Simonds Mfg. Co., Lockport, N. Y.
West Leechburg Steel Co., Pittsburgh, Pa.

STEEL—Spring

Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Athenia Steel Co., 135 William St., N. Y.
Bethlehem Steel Company, So. Bethlehem, Pa.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Patriarche & Bell, 351 West St., N. Y. C.
Ward's, Edgar T., Sons, Co., Boston, Mass.

STEEL—Stainless

Bethlehem Steel Company, So. Bethlehem, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.

STEEL—Stamping and Drawing

Columbia Steel Co., Elyria, O.
Griffin Mfg. Co., Erie, Pa.
West Leechburg Steel Co., Pittsburgh, Pa.

STEEL—Tool

Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Allen, Edgar, Steel Co., Inc., Chicago, Ill.
Bethlehem Steel Co., South Bethlehem, Pa.
Disston, Henry, & Son, Inc., Philadelphia, Pa.
Electric Steel & Forge Co., Cleveland, O.
Federal Tool & Alloy Steel Corp., Woolworth Building, New York City.
Firth-Sterling Steel Co., McKeesport, Pa.
Halcomb Steel Co., Syracuse, N. Y.
Lowener, V., 114 Liberty St., New York City.
Milne, A., & Co., 745 Washington St., N. Y.
Patriarche & Bell, 351 West St., N. Y. C.
Potts, Horace T., & Co., Philadelphia, Pa.
Vulcan Crucible Steel Co., Aliquippa, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.
Wetherell Bros. Co., Cambridge, 39, Mass.

STEEL—Uranium

Standard Alloys Co., Pittsburgh, Pa.

STEEL—Welding

Federal Tool & Alloy Steel Corp., Woolworth Building, New York City.
Vulcan Crucible Steel Co., Alquippa, Pa.

STEEL BUILDINGS

American Bridge Co., 30 Church St., N. Y. C.
Bedford Fdry. & Mchy. Co., Bedford, Ind.
Belmont Iron Works, Philadelphia, Pa.
Berlin Construction Co., Inc., Berlin, Ct.
Blaw-Knox Co., Pittsburgh, Pa.
De Cou, Richard, Company, Philadelphia, Pa.
Erie Steel Construction Co., Erie, Pa.
Kenwood Bridge Co., Chicago, Ill.
Lackawanna Bridge Co., 2 Rector St., N. Y. C.
McClintic-Marshall Co., Pittsburgh, Pa.
Memphis Steel Construction Co. of Pennsylvania, Pittsburgh, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Scaife, Wm. B., & Sons Co., Pittsburgh, Pa.
Shoemaker-Satterthwait Bridge Co., Pottstown, Pa.
Worden-Allen Co., Milwaukee, Wis.

STEEL PLANTS AND ROLLING MILLS

Freyn, Brassert & Co., Chicago, Ill.
McKee, Arthur G., & Co., Cleveland, O.

STEEL PLATE CONSTRUCTION

Blaw-Knox Co., Pittsburgh, Pa.
Buffalo Pitts Company, Buffalo, N. Y.
Cruse-Kemper Co., Ambler, Pa.
Hammond Iron Works, Warren, Pa.
Hendrick Mfg. Co., Carbondale, Pa.
Lancaster Iron Works, Inc., Lancaster, Pa.
New York Central Iron Wks. Co., Inc., Hagerstown, Md.
Penn Fdry. & Mfg. Co., Box 182, Reading, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Petroleum Iron Works Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Riter-Conley Company, Pittsburgh, Pa.
Scaife, Wm. B., & Sons Co., Pittsburgh, Pa.
Sharpsville Boiler Works Co., Sharpsville, Pa.
Sotter Bros., Inc., Pottstown, Pa.
Tippett & Wood, Phillipsburg, N. J.
Wangler, Joseph F., Boiler & Sheet Iron Works Co., St. Louis, Mo.
Warren City Tank & Boiler Co., The, Warren, Ohio.

STEEL TYPE

Schoder & Lombard Co., 202-204 Centre St., New York City.

STENCIL CUTTING MACHINES

Diagraph Stencil Mch. Corp., St. Louis, Mo.

STEPS—Safety

Irving Iron Wks. Co., Long Island City, N. Y.

STILLS—Gasoline

Blaw-Knox Co., Pittsburgh, Pa.

STOCKS AND DIES

Jarecki Mfg. Co., Erie, Pa.
Jones & Lamson Mach. Co., Springfield, Vt.
Saunders' D., Sons, Yonkers, N. Y.

STOKERS

Babcock & Wilcox Co., 85 Liberty St., N. Y. C.
Green Eng. Co., East Chicago, Ind.
Under-Feed Stoker Co. of America, Detroit,

STOOLS—Steel

Chicago Wire Chair Co., Chicago, Ill.

STOPPERS—Open-Hearth Furnace

McCullough-Dalzell Crucible Co., Pitts., Pa.

STOVE TRIMMINGS

Matthews Mfg. Co., Worcester, Mass.

STOVES—Hot Blast

Smythe, S. R., Co., Pittsburgh, Pa.

STRAIGHTENING AND CUTTING MACHINES

Shuster, F. B., Co., New Haven, Conn.

STRAIGHTENING MACHINES

General Mfg. Co., Detroit, Mich.
Medart Patent Pulley Co., St. Louis, Mo.
Shuster, F. B., Co., New Haven, Conn.

STRIP STEEL MACHINERY

Aetna Fdry. & Mch. Co., Warren, Ohio.

STRUCTURAL IRON AND STEEL WORK

American Bridge Co., 30 Church St., N. Y. C.
Belmont Iron Works, Philadelphia, Pa.
Berlin Construction Co., Inc., Berlin, Ct.
Bethlehem Steel Company, So. Bethlehem, Pa.
Blaw-Knox Co., Pittsburgh, Pa.
Chesapeake Iron Works, Baltimore, Md.
Erie Steel Construction Co., Erie, Pa.
Lackawanna Bridge Co., 2 Rector St., N. Y. C.
McClintic-Marshall Company, Pittsburgh, Pa.
Memphis Steel Construction Co. of Pennsylvania, Pittsburgh, Pa.
Minneapolis Steel & Machy. Co., Minneapolis, Minn.
Phoenix Iron Co., Philadelphia, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Snead Architectural Iron Wks., Louisville, Ky.
Virginia Bridge & Iron Co., Roanoke, Va.
Western Drop Forge Co., Marion, Ind.
Worden-Allen Co., Milwaukee, Wis.

SULPHATE OF IRON

American Steel & Wire Co., Chicago, Ill.

SUPERHEATERS

Babcock & Wilcox Co., 85 Liberty St., N. Y. C.
Power Specialty Co., 111 B'way, N. Y. C.

SWAGING MACHINES

Langelier Mfg. Co., Arlington-Cranston, R. I.
Torrington Co., Torrington, Ct.

SWITCHBOARDS

Electric Controller & Mfg. Co., Cleveland, O.

SWITCHES—Electric

Electric Controller & Mfg. Co., Cleveland, O.

TABLES—Cooling

Blaw-Knox Co., Pittsburgh, Pa.

TABLES—Spacing

Terry Mfg. Co., Grand Central Terminal Bldg., New York City.

TACKS

American Steel & Wire Co., Chicago, Ill.
Interstate Iron & Steel Company, Chicago, Ill.

TANKS—Air, Gas, Oil and Water

Air-Tight Steel Tank Co., Pittsburgh, Pa.
Blaw-Knox Co., Pittsburgh, Pa.
Bowser, S. F., & Co., Inc., Ft. Wayne, Ind.
Caldwell, W. E., Co., 1940 Brook St., Louisville, Ky.
Chicago Bridge & Iron Wks., Chicago, Ill.
Cruse-Kemper Co., Ambler, Pa.
Graver Corporation, East Chicago, Ind.
Hamburg Steel Tank Works, Hamburg, Pa.
Hammond Iron Works, Warren, Pa.
Lancaster Iron Works Inc., Lancaster, Pa.
Memphis Steel Con. Co. of Penn., Pittsburgh.
New York Central Iron Works Co., Inc., Hagerstown, Md.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Petroleum Iron Wks. Co., Sharon, Pa.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.
Scaife, Wm. B., & Sons Co., Pittsburgh, Pa.
Shippers' Car Line, Inc., 165 B'way, N. Y. C.
Sotter Bros., Inc., Pottstown, Pa.
Tippett & Wood, Phillipsburg, N. J.
Tudor Boiler Mfg. Co., Cincinnati, O.
Warren City Tank & Boiler Co., The, Warren, O.
Wood, John, Mfg. Co., Conshohocken, Pa.

TANKS—Gasoline and Oil

Blaw-Knox Co., Pittsburgh, Pa.
Bowser, S. F., & Co., Inc., Ft. Wayne, Ind.

TANKS—Iron and Steel

Blaw-Knox Co., Pittsburgh, Pa.
Caldwell, W. E., Co., 1940 Brook St., Louisville, Ky.
Cave Welding & Mfg. Co., Springfield, Mass.
Chicago Bridge & Iron Wks., Chicago, Ill.
Hamburg Steel Tank Works, Hamburg, Pa.
Heltzer Steel Form & Iron Co., Warren, Ohio.
Lebanon Boiler Works, Phila., Pa.
New York Central Iron Wks. Co., Inc., Hagerstown, Md.
Riter-Conley Co., Pittsburgh, Pa.
Sharpsville Boiler Works Co., Sharpsville, Pa.
Shippers' Car Line, Inc., 165 B'way, N. Y. C.
Wilfong, M. F., Iron Wks. Co., Phila., Pa.

TANKS—Seamless Steel

Janney, Steinmetz & Co., Philadelphia, Pa.
National Tube Co., Pittsburgh, Pa.

TANKS—Second-Hand

Shippers' Car Line, Inc., 165 B'way, N. Y. C.

TANKS—Welded

Air-Tight Steel Tank Co., Pittsburgh, Pa.
Blaw-Knox Co., Pittsburgh, Pa.
Bowser, S. F., & Co., Inc., Ft. Wayne, Ind.
Graver Corporation, East Chicago, Ind.
Janney, Steinmetz & Co., Philadelphia, Pa.

TANKS—Wood

Caldwell, W. E., Co., 1940 Brook St., Louisville, Ky.

TAPES—Steel

Starrett, L. S., Co., Athol, Mass.

TAPPING MACHINES

Baker Brothers, Toledo, O.
Langelier Mfg. Co., Arlington-Cranston, R. I.

TAPS AND DIES

American Tap & Die Co., Greenfield, Mass.
Besly, Chas. H., & Co., Chicago, Ill.
Brubaker, W. L., & Bros., Company, 50 Church St., New York City.
Butterfield & Co., Division, Union Twist Drill Co., Derby Line, Vt.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

Morse Twist Drill & Machine Co., New Bedford, Mass.
Pipe Machinery Co., The, Cleveland, O.
Victor Tool Company, Inc., Waynesboro, Pa.

TAR DISTILLING PLANTS
Semet-Solvay Co., Syracuse, N. Y.

TELEGRAPH AND TELEPHONE LINE MATERIAL
Oliver Iron & Steel Co., Pittsburgh, Pa.

TERNE PLATES
American Sheet & Tin Plate Co., Pitts., Pa.
Carnahan Tin Plate & Sheet Co., Canton, O.
Standard Tin Plate Co., Canonsburg, Pa.
Taylor, N. & G., Co., Philadelphia, Pa.

TESTING MACHINES—Hardness
Shore Instrument & Mfg. Co., Jamaica, N. Y.

THERMOMETERS—Electric
Engelhard, Chas., 30 Church St., N. Y. C.

THERMOMETERS—Recording
Bristol Co., Waterbury, Ct.
Engelhard, Chas., 30 Church St., N. Y. C.

THREAD CUTTING MACHINES
Eastern Mch. Screw Corp., New Haven, Ct.
Williams Tool Corporation, Erie, Pa.

THREAD ROLLING MACHINES
National Machinery Co., Tiffin, O.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
V. & O. Press Co., Glendale, L. I., N. Y.
Waterbury Farrel Fdry. & Machine Co., Waterbury, Ct.

TIE PLATES
Bethlehem Steel Company, So. Bethlehem, Pa.
Interstate Iron & Steel Co., Chicago, Ill.
Joliet Wrought Washer Co., Joliet, Ill.

TIES—Bale
American Steel & Wire Co., Chicago, Ill.

TIES—Creosoted
Jennison-Wright Co., Toledo, Ohio.

TIN PLATE
American Sheet & Tin Plate Co., Pitts., Pa.
American Steel Co., Pittsburgh, Pa.
Bethlehem Steel Co., So. Bethlehem, Pa.
Carnahan Tin Plate & Sheet Co., Canton, O.
Standard Tin Plate Co., Canonsburg, Pa.
Taylor, N. & G., Co., Philadelphia, Pa.
Wheeling Steel Products Co., Wheeling, W. Va.

TIN PLATE MACHINERY
Aetna Fdry. & Mch. Co., The, Warren, O.

TINNERS' TOOLS AND MACHINES
Niagara Machine & Tool Works, Buffalo, N. Y.

TINWARE MACHINERY
Bliss, E. W., Co., 11 Adams St., Bklyn., N.Y.

TIRES—Locomotive
Standard Steel Works Co., The, Phila., Pa.

TIRES—Wheel
Standard Steel Works Co., The, Phila., Pa.

TOOL HOLDERS
Armstrong Bros. Tool Co., Chicago, Ill.
Williams, J. H., & Co., 57 Richards St., New York City.

TOOL STANDS
Lupton's, David, Sons, Co., Phila., Pa.

TOOLS, JIGS, FIXTURES, ETC.—See Jigs, Fixtures, Tools, Etc.

TOOLS—Blacksmith and Wheelwright
Champion Blower & Forge Co., Lancaster, Pa.

TOOLS—Carpenters
Starrett, L. S., & Co., Athol, Mass.

TOOLS—Diamond Pointed
Wheel Trueing Tool Co., Detroit, Mich.

TOOLS—Lathe
Armstrong Bros. Tool Co., Chicago, Ill.
Pratt & Whitney Co., 111 Broadway, N. Y. C.

TOOLS—Machinists
Besly, Chas. H., & Co., Chicago, Ill.
Starrett, L. S., Co., Athol, Mass.
Topping Bros., 122 Chambers St., N. Y. C.

TOOLS—Portable
Rooksby, E. J., & Co., Philadelphia, Pa.
Underwood, H. B., Corp., Philadelphia, Pa.

TOOLS—Screw Machine
Foster Machine Co., Elkhart, Ind.

TOOLS—Shaped Carbon
Wheel Trueing Tool Co., Detroit, Mich.

TOOLS—Steam and Gas Fitters
Saunders' D., Sons, Yonkers, N. Y.

TORCHES—Oil
Mahr Mfg. Co., Minneapolis, Minn.

TORCHES—Welding and Cutting
Air Reduction Sales Co., 342 Madison Ave., N.Y.
Milburn, Alexander, Co., Baltimore, Md.

TOWERS—Steel
Caldwell, W. E., Co., 1940 Brook St., Louisville, Ky.
Pittsburgh-Des Moines Steel Co., Pitts., Pa.

TOWERS—Transmission
American Bridge Co., 30 Church St., N. Y. C.
Blaw-Knox Co., Pittsburgh, Pa.

TOWERS—Water
Caldwell, W. E., Co., 1940 Brook St., Louisville, Ky.

TRACK—Industrial
Bethlehem Steel Co., So. Bethlehem, Pa.
Chase Fdry. & Mfg. Co., Columbus, O.
Cincinnati Frog & Switch Co., Cincinnati, O.
Easton Car & Construction Co., Easton, Pa.
Foster, L. B., Co., Pittsburgh, Pa.

TRACTORS—Storage Battery
Atlas Car & Mfg. Co., Cleveland, O.
Baker R & L Co., Cleveland, O.
Elwell-Parker Electric Co., Cleveland, O.
Minneapolis Steel & Mchy. Co., Minneapolis, Minn.

TRAILERS—Industrial
Sharon Pressed Steel Co., Sharon, Pa.

TRAMRAILS—Overhead Systems
Brown Hoisting Machry. Co., Cleveland, O.
Cleveland Crane & Engrg. Co., Wickliffe, O.
Dreis & Krump Mfg. Co., Chicago, Ill.
N. J. Fdry. & Mch. Co., 140 Cedar St., N. Y. C.

TRAMWAYS—Wire Rope
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis, Mo.
Lescher, A., & Sons Rope Co., St. Louis, Mo.
Moon, Geo. C., Co., Garwood, N. J.

TRAPS—Steam
Nicholson, W. H., & Co., Wilkes-Barre, Pa.

TROLLEYS
Brown Hoisting Machry. Co., Cleveland, O.
Curtis Pneumatic Mchry. Co., St. Louis, Mo.
Euclid Crane & Hoist Co., Euclid, O.
Ford Chain Block Co., Philadelphia, Pa.
Hanna Engineering Works, Chicago, Ill.
Milwaukee Elec. Crane & Mfg. Co., Inc., Milwaukee, Wis.
Morris, Herbert, Inc., Buffalo, N. Y.
N. J. Fdry. & Mch. Co., 140 Cedar St., N. Y.
Northern Engineering Works, Detroit, Mich.
Wright Mfg. Co., Lisbon, O.

TRUCKS—Electric Storage Battery
Baker R & L Co., Cleveland, O.
Elwell-Parker Electric Co., Cleveland, O.

TRUCKS—Elevating
Baker R & L Co., Cleveland, O.
Lewis-Shepard Co., Boston, Mass.

TRUCKS—Industrial
Lewis-Shepard Co., Boston, Mass.
Sharon Pressed Steel Co., Sharon, Pa.
Sterling Wheelbarrow Co., Milwaukee, Wis.

TRUCKS—Wire Mill
Vaughn Mchry. Co., Cuyahoga Falls, O.

TUBE MILL MACHINERY
Standard Engineering Co., Ellwood City, Pa.
Woodard Mach. Co., Wooster, O.

TUBES—Boiler
Allegheny Steel Co., Brackenridge, Pa.
Detroit Seamless Steel Tubes Co., Detroit.
Giberson, E. D., & Co., Inc., 40 Rector St., New York City.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette St., New York City.
Johnson-Peter Co., Bush Terminal, Brooklyn, N. Y.
Keating, E. F., Co., 452 Water St., N. Y. C.
National Tube Co., Pittsburgh, Pa.
Reading Iron Company, Reading, Pa.
Roessing Mfg. Company, Pittsburgh, Pa.
Ryerson, Jos. T., & Son, Chicago, Ill.
Scully Steel & Iron Co., Chicago, Ill.
Williams & Company, Inc., Pitts., N. S., Pa.

TUBES—Nickel Silver
Mohegan Tube Co., Brooklyn, N. Y.
Seymour Mfg. Co., Seymour, Ct.

TUBES—Pyrometer
Engelhard, Chas., 30 Church St., N. Y. C.

TUBES—Pyrometer Protection
Stupakoff Laboratories, Pittsburgh, Pa.

TUBING—Bent
American Circular Loom Co., 90 West Street, New York City.
Empire Tube & Steel Corp., College Point, N. Y.
Newark Tube & Metal Wks., Inc., Newark, N.J.

TUBING—Boiler
Foster-Songer Co., Pittsburgh, Pa.

TUBING—Brazed
American Circular Loom Co., 90 West Street, New York City.
Newark Tube & Metal Wks., Inc., Newark, N.J.

TUBING—Drawn
Empire Tube & Steel Corp., College Point, N. Y.

TUBING—Flexible Metallic
American Metal Hose Co., Waterbury, Ct.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.

TUBING—Open-Seam
Mohegan Tube Co., Brooklyn, N. Y.

TUBING—Seamless Aluminum
Summerill Tubing Co., Bridgeport, Montgomery County, Pa.

TUBING—Seamless Brass and Copper
Chase Metal Works, Waterbury, Ct.
Cook, Edward N., Plate Co., Providence, R. I.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette St., New York City.
Rome Brass & Copper Co., Rome, N. Y.
Scovill Mfg. Co., Waterbury, Conn.
Summerill Tubing Co., Bridgeport, Montgomery County, Pa.
Wheeler Condenser & Engineering Company, Carteret, N. J.

TUBING—Seamless Steel
Detroit Seamless Steel Tubes Co., Detroit.
Foster-Songer Co., Pittsburgh, Pa.
Giberson, E. D., & Co., Inc., 40 Rector St., New York City.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette St., New York City.
Keating, E. F., Co., 452 Water St., N. Y. C.
Page Steel & Wire Co., Grand Central Terminal, New York City.
National Tube Co., Pittsburgh, Pa.
Summerill Tubing Co., Bridgeport, Montgomery County, Pa.
Ward's, Edgar T., Sons Co., Boston, Mass.
Williams & Co., Inc., Pitts., N. S. Pa.

TUBING—Square and Rectangular
American Circular Loom Co., 90 West Street, New York City.
Empire Tube & Steel Corp., College Point, N. Y.
National Tube Co., Pittsburgh, Pa.
Newark Tube & Metal Wks., Inc., Newark, N.J.

TUBING—Welded Steel
American Circular Loom Co., 90 West Street, New York City.
Empire Tube & Steel Corp., College Point, N. Y.
Johnson-Peter Co., Bush Terminal, Brooklyn, N. Y.
Mark Mfg. Co., Evanston, Ill.
Mohegan Tube Co., Brooklyn, N. Y.
National Tube Co., Pittsburgh, Pa.
Page Steel & Wire Co., Grand Central Terminal, New York City.

TUMBLING BARRELS
Globe Machine & Stamping Co., Cleveland, O.
Henderson Bros. Co., The, Waterbury, Ct.
Ideal Concrete Machry. Co., Cincinnati, O.
Paxson, J. W., Co., Philadelphia, Pa.
Sly, W. W., Mfg. Company, Cleveland, O.
Whiting Corporation, Harvey, Ill.

TURBINES
De Laval Steam Turbine Co., Trenton, N. J.
Kerr Turbine Company, Wellsville, N. Y.
Moore Steam Turbine Corp., Wellsville, N. Y.
Sturtevant, B. F., Co., Hyde Park, Mass.

TURBO-GENERATORS
Kerr Turbine Company, Wellsville, N. Y.
Moore Steam Turbine Corp., Wellsville, N. Y.

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Stewart, Paul, & Co., Cincinnati, Ohio.

TURNBUCKLES
Merrill Bros., Maspeth, N. Y.
Moon, Geo. C., Co., Garwood, N. J.
Rhode Island Tool Co., Providence, R. I.

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Fastfeed Drill & Tool Corp., Toledo, O.
Morse Twist Drill & Machine Co., New Bedford, Mass.
National Twist Drill & Tool Co., Detroit, Mich.
Whitman & Barnes Mfg. Co., Akron, O.

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Jefferson Union Co., Lexington, Mass.
Mark Mfg. Co., Evanston, Ill.

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Cook, Asa S., Co., Hartford, Ct.
National Machinery Co., Tiffin, O.

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Crane Co., 836 So. Michigan Ave., Chicago, Ill.

VALVES—Air
Powell, William, Company, Cincinnati, O.

VALVES—Back Pressure & Automatic Relief
Cash, A. W., Company, Decatur, Ill.
Crane Co., 836 So. Michigan Ave., Chicago, Ill.
H. S. B. W.-Cochrane Corp., Phila., Pa.

VALVES—Balanced Throttle
Lunkenheimer Co., Cincinnati, O.

VALVES—Blow-Off
Crane Co., 836 So. Michigan Ave., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.

VALVES—Gas and Air Reversing
Morgan Construction Co., Worcester, Mass.
Smythe, S. R., Co., Pittsburgh, Pa.
Swindell, W., & Bros., Pittsburgh, Pa.

SEE ADVERTISEMENTS FOR COMPLETE INFORMATION. ALPHABETICAL INDEX—PAGES 229-231.

VALVES—Gas, Water and Steam
Crane Co., 836 So. Michigan Ave., Chicago, Ill.
Jenkins Bros., 80 White St., New York City.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Lunkenheimer Co., Cincinnati, O.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Pittsburgh Valve, Fdry. & Construction Co., Pittsburgh, Pa.
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Walworth Mfg. Co., Boston, Mass.
Wood, R. D., & Co., Philadelphia, Pa.

VALVES—Gate
Crane Co., 836 So. Michigan Ave., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.

VALVES—Globe, Angle and Check
Crane Co., 836 So. Michigan Ave., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.

VALVES—Hydraulic
Birdsboro Steel Foundry & Mch. Co., Birdsboro, Pa.
Crane Co., 836 So. Michigan Ave., Chicago, Ill.
Hydraulic Press Mfg. Co., Mount Gilead, O.
Powell, William, Company, Cincinnati, O.
Southwark Fdry. & Mch. Co., Philadelphia, Pa.
Watson-Stillman Co., 190 Fulton St., N. Y.
Wood, R. D., & Company, Philadelphia, Pa.

VALVES—Non-Return Safety Boiler Stop
Lunkenheimer Co., Cincinnati, O.

VALVES—Pop, Safety and Relief
Crane Co., 836 So. Michigan Ave., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.

VALVES—Radiator
Crane Co., 836 So. Michigan Ave., Chicago, Ill.

VALVES—Steel
Lunkenheimer Co., Cincinnati, O.

VALVES—Temperature Control
Crane Co., 836 So. Michigan Ave., Chicago, Ill.

VIBRATORS
Hanna Eng. Wks., 1761 Elston Ave., Chicago.

VISES
Eagle Anvil Works, Trenton, N. J.
Skinner Chuck Co., New Britain, Ct.
Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

WASHERS—Ball Bearing Race
Auburn Ball Bearing Co., Rochester, N. Y.

WASHERS—Brass and Copper
Hobbs Mfg. Co., Worcester, Mass.

WASHERS—Felt
Booth-Felt Co., Inc., Brooklyn, N. Y.

WASHERS—Iron and Steel
Bethlehem Steel Company, So. Bethlehem, Pa.
Bettcher Stpg. & Mfg. Co., The, Cleveland, O.
Hobbs Mfg. Co., Worcester, Mass.
Joliet Wrought Washer Co., Joliet, Ill.
Positive Lock Washer Co., Newark, N. J.
Sessions, J. H., & Son, Bristol, Ct.
Topping Brothers, 122 Chambers St., N. Y. C.
Wrought Washer Mfg. Co., Milwaukee, Wis.

WASHERS—Leather
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WASHERS—Lock
Hobbs Mfg. Co., Worcester, Mass.
Mansfield Lock Washer Co., The, Mansfield, O.
National Umbrella Frame Co., Phila., Pa.
Positive Lock Washer Co., Newark, N. J.
Reliance Manufacturing Co., Massillon, O.

WASHERS—Spring Steel
Dunbar Bros. Co., Bristol, Ct.
Hobbs Mfg. Co., Worcester, Mass.
Mansfield Lock Washer Co., Mansfield, Ohio.
Positive Lock Washer Co., Newark, N. J.
Reliance Manufacturing Co., Massillon, O.

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WASHERS—Thrust, Hardened and Ground
Globe Mch. & Stamping Co., Cleveland, O.

WASHERS—Wrought
Nicetown Plate Washer Co., Philadelphia, Pa.
Wrought Washer Mfg. Co., Milwaukee, Wis.

WASHING MACHINES—For Metal Parts
Ideal Concrete Machry. Co., Cincinnati, O.

WATER SOFTENING AND PURIFYING
Graver Corporation, East Chicago, Ind.
Scaife, Wm. B., & Sons Co., Pittsburgh, Pa.

WEDGES—Foundry
Diamond Clamp & Flask Co., Richmond, Ind.
Sterling Wheelbarrow Co., Milwaukee, Wis.

WELDING—Electric
Blaw-Knox Co., Pittsburgh, Pa.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Mch. & Welder Co., Warren, O.
Page Steel & Wire Co., Grand Central Terminal Bldg., New York City.
Taylor Welder Company, Warren, O.

WELDING—Forge and Hammer
Blaw-Knox Co., Pittsburgh, Pa.

WELDING—Oxy-Acetylene
Blaw-Knox Co., Pittsburgh, Pa.
Davis-Bournonville Co., Jersey City, N. J.
Page Steel & Wire Co., Grand Central Terminal Bldg., New York City.

WELDING AND CUTTING APPARATUS AND SUPPLIES
Air Reduction Sales Co., 342 Madison Ave., N. Y. C.
Davis-Bournonville, Co., Jersey City, N. J.
Electric Arc Cutting & Welding Co., Newark, N. J.
Federal Mch. & Welder Co., Warren, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Milburn, Alexander, Co., Baltimore, Md.

WELDING MACHINES—Electric
Federal Mch. & Welder Co., Warren, O.
Thomson Electric Welding Co., Lynn, Mass.
Thomson Spot Welder Co., Lynn, Mass.

WELL SUPPLIES
Mark Mfg. Co., Evanston, Ill.

WHEELBARROWS—Foundry
Sterling Wheelbarrow Co., Milwaukee Wis.

WHEELS—Rolled Steel
Carnegie Steel Co., Pittsburgh, Pa.
Standard Steel Works Co., The, Phila., Pa.

WHISTLES—Steam and Air
Crane Co., 836 So. Michigan Ave., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.

WINDOWS—Steel
Dahlstrom Metallic Door Co., Jamestown, N. Y.
Lupton's, David, Sons Co., Phila., Pa.

WIRE—Aeroplane
American Steel & Wire Co., Chicago, Ill.

WIRE—Barb
American Steel & Wire Co., Chicago, Ill.

WIRE—Brass and Copper
Chase Metal Works, Waterbury, Ct.
Conklin, T. E., & Co., 61-63 Duane St., N.Y.C.
Hungerford, U. T., Brass & Copper Company, 80 Lafayette St., New York City.
Scovill Mfg. Co., Waterbury, Conn.

WIRE—Broom
American Steel & Wire Co., Chicago, Ill.
Seneca Wire & Mfg. Co., Fostoria, O.

WIRE—Fence
American Steel & Wire Co., Chicago, Ill.

WIRE—Flat, Round and Square
American Steel & Wire Co., Chicago, Ill.
Cook, Edward N., Plate Co., Providence, R. I.
Dehaven Mfg. Co., 50 Columbia Heights, Brooklyn, N. Y.
Interstate Iron & Steel Co., Chicago, Ill.
Miller & Van Winkle, Inc., Brooklyn, N. Y.
Newman, C., Wire Co., 25 Church St., N.Y.C.
Prentiss, Geo. W., & Co., Holyoke, Mass.
Roebling's, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., Fortoria, O.
Townsend Co., New Brighton, Pa.
Washburn Wire Co., 118th St. & Harlem River, N. Y. C.
Webb Wire Works, New Brunswick, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Corp., Buffalo, N. Y., & Worcester, Mass.

WIRE—Mattress
American Steel & Wire Co., Chicago, Ill.
Seneca Wire & Mfg. Co., Fortoria, O.

WIRE—Nickel
Seymour Mfg. Co., Seymour, Ct.

WIRE—Nickel Silver
Seymour Mfg. Co., Seymour, Ct.

WIRE—Phosphor Bronze
Seymour Mfg. Co., Seymour, Ct.

WIRE—Piano and Music
American Steel & Wire Co., Chicago, Ill.
Newman, C., Wire Co., 25 Church St., N. Y. C.
Ward's Edgar T., Sons Co., Boston, Mass.
Washburn Wire Co., 118th St. & Harlem River, N. Y. C.
Webb Wire Works, New Burnswick, N. J.

WIRE—Plain, Galvanized and Coppered
Page Steel & Wire Co., Grand Central Terminal Bldg., New York City.

WIRE—Rubber Covered
American Steel & Wire Co., Chicago, Ill.
Hazard Mfg. Co., Wilkes-Barre, Pa.

WIRE—Special Drawn Shapes
American Steel & Wire Co., Chicago, Ill.

WIRE—Spoke and Crimping
American Steel & Wire Co., Chicago, Ill.
Prentiss, Geo. W., & Co., Holyoke, Mass.

WIRE—Spring Steel
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.

WIRE—Strand
American Steel & Wire Co., Chicago, Ill.

WIRE—Telephone and Telegraph
American Steel & Wire Co., Chicago, Ill.

WIRE—Weaving
American Steel & Wire Co., Chicago, Ill.

WIRE—Welding
Aborn Steel Co., Inc., 22 Clarke St., N. Y. C.
Page Steel & Wire Co., Grand Central Terminal Bldg., New York City.
Philadelphia Steel & Iron Co., Phila., Pa.

WIRE CLOTH
Buffalo Wire Works Co., Buffalo, N. Y.
Ludlow-Saylor Wire Co., The, St. Louis, Mo.
Morss & Whyte Co., Cambridge, Mass.
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N. J. Wire Cloth Co., Trenton, N. J.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Corp., Worcester, Mass., and Buffalo, N. Y.

WIRE COILING MACHINERY
Baird Machine Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE CRIMPERS
Automatic Machine Co., Bridgeport, Ct.

WIRE DRAWING MACHINES
Morgan Construction Co., Worcester, Mass.
New England Wire Machinery Co., New Haven, Conn.
Vaughn Machry Co., Cuyahoga Falls, O.
Waterbury-Farrel Fdry. & Mach. Co., Waterbury, Ct.

WIRE FORMING MACHINERY
Baird Machine Co., Bridgeport, Ct.
Manville, E. J., Mach. Co., Waterbury, Ct.
Nilson, A. H., Mach. Co., Bridgeport, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE MILL EQUIPMENT
Morgan Construction Co., Worcester, Mass.
New England Wire Machinery Co., New Haven, Conn.
Shuster, F. B., Co., New Haven, Ct.
Vaughn Machry. Co., Cuyahoga Falls, O.

WIRE NAIL MACHINERY
National Machinery Co., Tiffin, O.
Ryerson, Jos. T., & Son, Chicago, Ill.
Sleeper & Hartley, Inc., Worcester, Mass.

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American Steel & Wire Co., Chicago, Ill.
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Leschen, A., & Sons Rope Co., St. Louis, Mo.
Moon, Geo. C., Co., Garwood, N. J.
Page Steel & Wire Co., Grand Central Terminal Bldg., New York City.
Roebling's, John A., Sons Co., Trenton, N. J.
Upson-Walton Co. of N. Y., 291 B'way, N.Y.C.
Wickwire Spencer Steel Corp., Worcester, Mass., and Buffalo, N. Y.

WIRE ROPE FITTINGS
American Steel & Wire Co., Chicago, Ill.
Broderick & Bascom Rope Co., St. Louis, Mo.
Upson-Walton Co. of N. Y., 291 B'way, N. Y.

WIRE SPECIALTIES
American Steel & Wire Co., Chicago, Ill.
Autoyre Co., Oakville, Ct.
Bridgeport Chain Co., Bridgeport, Ct.
Campbell Wire Specialty Works, South Bend, Ind.
Cuyahoga Spring Co., Cleveland, O.
Hindley Mfg. Co., Valley Falls, R. I.
Jenkinson, R. C., & Co., Newark, N. J.
Mattatuck Mfg. Co., Waterbury, Ct.
Parker Wire Goods Co., Worcester, Mass.
Torrington Co., Torrington, Ct.
Traut & Hine Mfg. Co., New Britain, Ct.
Wickwire Bros., Cortland, N. Y.
Wickwire Spencer Steel Corp, Worcester, Mass., and Buffalo, N. Y.

WIRE STRAIGHTENING AND CUTTING MACHINERY—Automatic
Nilson, A. H., Machine Co., Bridgeport, Ct.
Shuster, F. B., Co., New Haven, Ct.
Sleeper & Hartley, Inc., Worcester, Mass.

WIRE STRANDING & CLOSING MACHINES
New England Wire Machinery Co., New Haven, Conn.

WIRE WORK
Buffalo Wire Works Co., Buffalo, N. Y.
Morss & Whyte Co., Cambridge, Mass.

WOOD BLOCK FLOORING
Carter Bloxonend Flooring Co., Kansas City, Mo.
Jennison-Wright Co., Toledo, O.

WOOD WORKING MACHINERY
Osborne & Sexton Machry. Co., Columbus, O.
Seyfert's, L. F., Sons, Inc., Philadelphia, Pa.

WRENCHES
Armstrong Bros. Tool Co., Chicago, Ill.
Cleveland Punch & Shear Wks. Co., Cleve., O.
Drop Forging Co. of N. Y., Jersey City, N. J.
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Lakeside Forge Co., Erie, Pa.
Walworth Mfg. Co., Boston, Mass.
War Dept., Ordnance Dept., Washington, D. C.
Williams, J. H., & Co., 57 Richards St., Brooklyn, N. Y.

ZINC
Erdle Perforating Co., Rochester, N. Y.

ADVERTISERS INDEX

A

Abendroth & Root Mfg. Co..... 74
Aborn Steel Co., Inc..... 14
Acme Die & Stamping Co.....198
Acme Gear Co..... 80
Acme Machinery Co.....149
Acme Steel & Malleable Iron Works, Inc..... 46
Acme Steel Goods Co..... 26
Adams, Wm., Fdry. Co., Inc....204
Adamson Machine Co.....205
Addy, Matthew, Co., The, Cincinnati, Ohio 26
Addy, Matthew, Co., The, Philadelphia, Pa. 106
Adriance Mach. Works, Inc.....159
Advance Furnace & Engrg. Co...100
Advance Spring & Wire Co..... 66
Aetna Fdry. & Mach. Co.....106
Air Reduction Sales Co.....105
Air-Tight Steel Tank Co.....111
Ajax Metal Co..... 36
Akron-Selle Co., The..... 39
Albaugh-Dover Co..... 80
Alberger Pump & Condenser Co..170
Albert & Davidson, Inc.....194
Alden Coal Mining Co..... 29
Allegheny Steel Co..... 21
Allen, Edgar, Steel Co., Inc..... 17
Allen, John F., Co.....150
Allen Mfg. Co., The..... 52
Allen, S. L., & Co., Inc.....198
Allentown Cable & Mach. Co....198
Alliance Machine Co., The..... 88
Allis-Chalmers Mfg. Co.....169
Alloy Steel & Metals Co..... 14
Altemus & Prindle..... 31
American Air Compressor Wks..172
American Bridge Co..... 39
American Broach & Machine Co..127
American Chain Co., Inc..... 85
American Circular Loom Co..... 76
American Flyer Mfg. Co.....198
American Foundry Equip. Co..... 97
American Gas Furnace Co..... 98
American Indus. Engineering Co..103
American Indus. Furnace Corp... 98
American Manganese Bronze Co... 82
American Metal Hose Co..... 77
American Pattern Works Co....206
American Pressed Steel Co..... 19
American Pulley Co..... 84
American Radiator Co..... 45
American Railway Supply Co....135
American Refractories Co..... 31
American Roller Bearing Co..... 81
American Screw Co..... 54
American Sheet & Tin Plate Co.. 22
American Shipbuilding Co.....188
American Spiral Pipe Works..... 76
American Steel & Wire Co..... 67
American Steel Co..... 68
American Swiss File & Tool Co..142
American Tap & Die Co.....138
American Tool Works Co.....124
American Tube & Stamping Co.. 26
Ames, B. C., Co.....126
Ames, W., & Co..... 58
Anchor Brass & Aluminum Co..205
Anchor Post Iron Works..... 69
Andes Foundry Co.....205
Anthony Co., The..... 97
Anti-Borax Compound Co.....104
Apollo Steel Co..... 22
Archer & Baldwin, Inc.....192
Armington Engrg. Co..... 88
Armstrong-Blum Mfg. Co.....132
Armstrong Bros. Tool Co.....141
Arrow Tool & Mfg. Co.....197
Ashland Fire Brick Co..... 30
Athenia Steel Co..... 12
Atherton, Jesse 185
Atlanta Bolt & Steel Prod. Co... 58
Atlantic Steel Castings Co..... 42
Atlas Bolt & Screw Co..... 60
Atlas Car & Mfg. Co..... 95
Atlas Crucible Steel Co..... 18
Atlas Steel Casting Co..... 44
Auburn Ball Bearing Co..... 82
Automatic Machine Co.....126
Automatic Products Co., Detroit, Mich. 52
Automatic Products Corp., L. I. City, N. Y..... 56
Autoyre Co. 67

B

B. & W. Tool & Die Co.....197
Babcock & Wilcox Co., The.....168
Badger Tool Co.....131
Baird Machine Co.....147
Baker & Co., Inc..... 36
Baker Bros. 127
Baker Mfg. Corp.....204
Baker R & L Co..... 95
Baldwin Chain & Mfg. Co..... 85
Baltimore Brass Co., The..... 33
Banfield, W. H., & Sons, Ltd....140
Barber-Colman Co. 137
Barber-Foster Engrg. Co..... 90
Barbour, R. W. 16
Barnes Drill Co.....122
Barnes, W. F., & John.....123
Barnes, Wallace Co.....56, 65
Barnett, G. & H., Co.....142
Barth Stpg. & Mch. Wks.....198
Bath, Cyril J., & Co.....184
Baush Mch. Tool Co., Metals Div. 35
Bayonne Bolt & Nut Co..... 58
Bearings Co. of America..... 82
Beatty Mach. & Mfg. Co.....150
Beaudry & Co., Inc.....162
Becker Milling Mach. Co.....126
Beckley Perforating Co.....71, 206
Bedaux, Chas. E., Co.....114
Bedford Fdry. & Mach. Co..... 90
Belden Machine Co..... 40
Belding Foundry Co.....205
Bell Co., The..... 56
Belle City Malleable Iron Co..... 45
Bellevue Industrial Furnace Co.. 98
Belmont Iron Works.....114
Benton Harbor Malleable Fdry. Co. 45
Berks Fdry. & Mfg. Co.....204
Berlin Construction Co., Inc.....114
Bertolette Mch. Tool Co.184, 185, 187
Bertsch & Co.....150
Besly, Charles H., & Co.....130
Best, W. N., Furnace & Burner Corp. 100
Bethlehem Steel Co.....161
Bettcher Stpg. & Mfg. Co..... 48
Betts Mach. Co., Inc.....128
Betz-Pierce Co., The..... 14
Bignall & Keeler Mach. Wks.....144
Binghamton Flexible Shaft Co... 84
Birdsboro Steel Fdry. & Mch. Co. 167
Birmingham Iron Fdry. 80
Blake & Johnson Co..... 55
Blanchard Mach. Co.....130
Blaw-Knox Co.....104
Bliss, E. W., Co. 49, 202
Bonnot Co., The.....103
Booth Electric Furnace Co., The.100
Booth Felt Co., Inc.....175
Boston Pressed Metal Co..... 48
Botwinik Bros. 182, 194
Bour, L. J., Refrac. Co., Inc..... 30
Bowser, S. F., & Co., Inc.....110
Box, Alfred, & Co., Inc..... 88
Boyle, John, Jr.....114
Boyts, Porter & Co.....170
Bradlee & Co..... 86
Bradley, C. C., & Son.....164
Brass Fixtures Co.....197
Brearley, H. P.....189
Brenholts, Roy 193
Briddell, W. C., Co., Inc.....195
Bridgeport Brass Co..... 34
Bridgeport Chain Co..... 66
Bridgeport Metal Goods Mfg. Co.. 51
Bridgeport Safety Emery Wheel Co., Inc. 130
Bridgeport Screw Co..... 54
Bridgeport Silverware Mfg. Corp.197
Brier Hill Steel Co., The..... 19
Briggs, Marvin, Inc.....192
Bristol Co. 103
Broderick & Bascom Rope Co.... 69
Brooks Machine Co..... 40
Brosius, Edgar E..... 87
Brown Bag Filling Mach. Co..... 56
Brown Engineering Co..... 84
Brown Hoisting Mchry. Co..... 90
Brown-McLaren Mfg. Co..... 56
Brown & Sharpe Mfg. Co.....137
Browneli Mchry. Co.....186
Browning Co. 92
Brubaker, W. L., & Bros. Co....139
Buck, Wm. E., Mfg. Co.....206
Buckeye Twist Drill Co.....137
Buffalo Bronze Die Cast. Corp...204
Buffalo Forge Co.....124
Buffalo-Pitts Co.....199
Buffalo Wire Works Co., Inc.... 69
Bunting Brass & Bronze Co., The. 88
Burrows Metal Mfg. Co.....197
Bury Compressor Co.....170
Business Opportunities Section 207-208
Butterfield & Co., Div. Union Twist Drill Co., The.....137
Byers Mach. Co., The.....92

C

Calder, Geo. H.....132
Caldwell, H. W., & Son Co..... 87
Caldwell, W. E., Co..... 88
Campbell Wire Specialty Works.. 67
Canadian Cartridge Co. 187
Canedy-Otto Mfg. Co.....123
Canton Fdry. & Mch. Co..... 92
Canton Pneumatic Tool Co., The.143
Canton Sheet Steel Co..... 21
Carnahan Tin Plate & Sheet Co.. 23
Carnegie Steel Co. 9
Carter Bloxonend Flooring Co...115
Cary Mfg. Co. 135-136
Casey Hudson Co. 203
Cash, A. W., Co.....173
Cave Welding & Mfg. Co.....206
Celite Prod. Co. 31
Central Iron & Metal Co.....195
Central Tube Co. 74
Ceramic Mchry. Co. 200
Chain Products Co..... 86
Chambersburg Engineering Co....164
Champion Blower & Forge Co...102
Champion Engineering Co..... 88
Champion Mach. & Forging Co... 42
Champion Rivet Co., The..... 61
Chapman Engrg. Co., Division of The C. & G. Cooper Co.....172
Chase Fdry. & Mfg. Co..... 95
Chase, Frank D., Inc.....114
Chase Metal Works..... 36
Chemung Fdry. & Supply Co., Inc.204
Chesapeake Iron Works 90, 114
Chester Steel Castings Co..... 42
Chicago Bridge & Iron Works....110
Chicago Flexible Shaft Co..99, 199
Chicago Perforating Co..... 74
Chicago Pneumatic Tool Co.....143
Chicago Rawhide Mfg. Co..... 80
Chicago Solder Co. 36
Chicago Steel Fdry. Co..... 45
Chicago Wire Chair Co.....133
Cincinnati Bickford Tool Co.....122
Cincinnati Frog & Switch Co..... 95
City Fdry. Co..... 47
Clapp, E. D., Mfg. Co..... 42
Clark Bros. Bolt Co..... 58
Clark, Cadle, Harmon Corp.....199
Clearing House Sec.....177, 195
Clemson Bros., Inc.....132
Cleveland-Cliffs Iron Co. 29
Cleveland Crane & Engrg. Co..... 88
Cleveland Hardware Co..... 41
Cleveland Knife & Forge Co.....156
Cleveland Planer Co.....128
Cleveland Pneumatic Tool Co.....143
Cleveland Punch & Shear Works Co. 153
Cobb & Drew, Inc..... 62
Cohen, Louis, & Son.....195
Colburn Mach. Tool Co., The....123
Colorado Power Co.....116
Columbia Machine Works & Malleable Iron Co..... 36
Columbia Steel Co. 24
Columbia Steel & Shafting Co... 8
Columbus Brass Co. 48
Columbus Forge & Iron Co..... 40
Columbus McKinnon Chain Co., The 86
Commercial Drop Forge Co..... 42
Cone Automatic Machine Co.....127
Conklin, T. E., & Co..... 33
Connecticut Gears, Inc..... 80
Connellsville Foundry, Machine & Steel Casting Co. 44
Connelly, D., Boiler Co.....168
Connersville Blower Co. 116
Connersville Fdry. Corp.....206
Conradson Mch. Tool Co.....203
Continental Iron & Steel Co.....195
Contract Work Sec.....197, 206
Converse, F. S., Co., Inc..... 87
Cook, Asa S., Co.....150
Cook, Edward N., Plate Co..... 76
Cook Spring Co..... 67
Corry, Jamestown Mfg. Corp....133
Covington Mach. Co.....152
Cowles Tool Co. 137
Craig Oil Co. 106
Crane Co. 176
Crawford, F. H. 187-188
Crescent Refractories Co. 31
Cresson-Morris Co. 84
Creswell, Samuel J., Iron Works.205
Crocker Bros. 26
Crocker-Wheeler Co. 82
Crosby Co., The..... 50
Cross Engineering Co..... 72
Crucible Steel Casting Co..... 44
Cruse-Kemper Co. 112
Cullman Wheel Co. 85
Cummings Machine Co..... 94
Curtis Pneumatic Mchry. Co.....170
Cutler-Hammer Mfg. Co..... 83
Cuyahoga Spring Co. 64

D

Dahlstrom Metallic Door Co.... 13
Damascus Bronze Co..... 82
Dart, E. M., Mfg. Co.....174
Davidson Pipe & Iron Corp.....194
Davis-Bournonville Co. 104
Davis, Chas. E., Fdry. Co., Inc..203
Davis, C., & Co.....194
Davis Fire Brick Co. 31
Davis, J. F. 189
Day Mchry. Co.....188
Day, William J., Estate.....198
Day & Zimmermann, Inc.....113
Dean Bros. Steam Pump Wks....169
Decatur Malleable Iron Co..... 46
De Cou, Richard, Co..... 14
DeHaven Mfg. Co..... 26
DeLaval Steam Turbine Co.....170
Deming Co., The.....169
Desmond-Stephen Mfg. Co.....131
Detroit Electric Furnace Co.....100
Detroit Hoist & Mach. Co..... 94
Detroit Machine Tool Co.....123
Detroit Seamless Steel Tubes Co. 77
Detroit Stamping Co.....138
Devlin, Thomas, Mfg. Co..... 60
Diagraph Stencil Machine Corp..133
Diamond Clamp & Flask Co..... 97
Diamond Expansion Bolt Co..... 58
Diamond Saw & Stpg. Co.....133
Dickinson, Thos. L. 132
Disston, Henry, & Sons, Inc..... 18
Doehler Die Casting Co..... 47
Donner Steel Co., Inc..... 27
Douglas & Lomason Co.....197
Drake Lock Nut Co..... 60
Dreis & Krump Mfg. Co.....87, 159
Driggs Ordnance & Mfg. Corp...199
Driver-Harris Co.....102
Drop Forging Co. of New York.. 42
Drouve, G., Co.....115
Duff Mfg. Co..... 36
Duff Patents Co., Inc.....113
Dunbar Bros. Co., The..... 63
Dunbar Drop Forge Co..... 41
Durant Mfg. Co. 104
Dyson, Jos., & Sons..... 40

E

Eagle Anvil Works.....142
Eagle Pipe Supply Co., Inc.....194
Earle Gear & Mach. Co.....77, 203
Eastern Machine Screw Corp.....138
Eastern Rolling Mill Co..... 22
Easton Car & Construction Co.... 95
Eccles, Richard, Co..... 42
Economy Furnace Co., The.....100
Eddystone Steel Co..... 23
Edge Hill Silica Rock Co..... 31
Egleston Bros. & Co., Inc..... 16
Electric Arc Cutting & Wldg. Co.104
Electric Controller & Mfg. Co....233
Electric Furnace Co., The..... 97
Electric Furnace Construction Co.100
Electric Steel & Forge Co..... 17
Electric Steel Prod. Co..... 45
Ellis, Frank I. 113
Elmes, Chas. F., Engrg. Wks....162
Elwell-Parker Elec. Co..... 95
Emery, A. H. 200
Empire Metal Co..... 36
Empire Refineries, Inc.....109
Empire Tube & Steel Corp..... 76
Endicott Forging & Mfg. Co., Inc. 42
Engelhard, Charles 103
Erdle Perforating Co..... 72
Erie City Iron Works.....169
Erie Foundry Co. 164
Erie Mfg. & Supply Co.....182
Erie Steel Construction Co..... 90
Espen-Lucas Mach. Wks.....132
Essley, E. L., Mchry. Co.....186
Euclid Crane & Hoist Co., The... 94
Eureka Fire Brick Wks..... 30
Everitt Co., The..... 58
Excelsior Tool & Mach. Co.....159

F

F. P. Screw Co.....52
Fafnir Bearing Co..... 82
Fairbanks, Morse & Co.....170
Fairmount Foundry Co..... 46
Falk Corp. 81
Falls Clutch & Machry. Co..... 84
Farrel Fdry. & Mach. Co...162, 203
Fastfeed Drill & Tool Corp.....135
Fawcus Machine Co..... 80
Federal Bearings Co., Inc., The. 81
Federal Mach. & Welder Co.....104
Federal Mchry. Sales Co.....187
Federal Sign System (Electric)..133
Federal Steel Foundry Co..... 44
Federal Tool & Alloy Steel Corp.. 16
Fenton Mch. Tool & Die Co.....197
Ferguson Furnace Co..... 98
Ferracute Machine Co.....159
Ferry Cap & Set Screw Co..... 53
Fielden & Co.....113
Fillmore Ave. Fdry. & Iron Wks. Inc. 204
Firth-Sterling Steel Co..... 18
Fischer, Charles, Spring Co..... 66
Fisher & Norris.....142
Fitzsimons Co., The 12
Flather Mfg. Co.....130
Flinn & Dreffein Co.....173
Ford Chain Block Co..... 94

Ford, J. B., Co., The....110
Fosdick Mach. Tool Co....124
Foster, H. M., Co....195
Foster, L. B., Co....195
Foster Machine Co....127
Foster-Songer Co....77
Fostoria Screw Co., The....58
Frank Fdries. Corp....205
Frank, M. K....195
Franklin Mach. Co....203
Frederick Iron & Steel Co., The..169
Freeman-Riff Co....86
Freyn, Brassert & Co....114
Friendship Pattern Works....206
Frost Mfg. Co....97
Fuller Engrg. Co....98
Fuller Lehigh Co....102
Fulton Machine Tool Co....141

G

Gale Mfg. Co....205
Gandy Belting Co....85
Ganschow, Wm., Co....80
Garland Mfg. Co....60
Garrison, A., Fdry. Co....166
Garvin Mach. Co....140, 199
Gathmann Engrg. Co....113
Gehnricht Indirect Heat Oven Co., Inc....100
Gem Stamped Steel Co....197
General Drop Forge Co....42
General Mfg. Co....159
General Spring & Wire Co....66
Geuder, Paeschke & Frey Co....49
Giberson, E. D., & Co., Inc....77
Gibson, Wm. D., Co....67
Girard Steel Stpg. Co....198
Gisholt Machine Co....127
Gits Bros. Mfg. Co....110
Gleason Works....128
Glens Falls Mach. Wks....204
Globe Mach. & Stamping Co....50
Globe Steel Co....96
Godfrey Conveyor Co....86
Gordon, Robt., Inc....116
Gould & Eberhardt....128
Goulds Mfg. Co....171
Goyer Co., The....197
Graver Corp....110, 168
Graves Machry. Exchange....185
Gray Foundry, Inc....203
Gray, Peter, & Sons, Inc....197
Great Lakes Pressed Steel Corp..197
Green, A. P., Fire Brick Corp....31
Green Engineering Co....168
Green, L. A., Rail & Machry. Co.195
Green's Car Wheel Mfg. Co....206
Greer Steel Co....25
Gregory Electric Co....191
Griffin Mfg. Co....25
Grimes Molding Mach. Co....96

H

H. S. B. W.—Cochrane Corp....169
Hadfield-Penfield Steel Co., The..97
Haetten, J. E., & Co., Inc....182
Hagan, George J., Co....172
Haiss, Geo., Mfg. Co....87
Halcomb Steel Co....18
Hamburg Steel Tank Works....111
Hammond Iron Works....111
Hampden Brass Co....203
Hanna Engrg. Works....92
Hanna, M. A., & Co....120
Hanson Bros. Screw Co....198
Harbison-Walker Refractories Co..31
Hardy, F. A., & Co....118
Harrington, E., Son & Co....93
Harrington & King Perforating Co. 73
Harrington, Robinson & Co....40
Harris Bros. Co....178
Harrisburg Bar Mill Co....16
Harrison Bolt & Nut Co....58
Harsch, John, Bronze & Fdry. Co....205
Hart, R. A., Mfg. Co....103
Hartford Fdry. & Mach. Co....205
Hartford Machine Screw Co....56
Harvey, Arthur C., Co....16
Haskell, Wm. H., Mfg. Co....148
Hawkridge Bros. Co....17
Hawley Down Draft Furnace Co..98
Hayward Co....88
Hazard Mfg. Co....69
Heald Mach. Co....130
Heine Boiler Co....168, 188
Help and Situations Wanted.209-210
Heltzel Steel Form & Iron Co...112
Henderson Bros. Co....97
Henderson Mach. Co....160
Hendley & Whittemore Co....156
Hendrick Mfg. Co....73
Henry & Wright Mfg. Co....157
Heppenstall Forge & Knife Co...40
Hercules Mach. & Tool Co....199
Heyward, Thos. R., Co....33
Hickman, Williams & Co....27
Hill, Clarke & Co., of Chicago...179
Hilles & Jones Co....154, 188
Hilliard Clutch & Mchry. Co....84
Hillman Coal & Coke Co....30
Hindley Gear Co....80
Hindley Mfg. Co....67
Hinter's, Henry A., Sons Co....194
Hobbs Mfg. Co....62
Hoeft & Co., Inc....52
Hoevel Mfg. Co....96
Holt & Merrall, Inc....207
Horsburgh & Scott Co....80
Horton, E., & Son Co....141
Horton, John T., Co., Inc....94
Hoskins Mfg. Co....98
Howard Iron Works....150
Hubbard Pressed Steel Co....135
Hubbard Spring Works....66
Hubbell, Harvey, Inc....52
Hubley Mfg. Co....47
Hungerford, U. T., Brass & Copper Co....77
Hunter Saw & Machine Co....144
Hyatt Roller Bearing Co....81
Hyde Park Fdry. & Mch. Co....166
Hydraulic Press Mfg. Co....162
Hyman, Joseph, & Sons....187
Hyman-Michaels Co....195

I

Ideal Concrete Mchry. Co....97
Ideal Machinery Co....182
Illinois Steel Co., Warehouse Dept....10
Imperial Brass Mfg. Co....104
Indianapolis Drop Forging Co....41
Indianapolis Pressed Steel Co....198
Industrial Equipment Co....192
Industrial Plants Corp....207
Industrial Steel Casting Co....45
Ingersoll-Rand Co....172
Ingram, H. C., & Son....98
International Mach. Tool Co....127
Interstate Iron & Steel Co....14
Interstate Equipment Corp....186
Interstate Mchry. Co....184
Iron Trade Products Co....26
Ironton Fire Brick Co....31
Ironton Punch & Shear Co....152
Irving Iron Works....115

J

Jackson Screw Products Co., Inc.199
Janney, Steinmetz & Co....112
Jarecki Mfg. Co....144
Jefferson Union Co....174
Jelliff, Geo. H., & Son....96
Jenkins Bros....173
Jenkins Mfg. Co....204
Jenkinson, R. C., & Co....67
Jennison-Wright Co....116
Johnson Bronze Co....82
Johnson, Carlyle Machine Co....83
Johnson-Peter Co....77
Johnson, Wm. C., & Sons, Mchry. Co....186
Johnston, Wm. T., Co....184
Joliet Wrought Washer Co....48
Jones & Lamson Mach. Co..120, 138
Jones & Laughlin Steel Co....7
Jones Mach. Tool Co....184
Jones Mch. Tool Works....127

K

Kalamazoo Malleable Iron Co....45
Kearney & Trecker Corp....129
Keating, E. F., Co....77
Keeler, E., Co....168
Keller Pneumatic Tool Co....143
Kempsmith Mfg. Co....130
Kennedy, Julian....113
Kennedy Valve Mfg. Co....173
Kent-Owens Machine Co....201
Kenwood Bridge Co....114
Keokuk Electro Metals Co....33
Kerr Turbine Co....170
Keystone Drop Forge Works....85
Keystone Screw Co....52
Kidder, R. E., Co....132
Kilborn & Bishop Co....42
Kilborn-Sauer Co....197
Kinnear Mfg. Co....133
Kirk-Latty Mfg. Co....58
Klein, Nathan, & Co....191
Kline Hardware Co....204
Klotz Machine Co....200
Knickerbocker Co....118
Koch, Carl, Inc....95
Koehler Mfg. Co., Inc....197
Konigslow, E., Stpg. & Tool Works....48, 198
Koppel Indus. Car & Equip. Co..95
Kropp Forge Co....40

L

L. & D. Metal & Supply Co., Inc.194
Lackawanna Bridge Co....115
Lackawanna Steel Co....13
Laclede Steel Co....24
Lakeside Forge Co....41
Lakeside Malleable Castings Co..46
Lamberg, A., & Co....184
Lambert & Todd Mach. Co....201
Lancaster Fdry. Co....204
Lancaster Iron Works, Inc....110
Landis Machine Co....145
Landis Tool Co....131
Lane, H. M., Co., The....113
Langelier Mfg. Co....141
Lansing Stamping Co....130
Lapointe, J. N., Co....127
LaSalle Steel Co....12
Laughlin, Alex., & Co....113
Lay, Joseph, Co., The....133
Lazarus, Lewis, & Sons....86
Lea-Courtenay Co....169
Leaf, E. B., Co....189
Leavitt, C. W., & Co....33
Lebanon Boiler Works....168
Lebanon Brass Mfg. Co....205
Lebanon Gear & Mach. Wks....200
Leffler, Chas., & Co....159
Leland-Gifford Co....124
Leschen, A., & Sons Rope Co....69
Letson, T. H., Co....193
Levering Bros....205
Lewis Fdry. & Mch. Co....165
Lewis-Shepard Co....95
Limbert, Geo. B., & Co....175
Link-Belt Co....46, 86, 87, 92, 94
Lippincott-Carwen Corp....203
Littell, F. J., Machine Co....160
Lodge & Shipley Mach. Tool Co..184
Long & Allstatter Co....152
Lowener, V....17
Loy & Nawrath Co....156
Lucas Mach. Tool Co....127
Ludlow-Saylor Wire Co....71
Lukens Steel Co....19
Lumen Bearing Co....48
Lunkenheimer Co....173
Lupton's David, Sons Co....133
Luria Bros. & Co., Inc....195
Lycoming Motors Corp....46
Lynch, F. B....194

M

McCabe, J. J., Lathe & Mchry. Corp....126, 177
McClintic-Marshall Co....114
McConway & Torley Co....15
McCoy-Brandt Machinery Co....186
McCullough-Dalzell Crucible Co..97
McDowell & Co....194
McKee, Arthur G., & Co....113
McKiernan-Terry Drill Co....133
McKim Fdry. & Mch. Co....204
McLain's System, Inc....42
McMullen Mchry. Co....187
Madden & Morrison File Co....142
Maehler Co., The....100
Mahoning Valley Steel Co., The..22
Mahr Mfg. Co....102
Mal-Gra Co., The....46
Malleable Iron Fittings Co....120
Manganese Steel Forge Co....17
Manistee Iron Works Co....170
Manning, Maxwell & Moore, Inc..127
Mansfield Lock Washer Co....62
Manville, E. J., Machine Co....149
Marchant, Geo. F., Co....143
Maris Bros....88
Mark Mfg. Co....174
Marshalltown Mfg. Co....155
Martien, Wm., & Co....207
Maryland Metal Prod. Co....198
Massillon Fdry. & Mach. Co....164
Mattatuck Mfg. Co., The....57
Matthews, H. A., Mfg. Co....50
Matthews, Jas. H., & Co....135
Matthews Mfg. Co....50
Maynard Elec. Steel Casting Co..45
Meachem Gear Corp....79
Meaker Galvanizing Co....106
Medart Patent Pulley Co....84
Meeker Fdry. Co....46
Meisselbach-Catucci Mfg. Co. Inc....200
Melling Forging Co....40
Memphis Steel Con. Co. of Pa...115
Merrell Mfg. Co....144
Merrill Bros....69
Mesta Machine Co....107
Metal & Alloy Specialties Co., Inc....204
Metal Specialty Co....198
Metaline Co....82
Metzler, Robt. J., Inc....196
Midvale Steel & Ordnance Co....37
Milburn, Alexander, Co....106
Miles, F. S., Co....58
Mill Supply Co....185, 192
Millbury Steel Fdry. Co....44
Miller-Owen Electric Co., Inc....192
Miller & Van Winkle....66
Millholland Mch. Co....200
Milne, A., & Co....19
Milwaukee Electric Crane & Mfg. Co., Inc....91
Milwaukee Steel Foundry Co....42
Minneapolis Steel & Mchry. Co..114
Mitchell-Tappen Co....187
Modern Steel Casting Co....44
Mohegan Tube Co....76
Moltrup Steel Products Co....10
Monarch Felt Works....175
Monarch Mach. Tool Co., The...127
Monroe Steel Castings Co....45
Moon, George C., Co....104
Moore, Edwin A....204
Moore Steam Turbine Corp....170
Moore, W. E., & Co....98
Moore & White Co....83
Morey & Co., Inc....180
Morgan Construction Co....166
Morris & Bailey Steel Co....24
Morris, Herbert, Inc....93
Morris Machine Works....169
Morris Machinery Co....196
Morris, Wheeler & Co....14
Morrison & Risman Co....195
Morse Chain Co....86
Morse Twist Drill & Mach. Co...136
Morss & Whyte Co....69
Morton Mfg. Co....128
Morton, Thos....86
Motor Castings Co....205
Mueller Mach. Tool Co....124
Mundt, Chas., & Sons....72
Munson, E. G....204
Myers, F. E., & Bro., Co....169

N

Nagle Steel Co....19
Napier Saw Works, Inc....133
Nashville Indus. Corp....188-189
National Car Coupler Co....44
National Coal Mining News....118
National Drawn Steel Co....13
National Engrg. Co....96
National Forge & Tool Co....38
National Mchry. Co....149
National Steel Cast. Co....44
National Tool Co....138
National Transit Pump & Mach. Co....169
National Tube Co....75
National Twist Drill & Tool Co..136
National Umbrella Frame Co....62
Naugatuck Mfg. Co....175
Nazel Engrg. & Mach. Works....162
Neil & Smith Elec. Tool Co....143
Newark Gear Cutting Mach. Co..80
Newark Tube & Mtl. Wks., Inc..76
Newark Wire Cloth Co....69
New Britain Mach. Co....56
New Departure Mfg. Co....82
New England Wire Mchry. Co....148
Newhall Chain Forge & Iron Co..86
N. J. Fdry. & Mach. Co....88
N. J. Wire Cloth Co....71
New London Ship & Engine Co..199
Newman, C., Wire Co....24
Newton Mfg. Co., The....198
Newton Steel Co....21
N. Y. Belting & Packing Co....85
N. Y. Central Iron Works Co., Inc....110
N. Y. Mchry. Exchange....183
Niagara Mch. & Tool Wks....154
Nicetown Plate Washer Co....16
Nicholls, Wm. H., Co., Inc....96
Nicholson, W. H., & Co....140
Niles-Bement-Pond Co....78, 91, 185
Niles, F. H., & Co., Inc....186
Nilson, A. H., Mach. Co....148
Nilson-Miller Co....200
Norma Co. of America....81
North Wales Mch. Co....204
Northern Engrg. Works....88, 93
Northern Malleable Iron Co....46
Norton Iron Works....62
Norwalk Iron Works....172
Nute, McGehee, Geary Co., Inc..204

O

Oakley Chemical Co....110
Oakley Mach. Tool Co....131
O'Brien Mchry. Co....187, 189
Oglebay, Norton & Co....29
Ohio Elec. & Controller Co....94
Ohio Locomotive Crane Co....92
Ohio Nut & Bolt Co....60
Ohio Steel Fdry. Co....42
Old Dominion Iron & Steel Corp..15
Oldham, Geo., & Son Co....143
Oliver Iron & Steel Co....60
Orton & Steinbrenner Co....92
Osborne & Sexton Mchry. Co....184
Otis Steel Co....22
Ottemiller, Wm. H., Co., Inc....52
Oven Equipment & Mfg. Co....100
Oviatt, D. C., & Co....188

P

Pacific Coast Steel Co. 15
Page Boiler Co. 168
Page Steel & Wire Co. 77
Pangborn Corp. 96
Pannier Bros. Stamp Co. 135
Pardee Steel Corp. 15
Park & Williams, Inc. 14
Parker Wire Goods Co. 48
Patch, F. R., Mfg. Co. 203
Patriarche & Bell 17
Pawling & Harnischfeger Co. 92
Pawtucket Mfg. Co. 148
Paxson, J. W., Co. 96
Payne, N. B., & Co. 88, 193
Peabody Fuel Co. 29
Pease, C. F., Co. 133
Peerless Drawn Steel Co. 12
Penn Foundry & Mfg. Co. ..87, 204
Penn Mold & Mfg. Co. 14
Pennsylvania Engineering Wks. ..112
Pennsylvania Flexible Metallic Tubing Co. 77
Pennsylvania Furnace & Iron Co. 111
Pennsylvania Pressed Steel Corp. 198
Pennsylvania Pump & Comp. Co. 172
Pennsylvania Tool & Mfg. Co. ..197
Perin, C. P.—S. M. Marshall ..113
Perry, Buxton, Doane Co. ..194-195
Petroleum Iron Wks. Co., The ..112
Petroleum Refining Co. 106
Pettinos, Geo. F. 96
Pfannmueller Engrg. Co. 189
Philadelphia Gear Wks. 78
Philadelphia Machine Screw Wks., Inc. 52
Philadelphia Roll & Mach. Co. ..166
Philadelphia Steel & Iron Co. ..38, 175
Phillips, F. R., & Sons 13
Phoenix Iron Co. 112
Pidgeon, Thos., Iron Co. 195
Piedmont Fdry. & Mch. Co., Inc. 205
Pilling & Co. 28
Pipe Machinery Co. 144
Pittsburgh Des Moines Steel Co. 110
Pittsburgh Elec. Furnace Corp. .. 98
Pittsburgh Fan Mfg. Co. 116
Pittsburgh Gear & Mch. Co. 81
Pittsburgh Grinding Wheel Co. ..131
Pittsburgh Knife & Forge Co. 40
Pittsburgh Perforating Co. 71
Pittsburgh Piping & Equip. Co. 175
Pittsburgh Rolls Corp. 166
Pittsburgh Saw & Mfg. Co. 133
Pittsburgh Tool Steel Wire Co. 17
Pittsburgh Valve Fdry. & Con. Co. 173
Platt Iron Wks. 169
Portable Machinery Co. 87
Portage Silica Co., The 96
Porter, H. K. 142
Porter, H. K., Co. 95
Porter Machine Co. 200
Portland Foundry Co. 47
Positive Lock Washer Co. 62
Potts, Henry, & Co. 195
Potts, Horace T., & Co. 15
Pottstown Steel Co. 194
Powell Pressed Steel Co. 51
Powell, Wm., Co. 174
Power Machinery Exchange, Inc. 192
Power Specialty Co. 170
Pratt & Whitney Co. 121, 138
Prentiss, Geo. W., & Co. 68
Prentiss, Henry, & Co., Inc. 183
Prest-O-Lite Co. 232
Prichard, C. W., & Co., Inc. 185, 189
Progressive Mfg. Co. 57
Pruyn Bearings Exch., The 81
Pulaski Fdry. & Mfg. Corp. 205
Pure Oil Co., The 108
Purinton & Smith Co. 187
Pusey & Jones Co. 47
Pyro Clay Products Co. 31

Q

Queen City Shaper Co. 128
Quickwork Co. 154
Quigley Fur. Spec. Co., Inc. 31
Quinsigamond Pressed Steel Co. .. 48

R

Randle Mchry. Co. 190
Ransom Mfg. Co. 130
Raritan Fdry. Co. 204
Rathbone, J. A. 114
Ray Machine Works 200
Raymond Bros. Impact Pulv. Co. 102
Raymond Mfg. Co., Ltd. 64
Reading Brass Wks., Inc. 204
Reading Chain & Block Corp. 94
Reading Iron Co. 74
Reading Steel Casting Co. 44
Redin, Ekstrom & Co. 197
Redington, F. B., Co. 104
Reed Fdry. & Mach. Co. 205
Reed-Prentice Co. 126
Reliance Electric & Engrg. Co. 83
Reliance Mfg. Co. 63
Republic Iron & Steel Co. 74
Republic Pipe & Iron Corp. 195
Reynolds Engineering Co. 200
Rhode Island Tool Co. 59
Richardson & Co., Inc. 195
Richey, Browne & Donald, Inc. .204
Richmond Forgings Corp. 41
Richmond Malleable Castings Co. 46
Ridgway, Craig & Son Co. 87
Riter Conley Co. 112
Riverside Steel Casting Co. 44
Rivet Cutting Gun Co. 144
Rivett Lathe & Grinder Co. 124
Robins Conveying Belt Co. 87
Robinson & Orr 195
Robinson Tool Wks., Inc. 197
Rockford Bolt Co. 58
Rockford Drilling Mach. Co. 127
Rockford Iron Works 160
Rockford Malleable Iron Works .. 46
Roebling's, J. A., Sons Co. 68
Roeper Crane & Hoist Works ... 94
Roessing Mfg. Co. 175
Rogers, Brown & Co. 26, 28
Rome Brass & Copper Co. 36
Rooksby, E. J., & Co. 170
Root, B. M., Co. 200
Roots, P. H. & F. M., Co. 116
Rose, Trudeau & Williamson 197
Ross-Meehan Fdries 42
Royersford Fdry. & Mach. Co., Inc. 123
Ruetsch, H. J., Mach Co. 200
Russell, Burdsall & Ward Bolt & Nut Co. 59
Russell Machine Co. 188
Ryan, F. J., & Co. 99
Ryerson, Jos. T., & Son 2, 158

S

Sachsenmaier, Geo., Co. 192
Sacks, Louis, Iron Fdry. 46
Safety Equip. Service Co. 118
St. Louis Coke & Chemical Co. 28
St. Louis Malleable Casting Co. .. 46
Samson Cordage Wks. 69
Samuel, Frank 33
Sandusky Nut Co. 60
Saunders, D., Sons 144
Savage, John A., & Co. 29
Savage Mountain Fire Brick Co. . 31
Savage, W. H. 185
Scaife, Wm. B., & Sons Co. 111
Schieren, Chas. A., Co. 85
Schoder & Lombard Co. 135
Schoedinger, F. O. 198
Schultz, A. L., & Son 83
Schuylkill Forge Co. 40
Schwerdtle Stamp Co. 135
Scovill Mfg. Co. 33
Scranton Forging Co. 40
Scully-Jones & Co. 193
Scully Steel & Iron Co. 21
Semet-Solvay Co. 234
Seneca Iron & Steel Co. 23
Seneca Wire & Mfg. Co. 67
Sessions Foundry Co. 47
Sessions, J. H., & Son 48
Seyfert's, L. F., Sons, Inc. 186
Seymour Mfg. Co. 36
Seymour Metal Goods Co. 197
Sharon Foundry Co. 42
Sharon Pressed Steel Co. 95
Sharpsville Boiler Works Co. 193
Shepard Elec. Crane & Hoist Co. 88
Shepherd Engrg. Co. 200
Sherritt & Stoer Co., Inc. 180
Sherwood, E. C. 195
Shimer, Samuel J., & Sons, Inc. .. 55
Shippers' Car Line 193
Shoemaker-Satterthwait Bridge Co. 114
Shore Instrument & Mfg. Co. 103
Shuster, F. B., Co. 149
Simonds Mfg. Co., Lockport, N. Y. 12
Simmons Mach. Co., Inc. 181
Simpson Fdry. & Engrg. Co. 205
Sivyer Steel Casting Co. 44
Skinner Chuck Co. 141
Sleeper & Hartley, Inc. 144
Sloan & Zook 106
Sly, W. W., Mfg. Co. 96
Smith Gas Engineering Co. 172
Smith, Geo. H., Steel Casting Co. 45
Smith & Jaffe 193
Smith & Mills Co. 128
Smith, Morton B., Co. 195
Smith & Serrell 84
Smythe, S. R., Co., Inc. 113
Snead Architectural Iron Works .. 14
Snyder, W. P., & Co. 29
Sotter Bros., Inc. 112
South Bend Lathe Works 126
Southern Ferro Alloys Co. 26
Southern Iron & Equipment Co. .195
Southwark Fdry. & Mch. Co. 151
Spencer Turbine Co. 172
Spencer's, I. S., Sons Co. 46
Spindler & Deringer 201
Springfield Aluminum Plate & Cast. Co., The 205
Springfield Mfg. Co. 130
Standard Alloys Co. 31
Standard Appraisal Co. 113
Standard Elec. Tool Co. 142
Standard Engrg. Co. 155
Standard Gauge Steel Co. 11
Standard Scale & Supply Co. 135
Standard Screw Products Co. 52
Standard Stamping Co. 197
Standard Steel Wks. Co. 6
Standard Tin Plate Co., The 23
Stanley Belting Corp. 85
Stanley Works 23
Star Expansion Bolt Co. 58
Starrett, L. S., Co. 140
Steel & Tube Co. of America 20
Steele & Condit, Inc. 200
Steiner Bros. 140
Steiner, Emil E., & Co., Inc. 100
Steinle Turret Machine Co. 124
Sterling Blower Co. 116
Sterling Grinding Wheel Co. 131
Sterling Wheelbarrow Co. 97
Stewart Furnace Co., The 28
Stewart, Paul, & Co. 190, 192
Stickley, E. B., Mchry. Co. 185
Stockbridge Machine Co. 128
Stocker-Rumely-Wachs Co. 184
Stokvis, R. S., & Sons 181
Stoll, D. H., Co. 159
Stone & Webster, Inc. 113
Storms Drop Forging Co. 41
Stow Manufacturing Co. 130
Stowe-Fuller Co., The 30
Stowell Co., The 45
Straight Line Engine Co., Inc. ..204
Strand, N. A., & Co. 131
Straub-Atkinson Coal & Coke Co. . 30
Streine Tool & Mfg. Co. 156
Strieby & Foote Co. 42
Stroud, Arva 130
Struthers Furnace Co. 28
Stupakoff Laboratories 103
Sturtevant, B. F., Co. 117
Sullivan Machinery Co. 170
Summerill Tubing Co. 76
Sun Co. 106
Superior Metal Products 198
Superior Steel Corp. 25
Surface Combustion Co. 98
Swedish Crucible Steel Co. 102
Swett, A. L., Iron Works 204
Swind Machinery Co. 182
Swindell, Wm., & Bros. 113

T

Tate-Jones & Co., Inc. 100
Taylor, Chas., Sons Co. 31
Taylor & Fenn Co. 122
Taylor, N. & G., Co. 23
Taylor-Wason Corp. 14
Taylor Welder Co., The 104
Taylor-Wilson Mfg. Co. 77
Temple Malleable Iron & Steel Co. 46
Tennessee Coal, Iron & R. R. Co. 10
Terry Mfg. Co. 94
Texas Co., The 106
Thomas Spacing Machine Co. 184
Thompson Bros. 84
Thompson Grinder Co. 130
Thomson Electric Welding Co. ..106
Thomson Spot Welder Co. 106
Thorn, J. S., Co. 198
Tioga Steel & Iron Co. 38
Tippett & Wood 111
Titanium Alloy Mfg. Co. 32
Tod-Stambaugh Co. 29
Toledo Crane Co. 91
Toledo Machine & Tool Co. 160
Topping Bros. 62
Torrington Co. 52
Torrington Mfg. Co. 166
Townsend Co. 62
Transue & Williams Steel Forging Corp. 41, 50
Triumph Electric Co. 83
Traut & Hine Mfg. Co. 197
Troy Engine & Mch. Co. 170
Troy Fdry. & Mach. Co., Inc. 47
Tudor Boiler Mfg. Co. 111
Turner Mach. Co. 201
Turner & Seymour Mfg. Co. 203
Tutein, E. Arthur, Inc. 28

U

Under-Feed Stoker Co. of Amer. .168
Underwood, H. B., Corp. 170
Union Chain & Mfg. Co. 86
Union Drawn Steel Co. 8
Union Mfg. Co. 141
Union Switch & Signal Co. 41
United Engineering & Fdry. Co. .163
United Hammer Co. 164
United Smeltg. & Alum. Co., Inc. 36
U. S. Cast Iron Pipe & Fdry. Co. 74
U. S. Ferro Alloys Corp. 33
U. S. Molding Machine Co. 96
U. S. Nickel Co. 36
U. S. Silica Co. 96
Upson-Walton Co. of N. Y., The. 68
Utica Steam Engine & Boiler Works, The 201

V

V. & O. Press Co. 169
Valley Iron Works 204
Valley Mould & Iron Corp. 11
Vanadium-Alloys Steel Co. 17
Vandyck Churchill Co. 133
Vaughn Machinery Co., The 147
Veeder Mfg. Co. 103
Vermillion Malleable Iron Co. 46
Victor Tool Co. 136
Virginia Bridge & Iron Co. 114
Vogt Bros. Mfg. Co., Inc. ..200, 206
Vom Baur, C. H. 160
Vulcan Crucible Steel Co. 16
Vulcan Iron Works, Chicago, Ill. .162
Vulcan Iron Works, Inc., Jersey City, N. J. 203

W

Wagner, E. R., Mfg. Co. 48
Walcott Lathe Co. 127
Walker, Wm. J., Steel Co. 23
Wall, P. Mfg. Supply Co. 110
Walter-Wallingford & Co. 33
Waltham Screw Co. 198
Walworth Mfg. Co. 1, 174
Wangler, Jos. F., Boiler & Sheet Iron Works 206
Wanted Section 196
Wapakoneta Mach. Co. 156
War Dept. Ordnance Dept. 134
Wardlow, S. & C. 17
Ward's, Edgar T., Sons Co. 24
Warner & Swasey Co. 125
Warren City Tank & Boiler Co. .111
Warren Fdry. & Mach. Co. 76
Washburn Wire Co., N. Y. C. 68
Washington Co. 189
Waterbury Farrel Fdry. & Mach. Co. 149
Waterville Mach. Works 187
Watson-Stillman Co. 175
Wayne Machinery Co. 188
Wayne Tool Mfg. Co. 136
Webb Wire Works 67
Wellman Bronze Co. 48
West Leechburg Steel Co. 24
Western Drop Forge Co. 40
Western Screw Products Co. 58
Wetherell Bros. Co. 14
Wheel Truing Tool Co. 132
Wheeler Condenser & Engrg. Co. .110
Wheeling Mold & Fdry. Co. 43
Wheeling Steel Prod. Co. 27
Whipp Mach. Tool Co. 128
Whitcomb-Blaisdell Machine Tool Co. 126
Whitcomb, George D., Co. 95
White, A. D., Machinery Co. 186
Whiting Corp. 89
Whitman & Barnes Mfg. Co. 136
Whitney Mfg. Co., The 86
Whiton, D. E., Mach. Co. 141
Wickes Boiler Co. 168
Wickes Bros. 135
Wickes Machinery Co. 189
Wickwire Bros. 70
Wickwire Spencer Steel Corp. .. 26
Wilcox, D., Mfg. Co. 40
Wilfong, M. F., Iron Wks. Co. .102
Williams & Co., Inc. 36
Williams, J. H., & Co. 142
Wiliams Tool Corporation 146
Williams, White & Co. 156
Wilmarth & Morman Co. 131
Wilmington Fibre Specialty Co. .175
Winterer, Herman L. 182
Witherbee, Sherman & Co. 29
Witherow Steel Co. 15
Wollaston Fdry. Co. 203
Wood, Alan, Iron & Steel Co. 28
Wood, John, Mfg. Co. 111
Wood, R. D., & Co. 173
Woodard Machine Co. 80
Woodhouse Chain Works 86
Wood's, T. B., Sons Co. 84
Worcester Pressed Steel Co. 48
Worcester Stamped Metal Co. 48
Worden-Allen Co. 115
Wright Mfg. Co. 92
Wrought Washer Mfg. Co. 63
Wyckoff Drawn Steel Co. 9

X

Xardell Corp., The 198

Y

Yoder Co. 156
York Elec. & Mach. Co. 200
Young Bros. Co. 101
Youngstown Fdry. & Mach. Co. .166
Youngstown Sheet & Tube Co. 22

Z

Zeh & Hahnemann 160
Zelnicker, Walter A., Supply Co. .195



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